IBM OpenPages GRC
Version 7.4.0

Installation and Deployment Guide

Note

Before using this information and the product it supports, read the information in “Notices” on page 371.

Product Information

This document applies to IBM OpenPages GRC Version 7.4.0 and may also apply to subsequent releases.

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Chapter 1. Introduction

IBM® OpenPages® GRC Platform is an integrated governance, risk, and compliance platform that enables companies to manage risk and regulatory challenges across the enterprise.

Audience

The *IBM OpenPages GRC Installation and Deployment Guide* provides instructions for installing and deploying the OpenPages GRC Platform application.

Please read the following important information regarding IBM OpenPages GRC documentation

IBM maintains one set of documentation serving both cloud and on premise IBM OpenPages GRC deployments. The IBM OpenPages documentation describes certain features and functions which may not be available in OpenPages GRC on Cloud. For example, OpenPages GRC on Cloud does not include integration with IBM Business Process Manager and certain administrative functions.

If you have any questions about the functionality available in the product version that you are using, please contact IBM OpenPages Support via the IBM Support Community.

Finding information

To find product documentation on the web, including all translated documentation, access IBM Knowledge Center (http://www.ibm.com/support/knowledgecenter).

Accessibility features

Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products. OpenPages GRC documentation has accessibility features. PDF documents are supplemental and include no added accessibility features.

Installation locations

The installation directory is the location of product artifacts after a package, product, or component is installed. The following table lists the conventions that are used to refer to the installation location of installed components and products:

Important: Directory locations that contain spaces are not supported. IBM OpenPages GRC Platform or any software that is used by it must not be installed into a directory with spaces. For example, do not install database server, database client, or application server software into the `Program Files` directory.

Table 1: Variable notations for installation directories

Directory	Description
<installation_server_home>	The directory where the IBM OpenPages GRC Platform installation server is installed. For example: • On Windows: `c:\IBM\OPInstall\OP_<version>_Installer` • On AIX® and Linux: `/home/opuser/IBM/OPInstall/OP_<version>_Installer`

Table 1: Variable notations for installation directories (continued)	
Directory	**Description**
<agent_home>	The directory where the IBM OpenPages GRC Platform installation agent is installed on a remote server. For example: • On Windows: `c:\IBM\OPAgent` • On AIX and Linux: `/home/opuser/IBM/OPAgent`
<OP_HOME>	The directory where OpenPages GRC Platform is installed. For example: • On Windows: `c:\OpenPages` • On AIX and Linux: `/opt/OpenPages`
<ORACLE_HOME>	The installation location of the Oracle database server. For example: • On Windows: `C:\app\Administrator\product\12.1\client_1` • On AIX and Linux: `/home/oracle/app/oracle/product/12.1/client_1`
<DB2_HOME>	The installation location of the IBM DB2® software. For example: • On Windows: `C:/IBM/SQLLIB` • On AIX and Linux: `/home/db2inst1/sqllib`
<WAS_HOME>	The installation location of IBM WebSphere® Application Server. For example: • On Windows: `C:\IBM\WebSphere\AppServer` • On AIX and Linux: `/opt/IBM/WebSphere/AppServer`
<COGNOS_HOME>	The installation location of Cognos Analytics. For example: • On Windows: `C:\IBM\cognos\analytics` • On AIX and Linux: `/usr/IBM/cognos/analytics`
<JAVA_HOME>	The installation location of your Java™ Runtime Environment (JRE) or your IBM Java Software Development Kit (SDK). SDK example on an application server where IBM WebSphere is installed: • On Windows: `C:\IBM\WebSphere\AppServer\Java\8.0` • On AIX and Linux: `/opt/IBM/WebSphere/AppServer/Java/8.0` JRE example on a reporting server where Cognos Analytics is installed: • On Windows: `C:\`*`<COGNOS_HOME>`*`\jre` • On AIX and Linux: `/`*`<COGNOS_HOME>`*`/jre`

Table 1: Variable notations for installation directories (continued)	
Directory	**Description**
<CC_HOME>	The installation location of OpenPages GRC Platform CommandCenter. For example: • On Windows: `C:\OpenPages\CommandCenter` • On AIX and Linux: `/opt/OpenPages/CommandCenter`
<SEARCH_HOME>	The installation location of global search. The *<SEARCH_HOME>* directory contains the `opsearchtools.jar`, Apache Solr, and other global search files. The global search indexing directory is also stored in the *<SEARCH_HOME>* directory. For example: • On Windows: `c:\OpenPages\OPSearch` • On AIX and Linux: `/opt/OpenPages/OPSearch` In the installation app, you specify the *<SEARCH_HOME>* directory in the **Search Home Directory** field on the **Search Server** card.

Changes to the installation process

If you installed previous versions of IBM OpenPages GRC Platform, you will notice many differences in version 7.4 and later. The installation process has changed to make it easier to install and upgrade IBM OpenPages GRC Platform.

Phases of the installation process

In version 7.4 and later, the installation process is divided into three phases:

- Validation: After you enter the details for your deployment, you validate them. The installation server checks your deployment for any issues that need to be resolved before you continue with the installation. The installation server also installs and starts agents on the remote servers that are in your deployment.
- Installation: During this phase, the installation server stages the assets onto the servers in your deployment.
- Configuration: During this phase, the installation server sets up and configures the OpenPages components.

You complete each phase before continuing to the next phase.

Upgrade process changes

In previous versions, upgrades were done in-place, onto your existing OpenPages environment. In version 7.4 and later, an upgrade begins with a fresh installation. You then upgrade the database and migrate files.

When you do the fresh installation, you can use your existing hardware, but the software must be installed into new directories. You cannot install on top of your existing OpenPages directory structures.

When you upgrade the database, you can choose to upgrade the database on your existing database server or use a new database server.

New installation server component

In version 7.4 and later, the installation server replaces the IBM OpenPages Administrative Console. The installation server automates many tasks that were done manually in previous versions. The installation server also provides more validation, more flexibility in configuring your deployment, and improved error logging.

You can install and upgrade multiple environments with a single installation server. You can install the installation server on a separate computer or on a server in an OpenPages environment. In addition, you do not need to install IBM Installation Manager to install the installation server. The installation server includes its own installer.

The installation server provides a web application, called the installation app, which you can use to install and upgrade OpenPages. You can also install and upgrade in silent mode. The installation app replaces the OpenPages Administrative Console user interface.

Figure 1: Installation server

Tip: You can log out and close the installation app during the **Install** and **Configure** processes. The processes continue to run. When you log in to the installation app again, the app shows the status of your deployment.

Agents

In previous versions, you needed to install `OPAdminConsoleRemote` on each server in your deployment. In version 7.4 and later, the installation server installs the agent software and starts the agents on remote servers automatically. The agent software is not needed on the database server.

To install the agents on remote servers, you must have access to an account on the remote server. The account must have the necessary permissions to install and run software on the remote server. Or, you can install the agents manually on remote servers.

Deployment Manager

In version 7.4 and later, the IBM WebSphere deployment manager for OpenPages is a separate component. You can install the deployment manager on its own computer or on the same computer as an application server.

Ports

In previous versions, default ports were used. In version 7.4 and later, you can set custom port numbers for IBM WebSphere, Cognos Analytics, and other components when you configure your deployment.

Shared cell deployments

In version 7.4 and later, you can deploy OpenPages into an existing IBM WebSphere cell.

Rollback operations

In previous versions, if a failure occurred during an operation, the entire process failed. In version 7.4 and later, you can use the **Rollback** option for each server to roll back the operation that caused the error. This feature enables you to resolve issues more quickly and resume the installation from the point of failure.

Migrating files during an upgrade

In version 7.4 and later, you can choose the files and directories that you want to migrate when you upgrade OpenPages.

Redesigned database scripts

The database scripts that are used to install and upgrade the OpenPages database have been redesigned. The redesigned scripts provide the following enhancements:

- The database installation and upgrade scripts incorporate more pre- and post-validation checks than in previous versions.
- The scripts now separate DBA and non-DBA tasks.

  When you install the database, you now have the following options:

  – You can use the OpenPages installation app to create the database objects. The user who installs OpenPages must provide DBA credentials.
  – A database administrator can run the scripts that require DBA privileges, and then another user can use the OpenPages installation app to complete the installation.
  – You can create all of the objects required for the database manually before you install OpenPages. A database administrator must run the scripts that require DBA privileges. A schema user can run the other scripts.

  When you upgrade the database, a database administrator runs the scripts that require DBA privileges. A user who is not a database administrator can run the scripts that do not require DBA privileges.
- Oracle Transparent Data Encryption is now supported.
- You can customize the schema name (Oracle) and table space names (Oracle and IBM DB2) when you create the OpenPages database.
- You no longer need to run the `sysdba-xa-views-wrapper.sql` script. The `sydba-create-xa-views.sql` and `sysdba-xa-grants.sql` scripts are also no longer used.

Validation

In version 7.4 and later, additional validation is done before you install OpenPages. The installation server validates each server in your deployment before the installation process begins.

The additional validation prevents possible deployment failures caused by configuration issues, unmet prerequisites, and insufficient permissions. The additional validation enables you to identify and resolve issues up-front, which can save you time and effort.

For example, the installation server checks if ports are occupied. If a port is occupied, you can fix the issue before you install OpenPages. In previous versions, the ports were not validated. If a port was occupied, the deployment would fail.

Validation messages are displayed on server cards. When you click the card, an error icon is displayed next to the field where the error occurs.

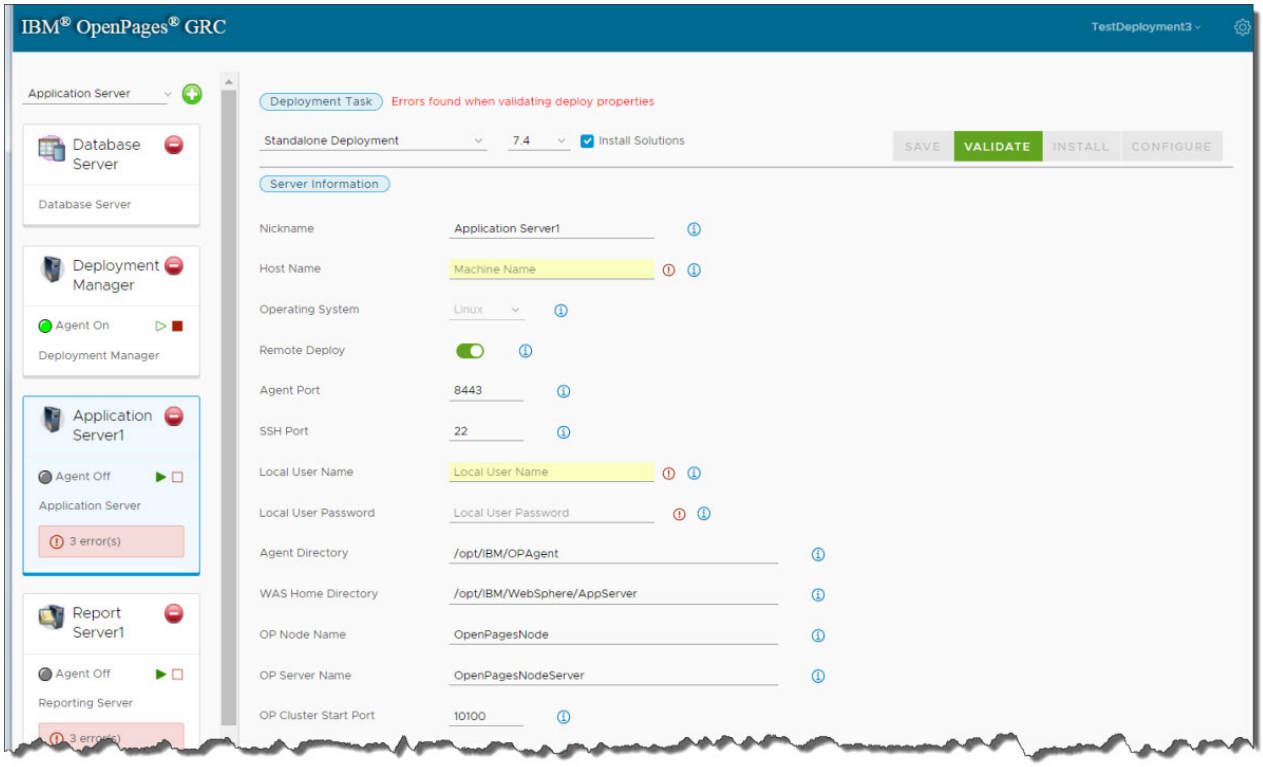


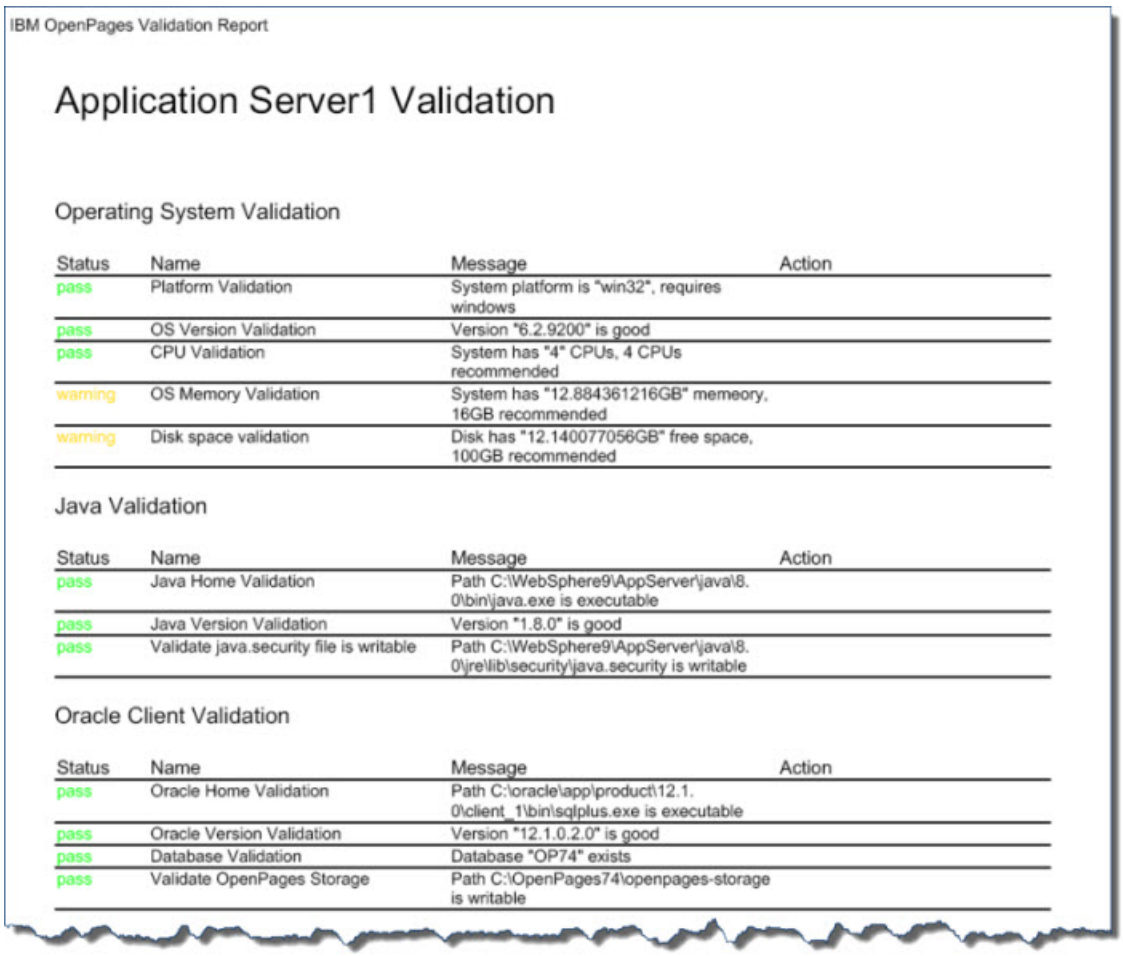
Figure 2: Example of error notifications – three fields are empty on the application server card

Log files and reports

The installation server provides more logging and exception handling.

- You can validate your deployment before you begin the installation process.
- You can download the validation results in a report to see the details.
- When the installation server encounters an exception, the error is displayed in the user interface. You can download the log file.
- You can view log files for each phase of the installation process as well as for each server in your deployment.

The following image shows an example of a pre-installation validation report. The page about `Application Server1` is displayed. No errors were found. Two warnings indicate that values are below the recommended values. Warnings do not need to be fixed before you install OpenPages.



IBM OpenPages Validation Report

Application Server1 Validation

Operating System Validation

Status	Name	Message	Action
pass	Platform Validation	System platform is "win32", requires windows	
pass	OS Version Validation	Version "6.2.9200" is good	
pass	CPU Validation	System has "4" CPUs, 4 CPUs recommended	
warning	OS Memory Validation	System has "12.884361216GB" memeory, 16GB recommended	
warning	Disk space validation	Disk has "12.140077056GB" free space, 100GB recommended	

Java Validation

Status	Name	Message	Action
pass	Java Home Validation	Path C:\WebSphere9\AppServer\java\8.0\bin\java.exe is executable	
pass	Java Version Validation	Version "1.8.0" is good	
pass	Validate java.security file is writable	Path C:\WebSphere9\AppServer\java\8.0\jre\lib\security\java.security is writable	

Oracle Client Validation

Status	Name	Message	Action
pass	Oracle Home Validation	Path C:\oracle\app\product\12.1.0\client_1\bin\sqlplus.exe is executable	
pass	Oracle Version Validation	Version "12.1.0.2.0" is good	
pass	Database Validation	Database "OP74" exists	
pass	Validate OpenPages Storage	Path C:\OpenPages74\openpages-storage is writable	

Figure 3: Example of a validation report showing results for an application server

IBM Java 8 is provided with Cognos Analytics

In previous versions, you needed to install Java on each reporting server in your deployment. Cognos Analytics V11 includes IBM Java 8.

IBM HTTP Server for Cognos Analytics

If you use IBM HTTP Server to load balance the reporting servers, note that the configuration method has changed. See the Cognos Analytics documentation for details.

Oracle database alias

If you use the same Oracle database instance for OpenPages and Cognos®, use the same database alias for both OpenPages and Cognos.

When you configure the database connection information, you can choose to use either the SID or the Service Name.

IBM Business Process Manager integration

In version 7.3, the integration of IBM Business Process Manager with OpenPages was done manually by running a script. In version 7.4 and later, you can still do the integration manually, but you also have the option to use the installation server to do the integration.

Chapter 2. What's new?

New and changed features affect the installation and configuration of IBM OpenPages GRC Platform. Use this information to help you plan your upgrade and deployment strategies and the training requirements for your users.

For information about all new features for this release, see the *IBM OpenPages GRC New Features Guide*.

For an up-to-date list of environments that are supported by OpenPages GRC Platform, see the IBM Software Product Compatibility Reports (http://www.ibm.com/support/docview.wss?uid=swg27039467).

New features in version 7.4.0

The new features in IBM OpenPages GRC Platform version 7.4.0 are described in the following sections.

Software versions

For details about supported software, see IBM OpenPages GRC Platform Supported Environments.

Table 2: Changes to supported software versions

Software	Conformance changes
Linux	Red Hat Enterprise Linux (RHEL) 6.6 (and higher minor releases and updates) is now supported in addition to RHEL 7.0. RHEL 6.5 is no longer supported.
AIX	AIX 6.1 is no longer supported. AIX 7.1 or higher is supported.
IBM WebSphere Application Server Network Deployment	IBM Websphere 9.0.0.3 (or higher fix packs) is now supported. IBM Websphere 8.5.5.x is no longer supported.
IBM DB2	DB2 ESE 11.1.1.1 (or higher editions/fix packs) is supported in addition to DB2 ESE 11.1.0.0.
Oracle	Oracle 11g is no longer supported. Oracle SE 12.1.0.2 and later fix packs is supported.
IBM Java SDK/JRE	Version 8.0.4.1 and later fix packs is supported. Java 1.7 is no longer supported.
Microsoft Internet Explorer	Internet Explorer 11 in native mode is supported. Internet Explorer 9 and 10 and Internet Explorer compatibility mode are no longer supported. The Force Internet Explorer Compatibility Mode registry setting has been removed and is disregarded during upgrade. Google Chrome is also supported.

Table 2: Changes to supported software versions (continued)	
Software	**Conformance changes**
IBM Cognos	11.0.7 Interim Fix 1001 (and higher 11.0.x continuous releases) is now supported. IBM Cognos Business Intelligence 10.2.2.x is no longer supported.
Fujitsu	Fujitsu Interstage BPM is no longer supported.

Administration and serviceability enhancements

For an overview of the changes to the installation process, including the new installation server, see "Changes to the installation process" on page 3.

Table 3: Administration and serviceability enhancements	
For new information about...	**See this topic...**
The new installation app makes it easier to install IBM OpenPages GRC Platform.	Chapter 5, "OpenPages installation server and app," on page 33
The installation process has been redesigned.	Chapter 6, "Install IBM OpenPages GRC Platform," on page 45
The upgrade process has been redesigned.	Chapter 7, "Upgrade IBM OpenPages GRC Platform," on page 167
Shared cell deployments	"Considerations for shared cell deployments" on page 124
Oracle Transparent Data Encryption is now supported.	For new installations of IBM OpenPages GRC Platform, see "Oracle Transparent Data Encryption (TDE) for fresh installations" on page 114. For upgrades, see "Oracle Transparent Data Encryption (TDE) for upgrade customers" on page 238.
The SQL for security rules has changed.	In certain security rules, the product was improperly extending or restricting access to users when the conditions of the security rule were met by data in past reporting periods, even when the user was interacting with data in the current reporting period. This issue was addressed by a fix to the security rules SQL that had this problem. When the fix is applied, security rule conditions are evaluated against data in the correct reporting period only. See "Updating security rules" on page 185.

New features in version 7.3.0.2

The new features in IBM OpenPages GRC Platform, version 7.3.0.2, are described in the following sections.

Integration with IBM Regulatory Compliance Analytics

You can import data from IBM Regulatory Compliance Analytics into IBM OpenPages GRC Platform. To enable this functionality, you need to do some post-installation tasks.

For more information, see Chapter 17, “IBM Regulatory Compliance Analytics,” on page 307.

New features in version 7.3.0.1

The new features in IBM OpenPages GRC Platform, version 7.3.0.1, are described in the following sections.

IBM OpenPages Vendor Risk Management solution loader

The IBM OpenPages Vendor Risk Management solution loader enables customers who upgraded from a fresh 7.2 installation to version 7.3.0.1 to load the objects, relationships, and profiles to use the IBM OpenPages Vendor Risk Management solution.

If you had a fresh installation of IBM OpenPages GRC Platform version 7.2 with solutions and then upgraded to version 7.3.0.1 or later, use the solutions loader to install IBM OpenPages Vendor Risk Management. You must have the 7.2 solutions schema in your environment. You must also have licensed IBM OpenPages Vendor Risk Management.

UCF connector integration

Use IBM OpenPages GRC SDI Connector for UCF Common Controls Hub to import data from UCF Common Controls Hub into IBM OpenPages GRC Platform.

For more information, see Chapter 14, “IBM OpenPages GRC SDI Connector for UCF Common Controls Hub,” on page 275.

New features in version 7.3.0

New features affect the installation and configuration of IBM OpenPages GRC Platform.

Collect and view logs

The new LogCollector tool provides a command-line interface that you can use to collect log files and diagnostic data from the IBM OpenPages GRC Platform environment.

With the LogCollector tool, you can collect log and diagnostic files from the IBM OpenPages GRC Platform environment and from the IBM OpenPages GRC Platform database.

For more information, see “Collect log files and diagnostic data” on page 342.

Administrative Console application interface runs on Linux

You can now run the IBM OpenPages GRC Platform Administrative Console application interface on Linux systems. For more information, see “Setting up the installation server on Linux or AIX” on page 34.

Software versions

OpenPages GRC Platform now supports Red Hat Enterprise Linux (RHEL) 7.0 (and higher minor releases and updates). Red Hat Enterprise Linux (RHEL) 6.5 (and higher minor releases and updates) is also supported.

OpenPages GRC Platform requires new versions of some software. If you are upgrading or migrating, you must update your environment to use these versions:

- IBM WebSphere Application Server 8.5.5.9
- If you are using IBM DB2, version 11.1 is required. IBM DB2 version 10.5 is no longer supported.
- If you are using IBM DB2, IBM Cognos Business Intelligence (BI) version 10.2.2.6 or later is required.

Integration with IBM Business Process Manager

The integration of IBM OpenPages GRC Platform with IBM Business Process Manager gives you access to an enhanced level of GRC process automation. IBM Business Process Manager is a leading industry process automation system that is both scalable and highly configurable.

For information about how to integrate IBM Business Process Manager with IBM OpenPages GRC Platform, see the *IBM OpenPages GRC - Business Process Manager Installation Guide*.

New features in version 7.2.0.4

The new features in IBM OpenPages GRC Platform, version 7.2.0.4, are described in the following sections.

Collect and view logs

The new LogCollector tool provides a command-line interface that you can use to collect log files and diagnostic data from the IBM OpenPages GRC Platform environment.

With the LogCollector tool, you can collect log and diagnostic files from the IBM OpenPages GRC Platform environment and from the IBM OpenPagesdatabase.

For more information, see “Collect log files and diagnostic data” on page 342.

New features in version 7.2.0.3

The new features in IBM OpenPages GRC Platform, version 7.2.0.3, are described in the following sections.

Changes to DB2 conformance

Version 7.2.0.3 introduces support for IBM DB2 version 11.1. IBM DB2 10.5.0.5 special_33521 is also supported.

For more information, see supported software environments (http://www.ibm.com/support/docview.wss?uid=swg27039467).

For information about upgrading to IBM DB2 version 11.1, see „Upgrade IBM DB2” auf Seite 58.

New features in version 7.2.0.2

The new features in IBM OpenPages GRC Platform, version 7.2.0.2, are described in the following sections.

OpenPages Loss Event Entry

You can use the new optional, chargeable component, IBM OpenPages Loss Event Entry, to enable users across an organization to quickly create loss events. It is easy to use and task focused for users with no experience with OpenPages.

For more information, see Chapter 16, “Loss Event Entry,” on page 295.

New features in version 7.2.0.1

The new features in IBM OpenPages GRC Platform, version 7.2.0.1, are described in the following sections.

Approval app

The approval app is an optional feature that leverages the power of IBM OpenPages GRC Platform and provides an easy-to-use interface for quickly taking action on a review, approval, or attestation request with confidence and full knowledge of the context surrounding the request. The approval app works with objects that are set up for the configurable lifecycle.

For more information, see Chapter 15, “Approval app,” on page 281.

New features in version 7.2.0

New features affect the installation and configuration of IBM OpenPages GRC Platform.

Software versions

Support for the Oracle 12.1.0.2 database server and database client is now supported in addition to the existing supported versions.

Microsoft Internet Explorer version 11 is now provided, in addition to the existing supported versions.

Google Chrome is now a supported web browser.

OpenPages GRC Platform requires new versions of some software. If you are upgrading or migrating, you must update your environment to use these versions:

- IBM Runtime Environment for Java 1.7.3
- IBM WebSphere Application Server Network Deployment 8.5.5.5
- IBM Cognos Business Intelligence (BI) version 10.2.2.1

IBM WebSphere Liberty Profile 8.5.5.6 is now installed with OpenPages CommandCenter instead of Apache Tomcat. Tomcat is no longer supported.

Two versions of Dojo are now installed when you deploy OpenPages. Dojo 1.8.4 is required for visualization reports and Dojo 1.10.4 is used in the OpenPages application.

Search server

Global search is an optional component that you can install so users can search easily for objects across the entire application. The search server that you install for global search is deployed as part of the OpenPages GRC Platform application from the Administrative Console.

For more information, see “Search server” on page 19.

IBM QRadar integration

IBM QRadar® integration is an optional project that you can install to import offenses from QRadar to OpenPages GRC Platform as incidents.

For more information, see Chapter 13, "QRadar integration," on page 271.

SAML V2.0 single sign-on

You can now configure IBM OpenPages GRC Platform to use SAML V2.0 for single sign-on without the need for custom code and without involvement from IBM Services.

Changed features in version 7.2.0

The following topics describe features that have changed since the last release of IBM OpenPages GRC Platform.

New objects added to profiles

After you upgrade or migrate, new object types are added to the master profiles.

- The Questionnaire subcomponent includes new object types - Questionnaire Template, Questionnaire Assessment, Section Template, SubSection Template, Question Template.
- A new subcomponent, Assessment Program, is added. It includes a new object type - Program.
- The Regulatory Library subcomponent includes a new object type - Regulation Initiative.

For more information, see the *IBM OpenPages GRC Platform Solutions Guide*.

Changes to solutions trigger files

After you upgrade or migrate, the following files are updated:

- Standard solutions classes are removed from the `openpages-ext.jar` file.
- A new file is deployed, `openpages-solutions.jar`, that contains the standard solutions classes.

When you add custom triggers, do not include the class files the `openpages-solutions.jar` file. If you already added custom trigger class files to `openpages-solutions.jar` for the previous release, you can back up the class file before you upgrade, and restore it manually.

New features in version 7.1.0.1

The following topics describe the new features for this release.

Support for Oracle 12.1.0.2 database server

Support for the Oracle 12.1.0.2 database server is now provided in addition to the existing supported versions.

For more information, see "Oracle 12.1.0.2 database server considerations" on page 75.

New features in version 7.1.0

The following topics describe the new features for this release.

Use IBM Installation Manager to install OpenPages GRC Platform solutions

You now use IBM Installation Manager to install, update, and uninstall IBM OpenPages GRC Platform solutions.

Changed features in version 7.1.0

The following topics describe features that have changed since the last release.

IBM JRE for OpenPages GRC Platform is included with the Administrative Console

When you install the IBM OpenPages GRC Platform Administrative Console, IBM Runtime Environment for Java for OpenPages GRC Platform is now installed as well. It is no longer necessary to install Java as a separate component.

REST API security or IBM WebSphere Application Server global security must be enabled

IBM WebSphere Application Server global security is now enabled by default on the application servers when you first install IBM OpenPages GRC Platform.

If you enabled REST API security or WebSphere Application Server global security before upgrading or migrating OpenPages GRC Platform, no further action is required.

If you did not enable REST API security or IBM WebSphere Application Server global security before upgrading or migrating, you must enable REST API security manually.

Migrating OpenPages GRC Platform

The process for migrating from a previous version of IBM OpenPages GRC Platform has changed.

Increased support for concurrent users

IBM OpenPages GRC Platform now supports up to 1000 concurrent users on a single node.

Default folder for adding new child objects

If you upgrade or migrate from IBM OpenPages GRC Platform 7.0, when you create a new object, the system uses the default folder setting to determine in which folder to create child objects.

In previous releases, when the **parent_entity** folder was set as the default folder, child objects were added to the next level parent folder.

In this release, when the **parent_entity** is set as the default folder, new child objects are added to the **parent_entity** folder.

Check the value of this setting after upgrading or migrating to ensure that it is correctly set for your requirements.

For more information, see the *IBM OpenPages GRC Platform Administrator's Guide*.

New features in version 7.0.0

The following topics describe the new features for this release.

Use IBM Installation Manager to install the OpenPages GRC Platform Administrative Console

Use IBM Installation Manager to install, update, and uninstall the IBM OpenPages GRC Platform Administrative Console. Use the Administrative Console to install, configure, and deploy OpenPages components to WebSphere Application Server.

You can run the Administrative Console application interface on computers that are running either Microsoft Windows or Linux operating systems. To run the Administrative Console application interface on Linux, you must perform some additional steps. To use the Administrative Console on AIX operating systems, you must use it in silent mode.

Topology-driven deployments in the IBM OpenPages GRC Platform Administrative Console

The IBM OpenPages GRC Platform Administrative Console provides a topological view of your deployments. You can manage the topology by adding components, such as more application servers to an existing OpenPages GRC Platform deployment.

New deployment wizards in the OpenPages GRC Platform Administrative Console

The IBM OpenPages GRC Platform Administrative Console has changed and now provides new deployment wizards for managing your deployments.

Wizards allow you to create new deployments and upgrade or migrate existing deployments. You can also extend existing OpenPages GRC Platform deployments, such as by adding servers to the deployment.

Embedded guidance for the Next Steps panel in the OpenPages GRC Platform Administrative Console

The **Next Steps** panel displays the status of your IBM OpenPages GRC Platform deployment, and also provides help for completing the next steps in the deployment.

Validation of software prerequisites

The IBM OpenPages GRC Platform Administrative Console provides validation of your software prerequisites, such as installed versions of your database server, database client, WebSphere Application Server, and IBM Cognos Business Intelligence software.

If the software does not meet the minimum requirements, you must update the software before you can proceed with the installation.

Changed features in version 7.0.0

The following topics describe features that have changed since the last release.

Supported software environments

Ensure that you review the software environments that are supported by IBM OpenPages GRC Platform version 7.0. New versions and end of support for various environments can affect your upgrade strategy.

You can review the supported environments by using the IBM Software Product Compatibility Reports (http://www.ibm.com/support/docview.wss?uid=swg27039467).

Silent installations require a deployment properties file

Before you run a silent installation, you must create a `deploy.properties` file, which defines your installation, and identify a deployment folder.

You can create the `deploy.properties` file and the deployment folder from the IBM OpenPages GRC Platform installation app.

Interactive Object Manager loading and status monitoring

Use the **Config** > **OM Load** tab in the IBM OpenPages GRC Platform Administrative Console to view the status, load, and reload Object Manager schema data to your OpenPages database.

IBM Cognos BI Software Development Kit installation no longer required

The IBM OpenPages GRC Platform reporting server no longer requires the IBM Cognos Business Intelligence (BI) Software Development Kit.

Chapter 3. OpenPages GRC Platform overview

You use IBM OpenPages GRC Platform to manage risk and regulatory challenges across the enterprise. OpenPages GRC Platform provides core services and components that span risk and compliance domains. These components include operational risk, policy and compliance, financial controls management, IT governance, internal audit, regulatory compliance management, and model risk governance.

The following diagram shows the architectural components for OpenPages GRC Platform applications. The platform contains the database and key services such as the security framework and reporting framework, and document management. The solutions are configurations that work with the platform.

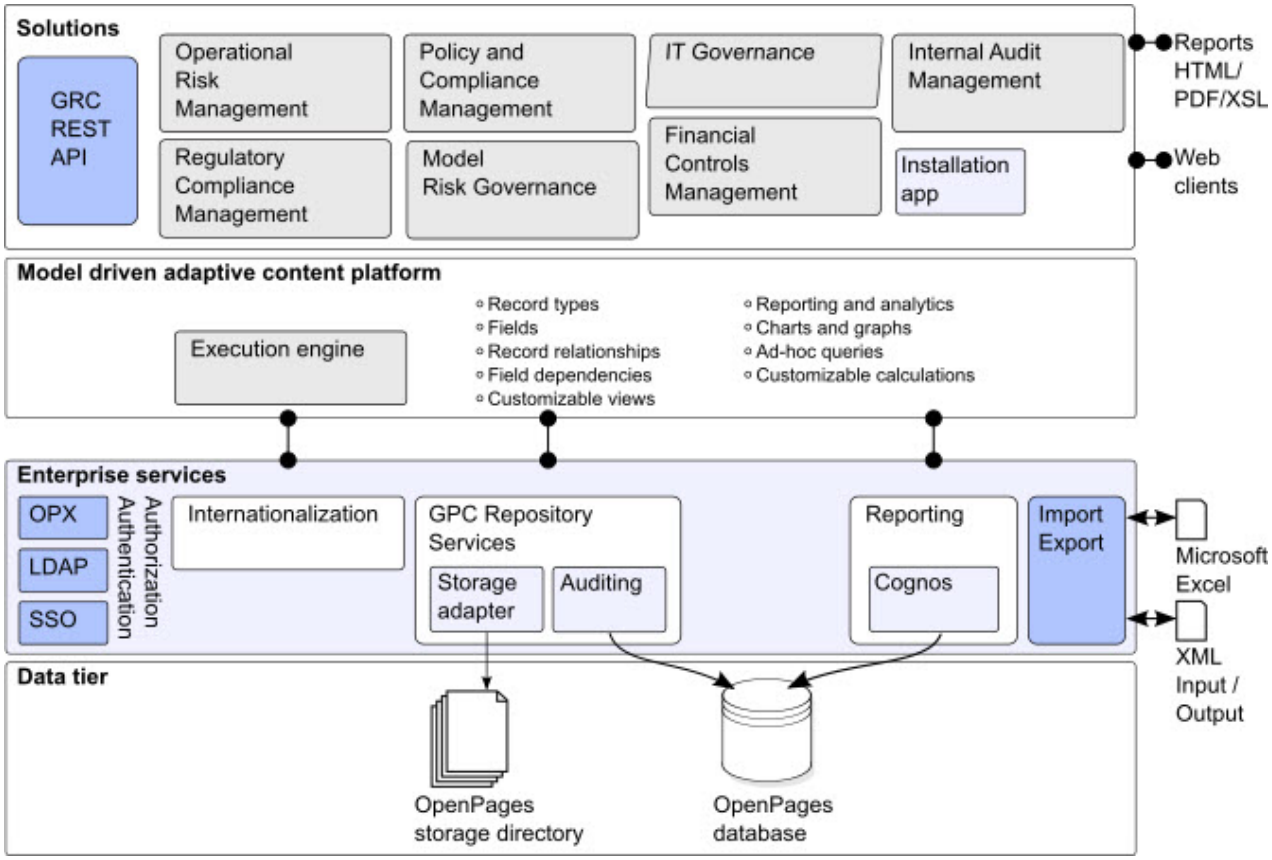


Figure 4: OpenPages GRC Platform components

OpenPages GRC Platform components

IBM OpenPages GRC Platform consists of the following components:

- An installation server, which is used to install IBM OpenPages GRC Platform.
- A database server for hosting the OpenPages GRC Platform repository.
- One or more application servers for hosting the OpenPages GRC Platform application.
- One or more reporting servers for hosting Cognos Analytics and OpenPages GRC Platform CommandCenter.
- Up to one search server (optional) for hosting the OpenPages GRC Platform global search component.
- Up to one workflow server (optional) for IBM Business Process Manager.

After installation, users can access OpenPages GRC Platform from a separate client computer.

Installation server

The IBM OpenPages GRC Platform installation server is required to install and upgrade IBM OpenPages GRC Platform. You can also use it to apply fix packs and interim fixes. The installation server includes a web interface, called the installation app.

The installation server uses installation agents to install components on remote servers, except the database server. The installation server pushes the agent software to the remote servers and starts the agents automatically. For each remote server, you must provide the credentials of a local user who can install and run software on the remote server.

You can set up the installation server on one of the servers in your OpenPages environment or on a separate computer.

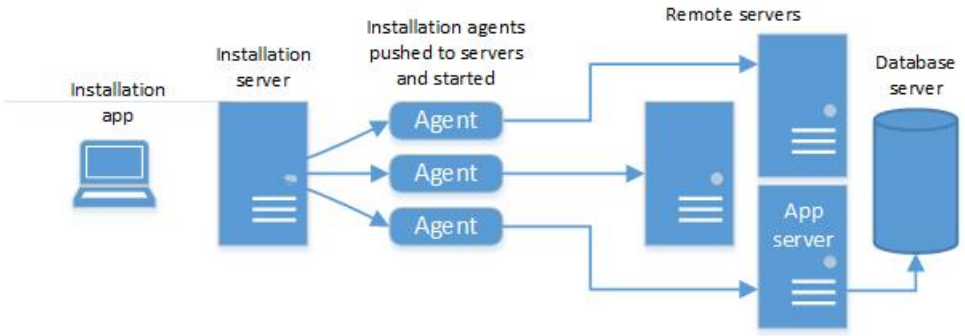


Figure 5: Installation server

Database server

A database server is required to host the IBM OpenPages GRC Platform repository. The repository is a central source for metadata management, versioned application data, and access control.

To install the IBM OpenPages GRC Platform application, you must create an OpenPages database schema, a set of database users, and table spaces.

You can automatically create and configure these components during the OpenPages installation. Alternatively, you can create them manually before you install OpenPages.

You can use an IBM DB2 database or an Oracle database for the OpenPages repository.

Application server

An application server is required to host the IBM OpenPages GRC Platform application.

The IBM OpenPages GRC Platform application server runs the application solutions, and includes the definition and administration of business metadata, UI views, user profiles, and user authorization.

You must install IBM WebSphere Application Server before you install OpenPages GRC Platform.

You can install the IBM WebSphere deployment manager for IBM OpenPages GRC Platform on a separate computer or on the same computer as the application server.

You can also add horizontal and vertical cluster members for the application server.

The admin application server is the main application server for your deployment and is referred to as *appserver1*.

All secondary application servers are known as non-admin application servers.

Reporting server

A reporting server is required to host Cognos Analytics and OpenPages GRC Platform CommandCenter.

Cognos Analytics

Cognos Analytics provides executive dashboards and reports that are designed to accelerate the review and approval of governance, risk, and compliance management (GRCM) information throughout the enterprise. Business users can browse through complex information easily by clicking dashboard elements to drill down through detailed reports.

Cognos Analytics includes a content store, which is a relational database. The content store contains data, such as report specifications, published models, and the packages that contain them. The content store also contains connection information for data sources.

If you install more than one reporting server with OpenPages GRC Platform, you only need one IBM Cognos content store database for all servers. The main server is known as the active reporting server, and all secondary servers are known as standby reporting servers.

For more information on active and standby servers, see the *IBM Cognos Analytics Installation and Configuration Guide*.

OpenPages GRC Platform CommandCenter

OpenPages GRC Platform CommandCenter provides the integration between OpenPages and Cognos Analytics so that you can create and run reports.

It installs the OpenPages Reporting Framework Generator and the OpenPages security provider, creates the OpenPages data sources, and imports the report packages that are supplied with OpenPages.

Search server

OpenPages GRC Platform supports a single search server in the enterprise configuration.

The search server is required to host the OpenPages GRC Platform global search component. Global search is an optional component that you can install so users can search easily for objects across the entire application.

For best performance, install the search server on a separate computer.

Workflow server

You can integrate IBM Business Process Manager with your IBM OpenPages GRC Platform deployment by adding workflow server.

The workflow server is an optional component.

For more information, see the *IBM OpenPages GRC - Business Process Manager Installation Guide*.

Server topology and installation configurations

Before you install IBM OpenPages GRC Platform, plan the server topology. The number of computers you use depends on the expected user loads.

A mix of client and server operating systems are supported. For example, you can install OpenPages GRC Platform application servers on a Windows operating system and install the OpenPages database on Linux or AIX operating systems. You can also install the OpenPages application servers on Linux or AIX and install the OpenPages database on Windows.

Use the following guidelines to plan your server topology.

Very light loads for proof of concept testing and demos

If you want to install OpenPages to see new features or to develop a proof of concept, you can use Docker to install OpenPages. For more information, see Appendix B, “Install OpenPages by using Docker,” on page 325.

Light loads

For light user loads, you can use one application server, one reporting server, a server for the deployment manager, and a database server.

If you are installing a search server, install it on a separate computer.

This topology is typical in a testing or staging environment.

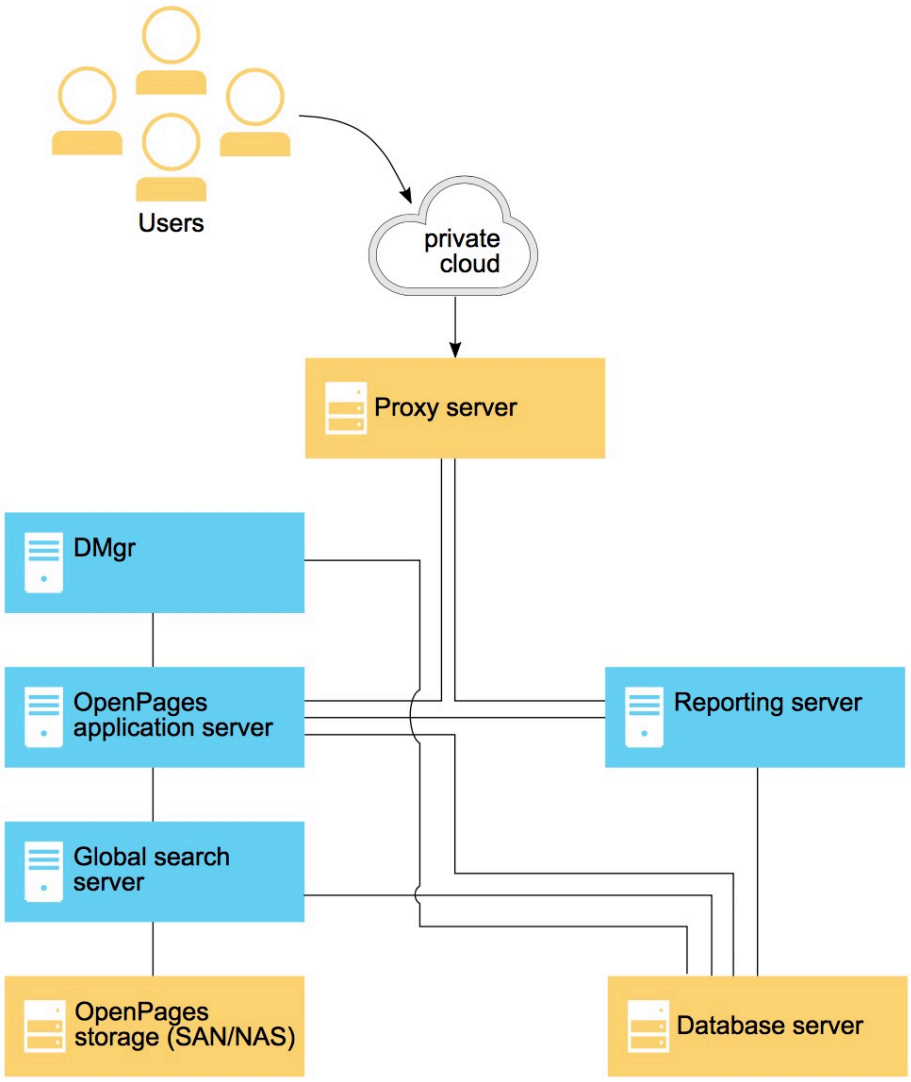


Figure 6: Topology for test environments or light user loads

If you want to integrate IBM Business Process Manager with IBM OpenPages GRC Platform, use a separate computer for IBM Business Process Manager.

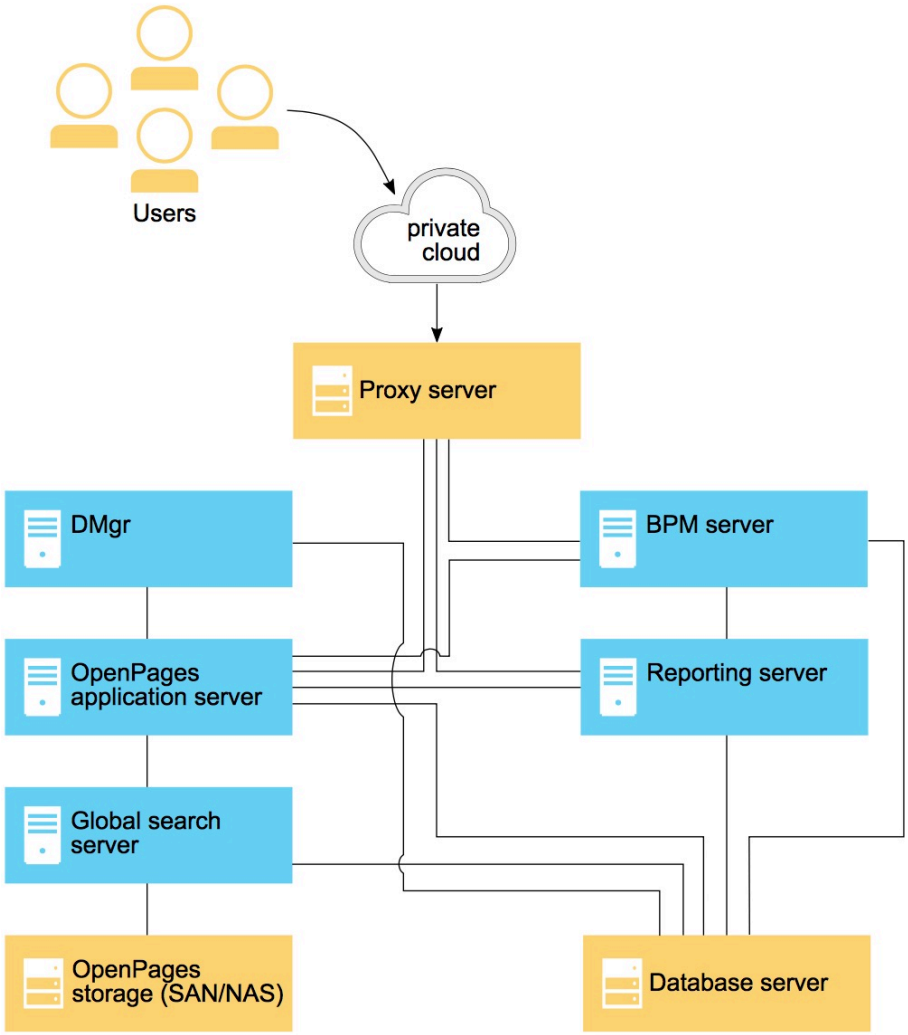


Figure 7: Topology for light user loads with a workflow server for IBM BPM

Moderate to high loads

For moderate to high loads, set up a clustered OpenPages GRC Platform environment. By adding vertical or horizontal cluster members to the environment, you can increase scalability. Scaling requires that you use a load balancer to distribute the incoming client requests.

You can scale application servers horizontally or vertically by adding cluster members. You can also scale the reporting server by adding horizontal cluster members.

You can install the deployment manager on the same computer as the primary application server (`appserver1`). Or, for added scalability, you can install the deployment manager on a separate computer.

If you are installing a search server, install it on a separate computer.

The following diagram shows an example of using horizontal cluster members for the application server and for the reporting server. A load balancer distributes incoming requests to horizontal cluster members.

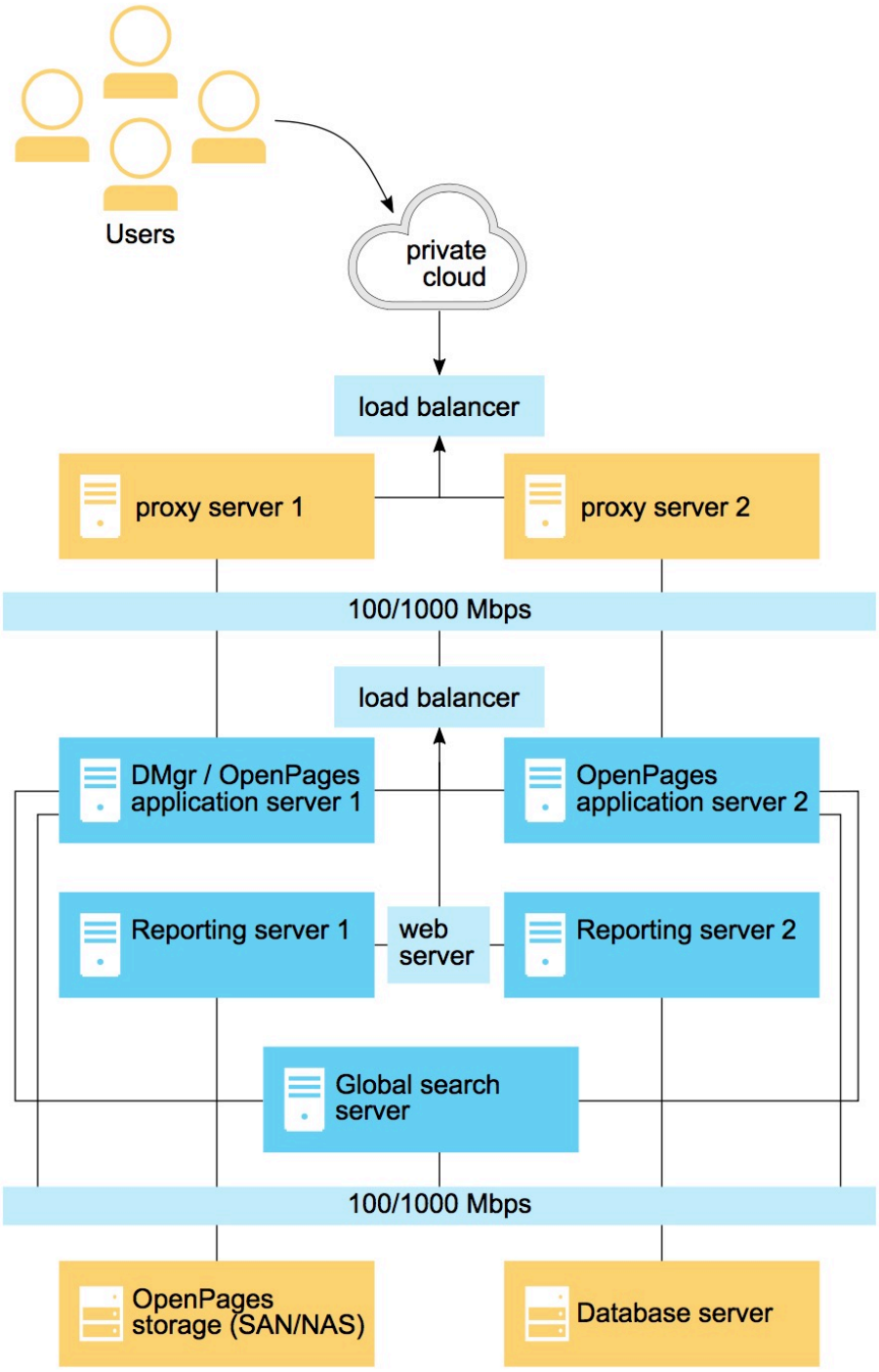


Figure 8: Topology for moderate to high user loads

If you are installing a workflow server, install it on a separate computer.

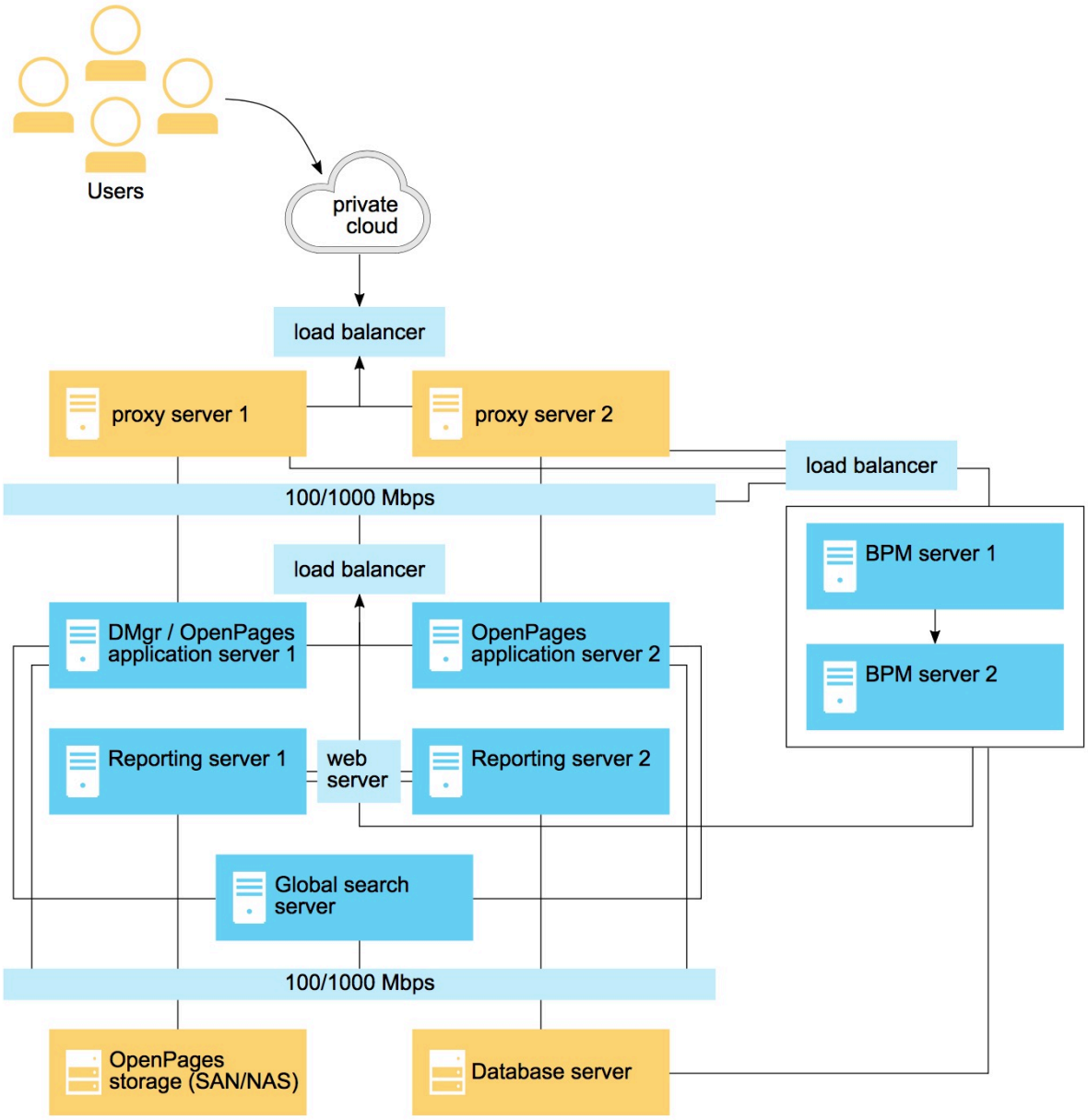


Figure 9: New medium load diagram with BPM

Clustered environments

A clustered environment consists of multiple IBM OpenPages GRC Platform application servers (known as cluster members) running simultaneously to provide increased scalability.

You can set up a vertical cluster with multiple cluster members running on a single computer. You can also set up a horizontal cluster with multiple cluster members running on different computers.

When you set up a clustered environment, load balancing is required to distribute incoming client requests across the members. This configuration allows the IBM OpenPages GRC Platform application to scale as the number of concurrent users increases.

You can also scale the reporting server horizontally by installing additional reporting servers. You must configure additional Cognos dispatchers to ensure that the incoming requests are distributed across multiple servers.

Configure clustered environments

To accommodate increased user loads, you can scale the application servers and reporting servers in your IBM OpenPages GRC Platform environment.

Scaling application servers

You can scale application servers horizontally or vertically by adding cluster members to the OpenPages environment. A cluster member consists of an instance of the OpenPages application server. Each member runs on a different port.

When you scale, load balancing is required to distribute the incoming requests across the members.

For more information on adding horizontal and vertical cluster members to the OpenPages environment, see the *IBM OpenPages GRC Administrator's Guide*.

Scaling the reporting server

You can scale the reporting server horizontally by installing more reporting servers. You must configure the additional Cognos dispatchers to ensure that the incoming requests are distributed across the multiple servers.

Creating a clustered environment

The process to create a clustered OpenPages environment is summarized here:

1. Install and configure the admin application server, each application server, and the reporting server as a stand-alone system.

   If you are using more than one reporting server, ensure that you stop all standby reporting servers when you install the active reporting server.
2. Configure each system for load balancing.

   Set up the load balancer on the OpenPages application server or on an external system.

   You can deploy a hardware or software load balancer. The load balancer must support session affinity and port-based URL routing.

Chapter 4. Installation prerequisites

Ensure that you have installed the prerequisite software and hardware before you install IBM OpenPages GRC Platform.

Software prerequisites

To ensure that your product works properly, apply all minimum required operating system patches, and use only the supported versions of third-party software. Review the prerequisite software before installing IBM OpenPages GRC Platform.

You can review the supported prerequisite software by using the IBM Software Product Compatibility Reports (www.ibm.com/support/docview.wss?uid=swg27039467).

Prerequisite software for all servers

Before you install IBM OpenPages GRC Platform, ensure that the prerequisite software is installed on each server in your environment.

The following table lists the third-party software that must be installed on each computer you are using for the database server, all application servers, reporting servers, and the search server.

For more information, see IBM OpenPages GRC Platform Supported Environments (http://www-01.ibm.com/support/docview.wss?uid=swg27039467).

Table 4: Software prerequisites for all Windows computers

Requirement	**Specification**
Operating system	Microsoft Windows Server 2012 Standard Edition Microsoft Windows Server 2012 R2 Standard Edition
Web browser	Microsoft Internet Explorer 11, Native mode Google Chrome 46 or later
File compression utility	For example, WinZip or 7-Zip
PDF reader	Adobe Acrobat

Table 5: Software prerequisites for all AIX or Linux computers

Requirement	**Specification**
Operating system	Linux: • Red Hat Enterprise Linux (RHEL) Server 6.6 • Red Hat Enterprise Linux (RHEL) Server 7.x AIX 7.1
File compression utility	For example, GNU compression utility (`gtar`)

Note: If you are using Red Hat Enterprise Linux 7.2, note the following known issue https://access.redhat.com/solutions/2062273. To fix the issue, edit the `/etc/systemd/logind.conf` file, set `RemoveIPC=no`, and then restart the corresponding service or reboot.

Prerequisite software for the installation server

The following table provides the software requirements for the installation server.

You can install the installation server on a separate computer or on a computer in your IBM OpenPages GRC Platform environment, such as the admin application server.

After you install the installation server, you can use the OpenPages installation app to create and manage deployments. For more information, see Chapter 5, "OpenPages installation server and app," on page 33.

Table 6: Software prerequisites for the installation server computer

Requirement	Specification
IBM Runtime Environment for Java 8	IBM Java JRE 8.0_64 IBM JRE is available on the IBM OpenPages GRC Platform installation media. Install the IBM Runtime Environment for Java (IBM JRE) and set up the system environment variables for Java on the installation server computer before you install the installation app.
Windows PowerShell	If you are using Microsoft Windows, then Windows PowerShell version 4.0 or later is required.
Libraries required for AIX	If you are using AIX, ensure that you have the following libraries: • `libgcc-4.8.5-5.aix7.1.ppc.rpm` • `libstdc++-4.8.5-5.aix7.1.ppc.rpm` **Note:** Do not install versions later than 4.8.x. Later versions of the libraries are not compatible with the installation server.

Prerequisite software for the database server

You must install the required software on the database server, including any fix packs, patches, or other service updates.

For more information, see Supported Software Environments (http://www.ibm.com/support/docview.wss?uid=swg27039467).

Table 7: Supported database server software	
Database server software	**Version**
IBM DB2	11.1.0.x or 11.1.1.x If you are installing the database server on a Microsoft Windows operating system, ensure that the C:\ drive contains a minimum of 8GB free disk space for temporary files that are created during the installation. If you are installing the database server on a Linux operating system, ensure that the `temp` directory contains sufficient free disk space for log files that are created during the installation.
Oracle	12.1.0.2 and later fix packs If you use field level encryption for long string fields, you need to apply an Oracle patch to fix an Oracle issue. For more information about using Oracle 12.1.0.2, see “Upgrading the Oracle database server to 12.1.0.2” on page 76 and “Oracle 12.1.0.2 database server considerations” on page 75.

Prerequisite software for application servers

Ensure that you install the prerequisite software on all application servers and the deployment manager.

The following table lists the software requirements for application servers.

Table 8: Software prerequisites for application server computers	
Requirement	**Specification**
Application server	IBM WebSphere Application Server Network Deployment 9.0.0.3 and all fix packs, and IBM WebSphere SDK Java Technology Edition 8. All servers across a cluster must have the same WebSphere version. The OpenPages GRC Platform installation requires that the application server software is installed to a path with no spaces.

Table 8: Software prerequisites for application server computers (continued)	
Requirement	**Specification**
Database client software	IBM DB2 or Oracle database client software. If the database server is on a separate computer, install the database client software on each OpenPages application server in your deployment. For DB2, ensure that you use the same version for the database client software and database server software. Apply all required patches, interim fixes, or services to both the database server and the database client software. For Oracle, ensure that you use version 12.1.0.2 or a later fix pack. If you are using the same computer for the application server and reporting server, and you want to install Oracle 12.1.0.2, you must install the 32-bit version.
IBM Installation Manager (IIM)	IIM is used to install IBM WebSphere Application Server IBM WebSphere Application Server requires IIM 1.8.7 or later. IIM is also used to deploy IBM OpenPages Loss Event Entry and IBM OpenPages GRC SDI Connector for UCF Common Controls Hub.

Prerequisite software for reporting servers

The following table provides the software requirements for reporting servers.

Table 9: Software prerequisites for reporting server computers	
Requirement	**Specification**
Reporting server	Cognos Analytics V11.0.7 Interim Fix 1001 or later fix packs. For information about the software prerequisites for Cognos Analytics, see the *IBM Cognos Analytics Installation and Configuration Guide*. If you are using Linux 7.x, update `pam.x86_64` and then install `pam.i686`. For example, run `yum install pam.x86_64` and then run `yum install pam.i686`.
Web server	One of the following web servers: • Apache HTTP Server 2.2 or later • IBM HTTP Server 8.5.5 or later • Microsoft IIS 8.0 and later fix packs (Windows only)

Table 9: Software prerequisites for reporting server computers (continued)	
Requirement	**Specification**
Database client software	IBM DB2 or Oracle database client software. If the database server is on a separate computer, install the database client software on each reporting server in your deployment. For DB2, ensure that you use the same version for the database client software and database server software. Apply all required patches, interim fixes, or services to both the database server and the database client software. For Oracle, ensure that you use version 12.1.0.2 or a later fix pack. The 32-bit Oracle database client is required by the reporting server. If you are using the same computer for the application server and reporting server, you must install the 32-bit version.

Prerequisite software for the search server

The following table provides the software requirements for the search server.

The search server must be installed on a different computer from the IBM OpenPages GRC Platform application server.

Table 10: Software prerequisites for the search server computer	
Requirement	**Specification**
IBM Runtime Environment for Java8	IBM Java JRE 8.0_64 IBM JRE is available on the IBM OpenPages GRC Platform installation media. Install the IBM Runtime Environment for Java (IBM JRE) and set up the system environment variables for Java on the search server computer before you install global search.

If you are using AIX on the search server, bash is required.

Prerequisite software for the workflow server

The following table provides the software requirements for the workflow server.

Table 11: Software prerequisites for the workflow computer	
Requirement	**Specification**
IBM Business Process Manager	IBM Business Process Manager 8.5.7 and later fix packs For more information, see IBM Business Process Manager Standard detailed system requirements. **Note:** If you already have IBM Business Process Manager installed, you can use your existing installation.

Prerequisite software for OpenPages GRC Platform client computers

Ensure that prerequisite software is installed on all computers that access IBM OpenPages GRC Platform.

The following table lists the software requirements for client computers.

Table 12: Software prerequisites for client computers	
Requirement	**Specification**
Web browser	Microsoft Internet Explorer version 11 running in Native view. Google Chrome 46 or later.
PDF reader	For example, Adobe Reader.
Optional: Microsoft Excel	Microsoft Excel 2010 or 2013. Required for some reporting functions.
Optional: Microsoft .NET Framework	Required on client computers where IBM Cognos for Microsoft Office products are installed. For more information, see the Cognos documentation.

Hardware prerequisites

To ensure that your product works properly, you must have hardware that is correctly sized for your IBM OpenPages GRC Platform deployment. Review the hardware prerequisites before installing the deployment.

IBM OpenPages GRC Platform has recommended and required minimum values per server for disk space and recommended minimum values for CPU and RAM. During the installation process, the actual capacity of the servers in your deployment is checked. A warning is issued if a server does not have the recommended capacity for CPU, RAM, or disk space. An error is issued if a server does not have the required minimum capacity for disk space. Errors must be addressed for the installation process to continue.

VMWare configuration requirements on Windows computers

The VMWare performance on a virtualized system is comparable to hardware. You can use the hardware guidelines for the database server, application server, reporting server, or search server for sizing VM requirements.

Cloning of IBM OpenPages GRC Platform application server VMs is not supported.

Chapter 5. OpenPages installation server and app

Use the IBM OpenPages GRC Platform installation server to install and upgrade OpenPages. You can also use it to apply fix packs and interim fixes. The installation server includes a web interface, called the installation app. The installation app is installed when you install the OpenPages installation server.

You can set up the installation server on one of the servers in your OpenPages environment or on a separate computer.

For example, you can set up the installation server on the admin application server, and then log in to the installation app from your laptop.

Or, you can set up the installation server on your laptop, and log in to the app from your laptop.

Important: If you use Windows servers in your deployment, set up the OpenPages installation server on a Windows computer.

The installation server uses installation agents to install components on remote servers. The installation server pushes the agent software to the remote servers and starts the agents automatically. Or, you can install the agent software manually on remote servers, if you prefer.

Installation on different operating systems

You can use different operating systems in your IBM OpenPages GRC Platform deployment.

If your deployment includes servers that are running on Microsoft Windows, install the IBM OpenPages GRC Platform installation server on a Windows computer.

For example, if your deployment uses application servers and reporting servers that are running on Linux and a search server that is running on Windows, install the installation server onto a Windows computer.

If the servers in your deployment are running on Linux or AIX, you can install the IBM OpenPages GRC Platform installation server on a Linux, AIX, or Windows computer.

Supported shells for UNIX installations

You can run the installation server on the Bourne shell (`/bin/sh`), Bourne Again Shell, (`/bin/bash`), C-Shell (`/bin/csh`), or Korn Shell (`/bin/ksh`).

Setting up the installation server on Windows

You can set up the installation server on a server in your deployment or on a separate computer. Use a computer that can communicate with the servers in your OpenPages environment.

After you set up the installation server, you can use the OpenPages installation app to create and manage deployments.

Before you begin

The computer where you set up the installation server must meet the following requirements:

- IBM Java 8 is installed.
- Java is included in the PATH system environment variable.

You might also want a PDF reader application on the computer. When you install or upgrade OpenPages, you can download validation reports in PDF format.

Procedure

1. Log on to the computer as an administrator.

2. Do one of the following steps:
   - Update the antivirus policy on the installation server computer to allow `Node.js`.
   - Disable antivirus software on the installation server computer. You can re-enable it after you install the installation server.
3. Create a new directory.
   For example, `C:\IBM\OPInstall`.
4. Locate the installation files.
   The files are stored in `\OP_<version>_Non_Embedded\OP_<version>_Installer`.
5. Copy the `\OP_<version>_installer` directory to the directory that you created.
6. Change directory to `<installation_server_home>\OP_<version>_installer\install\Windows`.
7. Open a command prompt as an administrator.
8. Run the installation script.

   You can use the `/p` parameter to set the password for the initial installation app user, called `admin`. If you exclude the parameter, the `install.bat` script prompts you for the password.

   Syntax:

   ```
   install.bat –acceptLicense [/p:password]
   ```

   Note: You can also use an optional `/s` parameter to stop the installer from starting automatically after the `install.bat` file completes.
9. If you did not use the `/p` parameter, type a password and then press Enter.
10. After the installation completes, re-enable the antivirus software on the installation server.
    Do this step if you disabled the antivirus software in step “2” on page 34.

Results

The OpenPages installation server is installed and started. You can now log in. For the user name, type `admin`. For the password, type the password that you set when you ran the `install.bat` script. See “Logging in to the installation app” on page 37.

Setting up the installation server on Linux or AIX

You can set up the installation server on a server in your deployment or on a separate computer. Use a computer that can communicate with the servers in your OpenPages environment.

After you set up the installation server, you can use the OpenPages installation app to create and manage deployments.

Important: If you use Windows servers in your deployment, set up the OpenPages installation server on a Windows computer. See “Setting up the installation server on Windows” on page 33.

Before you begin

The computer where you set up the installation server must meet the following requirements:

- IBM Java 8 is installed.
- Java is included in the PATH system environment variable.
- `JAVA_HOME` is set.

You might also want a PDF reader application on the computer. When you install or upgrade OpenPages, you can download validation reports in PDF format.

About this task

This video demonstrates how to set up the installation server: https://youtu.be/ojQgmgQI5Qs.

Procedure

1. Log on to the computer as an administrator.
2. Do one of the following steps:
   - Update the antivirus policy on the installation server computer to allow `Node.js`.
   - Disable antivirus software on the installation server computer. You can re-enable it after you install the installation server.
3. Create a directory.
   For example, `/home/opuser/IBM/OPInstall`.
4. Locate the installation files.
   The files are stored in `/OP_<version>_Non_Embedded/OP_<version>_Installer`.
5. Copy the `OP_<version>_Installer` directory to the directory that you created.
6. Change directory to `/home/opuser/IBM/OPInstall/OP_<version>_Installer/install/Linux`. Or, if you are using AIX, go to `/home/opuser/IBM/OPInstall/OP_<version>_Installer/install/AIX`
7. Grant the `+rwx` permission to the user on the installation server directory, subdirectories, and scripts.
8. Open a shell and run the setup script.

   You can use the `-p` parameter to set the password for the initial installation app user, called `admin`. If you exclude the parameter, the `install.sh` script prompts you for the password.

   Syntax:

   ```
   ./install.sh –-acceptLicense [-p:password]
   ```

   Note: You can also use an optional `-s` parameter to stop the installer from starting automatically after the `install.sh` file completes.
9. If you did not use the `-p` parameter, type a password and then press Enter.
10. Close the shell window.
11. After the installation completes, re-enable the antivirus software on the installation server.
    Do this step if you disabled the antivirus software in step “2” on page 35.

Results

The OpenPages installation server is installed and started. You can now log in. For the user name, type `admin`. For the password, type the password that you set when you ran the `install.sh` script. See “Logging in to the installation app” on page 37.

Installing agents manually

The installation server can automatically install the agent software on remote servers. But you can install the agent software manually, if you prefer.

Before you begin

The computer where you install the agent software must meet the following requirements:

- IBM Java 8 is installed.
- Java is included in the PATH system environment variable.

About this task

When you specify the deployment properties for a remote server, you are asked to provide the user name and password of an administrator account on the remote server. The installation server uses these credentials to install the agent software on the remote server. However, your organization might have policies that restrict the use of administrator credentials. In this case, you can install the agent software manually before you install IBM OpenPages GRC Platform.

The overall process involves the following steps:

1. Install the agent software manually and start the agent on each remote server, except the database server. The agent software is not needed on the database server.
2. In the installation app, enter the deployment properties for the remote servers.
   - Enable the **Remote Deploy** option.
   - Use `Agent` for the **Local User Name** and **Local User Password**.

     Note: If the real local account uses `Agent` for the user name or password, use different text for the **Local User Name** and **Local User Password**.
   - In the **Agent Directory** field, type the full path to the directory on the remote server where you installed the agent software. This directory is the *<agent_home>* directory.

Procedure

1. Log on to the remote server as an administrator.
2. Do one of the following steps:
   - Update the antivirus policy on the remote server to allow `Node.js`.
   - Disable antivirus software on the remote server. You can re-enable it after you install the agent software.
3. Create a directory.
   For example:
   - Windows: `C:\IBM\OPAgent`
   - Linux or AIX: `/home/opuser/IBM/OPAgent`

   This directory will be the *<agent_home>* directory for the remote server.
4. Copy the agent installation software to the remote server.
   a) Locate the following file on the installation server: *<installation_server_home>*`/op-installer-agent.zip`.
   b) Copy `op-installer-agent.zip` to the *<agent_home>* directory that you created on the remote server.
   c) Extract the `op-installer-agent.zip` file into the *<agent_home>* directory.
5. Open a shell or command window. If you are using Windows, open the command window as an administrator.
6. Go to the *<agent_home>*`/install/`*<OS>* directory.
7. Run the following script to install the agent software:
   - Windows:

     ```
     install.bat -acceptLicense
     ```
   - Linux or AIX:

     ```
     chmod 755 install.sh
     ./install.sh -acceptLicense
     ```
8. When the script completes, close the shell or command window.
9. Start the agent.

See “Starting the installation agent manually” on page 41.

10. Repeat these steps on each remote server, except the database server.

What to do next

When you fill in the server properties, do the following:

- Enable the **Remote Deploy** option.
- In the **Agent Directory** field, type the full path to the *<agent_home>* directory on the remote server.
- Update the **Local User Name** and **Local User Password** fields. Use `Agent` for the **Local User Name** and **Local User Password**.

Logging in to the installation app

Use the installation app to create a new deployment or to work with an existing deployment.

Before you begin

The installation server must be running.

Procedure

1. Open Google Chrome or Microsoft Internet Explorer.
2. Go to `https://<host>:<port_number>`.
   - Replace *<host>* with the name of the computer where you set up the installation server.
   - Replace *<port_number>* with the port number of the installation server. The default port number is 8443.

   For example, `https://appserver1.mycompany.com:8443`

   If you are running the installation server on your local computer, go to `https://localhost:8443`
3. Enter your credentials.
4. Review and accept the terms and conditions.
5. Click **Login**.

Adding users

You can set up additional user accounts to access the IBM OpenPages GRC Platform installation app.

About this task

You add users by editing the *<install_server_home>*`/src/db/jsonDB.json` file.

Create a backup of the `jsonDB.json` file before you begin.

When you save the file and restart the installation server, the passwords in the file are encrypted.

This video demonstrates how to add users and update user passwords:

https://youtu.be/0RGTvjrb02s

Procedure

1. Log out of the IBM OpenPages GRC Platform installation app.
2. Stop the installation server.
   For more information, see “Stopping the installation server” on page 40.
3. Open the *<install_server_home>*`/src/db/jsonDB.json` file in a text editor.

4. Use the following code as a guide to help you to add user accounts.

```
{
  "token": [],
  "user": [
    {
      "name": "admin",
      "password": "{AES}QiTCrj1RuBgvLvKHm32JoQ==",
      "id": "101",
      "encrypted": true
    },
    {
      "name": "<new_user>",
      "password": "<new_user_password>",
      "id": "102"
    },
    {
      "name": "<new_user>",
      "password": "<new_user_password>",
      "id": "103"
    }
  ]
}
```

   Note the following requirements:

   - Each user name must be unique.
   - Each user account must have a unique ID.

   The last block (with ID 103 in this example) does not end with a comma.
5. Save the file and close it.
6. Start the installation server.

   On Windows:

   a. Go to the `<installation_server_home>` directory. For example `c:\74Installer\OP_<version>_Installer`.
   b. Right-click the `startup.bat` file and click **Run As Administrator**

   On Linux or AIX:

   a. Open a shell and go to the `<installation_server_home>` directory, for example `/home/opuser/74Installer/OP_<version>_Installer`.
   b. Run the following command:

```
./startup.sh
```

Results
The user accounts are added and the passwords in the `jsonDB.json` file are encrypted.

Changing passwords

You can change the passwords of the installation app user accounts.

About this task

You change passwords by editing the `<install_server_home>/src/db/jsonDB.json` file.

Create a back up of the `jsonDB.json` file before you begin.

When you save the file and restart the installation server, the passwords in the file are encrypted.

Procedure

1. Log out of the IBM OpenPages GRC Platform installation app.

2. Stop the installation server.

   For more information, see “Stopping the installation server” on page 40.
3. Open the *<install_server_home>*/src/db/jsonDB.json file in a text editor.
4. Locate the user whose password you want to change, for example admin2.

```
{
  "token": [],
  "user": [
    {
      "name": "admin",
      "password": "{AES}QiTCrj1RuBgvLvKHm32JoQ==",
      "id": "101",
      "encrypted": true
    },
    {
      "name": "admin2",
      "password": "{AES}QiTCrj1RuBgvLvKHm32JoQ==",
      "id": "102",
      "encrypted": true
    },
    {
      "name": "admin3",
      "password": "{AES}IAHJQUu_MiqdcX2LtugZcA==",
      "id": "103",
      "encrypted": true
    }
  ]
}
```

5. Delete the encrypted password and then type a new password.
6. Delete the comma after the id value.
7. Delete the "encrypted": true line.

   The result is:

```
{
  "token": [],
  "user": [
    {
      "name": "admin",
      "password": "{AES}QiTCrj1RuBgvLvKHm32JoQ==",
      "id": "101",
      "encrypted": true
    },
    {
      "name": "admin2",
      "password": "<new_password>",
      "id": "102"
    },
    {
      "name": "admin3",
      "password": "{AES}IAHJQUu_MiqdcX2LtugZcA==",
      "id": "103",
      "encrypted": true
    }
  ]
}
```

8. Save the file and close it.
9. Start the installation server.

   On Windows:

   a. Go to the <installation_server_home> directory. For example c:\74Installer\OP_*<version>*_Installer.

   b. Right-click the startup.bat file and click **Run As Administrator**

   On Linux or AIX:

   a. Open a shell and go to the <installation_server_home> directory, for example /home/opuser/74Installer/OP_*<version>*_Installer.

b. Run the following command:

```
./startup.sh
```

Results

The passwords are changed and they are encrypted in the `jsonDB.json` file.

Starting the installation server

If you stop the IBM OpenPages GRC Platform installation server you can restart it.

Procedure

1. Log on to the computer where you set up the installation server.
2. Start the installation server.

   On Windows:

   a. Go to the <installation_server_home> directory. For example `c:\74Installer\OP_<version>_Installer`.

   b. Right-click the `startup.bat` file and click **Run As Administrator**

   On Linux or AIX:

   a. Open a shell and go to the <installation_server_home> directory, for example `/home/opuser/74Installer/OP_<version>_Installer`.

   b. Run the following command:

   ```
   ./startup.sh
   ```

Results

The installation server is running. You can now log in to the installation app. See "Logging in to the installation app" on page 37.

Stopping the installation server

You can stop the IBM OpenPages GRC Platform installation server.

Procedure

1. Log on to the computer where you set up the installation server.
2. Stop the installation server.

   On Windows:

   - Stop the `ibmopenpagesgrcplatforminstaller<version>.exe` service.
   - Or, go to the <installation_server_home> directory, open a command prompt as an administrator, and run the following command:

     ```
     npm run stop
     ```

   On Linux or AIX:

   a. Open a shell and go to the <installation_server_home> directory, for example `/home/opuser/IBM/OPInstall/OP_<version>_Installer`.

b. Run the following command:

```
npm run stop
```

Results

The installation server is stopped. To restart it, see “Starting the installation server” on page 40.

Starting the installation agent manually

You can start the agent on a remote server manually.

About this task

When you specify the deployment properties for a remote server, you are asked to provide the user name and password of an administrator account on the remote server. The installation server uses these credentials to start and stop the agent software on the remote server. If you install the agent software manually and you use `Agent` for the remote server login credentials, you need to start and stop the agent manually. You cannot use the installation app to start or stop the agent.

You might also choose to start and stop agents manually if you prefer to use the command line.

Procedure

1. Log on to the remote server as the user who installed the agent software.

   Alternatively, you can log in as any user who has full permissions on the agent directories and who can run `Node.js`.
2. Start the installation agent.

   On Windows:

   a. Go to the *<agent_home>*`\install\Windows` directory.

   b. Open a command prompt as an administrator.

   c. Run the following command:

   ```
   startup.bat
   ```

   On Linux or AIX:

   a. Open a shell and go to the *<agent_home>*`/install/`*<OS>* directory.

   b. Run the following command:

   ```
   ./startup.sh
   ```

Results

The installation agent is running.

Stopping the installation agent manually

You can stop the agent on a remote server manually.

About this task

When you specify the deployment properties for a remote server, you are asked to provide the user name and password of an administrator account on the remote server. The installation server uses these credentials to start and stop the agent software on the remote server. If you install the agent software

manually and you use Agent for the remote server login credentials, you need to start and stop the agent manually. You cannot use the installation app to start or stop the agent.

You might also choose to start and stop agents manually if you prefer to use the command line.

Procedure

1. Log on to the remote server as the user who installed the agent software.

   Alternatively, you can log in as any user who has full permissions on the agent directories and who can run Node.js.
2. Stop the installation agent.
   - Windows: Stop the ibmopenpagesgrcplatforminstaller<*version*>.exe service. Or, open a command prompt as an administrator, go to the <*agent_home*> directory, and run the following command:

     ```
     npm run stop
     ```
   - Linux or AIX: Go to the <*agent_home*> directory and run the following command:

     ```
     npm run stop
     ```

Results

The installation agent is stopped.

Changing the port number of the installation server

You can change the port number of the IBM OpenPages GRC Platform installation server. This task is optional.

Procedure

1. Log on to the computer where you set up the installation server.
2. If the installation server is running, stop it.

   On Windows:
   - Stop the ibmopenpagesgrcplatforminstaller<*version*>.exe service.
   - Or, go to the <installation_server_home> directory, open a command prompt as an administrator, and run the following command:

     ```
     npm run stop
     ```

   On Linux or AIX:

   a. Open a shell and go to the <installation_server_home> directory, for example /home/opuser/IBM/OPInstall/OP_<*version*>_Installer.

   b. Run the following command:

   ```
   npm run stop
   ```
3. Create a .env file to set the port number.

   a) Create a new file and add the following line:

   ```
   INSTALLER_PORT=<port_number>
   ```

   Example:

   ```
   INSTALLER_PORT=9091
   ```

b) Save the file in the <installation_server_home> directory. Name the file .env.

Example: <installation_server_home>/.env

4. Start the installation server.

On Windows:

a. Go to the <installation_server_home> directory. For example c:\74Installer\OP_<*version*>_Installer.

b. Right-click the startup.bat file and click **Run As Administrator**

On Linux or AIX:

a. Open a shell and go to the <installation_server_home> directory, for example /home/opuser/74Installer/OP_<*version*>_Installer.

b. Run the following command:

```
./startup.sh
```

Results

The port number of the installation server is updated. Use the new port number when you log into the installation app: https://<*host*>:<*port_number*>.

Chapter 6. Install IBM OpenPages GRC Platform

You can use the installation app to install IBM OpenPages GRC Platform.

For videos about how to install OpenPages, see the IBM Industry Platforms Support and Documentation channel.

Installation process overview

Installing OpenPages GRC Platform requires the following steps.

- Install the OpenPages installation app. See Chapter 5, “OpenPages installation server and app,” on page 33.
- Set up the servers that you want to use in your deployment and install the prerequisite software. See “Preparing your system for installation” on page 46.
- Decide how you want to create the database. You can use the OpenPages installation app to install the database or you can use scripts to do some or all of the database installation steps. If you are using IBM DB2 , see “OpenPages database object creation for DB2” on page 103. If you are using Oracle, see “OpenPages database schema creation for Oracle” on page 110.
- Install OpenPages. You can use the installation app or you can do a silent installation.

  The following tasks are required:

  – “Configuring the database server (DB2)” on page 125 or “Configuring the database server (Oracle)” on page 127
  – “Configuring the deployment manager” on page 129
  – “Configuring application servers” on page 131
  – “Configuring reporting servers” on page 133

  The following tasks are optional:

  – “Configuring a search server” on page 134
  – “Workflow server configuration” on page 135
- Do the post-installation tasks. See “Post installation tasks” on page 135.

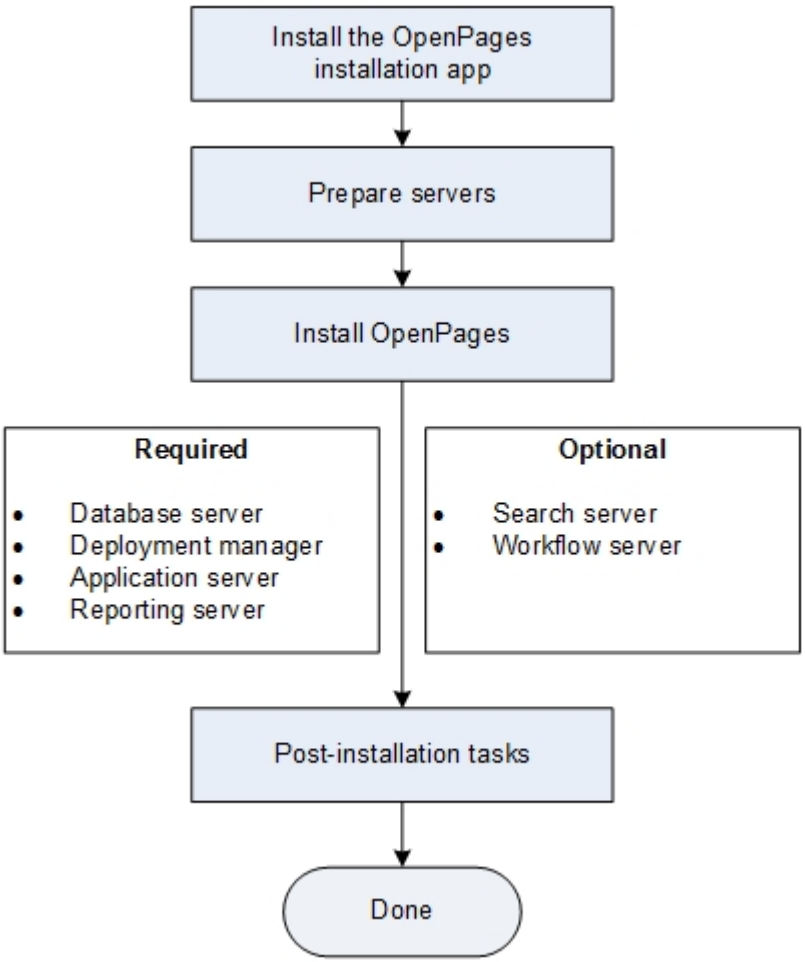


Figure 10: Installation process overview

Preparing your system for installation

Before you install IBM OpenPages GRC Platform, prepare the servers that you are going to use in your deployment.

Checklist if you are using existing hardware

Do the following steps if you are installing OpenPages on existing hardware where you have an older version of OpenPages installed.

1. Stop all servers (OpenPages, Cognos, and global search).
2. Back up the existing OpenPages environment. For more information, see "Backing up your source environment" on page 174.
3. Use new directory paths for the new installation.
4. If you are using Microsoft Windows:
   - For Cognos Analytics to start, ensure that *<JAVA_HOME>* is set to Java 8 before you start the Cognos servers.
   - If Cognos fails to start and the error, Bad Major Version, is issued, Cognos did not pick up the change to *<JAVA_HOME>*.

You must set the Java 8 location as the *<JAVA_HOME>* variable in the `ibmcognos_location/bin64/bootstrap_wlp_<OS>.xml` file.

```
<param>-java_home=C:\IBM\WebSphere9\AppServer\java\8.0\jre</param>
```

This known issue can occur only on a Windows server where IBM WebSphere and Cognos reside on the same server.

Checklist for Windows servers

Do the following tasks on each Microsoft Windows server before you install IBM OpenPages GRC Platform:

- Make sure that the clocks are synchronized across the application servers, database server, reporting servers, search server, and the deployment manager server.
- Enable Data Execution Prevention (DEP). See "Enabling Data Execution Prevention for essential Windows programs and services" on page 47.

Do the following additional tasks on all servers except the database server:

- Create the OpenPages installation user and add the user to the power users or admin group. See "Users and groups for installations on Windows" on page 47.

Enabling Data Execution Prevention for essential Windows programs and services

By default, Windows Server uses settings that are designed to prevent an application from running unauthorized programs. These settings can interfere with the IBM OpenPages GRC Platform installation. Configure Data Execution Prevention (DEP) before starting the installation to prevent any issues.

Procedure

1. Log on to the server.
2. Open Windows Explorer.
3. Right-click **This PC** and click **Properties**.
4. Click **Advanced System Settings**.
5. On the **Advanced** tab, under the **Performance** heading, click **Settings**.
6. In the **Performance Options** window, click the **Data Execution Prevention** tab, and then select **Turn on DEP for essential Windows programs and services only**.
7. Click **OK** and then restart your system to enable the change.
8. Repeat these steps for each Windows server in the installation.

What to do next

When the installation of all software is complete, you can disable the setting.

Users and groups for installations on Windows

To install and configure IBM OpenPages GRC Platform on a Windows operating system, you must set up an OpenPages installation user that is a member of the power user or administrator group.

In this guide, the OpenPages installation user is called `opuser`.

Important: The password for this user cannot contain spaces or special characters.

Checklist for Linux and AIX servers

Do the following tasks on each Linux or AIX server before you install IBM OpenPages GRC Platform:

- Make sure that the clocks are synchronized across the application servers, database server, reporting servers, search server, and the deployment manager server.
- Set the file descriptor limit for OpenPages users.

- If you are using Linux, see “Setting the file descriptor limit for OpenPages GRC Platform users on Linux ” on page 48.
- If you are using AIX, see “Setting the file descriptor limit for OpenPages GRC Platform users on AIX ” on page 49.

Do the following additional tasks on all application servers (admin and non-admin), the deployment manager server, reporting servers (active and standby), and the search server:

- If you are using Linux, check the operating system limits that are set on the server. See “Check operating system limits on Linux” on page 50.

Do the following additional task on all application servers (admin and non-admin) and the search server:

- Create the users and groups for installing OpenPages. See “Users and user groups for installation on AIX and Linux” on page 50
- Create the OpenPages installation directory and give the OpenPages installation user access. See “Creating the installation directories for AIX or Linux” on page 51.

Setting the file descriptor limit for OpenPages GRC Platform users on Linux

You must set the soft and hard limits for the file descriptor and update system files to allocate sufficient resources to the IBM OpenPages GRC Platform users. You must complete this task on all Linux operating system servers in your environment.

Procedure

1. Log on to the application server as the `root` user.
2. Verify that the `/etc/pam.d/system-auth` file contains the correct settings by typing the following commands:
   - `cat /etc/pam.d/system-auth | grep session | grep pam_unix.so`

     The system response: `session required pam_unix.so`
   - `cat /etc/pam.d/system-auth | grep session | grep pam_limits.so`

     The system response: `session required pam_limits.so`

   Both commands must return a session line.
3. To determine the current value of the fs.file-max property that is set in the `/etc/sysctl.conf` file, type the following command:

   ```
   cat /etc/sysctl.conf | grep fs.file-max
   ```

   - If the fs.file-max setting does not exist, add it to the `/etc/sysctl.conf` file by typing the following commands:

     ```
     echo "# Added to increase system open files" >> /etc/sysctl.conf
     echo "fs.file-max=500000" >> /etc/sysctl.conf
     ```

   - If the fs.file-max setting exists, but it is set to less than 500000, change the fs.file-max setting to 500000.
4. Change the file descriptor limits in the `/etc/security/limits.conf` file by adding the following text to the end of the file before the `#End of file` text.

   ```
   *  soft nofile 100000
   *  hard nofile 200000
   *  soft stack 10240
   ```

5. To determine the startup limits for the number of processors, type the following command:

   `ls /etc/security/limits.d/90-nproc.conf`

   - If this `90-nproc.conf` file exists, then modify the number of processes to 4096.

- If the file does not exist, add the following lines to the end of the `/etc/security/limits.conf` file:

  ```
  * soft nproc    4096
  * hard nproc    5120
  ```

  The soft limit provides a specific limit that can be exceeded, for a short period, up to the system hard limit.

6. Restart the system and then verify the settings that you changed by typing the following command:

   `ulimit -a`

Setting the file descriptor limit for OpenPages GRC Platform users on AIX

You must set the soft and hard limits for the file descriptor and update system files to allocate sufficient resources to the IBM OpenPages GRC Platform users. You must complete this task on all AIX operating system servers in your environment.

Procedure

1. Log on to the operating system as `root` user.
2. Open the `/etc/security/limits` file.
3. Add the following lines to the end of the file:

   ```
   opuser:
   fsize = -1
   nofiles =-1
   ```

4. To set the maximum number of processes for non-root users, open a shell and type the following command:

   ```
   chdev -l sys0 -a maxuproc='16384'
   ```

5. Restart the operating system.

Optional: Changing the TEMP directory for AIX installations

By default, the `/tmp` directory is configured as the TEMP directory. For AIX installations, you can change the TEMP directory by adding variables to the `.profile` of the user who is installing the product.

Procedure

1. On the IBM OpenPages GRC Platform application servers, ensure that the `/tmp` directory on the database server is set to a minimum size of 4 GB.
2. Log on to the application server as the OpenPages installation user.

   The user has `non-root` privileges.

3. Use the following commands to change the TEMP directory:

   `export IATEMPDIR=`*`temp_directory`*

   `export TEMP=`*`temp_directory`*

   `export TMP=`*`temp_directory`*

   `export TMPDIR=`*`temp_directory`*

   `export TEMPDIR=`*`temp_directory`*

   For example, use the following commands:

   `export IATEMPDIR=/opt/temp`

   `export TEMP=/opt/temp`

   `export TMP=/opt/temp`

   `export TMPDIR=/opt/temp`

```
export TEMPDIR=/opt/temp
```

Check operating system limits on Linux
If your application server, reporting server, or search server is running Red Hat Enterprise Linux, check the operating system limits that are configured on the server.

You can run the `ulimit -a` command to check the limits. Update the limits, if needed, to use the following minimum values:

```
core file size              (blocks, -c) 10485760
data seg size               (kbytes, -d) unlimited
scheduling priority         (-e) 0
file size                   (blocks, -f) unlimited
pending signals             (-i) 63407
max locked memory           (kbytes, -l) 65536
max memory size             (kbytes, -m) unlimited
open files                  (-n) 100000
pipe size                   (512 bytes, -p) 8
POSIX message queues        (bytes, -q) 819200
real-time priority          (-r) 0
stack size                  (kbytes, -s) unlimited
cpu time                    (seconds, -t) unlimited
max user processes          (-u) 127457
virtual memory              (kbytes, -v) unlimited
file locks                  (-x) unlimited
```

If you change any values, restart the server.

Users and user groups for installation on AIX and Linux
To install IBM WebSphere Application Server and IBM OpenPages GRC Platform on a UNIX operating system, you must create the required users and groups.

Tip: For simplicity, you can use the root user to install IBM WebSphere Application Server, then change the owner of the IBM WebSphere directory to the same account as the OpenPages installation user.

If you prefer, you can create two separate users:

- One user to install IBM WebSphere Application Server.
- One user to install IBM OpenPages GRC Platform.

Both users must belong to the same primary group. If you create separate users, after the installation, you must change the permissions on the installation directories and files. The group members must have read, write, and execute permissions (775) on the files and directories.

Example: Create an AIX or Linux operating system group named `opgroup`. This group contains the user that starts IBM WebSphere and the user that owns the OpenPages application server files. Install IBM WebSphere and the OpenPages application. Ensure that the installation files and directories are writable for the owner and that the owners are members of the same group (`chmod 775` command).

Before you begin
If you are using an IBM DB2 database, see Creating group and user IDs for a DB2 database installation (Linux and UNIX) (http://www.ibm.com/support/knowledgecenter/SSEPGG_11.1.0/com.ibm.db2.luw.qb.server.doc/doc/t0006742.html).

Procedure

1. Log on to the application server as `root` and open a shell.
2. To install IBM WebSphere Application Server, create a user, such as `wasuser`.

   ```
   useradd -m wasuser
   ```
3. To create a group, such as *opgroup*, enter the following command:
   - On AIX operating systems:

     ```
     mkgroup -A opgroup
     ```
   - On Linux operating systems:

```
groupadd opgroup
```

4. Do one of the following steps:
   - If you created an opgroup group, add the opuser and *wasuser* users to the primary group (opgroup group).

     ```
     useradd -G opgroup opuser
     ```

     ```
     useradd -G opgroup wasuser
     ```
   - If the same user account installs both IBM WebSphere Application Server and the OpenPages application server, create a user, such as opuser.

     ```
     useradd -m opuser
     ```
5. Change the password for the OpenPages installation user by using the following command:

   ```
   passwd opuser
   ```
6. Change the password for the IBM WebSphere Application Server installation user by using the following command:

   ```
   passwd wasuser
   ```
7. On AIX and Linux operating systems, grant read, write, and execute permissions to the home directory of the OpenPages installation user.

   ```
   chmod 755 /home/opuser
   ```

   For local installations on Linux operating systems, the OpenPages installation user is the user who runs the OpenPages installation program.

   For remote installations on AIX and Linux operating systems, the OpenPages installation user is the user who connects to the remote server.

What to do next

After you install IBM WebSphere Application Server and OpenPages application server, ensure that installation directories and files have write permission for the group.

Creating the installation directories for AIX or Linux

You must create the installation directories for OpenPages GRC Platform and change the ownership of these directories to the OpenPages installation user. Do this task if you are installing OpenPages GRC Platform on a UNIX operating system.

Procedure

1. Log on to the application server computer as the root user.
2. If the installation directory for OpenPages does not exist, create it by typing the following command.

   Restriction: Ensure that the directory to which you install OpenPages contains only ASCII characters in the path name.

   ```
   mkdir -p <directory>
   ```

   Example:

   ```
   mkdir -p /OpenPages
   ```
3. Change the ownership of the directory to the OpenPages installation user.

   Tip: For simplicity, you can use the root user to install IBM WebSphere Application Server, then change the owner of the IBM WebSphere directory to the same account as the OpenPages installation user.

   ```
   chown -R opuser /OpenPages
   ```

Checklist for application servers

Do these tasks on each application server before you install IBM OpenPages GRC Platform:

- Check that all of the required ports are available. See "Port assignments " on page 102.
- Set the DB2_HOME or ORACLE_HOME environment variable.
- If you are using Microsoft Windows, set the TMP and TEMP environment variables to a location that is accessible by all users. For example, use C:\TEMP instead of C:\Users\ADMINI~1\AppData\Local\Temp. See "Changing the Temp directory for Windows application servers" on page 52.
- If you are using a horizontal cluster for the application servers, do the following tasks:
  - Set up the load balancer.
  - If you are using Microsoft Windows application servers, configure a domain account. See "Configuring OpenPages GRC Platform applications to use a domain account on Windows operating systems" on page 139
  - If you are using Linux or AIX application servers, configure file permissions. See "Configuring file share permissions on AIX or Linux operating systems" on page 139
- Install IBM Installation Manager (IIM is used to install IBM WebSphere Application Server). See "Installing IBM Installation Manager" on page 54.
- Install IBM WebSphere Application Server and the IBM Java JRE that is supplied with IBM WebSphere Application Server. See "Installing IBM WebSphere Application Server Network Deployment" on page 54.
- Set the JAVA_HOME environment variable to point to the IBM Java JRE that is supplied with IBM WebSphere Application Server.
- If the database server is on a separate computer:
  - If you are using IBM DB2, see "DB2 database client installations" on page 73.
  - If you are using Oracle, see "Oracle database client installations" on page 83.

Do these additional tasks on the admin application server (**AppServer1**):

- Configure the hosts file. See "Configuring the hosts file" on page 53.

Changing the Temp directory for Windows application servers

You can change the location of the Temp directory by changing environment variables in the system properties.

About this task

By default, the TEMP and TMP environment variables are set to a hidden user folder location. The folder location is typically %USERPROFILE%\AppData\Local\Temp. You can change the location of the directory by changing the TEMP and TMP environment variables in the system properties.

If you use more than one administrator level user account to install IBM OpenPages GRC Platform, install fix packs, or perform upgrades, do the steps in this topic to avoid potential privilege violations that can occur during a deployment.

Procedure

1. Ensure that the TEMP directory that you want to use is set to at least 8 GB on each application server.
2. Log on to application server as the OpenPages administrator.
3. Right-click **This PC** and click **Properties**.
4. Click **Advanced System Settings** and then click **Environment Variables**.
5. Select the TEMP variable and click **Edit**.

   TEMP and TMP might be defined as system variables or user variables, depending on how your system is set up.
6. In the **Variable value** box, type the new folder location and click **OK**.

For example, type `c:\temp`.

7. Repeat the steps to change the folder location for the TMP variable.
8. Click **OK**.

Configuring the `hosts` file

You must ensure that the computer that you use to deploy IBM OpenPages GRC Platform can connect to each computer on which you install the database server, application servers, reporting servers, and search server. You must also ensure that each server in your deployment can successfully ping and perform a trace route to and from each of the other servers.

Procedure

1. Log on to the admin application server as the `admin` user.
2. Edit the `hosts` file:
   - For UNIX, go to the `/etc` directory and open the hosts file in a text editor.
   - For Windows, open the `C:\Windows\System32\drivers\etc\hosts` file.
3. Add the IP address and name of each OpenPages application server, reporting server, search server, and database server.
4. Save and close the `hosts` file.
5. Repeat these steps for each OpenPages application server, reporting server, search server, and database server.

IBM WebSphere Application Server installations

IBM WebSphere Application Server must be installed and running on each computer where you plan to install the IBM OpenPages GRC Platform application server.

Moving from IBM WebSphere Application Server 8.5.5.x

If you have a previous version of OpenPages GRC Platform with IBM WebSphere Application Server version 8.5.5.x, you must do a new installation of 9.0.0.x.

Tip: You do not need to uninstall WebSphere 8.5.5. WebSphere supports the installation of multiple versions on a server. For more information, see the WebSphere documentation.

Installation restrictions

Review the following restrictions before you install IBM WebSphere Application Server.

Supported WebSphere Application Server software environments

Ensure that you are using a supported version of IBM WebSphere Application Server. The OpenPages GRC Platform installation program verifies the version. For more information about supported software environments, see Review the IBM OpenPages GRC Platform supported software environments and other system requirements.

Note: IBM product fixes and updates are available from IBM Fix Central (www.ibm.com/support/fixcentral/).

Installation path cannot contain spaces

The installation path for IBM WebSphere Application Server must not contain spaces. The default location is *<path>*`/WebSphere/AppServer`.

For Windows installations, if IBM WebSphere Application Server is installed in a directory with spaces, you can enter the short file name convention. For example, for `C:\Program Files\IBM\WebSphere\AppServer`, enter `C:\PROGRA~1\IBM\WebSphere\AppServer`.

Installing IBM Installation Manager

You use IBM Installation Manager to install IBM WebSphere Application Server, Cognos Analytics, and some other components, such as IBM OpenPages Loss Event Entry. Install IBM Installation Manager on each application server and reporting server.

Ensure you install the 64-bit version of IBM Installation Manager.

If an older version of IBM Installation Manager is installed, install to a new directory. For more information about this requirement, see Update to Installation Manager 1.8 is blocked when its data location is within its install location (http://www.ibm.com/support/docview.wss?uid=swg21692402).

For more information about IBM Installation Manager, see the Installation Manager documentation (http://www.ibm.com/support/knowledgecenter/SSDV2W/im_family_welcome.html).

Procedure

1. Download IBM Installation Manager from Passport Advantage®.
2. Complete the following steps.
   a) On Microsoft Windows, double-click `install.exe`.
   b) On AIX or Linux, in a terminal window, enter `./install`.
3. Follow the steps to install IBM Installation Manager.

Installing IBM WebSphere Application Server Network Deployment

Use IBM Installation Manager to install IBM WebSphere Application Server and fix packs.

For horizontal cluster configurations, install IBM WebSphere on the admin application server and all non-admin application servers. You must install the same version of IBM WebSphere on each application server.

For more information, see the IBM WebSphere documentation on IBM Knowledge Center.

Restriction: Do not install into a directory that contains spaces or non-ASCII characters.

Procedure

1. Start IBM Installation Manager.

   For information about installing IBM Installation Manager, see "Installing IBM Installation Manager" on page 54.
2. Click **File** > **Preferences**, and then click **Repositories**.
3. Click **Add repository**.
4. Enter the path to the IBM WebSphere installation files, and click **OK**.

   If you provided an HTTPS or restricted FTP repository location, then you are prompted to enter a user ID and password. The new or changed repository location is listed. If the repository is not accessible, a red x is displayed in the **Accessible** column.
5. Click **Add repository**.
6. Enter the path to the IBM SDK Java 8 files, and click **OK**.
7. In IBM Installation Manager, click **Install**.
8. Select the IBM WebSphere installation package, then click **Next**. Follow the steps in IBM Installation Manager to complete the installation.
9. When the installation process is complete, select whether to create a profile and then click **Finish**. For OpenPages admin and non-admin application servers, select **None**.

Configuring the application server

Configure the IBM OpenPages GRC Platform application servers to avoid time-outs and other issues.

Procedure

1. Open a browser window and log on to the IBM WebSphere Integrated Solutions Console as a server administrator.

   The default URL is `http://<server_name>:<port>/ibm/console`.
2. In the Integrated Solutions Console:
   a) Expand **Servers** > **Server Types**
   b) Click **WebSphere Application Server**.
3. On the **Application servers** page, click the name of the application server you want to configure.
4. On the **Application servers | OpenPages-*server-name*** page, click the **Configuration** tab.
5. Under the **Web Container** heading, click **Session Management**.
6. On the **Session Management** page:
   a) Set the **Maximum in-memory session count** to 3000.
   b) Click **Apply**.
7. On the **Application servers | Configuration** tab, under the **Java and Process Management | Process definition** heading, click **Java Virtual Machine**.
8. On the **Java Virtual Machine** page:
   a) Set the **Initial heap size** to 1024 MB.
   b) Set the **Maximum heap size** to 3072 MB.
   c) Update the **Generic JVM arguments**:
      - Change the **GC policy** to **-Xgcpolicy:gencon**
      - Change the **Nursery size** to **-Xmn768m**
      - Change the **-Xgcpolicy:gencon -Xmn350m -Xdisableexplicitgc** to **-Xthr:noAdaptSpin -Xgcpolicy:gencon -Xmn768m -Xdisableexplicitgc**.
   d) Click **Apply**.
9. On the **Application servers | Configuration** tab, under the **Thread Pools** heading, click **Web Container**.
10. On the **Web Container** page:
    a) Set the **Minimum size** to 50.
    b) Set the **Maximum size** to 500.
    c) Click **Apply**.
11. In the Integrated Solutions Console:
    a) Expand **Resources | JDBC**
    b) Click **Data Sources** .
    c) In the **Data sources** pane, click the **CWTxDataSourceXA** application server.
    d) Click **Connection pool properties**.
    e) On the **Configuration** tab, set the **Maximum connections** to 750.
    f) Click **Apply**.
12. Repeat these steps on each application server.

    If you are using a horizontal cluster, do these steps on each horizontal cluster member.

    If you are using a vertical cluster, do these steps on each vertical cluster member.

Checklist for the deployment manager server

If you are installing the deployment manager on a separate computer, do these tasks on the deployment manager server before you install IBM OpenPages GRC Platform:

- Check that all of the required ports are available. See “Port assignments ” on page 102.
- Set the DB2_HOME or ORACLE_HOME environment variable.
- Install IBM Installation Manager (IIM is used to install IBM WebSphere Application Server). See “Installing IBM Installation Manager” on page 54.
- Install IBM WebSphere Application Server and the IBM Java JRE that is supplied with IBM WebSphere Application Server. See “Installing IBM WebSphere Application Server Network Deployment” on page 54.

  The deployment manager must use a version of IBM WebSphere Application Server that is equal to or greater than the version of IBM WebSphere Application Server that is installed on the application servers. For example, if IBM WebSphere Application Server version 9.0.0.4 is installed on the application server, the deployment manager must use 9.0.0.4 or a later fix pack. If possible, use the same version on the deployment manager and application servers.
- Set the JAVA_HOME environment variable to point to the IBM Java JRE that is supplied with IBM WebSphere Application Server.
- If the database server is on a separate computer:
  - If you are using IBM DB2, see “DB2 database client installations” on page 73.
  - If you are using Oracle, see “Oracle database client installations” on page 83.

Checklist for the database server (DB2)

If you use an IBM DB2 database server, do these tasks before you install IBM OpenPages GRC Platform:

- Check that all of the required ports are available. See “Port assignments ” on page 102.
- Install IBM DB2. Include the DB2 Text Search component. See “IBM DB2 database server installations” on page 57.
- Copy the encryption function for OpenPages to the database server. See “Copying the encryption function for OpenPages to the DB2 server” on page 58.
- Set up operating system users and groups (instance owner, DAS user, OP installation user. See “Operating system user accounts for IBM DB2 databases” on page 71.
- Set up the schema owners (the OpenPages database user and the Cognos content store user) See “Database schema owners” on page 72.
- Check that the database user passwords have not expired.
- Prepare a database instance for OpenPages. See “Preparing the database instances for OpenPages on DB2” on page 69.
- Create the OpenPages database. See “Creating the OpenPages database on IBM DB2” on page 65.
- You must create a separate database for Cognos Analytics.

If the database server is on a separate computer, do one of the following tasks:

- If you are using IBM DB2, see “DB2 database client installations” on page 73.
- If you are using Oracle, “Oracle database client installations” on page 83.

IBM DB2 database server and client setup for OpenPages GRC Platform

Before you install OpenPages GRC Platform, you must complete these tasks if you are installing IBM DB2:

- Install and configure IBM DB2 on the database server.
- Prepare a DB2 database instance for the OpenPages database.
- Create the OpenPages database.
- Install the DB2 database client software on each OpenPages application server and reporting server.

- Verify the connection between the database server and the application and reporting servers.
- Create the OpenPages database objects.

  This step is optional. You can use scripts to create some or all of the database objects. Or, you can use the OpenPages installation program to create them.

Restriction: You must use two separate databases - one for the Cognos Analytics content store and one for the IBM OpenPages GRC Platform database.

IBM DB2 database server installations
You can use an IBM DB2 database for the IBM OpenPages GRC Platform repository.

Check the specific requirements for your system before you install IBM DB2 products.

For more information about IBM OpenPages GRC Platform supported software, see "Software prerequisites" on page 25.

For more information about DB2 system requirements, see the DB2 for Linux, UNIX, and Windows system requirements web page.

To use DB2 for the OpenPages database, complete following tasks:

- Install the DB2 database server using a custom installation to include the DB2 Text Search component.

  The database server that hosts the OpenPages database must have the required server software installed. DB2 must be installed before you install any required fix packs.

  For more information about database server versions, see "Prerequisite software for the database server" on page 26.

  For more information about the DB2 Text Search component, see "The DB2 Text Search component " on page 57.

  Restriction: IBM OpenPages GRC Platform does not support installation of DB2 software in directories that contain spaces. To use DB2 software that is installed in a directory with spaces, you can enter the short file name convention in the OpenPages installation app. For example, for `C:\Program Files\IBM\DB2\SQLLIB`, use `C:\PROGRA~1\IBM\DB2\SQLLIB`.
- Set up the required users and groups. See "Operating system user accounts for IBM DB2 databases" on page 71.
- Prepare the database instance. See Prepare the IBM DB2 database instance for OpenPages.
- Create the database. See "Creating the OpenPages database on IBM DB2" on page 65.

Note: For information about how to upgrade DB2, see "Upgrading IBM DB2 (Windows)" on page 58 or "Upgrading IBM DB2 (Linux or AIX)" on page 60.

The DB2 Text Search component
The IBM DB2 Text Search component is required by the IBM OpenPages GRC Platform installation. When you install the IBM DB2 database server, select the custom installation type and the IBM DB2 Text Search component.

For more information, see Installing DB2 Accessories Suite for DB2 Text Search in the DB2 documentation.

If the DB2 database server is already installed on the database server computer, use the DB2 setup program to add the DB2 Text Search function to your existing DB2 installation.

To determine whether the DB2 Text Search component is installed, run the `db2ts` command to start or stop the component. If the command fails, the component is not installed. For more information about running the command, see the DB2 search commands in the DB2 documentation.

Copying the encryption function for OpenPages to the DB2 server

If you are doing a fresh installation or if you are upgrading and using a new computer for the database server, you must manually copy the encryption function for IBM OpenPages GRC Platform to the IBM DB2 server.

Procedure

1. Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/INSTALL_SCRIPTS /bin/*<PLATFORM>* directory.
2. Copy the files to the following directories:
   - *<DB2_HOME>*/FUNCTION
   - *<DB2_HOME>*/FUNCTION/unfenced

Upgrade IBM DB2

Before you upgrade IBM OpenPages GRC Platform, upgrade IBM DB2 to version 11.1.

Upgrading IBM DB2 (Windows)

You must upgrade to a supported version of IBM DB2 before you upgrade your IBM OpenPages GRC Platform environment.

This task provides the basic steps for upgrading IBM DB2. For more information about this process, see the IBM DB2 Knowledge Center.

Procedure

1. Stop all OpenPages application servers.

   For more information, see "Stopping application servers in a Windows environment" on page 260.
2. Stop the global search services.

   For more information, see "Stopping the global search services by using a script" on page 258 and "Stopping the global search services" on page 259.
3. Stop all IBM Cognos services.

   For more information, see "Starting and stopping the Cognos services" on page 264.
4. Complete the DB2 pre-upgrade tasks for both the OpenPages database and the Cognos content store. For more information, see Pre-upgrade tasks for DB2 servers.

   If you get warnings about the discontinued SYSFUN.ASCII1 function, you can ignore them.
5. Drop the DB2 Text Search index and disable DB2 Text Search.

   For more information, see "Dropping the DB2 Text Search index and disabling DB2 Text Search" on page 64.
6. Check the value of the application heap size for the Cognos database.
   a) Open the DB2 command line processor (CLP).
   b) Run the following command as the database instance owner. Replace *<cognosdb>* with the name of your Cognos database.

      ```
      db2 get db cfg for <cognosdb> | findstr APPLHEAPSZ
      ```

   c) If the value is less then 4096 then increase it to a minimum of 4096.

      Open the DB2 command line processor (CLP) and run the following command as the database instance owner. Replace *<cognosdb>* with the name of your Cognos database.

      ```
      db2 update db cfg for <cognosdb> using applheapsz 4096
      ```
7. Back up the OpenPages database and the Cognos content store.
8. Run the IBM DB2 installation program.

The installation program installs DB2 and upgrades the existing database instances. For more information, see Upgrading a DB2 server (Windows).

a) Click **Install a Product**.

b) For the **Product**, choose **Workgroup, Enterprise and Advanced Editions**. Click **Work with Existing**.

c) Select the installation that you want to upgrade.

d) Select the **Custom** option.

e) Accept the default values for the response file settings.

f) Expand **Server Support** and select **DB2 Text Search** for installation.

g) Accept the default settings on each page of the wizard until you are prompted for the **db2admin** credentials.

h) Enter the domain and password for the db2admin user.

i) Accept the default settings on the remaining pages of the wizard. Click **Finish**.

When the installation process completes, check the log files.

9. Upgrade your OpenPages database.

   For more information, see Upgrading databases.

   For example, start the DB2 command line processor (CLP) and run the following commands:

```
set db2instance=db2inst1
db2start
db2 upgrade database opx user opuser using password
```

10. Upgrade your Cognos content store database.

    For more information, see Upgrading databases.

    For example, start the DB2 command line processor (CLP) and run the following commands:

```
set db2instance=db2inst2
db2start
db2 upgrade database cognosdb user db2admin using password
```

11. Revalidate objects, rebind packages, and redeploy the Java routines for OpenPages in the OpenPages database.

    a) Start the DB2 command line processor (CLP).

    b) Run the following command:

```
set db2instance=db2inst1
```

    c) Go to the \OP_*<version>*_Non_Embedded\OP_*<version>*_Configuration\Database\DB2\INSTALL_SCRIPTS directory.

    For example:

```
cd C:\OP\OpenPages\DB2\INSTALL_SCRIPTS
```

    d) Revalidate the database objects.

    For example:

```
clpplus -nw opuser/password@localhost:50000/opx
  @sql-wrapper revalidate.sql revalidate.log opuser
```

    e) Rebind the packages.

    For example:

```
db2rbind opx -l opbind.log all
  -u db2admin -p password -r any
```

    f) Redeploy the Java routines for OpenPages.

For example:

```
manageOPJavaRoutines.bat opx opuser password remove opdb2udf.jar
```

```
manageOPJavaRoutines.bat opx opuser password
  install opdb2udf.jar
```

12. Revalidate objects and rebind packages in the Cognos content store.
    a) Start the DB2 command line processor (CLP).
    b) Run the following command:

    ```
    set db2instance=db2inst2
    ```

    c) Revalidate the database objects.

    For example:

    ```
    db2 connect to cognosdb user db2admin using password
    db2 "call sysproc.admin_revalidate_db_objects()"
    ```

    d) Rebind packages in the Cognos database.

    For example:

    ```
    db2rbind cognosdb -l cogbind.log -u db2admin -p password
    ```

13. Apply the IBM DB2 license.
    a) Extract the quick start activation file for IBM DB2.
    b) Start the DB2 command line processor (CLP).
    c) Go to the directory where the license file, `db2ese_u.lic`, is stored.
    d) Run the following command:

    ```
    db2licm –a db2ese_u.lic
    ```

14. Start all IBM OpenPages GRC Platform services.
15. Configure and enable DB2 Text Search, create the index, and schedule a job to synchronize the index.

    For more information, see "Utilities for filtering on long string field content in a DB2 database" in the *IBM OpenPages GRC Administrator's Guide*.

Upgrading IBM DB2 (Linux or AIX)

You must upgrade to a supported version of IBM DB2 before you upgrade your IBM OpenPages GRC Platform environment.

This task provides the basic steps for upgrading IBM DB2. For more information about this process, see the IBM DB2 Knowledge Center.

Procedure

1. Stop all OpenPages application servers.

   For more information, see “Stopping all application servers in AIX and Linux using a script” on page 261.
2. Stop the global search services.

   For more information, see “Stopping the global search services by using a script” on page 258 or “Stopping the global search services” on page 259.
3. Stop all IBM Cognos services.

   For more information, see “Starting and stopping the Cognos services” on page 264.
4. Mount the IBM DB2 installation media or extract the downloaded installation package onto your file system.
   a) Log in as the instance owner.

b) Create a new directory. Do not create it under `/sqllib`.

c) Extract the installation package to the directory that you created.

5. Check that your system meets the installation prerequisites.

   For more information, see db2prereqcheck - Check installation prerequisites.

   a) Go to the DB2 V11.1 installation directory.

   ```
   cd server_ese_u
   ```

   b) As the root or sudo user, check the installation requirements.

   ```
   ./db2prereqcheck –i -v 11.1.0.0
   ```

   If successful, you see the message `DBT3533I The db2prereqcheck utility has confirmed that all installation prerequisites were met.`

   c) Review the log file.

6. Complete the DB2 pre-upgrade tasks for both the OpenPages database and the Cognos database. For more information, see Pre-upgrade tasks for DB2 servers.

   If you get warnings about the discontinued `SYSFUN.ASCII1` function, you can ignore them.

7. Check the value of the application heap size for the Cognos database.

   a) Run the following command as the database instance owner. Replace *<cognosdb>* with the name of your Cognos database.

   ```
   db2 get db cfg for <cognosdb> | grep -i APPLHEAPSZ
   ```

   b) If the value is less then 4096 then increase it to a minimum of 4096.

   Run the following command as the database instance owner. Replace *<cognosdb>* with the name of your Cognos database.

   ```
   db2 update db cfg for <cognosdb> using applheapsz 4096
   ```

8. Drop the DB2 Text Search index and disable DB2 Text Search.

   For more information, see “Dropping the DB2 Text Search index and disabling DB2 Text Search” on page 64.

9. Back up the OpenPages database and the Cognos database.

10. Run the IBM DB2 installation program to upgrade IBM DB2

    For more information, see Upgrading DB2 server (Linux and UNIX).

    a) Log on to the database server as the root user and run the `db2setup` command.

    ```
    cd <Installation Home>/servers_ese_u
    ./db2setup
    ```

    b) Click **Install a Product** and **New Install**.

    c) For the **Product**, choose **Workgroup, Enterprise and Advanced Editions**.

    d) Select the **Custom** option.

    e) Clear the **Create an instance check box**.

    f) Expand **Server Support** and select **DB2 Text Search** for installation.

    g) Accept the default settings on the remaining pages of the wizard.

    h) When the installation process completes, review the log files.

    i) Click **Finish**.

11. Upgrade your OpenPages database instance.

    Perform this step as the root user

    For more information, see Upgrading Version 10.5 or DB2 Version 10.1 instances.

a) Stop all DB2 version 10.5 services.

b) Edit the `/etc/services` file and remove any existing entry for the DB2text service.

c) Upgrade the OpenPages database instance.

For example:

```
cd /opt/ibm/db2/V11.1/instance
./db2iupgrade -u db2fenc1 -j "TEXT_SEARCH,db2j_db2inst1,55000" db2inst1
```

d) View the log file, for example `/tmp/db2iupgrade.log.20620`. Verify that the upgrade was successful. Look for the message `DBI1070I Program db2iupgrade completed successfully`.

12. Upgrade your Cognos database instance.

Perform this step as the root user

For more information, see Upgrading Version 10.5 or DB2 Version 10.1 instances.

Note: Perform this step after the OpenPages database instance upgrade completes successfully.

a) Upgrade the Cognos database instance.

For example:

```
cd /opt/ibm/db2/V11.1/instance
./db2iupgrade -u db2fenc1 db2inst2
```

b) View the log file, for example `/tmp/db2iupgrade.log.18463`. Verify that the upgrade was successful. Look for the message `DBI1070I Program db2iupgrade completed successfully`.

13. Check the installation level for both instances.

For more information, see db2level - Show DB2 service level command.

For each instance, run the `db2level` command as the instance owner.

For each instance, look for a return value of `DB2 v11.1.0.0`.

14. If you are using DB2 Administration Server (DAS), upgrade the service.

For more information, see Upgrading the DB2 Administration Server (DAS).

For example:

```
cd /opt/ibm/db2/V11.1/instance
./dasmigr
```

The value `DBI1070I Program dasmigr completed successfully` indicates success.

15. Upgrade your OpenPages database.

Perform this step as a user with SYSADM authority.

For more information, see Upgrading databases.

For example:

```
db2start
db2 upgrade database opx user opuser using password
```

16. Upgrade your Cognos database instance.

Perform this step as a user with SYSADM authority.

For more information, see Upgrading databases.

For example:

```
db2start
db2 upgrade database cognosdb user db2inst2 using password
```

17. Configure and enable DB2 Text Search, create the index, and schedule a job to synchronize the index.

For more information, see "Utilities for filtering on long string field content in a DB2 database" in the *IBM OpenPages GRC Administrator's Guide*.

18. Revalidate objects, rebind packages, and redeploy the Java routines for OpenPages in the OpenPages database.

    Perform these steps as the instance owner for the OpenPages database.

    a) Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/INSTALL_SCRIPTS directory.

    For example:

    ```
    cd /home/opuser/OP/OpenPages/DB2/INSTALL_SCRIPTS
    ```

    b) Revalidate the database objects.

    For example:

    ```
    clpplus -nw opuser/password@localhost:50000/opx
      @sql-wrapper revalidate.sql revalidate.log opuser
    ```

    c) Rebind the packages.

    For example:

    ```
    db2rbind opx -l opbind.log all
      -u db2admin -p password -r any
    ```

    d) Redeploy the Java routines for OpenPages.

    For example:

    ```
    ./manageOPJavaRoutines.sh opx openpage password
       remove /home/db2inst1/sqllib/function/jar/OPENPAGE
    ./manageOPJavaRoutines.sh OPX openpage password
       install /home/opuser/OP/OpenPages/DB2/INSTALL_SCRIPTS/opdb2udf.jar
    ls -lrt /home/db2inst1/sqllib/function/jar/OPENPAGE
    ```

19. Revalidate objects and rebind packages in the Cognos database.

    Perform these steps as the instance owner for the Cognos database.

    a) Revalidate the database objects.

    For example:

    ```
    db2 connect to cognosdb user db2admin using password
    db2 "call sysproc.admin_revalidate_db_objects()"
    ```

    b) Rebind packages in the Cognos database.

    For example:

    ```
    db2rbind cognosdb -l cogbind.log -u db2inst2 -p password
    ```

20. Optional: Back up the databases.

    - For the OpenPages database, run the following commands as the instance owner for the OpenPages database:

      ```
      mkdir db2v11bu
      cd db2v11bu
      db2 backup database opx to .
      ```

    - For the Cognos database, run the following commands as the instance owner for the Cognos database:

      ```
      mkdir db2v11bu
      cd db2v11bu
      db2 backup database cognosdb to .
      ```

21. Apply the IBM DB2 license.

For more information, see db2licm - License management tool command.

a) Extract the quick start activation file for IBM DB2.

b) Run the `db2licm` command.

For example:

```
db2licm -a /home/db2inst1/ese_u/db2/license/db2ese_u.lic
```

c) Verify the license by running the `db2licm -l` command.

22. Start all IBM OpenPages GRC Platform services.
23. Verify that DB2 Text Search is running.

```
db2connect to <openpages_database_name> user <openpages_database_user>
  using <database_user_password>
db2 "select count(*) from <openpages_database_user>.propertyvals_clob
  where contains(CLOB_VALUE, 'RPS') = 1"
```

Dropping the DB2 Text Search index and disabling DB2 Text Search

If DB2 Text Search is enabled in your source environment, drop the text search indexes, disable the text search service, remove the DB2 administrative task to update the indexes, and disable DB2 Text Search. Do this procedure before you back up the OpenPages database.

Procedure

1. Log on to a system as the OpenPages installation user, for example `opuser`.

   You can use any system with access to CLPPlus that can connect to the OpenPages GRC Platform database server.
2. Drop the DB2 Text Search index.

   a) Go to the *<OP_HOME>*`/aurora/bin/full-text-index` directory.

   b) Open a command or shell window and run the following command:

   ```
   clpplus -nw @sql-wrapper CustomIndexing_Step5_IndexDrop.sql
     <LOG_FILE_NAME> <DB2_SERVER_NAME> <DB2_PORT_NUMBER> <DATABASE_NAME>
     <OP_DB_USER> <OP_DB_PASSWORD> <FORCE_DROP_INDEX>
   ```

   For example

   ```
   clpplus -nw @sql-wrapper CustomIndexing_Step5_IndexDrop.sql
      CustomIndexing_Step5_IndexDrop.log localhost 50000 OPX OPENPAGE
      password Y
   ```

   Note: For more information about the script, see "Drop a long string index" in the *IBM OpenPages GRC Administrator's Guide*.
3. Run the following command to determine if DB2 Text Search is enabled.

   ```
   select * from all_tables where table_schema = 'SYSIBMTS';
   ```

   If the command returns any data, DB2 Text Search is enabled. Continue with the next step to disable DB2 Text Search.
4. Log on to the OpenPages database as the db2inst1 user.

   ```
   db2 connect to opx user opuser using password
   ```
5. Run the following command to disable DB2 Text Search.

   For more information, see SYSTS_DISABLE procedure - Disable current database for text search.

   ```
   db2 "call sysproc.systs_disable('','en_US',?)"
   ```

Alternatively, use these commands.

```
db2 GRANT SYSTS_ADM TO db2inst1
db2 grant SYSTS_MGR to db2inst1
db2 connect reset
db2ts start for text
export DB2DBDFT=OPX
db2ts DISABLE DATABASE FOR TEXT
```

6. Remove the DB2 administrative task to update the indexes

   For more information, see the following topic in the DB2 documentation: Removing a task from the administrative task scheduler (https://www.ibm.com/support/knowledgecenter/SSEPGG_11.1.0/com.ibm.db2.luw.admin.gui.doc/doc/t0054384.html).

Copy Java routine class files to the DB2 server

If you are using a new instance for the OpenPages database, copy the Java routine class files for IBM OpenPages GRC Platform to the IBM DB2 server before you create the reporting schema.

Perform this task after you have upgraded your database server to IBM DB2 version 11.1.

1. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
2. Copy the following files to the *DB2_HOME*`/FUNCTION` directory:
   - `opconvert.class`
   - `regexp.class`

   For example, on Microsoft Windows operating systems, the *<DB2_HOME>*`\FUNCTION` directory is *<install_path>*`\ibm\SQLLIB\FUNCTION`.

   On AIX or Linux operating systems, the default location is `/home/`*<db2_instance_owner>*`/sqllib/FUNCTION`.

Creating the OpenPages database on IBM DB2

IBM OpenPages GRC Platform requires an OpenPages database. You must create the database before you install IBM OpenPages GRC Platform.

Procedure

1. Log on to the DB2 database server computer as the DB2 database instance owner.
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
3. Verify that you have write permission on the `sql-wrapper.sql` file. If not, switch users or change the permission on the file by using the `chmod` command.
4. Edit the `sql-wrapper.sql` file to ensure that the variables are set correctly for your environment and save the changes.

   - On Windows operating systems, if required, modify the following properties to suit your environment:

     ```
     define opx_base_currency_iso_code='USD'
     define opx_dflt_stor_srv_root='c:\OpenPages\openpages-storage'
     define opx_op_admin_name='OpenPagesAdministrator'
     define opx_op_admin_pwd='OpenPagesAdministrator'
     define sqllib_dir='C:\IBM\SQLLIB'
     ```

   - On AIX or Linux operating systems, if required, modify the following properties to suit your environment.

     ```
     define opx_base_currency_iso_code='USD'
     define opx_dflt_stor_srv_root='opt/openpages-storage/'
     define opx_op_admin_name='OpenPagesAdministrator'
     define opx_op_admin_pwd='OpenPagesAdministrator'
     define sqllib_dir='home/db2inst1/sqllib'
     ```

5. On Linux or AIX, verify that you have execute permission on the `create-opx-db-srv.sh` script.
6. On Windows, start the DB2 command line processor (CLP). Click **All Programs** > **IBM DB2** > **IBM DB2 DB2COPY1** > **DB2 Command Window - Administrator**.
7. To create the database for OpenPages, run the `create-opx-db-srv.sh|.bat` script from the command line.

   Use the following table to replace the variables in the command-line options with values that are suitable for your environment.

Table 13: Options for the `create-opx-db-srv.sh|.bat` script

Variable	Description
database_name	The name of the OpenPages database **Note:** If you are upgrading OpenPages, use the name from your previous OpenPages environment. DB2 does not support restoring to a database with a different name.
path	The location of the database on the server
catalog_path	The location of the database alias on the local server On Windows operating systems, the *<catalog_path>* is the drive letter (C: or E:). On Linux or AIX operating systems, *<catalog_path>* is the absolute path (`/home/db2inst1`)

   - On Windows, type the following command:

     ```
     create-opx-db-srv.bat <database_name> <path>
        <catalog_path>
     ```

     Example: A database named OPX is created. The database and database alias are on the `D:` drive.

     ```
     create-opx-db-srv.bat OPX D: D:
     ```

   - On AIX or Linux, type the following command:

     ```
     ./create-opx-db-srv.sh <database_name> <path>
        <catalog_path>
     ```

     Example: A database named OPX is created. The database and database alias are in the `/home/db2inst1` directory.

     ```
     ./create-opx-db-srv.sh OPX /home/db2inst1 /home/db2inst1
     ```

8. If the database server is on a Windows operating system and the OpenPages installation user is not the DB2 database instance owner, run the following script:

   ```
   clpplus -nw <username>/<password>@<hostname>:
      <port>/<database_name>
      @sql-wrapper dba-grant.sql dba-grant.log <instance_owner_username>>
   ```

   - *username* is the user name of the OpenPages installation user (the user that is logged in to the system).
   - *password* is the password of the OpenPages installation user.
   - *instance_owner_username* is the DB2 database instance owner (the user who creates the database instance).

If the OpenPages installation user is the same as the DB2 database instance owner, no action is required.

The script explicitly grants control on the SYSTOOLS schema objects to the DB2 database instance owner.

9. If the database server is on a Windows computer, the OpenPages installation user is not the DB2 database instance owner, and the DB2 database instance owner is not the DB2 administration server (DAS) user, then run the following script:

```
clpplus -nw <username>/<password>@<hostname>:
   <port>/<database-name>
   @sql-wrapper dba-grant.sql dba-grant.log <das_user_name>
```

- *username* is the user name of the OpenPages installation user (the user that is logged in to the system).
- *password* is the password of the OpenPages installation user.
- *das_user_name* is the DB2 Administration server (DAS) user account.

The script explicitly grants control on the SYSTOOLS schema objects to the DAS user.

What to do next

Create the database objects. You can use the OpenPages installation program or you can create the schema by using scripts. See "OpenPages database object creation for DB2" on page 103.

Running the database creation scripts from the OpenPages application server computer

If your IBM OpenPages GRC Platform application server is not on the same computer as your database server, you can also run the database scripts remotely.

Before you begin

Ensure that your environment meets these prerequisites:

__ • The DB2 client software is installed on the application server, see "DB2 database client installations" on page 73

__ • The DB2 database server is running

__ • A database instance for the OpenPages database has been created

__ • Oracle compatibility mode is enabled

__ • You have updated the database manager configuration for the OpenPages database instance

__ • You have copied the Java routine class files and encryption files to the DB2 server from the OpenPages installation files.

__ • DB2 text search is enabled and configured

Procedure

1. Log on to the OpenPages GRC Platform application server computer as the DB2 administrator.
2. On Windows, start the DB2 command line processor (CLP). Click **All Programs** > **IBM DB2** > **IBM DB2 DB2COPY1** > **DB2 Command Window - Administrator**
3. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
4. To catalog the node, run the following script:
   - On AIX or Linux operating systems:

```
./db2-catalog-node.sh <node_name> <hostname> <port>
```

- On Windows operating systems:

```
db2-catalog-node.bat <node_name> <hostname> <port>
```

Table 14: Command-line variables for the db2-catalog-node.sh|.bat script	
Variable name	**Description**
node_name	The node name of the database partition server. The node name represents a local nickname that you can set for the computer that contains the database you want to catalog.
hostname	The host name or the IP address of the node where the target database is installed.
port	The port that the database server uses. The default port is 50000.

Example: On AIX or Linux operating systems:

```
./db2-catalog-node.sh OPNode OPAdmin 50000
```

On Windows operating systems:

```
db2-catalog-node.bat OPNode OPAdmin 50000
```

5. To create the database for OpenPages, run the `create-opx-db-clt` script.

   Replace the variables with your system values:

   - *database_name* is the name of the OpenPages database.
   - *path* is the location on which to create the database on the server.
   - *catalog_path* is the location of the database alias on the local computer.
   - *node_name* is the cataloged node name.
   - *instance_owner_usrname* is the user name of the DB2 account that owns the instance on the remote computer.
   - *instance_owner_password* is the password for the account that owns the database instance.
   - On AIX or Linux operating systems, type the following command:

     ```
     ./create-opx-db-clt.sh <database_name> <path>
        <catalog_path>
     ```

     Example: Create a remote database on a Linux operating system from an AIX-based computer. The DB2 database instance owner on the remote computer is `db2inst1`

     ```
     ./create-opx-db-clt.sh OPdb7 /usr /usr
        OPNode db2inst1 Db2_1234
     ```

   - On Windows operating systems, type the following command:

     ```
     create-opx-db-clt.bat <database_name>
        <path> <catalog_path>
        <node_name> <instance_owner_username>
        <instance_owner_password>
     ```

Example: Create a remote database on AIX or Linux operating systems from a Windows-based computer. The DB2 database instance owner on the remote computer is `db2inst1`.

```
create-opx-db-clt.bat OPdb7 /usr /usr
   OPNode db2inst1 Db2_1234
```

6. If the database server is on a Windows operating system and the OpenPages installation user is not the DB2 database instance owner, run the following script:

```
clpplus -nw <username>/<password>@<hostname>:
   <port>/<database_name>
   @sql-wrapper dba-grant.sql dba-grant.log <instance_owner_username>>
```

   - *username* is the user name of the OpenPages installation user (the user that is logged in to the system).
   - *password* is the password of the OpenPages installation user.
   - *instance_owner_username* is the DB2 database instance owner (the user who creates the database instance).

   If the OpenPages installation user is the same as the DB2 database instance owner, no action is required.

   The script explicitly grants control on the SYSTOOLS schema objects to the DB2 database instance owner.
7. If the database server is on a Windows computer, the OpenPages installation user is not the DB2 database instance owner, and the DB2 database instance owner is not the DB2 administration server (DAS) user, then run the following script:

```
clpplus -nw <username>/<password>@<hostname>:
   <port>/<database-name>
   @sql-wrapper dba-grant.sql dba-grant.log <das_user_name>
```

   - *username* is the user name of the OpenPages installation user (the user that is logged in to the system).
   - *password* is the password of the OpenPages installation user.
   - *das_user_name* is the DB2 Administration server (DAS) user account.

   The script explicitly grants control on the SYSTOOLS schema objects to the DAS user.

Preparing the database instances for OpenPages on DB2

You must prepare the IBM DB2 database instances that are used for the IBM OpenPages GRC Platform databases.

Before you begin

For more information about IBM OpenPages GRC Platform supported software, see "Software prerequisites" on page 25.

Tip: To verify the current version and service level of IBM DB2, use the `db2level` command.

About this task

To prepare the database instances, you must:

__ • Run the `enable-ora-compatibility` script to enable Oracle compatibility mode for the DB2 database instance that is used for the OpenPages schema.

Important: Oracle compatibility mode must not be enabled on the DB2 database instance that is used for the Cognos Analytics content store or on the database instance that is used for IBM Business Process Manager.

__ • Run the `opx-dbm-cfg` script to update the database manager configuration for the OpenPages database instance.

__ • Copy the Java routine class files to the DB2 database server installation location from the OpenPages installation files.

__ • Enable and configure DB2 text search.

For more information, see the *IBM OpenPages GRC Platform Administrator's Guide*.

Procedure

1. Log on to the DB2 database server as the DB2 instance owner.
2. Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/INSTALL_SCRIPTS directory.
3. On Linux and AIX, ensure that the DB2 instance owner has execute permission on the scripts in the INSTALL_SCRIPTS directory.
   - If the DB2 instance owner owns the directory, type the following command:

     ```
     chmod -R 755 /<path>/INSTALL_SCRIPTS
     ```
   - If the DB2 instance owner belongs to the same group as the user who owns the directory, type the following command:

     ```
     chmod -R 775 /<path>/INSTALL_SCRIPTS
     ```
   - If the DB2 instance owner is part of other groups, type the following command:

     ```
     chmod -R 777 /<path>/INSTALL_SCRIPTS
     ```
4. Edit the sql-wrapper.sql file to ensure that the variables are set correctly for your environment and save the changes.
   - On Windows operating systems, if required, modify the following properties to suit your environment:

     ```
     define opx_base_currency_iso_code='USD'
     define opx_dflt_stor_srv_root='c:\OpenPages\openpages-storage'
     define opx_op_admin_name='OpenPagesAdministrator'
     define opx_op_admin_pwd='OpenPagesAdministrator'
     define sqllib_dir='C:\IBM\SQLLIB'
     ```
   - On AIX or Linux operating systems, if required, modify the following properties to suit your environment.

     ```
     define opx_base_currency_iso_code='USD'
     define opx_dflt_stor_srv_root='opt/openpages-storage/'
     define opx_op_admin_name='OpenPagesAdministrator'
     define opx_op_admin_pwd='OpenPagesAdministrator'
     define sqllib_dir='home/db2inst1/sqllib'
     ```
5. Enable Oracle compatibility mode on the OpenPages database instance.
   - On Windows, open a command window and type db2cmd to start the DB2 command line processor (CLP). Then, type enable-ora-compatibility.bat.
   - On AIX or Linux, type ./enable-ora-compatibility.sh.

   Note: If you have multiple instances of the DB2 server, ensure that you choose the DB2COPY of the OpenPages database instance.

   Restriction: DB2 compatibility features are enabled at the database instance level and cannot be disabled. Keep the selected compatibility level for the life of the OpenPages database.

   To confirm that Oracle compatibility mode is set, type db2set -all. Verify that one of the listed profile variables is DB2_COMPATIBILITY_VECTOR=ORA.
6. Update the database manager configuration for the OpenPages database instance.
   - On Windows, open a command window and type db2cmd to start the DB2 command line processor (CLP). Then, type opx-dbm-cfg.bat.
   - On AIX or Linux, type ./opx-dbm-cfg.sh.

7. Copy the Java routine class files for OpenPages to the DB2 server.
   a) Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/INSTALL_SCRIPTS directory.
   b) Copy the following files to the *<DB2_HOME>*\FUNCTION directory:
      - opconvert.class
      - regexp.class

      For example, on Windows, the *<DB2_HOME>*\FUNCTION directory is *<install_path>*\ibm\SQLLIB\FUNCTION.

      On AIX or Linux, the default location is /home/*<db2_instance_owner>*/sqllib/FUNCTION.
8. Enable and configure text search. For more information, see DB2 Text Search (http://www.ibm.com/support/knowledgecenter/SSEPGG_11.1.0/com.ibm.db2.luw.admin.ts.doc/doc/c0051296.html).
9. Copy the encryption function for OpenPages to the DB2 server.
   a) Go to the/OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/INSTALL_SCRIPTS /bin/<PLATFORM> directory.
   b) Copy the files to the following directories:
      - *<DB2_HOME>*\FUNCTION
      - *<DB2_HOME>*\FUNCTION\unfenced

What to do next

You can create the database instance for OpenPages.

Operating system user accounts for IBM DB2 databases

Operating system user accounts affect the procedures that are used to create the IBM OpenPages GRC Platform repository and Cognos Analytics content store.

Restriction: You must use two separate databases - one for the Cognos Analytics content store and one for the IBM OpenPages GRC Platform database.

DB2 instance owner

This user controls all DB2 processes and owns all file systems and devices that are used by the databases within the database instance.

For Windows operating systems, the default user is db2admin.

For Linux and AIX operating systems, the default user is db2inst1.

The user account for the DB2 instance owner is created as a prerequisite step to installing DB2 software and instance.

DB2 administration server (DAS) user

The user ID for the DB2 administration server user.

For Windows operating systems, the default user is db2admin.

For Linux and AIX operating systems, the default user is dasusr1.

Important: To simplify user administration, when you install the DB2 database, ensure that you assign the DB2 instance owner as the DAS user.

OpenPages installation user

This user installs OpenPages GRC Platform. The user account can create the OpenPages database automatically by using the OpenPages installation program or manually by running scripts.

Restriction: On Windows, if the OpenPages installation user is not the same as the DB2 instance owner, the OpenPages installation user must run the dba-grant.sql script. The script explicitly grants control on SYSTOOLS schema objects to the DB2 database instance owner.

For information on manually running the script, see "Creating the OpenPages database on IBM DB2" on page 65.

Database schema owners

The following distinct database user accounts must exist before you install OpenPages GRC Platform and Cognos Analytics:

- OpenPages database user account.
- Cognos Analytics content store user account

On Linux and AIX operating systems, the user names for the OpenPages database user account must not be the same as the group name. For example, `opuser:opuser` is not allowed.

DB2 guidelines for creating users

Important: The user accounts must match the schema names on which they operate.

Follow the DB2 guidelines for creating user names (http://www.ibm.com/support/knowledgecenter/SSEPGG_11.1.0/com.ibm.db2.luw.admin.dbobj.doc/doc/c0007248.html).

For more information about passwords for your DB2 user accounts, see the IBM DB2 documentation (http://www.ibm.com/support/knowledgecenter/SSEPGG_11.1.0/com.ibm.swg.im.dbclient.install.doc/doc/c0060749.html)

Users and groups for application servers on Linux or AIX that use DB2 databases

To install the DB2 database client, IBM WebSphere Application Server , and the IBM OpenPages GRC Platform application, you must create two users and one group. You can create a separate user and group to install IBM WebSphere Application Server.

To install the DB2 database client, create and configure the required users and groups as specified in the following table.

Table 15: Required users and groups for application servers

User	Assign to Groups	Permissions	Reason
`db2user`	The group is assigned during the installation of the DB2 client.	Read, write, execute permission to the DB2 client installation directory.	Required by DB2 database client installation program.
`wasuser`	IBM WebSphere Application Server installation.	Read, write, execute permission to the IBM WebSphere Application Server installation directory.	You can create a non-root user to install the IBM WebSphere Application Server software. You can create a separate user or use `opuser`. If the `wasuser` and `opuser` are separate users, they must belong to the same primary group.

Table 15: Required users and groups for application servers (continued)			
User	**Assign to Groups**	**Permissions**	**Reason**
`opuser`		Read, write, execute permission to the following directories: • DB2 database client installation directory. • IBM WebSphere Application Server installation directory. • Java SDK or JRE installation directory. • Cognos Analytics installation directory.	The user account that installs OpenPages GRC Platform.

DB2 database client installations
Install an IBM DB2 database client so that the IBM OpenPages GRC Platform application servers and reporting servers can connect to the DB2 database server.

Use the following checklist to guide you through the required setup:

__ • Install the DB2 client software.

Use the DB2 Setup wizard to install the IBM Data Server Client. For information, see the DB2 documentation:

– Installing DB2 database servers using the DB2 Setup wizard (Windows)
– Installing DB2 servers using the DB2 Setup wizard (Linux and UNIX)

__ • Create a DB2 database client instance on the client computer (AIX and Linux only).

__ • Configure the DB2 client and server connection.

__ • Test the connection between the database server and the client.

For information about the installation methods for IBM data server clients in AIX and Linux environments, see Installing IBM data server clients (Linux and UNIX).

Creating and configuring a DB2 client instance in AIX and Linux environments
If you are using Linux or AIX application servers or reporting servers, create a DB2 client instance on the application server and reporting server computers.

In Windows environments, the client instance is created by default when the client software is installed.

For more information, see db2icrt - Create instance command.

Procedure

1. Log on to the application server computer as a root user.
2. Go to the *<DB2DIR>*`/instance/` directory.

   <DB2DIR> is installation location of the DB2 client software.

   - On AIX operating systems, the default DB2 installation directory is `/opt/IBM/db2/`*`version`*`/instance`.
   - On Linux operating systems, the default installation directory is `/opt/ibm/db2/`*`version`*`/instance`.
3. To create an instance for a client, run the following command:

```
db2icrt -s client <instname>
```

The *-s* option is used when you create an instance other than the default instance that is associated with the installed product from which you run the `db2icrt` command.

<instname> is the user name of the instance owner.

Example: `db2icrt -s client db2inst2`

The default location of the DB2 instance `/home/db2inst2/sqllib`.

4. Log on to the reporting server computer as a root user, and repeat steps 2 and 3.

Testing the connection between the DB2 client and server

If the IBM OpenPages GRC Platform application server is not on the same computer as the database server, test the connection. Ensure that you can connect to the IBM DB2 server from the OpenPages application server computer.

Before you begin

You must have System Administrative (SYSADM) or System Controller (SYSCTRL) authority. Otherwise, ensure that the catalog_noauth option is set to ON. You cannot use root authority when you catalog a node.

Procedure

1. Log on to the OpenPages application server as a DB2 user.
2. If you are using Microsoft Windows, start the DB2 command line processor.

   From the command prompt, type db2cmd, or from the **Start** menu, click **All Programs** > **DB2COPY1** > **Command Window - Administrator**.
3. Test the connection from the client to the database.
   a) To verify that the node was created, issue the following command to list the contents of the node directory:

   `db2 list node directory show detail`

   A list of the nodes that you created is displayed.

```
Node Directory

 Number of entries in the directory = 1

Node 1 entry:

 Node name                      = OPNode_Name
 Comment                        =
 Directory entry type           = LDAP
 Protocol                       = TCPIP
 Hostname                       = database_server_name
 Service name                   = 50000
```

   b) To list the database directory, run the following command:

   `db2 list database directory`

   A list of the databases is displayed.

   c) To connect to the remote database from the client, type the following command

```
db2 => connect to <database_alias> user <userid>
```

   Example: `connect to opdb user opuser`

   If the connection is successful, a message similar to the following message is displayed:

   `Database Connection Information`

   `Database server = DB2 version`

   `SQL authorization ID = opuser`

```
Local database alias = opdb
```

Checklist for the database server (Oracle)

If you use an Oracle database server, do these tasks before you install IBM OpenPages GRC Platform:

- Check that all of the required ports are available. See “Port assignments ” on page 102.
- If the database server is running on Linux or AIX, set up the operating system users and groups for Oracle (`oinstall`, `dba`, `oracle`). See “Creating users and groups on the Oracle database server for Linux operating systems” on page 79.
- Install Oracle. See “Oracle database server installations” on page 75.
- Review the list of Oracle package dependencies.

  To function correctly, the OpenPages Oracle packages must have access to some standard Oracle objects. If you are using a standard Oracle deployment, access to these objects is granted by default.

  Some environments, however, might restrict the default Oracle access model and remove public access from some of the objects. Review the list of package dependencies to ensure access is granted. See “Oracle package dependencies” on page 77.
- Add a listener for the OpenPages database. See “Adding an Oracle listener for the OpenPages GRC Platform database” on page 80.
- Create a database instance for OpenPages. See “Creating an Oracle database instance for the OpenPages GRC Platform database” on page 80.
- Add a net service name for each server in your OpenPages deployment. See “Add a local net service name for the OpenPages GRC Platform database” on page 81.
- Set environment variables. See “Setting the Oracle environment variables for the database server” on page 81.

Oracle database server and client setup for OpenPages GRC Platform installations

Install and configure database server software to use with IBM OpenPages GRC Platform.

Install the database client software (Oracle Admin client) on all OpenPages application servers, the deployment manager server, and on all reporting servers.

Oracle database server installations

IBM OpenPages GRC Platform requires a database server. Use the installation instructions from the vendor to install the Oracle database server on the OpenPages database server. After you install Oracle database, some configuration is required.

Restriction: Do not install Oracle database server or Oracle client software into a directory that contains spaces.

Important: The password for database users (such as SYSTEM, SYS, DBSNMP, SYSMAN) cannot contain spaces or special characters due to database requirements and conflicts with OpenPages scripts.

After installing the Oracle database server, you must install Oracle client software on all application server computers.

Oracle 12.1.0.2 database server considerations

If you have installed the 64-bit Oracle 12.1.0.2 database server, and you want to install the 32-bit Oracle 12.1.0.2 client on the same computer, some manual configuration might be required.

For more information, see “Install the 32-bit Oracle 12.1.0.2 client and 64-bit Oracle 12.1.0.2 database server on the same computer” on page 354.

Upgrading the Oracle database server to 12.1.0.2

If you are upgrading from an existing installation of OpenPages GRC Platform with Oracle 11.2.0.4 to OpenPages GRC Platform with Oracle 12.1.0.2, you must complete the following steps to upgrade the Oracle database server.

Procedure

1. Perform the pre-upgrade steps.
   a) Stop all OpenPages application servers, Oracle database servers, and Cognos servers.

      For more information, see Chapter 11, "Starting and stopping servers," on page 253.

   b) Back up the existing OpenPages environment by using the OPBackup and OPCCBackup utilities.

      For more information, see "Backing up the OpenPages database (Oracle)" on page 215.

      If you prefer, you can back up only the databases, by using the Oracle backup tool.

   c) Update the Oracle path in the environment variables on the Oracle server.

      If the Oracle 11.2.0.4 database client is running on the same computer as the Oracle server, ensure that you note the Oracle 11.2.0.4 client path information because it is required in step 5b.

      On Microsoft Windows, for example, if Oracle 11.2.0.4 is installed in `C:\app\ product \11.2.0\dbhome_1`, change the path to `C:\app\product\12.1.0\dbhome_1`

      On UNIX, if Oracle 11.2.0.4 is installed in `/home/oracle/app/oracle/product/11.2/ dbhome_1`, change the path to `/home/oracle/app/oracle/product/12.1/dbhome_1`
2. Upgrade the Oracle database server from version 11.2.0.4 to version 12.1.0.2.
   a) Run the Oracle 12.1.0.2 installation wizard.

      Accept the default options on all pages, except for the pages described here.

      For full information, see the Oracle documentation.

   b) On the **Select Installation Option** page, select **Upgrade an existing database**.

   c) For Windows only:

      1) On the **Oracle Home User** page, select **Use Windows Built-in Account**.
      2) On the **Specify Installation Location** page, ensure the **Oracle base** and **Software location** show the same path that you specified in step 1c.

      For UNIX only, follow these steps on the **Perform Prerequisite Checks** page if errors are shown:

      1) Select **Fix & Check Again**, and follow the instructions.
      2) Run the following command as a root user to increase the swap size:

```
dd if=/dev/zero of=/tmp/swap1 bs=1M count=512
mkswap /tmp/swap1
swapon /tmp/swap1
```

      Where `count` is the size to increase.

      When the errors are fixed, you can continue with the installation.
3. Update the Oracle listener details from the Oracle Net Configuration Assistant wizard.

   On the **Listener Configuration, Listener Name** page, update the **Listener name** to the name specified in the `listener.ora` file of the Oracle 11.2.0.4 installation.

   Tip: You can find the value of the `listener.ora` from your Oracle 11.2.0.4 server environment. For example, `C:\app\OPDB\product\11.2.0\dbhome_1\NETWORK\ADMIN`
4. Migrate the data from the Database Upgrade Assistant.
   a) On the **Select Database** page, ensure the **Target Oracle Home** and **Source Oracle Home** values are correct.
5. Perform the post upgrade steps.

a) Stop the Oracle 11.2.0.4 listener service and change the startup type to manual.

   This step is required if your system restarts after the Oracle server upgrade is complete.

b) Revert to the original Oracle 11.2.0.4 path in the environment variables that you updated in step 1c.

   This step is required only if the Oracle 11.2.0.4 database client is running on the same computer as the updated Oracle server.

c) Start the Oracle 12.1.0.2 listener service.

Oracle package dependencies

To function correctly, the IBM OpenPages GRC Platform Oracle packages must have access to some standard Oracle objects.

In a standard Oracle deployment, database users can access the objects listed in the following tables. Some customer environments might restrict the default Oracle access model and remove public access from some of these objects. To use the OpenPages GRC Platform application, users require access to all objects in the tables. Verify that access to these objects has not been revoked before you install OpenPages.

The following tables list the standard Oracle objects to which the OpenPages application requires access. The tables show the base object, the object name, and the public synonym for the Oracle database objects.

Table 16: Base objects for the package object type

Base Object	Object Name	Public Synonym
SYS.DBMS_LOB	DBMS_LOB	PUBLIC.DBMS_LOB
SYS.DBMS_LOCK	DBMS_LOCK	PUBLIC.DBMS_LOCK
SYS.DBMS_JOB	DBMS_JOB	PUBLIC.DBMS_JOB
SYS.DBMS_OUTPUT	DBMS_OUTPUT	PUBLIC.DBMS _OUTPUT
SYS.DBMS_RANDOM	DBMS_RANDOM	PUBLIC.DBMS _RANDOM
SYS.DBMS_SESSION	DBMS_SESSION	PUBLIC.DBMS _SESSION
SYS.DBMS_SNAPSHOT	DBMS_MVIEW	PUBLIC.DBMS _MVIEW
SYS.DBMS_SQL	DBMS_SQL	PUBLIC.DBMS_SQL
SYS.DBMS_STANDARD	DBMS_STANDARD	PUBLIC.DBMS_ STANDARD
SYS.DBMS_STATS	DBMS_STATS	PUBLIC.DBMS _STATS
SYS.DBMS_UTILITY	DBMS_UTILITY	PUBLIC.DBMS _UTILITY
SYS.ODCICONST	ODCICONST	PUBLIC.ODCICONST
SYS.PLITBLM	PLITBLM	PUBLIC.PLITBLM
SYS.STANDARD	STANDARD	N/A
SYS.UTL_I18N	UTL_I18N	PUBLIC.UTL_I18N

Table 17: Base objects for the view object type

Base Object	Object Name	Public Synonym
SYS.ALL.PROCEDURES	ALL_PROCEDURES	PUBLIC.ALL _PROCEDURES
SYS.ALL_TAB_PRIVS	ALL_TAB_PRIVS	PUBLIC.ALL _TAB_PRIVS
SYS.NLS_SESSION_ PARAMETERS	NLS_SESSION _PARAMETERS	PUBLIC.NLS _SESSION _PARAMETERS
SYS.PRODUCT_COMPONENT_ VERSION	PRODUCT_COMPONENT _VERSION	PUBLIC.PRODUCT_ COMPONENT _VERSION
SYS.USER_CONS_COLUMNS	USER_CONS_COLUMNS	PUBLIC.USER _CONS_ COLUMNS
SYS.USER_CONSTRAINTS	USER_CONSTRAINTS	PUBLIC.USER_ CONSTRAINTS
SYS.USER_DB_LINKS	USER_DB_LINKS	PUBLIC.USER _DB_LINKS
SYS.USER_IND_COLUMNS	USER_IND_COLUMNS	PUBLIC.USER_IND_ COLUMNS
SYS.USER_INDEXES	USER_INDEXES	PUBLIC.USER _INDEXES
SYS.USER_OBJECTS	USER_OBJECTS	PUBLIC.USER _OBJECTS
SYS.USER_SEGMENTS	USER_SEGMENTS	PUBLIC.USER _SEGMENTS
SYS.USER_SEQUENCES	USER_SEQUENCES	PUBLIC.USER_ SEQUENCES
SYS.USER_SOURCE	USER_SOURCE	PUBLIC.USER _SOURCE
SYS.USER_TAB_COLS	USER_TAB_COLS	PUBLIC.USER _TAB_COLS
SYS.USER_TAB_COLUMNS	USER_TAB_COLUMNS	PUBLIC.USER_TAB_ COLUMNS
SYS.USER_TABLES	USER_TABLES	PUBLIC.USER _TABLES
SYS.USER_TABLESPACES	USER_TABLESPACES	PUBLIC.USER_ TABLESPACES
SYS.USER_TRIGGERS	USER_TRIGGERS	PUBLIC.USER _TRIGGERS

Users also require access to all synonyms. If any public synonyms are removed from a default Oracle deployment, you must create a private synonym to the object in the OpenPages GRC Platform application user schema.

Follow these steps to grant explicit permission to an object:

1. Log on to a computer with SQL*Plus and access to the database server.
2. From the command line, log on to SQL*Plus:

   ```
   sqlplus sys/<password>@<tns_alias> as sysdba
   ```

3. At the SQL prompt, type the following command for the objects listed in Table 16 on page 77:

   ```
   grant execute on <object_name> to public;
   ```

   Type the following command for the objects listed in Table 17 on page 78:

   ```
   grant select on <object_name> to public;
   ```

Each package object requires the EXECUTE permission. All other objects require the SELECT permission.

Creating users and groups on the Oracle database server for Linux operating systems
For Linux installations, create and configure the `oinstall` and dba groups and the `oracle` user on the server that hosts the Oracle database.

The users and groups must be created and configured by a user with SYSADMIN privileges and access to `root`.

For more information, see the Oracle documentation.

If you are installing a cluster environment, you must create these users on the cluster administrator server and on each cluster member.

About this task

Use the following table to help you create the required users and user groups for the database server.

Table 18: Required users and groups for Oracle database servers

User	Assign to Groups	Permissions	Reason
`oracle`	`oinstall`; dba `oinstall` is the primary group for this user.	Read, write, execute permission to the Oracle Admin client installation directory.	Required by Oracle database installation program. **Important:** The password for this user cannot contain spaces or special characters due to conflicts with OpenPages scripts.

Procedure

1. Log on to the database server as `root`.
2. Create the groups: `oinstall` and dba.
   a) Open a Linux shell .
   b) Type the following command:

      ```
      groupadd oinstall
      ```

      This group is the primary group for the `oracle` user. This group is the inventory group.

      Note: The Oracle database requires this name.
   c) Type the following command:

      ```
      groupadd dba
      ```

Note: The Oracle database requires this name.

3. Create a user that is called `oracle`, assign the initial login group (`oinstall`), and add the user to the dba group.
   a) Go to the `/usr/sbin/` directory
   b) Type the following command:

```
/usr/sbin/useradd -m -g oinstall -G dba oracle
```

4. Change the password for the `oracle` user by using the following command:

```
passwd oracle
```

5. At the **New Password** prompt, enter a new password.

Adding an Oracle listener for the OpenPages GRC Platform database
You must manually add an Oracle database listener for the IBM OpenPages GRC Platform database.

Procedure

1. Log on to your database server as a user with administrative privileges.
2. Start the Net Configuration Assistant.
   a) Open a Command Prompt window as a user with Administrative privileges.
   b) Go to the *<ORACLE_HOME>*`/bin` directory.
   c) To start the Net Configuration Assistant, type the following command: `netca`.
3. Accept the default options on all pages, except for the pages described here. For full information, see the Oracle documentation.
   a) On the **Listener Configuration, Listener Name** page, ensure the listener name that you specify is unique in the current Oracle Home
   b) On the **TCP/IP Protocol** page, choose a port.

Creating an Oracle database instance for the OpenPages GRC Platform database
You must create an Oracle database instance for OpenPages GRC Platform to use.

Note: OpenPages GRC Platform supports non-CDB databases only.

Procedure

1. Log on to your Oracle database server as a user with administrative privileges.
2. Start the Database Configuration Assistant.
   a) Open a command prompt window as a user with administrative privileges.
   b) Go to the *<ORACLE_HOME>*`/bin` directory.
   c) To start the Database Configuration Assistant, type the following command: `dbca`.
3. Accept the default options on all pages, except for the pages described here. For full information, see the Oracle documentation.
4. On the **Initialization Parameters** page, change the following settings.
   a) On the **Memory** tab, click **Custom** and then set the following options:
      - **Memory Management** to `Automatic Shared Memory Management`.
      - **SGA Size** field to `1024`.
      - **PGA Size** field to `768`.
   b) On the **Sizing** tab, set the following options:
      - **Block Size** to `8192`.
      - **Processes** to `250`.

c) On the **Character Sets** tab, select **Use Unicode (AL32UTF8)** and set the **National Character Set** option to **AL16UTF16 - Unicode UTF-16 Universal character set**.

You must create your database with the AL32UTF8 character set.

Add a local net service name for the OpenPages GRC Platform database
The database client uses a net service name to connect to the IBM OpenPages GRC Platform repository.

You must add a net service name, with the appropriate host, port, and service name details, for each server in the OpenPages GRC Platform deployment.

For more information on creating a net service name, see the Oracle documentation.

Setting the Oracle environment variables for the database server
After you install the Oracle database server, you must set the Oracle environment variables on the OpenPages database server computer.

The following table lists the environment variables required for AIX and Linux operating systems. If you are using Microsoft Windows, you need to set only the `ORACLE_HOME` environment variable.

Table 19: Oracle environment variables

Environment variables	**Description**
ORACLE_SID	Specifies the database service name. **Restriction:** The SID is case-sensitive in AIX and Linux environments.
ORACLE_HOME	Specifies the installation location or top-level directory structure for the database installation.
NLS_LANG	Specifies the database character set that is configured during the database installation. The default value is `AMERICAN_AMERICA.AL32UTF8` **Note:** To display non-English characters for Japanese locales, set the variable to the following value: `NLS_LANG=JAPANESE_JAPAN.JA16SJISTILDE`
TNS_ADMIN	Specifies the location of the `tnsnames.ora` file. The default location is the *<ORACLE_HOME>*`/network/admin` directory.

On Windows:

1. Log on to the database server as a user with administrative privileges.
2. Right-click **My Computer** > **Properties**.
3. Click **Advanced system settings** > **Environment Variables**.
4. In the **System Variables** pane, click **New**.
5. Add the `ORACLE_HOME` variable, then click **OK**.

   For example: `ORACLE_HOME=C:\app\Administrator\product\12.1.0\dbhome_1`
6. Select the `PATH` variable in the **System Variables** pane, and click **Edit**.
7. In the **Edit System Variable** box, add the path to `ORACLE_HOME` at the start of the `PATH` variable.

   `%ORACLE_HOME%\bin`

   By default, the `PATH` variable already includes the path `%ORACLE_HOME%\bin` after you install the Oracle database server software.
8. Click **OK** twice to exit.

On UNIX:

1. Log on to the database server as the user who installed the Oracle database server.
2. Open the user profile, and set the ORACLE_SID, NLS_LANG, ORACLE_HOME, and TNS_ADMIN variables.

   Important: Use the syntax and delimiters that are appropriate for the shell that you are using.

   For example:

   ```
   export ORACLE_SID=OP
   export NLS_LANG=AMERICAN_AMERICA.AL32UTF8
   export ORACLE_HOME=/home/oracle/app/oracle/product/12.1.0/dbhome_1
   export TNS_ADMIN=$ORACLE_HOME/network/admin
   ```

3. Append the location of ORACLE_HOME/bin to the PATH environment variable.

   For example:

   ```
   export PATH=$ORACLE_HOME/bin:$PATH
   ```

4. Refresh the profile.

   For example, on Linux, open a shell and run the following command:

   ```
   ./home/oracle/.bash_profile
   ```

   On AIX, open a shell and run the following command:

   ```
   ./home/oracle/.profile
   ```

Increasing the Oracle connection limit
In clustered environments, you must increase the number of users who can connect to the database instance.

Procedure

1. Log on to the database server as a user with administrative privileges.
2. To start the Oracle Enterprise Manager console, open a web browser and type `https://<oracle_server_name>:<port>/em`

   If you are using Oracle 12.1.0.2, the default port number is 5500.
3. Log on to the Oracle Enterprise Manager console by using the following syntax: `sys/<password>@sysdba`.
   a) For the **User Name**, enter `sys`.
   b) Enter the password for the `sys` user.
   c) From the **Connect As** list, select **SYSDBA**.
4. On the Oracle Enterprise Manager home page, click the **Server** tab.
5. Under **Database Configuration**, click **Initialization Parameters**.
6. On the **Initialization Parameters** page, click the **SPFile** tab.
7. Locate the **Processes** parameter.

   If necessary, use the search function by entering `Processes` in the **Name** field and then clicking **Go**.
8. Enter a value in the **Processes** field.

   In a clustered environment, for best performance allocate sufficient processes for each IBM OpenPages GRC Platform application instance and each corresponding Cognos instance.

   For a two-node OpenPages GRC Platform environment, use the following settings:

OpenPages
Configure 75 processes for each OpenPages instance.

CommandCenter
Configure 80 processes for each OpenPages CommandCenter instance.

Database processing usage
Configure 60 processes for database connection processing and background processes.

By default, this setting is 250 processes and 280 sessions for a two-node OpenPages environment. If you have two or more application servers, increase the number of processes.

9. Click **Apply**.

   You are prompted to restart the server.
10. To restart the server, select **Immediate**.

Starting and stopping the Oracle database server in a Windows environment
Use Windows services to start or stop the Oracle database instance.

Procedure

1. Log on to the database server as a user with administrative privileges.
2. Click **Start** > **All Programs** > **Administrative Tools** > **Services**.
3. Start the Oracle database listener service, which connects the user to the Oracle database instance
4. To start the Oracle database instance, right-click the service name (`OracleService`*`SID`*) and select **Start**.

Oracle database client installations
You install the Oracle database client on each IBM OpenPages GRC Platform application server so that it can connect to the Oracle database server remotely and administer the OpenPages database.

If the Oracle database server is installed on the same computer as the application server, the Oracle Admin client is not required.

The 32-bit Oracle database client is required by the reporting server. If you are using the same computer for the application server and reporting server, you must install the 32-bit version.

Review the following tasks before you install the Oracle Admin client software:

- "Setting the ORACLE_HOME environment variable on the OpenPages application servers" on page 85.
- "Testing the connection to the OpenPages database from the Oracle database client" on page 86.

For information on installing the Oracle Admin client software, see the Oracle documentation.

Creating users and groups for application servers on UNIX that use Oracle databases
To install the Oracle Admin client, IBM WebSphere Application Server, and the IBM OpenPages GRC Platform application, you must create two users and one group on AIX and Linux operating systems. You can create a separate user and group to install IBM WebSphere Application Server.

About this task

To install the Oracle Admin client, create and configure the `oinstall` group and the `oracle` user on the server that hosts the OpenPages application.

Table 20: Required users and groups for application servers (Linux and AIX)			
User	**Assign to Groups**	**Permissions**	**Reason**
`oracle`	`oinstall` The primary group for the `oracle` user.	Read, write, execute permission to the Oracle Admin client installation directory.	Required by Oracle Admin client installation program. For information on creating standard Oracle users and user groups, see the Oracle documentation.
`wasuser`	IBM WebSphere Application Serverinstallation	Read, write, execute permission to the WebSphere Application Server installation directory.	You can create a non-root user to install the IBM WebSphere Application Server software. You can create a separate user and group or use the `opuser` user.
`opuser`	`oinstall`	Read, write, execute permission to the following directories: • *<OP_HOME>*`/tmp` directory. • Oracle Admin client installation directory and *<ORACLE_HOME>* directory. • IBM WebSphere Application Server installation directory. • Java SDK or JRE installation directory. • Cognos Analytics installation directory. User must include *<ORACLE_HOME>*`/bin` in the path to run SQL*Plus commands.	Required by the OpenPages installation.

Procedure

1. Log on to the application server as the `root` user and open a shell.
2. To create a group called `oinstall`, enter the following command:

   AIX:

   ```
   mkgroup oinstall
   ```

   Linux:

   ```
   groupadd oinstall
   ```

   Restriction: The Oracle Admin Client installer requires that this group is named `oinstall`.
3. To create the `oracle` user and assign the user to the `oinstall` group, go to the `/usr/sbin/` directory and enter the following command:

   ```
   /usr/sbin/useradd -m -g oinstall oracle
   ```

   Restriction: The Oracle Admin Client installer requires that this user is named `oracle`.

4. Use the following command to change the password for the `oracle` user:

   ```
   passwd oracle
   ```

5. Enter a new password at the **New Password** prompt.
6. To install the OpenPages application, `opuser` must exist.

   If this user does not already exist, create the user:

   ```
   useradd -m -g oinstall <name>
   ```

   If the user already exists, assign it to the `oinstall` group:

   a. Obtain the groups to which `opuser` belongs by using the `id opuser` command.

   b. Add the `oinstall` group to its supplementary groups:

      ```
      usermod -G group1,group2,...,oinstall opuser
      ```

   Example:

   Run the command `id opuser`.

   The output from the command window shows that `opuser` is assigned to the groups `opgroup` and `staff`:

   ```
   uid=210(opuser) gid=206(opgroup) groups=1(staff)
   ```

   Run the command `usermod -G staff,oinstall opuser`

   Run the command `id opuser` to verify whether `opuser` has been assigned to the `oinstall` group successfully.

   The output from the command window shows that `opuser` is assigned to the groups `staff` and `oinstall`:

7. If you created a new `opuser` in the previous step, change the password by using the following command:

   `passwd <name>`

   Restriction: The password cannot contain spaces or special characters.

8. At the **New Password** prompt, enter a new password.
9. Grant read, write, and execute permissions for `opuser` to the `ORACLE_HOME` directory. Run the following command by using SQL*Plus:

   ```
   chmod -R 775 /home/oracle
   ```

10. Grant read, write and execute permissions for `opuser` to the IBM WebSphere Application Server installation directory, the Java SDK or IBM JRE installation directory, and the Cognos Analytics installation directory.

Setting the ORACLE_HOME environment variable on the OpenPages application servers

Set up the `ORACLE_HOME` environment variable to point to the directory where the Oracle database client software is installed. Set the variable on the admin application server and each non-admin application server.

Procedure

1. Log on to the application server.

   On Microsoft Windows, log on as a user with administrative privileges and full access to the local server drives.

   For UNIX, log in as a `non-root` user, such as the `opuser` user that you created for the IBM OpenPages GRC Platform installation.

2. Set the ORACLE_HOME environment variable to point to the Oracle Admin Client installation directory.

   On Windows:

   a. Right-click **My Computer** > **Properties**.
   b. Click **Advanced system settings** > **Environment Variables**.
   c. Click **New** in the **System Variables** panel.
   d. Add the ORACLE_HOME variable to the **New System Variable** box, then click **OK**.

      For example: `ORACLE_HOME=C:\app\Administrator\product\12.1.0\client_1`
   e. Select the PATH variable in the **System Variables** panel, and click **Edit**.
   f. In the **Edit System Variable** box, add the path to ORACLE_HOME at the start of the PATH variable.

      `%ORACLE_HOME%\bin`

      By default, the PATH variable already includes the path *<ORACLE_HOME>*`\bin` after you install the Oracle client software.
   g. Click **OK** twice to exit.

   On UNIX, add the ORACLE_HOME variable to the profile.

   - On Linux, the profile is `/home/`*<user>*`/.bash_profile`
   - On AIX, the profile is `/home/`*<user>*`/.profile`

   Where *<user>* is the person who logs in to the operating system and creates the OpenPages installation.

   For example:

   ```
   export ORACLE_HOME=/home/oracle/app/oracle/product/12.1.0/client_1
   ```

3. Append the location of *<ORACLE_HOME>*`/bin` to the PATH environment variable.

   For example:

   ```
   export PATH=$ORACLE_HOME/bin:$PATH
   ```

4. Refresh the profile.

   For example, on Linux, open a shell and run the following command:

   ```
   . /home/opuser/.bash_profile
   ```

   On AIX, open a shell and run the following command:

   ```
   . /home/opuser/.profile
   ```

Testing the connection to the OpenPages database from the Oracle database client

Test whether the SQL*Net connect string can connect to the IBM OpenPages GRC Platform database on the Oracle database server from the Oracle database client.

Procedure

1. Copy the file *<ORACLE_HOME>*`/network/admin/tnsnames.ora` from the Oracle database server operating system to the *<ORACLE_HOME>*`/network/admin` Oracle database client directory.

   Ensure that the OpenPages installation user has read, write and execute permissions on the `tnsnames.ora` file in the Oracle database client operating system.
2. Log on to the Oracle database client as an OpenPages installation user.
3. Edit the file *<ORACLE_HOME>*`/network/admin/tnsnames.ora`, and update the `Host` value to the host name or IP address of the Oracle database server.

4. To test the connection to the OpenPages database on the database server, type the following command:

   `sqlplus <username>/<password>@<service_name>`

   For example, `sqlplus system/openpages@op`

   The system connects you to an Oracle database instance.
5. To exit SQL*Plus, type `exit`.

Configuring IBM OpenPages GRC Platform to work on a single computer with an Oracle database
For test and development environments, you can install IBM OpenPages GRC Platform, the Oracle database, the 32-bit Oracle Admin Client, and Cognos Analytics on a single computer. However, some configuration is required.

About this task

You can install IBM OpenPages GRC Platform on a single computer for pre-deployment testing or proof of concept demonstrations. For single computer installations, ensure that the correct Oracle Admin Client is used by each software component.

If you install IBM OpenPages GRC Platform on a single server, you must install two versions of Oracle Admin Client. Both the 32-bit and 64-bit versions are required. The OpenPages application requires the 64-bit Oracle Admin Client and the Cognos Analytics software requires the 32-bit Oracle Admin Client.

Ensure that IBM OpenPages GRC Platform has already been installed before performing these steps.

Procedure

1. Log on to the Cognos server as a user with administrative privileges.
2. Ensure that the `ORACLE_HOME` environment variable points to the 32-bit Oracle Admin Client.
3. Edit the `PATH` variable to add `%ORACLE_HOME%\bin`.
4. If set, remove the `TNS_ADMIN` variable.
5. From the command line, go to the *<CC_HOME>*`/framework/conf` directory.
6. Open the `framework.properties` file in a text editor and ensure that the oracle.client.path property contains the location of the 32-bit Oracle Admin client `bin` directory.
7. Save and close the file.

   Note: If the server is Windows, ensure that the PATH system environment variable contains the path to the Oracle server and not the Oracle client to avoid issues that can occur on server restarts.
8. Restart the `IBMOpenPagesFrameworkModelGenerator` service.

Testing the connections to the database server and the OpenPages GRC Platform database
Test whether the SQL*Net connect string can connect to the database listener by using the TNSPING utility in the *<ORACLE_HOME>*`/bin` directory. The TNSPING utility tests whether the listener is available. It does not test whether the databases behind the listener are working.

To test that the IBM OpenPages GRC Platform database is created, use SQL*Plus to log on to the OpenPages Oracle database schema.

Procedure

1. To test whether you can log on to Oracle Enterprise Manager, the web-based interface that is used to administer an Oracle database, type the following command:

   `https://<oracle_server_name>:<port>/em`

   If you are using Oracle 12.1.0.2 or a later fix pack, the default port number is 5500.
2. To test whether a SQL*Net connect string can connect to the listener, type the following command:

   `tnsping <database_instance_name>`

The utility requests acknowledgment that the service name is valid and that the listener is configured to handle requests for that service name.

If the configuration is correct, a message is displayed that shows the return time.

If the configuration is not correct, the utility returns an error message. Ensure that you use the correct service name and that the listener is started on the server computer.

3. To test that the OpenPages database is created, type the following command:

   `sqlplus <username>/<password>@<service_name>`

   For example, `sqlplus system/openpages@op`

   The system connects you to an Oracle database instance.
4. To exit SQL*Plus, type `exit`.

Checklist for reporting servers

Do the following tasks on each reporting server (active and standby) before you install IBM OpenPages GRC Platform:

- Check that all of the required ports are available. See “Port assignments ” on page 102.
- If you are using Linux or AIX, give the OpenPages installation user (`opuser`) read, write, and execute permissions to the following directories:
  - Java SDK or JRE installation directory
  - Cognos Analytics installation directory
- If you are using a horizontal cluster for the reporting servers, set up the load balancer.
- If the database server is on a separate computer, install the database client software (32-bit version) on each reporting server and test the connection.
  - If you are using IBM DB2, see “DB2 database client installations” on page 73.
  - If you are using Oracle, see “Oracle database client installations” on page 83.
- Install and configure a web server. See “Web server configuration options for Cognos Analytics” on page 92.
- If you are using Linux or AIX, ensure that you have the 32-bit and 64-bit libraries required by Cognos.
- Install Cognos Analytics, 32-bit version. See “Installing Cognos Analytics” on page 90.
  - Optional: Include the Cognos Framework Manager when you install Cognos Analytics.
- Copy the JDBC driver to the reporting servers.
- Configure the connection to the content store.
  - If you are using IBM DB2, see “Configuring a connection to the content store (DB2)” on page 93.
  - If you are using Oracle, see “Configuring a connection to the content store (Oracle)” on page 94.
- Start Cognos services. See “Saving your settings and starting the IBM Cognos services” on page 96.
- Prepare the server for IBM OpenPages CommandCenter.
  - If you are using IBM DB2 for the Cognos database, enable a connection between CommandCenter and the database servers. See “Enabling the connection to a DB2 database from the OpenPages CommandCenter computer” on page 97.
  - If you are using Oracle for the Cognos database, do the following tasks:
    - Set environment variables for CommandCenter on each reporting server.
    - Test the connection to the OpenPages database on the database server.

Installing IBM Installation Manager

You use IBM Installation Manager to install IBM WebSphere Application Server, Cognos Analytics, and some other components, such as IBM OpenPages Loss Event Entry. Install IBM Installation Manager on each application server and reporting server.

Ensure you install the 64-bit version of IBM Installation Manager.

If an older version of IBM Installation Manager is installed, install to a new directory. For more information about this requirement, see Update to Installation Manager 1.8 is blocked when its data location is within its install location (http://www.ibm.com/support/docview.wss?uid=swg21692402).

For more information about IBM Installation Manager, see the Installation Manager documentation (http://www.ibm.com/support/knowledgecenter/SSDV2W/im_family_welcome.html).

Procedure

1. Download IBM Installation Manager from Passport Advantage.
2. Complete the following steps.
   a) On Microsoft Windows, double-click `install.exe`.
   b) On AIX or Linux, in a terminal window, enter `./install`.
3. Follow the steps to install IBM Installation Manager.

Cognos Analytics installations

Cognos Analytics and OpenPages CommandCenter must be installed on the reporting server.

For more information about IBM OpenPages GRC Platform supported software, see “Software prerequisites” on page 25.

Reporting server distribution options

For light user loads, with fewer than 50 concurrent users, Cognos Analytics and OpenPages CommandCenter can be installed on the same computer as the OpenPages application server.

For heavier user loads, install Cognos Analytics and CommandCenter on a different computer than the OpenPages application servers. OpenPages GRC Platform operates at peak performance when the database server, application server, and the reporting server are installed on separate computers.

Requirements for installing Cognos Analytics in a Linux environment

Cognos Analytics requires specific Linux packages.

For more information, see the Software Product Compatibility Report for Cognos Analytics.

Requirements for running multiple instances of Cognos Analytics on the same computer

If you want to install multiple instances of Cognos Analytics on the same computer, you must change the configuration to ensure that the instances do not share port numbers or other resources. For more information, see Configuration settings that are the same for multiple versions on the same server in the IBM Cognos Knowledge Center.

Database server requirements for OpenPages GRC Platform and Cognos Analytics

If you are using an IBM DB2 database server, you must use two separate databases - one for the IBM Cognos content store, and a second one for the IBM OpenPages GRC Platform database.

If you are using an Oracle database server, for best performance, use separate databases for the content store and IBM OpenPages GRC Platform database.

Installing Cognos Analytics

Before you install IBM OpenPages GRC Platform components, ensure that Cognos Analytics is installed and running on your reporting server computer.

For more information, see the *IBM Cognos Analytics Installation and Configuration Guide* in IBM Knowledge Center (https://www.ibm.com/support/knowledgecenter/SSEP7J_11.0.0/).

Before you begin

Review the following notes:

Java

In previous versions, you needed to install Java from the IBM OpenPages GRC Platform installation media. This step is no longer required. IBM Runtime Environment for Java is provided with Cognos Analytics.

On all operating systems, if the Cognos Analytics installation program does not find Java 8 in the PATH environment variable, the installer automatically points to the Java that is provided with Cognos Analytics. The location is *<COGNOS_HOME>*/jre.

Important: If you want to use your own Java, ensure that it meets the Java requirements for Cognos. For more information, see the Cognos documentation.

Oracle

If you use Oracle and the OpenPages database is installed on a separate computer than the Cognos Analytics server, ensure that a 32-bit database client is installed on the Cognos Analytics server.

Restriction: Do not install the database client software into a directory with spaces.

If you are using an Oracle database on the same computer as Cognos Analytics, you must update your environment variables so that the IBM Cognos service uses the 32-bit Oracle libraries, and the Oracle server uses the 64-bit libraries.

IBM DB2

If you are using IBM DB2, install the 64-bit database client, which also includes the 32-bit client software.

Linux

Ensure that the dependent 32-bit and 64-bit libraries are installed.

To create the user variables for the IBM Cognos service, do the following tasks:

- Create a user variable that is named ORACLE_HOME and set its value to the 32-bit Oracle Admin client home.

  For example, on Microsoft Windows operating systems, set the ORACLE_HOME user variable to C:\oracle\product\12.1\client_1.
- Create a user variable that is named PATH, or append to an existing one, and include the 32-bit Oracle Admin client home.

  For example, on Windows, set the PATH user variable to %ORACLE_HOME%\bin;%PATH%.
- Add *<ORACLE_HOME>*/lib to the system libraries variable.

Table 21: Oracle Admin client path environment variables for Cognos installations

Operating system	Environment variable	Example
Linux	LD_LIBRARY_PATH	LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH
AIX	LIBPATH	LIBPATH=$ORACLE_HOME/lib:$LIBPATH

The 64-bit IBM DB2 database installation includes libraries for both 32-bit and 64-bit systems. Use the following table to add the path to the DB2 32-bit server libraries.

Table 22: IBM DB2 path environment variables for Cognos installations

Operating system	Environment variable	Example
Linux	LD_LIBRARY_PATH	`LD_LIBRARY_PATH=$DB2DIR/lib32:$LD_LIBRARY_PATH`
AIX	LIBPATH	`LIBPATH=$DB2DIR/lib32:$LIBPATH`

Procedure

1. Optional: If you have an earlier version of Cognos, back up the content store.
2. Ensure that a web server is installed.

   For more information, see "Prerequisite software for reporting servers" on page 28.
3. On the reporting server, install Cognos Analytics.

   a) Install Cognos Analytics.

   Restriction: Install Cognos Analytics into a directory that contains only ASCII characters in the path name. Do not install Cognos Analytics into a directory that contains spaces.

   For information about installing Cognos Analytics, see the following topics in the Cognos documentation:

   - Installing server components on Windows operating systems
   - Installing on UNIX or Linux operating systems

   b) Install Framework Manager.

   Framework Manager is not required in production environments. Framework Manager is the modeling tool for creating and managing business-related metadata.

   Restriction: If you need Framework Manager in your development environment, you must install the 64-bit IBM Cognos server and the 32-bit Framework Manager to different directories. The default installation locations for 32 and 64-bit IBM Cognos components are different. For more information about installing Framework Manager, see Install and configure IBM Cognos Framework Manager in the IBM Cognos documentation.
4. Copy the JDBC database driver to the *<COGNOS_HOME>*`/drivers` directory.
   - If the content store is an Oracle database, copy the `ojdbc7.jar` file from the Oracle installation.
   - If the content store is a DB2 database, copy the `db2jcc4.jar` and `db2jcc_license_cu.jar` files from the IBM DB2 installation.
5. Append the *<COGNOS_HOME>*`/bin64` directory to the library path environment variable.
   - On Linux operating systems, update the LD_LIBRARY_PATH environment variable.

     Example: `export LD_LIBRARY_PATH=/opt/ibm/cognos/analytics/bin64:$LD_LIBRARY_PATH`
   - On AIX operating systems, update the LIBPATH environment variable.

     Example: `LIBPATH=/opt/ibm/cognos/analytics/bin64:$LIBPATH`
6. Append the *<COGNOS_HOME>*`/bin64` directory to the PATH environment variable.

   Example: `export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/opt/ibm/cognos/analytics/bin64`
7. Verify that `JAVA_HOME` is set in the system environment variables.

Set JAVA_HOME to *<COGNOS_HOME>*/jre/bin

Do this step on each reporting server in your deployment (active and standby).

If the reporting server is installed on the same computer as the application server, you can skip this step.

8. If you are using an Oracle database on the same computer as Cognos Analytics, update the IBM Cognos service settings to the user account for which you created the user variables for the 32-bit Oracle libraries.
   a) Open the Microsoft Windows **Services** page.
   b) Right-click the IBM Cognos service, select **Properties**, and click the **Log On** tab.
   c) Select **This Account**, and select the user account for which you created the user variables for the 32-bit Oracle libraries.

Web server configuration options for Cognos Analytics

You must configure your web server before users can connect to the Cognos Analytics portal.

For more information, see the following topics in the Cognos Analyticsdocumentation:

- Configure Cognos Analytics with your web server (https://www.ibm.com/support/knowledgecenter/en/SSEP7J_11.0.0/com.ibm.swg.ba.cognos.inst_cr_winux.doc/c_configureawebserver_single.html)
- Configure Apache HTTP Server or IBM HTTP Server (https://www.ibm.com/support/knowledgecenter/en/SSEP7J_11.0.0/com.ibm.swg.ba.cognos.inst_cr_winux.doc/c_config_web_server_intro.html)

  The configuration for these web servers has changed in Cognos Analytics V11.0. See the following topic for an example of the configuration: "Configuring Apache Web Server or IBM HTTP Server" on page 92
- Configuring IIS in Cognos Analytics 11.0.4+ (https://www.ibm.com/support/knowledgecenter/en/SSEP7J_11.0.0/com.ibm.swg.ba.cognos.inst_cr_winux.doc/t_gateway_iis.html)

  If you are using Microsoft Internet Information Services (IIS) on Windows, see the following technote for information about how to use a script to do the configuration.

Consider the following guidelines:

- Use compiled gateways for production systems

  For production systems, you can improve performance by changing the gateway from the default CGI gateway.
- Use CGI gateways

  You can use the CGI gateway on IBM HTTP Server, Apache Web Server, or Microsoft Internet Information Services (IIS) Server. Cognos Analytics is configured to use the CGI gateway by default.
- Configure WebDAV to view and browse images

  To view and browse images in the Cognos Analytics, configure Web Distributed Authoring and Versioning (WebDAV) on your web server. Report authors can browse for images to include in reports in a way that is similar to browsing a file system.

Configuring Apache Web Server or IBM HTTP Server

You must configure the Cognos Analytics gateway on your web server.

Procedure

1. Log on to the web server as a user with administrative privileges.
2. From the command prompt, go to the *<Webserver_installation>*/conf/ directory.
3. Make a backup copy of the `httpd.conf` file and rename the file to: `httpd.conf.original`.
4. Open the `httpd.conf` file in a text editor.
5. Configure the virtual directories by adding the following lines to the end of the `httpd.conf` file.

For example, on UNIX:

```
LoadModule headers_module modules/mod_headers.so
LoadModule proxy_module modules/mod_proxy.so
LoadModule proxy_http_module modules/mod_proxy_http.so

<Location /ibmcognos/bi>
RequestHeader set X-BI-PATH /ibmcognos/bi/v1
ProxyPass http://op-server.com:9300/bi
ProxyPassReverse http://op-server.com:9300/bi
ProxyPassReverseCookieDomain . ibm.com
</Location>

ScriptAlias /ibmcognos/cgi-bin /home/opuser/IBM/cognos/analytics/cgi-bin
<Directory /home/opuser/IBM/cognos/analytics/cgi-bin>
AllowOverride FileInfo
Options FollowSymLinks
Order Allow,Deny
Allow from All
</Directory>

Alias /ibmcognos/help /home/opuser/IBM/cognos/analytics/webcontent/documentation
<Directory /home/opuser/IBM/cognos/analytics/webcontent/documentation>
AllowOverride FileInfo
Options FollowSymLinks
Order Allow,Deny
Allow from All
</Directory>

Alias /ibmcognos /home/opuser/IBM/cognos/analytics/webcontent
<Directory /home/opuser/IBM/cognos/analytics/webcontent>
AllowOverride FileInfo
Options FollowSymLinks
Order Allow,Deny
Allow from All
</Directory>
```

Note: Ensure that you define the `/ibmcognos/cgi-bin` alias before the `/ibmcognos` alias.

6. Save and close the file.
7. Restart the web server.

Configuring a connection to the content store (DB2)

After you install Cognos Analytics, configure a connection to the content store database.

Important: The content store database must be in a separate database instance than the IBM OpenPages GRC Platform database. Oracle compatibility mode must not be enabled for the IBM DB2 database instance that is used for the content store.

Before you begin

Ensure that you copied the following files from the *<DB2_HOME>*`/sqllib/java` directory to the *<COGNOS_HOME>*`/drivers` directory:

- `db2jcc4.jar`
- `db2jcc_license_cu.jar`

Procedure

1. Log on to the reporting server as a user with administrator privileges.

   Note: For Windows installations, the user must belong to the DB2ADMINS group. For Linux or AIX installations, the user must belong to the `db2iadm` group.
2. Start Cognos Configuration.
   - On Windows computers, from the **Start** menu, click **All Programs** > **IBM Cognos Analytics** > **IBM Cognos Configuration**.
   - On Linux or AIX, go to the *<COGNOS_HOME>*`/bin64` directory, type `./cogconfig.sh`, and press Enter.
3. In Cognos Configuration, configure the database connection to the content store.

a) In the **Explorer** pane, under **Data Access** > **Content Manager,**, click **Content Store**.

b) In the **Database server and port number** field, enter the name of the computer and the port number on which DB2 is running.

`localhost:50000` is the default setting. 50000 is the default port number that is used by DB2. Replace `localhost` with the DB2 server name. If you are using a different port number, replace the default port with the port that you are using.

c) Click the **Value** field next to the **User ID and password** property, click the edit icon, and type the appropriate values for the Cognos user that you created for the content store database, and click **OK**.

d) In the **Properties** window, for the **Database name** property, type the name for your content store database.

Restriction: Do not use a name longer than eight characters and use only letters, numbers, underscores, and hyphens in the name.

4. Right-click **Content Store**, and click **Generate DDL**.
5. In the message box, click **Details** to record the location of the DDL file that is generated.

   The `createDb.sql` file is created in the *<COGNOS_HOME>*`/configuration/schemas/content/db2` directory.
6. To save your settings in Cognos Configuration, click **File** > **Save**.
7. To run the script that creates the database, log in to the database server as a user who has permissions to create a database.
   a) For Windows installations, at the command prompt, type `db2cmd`.
   b) From the command line, type `db2 -tvf createDb.sql`.
   c) On Windows computers, close the CLP.
8. In Cognos Configuration, in the **Explorer** pane, right-click the content store database connection and click **Test**.

Configuring a connection to the content store (Oracle)

After you install Cognos Analytics, configure a connection to the content store database.

Before you begin

Ensure that you copied the `ojdbc7.jar` file from the *<ORACLE_HOME>*`/jdbc/lib` directory on the database server to the *<COGNOS_HOME>*`/drivers` directory on the reporting server.

Procedure

1. Log on to the reporting server computer where Cognos Analytics is installed.
2. Go to the *<OP_version>*`_Non_Embedded/`*<OP_version>*`_Configuration/Database/ORACLE/COGNOS` directory.
3. Log on to the Oracle database as SYS using the following command:

   ```
   sqlplus <sys>/<password>@<SID> as sysdba
   ```

   For example:

   ```
   sqlplus sys/mypassword@OP as sysdba
   ```
4. At the SQL*Plus prompt, run the following command to create the user and password for the content store database:

   ```
   @cognosdbcreate.sql <cognos_user> <cognos_password>
        <oracle_data_home> <tablespace_name> <log_file>
   ```

Table 23: Parameter descriptions for the `cognosdbcreate.sql` script for Oracle databases	
Script parameters	**Description**
cognos_user	Specifies the new user name for the content store database
cognos_password	Specifies the password for the cognos_user
oracle_data_home	Specifies the location of the Oracle data home directory for the content store database instance. On Windows operating systems: *<ORACLE_BASE>*\oradata*<SID>*
tablespace_name	Specifies the name of the exported table space.
log_file	Specifies the file name and location of the log file to create.

For example:

```
@cognosdbcreate.sql cognos mypassword
    /home/oracle/app/oracle/oradata/<SID> cognos_ts cognosdbcreate.log
```

5. Exit SQL*Plus.
6. Start Cognos Configuration.
   - On Windows computers, from the **Start** menu, click **All Programs** > **IBM Cognos Analytics** > **IBM Cognos Configuration**.
   - On Linux or AIX, go to the *<COGNOS_HOME>*/bin64 directory, type `./cogconfig.sh`, and press Enter.
7. In Cognos Configuration, configure the database connection to the content store.
   a) In the **Explorer** pane, under **Data Access** > **Content Manager**, right-click **Content Store** > **Delete**.
   b) Right-click **Content Manager** > **New Resource** > **Database**.
   c) In the **New Database** window, for the **Name** field, enter a descriptive name for the connection.

      Note: The name is not required to match the database identifier.
   d) For the **Type**, select **Oracle Database (Advanced)** for Oracle RAC databases, or **Oracle Database** if you are not using an Oracle RAC database.
   e) Click **OK**.
   f) In the **Explorer** panel, select the new connection, and in the **Properties** panel, use the following tables to enter the property settings.

Table 24: Content store property settings for Oracle database	
Property name	**Property value**
Database server and port number	The name of the database server and the listener port that is used for the database instance.

Table 24: Content store property settings for Oracle database (continued)	
Property name	**Property value**
User ID and Password	Click the value field and then click the pencil icon. In the **Value - User ID and password** field, enter the appropriate values for the user and password for the content store database you created in step 4. If you used the IBM OpenPages GRC Platform Installer for Cognos, the default user is `cognos`.
Service name	Enter the SID for the database instance.

Table 25: Content store property settings for Oracle database (Advanced) (Oracle RAC database)	
Property name	**Property value**
Database server and port number	The name of the database server and the listener port that is used for the database instance.
User ID and Password	Click the value field and then click the pencil icon. In the **Value - User ID and password** field, enter the appropriate values for the content store database you created in step 4. If you used the OpenPages GRC Platform Installer for Cognos, the default user is `cognos`.

Database specifier	Enter a database specifier string in the following format with no carriage returns:
	`(description=(address=`
	`(host=<server_name>)`
	`(protocol=tcp)(port=<port>)`
	`(connect_data(service_name=`
	`<service_name>)))`

8. To test that the database connection to the content store database is successful, in the **Explorer** pane, right-click the content store database connection and click **Test**.

Saving your settings and starting the IBM Cognos services

You must save your configuration settings and start the IBM Cognos services.

Procedure

1. Start Cognos Configuration.
   - On Windows computers, from the **Start** menu, click **All Programs** > **IBM Cognos Analytics** > **IBM Cognos Configuration**.
   - On Linux or AIX, go to the *<COGNOS_HOME>*`/bin64` directory, type `./cogconfig.sh`, and press Enter.
2. Ensure that the name under **IBM Cognos services** is **IBM Cognos**, the default value.

   Important: On Microsoft Windows operating systems, IBM OpenPages GRC Platform requires IBM Cognos as the service name.
3. Under **Local Configuration**, click **Environment**.

4. Ensure that you use the default port number for the values such as Dispatcher URIs for gateway, External dispatcher URI, Internal dispatcher URI, Dispatcher URIs for external applications, and Content Manager URIs. The default port number is 9300.

   Important: Changing the default port number also changes the IBM Cognos service name.
5. In IBM Cognos Configuration, click **File** > **Save** to save your configuration settings.

   You must save the configuration settings, even if you have not changed any of the values.
6. Click **Actions** > **Start**.

   It might take a few minutes for the IBM Cognos service to start.

   If you receive a warning during the **Testing the mail server connection** process, click **OK** and **Continue** to continue starting the services. A mail server connection is not required.

   Warning: If you chose to upgrade your content store database by creating a backup and restoring it, you are prompted to upgrade your reports. Do not select the option to upgrade your reporting content. Upgrade your reports later by using the New Report Upgrade wizard in IBM Cognos Administration.

Enabling the connection to a DB2 database from the OpenPages CommandCenter computer

Cataloging a TCP/IP node adds an entry to the Data Server Client node directory that describes the remote node. This entry specifies the chosen alias, the host name or IP address, and the service name (or the port number) that the client uses to access the remote host.

Before a client application can access a remote database, the database must be cataloged on the client. When you create a database, the database is automatically cataloged on the server with a database alias. The database alias is the same as the database name, unless a different database alias is specified.

Important: If the application server and database server are on the same computer, you can ensure that the Cognos installation user has access to the IBM OpenPages GRC Platform data source by cataloging the OpenPages repository node and database.

Before you begin

Ensure that IBM DB2 client software is installed on the reporting server.

Procedure

1. Log on to the reporting server with a valid DB2 user ID.
2. If you are using Microsoft Windows, start the DB2 command line processor. Open a command prompt and run `db2cmd`.
3. Catalog the node by entering the following commands in the command line processor:

```
db2 catalog tcpip node <node_name> remote <hostname|ip_address>
   server <service_name|port_number>
db2 terminate
```

   Example:

```
db2 catalog tcpip node OPNODE remote mycomputer.domain.com server 50000
db2 terminate
```

4. Catalog the database by entering the following commands in the command line processor:

```
db2 catalog database <database_name> as <database_alias>
  at node <node_name> [ authentication <auth_value> ]
```

   Example:

```
db2 catalog database OPX at node OPNODE authentication server
db2 terminate
```

5. To list the node directory, type the following command:

```
db2 list node directory show detail
```

6. To list the database directory, type the following command:

```
db2 list database directory
```

Setting database environment variables for the reporting server on AIX and Linux operating systems

If you use an Oracle database for the IBM OpenPages GRC Platform repository, you must set some system environment variables on the reporting server.

Procedure

1. Log on to the reporting server as an OpenPages installation user with administrative privileges.
2. To determine the version of Java that is in the PATH variable, run the following command:

```
java -version
```

   If you get the following error, Java is not in the PATH variable.

   `Command not found`

3. Set the following environment variables.

Table 26: Environment variable settings on the reporting server on Linux or AIX operating systems

Environment variable	Example settings
JAVA_HOME	Specifies the installation location of your Java Runtime Environment (JRE). For example `/usr/IBM/cognos/analytics/jre`
COGNOS_HOME	Specifies the installation location of Cognos Analytics. For example `/usr/IBM/cognos/analytics`

4. Append JAVA_HOME to the PATH variable.

   Example: `PATH=$JAVA_HOME/bin:$PATH`

5. If you use Oracle for the OpenPages database, set the following environment variables.

Table 27: Oracle database environment variable settings on the reporting server on Linux or AIX operating systems

Environment variable	Example settings
ORACLE_HOME	The default location is `/home/oracle/app/oracle/product/<Oracle_version>/client_1` If you installed the OpenPages application and Cognos on the same server, enter the location of the 32-bit Oracle Admin Client.
TNS_ADMIN	Specifies the location of the `tnsnames.ora` file. The default location is `$ORACLE_HOME/network/admin`

Table 27: Oracle database environment variable settings on the reporting server on Linux or AIX operating systems (continued)	
Environment variable	**Example settings**
NLS_LANG	Specifies the database character set configured during the database installation. By default, set to AMERICAN_AMERICA.AL32UTF8 **Important:** To display non-English characters for Japanese locales, set NLS_LANG=JAPANESE_JAPAN.JA16SJISTILDE

6. Append ORACLE_HOME to the PATH variable.

   Example: PATH=$ORACLE_HOME/bin:$PATH
7. Refresh the profile.

Setting database environment variables for reporting servers on Windows operating systems

You must set some system environment variables on the reporting server.

Procedure

1. Log on to the reporting server as a user with administrative privileges.
2. Set the following environment variables in the user profile.

Table 28: Environment variable settings on the reporting server on Windows operating systems	
Environment variable	**Setting**
JAVA_HOME	Specifies the installation location of your Java Runtime Environment (JRE).
COGNOS_HOME	Specifies the location of the Cognos Analytics directory. C:\IBM\cognos\analytics

3. Append JAVA_HOME to the PATH environment variable.

   Example: Add %JAVA_HOME%/bin to the PATH environment variable.
4. If you are using an Oracle database for the OpenPages database, set the following environment variables.

Table 29: Oracle environment variable settings on the reporting server on Windows operating systems	
Environment variable	**Setting**
ORACLE_HOME	The default location is a subdirectory of ORACLE_BASE, such as ORACLE_BASE=C:\app\product*<Oracle_version>*\client_1 If you installed the OpenPages application and Cognos Analytics on the same server, enter the location of the 32-bit Oracle Admin Client. **Example:** ORACLE_HOME=C:\app\product*<Oracle_version>*\client_32bit
TNS_ADMIN	Specifies the location of the tnsnames.ora file. The default location is *<ORACLE_HOME>*\network\admin

Table 29: Oracle environment variable settings on the reporting server on Windows operating systems (continued)	
Environment variable	**Setting**
NLS_LANG	Specifies the database character set configured during the database installation. The default value is AMERICAN_AMERICA.AL32UTF8 **Note:** To display non-English characters for Japanese locales, set the NLS_LANG property: NLS_LANG=JAPANESE_JAPAN.JA16SJISTILDE

5. Append ORACLE_HOME to the PATH environment variable.

   Example: Add %ORACLE_HOME%/bin to the PATH environment variable.

Testing the connection to the OpenPages database from the Oracle database client

Test whether the SQL*Net connect string can connect to the IBM OpenPages GRC Platform database on the Oracle database server from the Oracle database client.

Procedure

1. Copy the file *<ORACLE_HOME>*/network/admin/tnsnames.ora from the Oracle database server operating system to the *<ORACLE_HOME>*/network/admin Oracle database client directory.

   Ensure that the OpenPages installation user has read, write and execute permissions on the tnsnames.ora file in the Oracle database client operating system.
2. Log on to the Oracle database client as an OpenPages installation user.
3. Edit the file *<ORACLE_HOME>*/network/admin/tnsnames.ora, and update the Host value to the host name or IP address of the Oracle database server.
4. To test the connection to the OpenPages database on the database server, type the following command:

   sqlplus *<username>*/*<password>*@*<service_name>*

   For example, sqlplus system/openpages@op

   The system connects you to an Oracle database instance.
5. To exit SQL*Plus, type exit.

Checklist for the search server

If you want to use global search, you need a search server. Do the following tasks on the search server before you install IBM OpenPages GRC Platform:

- Check that all of the required ports are available. See “Port assignments ” on page 102.
- Install IBM Java 8. See “Getting a copy of the IBM Runtime Environment for Java for the search server” on page 100.

Getting a copy of the IBM Runtime Environment for Java for the search server

Before you install a search server, install IBM Runtime Environment for Java (IBM JRE) and set up the system environment variables for Java on the search server computer.

About this task

You can install the search server on a computer that is using a different operating system from the OpenPages application servers. The version of Java on the search server must be a version of Java that is supported by IBM OpenPages GRC Platform.

Procedure

1. Get a copy of IBM Runtime Environment for Java (IBM JRE) from the IBM OpenPages GRC Platform installation media.
   - If you are installing the search server on a computer that is running Microsoft Windows, copy `\OP_<version>_Non_Embedded\IBM_Java\WIN64\java_8.0_64` to the search server.
   - If you are installing the search server on a computer that is running Linux, copy `/OP_<version>_Non_Embedded/IBM_Java/Linux64/java_8.0_64` to the search server.
   - If you are installing the search server on a computer that is running AIX, copy `/OP_<version>_Non_Embedded/IBM_Java/AIX64/java_8.0_64` to the search server.
2. Copy IBM JRE to the local hard disk of the search server.

   You can copy IBM JRE to any directory on the search server.

   For example:
   - Windows operating systems: Copy IBM JRE to the root of the C drive under `C:\IBM`.
   - Linux or AIX operating systems: Copy IBM JRE to `/opt/IBM/`.
3. For Linux or AIX operating systems, grant read, write, and execute permissions on Java to the OpenPages installation user (`opuser`).

   Run the following command:

   ```
   chmod -R +x /opt/IBM/java_8.0_64
   ```
4. Set the system environment variables for Java.

   Windows operating systems:

   a) Click **Start**. Right-click **Computer**, click **Properties**, and then click **Advanced system settings**.

   b) Click **Environment Variables**.

   c) Under **System variables**, click **New**.

   d) Type `JAVA_HOME` in the **Variable name** field.

   e) Type `C:\IBM\java_8.0_64\jre` in the **Variable value** field.

   f) Click **OK**.

   g) Under System variables, select the **Path** variable, and then click **Edit**.

   h) Type `%JAVA_HOME%\bin;` at the beginning of the list of paths in the **Variable value** field.

   i) Click **OK**.

   Linux or AIX operating systems:

   a) Based on the UNIX shell that you are using and the account under which the search server will run, edit the `.profile` or `.bashrc` file.

   b) Ensure that `JAVA_HOME` is set to `/opt/IBM/java_8.0_64/jre`.

   c) Ensure that `PATH` includes `$JAVA_HOME/bin` as the first item.

   Note: On AIX, Linux and Windows operating systems, start a new command prompt or shell window to see the changes to the environment variables.
5. Verify the version of Java that is on the search server.

   Run the `java -version` command. The result should be similar to the following sample:

   ```
   java version "1.8.0"
   Java(TM) SE Runtime Environment (build pxa6480sr4fp1-20170215_01(SR4 FP1))
   IBM J9 VM (build 2.8, JRE 1.8.0 Linux amd64-64 Compressed References 20170209_336038 (JIT
   enabled, AOT enabled)
   J9VM - R28_20170209_0201_B336038
   JIT  - tr.r14.java.green_20170125_131456
   GC   - R28_20170209_0201_B336038_CMPRSS
   J9CL - 20170209_336038)
   JCL - 20170215_01 based on Oracle jdk8u121-b13
   ```

Port assignments

Both dedicated ports and ports that are dynamically assigned for each installation are used for the IBM OpenPages GRC Platform installation. These default ports can be changed after installation.

You can change some port settings during the installation. You can also change the default port settings after installation. For information about changing the ports after installation, see the *IBM OpenPages GRC Administrator's Guide*.

Default ports

The following table lists the default ports.

Table 30: Default fixed port assignments

Description	Ports
OpenPages installation server	8443
OpenPages installation agent	8443
OpenPages database instance (Oracle)	1521
OpenPages database instance (IBM DB2)	50000
OpenPages deployment manager	9060
OpenPages deployment manager (SSL)	9043
OpenPages application URL	10108
OpenPages application URL (SSL)	10111
OpenPages deployment manager SOAP port	8879
Cognos Analytics gateway (as configured for your web server)	80
Framework Generator port	8080
Cognos Analytics dispatcher URI	9300
Search server (used for indexing and searching OpenPages data)	8983
Search server (used to administer global search)	8985

On Windows computers, additional OpenPages installations increment the port numbers by two.

Files containing port numbers

After installation, you can view the OpenPages port assignments by using the IBM WebSphere Administrative Console.

The following tables list property files on the OpenPages admin application server that contain port numbers for other components.

Table 31: Files that contain port numbers		
Port	**File name**	**Parameter Name**
Oracle database instance port	*<ORACLE_HOME>*/NETWORK/ ADMIN/tnsnames.ora	N/A
Framework Generator port	*<OP_HOME>*/aurora/conf/ aurora.properties	cognos.framework.refresh.servlet
Cognos Analytics server port	*<OP_HOME>*/aurora/conf/ aurora.properties	cognos.server
Cognos Analytics Dispatcher URI	*<OP_HOME>*/aurora/conf/ aurora.properties	cognos.computation.server

Dynamically assigned ports

Port numbers for IBM OpenPages GRC Platform servers that are not listed, such as OpenPages non-admin application servers, are assigned dynamically during the installation.

OpenPages application non-admin server port numbers start at 9080 and increment by 1 for each additional server in the installation.

After installation, you can view all port assignments by using the IBM WebSphere Administrative Console.

Create the database schema objects

Before you install IBM OpenPages GRC Platform, decide how you want to create the OpenPages database.

OpenPages database object creation for DB2

Before you install IBM OpenPages GRC Platform, decide how you want to create the OpenPages database objects.

You have the following options:

- You can use the OpenPages installation program to create the database objects. If you choose this option, you need to provide DBA credentials when you install OpenPages.
- You can ask a database administrator to do the steps that require DBA privileges, and then use the OpenPages installation program to complete the database setup. Use this option if your organization's security policies require the separation of DBA and non-DBA tasks. Also, use this option if your database administrator wants to customize the table space names, the schema name, or make other customizations.
- You can create all of the objects required for the database manually by using scripts. Use this option if you want to customize the table space names or if you want to run custom scripts.

The initial install of a DB2 database always assumes LFS for the OpenPages storage type. If you want to use UNC, you must first install with LFS and then use the update storage script to change to UNC.

Preparing the files for your database administrator

Your database administrator needs a set of scripts to create the database objects. You need to prepare the files and send them to your DBA with instructions on how to run the scripts.

Do this procedure if your organization's security policies require the separation of DBA and non-DBA tasks.

About this task

The `sql-wrapper.sql` file contains information that is used by the database scripts. You need to enter the values for your environment, such as the name of the database instance for OpenPages.

When you install OpenPages, use the same values that you set in the `sql-wrapper.sql` file.

Procedure

1. Log on to the DB2 database server computer as a user with administrative privileges.
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
3. Verify that you have write permission on the `sql-wrapper.sql` file. If not, change the permission on the file by using the `chmod` command.
4. Edit the `sql-wrapper.sql` file.

   Restriction: Change only the parameters that are described in this step.

   These parameters are used by the scripts that your DBA will run.

Table 32: Parameters in the `sql-wrapper.sql` file for DB2 databases

Property	Description
`opx_instance_owner`	The database instance owner for OpenPages. The user you specify must have both DBADM and SECADM privileges If your database administrator is going to run the DBA scripts for you, then you can leave this value empty when you run the non-DBA scripts.
`opx_db2_server_name`	The database server name
`opx_db2_port_number`	The database port number, for example `50000`
`opx_db2_db_name`	The name of the OpenPages database.
`opx_db_owner`	The schema owner of the OpenPages database.
`opx_dflt_stor_srv_root`	The path to the OpenPages storage directory. Example: `define opx_dflt_stor_srv_root='/home/opuser/OP/OpenPages/openpages-storage'`
`opx_op_admin_name`	The OpenPages administrator user name
`opx_op_admin_pwd`	The OpenPages administrator password

5. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
6. Collect the following files and send them to your DBA.
   - `sql-wrapper.sql`

- `create-opx-schema-owner.sql`
- `create-opx-tablespaces.sql`
- `dba-grant.sql`
- `no-op.sql`
- `op-database-dba-install.bat/.sh`
- `op-database-dba-install.sql`

Also, send your DBA the instructions to run the DBA script: "Running the steps that require DBA privileges" on page 105

Note: If you have DBA privileges and you plan to run the DBA scripts, you can skip this step.

Running the steps that require DBA privileges

You can run a script to do the database object creation steps that require DBA privileges. Do this procedure if you do not want to enter DBA credentials when you install OpenPages or if your organization's security policies require the separation of DBA and non-DBA tasks.

Before you begin

- The DB2 database server is running
- A database instance for the OpenPages database is created
- The `sql-wrapper.sql` is configured for your environment

About this task

Run the following script: `op-database-dba-install.sh|.bat`. The script uses the parameters in the `sql-wrapper.sql` file.

The `op-database-dba-install.sh|.bat` calls the following scripts:

- `op-database-dba-install.sql`: Runs the DBA steps. This script calls the other scripts in this list.
- `create-opx-tablespaces.sql`: Creates the OpenPages table spaces.
- `dba-grant.sql`: Grants privileges to the DBA user.
- `create-opx-schema-owner.sql`: Creates the OpenPages schema owner and grants the user access to the OpenPages table spaces.
- `no-op.sql`: This script is empty. Edit this script if you want to run any custom scripts at the end of the DBA setup process. See "Custom table space names" on page 106.

You can do the following configurations:

- You can specify custom names for table spaces
- You can specify a custom SQL script to run

Procedure

1. Log on to the DB2 database server computer as the DB2 database administrator (DBA).
2. Locate the scripts that are required.

   If you are a database administrator, get the scripts from your OpenPages team.

   Or, you can get the scripts from the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
3. Verify that you have execute permission on the scripts.
4. Open the `sql-wrapper.sql` file. Verify that the values are suitable for your environment.

   The user that you specify for the `opx_instance_owner` parameter must have both DBADM and SECADM privileges.

   If you want to customize the table space names, see "Custom table space names" on page 106.

Note: Do not modify the parameters in the section that is used only for upgrades.

5. On Windows, start the DB2 command line processor (CLP). Click **All Programs** > **IBM DB2** > **IBM DB2 DB2COPY1** > **DB2 Command Window - Administrator**
6. Run the `op-database-dba-install.sh | .bat` script from the command line.

   On Windows:

   ```
   op-database-dba-install.bat <dba_password>
   ```

   On Linux or AIX:

   ```
   ./op-database-dba-install.sh <dba_password>
   ```

7. Verify that the return code is 0, indicating success.

   You can also check the log file, `op-dba-install-<timestamp>.log`.

What to do next

You can use the OpenPages installation program to complete the database setup. Or you can complete the database setup manually by using scripts.

Custom table space names

You can customize the table spaces in the OpenPages database. These procedures are intended for database administrators.

To customize the table space names, edit the following properties in the `sql-wrapper.sql` file:

```
define opx_dflt_data_ts='AURORA'
define opx_dflt_indx_ts='INDX'
define opx_dflt_temp_data_ts='AURORA_NL'
define opx_dflt_temp_indx_ts='AURORA_NLI'
define opx_dflt_dedi_temp_ts='AURORA_TEMP'
define opx_dflt_snp_ts='AURORA_SNP'
define opx_dflt_clob_data_ts='AURORA_CLOB_DATA'
define opx_dflt_domain_indx_ts='AURORA_DOMAIN_INDX'
```

Give the new table space names to the user who will install OpenPages. The table space names must be provided during the installation process.

Preparing to run the non-DBA database scripts

Edit the `sql-wrapper.sql` file to specify the values for your environment.

This procedure is optional. Instead of running scripts, you can complete the database setup when you install OpenPages.

About this task

The `sql-wrapper.sql` file contains information that is used by the database scripts. You need to enter the values for your environment, such as the name of the database instance for OpenPages.

When you install OpenPages, use the same values that you set in the `sql-wrapper.sql` file.

Procedure

1. Log on to the DB2 database server computer as the DB2 database administrator (DBA).
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
3. Verify that you have write permission on the `sql-wrapper.sql` file. If not, change the permission on the file by using the `chmod` command.
4. Edit the `sql-wrapper.sql` file to ensure that the variables are set correctly for your environment.

   Edit the following parameters, if needed:

Table 33: Parameters in the `sql-wrapper.sql` file for DB2 databases	
Property	**Description**
`opx_instance_owner`	The database instance owner for OpenPages.
`opx_db2_server_name`	The database server name
`opx_db2_port_number`	The database port number, for example `50000`
`opx_db2_db_name`	The name of the OpenPages database.
`opx_db_owner`	The schema owner of the OpenPages database.
`opx_dflt_stor_srv_root`	The path to the OpenPages storage directory. Example: `define opx_dflt_stor_srv_root='/home/opuser/OP/OpenPages/openpages-storage'`
`opx_op_admin_name`	The OpenPages administrator user name
`opx_op_admin_pwd`	The OpenPages administrator password
`opx_base_currency_iso_code`	The base currency For example, if you use Euros as your base currency, change the default ISO currency code from USD to EUR. `define opx_base_currency_iso_code='EUR'`

5. If you want to load custom data during the database setup process, see “Loading custom data (DB2 and Oracle)” on page 107.

Loading custom data (DB2 and Oracle)

If you want to load custom data during the database setup process, edit the `sql-wrapper.sql` file to specify the scripts to run.

About this task

You can use the `custom_environment_script` and `custom_data_load_script` parameters to configure a custom scripts.

Use the `custom_environment_script` parameter to set environment values. The script that you specify is called each time that the `sql-wrapper.sql` script is called.

Use the `custom_data_load_script` parameter to load custom data. The script that you specify is called by the `op-database-product-install.sh|.bat` script. The custom data load is done as the last step in the `op-database-product-install.sh|.bat` script.

Procedure

1. Open the `sql-wrapper.sql` file.
2. If you are using IBM DB2, verify that the `sqllib_dir` path is correct. If you are running the custom scripts from a computer other than the database server, update the path.
3. Edit the following parameters:

```
define custom_environment_script=no-op.sql
define custom_data_load_script=no-op.sql
```

   Replace `no-op.sql` with the script that you want to run.
4. Place your custom scripts in the same directory as the `sql-wrapper.sql` file.

Running the steps that do not require DBA privileges

You can complete the database setup manually by using scripts. Do this procedure after a database administrator has run the DBA scripts.

This procedure is optional. Instead of running scripts, you can complete the database setup when you install OpenPages.

Before you begin

Ensure that the following conditions are met:

- The DB2 database server is running.
- A database instance for the OpenPages database is created.
- The database setup steps that require DBA privileges are complete.
- The `sql-wrapper.sql` file is configured for your environment.

About this task

You need to run the following scripts:

- `op-validate-dba-install.sh|.bat`: Validates that the DBA steps completed successfully.
- `op-database-product-install.sh|.bat`: Performs the database creation tasks that do not require DBA privileges.
- `op-validate-product-install.sh|.bat`: Validates that the database setup steps completed successfully.

These scripts use the parameters that are specified in the `sql-wrapper.sql` script.

Procedure

1. Log on to the DB2 database server computer as the DB2 database administrator (DBA).
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
3. Verify that you have execute permission on the scripts in the `INSTALL_SCRIPTS` directory.
4. On Windows, start the DB2 command line processor (CLP). Click **All Programs** > **IBM DB2** > **IBM DB2 DB2COPY1** > **DB2 Command Window - Administrator**
5. Run the `op-validate-dba-install.sh|.bat` script from the command line.

   The script verifies that the DBA setup steps are complete.

   On Linux or AIX:

   ```
   ./op-validate-dba-install.sh <opuser_password>
   ```

   On Windows:

   ```
   op-validate-dba-install.bat <opuser_password>
   ```

   Replace *<opuser_password>* with the password of the OpenPages database user.
6. Verify that the return code is 0, indicating success.
7. Run the `op-database-product-install.sh|.bat` script from the command line.

   On Linux or AIX:

   ```
   ./op-database-product-install.sh <opuser_password>
   ```

   On Windows:

   ```
   op-database-product-install.bat <opuser_password>
   ```

   Replace *<opuser_password>* with the password of the OpenPages database user.

8. Verify that the return code is 0, indicating success.

   You can also view the log file, `op-database-product-install-<timestamp>.log`.
9. Run the `op-validate-product-install.sh|.bat` script from the command line.
   The script verifies that the setup steps are complete.

   On Linux or AIX:

   ```
   ./op-validate-product-install.sh <opuser_password>
   ```

   On Windows:

   ```
   op-validate-product-install.bat <opuser_password>
   ```

   Replace *<opuser_password>* with the password of the OpenPages database user.
10. Verify that the return code is 0, indicating success.

    You can also view the log file, `validate-product-install-<timestamp>.log`.
11. Remove the passwords from the `sql-wrapper.sql` file for security purposes.

Troubleshooting DB2 database object creation
If you encounter problems when you run the scripts to create the database objects, you can run scripts to drop the objects and then try again.

You have two choices:

- You can drop the database objects that were created when you ran the non-DBA script (`op-database-product-install.sh|.bat`). See "Dropping non-DBA database objects in a DB2 database" on page 109.
- You can drop all of the OpenPages database objects. This option drops the database objects created by `op-database-dba-install.sh|.bat` and `op-database-product-install.sh|.bat`. See "Dropping all OpenPages objects in a DB2 database" on page 110.

Dropping non-DBA database objects in a DB2 database
You can run the `AuroraDbDelete.sql` script to drop the database objects that the `op-database-product-install.sh|.bat` script created.

Procedure

1. Log on to the IBM DB2 database server as a user with administrative privileges.
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
3. Verify that you have execute permission on the files in the `INSTALL_SCRIPTS` directory. If not, change the permission on the file by using the `chmod` command.
4. On Windows, start the DB2 command line processor (CLP). Click **All Programs** > **IBM DB2** > **IBM DB2 DB2COPY1** > **DB2 Command Window - Administrator**
5. Run the `AuroraDbDelete.sql` script from the command line.

   ```
   @AuroraDbDelete.sql
   ```

What to do next
Run the `op-database-product-install.sh|.bat` script again. See "Running the steps that do not require DBA privileges" on page 108.

If you encounter problems again, you can drop all of the OpenPages database objects. See "Dropping all OpenPages objects in a DB2 database" on page 110.

Dropping all OpenPages objects in a DB2 database

You can run the `init-db-cleanup.sql` script to drop the database objects. The script drops the objects that the `op-database-dba-install.sh|.bat` and `op-database-product-install.sh|.bat` scripts created.

About this task

The `init-db-cleanup.sh|.bat` script drops the database objects and removes the OpenPages table spaces.

You must have DBA privileges to run the script.

Procedure

1. Log on to the IBM DB2 database server as a user with administrative privileges.
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
3. Verify that you have execute permission on the files in the `INSTALL_SCRIPTS` directory. If not, change the permission on the file by using the `chmod` command.
4. Open the `sql-wrapper.sql` file. Verify that the values are suitable for your environment.
5. On Windows, start the DB2 command line processor (CLP). Click **All Programs** > **IBM DB2** > **IBM DB2 DB2COPY1** > **DB2 Command Window - Administrator**
6. Run the `init-db-cleanup.sh|.bat` script.

   On Linux or AIX:

   ```
   ./init-db-cleanup.sh <dba_password>
   ```

   On Windows:

   ```
   init-db-cleanup.bat <dba_password>
   ```

What to do next

Run the database object creation scripts in a clean database environment. See “OpenPages database object creation for DB2” on page 103.

OpenPages database schema creation for Oracle

Before you install IBM OpenPages GRC Platform, decide how you want to create the OpenPages database.

You have the following options:

- You can use the OpenPages installation program to create the database schema. If you choose this option, you need to provide DBA credentials when you install OpenPages.
- You can ask a database administrator to do the steps that require DBA privileges, and then use the OpenPages installation program to complete the database setup. Use this option if your organization's security policies require the separation of DBA and non-DBA tasks. Also, use this option if your database administrator wants to customize the table space names, the schema name, or make other customizations.
- You can create all of the objects required for the database manually by using scripts. Use this option if you want to do any of the following configurations:
  - Customize the table space names or the schema name
  - Customize the table space data file locations
  - Use Oracle Transparent Data Encryption (TDE)
  - Run custom scripts

The initial install of an Oracle database always assumes LFS for the OpenPages storage type. If you want to use UNC, you must first install with LFS and then use the update storage script to change to UNC.

This video demonstrates how to create the database schema by using scripts:

https://youtu.be/0WGVOxWqQH4

Preparing the files for your database administrator
Your database administrator needs a set of scripts to create the database schema. You need to prepare the files and send them to your DBA with instructions on how to run the scripts.

Do this procedure if your organization's security policies require the separation of DBA and non-DBA tasks.

About this task

The `sql-wrapper.sql` file contains information that is used by the database scripts. You need to enter the values for your environment, such as the name of the database instance for OpenPages.

When you install OpenPages, use the same values that you set in the `sql-wrapper.sql` file.

Procedure

1. Log on to the Oracle database server computer as a user with administrative privileges.
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/INSTALL_SCRIPTS` directory.
3. Verify that you have write permission on the `sql-wrapper.sql` file. If not, change the permission on the file by using the `chmod` command.
4. Edit the `sql-wrapper.sql` file.

   Restriction: Change only the parameters that are described in this step.

   These parameters are used by the scripts that your DBA will run.

Table 34: Parameters in the `sql-wrapper.sql` file for Oracle databases

Property	Description
`opx_datafile_storage_dir`	Defines the physical locations of the datafiles that are associated with the tablespaces that are created. This should be set to a value that is appropriate for your environment
`opx_dflt_sid`	The TNS alias of the Oracle database for OpenPages.
`opx_db_owner`	The database owner, also the name of the schema
`opx_op_admin_name`	The OpenPages administrator user name
`opx_op_admin_pwd`	The OpenPages administrator password
`opx_dflt_stor_srv_root`	The path to the OpenPages storage directory. Example: `define opx_dflt_stor_srv_root='/home/opuser/OP/OpenPages/openpages-storage'`

5. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/INSTALL_SCRIPTS` directory.
6. Collect the following files and send them to your DBA.
   - `sql-wrapper.sql`

- `create-opx-directory.sql`
- `create-opx-schema-owner.sql`
- `create-opx-tablespaces.sql`
- `install-oracle-text.sql`
- `no-op.sql`
- `op-database-dba-install.sh|.bat`
- `op-database-dba-install.sql`
- `uniform-grants.sql`

Also, send your DBA the instructions to run the DBA script: "Running the steps that require DBA privileges" on page 112.

Note: If you have DBA privileges and you plan to run the DBA scripts, you can skip this step.

Running the steps that require DBA privileges

You can run a script to do the database schema creation steps that require DBA privileges. Do this procedure if you do not want to enter DBA credentials when you install OpenPages or if your organization's security policies require the separation of DBA and non-DBA tasks.

Before you begin

- The Oracle database server is running
- A database instance for the OpenPages database is created
- The `sql-wrapper.sql` file is configured for your environment

About this task

Run the following script: `op-database-dba-install.sh|.bat`. The script uses the properties that are defined in the `sql-wrapper.sql` file.

The `op-database-dba-install.sh|.bat` calls the following scripts:

- `op-database-dba-install.sql`: Runs the DBA steps. This script calls the other scripts that are in this list.
- `create-opx-directory.sql`: Sets the location of the data pump directory to use for OpenPages.
- `create-opx-tablespaces.sql`: Creates the OpenPages table spaces. Edit this file to enable Oracle TDE or to customize the table space data file names and locations.
- `create-opx-schema-owner.sql`: Creates the OpenPages schema owner and grants the user access to the OpenPages table spaces.
- `uniform-grants.sql`: Grants privileges to the schema owner.
- `install-oracle-text.sql`: Enables Oracle Text Search.
- `no-op.sql`: This script is empty. Edit this script if you want to run any custom scripts at the end of the DBA setup process.

You can do the following configurations:

- You can specify a custom name for the OpenPages schema
- You can specify custom names for the table spaces
- You can specify custom data file names and locations for the table spaces
- You can enable or disable Oracle Text
- You can specify a custom SQL script to run

Procedure

1. Log on to the Oracle database server computer as the Oracle database administrator (DBA).

2. Locate the scripts that are required.

   If you are a database administrator, get the scripts from your OpenPages team.

   Or, you can get the scripts from the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/INSTALL_SCRIPTS` directory.
3. Verify that you have execute permission on the scripts.
4. Open the `sql-wrapper.sql` file. Verify that the values are suitable for your environment.
   - Enter the DBA user name in the `opx_oracle_dba_user` parameter. The user that you specify must have SYSDBA privileges.

     For example:

     ```
     define opx_oracle_dba_user='SYS'
     ```
   - If you want to customize the table space names, see "Table space names and other customizations" on page 113.
   - If you want to use custom locations for the table space data files, see "Customize table space data file locations" on page 114.
   - If you use Oracle Automatic Storage Management (ASM), see "Changing the database script when you use Oracle ASM" on page 114.
   - If you want to use Oracle TDE, see "Oracle Transparent Data Encryption (TDE) for fresh installations" on page 114.

   Note: Do not modify the parameters in the section that is used only for upgrades.
5. Run the `op-database-dba-install.sh|.bat` script from the command line.

   On Windows:

   ```
   op-database-dba-install.bat <dba_password>
      <op_schema_owner_password>
   ```

   On Linux or AIX:

   ```
   ./op-database-dba-install.sh <dba_password>
      <op_schema_owner_password>
   ```
6. Verify that the return code is 0, indicating success.

   You can also check the log file, `op-database-dba-install-<timestamp>.log`.

What to do next

You can use the OpenPages installation program to complete the database setup. Or you can complete the database setup manually by using scripts.

Table space names and other customizations

You can customize the table spaces in the OpenPages database. These procedures are intended for database administrators.

To customize the table space names, edit the following properties in the `sql-wrapper.sql` file:

```
define opx_dflt_data_ts='AURORA'
define opx_dflt_indx_ts='INDX'
define opx_dflt_temp_data_ts='AURORA_NL'
define opx_dflt_temp_indx_ts='AURORA_NLI'
define opx_dflt_dedi_temp_ts='AURORA_TEMP'
define opx_dflt_snp_ts='AURORA_SNP'
define opx_dflt_clob_data_ts='AURORA_CLOB_DATA'
define opx_dflt_domain_indx_ts='AURORA_DOMAIN_INDX'
```

Give the new table space names to the user who will install OpenPages. The table space names must be provided during the installation process.

Note: If you complete both the DBA and non-DBA setup steps by using scripts, the table space names do not need to be provided when you install the OpenPages.

You can also customize the data file path for each table space. See "Customize table space data file locations" on page 114.

Customize table space data file locations

You can customize the data file location of the OpenPages table spaces.

Procedure

1. Log on to the Oracle database server as the user who installed Oracle.
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/INSTALL_SCRIPTS` directory.
3. Open the `create-opx-tablespaces.sql` script in a text editor.
4. Replace the &&3 parameter with the full path to the data file.

   For example, suppose that you want to customize the location of the `opx_dflt_data_ts` data file:

   ```
   SELECT lower('&&opx_dflt_data_ts') lcase_name FROM dual;
   create tablespace &&opx_dflt_data_ts datafile '&&3/&v_lcase_name..dbf'
   size 512 M reuse autoextend on next 128 M maxsize 1024 M &&encrypt_var;
   ```

   Replace &&3 with the full path:

   ```
   SELECT lower('&&opx_dflt_data_ts') lcase_name FROM dual;
   create tablespace &&opx_dflt_data_ts datafile '/u01/oradata/OP/&v_lcase_name..dbf'
   size 512 M reuse autoextend on next 128 M maxsize 1024 M &&encrypt_var;
   ```

   Note: Do not modify the `&v_lcase_name..dbf` parameter. The table space name is read from the `sql-wrapper.sql` file.

Changing the database script when you use Oracle ASM

If you use Oracle Automatic Storage Management (ASM), you must modify some scripted values. You must update the `create-opx-tablespaces.sql` script before you run the `op-database-dba-install.sh|.bat` script.

Procedure

1. Log on to the Oracle database server as the user who installed Oracle.
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/INSTALL_SCRIPTS` directory.
3. Open the `create-opx-tablespaces.sql` script in a text editor.
4. As appropriate for your environment, replace the `'&&3/&v_lcase_name..dbf'` parameter with the name of a disk group.

   For example, if you want to use a disk group called DATA to store the `opx_dflt_data_ts` table space, use the following syntax:

   ```
   create tablespace &&opx_dflt_data_ts datafile '+DATA' size 512 M
      reuse autoextend on next 128 M maxsize 1024 M &&encrypt_var;
   ```

5. Save and close the file.

Oracle Transparent Data Encryption (TDE) for fresh installations

You can use Oracle Transparent Data Encryption (TDE) to encrypt the OpenPages and Cognos table spaces in the OpenPages database.

This task is optional.

Note: This task is for new installations only. If you are upgrading, see "Oracle Transparent Data Encryption (TDE) for upgrade customers" on page 238.

IBM OpenPages GRC Platform supports the ability to implement TDE, but TDE is an Oracle feature. You need to be familiar with data encryption of Oracle databases and you need to configure and maintain TDE. If you have questions about TDE, refer to the Oracle documentation.

Restriction: OpenPages supports Oracle TDE only for table spaces. Column-based TDE is not supported.

To implement Oracle TDE, you need to complete two main tasks:

1. Configure a key store. Do this step before you install Cognos and OpenPages.

   Your database administrator needs to create a key store. The steps and requirements for key stores are determined by Oracle. IBM is not responsible for the configuration or maintenance of the key store.

   Note: A table space can be encrypted only when it is initially created. You cannot alter an existing table space to enable encryption.
2. Encrypt the Cognos and OpenPages table spaces that support encryption.

   To install OpenPages with Oracle TDE, you need to do some manual configuration tasks. Review and ensure that you understand these manual steps before you install OpenPages with Oracle TDE.

   Note: Oracle does not support encryption on system, undo, or temporary table spaces.

For more information about TDE, refer to the Oracle documentation, such as the Oracle Database Advance Security Guide (https://docs.oracle.com/database/121/ASOAG/toc.htm).

Prerequisites and process overview
Ensure that your environment meets prerequisites for Oracle TDE and review the configuration process.

Note: These instructions are specific to Oracle version 12.1.0.2.

Ensure that your environment meets the following prerequisites:

1. The Oracle database that you are going to use for OpenPages is already created.
2. IBM OpenPages GRC Platform is not installed.
3. Cognos Analytics is not installed.
4. The Oracle instance is open and accepting connections.
5. The database compatibility parameter is set to at least 11.2.0.0 or higher.

Complete the following process to configure TDE:

1. Configure a software key store. Refer to the Oracle documentation: Configuring Transparent Data Encryption
2. Encrypt the OpenPages table spaces that support encryption:
   a. Verify the value of the database compatible parameter.
   b. Enable Oracle TDE for Cognos table space.
   c. Enable Oracle TDE for OpenPages table spaces.
   d. Create the Cognos database user and table space.
   e. Run the DBA step of the OpenPages database installation.
   f. Verify that the table spaces are encrypted.
   g. Complete the installation of OpenPages and Cognos

Encrypting OpenPages and Cognos table spaces
You can encrypt the OpenPages and Cognos table spaces by using Oracle TDE.

About this task

Do this procedure after you set up the key store and before you install IBM OpenPages GRC Platform and Cognos Analytics.

Procedure

1. Log on to the OpenPages database instance as the instance owner.
2. Start SQL*Plus.
3. Verify that the database compatible parameter is set to 11.2.0.0 or later.

```
select value from GV$SYSTEM_PARAMETER where name = 'compatible';
```

4. To encrypt the Cognos table spaces, modify the `cognosdbcreate.sql` file.

   The `cognosdbcreate.sql` file is located in the following directory:
   `OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/COGNOS`

   a) Open the `cognosdbcreate.sql` file in a text editor.

   b) Locate the `Oracle Transparent Data Encryption` section.

   c) Comment out the `define encrypt_var=''` line.

   d) Uncomment the line for the encryption algorithm that you are using for the table spaces.

   For example, if you are using AES128:

```
--define encrypt_var=''
--define encrypt_var='ENCRYPTION USING ''3DES168'' DEFAULT STORAGE(ENCRYPT)'
define encrypt_var='ENCRYPTION USING ''AES128'' DEFAULT STORAGE(ENCRYPT)'
--define encrypt_var='ENCRYPTION USING ''AES192'' DEFAULT STORAGE(ENCRYPT)'
--define encrypt_var='ENCRYPTION USING ''AES256'' DEFAULT STORAGE(ENCRYPT)'
```

5. To encrypt the OpenPages table spaces, modify the `create-opx-tablespaces.sql` file.

   The `create-opx-tablespaces.sql` file is located in the following directory:
   `OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/INSTALL_SCRIPTS`

   a) Open the `create-opx-tablespaces.sql` file in a text editor.

   b) Locate the `Oracle Transparent Data Encryption` section.

   c) Comment out the `define encrypt_var=''` line.

   d) Uncomment the line for the encryption algorithm that you are using for the table spaces.

   For example, if you are using AES128:

```
--define encrypt_var=''
--define encrypt_var='ENCRYPTION USING ''3DES168'' DEFAULT STORAGE(ENCRYPT)'
define encrypt_var='ENCRYPTION USING ''AES128'' DEFAULT STORAGE(ENCRYPT)'
--define encrypt_var='ENCRYPTION USING ''AES192'' DEFAULT STORAGE(ENCRYPT)'
--define encrypt_var='ENCRYPTION USING ''AES256'' DEFAULT STORAGE(ENCRYPT)'
```

6. Run the `op-database-dba-install.sh/bat` script . For more information, see "Running the steps that require DBA privileges" on page 112.
7. Install Cognos Analytics.

   For more information, see "Installing Cognos Analytics" on page 90.
8. Run the `cognosdbcreate.sql` script.

   For more information, see "Configuring a connection to the content store (Oracle)" on page 94.
9. Install IBM OpenPages GRC Platform.
10. Verify that the table spaces are encrypted.

    Log in to the OpenPages database as a DBA user and run the following command:

```
select tablespace_name, encrypted, status from dba_tablespaces;
```

    Verify that the output is similar to the following text:

```
TABLESPACE_NAME                ENC STATUS
------------------------------ --- ---------
SYSTEM                         NO  ONLINE
```

```
SYSAUX                         NO  ONLINE
UNDOTBS1                       NO  ONLINE
TEMP                           NO  ONLINE
USERS                          NO  ONLINE
AURORA                         YES ONLINE
INDX                           YES ONLINE
AURORA_SNP                     YES ONLINE
AURORA_TEMP                    NO  ONLINE
AURORA_NL                      YES ONLINE
AURORA_NLI                     YES ONLINE
AURORA_CLOB_DATA               YES ONLINE
AURORA_DOMAIN_INDX             YES ONLINE
COGNOS                         YES ONLINE

14 rows selected.
```

Preparing to run the non-DBA database scripts
Edit the `sql-wrapper.sql` file to specify the values for your environment.

This procedure is optional. Instead of running scripts, you can complete the database setup when you install OpenPages.

About this task

The `sql-wrapper.sql` file contains information that is used by the database scripts. You need to enter the values for your environment, such as the name of the database instance for OpenPages.

When you install OpenPages, use the same values that you set in the `sql-wrapper.sql` file.

Procedure

1. Log on to the Oracle database server computer as the Oracle database administrator (DBA).
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/INSTALL_SCRIPTS` directory.
3. Verify that you have write permission on the `sql-wrapper.sql` file. If not, change the permission on the file by using the `chmod` command.
4. Edit the `sql-wrapper.sql` file to ensure that the variables are set correctly for your environment.

Table 35: Parameters in the `sql-wrapper.sql` file for Oracle databases

Property	Description
`opx_dflt_sid`	The TNS alias of the Oracle database for OpenPages.
`opx_db_owner`	The database owner, also the name of the schema
`opx_op_admin_name`	The OpenPages administrator user name
`opx_op_admin_pwd`	The OpenPages administrator password
`opx_base_currency_iso_code`	The base currency For example, if you use Euros as your base currency, change the default ISO currency code from USD to EUR. `define opx_base_currency_iso_code='EUR'`

Table 35: Parameters in the `sql-wrapper.sql` file for Oracle databases (continued)	
Property	**Description**
`opx_dflt_stor_srv_root`	The path to the OpenPages storage directory. Example: `define opx_dflt_stor_srv_root='/home/opuser/OP/OpenPages/openpages-storage'`

5. To enable or disable Oracle Text, modify the `flag_install_oracle_text` property.

   For example, to enable Oracle Text, type Y.

   ```
   define flag_install_oracle_text='Y'
   ```

6. If you want to load custom data during the database setup process, see "Loading custom data (DB2 and Oracle)" on page 107.

Loading custom data (DB2 and Oracle)

If you want to load custom data during the database setup process, edit the `sql-wrapper.sql` file to specify the scripts to run.

About this task

You can use the `custom_environment_script` and `custom_data_load_script` parameters to configure a custom scripts.

Use the `custom_environment_script` parameter to set environment values. The script that you specify is called each time that the `sql-wrapper.sql` script is called.

Use the `custom_data_load_script` parameter to load custom data. The script that you specify is called by the `op-database-product-install.sh|.bat` script. The custom data load is done as the last step in the `op-database-product-install.sh|.bat` script.

Procedure

1. Open the `sql-wrapper.sql` file.
2. If you are using IBM DB2, verify that the `sqllib_dir` path is correct. If you are running the custom scripts from a computer other than the database server, update the path.
3. Edit the following parameters:

   ```
   define custom_environment_script=no-op.sql
   define custom_data_load_script=no-op.sql
   ```

   Replace `no-op.sql` with the script that you want to run.
4. Place your custom scripts in the same directory as the `sql-wrapper.sql` file.

Running the steps that do not require DBA privileges

You can complete the database setup manually by using scripts. Do this procedure after the DBA steps are complete.

This procedure is optional. Instead of running scripts, you can complete the database setup when you install OpenPages.

Before you begin

- The Oracle database server is running
- A database instance for the OpenPages database is created
- The database setup steps that require DBA privileges are complete

- The `sql-wrapper.sql` file is configured for your environment

About this task

You need to run three scripts:

- `op-validate-dba-install.sh|.bat`: Validates that the DBA steps completed successfully
- `op-database-product-install.sh|.bat`: Performs the database creation tasks that do not require DBA privileges
- `op-validate-product-install.sh|.bat`: Validates that the steps completed successfully

Procedure

1. Log on to the Oracle database server as the OpenPages application user, `opuser`.
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/INSTALL_SCRIPTS` directory.
3. Verify that you have execute permission on the files in the `INSTALL_SCRIPTS` directory. If not, change the permission on the file by using the `chmod` command.
4. Verify that the DBA portion of the database setup completed successfully.

   On Windows, open a command prompt by using the **Run as Administrator** option. Run the following scripts:

   ```
   op-validate-dba-install.bat <op_schema_owner_password>
   ```

   On Linux or AIX:

   ```
   ./op-validate-dba-install.sh <op_schema_owner_password>
   ```

   You can view the log file: `op-validate-dba-install-<timestamp>.log`.
5. Run the following script to set up the Oracle database instance.

   On Windows, open a command prompt by using the **Run as Administrator** option. Run the following script:

   ```
   op-database-product-install.bat <op_schema_owner_password>
   ```

   On Linux or AIX:

   ```
   ./op-database-product-install.sh <op_schema_owner_password>
   ```

   The `op-database-product-install.sh|.bat` script performs the installation steps that do not require DBA privileges.
6. Run the following scripts to verify the product installation on the Oracle database instance.

   On Windows, open a command prompt by using the **Run as Administrator** option. Run the following scripts:

   ```
   op-validate-product-install.bat <op_schema_owner_password>
   ```

   On Linux or AIX:

   ```
   ./op-validate-product-install.sh <op_schema_owner_password>
   ```

   The `op-validate-product-install.sh|.bat` script verifies that the installation steps completed successfully.
7. Remove the passwords from the `sql-wrapper.sql` file for security purposes.

Troubleshooting Oracle schema creation
If you encounter problems when you run the scripts to create the Oracle database schema, you can run scripts to drop the schema and then try again.

You have two choices:

- You can drop the database objects that were created when you ran the non-DBA script (`op-database-product-install.sh|.bat`). See "Dropping non-DBA objects in an Oracle database" on page 120.
- You can drop the full schema. This option drops the database objects created by `op-database-dba-install.sh|bat` and `op-database-product-install.sh|.bat`. See "Dropping the full schema in an Oracle database" on page 120.

Dropping non-DBA objects in an Oracle database
You can run the `AuroraDbDelete.sql` script to drop the database objects that the `op-database-product-install.sh|.bat` script created.

Procedure

1. Log on to the Oracle database server as a user with administrative privileges.
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/INSTALL_SCRIPTS` directory.
3. Verify that you have execute permission on the files in the `INSTALL_SCRIPTS` directory. If not, change the permission on the file by using the `chmod` command.
4. Log on to SQL*Plus as the OpenPages database user.
5. Use the `spool` command to create a log file.

   ```
   spool <log_file directory>/<log_file name>
   ```

   Ensure that you have write permission on the *<log_file directory>*.

   Example:

   ```
   spool /tmp/AuroraDbDelete.log
   ```

6. Run the `AuroraDbDelete.sql` script.

   ```
   @AuroraDbDelete.sql
   ```

What to do next
Run the `op-database-product-install.sh|.bat` script again. See "Running the steps that do not require DBA privileges" on page 118.

If you encounter problems again, you can drop the full schema. See "Dropping the full schema in an Oracle database" on page 120.

Dropping the full schema in an Oracle database
You can run the `init-db-cleanup.sql` script to drop the OpenPages database schema. The script drops the objects that the `op-database-dba-install.sh|.bat` and `op-database-product-install.sh|.bat` scripts created.

About this task
The `init-db-cleanup.sql` script drops the schema and removes the OpenPages table spaces.

Procedure

1. Log on to the Oracle database server as a user with administrative privileges.
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/INSTALL_SCRIPTS` directory.

3. Verify that you have execute permission on the files in the `INSTALL_SCRIPTS` directory. If not, change the permission on the file by using the `chmod` command.
4. Log on to SQL*Plus as the OpenPages database user
5. Run the `init-db-cleanup.sql` script.

   Syntax:

```
sqlplus /nolog @sql-wrapper init-db-cleanup.sql <log_file>
   <oracle_tns_alias> <sysdba_user> <sysdba_password>
   <op_user>
```

Table 36: Parameters of the `init-db-cleanup.sql` script for Oracle databases	
Parameter	**Description**
<log_file>	Optional: The path and name of a log file
<oracle_tns_alias>	The TNS alias of the Oracle database instance
<sysdba_user>	A user with SYSDBA privileges
<sysdba_password>	The password of the SYSDBA user
<op_user>	The OpenPages schema owner

   For example:

```
sqlplus /nolog @sql-wrapper.sql init-db-cleanup.sql
   log_file.txt OP system openpages openpages
```

What to do next

Run the database schema creation scripts in a clean database environment. See “OpenPages database schema creation for Oracle” on page 110.

Creating a deployment

Create a deployment to install IBM OpenPages GRC Platform. You can create a deployment from scratch or you can import deployment properties from a file.

If you are upgrading, you create a new deployment as part of the upgrade process. For more information, see Chapter 7, “Upgrade IBM OpenPages GRC Platform,” on page 167.

Before you begin

- Before you create a deployment, plan your server topology and prepare each server for the installation.
- Ensure that the installation server can communicate with all of the servers in your deployment.
- On each remote server in your deployment, do one of the following steps:
  - Update the antivirus policy on the remote server to allow `Node.js`.
  - Disable antivirus software on the remote server. You can re-enable it after you complete the installation of IBM OpenPages GRC Platform.

About this task

Tip: You can save your work at any time and return to your deployment later to complete the installation.

This video demonstrates how to manage and create deployments:

https://youtu.be/L2yGvDjsZWE

For more videos, see the IBM Industry Platforms Support and Documentation channel.

Procedure

1. Log in to the IBM OpenPages GRC Platform installation app.
   See "Logging in to the installation app" on page 37.
2. Create a deployment.
   You can create a deployment from scratch or you can load values from an existing deployment.
   - To create a deployment from scratch, click **Create New**. Type a name for the deployment, and then click **Create**.

     Note: The deployment name is used to create directories. Do not use spaces or special characters in the deployment name.

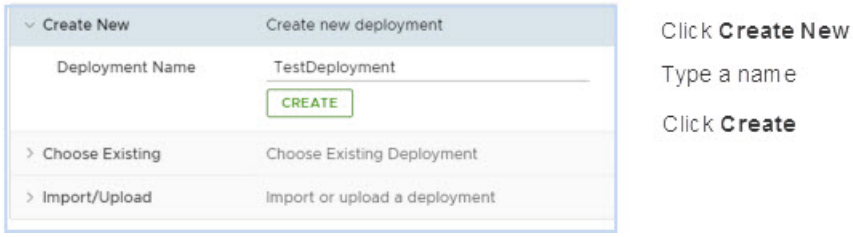


Figure 11: Create a new deployment

   - To load values from a deployment, click **Import/Upload**. Type a name for the new deployment. Drag a `deploy.properties` file onto the window or click **Browse** to select a file. Click **Upload**.

     Note: If you are upgrading, you can use a `topology.xml` file from your previous version of IBM OpenPages GRC Platform.

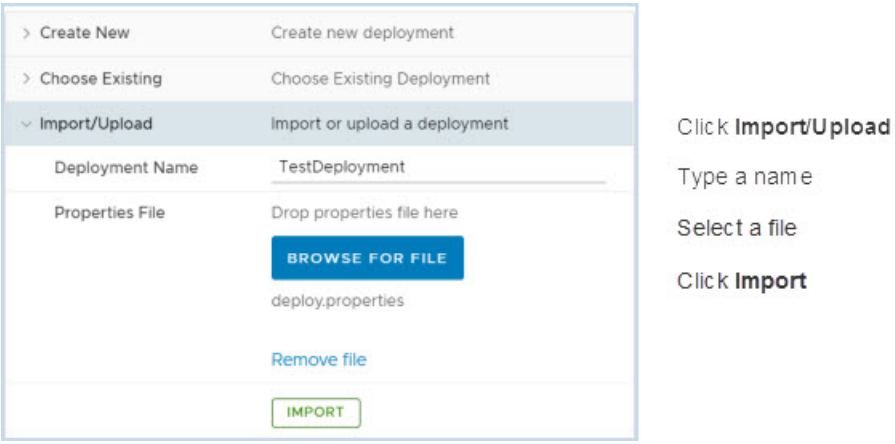


Figure 12: Import a deployment

3. Choose the type of deployment that you want to install.
   - **Standalone Deployment**: Select this option if you want to create a new cell for OpenPages. The installation process creates a new cell and deployment manager in IBM WebSphere before installing OpenPages. See this video about standalone deployments.
   - **Shared Cell Deployment**: Select this option if you already have a cell and deployment manager in your environment and you want to use them for OpenPages. The installation process deploys OpenPages into the cell that you specify.

     If you select this option, global security must be enabled on the shared cell before you install IBM OpenPages GRC Platform. For more information, see "Considerations for shared cell deployments" on page 124.

For both types of deployments adding two horizontal clusters in one VM is not supported.

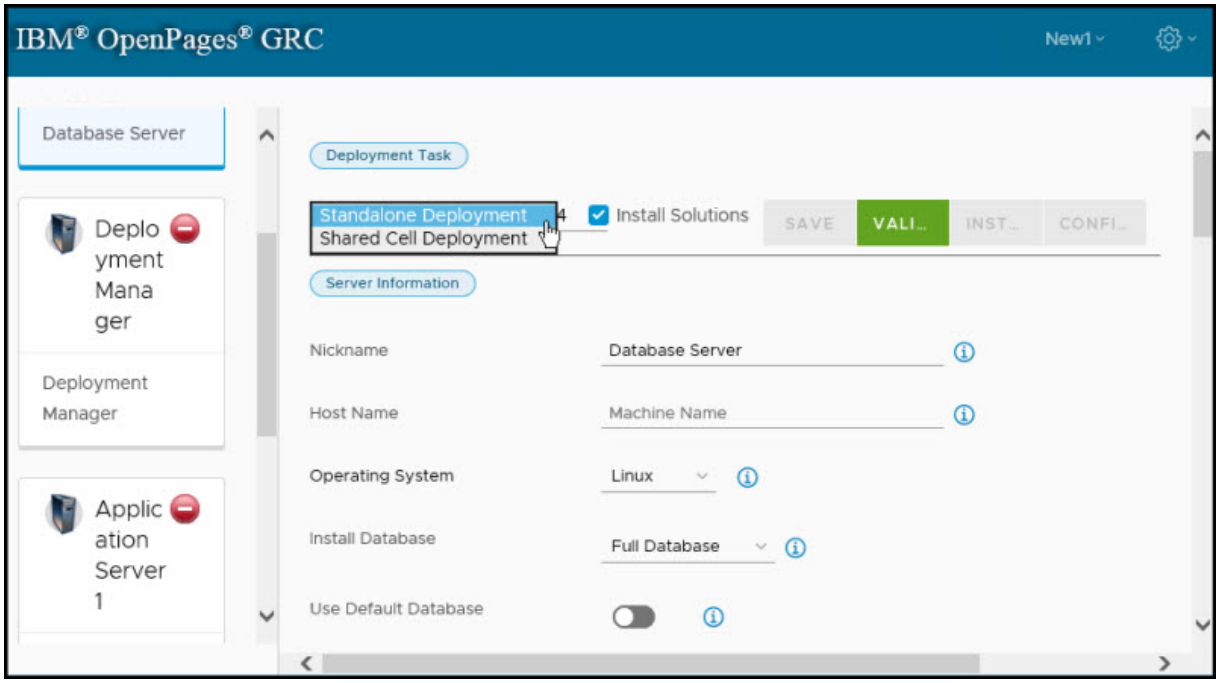


Figure 13: Selecting the deployment type

4. Optional: If you want to install IBM OpenPages solutions, enable the **Install Solutions** check box.
5. Set up the database server.

   See “Configuring the database server (DB2)” on page 125 or “Configuring the database server (Oracle)” on page 127.
6. Set up the deployment manager.

   See “Configuring the deployment manager” on page 129.
7. Set up the application servers.

   See “Configuring application servers” on page 131.
8. Set up the reporting servers.

   See “Configuring reporting servers” on page 133.
9. Optional: Set up the search server.

   See “Configuring a search server” on page 134.
10. Optional: Set up the IBM Business Process Manager workflow server.

    Important: Before you set up a workflow server, see the *IBM OpenPages GRC - Business Process Manager Installation Guide*. You need to do some pre-installation tasks and some post-installation tasks.

    If you are upgrading and you used IBM Business Process Manager in your previous version of OpenPages, see the *IBM OpenPages GRC - Business Process Manager Installation Guide* for information about how to update the integration.
11. Click **Validate** to save and validate the deployment.

    During the validation process, the installation app installs the agent software on the remote servers, starts the agents, validates the deployment properties, and verifies that the prerequisites for the installation are complete.

    For example, the following image shows an application server card after validation is complete The **Agent On** icon is green, indicating that the agent is installed and running on the remote server.

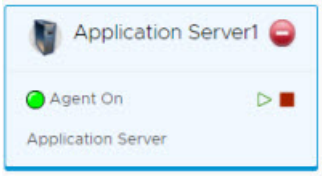


Figure 14: Agent software is running on Application Server1

You can download a validation report. Click the link at the top of the page.

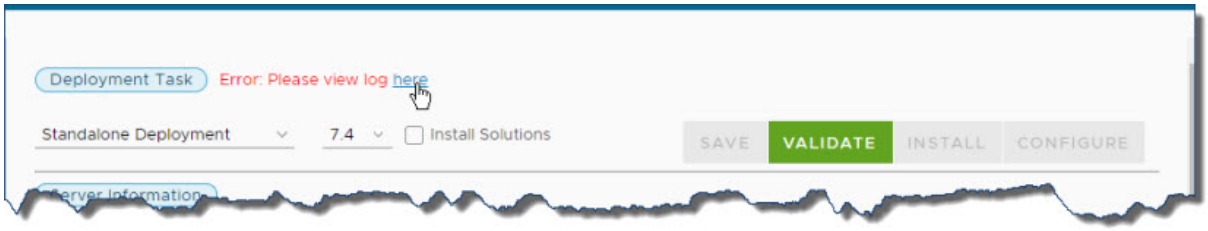


Figure 15: Click to download a validation report

The validation reports are also stored in the *<installation_server_home>*/src/deployment/*<deployment-name>*/validation directory.

Fix any errors and review the warnings. Click **Save**, and then click **Validate**. When the **Install** button is available, you can continue. If fixing issues requires an update to the environment variables on any servers, you must restart the installer server/agent on that server before re-validating.

12. Click **Install**.

    The installation server stages the assets onto the servers in your deployment.

    Tip: You can log out and close the browser window. The **Install** process continues to run. When you log in to the installation app again, the app shows the status of your deployment. You can also close the browser window during the **Configure** process.

13. Click **Configure**.

    The installation server sets up and configures the IBM OpenPages GRC Platform components.

14. Review the log files.

    For more information, see "Log files" on page 341.

15. If you disabled the antivirus software on remote servers, re-enable the antivirus software.
16. Optional: Download the deployment properties so that you can use the properties file for future installations.

    Click , and then click **Download Properties**. If you are using Internet Explorer, click **Save** or **Save As**.

Considerations for shared cell deployments

Before you create a shared cell deployment, review the prerequisites and important considerations for shared cell deployments.

Ensure that your environment meets these prerequisites:

- Enable Global Security on the cell before you install OpenPages.

  The preinstallation validation process will fail if Global Security is not enabled.

  In a standalone deployment, the installation server creates a cell with Global Security enabled. In a shared cell deployment, however, you must enable Global Security in the cell that you want to use for OpenPages.

- Make sure that none of the profile directories for the cell, deployment manager, or other profiles fall under any of the directories that you are using to install OpenPages, such as *<OP_HOME>*, *<CC_HOME>*, and so on.

  If your profiles are in the OpenPages installation directories, the profiles might be deleted when you install OpenPages.
- Note that OpenPages cannot be deployed into the same cell as IBM Business Process Manager, if a workflow server is included in your deployment.
- The software prerequisites for shared cell deployments are the same as the prerequisites for standalone deployments.

Also, keep the following considerations in mind:

- The deployment manager will be stopped and started multiple times during the OpenPages installation.
- The `startAllServers`/`stopAllServers` scripts that are in *<OP_HOME>*`/bin` will not start or stop the deployment manager in shared-cell deployments, even if the deployment manager is on the same host as an application server.
- The installer does not create Microsoft Windows services for the deployment manager.

When you install OpenPages, the installation server configures the cell for OpenPages.

This video demonstrates how to manage and create deployments:

https://youtu.be/N2JavLP-mc4

Configuring the database server (DB2)

You can use an IBM DB2 database server in your IBM OpenPages GRC Platform deployment.

About this task

Complete all of the fields on the **Database Server** card. You might need some information from your database administrator to complete the card.

Determine if the OpenPages database schema is installed.

- If the database schema is not yet installed, you can use the OpenPages installation app to install it. For the **Install Database** option, click **Full Database**. You must provide DBA credentials to install the database schema.
- If your database administrator completed only the database schema installation steps that require DBA privileges, use the OpenPages installation app to complete the installation. For the **Install Database** option, click **Only Non-DBA**.
- If your database administrator has already installed the database schema, you do not need to install the database. For the **Install Database** option, click **Already Installed**.

If your database administrator installed the database schema or completed the DBA installation steps, determine if your database administrator customized the table space names.

- If the table space names are customized, deselect the **Use Default Database** option. Type the custom table space names in the table space fields.
- If the table space names are not customized, enable the **Use Default Database** option.

If the database is not already installed or if your database uses custom table space names, you need the values from the `sql-wrapper.sql` file to complete the **Database Server** card.

Procedure

1. Click the **Database Server** card in the left pane.
2. Type a **Nickname** for the server.
   The name is displayed on the server card.

3. Type the **Host Name** of the server. Use the fully qualified domain name (FDQN).
4. Select the **Operating System** of the server.
5. Click **Install Database** and choose one of the following options:
   - **Full Database**: Click this option if the database is not installed yet. The installation app will complete both the DBA and non-DBA portions of the database installation.
   - **Only Non-DBA**: Click this option if your database administrator completed the DBA portion of the database installation. The installation app will complete the database installation.
   - **Already Installed**: Click this option if the database is already installed.
6. If your database uses custom table space names, disable the **Use Default Database** option.

   Ensure that you know the custom names. You need to enter them in a later step.
7. For the **Database Vendor**, select **DB2**.
8. Type the port number of the IBM DB2 database server in the **Database Port** field.
9. Type the name of the OpenPages database instance in the **Alias** field.

   In the `sql-wrapper.sql` file, the **Alias** is specified by the `opx_db2_db_name` parameter.
10. If you chose to install the full database, type the **DBA Username** and the **DBA Password**.

    The user that you specify must have both DBADM and SECADM privileges.

    You need to provide the DBA credentials if you selected **Full Database** for the **Install Database** option.

    In the `sql-wrapper.sql` file, the **DBA Username** is specified by the `opx_instance_owner` parameter.
11. Type the credentials of the OpenPages schema owner in the **OP Database Username** and **OP Database Password** fields.

    In the `sql-wrapper.sql` file, the **OP Database Username** is specified by the `opx_db_owner` parameter.
12. Select the default currency to use in the OpenPages database.

    You need to select the **Base Currency** if you selected **Full Database** or **Only Non-DBA** for the **Install Database** option.

    In the `sql-wrapper.sql` file, the **Base Currency** is specified by the `opx_base_currency_iso_code` parameter.
13. If your database uses custom table space names, complete the table space name fields.

    You need to provide the table space names if the **Use Default Database** option is disabled.

    In the `sql-wrapper.sql` file, the table space names are specified by the `opx_dflt_*_ts` parameters.
14. If you want to use the rollback feature for this server, enable the **Rollback on failure** option.

    When **Rollback on failure** is enabled and an error occurs, the operation that caused the failure is rolled back. You can then fix the error and continue with the installation. The installation process resumes at the operation that was rolled back.

    For example, if an error occurs during the **Install** process, fix the error and then click **Install** to continue.
15. Click **Save**.

Configuring the database server (Oracle)

You can use an Oracle database server in your IBM OpenPages GRC Platform deployment.

About this task

Complete all of the fields on the **Database Server** card. You might need some information from your database administrator to complete the card.

Determine if the OpenPages database schema is installed.

- If the database schema is not yet installed, you can use the OpenPages installation app to install it. For the **Install Database** option, click **Full Database**. You must provide DBA credentials to install the database schema.
- If your database administrator completed only the database schema installation steps that require DBA privileges, use the OpenPages installation app to complete the installation. For the **Install Database** option, click **Only Non-DBA**.
- If your database administrator has already installed the database schema, you do not need to install the database. For the **Install Database** option, click **Already Installed**.

If your database administrator installed the database schema or completed the DBA installation steps, determine if your database administrator customized the table space names.

- If the table space names are customized, deselect the **Use Default Database** option. Type the custom table space names in the table space fields.
- If the table space names are not customized, enable the **Use Default Database** option.

If the database is not already installed or if your database uses custom table space names, you need the values from the `sql-wrapper.sql` file to complete the **Database Server** card.

Procedure

1. Click the **Database Server** card in the left pane.
2. Type a **Nickname** for the server.
   The name is displayed on the server card.
3. Type the **Host Name** of the server. Use the fully qualified domain name (FQDN).
4. Select the **Operating System** of the server.
5. Click **Install Database** and choose one of the following options:
   - **Full Database**: Click this option if the database schema is not installed yet. The installation app will complete both the DBA and non-DBA portions of the database schema installation.
   - **Only Non-DBA**: Click this option if your database administrator completed the DBA portion of the database schema installation. The installation app will complete the database schema installation.
   - **Already Installed**: Click this option if the database schema is already installed.
6. If your database uses custom table space names, disable the **Use Default Database** option.
   Ensure that you know the custom names. You need to enter them in a later step.
7. For the **Database Vendor**, select **Oracle**.
8. Type the port number of the Oracle database server in the **Database Port** field.
9. Complete the identification information that will be used to build the JDBC connection string for the OpenPages database.
   - To use the system identifier, click **SID** and type the system identifier in the **Identifier** field.
   - To use the service name, click **Service Name** and type the name in the **Identifier** field.
10. Type the name of the OpenPages database alias in the **Alias** field. In the `sql-wrapper.sql` file, the **Alias** is specified by the `opx_dflt_sid` parameter.
11. If you chose to install the full database, type the **DBA Username** and the **DBA Password**.

The user that you specify must have SYSDBA privileges.

You need to provide the DBA credentials if you selected **Full Database** for the **Install Database** option.

In the `sql-wrapper.sql` file, the **DBA Username** is specified by the `opx_oracle_dba_user` parameter.

12. Type the credentials of the OpenPages schema owner in the **OP Database Username** and **OP Database Password** fields.

    In the `sql-wrapper.sql` file, the **OP Database Username** is specified by the `opx_db_owner` parameter.

13. Select the default currency to use in the OpenPages database.

    You need to select the **Base Currency** if you selected **Full Database** or **Only Non-DBA** for the **Install Database** option.

    In the `sql-wrapper.sql` file, the **Base Currency** is specified by the `opx_base_currency_iso_code` parameter.

14. If your database uses custom table space names, complete the table space name fields.

    You need to provide the table space names if the **Use Default Database** option is disabled.

    In the `sql-wrapper.sql` file, the table space names are specified by the `opx_dflt_*_ts` parameters.

15. Type the path to the data home directory for the OpenPages database in the **Oracle Data Home Directory** field.

    You need to provide the data home directory path if you selected **Full Database** for the **Install Database** option.

    For example: `/home/oracle/app/oradata/OP`

16. Type the **Oracle Cognos JDBC Username** and the **Oracle Cognos JDBC Password**.
17. Type the TNS alias of the Cognos database in the **Oracle Cognos DB Alias** field.

    Note: If you are using the same database instance for Cognos and OpenPages, you must use the same alias as the OpenPages database.

18. If you want to use Oracle Text, enable the **Oracle Enable Text Search** option.

    When the Oracle Text feature is enabled, you can filter based on the contents of fields with long string data types.

    In the `sql-wrapper.sql` file, the **Oracle Enable Text Search** option is specified by the `flag_install_oracle_text` parameter.

19. If you want to skip the database memory configuration checks during the installation, enable the **Oracle Skip DB Memory Check** option.

    Your database administrator might ask you to disabled the memory checks. For more information, see “Memory validation step fails for an Oracle database” on page 364.

20. If you want to use the rollback feature for this server, enable the **Rollback on failure** option.

    When **Rollback on failure** is enabled and an error occurs, the operation that caused the failure is rolled back. You can then fix the error and continue with the installation. The installation process resumes at the operation that was rolled back.

    For example, if an error occurs during the **Install** process, fix the error and then click **Install** to continue.

21. Optional: Click **Save**.

Configuring the deployment manager

You must configure a deployment manager for IBM OpenPages GRC Platform. The deployment manager is the controller for OpenPages application servers.

About this task

The deployment manager is responsible for managing the nodes and application servers in the OpenPages cluster in IBM WebSphere.

The deployment manager can be installed on the same computer as any of the application servers. Alternatively, you can install the deployment manager on a separate computer. Use this option if your organization requires high availability.

The deployment manager and all of the application servers in your deployment must use the same operating system.

Procedure

1. Click the **Deployment Manager** card in the left pane.
2. Type a **Nickname** for the server.

   The name is displayed on the server card.
3. Type the **Host Name** of the server. Use the fully qualified domain name (FQDN).
4. Select the **Operating System** of the server.

   The operating system that you select also sets the operating system for application servers.
5. If the server is on a different physical machine than the installation server, enable the **Remote Deploy** option.

   The agent software is installed on the remote server automatically.

   Complete the following fields:

   - **Agent Port**: Type the port number for the agent software to use.

     Note: If the host name is the same in any two cards, port synchronization will only work if you complete the host information before completing the Agent Port field. Ensure that the port number is the same in any two cards where the host name is the same. If the port number is not the same in both cards, you will encounter exceptions during the validation phase where agents are installed automatically on target systems.
   - **SSH Port** (Linux/AIX only): Type the Secure Shell (SSH) port number of the remote server.
   - **Local User Name** and **Local User Password**: Type the credentials of the OpenPages installation user on the remote server. The account is used to install the agent software on the remote server. You can specify a local account that is on the remote server or a service account, for example *<domain>/<user name>*.

     Note: If you installed the agent manually, use `Agent` for the **Local User Name** and **Local User Password**.
   - **Agent Directory**: Type the absolute path to the directory on the remote server where you want the agent software installed.

     Note: If you are using Microsoft Windows, the maximum length of the path is 25 characters.
6. If you selected the **Install Solutions** option, configure the metrics for solutions.

   - **Module Assessment Method**: Select the risk assessment method.
   - **Total Likelihood Count**: The Total Likelihood Count identifies the scale of inherent and residual risk likelihood. Select the maximum value for the scale.
   - **Total Impact Count**: The Total Impact Count identifies the scale of inherent and residual risk impact. Select the maximum value for the scale.

The count that you specify determines the number of choices available for inherent and residual impact and likelihood fields in risk objects. For example, if **Total Impact Count** is set to 4, then the available choices for Inherent Impact, Residual Impact, Audit Inherent Impact, and Audit Residual Impact are: 1, 2, 3, 4.

You can modify these settings at a later time. **Total Likelihood Count** is called **YMAX** in the registry settings and **Total Impact Count** is called **XMAX**.

7. Configure IBM WebSphere.
   - **WAS Home Directory**: Type the absolute path of the IBM WebSphere installation directory.
   - **WAS Admin Username** and **WAS Admin Password**: Type the credentials of the IBM WebSphere administrator. If you are creating a standalone deployment, the installation process uses the values you provide in these fields. If you are deploying OpenPages into a shared cell, the values for these properties have already been set and you need to provide them in these fields.
8. Type the absolute path of the directory to use for the OpenPages profile in the **DMGR Profile Directory** field.

   If you are creating a standalone deployment, the installation process uses the value you provide in this field. If you are deploying OpenPages into a shared cell, a value for this property has already been set and you need to provide it in this field.
9. Type the SOAP port for the OpenPages deployment manager in the **DMGR SOAP Port** field.

   If you are creating a standalone deployment, the installation process uses the value you provide in this field. If you are deploying OpenPages into a shared cell, a value for this property has already been set and you need to provide it in this field.
10. Type the absolute path of the OpenPages home directory in the **OP Home Directory** field.
11. Type the absolute path of the OpenPages storage directory in the **Storage Directory** field.

    If the database installation is not complete and is being completed by the installation app, you must provide an LFS path for the storage directory. It can be updated to a UNC path after the installation is complete.

    If the database installation is already complete, you can put either an LFS path or a UNC path, depending on which storage type is in place at this point in the installation. The selected storage type must match the current storage type that is defined in the database. For more information, see "Updating the location of the openpages-storage directory (DB2)" on page 141 or "Updating the location of the openpages-storage directory (Oracle)" on page 143.
12. Type the name of the IBM WebSphere profile that you want to create for OpenPages in the **OP DMGR Profile Name** field.

    Note: The profile name is used to create directories. Do not use spaces or special characters in the name.

    If you are creating a standalone deployment, the installation process uses the value you provide in this field. If you are deploying OpenPages into a shared cell, a value for this property has already been set and you need to provide it in this field.
13. Type the name of the IBM WebSphere cell for OpenPages in the **OP Cell Name** field.

    If you are creating a standalone deployment, the installation process uses the value you provide in this field. If you are deploying OpenPages into a shared cell, a value for this property has already been set and you need to provide it in this field.
14. Type the name of the IBM WebSphere cluster for OpenPages in the **OP Cluster Name** field.
15. Type the name of the IBM WebSphere node for the deployment manager in the **OP Dmgr Node Name** field.

    If you are creating a standalone deployment, the installation process uses the value you provide in this field. If you are deploying OpenPages into a shared cell, a value for this property has already been set and you need to provide it in this field.

16. Type the OpenPages super administrator credentials in the **OP Admin Username** and **OP Admin Password** fields.

    For more information, see "Super Administrator" on page 131.
17. Type the absolute path of the database client home directory in the **DB Client Directory** field.
18. Type the absolute path of the **Java Home Directory** on the server.

    The **Java Home Directory** is where the IBM Java JRE that is supplied with IBM WebSphere Application Server is installed. The path that you enter must match the path in the `JAVA_HOME` system environment variable on the server.
19. If you want to use the rollback feature for this server, enable the **Rollback on failure** option.

    When **Rollback on failure** is enabled and an error occurs, the operation that caused the failure is rolled back. You can then fix the error and continue with the installation. The installation process resumes at the operation that was rolled back.

    For example, if an error occurs during the **Install** process, fix the error and then click **Install** to continue.
20. Optional: Click **Save**.

Super Administrator

IBM OpenPages GRC Platform uses the concept of a Super Administrator account. You set up the Super Administrator as part of the installation. The account has complete access to all objects, folders, role templates, and groups in the OpenPages system.

In a new installation, the Super Administrator is the only user in the system. You can change the login user name and password during or after installation.

In the OpenPages documentation, the Super Administrator account is called `OpenPagesAdministrator`.

Do not use the following user names, which are reserved by OpenPages:

- OPSystem
- OpenPages
- OpenPagesApplicationUsers
- OPAdministrators

If you change the login information by using the IBM OpenPages GRC Platform application after installation, you must also manually update the CommandCenter Framework Generator property file. For more information, see the *IBM OpenPages GRC Administrator's Guide*.

Configuring application servers

You can use one or more application servers in your IBM OpenPages GRC Platform deployment.

About this task

You can scale the application server by adding horizontal or vertical cluster members.

- To add horizontal cluster members, add an **Application Server** card for each cluster member.
- To add vertical cluster members, use the **OP Vertical Cluster Number** field to specify the number of cluster members.

You must configure a load balancer to distribute the incoming requests across the cluster members.

For more information, see "Configure clustered environments" on page 24.

Procedure

1. Click the **Application Server1** card in the left pane.

Application Server1 is the admin application server.

2. Type a **Nickname** for the server.

   The name is displayed on the server card.
3. Type the **Host Name** of the server. Use the fully qualified domain name (FQDN).
4. If the server is on a different physical machine than the installation server, enable the **Remote Deploy** option.

   The agent software is installed on the remote server automatically.

   Complete the following fields:

   - **Agent Port**: Type the port number for the agent software to use.

     Note: If the host name is the same in any two cards, port synchronization will only work if you complete the host information before completing the Agent Port field. Ensure that the port number is the same in any two cards where the host name is the same. If the port number is not the same in both cards, you will encounter exceptions during the validation phase where agents are installed automatically on target systems.
   - **SSH Port** (Linux/AIX only): Type the Secure Shell (SSH) port number of the remote server.
   - **Local User Name** and **Local User Password**: Type the credentials of the OpenPages installation user on the remote server. The account is used to install the agent software on the remote server. You can specify a local account that is on the remote server or a service account, for example *<domain>/<user name>*.

     Note: If you installed the agent manually, use `Agent` for the **Local User Name** and **Local User Password**.
   - **Agent Directory**: Type the absolute path to the directory on the remote server where you want the agent software installed.

     Note: If you are using Microsoft Windows, the maximum length of the path is 25 characters.
5. Type the absolute path of the IBM WebSphere installation directory in the **WAS Home Directory** field.
6. Type a name for the node in the **OP Node Name** field.
7. Type a name for the application server in the **OP Server Name** field.
8. Type the starting port number for OpenPages services in the **OP Cluster Start Port** field.

   The field defines the start of a contiguous range of 20 port numbers from the starting port that can be used for OpenPages services that run on the application server.
9. If you want to add vertical cluster members to the server, type a number greater than 1 in the **OP Vertical Cluster Number** field.
10. Type the absolute path of the directory to use for the OPBackup and OPRestore utilities in the **OP Backup Restore Directory** field.
11. Type the absolute path of the database client home directory in the **DB Client Directory** field.
12. Type the absolute path of the **Java Home Directory** on the server.

    The **Java Home Directory** is where the IBM Java JRE that is supplied with IBM WebSphere Application Server is installed. The path that you enter must match the path in the `JAVA_HOME` system environment variable on the server.
13. If you want to use the rollback feature for this server, enable the **Rollback on failure** option.

    When **Rollback on failure** is enabled and an error occurs, the operation that caused the failure is rolled back. You can then fix the error and continue with the installation. The installation process resumes at the operation that was rolled back.

    For example, if an error occurs during the **Install** process, fix the error and then click **Install** to continue.
14. Optional: Click **Save**.

Configuring reporting servers

You can use one or more reporting servers in your IBM OpenPages GRC Platform deployment.

About this task

You can scale the reporting server by adding horizontal members. To add horizontal cluster members, add a **Reporting Server** card for each cluster member.

You must configure additional Cognos dispatchers to ensure that the incoming requests are distributed across the reporting servers.

For more information, see "Configure clustered environments" on page 24.

Procedure

1. Click the **Report Server1** card in the left pane.
2. Type a **Nickname** for the server.

   The name is displayed on the server card.
3. Type the **Host Name** of the server. Use the fully qualified domain name (FQDN).
4. Select the **Operating System** of the server.
5. If the server is on a different physical machine than the installation server, enable the **Remote Deploy** option.

   The agent software is installed on the remote server automatically.

   Complete the following fields:

   - **Agent Port**: Type the port number for the agent software to use.

     Note: If the host name is the same in any two cards, port synchronization will only work if you complete the host information before completing the Agent Port field. Ensure that the port number is the same in any two cards where the host name is the same. If the port number is not the same in both cards, you will encounter exceptions during the validation phase where agents are installed automatically on target systems.
   - **SSH Port** (Linux/AIX only): Type the Secure Shell (SSH) port number of the remote server.
   - **Local User Name** and **Local User Password**: Type the credentials of the OpenPages installation user on the remote server. The account is used to install the agent software on the remote server. You can specify a local account that is on the remote server or a service account, for example *<domain>/<user name>*.

     Note: If you installed the agent manually, use `Agent` for the **Local User Name** and **Local User Password**.
   - **Agent Directory**: Type the absolute path to the directory on the remote server where you want the agent software installed.

     Note: If you are using Microsoft Windows, the maximum length of the path is 25 characters.
6. Type the absolute path of the **Cognos Home Directory**.
7. Type the **Cognos Port** and **Cognos Dispatcher Port**
8. Type the Cognos application URL context root in the **URL Context Root** field.
9. Type the Cognos Framework Manager port in the **Framework Port** field.
10. Type the **Framework Output Directory** property.
11. Type the absolute path of the directory on the reporting server where you want to install IBM OpenPages CommandCenter in the **Command Center Home Directory**.
12. Type the absolute path of the directory to use for the OPCCBackup and OPCCRestore utilities in the **Command Center Backup Directory** field.
13. Type the absolute path of the database client home directory in the **DB Client Directory** field.

14. Type the absolute path of the **Java Home Directory** on the reporting server.

    If you are using the IBM Java that is supplied with Cognos, the **Java Home Directory** is where the Cognos IBM Java is installed.

    The path that you enter must match the path in the `JAVA_HOME` system environment variable on the reporting server.

15. If you want to use the rollback feature for this server, enable the **Rollback on failure** option.

    When **Rollback on failure** is enabled and an error occurs, the operation that caused the failure is rolled back. You can then fix the error and continue with the installation. The installation process resumes at the operation that was rolled back.

    For example, if an error occurs during the **Install** process, fix the error and then click **Install** to continue.

16. Optional: Click **Save**.

Configuring a search server

You can use one search server in your IBM OpenPages GRC Platform deployment. The search server is optional. Configure a search server if you want to use global search.

Procedure

1. Click the server list, select **Global Search Server**, and then click . Click **Continue** to confirm. A **Global Search** card is added in the left pane.
2. Type a **Nickname** for the server.

   The name is displayed on the server card.
3. Type the **Host Name** of the server. Use the fully qualified domain name (FQDN).
4. Select the **Operating System** of the server.
5. If the server is on a different physical machine than the installation server, enable the **Remote Deploy** option.

   The agent software is installed on the remote server automatically.

   Complete the following fields:

   - **Agent Port**: Type the port number for the agent software to use.

     Note: If the host name is the same in any two cards, port synchronization will only work if you complete the host information before completing the Agent Port field. Ensure that the port number is the same in any two cards where the host name is the same. If the port number is not the same in both cards, you will encounter exceptions during the validation phase where agents are installed automatically on target systems.
   - **SSH Port** (Linux/AIX only): Type the Secure Shell (SSH) port number of the remote server.
   - **Local User Name** and **Local User Password**: Type the credentials of the OpenPages installation user on the remote server. The account is used to install the agent software on the remote server. You can specify a local account that is on the remote server or a service account, for example *<domain>/<user name>*.

     Note: If you installed the agent manually, use `Agent` for the **Local User Name** and **Local User Password**.
   - **Agent Directory**: Type the absolute path to the directory on the remote server where you want the agent software installed.

     Note: If you are using Microsoft Windows, the maximum length of the path is 25 characters.
6. Type the absolute path of the directory where you want to install global search in the **Search Home Directory** field.

The directory that you specify is the SEARCH_HOME directory for your deployment. The `opsearchtools.jar` file, Apache Solr, and other global search files are installed in this directory. The global search indexing directory is also stored under the **Search Home Directory**.

7. Select a language from the **Search Language** list.

   The language that you select is used by the search server for indexing.

8. Type the absolute path of the **Java Home Directory** on the server.

   The **Java Home Directory** is where the IBM Java JRE that is supplied with IBM WebSphere Application Server is installed. The path that you enter must match the path in the JAVA_HOME system environment variable on the server.

9. If you want to use the rollback feature for this server, enable the **Rollback on failure** option.

   When **Rollback on failure** is enabled and an error occurs, the operation that caused the failure is rolled back. You can then fix the error and continue with the installation. The installation process resumes at the operation that was rolled back.

   For example, if an error occurs during the **Install** process, fix the error and then click **Install** to continue.

10. Optional: Click **Save**.

Workflow server configuration

You can integrate IBM Business Process Manager with IBM OpenPages GRC Platform. You need to do some pre-installation tasks before you add a workflow server to your deployment.

See the *IBM OpenPages GRC - Business Process Manager Installation Guide* before you add a **Workflow Server** card.

The guide describes how to prepare for the integration, how to complete the **Workflow Server** card, and what postinstallation tasks you need to do. The guide also describes how you set up the integration manually by running a script.

If you are upgrading and you used IBM Business Process Manager in your previous version of OpenPages, see the *IBM OpenPages GRC - Business Process Manager Installation Guide* for information about how to update the integration.

Post installation tasks

After you install IBM OpenPages GRC Platform, you must perform some post installation tasks.

You can also modify the installation environment to improve performance, enhance security, or change default settings. For example, you can tune the application servers or configure LDAP.

As part of the post installation tasks, you can configure OpenPages GRC Platform to use Secure Sockets Layer (SSL) to ensure that all data passed between the application server and a browser remains private.

For information about SSL configurations and about addition configurations, such as adding a member to a cluster or changing port numbers, see the *IBM OpenPages GRC Administrator's Guide*.

After you complete the installation, consider backing up your environment by running OPBackup and OPCCBackup.

OpenPages GRC Platform CommandCenter post-installation tasks

After you install IBM OpenPages CommandCenter on the reporting servers, some post installation tasks are required. You must update the CommandCenter configuration files to ensure that OpenPages components can communicate with each other.

Copying the IBM Global Security Kit files to the DB2 server installations on Windows operating systems

On Windows operating systems, you must copy the 32-bit version of the IBM Global Security Kit (GSK) files to the DB2 server instance location. You must copy the files before you generate the reporting framework.

Procedure

1. Log on to the database server computer.
2. Go to the *<DB2_HOME>*\bin directory for the IBM OpenPages GRC Platform database instance and create a folder named icc.
3. Copy the contents of the C:\Program Files (x86)\IBM\gsk8\lib directory to the *<DB2_HOME>* \bin\icc directory.

Updating IBM WebSphere Application Server Liberty for the Framework Model Generator

You can update the IBM WebSphere Application Server Liberty profile for the IBM OpenPages GRC Platform Framework Model Generator. Update WebSphere Liberty after you install, upgrade, or migrate IBM OpenPages GRC Platform.

Before you begin

Ensure that JAVA_HOME is defined.

About this task

You can update WebSphere Liberty by using IBM Installation Manager. Open IBM WebSphere and click the link to download and install updates. For more information, see Installing Liberty on distributed operating systems by using the GUI on IBM Knowledge Center

Alternatively, you can download the update and install it manually.

Procedure

1. Log on to the active reporting server as a user with administrative privileges.
2. Go to the Framework Model Generator home page, http://*<server name>*:*<server port>*
3. Click the link to download WebSphere Application Server Liberty Runtime. Save the .zip file to a temporary directory.
4. Back up your current WebSphere Liberty installation.
   a) Stop the Framework Model Generator. For more information, see “Starting and stopping the OpenPages GRC Platform Framework Model Generator service on Windows” on page 265 or “ Starting and stopping the OpenPages GRC Platform Framework Model Generator service on AIX or Linux” on page 265.
   b) Go to the <CommandCenter_Home> directory.
   c) Rename the wlp directory to wlp_backup.
5. Install the new version of WebSphere Liberty.
   a) Extract the downloaded .zip file to the temporary directory on the active reporting server.
   b) Copy the wlp directory from the temporary directory to the <CommandCenter_Home> directory.
6. Configure WebSphere Liberty.
   a) Go to the *<CommandCenter_Home>*/wlp_backup/bin directory and copy the script file server or server.bat to the *<CommandCenter_Home>*/wlp/bin directory

b) If you are using Windows, copy the Windows services files `prunsrv.exe` and `openpages_wlp_svc_setup.bat` from *<CommandCenter_Home>*`/wlp_backup/bin` to *<CommandCenter_Home>*`/wlp/bin`.

c) Copy the `IBMOpenPagesFrameworkModelGenerator` directory from *<CommandCenter_Home>*`/wlp_backup/usr/servers` to *<CommandCenter_Home>*`/wlp/usr/servers`.

7. Start the Framework Model Generator. For more information, see "Starting and stopping the OpenPages GRC Platform Framework Model Generator service on Windows" on page 265 or " Starting and stopping the OpenPages GRC Platform Framework Model Generator service on AIX or Linux" on page 265.

Creating the reporting schema and framework

To see the default IBM OpenPages GRC Platform reports, you must create a reporting schema and update the reporting framework.

Before you begin

If you are using clustered environments, ensure you have configured them before you create the reporting schema and framework. For more information, see "Configure clustered environments" on page 24.

Procedure

1. In a web browser, open the OpenPages GRC Platform application:

   `http://`*`openpages_server`*`:`*`port`*`/openpages`
2. Log on to the application as a user with administrative privileges.
3. For **System Admin Mode**, switch from **Disabled** to **Enabled**.
4. From the menu bar, click **Administration** and select **Reporting Schema**.
5. Click **Create**.
6. After the create operation finishes, click **System Admin Mode** to switch from **Enabled** to **Disabled**.
7. From the menu bar, click **Administration** > **Reporting Framework** > **Generation**.
8. On the **Reporting Framework Operations** page, click **Update**.
9. In the **Reporting Framework Generation** window, under **Framework Generation**, select the **Framework Model** and **Labels** and other options you want for the relational data model.
10. Click **Submit**.
11. To view the progress of the update, click **Refresh**.

    The **Percent Complete** column on the **Reporting Framework Operations** table updates the percentage of completion.

Results

Updating the reporting framework process takes approximately 30 minutes or longer.

OpenPages GRC Platform CommandCenter portal security

After installation, you can restrict which user groups are allowed to modify reports. To grant IBM OpenPages GRC Platform CommandCenter administrative rights, create a group in the OpenPages application or use an existing group, such as `OPAdministrators`. This is optional.

To restrict user access to administrative functions within the Cognos Analytics portal, use IBM Cognos Administration. To prevent users from deleting, changing, or saving reports, restrict access to the OpenPages reports that are in Public Folders. You can also restrict users from running reporting tools, such as Cognos Analytics - Reporting, or from modifying reports.

For more information, see the *IBM OpenPages GRC Administrator's Guide*.

Creating an open session command block for the OpenPages GRC Platform data source

For IBM OpenPages GRC Platform to work, you must create an open session command block for the OpenPages data source.

Procedure

1. In the Internet Explorer browser, type the following URL:

   `http://cognos_server_name/ibmcognos`
2. Open IBM Cognos Administration:
   a) If the Cognos **Welcome** page is displayed, click **Administer IBM Cognos Content**.
   b) If the IBM Cognos Connection is displayed, click **Launch** > **IBM Cognos Administration**.
3. On the **Configuration** tab, click **Data Source Connections**.
4. Click **More** next to **OpenPages DataSource**.
5. Click **Set properties**.
6. Select the **Connection** tab.
7. Next to the **Open session commands**, click **Set**.
8. In the XML database commands box, copy the following text:

```
<commandBlock>
<commands>
<sqlCommand>
<sql>begin OP_SESSION_MGR.SET_ACTOR_ID_PRIVATE (#$account.parameters.openPagesUserId#);
OP_CRYPT_MGR.SET_ENCRYPTION_PARAMS (#$account.parameters.openPagesEncryptKey#,
   #$account.parameters.openPagesEncryptAlgorithm#,
   #$account.parameters.openPagesEncryptPrefix#);
end;
</sql>
</sqlCommand>
</commands>
</commandBlock>
```

9. Click **OK** to save your changes.

Loading the Cognos Analytics dashboard integration after installing

After you install OpenPages, you must load a mandatory integration configuration so that you can use Cognos Analytics dashboards within OpenPages.

Procedure

1. Copy the `CommandCenter-integration-op-config.xml` and `CommandCenter-integration-op-file-content.zip` files from the IBM OpenPages GRC Platform installation media to the administrative application server.

   The files are located in the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/loader-data/commandcenter` directory.
2. Open a command line.

   If you are using Microsoft Windows , open a command prompt with the **Run as Administrator** option.
3. Go to the `<OP_HOME>/bin` directory.
4. Run the following command to load the files.

   Replace *<loader-file-path>* with the location of the `CommandCenter-integration-op-config.xml` and `CommandCenter-integration-op-file-content.zip` files.

```
ObjectManager.cmd|sh l c <OpenPages Administrator user>
   <OpenPages Administrator password> <loader-file-path>
   CommandCenter-integration
```

5. If you encounter any errors, review the log file, `OP_HOME/bin/logs/ObjectManager.log`.

Configuring OpenPages GRC Platform applications to use a domain account on Windows operating systems

In a clustered environment, the IBM OpenPages GRC Platform application services access a file share. The account that starts the services must have permissions to the file share.

Configuring the OpenPages applications to use a domain account must be done for new installations and upgrades.

About this task

By default, on Windows operating systems, services run under the `LocalSystem` account. This account cannot access a shared drive on another computer. In a horizontal cluster, configure the OpenPages application services on all application servers to run under a domain account that has access to the shared drive.

For IBM WebSphere Application Server, the following OpenPages application services must have permissions to the file share:

- IBMWAS*<version>*Service - *<OpenPages-dmgr-name>*
- IBMWAS*<version>*Service - *<OpenPages-node-name>*
- IBMWAS*<version>*Service - *<OpenPages-node-server-name>*Server*<#>*

For the OpenPages installer, the following application service must have permissions to the file share:

- `ibmopenpagesgrcplatforminstaller<version>.exe`

Procedure

1. Log on to each application server as a user with administrative privileges.
2. Open the **Services** control panel.
3. Stop each of the OpenPages services.
   a) Right-click the service name, and select **Properties** from the menu.
   b) In the **Properties** window, click the **Log On** tab.
   c) Select **This account**.
   d) Type a domain, account name, and password for at least one user who has access to the shared drive.
   e) Click **OK** to continue.

Configuring file share permissions on AIX or Linux operating systems

For clustered IBM OpenPages GRC Platform environments that run on AIX or Linux operating systems, configure the same user name and password on all systems. File share permissions are the same on all systems. If you are using a network file share (NFS), ensure that users have read and write access to the file share.

Sharing a network OpenPages GRC Platform storage directory on AIX or Linux operating systems

When you install IBM OpenPages GRC Platform, you specify the **Storage Directory** location on the **Deployment Manager** card. The storage location is a directory where attached files and forms that are associated with OpenPages objects are stored.

If you pointed to a location on the local computer and you are using a horizontal cluster for the application servers, you must change the pointer to a shared network storage location.

After you share the directory, use the `update-storage` script to update the database with the shared network location.

Procedure

1. Mount the storage directory on the admin application server to the non-admin server.
   a) Log on to the OpenPages admin application server as the root user or a user that belongs to the System group, and open a shell.
   b) Go to the `/etc` directory, and open the `hosts` file in a text editor.
   c) Add the IP address and name of each OpenPages horizontal cluster member.
   d) Save and close the `hosts` file.
   e) Create a file with the name `exports` in the `/etc` directory.

      Important: Ensure that you have full rights to the local installation directory.
   f) Open the `exports` file in a text editor and add the full path to the storage directory followed by `*(insecure,rw,async,no_root_squash)`.

      ```
      /opt/OpenPages/openpages-storage *(insecure,rw,async,no_root_squash)
      ```
   g) Export all file systems that are named in `/etc/exports` directory by using the following command:

      ```
      exportfs -a
      ```

      The `exportfs` command maintains the current table of exported file systems for NFS in the `/var/lib/nfs/etc` file.
   h) Restart the NFS server.

      On AIX operating systems, use the following commands:

      ```
      stopsrc -g nfs
       startsrc -g nfs
      ```

      On Linux operating systems, use the following command:

      ```
      service nfs restart
      ```

      The NFS server processes requests from the NFS clients.
   i) Use the following command to check that the `openpages-storage` directory is exported and ready for mounting:

      ```
      showmount -e
      ```

      Ensure that the `openpages-storage` directory is listed.
2. Mount the storage directory from the admin application server on the horizontal cluster member.
   a) Log on to the OpenPages horizontal cluster member as the root user or a user that belongs to the System group.
   b) Open a shell as a user with administrative privileges.
   c) Go to the `/etc` directory.
   d) Open the `hosts` file in a text editor and add the IP address and name of each OpenPages horizontal cluster member.
   e) Save and close the `hosts` file.
   f) Run the following command to mount the storage directory:

      ```
      mount nfsservername mountpoint
      ```

      - *nfsservername* is the name of the OpenPages admin application server and the location of the `openpages-storage` directory on the admin server.
      - *mountpoint* is the name and path of the `openpages-storage` directory on the horizontal cluster member.

Example:

```
mount aix61-1-5.openpages.com:/usr/OpenPages/openpages-storage
/usr/OpenPages/openpages-storage
```

3. Update the location of the `openpages-storage` directory in the database.
   - DB2: "Updating the location of the openpages-storage directory (DB2)" on page 141
   - Oracle: "Updating the location of the openpages-storage directory (Oracle)" on page 143

Sharing a network OpenPages GRC Platform storage directory on Windows operating systems

When you install IBM OpenPages GRC Platform, you specify the **Storage Directory** location on the **Deployment Manager** card. The storage location is a directory where attached files and forms that are associated with OpenPages objects are stored.

If you pointed to a location on the local computer and you are using a horizontal cluster for the application servers, you must change the pointer to a shared network storage location. Ensure that all cluster members can access the directory. If you are using a search server, ensure that the search server can also access the shared network location.

After you share the directory, use the `update-storage` script to update the database with shared network location.

Updating the location of the `openpages-storage` directory (DB2)

In the database, update the location of the `openpages-storage` directory.

If you are using Microsoft Windows, you can also use this procedure to change the storage type from LFS to UNC.

Before you begin

Stop the IBM OpenPages GRC Platform services if they are running.

Procedure

1. Log on to the target environment as a user with administrative permissions. You can use any system with access to CLPPlus that can connect to the database server.
2. Open a command or shell window.
3. Locate the `update-storage.sql` script.

   The script is stored in the following directories. You can use the script in either location.

   - `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS` directory
   - `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/UPGRADE_SCRIPTS`
4. Run the `update-storage.sql` script to update the `openpages-storage` directory location in the database:

```
clpplus -nw <op_db_user>/<op_db_password>@<database_host>:
   <database_port>/<database_name> @sql-wrapper update-storage <log_file>
   <database_host> <database_port> <database_name> <op_db_user>
   <op_db_password> <storage_type> <storage_server_name> <host_name>
   <os_type> <path_or_UNC_name>
```

Table 37: Parameters in the `update-storage.sql` script (DB2)	
Parameter	**Description**
<op_db_user>	OpenPages user name for accessing the OpenPages database.
<op_db_password>	The OpenPages password for accessing the OpenPages database.
<database_host>	Name of the DB2 server host machine that contains the OpenPages database.
<database_port>	Port number of the DB2 database instance that is installed on the database server. For DB2, the default port is `50000`.
<database_name>	Name of the OpenPages database.
<log_file>	The name of the log file that the script creates and writes information to.
<storage_type>	The type of file storage to be used. Valid values are as follows: • LFS (local file system) • UNC (Universal Naming Convention) - for Windows only. **Note:** After you move from LFS to UNC, you cannot go back to using LFS.
<storage_server_name>	The name of the storage server.
<host_name>	The host name of the machine.
<os_type>	The type of operating system. Valid values are as follows: • `Windows` • `Unix`
<path_or_UNC_name>	The file path or UNC of the storage location. If the path contains backslashes, wrap the path in single quotation marks.

Examples

- LFS

  Windows

```
clpplus -nw openpage/password@myserver.ibm.com:50000/opx
   @sql-wrapper update-storage
   output.log myserver.ibm.com 50000 OPX openpage password
   LFS eng11 eng11  Windows 'C:\IBM\OpenPages\openpages-storage'
```

- Linux and AIX

```
clpplus -nw openpage/password@myserver.ibm.com:50000/opx
   @sql-wrapper update-storage
   output.log myserver.ibm.com 50000 opx openpage password
   LFS aix11 aix11 Unix /usr/opdata/openpages-storage
```

- UNC

  Windows

```
clpplus -nw openpage/password@myserver.ibm.com:50000/opx
   @sql-wrapper update-storage
   output.log myserver.ibm.com 50000 OPX openpage password
   UNC eng11 eng11 Windows openpages-storage
```

Updating the location of the openpages-storage directory (Oracle)

In the database, update the location of the openpages-storage directory.

If you are using Microsoft Windows, you can also use this procedure to change the storage type from LFS to UNC.

Before you begin

Stop the IBM OpenPages GRC Platform services if they are running.

Procedure

1. Log on to the target environment as a user with administrative permissions. You can use any system with access to SQL*Plus that can connect to the database server.
2. Open a command or shell window.
3. Locate the update-storage.sql script.

   The script is stored in the following directories. You can use the script in either location.

   - /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/ORACLE/INSTALL_SCRIPTS directory.
   - /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/ORACLE/UPGRADE_SCRIPTS
4. Run the update-storage.sql script to update the openpages-storage directory location in the database:

```
sqlplus /nolog @sql-wrapper.sql update-storage <log_file>
   <oracle_tns_alias> <op_db_user> <op_db_password>
   <storage_type> <storage_server_name> <host_name>
   <os_type> <path_or_UNC_name>
```

Table 38: Parameters in the update-storage.sql script (Oracle)

Parameter	Description
<log_file>	The name of the log file that the script will create and write information to.
<oracle_tns_alias>	The database alias for the OpenPages database instance, as set during the Oracle database installation.
<op_db_user>	The user name for accessing the OpenPages database.
<op_db_password>	The password for accessing the OpenPages database.
<storage_type>	The type of file storage to be used. Valid values are: • LFS (local file system) • UNC (Universal Naming Convention) - for Windows only **Note:** After you move from LFS to UNC, you cannot go back to using LFS.
<storage_server_name>	The name of the storage server.
<host_name>	The host name of the machine.
<os_type>	The type of operating system. Valid values are: • Windows • Unix

Table 38: Parameters in the update-storage.sql script (Oracle) (continued)	
Parameter	**Description**
<path_or_UNC_name>	The file path or UNC of the storage location. If the path contains backslashes, wrap the path in single quotation marks.

Examples

- LFS

  Windows

```
sqlplus /nolog @sql-wrapper.sql
  update-storage output.log OP
  openpage password LFS eng11 eng11
  Windows 'C:\IBM\OpenPages\openpages-storage'
```

  Linux or AIX

```
sqlplus /nolog @sql-wrapper.sql
 update-storage /home/op/upd-storage-output.log
 op openpages openpages LFS  aix11 aix11
 Unix /usr/opdata/openpages-storage
```

- UNC

  Windows

  In the following example, openpages-storage is the UNC share name of the storage location. The openpages-storage location is accessible to all horizontal cluster members as \\testserver1\openpages-storage.

```
sqlplus /nolog @sql-wrapper.sql update-storage
   c:\temp\update-storage-output.log op openpages openpages
   UNC eng11 eng11 Windows openpages-storage
```

Configuring IBM HTTP Server to load balance application servers

In a typical configuration that uses IBM HTTP Server to load balance the OpenPages application servers, IBM HTTP Server is installed on a separate computer.

Web server plug-ins enable IBM HTTP Server to communicate requests for dynamic content, such as servlets, to the application server. A configuration file is generated for each plug-in.

Open a port for the load-balancer, for example port 80.

Before you begin

If you are configuring the IBM OpenPages GRC Platform environment for SSL, configure SSL before you configure the plugin-cfg.xml file. For more information, see the *IBM OpenPages GRC Administrator's Guide*.

Procedure

1. Log on to the load-balancing server as a user with administrative privileges.
2. Copy the OP_*<version>*_Configuration directory from the installation media to your local system.
3. Create the web server instances for the OpenPages application.
   a) Log on to the application server as a non-root user who has administrative privileges.
   b) In a web browser, type http://*<admin_server_name>*:*<port>*/ibm/console.

      For example: http://*testserver1.com*:9060/ibm/console
   c) Enter the WebSphere administrator user name and password.

d) Click **Servers** > **Server Types** > **Web Servers**.

e) On the **Web Servers** page, click **New**.

f) On the **Select a node for the Web server** page, select the application server from the **Select node** list.

g) Enter a name for the server, such as opapp, in the **Server name** field.

h) From the **Type** list, select **IBM HTTP Server** and click **Next**.

i) On the **Confirm new Web server** page, review the settings and click **Finish**.

j) In the messages box, click **Save** to commit the changes to the master configuration file.

4. Create the plug-in for the OpenPages server instance.

   a) Click **Generate Plugin**.

      The plug-in is created and saved to the `$IHS_HOME/Plugins/config/<webserver_name>/` directory.

      The *<webserver_name>* is the OpenPages server instance that you created.

5. Open the `httpd.conf` file, and add or modify the following line to point to the new plug-in file.

```
WebSpherePluginConfig
/usr/IBM/HTTPServer/Plugins/config/OP/<plugin_file>.xml
```

6. Ensure that the IgnoreAffinityRequests setting in the `<ServerCluster>` section is set to `false`:
7. Save and close the file.
8. Restart IBM HTTP Server.
9. Log in to OpenPages as a user with administrative privileges.
10. Click **Administration**, and then click **Settings**.

    a) Expand **Platform** > **Reporting Schema** > **Object URL Generator**.

    b) Type the **Host**, **Port**, and **Protocol** of the load balancer.

       If you are using a single server, type the **Host**, **Port**, and **Protocol** of the admin application server.

Adding a load-balancing port to virtual hosts

If the load-balancing port is not 80 or 443, you must set the port in the virtual hosts.

Procedure

1. Log on to the IBM WebSphere Integrated Solutions Console as a server administrator.

   `http://server_name:port/ibm/console`

   The default port is 9060.
2. Expand **Environment** and click **Virtual Hosts**.
3. In the list on the **Virtual Hosts** page, click **default_host**.
4. On the **Virtual Hosts** > **default_host** page, under the **Additional Properties** heading, click **Host Aliases**.
5. If the load-balancing port is not present in the table, click **New**.
6. Leave **Host Name** as `*`. Update the port to the load-balancing port.
7. Click **Apply**.
8. In the **Messages** box, click **Save** to commit the changes to the master configuration.
9. Restart all OpenPages servers.

Configuring the HTTP Server for SAMLV2.0 single sign-on

If you are using SAML V2.0 for single sign-on, extra configuration is required on the IBM HTTP Server configuration for the SAML V2.0 service provider that you installed on the IBM OpenPages GRC Platform application server.

Procedure

1. Open the `plugin-cfg.xml` file in a text editor
2. Update the `<UriGroup Name="default_host_OpenPagesCluster_URIs">` section with a new element.

```
<Uri AffinityCookie="opsosa" AffinityURLIdentifier="opsosa" Name="/samlsps/*"/>
```

3. Save and close the file.

What to do next

Ensure that you replace the application server URL with the load balancing URL for the service provider when you configure SAML V2.0.

Configuring property files for load balancing on Windows, AIX, and Linux operating systems

Some configuration is required when using IBM HTTP Server as a load balancer in a WebSphere Application Server environment.

Procedure

1. On the load-balancing web server, go to the `/usr/IBM/HTTPServer/modules/` directory.
2. Open the plug-in file (`plugin-cfg-merged.xml`) in a text editor to make the following changes:
   a) Change the IgnoreAffinityRequests setting to `true`.
   b) Change the ServerIOTimeout setting for all servers to a value that allows sufficient time for the IBM OpenPages GRC Platform application to respond to request from a client.
   c) Save and close the file.
3. Open the `httpd.conf` file in a text editor and make the following changes:

   The default location of the file is `/usr/IBM/HTTPServer/conf/httpd.conf`.

   a) To load the required modules, add or uncomment the following lines

```
LoadModule negotiation_module modules/mod_negotiation.so
LoadModule proxy_module modules/mod_proxy.so
LoadModule proxy_ajp_module modules/WebSphereCE/mod_proxy_ajp.so
LoadModule proxy_balancer_module modules/WebSphereCE/mod_proxy_balancer.so
LoadModule proxy_connect_module modules/mod_proxy_connect.so
LoadModule proxy_http_module modules/mod_proxy_http.so
LoadModule status_module modules/mod_status.so
LoadModule was_ap22_module modules/mod_was_ap22_http.so
```

   b) Modify the ServerName setting to point to the host name where you installed the IBM HTTP Web Server.

```
ServerName=MYSERVERNAME.DOMAIN.COM
```

   c) Modify the ServerRoot setting to point to the installation location of the Apache Web Server. For example,

```
ServerRoot=/usr/IBM/HTTPServer/htdocs
```

   d) Add the `Allow from all` attribute to each `Directory` element.

```
<Directory>
Options Indexes FollowSymLinks
AllowOverride None
Order allow,deny
```

```
Allow from all
</Directory>
```

e) Uncomment the parameter ExtendedStatus setting and set the value to On.

f) Set the location tags for `server-status` and `server-info`.

For example,

```
<Location /server-status>
SetHandler server-status
Order Deny,Allow
Deny from all
Allow from all
</Location>

<Location /server-info>
SetHandler server-info
Order Deny,Allow
Deny from all
Allow from all
</Location>
```

4. Save and close the file.
5. Restart the IBM HTTP server.

Configuring property files for each OpenPages GRC Platform instance

You must edit the server properties file on each IBM OpenPages GRC Platform application server in the horizontal cluster to point to the load balancer.

Procedure

1. Log on to the OpenPages application server as a non-root user who has administrative privileges.
2. Go to the *<OP_HOME>*`/aurora/conf` directory.
3. Open the `aurora.properties` file in a text editor.
   a) Edit the application.url.path to point to the fully qualified domain name of the load balancer.

   ```
   application.url.path=http\://op-load-balancer.domain.com\:<port>
   /openpages
   ```

   b) Save and close the file.
4. Open each *<OpenPages-node-server-name>*`Server`*<#>*`-server.properties` file in a text editor.
   a) Edit the `url.path` lines to point to the fully qualified domain name of the load balancer.

   ```
   url.path.openpages=http\://<op-load-balancer.domain.com>\:<port>/openpages
   ```

   b) Save and close each `server.properties` file.
5. Open each *<OpenPages-node-server-name>*`Server`*<#>*`-sosa.properties` file in a text editor.
   a) Edit the Application.url.path lines to point to the fully qualified domain name of the load balancer.

   ```
   application.url.path=https\://<op-load-balancer.domain.com>\:<port>
     /openpages
   ```

   b) Save and close each `sosa.properties` file.
6. Restart the web server.

Customizing the load balancer for large data sets

For databases with a large data set, some IBM OpenPages GRC Platform reports might time out before completion. If you experience problems with reports that are timing out, change configuration settings in the IBM HTTP Web Server configuration file.

Change the following settings:

`TimeOut`
The number of seconds IBM HTTP Web Server waits to receive a GET request between receipt of TCP packets on a POST or PUT request and between ACKs on transmissions of TCP packets in responses.

`KeepAliveTimeout`
The number of seconds IBM HTTP Server waits for a subsequent request before closing the connection.

Note: A high value for the setting can cause performance problems, especially if the higher timeout causes server processes to wait for idle clients.

Procedure

1. Log on to load balancing web server as a user with administrative privileges.
2. Open `httpd.conf` in a text editor.
3. Change the KeepAliveTimeout property to a higher value.

```
KeepAliveTimeout  1800
```

4. Add and then set the TimeOut property.

   Ensure that the setting prevents timeout errors.

   For example, `TimeOut 1800`
5. Save and close the file.
6. Restart IBM HTTP Web Server.

Load balancing the OpenPages GRC Platform reporting server

IBM OpenPages GRC Platform CommandCenter uses Cognos Analytics, which can scale horizontally. To scale OpenPages CommandCenter vertically within the same environment, increase the number of processes that are available to handle requests. Depending on the load, you can configure more dispatchers.

About this task

To scale OpenPages CommandCenter horizontally, install more environments and register the IBM Cognos dispatchers. Incoming requests are distributed across the multiple environments.

The number of dispatchers you need depends on the operating system, system resources, the number of users, and other factors.

For more information about configuring dispatchers for your environment, see the IBM Cognos documentation (http://www.ibm.com/support/knowledgecenter/SSEP7J_11.0.0).

When you design and implement the infrastructure for the IBM Cognos reporting servers, the following OpenPages components determine how many reporting servers are required for the OpenPages solution:

- The number of computed fields on an object type.
- The complexity of the computed fields on an object type.
- The number of reporting fragments on an object type.
- The complexity of the computed fields on an object type.
- The number of embedded reports on the classic home page.
- Whether reporting fragments and computed fields are set to appear automatically.
- The number of IBM Cognos reports available to users.
- The complexity of IBM Cognos reports available to users.
- The custom components using the OpenPages reporting framework.

You should review the IBM Cognos log files and metrics to determine whether more reporting servers are required in the environment if timeout errors occur or issues occur as a result of excessive load.

Procedure

1. On the load-balancer server, stop IBM HTTP Server.
   For example, in the `IBM/HTTPServer/bin` directory, run the following command: `httpd -k stop`.
2. Open the `IBM/HTTPServer/Plugins/config/OP/merged-plugin-cfg.xml` file in a text editor.
3. Change the session affinity from JSESSIONID to opsosa.

   For example, change the file so that it looks like the following:

```
<UriGroup Name="default_host_OpenPagesCluster_URIs">
  <Uri AffinityCookie="opsosa" AffinityURLIdentifier="opsosa" Name="/opws/*"/>
  <Uri AffinityCookie="opsosa" AffinityURLIdentifier="opsosa"
      Name="/opstartup_OPAdmin/*"/>
  <Uri AffinityCookie="opsosa" AffinityURLIdentifier="opsosa" Name="/opx/*"/>
  <Uri AffinityCookie="opsosa" AffinityURLIdentifier="opsosa" Name="/publishweb/*"/>
  <Uri AffinityCookie="opsosa" AffinityURLIdentifier="opsosa" Name="/openpages/*"/>
  <Uri AffinityCookie="opsosa" AffinityURLIdentifier="opsosa"
      Name="/opwebservices/*"/>
  <Uri AffinityCookie="opsosa" AffinityURLIdentifier="opsosa" Name="/grc/*"/>
 <Uri AffinityCookie="opsosa" AffinityURLIdentifier="opsosa" Name="/samlsps/*"/>
</UriGroup>
```

4. Save and close the file.
5. Start IBM HTTP Server.
   For example, in the `IBM/HTTPServer/bin` directory, run the following command: `httpd -k start`.

Adding OpenPages GRC Platform servers to the Cognos Application Firewall safe list
By default, the IBM Cognos Application Firewall is enabled. Cognos Application Firewall validates domain and host names to protect URLs that are created. Cognos Application Firewall considers domain names derived from the environment configuration properties as safe domain names. Use Cognos Configuration to add IBM OpenPages GRC Platform application servers to the list of valid domains and host names.

Procedure

1. Log on to the reporting server as a user with administrative privileges.
2. Start IBM Cognos Configuration.
3. In the **Explorer** pane, go to **Local Configuration** > **Security** > **IBM Cognos Application Firewall**.
4. In the **Properties** pane, click the **Valid domain names or hosts** field and click the pencil icon.
5. In the **Valid domain or hosts** window, click **Add**.
6. Enter the names of all OpenPages application servers.
7. Click **OK**.
8. Save the configuration and restart the Cognos service.

   If you use Windows Services to restart the Cognos service, the service is listed as **IBM Cognos**.

Communication between OpenPages GRC Platform CommandCenter servers
If you install Cognos on more than one computer, you must configure the distributed installations to communicate with each other

Configure the following communication paths:

- Configure the primary Cognos server as the default active server.
- All Cognos servers must know the location of the content store database.
- All Cognos servers must know the location of the other Cognos servers.
- All Cognos servers must use the same cryptographic settings.
- All Cognos servers must have their system clock synchronized.

Configuring the active reporting server

In a clustered environment, one reporting server acts as the active server, or default primary server, and one or more reporting servers act as standby servers.

Procedure

1. Ensure that IBM OpenPages GRC Platform CommandCenter is not running on any server.
2. On the reporting server that is designated as the active server, start IBM Cognos Configuration.

   Tip: Use the computer with the highest processor speed for the default active server.
3. In the **Explorer** pane, click **Environment**.
4. For the **Gateway URI**, change the `localhost` portion of the URL to the name of the primary reporting server.
5. For the **Dispatcher URI for Gateway**, click the pencil icon next to the **Value** box.
6. In the **Current Values** list, change the `localhost` portion of the URL to the name of the primary Cognos computer.
   a) For each additional Cognos computer, click **Add**.
   b) Change the `localhost` portion of the URL to the name of each additional Cognos computer.
   c) Click **OK**.
7. For the **Content Manager URIs**, click the pencil icon next to the **Value** box.
   a) In the **Current Values** list, change the `localhost` portion of the URL to the name of the primary Cognos computer.
   b) For each additional Cognos computer, click **Add**.
   c) Change the `localhost` portion of the URL to the name of each additional Cognos computer.
   d) Click **OK**.
8. In the **Explorer** pane, click **Security** > **Cryptography**.
9. In the **Properties** pane, under **CSK settings**, ensure that **Store symmetric key locally?** is set to `True`.

   The key store must be created on the default active Cognos computer
10. Click **File** > **Save**.
11. Click **Actions** > **Start**.

    When the services start, this computer becomes the default active Cognos computer.

Configuring standby reporting servers

In a clustered environment, configure one or more reporting servers to act as standby servers.

Procedure

1. Ensure that Cognos is running on the active Cognos server.
2. On the reporting server that is designated as a standby server, start IBM Cognos Configuration.
3. In the **Explorer** pane, click **Environment**.
4. In the **Environment - Group Properties** pane, click **Gateway URI**.
5. In the **Value** field, change the `localhost` portion of the URL to the name of the primary Cognos computer.
6. In the **Environment - Group Properties** pane, click **Dispatcher URI for Gateway**.
   a) Click the pencil icon next to the **Value** box.
   b) In the **Current Values** list, change the `localhost` portion of the URL to the name of the primary Cognos computer.
   c) For each additional Cognos computer, click **Add**.
   d) Change the `localhost` portion of the URL to the name of each additional Cognos computer.

e) Click **OK**.

7. In the **Environment - Group Properties pane**, click **Content Manager URIs**.
   a) Click the pencil icon next to the **Value** box.
   b) In the **Current Values** list, change the `localhost` portion of the URL to the name of the primary Cognos computer.
   c) For each additional Cognos computer, click **Add**.
   d) Change the `localhost` portion of the URL to the name of each additional Cognos computer.
   e) Click **OK**.
8. In the **Explorer** pane, under **Security**, click **Cryptography**.
9. In the **Properties** pane, under **CSK settings**, set **Store symmetric key locally** to `False`.

   Note: The key store is created on the primary Cognos computer. There can be only one key store in a load balanced Cognos installation.
10. In the **Explorer** window, under **Security**, **Cryptography**, click **Cognos**.
11. Under the **Certificate Authority settings** property group, set the **Password** property to match the one that you configured on the primary Cognos server.

    Ensure that all other cryptographic settings match the settings that you configured on the primary Cognos computer.
12. In the **Explorer** pane, under **Data Access** > **Content Manager**, click **Content Store**.
13. Ensure that the values for the content store match the primary Cognos computer
14. Click **File** > **Save**.
15. Click **Actions** > **Start**.

Configuring an Apache load balancer or proxy server
If you are using an external proxy server for load balancing, you must add a proxy redirection directive to the `httpd.conf` file on the proxy server. Requests sent to the proxy server are redirected to the server specified in the `httpd.conf` file.

Procedure

1. Log on to the load balancer server as a user who has administrative privileges.
2. Go to the *Apache_Home*`\conf\` directory, and open the `httpd.conf` file in an editor.
3. Add the following lines:

```
<Location /ibmcognos/>
ProxyPass http://primary_reporting_server/ibmcognos/
SetEnv force-proxy-request-1.0 1 SetEnv proxy-nokeepalive 1
</Location>
```

   Note: You must include the trailing forward slash in the `ProxyPass` directive when specifying the Cognos virtual directory (`/ibmcognos/`).
4. Save and close the file.

Using a reverse proxy server for load balancing
If you are using a reverse proxy server for load balancing, you must add a ProxyPassReverseCookieDomain value to the `httpd.conf` file on the reverse proxy server.

Procedure

1. Log on to the load balancer server as a user who has administrative privileges.
2. Go to the *Apache_Home*`\conf\` directory, and open the `httpd.conf` file in an editor.

3. Add a ProxyPassReverseCookieDomain value to the file as follows:

```
# Proxy
ProxyPass  /openpages http://<hostname>:<port>/openpages
ProxyPassReverse  /openpages http://<hostname>:<port>/openpages
```

```
ProxyPass  /ibmcognos http://<hostname>:<port>/ibmcognos
ProxyPassReverse  /ibmcognos http://<hostname>:<port>/ibmcognos
```

```
ProxyPassReverseCookieDomain <internal.domain.com> <public.domain.com>
```

4. Save and close the file.
5. Restart the web server.

Changing the CommandCenter host settings

You must update configuration files to use the IBM OpenPages GRC Platform CommandCenter server name and port settings.

Procedure

1. Log on to the OpenPages GRC Platform application server as a user with administrative privileges.
2. Stop the OpenPages services.
3. Go to the *<OP_HOME>*`/aurora/conf` directory.
4. In the `cognos.framework.refresh.servlet=http\://localhost\:8080/crf-refresher` property, replace `localhost\:8080` with the reporting server name and port.

   Example:

   ```
   cognos.framework.refresh.servlet=http\://ccserver\:8080/crf-refresher
   ```

5. In the `cognos.server=http\://localhost:80/ibm/cognos/analytics/cgi-bin/cognos.cgi` property, replace `localhost:80` with the reporting server name and port number.

   Example: `cognos.server=http\://ccserver:80/ibm/cognos/analytics/cgi-bin/cognos.cgi`
6. Add the following value to the `logout.url.cognos` property:

   ```
   http\://<CommandCenter_server_name>\<CommandCenter_port>\/
     ibm/cognos/analytics/cgi-bincognos.cgi? b_action\=xts.run&m\=portal/
     logoff.xts&h_CAM_action\=logoff
   ```

   Example:

   ```
   logout.url.cognos=http\://ccserver\:8080/ibm/cognos/analytics/
     cgi-bincognos.cgi? b_action\=xts.run&m\=portal/logoff.xts&h_CAM_action\=logoff
   ```

7. Save your changes and exit the editor.

Administrative server tuning

You can tune your admin server settings to improve performance.

Preventing concurrency conflicts for installations that use Oracle databases

If two administrators both try to modify settings at the same time, errors might occur. To help avoid concurrency errors, run the SQL `enable-session-sleep.sql` script.

A concurrency conflict might result in the following error message:

```
Operation failed, security settings are being
concurrently modified by another administrator.
Please try again later.
```

Procedure

1. On a computer that has SQL*Plus and access to the database server, log on as a user with SYSDBA permissions.
2. Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/ORACLE/INSTALL_SCRIPTS directory.
3. Copy the `enable-session-sleep.sql` script to the local computer.
4. Run the `enable-session-sleep.sql` script.

```
sqlplus /nolog @sql-wrapper enable-session-sleep.sql
   <log_file_name> <connect_identifier>
   <sysdba_user_name> <sysdba_user_password>
   <schema_owner_name>
```

Example:

```
sqlplus /nolog @sql-wrapper enable-session-sleep.sql enable-session-sleep.log
 opx10g sys manager openpages
```

If the process completes successfully, a message is displayed.

If the script fails, check the log files for error messages.

Optional: Increasing the paging file size on Windows computers
On computers that have 4 GB of RAM, the suggested paging file size is 8 GB.

Procedure

1. Click **Start** > **Run** and then type `sysdm.cpl`, and press Enter.
2. Click the **Advanced** tab, and then in the **Performance** section, click **Settings**.
3. In the **Performance Options** window, in the **Virtual Memory** section, click the **Advanced** tab, and then click **Change**.
4. Find the list of drives and select the drive that contains your paging file.

   Note: If necessary, clear the **Automatically manage page file size for all drives** check box.
5. Under **Paging File Size**, select **Custom Size**.
6. Reset both the **Initial Size** and **Maximum Size** values to higher values.
7. Click **Set**.
8. Click **OK**.

Optional: Increasing the paging file size on AIX computers
On computers that have 4 GB of RAM, the suggested paging file size is 8 GB.

Procedure

1. On AIX computers, open a shell as user with administrative privileges.
2. Type the following command to change the attributes of the paging space:

```
chps -s LogicalPartitions <PagingSpace_Name>
```

For example, the following command adds four logical partitions to the pgspce paging space:

```
chps -s 4 pgspce
```

Database server tuning for DB2 databases

To improve performance, tune the database. You must change some of the values for database server parameters. Other changes are suggested in environments where there are heavy user loads.

Changing the DB2 varchar limit for IBM Cognos reports

Conditional statements are used in IBM OpenPages GRC Platform computed fields that reference data columns with varchar values larger than 4000. By default Cognos Analytics uses a varchar limit of 4000. You can ensure that errors do not occur in OpenPages reports by removing the varchar limit.

If you do not change the varchar limit, errors like the following can appear in the `cogserver.log` file.

```
RQP-DEF-0177 An error occurred while performing operation 'sqlPrepareWithOptions'
status='-120'
UDA-SQL-0458 PREPARE failed because the query requires local processing of the data.
The option to allow local processing has not been enabled.
UDA-SQL-0476 A VARCHAR column in a comparison exceeds the maximum length allowed
by the database.
This operation requires local processing of the data.
```

Procedure

1. Log on to the reporting server as a user with administrative privileges.
2. Go to the *<Cognos_HOME>*`/bin` directory.
   For example, go to the `C:\IBM\cognos\analytics\bin` directory.
3. Make a backup copy of the `cogdmd2.ini` file.
4. Open the `cogdmd2.ini` file in a text editor.
5. Find the following statement:

   ```
   [Exceptions Operators DATABASE:SQL]
   Varchar_Compare_Limit="4000"
   ```

6. Comment out the `Varchar_Compare_Limit="4000"` statement by adding a semicolon (;) in front of it.
   For example,

   ```
   [Exceptions Operators DATABASE:SQL]
   ;Varchar_Compare_Limit="4000"
   ```

7. Save and close the file.
8. Restart the Cognos Analytics services.

Activate DB2 databases to improve application start-up times

You can use the activate database command to initialize IBM DB2 databases before you start IBM OpenPages GRC Platform, and to keep the database initialized if the applications are stopped or disconnected.

The OpenPages database is activated when you create it during the IBM OpenPages GRC Platform installation process. You might want to activate the database each time that you start IBM OpenPages GRC Platform to improve application start-up times.

The activate database command explicitly starts a database and makes it ready to accept connections and process requests. An explicitly activated database remains ready and primed even when there are no application connections to the database. You can activate a database during routine start-up procedures to make it ready to immediately accept connections and process requests.

Use the deactivate database command on an explicitly activated database before you stop the instance or perform an offline backup.

Note: An explicitly activated database cannot be dropped.

For example, the following sequence of commands shows how you can use the activate and deactivate commands:

1. Start the database instance:

   ```
   db2start
   ```

2. Start the database:

   ```
   db2 activate database opx
   ```

   The database performs consistency checks, recovery tasks, and allocate memory heaps, such as bufferpools.

3. Start the OpenPages servers:

   ```
   ./startServersAll.sh
   ```

   The database connections are made immediately.

4. Stop the OpenPages servers:

   ```
   ./stopServers.sh
   ```

   The database remains activated, ready for connections, and the buffer pools remain primed.

5. Deactivate the database:

   ```
   db2 deactivate database opx
   ```

6. Back up the database:

   ```
   db2 backup database opx to /backupdir
   ```

   The database must not be active when you back it up.

7. Start the database:

   ```
   db2 activate database opx
   ```

8. Start the OpenPages servers:

   ```
   ./startServersAll.sh
   ```

Database server tuning for Oracle databases

To improve performance, tune the database.

Memory tuning guidelines for Oracle databases

If your application is running in a heavy-load environment, consider allocating as much memory as possible to the Oracle database instance.

The following table provides general guidelines for memory allocation on a system with 8 GB of RAM or more.

Table 39: Memory tuning guidelines for computer with 8 GB of RAM

For this...	**Allocate...**
Operating system	2 GB of physical RAM for the Windows OS.
SGA Size	75% of remaining physical RAM to the SGA_TARGET parameter. Minimum allocation: 4608 MB (or 4.5 GB).
PGA Size	25% of remaining physical RAM to the PGA_AGGREGATE_TARGET parameter. Minimum allocation: 1536 MB (or 1.5 GB).

Computer with multiple database instances

Note: If you are planning to run multiple database instances on the same computer, adjust the memory to ensure that concurrently running instances fit into the available physical RAM. Using physical memory avoids swapping to disk.

For example, to run the IBM OpenPages GRC Platform database and Cognos database services on the same computer with 8 GB of RAM:

- 2 GB of RAM for the OS
- The remaining 6 GB of RAM can be split between the OpenPages GRC Platform database and Cognos database as follows:
  - OpenPages GRC Platform database instance: 2.5 GB SGA + 1 GB PGA
  - Cognos database instance: 1.5 GB SGA + 1 GB PGA

Enabling LDAP for the IBM OpenPages GRC Platform application

If you are installing IBM OpenPages GRC Platform into an LDAP environment, you must enable LDAP. The Openpages module in the LDAP configuration file, `aurora_auth.config`, determines whether LDAP is enabled.

Note: The LDAP server for the user provisioning feature is configured separately. See the *IBM OpenPages GRC Administrator's Guide*.

For information about how to configure LDAP for the REST API, see Authentication for GRC REST API with a custom user realm for WebSphere (https://www.ibm.com/developerworks/community/blogs/d89a3ddf-2acf-4cc8-b11b-14f33b5c653e/entry/authentication_for_grc_rest_api_with_a_custom_user_realm_for_websphere).

Procedure

1. Log on to the OpenPages GRC Platform application server as a user with administrative privileges.
2. Use your LDAP Directory Server to add users who require access to the OpenPages application or to the OpenPages environment to the LDAP authentication server.

   For more information about the steps required to add OpenPages users to the LDAP server, see the documentation for your LDAP Directory Server.
3. Log on to the OpenPages application and create the same users.
4. Stop all OpenPages services.
5. Go to the directory where you copied the `aurora_auth.config` file.
6. Open the LDAP configuration file, `aurora_auth.config`, in a text editor.
7. Rename the Openpages module to something different, such as `Openpages_default`.
8. Depending on your LDAP server, rename the LDAP module to Openpages
   - If you are using a Microsoft Active Directory server, change the OpenpagesAD module name to Openpages.
   - If you are using any other LDAP server, change the OpenpagesIP module name to Openpages.
9. Specify the correct values for the following properties in the appropriate module:

Table 40: LDAP properties	
Property	**Description**
provider.url	IP address and port number of the LDAP authentication server, in the <*protocol*>://<*ip_address*>:<*port*> format. **Note:** If you are configuring LDAP over SSL (LDAPS), the protocol is `ldaps` and the port is the LDAPS port.
security.search.user.dn	The fully qualified name of an administrative user on the LDAP server.
security.search.user.credentials	The password for the specified user
base.dn	The top level of the LDAP directory tree structure (Domain Name) on the LDAP server. If the users to be authenticated are in multiple locations within your Active Directory structure, list all locations explicitly. Use the distinguished names of the locations, each separated by a semi-colon.
user.attr.id	The attribute name of the user identifier. Typically a common name (CN), `uid`, or `sAMAccountName`.

For example

```
Openpages_default
 {
 com.openpages.aurora.service.security.namespace.AuroraLoginModule required
   debug=false;
 };

Openpages
{
com.openpages.aurora.service.security.namespace.LDAPLoginModule required debug=false
provider.url="ldap://10.128.25.150:389"
security.authentication="simple"
security.search.user.dn="CN=Administrator,CN=Users,DC=LDAPTesting,DC=local"
security.search.user.credentials="openpages"
base.dn="CN=Users,DC=LDAPTesting,DC=local"
user.attr.id="CN";
};
```

10. Save and close the file.
11. Log on to the OpenPages application and change the OpenPages Administrator password to `openpages`.
12. Restart all OpenPages services.
13. Log on to the OpenPages application as one of the users that you created in the LDAP Directory Server.

Disabling LDAP for the IBM OpenPages GRC Platform application

If LDAP is enabled on your system, the default Openpages module was renamed. Either the OpenpagesIP or OpenpagesAD was renamed to Openpages. To disable LDAP, change the name of the current Openpages module and change the name of the default Openpages module back to Openpages.

Note: The LDAP server for the user provisioning feature is configured separately. See the *IBM OpenPages GRC Administrator's Guide*.

Procedure

1. Log on to the application server as a user with administrative privileges.
2. Stop all IBM OpenPages GRC Platform services.
3. Go to the directory where you copied the `aurora_auth.config` file.

   <OP_HOME>`/aurora/conf`
4. Open the LDAP configuration file, `aurora_auth.config`, in a text editor.
5. Change the name of the Openpages_default module back to Openpages.
6. Change the name of the current Openpages module to something different.
7. Save and close the file.

Accessing OpenPages GRC Platform

To view the application log in page for your installation, type the IBM OpenPages GRC Platform URL into your web browser.

For default installations, type the following URL in your web browser:

`http://`*`<openpages_server>`*`:`*`<port>`*`/openpages`

If you are using an SSL connection to access the OpenPages application, you must have an SSL digital certificate. After configuration, type the following URL in your web browser:

`https://`*`<openpages_server>`*`:`*`<ssl_port>`*`/openpages`

Search server post installation tasks

If you installed a search server with IBM OpenPages GRC Platform, ensure that you completed the following post installation tasks.

- Copy the JDBC driver from the database server to the search server.

  For more information, see "Copying database driver files to the search server" on page 159.
- Optional: Set up SSL for the global search service.

  For more information, see "Setting up SSL for the global search service" on page 159.
- Configure the location of the `openpages-storage` directory in the search server properties file.

  For more information, see "Updating the search server properties file with the location of the OpenPages storage directory" on page 162.
- Tune the search server parameter settings.

  For more information, see "Search server tuning" on page 163.
- Create the global search index.

  For more information, see "Creating the global search index" on page 164.

  Note: If you are upgrading from 7.2.x or 7.3.x, skip this task. You will update global search during the upgrade process.

For more information about the search server, see the *IBM OpenPages GRC Administrator's Guide*.

Copying database driver files to the search server

After you install the search server, you must copy the database driver files to the search server.

Procedure

1. Copy the JDBC database drivers from the database server.
   - If you are using an Oracle database server:
     a. Go to the following directory:

        <ORACLE_HOME>\jdbc\lib (on Microsoft Windows operating systems)

        <ORACLE_HOME>/jdbc/lib (on UNIX operating systems)

     b. Copy the following file:

        ojdbc7.jar
   - If you are using an IBM DB2 database server:
     a. Go to the following directory:

        <DB2_HOME>\sqllib\java (on Windows)

        <DB2_HOME>/sqllib/java (on UNIX)

     b. Copy the following files:

        db2jcc4.jar

        db2jcc_license_cu.jar
2. Copy the files to the following directory on the search server:

   <SEARCH_HOME>\opsearchtools\lib (on Windows)

   <SEARCH_HOME>/opsearchtools/lib (on UNIX)
3. Start the global search services. For more information, see "Start or stop the global search services" on page 257.

Setting up SSL for the global search service

You can configure IBM OpenPages GRC Platform global search service (Apache Solr) to use Secure Sockets Layer (SSL). SSL ensures that all data that is passed between the application server and the Solr service remains private.

About this task

If you are setting up the global search component in a test environment, do not enable Secure Sockets Layer (SSL) until you resolve all installation and configuration issues.

For more information about the commands that are used in this task, see the Apache Solr documentation https://cwiki.apache.org/confluence/display/solr/Enabling+SSL#EnablingSSL-BasicSSLSetup.

Important: IBM is not responsible for third-party content. At the time of publication, the information is correct.

Procedure

1. If the global search component is enabled, you must disable it.
   a) Log on to OpenPages as a user with administrative privileges.
   b) Click **Administration** > **Global Search**.
   c) Click **Disable**.
2. Stop the global search services.

   For more information, see "Start or stop the global search services" on page 257.
3. Create a certificate for the secure connection.

a) Go to the *<SEARCH_HOME>*/solr/server/etc folder and run the following command.

```
keytool -genkeypair -alias alias -keyalg key_algorithm
  -keysize keysize -keypass key_pass -storepass keystore_passwd
  -validity validity -keystore jks_keystore -ext ip_address
  -dname "CN=localhost, OU=Organizational Unit, O=Organization, L=Location,
   ST=State, C=Country"
```

In the following example, the command creates a self-signed certificate in a key store named solr-ssl.keystore.jks. The key store contains a key with an alias of solr-ssl, a key store password of secret, a trust store password of secret. It specifies Subject Alternative Name (SAN) values of DNS:host1.companya.com and IP:127.0.0.1,192.168.7.1 to include in the certificate. (SAN values are not mandatory, and might not be specified in your environment).

```
keytool -genkeypair -alias solr-ssl -keyalg RSA
  -keysize 2048 -keypass secret -storepass secret
  -validity 9999 -keystore solr-ssl.keystore.jks
  -ext SAN=DNS:host1.companya.com,IP:127.0.0.1,IP:192.168.7.1
  -dname "CN=localhost, OU=Organizational Unit, O=Organization, L=Location,
   ST=State, C=Country"
```

b) Convert the JKS key store into PKCS12 format.

```
keytool -importkeystore -srckeystore jks_keystore
 -destkeystore jks_keystore.p12 -srcstoretype source_keystore_type
 -deststoretype destination_keystore_type
```

When prompted, type a destination key store password, and the source key store password that you specified in the step 3a.

c) Convert the PKCS12 format key store, including the certificate and the key, into PEM format.

To run this command, openssl must be installed, and added to the PATH environment variable.

```
openssl pkcs12 -in <jks_keystore.p12> -out <jks_keystore.pem>
```

When you are prompted for the import password and PEM pass phrase, you can use the same password that you specified for the *<key_pass>* value in step 3a.

4. Export the certificate.

```
keytool -export -keystore <jks_keystore> -alias <alias> -file <solr_certificate>
```

When you are prompted for the key store password, type the password that you specified for the *<key_pass>* value in step 3a.

5. Update the solr.in file.

a) Edit the following file in a text editor:

<SEARCH_HOME>\solr\bin\solr.in.cmd (on Windows)

<SEARCH_HOME>/solr/bin/solr.in.sh (on UNIX)

b) Uncomment and set the following SSL properties.

```
SOLR_SSL_KEY_STORE=etc/jks_keystore
SOLR_SSL_KEY_STORE_PASSWORD=keystore_passwd
SOLR_SSL_TRUST_STORE=etc/jks_keystore
SOLR_SSL_TRUST_STORE_PASSWORD=keystore_passwd
SOLR_SSL_NEED_CLIENT_AUTH=false
SOLR_SSL_WANT_CLIENT_AUTH=true
```

On Windows, you might need to use server/etc as the path name for the SOLR_SSL_KEY_STORE and SOLR_SSL_TRUST_STORE properties.

6. Log in to the OpenPages application as a user with administrative privileges. Update the following settings to use https instead of http.

Administration > **Settings** > **Platform** > **Search** > **Admin** > **Search Server Administration URL**

Administration > **Settings** > **Platform** > **Search** > **Index** > **Search Server URL**

Administration > **Settings** > **Platform** > **Search** > **Request** > **Search Server URL**

7. Copy the certificate file that you exported to the following folder on the application server.

   <WAS_HOME>/AppServer/Java/8.0/jre/lib/security

8. Add the certificate to the IBM JRE key store file.
   a) Open a Windows command prompt by using the **Run as Administrator** option, or open a UNIX shell with administrative privileges.
   b) Back up the *<WAS_HOME>*/WebSphere/AppServer/Java/8.0/jre/lib/security/cacerts file.
   c) Go to *<WAS_HOME>*/WebSphere/AppServer/Java/8.0/jre/lib/security folder and run the following command.

   ```
   keytool -import -alias <alias> -keystore cacerts -file
      solr_certificate
   ```

   When prompted, type the key store password of the cacerts key store. The default password is typically changeit.
   d) Confirm that you want to trust the certificate.
   e) Restart all OpenPages services.
9. Import the certificate to the IBM WebSphere trust store.
   a) Log on to the WebSphere Integrated Solutions Console.

   http://*<server_name>*:*<port>*/ibm/console

   The default port is 9060.
   b) Click **Security** > **SSL certificate and key management** > **Key stores and certificates** > **CellDefaultTrustStore** > **Signer certificates**.
   c) Click **Add**.
   d) Update the following fields:

   - **Alias**: Type the value that you specified for the *alias* in step 9.
   - **File name**: Type the full path of the *solr_certificate* file that you imported into the cacerts file in step 9.

     Ensure that the data type is set to **Base64-encoded ASCII data**.

   e) Click **OK**.
   f) Click **Save** to update the master configuration.
   g) Restart all OpenPages services.
10. Start the global search services.

    For more information, see "Start or stop the global search services" on page 257.
11. If the search server is installed on a different computer than the application server, add the certificate to the IBM JRE key store on the search server.
    a) Open a Windows command prompt by using the **Run as Administrator** option, or open a UNIX shell with administrative privileges.
    b) Go to the *<JAVA_HOME>*/lib/security directory and run the following command:

    ```
    keytool -import -alias <alias> -keystore cacerts
       -file <SEARCH_HOME>/solr/server/etc/solr_certificate
    ```

    c) When prompted, type the key store password of the cacerts key store. The default password is typically changeit.
12. Continue with the post installation or post upgrade steps for global search.

Updating the search server properties file with the location of the OpenPages storage directory
Configure the path to the `openpages-storage` directory in the search server properties file to enable the search server to access the directory.

About this task

When you install IBM OpenPages GRC Platform, a pointer to the OpenPages storage location is created. The storage location is a directory where attached files and forms that are associated with OpenPages objects are stored. The search server looks in the `openpages-storage` directory to index file attachments, when file attachment search is enabled.

To configure the location of the directory, share the `openpages-storage` directory on the admin application server, and then modify the search server properties on the search server to point to the shared network location.

Note: If you are working with a test environment in which the search server is on the same physical computer as the admin application server, you do not need to do this task.

Attention: By default, file attachment search is enabled. If you enable global search without first configuring the location of the OpenPages storage directory location, files cannot be searched.

Procedure

1. Share the `openpages-storage` directory on the admin application server so that it can be reached by the search server.

   For more information, see "Sharing a network OpenPages GRC Platform storage directory on AIX or Linux operating systems" on page 139 and "Sharing a network OpenPages GRC Platform storage directory on Windows operating systems" on page 141.
2. Log on to the search server as a user with administrative privileges.
3. Go to *<SEARCH_HOME>*`/opsearchtools/`.
4. Open the `openpages_search.properties` file in a text editor.
5. Modify the `OPSearchTool.FileStorageRootPath` property to specify the full path to the `openpages-storage` directory on the admin application server.

   UNIX: `/opt/ibm/op/openpages/openpages-storage`

   Microsoft Windows:

   Note: On Windows operating systems, escape the directory separator with a backslash (\).

   - If you share is mounted to a driver letter, use the following syntax: `C:\\ibm\\op\\openpages\\openpages-storage`
   - If your share is a network share, use the following syntax: `\\\\op-server\\shared\\openpages-storage`

   For more information about the `OPSearchTool.FileStorageRootPath` property, see the *IBM OpenPages GRC Administrator's Guide*.
6. Disable global search and stop the global search services.

   For more information, see "Stopping the global search services by using a script" on page 258 or "Stopping the global search services" on page 259.
7. Start the global search services.

   For more information, see one of the following topics:

   - "Starting the global search services by using a script" on page 257
   - "Starting the global search services on Windows" on page 258
   - "Starting the global search services on Linux or AIX" on page 259

Search server tuning
The standard installation of the IBM OpenPages GRC Platform global search component uses default parameter settings. You might need to tune some parameter settings depending on your organization's requirements and data.

There are two settings that you can configure:

- The ports used by the global search component.

  For more information, see "Changing port values for the global search component" on page 163.
- The amount of memory used by the search engine service and the indexer service.

  For more information, see "Allocating memory for the global search component" on page 163.

Changing port values for the global search component
By default, the IBM OpenPages GRC Platform global search component uses two ports. Port 8983 is used for indexing and searching IBM OpenPages data. Port 8985 is used to administer global search.

About this task

If you have a firewall, ensure that these ports are enabled. If your organization uses different ports, you can change the port values.

Procedure

1. If the global search component is enabled, you must disable it.
   a) Log on to OpenPages as a user with administrative privileges.
   b) Click **Administration** > **Global Search**.
   c) Click **Disable**.
2. Stop the global search services.

   For more information, see "Start or stop the global search services" on page 257.
3. Log in to the OpenPages application as a user with administrative privileges, and update the following registry setting values.
   a) Click **Administration** > **Settings** > **Applications** > **Common** > **Configuration** > **Show Hidden Settings** and set the value to `true`.
   b) Click **Administration** > **Settings** > **Platform** > **Search** > **Admin** and update the **Search Server Administration URL** default port value (8985) to a value of your choice.
   c) Click **Administration** > **Settings** > **Platform** > **Search** > **Index** and update the **Search Server URL** default port value (8983) to a value of your choice.
   d) Click **Administration** > **Settings** > **Platform** > **Search** > **Request** and update the **Search Server URL** default port value (8983) to a value of your choice.

      Ensure the port value matches the value you specified in step 3c to avoid issues for users.
4. Start the global search services.

   For more information, see "Start or stop the global search services" on page 257.
5. Continue with the post installation or post upgrade steps for global search.

Allocating memory for the global search component
You can change the amount of memory used by the Apache Solr search engine service and the indexer service for the IBM OpenPages GRC Platform global search component.

Procedure

1. Update the memory allocation on the computer on which you installed the search server.

   Ensure you have sufficient free memory on the computer. If you set the memory too high and the computer does not have enough free memory, you might encounter performance issues.

a) Edit the *<SEARCH_HOME>*/opsearchtools/openpages_search.properties file in a text editor.

b) To update the amount of memory (in megabytes) to allocate to the Apache Solr service, edit the OPSearchTool.SolrHeapSize value.

c) To update the amount of memory (in megabytes) to allocate to the OpenPages indexer service, edit the OPSearchTool.IndexerHeapSize value.

2. If the global search component is enabled, you must disable it.
   a) Log on to OpenPages as a user with administrative privileges.
   b) Click **Administration** > **Global Search**.
   c) Click **Disable**.
3. Stop the global search services.

   For more information, see "Start or stop the global search services" on page 257.
4. Start the global search services.

   For more information, see "Start or stop the global search services" on page 257.
5. Continue with the post installation or post upgrade steps for global search.

Creating the global search index

After you install IBM OpenPages, create the global search index. If you are upgrading, you can skip this task.

Before you begin

The reporting schema must exist and must be enabled before you create the search index.

Procedure

1. Start the search services, if they are not already started.
2. Log in to OpenPages as a user with administrative privileges.
3. Click **Administration** > **Global Search** and click **Create**.

   Creating the index also enables global search.

   Click **Refresh** to update the page.

Results

The **Global Search** is available next to the **Reporting Period** box.

If global search does not start, see "Known problems and solutions for global search" on page 345.

For more information about global search, see the *IBM OpenPages GRC Administrator's Guide*.

Complete the workflow server integration

If you added a IBM Business Process Manager workflow server to your deployment, you need to some post-installation tasks.

For more information, see the *IBM OpenPages GRC - Business Process Manager Installation Guide*.

Modify the SDI/TDI assembly line after fresh installations

If you did a fresh installation and you use the IBM QRadar integration project or IBM OpenPages GRC SDI Connector for UCF Common Controls Hub, due to a known issue you have to modify the SDI/TDI assembly line to be able to upload the date values for date fields. Contact Customer Support for more information.

Preventing orphan objects

After you install IBM OpenPages, to prevent orphan objects, you must update the Cascade Delete registry setting.

Procedure

1. Log in to OpenPages as a user with administrative privileges.
2. Click **Administration** > **Common** > **Cascade Delete** > **Include Object Types**.
3. Append the registry setting value with the following string:

```
,ProjectActionItem,QuestionnaireAssessment,QuestionTemplate,
SectionTemplate,SOXBusEntity,SOXDocument,SOXExternalDocument,
SOXIssue,SOXMilestone,SOXSignature,SOXTask,SubSectionTemplate
```

Verification checklist

After you install the IBM OpenPages GRC Platform application, verify that the installation is working as expected.

Use the following checklist to verify whether the installation is successful.

Table 41: Post installation verification checklist

Task	**Guidance**
Review all installation logs for errors.	For log file locations and names, see “Log files” on page 341.
Verify that the database parameters are correct.	Review the database parameters, such as NLS_LENGTH_SEMANTICS=CHAR, to ensure that they are correct.
Confirm that the reporting schema and reporting framework generated successfully.	For more information, see “Creating the reporting schema and framework” on page 137.
Confirm that base reports are functioning as expected.	Log on to the OpenPages application and run the `All Documentation` Cognos report.
If single sign-on (SSO) is enabled, verify that user accounts can access the environment.	Log on to the OpenPages application with an SSO user account.
Confirm that you can upload and download sample attachments.	Log on to the OpenPages application and upload and download a file attachment.
Verify that links in reports reference the correct server address and use the correct web URL parameters.	Run a report that uses OpenPages links. Select a link and confirm that the target object is rendered successfully in the OpenPages interface.
For clustered environments, verify that all servers can upload and download attachments.	Upload and download files from both the admin and non-admin application servers.

Table 41: Post installation verification checklist (continued)	
Task	**Guidance**
Test that you can access the Cognos Analytics portal.	Type the following web URL: `http://`*`server_name`*`/ibmcognos` Confirm that you can log on to the portal.
Confirm that you ran the `enable-session-sleep.sql` script.	For more information, see “Preventing concurrency conflicts for installations that use Oracle databases” on page 152.
Confirm that object data is created. Do this test after you back up the database.	Log on to the OpenPages application and create sample Entity, Process, and Risk objects. Delete these objects.

Chapter 7. Upgrade IBM OpenPages GRC Platform

Upgrade your existing version of IBM OpenPages GRC Platform to take advantage of new features, enhancements, and performance improvements.

You can upgrade from IBM OpenPages GRC Platform version 7.1.x, 7.2.x, or 7.3.x installed on IBM WebSphere Application Server 8.5.5 or later.

For more information about the supported software versions for OpenPages GRC Platform, see the IBM Software Product Compatibility Reports (www.ibm.com/support/docview.wss?uid=swg27039467)..

When you upgrade, you do a fresh installation of IBM OpenPages GRC Platform and then migrate your data. You can install IBM OpenPages GRC Platform in a new environment or in your existing IBM OpenPages GRC Platform environment.

IBM OpenPages GRC Platform supports upgrades from versions 7.1.x, 7.2.x, and 7.3.x. If your environment was originally based on a fresh installation of 7.0.x or an earlier version, you might need to do some remediation steps. For more information, see http://www.ibm.com/support/docview.wss?uid=swg22014144.

If you have version 7.0.x, 6.x, or 5.x, you must first migrate to version 7.1.x, 7.2.x, or 7.3.x before you can upgrade. For more information, see the following topics:

- For information about migrating to version 7.1, see the topics about migrating in the OpenPages GRC Platform version 7.1 installation guide.
- For information about migrating to version 7.2, see the topics about migrating in the OpenPages GRC Platform version 7.2 installation guide.
- For information about migrating to version 7.3, see the topics about migrating in the OpenPages GRC Platform version 7.3 installation guide.

Upgrade scenarios

When you upgrade IBM OpenPages GRC Platform, you can follow two main scenarios: using the database server from your source environment or using new hardware for the database server.

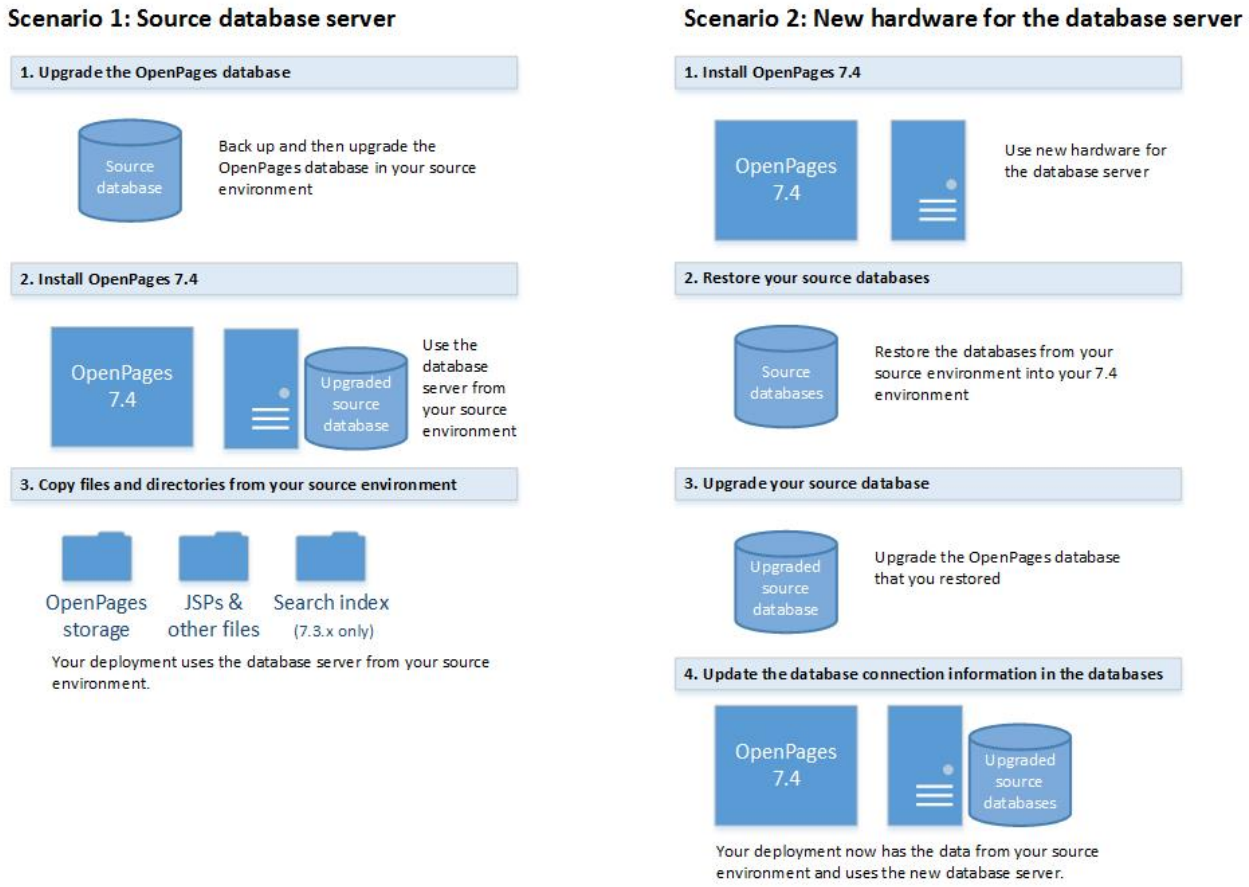


Figure 16: Upgrade scenarios

Upgrade process overview: Using the database server from your source environment

You can upgrade IBM OpenPages GRC Platform and use the existing database server from your 7.1, 7.2, or 7.3 environment .

Use this option if you do not want to use new hardware for the database server.

Upgrading OpenPages GRC Platform requires the following steps.

1. Ensure that your source database server meets the prerequisites for OpenPages. See “Upgrade prerequisite software ” on page 173. Also see the following checklists:
   - “Checklist for the database server (DB2)” on page 56
   - “Checklist for the database server (Oracle)” on page 75
2. Upgrade to Cognos Analytics and upgrade the content store. See “Cognos Analytics upgrade process” on page 173.
3. If you use global search, prepare the search server for the upgrade. See “Preparing the search server in the source environment” on page 174.
4. Back up the OpenPages source environment. See “Backing up your source environment” on page 174.
5. Upgrade the OpenPages database in your source environment manually. See “Upgrade the OpenPages database” on page 175.
6. Install OpenPages. On the **Database Server** card, point to the database server from your source environment. Select **Already Installed** for the **Install Database** option.

   See Chapter 6, “Install IBM OpenPages GRC Platform,” on page 45.

7. Update the location of the OpenPages storage directory, `openpages-storage`, in the database. See one of the following topics:
   - "Updating the location of the openpages-storage directory (DB2)" on page 141
   - "Updating the location of the openpages-storage directory (Oracle)" on page 143
8. If your deployment includes a search server, update the settings for global search. See "Updating search server settings" on page 182.
9. Update the URL host pointers for Cognos reports. See "Updating URL host pointers for reports" on page 182. See "Updating URL host pointers for reports" on page 182.
10. Verify the list of valid OpenPages application server domains and host names for Cognos Analytics. See "Verify the list of valid domains and host names for Cognos Analytics" on page 183.
11. Open your deployment in the installation app and validate it.
12. Migrate the data from the source environment to your upgraded environment. See "Migrate files" on page 176.

    Use the installation app to back up and restore files and directories, such as JSPs and other customer deliverables.

    If you are upgrading from 7.3.x, you can use the installation app to restore the global search index.
13. Upgrade the application data. See "Upgrading application data" on page 179.
14. Do the post-upgrade tasks. See "Post upgrade tasks" on page 180.
15. If you use IBM OpenPages solutions, do the post upgrade tasks for solutions. See Chapter 10, "OpenPages solutions post-upgrade tasks," on page 239.
16. Test the upgraded deployment.
17. Review the new and changed features for this release to check whether there is anything that affects your installation after upgrading.

Note:

Fujitsu Interstage Business Process Manager is not supported in IBM OpenPages GRC Platform version 7.4 and later. For more information, see the following software announcement.

The database upgrade scripts remove the workflow schema and any references to the workflow schema that are contained within the OpenPages schema.

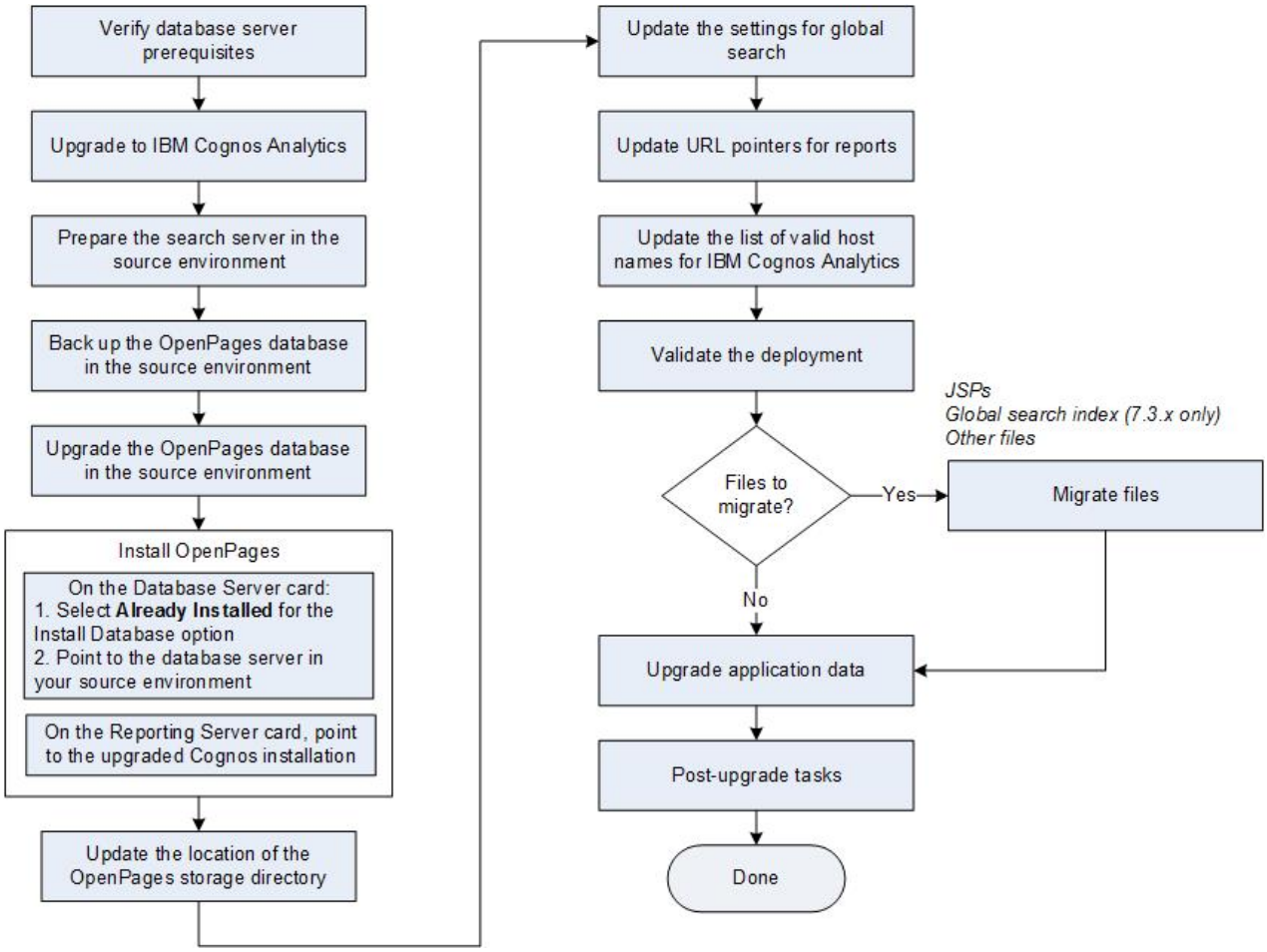


Figure 17: Upgrade process overview: Using the database server from your source environment

Upgrade process overview: Using new hardware for the database server

You can upgrade IBM OpenPages GRC Platform and use new hardware for the database server.

Upgrading OpenPages GRC Platform requires the following steps.

1. Upgrade to Cognos Analytics and upgrade the content store. See “Cognos Analytics upgrade process” on page 173.
2. If you use global search, prepare the search server for the upgrade. See “Preparing the search server in the source environment” on page 174.
3. Back up your existing OpenPages environment (the source environment for the upgrade). See “Backing up your source environment” on page 174.

   Note: If you are upgrading from OpenPages version 7.1.x or 7.2.x with IBM DB2 10.5, you might need to drop and re-create the reporting schema during the upgrade.
4. Install OpenPages. See Chapter 6, “Install IBM OpenPages GRC Platform,” on page 45.

   If you use your existing environment, ensure that it meets the software prerequisites. See “Upgrade prerequisite software ” on page 173.

   Note: You must use a new, empty directory for OpenPages.

   If you are using IBM DB2, you must use the same database instance name as the database in your previous version of OpenPages.

   If you are using Oracle, you can use different names for the OpenPages schema and Cognos schema. When you restore the databases from your source environment, you must remap the schema names.

Note: If you use a different name for the OpenPages schema in your upgraded environment, the change might impact your reports. You might need to do some remediation steps. If your reports contain references to the schema, update the reports to use the new schema name. Out-of-the-box reports are not impacted by this issue because they do not reference the schema name.

Ensure that you complete the database server and OpenPages database setup tasks:

- For IBM DB2, see "Checklist for the database server (DB2)" on page 56.
- For Oracle, see "Checklist for the database server (Oracle)" on page 75.

5. Restore the OpenPages database from your previous version into the upgraded environment. See one of the following topics:
   - "Restore the OpenPages database in your upgraded environment (DB2)" on page 197
   - "Restore the OpenPages database in your upgraded environment (Oracle)" on page 217
6. Upgrade the OpenPages database. See "Upgrade the OpenPages database" on page 175.
7. Update the database connection information.

   When you restore the database, the connection information from your source environment is imported. You need to update the connection information to use the new database server.

   See one of the following topics:
   - "Update the database connection information (DB2)" on page 211
   - "Update the database connection information (Oracle)" on page 233
8. Update the URL host pointers for Cognos reports. See "Updating URL host pointers for reports" on page 182.
9. Migrate the data from the source environment to your upgraded environment. See "Migrate files" on page 176.

   Use the installation app to back up and restore files and directories. For example, if you are upgrading from 7.3.x, you can restore the global search index.
10. Upgrade the application data. See "Upgrading application data" on page 179.
11. Do the post-upgrade tasks. See "Post upgrade tasks" on page 180.
12. If you use IBM OpenPages solutions, do the post upgrade tasks for solutions. See Chapter 10, "OpenPages solutions post-upgrade tasks," on page 239.
13. Test the upgraded deployment.
14. Review the new and changed features for this release to check whether there is anything that affects your installation after the upgrade.

Note: Fujitsu Interstage Business Process Manager is not supported in IBM OpenPages GRC Platform version 7.4 and later. For more information, see the following software announcement.

During the upgrade process, you need to back up and then restore both the OpenPages schema and the workflow schema so that the database upgrade scripts can remove any references to the workflow schema that are contained within the OpenPages schema. After the OpenPages schema has these references removed, the workflow schema will then be removed to complete the upgrade.

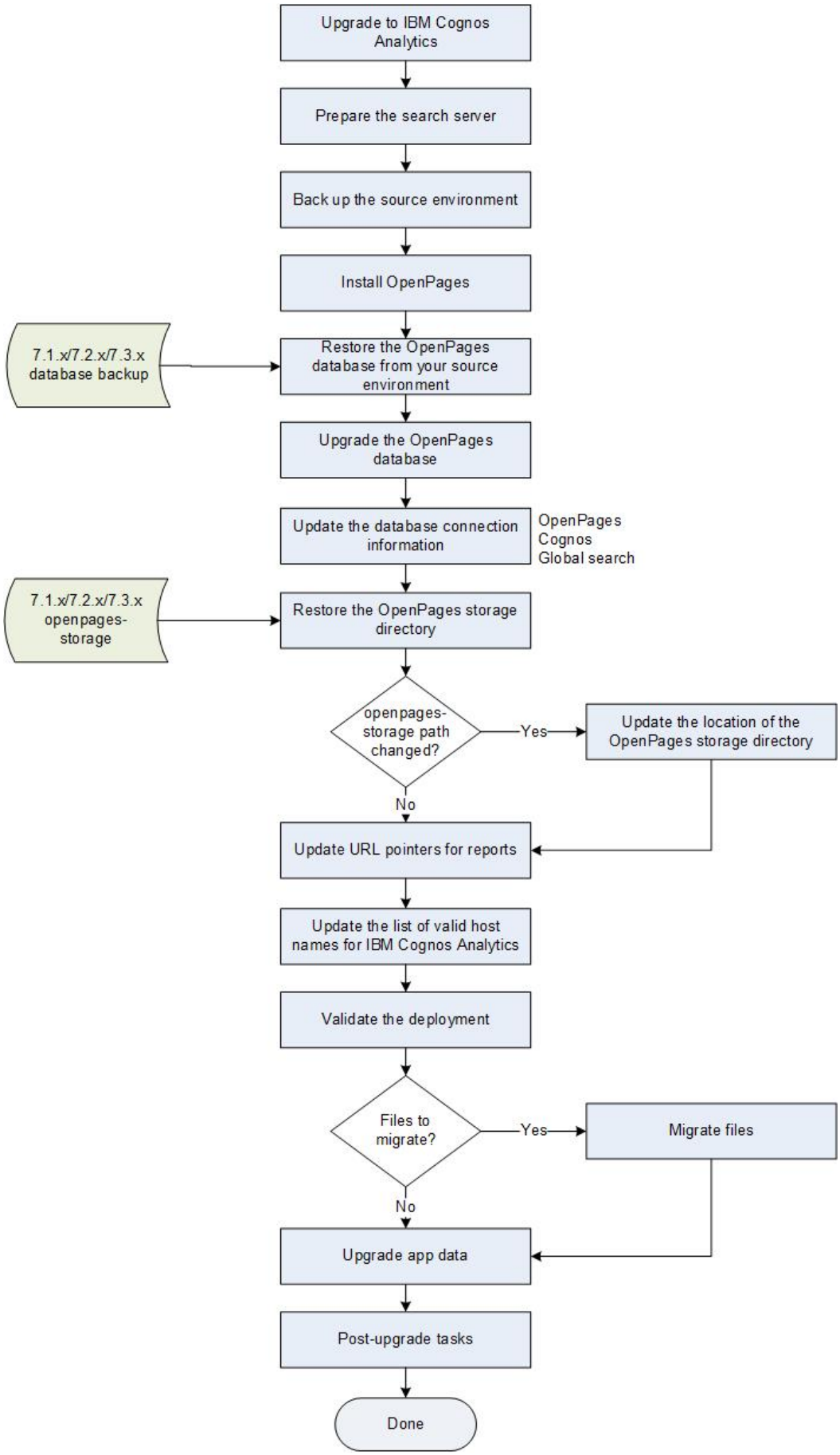


Figure 18: Upgrade process overview

Upgrade prerequisite software

If you want to use your existing IBM OpenPages GRC Platform environment for the upgrade, ensure that it has the supported versions of the software required by IBM OpenPages GRC Platform

Review the software prerequisites for application servers, reporting servers, the database server, and the search server. For more information, see "Software prerequisites" on page 25.

For example, if you are upgrading from version 7.2.x, do the following steps:

- If you are using IBM DB2, upgrade to version 11.1 or a later fix pack. See "Upgrade IBM DB2" on page 58.
- If you are using Oracle, upgrade to version 12.1.0.2 or a later fix pack. See "Upgrading the Oracle database server to 12.1.0.2" on page 76.
- Install IBM WebSphere Application Server version 9.0.0.3 or a later fix pack. See "IBM WebSphere Application Server installations" on page 53.

  Tip: You do not need to uninstall WebSphere 8.5.5. WebSphere supports the installation of multiple versions on a server. For more information, see the WebSphere documentation.
- Install Cognos Analytics version 11.0.7 or later and migrate your data. See "Cognos Analytics upgrade process" on page 173.

  Tip: You do not need to uninstall Cognos 10.2.x. Cognos Analytics supports the installation of multiple versions on a server. For more information, see the Cognos documentation.
- Install IBM Runtime Environment for Java 8 on the search server.

Also, ensure that your users have a supported version of Google Chrome or Microsoft Internet Explorer. See "Prerequisite software for OpenPages GRC Platform client computers" on page 30.

Note:

Fujitsu Interstage Business Process Manager is not supported in IBM OpenPages GRC Platform version 7.4 and later. For more information, see the following software announcement.

If you have Fujitsu Interstage Business Process Manager Studio installed, you can uninstall it.

Cognos Analytics upgrade process

If you are upgrading IBM OpenPages GRC Platform, you need to upgrade Cognos.

To upgrade Cognos, you install Cognos Analytics and then migrate your data. The Cognos Analytics documentation provides details about how to upgrade. For more information, see Planning your upgrade to IBM Cognos Analytics.

Tip: You do not need to uninstall Cognos 10.2.x. Cognos Analytics supports the installation of multiple versions on a server. For more information, see the Cognos documentation.

During the Cognos upgrade process, you move your content store to the new version of Cognos. The Cognos documentation describes two methods for moving the content store. One of the options is to move the entire content store by backing up and restoring the database. If you want to use this option, see the following topics:

IBM DB2

- "Backing up the Cognos database (DB2)" on page 196
- "Restoring the Cognos content store (DB2)" on page 199

Oracle

- "Backing up the Cognos content store (Oracle)" on page 216
- "Restoring the Cognos content store (Oracle)" on page 224

Preparing the search server in the source environment

Before you upgrade OpenPages, prepare the search server in your source environment .

About this task

The steps that you need to do depend on the version that you are upgrading from.

If you are upgrading from 7.1.x, you do not need to do this task.

Procedure

1. Start the search server in your source environment.
   - For 7.3.x, see "Start or stop the global search services" on page 257.
   - For 7.2.x, see Starting and stopping the global search services.
2. Log in to OpenPages as a user with administrative privileges.
3. Click **Administration** > **Global Search**.
4. If you are upgrading from version 7.2.x, disable global search and drop the global search index.
   a) Click **Administration** > **Global Search** and click **Disable**.
   b) Click **Administration** > **Global Search** and click **Drop**.
5. If you are upgrading from version 7.3.x, disable global search.
   You do not need to drop the global search index.
   a) Click **Administration** > **Global Search** and click **Disable**.
6. If the **Update** button is enabled, click it to update the search index.
7. Stop the search services in your 7.2.x or 7.3.x environment.
   - For 7.3.x, see "Start or stop the global search services" on page 257.
   - For 7.2.x, see Starting and stopping the global search services.
8. For either Windows or UNIX, verify that global search is fully stopped by doing the following steps:
   a) In the directory `<SEARCH_HOME>/opsearchtools/`, examine the files `opsearchtool_openpages.state` and `opsearchtool_folderacl.state` and verify that the PID value is `-1`.
   b) From a browser, point to your search server at ports 8983 and 8985 and make sure that the Solr search platform cannot be reached, for example, `https://<search-server>:8983/` and `https://<search-server>:8985/`.

      If the stop verification fails, repeat the preceding step and then follow the steps in " Forcing a reset of global search" on page 346.

Backing up your source environment

Before you upgrade, back up IBM OpenPages GRC Platform in your source environment.

Procedure

1. Stop the application servers (admin and non-admin), reporting servers (active and standby), database server, and the search server in your source environment.
2. Back up the databases.
   - If you are using IBM DB2, see "Back up the database (DB2)" on page 193.

     Note: If you are upgrading from OpenPages version 7.1.x or 7.2.x with IBM DB2 10.5, you might need to drop and re-create the reporting schema during the OpenPages upgrade.
   - If you are using Oracle, see "Backing up the OpenPages database (Oracle)" on page 215.

3. Back up the `openpages-storage` directory.

   The `openpages-storage` directory can be located on a server in your deployment or it can be on a separate network share.

   The default location is *<OP_HOME>*`/openpages-storage`.
4. If you modified the standard reports that are provided with OpenPages, copy them to your personal folders.

   OpenPages standard reports can be overwritten during an upgrade.

   After the upgrade, you can change the reports and restrict access to them.
5. On each application server, as the OpenPages installation user (`opuser`), rename the top level `OpenPages` directory to `OpenPages-`*`<current-version>`*. For example, if you are upgrading from version 7.2.0.4, rename the `OpenPages` directory to `OpenPages-7.2.0.4`.

   You use this backup directory to restore the current OpenPages version if you need to roll back from the upgrade.
6. On each reporting server, as the OpenPages installation user (`opuser`), rename the top level `CommandCenter` directory to `CommandCenter-`*`<current-version>`*. For example, if you are upgrading from version 7.2.0.4, rename the `CommandCenter` directory to `CommandCenter-7.2.0.4`.

   You use this backup directory to restore the current *<CC_HOME>* directory if you need to roll back from the upgrade.
7. On the search server, as the OpenPages installation user (`opuser`), rename the top level `OpenPages` directory to `OpenPages-`*`<current-version>`*. For example, if you are upgrading from version 7.2.0.4, rename the `OpenPages` directory to `OpenPages-7.2.0.4`.

   You use this backup directory to restore the current search server version if you need to roll back from the upgrade.

   Note: The search server is an optional component that was first available in OpenPages 7.2.0.0.

Upgrade the OpenPages database

The tasks that you need to do to upgrade the OpenPages database depend on the upgrade scenario that you are following.

Using the database server from your source environment

- Back up the database.

  See one of the following topics:

  – “Back up the database (DB2)” on page 193
  – “Backing up the OpenPages database (Oracle)” on page 215
- Upgrade the database manually.

  See one of the following topics:

  – “Upgrade the databases (DB2)” on page 201
  – “Upgrade the databases (Oracle)” on page 225

Using new hardware for the database server

- Back up the database in your source environment.

  See one of the following topics:

  – “Back up the database (DB2)” on page 193
  – “Backing up the OpenPages database (Oracle)” on page 215
- Import the OpenPages from your source environment into the database on the new database server.

See one of the following topics:

- "Restore the OpenPages database in your upgraded environment (DB2)" on page 197
- "Restore the OpenPages database in your upgraded environment (Oracle)" on page 217

- Upgrade the OpenPages database.

  See one of the following topics:

  - "Upgrade the databases (DB2)" on page 201
  - "Upgrade the databases (Oracle)" on page 225

- Update the connection information in the database.

  See one of the following topics:

  - "Update the database connection information (DB2)" on page 211
  - "Update the database connection information (Oracle)" on page 233

Migrate files

You can migrate application files from your previous installation of IBM OpenPages GRC Platform.

For example, your source environment might contain custom reports that you want to use in your upgraded environment.

You can restore files onto a system that uses a different operating system than the source system. For example, if the application server in your source environment is running Microsoft Windows, you can restore the files to a Linux application server.

The topology of your source and target environments can differ. For example, if your source environment uses clustered application servers, you can migrate files to a target system that uses a single application server or to a target system that uses a different number of clustered application servers.

This video demonstrates how to migrate files:

https://youtu.be/D_eXA50AkOA

Backing up application files

Use the IBM OpenPages GRC Platform installation app to back up application files.

Before you begin

- Ensure that all of the servers in the source environment are stopped.
- If you use clustered application servers or reporting servers, ensure that all of the nodes are synchronized.
- Ensure that the installation server computer has sufficient disk space to store the backup files.
- Ensure that the installation server computer can access the servers in the source environment.

About this task

Your source environment might include custom files, reports, services deliverables, and other application files that you want to use in your target environment. Back up the application files in your source environment. You can then restore them in your target environment.

If your source environment includes customized JSP files, you must manually incorporate those customizations into the JSP files in your target environment. If you have already merged the edits into the JSP files that are deployed by the upgrade, do not include the JSP files in the backup since the restore process will overwrite your edits to the JSP files in your target environment.

If you are using clustered application servers or reporting servers, synchronize the nodes, and then back up the files on the primary server. When you restore the application files, the files are copied to each server in the cluster automatically.

Keep the following points in mind:

Application server

Do not select the `openpages-storage` directory for the backup. The directory can be very large. Instead, copy the directory to your target environment. Or, make the directory available on a network share.

Search server

- Select the `openpages_search.properties` file for the backup. During the post upgrade steps, you can modify the settings in this file, if needed.
- If you are upgrading from 7.3.x, you select the *<SEARCH_HOME>*`/openpages-solr-index` directory for the backup. The directory contains the global search index.

  If you are upgrading from 7.2.x, do not include the `openpages-solr-index` directory in the backup. You need to re-create the search index during the post upgrade step.
- For the global search server the files are stored on the source server in the `OPSearchBackup` directory, for example, `/op-search-backup-restore`.

Procedure

1. Start the installation app and log in.
2. Open your deployment.
3. Click **Current Deployment** and select **File Backup**.
   The left pane displays an application server card, a reporting server card, and a search server card.
4. If your source environment does not have a search server, delete the search server card.

   Tip: You can add a card that you deleted. Select the server type from the list in the left pane and then click .
5. Click one of the cards and enter the host name and other details about the server in your source environment.

   On the application server card, if you are using a clustered environment, enter the information for the admin application server.

   On the reporting server card, if you are using a clustered environment, enter the information for the active reporting server.

   If the OpenPages installation server is installed on the same physical computer as the server that you are backing up, disable the **Remote** option.
6. Use the toggles to select the directories that you want to migrate.

   Click to view the directory path.

   The **Files selected for backup** field displays the files and directories that you selected.

   Note: When you select the **Model Query Subjects** toggle, the *<CC_HOME>*`/framework/conf` directory is displayed in the **Files selected for backup** field. However, only the static model query subjects are backed up and restored. This is intended.
7. If you want to back up and restore more files or directories, enter them in the **Additional files to backup**.

   Use relative paths to specify files and directories. Paths cannot contain spaces. Separate each item with a comma. Do not enter spaces.

- On the application server card, use paths relative to the **OP Home Directory**. For example, if you want to migrate the files `/opt/IBM/OpenPages/temp/myfile.xml` and `/opt/IBM/OpenPages/mydir/otherfile.xml`, type:

  ```
  /temp/myfile.xml,/mydir/otherfile.xml
  ```

  `/temp/myfile.xml,`
- On the reporting server card, use paths relative to the **Command Center Home Directory**. For example, if you want to migrate the `/opt/OpenPages/CommandCenter/temp/myreports/` directory, type `/temp/myreports/`
- On the search server card, use paths relative to the **Search Server Home Directory**. For example, if you want to migrate the file `/opt/IBM/OpenPages/Search/temp/data.xml`, type `/temp/data.xml`

8. Decide whether you want files to be overwritten when you restore them.

   If you want the files from your source environment to overwrite the files in your target environment, enable the **Overwrite files during restore** option. During the restore process, the files in your target environment will be backed up before they are overwritten.

   If you do not want the files from your source environment to overwrite the files in your target environment, disable the **Overwrite files during restore** option. During the restore process, if a file exists in the target environment, the file is skipped.
9. Click **Save**.
10. Click **Backup**.

    If an error occurs, a message is displayed on the server card. Click the server card, and then click ⓘ to see the error message.

    The backup process creates a `.zip` file for each server card. The files are saved in the following locations:

    - The files are stored on the installation server computer in: *<installation_server_home>*`/installer/`*<deployment_name>*`/migration/`.

      The restore process uses the files in this directory.
    - For the application server the files are stored on the source server in the OPBackup directory, for example *<OP_HOME>*`/openpages-backup-restore`.
    - For the reporting server the files are stored on the source server in the OPCCBackup directory, for example *<OP_HOME>*`/op-cc-backup-restore`.
    - The files are stored on the source server in: *<OP_HOME>*`/agent/op-agent/agent/src/deployment/`*<deployment_name>*`/migration/`.

    The files are named op_*<node_name>*_*<incremental number>*_source_backup_*<timestamp>*`.zip`.

    Note: The time stamp is based on the time zone of the source server computer.

    If a file or directory was not found on the source server, it is skipped. For example, if a file name contains a typo, the file does not get backed up. The log file includes messages about any files that were skipped.
11. Download and review the log file.

Restoring application files

Use the IBM OpenPages GRC Platform installation app to restore application files from the source environment to your target environment.

Before you begin

- Ensure that all of the servers in the environment are stopped.

About this task

The restore process uses the files in the *<installation_server_home>*/installer/*<deployment_name>*/migration/ directory. The files are called: op_*<node_name>*_*<incremental number>*_source_backup_*<timestamp>*.zip

Only the files with the most recent timestamps are used.

When the files from the source system are restored, any files on the target system that will be overwritten are backed up. A zip file that contains all original files that were replaced during the restore process is created. The backup files are called op_*<node_name>*_*<incremental number>*_target_backup_*<timestamp>*.zip.

- The application server files are stored in the **OP Backup Restore Directory** on the target server, for example, /opt/IBM/OpenPages/openpages-backup-restore.
- The search server files are stored in the **OP Backup Restore Directory** on the target server.
- The reporting server files are stored in the **Command Center Backup Directory** on the target server, for example, /opt/IBM/OpenPages/openpages_cc_backup_restore.

Procedure

1. Start the installation app and log in.
2. Open your target deployment.
3. Click **Restore**.

   Wait for the process to complete.
4. Download the log file and review it. Look for any files or directories that were skipped.

Restore the storage directory in the target environment

You need to make the *<OP_HOME>*/openpages-storage directory available to the servers in your target environment.

The *<OP_HOME>*/openpages-storage directory can be stored on a server in your deployment or it can be on a separate network share.

- If the directory is on a server in your source environment, restore the backup that you created before the upgrade. Copy the directory to a server in your target environment. If the *<OP_HOME>*/openpages-storage directory exists on the target server, you can overwrite it.

  Or, copy the backed up directory to a network share and give the servers in your target environment access to the network location.
- If your *<OP_HOME>*/openpages-storage directory is on a network share, ensure that the servers in your target environment can access the network location.

Note: You can also use OPBackup and OPRestore to move the openpages-storage directory.

If the location of the openpages-storage directory is different than it was in your source environment, update the OpenPages database with the location of the openpages-storage directory.

Upgrading application data

You must upgrade the application data that is required for the operation of IBM OpenPages GRC Platform. The application data includes localized text and other miscellaneous settings that are required by OpenPages.

Before you begin

- If **System Admin Mode** is enabled in your target environment, disable it.
- If IBM Cognos Configuration is open, close it.

About this task

This video demonstrates how to upgrade application data:

https://youtu.be/8kLP1Ajr7Xo

Procedure

1. If your source environment includes customized JSP files, you must manually incorporate those customizations into the JSP files in your target environment. JSP files are located in the following directories:

```
<OP_HOME>/profiles/<OpenPages-node-name>/installedApps/
  <OpenPages-cell-name>/op-apps.ear/openpages.war
```

```
<OP_HOME>/profiles/<OpenPages-node-name>/installedApps/
  <OpenPages-cell-name>/op-apps.ear/publishweb.war
```

```
<OP_HOME>/profiles/<OpenPages-node-name>/installedApps/
  <OpenPages-cell-name>/op-apps.ear/sosa.war
```

   a) Restart the application servers in the target environment to ensure that the servers are synchronized.

   b) For each customized JSP file in your source environment, locate the JSP file in the target environment. Merge the edits into the JSP file on the administrative application server in your target environment.

   c) After all JSP file edits have been incorporated, restart the application servers.

2. Start the installation app and log in.
3. Open your target deployment.
4. Click **Upgrade App Data**.

   a) If **Upgrade App Data** is not enabled, click **Validate**.

   If the **Upgrade App Data** button is still not available, verify that the OpenPages database upgrade scripts completed successfully. See “Upgrade the databases (DB2)” on page 201 or “Upgrade the databases (Oracle)” on page 225.

   b) Click **Upgrade App Data**.

   c) Wait for the process to complete.

5. Review the log files.

   If any issues occurred, look for a log file in the *<OP_HOME>*`/installer/migration/upgrade/addon_module/loaderdata` directory. Typical data loading activity is logged in the *<OP_HOME>*`/bin/logs` directory.

Post upgrade tasks

Complete the following tasks after you upgrade IBM OpenPages GRC Platform.

- Verify the list of valid domain names and host names.

  For more information, see “Verify the list of valid domains and host names for Cognos Analytics” on page 183.

- If your OpenPages GRC Platform environment is using 3DES password encryption, change the encryption algorithm to AES, which is more secure.

  For more information, see “Upgrading the OpenPages password encryption algorithm to AES encryption” on page 184.

- Determine if you need to update security rules. You might need to update security rules if you use reporting periods or if you plan to use reporting periods.

For more information, see “Updating security rules” on page 185.

- If you customized configuration files in your source environment, reapply or merge your changes.

  For more information, see “Custom settings in configuration files ” on page 185.
- If you installed a search server, you must complete some post upgrade tasks.

  For more information, see “Search server post upgrade tasks” on page 185.
- If you used IBM Business Process Manager in your previous deployment, you must re-establish the integration of IBM Business Process Manager and IBM OpenPages GRC Platform.

  For more information, see “Complete the workflow server integration after an upgrade” on page 186.
- If LDAP was configured in the source system and you did not migrate the `aurora_auth.config`, you need to re-enable LDAP in your target environment.

  For more information, see “Enable LDAP after upgrading” on page 187.
- If you use the approval app, upgrade the app.

  For more information, see “Upgrade the approval app” on page 291.
- If you use IBM OpenPages Loss Event Entry, upgrade it.

  For more information, see “Upgrade process overview for Loss Event Entry” on page 299.
- If you want to use Dynamic Query Mode (DQM) for the OpenPages reporting framework, configure a JDBC connection to the OpenPages database.

  For more information, see “Updating the connection to the OpenPages database for Cognos (DB2)” on page 213 or “Updating the connection to the OpenPages database for Cognos (Oracle)” on page 237.
- Re-create the reporting schema.

  If you dropped the reporting schema during the upgrade process, re-create it. For more information, see “Recreating the reporting schema” on page 188.
- Regenerate the reporting framework.

  Depending on your environment, you might need to regenerate the reporting framework. For more information, see “Regenerating the reporting framework” on page 188.
- If you do not see the OpenPages reports and packages in the Cognos Analytics portal, import the `OpenPages Platform V6` package.

  For more information, see “OpenPages reports are not displayed in the Cognos Analytics portal” on page 368.
- Optional: change the singular and plural labels for the ModelReport object type to "Model Report" and "Model Reports". Make appropriate changes in other locales.
- Verify the upgrade.

  For more information, Upgrade verification tests..
- Test Cognos Analytics.

  For more information, see “Testing Cognos Analytics after the upgrade” on page 191.
- Optional: Back up your environment by running OPBackup and OPCCBackup.

Loading the Cognos Analytics dashboard integration after upgrading

After you upgrade OpenPages, you must load a mandatory integration configuration so that you can use Cognos Analytics dashboards within OpenPages.

Procedure

1. Copy the `CommandCenter-integration-op-config.xml` and `CommandCenter-integration-op-file-content.zip` files from the IBM OpenPages GRC Platform installation media to the administrative application server.

The files are located in the /OP_<version>_Non_Embedded/OP_<version>_Configuration/loader-data/commandcenter directory.

2. Open a command line.

   If you are using Microsoft Windows , open a command prompt with the **Run as Administrator** option.

3. Go to the <OP_HOME>/bin directory.
4. Run the following command to load the files.

   Replace *<loader-file-path>* with the location of the CommandCenter-integration-op-config.xml and CommandCenter-integration-op-file-content.zip files.

   ```
   ObjectManager.cmd|sh l c <OpenPages Administrator user>
      <OpenPages Administrator password> <loader-file-path>
      CommandCenter-integration
   ```

5. If you encounter any errors, review the log file, OP_HOME/bin/logs/ObjectManager.log.

Updating search server settings

Update the search server settings in IBM OpenPages GRC Platform.

You do not need to do this task if you did not install a search server, or if you are upgrading from OpenPages 7.1.x. You need to perform these steps if you are upgrading from OpenPages 7.2.x or later.

Procedure

1. Update the database connection information for the search server.

   See the following topics:

   - "Updating the database connection information for the search server (DB2)" on page 212
   - "Updating the database connection information for the search server (Oracle)" on page 236

2. If it is not already started, start the global search services.

   For more information, see "Start or stop the global search services" on page 257.

3. If the global search component is enabled, you must disable it.
   a) Log on to OpenPages as a user with administrative privileges.
   b) Click **Administration** > **Global Search**.
   c) Click **Disable**.
4. Stop the global search services.

   For more information, see "Start or stop the global search services" on page 257.

5. If the global search service (Apache Solr) user name and password are different than in your source environment, update them.
   a) Click **Administration** > **Settings** > **Applications** > **Common** > **Configuration**.
   b) Click **Show Hidden Settings** and set the value to true.
   c) Click **Administration** > **Settings** > **Platform** > **Search**.
   d) Update the **Solr user ID** and **Solr password** settings.

Updating URL host pointers for reports

After you migrate, change port settings in a production environment, or if you want to refresh a test environment from a production database, you must update the URL host pointers on the application server so that links in reports work properly.

You can update links in reports by modifying URL host pointer settings, and then propagating these reporting schema changes to the application server.

To update the reporting schema, you can do either of the following:

- Run an SQL script that incrementally updates the reporting schema with the changes (recommended).

Note: For SQL tool information, see the topic "Database tool information" in the *IBM OpenPages GRC Administrator's Guide*.

- Use the IBM OpenPages GRC Platform application user interface to re-create the entire reporting schema.

Procedure

1. Start the IBM OpenPages GRC Platform services on the admin application server.
2. Log on to the OpenPages GRC Platform application user interface as a user with administrator privileges.
3. Change the **Object URL Generator** settings.
   a) From the menu bar, click **Administration** > **Settings**.
   b) Expand **Platform** > **Reporting Schema** > **Object URL Generator**.
   c) Update the **Object Generator URL** settings, as required, to point to the application server (such as a test application server). Make sure to click **Save** after you modify each setting.

Table 42: Object Generator URL settings

Setting Name	Description
Host	The changed name of the application server. Example : `test-eng1`
Port	The changed port number of the application server. Example : 10108 (IBM WebSphere)
Protocol	The changed protocol for accessing the application server. Valid values are either `http` or `https`.

4. To update the changed URL setting on the application server, update the reporting schema using one of the following methods:
   - Method 1: Run the following SQL script to incrementally update the reporting schema (recommended):
     a. From a machine with a SQL tool and access to the database server, log on to SQL as the OpenPages GRC Platform database user (for example, `openpages`).
     b. Run the following SQL statements to update the reporting schema:

```
begin
OP_RPS_MGR.SET_DETAIL_PAGE_URL_IN_RPS_RT;
end;
/
```

   - Method 2: Re-create the entire reporting schema by using the application user interface. For details, see the topic "Creating or recreating the reporting schema" in the *IBM OpenPages GRC Administrator's Guide*.

Verify the list of valid domains and host names for Cognos Analytics

If you imported the Cognos Analytics content store when you upgraded IBM OpenPages GRC Platform, verify the list of valid domains and host names. Ensure that all application servers are listed. Also, verify the public domain that is used for load balanced environments on all reporting servers.

Procedure

1. Log on to the reporting server as a user with administrative privileges.
2. Start IBM Cognos Configuration.
3. In the **Explorer** pane, go to **Local Configuration** > **Security** > **IBM Cognos Application Firewall**.
4. In the **Properties** pane, click the **Valid domain names or hosts**.
5. Verify that all OpenPages application servers are listed.
6. If any application servers are missing from the list, add them.
   a) Click the pencil icon.
   b) In the **Valid domain or hosts** window, click **Add**.
   c) Enter the names of the OpenPages application servers.
   d) Click **OK**.
   e) Save the configuration and restart the Cognos service.

      If you use Windows Services to restart the Cognos service, the service is listed as **IBM Cognos**.

Upgrading the OpenPages password encryption algorithm to AES encryption

Determine the password encryption algorithm that your environment is using and upgrade it to AES encryption, if needed.

About this task

If your OpenPages GRC Platform environment is using the OP-CUSTOM or 3DES encryption algorithm, change the encryption algorithm to AES, which is more secure.

To determine the encryption algorithm that your environment is using, examine the ALGORITHMNAME value of the ENCRYPTIONMODULES table entry that has an INACTIVE value of 0.

Procedure

1. Edit the <OP_root>/OpenPages/aurora/conf/aurora.properties file and the <OP_root>/OpenPages/aurora/bin/op-backup-restore.env file and change any encrypted passwords to plain text.
   - If you are using 3DES, look for lines that contain {3DES}.

     For example, suppose the aurora.properties file contains the following line: database.PASSWORD=**{3DES}**Rj+steg+3eU7kb80+\=\=. The database password is encrypted with the 3DES algorithm. Replace the encrypted password with the password in plain text, for example, database.PASSWORD=db_password.
   - If you are using OP-CUSTOM, the lines do not have an algorithm indicator. Look for encrypted passwords and change each of them to the password in plain text.

   The passwords are encrypted with the AES algorithm when you restart the OpenPages GRC Platform services in step 3.
2. Open a command or shell window on the OpenPages GRC Platform server.

   Go to the *<OP_HOME>*/bin directory.
   - For Microsoft Windows operating systems, the default installation directory of OpenPages GRC Platform is C:\OpenPages.
   - For AIX and Linux operating systems, the default installation directory of OpenPages GRC Platform is /opt/OpenPages.

   From the command or shell window, run the following command on a single line:

```
UpdatePasswordEncryptionAlgorithm.sh|.cmd -Mode CA -Host localhost
   -Port <port> -AlgorithmName AES -ProviderName CAMCryptoBC
   -ProviderClass org.bouncycastle145.jce.provider.BouncyCastleProvider
```

```
    -KeySize 128 -Username <OpenPagesAdministrator>
    -Password <OpenPagesAdministratorPassword>
```

- *<port>* is the bootstrap port number. If you do not specify a value, `10101` is used.
- *<host>* is the host name of the application server. If you do not specify a value, `localhost` is used.

3. Restart all OpenPages GRC Platform services.
4. If you are using OpenPages to authenticate users, notify all users that their passwords have been reset to `0p3nP4g3s` and that they must change their passwords the next time they log into the system.

   Note: If you are using Single Sign-On (SSO), LDAP, or another external system to authenticate users, passwords are not reset.

Updating security rules

If you use security rules, you might need to update the rules after you upgrade to address an issue with security rules that were created before version 7.4.

About this task

Do this procedure if you use reporting periods or if you plan to use reporting periods.

Update any security rules that have both of the following properties:

- The rule uses parent-child paths, for example `FOR(Primary Parent)`, `FOR(Immediate)`, and so on
- The rule uses `FOR()` clauses that have an `AND` or `OR` clause before or after the `FOR()` clause

Procedure

1. Log on to IBM OpenPages GRC Platform as an administrator.
2. Enable System Admin Mode.
3. Go to **Administration** > **Security Rules**.
4. For each security rule that needs to be updated, click **Edit** and then click **Save**.
5. Disable System Admin Mode.

Results

New SQL is generated for the rules.

Custom settings in configuration files

If you manually edited any configuration files in the previous version, you must merge your changes.

Search server post upgrade tasks

If you backed up and then restored the search server, complete the following post upgrade tasks.

- If the location of the `openpages-storage` directory has changed, update the search server properties file.

  For more information, see "Updating the search server properties file with the location of the OpenPages storage directory" on page 162.
- If you upgraded from 7.2.x, create the global search index.

  For more information, see "Creating the global search index after upgrading" on page 186.
- If you upgraded from 7.3.x, enable global search.

  For more information, see "Enabling global search" on page 186.

You can also do the following optional tasks:

- Set up SSL for the global search service.

  For more information, see "Setting up SSL for the global search service" on page 159.

- Tune the search server memory settings.

  For more information, see “Allocating memory for the global search component” on page 163.

For more information about the search server, see the *IBM OpenPages GRC Administrator's Guide*.

Enabling global search
If you upgraded from 7.3.x and you used global search in 7.3.x, enable the global search feature.

If you upgraded from 7.2.x, create the global search index. For more information, see “Creating the global search index after upgrading” on page 186.

Procedure

1. Start the search services, if they are not already started.
   For more information, see “Start or stop the global search services” on page 257.
2. Log in to OpenPages as a user with administrative privileges.
3. Click **Administration** > **Global Search** and click **Enable**.

Results

The **Global Search** is available next to the **Reporting Period** box.

If global search does not start, see “Known problems and solutions for global search” on page 345.

For more information about global search, see the *IBM OpenPages GRC Administrator's Guide*.

Creating the global search index after upgrading
If you upgraded from 7.2.x, create the global search index.

Before you begin

The reporting schema must exist and must be enabled before you create the search index.

Procedure

1. Start the search services, if they are not already started.
2. Log in to OpenPages as a user with administrative privileges.
3. Click **Administration** > **Global Search** and click **Create**.

   Creating the index also enables global search.

   Click **Refresh** to update the page.

Results

The **Global Search** is available next to the **Reporting Period** box.

If global search does not start, see “Known problems and solutions for global search” on page 345.

For more information about global search, see the *IBM OpenPages GRC Administrator's Guide*.

Complete the workflow server integration after an upgrade

If you used IBM Business Process Manager in your previous deployment, you need to some post-upgrade tasks.

You need to re-establish the integration of IBM Business Process Manager with IBM OpenPages GRC Platform.

For more information, see "Post upgrade tasks for OpenPages" in the *IBM OpenPages GRC - Business Process Manager Installation Guide*.

Enable LDAP after upgrading

If you used LDAP in your previous version of IBM OpenPages GRC Platform and you did not migrate the `aurora_auth.config`, you must re-enable LDAP.

Open the LDAP configuration file, `aurora_auth.config`, in a text editor.

Check that the provider.url points to your LDAP server. Also verify the other settings.

If the settings are not correct, see "Enabling LDAP for the IBM OpenPages GRC Platform application" on page 156.

Enabling a JDBC connection for the OpenPages database (DB2)

If you want to use Dynamic Query Mode (DQM) for the OpenPages reporting framework, you need to configure a JDBC connection to the OpenPages database.

Enable a JDBC connection so that your reports can run on a reporting framework that is published to Cognos in DQM mode. For more information, see the *IBM OpenPages GRC Administrator's Guide*.

Procedure

1. Open a browser window and log on to the reporting portal as a user with administrative privileges.

   By default, the URL is `http://<server_name>/ibmcognos`.

   Where *<server_name>* is the host name of the reporting server.
2. Click **Manage**.
3. Click **Administration console**.
4. Click the **Configuration** tab.
5. Click **OpenPages DataSource** under **Data Source Connections**.
6. Click **Actions** > **Set Properties - OpenPages DataSource**.
7. Update the JDBC connection information.
   a) Click the **JDBC** tab.
   b) Check **Enable JDBC connection**.
   c) Enter the OpenPages database information in the **Server Name**, **Port Number**, and **Database Name** fields.

Enabling a JDBC connection for the OpenPages database (Oracle)

If you want to use Dynamic Query Mode (DQM) for the OpenPages reporting framework, you need to configure a JDBC connection to the OpenPages database.

Enable a JDBC connection so that your reports can run on a reporting framework that is published to Cognos in DQM mode. For more information, see the *IBM OpenPages GRC Administrator's Guide*.

Procedure

1. Open a browser window and log on to the reporting portal as a user with administrative privileges.

   By default, the URL is `http://<server_name>/ibmcognos`.

   Where *<server_name>* is the host name of the reporting server.
2. Click **Manage**.
3. Click **Administration console**.
4. Click the **Configuration** tab.
5. Click **OpenPages DataSource** under **Data Source Connections**.
6. Click **Actions** > **More** > **Set Properties**.
7. Update the JDBC connection information.
   a) Click the **JDBC** tab.

b) Check **Enable JDBC connection**.

c) Under **Connection type**, click **Service ID**.

d) Enter the OpenPages database information in the **Server Name**, **Port Number**, and **Oracle Service ID** fields.

e) Click **OK**.

8. Click **OK**.

Recreating the reporting schema

If you are using IBM DB2 and you dropped the reporting schema during the upgrade process, re-create the reporting schema.

Procedure

1. Log on to OpenPages as a user with the **Reporting Schema** application permission set.
2. Click **Administration** > **Reporting Schema**.
3. Enable **System Administration Mode**.
4. Perform one of the following actions:
   - If a reporting schema already exists, click **Re-Create** to drop the existing schema and create a new schema.
   - If no reporting schema exists, click **Create**.

   Note: For more information, see the *IBM OpenPages GRC Administrator's Guide*.
5. When the creation task (or re-creation task) is complete, update the reporting framework so that the Cognos reports can access the new schema. For more information, see "Regenerating the reporting framework" on page 188.

Regenerating the reporting framework

After you upgrade IBM OpenPages GRC Platform you might need to regenerate the reporting framework.

For example, if you re-created the reporting schema during the upgrade process, you need to regenerate the reporting framework.

About this task

If you plan to install or upgrade other components, such as IBM OpenPages Loss Event Entry, perform this task after completing all other installation or upgrade tasks.

When you generate the Reporting Framework V6 or the Legacy Reporting Framework, you can choose to update all or particular components of the reporting framework. For more information, see "Choosing update options in the reporting framework" in the *IBM OpenPages GRC Administrator's Guide*.

Procedure

1. Log on to OpenPages as a user with administrative privileges.
2. If **System Admin Mode** is enabled, disable it.
3. Click **Administration** > **Reporting Framework** > **Generation**.
4. On the **Reporting Framework Operations** page, click **Update**.
5. In the **Reporting Framework Generation** window, complete the following steps:
   a) Under **Framework Generation**, select the **Framework Model**, **Labels**, **All Models** or **Selected Models** options and any additional options for generation in the Reporting Framework V6 relational data model.

   Note: For upgraded systems that have the Legacy Reporting Framework setting enabled, if you also want to generate the Legacy Reporting Framework relational data model, under **Legacy Framework Generation**, select the **Framework Model** and **Labels** options.

b) Click **Submit**.

You are returned to the Reporting Framework Operations page with the new task listed in the Reporting Framework Operations table.

6. To view the progress of the update, click **Refresh**.

Regenerating the legacy reporting framework

After you upgrade IBM OpenPages GRC Platform from version 7.1, regenerate the Legacy Reporting Framework.

Procedure

1. Log into OpenPages application and do the following steps:
   a) Navigate to **Administration** > **Settings** > **Platform** > **Reporting** > **Framework** > **Generation** > **Namespaces** > **OPENPAGES_DEFAULT** > **Folders** > **Workflow** > **Items**.
   b) Remove the entire value and save it.
2. Log into the reporting server and do the following steps:
   a) Navigate to the *<CC_HOME>*`/framework/conf` directory.
   b) Edit "static-modelquerysubjects_SHARED.xml" and remove all the MODELQUERYSUBJECT elements which have the `folder="/WORKFLOW"` attribute. For example:

```
</MODELQUERYSUBJECT>
        <MODELQUERYSUBJECT name="PROCINSTACCESS" childId="ID"
parentId="ID" passthrough="true" folder="/WORKFLOW">
<![CDATA[select ID from PROCINSTACCESS]]>
        <COLUMNS>
                <column name="ID"/>
        </COLUMNS>
                <KEYS/>
</MODELQUERYSUBJECT>
```

3. Log into the reporting server and do the following steps:
   a) Navigate to the *<CC_HOME>*`/framework/conf` directory.
   b) Add the `op.user` and `op.password` properties in the `framework.properties`. For example:

```
op.user=<OpenPages Administrator user>
op.password=<OpenPages Administrator password>
```

Deleting workflow reports

After you upgrade IBM OpenPages GRC Platform, you can delete the workflow reports for Fujitsu.

About this task

The workflow reports are no longer needed and can be removed from the system.

Procedure

1. In OpenPages, click **Reporting** > **Cognos Analytics**.
2. Click **Team content**.
3. On the Team content page, navigate through the links as follows:
   OpenPages_Platform_V6>Workflow Reports
4. Hover over the **Active Tasks** report and click the ellipse button.
5. Click **Delete**.
6. Hover over the **Jobs and Tasks** report and click the ellipse button.
7. Click **Delete**.
   The workflow reports are deleted.

Modify the SDI/TDI assembly line after upgrading

If you upgraded OpenPages and you use the IBM QRadar integration project or IBM OpenPages GRC SDI Connector for UCF Common Controls Hub, due to a known issue you have to modify the SDI/TDI assembly line to be able to import the release date. Contact Customer Support for more information.

Upgrade verification tests

After you upgrade IBM OpenPages GRC Platform, verify that the upgrade is successful and the product works as expected.

Use the following checklist to verify the upgrade.

Table 43: Post-installation verification checklist

Task	**Guidance**
Review all installation logs for errors.	For more information, see "Log files" on page 341.
Verify that a backup of the system exists	If it does not exist, create a backup of your system by running the `OPBackup` command from the *<OP_HOME>*`/aurora/bin` directory. Verify that a compressed file was created with the correct time stamp. The file is in the OPBackup directory. The location of the OPBackup directory is specified by the **OP Backup Restore Directory** field on the **Application Server** card. For information about using the backup utility, see the *IBM OpenPages GRC Administrator's Guide*.
Confirm that the reporting schema and framework generated successfully.	For more information, see "Regenerating the reporting framework" on page 188.
Confirm that base reports are functioning as expected.	Log on to the OpenPages application and run the `All Documentation` Cognos report.
If single sign-on (SSO) is enabled, verify that user accounts can access the environment.	Log on to the OpenPages application with an SSO user account.
Confirm that you can upload and download sample attachments.	Log on to the OpenPages application and upload and download a file attachment.
Verify that links in reports reference the correct server address and use the correct web URL parameters.	Run a report that uses OpenPages links. Select a link and confirm that the target object is rendered successfully in the OpenPages interface.
For clustered environments, verify that all servers can upload and download attachments.	Upload and download files from both the admin and non-admin application servers.
Validate that you can access the Cognos Analytics portal.	Type the web URL `http://`*<server_name>*`/ibmcognos` from a client system. Confirm that you can log on to the portal.

Testing Cognos Analytics after the upgrade

Verify that Cognos Analytics works with the IBM OpenPages GRC Platform environment.

Procedure

1. Log on to OpenPages GRC Platform and verify that you can connect to the Cognos Analytics portal.
   a) In a web browser, log on to the OpenPages GRC Platform application.
   b) To test the connection from OpenPages to the Cognos Analytics portal, click **Reporting** > **Cognos Analytics**.
   c) Close the session.
2. From the OpenPages application, click **Reporting** > **All Reports**, and run some standard and custom user reports.

Rolling back an OpenPages upgrade

You can roll back OpenPages to the version from which it was upgraded.

Before you begin

Locate the full server directory backups for each server that were made before the upgrade. For information, see “Backing up your source environment” on page 174.

About this task

The following steps provide a general overview of how to roll back a 7.4.0.0 upgrade.

Procedure

1. Ensure that the IP/DNS setup of the previous deployment is fully intact and uses the exact same configuration that was in place before the OpenPages upgrade.
2. For the database server:

   If the database server was upgraded in-place from the previous OpenPages version:

   a. If the database software was upgraded, reinstate the previous database software version.
   b. Restore the database using the database backup created before the upgrade.

   If a new database server was introduced for the upgrade:

   - Reinstate the former database server into the deployment. You should not have to restore the OpenPages database from a backup.
3. For all other servers in the previous deployment:
   a) If there are any remnants of the OpenPages 7.4 deployment remaining on any of the servers, rename the top level OpenPages directory to `OpenPages-7.4.0.0` on each applicable server.
   b) If during the preparation for the upgrade you renamed the OpenPages root folder or if you created full backup directories or ZIP or tar files of each server, restore them if needed. For more information about the steps required to prepare for a rollback, see “Backing up your source environment” on page 174.

   After all servers are restored and all third-party products are at the versions required by the previous OpenPages deployment, the previous OpenPages deployment should work without further actions.

Chapter 8. Upgrade tasks for DB2 databases

If you are using IBM DB2, refer to the following topics when you upgrade IBM OpenPages GRC Platform.

The tasks that you need to do depend on the upgrade scenario that you are following. Use the following topics to guide you through the upgrade process:

- "Upgrade process overview: Using the database server from your source environment" on page 168
- "Upgrade process overview: Using new hardware for the database server" on page 170

Back up the database (DB2)

Do the following procedures to back up the IBM DB2 database in your previous deployment of IBM OpenPages GRC Platform.

- If you use IBM DB2 for your reporting server in the source environment, you might need to drop the reporting schema before you back up the database. See "Dropping the reporting schema (DB2)" on page 193.
- If DB2 Text Search is enabled in your source environment, install and enable DB2 Text Search in your target environment.
- If DB2 Text Search is enabled in your source environment, drop the text search indexes and disable DB2 Text Search.
- Back up the OpenPages database.
- If you created a separate database for Cognos, back up the Cognos database.

You need to back up and then restore both the OpenPages schema and the workflow schema so that the database upgrade scripts can remove any references to the workflow schema that are contained within the OpenPages schema. Once the OpenPages schema has these references removed, the workflow schema will then be removed to complete this step.

Dropping the reporting schema (DB2)

If you use IBM DB2 for your reporting server in the source environment, you might need to drop the reporting schema before you back up the database.

About this task

The version of IBM OpenPages GRC Platform that you are upgrading from determines whether you need to drop the reporting schema.

- If you are upgrading from version 7.1.x on IBM DB2, then you must drop the reporting schema.
- If you are upgrading from version 7.2.x on IBM DB2 10.5, you do not need to drop the reporting schema if you upgrade to IBM DB2 11.1.x before you upgrade IBM OpenPages GRC Platform. Otherwise, you must drop the reporting schema.
- If you are upgrading from version 7.2.0.3 or later or 7.3.x on IBM DB2 11.1, you do not need to drop the reporting schema.

Note: Wait until after the upgrade is complete before you run any ObjectManager loads that create or modify schema objects. You must also wait to install IBM OpenPages Loss Event Entry or the approval app, since they require schema modifications as part of their installation process.

Procedure

1. Log on to OpenPages GRC Platform application as an administrator.
2. Click **System Admin Mode: Disabled**.
3. Click **OK**.

System Admin Mode is enabled.

4. From the menu bar, click **Administration** and select **Reporting Schema**.
5. Click **Drop**.

   Wait for the process to complete.
6. Click **System Admin Mode: Enabled**.
7. Click **OK**.
   System Admin Mode is disabled.

Dropping the DB2 Text Search index and disabling DB2 Text Search

If DB2 Text Search is enabled in your source environment, drop the text search indexes, disable the text search service, remove the DB2 administrative task to update the indexes, and disable DB2 Text Search. Do this procedure before you back up the OpenPages database.

Procedure

1. Log on to a system as the OpenPages installation user, for example `opuser`.

   You can use any system with access to CLPPlus that can connect to the OpenPages GRC Platform database server.
2. Drop the DB2 Text Search index.
   a) Go to the *<OP_HOME>*`/aurora/bin/full-text-index` directory.
   b) Open a command or shell window and run the following command:

   ```
   clpplus -nw @sql-wrapper CustomIndexing_Step5_IndexDrop.sql
     <LOG_FILE_NAME> <DB2_SERVER_NAME> <DB2_PORT_NUMBER> <DATABASE_NAME>
     <OP_DB_USER> <OP_DB_PASSWORD> <FORCE_DROP_INDEX>
   ```

   For example

   ```
   clpplus -nw @sql-wrapper CustomIndexing_Step5_IndexDrop.sql
      CustomIndexing_Step5_IndexDrop.log localhost 50000 OPX OPENPAGE
      password Y
   ```

   Note: For more information about the script, see "Drop a long string index" in the *IBM OpenPages GRC Administrator's Guide*.
3. Run the following command to determine if DB2 Text Search is enabled.

   ```
   select * from all_tables where table_schema = 'SYSIBMTS';
   ```

   If the command returns any data, DB2 Text Search is enabled. Continue with the next step to disable DB2 Text Search.
4. Log on to the OpenPages database as the db2inst1 user.

   ```
   db2 connect to opx user opuser using password
   ```
5. Run the following command to disable DB2 Text Search.

   For more information, see SYSTS_DISABLE procedure - Disable current database for text search.

   ```
   db2 "call sysproc.systs_disable('','en_US',?)"
   ```

   Alternatively, use these commands.

   ```
   db2 GRANT SYSTS_ADM TO db2inst1
   db2 grant SYSTS_MGR to db2inst1
   db2 connect reset
   db2ts start for text
   export DB2DBDFT=OPX
   db2ts DISABLE DATABASE FOR TEXT
   ```
6. Remove the DB2 administrative task to update the indexes

For more information, see the following topic in the DB2 documentation: Removing a task from the administrative task scheduler (https://www.ibm.com/support/knowledgecenter/SSEPGG_11.1.0/com.ibm.db2.luw.admin.gui.doc/doc/t0054384.html).

Backing up the OpenPages database (DB2)

Create a backup of the OpenPages GRC Platform database.

Before you begin

If DB2 Text Search is enabled in your source environment, drop the text search indexes and disable DB2 Text Search before you back up the database.

About this task

Use the utilities that are provided with IBM DB2 to back up the database.

Note: You can back up the database by using other methods. For example, you can use a combination of full and incremental backups. If you want to use an alternative method, it is critical that you have the necessary skills available within your organization to complete all aspects of the backup and restore activity.

For information about developing a database backup and restore strategy, see Backup Overview (http://www.ibm.com/support/knowledgecenter/SSEPGG_11.1.0/com.ibm.db2.luw.admin.ha.doc/doc/c0006150.html) in the DB2 documentation.

For more information about the commands that are used in this procedure, see the IBM DB2 documentation.

Procedure

1. Make sure that no OpenPages GRC Platform processes are running, such as object reset jobs.
2. Shut down all OpenPages components: application servers (admin and non-admin), reporting servers (active and standby), and the search server.

   For more information, see Chapter 11, “Starting and stopping servers,” on page 253.
3. Open a command or shell window and connect to the OpenPages database as the database instance owner.

   For Windows users only, you must use the `db2cmd` command in the **Command Prompt** window to initialize the DB2 command line processor (CLP).
4. Go to the `sqllib` directory.
5. Force any applications from the database.

   Run the following command:

   ```
   db2 force application all
   ```
6. Deactivate the database.

   Run the following command:

   ```
   db2 deactivate database <db_name>
   ```
7. Create a directory in which to store the backup.
8. Do an offline backup by using the `db2 backup` command.

   ```
   db2 backup database <db_name> to <backup_directory>
   ```

   Example:

   ```
   db2 backup database opx to /home/db2inst1/backup
   ```
9. Copy the backup file to the instance owner account on the target OpenPages database server.

What to do next

If you created a separate database for Cognos, back up the Cognos database.

Backing up the Cognos database (DB2)

Create a backup of the Cognos database. Do this procedure if you use a separate database for Cognos.

About this task

Use the utilities that are provided with IBM DB2 to back up the database.

Note: You can back up the database by using other methods. For example, you can use a combination of full and incremental backups. If you want to use an alternative method, it is critical that you have the necessary skills available within your organization to complete all aspects of the backup and restore activity.

For information about developing a database backup and restore strategy, see Backup Overview (http://www.ibm.com/support/knowledgecenter/SSEPGG_11.1.0/com.ibm.db2.luw.admin.ha.doc/doc/c0006150.html) in the DB2 documentation.

For more information about the commands that are used in this procedure, see the IBM DB2 documentation.

Procedure

1. Shut down all OpenPages components: application servers (admin and non-admin), reporting servers (active and standby), and the search server.

   For more information, see Chapter 11, “Starting and stopping servers,” on page 253.
2. Ensure that all Cognos components are shut down.
3. Open a command or shell window and connect to the Cognos database as the database instance owner.

   For Windows users only, you must use the `db2cmd` command in the **Command Prompt** window to initialize the DB2 command line processor (CLP).
4. Go to the `sqllib` directory.
5. Force any applications from the database.

   Run the following command:

   ```
   db2 force application all
   ```
6. Deactivate the database.

   Run the following command:

   ```
   db2 deactivate database <db_name>
   ```
7. If you are migrating from DB2 V10.5.x to DB2 V11.1.x, ensure that the APPLHEAPSZ parameter is set to a value greater than or equal to 4096 before you back up the database.

   To check the value, run the following command:

   - Linux or AIX:

     ```
     db2 get db cfg for cognosdb | grep APPLHEAPSZ
     ```
   - Windows:

     ```
     db2 get db cfg for cognosdb | findstr APPLHEAPSZ
     ```

   To update the value, run the following command:

   ```
   db2 update db cfg for cognosdb using applheapsz 32768
   ```

8. Create a directory in which to store the backup.
9. Do an offline backup by using the db2 backup command.

```
db2 backup database <db_name> to <backup_directory>
```

Example:

```
db2 backup database cognosdb to /home/db2inst2/backup
```

10. Copy the backup file to the instance owner account on the target Cognos database server.

Restore the OpenPages database in your upgraded environment (DB2)

Restore the OpenPages database from your previous IBM OpenPages GRC Platform environment into your upgraded environment.

The source and target schema name must be the same.

You cannot use DB2 backup and restore to move a backup to a new operating system. For more information, see the following topic in the DB2 documentation: Backup and restore operations between different operating systems and hardware platforms.

Do these tasks to restore the database:

- Restore the OpenPages database. See “Restoring the OpenPages database (DB2)” on page 197.
- If you use DB2 Text Search, reconfigure and enable DB2 Text Search on the target database server. See “Restore DB2 Text Search ” on page 199.
- If your target environment uses a later 11.x fix pack version of DB2 than your source environment,update the databases on the target database server. See “Update the databases for a DB2 11.1.x fix pack” on page 199.

Restoring the OpenPages database (DB2)

Restore the OpenPages database in your target environment.

Before you begin

Determine whether you need to do a redirected database restore. You need to do a redirected restore if the DBPATH/DB_STORAGE_PATH directory in the target environment is different than in the source environment. You can run a query to check the path.

1. In the source environment, log in as the OpenPages instance owner.
2. Run the following query:

```
db2 "select DBPARTITIONNUM, substr(TYPE,1,15) as TYPE,
substr(PATH,1,70) as PATH from sysibmadm.DBPATHS"
```

3. Log on to the target environment as the OpenPages instance owner and run the query again.

If the directories are the same, restore the database by using the steps in this topic.

If the directories are not the same, do a redirected database restore instead. For more information, see the DB2 documentation: Performing a redirected restore operation.

Procedure

1. Stop all OpenPages and Cognos services in the target environment.
2. Log on to a server that has access to the target database server and has Command Line Processor Plus (CLPPlus).
3. Start the IBM DB2 command line processor.

On Microsoft Windows operating systems, from the command prompt, type db2cmd, or from the **Start** menu, click **All Programs** > **DB2COPY1** > **Command Window - Administrator**.

4. Go to the directory where you copied the database backup file for the OpenPages database.
5. Ensure that there are no connections to the database.

```
db2 list applications
db2 force applications all
```

6. Deactivate the database.

```
db2 deactivate database <db_name>
```

7. Run the DB2 restore command to restore the OpenPages database.

```
db2 restore database <source_db_name> from <backup_directory>
   taken at <timestamp> into <target_db_name>
```

For example:

```
db2 restore database opx from /home/db2inst1/backup
   taken at 20171024165648 into opx
```

A warning about overwriting data is displayed.

8. Type y to overwrite the data.

If the version of DB2 in your target environment is a later version than in the source environment, a complete database upgrade takes place automatically during the restore process. At the end of the restore process, a message is displayed:

```
SQL2555I The database was restored and then successfully upgraded
to the current DB2 release where you issued the RESTORE DATABASE command
```

Note: The automatic upgrade does not update the database when the source and target are at version 11.1 but at different fix pack levels. If your source is 11.1.0 and your target is 11.1.1 or a later fix pack, see "Update the databases for a DB2 11.1.x fix pack" on page 199.

9. Revalidate objects and rebind packages.

Do these steps as the instance owner for the OpenPages database.

a) Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/INSTALL_SCRIPTS directory.

b) Revalidate the database objects.

```
clpplus -nw <openpages_db_username>/<openpages_db_password>
@<hostname>:<port_number>/<database_name>
@sql-wrapper revalidate.sql revalidate.log <openpages_db_username>
```

For example:

```
clpplus -nw openpage/passWORD@localhost:50000/opx
  @sql-wrapper revalidate.sql revalidate.log openpage
```

c) Rebind the packages.

```
db2rbind <database_name> -l oprbind.log all
  -u <openpages_db_username> -p <openpages_db_password> -r any
```

For example:

```
db2rbind opx -l opbind.log all
  -u openpage -p passWORD -r any
```

What to do next

If you use a separate database for the Cognos content store, restore the Cognos database in your target environment.

Restore DB2 Text Search

If you use DB2 Text Search, reconfigure and enable DB2 Text Search on the target database server.

For more information, see "Utilities for filtering on long string field content in a DB2 database" in the *IBM OpenPages GRC Administrator's Guide*

Update the databases for a DB2 11.1.x fix pack

If the version of IBM DB2 in your source environment is at a different fix pack level than the version of IBM DB2 in your target environment, you need to update the databases.

For example, if your source environment uses IBM DB2 version 11.1.0 and your target environment uses IBM DB2 11.1.1 or a later fix pack, you need to update the databases in the target environment to update them to version 11.1.1.

Note: This task applies only when the target environment is using a different fix pack level than the source. If your source environment is using version 10.5 and your target is using version 11.1.0 or a later fix pack, you do not need to do this task.

Do this task after you have restored the databases into your target environment.

For information about how to update the databases, see the following topic in the IBM DB2 documentation: db2updv111 - Update database to Version 11.1 fix pack command (https://www.ibm.com/support/knowledgecenter/SSEPGG_11.1.0/com.ibm.db2.luw.admin.cmd.doc/doc/r0054449.html).

For example:

```
db2updv111 -d opx -a
db2updv111 completed successfully for database 'opx'
```

If you are using a separate database instance for the Cognos content store, update the Cognos database also. For example:

```
db2updv111 -d cognosdb
db2updv111 completed successfully for database 'cognosdb'
```

Restoring the Cognos content store (DB2)

If you use a separate database for the Cognos content store, restore the Cognos database in your target environment.

Before you begin

Determine whether you need to do a redirected database restore. You need to do a redirected restore if the DBPATH/DB_STORAGE_PATH directory in the target environment is different than in the source environment. You can run a query to check the path.

1. In the source environment, log in as the Cognos instance owner.
2. Run the following query:

```
db2 "select DBPARTITIONNUM, substr(TYPE,1,15) as TYPE,
substr(PATH,1,70) as PATH from sysibmadm.DBPATHS"
```

3. Log on to the target environment as the Cognos instance owner and run the query again.

If the directories are the same, restore the database by using the steps in this topic.

If the directories are not the same, do a redirected database restore instead. For more information, see the DB2 documentation: Performing a redirected restore operation.

Procedure

1. Stop all Cognos services in the target environment.
2. Log on to a server that has access to the target Cognos database server and has Command Line Processor Plus (CLPPlus).
3. Start the IBM DB2 command line processor.

   On Microsoft Windows operating systems, from the command prompt, type db2cmd, or from the **Start** menu, click **All Programs** > **DB2COPY1** > **Command Window - Administrator**.
4. Go to the directory where you copied the database backup file for the Cognos database.
5. Ensure that there are no connections to the database.

```
db2 list applications
db2 force applications all
```

6. Deactivate the database.

```
db2 deactivate database <db_name>
```

7. Run the DB2 restore command to restore the Cognos database.

```
db2 restore database <source_db_name> from <backup_directory>
   taken at <timestamp> into <target db name>
```

   For example:

```
db2 restore database cognosdb from /home/db2inst1/backup
   taken at 20171024174956 into cognosdb
```

   A warning about overwriting data is displayed.
8. Type y to overwrite the data.

   If the version of DB2 in your target environment is a later version than in the source environment, a complete database upgrade takes place automatically during the restore process. At the end of the restore process, a message is displayed:

```
SQL2555I The database was restored and then successfully upgraded
to the current DB2 release where you issued the RESTORE DATABASE command
```

   Note: The automatic upgrade does not update the database when the source and target are at version 11.1 but at different fix pack levels. If your source is 11.1.0 and your target is 11.1.1 or a later fix pack, see “Update the databases for a DB2 11.1.x fix pack” on page 199.
9. Revalidate objects and rebind packages in the Cognos database.

   Do these steps as the instance owner for the Cognos database.

   a) Revalidate the database objects.

      For example:

```
db2 connect to cognosdb user db2admin using password123
db2 "call sysproc.admin_revalidate_db_objects()"
```

   b) Rebind packages in the Cognos database.

      For example:

```
db2rbind cognosdb -l cogbind.log -u db2inst2 -p password123
```

Upgrade the databases (DB2)

Run scripts to upgrade the OpenPages database objects.

You must run all of the upgrade scripts in sequence to upgrade the database schema.

Two of the scripts require DBA privileges: a pre-upgrade script and a post-upgrade script. If you have DBA privileges, you can run all of the scripts. If you do not have DBA privileges, contact your database administrator.

A schema user can run the scripts that do not require DBA privileges.

Pre-upgrade step – DBA tasks
During this step, your database administrator runs a script to prepare the database for the upgrade.

You need both DBADM and SECADM privileges to run this script.

Validate the pre-upgrade step
During this step, you run a script to verify that the pre-upgrade DBA script completed successfully and that the database schema is ready for the upgrade.

Upgrade step
During this step, you run a script to upgrade the database. The script determines the current version of the database schema objects, and then runs the upgrade scripts required to upgrade the database.

Post upgrade step – DBA tasks
During this step, your database administrator runs a script to complete the database upgrade and to set database tuning parameters.

You need both DBADM and SECADM privileges to run this script.

Validate the post-upgrade step
During this step, you run a script to validate the post-upgrade DBA step.

Extending database row sizes for the databases (DB2)

After you restore your IBM OpenPages GRC Platform database to the supported version of IBM DB2 you must manually enable the EXTENDED_ROW_SZ database configuration parameter.

Procedure

1. Start the IBM DB2 command line processor.

   On Microsoft Windows operating systems, from the command prompt, type db2cmd, or from the **Start** menu, click **All Programs** > **DB2COPY1** > **Command Window - Administrator**.

   On AIX or Linux operating systems, from the command prompt, type db2cmd.
2. Connect to the OpenPages database.

   For example, type

   ```
   db2 connect to OPX user <userid>
   ```
3. Enter the following commands:

   ```
   db2 update db cfg using EXTENDED_ROW_SZ ENABLE
   db2 update db cfg for OPX using APPLHEAPSZ 25600 APPL_MEMORY 320000
   ```

Preparing for the database upgrade (DB2)

Prepare for the upgrade of the database objects.

Procedure

1. Shut down all OpenPages components: application servers (admin and non-admin), reporting servers (active and standby), and the search server.

For more information, see Chapter 11, “Starting and stopping servers,” on page 253.

2. Ensure that the IBM DB2 database server is running.
3. Log on to the DB2 database server computer as a user with administrative privileges.
4. Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/UPGRADE_SCRIPTS directory.
5. Verify that you have write permission on the `sql-wrapper.sql` file. If not, change the permission on the file by using the chmod command.
6. Edit the `sql-wrapper.sql` file.

   Restriction: Change only the parameters that are described in this step.

Table 44: Parameters in the `sql-wrapper.sql` file for DB2 databases

Property	**Description**
opx_instance_owner	The database instance owner for OpenPages. The user you specify must have both DBADM and SECADM privileges If your database administrator is going to run the DBA scripts for you, then you can leave this value empty when you run the non-DBA scripts.
opx_db2_server_name	The database server name
opx_db2_port_number	The database port number, for example 50000
opx_db2_db_name	The name of the OpenPages database.
opx_db_owner	The schema owner of the OpenPages database.
opx_dflt_stor_srv_root	The path to the OpenPages storage directory. Example: `define opx_dflt_stor_srv_root='/home/opuser/OP/OpenPages/openpages-storage'`
opx_workflow_user	The Fujitsu Interstage BPM workflow database user name. You need to provide the workflow user name to complete the upgrade. The database upgrade scripts remove any references to the workflow schema that are contained within the OpenPages schema, and then the scripts remove the workflow schema.

Table 44: Parameters in the `sql-wrapper.sql` file for DB2 databases (continued)	
Property	**Description**
`opx_override_ver_check`	Use the default value, N, unless you are re-running the database upgrade scripts after a failure. If the database upgrade failed in the middle of the schema upgrade process, set this parameter to Y. When you re-run the upgrade script, the upgrade process resumes from the last successful schema upgrade step. For example, suppose you are upgrading from 7.2 to 7.4. When you run the upgrade script, it successfully upgrades the schema from 7.2 to 7.3, but fails during the upgrade from 7.3 to 7.4. Set this flag to Y and then re-run the script. The upgrade resumes at the 7.3 to 7.4 upgrade step.
`sqllib_dir`	The path to the DB2 client installation directory on the admin application server (App Server1) Example: • Windows: `define sqllib_dir='C:\IBM\SQLLIB'` • AIX or Linux: `define sqllib_dir='/home/db2inst1/sqllib'`

7. If you want to run a custom script during the upgrade process, see "Running a custom script during the database upgrade (DB2)" on page 203.

Running a custom script during the database upgrade (DB2)

If you want to run custom a script during the database upgrade process, edit the `sql-wrapper.sql` file to specify the script to run.

About this task

You can use the `custom_data_upgrade_script` parameter to configure a custom script.

The script that you specify is run during the database upgrade step. The custom script is called by the `op-database-product-upgrade.sh/bat` script after the other upgrade steps, such as DDL changes, PL/SQL code changes, and database level data changes are complete.

Procedure

1. Open the `sql-wrapper.sql` file.
2. Verify that the `sqllib_dir` path is correct. If you are running the custom script from a computer other than the database server, update the path.
3. Edit the following parameters:

```
define custom_data_upgrade_script=no-op.sql
```

   Replace `no-op.sql` with the script that you want to run.
4. Place your custom script in the same directory as the `sql-wrapper.sql` file.

Preparing the files for your database administrator (DB2)

If your organization requires the separation of DBA and non-DBA tasks, prepare the files that your database administrator needs to do the upgrade.

About this task

Note: If you have DBA privileges and you plan to run the DBA scripts, you can skip this procedure.

Procedure

1. Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/UPGRADE_SCRIPTS directory.
2. Collect the following files and send them to your DBA.
   - sql-wrapper.sql
   - op-database-dba-upgrade.sh|.bat
   - op-database-dba-pre-upgrade.sql
   - op-upgrade-save-original-version.sql
   - op-upgrade-save-current-db-version.sql
   - op-database-dba-post-upgrade.sql
   - no-op.sql
   - /UPGRADE_SCRIPTS/OP730X_TO_OP7400/dbu-Fujitsu-IBPM-Removal.sql
3. Send your DBA the instructions to run the DBA scripts.
   - "Running the pre-upgrade DBA script (DB2)" on page 204
   - "Running the post-upgrade DBA script (DB2)" on page 207

Running the pre-upgrade DBA script (DB2)

Ask your database administrator to run the pre-upgrade script. Or, if you have DBA privileges, you can run the script.

Before you begin

- The IBM DB2 database server is running. All other OpenPages servers are stopped.
- The JAVA_HOME system variable is defined and points to the IBM Software Development Kit (SDK) for Java that is installed with DB2. For example:

  ```
  export JAVA_HOME=/db2/V11.1_01/java/jdk64
  export PATH=$JAVA_HOME/bin:$PATH
  ```

  If you are running the script from another host, ensure that JAVA_HOME is pointing to the IBM Software Development Kit (SDK) for Java that is installed on the computer.
- apache-ant-1.8.1 is deployed to /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/UPGRADE_SCRIPTS
- The DB2_HOME system variable is defined.

About this task

Run the following script: op-database-dba-upgrade.sh|.bat. The script uses the properties that are defined in the sql-wrapper.sql file.

The op-database-dba-upgrade.sh|.bat script calls the following scripts:

- op-database-dba-pre-upgrade.sql: This script grants the privileges that are needed to upgrade the database schema. The script also configures database tuning parameters, such as package cache size (PCKCACHESZ) and the catalog cache size (CATALOGCACHE_SZ),

- `no-op.sql`: This is an empty file. You can use it to run custom scripts.
- `op-upgrade-save-original-version.sql`: This script writes the version of the pre-upgrade schema to a log file. The upgrade script uses this information to determine which upgrade scripts to run.
- `op-upgrade-save-current-db-version.sql`: This script writes the version of the schema to a log file. The upgrade script uses this information to track which upgrade scripts completed successfully.

Procedure

1. Log on to the DB2 database server computer as a database administrator (DBA).
2. Locate the scripts.

   If you are a database administrator, get the scripts from your OpenPages team.

   Or, you can get the scripts from the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/UPGRADE_SCRIPTS` directory.
3. Verify that you have execute permission on the scripts.
4. Open the `sql-wrapper.sql` file. Verify that the values are suitable for your environment.
   a) For the `opx_instance_owner` parameter, specify a user that has both DBADM and SECADM privileges.

      You can run the following script to get a list of users that have the necessary privileges:

      ```
      select grantee from syscat.dbauth where dbadmauth = 'Y' and securityadmauth = 'Y';
      ```

   b) If you customized the table space names, update the `define opx_dflt_*` parameters with the custom table space names.
   c) If you want to run custom scripts during the upgrade, see "Running a custom script during the database upgrade (DB2)" on page 203.
5. Run the following command:

   Windows:

   ```
   op-database-dba-upgrade.bat pre <dba_password>
   ```

   Linux or AIX:

   ```
   ./op-database-dba-upgrade.sh pre <dba_password>
   ```
6. Verify that the return code is 0, indicating success.

   You can also check the log file, `op-database-dba-pre-upgrade.log`.

What to do next

Validate the pre-upgrade DBA script.

Validating the pre-upgrade DBA step (DB2)

Run the script to validate the pre-upgrade DBA steps.

Before you begin

- The IBM DB2 database server is running. All other OpenPages servers are stopped.
- The `JAVA_HOME` system variable is defined and points to the IBM Software Development Kit (SDK) for Java that is installed with DB2. For example:

```
export JAVA_HOME=/db2/V11.1_01/java/jdk64
export PATH=$JAVA_HOME/bin:$PATH
```

If you are running the script from another host, ensure that JAVA_HOME is pointing to the IBM Software Development Kit (SDK) for Java that is installed on the computer.

- apache-ant-1.8.1 is deployed to /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/UPGRADE_SCRIPTS
- The DB2_HOME system variable is defined.

Procedure

1. Log on to the IBM DB2 database server computer as the OpenPages application user, opuser.
2. Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/UPGRADE_SCRIPTS directory.
3. Verify that you have execute permission on the scripts.
4. Open the sql-wrapper.sql file. Verify that the values are suitable for your environment.
5. Run the following command:

   Windows:

   ```
   op-database-product-upgrade.bat preupgrade <op_password> ""
   ```

   Linux or AIX:

   ```
   ./op-database-product-upgrade.sh preupgrade <op_password>
   ```

6. Verify that the script completed successfully.

   Look for the following message: Status:Success or a return code of 0.

   You can also check the log file, op-validate-dba-pre-upgrade.log.

What to do next

Run the script to upgrade the database objects.

Upgrading the database (DB2)

Run the script to upgrade the database schema objects and data.

Before you begin

- The IBM DB2 database server is running. All other OpenPages servers are stopped.
- The JAVA_HOME system variable is defined and points to the IBM Software Development Kit (SDK) for Java that is installed with DB2. For example:

  ```
  export JAVA_HOME=/db2/V11.1_01/java/jdk64
  export PATH=$JAVA_HOME/bin:$PATH
  ```

  If you are running the script from another host, ensure that JAVA_HOME is pointing to the IBM Software Development Kit (SDK) for Java that is installed on the computer.
- apache-ant-1.8.1 is deployed to /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/UPGRADE_SCRIPTS
- The DB2_HOME system variable is defined.

Procedure

1. Log on to the IBM DB2 database server computer as the OpenPages application user, opuser.
2. Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/UPGRADE_SCRIPTS directory.
3. Verify that you have execute permission on the scripts in the UPGRADE_SCRIPTS directory and its subdirectories.

4. Open the `sql-wrapper.sql` file. Verify that the values are suitable for your environment.
5. Run the following command:

   Windows:

   ```
   op-database-product-upgrade.bat upgrade <op_password> <workflow_password>
   ```

   Linux or AIX:

   ```
   ./op-database-product-upgrade.sh upgrade <op_password> <workflow_password>
   ```

   Note: You need to provide the workflow user password to complete the upgrade. The database upgrade scripts remove any references to the workflow schema that are contained within the OpenPages schema, and then the scripts remove the workflow schema.
6. Verify that the return code is 0, indicating success.

   You can also check the log file, `op-database-product-upgrade.log`.

What to do next

Ask your database administrator to run the post-upgrade DBA script.

Running the post-upgrade DBA script (DB2)

Ask your database administrator to run the post-upgrade script. Or, if you have DBA privileges, you can run the script.

Before you begin

- The IBM DB2 database server is running. All other OpenPages servers are stopped.
- The JAVA_HOME system variable is defined and points to the IBM Software Development Kit (SDK) for Java that is installed with DB2. For example:

  ```
  export JAVA_HOME=/db2/V11.1_01/java/jdk64
  export PATH=$JAVA_HOME/bin:$PATH
  ```

  If you are running the script from another host, ensure that JAVA_HOME is pointing to the IBM Software Development Kit (SDK) for Java that is installed on the computer.
- apache-ant-1.8.1 is deployed to `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/UPGRADE_SCRIPTS`
- The DB2_HOME system variable is defined.
- The `op-database-product-upgrade.sh|.bat` script completed successfully.

About this task

Run the following script: `op-database-dba-upgrade.sh|.bat`. The script uses the parameters defined in the `sql-wrapper.sql` file.

The `op-database-dba-upgrade.sh|.bat` script calls the following scripts:

- `op-database-dba-post-upgrade.sql`: This script verifies that the schema has been upgraded and is at the correct version.
- `no-op.sql`: This is an empty file.
- `dbu-Fujitsu-IBPM-Removal.sql`: This script removes the workflow database objects and the workflow user. Fujitsu Interstage BPM is not supported in OpenPages 7.4 and later.

Procedure

1. Log on to the IBM DB2 database server computer as a database administrator (DBA).
2. Locate the scripts that are required.

If you are a database administrator, get the scripts from your OpenPages team.

Or, you can get the scripts from the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/UPGRADE_SCRIPTS directory.

3. Verify that you have execute permission on the scripts.
4. Open the sql-wrapper.sql file. Verify that the values are suitable for your environment.

   The user that you specify in the opx_instance_owner parameter must have both DBADM and SECADM privileges

   You can run the following script to get a list of users that have the necessary privileges:

   ```
   select grantee from syscat.dbauth where dbadmauth = 'Y' and securityadmauth = 'Y';
   ```

5. Run the following command:

   Windows:

   ```
   op-database-dba-upgrade.bat post <dba_password>
   ```

   Linux or AIX:

   ```
   ./op-database-dba-upgrade.sh post <dba_password>
   ```

6. Verify that the return code is 0, indicating success.

   You can also check the log file: op-database-dba-post-upgrade.log.

What to do next

Validate the post-upgrade DBA step.

Validating the post-upgrade DBA step (DB2)

Run the script to validate the post-upgrade DBA steps.

Before you begin

- The IBM DB2 database server is running. All other OpenPages servers are stopped.
- The JAVA_HOME system variable is defined and points to the IBM Software Development Kit (SDK) for Java that is installed with DB2. For example:

  ```
  export JAVA_HOME=/db2/V11.1_01/java/jdk64
  export PATH=$JAVA_HOME/bin:$PATH
  ```

  If you are running the script from another host, ensure that JAVA_HOME is pointing to the IBM Software Development Kit (SDK) for Java that is installed on the computer.
- apache-ant-1.8.1 is deployed to /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/UPGRADE_SCRIPTS
- The DB2_HOME system variable is defined.

Procedure

1. Log on to the IBM DB2 database server computer as the OpenPages application user, opuser.
2. Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/UPGRADE_SCRIPTS directory.
3. Verify that you have execute permission on the scripts.
4. Open the sql-wrapper.sql file. Verify that the values are suitable for your environment.
5. Run the following command:

Windows:

```
op-database-product-upgrade.bat postdba <op_password> ""
```

Linux or AIX:

```
./op-database-product-upgrade.sh postdba <op_password>
```

6. Verify that the script completed successfully.
   Look for the following message: `Status:Success` or a return code of 0.
   You can also check the log file, `op-validate-dba-post-upgrade.log`.
7. Remove the passwords from the `sql-wrapper.sql` file for security purposes.

Results

The OpenPages database is upgraded.

What to do next

Migrate the application data from your previous version of OpenPages. See "Migrate files" on page 176.

Updating the location of the openpages-storage directory (DB2)

In the database, update the location of the openpages-storage directory.

If you are using Microsoft Windows, you can also use this procedure to change the storage type from LFS to UNC.

Before you begin
Stop the IBM OpenPages GRC Platform services if they are running.

Procedure

1. Log on to the target environment as a user with administrative permissions. You can use any system with access to CLPPlus that can connect to the database server.
2. Open a command or shell window.
3. Locate the `update-storage.sql` script.
   The script is stored in the following directories. You can use the script in either location.
   - /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/INSTALL_SCRIPTS directory
   - /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/DB2/UPGRADE_SCRIPTS
4. Run the `update-storage.sql` script to update the openpages-storage directory location in the database:

```
clpplus -nw <op_db_user>/<op_db_password>@<database_host>:
   <database_port>/<database_name> @sql-wrapper update-storage <log_file>
   <database_host> <database_port> <database_name> <op_db_user>
   <op_db_password> <storage_type> <storage_server_name> <host_name>
   <os_type> <path_or_UNC_name>
```

Table 45: Parameters in the update-storage.sql script (DB2)

Parameter	Description
<op_db_user>	OpenPages user name for accessing the OpenPages database.
<op_db_password>	The OpenPages password for accessing the OpenPages database.

Table 45: Parameters in the update-storage.sql script (DB2) (continued)	
Parameter	**Description**
<database_host>	Name of the DB2 server host machine that contains the OpenPages database.
<database_port>	Port number of the DB2 database instance that is installed on the database server. For DB2, the default port is 50000.
<database_name>	Name of the OpenPages database.
<log_file>	The name of the log file that the script creates and writes information to.
<storage_type>	The type of file storage to be used. Valid values are as follows: • LFS (local file system) • UNC (Universal Naming Convention) - for Windows only. **Note:** After you move from LFS to UNC, you cannot go back to using LFS.
<storage_server_name>	The name of the storage server.
<host_name>	The host name of the machine.
<os_type>	The type of operating system. Valid values are as follows: • Windows • Unix
<path_or_UNC_name>	The file path or UNC of the storage location. If the path contains backslashes, wrap the path in single quotation marks.

Examples

- LFS

  Windows

```
clpplus -nw openpage/password@myserver.ibm.com:50000/opx
   @sql-wrapper update-storage
   output.log myserver.ibm.com 50000 OPX openpage password
   LFS eng11 eng11  Windows 'C:\IBM\OpenPages\openpages-storage'
```

- Linux and AIX

```
clpplus -nw openpage/password@myserver.ibm.com:50000/opx
   @sql-wrapper update-storage
   output.log myserver.ibm.com 50000 opx openpage password
   LFS aix11 aix11 Unix /usr/opdata/openpages-storage
```

- UNC

  Windows

```
clpplus -nw openpage/password@myserver.ibm.com:50000/opx
   @sql-wrapper update-storage
   output.log myserver.ibm.com 50000 OPX openpage password
   UNC eng11 eng11 Windows openpages-storage
```

Update the database connection information (DB2)

After you restore and upgrade the source database, update the connection information that is stored in the database.

If you are using the database server from your source environment, you do not need to do these tasks.

- Update the `aurora.properties` with the URL of the database server. See "Updating the aurora.properties file (DB2)" on page 211.
- Update the Data Source Connection URL in IBM WebSphere Application Server. See "Updating the Data Source Connection URL in IBM WebSphere Application Server (DB2)" on page 211.
- Update IBM Cognos Configuration with the connection information for your IBM DB2 database server. See "Updating the Cognos content store information (DB2)" on page 212
- Update the database connection information for the search server. See "Updating the database connection information for the search server (Oracle)" on page 236.
- Configure Cognos with the connection information for the OpenPages data source. See "Updating the connection to the OpenPages database for Cognos (DB2)" on page 213.

Updating the `aurora.properties` file (DB2)

Update the database server URL in the `aurora.properties` file.

Procedure

1. Open a command or shell window and go to the `<OP_HOME>/aurora/conf` directory.
2. Make a backup copy of the `aurora.properties` file.
3. Open the `aurora.properties` file in a text editor.
4. Search the file for the string `database.URL`.
5. Change the value that follows the equal sign to the URL of your database server.

   Use the following format:

   ```
   jdbc\:db2\://<host_name>\:<port>/<db_name>
   ```

   Where:

   - *<host_name>* is the name of the database server, such as `eng11`.
   - *<port>* is the database port number, such as `50000`.
   - *<db_name>* is the name of the DB2 database, such as `OP`.
6. Save your changes and close the editor.

Updating the Data Source Connection URL in IBM WebSphere Application Server (DB2)

Update IBM WebSphere Application Server with the database server connection URL.

Procedure

1. Log on to the IBM WebSphere Application Server console.

   By default, the URL is `http://<host_name>:<port>/ibm/console`

   Where:

   - `<host_name>` is the name of the application server where IBM WebSphere is installed.
   - `<port>` is the application server port number.

   For example: `http://myappserver.com:9060/ibm/console`
2. Expand **Resources** > **JDBC** and click the **Data sources** link.
3. In the **Data sources** pane, click `CWTxDataSourceXA`.

4. Locate the **Common and required data source properties** heading.
5. Type the database server connection URL in the **URL** field.

   Use the following format:

   ```
   jdbc:db2://<host_name>:<port>/<db_name>
   ```

   Where:

   - *<host_name>* is the name of the database server, such as `eng11`.
   - *<port>* is the database port number, such as `50000`.
   - *<db_name>* is the name of the DB2 database, such as `OP`.
6. Type the name of the OpenPages database in the **Database name** field.
7. In the **Messages** box, click **Save**.
8. Click **OK**.

Updating the Cognos content store information (DB2)

Update IBM Cognos Configuration with the connection information for your IBM DB2 database server.

Procedure

1. Start the IBM Cognos services and the IBM OpenPages GRC Platform services.
2. Log on to the reporting server as a user with administrator privileges.

   Note: For Windows installations, the user must belong to the `DB2ADMINS` group. For Linux or AIX installations, the user must belong to the `db2iadm` group.
3. Start Cognos Configuration.
   - On Windows computers, from the **Start** menu, click **All Programs** > **IBM Cognos Analytics** > **IBM Cognos Configuration**.
   - On Linux or AIX, go to the *<COGNOS_HOME>*`/bin64` directory, type `./cogconfig.sh`, and press Enter.
4. Update the database connection information for the content store.
   a) In the **Explorer** pane, under **Data Access** > **Content Manager**, click **Content Store**.
   b) In the **Database server and port number** field, enter the name of the computer and the port number on which DB2 is running.
   c) Click the **Value** field next to the **User ID and password** property, click the edit icon, and type the appropriate values for the Cognos user that you created for the content store database, and click **OK**.
   d) In the **Properties** window, for the **Database name** property, type the name for your content store database.

      Restriction: Do not use a name longer than eight characters and use only letters, numbers, underscores, and hyphens in the name.
5. Click **File** > **Save**.
6. In the **Explorer** pane, right-click the content store database connection and click **Test**.
7. Stop the IBM Cognos services and the IBM OpenPages GRC Platform services.

Updating the database connection information for the search server (DB2)

Update the connection information that the search server uses to access the database server.

Procedure

1. Log on to the search server as a user with administrative privileges.
2. Go to *<SEARCH_HOME>*`/opsearchtools/`.

3. Open the `openpages_search.properties` file in a text editor.
4. Modify the database connection properties with the values for the production database server.

   Use the following examples as a guide.

```
# Database connectivity information
OPSearchTool.DatabaseType = DB2
OPSearchTool.DatabaseHostName = OP-WIN-DB2
OPSearchTool.DatabasePort = 50000
OPSearchTool.DatabaseName = OPX
OPSearchTool.DatabaseUserID = openpages_db_user_id
OPSearchTool.DatabasePassword = openpages_db_password
```

Updating the `deploy.properties` file

Update the database server host name and the database credentials in the `deploy.properties` file.

Procedure

1. If the installation app is running, log out.
2. Open a command or shell window and go to the *<installation_server_home>*`/src/deployment/`*<deployment-name>* directory.
3. Make a backup copy of the `deploy.properties` file.
4. Open the `deploy.properties` file in a text editor.
5. Go to the database server section.
6. Update the following parameters with the values for your production database server.
   - `host`
   - `db_port`
   - `dba_username`
   - `dba_password`
   - `op_db_username`
   - `op_db_password`
7. Save your changes and close the editor.

Updating the connection to the OpenPages database for Cognos (DB2)

If you are using new hardware for the database server, update Cognos with the database connection information for the OpenPages database.

Procedure

1. Start the IBM Cognos services.
2. Open a browser window and log on to the reporting portal as a user with administrative privileges.

   By default, the URL is `http://`*<server_name>*`/ibmcognos`.

   Where *<server_name>* is the host name of the reporting server.
3. Click **Manage**.
4. Click **Administration console**.
5. Click the **Configuration** tab.
6. Click **OpenPages DataSource** under **Data Source Connections**.
7. Click **Actions** > **Set Properties - OpenPages DataSource**.
8. Update the database connection string:
   a) Click the **Connection** tab.
   b) Click the pencil icon next to the **Connection String** box to edit the field.

c) On the **CLI** tab, in the **DB2 database name** box, change the DB2 database name to the Catalog Database Name of the OpenPages database in your upgraded environment.

Chapter 9. Upgrade tasks for Oracle databases

If you are using Oracle, refer to the following topics when you upgrade IBM OpenPages GRC Platform.

The tasks that you need to do depend on the upgrade scenario that you are following. Use the following topics to guide you through the upgrade process:

- "Upgrade process overview: Using the database server from your source environment" on page 168
- "Upgrade process overview: Using new hardware for the database server" on page 170

Backing up the OpenPages database (Oracle)

Run the OPBackup utility to back up the IBM OpenPages GRC Platform databases in your source environment.

About this task

You need to back up and then restore both the OpenPages schema and the workflow schema so that the database upgrade scripts can remove any references to the workflow schema that are contained within the OpenPages schema. After the OpenPages schema has these references removed, the workflow schema will then be removed to complete this step.

Run the OPBackup utility with the `dbonly` parameter.

Note:

You can back up the databases by using other methods. Some examples of alternative methods include:

- Doing a full physical backup by using RMAN
- Doing a combination of full and incremental backup by using RMAN
- Doing an Oracle data pump export.

If you want to use an alternative method, it is critical that you have the necessary skills available within your organization to complete all aspects of the backup and restore activity.

For more information about backing up your environment, see the *IBM OpenPages GRC Administrator's Guide*.

Procedure

1. In your source environment, make sure that no OpenPages GRC Platform processes are running, such as object reset jobs.
2. Shut down all OpenPages components: application servers (admin and non-admin), reporting servers (active and standby), and the search server.

   For more information, see Chapter 11, "Starting and stopping servers," on page 253.
3. Open a command or shell window on the admin application server in your source environment.
4. Go to the *<OP_HOME>*`/aurora/bin` directory.
5. Do a full database backup of the OpenPages schema by using OPBackup.

   Windows:

   ```
   OPBackup.cmd <backup_directory> dbonly
   ```

   Linux or AIX:

   ```
   ./OPBackup.sh <backup_directory> dbonly
   ```

The *<backup_directory>* is the full path to a directory on the database server. This directory is where the log files are saved. If the file path is not specified, the OPBackup command uses the location that is specified by the BACKUP_LOCATION parameter in the *<OP_HOME>*/aurora/bin/op-backup-restore.env file.

Two dump files are created in the OP_DATAPUMP_DIRECTORY directory: one for the OpenPages schema one for the workflow schema.

6. Examine the backup log and make note of the dump file names. The naming convention is openpage_*<timestamp>*.dmp and workflow_*<timestamp>*.dmp.
7. Go to the *<OP_HOME>*/CommandCenter/tools/bin directory.
8. Copy the two .dmp files to the OP_DATAPUMP_DIRECTORY directory on the database server in your target environment.
   a) Locate the OP_DATAPUMP_DIRECTORY directory on the target database server.

      To find the OP_DATAPUMP_DIRECTORY directory, run the following SQL as the system user::

      ```
      select directory_name, directory_path from dba_directories
      where directory_name = upper ('OP_DATAPUMP_DIRECTORY');
      ```

   b) Copy the OpenPages and workflow database dump files to the OP_DATAPUMP_DIRECTORY directory on the target database server.

      Copy the following files:

      - openpage_*<timestamp>*.dmp
      - workflow_*<timestamp>*.dmp

      Note: Make sure to copy the .dmp files with the time stamp that matches when you ran the OPBackup command.

Backing up the Cognos content store (Oracle)

You can use OPCCBackup to back up the Cognos content store.

About this task

Run the OPCCBackup utility with the dbonly parameter.

Note: You can back up the content store by using other methods. Some examples of alternative methods include:

- Doing a full physical backup by using RMAN
- Doing a combination of full and incremental backup by using RMAN
- Doing an Oracle data pump export.

If you want to use an alternative method, it is critical that you have the necessary skills available within your organization to complete all aspects of the backup and restore activity.

For more information about backing up your environment, see the *IBM OpenPages GRC Administrator's Guide*.

Procedure

1. In your source environment, make sure that no OpenPages GRC Platform processes are running, such as object reset jobs.
2. Shut down all OpenPages components: application servers (admin and non-admin), reporting servers (active and standby), and the search server.

   For more information, see Chapter 11, “Starting and stopping servers,” on page 253.
3. Ensure that all Cognos components are shut down.

4. Open a command or shell window on the admin application server in your source environment.
5. Go to the *<OP_HOME>*/CommandCenter/tools/bin directory.
6. Do a full database backup of the Cognos schema by using OPCCBackup.

   Windows:

   ```
   OPCCBackup.cmd <backup_directory> dbonly
   ```

   Linux or AIX:

   ```
   ./OPCCBackup.sh <backup_directory> dbonly
   ```

   The *<backup_directory>* is the full path to a directory on the database server. This directory is where the log files are saved. If the file path is not specified, the OPCCBackup command uses the location that is specified by the OP_CC_BACKUP_HOME parameter in the *<CC_HOME>*/tools/bin/op-cc-backup-restore.env file.

   A dump file is created in the OP_DATAPUMP_DIRECTORY directory. The file is called openpage_cc_*<timestamp>*.dmp.
7. Copy the .dmp file to the OP_DATAPUMP_DIRECTORY directory on the database server in your target environment.
   a) Locate the OP_DATAPUMP_DIRECTORY directory on the target database server.

      Note:

      To find the datapump directory for either the source or target database, run the following SQL query as the system user:

      ```
      select directory_name, directory_path from dba_directories
      where directory_name = upper ('OP_DATAPUMP_DIRECTORY');
      ```

      By default, the datapump directory on the database server is <oracle-server-directory>|admin|<sid>|dpdump
   b) Copy the Cognos database dump files to the OP_DATAPUMP_DIRECTORY directory on the target database server.

      Copy the following file: openpage_cc_*<timestamp>*.dmp

      Note: Make sure to copy the .dmp files with the time stamp that matches when you ran the OPCCBackup command.

Restore the OpenPages database in your upgraded environment (Oracle)

Import the OpenPages database from your source environment to the upgraded environment. Do this step before you upgrade the database.

Do these tasks to restore the databases:

- Prepare the Oracle database in your upgraded environment.
- Restore the OpenPages and workflow database schemas.

You need to restore the workflow schema so that the database upgrade scripts can remove any references to the workflow schema that are contained within the OpenPages schema. Once the OpenPages schema has these references removed, the workflow schema will then be removed to complete the upgrade.

Preparing to import the OpenPages database (Oracle)

Prepare the database in your target environment before you restore the database schemas from your previous installation of OpenPages.

Before you begin

Ensure that you completed the backup of the database schemas. See "Backing up the OpenPages database (Oracle)" on page 215.

Procedure

1. Shut down all OpenPages components: application servers (admin and non-admin), reporting servers (active and standby), and the search server.

   For more information, see Chapter 11, "Starting and stopping servers," on page 253.
2. Log on to a server that has access to the database server and has SQL*Plus.
3. Drop the OpenPages database schema in your target environment.
   a) Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/UPGRADE_SCRIPTS/OP730X_TO_OP7400` directory.
   b) Verify that you have execute permission on the files in the `UPGRADE_SCRIPTS` directory.
   c) Log on to SQL*Plus as the OpenPages database user (for example: `sqlplus openpages/openpages@test`).
   d) Use the `spool` command to create a log file.

      ```
      spool <log_file directory>/<log_file name>
      ```

      Ensure that you have write permission on the *<log_file directory>*.

      Example:

      ```
      spool /tmp/AuroraDbDelete.log
      ```

   e) Run the `AuroraDbDelete.sql` script.

      ```
      @AuroraDbDelete.sql
      ```

   f) Log out of SQL*Plus.
4. Completely populate the required entries in the `sql-wrapper.sql` file. For more information, see Table 49 on page 226.
5. Create the workflow user on the admin application server in your target environment.
   a) Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/UPGRADE_SCRIPTS` directory.
   b) Log in to SQL*Plus as a DBA user.
   c) Run the following script:

      ```
      @sql-wrapper ibpm-ts-and-schema-owner.sql ibpm-ts-and-schema-owner.log
         <workflow_password>
      ```

What to do next

Restore the database schema from your previous version of OpenPages.

Restoring the OpenPages database schemas (Oracle)

Restore the database schemas from your previous installation of OpenPages into your target environment.

Before you begin

Ensure that the following tasks are complete:

- You backed up the OpenPages databases in the source environment. See "Backing up the OpenPages database (Oracle)" on page 215.
- You prepared the database in your target environment for the import. See "Preparing to import the OpenPages database (Oracle)" on page 218.
- You copied the backup files to the database server in your target environment. Store the files in the `OP_DATAPUMP_DIRECTORY` directory.

  If the OpenPages and Cognos databases are on different database servers, copy the OpenPages and workflow dump files to the OpenPages database server.

About this task

Import the databases in the following order:

- OpenPages database
- Workflow database

You need to back up and then restore both the OpenPages schema and the workflow schema so that the database upgrade scripts can remove any references to the workflow schema that are contained within the OpenPages schema. After the OpenPages schema has these references removed, the workflow schema will then be removed to complete this step.

If the schema names or table space names are different in the source and target environments, you must remap them during the import. See "Remap schema and table space names (Oracle)" on page 221.

Note: When you import the OpenPages or workflow database, you might see an error as a result of the default data file size. For more information, see "Issues when importing databases" on page 361.

Procedure

1. Shut down all OpenPages components: application servers (admin and non-admin), reporting servers (active and standby), and the search server.

   For more information, see Chapter 11, "Starting and stopping servers," on page 253.
2. Log on to a server that has access to the database server and has SQL*Plus.
3. Set the `NLS_LANG` environment variable.

   Windows

   a. Click **My Computer** > **Properties**.
   b. Click **Advanced system settings** > **Environment Variables**.
   c. In the **System Variables** pane, click **New**.
   d. Add the `NLS_LANG` variable.

      For example: `NLS_LANG=AMERICAN_AMERICA.AL32UTF8`
   e. Click **OK** twice to exit.

   Alternatively, you can set the environment variable globally. See Configure an Environment Variable Item in the Microsoft Windows documentation.

AIX and Linux

Open a shell window. Open the `.profile` file that is in the home directory of the user who is currently logged in. Enter the following line if it is missing from the file:

```
export NLS_LANG=AMERICAN_AMERICA.AL32UTF8
```

Save the file, and either execute the `.profile` in your shell window or log on again.

4. Import the OpenPages GRC Platform database schema.

Note: The Oracle Data Pump command IMPDP is used because the IMP command is not supported.

For more information about Oracle Data Pump, see the *IBM OpenPages GRC Administrator's Guide*.

Run the following command to import the OpenPages GRC Platform database:

```
impdp <op_db_user>/<op_db_password>@<SID>
   DIRECTORY=OP_DATAPUMP_DIRECTORY DUMPFILE=<openpages_dump_file>
   LOGFILE=openpages_import.log exclude=statistics
```

Table 46: Parameters and their descriptions: Importing the OpenPages database schema

Parameter	Description
<op_db_user>	The user name for accessing the OpenPages database.
<op_db_password>	The password for accessing the OpenPages database.
<SID>	The Oracle System Identifier (for example, OP).
<openpages_dump_file>	The `.dmp` file name of the backed-up OpenPages database schema: openpage_*<timestamp>*.dmp. **Important:** Do not enter a path. Enter only the file name.
DIRECTORY	**Important:** Do not enter an explicit path when you specify the DIRECTORY parameter. Use OP_DATAPUMP_DIRECTORY only.

If you receive the following error, you can ignore it:

```
ORA-39083: Object type OBJECT_GRANT failed to create with error:
ORA-01917: user or role 'BPMACCNT' does not exist
```

Example

```
impdp openpages/openpages@OP
   DIRECTORY=OP_DATAPUMP_DIRECTORY
   DUMPFILE=openpages_backup_YYYY_MM_DD_HH_MI_SS.dmp
   LOGFILE=openpages_import.log exclude=statistics
```

5. Import the workflow database schema from the backup files.

From the same command or shell window, run the following command to import the workflow database:

```
impdp <workflow_db_user>/<workflow_db_password>@<SID>
   DIRECTORY=OP_DATAPUMP_DIRECTORY DUMPFILE=<workflow_dump_file>
   LOGFILE=opworkflow_import.log exclude=statistics
```

Table 47: Parameters and their descriptions: Importing the workflow database schema	
Parameter	**Description**
<workflow_db_user>	The user name for accessing the workflow database.
<workflow_db_password>	The password for accessing the workflow database.
<SID>	The Oracle System Identifier (for example, OP).
<workflow_dump_file>	The `.dmp` file name of the backed-up workflow database schema: `workflow_<timestamp>.dmp`. **Important:** Do not enter the path. Enter only the file name.
DIRECTORY	**Important:** Do not enter an explicit path when you specify the DIRECTORY parameter. Use `OP_DATAPUMP_DIRECTORY` only.

Example

```
impdp opworkflow/opworkflow@OP
   DIRECTORY=OP_DATAPUMP_DIRECTORY
   DUMPFILE=opworkflow_backup_YYYY_MM_DD_HH_MI_SS.dmp
   LOGFILE=opworkflow_import.log exclude=statistics
```

What to do next

If the import fails, review the log files carefully. A failure at the beginning of the process might cause a number of cascading failures that are a symptom of the root issue.

After the import completes successfully, upgrade the OpenPages database.

Remap schema and table space names (Oracle)

If the schema names or table space names are different in the source and target environments, you must remap them during the import.

Remap schema names

If the schema names are different in the source and target, you must remap the schema names. You must also run the import command as a DBA user.

OpenPages schema name is different

If the OpenPages schema name is different, remap it when you import the OpenPages database and when you import the workflow database.

- Add the following clause to the import command for the OpenPages database:

  ```
  remap_schema=<op_source>:<op_target>
  ```

- Add the following clause to the import command for the workflow database:

  ```
  remap_schema=<op_source>:<op_target>
  ```

Note: If you use a different name for the OpenPages schema in your upgraded environment, the change might impact your reports. You might need to do some remediation steps. If your reports contain references to the schema, update the reports to use the new schema name. Out-of-the-box reports are not impacted by this issue because they do not reference the schema name.

Workflow schema name is different

If the workflow schema name is different but the OpenPages schema name is the same, remap the workflow schema when you import the workflow database. Add the following clause to the import command for the workflow database:

```
remap_schema=<workflow_source>:<workflow_target>
```

OpenPages and workflow schema names are different

If both the OpenPages and workflow schema names are different, do the following steps:

- Remap the OpenPages schema when you import the OpenPages database. Add the following clause:

  ```
  remap_schema=<op_source>:<op_target>
  ```

- Remap both the OpenPages schema and the workflow schema when you import the workflow database. Add the following clauses:

  ```
  remap_schema=<workflow_source>:<workflow_target>
  remap_schema=<op_source>:<op_target>
  ```

Example : In this example, the OpenPages schema name is different and the workflow schema name is the same in the source and target.

```
impdp <dba_user>/<dba_password>@OP
   DIRECTORY=OP_DATAPUMP_DIRECTORY
   DUMPFILE=openpages_backup_YYYY_MM_DD_HH_MI_SS.dmp
   LOGFILE=openpages_import.log remap_schema=opuser:openpages
   exclude=statistics
```

```
impdp <dba_user>/<dba_password>@OP
   DIRECTORY=OP_DATAPUMP_DIRECTORY
   DUMPFILE=opworkflow_backup_YYYY_MM_DD_HH_MI_SS.dmp
   LOGFILE=opworkflow_import.log remap_schema=opuser:openpages
   exclude=statistics
```

Example : In this example, both the OpenPages and workflow schema names are different.

```
impdp <dba_user>/<dba_password>@OP
   DIRECTORY=OP_DATAPUMP_DIRECTORY
   DUMPFILE=openpages_backup_YYYY_MM_DD_HH_MI_SS.dmp
   LOGFILE=openpages_import.log remap_schema=opuser:openpages
   exclude=statistics
```

```
impdp <dba_user>/<dba_password>@OP
   DIRECTORY=OP_DATAPUMP_DIRECTORY
   DUMPFILE=opworkflow_backup_YYYY_MM_DD_HH_MI_SS.dmp
   LOGFILE=opworkflow_import.log remap_schema=myworkflow:opworkflow
   remap_schema=opuser:openpages exclude=statistics
```

Example : In this example, the Cognos schema name is different.

```
impdp <dba_user>/<dba_password>@OPCC
   DIRECTORY=OP_DATAPUMP_DIRECTORY
   DUMPFILE=openpage_cc_YYYY_MM_DD_HH_MI_SS.dmp
   LOGFILE=opcognos_import.log fromuser=cognos touser=cognos
   TABLE_EXISTS_ACTION=REPLACE remap_schema=mycc:opcc
```

Remap table space names

If the source and target databases are using different table space names, include the following clause in the import command:

```
remap_tablespace=<source_tablespace_name>:<target_tablespace_name>
```

Example : In this example, the MCRN table space is remapped to the CRN table space in the target environment.

```
impdp system/password@OPCC
   DIRECTORY=OP_DATAPUMP_DIRECTORY
   DUMPFILE=openpage_cc_YYYY_MM_DD_HH_MI_SS.dmp
   LOGFILE=opcognos_import.log fromuser=cognos touser=cognos
   TABLE_EXISTS_ACTION=REPLACE remap_tablespace=MYCRN:CRN
```

To determine the table space names that are used, do the following steps:

1. In the source environment, log in to SQL*Plus as the `cognos` user.
2. Run the following command to get a list of table spaces:

   ```
   select tablespace_name from user_tablespaces;
   ```

3. Run the following command to get a list of table spaces that contain objects:

   ```
   select distinct tablespace_name from user_segments;
   ```

4. Repeat these steps in the target environment and compare the table space names.

If you need to remap the schema and the table spaces, place the `remap_schema` parameter before the `remap_tablespace` parameter. Run the command as a DBA user.

Example : In this example, the Cognos schema name is remapped and the MYCRN table space is also remapped.

```
impdp <dba_user>/<dba_password>@OPCC DIRECTORY=OP_DATAPUMP_DIRECTORY
   DUMPFILE=openpage_cc_YYYY_MM_DD_HH_MI_SS.dmp
   LOGFILE=opcognos_import.log fromuser=cognos touser=cognos
   TABLE_EXISTS_ACTION=REPLACE remap_schema=mycc:opcc
   remap_tablespace=MYCRN:CRN
```

Restore the Cognos content store in your upgraded environment (Oracle)

When you upgrade to Cognos Analytics, you can import the content store from your source environment.

Do these tasks to restore the content store:

- Prepare the Oracle database in your upgraded environment.
- Restore the Cognos database schemas.

Preparing to import the Cognos content store (Oracle)

Prepare the database in the target environment before you restore the Cognos content store schema.

Before you begin

Ensure that you completed the backup of the content store. See "Backing up the Cognos content store (Oracle)" on page 216.

Procedure

1. Shut down all OpenPages components: application servers (admin and non-admin), reporting servers (active and standby), and the search server.

   For more information, see Chapter 11, "Starting and stopping servers," on page 253.
2. Log on to a server that has access to the database server and has SQL*Plus.
3. Drop the Cognos database schema in your target environment.
   a) Log on to a server that has access to the database server and has SQL*Plus.
   b) Log on to SQL*Plus as the Cognos database user.

c) Use the `spool` command to create a log file.

```
spool <log_file directory>/<log_file name>
```

Ensure that you have write permission on the *<log_file directory>*.

Example:

```
spool /tmp/AuroraDbDelete.log
```

d) Run the `AuroraDbDelete.sql` script.

```
@AuroraDbDelete.sql
```

e) Log out of SQL*Plus.

Restoring the Cognos content store (Oracle)

Restore the content store from your previous installation of Cognos.

Before you begin

Ensure that the following tasks are complete:

- You backed up the Cognos content store in the source environment. See "Backing up the Cognos content store (Oracle)" on page 216.
- You prepared your database for the import. See "Preparing to import the Cognos content store (Oracle)" on page 223.
- You copied the backup files to the database server in your target environment. Store the files in the `OP_DATAPUMP_DIRECTORY` directory.

  If the OpenPages and Cognos databases are on different database servers, copy the Cognos dump file to the Cognos database server.

About this task

If the schema names or table space names are different in the source and target environments, you must remap them during the import. See "Remap schema and table space names (Oracle)" on page 221.

Procedure

1. Shut down all OpenPages components: application servers (admin and non-admin), reporting servers (active and standby), and the search server.

   For more information, see Chapter 11, "Starting and stopping servers," on page 253.
2. Log on to a server that has access to the database server and has SQL*Plus.
3. Import the Cognos content store.

   From a command or shell window, run the following command to import the Cognos content store:

```
impdp system/<system_password>@<SID>
   DIRECTORY=OP_DATAPUMP_DIRECTORY DUMPFILE=<cognos_dump_file>
   LOGFILE=opcognos_import.log fromuser=cognos touser=cognos
   TABLE_EXISTS_ACTION=REPLACE
```

Table 48: Parameters and their descriptions: Importing the Cognos database schema

Parameter	Description
<system_password>	The password of the SYSTEM user.
<SID>	The Oracle System Identifier (for example, 0PCC).

Table 48: Parameters and their descriptions: Importing the Cognos database schema (continued)	
Parameter	**Description**
<cognos_dump_file>	The `.dmp` file name of the backed-up Cognos database schema: `openpage_cc_<timestamp>.dmp`. **Important:** Do not enter the path. Enter only the file name.
DIRECTORY	**Important:** Do not enter an explicit path when you specify the DIRECTORY parameter. Use `OP_DATAPUMP_DIRECTORY` only.

Example

```
impdp system/password@OPCC
   DIRECTORY=OP_DATAPUMP_DIRECTORY
   DUMPFILE=openpage_cc_YYYY_MM_DD_HH_MI_SS.dmp
   LOGFILE=opcognos_import.log fromuser=cognos touser=cognos
   TABLE_EXISTS_ACTION=REPLACE
```

What to do next

If the import fails, review the log files carefully. A failure at the beginning of the process might cause a number of cascading failures that are a symptom of the root issue.

Upgrade the databases (Oracle)

Run scripts to upgrade the OpenPages database schema.

This video demonstrates how to upgrade the database schema by using scripts:

https://youtu.be/6uVOdXyCTT8

You must run all of the upgrade scripts in sequence to upgrade the database schema.

Two of the scripts require DBA privileges: a pre-upgrade script and a post-upgrade script. If you have DBA privileges, you can run all of the scripts. If you do not have DBA privileges, contact your database administrator.

A schema user can run the scripts that do not require DBA privileges.

Pre-upgrade step – DBA tasks
During this step, your database administrator runs a script to prepare the database for the upgrade.

You need SYSDBA privileges to run this script.

Validate the pre-upgrade step
During this step, you run a script to verify that the pre-upgrade DBA script completed successfully and that the database schema is ready for the upgrade.

Upgrade step
During this step, you run a script to upgrade the schema. The script determines the current version of the database schema, and then runs the upgrade scripts required to upgrade the schema.

Post upgrade step – DBA tasks
During this step, your database administrator runs a script to complete the database upgrade and to set database tuning parameters.

You need SYSDBA privileges to run this script.

Validate the post-upgrade step
During this step, you run a script to validate the post-upgrade DBA step.

Preparing for the database upgrade (Oracle)

Prepare for the upgrade of the database schema.

Procedure

1. Shut down all OpenPages components: application servers (admin and non-admin), reporting servers (active and standby), and the search server.

   For more information, see Chapter 11, "Starting and stopping servers," on page 253.
2. Ensure that the Oracle database server is running.
3. Log on to the Oracle database server computer as a user with administrative privileges.
4. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/UPGRADE_SCRIPTS` directory.
5. Verify that you have write permission on the `sql-wrapper.sql` file.
6. Edit the `sql-wrapper.sql` file.

   Note: Change only the parameters that are described in this step.

Table 49: Parameters in the `sql-wrapper.sql` file for Oracle databases

Property	Description
`opx_datafile_storage_dir`	Defines the physical locations of the datafiles that are associated with the tablespaces that are created. This should be set to a value that is appropriate for your environment
`opx_dflt_sid`	The TNS alias of the Oracle database for OpenPages.
`opx_db_owner`	The OpenPages database owner
`opx_oracle_dba_user`	The user name of a DBA user. If your database administrator is going to run the DBA scripts for you, then you can leave this value empty when you run the non-DBA scripts.
`opx_workflow_user`	The Fujitsu Interstage BPM workflow database user name. You need to provide the workflow user name to complete the upgrade. The database upgrade scripts remove any references to the workflow schema that are contained within the OpenPages schema, and then the scripts remove the workflow schema.
`opx_override_ver_check`	Use the default value, `N`, unless you are re-running the database upgrade scripts after a failure. If the database upgrade failed in the middle of the schema upgrade process, set this parameter to Y. When you re-run the upgrade script, the upgrade process resumes from the last successful schema upgrade step. For example, suppose you are upgrading from 7.2 to 7.4. When you run the upgrade script, it successfully upgrades the schema from 7.2 to 7.3, but fails during the upgrade from 7.3 to 7.4. Set this flag to Y and then re-run the script. The upgrade resumes at the 7.3 to 7.4 upgrade step.

7. If you want to run a custom script during the upgrade process, see "Running custom scripts during the database upgrade (Oracle)" on page 227.

Running custom scripts during the database upgrade (Oracle)

If you want to run custom scripts during the database upgrade process, edit the `sql-wrapper.sql` file to specify the scripts to run.

About this task

You can use the `custom_data_upgrade_script` parameter to configure a custom script.

The script that you specify is run during the database upgrade step. The custom script is called by the `op-database-product-upgrade.sh/bat` script after the other upgrade steps, such as DDL changes, PL/SQL code changes, and database level data changes are complete.

Procedure

1. Open the `sql-wrapper.sql` file.
2. Edit the following parameters:

   ```
   define custom_data_upgrade_script=no-op.sql
   ```

   Replace `no-op.sql` with the script that you want to run.
3. Place your custom scripts in the same directory as the `sql-wrapper.sql` file.

Preparing the files for your database administrator (Oracle)

If your organization requires the separation of DBA and non-DBA tasks, prepare the files that your database administrator needs to do the upgrade.

Note: If you have DBA privileges and you plan to run the DBA scripts, you can skip this procedure.

Procedure

1. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/UPGRADE_SCRIPTS` directory.
2. Collect the following files and send them to your DBA.
   - `sql-wrapper.sql`
   - `op-database-dba-upgrade.sh|.bat`
   - `op-database-dba-pre-upgrade.sql`
   - `op-upgrade-save-original-version.sql`
   - `op-upgrade-save-current-db-version.sql`
   - `op-database-dba-post-upgrade.sql`
   - `/UPGRADE_SCRIPTS/OP730X_TO_OP7400/dbu-Fujitsu-IBPM-Removal.sql`
   - `no-op.sql`
3. Send your DBA the instructions to run the DBA scripts.
   - “Running the pre-upgrade DBA script (Oracle)” on page 227
   - “Running the post-upgrade DBA script (Oracle)” on page 230

Running the pre-upgrade DBA script (Oracle)

Ask your database administrator to run the pre-upgrade script. Or, if you have DBA privileges, you can run the script.

Before you begin

- The Oracle database server is running. All other OpenPages servers are stopped.
- The `JAVA_HOME` system variable is defined.

- apache-ant-1.8.1 is deployed to /OP_<*version*>_Non_Embedded/OP_<*version*>_Configuration/Database/ORACLE/UPGRADE_SCRIPTS
- The ORACLE_HOME system variable is defined.

About this task

Run the following script: op-database-dba-upgrade.sh | .bat. The script uses the parameters defined in the sql-wrapper.sql file.

The op-database-dba-upgrade.sh | .bat script calls the following scripts:

- op-database-dba-pre-upgrade.sql: This script grants the privileges that are needed to upgrade the database schema.
- no-op.sql: This is an empty file. You can use it to run custom scripts.
- op-upgrade-save-original-version.sql: This script writes the version of the pre-upgrade schema to a log file. The upgrade script uses this information to determine which upgrade scripts to run.
- op-upgrade-save-current-db-version.sql: This script writes the version of the schema to a log file. The upgrade script uses this information to track which upgrade scripts completed successfully.

Procedure

1. Log on to the Oracle database server computer as a database administrator (DBA).
2. Locate the scripts that are required.

   If you are a database administrator, get the scripts from your OpenPages team.

   Or, you can get the scripts from the /OP_<*version*>_Non_Embedded/OP_<*version*>_Configuration/Database/ORACLE/UPGRADE_SCRIPTS directory.
3. Verify that you have execute permission on the scripts.
4. Open the sql-wrapper.sql file. Verify that the values are suitable for your environment.
   a) For the opx_oracle_dba_user parameter, enter a user that has SYSDBA privileges, for example SYS.
   b) If you customized the table space names, update the define opx_dflt_* parameters with the custom table space names.
   c) If you want to run custom scripts during the upgrade, see "Running custom scripts during the database upgrade (Oracle)" on page 227.
5. Run the following command:

   Windows:

   ```
   op-database-dba-upgrade.bat pre <sysdba_password>
   ```

   Linux or AIX:

   ```
   ./op-database-dba-upgrade.sh pre <sysdba_password>
   ```
6. Verify that the return code is 0, indicating success.

   You can also check the log file, op-database-dba-pre-upgrade.log.

What to do next

Validate the pre-upgrade script.

Validating the pre-upgrade DBA step (Oracle)

Run the script to validate the pre-upgrade DBA steps.

Before you begin

- The Oracle database server is running. All other OpenPages servers are stopped.
- The JAVA_HOME system variable is defined.
- apache-ant-1.8.1 has been deployed to /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/ORACLE/UPGRADE_SCRIPTS
- The ORACLE_HOME system variable is defined.

Procedure

1. Log on to the Oracle database server computer as the OpenPages application user, opuser.
2. Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/ORACLE/UPGRADE_SCRIPTS directory.
3. Verify that you have execute permission on the scripts.
4. Open the sql-wrapper.sql file. Verify that the values are suitable for your environment.
5. Run the following command:

   Windows:

   ```
   op-database-product-upgrade.bat preupgrade <op_schema_owner_password> ""
   ```

   Linux or AIX:

   ```
   ./op-database-product-upgrade.sh preupgrade <op_schema_owner_password>
   ```

6. Verify that the script completed successfully.

   Look for the following message: Status:Success or a return code of 0.

   You can also check the log file, op-validate-dba-pre-upgrade.log.

What to do next

Run the script to upgrade the database schema.

Upgrading the schema (Oracle)

Run the script to upgrade the database schema.

Before you begin

- The Oracle database server is running. All other OpenPages servers are stopped.
- The JAVA_HOME system variable is defined.
- apache-ant-1.8.1 is deployed to /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/ORACLE/UPGRADE_SCRIPTS
- The ORACLE_HOME system variable is defined.
- The op-database-product-upgrade.sh|.bat script completed successfully.

Procedure

1. Log on to the Oracle database server computer as the OpenPages application user, opuser.
2. Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/ORACLE/UPGRADE_SCRIPTS directory.
3. Verify that you have execute permission on the scripts in the UPGRADE_SCRIPTS directory and its subdirectories.

4. Open the `sql-wrapper.sql` file. Verify that the values are suitable for your environment.
5. Run the following command:

   Windows:

   ```
   op-database-product-upgrade.bat upgrade <op_schema_owner_password>
      <workflow_password>
   ```

   Linux or AIX:

   ```
   ./op-database-product-upgrade.sh upgrade <op_schema_owner_password>
      <workflow_password>
   ```

   Note: You need to provide the workflow user password to complete the upgrade. The database upgrade scripts remove any references to the workflow schema that are contained within the OpenPages schema, and then the scripts remove the workflow schema.
6. Verify that the return code is 0, indicating success.

   You can also check the log file, `op-database-product-upgrade.log`.

What to do next

Ask your database administrator to run the post-upgrade DBA script.

Running the post-upgrade DBA script (Oracle)

Ask you database administrator to run the post-upgrade script. Or, if you have DBA privileges, you can run the script.

Before you begin

- The Oracle database server is running. All other OpenPages servers are stopped.
- The `JAVA_HOME` system variable is defined.
- apache-ant-1.8.1 is deployed to `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/UPGRADE_SCRIPTS`
- The `ORACLE_HOME` system variable is defined.
- The `op-database-product-upgrade.sh|.bat` script completed successfully.

About this task

Run the following script: `op-database-dba-upgrade.sh|.bat`. The script uses the parameters defined in the `sql-wrapper.sql` file.

The `op-database-dba-upgrade.sh|.bat` script calls the following scripts:

- `op-database-dba-post-upgrade.sql`: This script validates database parameters. This script also sets database tuning parameters.
- `no-op.sql`: This is an empty file.
- `dbu-Fujitsu-IBPM-Removal.sql`: This script removes the Fujitsu Interstage BPM workflow schema and the workflow user. Fujitsu Interstage BPM is not supported in OpenPages 7.4 and later.

Procedure

1. Log on to the Oracle database server computer as a database administrator (DBA).
2. Locate the scripts that are required.

   If you are a database administrator, get the scripts from your OpenPages team.

   Or, you can get the scripts from the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/UPGRADE_SCRIPTS` directory.
3. Verify that you have execute permission on the scripts.

4. Open the `sql-wrapper.sql` file. Verify that the values are suitable for your environment. In the `opx_oracle_dba_user` parameter, enter a user that has SYSDBA privileges, for example SYS.
5. Run the following command:

   Windows:

   ```
   op-database-dba-upgrade.bat post <sysdba_password>
   ```

   Linux or AIX:

   ```
   ./op-database-dba-upgrade.sh post <sysdba_password>
   ```

6. Verify that the return code is 0, indicating success.

   You can also check the log file: `op-database-dba-post-upgrade.log`.

What to do next

Validate the post-upgrade DBA step.

Validating the post-upgrade DBA step (Oracle)

Run the script to validate the post-upgrade DBA steps.

Before you begin

- The Oracle database server is running. All other OpenPages servers are stopped.
- The `JAVA_HOME` system variable is defined.
- apache-ant-1.8.1 has been deployed to `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/UPGRADE_SCRIPTS`
- The `ORACLE_HOME` system variable is defined.

Procedure

1. Log on to the Oracle database server computer as the OpenPages application user, `opuser`.
2. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/UPGRADE_SCRIPTS` directory.
3. Verify that you have execute permission on the scripts.
4. Open the `sql-wrapper.sql` file. Verify that the values are suitable for your environment.
5. Run the following command:

   Windows:

   ```
   op-database-product-upgrade.bat postdba <op_schema_owner_password> ""
   ```

   Linux or AIX:

   ```
   ./op-database-product-upgrade.sh postdba <op_schema_owner_password>
   ```

6. Verify that the script completed successfully.

   Look for the following message: `Status:Success` or a return code of 0.

   You can also check the log file, `op-validate-dba-post-upgrade.log`.

   Note: If you are upgrading from version 7.1 on Oracle, then the 7.1 to 7.2 portion of the upgrade could encounter the following warning during the verification step: "*PROPERTYDEFS Missing Required Entries*". If you encounter this warning, you can ignore it. For more information, see "Warning when upgrading OpenPages Version 7.1 (Oracle)" on page 353.
7. Remove the passwords from the `sql-wrapper.sql` file for security purposes.

Results
The OpenPages database schema is upgraded.

What to do next

Migrate the application data from your previous version of OpenPages. See “Migrate files” on page 176.

Updating the location of the openpages-storage directory (Oracle)

In the database, update the location of the openpages-storage directory.

If you are using Microsoft Windows, you can also use this procedure to change the storage type from LFS to UNC.

Before you begin
Stop the IBM OpenPages GRC Platform services if they are running.

Procedure

1. Log on to the target environment as a user with administrative permissions. You can use any system with access to SQL*Plus that can connect to the database server.
2. Open a command or shell window.
3. Locate the update-storage.sql script.

   The script is stored in the following directories. You can use the script in either location.

   - /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/ORACLE/INSTALL_SCRIPTS directory.
   - /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/ORACLE/UPGRADE_SCRIPTS
4. Run the update-storage.sql script to update the openpages-storage directory location in the database:

```
sqlplus /nolog @sql-wrapper.sql update-storage <log_file>
   <oracle_tns_alias> <op_db_user> <op_db_password>
   <storage_type> <storage_server_name> <host_name>
   <os_type> <path_or_UNC_name>
```

Table 50: Parameters in the update-storage.sql script (Oracle)

Parameter	Description
<log_file>	The name of the log file that the script will create and write information to.
<oracle_tns_alias>	The database alias for the OpenPages database instance, as set during the Oracle database installation.
<op_db_user>	The user name for accessing the OpenPages database.
<op_db_password>	The password for accessing the OpenPages database.
<storage_type>	The type of file storage to be used. Valid values are: • LFS (local file system) • UNC (Universal Naming Convention) - for Windows only **Note:** After you move from LFS to UNC, you cannot go back to using LFS.
<storage_server_name>	The name of the storage server.

Table 50: Parameters in the `update-storage.sql` script (Oracle) (continued)	
Parameter	**Description**
<host_name>	The host name of the machine.
<os_type>	The type of operating system. Valid values are: • `Windows` • `Unix`
<path_or_UNC_name>	The file path or UNC of the storage location. If the path contains backslashes, wrap the path in single quotation marks.

Examples

- LFS

  Windows

```
sqlplus /nolog @sql-wrapper.sql
  update-storage output.log OP
  openpage password LFS eng11 eng11
  Windows 'C:\IBM\OpenPages\openpages-storage'
```

  Linux or AIX

```
sqlplus /nolog @sql-wrapper.sql
 update-storage /home/op/upd-storage-output.log
 op openpages openpages LFS  aix11 aix11
 Unix /usr/opdata/openpages-storage
```

- UNC

  Windows

  In the following example, `openpages-storage` is the UNC share name of the storage location. The `openpages-storage` location is accessible to all horizontal cluster members as `\\testserver1\openpages-storage`.

```
sqlplus /nolog @sql-wrapper.sql update-storage
   c:\temp\update-storage-output.log op openpages openpages
   UNC eng11 eng11 Windows openpages-storage
```

Update the database connection information (Oracle)

After you restore and upgrade the source database, update the connection information that is stored in the database.

If you are using the database server from your source environment, you do not need to do these tasks.

- Update the `aurora.properties` with the URL of the database server. See “Updating the aurora.properties file (Oracle)” on page 234.
- Update the Data Source Connection URL in IBM WebSphere Application Server. See “Updating the Data Source Connection URL in IBM WebSphere Application Server (Oracle)” on page 234.
- Update IBM Cognos Configuration with the connection information for your Oracle database server. See “Updating the Cognos content store information (Oracle)” on page 235.
- Configure Cognos with the connection information for the OpenPages data source. See “Updating the connection to the OpenPages database for Cognos (Oracle)” on page 237.
- Update the search server settings in OpenPages. See “Updating search server settings” on page 182.
- Update the database connection information for the search server. See “Updating the database connection information for the search server (Oracle)” on page 236.

Updating the `aurora.properties` file (Oracle)

Update the database server URL in the `aurora.properties` file.

Procedure

1. Open a command or shell window and go to the `<OP_HOME>/aurora/conf` directory.
2. Make a backup copy of the `aurora.properties` file.
3. Open the `aurora.properties` file in a text editor.
4. Search the file for the string `database.URL`.
5. Change the value that follows the equal sign to the URL of your database server.

   Use the following format:

   ```
   jdbc\:oracle\:thin\:@//<host_name>\:<port>/<SID>
   ```

   Where:

   - *<host_name>* is the name of the database server, such as `eng11`.
   - *<port>* is the database port number, such as `1521`.
   - *<SID>* is the Oracle System Identifier, such as `OP`.
6. Save your changes and close the editor.

Updating the Data Source Connection URL in IBM WebSphere Application Server (Oracle)

Update IBM WebSphere Application Server with the database server connection URL.

Procedure

1. Log on to the IBM WebSphere Application Server console.

   By default, the URL is `http://<host_name>:<port>/ibm/console`

   Where:

   - `<host_name>` is the name of the application server where IBM WebSphere is installed.
   - `<port>` is the application server port number.

   For example: `http://myappserver.com:9060/ibm/console`
2. Expand **Resources** > **JDBC** and click the **Data sources** link.
3. In the **Data sources** pane, click `CWTxDataSourceXA`.
4. Locate the **Common and required data source properties** heading.
5. Type the database server connection URL in the **URL** field.

   Use the following format:

   ```
   jdbc:oracle:thin:@//<host_name>:<port>/<SID>
   ```

   Where:

   - *<host_name>* is the name of the database server, such as `eng11`.
   - *<port>* is the database port number, such as `1521`.
   - *<SID>* is the Oracle System Identifier, such as `OP`.
6. In the **Messages** box, click **Save**.
7. Click **OK**.

Updating the Cognos content store information (Oracle)

Update IBM Cognos Configuration with the connection information for your Oracle database server.

Procedure

1. Start the IBM Cognos services and the IBM OpenPages GRC Platform services.
2. Log on to the reporting server as a user with administrator privileges.

   Note: For Windows installations, the user must belong to the DB2ADMINS group. For Linux or AIX installations, the user must belong to the db2iadm group.
3. Start Cognos Configuration.
   - On Windows computers, from the **Start** menu, click **All Programs** > **IBM Cognos Analytics** > **IBM Cognos Configuration**.
   - On Linux or AIX, go to the *<COGNOS_HOME>*/bin64 directory, type `./cogconfig.sh`, and press Enter.
4. Update the database connection information for the content store.
   a) In the **Explorer** pane, under **Data Access** > **Content Manager**, click **Content Store**.
   b) Use the following tables to update the database connection information.

Table 51: Content store property settings for Oracle database

Property name	Property value
Database server and port number	Type the name of the database server and the listener port that is used for the database instance.
User ID and Password	Click the value field and then click the pencil icon. In the **Value - User ID and password** field, enter the appropriate values for the user and password for the content store database.
Service name	Type the SID of the database instance.

Table 52: Content store property settings for Oracle database (Advanced) (Oracle RAC database)

Property name	Property value
Database server and port number	Type the name of the database server and the listener port that is used for the database instance.
User ID and Password	Click the value field and then click the pencil icon. In the **Value - User ID and password** field, enter the appropriate values for the content store database.

Table 52: Content store property settings for Oracle database (Advanced) (Oracle RAC database) (continued)

Property name	Property value

Database specifier	Type the database specifier string in the following format with no carriage returns:
	`(description=(address=`
	`(host=<server_name>)`
	`(protocol=tcp)(port=<port>)`
	`(connect_data(service_name=`
	`<service_name>)))`

5. Click **File** > **Save**.
6. In the **Explorer** pane, right-click the content store database connection and click **Test**.
7. Stop the IBM Cognos services and the IBM OpenPages GRC Platform services.

Updating the database connection information for the search server (Oracle)

Update the connection information that the search server uses to access the database server.

Procedure

1. Log on to the search server as a user with administrative privileges.
2. Go to *<SEARCH_HOME>*/opsearchtools/.
3. Open the openpages_search.properties file in a text editor.
4. Modify the database connection properties with the values for the database server.
   Use the following examples as a guide.

```
# Database connectivity information
OPSearchTool.DatabaseType = Oracle
OPSearchTool.DatabaseHostName = OP-WIN-ORACLE
OPSearchTool.DatabasePort = 1521
OPSearchTool.DatabaseName = OPX
OPSearchTool.DatabaseUserID = openpages_db_user_id
OPSearchTool.DatabasePassword = openpages_db_password
```

Updating the deploy.properties file

Update the database server host name and the database credentials in the deploy.properties file.

Procedure

1. If the installation app is running, log out.
2. Open a command or shell window and go to the *<installation_server_home>*/src/deployment/*<deployment-name>* directory.
3. Make a backup copy of the deploy.properties file.
4. Open the deploy.properties file in a text editor.
5. Go to the database server section.
6. Update the following parameters with the values for your production database server.
   - host
   - db_port
   - dba_username
   - dba_password
   - op_db_username
   - op_db_password

7. Save your changes and close the editor.

Updating the connection to the OpenPages database for Cognos (Oracle)

If you are using new hardware for the database server, update Cognos with the database connection information for the OpenPages database.

Also, do this procedure if the following conditions apply to you:

- The Oracle database alias that you used when you installed OpenPages in your target environment is different from the alias that you used in your source environment
- You imported a 7.1.x, 7.2.x, or 7.3.x database

You need to update the connection string to use the **Oracle Cognos DB Alias** that you configured on the **Database Server** card.

Procedure

1. Start the IBM Cognos services.
2. Open a browser window and log on to the reporting portal as a user with administrative privileges.

   By default, the URL is `http://<server_name>/ibmcognos`.

   Where *<server_name>* is the host name of the reporting server.
3. Click **Manage**.
4. Click **Administration console**.
5. Click the **Configuration** tab.
6. Click **OpenPages DataSource** under **Data Source Connections**.
7. Click **Actions** > **Set Properties - OpenPages DataSource**.
8. Update the database connection string:
   a) Click the **Connection** tab.
   b) Click the pencil icon next to the **Connection String** box to edit the field.
   c) Update the **SQL*Net connect string**. Type the TNS alias or the service name of the OpenPages database in your upgraded environment.
   d) Click **Test the connection**.
   e) Click **Test**. Verify that the test is successful. Click **Close**.
   f) Click **Close**.
   g) Click **OK**.
9. Click **OK**.
10. Click **Oracle Native Driver** under **Data Source Connections**.
11. Click **Actions** > **Set Properties - Oracle Native Driver**.
12. Update the database connection string:
    a) Click the **Connection** tab.
    b) Click the pencil icon next to the **Connection String** box to edit the field.
    c) Update the **SQL*Net connect string**. Type the TNS alias or the service name of the OpenPages database in your upgraded environment.
    d) Click **Test the connection**.
    e) Click **Test**. Verify that the test is successful. Click **Close**.
    f) Click **Close**.
    g) Click **OK**.
13. Click **OK**.

Oracle Transparent Data Encryption (TDE) for upgrade customers

You can use Oracle Transparent Data Encryption (TDE) to encrypt the OpenPages and Cognos table spaces in the OpenPages database.

This task is optional.

For information about how to implement TDE on an existing OpenPages database, see the *IBM OpenPages GRC Administrator's Guide*.

For more information about TDE, refer to the Oracle documentation, such as the Oracle Database Advance Security Guide (https://docs.oracle.com/database/121/ASOAG/toc.htm).

Chapter 10. OpenPages solutions post-upgrade tasks

If you use IBM OpenPages solutions, complete the following post-upgrade tasks.

- If you are upgrading or migrating from version 7.1.x:
  - Remove the obsolete triggers and helpers.
  - Load the upgraded solutions trigger files for version 7.2.
  - Load the OpenPages solution upgrade loader files.
  - Load the object profiles.

    For more information, see OpenPages Questionnaire Assessments post upgrade steps for 7.2.x customers (www.ibm.com/support/docview.wss?uid=swg27047260).
  - Update the IBM OpenPages Operational Risk Management reports.
- If you upgraded from 7.1.x or 7.2.x, load the scenario analysis fields for IBM OpenPages Operational Risk Management.
- If you upgraded from 7.1.x or 7.2.x, update the `openpages-solutions.xml` file to optimize triggers.
- If you upgraded from 7.2.x, configure lifecycles for IBM OpenPages Vendor Risk Management.
- Update the model query subjects for IBM OpenPages Operational Risk Management.
- Update the RCSA Alignment helper for IBM OpenPages Operational Risk Management.
- Remove any scenario analysis triggers that you do not need.
- If you loaded the Scenario Analysis fields for IBM OpenPages Operational Risk Management, update the field dependencies.
- If you upgraded from 7.3.x or from a previous version of OpenPages, and you did not previously load the approval app or Loss Event Entry or RCM schemas, then you can load those schemas now.
- Back up your solutions reports and then import the solutions report package to update them.

  For more information, see “Importing the solutions report packages” on page 251.

Removing obsolete solutions triggers

If you are upgrading from IBM OpenPages GRC Platform version 7.1.x to version 7.4 or later, remove the solutions triggers and helpers from the `openpages-ext.jar` file.

OpenPages uses versions of these triggers and helpers that are contained in the `openpages-solutions.jar` file.

If you are upgrading from OpenPages 7.2.x or 7.3.x, you do not need to perform this task.

Procedure

1. Stop all OpenPages services.
2. Back up the `openpages-ext.jar` file in the *<OP_HOME>*`/aurora/lib/` directory.
3. Extract `openpages-ext.jar` from the *<OP_HOME>*`/aurora/lib/` directory to the *<OP_HOME>*`/openpages-ext/` directory.
4. Delete the *<OP_HOME>*`/openpages-ext/com/openpages/ext/solutions` directory and all of the contents of the directory.
5. Create a JAR file of the *<OP_HOME>*`/openpages-ext` directory and name it `openpages-ext.jar`.
6. Copy the new `openpages-ext.jar` file to the *<OP_HOME>*`/aurora/lib` directory, and overwrite the existing file.
7. Start all OpenPages services.

8. Repeat steps 1 - 7 on all non-admin application servers.

Loading the upgraded OpenPages solution trigger files

If you upgraded or migrated IBM OpenPages GRC Platform from version 7.1, you must load the solution trigger files.

About this task

For example, the following procedure loads the trigger files for the IBM OpenPages IT Governance solution.

Procedure

1. Run the following command to load the `OPLC_Questionnaire-op-config.xml` file by using the `ObjectManager` command.

   On Microsoft Windows operating systems:

   ```
   ObjectManager.cmd l c <op_user> <op_password>
    <OP_HOME>\installer\migration\upgrade\addon_module\loaderdata\ OPLC_Questionnaire
   ```

   On UNIX operating systems:

   ```
   ./ObjectManager.sh l c <op_user> <op_password>
    <OP_HOME>/installer/migration/upgrade/addon_module/loaderdata/ OPLC_Questionnaire
   ```

2. Click **Administration** > **Settings** > **Applications** > **GRCM**.
3. Update the value of the **Trigger Configuration Files** property to `_trigger_config_.xml,openpages-solutions.xml,OPLC-QuestionnaireAssessment.xml`.
4. Restart all OpenPages application servers.

   For more information, see Chapter 11, “Starting and stopping servers,” on page 253.

Loading OpenPages solutions upgrade loader files

If you are upgrading from version 7.1.x, you must load some upgrade files that are used by IBM OpenPages solutions.

About this task

For example, the following procedure loads files that are used for the IBM OpenPages IT Governance solution.

Procedure

1. Copy the files in the `OP_<version>_Non_Embedded/OP_<version>_Configuration/Modules/Upgrade/ITG/loader-data` directory in the IBM OpenPages GRC Platform installation media to the following directory:

   `<OP_HOME>/addon_module/loaderdata`

   Important: The files that are used to load the schema in Step 7 must be in the same directory as the `schema_loader_properties.bat` (Microsoft Windows operating systems) or the `schema_loader_properties.sh` file (UNIX operating systems), which is in the `<OP_HOME>/addon_module/loaderdata` directory. Ensure that you have copied all the files to the `<OP_HOME>/addon_module/loaderdata` directory or the command will fail.
2. Go to the `<OP_HOME>/addon_module/loaderdata` directory, and edit the following file in a text editor:

`schema_loader_properties.bat` (Microsoft Windows operating systems)

`schema_loader_properties.sh` (UNIX operating systems)

3. Configure the following values:

   On Microsoft Windows operating systems, in the `schema_loader_properties.bat` file, update the following lines:

   ```
   OBJMGR_HOME=<OP_HOME>\bin
   PATCH_LOADER_DATA=<OP_HOME>\addon_module\loaderdata
   OPXUserName=Super_Administrator_user_name
   OPXUserPassword=*****
   ```

   On UNIX operating systems, in the `schema_loader_properties.sh` file, update the following lines:

   ```
   OBJMGR_HOME=<OP_HOME>/bin
   PATCH_LOADER_DATA=<OP_HOME>/addon_module/loaderdata
   OPXUserName=Super_Administrator_user_name
   OPXUserPassword=*****
   ```

   The default user name is `OpenPagesAdministrator`.

   The password for `OPXUserName` is masked by asterisks (***). Replace the mask with clear text. After the default configuration data is loaded, you can manually mask the password value with asterisks (***).

   Important: You must update these parameters or the command that is run in step 7 will fail.

4. Save and close the file.
5. Edit the *<OP_HOME>*`/bin/ObjectManager.properties` file and update the following settings as shown:

   ```
   configuration.manager.force.update.object.strings=true
   configuration.manager.force.update.application.strings=true
   ```

6. Save and close the file.
7. From the *<OP_HOME>*`/addon_module/` directory, run the following command:

   `openpages-itg-modules-upgrade-loader-data.bat` (Windows)

   `./openpages-itg-modules-upgrade-loader-data.sh` (UNIX)

8. If you encounter any errors, review the *<OP_HOME>*`/bin/logs/ObjectManager.log` file.
9. Edit the *<OP_HOME>*`/bin/ObjectManager.properties` file and update the following settings as shown:

   ```
   configuration.manager.force.update.object.strings=false
   configuration.manager.force.update.application.strings=false
   ```

10. Save and close the file.
11. Configure the menu items for questionnaire assessments.
    a) Log in to OpenPages as an administrator.
    b) Click **Adminstration** > **Settings**.
    c) Expand **Application** > **Common** > **Configuration**.
    d) Set **Show hidden settings** to **true**.
    e) Expand **Application** > **GRCM** > **Navigation Menu** > **Assessment**.
    f) Click **Object types** and append the following text:

       ```
       ,QuestionnaireTemplate,QuestionnaireAssessment,Program
       ```

For example:

```
RiskAssessment,RAEval,__separator__,SOXControlObjective,SOXRisk,RiskEval,
SOXControl,CtlEval,SOXTest,SOXTestResult,__separator__,ScenarioAnalysis,
ScenarioResult,__separator__,Questionnaire,QuestionnaireTemplate,
QuestionnaireAssessment,Program
```

g) Log out, and then log in.
Click **Assessments**. The menu now includes **Questionnaire Templates**, **Questionnaire Assessments**, and **Program**.

Updating the ORM reports

If you upgraded IBM OpenPages GRC Platform from version 7.1.x, you must update the IBM OpenPages Operational Risk Management reports.

Before you begin

To perform this procedure, you must have the **OpenPages Platform 3** profile associated with your user name.

Procedure

1. Copy the `ORM_JSPReports-resources-op-config.xml` and `ORM_JSPReports-resources-op-file-content.zip` files from the installation media to the administrative application server.

   The files are located in the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Modules/Upgrade/ORM/loader-data` directory.
2. Open a command line.

   If you are using Microsoft Windows, open a command prompt with the **Run as Administrator** option.
3. Go to the *<OP_HOME>*`/bin` directory.
4. Run the following command to load the files.

   Replace *<loader-file-path>* with the location of the `ORM_JSPReports-resources-op-config.xml` and `ORM_JSPReports-resources-op-file-content.zip` files.

   ```
   ObjectManager.cmd|sh l c <OpenPages Administrator user>
      <OpenPages Administrator password> <loader-file-path>
      ORM_JSPReports-resources
   ```
5. If you encounter any errors, review the log file, *OP_HOME*`/bin/logs/ObjectManager.log`.
6. From the menu bar, click **Administration** > **Manage System Files** > **Report**.
7. Click **Reports** > **SOX**, and click **ORM_Custom_Scope_Wizard.jsp**
8. Check the **Versions** table to verify the update.

Loading the Scenario Analysis fields

If you upgraded IBM OpenPages GRC Platform, you must load the scenario analysis fields for IBM OpenPages Operational Risk Management.

Procedure

1. Copy the `OPSS-ScenAn-bundle-type-op-config.xml` file from the installation media to the administrative application server.

   The file is located in the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Modules/Upgrade/ORM/loader-data` directory.
2. Open a command line.

If you are using Microsoft Windows, open a command prompt with the **Run as Administrator** option.

3. Go to the *<OP_HOME>*/bin directory.
4. Run the following command to load the files.

   Replace *<loader-file-path>* with the location of the OPSS-ScenAn-bundle-type-op-config.xml file.

   ```
   ObjectManager.cmd|sh l c <OpenPages Administrator user>
      <OpenPages Administrator password> <loader-file-path>
      OPSS-ScenAn-bundle-type
   ```

5. If you encounter any errors, review the log file, *OP_HOME*/bin/logs/ObjectManager.log.
6. Restart all OpenPages servers.

   For more information, see "Starting application servers" on page 253.
7. Regenerate the reporting framework.

   For more information, see "Regenerating the reporting framework" on page 188.

   Note: Do this task after completing all other post-upgrade or post-migration tasks.

Update the openpages-solutions.xml file

After you upgrade OpenPages GRC Platform, you need to update the openpages-solutions.xml file.

The steps that you need to do depend on the version you are upgrading from, and on whether you use lifecycle fields for the SOXControl, SOXIssue, or Loss Event object types.

Update the openpages-solutions.xml file: 7.1.x with lifecycle fields

If you upgraded IBM OpenPages GRC Platform from version 7.1.x and you use lifecycle fields for the SOXControl, SOXIssue, or Loss Event object types, do these steps to update the openpages-solutions.xml file.

Before you begin

To perform this procedure, you must have the **OpenPages Platform 3** profile associated with your user name.

Procedure

1. From the menu bar, click **Administration** > **Manage System Files** > **SysXMLDocument**.
2. Click the **_trigger_config.xml** file, and then click **View file**.
3. Open the _trigger_config.xml in a text editor.
4. Delete all of the standard OpenPages trigger definitions, and then save the file.

   Note: Keep any custom triggers.
5. Check out the _trigger_config.xml file.
6. Upload and check in the _trigger_config.xml file that you edited.
7. Copy the version 7.4 openpages-solutions.xml file from the installation media to the application server.

   The openpages-solutions.xml file is stored in /OP_7.4_Non_Embedded/OP_7.4_Configuration/Modules/Upgrade/ORM/triggers/7.4_openpages_solutions.
8. Select the **TriggerConfigFiles** folder and then click **Add New**.
9. Click **Browse** and select the openpages-solutions.xml that you copied.
10. Type a description, and then click **Create**.
11. Restart all OpenPages servers.

    For more information, see Chapter 11, "Starting and stopping servers," on page 253.

Update the openpages-solutions.xml file: 7.1.x without lifecycle fields

If you upgraded IBM OpenPages GRC Platform from version 7.1.x and you do not use lifecycle fields for the SOXControl, SOXIssue, or Loss Event object types, do these steps to update the openpages-solutions.xml file.

Before you begin

To perform this procedure, you must have the **OpenPages Platform 3** profile associated with your user name.

Procedure

1. From the menu bar, click **Administration** > **Manage System Files** > **SysXMLDocument**.
2. Click **_trigger_config.xml**, and then click **View file**.
3. Open the _trigger_config.xml in a text editor.
4. Delete all of the standard OpenPages trigger definitions, and then save the file.

   Note: Keep any custom triggers.
5. Check out the _trigger_config.xml file.
6. Upload and check in the _trigger_config.xml file that you edited.
7. Copy the version 7.4 openpages-solutions.xml file from the installation media to the application server.

   The openpages-solutions.xml file is stored in /OP_7.4_Non_Embedded/OP_7.4_Configuration/Modules/Upgrade/ORM/triggers/7.4_openpages_solutions.
8. Select the **TriggerConfigFiles** folder and then click **Add New**.
9. Click **Browse** and select the openpages-solutions.xml that you copied.
10. Type a description, and then click **Create**.
11. Optional: Edit the openpages-solutions.xml file. Add the objecttype property to the trigger definitions.

    For example:

    ```
    <trigger name="Valdt and Cls TSheet Trig Create"
       operation="create.object" type="CUSTOM"
       classname="com.openpages.ext.solutions.triggers.AuditValidateCloseTrigger"
       position="PRE" objecttype="Timesheet">
       <attribute name="content.type" value="Timesheet" />
    ```

    Adding the objecttype property to trigger definitions can improve performance.

    For information about triggers, see the *IBM OpenPages GRC Trigger Developer Guide*
12. Restart all OpenPages servers.

    For more information, see Chapter 11, “Starting and stopping servers,” on page 253.

Update the openpages-solutions.xml file: 7.2.x with lifecycle fields

If you upgraded IBM OpenPages GRC Platform from version 7.2.x and you use lifecycle fields for the SOXControl, SOXIssue, or Loss Event object types, do these steps to update the openpages-solutions.xml.

Before you begin

To perform this procedure, you must have the **OpenPages Platform 3** profile associated with your user name.

Procedure

1. Copy the version 7.4 `openpages-solutions.xml` file from the installation media to the application server.

   The `openpages-solutions.xml` file is stored in `/OP_7.4_Non_Embedded \OP_7.4_Configuration/Modules/Upgrade/ORM/triggers/7.4_openpages_solutions`.
2. From the menu bar, click **Administration** > **Manage System Files** > **SysXMLDocument**.
3. Click **TriggerConfigFiles**, and then click **openpages-solutions.xml**.
4. Click **View file** and save the file.
5. From the **Actions** menu, click **Check out this SysXMLDocument**.
6. From the **Actions** menu, click **Edit/Upoad this SysXMLDocument**.
7. Click **Browse** and select the `openpages-solutions.xml` that you copied from the installation media.
8. Add a comment, and then click **Save**.
9. From the **Actions** menu, click **Check in this SysXMLDocument**.
10. Restart all OpenPages servers.

    For more information, see Chapter 11, “Starting and stopping servers,” on page 253.

Update the `openpages-solutions.xml` file: 7.2.x without lifecycle fields

If you upgraded IBM OpenPages GRC Platform from version 7.2.x and you do not use lifecycle fields for the SOXControl, SOXIssue, or Loss Event object types, you can improve performance by adding an object type attribute to your trigger definitions. This step is optional.

About this task

Adding the `ObjectType=''` property to trigger definitions can improve performance. For more information, see the *IBM OpenPages GRC Trigger Developer Guide*

Procedure

1. From the menu bar, click **Administration** > **Manage System Files** > **SysXMLDocument**.
2. Click **TriggerConfigFiles**, and then click **openpages-solutions.xml**.
3. Click **View file** and save the file.
4. From the **Actions** menu, click **Check out this File**.
5. Edit the `openpages-solutions.xml` file. Add the `objecttype` property to the trigger definitions.

   For example:

   ```
   <trigger name="Valdt and Cls TSheet Trig Create"
      operation="create.object" type="CUSTOM"
      classname="com.openpages.ext.solutions.triggers.AuditValidateCloseTrigger"
      position="PRE" objecttype="Timesheet">
      <attribute name="content.type" value="Timesheet" />
   ```

   Adding the `objecttype` property to trigger definitions can improve performance.

   For information about triggers, see the *IBM OpenPages GRC Trigger Developer Guide*
6. From the **Actions** menu, click **Edit/Upoad this SysXMLDocument**.
7. Click **Browse** and select the `openpages-solutions.xml` that you modified.
8. Add a comment, and then click **Save**.
9. From the **Actions** menu, click **Check in this SysXMLDocument**.
10. Restart all OpenPages servers.

    For more information, see Chapter 11, “Starting and stopping servers,” on page 253.

Configuring lifecycles for IBM OpenPages Vendor Risk Management objects

If you upgraded from version 7.2.x and use lifecycle triggers, follow these steps to update the trigger definitions to include IBM OpenPages Vendor Risk Management objects.

Before you begin

To do this procedure, you must have the **OpenPages Platform 3** profile associated with your user name.

Procedure

1. From the menu bar, click **Administration** > **Manage System Files** > **SysXMLDocument**.
2. Click **TriggerConfigFiles**, and then click **OPLC-QuestionnaireAssessment.xml**.
3. Click **View file** and save the file.
4. Open the `OPLC-QuestionnaireAssessment.xml` file in a text editor.
5. Look for the `<!-- defaultsettings used when object is being created -->` section. Add the following lines:

```
<assigneefield objecttype="Vendor" field="OPSS-VRM:Vendor Owner"/>
<assigneefield objecttype="Engagement" field="OPSS-VRM-E:Enga Owner"/>
```

6. Update the `3 Stage Lifecycle transitions`.
   a) Go to the `<transition name="3Stage-Info-Submit" nextstage="3Stage-Review">` section and add the following lines.

```
<assigneefield objecttype="Vendor" field="OPSS-VRM:Business Unit Owner"/>
<assigneefield objecttype="Engagement" field="OPSS-VRM-E:Business Unit Owner"/>
```

   b) Go to the `<transition name="3Stage-Review-Reject" nextstage="3Stage-Info">` section and add the following lines.

```
<assigneefield objecttype="Vendor" field="OPSS-VRM:Vendor Owner"/>
<assigneefield objecttype="Engagement" field="OPSS-VRM-E:Enga Owner"/>
```

7. Update the `4 Stage Lifecycle transitions`.
   a) Go to the `<transition name="4Stage-Info-Submit" nextstage="4Stage-Review">` section and add the following lines.

```
<assigneefield objecttype="Vendor" field="OPSS-VRM:Business Unit Owner"/>
<assigneefield objecttype="Engagement" field="OPSS-VRM-E:Business Unit Owner"/>
```

   b) Go to the `<transition name="4Stage-Review-Reject" nextstage="4Stage-Info">` section and add the following lines.

```
<assigneefield objecttype="Vendor" field="OPSS-VRM:Vendor Owner"/>
<assigneefield objecttype="Engagement" field="OPSS-VRM-E:Enga Owner"/>
```

   c) Go to the `<transition name="4Stage-Approval-Reject" nextstage="4Stage-Review">` section and add the following lines.

```
<assigneefield objecttype="Vendor" field="OPSS-VRM:Business Unit Owner"/>
<assigneefield objecttype="Engagement" field="OPSS-VRM-E:Business Unit Owner"/>
```

8. Check out the `OPLC-QuestionnaireAssessment.xml` file.
9. Upload and check in the `OPLC-QuestionnaireAssessment.xml` file that you edited.
10. Restart all OpenPages servers.

    For more information, see Chapter 11, “Starting and stopping servers,” on page 253.

Updating model query subjects for IBM OpenPages Operational Risk Management

If you have customized the IBM OpenPages GRC Platform application URL and you use IBM OpenPages Operational Risk Management, update the model query subjects after you upgrade IBM OpenPages GRC Platform.

Procedure

1. Copy the `static-modelquerysubjects_ORM.xml` file from the installation media to the `<CC_HOME>/framework/conf/mqs` directory in the target environment.

   The `static-modelquerysubjects_ORM.xml` file is located in the `OP_<version>_Non_Embedded/OP_<version>_Configuration/Modules/Upgrade/ORM/` directory.
2. Regenerate the reporting framework.

   See "Regenerating the reporting framework" on page 188.

Updating the RCSA Alignment helper for IBM OpenPages Operational Risk Management

If you use IBM OpenPages Operational Risk Management, update the RCSA Alignment helper. Do this task to enable users to launch the RCSA Alignment helper from Filtered List Views in addition to Detail views.

Procedure

1. Log on to IBM OpenPages GRC Platform as a user with administrative privileges.
2. Select **Administration** > **Profiles** > ***Profile_name*** > **Risk Assessment** > **Filtered List** from the navigation bar.
3. Select **Assessments** > **Risk Assessments**.
4. In the filtered list view, click **RCSA Alignment helper** to open the helper.
5. Add the **RCSA Alignment Helper** field to its filtered list.

Removing the Scenario Analysis triggers

If you upgraded or migrated IBM OpenPages GRC Platform, you might need to remove some Scenario Analysis triggers that you do not need.

About this task

Do this task if the following statements are true.

- You have not installed the Scenario Analysis with Quantitative Data feature for IBM OpenPages Operational Risk Management
- You have installed the approval app, or you have set up a new lifecycle that uses the Loss Event, Control, or Issue object types

If you do not remove the triggers, users might encounter validation errors when they create or update Scenario Analysis objects.

To perform this procedure, you must have the **OpenPages Platform 3** profile associated with your user name.

Procedure

1. From the menu bar, click **Administration** > **Manage System Files** > **SysXMLDocument**.
2. Click **TriggerConfigFiles**, and then click **openpages-solutions.xml**.
3. Click **View file** and save the file.
4. Open the `openpages-solutions.xml` in a text editor.
5. Locate the text `<!-- BEGIN: Scenario Completion Triggers -->`
6. Delete the following lines, and the save the file.

```
<!-- BEGIN: Scenario Completion Triggers -->
<trigger name="Scenario Completion Update" operation="update.object"
  type="CUSTOM"
  classname="com.openpages.ext.solutions.triggers.ScenarioCompletionTrigger"
  position="POST" objecttype="ScenarioAnalysis">
  <attribute name="content.type" value="ScenarioAnalysis" />
  <actions>
    <action type="CUSTOM"
      classname="com.openpages.ext.solutions.triggers.ScenarioCompletionTriggerAction">
    </action>
  </actions>
</trigger>
<trigger name="Scenario Completion Create" operation="create.object"
  type="CUSTOM"
  classname="com.openpages.ext.solutions.triggers.ScenarioCompletionTrigger"
  position="POST" objecttype="ScenarioAnalysis">
  <attribute name="content.type" value="ScenarioAnalysis" />
  <actions>
    <action type="CUSTOM"
      classname="com.openpages.ext.solutions.triggers.ScenarioCompletionTriggerAction">
    </action>
  </actions>
</trigger>
<!-- END: Scenario Completion Triggers -->
```

7. Check out the `openpages-solutions.xml` file.
8. Upload and check in the `openpages-solutions.xml` file that you edited.
9. Restart all OpenPages servers.

Updating Scenario Analysis field dependencies

If you upgraded to IBM OpenPages GRC Platform version 7.4 or later and you loaded the Scenario Analysis fields for IBM OpenPages Operational Risk Management, you need to update the field dependencies.

About this task

If you did not load the Scenario Analysis fields when you upgraded, migrated, or installed a fix pack, do not do these steps. For information about loading the fields, see "Loading the Scenario Analysis fields" on page 242.

Procedure

1. Copy the `ScenAn-field-dependency-op-config.xml` file from the installation media to the administrative application server.

   The file is located in the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Modules/Upgrade/ORM/loader-data` directory.

   If the file already exists, overwrite it.
2. Open a command line.

   If you are using Microsoft Windows, open a command prompt with the **Run as Administrator** option.
3. Go to the *<OP_HOME>*`/bin` directory.
4. Run the following command to load the files.

Replace *<loader-file-path>* with the location of the ScenAn-field-dependency-op-config.xml file.

```
ObjectManager.cmd|sh l c <OpenPages Administrator user>
   <OpenPages Administrator password> <loader-file-path>
   ScenAn-field-dependency
```

5. If you encounter any errors, review the log file, *<OP_HOME>*/bin/logs/ObjectManager.log.
6. Restart all OpenPages servers.

   For more information, see "Starting application servers" on page 253.
7. Regenerate the reporting framework.

   For more information, see "Regenerating the reporting framework" on page 188.

   Note: Do this task after completing all other post-upgrade or post-migration tasks.

Update trigger definitions

Do this procedure if you are upgrading from 7.3.0.0 or if you are upgrading from 7.3.0.1 or later and you have not already updated the trigger definitions.

Updating trigger definitions when you have custom triggers

If you created custom triggers, follow these steps to update the trigger definitions. To perform this procedure, you must have the **OpenPages Platform 3** profile associated with your user name.

About this task

If you are upgrading from 7.3.0.1 or later and you have already updated the trigger definitions, you do not need to do this procedure.

Procedure

1. From the menu bar, click **Administration** > **Manage System Files** > **SysXMLDocument**.
2. Click **TriggerConfigFiles**, and then click **openpages-solutions.xml**.
3. Click **View file** and save the file.
4. Open the openpages-solutions.xml file in a text editor.
5. Look for the update.fields.status.2 attribute with the following value:

```
"OPSS-KRI-Shared.Collection Status=Awaiting Collection,OPSS-KRIVal.Value,
   OPSS-KRIVal.Value Date,OPSS-KRIVal.Approve Reject"
```

6. Replace the attribute value with the following:

```
"OPSS-KRI-Shared.Collection Status=Awaiting Collection,
   OPSS-KRIVal.Value,OPSS-KRIVal.Value Date,OPSS-KRIVal.Approve Reject,
   OPSS-KRI.Value,OPSS-KRI.Value Date,OPSS-KRI.Indicator Trend=Not Determined,
   OPSS-KRI-Shared.Breach Status=Not Determined"
```

7. Look for the update.fields.status.2 attribute with the following value:

```
"OPSS-KPI-Shared.Collection Status=Awaiting Collection,OPSS-KPIVal.Value,
   OPSS-KPIVal.Value Date,OPSS-KPIVal.Approve Reject"
```

8. Replace the attribute value with the following:

```
"OPSS-KPI-Shared.Collection Status=Awaiting Collection,
   OPSS-KPIVal.Value,OPSS-KPIVal.Value Date,OPSS-KPIVal.Approve Reject,
   OPSS-KPI.Value,OPSS-KPI.Value Date,OPSS-KPI.Indicator Trend=Not Determined,
   OPSS-KPI-Shared.Breach Status=Not Determined"
```

9. Check out the openpages-solutions.xml file.
10. Upload and check in the openpages-solutions.xml file that you edited.

11. Restart all OpenPages servers.
    For more information, see Chapter 11, "Starting and stopping servers," on page 253.

Updating trigger definitions when you do not have custom triggers

If you do not have custom triggers, follow these steps to update the trigger definitions. To do this procedure, you must have the **OpenPages Platform 3** profile associated with your user name.

About this task

If you are upgrading from 7.3.0.1 or later and you have already updated the trigger definitions, you do not need to do this procedure.

Procedure

1. Copy the `openpages-solutions.xml` file from the installation media to the application server.
   The `openpages-solutions.xml` file is stored in `OP_7.4_Non_Embedded/OP_7.4_Configuration/Modules/Upgrade/ORM/triggers/7.4_openpages_solutions`.
2. From the menu bar, click **Administration** > **Manage System Files** > **SysXMLDocument**.
3. Click **TriggerConfigFiles**, and then click **openpages-solutions.xml**.
4. From the **Actions** menu, click **Check out this SysXMLDocument**.
5. From the **Actions** menu, click **Edit/Upoad this SysXMLDocument**.
6. Click **Browse** select the `openpages-solutions.xml` file that is in the fix pack installation media
7. Add a comment, and then click **Save**.
8. From the **Actions** menu, click **Check in this SysXMLDocument**.
9. Restart all OpenPages servers.
   For more information, see Chapter 11, "Starting and stopping servers," on page 253.

Configuring email notifications for questionnaire assessment triggers

If you upgraded from version 7.2.x or 7.3.x, follow these steps to update the trigger definitions to send email notifications when a questionnaire assessment is launched.

Before you begin

To do this procedure, you must have the **OpenPages Platform 3** profile associated with your user name.

About this task

The behavior of email notifications for questionnaire assessments has changed.

In IBM OpenPages GRC Platform 7.2.x and 7.3.x, email notifications were sent when a questionnaire assessment was launched, regardless of the value of the `sendemail` attribute.

If you want emails to be sent when a questionnaire assessment is launched, update the `OPLC-QuestionnaireAssessment.xml` file. Set the `sendemail` attribute in the default settings section to `true`.

Procedure

1. Click **Administration** > **Manage System Files** > **SysXMLDocument**.
2. Click **TriggerConfigFiles**, and then click **OPLC-QuestionnaireAssessment.xml**.
3. Click **View file** and save the file.
4. Open the `OPLC-QuestionnaireAssessment.xml` file in a text editor.
5. Look for the `<!-- defaultsettings used when object is being created -->` section.

6. Look for the following line:

```
<attribute name="sendemail" value="false"/>
```

7. Change the value to `true`.
8. Check out the `OPLC-QuestionnaireAssessment.xml` file.
9. Upload and check in the `OPLC-QuestionnaireAssessment.xml` file that you edited.
10. Restart all OpenPages servers.

    For more information, see Chapter 11, “Starting and stopping servers,” on page 253.

Importing the solutions report packages

After you upgrade IBM OpenPages GRC Platform, import the solutions reports to update them.

For more information about importing content, see the *Cognos Analytics Administration and Security Guide*.

Procedure

1. Back up the following file if it exists: *<COGNOS_HOME>*`/deployment/OpenPages_Solutions_V6.zip`.
2. Get the latest version of the solutions report package.
   a) Locate the solutions package file for the database that you are using. The file is located in the following directory:
      - IBM DB2: `OP_`*<version>*`_Non_Embedded/OP_`*<version>*`_Configuration/Modules/Upgrade/ORM/DB2/OpenPages_Solutions_V6.zip`
      - Oracle: `OP_`*<version>*`_Non_Embedded/OP_`*<version>*`_Configuration/Modules/Upgrade/ORM/Oracle/OpenPages_Solutions_V6.zip`

   b) Copy the `OpenPages_Solutions_V6.zip` file to the following directory on the Cognos server: *<COGNOS_HOME>*`/deployment`. Overwrite the existing file.
3. From a browser, log on to the Cognos Analytics portal.

   By default, the URL is `http://<hostname>/ibmcognos/bi`

   Where `<hostname>` is the name of the Cognos server.
4. Click **Manage** > **Administration Console** to launch the **IBM Cognos Administration** page.
5. Click the **Configuration** tab and click **Content Administration**.

   Tip: To access this area in IBM Cognos Administration, you must have the required permissions for the **Administration** secured feature.
6. On the toolbar, click **New Import**.
7. From the **Deployment archive** list, select **OpenPages_Solutions_v6**.
8. Click **Next**.
9. Type a unique name, an optional description, and a screen tip for the deployment archive, select the folder where you want to save it, and then click **Next**.
10. In the **Public folders content** box, select **OpenPages_Solutions_v6**, and then click **Next**.
11. On the **Specify the general options** page, accept the default options and click **Next**.
12. On the **Review the summary** page, review the settings and click **Next**.
13. On the **Select an action page**, click **Finish**.
14. On the **Run with options** page, click **Run** and then, on the **IBM Cognos software** page, click **OK**.
15. To view the imported packages and reports, click the **Home** icon, and select the folder where you imported them.

Results

You can now open the OpenPages reports in Cognos Analytics.

Chapter 11. Starting and stopping servers

You can start and stop the IBM OpenPages GRC Platform application servers, the database server, the Cognos server, and the search server.

Starting application servers

You can start IBM OpenPages GRC Platform in Windows, AIX, and Linux environments.

In a Windows environment, the services that are required to start the OpenPages GRC Platform application servers can be configured to start automatically.

In an AIX and Linux environment, you manually run scripts to start the OpenPages GRC Platform application servers.

Important:

- Start the deployment manager first:
  - On Windows: start the IBMWAS<*version*>Service - <*OpenPagesdmgr-name*> service
  - On Linux or AIX: run the `startManager` script

  Then run the other services and scripts as described in the following procedures.
- If you are running OpenPages in a load-balanced environment, you must start the server on the cluster administrator first before starting a cluster member.

Microsoft Windows services

For the IBM OpenPages GRC Platform application to run, all of the required Microsoft Windows services must be started and the services of supporting applications must be running.

Note: This information applies only to Windows environments.

Table 53: Service descriptions

Service Name	Description
IBMWAS<*version*>Service - <*OpenPages-dmgr-name*>	Starts or stops the OpenPages deployment manager service. **Note:** In a horizontal-cluster or shared-cell environment, cluster members might not have an <*OpenPages-dmgr-name*> service.
IBMWAS<*version*>Service - <*OpenPages-node-name*>	Starts or stops an OpenPages node service.
IBMWAS<*version*>Service - <*OpenPages-node-server-name*>Server<*#*>	Starts or stops an OpenPages application server cluster member. In a clustered environment, the number for each cluster member increments by 1.

Microsoft Windows commands

In a Microsoft Windows environment, IBM OpenPages GRC Platform includes a number of commands to initiate and launch the application environment.

The application runs only if all of the services are started and all of the services for all supporting applications are running.

Note: These commands can be run individually or you can use wrapper commands to start and stop OpenPages GRC Platform.

The following table lists the commands required to start and stop the application.

Table 54: OpenPages GRC Platform commands on Windows

Script Name	Description
startManager.bat	Starts the OpenPages Deployment Manager.
startNode.bat	Starts the OpenPages node agent.
startServer.bat	Starts the OpenPages application server.
stopManager.bat	Stops the OpenPages Deployment Manager.
stopNode.bat	Stops the OpenPages node agent.
stopServer.bat	Stops the OpenPages application server.
startAllServers.bat	Starts all OpenPages services in the correct sequence.
stopAllServers.bat	Stops all OpenPages services in the correct sequence.

AIX and Linux scripts

In the AIX and Linux environments, IBM OpenPages GRC Platform includes a number of scripts to initiate and launch the application environment.

The application runs only if all of the services are started and all of the services for all supporting applications are running.

Note: These scripts can be run individually or you can use wrapper scripts to start and stop OpenPages GRC Platform.

The following table lists the scripts required to start and stop the application.

Table 55: OpenPages GRC Platform scripts on AIX and Linux

Script Name	Description
startManager.sh	Starts the OpenPages Deployment Manager.
startNode.sh	Starts the OpenPages node agent.
startServer.sh	Starts the OpenPages application server.
stopManager.sh	Stops the OpenPages Deployment Manager.
stopNode.sh	Stops the OpenPages node agent.
stopServer.sh	Stops the OpenPages application server.
startAllServers.sh	Starts all OpenPages services in the correct sequence.
stopAllServers.sh	Stops all OpenPages services in the correct sequence.

Determining application readiness

This procedure lets you determine whether the application is ready to be accessed after starting up servers.

Procedure

1. Open the log file specified in the following table.

Table 56: Log files and their locations		
If this...	**Navigate to this folder...**	**View this log file...**
Windows, AIX, and Linux	*<OP_HOME>*|profiles|*<OpenPages-node-name>*|logs|*<OpenPages-node-server-name>*Server*<#>*	startServer.log

   Where

   <OP_HOME> represents the installation location of the OpenPages GRC Platform application.

   <OpenPages-node-name> is the name of the node in which the servers run.

   *<OpenPages-node-server-name>*Server *<#>* is the name of the current server within the *<OpenPages-node-name>* node that the current server is in, and *<#>* is the number of the server within that node.
2. Scroll to the end of the log file and search for a message stating that the server is "open for e-business; process id is *<process-id>*". If this line appears, the server is running in production mode and the application is ready to be accessed.

Automatically starting application servers in Windows

By default, all IBM OpenPages GRC Platform services are configured as `Manual` (they do not start upon reboot).

You can configure all OpenPages GRC Platform services to `Automatic` through Windows Services to start upon booting, or use scripts on each server to start the services upon reboot.

When you reboot the server, all OpenPages GRC Platform services start.

Starting all application services in Windows using a script

The `StartAllServers.cmd` script included with IBM OpenPages GRC Platform starts all OpenPages services in the proper sequence.

Note: This information applies only to Microsoft Windows environments.

Procedure

1. Log on to the OpenPages GRC Platform application server as a user with administrative privileges.
2. Open a Command Prompt window (using the **Run as Administrator** option) and do the following:
   a) Navigate to the *<OP_HOME>*`\bin` directory.

      Where *<OP_HOME>* is the installation location of the OpenPages GRC Platform application. By default, this is: `c:\OpenPages`.

   b) Run the following command to start the OpenPages GRC Platform services:

      ```
      StartAllServers.cmd
      ```

      When all services have been started, the Command Prompt window closes.

Starting application services individually using Windows services

In the Windows environment, you start the IBM OpenPages GRC Platform application by starting the required OpenPages services.

Note: This information applies only to Windows environments.

Procedure

1. Log on to the OpenPages GRC Platform application server as a user with administrative privileges.
2. Click the Windows **Start** menu and select **All Programs**.
3. From the **Administrative Tools** list, click **Services**.
4. Start the IBMWAS*<version>*Service - *<OpenPages-dmgr-name>* service, if present.
5. Start the IBMWAS*<version>*Service - *<OpenPages-node-name>* service.
6. Start the IBMWAS*<version>*Service - *<OpenPages-node-server-name>*Server*<#>* services, where *<#>* represents the number of the cluster member.

   Note: If there is more than one cluster member on the current system, you must start the service (*<OpenPages-node-server-name>*Server*<#>*) for each cluster member in sequence.

   When the services are starting, Windows Services may indicate that the services have started, but background OpenPages processes may still be running. It might take a few minutes for the OpenPages services to be operational.

Starting all application servers in AIX and Linux using a script

The `startAllServers.sh` script included with IBM OpenPages GRC Platform will start all OpenPages services in the proper sequence.

Note: This information applies only to AIX and Linux environments.

Procedure

1. Log on to the OpenPages GRC Platform application server as a user with administrative privileges.
2. Open an AIX or Linux shell window.
3. Go to the *<OP_HOME>*`/bin` directory.
4. Run the following script to start OpenPages GRC Platform services:

```
./startAllServers.sh
```

Starting application servers in AIX and Linux individually using scripts

Use the following steps to start the IBM OpenPages GRC Platform services manually. In the AIX and Linux environments, you run a set of scripts to start the OpenPages application.

Note: This information applies only to AIX and Linux environments.

Procedure

1. Log on to the OpenPages GRC Platform application server as a user with administrative privileges.
2. Use an AIX or Linux shell to navigate to the *<DMGR profile directory>*`/`*<OpenPages-dmgr-name>*`/bin directory`, where *<DMGR profile directory>* is the same directory as the one provided on the installer's Deployment Manager card.

3. Enter the following command to launch a script that starts the OpenPages GRC Platform Deployment Manager:

```
./startManager.sh
```

4. After the script completes successfully, navigate to <*DMGR profile directory*>/<*OpenPages-dmgr-name*>/bin, where <*DMGR profile directory*> is the same directory as the one provided on the installer's Deployment Manager card.
5. Enter the following commands, in the order specified, to launch scripts that start the OpenPages Node Agent and the OpenPages application server:

```
./startNode.sh
./startServer.sh <OpenPages-node-server-name>Server<#>
```

Where <OpenPages-node-server-name> is the name of the current server within the <OpenPages-node-name> node that the current server is in, and <#> is the number of the server within that node. For example, OpenPagesNodeServerServer1.

Note: If there is more than one managed server on the current system, you must run the start script (./startServer.sh <*OpenPages-node-server-name*>Server<#>) for each managed server in sequence, starting with server number 1, then server number 2, and so on.

Start or stop the global search services

You can start and stop the global search services by using operating system services or by using scripts.

Note: Do not combine the two methods. If you start global search as a Microsoft Windows service, for example, stop global search by stopping the Windows service.

Starting the global search services by using a script

You can start the global search services by running a script from a command line.

Before you begin

On the Windows operating system, disable the Microsoft Windows service that is called **IBM OpenPages GRC - Global Search service**, if it is enabled. Otherwise, the StartSearchServer.cmd script interferes with the Windows services.

Make sure that the database server is reachable and is running. Otherwise, the search services will not connect and will not start.

Procedure

1. Start the search services:
   - For Windows, at a command prompt enter the following commands:

     ```
     cd <SEARCH_HOME>\opsearchtools\
     StartSearchServer.cmd
     ```

   - For UNIX, at a command line, enter the following commands:

     ```
     cd <SEARCH_HOME>/opsearchtools/
     ./StartSearchServer.sh
     ```

2. Open a browser and point to your search server at ports 8983 and 8985. Make sure that the Solr search platform can be reached.
   For example, http://<*search-server*>:8983/ and http://<*search-server*>:8985/.

   If the verification fails, repeat the preceding step.
3. Log on to IBM OpenPages GRC Platform as an administrator.
4. Click **Administration** > **Global Search** > **Enable**.

Stopping the global search services by using a script

You can stop the global search services by running a script from a command line.

Before you begin

On the Windows operating system, disable the Microsoft Windows service called **IBM OpenPages GRC - Global Search service**, if it is enabled. Otherwise, the `StopSearchServer.cmd` script interferes with the Windows services.

Procedure

1. Log on to IBM OpenPages GRC Platform as an administrator.
2. Click **Administration** > **Global Search** > **Disable**.
3. Stop the search services:
   - For Windows, at a command prompt, enter the following commands:

     ```
     cd <SEARCH_HOME>\opsearchtools\
     StopSearchServer.cmd
     ```

   - For UNIX, at a command line, enter the following commands:

     ```
     cd <SEARCH_HOME>/opsearchtools/
     ./StopSearchServer.sh
     ```

4. For either Windows or UNIX, verify that global search is fully stopped.
   a) In the directory *<SEARCH_HOME>*`/opsearchtools/`, examine the files `opsearchtool_openpages.state` and `opsearchtool_folderacl.state` and verify that the PID value is `-1`.
   b) Open a browser and point to your search server at ports 8983 and 8985. Make sure that the Solr search platform cannot be reached.
   For example, `http://`*<search-server>*`:8983/` and `http://`*<search-server>*`:8985/`.

   If the stop verification fails, repeat the preceding step and then follow the steps in “ Forcing a reset of global search” on page 346.

Starting the global search services on Windows

You can start global search as a Microsoft Windows service. The service is called **IBM OpenPages GRC - Global Search**.

About this task

By default, the service is set to start manually, but you can change the service to start automatically.

Note: Make sure that the database server is reachable and is up and running. Otherwise, the search services will not connect and will not start.

Procedure

1. Log on to the search server as a user with administrative privileges.
2. Open the **Services** snap-in (`services.msc`).
3. Locate the service that is called **IBM OpenPages GRC - Global Search**.
4. Click **Start**.
5. If you want the service to start automatically when Windows starts, change the **Startup Type** to **Automatic**.
6. Open a browser and point to your search server at ports 8983 and 8985. Make sure that the Solr search platform can be reached.
   For example, `http://`*<search-server>*`:8983/` and `http://`*<search-server>*`:8985/`.

If the verification fails, repeat the preceding step.

7. Log on to IBM OpenPages GRC Platform as an administrator.
8. Click **Administration** > **Global Search** > **Enable**.

Starting the global search services on Linux or AIX

You can start global search as a service.

About this task

Use the steps in this topic as a guide. Depending on your environment and organization policies, you might decide to use a different method to set up the search service. If you want to use a different method, open the `openpages-search` file and check the commands, and the order of the commands. Modify the commands to meet the needs of your environment.

Note: Make sure that the database server is reachable and is up and running. Otherwise, the search services will not connect and will not start.

Procedure

1. Log on to the search server.
2. Open a shell as the root user.
3. Copy the *<SEARCH_HOME>*`/opsearchtools/openpages-search` file to the `/etc/init.d/` directory.
4. Copy the *<SEARCH_HOME>*`/opsearchtools/openpages-searchcfg` file to the `/etc/sysconfig/` directory.
5. Set the execution permission on the `openpages-search` file by running the following command: `chmod +x /etc/init.d/openpages-search`
6. If you want the service to start automatically when the system restarts, run the following commands:

```
chkconfig --add openpages-search
chkconfig openpages-search on
service openpages-search start
```

7. Start the global search services by running the following command: `service openpages-search start`
8. Open a browser and point to your search server at ports 8983 and 8985. Make sure that the Solr search platform can be reached.
   For example, `http://`*<search-server>*`:8983/` and `http://`*<search-server>*`:8985/`.

   If the verification fails, repeat the preceding step.
9. Log on to IBM OpenPages GRC Platform as an administrator.
10. Click **Administration** > **Global Search** > **Enable**.

Stopping the global search services

If global search is running as a service, you can use the operating system to stop the global search services.

About this task

If you used the `StartSearchServer.sh|.cmd` script to start the global search services, use the `StopSearchServer.sh|.cmd` script to stop the services. For more information, see "Stopping the global search services by using a script" on page 258.

Procedure

1. Log on to IBM OpenPages GRC Platform as an administrator.
2. Click **Administration** > **Global Search** > **Disable**.

3. Log on to the search server as a user with administrative privileges.
4. Stop the search services.

   On Windows:

   a. Open the **Services** snap-in (`services.msc`)

   b. Locate the service that is called **IBM OpenPages GRC - Global Search**.

   c. Click **Stop**.

   On Linux or AIX, run the following command:

   ```
   service openpages-search stop
   ```

5. Verify that global search is fully stopped.

   a) In the directory *<SEARCH_HOME>*`/opsearchtools/`, examine the files `opsearchtool_openpages.state` and `opsearchtool_folderacl.state` and verify that the PID value is `-1`.

   b) Open a browser and point to your search server at ports 8983 and 8985. Make sure that the Solr search platform cannot be reached.
   For example, `http://`*<search-server>*`:8983/` and `http://`*<search-server>*`:8985/`.

   If the stop verification fails, repeat the preceding step and then follow the steps in “ Forcing a reset of global search” on page 346.

Stopping application servers

You can stop the IBM OpenPages GRC Platform application server in the Windows, AIX and Linux environments as required.

IBM WebSphere Application Server global security is enabled by default on the application servers. When stopping an application server, you must provide the WebSphere administrative user name and password as arguments to all stop scripts on all operating systems.

Stopping the application server prevents IBM OpenPages GRC Platform from being accessed.

Important: If you are running OpenPages GRC Platform in a load-balanced environment, stop the server on each cluster member first before stopping the cluster administrator.

Stopping application servers in a Windows environment

In a Windows environment, all IBM OpenPages GRC Platform services can be configured to stop automatically or you can stop the services manually, using one of the following three methods.

Stopping the application server prevents IBM OpenPages GRC Platform from being accessed.

Important: If you are running OpenPages GRC Platform in a load-balanced environment, stop the server on each cluster member first before stopping the cluster administrator.

Automatically stopping application servers in Windows

Windows automatically and gracefully stops the IBM OpenPages GRC Platform application when a server shuts down.

Note: This information applies only to Windows environments.

Stopping the application server prevents the OpenPages application from being accessed.

Important: If you are running OpenPages GRC Platform in a load-balanced environment, you must stop the server on each cluster member first before stopping the cluster administrator.

Stopping all application services in Windows using a script

The `StopAllServers.cmd` script included with IBM OpenPages GRC Platform will stop all OpenPages services in the proper sequence.

Stopping the application server prevents the OpenPages application from being accessed.

Important: If you are running OpenPages in a load-balanced environment, you must stop the server on each cluster member first before stopping the cluster administrator.

Procedure

1. Log on to the OpenPages GRC Platform application server as a user with administrative privileges.
2. Launch a Command Prompt window (using the **Run as Administrator** option).
3. Navigate to the *<OP_HOME>*`\bin` directory.
4. Enter the following command to launch a script that stops the OpenPages services:

```
StopAllServers.cmd <username> <password>
```

   Where <username> and <password> are the administrative user name and password for IBM WebSphere Application Server.

   When all services have been stopped, the Command Prompt window closes.

Stopping application services individually using Windows services

You can stop the IBM OpenPages GRC Platform application without shutting down or rebooting the computer.

Stopping the application server prevents the application from being accessed.

Important: If you are running OpenPages in a load-balanced environment, you must stop the server on each cluster member first before stopping the cluster administrator.

Use the following steps to stop OpenPages services manually.

Important: Stopping the OpenPages GRC Platform Admin service before you stop each cluster member causes the OpenPages application to stop on all servers. This could result in the loss of data and other problems.

In the Windows environment, you stop the OpenPages GRC Platform application by stopping the required OpenPages services.

Procedure

1. Log on to the OpenPages GRC Platform application server as a user with administrative privileges.
2. Click the Windows **Start** menu and select **All Programs**.
3. From the **Administrative Tools** list, select **Services**.
4. Stop the IBMWAS*<version>*Service - *<OpenPages-node-server-name>*Server*<#>* services.
5. Stop the IBMWAS*<version>*Service - *<OpenPages-node-name>* service.
6. Stop the IBMWAS*<version>*Service - *<OpenPages-dmgr-name>* service, if present.

Results

When the services are stopped successfully, the OpenPages application is properly shut down.

Stopping all application servers in AIX and Linux using a script

The `stopAllServers.sh` script included with IBM OpenPages GRC Platform stops all OpenPages services in the proper sequence.

Stopping the application server prevents the application from being accessed.

Important: If you are running OpenPages GRC Platform in a load-balanced environment, you must stop the server on each cluster member first before stopping the cluster administrator.

Procedure

1. Log on to the OpenPages GRC Platform application server as a user with administrative privileges.
2. Use an AIX or Linux shell to navigate to the *<DMGR profile directory>*/*<OpenPages-dmgr-name>*/bin directory, where *<DMGR profile directory>* is the same directory as the one provided on the installer's Deployment Manager card.
3. Enter the following command to launch a script that stops OpenPages GRC Platform services:

```
./stopAllServers.sh <username> <password>
```

   Where *<username>* and *<password>* are the administrative user name and password for the IBM WebSphere Application Server.

Stopping application servers in AIX and Linux individually using scripts

In the AIX and Linux environments, you run a set of scripts to stop the IBM OpenPages GRC Platform application.

Stopping the application server prevents the application from being accessed.

Important: If you are running OpenPages in a load-balanced environment, you must stop the server on each cluster member first before stopping the cluster administrator.

Procedure

1. Log on to the OpenPages GRC Platform application server as a user with administrative privileges.
2. Go to the *<OP_HOME>*/profiles/<OpenPages-node-name>/bin directory.
3. Enter the following commands, in the order specified, to launch a script that stops the OpenPages application server and the OpenPages Node Agent.

```
./stopServer.sh -username <username> -password <password>
<OpenPages-node-server-name>Server<#>

./stopNode.sh -username <username> -password <password>
```

   Where <OpenPages-node-server-name> is the name of the current server within the <OpenPages-node-name> node that the current server is in, and <#> is the number of the server within that node. For example, OpenPagesNodeServerServer1.

   Where <username> and <password> are the administrative user name and password for IBM WebSphere Application Server.

   If there is more than one managed server on the current system, you must run the stop server script (./stopServer.sh *<OpenPages-node-server-name>*Server*<#>*) for each managed server before running the stop node agent script (./stopNode.sh). The managed servers can be stopped in any order.
4. After the scripts complete successfully, go to the *<DMGR profile directory>*/*<OpenPages-dmgr-name>*/bin directory where *<DMGR profile directory>* is the same directory as the one provided on the installer's Deployment Manager card.
5. Enter the following command to launch a script that stops the OpenPages GRC Platform Deployment Manager:

```
./stopManager.sh -username <username> -password <password>
```

   Where <username> and <password> are the administrative user name and password for the IBM WebSphere Application Server.

When the script completes successfully, the OpenPages application is properly shut down.

Starting and stopping the Oracle database server in a Windows environment

You can start or stop database services using Windows services that are associated with the IBM OpenPages GRC Platform Oracle database instance.

Note: This information applies only to Windows environments.

Table 57: OpenPages GRC Platform Oracle services on Windows

Service Name	Description
OracleOraDB12Home1TNSListener	Runs the Oracle Database listener service that connects the user to the Oracle database instance.
OracleService<SID>	Used to start and stop the Oracle database instance. Where <SID> represents the database instance identifier, for example OP.
OracleVssWriter<SID>	Where <SID> represents the database instance identifier, for example OP.

Use the following steps to start or stop database services using Windows Services.

Procedure

1. Log on to the database server as a user with administrative privileges.
2. Click the Windows **Start** menu and select **All Programs**.
3. From the **Administrative Tools** list, select **Services**.
4. For each database service listed in the previous table, do the following:
   - To start the server, right-click the service name and select **Start**.
   - To stop the server, right-click the service name and select **Stop**.

Starting and stopping the Oracle database server in an AIX and Linux environment

Use the following steps to start or stop the Oracle database server.

Procedure

1. Log on to the database server as a user with administrative privileges.
2. In a shell window, navigate to the following directory:

   ```
   <ORACLE_HOME>/bin
   ```

   For example: `/opt/oracle/app/product/12.1/dbhome_1/bin`.
3. To start Oracle, do the following steps.
   a) Log in to SQL*Plus.

   ```
   sqlplus / as sysdba
   ```

b) Run the following command to start Oracle.

```
startup
```

4. To stop Oracle, do the following steps.
   a) Log in to SQL*Plus.

```
sqlplus / as sysdba
```

   b) Run the following command to start Oracle.

```
stop immediate
```

Starting and stopping the Cognos services

There are different procedures to start or stop the Cognos services in the Windows, AIX and Linux environments. The services are the `IBM Cognos` service and the `OpenPages Framework Model Generator` service

These procedures are:

- “Using the IBM Cognos configuration tool to start and stop the IBM Cognos service” on page 264
- “Using the Windows operating system to start and stop the IBM Cognos service” on page 265
- “Using the AIX or Linux operating system to start and stop IBM Cognos service” on page 265
- “Starting and stopping the OpenPages GRC Platform Framework Model Generator service on Windows” on page 265
- “ Starting and stopping the OpenPages GRC Platform Framework Model Generator service on AIX or Linux” on page 265

Using the IBM Cognos configuration tool to start and stop the IBM Cognos service

You can use the IBM Cognos Configuration tool to start or stop the `IBM Cognos` service.

Note: The IBM Cognos Configuration tool displays the status of the start-up, which can be helpful with troubleshooting, if necessary.

Procedure

1. Log on to the reporting server as a user with administrative privileges.
2. Start the IBM Cognos Configuration tool as follows:
   a) Open a Command Prompt window (using the **Run as Administrator** option), or AIX or Linux shell, and navigate to the *<COGNOS_HOME>*`/bin64` directory.

      <COGNOS_HOME> represents the installation location of the Cognos application. By default, this is:

      Windows
      `cogconfig.bat`

      AIX and Linux
      `./cogconfig.sh`

   b) Execute one of the following commands to open the tool:
3. Do one of the following:
   - To start the server, click **Actions** | **Start.** (It may take several minutes for the service to start the first time.) If the **Start** option is not available, the service has already started.
   - To stop the service, click **Actions** | **Stop**.

Using the Windows operating system to start and stop the IBM Cognos service

Use the following steps to start or stop the IBM Cognos service in a Windows environment using Windows Services.

Procedure

1. Log on to the reporting server as a user with administrative privileges.
2. Click the Windows **Start** menu and select **All Programs**.
3. From the **Administrative Tools** list, select **Services**.
4. Do one of the following:
   - To start the server, right-click the IBM Cognos service and select **Start**.
   - To stop the server, right-click the IBM Cognos service and select **Stop**.

Using the AIX or Linux operating system to start and stop IBM Cognos service

Use the following steps to start or stop the IBM Cognos service in an AIX or Linux environment using command-line scripts.

Procedure

1. Log on to the reporting server as a non-root user with administrative privileges.
2. Launch an AIX or Linux shell and navigate to the bin directory as follows:
   <COGNOS_HOME>/bin64

   Where
   <COGNOS_HOME> is the installation location of the Cognos application.
3. Do one of the following:
   - To start the service, enter the following command: `./cogconfig.sh -s`
   - To stop the service, enter the following command: `./cogconfig.sh -stop`

Starting and stopping the OpenPages GRC Platform Framework Model Generator service on Windows

Use the following steps to start or stop the IBM OpenPages GRC Platform Framework Model Generator service in a Microsoft Windows environment.

Procedure

1. Log on to the reporting server as a user with administrative privileges.
2. Click the Windows **Start** menu and select **All Programs**.
3. From the **Administrative Tools** list, select **Services**.
4. Do one of the following:
   - To start the server, right-click the IBMOpenPagesFrameworkModelGenerator service and select **Start**.
   - To stop the server, right-click the IBMOpenPagesFrameworkModelGenerator service and select **Stop**.

Starting and stopping the OpenPages GRC Platform Framework Model Generator service on AIX or Linux

Use the following steps to start or stop the IBMOpenPagesFrameworkModelGenerator service in an AIX or Linux environment.

Procedure

1. Log on to the reporting server as a non-root user with administrative privileges.

2. Open an AIX or Linux shell as a user with administrative privileges and navigate to the following directory:

   ```
   <CommandCenter_Home>/wlp/bin
   ```

   Where *<CommandCenter_Home>* is the installation location ofIBM OpenPages CommandCenter. By default, this is: `/opt/OpenPages/CommandCenter`.
3. To start the service, run the following command.

   ```
   server start IBMOpenPagesFrameworkModelGenerator
   ```
4. To stop the service, run the following command.

   ```
   server stop IBMOpenPagesFrameworkModelGenerator
   ```

Chapter 12. Single sign-on integration for the OpenPages GRC Platform application server and the reporting server

IBM OpenPages GRC Platform can integrate into a number of single sign-on solutions, such as IBM Tivoli Federated Identity Manager (TFIM), CA SiteMinder, and Microsoft Active Directory Federation Services (ADFS). You can also configure the reporting server for single sign-on.

To integrate single sign-on, configure the settings in the OpenPages GRC Platform application interface.

You can use one of the following options to configure single sign-on:

- Header-based single sign-on

  For more information, see “Configuring header-based single sign-on” on page 267.
- SAML V2.0 single sign-on

  For more information, see the "Single Sign On (SSO) for OpenPages (on WebSphere) using the Microsoft Active Directory Federation Server (ADFS) " blog in the GRC Power Plant community.
- SPNEGO single sign-on

  For more information, see the "Configuring SPNEGO SSO for IBM OpenPages GRC Platform (on WebSphere) using the Microsoft Active Directory Federation Server (ADFS) " blog in the GRC Power Plant community.

Attention: OpenPages user names are case-sensitive. If you are using single sign-on (SSO) or LDAP authentication, the user name you choose here must match the user name you enter in the SSO or LDAP system.

Configuring header-based single sign-on

To integrate header-based single sign-on for IBM OpenPages GRC Platform applications, complete the following steps.

Procedure

1. Start the OpenPages GRC Platform services.
2. Log on to the OpenPages application interface as a user with administrative privileges.
3. Update the **Show Hidden Settings** setting.
   a) Click **Administration** > **Settings** > **Common** > **Configuration**.
   b) Set the value of **Show Hidden Settings** to `true`:
4. Update the **Class Name**, **Session Attribute**, and **Username Attribute** settings.
   a) Click **Platform** > **Security** > **Single Sign On** > **Implementations** > **Header-based**.
   b) Set the value of **Class Name** to `com.openpages.singlesignon.HTTPHeaderBasedModule`.
   c) Update the value of **Session Attribute** to match the session attribute for your single sign-on system.

      The following examples show values for the Session Attribute parameter.

      - Using SiteMinder 6.0, the value of the Session Attribute parameter is `SMSERVERSESSIONID`
      - Using Tivoli® Access Manager 6.1, the value of the Session Attribute parameter is `iv_creds`
   d) Update the value of **Username Attribute** to match the user name attribute for your single sign-on system.

The following examples show values for the Username Attribute parameter.

- Using SiteMinder 6.0, the value of the Username Attribute is SMUSER
- Using Tivoli Access Manager 6.1, the value of the Username Attribute is `iv_user`

5. Reset the value of **Show Hidden Settings** to `false`.
6. Click **Save**.
7. Update the default file name and redirect to the following path: `/home.do` (rather than `/openpages` or `/openpages/log.on.do`).

What to do next

You must now enable single sign-on and set the password to never expire.

Configuring the single sign-on logout destination

To securely log out of an IBM OpenPages GRC Platform application session where single sign-on is enabled, configure the system to redirect the user.

Logging out of the OpenPages GRC Platform application does not automatically log the user out of a single sign-on system. If you use **Back** in the web browser to reenter the OpenPages application, your session is re-created. The session uses the existing, valid third-party credentials.

Procedure

1. Log on to the OpenPages application interface as a user with administrative privileges.
2. Click **Administration** > **Settings**.
3. Expand **Platform** > **Security**.
4. Click **Logout URL** to open the detail page.
5. In the **Value** box, type a fully qualified URL.
6. Click **Save**.

Enabling single sign-on

After you configure single sign-on, you must enable it and set the password to never expire on the user profile.

Procedure

1. Complete the following steps to enable single sign-on.
   a) Click **Administration** > **Settings**.
   b) Expand **Platform** > **Security** > **Single Sign On**
   c) Click **OP** and set the value to `true`.
   d) Click **Save**.
   e) Click **SOX** and set the value to `true`.
   f) Click **Save**.
2. Set the password to never expire.

   You must complete these steps for each user individually.

   a) Click **Administration** > **Users**.
   b) Type a user name in the **View, Edit, or Delete User** box and select the user that you want to edit.
   c) Click **Reset Password**.
   d) Ensure the **User must change password at next logon** option is not selected.

e) Select the **Password never expires** option.

f) Click **Save**.

Disabling single sign-on for OpenPages GRC Platform

You can disable single sign-on for IBM OpenPages GRC Platform.

Procedure

1. Start the OpenPages GRC Platform services.
2. Log on to the OpenPages application as a user with administrative permissions.
3. Click **Administration** > **Settings**.
4. Disable single sign-on.
   a) Expand **Platform** > **Security** > **Single Sign On**.
   b) Click **OP** to open its detail page.
   c) Set the **Value** to `false`.
   d) Click **Save**.
   e) Click **SOX** to open its detail page.
   f) Set the **Value** to **false**.
   g) Click **Save**.

Configuring single sign-on for a reporting server

If you are using single sign-on (SSO), update the JSP responsible for the single sign-on re-directions by deploying a new file.

Load the JavaServer Pages (JSPs) through the ObjectManager tool by using the `CommandCenter-integration-op-config.xml` file. The file is in the OpenPages installation media.

Procedure

1. Log on to a computer that has SQL*Plus and access to the database server.

   Note: For AIX installations, log on as the `opuser` or a non-root user who has administrative privileges.
2. Copy the `OP_<version>_Non_Embedded/OP_<version>_Configuration/loader-data/commandcenter` directory to the local system.
3. Go to the *<OP_HOME>*`/bin` directory.
4. Run the following command:

```
ObjectManager load config OpenPagesAdministrator password
   path-to-loader-file CommandCenter-integration
```

Chapter 13. QRadar integration

The IBM QRadar integration project is an optional project that you can install to import offenses from QRadar to IBM OpenPages GRC Platform as incidents.

You must complete the following steps to install and configure the QRadar integration project.

- Ensure IBM QRadar is installed.
- Install IBM Tivoli Directory Integrator 7.1.1 and then install IBM Tivoli Directory Integrator Fix Pack 4 from the OpenPages GRC Platform installation media.
- Configure Tivoli Directory Integrator to connect to QRadar.

  For more information, see “Setting up the QRadar SSL certificate” on page 271.
- Import the assembly line.

  For more information, see “Importing the assembly line for QRadar” on page 272.
- Configure the property files.

  For more information, see “Configuring the QRadar connector properties file” on page 273 and “Configuring the QRadar connector passwords properties file” on page 273.

Setting up the QRadar SSL certificate

You must specify the SSL certificate that allows IBM Tivoli Directory Integrator (TDI) to connect to the QRadar server.

Procedure

1. Obtain the QRadar SSL certificate:
   a) Log in to the QRadar console.
   b) Use the certificate management tool in your browser to export the QRadar certificate to a file on the system where TDI is installed. For example, in Internet Explorer, click **Tools** > **Internet Options**. Click the **Content** tab, and then click **Certificates**.

      Alternatively, enter the following command to retrieve the certificate in Base-64 encoded X509 format from the QRadar server.

      Attention: The command assumes that the `openssl` command is in the path. Replace *<host>* with the fully qualified host name of your QRadar server, and replace *<port>* with the port number being used. If no port number is specified in the URL when logging in to the QRadar console, specify port 80 for HTTP, or port 443 for HTTPS.

      - **Windows** (You might need to press CONTROL-C to end the command):

        ```
        openssl s_client -showcerts -connect host:port | openssl
           x509 -outform PEM > mycertfile.pem
        ```

      - **UNIX**:

        ```
        openssl s_client -showcerts -connect host:port
           </dev/null 2>/dev/null | openssl x509 -outform PEM > mycertfile.pem
        ```

      The Base-64 X509 encoded certificate will be in the `mycertfile.pem` file.
2. From the Tivoli Directory Integrator Configuration Editor, add the certificate to Tivoli Directory Integrator.
   a) Click **Key Manager**, then click the **Open** icon.

b) Select **JKS** from the **Key database type** list.

c) Click **Browse**, and locate the *<TDI_Solutions_user_home>*/Solutions/serverapi/testadmin.jks file, then click **OK**.

d) At the password prompt, type administrator.

e) Select **Signer Certificates** from the **Key database content**.

f) Click **Add** and browse to the location of the certificate that you obtained in step 1.

g) Specify the label for the certificate as administrator, then click the **Save** icon.

h) When you are prompted for the password, type administrator.

i) Close the dialog box.

3. Copy testadmin.jks into the following directories. Some of these directories might not exist, depending on the options that were chosen when Tivoli Directory Integrator was installed.

   If required, back up the existing file in each directory before you copy the updated version.

   <TDI_home>/win32_services/serverapi (Windows platforms only)

   <TDI_home>/serverapi

   <TDI_Solutions_user_home>/serverapi

Importing the assembly line for QRadar

To run the QRadar assembly line, you import the qradar_integration.xml file as a new Tivoli Directory Integrator project.

About this task

An assembly line is commonly referred to as an AL in the Tivoli Directory Integrator documentation.

Procedure

1. Extract the Tivoli Directory Integrator project file.
   a) Open qradar-integration.zip from the following location:

      <OP_HOME>/OpenPages/integrations/ITG

   b) Extract the files to a temporary directory.
2. Import qradar_integration.xml from the extracted files as a new project in IBM Tivoli Directory Integrator.
   a) Click **File** > **Import** > **IBM Tivoli Directory Integrator** > **Configuration**.

   b) Click **Next**.

   c) Select **New Project** in the **Project** list.

   d) In the **Configuration File** field, browse to qradar_integration.xml that you extracted and select it.

   e) Click **Finish**.

   f) In the **New Project** field, type qradar_integration.

      The project is created in your workspace location.

   g) Click **Finish**.
3. Copy the connector.properties and Connector-Passwords.properties files from the files you extracted in step 1 to the Runtime-qradar_integration folder in your Tivoli Directory Integrator workspace location.

   Note: If the Runtime-qradar_integration folder is not visible in the Tivoli Directory Integrator Configuration Editor, right-click the qradar_integration.xml project in the TDI Configuration Editor and click **Refresh**.

Configuring the QRadar connector properties file

You must update the `connector.properties` file with the correct configuration for the connector components.

About this task

The `qradar_integration.zip` located in the *<OP_ROOT>*`/integrations/ITG` directory contains the `qradar_integration.xml` file. This is the project file that is used to import the `qradar_integration` project into Tivoli Directory Integrator.

There are also two text properties files that you can use to configure the connector-related properties in the respective **Resources** > **Properties** components of the `qradar_integration` project. Use the `connector.properties` text properties file to set or update the property values in the `connector` property store. Use the `Connector-Passwords.properties` text properties file to set or update the property values in the `Connector-Passwords` property store.

The non-encrypted connector properties are maintained in the `connector.properties` file. This file is one of the two property files that you manually copy into the `Runtime-qradar_integration` folder after you import the `qradar_integration` project into your Tivoli Directory Integrator deployment. The properties in this file can be used to set or update the values that are stored in the `connector` property store located under the **Resources** > **Properties** project folder.

The `connector.properties` file has three sections: one shared area for email settings; one section specifically for the QRadar API Connector properties; and one section for the OpenPages Connector properties. Mandatory fields are marked as REQUIRED in the text properties files, and are marked with an asterisk (*) when viewed from the TDI Configuration Editor's Connection Editor in the **Connection** tab for the connector component. You can use the example values shown for each property for hints on what to specify for that property.

Procedure

1. From the Tivoli Directory Integrator Configuration Editor, open the `qradar_integration` project.
2. In the Navigator pane, expand **Runtime-qradar_integration**.
3. Right-click the `connector.properties` file and open it using the **Text Editor** option.
4. Set or change the property values.
5. Save the changes and exit the text editor.
6. In the Navigator pane, expand **Resources** > **properties**.
7. Right-click the `connector` object and click **Properties Editor**.
8. Click **Read properties from Server**.
9. Click **Send properties to Server**.
10. Click the **Save** icon to save the changes in Tivoli Directory Integrator `connector` property store. Close the `connector` editor. If you are prompted to save the properties again, click **Yes**.

Configuring the QRadar connector passwords properties file

You must update the `Connector-Passwords.properties` file with the correct OpenPages password and QRadar API token values for the connector components.

About this task

The connector components use two encrypted properties: the op_conn_password property and the qradarToken property. Both properties are maintained in the `Connector-Passwords.properties` file. This file is one of the two properties files that you manually copy into the `Runtime-qradar_integration` folder after you import the `qradar_integration` project into your Tivoli Directory Integrator deployment. You can use the properties in this file to set or update the values that

are maintained in the Connector-Passwords password property store located under the **Resources** > **Properties** project folder.

Procedure

1. Obtain the QRadar API token value:
   a) Log in to the QRadar console.
   b) Click **Admin** > **Authorized Services**.
   c) Copy the **Authentication Token** value from the **REST Service** service name line item for use in step 5.
2. From the Tivoli Directory Integrator Configuration Editor, open the qradar_integration project.
3. In the Navigator pane, expand **Runtime-qradar_integration**.
4. Right-click the Connector-Passwords.properties file and open it using the **Text Editor** option.
5. Set or change the password-related property values.
   a) Enter a clear-text value for the op_conn_password property after the = character.
   b) Enter the value that you obtained from the QRadar server in step 1 after the = character for the qradarToken property.

   Note: Do not remove the {protect}- prefix from any property entry in the file. If you are updating an already-encrypted value, you can either leave the {encr} prefix after the equal sign (=) character, or you can remove it. If the {encr} prefix is removed, it is automatically reinserted after the equal sign (=) character as part of the encryption processing that occurs during step 11.
6. Save the changes and exit the text editor.
7. In the Navigator pane, expand **Resources** > **Properties**.
8. Right-click the Connector-Passwords object and click **Properties Editor**.
9. Click **Read properties from Server**.
10. Click **Send properties to Server**.
11. Click the **Save** icon to save the changes in Tivoli Directory Integrator Connector-Passwords password property store. Close the Connector-Passwords editor. If you are prompted to save the properties again, click **Yes**.

    Note: After this step is complete, the values in the Connector-Passwords property store and the values in the Connector-Passwords.properties text file are automatically encrypted. If needed, the {encr} tag is automatically inserted before the property value of each property in the Connector-Properties.properties text file.

Chapter 14. IBM OpenPages GRC SDI Connector for UCF Common Controls Hub

IBM OpenPages GRC SDI Connector for UCF Common Controls Hub is an optional connector that you can install. Use the connector to import data from the Unified Compliance Framework (UCF) Common Controls Hub into IBM OpenPages GRC Platform.

You must have a UCF Common Controls Hub Basic Subscription with the API Access add-on to use the connector.

Complete the following steps to install and configure the UCF connector.

- Obtain an API token from UCF. To get your token, log in to UCF Common Controls Hub. Click **Settings** > **API Manager** > **API Keys**. Click **Create Credentials**.
- Install IBM Tivoli Directory Integrator 7.1.1 and then install IBM Tivoli Directory Integrator Fix Pack 4 from the OpenPages GRC Platform installation media.

  The server where you install IBM Tivoli Directory Integrator must be able to reach UCF Common Controls Hub and the IBM OpenPages REST API.

  Note: IBM Security Directory Integrator is the latest name for IBM Tivoli Directory Integrator. You might see TDI and SDI used interchangeably in the documentation.
- Install IBM OpenPages GRC SDI Connector for UCF Common Controls Hub. For more information, see “Installing IBM OpenPages GRC SDI Connector for UCF Common Controls Hub” on page 275.
- Import the assembly lines.

  For more information, see “Importing the assembly lines for UCF” on page 276.
- Configure the property files.

  For more information, see “Configuring the connection information” on page 277.
- Configure OpenPages GRC Platform.

  For more information, see “Configuring OpenPages for UCF integration” on page 278.

For information about how to use the UCF connector, see "IBM OpenPages GRC SDI Connector for UCF Common Controls Hub integration" in the *IBM OpenPages GRC Administrator's Guide*.

Installing IBM OpenPages GRC SDI Connector for UCF Common Controls Hub

You must run the IBM OpenPages GRC SDI Connector for UCF Common Controls Hub installation program on the OpenPages admin application server.

Procedure

1. Download the installer package from IBM Passport Advantage.
2. Extract the package files.
3. On the admin application server, run IBM Installation Manager.
4. Add the UCF connector repository to IBM Installation Manager.
   a) Click **File** > **Preferences**.
   b) Click **Repositories** and then click **Add Repository**.
   c) Select the UCF connector installer package.
   d) Click the `repository.config` file.
   e) Click **OK**.

f) Click **OK** to return to the main IBM Installation Manager page.

5. Click **Install**.
6. Select **IBM OpenPages GRC SDI Connector for UCF Common Controls Hub** and **Version 7.4**, and click **Next**.
7. Accept the license agreement and click **Next**.
8. Type the location of your IBM OpenPages GRC Platform installation directory (*OP_HOME*).
9. Click **Next**.
10. Click **Next**. If any errors appear on the page, follow the instructions to fix them before you continue.
    If you see warning messages about the 64-bit version of IIM, you can ignore them.
11. Click **Install**.

Importing the assembly lines for UCF

To import the UCF assembly lines, you import the `ucf_integration.xml` file as a new Tivoli Directory Integrator project.

About this task

The `ucf_integration.xml` file is located in the *<OP_HOME>*`/integrations/UCF` directory. This is the project file that you use to import the assembly lines and other project files into Tivoli Directory Integrator.

The UCF connector uses three assembly lines to import objects.

- UCF Authority Documents to OP Mandates
- UCF Citations to OP Submandates
- UCF Controls to OP Requirements

An assembly line is commonly referred to as an AL in the Tivoli Directory Integrator documentation.

Procedure

1. Go to the *<OP_HOME>*`/integrations/UCF` directory and locate the `ucf_integration.xml` file
2. Copy the file to the server where IBM Tivoli Directory Integrator is installed.
3. Import the `ucf_integration.xml` file as a new project in IBM Tivoli Directory Integrator.
   a) Click **File** > **Import** > **IBM Tivoli Directory Integrator** > **Configuration**.
   b) Click **Next**.
   c) Select **New Project** in the **Project** list.
   d) Click **File**.
   e) Click the browse button next to the **Configuration File** field. Select the `ucf_integration.xml` file.
   f) Click **Finish**.
   g) Type a name for the project, such as `ucf_integration`.
   h) Click **Finish**.
   The project is displayed in the **TDI Configuration Editor** and the project files are created in your TDI workspace directory.
4. Copy the UCF connector property files into your project runtime Tivoli Directory Integrator workspace directory.

   The workspace directory is where the projects, files, and folders that you create in TDI are stored, for example `C:\Users\`*`<user>`*`\Documents\TDI\workspace\ucf_integration\Runtime-ucf_integration`.

   a) Go to the *<OP_HOME>*`/integrations/UCF` directory.

b) Copy the following files to the `Runtime-ucf_integration` directory.

- `passwords.properties`
- `op_client.properties`

5. Right-click the **ucf_integration** project in the **TDI Configuration Editor** and click **Refresh**.

Results
In Tivoli Directory Integrator, the **AssemblyLines** folder contains the UCF assembly lines. In addition, the **Resources** > **Properties** folder contains the UCF property files.

Configuring the connection information

You must configure the connection information that the UCF connector uses to connect to IBM OpenPages GRC Platform and to UCF Common Controls Hub. You configure the connection information by updating property files and by entering passwords in the Tivoli Directory Integrator Configuration Editor. Do this procedure after you import the assembly lines.

About this task

The UCF connector includes two text files that contain the assembly line properties.

The property files are in the **Runtime-ucf_integration** folder of the **ucf_integration** project.

`op_client.properties`
The `op_client.properties` file stores the connection information for OpenPages.

`passwords.properties`
The `passwords.properties` file contains the OpenPages password and your UCF token. The values are encrypted.

Note: Do not edit this file. Set the values by using the Tivoli Directory Integrator Configuration Editor.

Procedure

1. From the Tivoli Directory Integrator Configuration Editor, open the **ucf_integration** project.
2. In the Navigator pane, expand **Runtime-ucf_integration**.
3. Right-click the `op_client.properties` file and click **Text Editor**.
4. Set or change the property values.

Table 58: Properties in the `op_client.properties` file

Property	Description
`op_api_root`	The OpenPages REST API root The default (typical) value is `/grc/api`. The `op_api_root` is appended to the `op_url` to form the full URL to access the OpenPages REST API.
`op_url`	The OpenPages URL Use the format `https://<host>:<port>`

Table 58: Properties in the op_client.properties file (continued)	
Property	**Description**
op_user	The OpenPages user name that the UCF connector uses to log in to OpenPages Use an account with administrative privileges. The user account must have security permissions to create and update the mandate, submandate, and requirements object types.

For example:

```
op_api_root=/grc/api
op_url=https://op_server:10111
op_user=ucf
```

5. Save the changes and exit the text editor.
6. Right-click the password.properties file and click **Text Editor**.
7. Type the password of the OpenPages user that you used in the op_client.properties file.
8. Enter your UCF Common Controls Hub token in the ucf_api_token parameter.

   To get your token, log in to UCF Common Controls Hub. Click **Settings** > **API Manager** > **API Keys**. Click **Create Credentials**.

   If you are unable to create a token, contact UCF Common Controls Hub.
9. Save the changes and exit the text editor.

   The values in the password.properties file are automatically encrypted.
10. Refresh the property files and the connectors with the updated connection information.
    a) In the Navigator pane, expand **Resources** > **Properties**.
    b) Right-click **op_client**, and then click **Open**.
    c) Click **Read properties from Server**, and then click **Send properties to Server**.
    d) Click **Save**, and then close the window.
    e) Right-click **passwords**, and then click **Open**.
    f) Click **Read properties from Server**, and then click **Send properties to Server**.
    g) Click **Save**, and then close the window.

Configuring OpenPages for UCF integration

Importing business entities

Import the business entities that are used by UCF into OpenPages GRC Platform. When the UCF connector imports data into OpenPages, the business entities are used for the imported objects.

About this task

The UCF Entities.xlsx file contains the business entity structure for UCF. Import this file by using FastMap.

Procedure

1. Log in to OpenPages as a user with administrative privileges.
2. Click **Reporting** > **FastMap Import**.
3. Click **Choose File** and select the UCF Entities.xlsx file.

The file is located in the *<OP_HOME>*/integrations/UCF directory.

4. Click **Import data**.
5. Review the verification report, and then click **Import data**.

   The import process begins. The progress of the import is displayed in the **FastMap Import Status** window. Click **Refresh** to update the window.
6. Verify the import.
   a) Log in to OpenPages as a user with administrative privileges.
   b) Click **Organization** > **Business Entity Overview**.
   c) Expand **Library** > **UCF**.
   The business entity UCF is updated. It has two child entities, Authority Documents and Harmonized Controls.

Note: If UCF Common Controls Hub adds new control impact zones or adds new authority document guidance areas in future, you need to update OpenPages. For more information, see "Update business entities, fields, and field groups" in the *IBM OpenPages GRC Administrator's Guide*.

Updating object type relationships for UCF

The UCF connector requires an additional object type relationship. SOXBusEntity must be a parent of Requirement. Use ObjectManager to load the object relationship.

Procedure

1. Log on to the OpenPages administrative application server.
2. Copy the `req-op-config.xml` file to the administrative application server.

   The `req-op-config.xml` is in the *<OP_HOME>*/integrations/UCF directory.
3. Open a command line. If you are using Microsoft Windows, open a command prompt with the **Run as Administrator** option.
4. Go to the *<OP-HOME>*/bin directory.
5. Run the following command.

   Replace *<loader-file-path>* with the location of the `req-op-config.xml` file.

```
ObjectManager.cmd|sh l c <OpenPages Administrator user>
   <OpenPages Administrator password>
   <loader-file-path> req
```

6. If you encounter any errors, review the log file, *<OP_HOME>*/bin/logs/ObjectManager.log.
7. Verify the update.
   a) Log in to OpenPages.
   b) Click **Administration** > **Object Types**.
   c) Click **Requirement**.
   d) Click **Parent Associations**. Verify that SOXBusEntity is in the list.

Updating UCF field groups

You need to update the UCF field groups and fields.

About this task

You need to update the enumerated string values for the following:

- **UCF-Mand** field group, **UCF Category** field
- **UCF-SubMand** field group, **UCF Guidance Area** field
- **UCF-Req** field group, **UCF Guidance Area** field

The changes that you need to make are the same for each field.

Procedure

1. Log in to OpenPages as a user with administrative privileges.
2. Click **Administration** > **Field Groups**.
3. Click **UCF-Mand**, and then click **UCF Category**.
4. Add the following values:
   - Risk Management Organizations
   - Banking and Finance Organizations
   - Energy Organizations
   - Healthcare and Life Science Organizations
   - Payment Card Organizations
   - Records Management Organizations
   - Security and Privacy Organizations
   - International
   - North America
   - Australia-Oceania
   - Asia
   - Configuration
   - South America
   - Africa
   - Europe
5. Click **UCF-SubMand**, and then click **UCF Guidance Area**.
6. Repeat steps 4 and 5 to update the values.
7. Click **UCF-Req**, and then click **UCF Guidance Area**.
8. Repeat steps 4 and 5 to update the values.

Results

The field definitions for UCF are updated.

Note: If UCF Common Controls Hub adds new authority document categories or new geographies, update the UCF field definitions to add the new values.

Chapter 15. Approval app

The approval app is an optional feature that leverages the power of IBM OpenPages GRC Platform and provides an easy-to-use interface for quickly taking action on a review, approval, or attestation request with confidence and full knowledge of the context surrounding the request. The approval app works with objects that are set up for the configurable lifecycle.

By using the approval app, a casual or infrequent user of IBM OpenPages GRC Platform is able to make well-informed decisions for GRC tasks guided by information from the system quickly and easily, without the need for extensive training in OpenPages. If you want to see all of the items sent to you in the approval app, you can go to your To Do list by clicking the IBM OpenPages GRC Platform logo. You simply make the decision (or respond to certification language or questions), with your comments if necessary, and click the relevant button to submit. You can use this feature on tablets and mobile devices as well, for increased flexibility.

Deployment process overview for the approval app

If you upgraded IBM OpenPages GRC Platform and you previously did not use the approval app, you need to deploy and configure it.

If you deployed the approval app in version 7.2.0.1 or later, you need to upgrade the approval app. You do not need to deploy it. For more information, see “Upgrade the approval app” on page 291.

If you did a fresh installation of OpenPages, not an upgrade, you do not need to deploy the approval app. The app is installed when you install OpenPages. You can configure the approval app. For more information, see the *IBM OpenPages GRC Administrator's Guide*.

If you upgraded OpenPages and you are deploying the approval app for the first time, complete these steps to deploy the approval app:

1. Complete the pre-deployment tasks for the approval app. Check system requirements and back up your environment. For more information, see “Pre-upgrade tasks for the approval app” on page 282.
2. Make sure that you have all of the object types and field groups - along with the associations - loaded onto your system. For more information, see “Ensuring that you have the fields and field groups required for the approval app profile ” on page 283.
3. If you want to configure the approval app profile for selected object types only, exclude the object types that you don't want. For more information, see “Excluding object types from the approval app profile ” on page 284.
4. Modify the **Trigger Configuration Files** registry setting. For more information, see “Updating triggers for the approval app ” on page 289.
5. Load the approval app profile and enable the app. For more information, see “Loading the approval app profile ” on page 289.
6. Complete the approval app deployment. For more information, see “Completing the approval app deployment” on page 291.

Depending on your environment, you might need to do some additional tasks.

1. If you want to report on the fields and field groups for the approval app, regenerate the reporting framework. For more information, see "Generating the reporting framework V6" in the *IBM OpenPages GRC Administrator's Guide*.
2. If you needed to add the object types, fields, and field groups that are required for the approval app and you use global search, re-create the search index. See “Creating the global search index after upgrading” on page 186.

Pre-upgrade tasks for the approval app

Before you upgrade the approval app, ensure that your system meets the system requirements, back up IBM OpenPages GRC Platform files, and gather the information that is required to complete the installation.

Ensure that you completed the upgrade to version 7.4. The OpenPages database upgrade must be complete before you upgrade the approval app.

If you want to be able to restore your environment to its current state, back up the OpenPages application environment, the IBM Cognos environment, and the database.

Gather the following information. You need this information to complete the installation.

- The user name and password of the OpenPages administrator on the admin application server
- The path of the OpenPages home directory, *OP_HOME*

Preparing for the deployment of the approval app

You must perform some preparation tasks before you deploy the approval app.

Procedure

1. Complete the upgrade to IBM OpenPages GRC Platform version 7.4.
2. Ensure that there are no long running OpenPages processes, such as a FastMap import process or a global search indexing process.
3. Check the status of the OpenPages servers. Verify that the following servers are running: the OpenPages application servers (admin and non-admin), reporting servers (active and standby), the Framework Model Generator, the database server, and the search server (optional).

   For information about starting and stopping servers, see Chapter 11, “Starting and stopping servers,” on page 253.

Supported data types and field types in the approval app

These data types and field types are supported by the approval app.

Note: If a field type is configured but not supported, the field type is ignored, that is, no error is produced.

- Date
- Boolean
- Integer
- Decimal
- Currency. For more information about the currency data type, see Data types.
- The following system fields: Name, Description, Created By, Created On, Modified By, and Modified On.
- All text field types: URL, text box, text area, rich text. Includes support for rendering mathematical equations in rich text fields.
- All seven actor field display types: User Dropdown, User Selector, User/Group Selector, Multi User Selector, Multi User Group Selector, and Multi Group Selector.
- Business entity selector
- File attachments, with a link to view each attachment.
- Single-select enumerated fields and multi-select enumerated fields.
- Primary Parent hierarchy fields and Business Entity hierarchy fields.
- Hidden dependent fields.

  If you have set up Field Level Security in OpenPages for specific fields, the value of the field in the approval app is hidden by a black bar with the word Confidential on it. For more information, see Field Level Security.

The approval app does not support the following data types and field types:

- Report fragments
- Computed fields
- The following system fields: Folder or Location, Comments, Derived fields, and Orphan fields.

Ensuring that you have the fields and field groups required for the approval app profile

Make sure that you have all of the out-of-the-box fields and field groups required for the approval app profile loaded onto your system.

About this task

The approval app profile supports four object types (objects in parentheses are the related objects):

- SOXControl (SOXBusEntity, SOXDocument, SOXTest, SOXIssue, SOXRisk, SOXProcess)
- SOXIssue (SOXBusEntity, SOXTask (Action Item), SOXDocument)
- Incident (SOXBusEntity, SOXIssue, SOXDocument)
- LossEvent (SOXBusEntity, LossImpact, LossRecovery, SOXIssue, SOXRisk, SOXDocument, SOXProcess)

These object types use the following field groups, as well as the field groups that are loaded as a part of approval app installation:

SOXRisk
Uses OPSS-Rsk, OPSS-Risk, OPSS-Risk-Qual, OPSS-Risk-Quant, OPSS-Risk-Accp.

SOXTest
Uses OPSS-Shared-Test, OPSS-Test.

SOXTask
Uses OPSS-AI.

SOXIssue
Uses OPSS-Iss.

SOXControl
Uses OPSS-Ctl, OPSS-Ctl-Fin.

Incident
Uses OPSS-Inc, OPSS-Inc-IT.

LossEvent
Uses OPSS-LossEv, OPSS-Shared-Basel.

LossImpact
Uses OPSS-LossIm.

LossRecovery
Uses OPSS-LossRe.

Click **Administration** > **Object Types**. Check that all of the object types, field groups, and fields are listed in the system.

You can also review the approval app Automated Form Configuration (AFCON) spreadsheet, `Deck_AFCON_<version>.xls`, to make sure that you have everything you need in your system. You can find the AFCON spreadsheet in the `OP_<version>_Non_Embedded/ OP_<version>_Configuration/Approval_App/` directory.

If you upgraded from version 7.2.x and you are deploying the approval app for the first time, you might want to configure the approval app profile only for selected object types. For more information, see “Excluding object types from the approval app profile ” on page 284. If you performed a new installation, this step is not required.

Note: This topic lists the objects, field groups, and fields that you need to add if you have the 7.2 solutions schema. If you do not have the 7.2 solutions schema or if you customized the solutions schema,

additional changes might be required. For more information, see “Notes for users who do not have the 7.2 or later solutions schema” on page 288.

Excluding object types from the approval app profile

If you upgraded from version 7.2.x and you are deploying the approval app for the first time, you might want to configure the approval app profile for selected object types only and exclude others. If you performed a new installation of IBM OpenPages GRC Platform, this step is not required.

About this task

The approval app profile supports four object types. (See “Ensuring that you have the fields and field groups required for the approval app profile ” on page 283.)

You can choose to exclude any of these object types from the approval app profile. For example:

- You might not need Incidents because you don't use the Incident object type.
- You might have a customized process for an existing Loss Event object type to which you don't want to make any changes, but you might want to use the other object types for the approval app.

For a specific example of how to remove the LossEvent object type, see “Excluding the Loss Event object type from the approval app profile ” on page 285.

Important: If you exclude an object type, you must also remove any objects that are associated exclusively with the object type.

Use the following steps to exclude an object from the four objects that are supported by the approval app profile. To do this procedure, you must use the **OpenPages Platform 3** profile.

Procedure

1. In the `Load_End_User_App_Schema.sh|.bat` file, comment out the commands that load the files that are related to the object types from the loader file. Do this step to exclude loading the objects when you load the approval app profile.
   - For a Windows computer: In the `Load_End_User_App_Schema.bat` file, comment out the block of code relevant to the object type you want to exclude by adding `REM` at the beginning of each line.
   - For a Linux computer: In the `Load_End_User_App_Schema.sh` file, comment out the block of code relevant to the object type you want to exclude by adding *#* at the beginning of each line.

   For an example of the code to be commented out, see step 1 in “Excluding the Loss Event object type from the approval app profile ” on page 285.
2. Edit the `deck_config.json` file to exclude the object types.
   a) Locate the `deck_config.json` file.

      The approval app working directory is: *<OP_HOME>*`/installer/migration/upgrade/addon_module/loaderdata/deck`.

   b) Unzip `deck-config-opx-op-file-content.zip`.

   c) Locate the `End User Applications Config` folder.

   d) Locate the `deck_config.json` file.

   e) Make a backup copy of `deck_config.json` in case you need to repeat any steps.

   For more information, see "Configuring the JSON file for the approval app" in the *IBM OpenPages GRC Administrator's Guide*.

   After you edit and save the file `deck_config.json`, you must copy it back to the `End User Applications Config` directory and zip it back into `deck-config-opx-op-file-content.zip`.
3. Edit the `Deck_AFCON_<version>.xls` spreadsheet to remove the object, the associated objects, and the related views.

   The file is stored in: `OP_<version>_Non_Embedded/OP_<version>_Configuration/Approval_App/`.

Note: Before you start to edit the AFCON spreadsheet, make a backup copy of the AFCON spreadsheet. If you run into difficulties, you can start again from the backup copy.

4. Follow the steps in the AFCON user manual to generate the `.xml` file from the updated AFCON spreadsheet for the approval app profile.

   The AFCON user manual is stored on the installation media `AFCON-RAFCON/Afcon.zip`.

   The AFCON tool generates four `.xml` files:

   - `IBM_OP_DECK_object-profile-op-config.xml`
   - `IBM_OP_DECK_object-strings-op-config.xml`
   - `IBM_OP_DECK_rule-based-security-op-config.xml`
   - `IBM_OP_DECK_schema-op-config.xml`

5. Rename the `IBM_OP_DECK_object-profile-op-config.xml` file to `deck-profile-op-config.xml` and paste it in the approval app working directory. Ignore all of the other files.

   The approval app working directory is: *<OP_HOME>*`/installer/migration/upgrade/addon_module/loaderdata/deck`.

   Alternatively, you can edit the profile `.xml` file manually to match your requirements. You must remove the object type and its associated parent and child object types in the following sections: `objectProfile` and `ObjectProfileViewSet`.

6. Back up the `openpages-solutions.xml` file.

   a) Go to **Administration** > **Manage System Files** > **SysXMLDocument**.

   b) Expand the **TriggerConfigFiles** folder.

   c) Download the `openpages-solutions.xml` and name it `openpages-solutions-bk.xml`.

   If you want to exclude Loss Event but you want to include Issue, you must copy the triggers for Issue from OpenPages version 7.2.0.1 or later and replace the triggers for Issue in the OpenPages 7.2 version of the file.

   Note: You can get a copy of the version 7.2 `openpages-solutions.xml` file from the installation media. The file is located in `OP_`*<version>*`_Non_Embedded/OP_`*<version>*`_Configuration/Modules/Upgrade/ORM/triggers/7.2_openpages_solutions/.`

Excluding the Loss Event object type from the approval app profile

If your organization currently uses the Loss Event object type and you don't want to make changes to that process, but you want to use the approval app for the other object types, this task provides detailed steps on how to exclude the Loss Event object type from the approval app.

About this task

If you upgraded from version 7.2.x and you are deploying the approval app for the first time, you might want to configure the approval app profile to exclude the Loss Event object type.

The approval app profile supports four object types. One of these is the Loss Event object type.

You may want to exclude the Loss Event object type for the following reasons:

- You may already be using the Loss Event object type and its triggers.
- You don't have the Loss Event object type deployed in OpenPages.

Important: If you exclude an object type, you must also remove any objects associated exclusively with the object type. For example, if you want to exclude the Loss Event object type, you must remove the associated objects LossImpact and LossRecovery. However, note that you must keep the objects SOXIssue, SOXDocument, SOXRisk, SOXProcess, and SOXBusEntity because they are also associated with SOXControl, which is still included in the profile.

Use the following steps to exclude the Loss Event object type from the four objects supported by the approval app profile. To perform this procedure, you must use the **OpenPages Platform 3** profile.

Procedure

1. Edit the openpages-deck-schema-loader-data.txt file by commenting out the lines that are related to the objects that you want to exclude.

   For example, to exclude the Loss Event object type, in the Loading Deck Schema block, comment out deck-schema-lossevent and, in the Loading Deck Lifecycle block, comment out deck-lifecycle-lossevent.

```
# Loading Deck Schema
deck-schema-control
deck-schema-control-questions
deck-schema-issue
# deck-schema-lossevent

# Loading Deck lifecycle
deck-lifecycle-control
deck-lifecycle-incident
deck-lifecycle-issue
# deck-lifecycle-lossevent

# Loading Deck profile
Deck_object-profile
```

2. Edit the deck_config.json file to exclude the Loss Event object type.
   a) Locate the deck_config.json file.

      The file is stored in: *<OP_HOME>*/installer/migration/upgrade/addon_module/loaderdata/deck.

   b) Unzip deck-config-opx-op-file-content.zip.

   c) Go to the folder End User Applications Config.

   d) Locate the file deck_config.json.

   e) Make a backup copy of deck_config.json in case you need to repeat any steps.

   For more information, see "Configuring the JSON file for the approval app" in the *IBM OpenPages GRC Administrator's Guide*.

   To exclude the Loss Event object type, remove "LossEvent" from the objectTypes block:

   Before:

```
"objectTypes" : ["SOXControl","SOXIssue","LossEvent","Incident"],
```

   After:

```
"objectTypes" : ["SOXControl","SOXIssue","Incident"],
```

   Also, remove the following code from the objects block:

```
        {
            "type" : "LossEvent",
            "fieldTitle" : "Name",
            "fieldDesc" : "Description",
            "lifecycle" : {
                "enabled" : true,
                "stageMap" : {
                    "Awaiting Approval" : {"showInList": true},
                    "Awaiting Approval L1" : {"showInList": true},
                    "Awaiting Approval L2" : {"showInList": true}
                }
            },
            "widgetList" : [
                {
                    "name" : "details",
                    "type" : "activityView",
                    "activityView" : "OP-Deck-LE",
                    "parentViews" : [
                        {
                        "type" : "SOXRisk",
                        "activityView" : "OP-Deck-LE-Risk"
                        }
```

```
                    ]
                }
            ]
        },
```

After you edit and save the `deck_config.json` file, copy it back to the `/End User Applications Config` folder and zip it back into `deck-config-opx-op-file-content.zip`.

3. Edit the `Deck_AFCON_<version>.xls` spreadsheet to remove the Loss Event object, the associated objects, and the related views.

   The file is stored in: `OP_<version>_Non_Embedded/OP_<version>_Configuration/Approval_App/`.

   Note: Before you start to edit the AFCON spreadsheet, make a backup copy of the AFCON spreadsheet. If you run into difficulties, you can start again from the backup copy.

   a) Delete the worksheets `Loss Event`, `Loss Impact`, `Loss Recovery`, `AV - OP-Deck-LE`, and `AV - OP-Deck-LE-Risk`.

   b) From the `Labels - Object Types` worksheet, delete the rows related to Loss Event, Loss Impact, and Loss Recovery.

   c) From the `Default Views` worksheet, delete the rows related to Loss Event, Loss Impact, and Loss Recovery.

   d) From the `Overviews` worksheet, delete the rows related to Loss Event, Loss Impact, and Loss Recovery (Note: No change in the case of Loss Event).

   e) From the `Date Dimension Associations` worksheet, delete the rows related to the field groups associated to Loss Event, Loss Impact, and Loss Recovery. In this case, delete all rows related to OPSS-LossEv, OPSS-LossIm, and OPSS-LossRe.

   f) From the `Navigational Views Order` worksheet, delete the rows related to Loss Event, Loss Impact, and Loss Recovery.

   g) From the `Object Views Order` worksheet, delete the rows related to Loss Event, Loss Impact, and Loss Recovery.

4. Follow the steps in the AFCON user manual to generate the `.xml` files from the updated AFCON spreadsheet for the approval app profile.

   The AFCON user manual is stored on the installation media `AFCON-RAFCON/Afcon.zip`.

   The AFCON tool generates four `.xml` files:

   - `IBM_OP_DECK_object-profile-op-config.xml`
   - `IBM_OP_DECK_object-strings-op-config.xml`
   - `IBM_OP_DECK_rule-based-security-op-config.xml`
   - `IBM_OP_DECK_schema-op-config.xml`

5. Rename the `IBM_OP_DECK_object-profile-op-config.xml` file to `deck-profile-op-config.xml` and paste it in the approval app working directory, *<OP_HOME>*`/installer/migration/upgrade/addon_module/loaderdata/deck`. Ignore all the other files.

   Alternatively, you can edit the profile `.xml` file manually to match your requirements. You must remove the object type and its associated parent and child object types in the following sections: `objectProfile` and `ObjectProfileViewSet`.

6. Before you proceed to step 7, make sure that you understand the following background information about copying the SOXIssue trigger content from OpenPages version 7.2.0.1 or later to the `openpages-solutions.xml` file from OpenPages version 7.2.

   When OpenPages version 7.2 is installed, the `openpages-solutions.xml` file is stored in the **SysXMLDocument** > **TriggerConfigFiles** folder.

   For the present example where Loss Event is excluded from the approval app, you must modify the `openpages-solutions.xml` file from OpenPages version 7.2 and replace the trigger content for the SOXIssue object with the trigger content for the SOXIssue object from the version of `openpages-solutions.xml` from OpenPages version 7.2.0.1 or later.

Because you are excluding the Loss Event object type from the approval app, you want to retain the OpenPages 7.2 triggers from the OpenPages 7.2 Loss Event triggers, while updating the SOXIssue triggers with the newer version needed for the approval app.

For the SOXIssue object, the triggers in OpenPages version 7.2.0.1. or later are changed to work with the approval app. So you must copy the SOXIssue trigger content from the OpenPages version 7.2.0.1 or later `openpages-solutions.xml` file into the `openpages-solutions.xml` file in OpenPages version 7.2 and then save the file.

7. Download the `openpages-solutions.xml` file.
   a) Go to **Administration** > **Manage System Files** > **SysXMLDocument**.
   b) Expand the **TriggerConfigFiles** folder.
   c) Download the `openpages-solutions.xml` and name it `openpages-solutions-72.xml`.
8. Edit the `openpages-solutions.xml` file.

   The file is stored in: *<OP_HOME>*`/installer/migration/upgrade/addon_module/loaderdata/deck`.
   a) Unzip `deck-lifecycle-trigger-op-file-content.zip`.
   b) Make a backup copy of `openpages-solutions.xml` in case you need to modify it again. Name it `openpages-solutions-backup.xml` and save it.
   c) Edit `openpages-solutions.xml` from OpenPages version 7.2.0.1 or later. Locate the following section and copy it:

```
<!-- T-009 Issue Life Cycle Status Update Trigger Begin –>
...
</trigger>
```

   d) Edit the `openpages-solutions.xml` file from OpenPages version 7.2. Using the lines you copied in step 8c, replace the matching `.xml` snippet in the existing OpenPages version 7.2 version that you downloaded. Save the file.
   e) Take the `openpages-solutions.xml` you saved in step 8d and copy it back to the approval app working directory.
   f) Zip the file `deck-lifecycle-trigger-op-file-content.zip` and be sure that `deck-lifecycle-trigger-op-file-content.zip` is under the approval app working directory.

   Note: You can get a copy of the version 7.2 `openpages-solutions.xml` file from the installation media. The file is located in `OP_`*`<version>`*`_Non_Embedded/OP_`*`<version>`*`_Configuration/Modules/Upgrade/ORM/triggers/7.2_openpages_solutions/.`

   The approval app working directory is: *<OP_HOME>*`/installer/migration/upgrade/addon_module/loaderdata/deck`.

Now you are ready to load the approval app profile. For more information, see “Loading the approval app profile ” on page 289.

Notes for users who do not have the 7.2 or later solutions schema

If you do not have the 7.2 or later solutions schema in your environment or if you customized the solutions schema, you might need to add or modify objects, field groups, and fields before you load the approval app profile.

For example, if you installed version 7.1 with solutions and then upgraded to 7.4, your environment has the 7.1 solutions schema. The 7.1 solutions schema might not have all of the objects, field groups, and fields that you need for the approval app.

Examine the approval app Automated Form Configuration (AFCON) spreadsheet, `Deck_AFCON_`*`<version>`*`.xls`. Perform the following checks:

- Make sure that you have the objects, field groups, and fields for the approval app.
- Make sure that the attributes match, for example make sure that the display type of each field is defined correctly.

- Make sure that you have any prerequisites for the objects, field groups, and fields.

You can find the `Deck_AFCON_<version>.xls` spreadsheet in the `OP_<version>_Non_Embedded/OP_<version>_Configuration/Approval_App/` directory.

Updating triggers for the approval app

If you upgraded IBM OpenPages GRC Platform and you are deploying the approval app for the fist time, you need to modify the **Trigger Configuration Files** registry setting for the approval app profile.

Before you begin

Upgrade IBM OpenPages GRC Platform.

Make sure your system has the required fields and field groups as described in "Ensuring that you have the fields and field groups required for the approval app profile " on page 283.

About this task

The **Trigger Configuration Files** registry setting defines the trigger files to load when IBM OpenPages GRC Platform starts. For more information, see the *IBM OpenPages GRC Trigger Developer Guide*.

The trigger files set the lifecycle for the included object types on the system. Lifecycles define the stages that an object type can follow. At each stage, the system:

- Identifies a lifecycle assignee
- Defines the actions available to move to a different stage
- Automatically sends an email to the new lifecycle assignee (LCAssignee)
- Defines other attributes that are related to the current stage

Procedure

1. Log on to IBM OpenPages GRC Platform as a user with administrative privileges.
2. Click **Administration** > **Settings** > **GRCM** > **Trigger Configuration Files**.
3. Update the value for the **Trigger Configuration Files** setting.

   Add the following files, separated by commas.

   - `OPLC-LossEvent.xml`
   - `OPLC-SOXControl.xml`
   - `OPLC-SOXIssue.xml`

   For example:

   ```
   OPLC-LossEvent.xml,OPLC-SOXControl.xml,OPLC-SOXIssue.xml
   ```

   Note: If you want to exclude an object type from the approval app, do not include the related `OPLC-<object type>.xml` file in the **Trigger Configuration Files** registry setting.

Loading the approval app profile

If you upgraded IBM OpenPages GRC Platform and you are deploying the approval app for the first time in version 7.4, you need to load the approval app profile and enable the app.

Before you begin

You must install IBM OpenPages GRC Platform before you load the profile and enable the approval app.

Make sure that your system has the required fields and field groups as described in "Ensuring that you have the fields and field groups required for the approval app profile " on page 283.

If you upgraded IBM OpenPages GRC Platform and you are deploying the approval app for the first time, modify the **Trigger Configuration Files** registry setting before you load the approval app profile. For more information, see "Updating triggers for the approval app " on page 289.

About this task

In addition to the approval app profile, the scripts make the following changes:

- Load schema changes for three object types (SOXControl, SOXIssue, LossEvent)
- Load lifecycle schema changes for 4 object types (Incident, SOXControl, SOXIssue, LossEvent)
- Load Certification Questions (for SOXControl)
- Load `deck_config.json`
- Load the lifecycle trigger definition XML files (see step 1)
- Enable the approval app

Procedure

1. If you have an existing profile with an **LCAssignee** field for the object types that are supported by the lifecycle, perform the following steps to specify the display type of the field as **Multi Valued User/ Group Selector**.
   a) Go to the profile in which you want to make changes: **Administrator** > **Profiles**.
   b) Click the object type that includes the **LCAssignee** field.
   c) Click **LCAssignee**.
   d) In the **Object Field Information** section, click **Edit**.
   e) From the **Display Type** drop-down, click **Multi Valued User/Group Selector**.
   f) Click **Save**.

   This specifies the display type of the **LCAssignee** field for all the object types that are supported by the lifecycle to be **Multi Valued User/Group Selector**. You can now have multiple assignees.

   Tip: You can check if you have an existing profile with an **LCAssignee** field. **LCAssignee** is a specific field in a specific field group **OPLC-Std**. In version 7.2, this field was only in Incident and Questionnaire Assessment object types. You can look in each object type and see if it includes the **OPLC-Std** field group. Then, for each of those object types, look in each profile that object type is included in.
2. Load the approval app profile and enable the app.
   - Windows:
     a. Go to the approval app working directory: *<OP_HOME>*`/installer/migration/upgrade/addon_module/loaderdata/deck`.
     b. Update *openpages_domain_folder*, *login_username*, and *login_password properties* in `Environment_Variables.bat`.
     c. Run `Load_Deck_Schema.bat`. Wait for the script to complete before you continue to the next step.
     d. Run `Load_End_User_App_Schema.bat`.
     e. For security purposes, remove the password from the `Environment_Variables.bat` file.
   - Linux:
     a. Go to the approval app working directory: *<OP_HOME>*`/installer/migration/upgrade/addon_module/loaderdata/deck`.
     b. Update *openpages_domain_folder*, *login_username*, and *login_password properties* in `Environment_Variables.sh`.
     c. Run `Load_Deck_Schema.sh`
     d. Run `Load_End_User_App_Schema.sh`. Wait for the script to complete before you continue to the next step.

e. For security purposes, remove the password from the `Environment_Variables.sh` file.

Completing the approval app deployment

Complete the remaining steps to deploy the approval app.

Procedure

1. Restart the OpenPages server on all application servers. For information about starting and stopping servers, see Chapter 11, "Starting and stopping servers," on page 253.
2. Perform any conditional tasks required by your environment.

   For more information, see "Conditional steps for the approval app" on page 291.

Results

The approval app is deployed.

Conditional steps for the approval app

Depending on your environment, you might need to perform some additional tasks.

Perform these tasks after you complete all other deployment tasks. If you are installing other IBM OpenPages GRC Platform components, such as a fix pack or IBM OpenPages Loss Event Entry, perform these steps after all components are installed.

If you want to report on the fields and field groups for the approval app, regenerate the reporting framework. For more information, see Regenerating the reporting framework.

If you added the objects, fields, and field groups required for the approval app and you use global search, re-create the global search index. See "Creating the global search index after upgrading" on page 186.

Upgrade the approval app

If you deployed the approval app in version 7.2.0.1 or later and you upgraded IBM OpenPages GRC Platform to version 7.4, you need to perform some additional steps to upgrade the approval app.

1. Complete the pre-upgrade tasks for the approval app. Check system requirements and back up your environment. For more information, see "Pre-upgrade tasks for the approval app" on page 282.
2. Update the approval app configuration file. For more information, see "Updating the approval app configuration file" on page 292.
3. Upgrade the approval app. For more information, see "Upgrading the approval app" on page 292.

Pre-upgrade tasks for the approval app

Before you upgrade the approval app, ensure that your system meets the system requirements, back up IBM OpenPages GRC Platform files, and gather the information that is required to complete the installation.

Ensure that you completed the upgrade to version 7.4. The OpenPages database upgrade must be complete before you upgrade the approval app.

If you want to be able to restore your environment to its current state, back up the OpenPages application environment, the IBM Cognos environment, and the database.

Gather the following information. You need this information to complete the installation.

- The user name and password of the OpenPages administrator on the admin application server
- The path of the OpenPages home directory, *OP_HOME*

Updating the approval app configuration file

When you upgrade the approval app, you need to update the `deck_config.json` configuration file.

Before you begin

To do this procedure, you must use the **OpenPages Platform 3** profile.

Procedure

1. Back up the `deck_config.json` file.
   a) From the menu bar, click **Administration** > **Manage System Files** > **SysXMLDocument**.
   b) Click **End User Applications Config** > **deck_config.json**.
   c) Click **View file** and save it.
2. Delete the `deck_config.json` file.
   a) Return to the **End User Applications Config** folder.
   b) Click the check box next to **deck_config.json**, and then click **Delete**.
   c) Click **OK**.
3. Update the `deck-config-opx-op-file-content.zip` file.
   a) Go to the *<OP_HOME>*`/installer/migration/upgrade/addon_module/loaderdata/deck` directory on the application server.
   b) Use a compression utility to open or extract the `deck-config-opx-op-file-content.zip` file.
   c) Replace the `deck_config.json` file in the `.zip` file with the `deck_config.json` that you backed up.
   d) Use a compression utility to recompress the `deck-config-opx-op-file-content.zip` file.

      Note: Make sure that the files are packaged back into the `deck-config-opx-op-file-content.zip` file with the same directory structure as in the original `.zip` file.
4. Load the `deck_config.json` file.
   a) Select the check box next to the **End User Applications Config** folder.
   b) Click **Add New**.
   c) Click **Browse** and select the `deck_config.json` file.

Upgrading the approval app

If you deployed the approval app in IBM OpenPages GRC Platform version 7.2.0.1 or later and then upgraded IBM OpenPages GRC Platform, you need to upgrade the app.

Before you begin

Complete this task after you upgrade IBM OpenPages GRC Platform.

Procedure

1. Log on to the OpenPages admin application server as a user with administrative privileges.
2. Start the IBM OpenPages GRC Platform services on all application servers.
   For information, see Chapter 11, “Starting and stopping servers,” on page 253.
3. Open a command prompt by using the **Run As Administrator** option (Windows) or a command line (Linux or AIX).
4. Go to the approval app working directory: *<OP_HOME>*`/installer/migration/upgrade/addon_module/loaderdata/deck`.
5. Update *openpages_domain_folder*, *login_username*, and *login_password properties* in the `Environment_Variables.bat|.sh` file.
6. Run the upgrade script.

- Windows: `Upgrade_Deck.bat`
- Linux or AIX: `Upgrade_Deck.sh`

7. For security purposes, remove the password from the `Environment_Variables.bat|.sh` file.
8. Restart the OpenPages services on all application servers. For information about starting and stopping servers, see Chapter 11, “Starting and stopping servers,” on page 253.

Chapter 16. Loss Event Entry

Users across an organization can create loss events quickly and easily with IBM OpenPages Loss Event Entry. It is easy to use and task-focused for users with no experience with IBM OpenPages GRC Platform.

Users can access OpenPages Loss Event Entry without a sign-in account for IBM OpenPages GRC Platform. You can set up a link to OpenPages Loss Event Entry on your organization's intranet. When users click the link, they see the user interface in the language of their choice, and dates and numbers are formatted in ways that are familiar to them. Users can immediately begin entering information. When they submit a loss event, a confirmation email is sent to them.

OpenPages Loss Event Entry is integrated fully with IBM OpenPages GRC Platform. The following is an example of the workflow:

- Create a loss event in OpenPages Loss Event Entry.
- Triage, investigate, and enrich the loss event information in IBM OpenPages GRC Platform.
- Review and approve the loss event in the approval app.

For more information, see OpenPages Loss Event Entry.

Installation process overview for Loss Event Entry

If you want to use IBM OpenPages Loss Event Entry, you need to do some tasks to install it.

Do this task if you are doing a fresh installation of OpenPages Loss Event Entry. If you are upgrading, see “Upgrade process overview for Loss Event Entry” on page 299.

During the installation of IBM OpenPages Loss Event Entry, you can choose to load the default data required for OpenPages Loss Event Entry automatically or manually. The default data includes the field groups, fields, users, role templates, profile, and other data needed for OpenPages Loss Event Entry.

If you want to load OpenPages Loss Event Entry data automatically, complete the following steps:

1. Install IBM OpenPages GRC Platform.

   If you are upgrading from version 7.1.x and you use IBM DB2, install OpenPages Loss Event Entry before you re-create the reporting schema and framework. For information, see Chapter 7, “Upgrade IBM OpenPages GRC Platform,” on page 167.
2. Install OpenPages Loss Event Entry.
3. Modify the `web.xml` files for OpenPages Loss Event Entry.
4. Change OpenPages Loss Event Entry user passwords.
5. Configure OpenPages Loss Event Entry.

If you want to load OpenPages Loss Event Entry data manually, complete the following steps. Choose this option if you want to customize the field groups, fields, users, groups, profile, and other data used in OpenPages Loss Event Entry.

1. Install IBM OpenPages GRC Platform.

   If you are upgrading from version 7.1.x and you use IBM DB2, install OpenPages Loss Event Entry before you re-create the reporting schema and framework. For information, see Chapter 7, “Upgrade IBM OpenPages GRC Platform,” on page 167.
2. Install OpenPages Loss Event Entry.
3. Modify the `web.xml` files for OpenPages Loss Event Entry.
4. Load the OpenPages Loss Event Entry data manually.
5. Change OpenPages Loss Event Entry user passwords.
6. Configure OpenPages Loss Event Entry.

Depending on your environment, you might also need to regenerate the reporting framework. If you installed OpenPages and then regenerated the reporting framework, you might need to regenerate it again after you install OpenPages Loss Event Entry.

Pre-installation tasks for Loss Event Entry

Before you install IBM OpenPages Loss Event Entry, ensure that your system meets the system requirements, back up IBM OpenPages GRC Platform files, and gather information required to complete the installation.

Ensure that the following software is installed:

- IBM OpenPages GRC Platform
- IBM Installation Manager 1.8.7 or later

If you want to be able to restore your environment to its current state, back up the OpenPages application environment, the IBM Cognos environment, and the database.

Gather the following information. You need this information to complete the installation.

- The user name and password of the OpenPages administrator on the admin application server
- The path of the OpenPages home directory, *OP_HOME*

Installation tasks for Loss Event Entry

Preparing for the installation of Loss Event Entry

To ensure that the IBM OpenPages Loss Event Entry Installer is able to perform all necessary steps, you must perform some preparation tasks.

Procedure

1. Ensure that there are no long running OpenPages processes, such as a FastMap import process or a global search indexing process.
2. Check the status of IBM OpenPages GRC Platform servers. Verify that the following servers are running: the application servers (admin and non-admin), reporting servers (active and standby), the Framework Model Generator, and the database server.

   For information about starting and stopping servers, see Chapter 11, “Starting and stopping servers,” on page 253.

Installing Loss Event Entry

You must run the IBM OpenPages Loss Event Entry installation program on the OpenPages admin application server.

Procedure

1. Make sure that the OpenPages servers are running. See “Preparing for the installation of Loss Event Entry” on page 296.
2. Download the OpenPages Loss Event Entry installer package from IBM Passport Advantage (http://www.ibm.com/software/passportadvantage).
3. Extract the package files.
4. On the admin application server, run IBM Installation Manager.
5. Add the OpenPages Loss Event Entry repository to IBM Installation Manager.
   a) Click **File** > **Preferences**.
   b) Click **Repositories** and then click **Add Repository**.
   c) Select the OpenPages Loss Event Entry installer package.
   d) Click the `repository.config` file.
   e) Click **OK**.

f) Click **OK** to return to the main IBM Installation Manager page.

6. Click **Install**.
7. Select **IBM OpenPages Loss Event Entry** and **Version 7.4**, and click **Next**.
8. Accept the license agreement and click **Next**.
9. Click **Next**.

   Note: The installation directory does not impact the installation process. The files are installed to the same directory as the IBM OpenPages GRC Platform installation (*OP_HOME*).
10. In the Features list, make sure that **IBM OpenPages Loss Event Entry 7.4** is selected and click **Next**.
11. In the **Enter the location of your OpenPages installation** field, enter the path to the OpenPages home directory, *OP_HOME*. Type the path or click **Browse** to select the directory. This directory contains the `openpagesregistry.xml` file and the `bin` subdirectory.
12. In the **User Name** field, enter the user name for the administrator account on the OpenPages admin application server.
13. In the **Password** field, enter the password for the administrator account on the OpenPages admin application server.
14. Click one of the options for loading the default data. The default data includes the default users, groups, role templates, fields, field groups, profile, and other data used in OpenPages Loss Event Entry.
    - If you choose to load the data automatically, the installation program loads the default data used in OpenPages Loss Event Entry.
    - If you choose not to load the default data automatically, the installation program creates the files on your system but does not load them. You must load the data files manually before you use OpenPages Loss Event Entry. Select this option if you want to customize the data before loading it. For information about loading the data manually, see "Manual data loading for Loss Event Entry" on page 303.
15. Click **Next**. If any errors appear on the page, follow the instructions to fix them before you continue.

    If you see validation errors during the data load process, see "Data validation errors when installing Loss Event Entry" on page 363.
16. Click **Finish**.

What to do next

- If you chose not to load the data automatically, load the data manually before performing the post-installation tasks. See "Manual data loading for Loss Event Entry" on page 303 .
- If you chose to load the data automatically, continue with "Post-installation tasks for Loss Event Entry" on page 297.

Log files for Loss Event Entry

If errors occur when you install IBM OpenPages Loss Event Entry, you can review the log files.

The ObjectManager log files generated when loading the default data for OpenPages Loss Event Entry are located in `<OP_HOME>/LossEventEntry/logs/`.

If you see validation errors about data that already exists, see "Data validation errors when installing Loss Event Entry" on page 363.

Post-installation tasks for Loss Event Entry

After you install IBM OpenPages Loss Event Entry, you need to complete some additional tasks.

Certain prerequisites must be met to configure and use OpenPages Loss Event Entry.

- Modifying the `web.xml` files
- Setting passwords
- Configuring OpenPages Loss Event Entry

If you chose not to load the OpenPages Loss Event Entry default data automatically during the installation process, load the data manually before performing the post-installation tasks.

Modifying the web.xml files for Loss Event Entry
After you have installed IBM OpenPages Loss Event Entry, you need to modify the `web.xml` files for the application.

Procedure

1. Log on to the OpenPages application server as a user with administrative permissions.
2. Stop all OpenPages services.
3. Go to the *<OP_HOME>*`/profiles/<OpenPages-node-name>/installedApps/<OpenPages-cell-name>/op-apps.ear/sosa.war/WEB-INF` directory.
   - *<OP_HOME>* is the installation location of the OpenPages application. By default, this is `c:\OpenPages` on Windows, and `/opt/OpenPages` on UNIX.
   - *<server_name>* is the name of the application server.
4. In a text editor, open the `web.xml` file and insert the lines shown in bold, above XSS`Filter`.

```
<context-param>
  <param-name>sm.authentic.key</param-name>
  <param-value>SMSERVERSESSIONID</param-value>
</context-param>
<context-param>
  <param-name>sm.username.key</param-name>
  <param-value>SMUSER</param-value>
</context-param>

<filter>
  <filter-name>AppFilter</filter-name>
    <filter-class>com.ibm.openpages.components.apps.AppFilter
  </filter-class>
</filter>

<filter-mapping>
  <filter-name>AppFilter</filter-name>
  <url-pattern>/*</url-pattern>
</filter-mapping>

<filter>
  <filter-name>XSSFilter</filter-name>
  <filter-class>com.openpages.apps.common.tools.xss.XSSFilter</filter-class>
  <init-param>
      <param-name>com.openpages.xss.CHECK_POST</param-name>
      <param-value>true</param-value>
  </init-param>
  <init-param>
      <param-name>com.openpages.xss.REDIRECT_URL</param-name>
      <param-value>/malicious.jsp</param-value>
  </init-param>
</filter>
```

5. Save the file and close the editor.
6. Go to the *<OP_HOME>*`/profiles/<OpenPages-dmgr-name>/config/cells/<OpenPages-cell-name>/ applications/op-apps.ear/deployments/op-apps/sosa.war/WEB-INF` directory.
7. Repeat steps 4 and 5.
8. If this is a load-balanced environment, repeat steps 1-5 on each application server in the load-balanced environment.
9. Restart all OpenPages services.

Setting passwords for Loss Event Entry users

After you have installed IBM OpenPages Loss Event Entry, you need to configure the passwords for the Loss Event Entry users.

Before you begin

If you chose not to load the default data automatically during the installation process, load the data manually before setting passwords.

About this task

When you set passwords in the configuration tool and save your changes, the passwords are updated in IBM OpenPages GRC Platform. Passwords are encrypted.

Procedure

1. Start the configuration tool. Go to `http://<server_name>:<port>/openpages/app/jspview/lossevent#/editconfig`
2. Log in with a user account that is a member of the OPAdministrators group.
3. Under the **Locales** section, expand each locale and enter a password.

Configuration of Loss Event Entry

You can configure IBM OpenPages Loss Event Entry to meet the needs of your organization.

The configuration tool enables you to customize OpenPages Loss Event Entry. See Configuring OpenPages Loss Event Entry.

Conditional steps for Loss Event Entry

Depending on your environment, you might need to perform some additional tasks.

Perform these tasks after you complete all installation and post-installation tasks. If you are installing other IBM OpenPages components, such as a fix pack or the approval app, perform these steps after all components are installed.

If you want to report on the fields and field groups for OpenPages Loss Event Entry, regenerate the reporting framework. For more information, see Regenerating the reporting framework.

If you needed to add the objects, fields, and field groups required for OpenPages Loss Event Entry and you use global search, re-create the search index. See “Creating the global search index after upgrading” on page 186.

Upgrade process overview for Loss Event Entry

If you upgraded IBM OpenPages GRC Platform from 7.2.x or 7.3.x and you previously installed IBM OpenPages Loss Event Entry, you also need to upgrade OpenPages Loss Event Entry.

Complete the following steps.

1. Complete the pre-installation tasks for OpenPages Loss Event Entry. For more information, see “Pre-installation tasks for Loss Event Entry” on page 296.
2. Complete the preparation tasks for installing OpenPages Loss Event Entry. For more information, see “Preparing for the installation of Loss Event Entry” on page 296.
3. Optional: If you customized the OpenPages Loss Event Entry data files, back up the files.
4. Upgrade OpenPages Loss Event Entry.
5. Update the OpenPages Loss Event Entry configuration file.

Depending on your environment, you might also need to regenerate the reporting framework. If you upgraded OpenPages and then regenerated the reporting framework, you might need to regenerate it again after you install OpenPages Loss Event Entry.

Upgrading Loss Event Entry

If you upgraded OpenPages from version 7.2 or 7.3, upgrade IBM OpenPages Loss Event Entry.

Before you begin

Before you upgrade, complete the following tasks:

- "Pre-installation tasks for Loss Event Entry" on page 296
- "Preparing for the installation of Loss Event Entry" on page 296

Procedure

1. Make sure that the OpenPages servers are running. See "Preparing for the installation of Loss Event Entry" on page 296.
2. Download the IBM OpenPages Loss Event Entry 8.0 installer package from IBM Passport Advantage (http://www.ibm.com/software/passportadvantage).
3. Extract the package files.
4. On the admin application server, run IBM Installation Manager.
5. Add the OpenPages Loss Event Entry repository to IBM Installation Manager.
   a) Click **File** > **Preferences**.
   b) Click **Repositories** and then click **Add Repository**.
   c) Select the OpenPages Loss Event Entry installer package.
   d) Click the `repository.config` file.
   e) Click **OK**.
   f) Click **OK** to return to the main IBM Installation Manager page.
6. Click **Update**.
7. Select **IBM OpenPages Loss Event Entry**, and click **Next**.
8. Select **Version 7.4**, and then click **Next**.
9. Accept the license agreement and click **Next**.
10. In the Features list, make sure that **IBM OpenPages Loss Event Entry 7.4** is selected and click **Next**.
11. In the **Enter the location of your OpenPages installation** field, enter the path to the OpenPages home directory, *OP_HOME*. Type the path or click **Browse** to select the directory. This directory contains the `openpagesregistry.xml` file and the `bin` subdirectory.
12. In the **User Name** field, enter the user name for the administrator account on the OpenPages admin application server.
13. In the **Password** field, enter the password for the administrator account on the OpenPages admin application server.
14. Click the option to not load the data automatically.
15. Click **Next**. If any errors appear on the page, follow the instructions to fix them before you continue.
16. Click **Update**.
17. Click **Finish**.

What to do next

Update the OpenPages Loss Event Entry configuration file. For more information, see "Updating the Loss Event Entry configuration file" on page 301.

Updating the Loss Event Entry configuration file

After you upgrade or migrate IBM OpenPages Loss Event Entry, you need to update the `lossevent_config.json` configuration file.

Before you begin

To perform this procedure, you must use the **OpenPages Platform 3** profile.

Procedure

1. Back up the `lossevent_config.json` file.
   a) From the menu bar, click **Administration** > **Manage System Files** > **SysXMLDocument**.
   b) Click **End User Applications Config** > **lossevent_config.json**
   c) Click **View file** and save it.
2. Delete the `lossevent_config.json` file.
   a) Return to the **End User Applications Config** folder.
   b) Click the check box next to **lossevent_config.json**, and then click **Delete**.
   c) Click **OK**.
3. Add the Japanese locale to the `lossevent_config.json` file.
   a) Open the `lossevent_config.json` file that you downloaded.
   b) Add the following text at the end of the file, after the `zh_CN` locale.

```
"ja_JP":{
         "user":"LEE_JA_JP",
         "password": "",
         "enabled":true
      }
```

   The updated file now includes the Japanese locale:

```
"zh_CN":{
            "user":"LEE_ZH_CN",
            "password": "",
            "enabled":true
        },
"ja_JP":{
            "user":"LEE_JA_JP",
            "password": "",
            "enabled":true
        }
    }
}
```

   c) Save the file.
4. Update the `lossevent-entry-config-opx-op-file-content.zip` file.
   a) Go to the *<OP_HOME>*`/LossEventEntry` directory on the application server.
   b) Use a compression utility to open or extract the `lossevent-entry-config-opx-op-file-content.zip` file.
   c) Replace the `lossevent_config.json` file in the `.zip` file with the `lossevent_config.json` that you updated.
   d) Use a compression utility to recompress the `lossevent-entry-config-opx-op-file-content.zip` file.

      Note: Make sure that the files are packaged back into the `lossevent-entry-config-opx-op-file-content.zip` file with the same directory structure as in the original `.zip` file
5. Update OpenPages Loss Event Entry.
   a) Update the *<OP_HOME>*`/LossEventEntry/Environment_Variables.bat|sh` file with the values for your environment.

b) Go to *<OP_HOME>*/LossEventEntry/upgrade.

c) Open a command line and run Upgrade_LossEvent_Entry_App_Schema.bat|sh.

d) Remove the password from the login_password variable in the Environment_Variables.bat|sh file.

6. Update and review the settings in the OpenPages Loss Event Entry configuration tool.

a) Open the OpenPages Loss Event Entry configuration tool in a browser.
For example, navigate to http://<hostname>:10108/openpages/app/jspview/lossevent#/editconfig

b) Update the password for the Japanese locale user.

c) Review the other configuration settings.

d) Click **Save** to load the configuration.

Migration process overview for Loss Event Entry

You can migrate IBM OpenPages Loss Event Entry to a new environment.

Complete the following steps.

1. Install OpenPages Loss Event Entry in the target environment. Choose the option to not load the data automatically. For more information, see "Installation process overview for Loss Event Entry" on page 295.
2. Optional: If you customized the OpenPages Loss Event Entry data files in the source environment and you want to keep a copy, back up the data files.

   The data files are stored in the OpenPages Loss Event Entry working directory, *<OP_HOME>*/LossEventEntry/.
3. Update the OpenPages Loss Even Entry configuration file. For more information, see "Updating the Loss Event Entry configuration file" on page 301.

Additional tasks for Loss Event Entry

Silent installation for Loss Event Entry

You can run a silent installation by using the Silent mode in IBM Installation Manager.

Before you perform a silent installation, ensure that you have prepared your system for deploying IBM OpenPages Loss Event Entry.

You can generate a response file by using IBM Installation Manager, or you can create one manually. A template for creating a response file, called response_template.xml, is stored in the OpenPages Loss Event Entry installer package in the OP_*version*_LOS_EV_EN directory. The response file must contain the following code. Update the variables with the values for your environment:

Profile name
The name of the profile you want to use for OpenPages Loss Event Entry

Install location
The installation directory has no impact on the installation. OpenPages Loss Event Entry is installed to the same directory as IBM OpenPages GRC Platform, *OP_HOME*. Specify a directory that does not exist in your environment.

Path to OpenPages home
The absolute path to the OpenPages home directory, *OP_HOME*. This directory should contain the file openpagesregistry.xml and the subdirectory bin.

OpenPages administrator user name
The user name of the administrator account on the OpenPages admin application server.

OpenPages administrator password
The password for the administrator account on the OpenPages admin application server.

true or false
Choose an option for loading the default data for OpenPages Loss Event Entry. Enter `true` to load all default data, or enter `false` to load data manually later.

If you are upgrading or migrating OpenPages Loss Event Entry, enter `false`.

```
<?xml version='1.0' encoding='UTF-8'?>
<agent-input>
  <server>
    <repository location='((Path to repository for OpenPages Loss Event Entry))'/>
  </server>
  <profile id='((Profile name))' installLocation='((Install location))'>
    <data key='user.OPHome,com.ibm.openpages.lossevententry'
         value='((Path to OpenPages home))'/>
    <data key='user.OPAdminUsername,com.ibm.openpages.lossevententry'
         value='((OpenPages administrator user name))'/>
    <data key='user.OPAdminPassword,com.ibm.openpages.lossevententry'
         value='((OpenPages administrator password))'/>
    <data key='user.LoadAll,com.ibm.openpages.lossevententry'
         value='((true or false))'/>
  </profile>
  <install>
      <offering profile='((Profile Name))' id='com.ibm.openpages.lossevententry'/>
  </install>
</agent-input>
```

If you are upgrading OpenPages Loss Event Entry, follow these guidelines:

- The `repository location` must be the same as in the previous installation.
- The `Profile name` and `Install location` must be the same in the previous installation.

  If you do not know the profile name and install location, check the list of installed packages in IBM Installation Manager. Run the command `imcl listInstalledPackages -verbose`. Look for the package group containing the OpenPages Loss Event Entry package. The name of the package group is the profile name, and the installation directory is the install location. For more information, see the IBM Installation Manager documentation (https://www.ibm.com/support/knowledgecenter/SSDV2W_1.8.5/com.ibm.cic.commandline.doc/topics/t_imcl_viewing_installed_packages.html).
- The value for `LoadAll` should be false.

For more information about how to generate a response file to run the installer silently, see Response files (https://www.ibm.com/support/knowledgecenter/SSDV2W_1.8.5/com.ibm.silentinstall12.doc/topics/c_silent_response_files.html).

Manual data loading for Loss Event Entry

If you did not load the IBM OpenPages Loss Event Entry default data when you installed OpenPages Loss Event Entry, you can load the data manually. You also need to load the data manually if you have customized the data files.

Before you load the data, ensure that you have the object types and field groups required by the OpenPages Loss Event Entry profile.

Objects and field groups required for the Loss Event Entry profile
To load the Loss Event Entry profile successfully, you need to make sure you have all of the required object types and field groups loaded in your system.

Click **Administration** > **Object Types** and check that all of the following object types are listed.

- LossEvent
- LossImpact
- LossRecovery
- SoxBusEntity
- SoxDocument

- Preference

These object types use the following field groups:

- OPSS-LossEv (LossEvent)
- OPSS-Shared-Basel (LossEvent)
- OPSS-LossIm (LossImpact)
- OPSS-LossRe (LossRecovery)
- OPSS-Pref (Preference)

You can also review the IBM OpenPages Loss Event Entry Automated Form Configuration (AFCON) spreadsheet to make sure that you have everything you need on your system. You can find the AFCON spreadsheet in the *<OP_Home>*/LossEventEntry/ directory, along with the other loader files.

Note: This topic discusses the objects and field groups that you need to add if you have the 7.2 solutions schema. If you do not have the 7.2 or later solutions schema or if you customized the solutions schema, additional changes might be required. For more information, see "Notes for users who do not have the 7.2 or later solutions schema" on page 304.

Notes for users who do not have the 7.2 or later solutions schema
If you do not have the 7.2 or later solutions schema in your environment or if you customized the solutions schema, you might need to add or modify objects, field groups, and fields before you use IBM OpenPages Loss Event Entry.

For example, if you installed version 7.1 with solutions and then upgraded to 7.2, your environment has the 7.1 solutions schema. The 7.1 solutions schema might not have all of the objects, field groups, and fields that you need for OpenPages Loss Event Entry.

Examine the OpenPages Loss Event Entry Automated Form Configuration (AFCON) spreadsheet. Look for any gaps:

- Are any objects, field groups, or fields for OpenPages Loss Event Entry missing from your schema?
- Do the attributes match? For example, is the display type of each field defined correctly?
- Does your schema have the prerequisites for the objects, field groups, and fields for OpenPages Loss Event Entry?

You can find the AFCON spreadsheet in the *<OP_HOME>*/LossEventEntry/ directory.

Address each gap that you identify. For example, if your schema is missing a field, you could add the field to your schema or you could remove the field from the profile that you use for OpenPages Loss Event Entry. You can make changes by using the OpenPages application or by using the AFCON tool.

Loading the Loss Event Entry data manually
You can load the data used by IBM OpenPages Loss Event Entry manually. For example, if you have customized the data, such as the fields or field groups, you need to load the data manually to apply your changes.

About this task

You can load OpenPages Loss Event Entry data manually by using a script:
`Load_LossEvent_Entry_App_Schema.bat` (Windows) or
`Load_LossEvent_Entry_App_Schema.sh` (UNIX).

The script performs the following actions:

- Adds a new user group, called Loss Event Entry
- Adds users, and adds the new users to the Loss Event Entry user group

  The user accounts connect OpenPages Loss Event Entry to IBM OpenPages GRC Platform. Each user account is associated with a specific locale. When a user starts OpenPages Loss Event Entry, the user is logged in to OpenPages automatically with the user account for their locale.

  - LEE_EN_US
  - LEE_EN_GB
  - LEE_IT_IT
  - LEE_PT_BR
  - LEE_FR_FR
  - LEE_ES_ES
  - LEE_DE_DE
  - LEE_ZH_TW
  - LEE_ZH_CN
  - LEE_JA_JP
- Adds a new role template, called Loss Event Entry

  The role template controls access to IBM OpenPages GRC Platform by users of OpenPages Loss Event Entry.

  - The role template includes six object types: LossEvent, LossImpact, LossRecovery, SoxBusEntity, SoxDocument, and Preference.
  - The role template configures the following security permissions:
    - **Read** access to all six object types
    - **Write** access for LossEvent, LossImpact, LossRecovery and SoxDocument only
    - **Associate** access to SoxBusEntity, LossEvent, LossImpact, LossRecovery and SoxDocument only
    - **Delete** access to none of the object types
    - No application permissions
- Adds two new field groups and associates them with the LossEvent object.
  - OPSS-LE-BE includes fields to identify the entities involved in the loss event being created
  - OPSS-LE-Contact includes fields for the submitter of the loss event to provide their identifying information
- Adds a new profile, Loss Event Entry.

  The profile includes creation views for LossEvent, LossImpact, and LossRecovery. This profile drives the views in OpenPages Loss Event Entry.
- Assigns the Loss Event Entry profile to each of the nine new users
- Assigns the Loss Event Entry role template to each of the nine new users, at the root business entity security context point.

The XML files are located in the directory *<OP_HOME>*/LossEventEntry/. The following list describes the files:

- lossevent-entry-users-op-config.xml (Users and groups)
- lossevent-entry-role-template-op-config.xml (Role templates)
- lossevent-entry-schema-op-config.xml (Schema)
- LEE_object-profile-op-config.xml (Loss Event Entry profile)
- lossevent-entry-config-opx-op-config.xml (JSON configuration file)
- OpenPages-registry-entries-LEE-op-config.xml (Registry setting)
- lossevent-entry-app-string-keys-op-config.xml (Application text)
- lossevent-entry-object-strings-op-config.xml (Object strings)
- locales/<locale>/lossevent-entry-app-strings-<locale>-op-config.xml (Application text translations for each locale)

Procedure

1. Load the OpenPages Loss Event Entry data (users, groups, fields, field groups, and so on).

   To load the data on a Microsoft Windows computer, perform the following steps:

   a) Go to *<OP_HOME>*\LossEventEntry\.

   b) Open the Environment_Variables.bat file and update the openpages_domain_folder, login_username, and login_password properties.

   c) Run Load_LossEvent_Entry_App_Schema.bat.

   d) For security purposes, remove the password from the Environment_Variables.bat file.

   To load the data on a UNIX computer, perform the following steps:

   a) Go to *<OP_HOME>*/LossEventEntry/.

   b) Open the Environment_Variables.sh file and update the openpages_domain_folder, login_username, and login_password properties.

   c) Run Load_LossEvent_Entry_App_Schema.sh.

   d) For security purposes, remove the password from the Environment_Variables.sh file.

2. Optional: Add LossEvent to the list of object types that are disabled for the **Add New** wizard.

   OpenPages Loss Event Entry is more full-featured than the **Add New** wizard for loss events. You might want all users, including those that have access to IBM OpenPages GRC Platform, to use OpenPages Loss Event Entry to report loss events.

   a) Go to **Administrator** > **Settings** > **GRCM** > **Add New Wizard**.

   b) Expand **GRCM** > **Add New Wizard**.

   c) Click **Object Types Disabled**

   d) In the **Value** field, add the LossEvent object to the list.

   e) Click **Save**.

3. Optional: Configure auto-naming for the LossEvent, LossRecovery, and LossImpact object types.

   OpenPages Loss Event Entry users are unlikely to know the naming convention for new loss events, loss impacts, and loss recoveries. To avoid failures caused by duplicate names, enable auto-naming for these object types.

   a) Go to **Administrator** > **Settings**.

   b) Expand **Applications** > **GRCM** > **Auto Naming**.

   c) Expand the object type, and then expand **Auto-named**. Set **New Object** to true and **Can be Edited** to false.

Chapter 17. IBM Regulatory Compliance Analytics

You can import data from IBM Regulatory Compliance Analytics, now called IBM Watson Regulatory Compliance, into IBM OpenPages GRC Platform.

You need the following licenses to use this functionality:

- IBM Regulatory Compliance Analytics
- One or more of the following solutions:
  - IBM OpenPages Regulatory Compliance Management
  - IBM OpenPages IT Governance
  - IBM OpenPages Policy and Compliance Management

  These solutions entitle you to the Mandate, Requirement, and SOXControl object types in OpenPages that store the RCA data.

You need to do some post-installation tasks to set up OpenPages for IBM Regulatory Compliance Analytics data.

Importing an RCA certificate to the local trust store

You must import a IBM Regulatory Compliance Analytics certificate to the local trust store. It is needed to build an SSL communication between the OpenPages GRC Platform servers and the RCA server.

Before you begin

- Obtain the host name of the secure target server, in this case the RCA server. Currently, it is `rca.ibmcloud.com`. The target secure server is the server that OpenPages GRC Platform connects to in order to retrieve the certificates.
- The target secure server application from which you are going to retrieve the certificate must be running and listening on the port.

About this task

Complete this step even if you do not use SSL. You can use the **Retrieve from port** option in the IBM WebSphere administrative console to retrieve the certificate. The root certificate contains the public key and has been verified by the certificate authority (CA).

Procedure

1. Log on to the IBM WebSphere administrative console.
2. Expand **Security** and click **SSL certificate and key management**.
3. Under **Related Items**, click **Key stores and certificates** and click the **CellDefaultTrustStore** key store.
4. Under **Additional Properties**, click **Signer certificates** and **Retrieve from port**.
5. Enter the host and port information.
   - **Host**: Enter the host name of the secure target server, for example:

     ```
     rca.ibmcloud.com
     ```

   - **Port**: Enter the port number of the secure target server application, for example, 443.
   - **Alias**: Enter a descriptive name for the certificate, for example, `rca`.
6. Click **Retrieve signer information**.
7. Verify that the certificate information is for a certificate that you trust.

8. Click **Apply** and then click **Save**.
9. Restart the OpenPages GRC Platform services.

Object types, fields, and field groups for RCA data

If you upgraded and you do not have the 7.3 or later solutions schema, you might need to do some remediation in your environment to add any missing field groups and fields.

Note: If you are using the 7.3 or later solutions schema and you did not customize it, you have the required field groups and fields.

If you receive errors about missing field groups and fields when you load the RCA schema file, use the following list of schema changes to help you to resolve the errors.

The RCA schema file adds the following object types and field groups:

Mandate
Field groups: OPSS-RCA-Base

Requirement
Field groups: OPSS-RCA-Base, OPSS-RCA-Ext, OPSS-RCA-Req

SOXControl
Field groups: OPSS-RCA-Base, OPSS-RCA-Ext, OPSS-RCA-Ctl

The field groups use the following fields:

OPSS-RCA-Base
Uses the following fields:

- RCA Name: The name of the object in RCA
- RCA ID: The ID of the object in RCA
- RCA Owner: The owner of the object in RCA
- RCA Assignees: The assignees of the object in RCA
- IT Process Model: The category tags for IT Process Model in RCA
- Line of Business: The category tags for Line of Business in RCA
- Product: The category tags for Product in RCA

OPSS-RCA-Ext
Uses the following fields:

- Compliance Activity: The category tags for Compliance Activity in RCA
- Compliance Theme: The category tags for Compliance Theme in RCA
- Geography: The category tags for Geography in RCA
- Key Role: The category tags for Key Role in RCA
- Risk Type: The category tags for Risk Type in RCA

OPSS-RCA-Req
Uses the following fields:

- Materiality: The category tags for Materiality in RCA
- Process: The category tags for Process in RCA
- Obligation Status: The status of the obligation in RCA
- Interpretation: The interpretation of the obligation in RCA

OPSS-RCA-Ctl
Uses the following fields:

- Control Type: The category tags for Control Type in RCA
- Policy ID: The policy ID of the control object in RCA

- External Status: The external status of the control object in RCA
- Next Review Date: The next review date set for the control object in RCA
- Last Review Date: The date that the control object was last reviewed in RCA
- Last Updated Date: The date that the control object was last updated in RCA

The RCA schema file also makes the following changes:

OPSS-Req
Adds a new enumerated value, RCA, to the Content Source field.

OPSS-Mand
Adds new enumerated values to the Type field for the RCA document types.

Auto-naming
Enables auto-naming for the Mandate, Requirement, and SOXControl object types.

Loading the schema changes for RCA

If you upgraded to version 7.4 and you want to import data from IBM Regulatory Compliance Analytics into OpenPages GRC Platform, you need to update the solutions schema.

If you have a new installation of version 7.4, you do not need to do this procedure. The 7.4 solutions schema has the changes for RCA.

Before you begin

Upgrade OpenPages GRC Platform before you load the schema changes.

About this task

The script loads schema changes for three object types: Mandate, Requirement, and SOXControl. For more information, see "Object types, fields, and field groups for RCA data" on page 308.

Procedure

1. Go to the following directory: *<OP_HOME>*`/addon_module/loaderdata/rca`
2. Review the loader file, `rca-schema-op-config.xml`. Make any changes that are needed for your environment.
3. Update the *openpages_domain_folder*, *login_username*, and *login_password* properties in the `Environment_Variables.cmd|.sh file`.
4. Run `Load_Rca_Schema.bat|.sh`. Wait for the script to complete before you continue to the next step.
5. For security purposes, remove the password from the `Environment_Variables.bat|.sh` file.
6. Log in to OpenPages as a user with administrative privileges.
7. Optional: Update the profiles for users that will import data from RCA.

   Update the profiles so that users can see the results when they import data.

   a) Add the Mandate, Requirement, and SOXControl object types to the profiles.

   b) Update the views to include the RCA fields.

   For a list of the RCA fields, see "Object types, fields, and field groups for RCA data" on page 308.

What to do next

You can now configure OpenPages to import data from RCA. For more information, see the *IBM OpenPages GRC Administrator's Guide*.

Chapter 18. IBM OpenPages Vendor Risk Management

IBM OpenPages Vendor Risk Management supports organizations in organizing and centralizing information about their vendors.

As a solution it provides a configurable and customizable platform, allowing firms to:

- Create, maintain, and document all vendors and engagements
- Classify or "tier" vendors as low, medium, or high criticality
- Use standard risk assessments to identify and mitigate risk in a specific way for individual vendors
- Leverage the questionnaire assessment capability to conduct vendor or engagement tiering using information that you gather with risk or compliance questionnaire assessments

Installation process overview for IBM OpenPages Vendor Risk Management

If you had a fresh installation of IBM OpenPages GRC Platform version 7.2 with solutions and then upgraded to version 7.3.0.1 or later, you need to do some steps to install IBM OpenPages Vendor Risk Management.

Important:

- If you have a fresh installation of 7.4, you do not need to do these steps. IBM OpenPages Vendor Risk Management is installed when you do a fresh installation of version 7.4 with solutions.
- If you upgraded to version 7.4 from version 7.3.0.1 or later, you do not need to do these steps.
- If you customized the 7.2 or 7.3 solutions schema, you need to analyze your environment. Determine if any remediation steps are required and complete the remediation work before you install IBM OpenPages Vendor Risk Management.
- If you upgraded to version 7.2 from 7.0.x or 7.1.x, you need to analyze your environment. Determine if any remediation steps are required and complete the remediation work before you install IBM OpenPages Vendor Risk Management.
- If you upgraded to version 7.3 or 7.4 from 7.0.x or 7.1.x, you need to analyze your environment. Determine if any remediation steps are required and complete the remediation work before you install IBM OpenPages Vendor Risk Management.

The IBM OpenPages Vendor Risk Management installation process makes the following updates to your IBM OpenPages GRC Platform environment:

- Registers the VRM solution with the IBM OpenPages GRC Platform application
- Creates VRM objects
- Creates relationships between VRM objects and other objects
- Creates VRM default profiles
- Creates the VRM role templates

Complete these steps to install IBM OpenPages Vendor Risk Management:

1. Upgrade to IBM OpenPages GRC Platform version 7.4.
2. Complete the pre-installation tasks for IBM OpenPages Vendor Risk Management. Check system requirements and back up your environment. For more information, see “Pre-installation tasks for IBM OpenPages Vendor Risk Management” on page 312.
3. Complete the preparation tasks for IBM OpenPages Vendor Risk Management. For more information, see “Preparing for the installation of IBM OpenPages Vendor Risk Management” on page 312.

4. Run the scripts that load VRM into your system. For more information, see “Loading the IBM OpenPages Vendor Risk Management solution” on page 313.
5. Configure lifecycles for VRM, see “Lifecycle triggers for IBM OpenPages Vendor Risk Management objects” on page 314.
6. Configure the new menu items. For more information, see “Configuring menu items for IBM OpenPages Vendor Risk Management” on page 314. This step is optional.
7. Complete the installation. For more information, see “Completing the IBM OpenPages Vendor Risk Management installation” on page 314.

Pre-installation tasks for IBM OpenPages Vendor Risk Management

Before you install IBM OpenPages Vendor Risk Management, back up IBM OpenPages GRC Platform files, and gather information required to complete the installation.

Ensure that IBM OpenPages GRC Platform 7.4 or later is installed.

To load the VRM profiles, you need to have the approval app schema. Determine if your environment has the approval app schema. If you do not have the approval app, do one of the following:

- Deploy the approval app to load the schema. For more information, see Chapter 15, “Approval app,” on page 281.
- Use the Automated Form Configuration (AFCON) spreadsheets to update the VRM profiles to remove all references to the fields that are not in your schema. The spreadsheets are in the `Profiles` subdirectory in the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Modules/VRM/OpenPages_VRM.zip` file.

If you want to be able to restore your environment to its current state, back up the OpenPages application environment, the reporting environment, and the database.

Gather the following information. You need this information to complete the installation.

- The user name and password of the OpenPages administrator on the admin application server
- The path of the OpenPages home directory, *<OP_HOME>*

Preparing for the installation of IBM OpenPages Vendor Risk Management

You must perform some preparation tasks before you install IBM OpenPages Vendor Risk Management.

Procedure

1. Ensure that there are no long running OpenPages processes, such as a FastMap import process or a global search indexing process.
2. Check the status of the OpenPages servers. Verify that the following servers are running: the OpenPages application servers (admin and non-admin), reporting servers (active and standby), the Framework Model Generator, the database server, and the search server (if you use the global search feature).
3. Locate the VRM installation file, `OpenPages_VRM.zip`.

   The file is in the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Modules/VRM` directory.

Loading the IBM OpenPages Vendor Risk Management solution

You must load the IBM OpenPages Vendor Risk Management solution to create VRM objects, relationships, profiles, and role templates.

Before you begin

Complete the tasks that are described in "Preparing for the installation of IBM OpenPages Vendor Risk Management" on page 312 and "Pre-installation tasks for IBM OpenPages Vendor Risk Management" on page 312.

About this task

The VRM installation kit contains four folders:

Base
Contains scripts that create VRM objects and relationships. They also register the VRM solution with the OpenPages application.

Extended
Contains scripts that create relationships between VRM objects and other objects in the 7.2 modules schema.

Profiles
Contains scripts that create three profiles for VRM: VRM Master Profile, VRM Vendor Profile, VRM Vendor Manager Profile.

RoleTemplates
Contains scripts that create the VRM role template and the sample VRM user.

Procedure

1. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Modules/VRM` directory on the installation media. Locate the `OpenPages_VRM.zip` file.
2. Extract the `OpenPages_VRM.zip` file to a new directory on the admin application server.

   You now have the following subdirectories: `Base`, `Extended`, `Profile`, and `RoleTemplates`.
3. Go to the `Base` directory.
4. Edit the `Environment_Variables.cmd|.sh` file.

   Set the following parameters for your environment:

   - Windows: `openpages_domain_folder`, `administrator_username`, and `administrator_password`
   - Linux and AIX: `openpages_domain_folder`, `login_username`, and `login_password`.
5. If you are using Windows, open a command prompt by using the **Run As Administrator** option. Go to the `Base` directory.
6. Run the loader script.

   - On Windows operating systems, run the `Start.cmd` script.

     ```
     Start.cmd
     ```

   - On AIX or Linux operating systems, run the `Start.sh` script.

     ```
     ./Start.sh
     ```
7. Verify that the script ran successfully. Check for the message `Done! No errors detected`. If it is not displayed, check the `Schema_Load.log` file for errors.
8. Repeat these steps for the `Extended` directory.
9. Repeat these steps for the `Profiles` directory.
10. Repeat these steps for the `RoleTemplates` directory.

11. Remove the administrator password from the `Environment_Variables.cmd|.sh` file.

Lifecycle triggers for IBM OpenPages Vendor Risk Management objects

If you want to use the VRM objects in lifecycle triggers, ensure that you updated the trigger definitions to include VRM objects when you upgraded OpenPages.

For more information, see “Configuring lifecycles for IBM OpenPages Vendor Risk Management objects” on page 246.

Configuring menu items for IBM OpenPages Vendor Risk Management

After you load VRM, for users with access to the Vendor objects, the **Vendor** menu is displayed at the end of the menu list. You can move the **Vendor** menu to a location of your choosing. This step is optional.

For information, see "Menus: Modify the order of menus" in the *IBM OpenPages GRC Administrator's Guide*.

Completing the IBM OpenPages Vendor Risk Management installation

Complete the remaining steps to install IBM OpenPages Vendor Risk Management.

Procedure

1. Restart the OpenPages admin application server. For information about starting and stopping servers, see Chapter 11, “Starting and stopping servers,” on page 253.
2. If you use global search, update the search index.
   a) Start the search server if it is not already started.
   b) Log in to OpenPages with an administrative account.
   c) Click **Administration** > **Global Search** and click **Update**.
3. If you want to report on the fields and field groups for VRM, regenerate the reporting framework. For more information, see "Generating the reporting framework V6" in the *IBM OpenPages GRC Administrator's Guide*.

   Do this step after you have completed all other installation tasks. For example, if you want to install other features or apps, regenerate the reporting framework after all of the features and apps are installed.

Results
IBM OpenPages Vendor Risk Management is installed.

Chapter 19. Uninstalling OpenPages GRC Platform

Use the uninstall process to remove the IBM OpenPages GRC Platform software.

When you uninstall OpenPages, the uninstall process takes the following actions.

For standalone deployments:

- Removes the OpenPages application
- Deletes the IBM WebSphere profiles for OpenPages, including the deployment manager
- Deletes the `OP_HOME` directory structure
- Deletes the `CC_HOME` directory structure
- Reverts changes to Cognos Analytics that were made for OpenPages
- Deletes the search directory structures
- Deletes the IBM Business Process Manager integration kit directory structures

For shared-cell deployments:

- Removes the OpenPages application
- Deletes the IBM WebSphere profiles that were created for OpenPages
- Reverts any changes to the cell and deployment manager that were made for OpenPages
- Deletes the `OP_HOME` directory structure
- Deletes the `CC_HOME` directory structure
- Reverts changes to Cognos Analytics that were made for OpenPages
- Deletes the search directory structures
- Deletes the IBM Business Process Manager integration kit directory structures

For the `openpages-storage` directory:

- Deletes the `openpages-storage` directory when Application Server1 is uninstalled, even if it is on a network share. If it cannot be deleted, you can delete it manually after the uninstall process is finished.

For databases:

- Deletes the OpenPages data sources and reports from the Cognos Analytics content store.

For IBM Business Process Manager:

- No action is taken. The integration with IBM Business Process Manager is not uninstalled.

Uninstalling OpenPages GRC Platform process

Use these steps to uninstall IBM OpenPages GRC Platform.

Before you begin

Decide whether you need to uninstall OpenPages or roll back to a previous version. If you upgraded to 7.4.0.0 and you want to roll back to your previous version, do not do these steps. Instead, see “Rolling back an OpenPages upgrade” on page 191.

About this task

This video demonstrates how to uninstall IBM OpenPages GRC Platform:

https://youtu.be/-z73voYO7_I

Procedure

1. Stop the OpenPages search server.

   You can leave the application servers running or stop them. The reporting server must be running.
2. If you are using Windows, close any command prompts, folders, and files that are accessing the <OP_HOME>, <CC_HOME>, <SEARCH_HOME>, and IBM Business Process Manager integration kit files and directories.
3. If the OpenPages storage directory is mounted to an application server (Linux/AIX), unmount it.
4. Uninstall the OpenPages application. You can either follow the steps below or run the silent install with the `task` value in the `deploy.properties` set to `uninstall`. For more information, see Appendix A, "Silent installations," on page 319.
   a) Open your deployment in the installation app. For more information, see "Creating a deployment" on page 121.
   b) Click the task list and select **Uninstall**.
   c) Click **Validate**.
   d) Click **Uninstall**.
   e) When the process completes, check the log files for any errors:

      `<install_server_home>/src/deployment/<deployment name>/logs/nodes/<Server>/uninstall.log`

      Where *<Server>* depends on the server and how it is named in the `deploy.properties` files. The error is displayed in the user interface. You can download the log file.

   If **Uninstall** is still enabled in the installation app, the uninstall process did not complete.
5. On each remote server:
   a) If it is running, stop the agent. Go to the server card and click ■ or manually stop the agent with the `npm stop` command.
   b) Log on to the server and uninstall the agent software.
   c) Under the agent directory, go to the `/install/<OS type>` directory.
   d) Run the uninstall script.
      - Windows

        ```
        uninstall.bat
        ```

      - Linux or AIX:

        ```
        ./uninstall.sh
        ```

   e) Delete the agent directory.
6. Uninstall the installation server.
   a) Log out and close the installation app.
   b) Stop the installation server. For more information, see "Stopping the installation server" on page 40.
   c) Go to the `OP_<version>_Installer/install/<OS type>` directory.
   d) Run the uninstall script.
      - Windows

        ```
        uninstall.bat
        ```

      - Linux or AIX:

        ```
        ./uninstall.sh
        ```

e) Delete the <installation_server_home> directory where the installation app was installed, for example, NewInstaller.

What to do next

1. Drop the OpenPages database schema by using AuroraDBDelete.sql. For more information, see “Dropping all OpenPages objects in a DB2 database” on page 110 and “Dropping the full schema in an Oracle database” on page 120.
2. Drop the Cognos Analytics content store database schema by using AuroraDBDelete.sql. For more information, see “Preparing to import the Cognos content store (Oracle)” on page 223.
3. Check IBM WebSphere for OpenPages profiles. If OpenPages profiles still exist, delete them.

   To get a list of profiles:

   ```
   cd <WAS_HOME>/AppServer/bin
   ./manageprofiles.sh|.bat -listProfiles
   ```

   To delete profiles:

   ```
   ./manageprofiles.sh|.bat -delete -profileName <profile-name>
   ```

4. Verify that the OP_HOME directory does not exist.
5. Verify that the CC_HOME directory does not exist.
6. Verify that the SEARCH_HOME directory does not exist.
7. Verify that the IBM Business Process Manager integration kit directory does not exist.
8. Verify that the openpages-storage directory does not exist.
9. You can now reinstall OpenPages.

Appendix A. Silent installations

You run a silent installation from the command line by using inputs that you provide in a deployment configuration file.

This video demonstrates how to install IBM OpenPages GRC Platform in silent mode:

https://youtu.be/MV8WaNlKIdI

Creating a deployment file by using the installation server

You can use the installation server to save a deployment file that you can use to run a silent installation.

Procedure

1. Open Google Chrome or Internet Explorer.
2. Go to the URL for the installation app.
   For example, go to `https://<host>:8443`

   Replace *<host>* with the name of the computer where you set up the installation server, and ensure that you use the correct port number. 8443 is the default port number.

   For example, `https://appserver1.mycompany.com:8443`

   If you are running the installation server on your local computer, go to `https://localhost:8443`
3. Enter your credentials, and click **Login**.
4. Click **Create New**, enter a name for the deployment in **Deployment Name**, and click **Create**.
5. Enter the values for the installation that you want to deploy, and click **Save**.

   If you are going to run the installation on a different computer from where you are running the installation app, click the gear icon, and then click **Download Properties**. If you are using Internet Explorer, click **Save** or **Save As**.

   The installation server creates a directory for the deployment and a `deploy.properties` file. The deployment directory uses the **Deployment Name** value. The directory is in the `OP_<ver>_Installer/src/deployment` directory where you are running the installation server.

Creating a deployment file manually

You can manually create a deployment file for your silent installation by using one of the template files that are provided with the installation.

Procedure

1. On the computer where you copied the installation files, go the `deployment` directory.
   For example, go to the `/home/opuser/OP_<ver>_Installer/src/deployment` directory on Linux operating systems or the `C:\OP_<ver>_Installer\src\deployment` directory on Microsoft Windows operating systems.
2. Create a directory for the deployment that you want to run.
   For example, create a directory that is named `myopinstall`. If you used the above path, the full path would be `/home/opuser/OP_<ver>_Installer/src/deployment/myopinstall`

   Important: Do not use spaces or special characters in the directory name.
3. Copy the `deploy-unix.properties` or the `deploy-win.properties` file to the directory that you created.

4. Go to the `deployment` directory, and open the `deploy-unix.properties` or `deploy-win.properties` file in a text editor.
5. Enter the values to use for your deployment, and save the file.

   For more information about the properties, see "Deployment file properties" on page 320.

   - On Microsoft Windows operating systems, all path properties must use double backslashes. For example, `C:\\app\\Administrator\\product\\12.1.0\\client`
   - If you are using the remote deploy option, `remote_deploy=true`, you must provide values for the following properties:
     - `agent_port` is the port number for the agent to use
     - `agent_directory` is the folder on the remote server where you want to install the agent
     - `local_username` is the user name on the remote server that you want to use to run the installation on the remote server. The user must have administrative privileges on the remote server.
     - `local_password` is the password for the administrative user on the remote server.
     - On Linux and AIX operating systems, you must enter the `ssh_port` value for the port number to use on the remote server.

   If you are not using the remote deploy option, `remote_deploy=false`, these values are not used.
6. Rename the `deploy-unix.properties` or `deploy-win.properties` file to `deploy.properties`

Deployment file properties

The `deploy.properties` file is used by the silent installation command for a new installation, a file migration, or to upgrade the application data.

You must modify the `task` value in the `deploy.properties` file to indicate a new installation, a file migration, or to upgrade the application data. The rest of the properties in the file stay the same for a new installation, a file migration, or to upgrade the application data.

Table 59: Deployment file properties

Property	Values	Description
`deploy_type`	`standalone` `shared-cell`	`standalone` for a standalone deployment `shared-cell` for a shared cell deployment

`task`	`fresh`
	`file-migration`
	`upgrade-app-data`
	`current-deployment`
	`uninstall`
		`fresh` for a new installation
		`file-migration` to migrate from an existing installation
		`upgrade-app-data` to upgrade the application data
		`current-deployment` to modify an existing environment, such as adding a node
		`uninstall` to uninstall an environment

Table 59: Deployment file properties (continued)

Property	Values	Description
`module`	`true` `false`	The `module` value indicates whether to install the IBM OpenPages solutions.

`os`	`windows`
	`linux`
	`aix`
		The host computer operating system.

`remote_deploy`	`true` `false`	This value determines whether the installation is on a different host than the computer that runs the installer.
`auto_roll_back`	`true` `false`	This value determines whether the installation will roll back a failed operation.

`install_db`
For more information, see:
• "Configuring the database server (DB2)" on page 125
• "Configuring the database server (Oracle)" on page 127
	`full`
	`nondba`
	`done`
		`full` to install the full database. This option requires DBA credentials.
		`nondba` if the DBA installation actions are already complete. The installer will perform the non-DBA installation steps.
		`done` if the database installation is already complete.

`db_type`	`Oracle` `DB2`	`Oracle` for an Oracle database `DB2` for an IBM DB2 database.

Table 59: Deployment file properties (continued)		
Property	**Values**	**Description**
`java_home_directory`	The absolute path to `JAVA_HOME` on the server	For application servers and the deployment manager, use the IBM Java JRE that is supplied with IBM WebSphere Application Server. For reporting servers, use the IBM Java JRE that is supplied with Cognos or the Java that you configured for Cognos. For each server, the path that you enter must match the path specified in the `JAVA_HOME` system environment variable on the server. If the reporting server is deployed on the same server as the deployment manager or on the same server as an application server, do the following: • On the server, set `JAVA_HOME` to the IBM Java JRE that is supplied with IBM WebSphere Application Server. • For the `java_home_directory` property in the `[report server1]` section, use the same path as you specified for `JAVA_HOME`.

Modifying the migration properties file

If you are migrating any files from an existing OpenPages environment, you can do so by using the silent installation commands. You must edit the `migration.properties` file that is provided with the installation files.

Procedure

1. On the computer where you copied the installation files, go the `deployment` directory.
   For example, go to the `/home/`*`opuser`*`/OP_`*`<ver>`*`_Installer/src/deployment` directory on Linux operating systems or the `C:\OP_`*`<ver>`*`_Installer\src\deployment` directory on Microsoft Windows operating systems.
2. Copy the `migration.properties` file to the directory where you saved the `deploy.properties` file.

   For more information about the location, see “Creating a deployment file manually” on page 319.
3. Go to the directory, and open the `migration.properties` file in a text editor.
4. Edit the values to match your existing OpenPages environment.
5. Save and close the file.

Running the silent installation commands

After you create the deployment properties file, you can run the silent installation from the command line.

You use the silent installation command for:

- A fresh installation, where `task = fresh` in the `deploy.properties` file.
- A back up and restore task to migrate from your existing OpenPages environment to the new environment. The `deploy.properties` must have `task = file-migration`, and you must configure the `migration.properties` file. The `file-migration` task will also perform the `upgrade-app-data` task.
- An application data upgrade task, where `task = upgrade-app-data` in the `deploy.properties` file.

If you are migrating from an existing installation, you must follow this process:

1. Run a fresh install of OpenPages.

   The `task` value in the `deploy.properties` file is set to `fresh`:

   ```
   task = fresh
   ```

2. Upgrade the database. For more information, see
   - Chapter 8, “Upgrade tasks for DB2 databases,” on page 193
   - Chapter 9, “Upgrade tasks for Oracle databases,” on page 215
3. Do one of the following:
   - Run a file migration to backup and restore any files to the new installation.

     The `task` value in the `deploy.properties` file is set to `file-migration`:

     ```
     task = file-migration
     ```

     You must also edit the `migration.properties` file to match your existing environment. (The OpenPages environment that you are migrating from.)

     The `file-migration` task will also perform the `upgrade-app-data` task.
   - If you do not want to do a backup/restore, you must run the upgrade application data task.

     The `task` value in the `deploy.properties` file is set to `upgrade-app-data`:

     ```
     task = upgrade-app-data
     ```

     For more information, see .“Upgrading application data” on page 179.

For more information about upgrading, see “Upgrade scenarios” on page 167.

Procedure

1. On the computer where you copied the installation files, go to the `OP_<ver>_Installer` directory.
2. Ensure you have the correct value for the task that you want to run set in the `deploy.properties` file.
3. Run the following command:

   ```
   npm run silent <deployment_name> acceptLicense
   ```

   Where *<deployment_name>* is the name for the deployment that you used in the installation app and the deployment folder that you created in the `OP_<ver>_Installer/src/deployment` directory.

   Note: Do not close the command prompt or shell window until after the process completes.

Appendix B. Install OpenPages by using Docker

You can use Docker to install OpenPages. Use Docker to quickly install a small environment for testing or demonstration purposes.

You can install all of the OpenPages components on one computer, or you can separate the database components from the application components.

Installing Docker

You must install Docker. If you are installing Docker on an Linux operating system, you must also install Docker Compose.

Before you begin

Ensure that you have a minimum of 16 GB of RAM and 100 GB of free disk space on the computer on which you install Docker.

On Linux operating systems, you must also enable the extras repositories. For example,

- On Red Hat Enterprise Linux operating systems, use the following command to enable the extra RHEL repositories:

  ```
  sudo yum-config-manager --enable rhel-7-server-extras-rpms
  ```

- On CentOS, use the following command:

  ```
  sudo yum-config-manager --enable extras
  ```

If you are going to run OpenPages in a distributed environment, you must install Docker on two computers.

Procedure

1. Install Docker. For more information about installing Docker, see the product documentation:
   - For Linux operating systems, see Get Docker CE for CentOS (https://docs.docker.com/engine/installation/linux/docker-ce/centos/).
   - For Microsoft Windows operating systems, see Install Docker for Windows (https://docs.docker.com/docker-for-windows/install/).

     For some versions of Microsoft Windows, you might have to install Docker Toolbox. For more information, see Install Docker Toolbox on Windows (https://docs.docker.com/toolbox/toolbox_install_windows/).
   - For macOS operating systems, see Install Docker for Mac (https://docs.docker.com/docker-for-mac/install/).
2. If you are installing on Linux operating systems, do the following steps:
   a) Create a Docker group and add your user name to the group to allow for easier installation. For more information, see Manage Docker as a non-root user (https://docs.docker.com/engine/installation/linux/linux-postinstall/).
   b) Configure Docker to start when the computer starts up. For more information, see Configure Docker to start on boot (https://docs.docker.com/engine/installation/linux/linux-postinstall/).
   c) Install Docker Compose. For more information, see Install Docker Compose (https://docs.docker.com/compose/install/).
3. On Microsoft Windows or macOS operating systems, you must configure resource allocations.
   a) On Microsoft Windows operating systems, right-click the Docker icon on the Windows Taskbar, and click **Settings**.

b) On macOS operating systems, click the Docker icon on the Menu bar, and click **Preferences**.

c) On the **Advanced** tab, allocate at least 4 CPUs and 10240 MB for memory.

d) On Microsoft Windows operating systems, click **Apply**.

4. If you are using Docker Toolbox, you must create the Docker machine that is suitable to install OpenPages into.

a) Open the Docker Quickstart Terminal.

b) Run the following command to remove the default machine:

```
docker-machine rm -f default
```

c) Run the following command to create a machine that is suitable to install OpenPages into:

```
docker-machine create --driver virtualbox --virtualbox-disk-size "100000" --virtualbox-
cpu-count "4" --virtualbox-memory "10240" default
```

d) Run the following command and record the machine IP address. You must use the IP address to access the OpenPages URL.

```
docker-machine ip
```

e) Stop the Docker machine:

```
docker-machine stop
```

f) Start the Docker machine:

```
docker-machine start
```

Installing OpenPages on a single server by using Docker

After you install Docker, you can load and then start the OpenPages application.

About this task

This video demonstrates how to install OpenPages on a single server using Docker:

https://youtu.be/nO6EpCVhkK8

Procedure

1. On the computer where you installed Docker, create a directory for the files.
   For example, create a directory that is named `OPDocker`.
2. If you are installing OpenPages on a single computer, copy the following downloaded files to the directory:
   - `op<version>.tar.gz`
   - `.env`
   - `docker-compose.yml`
3. In a terminal window, go to the directory where you copied the files, and run the following command to load the Docker containers:

   ```
   docker load -i op<version>.tar.gz
   ```

   The command can take some time to run as it loads all of the software and the database content.
4. On Microsoft Windows operating systems, ensure that the HOSTNAME variable is set.

   In a PowerShell terminal, run the following command:

   ```
   echo $env:HOSTNAME
   ```

   If the value is not set, you can set it in the terminal window or add it to the `.env` file that you copied with the `op<version>.tar.gz` and `docker-compose.yml` files.

5. Open the `.env` file, and ensure that the OPVER variable value matches the version of OpenPages that you are installing.
6. On all operating systems, run the following command:

   ```
   docker-compose up -d
   ```

   Starting the application can take some time. Wait at least 10 minutes before you can access the application.

   After the application starts, you can access it at `https://<hostname>:10111/`

   For information about the log in credentials, see the `cheatsheet_*.txt` text files that are provided with the installation source files.

Installing OpenPages in a distributed environment by using Docker

After you install Docker, you can load and then start the OpenPages application. In a distributed environment, you use two Docker instances. One instance runs the database container and the other runs the application containers.

Procedure

1. On the Docker instance where you run the database container, do the following steps:
   a) Copy the following downloaded files to the directory:
      - `op<version>.tar.gz`
      - `db.env`
      - `dc-db-db2.yml`
   b) In a terminal window, go to the directory where you copied the files, and run the following command:

      ```
      docker load -i op<version>.tar.gz
      ```

      The command can take some time to run as it loads all of the software and the database content.
2. On the Docker instance where you run the application containers, do the following steps:
   a) Copy the following downloaded files to the directory:
      - `op<version>.tar.gz`
      - `app.env`
      - `dc-app-db2.yml`
   b) In a terminal window, go to the directory where you copied the files, and run the following command to load the Docker containers:

      ```
      docker load -i op<version>.tar.gz
      ```

      The command can take some time to run as it loads all of the software and the database content.
3. On Microsoft Windows operating systems, ensure that the HOSTNAME variable is set on both Docker instances.

   In a PowerShell terminal, run the following command:

   ```
   echo $env:HOSTNAME
   ```

   If the value is not set, you can set it in the terminal window or add it to the `.env` file that you copied with the `op<version>.tar.gz` and `docker-compose.yml` files.

   Repeat this step on the second Docker instance.
4. On all operating systems, on the Docker instance where you run the database container, do the following steps:
   a) Rename `db.env` to `.env`.

b) Ensure that the OPVER variable value in the `.env` file matches the version of OpenPages that you are installing.

c) Run the following command:

```
docker-compose -f dc-db-db2.yml up -d
```

5. On all operating systems, on the Docker instance where you run the application container, do the following steps:

a) Rename `app.env` to `.env`.

b) Open the `.env` file in a text editor.

c) Change the OPDB_HOST and OPREPORTDB_HOST values to the fully qualified domain name or IP address of the computer where the database container is running.

d) Ensure that the OPVER variable value in the `.env` file matches the version of OpenPages that you are installing.

e) Save and close the file.

f) Run the following command:

```
docker-compose -f dc-app-db2.yml up -d
```

Starting the application can take some time. Wait at least 10 minutes before you can access the application.

After the application starts, you can access it at `https://<hostname_for_application_server>:10111/`

<hostname_for_application_server> is the computer where you installed the application server container.

For information about the log in credentials, see the `cheatsheet_*.txt` text files that are provided with the installation source files.

Installing OpenPages with BPM in a distributed environment by using Docker

After you install Docker, you can load and then start the OpenPages application. In a distributed environment, you use two Docker instances. One instance runs the database container and the other runs the application containers.

Procedure

1. On the Docker instance where you run the database container, do the following steps:

a) Copy the following downloaded files to the directory:

- `op<version>.tar.gz`
- `op<version>bpm.tar.gz`
- `db.env`
- `dc-bpm-db-db2.yml`

b) In a terminal window, go to the directory where you copied the files, and run the following command to load the Docker containers:

```
docker load -i op<version>.tar.gz
```

```
docker load -i op<version>bpm.tar.gz
```

The command can take some time to run as it loads all of the software and the database content.

2. On the Docker instance where you run the application containers, do the following steps:

a) Copy the following downloaded files to the directory:

- op<*version*>.tar.gz
- op<*version*>bpm.tar.gz
- app.env
- dc-bpm-app-db2.yml

b) In a terminal window, go to the directory where you copied the files, and run the following command to load the Docker containers:

```
docker load -i op<version>.tar.gz
```

```
docker load -i op<version>bpm.tar.gz
```

The command can take some time to run as it loads all of the software and the database content.

3. On Microsoft Windows operating systems, ensure that the HOSTNAME variable is set on both Docker instances.

   In a PowerShell terminal, run the following command:

   ```
   echo $env:HOSTNAME
   ```

   If the value is not set, you can set it in the terminal window or add it to the `.env` file that you copied with the op<*version*>.tar.gz, `docker load -i` op<*version*>bpm.tar.gz, and `docker-compose.yml` files.

   Repeat this step on the second Docker instance.

4. On all operating systems, on the Docker instance where you run the database container, do the following steps:

   a) Rename `db.env` to `.env`.

   b) Run the following command:

   ```
   docker-compose -f dc-bpm-db-db2.yml up -d
   ```

5. On all operating systems, on the Docker instance where you run the application container, do the following steps:

   a) Rename `app.env` to `.env`.

   b) Open the `.env` file in a text editor.

   c) Change the OPDB_HOST, OPREPORTDB_HOST, and OPBPMDB_HOST values to the fully qualified domain name or IP address of the computer where the database container is running.

   d) Ensure that the OPVER variable value in the `.env` file matches the version of OpenPages that you are installing.

   e) Save and close the file.

   f) Run the following command:

   ```
   docker-compose -f dc-bpm-app-db2.yml up -d
   ```

   Starting the application can take some time. Wait at least 10 minutes before you can access the application.

   After the application starts, you can access it at `https://`<*hostname_for_application_server*>`:10111/`

   <*hostname_for_application_server*> is the computer where you installed the application server container.

   For information about the log in credentials, see the `cheatsheet_*.txt` text files that are provided with the installation source files.

Installing only the OpenPages applications by using Docker

If you already have a DB2 instance, you can restore the OpenPages and Cognos databases to your DB2 instance, and then install the OpenPages applications by using Docker.

Procedure

1. Load the OpenPages Docker containers.
   a) On Microsoft Windows operating systems, ensure that the HOSTNAME variable is set on both Docker instances.

      In a PowerShell terminal, run the following command:

      `echo $env:HOSTNAME`

      If the value is not set, you can set it in the terminal window or to the `.env` file that you use in step 4 below.
   b) On all operating systems, on the Docker instance where you want to run the application containers, copy the following downloaded files to the directory:

      - `op<version>.tar.gz`
      - `app.env`
      - `dc-app-db2.yml`
   c) On all operating systems, in a terminal window, go to the directory where you copied the files, and run the following command:

      `docker load -i op<version>.tar.gz`

      The command can take some time to run as it loads all of the software and the database content.
2. Create a backup of the OpenPages and the Cognos databases from the Docker container.
   a) Run the following command to create a backup of the OpenPages database to a `/tmp` directory:

      ```
      docker run --rm -v /tmp:/tmp op-dkreg-kvm01.swg.usma.ibm.com:5000/op/
      opdbdata_db2:<opversion> sh -c 'cp /home/db2inst1/backup/*.gz /tmp/'
      ```
   b) Run the following command to create a backup of the Cognos database to a `/tmp` directory:

      ```
      docker run --rm -v /tmp:/tmp op-dkreg-kvm01.swg.usma.ibm.com:5000/op/
      opreportdbdata_db2:<opversion> sh -c 'cp /home/db2inst1/backup/*.gz /tmp/'
      ```
3. Restore the databases to your DB2 instance.
   a) Copy the two `*.gz` files to the computer where DB2 is installed.
   b) Run the following command to restore the databases:

      `db2 restore database <database alias> from <backup directory>`

      You must run the command for the OpenPages database and the Cognos database. Ensure that the DB2 database instance that you restore the OpenPages database to has Oracle compatibility enabled.
4. Start the OpenPages application servers.
   a) On the computer where you copied the downloaded files, rename `app.env` to `.env`.
   b) Open the `.env` file in a text editor.
   c) Change the OPDB_* values to the database connection parameters for the OpenPages database.
   d) Change the OPREPORTDB_* values to the database connection parameters for the Cognos database.
   e) Ensure that the OPVER variable value in the `.env` file matches the version of OpenPages that you are installing.

f) Save and close the file.

g) Run the following command:

```
docker-compose -f dc-app-db2.yml up -d
```

Starting the application can take some time. Wait at least 10 minutes before you can access the application.

After the application starts, you can access it at `https://<hostname_for_application_server>:10111/`

<hostname_for_application_server> is the computer where you installed the application server container.

For information about the log in credentials, see the `cheatsheet_*.txt` text files that are provided with the installation source files.

Note: The Cognos data source signon credentials are not updated by the container startup. You must manually update the signon credentials after the Cognos server starts. For more information, see Modifying a signon in the Cognos documentation (https://www.ibm.com/support/knowledgecenter/en/SSEP7J_11.0.0/com.ibm.swg.ba.cognos.ug_cra.doc/t_asg_stepstomodifyasignon.html#ASG_StepstoModifyaSignon).

Installing only the OpenPages and BPM applications by using Docker

If you already have a DB2 instance, you can restore the OpenPages and Cognos databases to your DB2 instance, and then install the OpenPages applications by using Docker.

Procedure

1. Load the OpenPages Docker containers.
   a) On Microsoft Windows operating systems, ensure that the HOSTNAME variable is set on both Docker instances.

      In a PowerShell terminal, run the following command:

      ```
      echo $env:HOSTNAME
      ```

      If the value is not set, you can set it in the terminal window or to the `.env` file that you use in step 4 below.

   b) On all operating systems, on the Docker instance where you want to run the application containers, copy the following downloaded files to the directory:

      - op*<version>*.tar.gz
      - op*<version>*bpm.tar.gz
      - app.env
      - dc-app-db2.yml

   c) On all operating systems, in a terminal window, go to the directory where you copied the files, and run the following command:

      ```
      docker load -i op<version>.tar.gz
      ```

      ```
      docker load -i op<version>bpm.tar.gz
      ```

      The command can take some time to run as it loads all of the software and the database content.
2. Create a backup of the OpenPages, Cognos, and BPM databases from the Docker container.
   a) Run the following command to create a backup of the OpenPages database to a `/tmp` directory:

```
docker run --rm -v /tmp:/tmp op-dkreg-kvm01.swg.usma.ibm.com:5000/op/
opdbdata_db2:<opversion> sh -c 'cp /home/db2inst1/backup/*.gz /tmp/'
```

b) Run the following command to create a backup of the Cognos database to a /tmp directory:

```
docker run --rm -v /tmp:/tmp op-dkreg-kvm01.swg.usma.ibm.com:5000/op/
opreportdbdata_db2:<opversion> sh -c 'cp /home/db2inst1/backup/*.gz /tmp/'
```

c) Run the following command to create a backup of the BPM database to a /tmp directory:

```
docker run --rm -v /tmp:/tmp op-dkreg-kvm01.swg.usma.ibm.com:5000/op/
opbpmdbdata_db2:<opversion> sh -c 'cp /home/db2inst1/backup/*.gz /tmp/'
```

3. Restore the databases to your DB2 instance.
   a) Copy the three *.gz files to the computer where DB2 is installed.
   b) Run the following command to restore the databases:

      ```
      db2 restore database <database alias> from <backup directory>
      ```

      You must run the command for the OpenPages database, the Cognos database, and the BPM database. Ensure that the DB2 database instance that you restore the OpenPages database to has Oracle compatibility enabled.
4. Start the OpenPages application servers.
   a) On the computer where you copied the downloaded files, rename app.env to .env.
   b) Open the .env file in a text editor.
   c) Change the OPDB_* values to the database connection parameters for the OpenPages database.
   d) Change the OPREPORTDB_* values to the database connection parameters for the Cognos database.
   e) Change the OPBPMDB_* values to the database connection parameters for the BPM database.
   f) Ensure that the OPVER variable value in the .env file matches the version of OpenPages that you are installing.
   g) Save and close the file.
   h) Run the following command:

      ```
      docker-compose -f dc-app-db2.yml up -d
      ```

   Starting the application can take some time. Wait at least 10 minutes before you can access the application.

   After the application starts, you can access it at https://<hostname_for_application_server>:10111/

   <hostname_for_application_server> is the computer where you installed the application server container.

   For information about the log in credentials, see the cheatsheet_*.txt text files that are provided with the installation source files.

   Note: The Cognos data source signon credentials are not updated by the container startup. You must manually update the signon credentials after the Cognos server starts. For more information, see Modifying a signon in the Cognos documentation (https://www.ibm.com/support/knowledgecenter/en/SSEP7J_11.0.0/com.ibm.swg.ba.cognos.ug_cra.doc/t_asg_stepstomodifyasignon.html#ASG_StepstoModifyaSignon).

Accessing the OpenPages applications

The application URLs and credential information for OpenPages, Cognos, and IBM BPM installations from Docker are provided in the cheatsheet_deployment_info.txt file that is provided with the installation source files.

Stopping and starting OpenPages services deployed to Docker and other tasks

You stop and start the OpenPages application services by using docker-compose commands, and you can perform additional tasks by using Docker commands.

Procedure

1. To stop the OpenPages application, run the following command in a terminal window:

   ```
   docker-compose stop
   ```
2. To start the OpenPages application, run the following command in a terminal window:

   ```
   docker-compose start
   ```
3. You can use the following commands to check the status of the OpenPages containers:
   - Use the following command to list all of the active containers, the original images of containers, and the start-up command configurations:

     ```
     docker ps
     ```
   - Use the following command to list all of the active containers and the stopped containers:

     ```
     docker ps -a
     ```
   - Use the following command to show the CPU, memory, and I/O usage for the containers:

     ```
     docker stats
     ```
   - Use the following command to show the console output for the container:

     ```
     docker logs <container_name>
     ```
   - Use the following command to run commands on the container:

     ```
     docker exec <container_name> <command>
     ```

     For example, you can access the container by using the following command:

     ```
     docker exec -it <container_name> /bin/bash
     ```
   - Use the following command to access the bash terminal for a container:

     ```
     ssh -l <user> -p <port> <localhost | docker_host_IP>
     ```

     For the credential and port information, see the `cheatsheet_deployment_info.txt` file that is provided with the installation source files.
4. Some additional tasks are documented in the `cheatsheet_misc_operations.txt` file that is provided with the installation source files.
   For example, migrating data into containers, taking a backup, persisting your customizations as your own images, and transferring a deployment from one system to another.

Uninstalling OpenPages from Docker

You can uninstall the OpenPages containers and also free up the disk space that is allocated to the contains by using Docker commands.

Procedure

1. Use the following command to stop and remove the OpenPages containers:

   ```
   docker-compose down -v
   ```
2. Use the following command to remove the images to free up disk space:

   ```
   docker rmi -f $(docker images -q)
   ```

Appendix C. Adding servers to an OpenPages GRC Platform deployment

You can add non-admin application servers and standby reporting servers to your IBM OpenPages GRC Platform deployment.

This video demonstrates how to add servers to a deployment. You can add non-admin application servers and standby reporting servers to create or expand a horizontal cluster. You can also add vertical cluster members to an application server:

https://youtu.be/YuuCXuz8FAs

Adding servers to a deployment (horizontal cluster members)

You can add servers to a IBM OpenPages GRC Platform deployment. You can add non-admin application servers and standby reporting servers to increase the number of horizontal cluster members.

Before you begin

Review the following checklist before you add servers to your installation:

- Ensure that the installation server can communicate with all of the servers in your deployment, including the servers that you want to add.
- Ensure that the servers you want to add can access the `openpages-storage` directory.
- Prepare the servers that you want to add to your deployment. For more information, see the following topics in the *IBM OpenPages GRC Installation and Deployment Guide*
  - "Checklist for Windows servers" on page 47
  - "Checklist for Linux and AIX servers" on page 47

    On the server that you are adding, configure the same file system user names and passwords that you are using for the other servers in your deployment. Also, use the same file share permissions on all servers.
  - "Checklist for application servers" on page 52
  - "Checklist for reporting servers" on page 88
- Ensure that the same version of IBM Java Software Development Kit (SDK) or IBM WebSphere SDK Java Technology for WebSphere Application Server is installed.

Attention: If you are using SSL for your application servers, you must ensure that you are **not** using the TLSv1.1 or the TLSv1.2 protocols while you add the servers. For more information, see Verifying the SSL protocol before you deploy a new non-administrative server.

If you want to use TLSv1.1 or the TLSv1.2, you can change the SSL protocol to either of these protocols after you complete the configuration.

Procedure

1. Verify the status of the servers in your deployment. All servers must be running, except for the search server, which must be stopped.

   See Chapter 11, "Starting and stopping servers," on page 253.
2. Start the installation app and log in.
3. Open your deployment.
4. Do one of the following steps on the server that you want to add:
   - Update the antivirus policy on the remote server to allow `Node.js`.

- Disable antivirus software on the remote server. You can re-enable it after you complete the installation of the new servers.

5. Add a new horizontal cluster member:
   a) Click the server list and click the type of server that you want to add.
      - Click **Application Server** to add a non-admin application server horizontal cluster member.
      - Click **Reporting Server** to add a standby reporting server horizontal cluster member.

      A new server card is added to your deployment.
   b) Enter values for the server.

      If you are adding application servers, you must enter unique names in the **OP Node Name** and **OP Server Name** fields.

      If you are adding reporting servers, you must configure additional Cognos dispatchers to ensure that the incoming requests are distributed across the reporting servers.

      For more information, see the *IBM OpenPages GRC Installation and Deployment Guide*.
6. Click **Validate** to save and validate the deployment.

   During the validation process, the installation app installs the agent software on the remote servers, starts the agents, validates the deployment properties, and verifies that the prerequisites for the installation are complete.

   For example, the following image shows an application server card after validation is complete The **Agent On** icon is green, indicating that the agent is installed and running on the remote server.

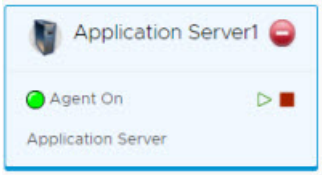


Figure 19: Agent software is running on Application Server1

You can download a validation report. Click the link at the top of the page.

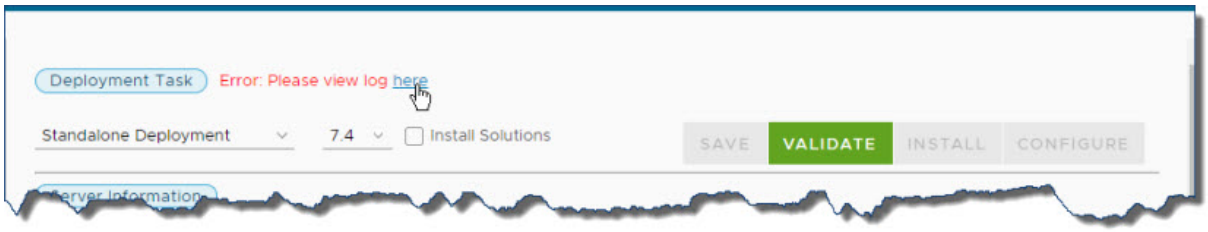


Figure 20: Click to download a validation report

The validation reports are also stored in the `<installation_server_home>/src/deployment/<deployment-name>/validation` directory.

Fix any errors and review the warnings. Click **Save**, and then click **Validate**. When the **Install** button is available, you can continue. If fixing issues requires an update to the environment variables on any servers, you must restart the installation server/agent on that server before re-validating.

7. Click **Install**.

   The installation server stages the assets onto the new servers in your deployment.

   Tip: You can log out and close the browser window. The **Install** process continues to run. When you log in to the installation app again, the app shows the status of your deployment. You can also close the browser window during the **Configure** process.

8. Click **Configure**.

   The installation server sets up and configures the IBM OpenPages GRC Platform components.
9. Start the search server.

   The installation server restarts the other servers in your deployment automatically.
10. Do the post installation tasks.

    If you added a non-admin application server, do the following tasks:

    - If the server is running on Windows, configure the OpenPages services to run under a domain account. See "Configuring OpenPages GRC Platform applications to use a domain account on Windows operating systems" on page 139.
    - If the server is running on Linux or AIX, configure file share permissions. See "Configuring file share permissions on AIX or Linux operating systems" on page 139.
    - Configure the load balancer. See "Configuring IBM HTTP Server to load balance application servers " on page 144.
    - Verify that you have shared the `openpages-storage` directory so that the non-admin application server can access it. See "Sharing a network OpenPages GRC Platform storage directory on AIX or Linux operating systems" on page 139 or "Sharing a network OpenPages GRC Platform storage directory on Windows operating systems" on page 141.

    If you added a standby reporting server, do the following tasks:

    - Configure the load balancer. See "Load balancing the OpenPages GRC Platform reporting server" on page 148.

Results

When the installation is complete, ensure that you can log in to OpenPages and complete tasks such as creating or updating objects, and running reports.

Adding non-admin application servers to a deployment (vertical cluster members)

You can add non-admin application servers to a IBM OpenPages GRC Platform deployment by increasing the number of vertical cluster application servers.

Before you begin

Review the following checklist before you add servers to your installation:

- Ensure that the installation server can communicate with all of the servers in your deployment.

Procedure

1. Decide which application server you want to modify. Ensure that the server has sufficient hardware resources to support vertical cluster members.

   Open the Detailed System Requirements report. Click the **Hardware** tab. Review the detailed system requirements for application servers.
2. Verify the status of the servers in your deployment. All servers must be running, except for the search server, which must be stopped.

   See Chapter 11, "Starting and stopping servers," on page 253.
3. Start the installation app and log in.
4. Open your deployment.
5. Click the **Application Server** card of the server you want to modify.
6. Add vertical cluster members by increasing the value in the **OP Vertical Cluster Number** field.

Note: Do not decrease the number of vertical cluster members. A decrease in the value can cause validation errors.

7. Click **Validate** to save and validate the deployment.

   You can download a validation report. Click the link at the top of the page.

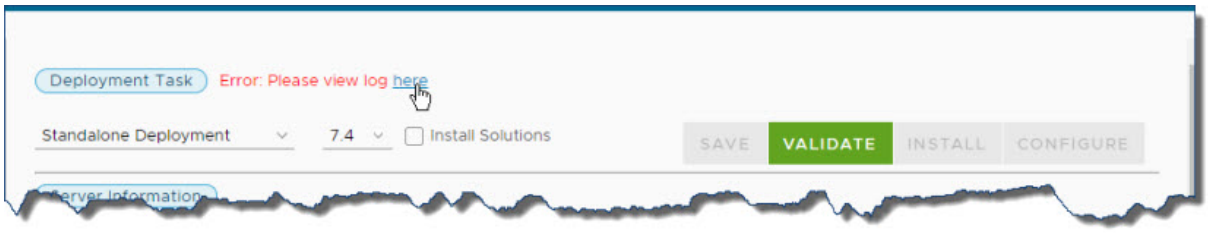


Figure 21: Click to download a validation report

   The validation reports are also stored in the `<installation_server_home>/src/deployment/<deployment-name>/validation` directory.

   Fix any errors and review the warnings. Click **Save**, and then click **Validate**. When the **Install** button is available, you can continue. If fixing issues requires an update to the environment variables on any servers, you must restart the installation server/agent on that server before re-validating.

8. Click **Install**.

   The installation server stages the assets onto the new servers in your deployment.

   Tip: You can log out and close the browser window. The **Install** process continues to run. When you log in to the installation app again, the app shows the status of your deployment. You can also close the browser window during the **Configure** process.

9. Click **Configure**.

   The installation server sets up and configures the IBM OpenPages GRC Platform components.

10. Start the search server.

    The installation server restarts the other servers in your deployment automatically.

Results

When the installation is complete, ensure that you can log in to OpenPages and complete tasks such as creating or updating objects, and running reports.

What to do next

Update the load balancer with information for the new non-admin application server. See “Configuring IBM HTTP Server to load balance application servers ” on page 144.

Appendix D. Troubleshooting problems

Troubleshooting is a systematic approach to solving a problem. The goal of troubleshooting is to determine why something does not work as expected and how to resolve the problem.

Review the following table to help you or customer support resolve a problem.

Table 60: Troubleshooting actions to prevent problems

Action	**Description**
Apply all known fix packs, service levels, or program temporary fixes (PTF).	A product fix might be available to fix the problem.
Ensure that the configuration is supported.	Review the software and hardware requirements in the Supported Environments document.
Look up error message codes by selecting the product from the IBM Support Community and then typing the error message code into the **Search support** box.	Error messages give important information to help you identify the component that is causing the problem.
Reproduce the problem to ensure that it is not just a simple error.	If samples are available with the product, you might try to reproduce the problem by using the sample data.
Check the installation directory structure and file permissions.	The installation location must contain the appropriate file structure and the file permissions. For example, if the product requires write access to log files, ensure that the directory has the correct permission.
Review relevant documentation, such as release notes, technotes, and proven practices documentation.	Search the IBM knowledge bases to determine whether your problem is known, has a workaround, or if it is already resolved and documented.
Review recent changes in your computing environment.	Sometimes installing new software might cause compatibility issues.

If you still need to resolve problems, you must collect diagnostic data. This data is necessary for an IBM technical-support representative to effectively troubleshoot and assist you in resolving the problem. You can also collect diagnostic data and analyze it yourself.

Troubleshooting resources

Troubleshooting resources are sources of information that can help you resolve a problem that you have with a product. Many of the resource links provided can also be viewed in a short video demonstration.

To view the video version, search for "troubleshooting" through either Google search engine or YouTube video community.

Support Community

The IBM Support Community is a unified, centralized view of all technical support tools and information for all IBM systems, software, and services.

Use IBM Support Community to access all the IBM support resources from one place. You can adjust the pages to focus on the information and resources that you need for problem prevention and faster problem resolution.

Find the IBM OpenPages GRC Platform content that you need by selecting your products from the IBM Support Community.

Service requests

Service requests are also known as Problem Management Records (PMRs). Several methods exist to submit diagnostic information to IBM Software Technical Support.

To open a service request, or to exchange information with technical support, view the IBM Software Support Exchanging information with Technical Support page (www.ibm.com/software/support/exchangeinfo.html). Service requests can also be submitted directly by using the Service requests (PMRs) tool (www.ibm.com/support/entry/portal/Open_service_request) or one of the other supported methods that are detailed on the exchanging information page.

Fix Central

Fix Central provides fixes and updates for your system software, hardware, and operating system.

Use the pull-down menu to go to your product fixes on Fix Central (www.ibm.com/support/fixcentral). You might also want to view Getting started with Fix Central (www.ibm.com/systems/support/fixes/en/fixcentral/help/getstarted.html).

Knowledge bases

You can often find solutions to problems by searching IBM knowledge bases. You can optimize your results by using available resources, support tools, and search methods

You can find useful information by searching the information center for IBM Cognos, but sometimes you must look beyond the information center to resolve problems.

IBM Support Community

The support community provides tools and information for all IBM systems, software, and services. The IBM Support Community provides you with access to the IBM electronic support portfolio from one place. You can customize the pages to focus on the information and resources that you need for problem prevention and faster problem resolution.

Find the IBM OpenPages GRC Platform content that you need by selecting your products from the IBM Support Community.

From the IBM Support Community, you can search technotes and APARs (problem reports).

IBM masthead search

Use the IBM masthead search by typing your search string into the **Search** field at the beginning of any ibm.com page.

External search engines

Search for content by using any external search engine, such as Google, Yahoo, or Bing. If you use an external search engine, your results are more likely to include information that is outside the ibm.com® domain. However, sometimes you can find useful problem-solving information about IBM products in newsgroups, forums, and blogs that are not on ibm.com.

Tip: Include "IBM" and the name of the product in your search if you are looking for information about an IBM product.

Log files

Use the log files to help troubleshoot problems that occur during the installation.

This video discusses errors, warnings, and log files:

https://youtu.be/ljYXq1Cj8gU

Installation log files

Log files for a deployment are stored on the installation server in the *<installation_server_home>*/src/deployment/*<deployment-name>*/logs/nodes directory.

For example, if your deployment is named "CorporateFinance", the log files for each deployed server are located in: *<installation_server_home>*/src/deployment/CorporateFinance/logs/nodes

The nodes directory contains a subdirectory for each server in your deployment, for example:

```
Application Server1
Application Server2
Database Server
Deployment Manager
Global Search Server
Report Server1
```

As a deployment progresses through the **Validate**, **Install**, and **Configure** phases, the following log files are created in the subdirectories:

- pre-vali.log
- install.log
- config.log

You might also see a restart.log file in the application server subdirectories.

When a component is installed remotely, the log files are copied from the remote server to the appropriate subdirectory on the installation server automatically. For example, if Application Server2 is installed on a remote computer, the files from the remote computer are copied to the Application Server2 directory on the installation server computer.

The subdirectories also contain JSON files that contain metadata relevant to the deployment of that server. Do not delete the JSON files.

The base directory, *<installation_server_home>*/src/deployment/*<deployment-name>*/logs/ also contains a log file that is named installer.log that contains logging information about the installation server.

Most log file entries contain a time stamp followed by the log message's status (error, warn, or info). Examine the log files for entries that contain error for any issues that might need to be addressed.

The info entries are primarily progress messages.

The warn entries indicate that a non-fatal issue was encountered. Some post-installation action might be needed.

The error entries indicate that an issue occurred. In most cases, you must take corrective action in order for the deployment to proceed.

Validation reports

During a deployment, the validation process runs at various points. If you are using the installation app, for example, the validation process runs each time that you click **Validate**.

The status of each validation is summarized in a color-coded Validation_Report.pdf file. If you are using the installation app, you can click a link to download the validation report.

The validation reports are stored on the installation server in the*<installation_server_home>*/src/deployment/*<deployment-name>*/validation directory.

On the individual servers where the installer agents are running, validation reports for each server are stored in a validation subdirectory within each server-specific directory. For example: *<agent_install_home>*/src/deployment/*<deployment-name>*/logs/nodes/Database Server/validation.

New PDF files are generated each time that a validation is run.

Collect log files and diagnostic data

You can use the LogCollector tool to collect log files and diagnostic data from the IBM OpenPages GRC Platform environment and from OpenPages databases.

The LogCollector tool collects log files and diagnostic data on an application server.

In a horizontal cluster environment, run the tool on each application server in your environment.

In a vertical cluster, with multiple application servers installed on the same machine, the tool gathers logs from all servers. The tool gathers logs from reporting servers only when they are installed on the same machine as one of the application servers. If the search server is also installed on the same machine, for example in a development environment, the tool also collects the search server logs.

The LogCollector tool is in the *<OP_HOME>*/bin directory.

The tool uses the following command options:

--configuration or -c to specify a configuration file path. If you do not include this option, the default is LogCollector.xml. Using --configuration or -c is optional.

Note: For all command options, the long name command option uses two hyphens (--), whereas the short name uses only 1 hyphen (-).

--database or -d to collect log and diagnostic data from only the database.

--file or -f to collect only log and diagnostic files.

--property or -p to set property values. Using --property or -p is optional.

You must include -p for each property that you use. For example, -p DB_OP_USER *username* -p DB_OP_PASSWORD *password*. The properties that you can use are:

Property	Description
DB_OP_USER	The OpenPages database user name
DB_OP_PASSWORD	The OpenPages database user's password
DB_TYPE	The database type. This value can be db2 or oracle.
DB_URL	The database JDBC URL.
BPM_HOME	The BPM home location.

--target or -t to specify a target package file. If you do not include this option, the default is LogCollector_*<timestamp>*.zip. Using --target or -t is optional.

--help or -h to display command help.

This video demonstrates how to collect log files:

https://youtu.be/81X6H0bSlDg

Example: Getting all information

1. Log in as the Super Administrator user.

2. Open a Command Prompt window.
3. Go to the *<OP_HOME>*/bin directory. For example, on Microsoft Windows operating systems, go to C:\OpenPages\bin. On UNIX operating systems, go to /opt/OpenPages/bin.
4. Enter the following command:

   On Microsoft Windows operating systems: LogCollector.cmd

   On UNIX operating systems: ./LogCollector.sh

The tool generates a package file that is named LogCollector_*<timestamp>*.zip in the C:\OpenPages\bin directory or the /opt/OpenPages/bin directory.

Example: Specifying a target package file

1. Log in as the Super Administrator user.
2. Open a Command Prompt window.
3. Go to the *<OP_HOME>*/bin directory. For example, on Microsoft Windows operating systems, go to C:\OpenPages\bin. On UNIX operating systems, go to /opt/OpenPages/bin.
4. Enter the following command:

   On Microsoft Windows operating systems: LogCollector.cmd -t LogCollector.zip

   On UNIX operating systems: ./LogCollector.sh -t LogCollector.zip

The tool generates a package file that is named LogCollector.zip in the C:\OpenPages\bin directory or the /opt/OpenPages/bin directory.

Example: Getting information from an IBM DB2 database

1. Log in as the Super Administrator user.
2. Open a Command Prompt window.
3. Go to the *<OP_HOME>*/bin directory. For example, on Microsoft Windows operating systems, go to C:\OpenPages\bin. On UNIX operating systems, go to /opt/OpenPages/bin.
4. Enter the following command:

   On Microsoft Windows operating systems: LogCollector.cmd -d -p DB_TYPE db2 -p DB_URL jdbc:db2://localhost:50000/OPX -p DB_OP_USER openpage -p DB_OP_PASSWORD password

   On UNIX operating systems: ./LogCollector.sh -d -p DB_TYPE db2 -p DB_URL jdbc:db2://localhost:50000/OPX -p DB_OP_USER openpage -p DB_OP_PASSWORD password

The tool generates a package file that is named LogCollector_*<timestamp>*.zip in the C:\OpenPages\bin directory or the /opt/OpenPages/bin directory.

Order of starting and stopping services

To restart the servers in an IBM OpenPages GRC Platform environment, you must stop and start them in sequence. Restarting the servers in order ensures that the OpenPages application server and Cognos Analytics can connect to the database server.

Use the following sequence to stop the servers:

1. Stop the services on the IBM BPM server.
2. Stop the services on the Search server.

3. Stop the services on the Cognos Analytics reporting server(s).
4. Stop the services on the OpenPages application server(s).
5. Stop the services on the database server.

Use the following sequence to start the servers:

1. Start the services on the database server.
2. Start the services on the OpenPages application server(s).
3. Start the services on the Cognos Analytics reporting server(s).
4. Start the services on the Search server.
5. Start the services on the IBM BPM server.

Manually creating the reporting table space and user for Oracle databases

After you create the Cognos content store, you can manually create the content store user and the content store table space. This user must be able to create, alter, and drop tables, triggers, views, procedures, and sequences, and have the CONNECT and RESOURCE roles.

Procedure

1. Log on to the reporting server as a user with administrative privileges.

   Note: For Linux operating systems, log in as a non-root user.
2. Copy the `OP_<version>_Configuration/Database/ORACLE/COGNOS` directory to the local system.
3. Log on to SQL*Plus by using the following command:

   `sqlplus system/<system_password>@<oracle_tns_alias>`

   To create the table space in the OpenPages database instance, enter the *oracle_tns_alias* of the OpenPages database. The database alias for the OpenPages database instance, as set during the Oracle database installation, is *oracle_tns_alias*. If necessary, you can retrieve this alias from the `tnsnames.ora` file.

   If you created a separate database instance for the content store, create the table space in the content store database instance. Enter the *oracle_tns_alias* of the content store database.
4. At the SQL prompt, type the following command:

```
@cognosdbcreate.sql <cognos_user> <cognos_password>
     <oracle_data_home> <tablespace_name> <log_file>
```

Table 61: Parameter descriptions for the `cognosdbcreate.sql` script for Oracle databases

Script parameters	Description
cognos_user	Specifies the new user name for the content store database
cognos_password	Specifies the password for the cognos_user
oracle_data_home	Specifies the location of the Oracle data home directory for the content store database instance. On Windows operating systems: *<ORACLE_BASE>*`\oradata\`*<SID>*
tablespace_name	Specifies the name of the exported table space.
log_file	Specifies the file name and location of the log file to create.

Known problems and solutions for global search

Issues that are related to the IBM OpenPages GRC Platform global search component are most commonly encountered when you are setting it up or when it is updated to synchronize the search index for changes that are made to the OpenPages GRC Platform schema (such as adding or removing object types or fields).

When an administrative operation fails, you can normally resolve these issues by clicking **View Log** to see the log message for the failed global search operation.

The most common failure is that the search service is not started, for which you see this error:

"Could not establish connection to the search engine. Please contact your system administrator."

Ensure that the search service is started or restart to try to resolve the issue.

Global search start fails

If you configured the global search services to start and stop by using a script and you forgot to stop global search before rebooting the system, when you attempt to start the global search services, the services will fail to start. To fix this issue complete the following steps.

Procedure

1. Log on to the search server as a user with administrative privileges.
2. Open a command line on the search server.
3. Go to the *<SEARCH_HOME>*/opsearchtools/ directory and run the following commands.

   On Microsoft Windows operating systems, run:

   ```
   opsearchtool.cmd clearState -indexname openpages
   opsearchtool.cmd clearState -indexname folderacl
   ```

   On UNIX operating systems, run:

   ```
   ./opsearchtool.sh clearState -indexname openpages
   ./opsearchtool.sh clearState -indexname folderacl
   ```

Global search setup fails

In some rare cases, the global search component might encounter a failure during the creation of the search index, before the operation completes. The failure might be caused by hardware issues, database issues, or a power outage, for example. When this happens, the state of the global search setup is in an undefined state and the **Enable** button might become available, giving the misleading impression that global search was set up successfully. To recover from this state, investigate the root cause, resolve it, and then set up global search again.

Procedure

1. Investigate and resolve the root cause of the failure.
2. Log on to OpenPages as a user with administrative privileges.
3. Click **Administration** > **Global Search**.
4. Click **Drop** to drop the search index.
5. Wait for the drop process to complete.

   If the **Drop** button is not available or if the drop process fails, see “ Forcing a reset of global search” on page 346.
6. Click **Create** to re-create the search index.

Forcing a reset of global search

In some rare cases, it might be necessary to reset the IBM OpenPages GRC Platform global search component if you cannot restore it from the global search administration page. These issues might prevent you from successfully completing tasks in the global search administration page. To resolve these issues, complete the following steps.

Procedure

1. Log on to the search server as a user with administrative privileges.
2. Open a command line on the search server.
3. Go to the *<SEARCH_HOME>*/opsearchtools/ directory to run the commands in the following steps.

   Attention: At the successful completion of each command, the statement "Normal completion of command" should appear. If it does not, contact Customer Support to diagnose the issue.
4. Ensure that Solr is running and is reachable on port 8983. If Solr is not running, then run the following command to start it.

   Microsoft Windows:

   ```
   opsearchtool.cmd startSolr
   ```

   UNIX:

   ```
   ./opsearchtool.sh startSolr
   ```
5. Run the following commands to stop indexing.

   Microsoft Windows:

   ```
   opsearchtool.cmd stopIndexing -indexname openpages
   opsearchtool.cmd stopIndexing -indexname folderacl
   ```

   UNIX:

   ```
   ./opsearchtool.sh stopIndexing -indexname openpages
   ./opsearchtool.sh stopIndexing -indexname folderacl
   ```
6. Verify that no opsearchtool.jar processes are running.

   On Microsoft Windows operating systems, use the task manager to see whether any opsearchtool.jar processes are running. If there are, terminate them.

   On UNIX operating systems, use the ps command to see whether any opsearchtool.jar processes are running. If there are, terminate them.
7. Run the following commands to clear any PID states that might still be set if the opsearchtool.jar processes did not end successfully.

   Microsoft Windows:

   ```
   opsearchtool.cmd clearState -indexname openpages
   opsearchtool.cmd clearState -indexname folderacl
   ```

   UNIX:

   ```
   ./opsearchtool.sh clearState -indexname openpages
   ./opsearchtool.sh clearState -indexname folderacl
   ```
8. Run the following commands to reset global search.

Microsoft Windows:

```
opsearchtool.cmd resetSolr -indexname openpages
opsearchtool.cmd resetSolr -indexname folderacl
opsearchtool.cmd resetDb
opsearchtool.cmd stopSolr
opsearchtool.cmd startSolr
```

UNIX:

```
./opsearchtool.sh resetSolr -indexname openpages
./opsearchtool.sh resetSolr -indexname folderacl
./opsearchtool.sh resetDb
./opsearchtool.sh stopSolr
./opsearchtool.sh startSolr
```

9. Log on to OpenPages as a user with administrative privileges.
10. Click **Administration** > **Global Search**.
11. Click **Create** to re-create the search index.

What to do next

Resetting the global search component does not change your global search settings, such as object types, fields that are enabled for search, registry settings, or property settings. The reset disables the global search component. You must enable it again to make it available to users.

Checking for global search setup issues and periodic monitoring

When the incremental indexer is running during global search setup or after setup, some records might not get indexed due to issues with the record, other system errors, or application errors.

About this task

If the issues are not unrecoverable, they do not impede the setup process or the incremental indexer. However, the records that do not get indexed are logged in an error-log file, with an error message that explains the issue so you can take appropriate action. The error-log files are never rotated. Periodically examine this directory for new error files.

Procedure

1. Log on to OpenPages as a user with administrative privileges.
2. Go to the directory *<SEARCH_HOME>*`/opsearchtools/logs_error/ .`
3. Examine this directory for new error files.

Encryption of long strings in OpenPages running on Oracle 12.1

Before encrypting long strings in OpenPages running on Oracle 12.1, refer to the following Technote: http://www.ibm.com/support/docview.wss?uid=swg22010106. The Technote describes a potential issue and how to resolve it by obtaining the appropriate patch from Oracle support and applying it to your environment.

Before you contact IBM OpenPages Support

When you contact IBM OpenPages Support, you need to collect diagnostic data and provide a detailed use case of the issue.

About this task

Before you contact IBM OpenPages Support to help with resolving global search issues, follow these steps to collect diagnostic data.

Note: You do not need to stop global search, the OpenPages application server, the database server, or any other application when you run the `collectDiagData` command.

Procedure

1. Log in to the OpenPages global search server as a user with administrative privileges.
2. Start a command prompt.
3. Go to the *<SEARCH_HOME>*/opsearchtools/ folder and run the following commands:
   - Microsoft Windows:

     ```
     mkdir diag
     opsearchtool.cmd collectDiagData -diagpath diag
     ```

   - UNIX:

     ```
     mkdir diag
     ./opsearchtool.sh collectDiagData -diagpath diag
     ```

   Attention: The collectDiagData command might report warning messages that look as if the command failed. This warning can happen due to a number of reasons, such as the data that is being collected cannot be accessed or is not yet available. If you see any such warnings, capture them and include them as part of the diagnostic data to IBM OpenPages Support.
4. Add the contents of the new folder that is created under the diag folder to a compressed file.
5. Send the compressed file and complete details about your issue to IBM OpenPages Support.

Installation issues and solutions

Error messages and log files provide you with information about errors that occur during the installation process. Use the error messages and log files to determine which part of the process failed.

Review common problem scenarios, recovery methods, and ways to get help if you encounter a problem during software installation. You can diagnose problems when the installation and configuration is unsuccessful.

Version is 7.4 when you use the 8.0 package

When you install IBM OpenPages GRC Platform, you see **7.4** in the installation media directories, in the installation app, and in OpenPages.

This is not an error. The 7.4 and 8.0 packages for OpenPages are the same.

After you install OpenPages, apply fix pack 8.0.0.1 to get the latest features and fixes.

Error starting the installation app

If you try to start the installation app on Linux or AIX operating systems but enter the command incorrectly, and you try to start it again, you can receive an error.

For example, you can receive an error such as:

```
*********************************************************
ERROR: Error occurred during OpenPages Installer startup.
Although, OpenPages Installer was successfully installed.
Try starting OpenPages Installer using startup.sh script.
Location: /home/opuser/OP_7.4_Installer/startup.sh
*********************************************************
```

This error can occur due to time out settings. You can check the log to verify whether the installation app started.

Silent installation hangs

During a silent installation of IBM OpenPages GRC Platform, the installation process appears to hang. For example, the process is taking a very long time and there are a couple of components that are not finished and do not appear to be progressing.

Additionally, the installation logs contain the following messages:

```
[31merror[39m:  Error: read ECONNRESET
    at exports._errnoException (util.js:1022:11)
    at TLSWrap.onread (net.js:610:25)
```

To resolve this problem:

1. Stop the installation server. For more information see, "Stopping the installation server" on page 40.
2. Restart the installation server. For more information, see "Starting the installation server" on page 40.
3. Run the installation again.

Global search fails to validate during upgrade

If the global search server fails to validate when you upgrade OpenPages, it can be because the host name in the URL points to the source server rather than the new target server.

About this task

Modify and run the following SQL statement to update the registry settings that define the admin and index/request URLs for global search on the target server.

Procedure

1. Modify the lines in bold in the following SQL statement.

   For example:

```
vcSearchAdminURL REGISTRYENTRIES.DESCRIPTION%Type := 'http://search.example.com:8985';
  vcSearchURL      REGISTRYENTRIES.DESCRIPTION%Type := 'http://search.example.com:8983';
```

   Oracle:

```
Declare
 vcSearchAdminURL REGISTRYENTRIES.DESCRIPTION%Type := '{full admin URL}';
  vcSearchURL      REGISTRYENTRIES.DESCRIPTION%Type := '{full request/index URL}';
  recActor         ACTORINFO%Rowtype;
Begin
  -- get the system user
  op_actor_mgr.get_actorinfo(OP_Actor_Mgr.gc_System_User, recActor);
  -- set registry values
  op_registry_mgr.set_registry_entry
  (
   p_parent_path            => '/OpenPages/Platform/Search/Admin',
   p_name                   => 'Search Server Administration URL',
   p_description            => 'URL for Search Server Administration',
   p_value                  => vcSearchAdminURL,
   p_is_hidden              => 'Y',
   p_is_encrypted           => 'N',
   p_is_protected           => 'Y',
   p_actor_id               => recActor.actorid,
   p_is_done_by_vendor      => OP_Globals.sc_true,
   p_behavior               => OP_Registry_Mgr.OPT_RE_Set_Defaults
  );
  op_registry_mgr.set_registry_entry
  (
   p_parent_path            => '/OpenPages/Platform/Search/Index',
   p_name                   => 'Search Server URL',
   p_description            => 'URL for Search Server Index',
   p_value                  => vcSearchURL,
   p_is_hidden              => 'Y',
   p_is_encrypted           => 'N',
   p_is_protected           => 'Y',
   p_actor_id               => recActor.actorid,
   p_is_done_by_vendor      => OP_Globals.sc_true,
   p_behavior               => OP_Registry_Mgr.OPT_RE_Set_Defaults
```

```
  );
  op_registry_mgr.set_registry_entry
  (
   p_parent_path            => '/OpenPages/Platform/Search/Request',
   p_name                   => 'Search Server URL',
   p_description            => 'URL for Search Request',
   p_value                  => vcSearchURL,
   p_is_hidden              => 'Y',
   p_is_encrypted           => 'N',
   p_is_protected           => 'Y',
   p_actor_id               => recActor.actorid,
   p_is_done_by_vendor      => OP_Globals.sc_true,
   p_behavior               => OP_Registry_Mgr.OPT_RE_Set_Defaults
  );
  Commit;
End;
/
```

DB2:

```
Declare
  vcSearchAdminURL REGISTRYENTRIES.DESCRIPTION%Type := '{full admin URL}';
  vcSearchURL      REGISTRYENTRIES.DESCRIPTION%Type := '{full request/index URL}';
  recActor         ACTORINFO%Rowtype;
Begin
  -- get the system user
  op_actor_mgr.get_actorinfo_by_actor_name(OP_Actor_Mgr.gc_System_User, recActor);
  -- set registry values
  op_registry_mgr.set_registry_entry_with_behavior
  (
   p_parent_path            => '/OpenPages/Platform/Search/Admin',
   p_name                   => 'Search Server Administration URL',
   p_description            => 'URL for Search Server Administration',
   p_value                  => vcSearchAdminURL,
   p_is_hidden              => 'Y',
   p_is_encrypted           => 'N',
   p_is_protected           => 'Y',
   p_actor_id               => recActor.actorid,
   p_is_done_by_vendor      => OP_Globals.sc_true,
   p_behavior               => OP_Registry_Mgr.OPT_RE_Set_Defaults
  );
  op_registry_mgr.set_registry_entry_with_behavior
  (
   p_parent_path            => '/OpenPages/Platform/Search/Index',
   p_name                   => 'Search Server URL',
   p_description            => 'URL for Search Server Index',
   p_value                  => vcSearchURL,
   p_is_hidden              => 'Y',
   p_is_encrypted           => 'N',
   p_is_protected           => 'Y',
   p_actor_id               => recActor.actorid,
   p_is_done_by_vendor      => OP_Globals.sc_true,
   p_behavior               => OP_Registry_Mgr.OPT_RE_Set_Defaults
  );
  op_registry_mgr.set_registry_entry_with_behavior
  (
   p_parent_path            => '/OpenPages/Platform/Search/Request',
   p_name                   => 'Search Server URL',
   p_description            => 'URL for Search Request',
   p_value                  => vcSearchURL,
   p_is_hidden              => 'Y',
   p_is_encrypted           => 'N',
   p_is_protected           => 'Y',
   p_actor_id               => recActor.actorid,
   p_is_done_by_vendor      => OP_Globals.sc_true,
   p_behavior               => OP_Registry_Mgr.OPT_RE_Set_Defaults
  );
  Commit;
End;
/
```

2. Run the SQL statement in SQL*Plus (Oracle) or CLPPLUS (DB2) as the OpenPages database user.
3. Rerun the upgrade validation and verify that global search can now validate.

Docker containers not starting

After installing OpenPages by using Docker, not all of the containers have started and you cannot access the OpenPages application URL.

To resolve this, you can start the containers again by using the following command:

```
docker-compose [-f <yml file>] start
```

Application URL is missing the domain of the host after a Docker deployment

After you install IBM OpenPages GRC Platform by using Docker, the application URL contains only the host name rather than the fully qualified domain name. Additionally, you cannot access to the JSP helper pages, the Cognos Analytics page, or IBM Business Process Manager from the OpenPages application.

The application URL is set when the Docker container starts and it is based on the HOSTNAME environment variable of the computer where you run the `docker-compose -f <yml_file> up` command. The container startup finds the fully qualified domain name automatically. However, you can set the host of the application URL explicitly by updating the HOSTNAME variable on the computer. For example, you can set the host of the application URL to myhost.mydomain.com and redeploy OpenPages on Docker by using the following commands:

```
export HOSTNAME=myhost.mydomain.com
docker-compose -f <yml_file> down
docker-compose -f <yml_file> up -d
```

The `docker-compose -f <yml_file> down` command is needed only if you have already deployed OpenPages on Docker.

If you deploy OpenPages on Docker in a distributed environment (for example, one database server host and another application server host), the HOSTNAME environment variable is looked up only by the containers on the application server host. You do not need to redeploy the containers on the database server host if you change the application URL.

Blank pages after you log in to IBM BPM or OpenPages application

You have OpenPages and IBM BPM installed on the same server and you see blank pages after you log in to OpenPages.

Some web browser cookie names are common between OpenPages and IBM BPM. When both application servers are deployed to single host (with different port numbers), the web browser can confuse the cookie values for the different application servers.

For more information, see Hosting the OpenPages application server and IBM Business Process Manager on the same computer.

Errors while loading data after you upgrade

After you upgrade, you see errors such as the following while you load data:

```
Caused by: java.lang.ClassNotFoundException: org.springframework.context.ApplicationContextAware
    at java.net.URLClassLoader.findClass(URLClassLoader.java:609)
    at com.ibm.ws.bootstrap.ExtClassLoader.findClass(ExtClassLoader.java:243)
    at java.lang.ClassLoader.loadClassHelper(ClassLoader.java:850)
    at java.lang.ClassLoader.loadClass(ClassLoader.java:829)
    at com.ibm.ws.bootstrap.ExtClassLoader.loadClass(ExtClassLoader.java:134)
    at java.lang.ClassLoader.loadClass(ClassLoader.java:809)
...
2018-03-02 09:08:08
CODE       : OP-00550
LEVEL      : 4
NAME       : com.openpages.sdk.trigger.grc.GRCTriggerCacheException
ERROR #    : TOKAUSA9HXAY
TOKEN ID   : 465433
USER       : OpenPagesAdministrator
MESSAGE    : Cache may not be setup correctly.
    at com.openpages.sdk.trigger.grc.GRCTriggerRuleDefinition.getInstance
(GRCTriggerRuleDefinition.java:111)
    at com.ibm.openpages.api.service.local.trigger.GRCTriggerManager.
```

```
processTriggerRule(GRCTriggerManager.java:237)
    ... 62 more

...
02 Mar 2018 09:08:08,849
ERROR ConfigurationManager on OPServer1
Loader EXCEPTION (Line: 88 Column: 53): Unable to create a new folder resource.
[P=630037:O=0:CT](ConfigurationManager.java:8112)
```

These errors can occur if triggers are still enabled during the data load. You can resolve this problem by disabling the triggers, and then reload the data. After you successfully load the data, ensure that you re-enable the triggers.

For more information about disabling triggers, see Disabling triggers when migrating environments in the *IBM OpenPages GRC Administrator's Guide*.

Password confirmation field is empty after importing deployment properties

After you import a deploy.properties file, the confirmation field for the Local User Password for a server is empty.

This issue can occur when the following conditions are true:

- The deploy.properties file has a value for local_password for the server.
- The deploy.properties file has remote_deploy set to false for the server.
- After you import the file, you enable Remote Deploy in the installation app for the server.

To resolve the issue, do one of the following steps:

- Set remote_deploy to true for the server and then reimport the file, or
- In the installation app, clear the Local User Password field on the server card and then reenter the value for both this field and the confirmation field.

Update to IBM Installation Manager 1.8 is blocked when the data location is the same as the installation location

Starting with IBM Installation Manager version 1.8, you are blocked from using a data location that is within the IBM Installation Manager installation location.

About this task

In older IBM Installation Manager versions, you are not blocked from using a data location within the IBM Installation Manager installation location. When you try to update an older version that was installed by using a data location within the IBM Installation Manager installation location, you receive an error message.

For example, if the older Installation Manager version was installed in the `/opt/IBM/IM` directory by using the `/opt/IBM/IM/dataLocation` directory as the data location, the following error message is displayed when you update to IBM Installation Manager version 1.8:

```
CRIMA1261E ERROR: The installation directory ("/opt/IBM/IM") must not be the
same directory, a parent directory, or sub-directory of the Installation
Manager data directory ("/opt/IBM/IM/dataLocation")
```

This issue occurs when one of the following scenarios occur:

1. Using an IBM Installation Manager version earlier than 1.8 (for example, 1.7.3), you install the Installation Manager that uses a data location within the installation location. For example:

   ```
   installc -acceptLicense -dataLocation /opt/IBM/IM/dataLocation -
   installationDirectory /opt/IBM/IM
   ```

2. Using an IBM Installation Manager version 1.8 or higher installer, you update the installed IBM Installation Manager. For example:

   ```
   Installc -acceptLicense -dataLocation /opt/IBM/IM/dataLocation
   ```

Putting the data location within the installation location violates basic assumptions about the separation of the installation artifacts and the runtime data of IBM Installation Manager, which can lead to errors. IBM Installation Manager 1.8 was intentionally changed to no longer allow this situation. When the software detects this situation, it displays the preceding error message.

To resolve this issue, you must reinstall IBM Installation Manager in a new location that does not collide with the data location.

Unfortunately, the `-reinstallim` option does not work in this particular case because the data location is incorrectly located in the IBM Installation Manager installation location. You must manually reinstall IBM Installation Manager as follows:

Procedure

1. Delete the IBM Installation Manager installation location.

   Normally, this means deleting the entire `/opt/IBM/IM` directory (the installation location in the preceding example), but because the data location was incorrectly put within the installation location, delete only the subdirectories of the `/opt/IBM/IM` directory, excluding the data location directory. Delete `eclipse`, `license`, and `properties`. The `/opt/IBM/IM/dataLocation` directory must remain.
2. Run IBM Installation Manager version 1.8 or higher installer to reinstall Installation Manager. Specify an installation location that does not collide with the data location. For example:

   ```
   installc -acceptLicense -dataLocation /opt/IBM/IM/dataLocation -
   installationDirectory /opt/IBM/IM/installLocation
   ```
3. To confirm that all previously installed products are still available, start the installed Installation Manager and click **File** > **View Installed Packages** to see the list of installed products.

   Note: The instructions for manually reinstalling Installation Manager are derived from Manually reinstalling Installation Manager, except that in this case, care must be taken not to delete the data location that was incorrectly put in the IBM Installation Manager installation location.

Warning when upgrading OpenPages Version 7.1 (Oracle)

If you are upgraded from IBM OpenPages version 7.1.x deployed on Oracle, then the 7.1 to 7.2 portion of the upgrade could encounter the following warning during the verification step: "PROPERTYDEFS Missing Required Entries". If you encounter this warning, you can ignore it.

You could encounter the following warning during the verification step of the upgrade process:

```
****************************************
* The script will verify the upgrade. *
****************************************

Connected.

PL/SQL procedure successfully completed.

PROPERTYDEFS Missing Required Entries

****************************************
WARNING
WARNING - Problems found during verification - Upgraded database missing required items
WARNING
****************************************
```

If you see this warning message, you can ignore it as the issue is with the script checking for a field in PROPERTYDEFS that was removed in version 7.2. There is no problem with the database.

SSL handshake error when the SOAP port on non-administrative application servers is validated

During the installation of IBM OpenPages GRC Platform in a clustered environment, you might receive an SSL handshake error. The error is displayed in the installation logs.

For information about installation log files, see "Log files" on page 341.

An SSL handshake error can occur when the SOAP port for each non-admin application server is being validated. The SOAP port validation process can fail with an SSL handshake error if an IBM WebSphere Application Server profile that is not owned by OpenPages exists in the OpenPages cell.

To correct the error so that the installer can continue, complete the following steps:

1. Get a list of the IBM WebSphere profiles that are being used on the OpenPages cell.

   Run the following commands:

   - UNIX

     ```
     cd <WAS_HOME>/AppServer/bin
     ./manageprofiles.sh -listProfiles
     ```

   - Microsoft Windows

     ```
     cd <WAS_HOME>\AppServer\bin
     manageprofiles.bat -listProfiles
     ```

2. Stop any services that are using profiles that do not belong to IBM OpenPages GRC Platform.
3. Delete any profiles that do not belong to OpenPages.

   Run the following command:

   - UNIX

     ```
     ./manageprofiles.sh -delete -profileName <profile-name>
     ```

   - Microsoft Windows

     ```
     manageprofiles.bat -delete -profileName <profile-name>
     ```

   For example, on Windows, to delete a profile that is called `Profile1`, run the following command:

   ```
   manageprofiles.bat -delete -profileName Profile1
   ```

Install the 32-bit Oracle 12.1.0.2 client and 64-bit Oracle 12.1.0.2 database server on the same computer

If the 64-bit Oracle 12.1.0.2 database server is installed, and you want to install the 32-bit Oracle 12.1.0.2 client on the same computer, where no previous version of the Oracle client exists, you must complete the following configuration steps:

1. Manually set the following registry key to the location of the Oracle Inventory directory of the computer on which you are performing the upgrade:

   ```
   HKEY_LOCAL_MACHINE\SOFTWARE\Oracle\inst_loc
   ```

   For example:

   ```
   [HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ORACLE]
   "inst_loc"="D:\app\OPDB\product\12.1.0\dbhome_1\inventory"
   ```

2. Edit the following file:

   ```
   <inst_loc>\ORA 12.1.0.2\win64\Client\client32\install\oraparam
   ```

Update the MSVCREDIST_LOC parameter:

```
MSVCREDIST_LOC=vcredist_x86.exe
```

If the 32-bit Oracle 11.2.0.4 client is already installed on the computer, you can upgrade to the 32-bit Oracle 12.1.0.2 client without any issues.

Issues with importing data to Oracle 12.1.0.2 using Oracle data pump

When you import data from an Oracle 11.2.0.4 source into an Oracle 12.1.0.2 target, you might encounter a data pump import error.

```
Processing object type SCHEMA_EXPORT/TABLE/INDEX/STATISTICS/INDEX_STATISTICS
ORA-39083: Object type INDEX_STATISTICS failed to create with error:
ORA-01403: no data found
ORA-01403: no data found
```

To import the data successfully, use the following solution. It is assumed that you are using a clean target database as the import destination.

Import the data using the `exclude=statistics` command.

For example:

```
impdp <user>/<password>@<db> full=Y
 DIRECTORY=<dp dir> DUMPFILE=<dp file>
 logfile=<log file> exclude=statistics
```

When the import is complete, you must gather table statistics for all objects manually.

SQL0569N Authorization ID *user_name* does not uniquely identify a user, a group or a role in the system error

The IBM OpenPages GRC Platform installation app might indicate that the installation is successful. However, you might see a message similar to the following text in the log file:

```
SQL0569N Authorization ID "user_name" does not uniquely identify a user,
a group or a role in the system error
```

Ensure that on Linux and AIX operating systems, the user name for the OpenPages database user account is not the same as the group name. For example, `opuser:opuser` is not allowed.

Tip: When you deploy OpenPages applications to WebSphere, ensure that you review the `session.log` file for errors.

For information about installation log files, see “Log files” on page 341.

OpenPages GRC Platform and software that is installed in a directory that contains spaces

If you installed software that IBM OpenPages GRC Platform uses into a directory with spaces, you must use the Windows short file name convention for the directory location.

For example, in the IBM OpenPages GRC Platform installation app, when you configure the home directory for IBM WebSphere Application Server, instead of entering the `C:\Program Files\IBM\WebSphere\AppServer` directory, enter `C:\PROGRA~1\IBM\WebSphere\AppServer`.

Garbled characters are displayed on the OpenPages GRC Platform home page when you log in for the first time

You might see garbled characters on the IBM OpenPages GRC Platform home page (`http://server_name:port/openpages`) if the DB2 database does not have sufficient memory.

The following SQL errors are in the *OP_Home*`\aurora\log` files or the *OP_Home*`\bin\logs\ObjectManager.log` file:

```
com.ibm.db2.jcc.am.SqlException: DB2 SQL Error:
SQLCODE=-20442, SQLSTATE=57011, SQLERRMC=null, DRIVER=3.64.104
```

To resolve the problem, increase the memory that is available to DB2 database by running the following commands, one by one, as the database instance owner:

```
db2 connect to <database_name> user <DB2_instance_owner> using <password>
db2 update db cfg for <database_name> using APPLHEAPSZ 512 APPL_MEMORY 80000
db2 terminate
db2start
```

Reload the configuration data. For more information, see "Manually loading the configuration data after a new installation" on page 356.

If the problem still exists, keep doubling the sizes for the APPLHEAPSZ and APPL_MEMORY settings, up to 2048,000 or acquire more memory (RAM).

Example: APPLHEAPSZ 1024 APPL_MEMORY 160000

```
db2 connect to <database_name> user <DB2_instance_owner> using <password>
db2 update db cfg for <database_name> using APPLHEAPSZ 1024 APPL_MEMORY 160000
db2 terminate
db2start
```

Example: APPLHEAPSZ 2048 APPL_MEMORY 320000

```
db2 connect to <database_name> user <DB2_instance_owner> using <password>
db2 update db cfg for <database_name> using APPLHEAPSZ 2048 APPL_MEMORY 320000
db2 terminate
db2start
```

Manually loading the configuration data after a new installation

The installation program for IBM OpenPages GRC Platform automatically loads the application data and enables user access to the standard Cognos Analytics reports. In limited situations, you can manually load the level-0 schema.

Before you begin

IBM OpenPages GRC Platform must be installed.

The OpenPages services must be running.

About this task

If the loader file execution that occurs during the fresh installation has errors, you can correct the issues that caused the errors and then manually execute the fresh installation loader file.

Procedure

To manually load the level-0 schema, use the following steps:

1. Log on to the OpenPages admin application server as a user with administrative privileges.
2. Go to the *<OP_HOME>*/addon_module/loaderdata directory.
3. Make a backup copy of the schema_loader_properties.sh|.bat file.
4. Open the original schema_loader_properties file in a text editor.
5. In the following line, update the password for the OpenPages Super Administrator.

   ```
   SET OPXUserName=<Super_Administrator_user_name>
   SET OPXUserPassword=********
   ```

   The default user name is OpenPagesAdministrator.

   The password for the OPXUserName user is masked by asterisks (***). Replace the mask with clear text. After the default configuration data is loaded, you can manually mask the password value with asterisks (***).
6. Save and close the file.

7. To load the default configuration, run the `openpages-level0-loader-data.sh|.bat` script.

   Tip:

   Redirect the output to a log file so that you can conveniently track the progress:

   - Windows: `openpages-level0-loader-data.bat > openpages-level0-loader-data.log`
   - AIX or Linux : `./openpages-level0-loader-data.sh > openpages-level0-loader-data.log`

   The script takes some time to finish loading the data. For example, the data might take two hours to load.
8. Restart the OpenPages services.

Manually loading the configuration data after an upgrade

When you upgrade IBM OpenPages GRC Platform to version 7.4, IBM OpenPages GRC Platform automatically loads the application data and enables user access to the standard Cognos Analytics reports. In limited situations, you can manually load the level-0 schema.

Before you begin

IBM OpenPages GRC Platform must be installed.

The OpenPages services must be running.

About this task

If the upgrade loader files that are executed during the upgrade action have errors, you can correct the issues that caused the errors and then manually execute the upgrade loader files.

Procedure

1. Log on to the OpenPages admin application server as a user with administrative privileges.
2. Go to the *<OP_HOME>*`/installer/migration/upgrade/addon_module/loaderdata` directory.
3. Make a backup copy of the `schema_loader_properties.sh|.bat` file.
4. Open the original `schema_loader_properties` file in a text editor.
5. In the following line, update the password for the OpenPages Super Administrator.

   ```
   SET OPXUserName=<Super_Administrator_user_name>
   SET OPXUserPassword=********
   ```

   The default user name is `OpenPagesAdministrator`.

   The password for the `OPXUserName` user is masked by asterisks (***). Replace the mask with clear text. After the default configuration data is loaded, you can manually mask the password value with asterisks (***).
6. Save and close the file.
7. Depending on your upgrade path, run the scripts in the order that is listed:

Upgrade path	Windows files to run
7.1.x to 7.4	a. `openpages-op720x-loader-data.bat` b. `openpages-op730x-loader-data.bat` c. `openpages-upgrade-loader-data.bat`
7.2.x to 7.4	a. `openpages-op730x-loader-data.bat` b. `openpages-upgrade-loader-data.bat`
7.3 to 7.4	`openpages-upgrade-loader-data.bat`

Upgrade path	AIX/Linux files to run
7.1.x to 7.4	a. `./openpages-op720x-loader-data.sh` b. `./openpages-op730x-loader-data.sh` c. `./openpages-upgrade-loader-data.sh`
7.2.x to 7.4	a. `./openpages-op730x-loader-data.sh` b. `./openpages-upgrade-loader-data.sh`
7.3 to 7.4	`./openpages-upgrade-loader-data.sh`

8. Restart the OpenPages services.

Dropping the IBM DB2 database for OpenPages GRC Platform

If you encounter problems when you try to create the database for IBM OpenPages GRC Platform, you can run clean up scripts. Use the scripts to drop the database and uncatalog the node.

About this task

In most cases, you do not need to drop the database. Try dropping and recreating the database objects first. See "Troubleshooting DB2 database object creation" on page 109.

Procedure

1. Log on to the OpenPages GRC Platform application server.
2. Go to the location where you extracted the installation files.
   - On Windows operating systems, go to the following directory:

     `\OP_<version>_Non_Embedded\OP_<version>_Configuration\Database\DB2\INSTALL_SCRIPTS`
   - On Linux or AIX operating systems, go to the following directory:

     `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/DB2/INSTALL_SCRIPTS`
3. On Windows operating systems, start the DB2 command line processor by typing `db2cmd`.
4. To drop the database, run the `drop-opx-db-clt` script.

```
drop-opx-db-clt.bat|.sh <database-name>
   <node-name> <instance.owner.username>
   <instance.owner.password>
```

5. To uncatalog the node, run the `db2-uncatalog-node.bat|.sh` script.

   Note: In most situations, uncataloging the node is unnecessary.

```
db2-uncatalog-node.bat|.sh <node-name>
```

Updating the services for multiple DB2 instances

DB2 database instances must be able to communicate through the network. If you have multiple DB2 instances on the same computer, ensure that the SVCENAME and listener port are configured. Otherwise, connection errors might occur.

To verify that the DB2 database instances are configured for network communication:

- DB2SET must show TCPIP for the DB2COMM setting.
- The SVCENAME in the DBM configuration must show a valid TCP service name and TCP port number.

If you changed either the DB2 registry (DBSET) or the Database Manager configuration, ensure that you stop and restart DB2.

Procedure

1. Log on to the database server as the DB2 instance owner.
2. To reserve a TCP port for the service, append the information to the `services` file.

   On Windows, edit the `%systemroot%\system32\drivers\etc\services` file

   On AIX or Linux, edit the `/etc/services` file.

   To reserve TCP port *5500* for the service named *db2c_opdb*, append the following line to the end of the services file:

   ```
   db2c_opdb 5500/tcp
   ```
3. Update the database manager configuration.

   ```
   db2 update database manager configuration using svcename 55000
   ```
4. Ensure that TCP communication is set for the database instance.

   ```
   db2cmd -i -w
   db2set DB2COMM=npipe,tcpip
   db2stop
   db2start
   ```
5. Stop and then restart the DB2 server.

   ```
   db2stop
   db2start
   ```

OP-03620: The Reporting Schema has not been instantiated error

You log on to the IBM OpenPages GRC Platform home page, and the following error message is displayed.

```
The Home Page cannot be viewed without a valid Reporting Schema.
Please contact your System Administrator. OP-03620:
The Reporting Schema has not been instantiated. Please instantiate it
before executing this operation.
```

This error occurs if the reporting schema has not yet been created.

To resolve the problem, enable **System Admin Mode**, and generate the reporting schema.

Procedure

1. In a web browser, open the OpenPages GRC Platform application:

   `http://`*`openpages_server`*`:`*`port`*`/openpages`
2. Log on to the application as a user with administrative privileges.
3. For **System Admin Mode**, switch from **Disabled** to **Enabled**.
4. From the menu bar, click **Administration** and select **Reporting Schema**.
5. Click **Create**.
6. After the create operation finishes, click **System Admin Mode** to switch from **Enabled** to **Disabled**.
7. From the menu bar, click **Administration** > **Reporting Framework** > **Generation**.
8. On the **Reporting Framework Operations** page, click **Update**.
9. In the **Reporting Framework Generation** window, under **Framework Generation**, select the **Framework Model** and **Labels** and other options you want for the relational data model.
10. Click **Submit**.
11. To view the progress of the update, click **Refresh**.

    The **Percent Complete** column on the **Reporting Framework Operations** table updates the percentage of completion.

Uninstalling OpenPages GRC Platform with an Oracle database before you reinstall

In test or development environments, you might be required to uninstall IBM OpenPages GRC Platform or remove the OpenPages database from the Oracle database server before you reinstall. You must completely uninstall before you reinstall.

Procedure

1. On a computer that has SQL*Plus, log on as a user, such as SYSTEM, who has database administration permissions.
2. Run the following SQL statements:

```
drop user <openpages_user> CASCADE;
drop user <cognos_user> CASCADE;
```

   Note: Drop the *cognos_user* if the OpenPages database and the Cognos content store schemas are in the same Oracle database. If you use a separate database for the Cognos content store, dropping the *cognos_user* is not required.
3. Run the following SQL statements to drop the default table spaces and data files:

```
drop tablespace AURORA including contents and datafiles;
drop tablespace INDX including contents and datafiles;
drop tablespace AURORA_SNP including contents and datafiles;
drop tablespace AURORA_TEMP including contents and datafiles;
drop tablespace AURORA_NL including contents and datafiles;
drop tablespace AURORA_NLI including contents and datafiles;
drop tablespace AURORA_CLOB_DATA including contents and datafiles;
drop tablespace AURORA_DOMAIN_INDX including contents and datafiles;
drop tablespace COGNOS including contents and datafiles;
```

4. Run the following script to drop the Oracle data pump storage directory.

```
drop directory <OP_DATAPUMP_DIRECTORY>;
```

5. Uninstall OpenPages GRC Platform.
6. If required, remove environment variables that reference OpenPages GRC Platform, or Cognos Analytics, or both products.
7. Restart the servers.
8. Remove the existing OpenPages GRC Platform application or Cognos Analytics installation directories.

   The following table lists examples of the installation directories for OpenPages and Cognos Analytics components.

Table 62: Example directory locations for OpenPages and Cognos Analytics components

Installation directory	**Location on Windows operating system**
OpenPages (OP_HOME)	`C:\OpenPages`
OpenPages CommandCenter (CC_HOME)	`C:\OpenPages\CommandCenter`
Cognos Analytics (Cognos_HOME)	`C:\IBM\cognos\analytics`

9. Review the TEMP or TMP directories for temporary installation files that might exist.

   The location of temporary directories varies. The location depends on the environmental variables that are set during the installation process.

For Windows operating systems, common temporary directory locations include

- `C:\temp`
- `C:\Users\<user_name>\AppData\Local\Temp`

Issues when importing databases

When you import the IBM OpenPages GRC Platform database during an upgrade or migration, you might see an error as a result of the default data file size.

If an error occurs, increase the default data file size as follows.

1. On a computer that has SQL*Plus, log on as a user, such as SYSTEM, who has database administration permissions.
2. Run the following SQL statements:

```
ALTER TABLESPACE INDX ADD DATAFILE
        'C:\app\Administrator\oradata\OP\INDX02.DBF'
                SIZE 128 M AUTOEXTEND ON     NEXT 128 M MAXSIZE 34359721984;

    Alter database datafile 'C:\app\Administrator\oradata\OP\AURORA.DBF'
  resize     2000m;
```

Logging in to Cognos Analytics fails

If you cannot log in to Cognos Analytics after you add a reporting server to an OpenPages deployment, you might need to check that the application URL is set correctly.

About this task

Follow these steps if you cannot log in to Cognos Analytics and the following error is issued:

```
java.net.MalformedURLException: For input string: "undefined"
```

Procedure

1. Go to the *<COGNOS_HOME>*`/configuration` directory.
2. Open the `OpenPagesSecurityProvider_OpenPagesSecurityRealm.properties` file in a text editor.
3. Ensure that the value for the `openpages.application.url` property matches the OpenPages application URL on the admin application server. Make the necessary change and save the file.
4. Restart Cognos Analytics.

Cognos content store import fails

If you use the database export and import option to restore the IBM Cognos content store, the import might fail if the table space name differs in the target environment.

To resolve this issue, you must update the table space name in the target environment:

1. Check the table space name in the target environment.
   a. Log on as an OpenPages user.
   b. Run the following command:

```
select tablespace_name from user_tablespaces;
```

2. Update the table space name.
   a. Log on as SYSTEM using SQL*Plus.
   b. Run the following scripts:

```
alter tablespace crn RENAME TO cognos;
```

3. Drop the Cognos database schema.
   a. Go to the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/ORACLE/INSTALL_SCRIPTS directory.
   b. Log on to SQL*Plus as the Cognos database user.
   c. Use the spool command to create a log file.

      ```
      spool <log_file directory>/<log_file name>
      ```

      Ensure that you have write permission on the *<log_file directory>*.

      Example:

      ```
      spool /tmp/AuroraDbDelete.log
      ```

   d. Run the AuroraDbDelete.sql script.

      ```
      @AuroraDbDelete.sql
      ```

   e. Log out of SQL*Plus.
4. Go the /OP_*<version>*_Non_Embedded/OP_*<version>*_Configuration/Database/ORACLE/INSTALL_SCRIPTS directory, and run the following script:

   ```
   impdp <system_user>/<system_password>@<alias>
   full=Y file=<filename.dmp> log=<filename.log>
   directory=<OP_DATAPUMP_DIRECTORY>
   fromuser=<cognos_user> touser=<cognos_user> EXCLUDE=INDEX
   ```

High CPU use with Windows 2012 R2 servers

You might experience high CPU use if the User Access Logging service is set to automatic in Windows Server 2012 or if you enabled the ProgramData Updater that is used by Microsoft Customer Experience Improvement Program.

To change the User Access Logging service to manual, follow these steps:

- Log in to Windows 2012 Server.
- In the services console, stop the **User Access Logging Service**.
- Change the Startup Type to **Manual**.

To disable the ProgramData Updater, follow these steps:

- Open **Administrative Tools**.
- Expand **Computer Management**.
- Select **Application Experience** and **ProgramData Updater**.
- Right-click, then click **Disable**.

Updating the Oracle client path on the reporting server

On a Linux or AIX OS that uses an Oracle database, if you change the Oracle client location after you install Cognos Analytics and IBM OpenPages GRC Platform, then you must update the Oracle client path on the reporting server. To update the Oracle client path, edit the PATH and LD_LIBRARY_PATH or LIBPATH environment variables in the BMTScriptPlayer.sh file.

Procedure

1. On the reporting server, navigate to the *<COGNOS_HOME>*/bin directory, and open the BMTScriptPlayer.sh file.
2. Update the Oracle client path in the environment variables:
   - For Linux, update the PATH and LD_LIBRARY_PATH variables.
   - For AIX, update the PATH and LIBPATH variables.

3. After you update the BMTScriptPlayer.sh file, verify that you can generate the OpenPages framework.

Issues when you use IBM Installation Manager on Linux

When you use the IBM Installation Manager on the Linux operating system to install IBM OpenPages GRC Platform, then an error message might be displayed.

Add the following line to the IBMIM.ini file, which you can find in <installation location>/eclipse: -Dorg.eclipse.swt.internal.gtk.cairoGraphics=false. Save the file and restart IBM Installation Manager.

Issues with IBM DB2 and Oracle after upgrading to RHEL 7.2

When you are using Red Hat Enterprise Linux 7.2, you might encounter issues with IBM DB2 and Oracle due to a known issue in RHEL 7.2.

For example, the OpenPages database instance on DB2 might crash with the following error displayed by the db2diag tool:

```
CALLED  : OS, -, unspecified_system_function      OSERR: EIDRM (43)

2016-09-29-11.18.10.184984-240 I2604417E2069         LEVEL: Severe (OS)
PID     : 27510                TID : 140561960920832 PROC : db2sysc 0
INSTANCE: db2inst1             NODE : 000            DB   : OPX
HOSTNAME: op-host-01
EDUID   : 197                  EDUNAME: db2agntdp (OPX     ) 0
FUNCTION: DB2 UDB, oper system services, sqloWaitEDUWaitPost, probe:100
MESSAGE : ZRC=0x8300002B=-2097151957
```

To fix the issue, edit the /etc/systemd/logind.conf file, set RemoveIPC=no, and then restart the corresponding service or reboot.

For more information, see https://access.redhat.com/solutions/2062273.

libdb2.so cannot be loaded

When you are using Linux for the reporting server, you might get an error that libdb2.so cannot be loaded.

```
UDA-SQL-0569 library to control program function (libdb2.so)
can not be loaded
UDA-SQL-0571 The operating system returned an error message (libpam.so.0:
can not open shared object file: No such file or directory).
```

To fix the issue, update pam.x86_64 and then install pam.i686. For example, run yum install pam.x86_64 and then run yum install pam.i686.

Data validation errors when installing Loss Event Entry

If data validation errors about existing data occur when you installIBM OpenPages Loss Event Entry, review the log files.

The log files for OpenPages Loss Event Entry are located in *<OP_HOME>*/LossEventEntry/logs/.

Validation errors can occur when OpenPages Loss Event Entry data exists in the OpenPages database.

If you chose to load the data automatically, run the OpenPages Loss Event Entry installer again and use the option to manually load the data. When the installation completes, load the data manually. You might see errors about existing data, but you can ignore them.

If you chose to load the data manually and you see errors about existing data, you can ignore them.

For information about installing OpenPages Loss Event Entry, see Chapter 16, “Loss Event Entry,” on page 295.

Memory validation step fails for an Oracle database

When you install OpenPages with an Oracle database, you get an error that the memory validation step failed.

OpenPages uses Automatic Shared Memory Management (ASMM) and requires the following configuration:

- **SGA Size**: 1024
- **PGA Size**: 768
- **Block Size**: 8192
- **Processes** : 250

Review these requirements with your database administrator. If your environment meets these requirements, for example if you are using an alternative method for managing memory, you can override the memory check and complete the installation.

1. Open the `sql-wrapper.sql` file in the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/INSTALL_SCRIPTS` directory.
2. Change the `dba_override_asmm_check` property to Y.

```
define dba_override_asmm_check='Y'
```

3. Run the `op-validate-dba-install.sh|.bat` script.
4. Resume the installation of OpenPages.

Configuring the Oracle data pump directory

For an Oracle deployment, if the backup process is not successful, configure the Oracle data pump storage directory, then run OPCCBackup again.

Procedure

1. Go to the `<WAS_HOME>/Java/8.0/lib` directory and copy the `tools.jar` file to the `<COGNOS_HOME>/jre/lib` directory.
2. Log on to a computer that has the SQL*Plus utility and a connection to the OpenPages CommandCenter database instance.
3. Go to the `/OP_<version>_Non_Embedded/OP_<version>_Configuration/Database/ORACLE/UPGRADE_SCRIPTS` directory.
4. From the command line, run the `update-datapump-directory.sql` script.

```
sqlplus /nolog @sql-wrapper update-datapump-directory <log_file_name>
<tns_name_alias> SYSTEM <password> create
<directory_location> <user_name>
```

The following table describes the variables in the script.

Table 63: Descriptions for variables in the `update-datapump-directory.sql` file

Variable	Description
<log_file_name>	The user-defined name of the log file that the script creates to store information.
<tns_name_alias>	The database Oracle TNS entry that is used by the OpenPages CommandCenter database instance on the reporting server computer.

Table 63: Descriptions for variables in the update-datapump-directory.sql file (continued)	
Variable	**Description**
<password>	The password for the Oracle SYSTEM user account.
<directory_location>	The full directory path to the location on the database server where the backup files are stored.
<user_name>	The user name of the Cognos account for the OpenPages CommandCenter database schema (content store).

Example:

```
sqlplus /nolog @sql-wrapper update-datapump-directory
C:\temp\update-datapump.log OP SYSTEM sys2Password create
d:\cc_backup cognos
```

Verifying the default SDK for WebSphere Application Server profiles

If you migrated from IBM WebSphere Application Server version 8.5.5.x to 9.x, verify that the default SDK is set to IBM SDK, Java Technology Edition, Version 8. Do this check after you migrate to version 9.x and before you upgrade OpenPages GRC Platform.

About this task

IBM SDK, Java Technology Edition, Version 8 is the default SDK that is delivered with IBM WebSphere Application Server 9.x.

If WebSphere Application Server global security is enabled, you are prompted to enter the WebSphere administrator user name and password when you run commands that access the application server.

Procedure

1. Log on to the IBM OpenPages GRC Platform admin application server. Log in as a user with administrative privileges.
2. Check that IBM WebSphere Application Server is using the correct SDK.
   a) Open a shell (Linux or AIX) or a command window as an administrator (Windows).
   b) Go to the *<WAS_HOME>*/bin directory.
   c) Run the following command:
   - Linux or AIX:

     ```
     ./managesdk.sh -getNewProfileDefault
     ```

   - Windows:

     ```
     managesdk -getNewProfileDefault
     ```

   The result is displayed. If you see 8.0_64, the default SDK is set correctly.

   ```
   CWSDK1007I: New profile creation SDK name: 8.0_64
   CWSDK1001I: Successfully performed the requested managesdk task.
   ```

3. If you do not see 8.0_64, change the default SDK.
   a) Open a shell (Linux or AIX) or a command window as an administrator (Windows).

b) Go to the *<WAS_HOME>*/bin directory.

c) Change the default SDK by running the following command:

- Linux or AIX:

```
./managesdk.sh -setNewProfileDefault -sdkname 8.0_64
```

- Windows:

```
managesdk -setNewProfileDefault -sdkname 8.0_64
```

The following message is displayed.

```
CWSDK1022I: New profile creation will now use SDK name 8.0_64.
CWSDK1001I: Successfully performed the requested managesdk task.
```

4. Verify that the default SDK is now set to 8.0_64.

   Run the following command:

   - Linux or AIX:

   ```
   ./managesdk.sh -getNewProfileDefault
   ```

   - Windows:

   ```
   managesdk -getNewProfileDefault
   ```

   The result is displayed. If you see 8.0_64, the default SDK is set correctly.

   ```
   CWSDK1007I: New profile creation SDK name: 8.0_64
   CWSDK1001I: Successfully performed the requested managesdk task.
   ```

5. Repeat these steps on each OpenPages application server in your environment.

CM-CFG-5114: The Cognos service does not start

When you start Cognos Analytics, it fails to start and you see a message that the content store is locked.

```
CM-CFG-5114 An error occurred while locking the content store database.
```

For example:

```
CM-CFG-5063 A Content Manager configuration error was detected
while connecting to the content store.
CM-CFG-5114 An error occurred while locking the content store database.
```

This error is a known issue in Cognos Analytics. For information about how to resolve the issue, see Problems With Starting the Cognos Service After Running the OpenPages OPCCBackup Utility (Error: CM-CFG-5114) (http://www-01.ibm.com/support/docview.wss?uid=swg21633776).

CM-CAM-4005 Unable to authenticate

You might see a `CM-CAM-4005 Unable to authenticate` error in the reporting server log during the `Import Solutions Reports` phase of the installation.

This error can happen when the reporting server is installed on the same computer as an IBM OpenPages application server or the Deployment Manager and the computer is running Linux or AIX.

The error occurs because the Cognos startup script (`cogconfig.sh`) uses the Java that is specified by $JAVA_HOME. When the reporting server is installed on the same computer as another OpenPages component, $JAVA_HOME might not point to the Java that is needed by Cognos Analytics.

You can resolve the problem by modifying the startup script.

1. Open the *<COGNOS_HOME>*/bin64/cogconfig.sh script in a text editor.

2. Comment out the first, second, and fourth lines. Leave the third line unchanged.

```
#if [ "$JAVA_HOME" = "" ]
#then
    JAVA_HOME=../jre
#fi
```

3. Save the file.
4. Resume the installation.

Agent does not exist on remote server

When you click ■ in a server card of the installation app, the server card might display the following message: `Agent does not exist at <directory> on <remote-server-name>`.

This issue occurs if the **Agent Directory** field was changed on the remote server's card after **Validate** was clicked and the original agent on the remote server was not stopped before the **Agent Directory** field was changed. If **Validate** is clicked again, the installation proceeds using the original agent. The error displays if you click ■ in that server's card because no agent exists at the specified location.

To fix the issue, complete the following steps:

1. Log on to the remote server as the installation user and manually stop the original agent:

```
# cd <original-agent-directory>
# npm stop
```

2. Go to the installation directory:

```
# cd <original-agent-directory>/install/<platform>
```

   Where `<platform>` is one of: AIX | Linux | Windows.

3. Run the uninstall script:
   - Windows

     ```
     uninstall.bat
     ```

   - Linux or AIX:

     ```
     ./uninstall.sh
     ```

4. Delete the original agent directory.
5. Return to the installation app and click **Validate**.

   The agent software is installed in the new directory location and the agent software starts.

Errors during database server validation (DB2)

If you have insufficient memory available on your IBM DB2 server you might encounter a functional issue during the installation of IBM OpenPages GRC Platform. You might see errors during the database server validation process.

The functional issue can be resolved by applying the workaround that is described in the following technote: IT19442: A DB2 FENCED ROUTINE MAY FAIL WITH ERROR SQL1646N DUE TO SHARED MEMORY PERMISSION PROBLEMS (http://www.ibm.com/support/docview.wss?uid=swg1IT19442).

However, insufficient memory allocation on your DB2 server can also lead to significant performance problems. Allocate more memory to the DB2 server before you continue with the installation of IBM OpenPages GRC Platform.

Warning: Run `sysdba-xa-views-wrapper.sql`

In the validation report, you see a message about the `sysdba-xa-views-wrapper.sql` script.

```
Warning: If you have not already done so, manually run
sysdba-xa-views-wrapper.sql after configuration.
```

You can ignore this warning. In IBM OpenPages GRC Platform version 7.4.0.0 and later, you do not need to run the `sysdba-xa-views-wrapper.sql` script.

Known issue: Incorrect notices file

The correct version of the notices file can be found in the installation media in the root folder.

If you want to replace the incorrect notices file with the correct version, follow these steps:

1. Copy the notices file (no extension) from /OP_<*version*>_Non_Embedded to the OpenPages Application Server under <*OP_HOME*>/license, and overwrite the existing notices file. Repeat this step on all non-admin application servers.
2. Copy the notices file (no extension) from /OP_<*version*>_Non_Embedded to the reporting servers (active and standby) under <*CC_HOME*>/license, and overwrite the existing notices file.

OpenPages reports are not displayed in the Cognos Analytics portal

After you install or upgrade IBM OpenPages GRC Platform, if you do not see the OpenPages reports and packages in the Cognos Analytics portal, you can import them manually.

For more information about importing content, see the *Cognos Analytics Administration and Security Guide*.

Procedure

1. If you use solutions, get the latest version of the solutions report package.
   a) Back up the following file if it exists: <*COGNOS_HOME*>/deployment/OpenPages_Solutions_V6.zip.
   b) Locate the solutions package file for the database that you are using. The file is located in the following directory:
      - IBM DB2: OP_<*version*>_Non_Embedded/OP_<*version*>_Configuration/Modules/Upgrade/ORM/DB2/OpenPages_Solutions_V6.zip
      - Oracle: OP_<*version*>_Non_Embedded/OP_<*version*>_Configuration/Modules/Upgrade/ORM/Oracle/OpenPages_Solutions_V6.zip
   c) Copy the OpenPages_Solutions_V6.zip file to the following directory on the Cognos server: <*COGNOS_HOME*>/deployment. Overwrite the existing file.

   Note: You do not need to copy the platform reports package from the installation media. The package is placed on the Cognos server automatically when you install OpenPages.
2. From a browser, log on to the Cognos Analytics portal.

   By default, the URL is `http://<hostname>/ibmcognos/bi`

   Where <hostname> is the name of the Cognos server.
3. Click **Manage** > **Administration Console** to launch the **IBM Cognos Administration** page.
4. Click the **Configuration** tab and click **Content Administration**.

   Tip: To access this area in IBM Cognos Administration, you must have the required permissions for the **Administration** secured feature.
5. On the toolbar, click **New Import**.
6. From the **Deployment archive** list, select the package that you want to import.
   - To import the platform reports, select the **OpenPages Platform v6** package.

- To import the solutions reports, select the **OpenPages_Solutions_v6** package.

7. Click **Next**.
8. Type a unique name, an optional description, and a screen tip for the deployment archive, select the folder where you want to save it, and then click **Next**.
9. In the **Public folders content** box, select the package that you are importing, and then click **Next**.
   - If you are importing the platform reports, select **OpenPages Platform v6**.
   - If you are importing the solutions reports, select **OpenPages_Solutions_v6**.
10. On the **Specify the general options** page, accept the default options and click **Next**.
11. On the **Review the summary** page, review the settings and click **Next**.
12. On the **Select an action page**, click **Finish**.
13. On the **Run with options** page, click **Run** and then, on the **IBM Cognos software** page, click **OK**.
14. To view the imported packages and reports, click the **Home** icon, and select the folder where you imported them.

Results

You can now open the OpenPages reports in Cognos Analytics.

Troubleshooting IBM OpenPages GRC Platform solutions

Solve common problems that might occur when you install or remove the IBM OpenPages GRC Platform solutions.

ObjectManager fails to initialize

Object Manager might fail to initialize and generate the following error `WSCL0912E component failed to initialize`.

To resolve the issue, verify that the environment variable *<WAS_HOME>* is defined in the profile of the user account that you specified in the `<user>` parameter. Verify that *<WAS_HOME>* is set to the directory where IBM WebSphere Application Server is installed.

For example:

- on Windows, `C:\IBM\WebSphere\AppServer`
- on AIX and Linux, `/opt/IBM/WebSphere/AppServer`

If *<WAS_HOME>* is defined correctly but the error is not resolved, see the following additional information http://www.ibm.com/support/docview.wss?uid=swg1PI26313.

Reporting Framework generation fails with CAMCryptoBC error

During installation, Reporting Framework generation might fail with a CAMCryptoBC error.

About this task

A CAMCryptoBC error occurs if the `bcprov-jdk14-145.jar` file that is provided with IBM OpenPages GRC Platform is missing from the Java location that is used by the IBM Cognos server or if the `BouncyCastleProvider` is not registered in the JRE master security provider file, `java.security`.

The following circumstances can cause the error:

- During the OpenPages upgrade process, the Java that is used for the Cognos server was changed to version 1.8.
- During the Cognos fix pack installation process, the Java that is used for the Cognos server was updated or overwritten.
- The Java used for the Cognos server was updated.

To resolve the issue, check each reporting server in your environment. Verify that the JRE that is used to run the Cognos software contains the `bcprov-jdk14-145.jar` file that is supplied with OpenPages. If the JRE does not have a copy of the `bcprov-jdk14-145.jar` file, you can get a copy of the file from the OpenPages application server in the directory: *<OP-HOME>*`/profiles/<OpenPages-node-name>/installedApps/<OpenPages-cell-name>/op-apps.ear`

Procedure

1. If the Cognos software is using the JRE that is installed with Cognos, do the following steps:
   a) Ensure that the `bcprov-jdk14-145.jar` is in the *<COGNOS_HOME>*`/analytics/jre/8.0/lib/ext` directory.
   b) Register the `BouncyCastleProvider` in the JRE master security provider file, if it is not already registered.

      To register the provider, add the following line to the `java.security` file that is stored in the *<COGNOS_HOME>*`/analytics/jre/8.0/lib/security` directory. Replace *<sequence number>* with the next number after the other `security.provider` sequence numbers that are in the file:

      ```
      security.provider.<sequence number>=
          org.bouncycastle145.jce.provider.BouncyCastleProvider
      ```

2. If the Cognos software is using the JRE that is installed with WebSphere, do the following steps:
   a) Ensure that the `bcprov-jdk14-145.jar` is in the *<WAS_HOME>*`/java_8.0_64/jre/lib/ext` directory.
   b) Register the `BouncyCastleProvider` in the JRE master security provider file, if it is not already registered.

      To register the provider, add the following line to the `java.security` file that is stored in the *<WAS_HOME>*`/java_8.0_64/jre/lib/security` directory. Replace *<sequence number>* with the next number after the other `security.provider` sequence numbers that are in the file:

      ```
      security.provider.<sequence number>=
          org.bouncycastle145.jce.provider.BouncyCastleProvider
      ```

3. If the Cognos software is using a JRE that is installed in another location on the reporting server, do the following steps:

   Replace *<JAVA_LOCATION>* with the directory where the JRE is installed.

   a) Ensure that the `bcprov-jdk14-145.jar` is in the *<JAVA_LOCATION>*`/lib/ext` directory.
   b) Register the `BouncyCastleProvider` in the JRE master security provider file, if it is not already registered.

      To register the provider, add the following line to the `java.security` file that is stored in the *<JAVA_LOCATION>*`/lib/security` directory. Replace *<sequence number>* with the next number after the other `security.provider` sequence numbers that are in the file:

      ```
      security.provider.<sequence number>=
          org.bouncycastle145.jce.provider.BouncyCastleProvider
      ```

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