IBM OpenPages GRC Platform
Version 6.2.1

Deploying to WebSphere Application Server Installation Guide

Note
Before using this information and the product it supports, read the information in "Notices" on page 167.

Product Information

This document applies to IBM OpenPages GRC Platform Version 6.2.1 and may also apply to subsequent releases.

Contents

Introduction

Installing and upgrading IBM® OpenPages® GRC Platform by using the OpenPages Administrative Console requires administrators have specific skills. Administrators must have a background in operating systems administration, application server management, relational database management, systems security management, and other aspects of systems management.

Installation and upgrade documentation

The instructions that you use to install or upgrade IBM OpenPages GRC Platform depends on your environment. Use the following table to find the right installation information for your installation environment.

Table 1. Installation and upgrade documentation based on installation environments

Operating System	Application Server	Database	Installation Type	Document title
AIX®	WebSphere®	DB2®	New	Deploying to WebSphere Application Server Installation Guide
AIX	WebSphere	Oracle	New	Installation Guide Installation Guide with Database
AIX	WebSphere	Oracle	Upgrade	Upgrade Guide
Linux	WebSphere	DB2	New	Deploying to WebSphere Application Server Installation Guide
Linux	WebSphere	Oracle	New	Deploying to WebSphere Application Server Installation Guide
Windows	WebSphere	DB2	New	Deploying to WebSphere Application Server Installation Guide
Windows	WebSphere	Oracle	New or Upgrade	Deploying to WebSphere Application Server Installation Guide
Windows	WebLogic	Oracle	New	Installation Guide Installation Guide with Database
Windows	WebLogic	Oracle	Upgrade	Upgrade Guide

Related documentation

Supplemental documentation is available on the web. Go to the IBM OpenPages Platform documentation library IBM OpenPages GRC Platform documentation library on the IBM support website (http://www.ibm.com/support/docview.wss?uid=swg27028308).

To find IBM OpenPages product documentation on the web, access the IBM OpenPages Information Center (http://pic.dhe.ibm.com/infocenter/op/v6r2m1f0/index.jsp).

For information about OpenPages phrases and terminology, see the *IBM OpenPages GRC Platform Administrator's Guide*.

For a more detailed explanation of the features and enhancements contained in this release of IBM OpenPages GRC Platform, see the *IBM OpenPages GRC Platform Release Notes*.

Documentation conventions

To illustrate screen displays, menu items, product displays, information that you enter, the following typographic conventions are used:

Table 2. Typographic conventions used in this document

Convention	Meaning
KEYWORD	Keywords of SQL or some other programming languages are displayed in uppercase letters in a serif font.
italics <text>	Variables that represent an object or entity that you replace with specific information. **Note:** To avoid confusion, in some situations, angle brackets enclose variables.
boldface	Names of interface elements (such as icons, menu items, and buttons) are displayed in boldface.
`monospace`	Information that the product displays and information that you enter is displayed in a monospace typeface.
>	This symbol indicates a menu item. For example, "**Choose Tools** > **Options**" means choose the **Options** item from the **Tools** menu.

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. Do not install OpenPages or any software that OpenPages uses into a directory with spaces. For example, do not install database server, database client, or application server software into the `Program Files` directory.

Table 3. Variable notations for installation directories on Windows operating systems

Directory	Meaning	Windows operating system
OP_HOME	The installation directory where OpenPages GRC Platform is installed.	`C:\OpenPages`
Workflow_HOME	The installation location of Fujitsu Interstage BPM.	`C:\Fujitsu\InterstageBPM`
ORACLE_HOME	The installation location of Oracle database software.	`ORACLE_BASE\client_software`
DB2_HOME	The location where the DB2 instance is created.	`C:\IBM\SQLLIB`
WAS_HOME	The location where the WebSphere Application Server is installed.	`C:\IBM\WebSphere\AppServer`
Cognos_HOME	The installation location of Cognos® Business Intelligence.	`C:\IBM\cognos\c10_64`
JAVA_HOME	The installation location of your Java™ Runtime Environment (JRE) or your Java Development Kit (JDK).	`C:\IBM\WebSphere\AppServer\java`

Table 3. Variable notations for installation directories on Windows operating systems (continued)

Directory	Meaning	Windows operating system
CC_HOME	The installation location of OpenPages CommandCenter.	`C:\OpenPages\CommandCenter`

Table 4. Variable notations for installation directories on AIX and Linux operating systems

Directory	Meaning	AIX and Linux operating systems
OP_HOME	The installation directory where OpenPages GRC Platform is installed.	`/opt/OpenPages`
Workflow_HOME	The installation location of Fujitsu Interstage BPM.	`/opt/Fujitsu/InterstageBPM`
ORACLE_HOME	The installation location of Oracle database software.	`/app/oracle/product/11.2.0/db_1`
DB2_HOME	The location where the DB2 instance is created.	`/home/db2inst1/sqllib`
WAS_HOME	The location where the WebSphere Application Server is installed.	`/opt/IBM/WebSphere/AppServer`
Cognos_HOME	The installation location of Cognos Business Intelligence.	`/usr/IBM/cognos/c10_64`
JAVA_HOME	The installation location of your Java Runtime Environment (JRE) or your Java Development Kit (JDK).	`/opt/IBM/WebSphere/AppServer/java`
CC_HOME	The installation location of OpenPages CommandCenter.	`/opt/OpenPages/CommandCenter`

Chapter 1. IBM OpenPages GRC Platform components

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

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, the workflow engine, and document management. The modules are configurations that sit on top of the platform.

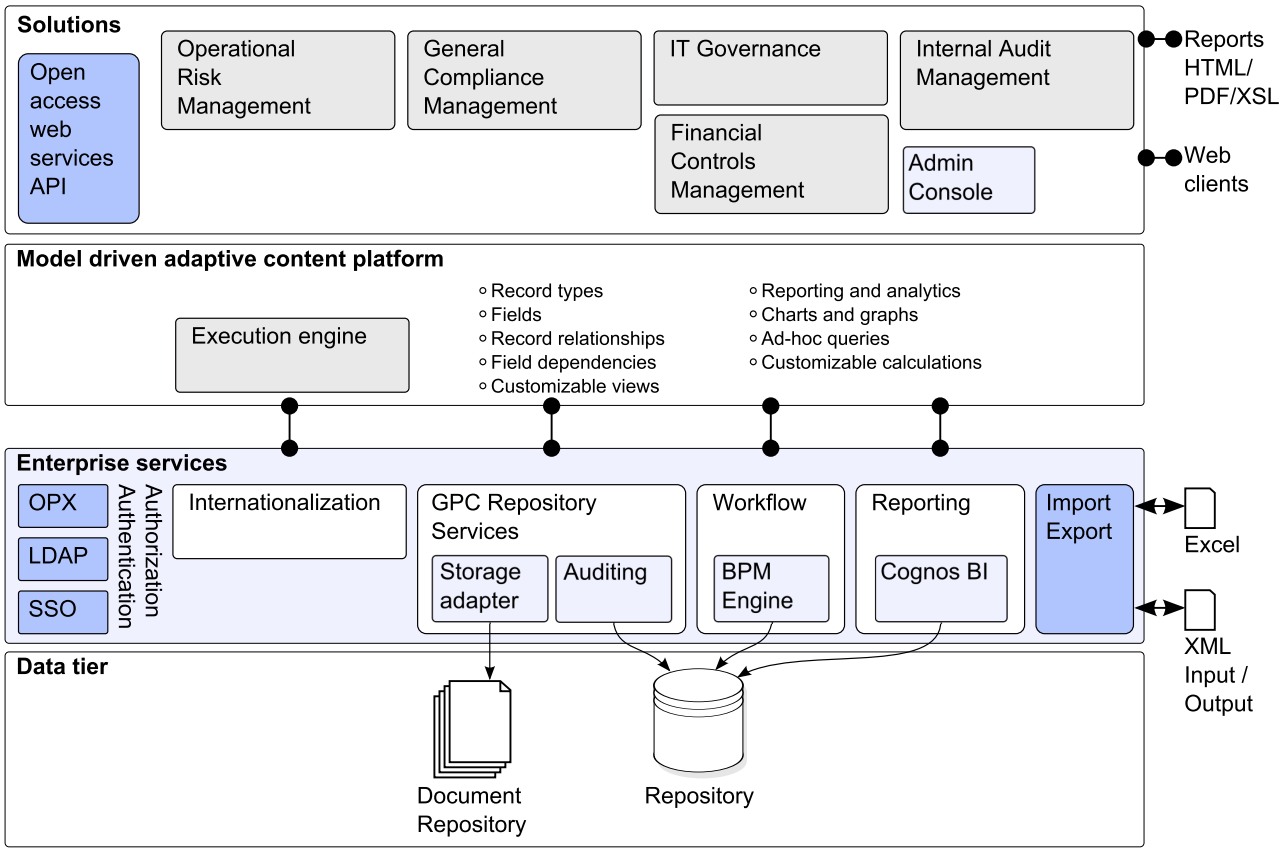

Figure 1. OpenPages GRC Platform components

Server topology and installation configurations

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

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

systems. You can also install the OpenPages application server on Linux or AIX operating systems and install the OpenPages database on a Windows operating system.

The OpenPages GRC Platform consists of the following components:

- Database server
- Application server
- Reporting server

Use the following guidelines to help you determine your topology:

Two computers

For light user loads, install the OpenPages application and IBM Cognos Business Intelligence on the same computer as the application server. A second computer hosts the database server.

This topology is typical in a testing or staging environment. Do not use this setup in a production environment.

The following diagram shows a test environment that uses two computers for the OpenPages GRC Platform installation.

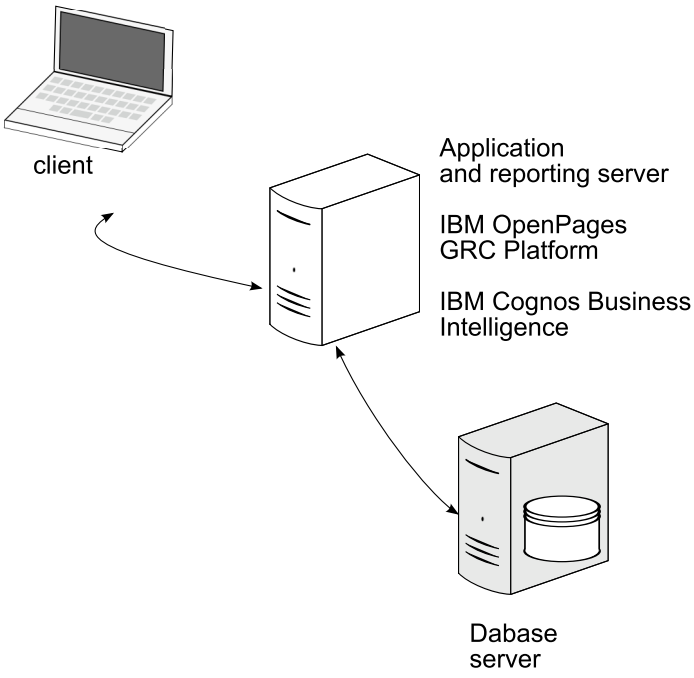

Figure 2. Topology for test environments or light user loads

Three computers

For moderate user loads, use three computers: one database server, one application server, and one reporting server. Install the OpenPages application on a single computer with the application server software. The database server software and Cognos Business Intelligence are each installed on separate computers

The following diagram shows an installation where the application server, reporting server and database server are each on separate computers.

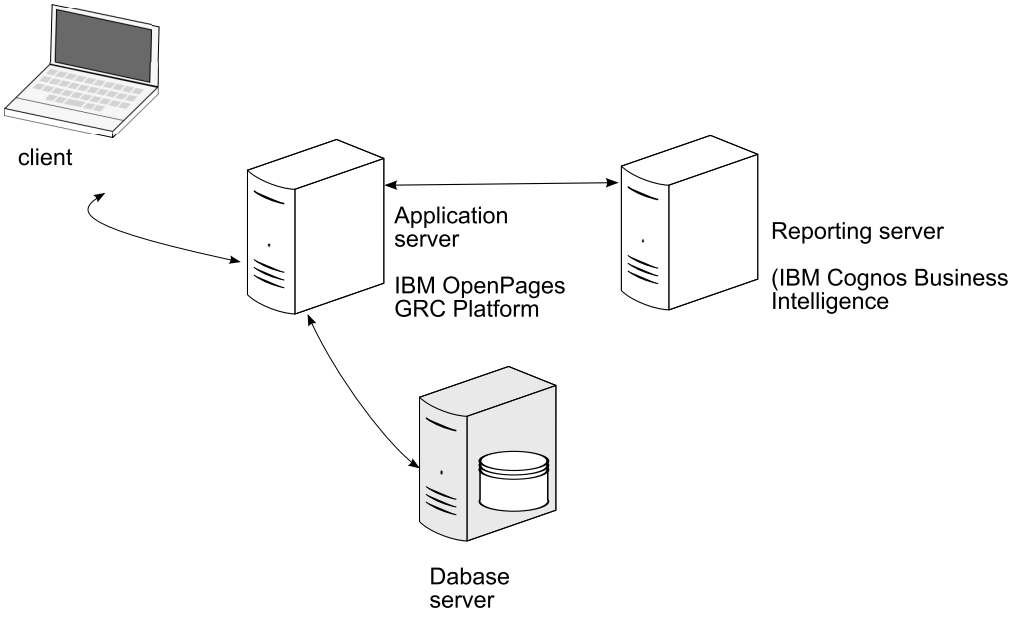

Figure 3. Topology for moderate user load

Multiple computers

To scale for heavier user loads, you can scale the OpenPages application vertically or horizontally. You scale by configuring more nodes. Scaling either vertically or horizontally requires that you use a load balancer. The load balancer distributes the incoming requests across the nodes.

To scale vertically, add a node to the same computer. To scale horizontally, add a node to an extra computer.

The following diagram shows an example of using a web server as a load balancer. The web server distributes incoming requests to horizontal cluster members.

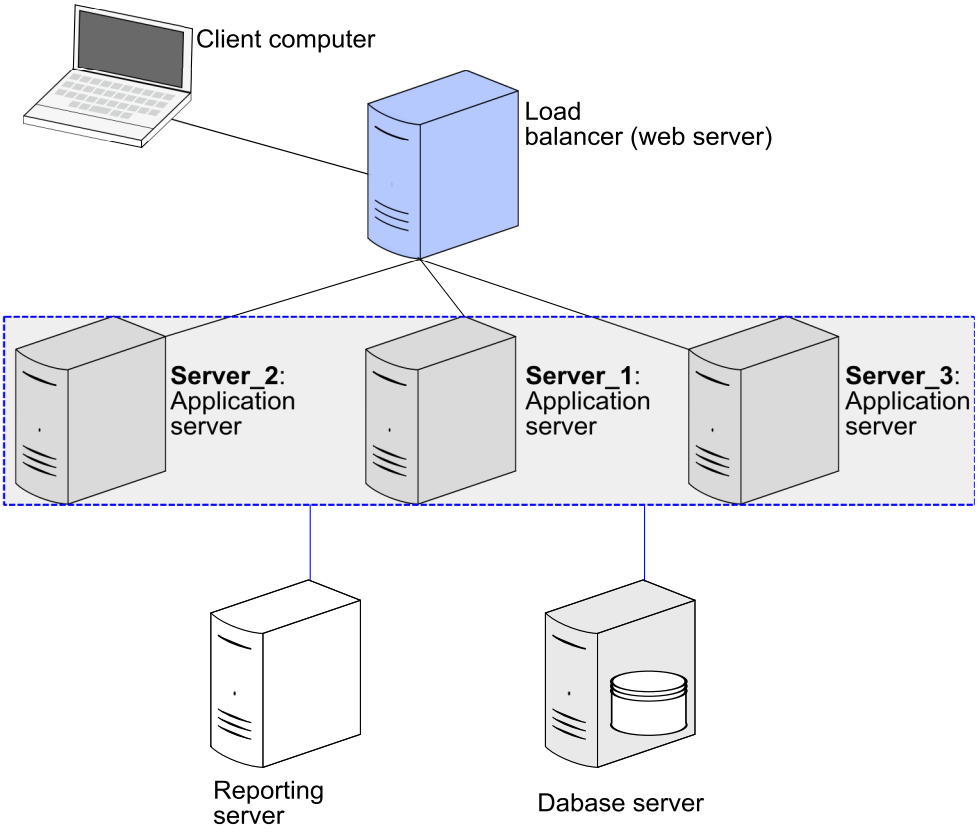

Figure 4. Topology for heavy user load

Vertical and horizontal scaling

If required, after the IBM OpenPages GRC Platform installation is complete, you can add additional OpenPages managed servers. To scale vertically, you can add an OpenPages application and workflow managed server to an existing cluster. To scale horizontally, you can add additional OpenPages application and workflow instances onto an existing OpenPages cluster member.

Load balancing configurations

Load balancing divides the load of incoming client requests across multiple application servers. The load on each computer is lessened. This configuration enables the OpenPages application to scale as the number of concurrent users increases.

The redundancy of the application tier, combined with the redundant hardware, also provides a path to high-availability for OpenPages.

Clustered OpenPages environments

Server cluster consists of multiple OpenPages application and workflow server instances that run simultaneously to provide increased scalability.

The server instances that comprise a cluster can run on the same computer or on different computers. You can add more server instances to the cluster on an existing computer. You can also add computers to the cluster to host the incremental server instances.

The OpenPages repository

The OpenPages database is a central source for metadata management, versioned application data, and access control.

The OpenPages application requires a set of database users and a tablespace, called the OpenPages database schema. You install these database components automatically during the OpenPages application installation or manually by using SQL scripts. Both the scripts and the installation program create and configure all of the required elements.

Oracle database software

An Oracle database is used for the OpenPages GRC Platform repository. You can use an Oracle database instance for the OpenPages GRC Platform repository

You must obtain the Oracle database and client software from the vendor. Install the Oracle database and the Oracle Client and also create a database instance. You must install the Oracle database before you install the OpenPages application.

DB2 database software

You can use a DB2 database for the OpenPages GRC Platform repository.

Before you install the OpenPages application, you must install the database server and client software, and create the database instance for the OpenPages repository.

Two DB2 database instances are required. One database instance for the OpenPages repository with Oracle compatibility enabled and one database instance for the Cognos content store without Oracle compatibility mode enabled.

Application server software

An application server is required to host the OpenPages applications. The application server runs the application modules, and includes the definition and administration of business metadata, UI views, user profiles, and user authorization.

The application server software must be installed before you install the IBM OpenPages GRC Platform components.

Use WebSphere Application Server as the application server.

OpenPages workflow server

OpenPages workflow server provides automated workflow capabilities to ensure consistent execution of business processes. Fujitsu Interstage BPM is installed as part of the OpenPages application server installation.

OpenPages workflow technology automates GRC processes, enabling companies to focus their resources on the gray areas of business where critical human decision making is required. Automation can help optimize the flow of risk and compliance activities.

Cognos Business Intelligence

IBM Cognos Business Intelligence provides executive dashboards and reports designed to accelerate 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.

Content store database

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

Important: If you use a DB2 database server product, you must use two separate database instances for the content store and the OpenPages databases.

Note: For the best performance if you use Oracle database server, use two separate databases for the content store and OpenPages database.

CommandCenter

The IBM OpenPages CommandCenter deploys the framework generator, the OpenPages security provider, creates the OpenPages data sources, and imports the standard OpenPages report packages.

Chapter 2. Upgrading OpenPages GRC Platform

To take advantage of new features, enhancements or performance improvements, upgrade existing versions of IBM OpenPages GRC Platform.

Upgrade your system in phases. Follow these basic steps:

1. Prepare the system for upgrade.

   Before you upgrade, you must back up the OpenPages database and application files and directories. Back up configuration files, reports, and the IBM Cognos BI content store database.
2. Upgrade the database schema.

   You can manually upgrade the OpenPages database schema by running SQL scripts. Otherwise, you use the installer to automatically upgrade the database schema.
3. Upgrade the OpenPages application and workflow servers.

   Run the upgrade installer on all computers in your environment. Upgrade the administrative server and workflow server, and then all non-administrative servers. You can choose to automatically update the database schema.

   In a horizontal clustered environment, install the upgrade on the administrative server first, and then on all non-administrative servers.

   You can run the upgrade installation multiple times to repair upgrade issues.
4. Complete post installation tasks.

   Some post installation tasks are required. Others, such as revoking the FORCE ANY TRANSACTION privilege, are optional.

Upgrade paths

You can use the upgrade deployment option in the OpenPages Administrative Console to upgrade from IBM OpenPages GRC Platform version 6.2.0 to version 6.2.1.

The IBM OpenPages GRC Platform upgrade installer verifies the version of OpenPages that is installed on your system. If the prerequisite version is not installed, the upgrade installer does not proceed.

When you upgrade the OpenPages software, the same version of Cognos Business Intelligence is used.

Additional setup is required after you upgrade if you decide to upgrade the version of WebSphere Application Server. For more information, see the WebSphere Application Server Information Center (http://pic.dhe.ibm.com/infocenter/wasinfo/v8r5/index.jsp).

Preparing to upgrade

Before you upgrade, prepare your OpenPages environment.

Ensure that the following conditions are met on all of your servers:

__• The PATH environment variable contains the location of the `javaw.exe` file.

The IBM OpenPages GRC Administrative Console requires a Java Runtime Environment (JRE).

Tip: You can use the JRE that is associated with WebSphere Application Server (*path*\WebSphere\AppServer\java\bin).

__ • Ensure that there is network access to the server that hosts the Oracle database by using the TNSPING or SQL*Plus.

__ • Ensure that the required users and groups exist and that they each have the appropriate permissions for installing applications.

__ • On Windows operating systems, enable Data Execution Prevention (DEP) in Microsoft Windows Server for essential Windows programs and services only.

__ • Ensure that you have access to the Microsoft Registry Editor (regedit.exe).

__ • If you use multiple network interfaces, ensure that all of the IP addresses and host names are listed in the Windows hosts file

__ • Review the IBM OpenPages GRC Platform supported software environments and other system requirements.

Backing up directories and files for a rollback on the application server computer

To uninstall the IBM OpenPages GRC Platform upgrade and revert to the previous level, you must back up directories and files. These directories and files are required for the uninstallation and rollback process.

Before you begin

If the following services are running, stop them:

- OpenPages application and workflow services (WebSphere Application Server nodes)
- OpenPages Framework Model Generator service
- IBM Cognos services

Procedure

1. Create a backup directory in a location that is different from the installation location.

   C:\OpenPagesBackup.
2. Log on to the application server as a user with administrative privileges and full access to the local server drives.
3. Go to the *OP_HOME* installation directory and copy the following directories to the backup location:
   - applications
   - aurora
   - bin
   - openpagesregistry.xml
4. To back up the Interstage BPM directory, copy the *Workflow_Home* installation directory to the backup location.

   The default installation location is C:\Fujitsu\InterstageBPM.
5. Log on to the reporting server as a user with administrative privileges and full access to the local server drives.
6. To back up CommandCenter directories and files, on the reporting server, copy the following directories and files from the *CC_Home* to the backup location:

- apache-tomcat
- tools\bin
- openpagesregistry.xml

Related tasks:

Chapter 11, "Starting and stopping OpenPages servers," on page 121
IBM OpenPages GRC Platform runs only if all of the services are started. All of the services for supporting software, such as the database server and Cognos Business Intelligence, must also be running.

Backing up the existing OpenPages GRC Platform environment

Run the OPBackup and OPCCBackup utilities to back up the existing IBM OpenPages GRC Platform environment.

The OPBackup and OPCCBackup utilities backs up the OpenPages database and application and the CommandCenter content store and files.

Procedure

Important: For complete information, including prerequisites, about backing up your environment, see the *IBM OpenPages GRC Platform Administrator's Guide*.

1. Run the OPBackup utility.
   - If you want to stop the IBM OpenPages services before you back up the application and environment files and export the OpenPages application database, run the OPBackup command from *OP_Home*\aurora\bin directory.

     OPBackup <*path-to-backup-location*>

     Note: The services are restarted when the backup activities are complete.
   - If you want the OpenPages application to continue to run during the backup process, use the nosrvrst option to run the OPBackup command from the *OP_Home*\aurora\bin directory.

     OPBackup <*path-to-backup-location*> nosrvrst

   The <*path-to-backup-location*> variable is the full path of the directory where the backup files are located. If the file path is not specified, the OPBackup command uses the backup location that is specified by the **BACKUP_LOCATION** parameter in the <*OP_Home*>\aurora\bin\op-backup-restore.env file.
2. If you are running the CommandCenter backup utility (OPCCBackup) for the first time, configure the Oracle data pump storage directory.
   a. Log on to a computer that has the SQL*Plus utility and a connection to the CommandCenter database instance.
   b. Go to the

      \WIN64-OP_*version*\OpenPages\Win64\
      OP_*version*_Non_Embedded_WAS_Oracle_DB2_WIN64\
      OP_*version*_Configuration\Database\ORACLE\UPGRADE_SCRIPTS\
      OP620X_TO_OP6210 directory.
   c. 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*>

      Use the following table to help replace the variables with values for your environment.

Table 5. 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 CommandCenter database instance on the reporting server computer.
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 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
```

3. Run the OPCCBackup utility to back up the CommandCenter files and the content store database.
   a. Go to the <*CC_Home*>\tools\bin directory
   b. Run the following command: OPCCBackup <*path-to-backup-location*>

   The <*path-to-backup-location*> variable is the full path of the directory where the backup files are located. If the file path is not specified, the OPCCBackup command uses the backup location that is specified by the **BACKUP_LOCATION** parameter in the <*CC_Home*>\tools\bin\op-cc-backup-restore.env file.

Enabling Data Execution Prevention for essential Windows programs and services

By default, Windows Server 2008 uses settings that are designed to prevent an application from running unauthorized programs. However, these settings can interfere with the IBM OpenPages GRC Platform installations. During the software installation, configure Data Execution Prevention (DEP) to allow the installers to work.

Procedure

1. Log on to the server.
2. Open Windows Explorer.
3. Right-click **Computer** > **Properties**.
4. In the **System Properties** window, click **Advanced System Settings**.
5. On the **Advanced** tab, under the **Performance** heading, click **Settings**.
6. In the **Performance Options** dialog box, 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 server in the installation.

What to do next

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

Verifying that services are running

All servers must be running during the upgrade installation of the IBM OpenPages GRC Platform. The upgrade installer validates user input by testing connections.

Procedure

1. If any administrative or managed servers are stopped, start them.
2. Verify that all administrative and managed servers are running, including database and reporting servers.
3. If the environment is a horizontal clustered installation, verify that all managed servers are running on all non-administrative servers.

Preparing the OpenPages application servers for upgrade

After you back up directories and files on all servers, some additional setup is required to prepare the OpenPages application servers for upgrade.

Configuring the default profile to accept the signer certificates from OpenPages and workflow deployment managers

If WebSphere Application Server global security is enabled, you must configure the default profile to automatically accept the signer certificates from OpenPages and workflow deployment managers.

Procedure

1. Log on to the OpenPages administrative server computer as an administrator.
2. Open a command prompt window as an administrator.
3. Go to the `WAS_HOME\bin` directory and run the following command to list the WebSphere Application Server profiles.

   ```
   manageProfiles.bat -listProfiles
   ```

   A list of the profiles is displayed. The first profile name is the *Default_Profile_Name*.

   Note: For example, on an admin server where you deployed two servers, the following message is displayed:

   ```
   [OpenPagesDmgr, op-OPNode1, IBPMDmgr, op-IBPMNode1, op-IBPMNode2]
   ```

   `OpenPagesDmgr` is the *Default_Profile_Name*.
4. To get the location of the *Default_Profile_Name*, run the following command:

   ```
   manageProfiles.bat -getPath -profileName <Default_Profile_Name>
   ```

   The *DEFAULT_PROFILE_PATH* is displayed.
5. Go to the *DEFAULT_PROFILE_PATH*`\bin` directory and run the following two commands:

   ```
   retrieveSigners.bat -autoAcceptBootstrapSigner -host <HOST_NAME> -port
   <OP_SOAP_PORT> -username <WAS_ADMIN_USERNAME> -password
   <WAS_ADMIN_PASSWORD>
   ```

   Example: To automatically accept the signer certificate from the OpenPages deployment manager:

```
retrieveSigners.bat -autoAcceptBootstrapSigner -host MY_HOST
-port 8879 -username admin -password mypassword
```

```
retrieveSigners.bat -autoAcceptBootstrapSigner -host <HOST_NAME>
-port <WORKFLOW_SOAP_PORT> -username <WAS_ADMIN_USERNAME>
-password <WAS_ADMIN_PASSWORD>
```

Example: To automatically accept the signer certificate from the workflow deployment manager:

```
retrieveSigners.bat -autoAcceptBootstrapSigner -host MY_HOST -port 8880
-username admin -password mypassword
```

6. To apply the changes, restart all the services.

Saving custom settings in configuration files after the upgrade

If you manually edited any configuration files, you must reapply the changes. Keep a record of any customizations to ensure that they can be reapplied after you upgrade. Also, back up these files so that the original version can be restored if necessary.

To save and then restore customized settings:

1. Before you upgrade, open the configuration file that has the settings that you changed manually.
2. Note the settings that you changed.
3. Back up the configuration file.
4. Install the upgrade.
5. Ensure that the upgrade works.
6. In the upgrade installation location, open the configuration file.
7. If necessary, update the configuration file with the changes you made in the previous product version.

Disabling single signon

To simplify testing the upgrade installation, temporarily disable single signon. You can test the upgraded environment without logging on to the single signon system.

Procedure

1. Open the current OpenPages application in a web browser.
2. Log on as a user with administrative permissions.
3. Click **Action** > **Configuration** > **Settings**.
4. Expand **OpenPages** > **Platform** > **Security** > **Single Sign On**.
5. Click the **OP** setting, set the value to `false`, and click **Save**.
6. Click the **SOX** setting, set the value to `false`, and click **Save**.

What to do next

After you test the upgrade, re-enable single signon.

Disabling system admin mode

Before you upgrade, temporarily disable the system admin mode.

To view **System Admin Mode** in the OpenPages application, you must have `System Administration Mode` permission.

Procedure

1. Log on to the OpenPages application user interface as a user with the `System Administration Mode` permission.
2. From the menu bar, click **Administration** > **System Admin Mode** > **Disable**.
3. Log on to the OpenPages application user interface as a user with the `System Administration Mode` permission.
4. From the menu bar, click **Administration** > **System Admin Mode** > **Disable**.
5. Click **OK**.

Modifying the ObjectManager properties file to disable object force update strings

The `ObjectManager.properties` file contains a number of settings that control or limit the scope of exported configuration and related data from the OpenPages ObjectManager tool.

Procedure

1. Log on to the application server as an administrative user.
2. Go to the *OP_HOME*`/bin` directory.
3. Make a backup copy of the `ObjectManager.properties` file.
4. Open the `ObjectManager.properties` file in a text editor.
5. Verify that the following two properties are set to false to ensure that custom strings are not overwritten:
   - `configuration.manager.force.update.object.strings=false`
   - `configuration.manager.force.update.application.strings=false`
6. Save and close the file.

Database schema upgrade

You can manually update the IBM OpenPages GRC Platform database schema by running SQL scripts included in the media kit. Also, you can use the upgrade installer program to automatically upgrade the database schema.

If you choose to manually upgrade the database server, you must run the SQL scripts to upgrade the database server before you upgrade the reporting and application servers.

Upgrading the database schema manually by using scripts

Run the `database-upgrade.sql` script to manually upgrade the OpenPages database schema.

Before you begin

Ensure that the passwords for the Oracle database system, OpenPages, and workflow user accounts are not expired.

Procedure

1. Stop all OpenPages services.
2. Log on to a computer that has the SQL*Plus utility and access to the database server.

3. Extract the installation files from the IBM OpenPages GRC Platform Installer *version* for WebSphere Application Server Microsoft Windows Multilingual DVD.
4. From the \WIN64-OP_*version*\OpenPages\Win64\OP_*version*_Non_Embedded_WAS_Oracle_DB2_WIN64\OP_*version*_Configuration\Database\ORACLE\UPGRADE_SCRIPTS directory, find the database-upgrade.sql script.
5. Use the following syntax to run the database-upgrade.sql script:

   ```
   sqlplus /nolog @sql-wrapper.sql database-upgrade.sql
   <log_file> <oracle_tns_alias> <dba_user> <dba_password>
   <workflow_user> <workflow_password>
   <op_user> <op_password>
   ```

   The following table describes the parameters that are passed to the SQL wrapper script.

Table 6. Descriptions of parameters that are passed to the SQL wrapper script

Parameter Name	Description	Example
log_file	The name of the log file that the script creates and writes information to.	logfile.txt
oracle_tns_alias	The database alias for the OpenPages database instance, as set during the Oracle database installation. If necessary, you can retrieve this alias from the tnsnames.ora file.	OP
dba_user	The Oracle system user name. If you do not have access to the system user account, then use a database user account with administrative privileges.	system
dba_password	The password for the Oracle system account.	openpages
workflow_user	The workflow database user name. OpenPages uses this account to create and access the workflow database, and to manage workflow-related transactions.	opworkflow
workflow_password	The password for the workflow database user account.	opworkflow
op_user	The user name that is used by OpenPages to create and access the OpenPages database instance	openpages
op_password	The password for the OpenPages database user account.	openpages

Example:

```
sqlplus /nolog @sql-wrapper.sql database-upgrade.sql
db_upgrade.log OP system oppassword opworkflow
oppassword openpages oppassword
```

Results

After the SQL script finishes, the OpenPages database schema is upgraded. The log file that you specified as a parameter is created in the directory where you ran the SQL script.

If you have problems when you run the `database-install.sql` script, use the `\WIN64-OP_version\OpenPages\Win64\OP_version_Non_Embedded_WAS_Oracle_DB2_WIN64\OP_version_Configuration\Database\ORACLE\init-db-cleanup.sql` script, which removes the database components that were added. Then, run the `database-install.sql` script in a clean database environment.

Example

```
sqlplus /nolog @sql-wrapper.sql init-db-cleanup.sql log_file
oracle_tns_alias dba_user dba_password workflow_user op_user
```

Note: The `init-db-cleanup.sql` script drops the database. You must restore the database from backup before you continue with the database upgrade. After the database environment is restored from backup, you can run the `database-upgrade.sql` wrapper script again.

Related tasks:

"Upgrading the OpenPages application server"
You must upgrade all application servers. Run the upgrade installer on all administrative and managed servers.

Upgrading the OpenPages application server

You must upgrade all application servers. Run the upgrade installer on all administrative and managed servers.

Before you begin

Ensure that the following conditions are met:

- System admin mode is disabled
- Services are running
- JAVA_HOME is set

  Restriction: Ensure that the JAVA_HOME environment variable points to `jdk1.6.0_24`. Other versions of Java cause issues with Interstage BPM. If you plan to upgrade the version of Java in your environment, keep the existing Java `jdk1.6.0_24` for OpenPages GRC Platform.
- Ensure that the password for the Oracle database system is not expired.
- If the OpenPages, and workflow database user accounts exist, ensure that the password for each account is not expired.

Procedure

1. Log on to the application server as a user with administrative privileges and full access to the local server drives.
2. Extract the installation files from the IBM OpenPages GRC Platform Installer *version* for WebSphere Application Server Microsoft Windows Multilingual DVD to the local system.
3. From the `\WIN64-OP_version\OpenPages\Win64\OP_version_Non_Embedded_WAS_Oracle_DB2_WIN64\OP_version_Admin_and_Config_Console` directory, extract the contents of the `opadminconsole-win32.win32.x86_64.zip` file.

   To avoid `File path too long` or other extraction errors, use a decompression utility, such as 7-Zip, Otherwise, extract the files to the root directory or to the `c:\temp` directory. The extraction might take a few moments to finish.
4. From the directory where you extracted the files, go to the `opadminconsole` directory and right-click `opadminconsole.exe` and click **Run as administrator**.
5. If the license agreement is displayed, accept the terms to proceed.
6. In the **Select the Installation Option** page, select **Upgrade WebSphere Server on Windows with Oracle** and click **Continue**.
7. From the **Select the Installation Option** page, click **Upgrade WebSphere on Windows with Oracle**.
8. On the **Properties** tab, enter the properties that are required to deploy OpenPages application servers and workflow server.

   Use the **Repair** option if you are installing on top of an existing upgrade installation.

   Tip: A description and online help for each property is displayed in the **Help** view when you click the property. If the **Help** view is not visible, click **View** > **Help** or press F1. For information about using the OpenPages Administrative Console, in the **Help** view, click **Contents**
9. For the **OpenPages Application Server Information** group of properties, choose whether you are installing the OpenPages administrative server or managed server, and then enter the property values.

   You must upgrade the OpenPages administrative server before you upgrade the managed servers.
10. If WebSphere Application Server security is enabled, select **Enabled on server**.

    Important: Ensure that you enter the correct information for the WebSphere **Admin Username** and **Admin Password**. These credentials are used to log in to the WebSphere Administrative Console.

    To verify the credentials, log on to the WebSphere Administrative Console (https://*was_host_name*:*secure_port*/ibm/console).

    The default secure port number for the OpenPages cell is 9043.
11. For the **Database Information** group of properties, select whether you upgraded the OpenPages database schema.
    - Select **Upgrade now** to automatically upgrade the OpenPages database schema when OpenPages GRC Platform is deployed to WebSphere Application Server.
    - Select **Already installed** if the schema is upgraded.

      You must upgrade The OpenPages database schema either before or during the deployment to WebSphere Application Server.
12. To verify the settings that you entered, click **Validate Properties**.

If there are errors, change the settings that require attention.

13. To upgrade OpenPages GRC Platform, click **Upgrade**.

    Monitor the progress of the installation in the **Installation Steps** or the **Log** view.

    A message is displayed to indicate whether the installation succeeded. If the installation fails, the OpenPages Administrative Console rolls back the installation to the last successful checkpoint.

    If you see the following exception in the `OP_Home\aurora\logs` files, you can safely ignore the message:

    ```
    com.ibm.websphere.ce.cm.DuplicateKeyException:
    ORA-00001: unique constraint (OPENPAGES.APPPERMISSIONS_UN)
    violated.
    ```

What to do next

For a complete upgrade, you must upgrade all OpenPages application server and CommandCenter computers.

Related concepts:

"Upgrade installation recovery options" on page 19
When the upgrade installation fails, the installation program does a partial rollback. The partial rollback backs out selected installation changes to a save point. To recover from the failed upgrade installation, choose one of the following options:

Related tasks:

"Upgrading the database schema manually by using scripts" on page 13
Run the `database-upgrade.sql` script to manually upgrade the OpenPages database schema.

Upgrading the reporting server

You must upgrade CommandCenter on all reporting servers.

Before you begin

Ensure that the following conditions are met:

- IBM Cognos Business Intelligence is installed and running
- All services are running
- JAVA_HOME is set

Restriction: Ensure that the JAVA_HOME environment variable points to `jdk1.6.0_24`. Other versions of Java cause issues with Interstage BPM. If you plan to upgrade the version of Java in your environment, keep the existing Java `jdk1.6.0_24` for OpenPages GRC Platform.

Procedure

1. Log on to the reporting server as a user with administrative privileges and full access to the local server drives.
2. Extract the installation files from the IBM OpenPages GRC Platform Installer *version* for WebSphere Application Server Microsoft Windows Multilingual DVD to the local system.
3. From the `\WIN64-OP_`*version*`\OpenPages\Win64\OP_`*version*`_Non_Embedded_WAS_Oracle_DB2_WIN64\`

OP_*version*_Admin_and_Config_Console directory, extract the contents of the opadminconsole-win32.win32.x86_64.zip file.

To avoid File path too long or other extraction errors, use a decompression utility, such as 7-Zip, Otherwise, extract the files to the root directory or to the c:\temp directory. The extraction might take a few moments to finish.

4. From the directory where you extracted the files, go to the opadminconsole directory and right-click opadminconsole.exe and click **Run as administrator**.
5. If the license agreement is displayed, accept the terms to proceed.
6. On the **Select the Installation Option** page, select **Upgrade WebSphere Server on Windows with Oracle** and click **Continue**.
7. On the **Properties** tab, enter the properties that are required to deploy OpenPages application servers and workflow server.

   Use the **Repair** option if you are installing on top of an existing upgrade installation.

   Tip: A description and online help for each property is displayed in the **Help** view when you click the property. If the **Help** view is not visible, click **View** > **Help** or press F1. For information about using the OpenPages Administrative Console, in the **Help** view, click **Contents**
8. To verify the settings that you entered, click **Validate Properties**.

   If there are errors, change the settings that require attention.
9. Click **Upgrade**.

   Monitor the progress of the installation in the **Installation Steps** or the **Log** view. A message is displayed to indicate whether the installation succeeded. If the installation fails, the OpenPages Administrative Console rolls back the installation to the last successful checkpoint.

What to do next

For a complete upgrade, you must upgrade all reporting server computers.

Related concepts:

"Upgrade installation recovery options" on page 19
When the upgrade installation fails, the installation program does a partial rollback. The partial rollback backs out selected installation changes to a save point. To recover from the failed upgrade installation, choose one of the following options:

Updating the reporting framework

After you upgrade IBM OpenPages GRC Platform, update the reporting framework.

Procedure

1. In a web browser, open the OpenPages application:

   http://*openpages_server*:*port*/openpages
2. Log on to the OpenPages application as a user with administrative privileges.
3. If **System Admin Mode** is enabled, disable it.
4. From the menu bar, click **Administration** > **Reporting Framework** > **Generation**.
5. On the **Reporting Framework Operations** page, click **Update**.

6. 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.

   Restriction: If you are upgrading from OpenPages GRC Platform version 5.x or earlier, you must generate the Legacy Framework.

   For upgraded systems that have the **Legacy Reporting Framework setting enabled**, you can generate the relational data model. Under **Legacy Framework Generation**, select the **Framework Model** and **Labels** options.

   For information about enabling the Legacy Framework and enabling computed fields in the Reporting Framework V6, see the *IBM OpenPages GRC Platform Administrator's Guide*.
7. Click **Submit**.
8. To view the progress of the update, click **Refresh**.

   The **Percent Complete** column on the **Reporting Framework Operations** table is updated.

Results

Updating the reporting framework process takes approximately 30 minutes or longer.

Upgrade installation recovery options

When the upgrade installation fails, the installation program does a partial rollback. The partial rollback backs out selected installation changes to a save point. To recover from the failed upgrade installation, choose one of the following options:

- Rerun the upgrade installation in **Repair** mode and complete the upgrade.
- Manually roll back to the previous version of IBM OpenPages GRC Platform.

Rolling back manually to a previous installation

If the upgrade installation fails, you can manually revert to the successful state of the previous version of IBM OpenPages GRC Platform.

About this task

Use the following table to replace the script variables with values that are appropriate for your environment.

Table 7. Variable descriptions for rollback scripts

Variable	Description
admin_host_name	The host name of the administrative server.
admin_username	User name of the WebSphere Application Server administrator account
admin_password	The password of the WebSphere Application Server administrator account

Table 7. Variable descriptions for rollback scripts (continued)

Variable	Description
OP_SOAP_port	The port number for the OpenPages Deployment Manager SOAP listener. In the OpenPages Administrative Console, this parameter is the **DMgr Manager SOAP Port**. The value of the **SOAP_CONNECTOR_ADDRESS** setting in the *<OP_Home>*\temp\wasconfig\OpenPagesCell*<server_name>*-OPNode1Server*<server#>*.config.props file The default port is 8879.
IBPM_SOAP_port	The port number for the workflow Deployment Manager SOAP listener. In the OpenPages Administrative Console, this parameter is the **Workflow DMgr SOAP Port**. The value of the **SOAP_CONNECTOR_ADDRESS** setting in the *<OP_Home>*\temp\wasconfig\IBPMCell*<server_name>*-IBPMNode*<server#>*Server.config.props file The default port is 8881.
host_name	The name of the computer where you are running the recovery steps.

Procedure

1. To manually stop the OpenPages services, go to the *OP_Home*\bin directory.
   - If WebSphere Application Server security is not enabled, run the following command:

     ```
     StopAllServers.cmd
     ```
   - If WebSphere Application Server security is enabled, run the following command:

     ```
     StopAllServers.cmd <admin_username> <admin_password>
     ```
2. To start the OpenPages Deployment Manager, go to the *OP_Home*\profiles\OpenPagesDmgr\bin directory and run the startManager.bat script.
3. To deploy the OpenPages application by using scripts, open a command window and go to the *OP_Home*\upgrade\temp\perlinstall directory.
   - If WebSphere Application Server security is not enabled, run the following command:

     ```
     <WAS_HOME>\bin\wsadmin.bat -wsadmin_classpath
     commons-configuration-1.6.jar;
     commons-lang-2.4.jar;commons-collections-3.2.1.jar -lang
     jython -conntype soap
     -host <admin_host_name> -port
     <OP_SOAP_port> -f updateOPApp.py
     ```
   - If WebSphere Application Server security is enabled, run the following command:

     ```
     <WAS_HOME>\bin\wsadmin.bat -wsadmin_classpath
     commons-configuration-1.6.jar;
     commons-lang-2.4.jar;commons-collections-3.2.1.jar
     ```

```
-user <admin_username>  -password <admin_password>
-lang jython -conntype soap
-host <OP_ADMIN_HOSTNAME> -port
<OP_SOAP_port> -f updateOPApp.py
```

4. To start the Fujitsu Interstage BPM Deployment Manager by using scripts, go to the *<worflow_HOME>*\profileIBPMDmgr\bin directory and run the startManager.bat command.
5. To deploy the workflow applications, open a command window and go to the *OP_Home*\upgrade\temp\perlinstall directory.
   - If WebSphere Application Server security is not enabled, run the following command:

     ```
     <WAS_HOME>\bin\wsadmin.bat -wsadmin_classpath
     commons-configuration-1.6.jar;commons-lang-2.4.jar;
     commons-collections-3.2.1.jar -lang
     jython -conntype soap -host <admin_host_name>
     -port <OP_SOAP_port> -f updateOPApp.py
     ```

   - If WebSphere Application Server security is enabled, run the following command:

     ```
     WAS_HOME>\bin\wsadmin.bat -wsadmin_classpath
     commons-configuration-1.6.jar;commons-lang-2.4.jar;
     commons-collections-3.2.1.jar
     -user <admin_username> -password <admin_password>
     -lang jython -conntype soap -host <admin_host_name>
     -port <OP_SOAP_port> -f updateOPApp.py
     ```

6. To synchronize the OpenPages nodes, open a command window and go to the *<OP_Home>*\profiles*<host_name>*\OPNode1\bin directory.
   - If WebSphere Application Server security is not enabled, run the following command:

     ```
     syncNode.bat <admin_host_name> <OP_SOAP_port>
     ```

   - If WebSphere Application Server security is enabled, run the following command:

     ```
     syncNode.bat <admin_host_name> <OP_SOAP_port>
     -user <admin_username> -password <admin_password>
     ```

7. To synchronize the workflow nodes, open a command window and go to each workflow (Interstage PBM) node directory.

   <workflow_Home>\profiles*<host_name>*IBPMNode*<Node_Number>*\bin

   - If WebSphere Application Server security is not enabled, run the following command:

     ```
     syncNode.bat <admin_host_name> <IBPM_SOAP_port>
     ```

   - If WebSphere Application Server security is enabled, run the following command:

     ```
     syncNode.bat <admin_host_name> <IBPM_SOAP_port>
     -user <admin_username> -password <admin_password>
     ```

8. To restore the solutions and services archives in the *<OP_Home>*\application directory, copy them into the corresponding locations in the following directory:

   <OP_Home>\profiles*<host_name>*-OPNode1\installedApps\OpenPagesCell\op-apps.ear

9. To restore the files under the *<OP_Home>*\upgrade\backup\ibpm\profiles directory, copy them to the *<workflow_Home>*\profiles directory.
10. Restore the OpenPages database backup.

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

11. Manually start the OpenPages services.
    a. Go to the <*OP_Home*>\bin directory
    b. Run the StartAllServers.cmd script.

Post upgrade tasks

After you upgrade IBM OpenPages GRC Platform, some post installation tasks are required to complete the upgrade.

Starting services after the upgrade

The upgrade installer stops all OpenPages servers on the computer where you are upgrading. When the upgrade installer is complete, you must manually restart the servers.

Procedure

1. Start all application and workflow servers.

   On Windows operating systems, you must start the **OpenPagesAdminServer** service first. Then, start the other services. Otherwise, use start the services from the Windows Start menu shortcut.

   For more information about starting services, see the *IBM OpenPages GRC Platform Administrator's Guide*.
2. Start the IBM Cognos Business Intelligence service.

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 8. Post-installation verification checklist

Task	Guidance
Review all installation logs for errors.	The log files are located in the OP_HOME\bin\logs directory.
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 timestamp. The file is in the *OP_Home*\openpages-backup-restore directory. For information about using the backup utility, see the *IBM OpenPages GRC Platform Administrators Guide*.
Confirm that the reporting schema and framework generated successfully.	For more information, see "Updating the reporting framework" on page 18.
Confirm that base reports are functioning as expected.	Log on to the OpenPages application and run the All Documentation CommandCenter report.
If single signon (SSO) is enabled, verify that user accounts can access the environment.	Log on to the OpenPages application with an SSO user account.

Table 8. Post-installation verification checklist (continued)

Task	Guidance
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 primary and secondary application servers.
For load-balanced environments, confirm that backup scheduling works.	On primary and secondary servers, verify backup scheduling and process times.
Validate that you can access the Cognos portal.	Type the web URL `http://server_name/ibmcognos` from a client system. Confirm that you can log on to the portal.

Testing IBM Cognos Business Intelligence after the upgrade

Verify that IBM Cognos Business Intelligence works with the IBM OpenPages GRC Platform environment.

Procedure

1. Log on to the IBM OpenPages application and verify that you can connect to the IBM Cognos Business Intelligence portal.
   a. In a web browser, log on to the IBM OpenPages application.
   b. To test the connection from OpenPages to the IBM Cognos BI portal, click **Reporting** > **Cognos Connection**.
   c. Close the session.
2. On the IBM OpenPages home page, from the **Reporting** menu, verify that you can open the Cognos studios.
3. From the IBM OpenPages application, click **Reporting** > **All Reports**, and run some standard and custom user reports.

Upgrading deployed images and custom query subjects on the reporting server

Upgrade the deployed OpenPages images and custom query subjects to the current version of IBM Cognos Business Intelligence.

Procedure

1. Go to the *Old_Cognos_HOME*|webcontent|skins|branding directory.

   Old_Cognos_HOME is the installation location of the previous version of Cognos software.
2. Copy the contents of the directory, without overwriting existing images, to the *New_Cognos_HOME*|webcontent|skins|branding directory.
3. To back up the custom query subjects, go to the *Old_CC_HOME*|framework|conf directory and copy the files to the *New_CC_HOME*|framework|conf directory.

Results

If there are no deployed images or custom query subjects, following this procedure will copy no files.

Enabling single signon after upgrade

If you disabled single signon, re-enable the settings.

Procedure

1. Open the current OpenPages application in a web browser.
2. Log on as a user with administrative permissions.
3. Click **Action** > **Configuration** > **Settings**.
4. Expand **OpenPages** > **Platform** > **Security** > **Single Sign On**.
5. Click the **OP** setting, set the value to `true`, and click **Save**.
6. Click the **SOX** setting, set the value to `true`, and click **Save**.

Updating OpenPages Modules reports after an upgrade

If you upgraded OpenPages from versions 6.0 or 6.1, you must manually deploy a Cognos deployment archive on the reporting server.

Restriction: To move a deployment archive, you need access to the installation directories on the computer where IBM Cognos Business Intelligence is installed. This location is set in the configuration tool. The default location is `Cognos_HOME/deployment`.

Procedure

1. Log on to the reporting server as a user with administrative privileges.
2. From the OpenPages Upgrade Installer DVD, go to the `Reports` directory.
3. Copy the `DrillUpDrillDownReportsWithUpdatedDrilling.zip` and `DrillUpDrillDownReportsWithFullDrilling.zip` files to the IBM Cognos deployment directory.

   The default location is the *Cognos_HOME*`\deployment` directory.
4. From the command prompt, go to the *CC_HOME*`\temp\bin` directory.

   The default location is the *OP_HOME*`/CommandCenter/temp/bin` directory.
5. Type the following command:

```
importReports.bat -a DrillUpDrillDownReportsWithUpdatedDrilling -s
    OpenPagesSecurityRealm -u <username> -p <password>
    -g http://<Cognos_server>:<dispatcher_port>/p2pd/servlet/dispatch
```

Results

You can access the reports in IBM Cognos Connection.

Custom settings in configuration files

If you manually edited any configuration files in the previous version, you must reapply the changes.

To restore customized settings after you upgrade:

1. Ensure that the upgrade works.
2. Find the backup copy of the configuration file.

3. In the upgrade installation location, open the new configuration file.
4. Update the configuration file with the changes you made in the previous product version.

Restoring changes to the `application.xml` file

If you preserved settings in the `application.xml` file, such as removing `openpages` from the application URL, you can restore the settings.

Procedure

1. If necessary, stop the OpenPages services.
2. Go to the *OP_HOME*`/profiles/OpenPagesDmgr/config/cells/OpenPagesCell/applications/op-apps.ear/deployments/op-apps/META-INF/application.xml` directory
3. Open the file in a text editor and compare it to the backed up version of the file.
4. Restore the customized settings.
5. For WebSphere Application Server, restore the setting on all nodes in the cluster.

   Each node has a version of the `application.xml` file in a location similar to the following directory: *OP_HOME*`/profiles/`*node_name*`1/installedApps/OpenPagesCell/op-apps.ear/META-INF/`.
6. Restart the services.

Backing up changes to the `web.xml` file

If you changed settings in the `web.xml` file, such as changing the HTTP session timeout for a user in your web application

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

Procedure

1. For WebLogic environments, log on to the IBM OpenPages application server as a user with administrative permissions.
   a. If necessary, stop all services.
   b. Find the backup copy of the `web.xml` file and open it in a text editor.
   c. Find the **`session-timeout`** parameter value (in minutes).

   ```
   <!--Set the default session timeout (in minutes)-->
   <session-config>
   <session-timeout>90</session-timeout>
   </session-config>
   ```

   d. In the upgrade location, go to the *OP_HOME*`\applications\op-apps\sosa\WEB-INF directory\web.xml` file and restore the setting.
2. For WebSphere Application Server installations, log on to the IBM WebSphere Integrated Solutions Console as a server administrator.

   `http://`*server_name*`:`*port*`/ibm/console`

   The default port is 9060.
   a. Expand **Applications** > **Application Types** and click **WebSphere enterprise applications**.
   b. On the **Enterprise applications page**, click the name of the resource you want to configure

c. On the **Enterprise Applications IBM OpenPages -*resource-name* page**, click the **Configuration** tab.
d. Under the **Web Module Properties** headingsame, click **Session management**.
e. On the **Enterprise servers IBM OpenPages -*resource-name* Session management page**, under **General Properties** find the **Session timeout** pane.
f. Select the **Set timeout** option, and reset the **Set timeout** setting to the value of the backup setting.
g. Exit the console

3. Restart the services.

Chapter 3. Installation planning

The key to a successful installation is planning. Review the IBM OpenPages GRC Platform supported software environments and other system requirements, such as hardware requirements, on the IBM support website ((http://www.ibm.com/support/ docview.wss?uid=swg27037756).

Related concepts:

"Server topology and installation configurations" on page 1
Before you install OpenPages GRC Platform, plan the server topology. The number of computers you use depends on the expected user loads.

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 OpenPages GRC Platform.

Prerequisite software for all servers

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

The following tables list the third-party software that must be installed on all OpenPages servers before you start the OpenPages installation.

Table 9. Software prerequisites for all Windows computers

Requirement	Specification
Operating System	Windows
Web browser	Internet Explorer
File compression utility	For example, WinZip
PDF reader	Adobe Acrobat

Table 10. Software prerequisites for all AIX or Linux computers

Requirement	Specification
Operating System	AIX or Linux
File compression utility	For example, GNU compression utility (`gtar`)

Prerequisite software for the database server

In addition to the software required for all servers, ensure that the prerequisite software is installed on the database server.

The server that hosts the OpenPages database must have the required server software that is installed, including any fix packs, patches, or other service updates. For more information, see the supported software environments on the IBM support website.

Oracle database server

The Oracle database server that hosts the OpenPages database must have the required server software installed.

- Oracle Database Server 11g Release 2 (11.2.0.1) Standard with October 2010 Critical Patch Update applied
- Oracle Database Server 11g Release 2 (11.2.0.1) Enterprise Edition with October 2010 Critical Patch Update and `p8795792_112010_Generic.zip` patch applied. You must contact Oracle Support and request the `p8795792_112010_Generic.zip` patch file.
- Oracle Real Application Clusters 11g Release 2

DB2 database server

The DB2 database server that hosts the OpenPages database must have the required server software installed. DB2 10.1 Server Fix Pack 1 must be installed before you install the DB2 Universal Fix Pack.

The following table lists the DB2 software requirements by operating system.

Table 11. Required DB2 10.1.0.1 software for OpenPages

Operating system	Universal Fix Pack
Windows	1. DB2 Server Fix Pack 1 2. Universal Fix Pack Special_30205 for Windows
Linux	1. DB2 Server Fix Pack 1 2. Universal Fix Pack Special_30155 for Linux-64
AIX	1. DB2 Server Fix Pack 1 2. Universal Fix Pack Special_30070 for AIX-64

Related concepts:

"Oracle Database Server installations" on page 61
IBM OpenPages GRC Platform requires a database server. Use the installation instructions from the vendor to install the Oracle database server on the IBM OpenPages database server. After you install Oracle Database, some configuration is required.

"DB2 server installations" on page 41
To use a DB2 database for the OpenPages repository, review the specific requirements for your system before you install DB2 products.

Prerequisite software for application servers

Ensure that you install the prerequisite software on all servers that host IBM OpenPages GRC Platform.

The following tables list the software requirements for application servers.

Table 12. Software prerequisites for application servers on Windows computers

Requirement	Specification
Java Development Kit	For WebSphere Application Server Network Deployment, use the JDK that is available with the application server.
Application server	WebSphere Application Server Network Deployment and required fix packs.
Application server installation location	**Restriction:** The IBM OpenPages GRC Platform Installer requires that application server software is installed to a path with no spaces. **Important:** IBM OpenPages GRC Platform requires a dedicated Windows-based server and IBM WebSphere Application Server environment. Sharing the OpenPages server with other applications and IBM WebSphere Application Server environments is not supported
Database client software	Oracle or DB2 database client software **Important:** Ensure that you use the same version of the database client software as the server software. Apply all required patches, interim fixes, or services to both the database server and the database client software

Table 13. Software prerequisites for application servers on AIX or Linux computers

Requirement	Specification
Application server	IBM WebSphere Application Server Network Deployment and required fix packs.
Application server installation location	**Important:** The IBM OpenPages GRC Platform requires a dedicated AIX LPAR and IBM WebSphere Application Server environment. Sharing the OpenPages LPAR with other applications and IBM WebSphere Application Server environments is not supported.
Database client software	Oracle or DB2 database client software **Important:** Ensure that you use the same version of the database client software as the server software. Apply all required patches, interim fixes, or services to both the database server and the database client software

Prerequisite software for reporting servers

Ensure that you install IBM Cognos Business Intelligence and the IBM Cognos Software Development Kit on reporting servers.

For information about the software prerequisites for IBM Cognos Business Intelligence, see the *IBM Cognos Intelligence Installation and Configuration Guide*.

Prerequisite software for OpenPages client computers

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

The following table lists the software requirements for client computers.

Table 14. Software prerequisites for client computers

Requirement	Specification
Web browser	Microsoft Internet Explorer
PDF reader	For example, Adobe Reader
Optional: Microsoft Excel	If required, for some reporting functions
Optional: Microsoft .NET Framework	Required on clients where IBMCognos Office products are installed

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, or reporting server for sizing VM requirements.

Cloning of OpenPages application server VMs is not supported.

Each VM server computer must meet the following software requirements:

- VMWare ESX Server version 4.1 or 5.0
- VMWare Infrastructure Client version 4.0
- Red Hat KVM 6.0
- Microsoft Windows 2008 R2

Chapter 4. Preparing your system for installation

Before you install OpenPages GRC Platform, some preinstallation tasks are required.

Procedure

1. Ensure that the database server software is installed.

   For more information about installing Oracle database server, see “Oracle Database Server installations” on page 61

   For more information about installing DB2 database server, see “DB2 server installations” on page 41.
2. Ensure that database passwords have not expired.
3. Ensure that WebSphere Application Server and any required maintenance updates for it are installed.

   For information about supported software environments, Review the IBM OpenPages GRC Platform supported software environments and other system requirements on the IBM Support website.
4. Ensure that the required users and groups exist and that they each have the appropriate permissions for installing applications.

   For more information about DB2 users and groups, see “Operating system user accounts for OpenPages and Cognos BI installations that use DB2 databases” on page 42.
5. Ensure that IBM Cognos Intelligence and the IBM Cognos Software Development Kit are installed.
6. For Windows installations, enable Data Execution Prevention (DEP), and ensure that you have access to the Microsoft Registry Editor (`regedit.exe`).
7. Ensure that all required ports are available for application use.
8. If the database server is separate from the OpenPages application servers, install the database client software on application server computers.
9. If the database server is separate from the Cognos Business Intelligence server, install the database client software on reporting servers.
10. Set the environment variables on OpenPages administration and managed servers and on reporting servers.

Connection methods for installing on different operating systems

You can run the IBM OpenPages GRC Platform Administrative Console on a Windows or Linux operating system. For AIX environment, run the OpenPages Administrative Console on a Windows computer and then connect to the target computer.

Depending on the operating system of the target installation computer, you can run the Administrative Console locally or on a Windows computer.

- To install on a Windows computer, you run the OpenPages Administrative Console locally.
- To install on an AIX computer, you must run the OpenPages Administrative Console remotely.
- To install on a Linux computer, you can install locally or remotely.

If your database server is not on the same computer as OpenPages application server, ensure that you installed the database client software on the OpenPages Administrative Console computer.

Supported shells for UNIX and Linux installations

You can use the Bourne shell (`/bin/sh`), Bourne Again Shell, (`/bin/bash`), the C-Shell (`/bin/sh`) and the Korn Shell (`/bin/ksh`) for OpenPages installations that use the IBM OpenPages GRC Platform Administrative Console.

The Super Administrator

IBM OpenPages GRC Platform uses the concept of a Super Administrator account. A Super Administrator is set up as part of the installation process and 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 logon user name and the password or both the user name and password of the OpenPages Super Administrator account before, during or after installation. If you use the application interface to change the user account information, you must manually make corresponding changes to the CommandCenter Framework Generator property file. For more information, see the *IBM OpenPages GRC Platform Administrator's Guide*.

Users and groups for installations on Windows operating systems

The user account required to install and configure the OpenPages environment must be members of the power user or administrator groups. Users in either of these groups can install and configure IBM OpenPages GRC Platform.

Important: The password for this user cannot contain special characters due to conflicts with OpenPages scripts.

Creating installation users and groups for application servers on AIX and Linux operating systems

To install WebSphere Application Server and the OpenPages application, you must create the required users and groups.

Tip: For simplicity, use the same account (`opuser`) to install WebSphere Application Server and the OpenPages application server.

Optionally, you can create two separate users:

- One user to install WebSphere Application Server.
- One user to install the OpenPages application.

Both users must both belong to the same primary group. If different users install OpenPages and WebSphere, after the installation, you must change the permission of the installation directories and files. To ensure that the group members have write permission, modify the permissions to 775.

Example: Create an AIX or Linux operating system group named `opgroup`. This group contains the user that starts the WebSphere Application Server and the user that owns the IBM OpenPages application server files. Install WebSphere

Application Server and the OpenPages application. Ensure that the installation files and directories are writeable for the owner and member of the same group as the owner (**chmod 775** command)

Procedure

1. Log on to the application server as `root` and open a shell.
2. Optional: To create a group, such as *opgroup*, enter the following command:
   - On AIX operating systems:

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

     ```
     groupadd opgroup
     ```
3. 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 WebSphere Application Server and the OpenPages application server, create a user, such as `opuser`.

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

   ```
   passwd opuser
   ```
5. Optional: To install WebSphere Application Server, create a user, such as `wasuser`.

   ```
   useradd -m wasuser
   ```
6. Change the password for the OpenPages application 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
   ```

   To install the Fujitsu IBPM software successfully, you must grant read, write, and execute permissions to the home directory of the user who is installing the OpenPages application.

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

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

Enabling Data Execution Prevention for essential Windows programs and services

By default, Windows Server 2008 uses settings that are designed to prevent an application from running unauthorized programs. However, these settings can interfere with the IBM OpenPages GRC Platform installations. During the software installation, configure Data Execution Prevention (DEP) to allow the installers to work.

Procedure

1. Log on to the server.
2. Open Windows Explorer.
3. Right-click **Computer** > **Properties**.
4. In the **System Properties** window, click **Advanced System Settings**.
5. On the **Advanced** tab, under the **Performance** heading, click **Settings**.
6. In the **Performance Options** dialog box, 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 server in the installation.

What to do next

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

WebSphere Application Server installations

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

Installation restrictions

Review the following restrictions before you install WebSphere Application Server.

Supported WebSphere Application Server software environments

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

Note: IBM product fixes and updates are available from IBM Fix Central (http://www-933.ibm.com/support/fixcentral/).

- The minimum requirement for WebSphere Application Server Network Deployment version 7.0 is version 7.0.0.13.

  Two interim fixes are required for WebSphere Application Server Network Deployment version 7.0.0.13 in Linux environments. For more information, see the notice on the IBM web site (http://www.ibm.com/support/docview.wss?uid=swg21462019).
- The minimum requirement for WebSphere Application Server Network Deployment version 8.0 is version 8.0.0.5 and an interim fix 8.0.0.0-WS-WAS-IFPM80935.

- The minimum requirement for WebSphere Application Server Network Deployment version 8.5 is version 8.5.0.1.

Installation path cannot contain spaces.

The installation path for WebSphere Application Server cannot contain spaces. The default location is `path\WebSphere\AppServer`. For Windows installations, if 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 WebSphere Application Server Network Deployment Version 8.5

Use IBM Installation Manager to install WebSphere Application Server and the required fix packs. You must install Installation Manager before you install WebSphere Application Server.

For horizontal cluster configurations, install WebSphere Application Server on the cluster administrator and cluster member servers.

The WebSphere Application Server version on the non-admin server must be the same as the WebSphere Application Server version on the admin server.

Procedure

1. Install Installation Manager.

   For more information about installing Installation Manager, see the Installation Manager Information Center (http://pic.dhe.ibm.com/infocenter/install/v1r5/index.jsp).

2. Use Installation Manager to install WebSphere Application Server from the product repositories on the media.

   For more information, see the installation options that documented in the WebSphere Application Server Information Center(http://pic.dhe.ibm.com/infocenter/wasinfo/v8r5/index.jsp?topic=%2Fcom.ibm.websphere.installation.nd.doc%2Fae%2Ftins_installation_dist_gui.html).

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

   A repository contains the product package.

   Example: Adding a repository connection in Installation Manager

   a. Start Installation Manager
   b. On the **Start** page of Installation Manager, click **File** > **Preferences**, and then click **Repositories**.
   c. On the **Repositories** page, click **Add Repository**.
   d. In the **Add repository** window, type the URL of the repository location or browse to it and set a file path.

      If you extracted the WebSphere Application Server installation files to the local system, browse to the `repository.config` file.
   e. 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.

3. Use Installation Manager to install the required fix packs for WebSphere Application Server from the fix pack repositories on the media.
4. When the installation process completes, select whether to create a profile and then click **Finish**.
   - For OpenPages administrative servers, select **None**.
   - For OpenPages non-administrative servers, select **Profile Management Tool to create a profile**.

   Important: At least one WebSphere Application Server profile is required on the non-admin server computers to validate the connection from the OpenPages non-administrative server to the OpenPages administrative server.

Multicasting in the OpenPages environment

The Fujitsu Interstage BPM software that is installed by IBM OpenPages GRC Platform requires a multicast IP address. Fujitsu Interstage BPM uses the multicast IP address to communicate with itself and with other components in the OpenPages environment.

In a clustered OpenPages environment with multiple Fujitsu Interstage BPM instances, Fujitsu Interstage BPM requires the multicast IP address to communicate with each instance.

In a single OpenPages environment with a single Fujitsu Interstage BPM instance, Fujitsu Interstage BPM requires the multicast IP address to communicate with itself

There are multiple Fujitsu Interstage BPM servers in a single environment and the multicast IP is used for JMS synchronization in the workflow.

You must obtain a multicast address before installing the OpenPages application.

- The multicast IP address must be unique within the network address space.
- When installing on a secondary server in a horizontal environment, use the same multicast IP address on all servers.

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, or reporting server for sizing VM requirements.

Cloning of OpenPages application server VMs is not supported.

Each VM server computer must meet the following software requirements:

- VMWare ESX Server version 4.1 or 5.0
- VMWare Infrastructure Client version 4.0
- Red Hat KVM 6.0
- Microsoft Windows 2008 R2

Port assignments

Both dedicated ports and ports that are dynamically assigned for each installation are used for IBM OpenPages GRC Platform deployments. 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 Platform Administrator's Guide*.

Fixed ports

The following table lists the fixed default ports.

Table 15. Default fixed port assignments

Description	Ports
Oracle database server console application port	1158
OpenPages database instance	1521
OpenPages admin server	9060
OpenPages admin server (SSL)	9043
Workflow admin server	9061
Workflow admin server (SSL)	9044
OpenPages application server	10108
OpenPages application server (SSL)	10111
Workflow application server	20108
Workflow application server (SSL)	20111
Cognos Business Intelligence gateway	80
Framework Generator port	8080
Cognos Business Intelligence dispatcher URI	9300

On Windows computers, more OpenPages installations increment by two. For example, the HTTP ports are 7009, 7011, 7013. The HTTPS ports are 7002, 7004, 7006.

On Windows, more workflow installations also increment by two.

Files containing port numbers

The following tables list property files on the OpenPages admin server that contain port numbers.

This file contains the HTTP and HTTPS ports for all OpenPages application instances that are associated with the current admin server. Or, see the individual *server_name*-OpenPagesServer#-server.properties files.

Table 16. Files that contain default port numbers. The file name, port and parameter name that stores the port information.

File name	Port	Parameter Name
OP_Home/temp/wasconfig/ OpenPagesCell.dmgr. config.props	OpenPages admin server port OpenPages admin server SSL port	**WC_adminhost** **WC_adminhost_secure**
OP_Home/temp/wasconfig /OpenPagesCell. *server_name*-OPNode#Server# .config.props	OpenPages application port	**WC_defaulthost**
	OpenPages application SSL port	**WC_defaulthost_secure**
OP_Home/temp/wasconfig/ IBPMCell.dmgr. config.props	Workflow admin server port Workflow admin server SSL port	**WC_adminhost** **WC_adminhost_secure**
OP_Home/temp/wasconfig/ IBPMCell.*server_name* -OPNode# Server.config.props	Workflow application port Workflow application SSL port	**WC_defaulthost** **WC_defaulthost_secure**
Oracle_Home/NETWORK/ADMIN/ tnsnames.ora	Oracle database instance port	
OP_Home/aurora/conf/ aurora.properties	Framework Generator port CommandCenter port Cognos Dispatcher URI	**cognos.framework** **cognos.server** **cognos.computation.server**

Dynamically assigned ports

Port numbers for OpenPages servers that are not listed, such as OpenPages managed servers, are assigned dynamically during the installation.

OpenPages application and workflow managed server port numbers start at the following values and increment by 1 for each additional managed server in the installation:

- OpenPages application managed servers: 9080.
- OpenPages workflow managed servers: 49951.

After installation, you can view all port assignments in OpenPages property files. There are multiple OpenPages property files, each with a `.props` extension (*OP_Home*`/temp/wasconfig/*.props`).

The OpenPages application server and workflow server port information are in:

- `OpenPagesCell.dmgr.config.props`
- `OpenPagesCell.`*server_name*`-OPNode#;Server#;.config.props`
- `IBPMCell.dmgr.config.props`
- `IBPMCell.`*server_name*`-IBPMNode#Server.config.props`

On a cluster system, the OpenPagesCell.*server_name*-OPNode1Server1.config.props file and IBPMCell.*server_name*-IBPMNode1Server.config.props file contain port information for that managed server only. If there is a second managed server within the same computer (vertical cluster), the port information is displayed in OpenPagesCell.*server_name*-OPNode1Server2.config.props and IBPMCell.*server_name*-IBPMNode2Server.config.props.

In a horizontal cluster, the numbering for the managed servers in the .props file restarts at 1 for each cluster member computer.

Chapter 5. DB2 client and server setup for OpenPages installations

To create a DB2 database instance for the OpenPages database, some setup on the database server and database client computers is required.

Restriction: Two DB2 database instances are required for the IBM OpenPages GRC Platform installation. One database instance hosts the OpenPages database and one database instance hosts the Cognos content store database. The requirements for each database instance are different. For more information, see "Installing IBM Cognos Business Intelligence" on page 74.

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

Before you install DB2 database products, ensure that your system meets the required system requirements. For more information about the supported software environments for OpenPages, see supported software environments on the IBM support website (http://www.ibm.com/support/docview.wss?uid=swg27037756)

For more information about DB2 system requirements, see the DB2 for Linux, UNIX, and Windows system requirements in the DB2 Information Center.

DB2 server installations

To use a DB2 database for the OpenPages repository, review the specific requirements for your system before you install DB2 products.

Ensure that your system meets the required system requirements. Review the IBM OpenPages GRC Platform supported software environments and other system requirements on the IBM Support website.

Review the following tasks

__ • Install DB2 database server.

The DB2 database server that hosts the OpenPages database must have the required server software installed. DB2 10.1 Fix Pack 1 must be installed before you install the DB2 Universal Fix Pack.

The following table lists the DB2 software requirements by operating system.

Table 17. Required DB2 10.1.0.1 software for OpenPages

Operating system	Universal Fix Pack
Windows	1. DB2 Server Fix Pack 1 2. Universal Fix Pack Special_30205 for Windows

Table 17. Required DB2 10.1.0.1 software for OpenPages (continued)

Operating system	Universal Fix Pack
Linux	1. DB2 Server Fix Pack 1 2. Universal Fix Pack Special_30155 for Linux-64
AIX	1. DB2 Server Fix Pack 1 2. Universal Fix Pack Special_30070 for AIX-64

Restriction: The OpenPages installation program does not support installations of DB2 server products or DB2 client 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 Administrative Console. For example, for `C:\Program Files\IBM\DB2\SQLLIB` , use `C:\PROGRA~1\IBM\DB2\SQLLIB`.

Important: DB2 Text Search component is required.

DB2 Text Search component is an optional installable component. To install it, you must select the custom installation type and the DB2 Text Search component. For more information, see the Installing and configuring DB2 Text Search in the DB2 Information Center.

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

To determine whether text search is installed, run the **db2ts** command to start or stop the text search. If the command fails, text search is not installed. For more information about running the command, see the DB2 search commands in the DB2 Information Center.

__ • Set up the required users and groups.

__ • Set up the DB2 database instance for the OpenPages repository.

Related concepts:

"Prerequisite software for the database server" on page 27
In addition to the software required for all servers, ensure that the prerequisite software is installed on the database server.

"Operating system user accounts for OpenPages and Cognos BI installations that use DB2 databases"
Operating system user accounts affect the procedures that are used to create the OpenPages database and Cognos Business Intelligence content store.

Operating system user accounts for OpenPages and Cognos BI installations that use DB2 databases

Operating system user accounts affect the procedures that are used to create the OpenPages database and Cognos Business Intelligence content store.

DB2 instance owner

The DB2 instance owner 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 instance, ensure that you assign the DB2 instance owner as the DAS user.

OpenPages installation user
The OpenPages installation user installs IBM OpenPages GRC Platform. The user account can choose to create the OpenPages database automatically by using the OpenPages Administrative Console installation program or manually by running scripts.

Restriction: On Windows operating systems, 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 DB2 database instance owner. Running the script is documented in the list of tasks to manually create the OpenPages database. If you use the OpenPages Administrative Console to create the OpenPagesdatabase, running the script is documented as a post installation task.

Database schema owners

The following three database user accounts must exist before you install IBM OpenPages GRC Platform and Cognos Business Intelligence:

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

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

DB2 guidelines for creating users

Follow the DB2 guidelines for creating user names in the DB2 Information Center (http://pic.dhe.ibm.com/infocenter/db2luw/v10r1/index.jsp?topic=%2Fcom.ibm.db2.luw.admin.dbobj.doc%2Fdoc%2Fc0007248.html).

- On UNIX and Linux operating systems, user names can contain 1-8 characters.
- On Windows operating systems, user names can contain 1-20 characters.
- Group and instances names can contain 1-8 characters.
- Names cannot begin with a number or underscore (_) characters.

Enabling users other than DB2 database instance owner to create the OpenPages repository

Users other than those users who installed the DB2 database instance can create the OpenPages and workflow schemas.

For example, the user who runs the IBM OpenPages GRC Platform Administrative Console can create the schemas. The user who creates the OpenPages repository in DB2 must have privileges to create a database, a tablespace, tables, and indexes.

Procedure

1. Identify the DB2 administrators group.

   The group is created when you install the DB2 instance.

   For Windows installations, the default administrators group name is DB2ADMNS.

   For Linux or AIX installations the default group name is `db2iadm1`.
2. Invoke the DB2 Command Line Processor (CLP).
   - On Windows computers, start the DB2 CLP from the **Start** menu by clicking **All Programs** > **IBM DB2** > ***DB2COPY1***, or typing `db2cmd` from the command line,
   - On Linux and AIX installation systems, open the command line of the DB2 instance.
3. From the command-line, type the following commands:

   ```
   db2 update dbm cfg using SYSADM_GROUP <DB2_admin_group>
   db2 update dbm cfg using SYSCTRL_GROUP <DB2_admin_group>
   db2stop
   db2start
   ```
4. Add the user who is not the DB2 instance owner to the <*DB2_admin_group*>.
   - For DB2 installations on Windows computers, add the user to the DB2ADMNS group.
   - For DB2 installations on AIX or Linux computers, add the user to the `db2iadm1` group.
5. Log on to the DB2 client computer or DB2 server computer as the user you added to the <*DB2_admin_group*>.

Related tasks:

"Manually creating database objects in the OpenPages database" on page 52
You can run scripts to manually create the required database objects in DB2 for the OpenPages repository.

Preparing the DB2 database instance for OpenPages on the database server

You must prepare the DB2 database instance that is used for the OpenPages repository.

__ • Enable the Oracle compatibility mode.

Important: Oracle compatibility mode must be enabled for DB2 database instance that is used for the OpenPages and workflow schemas. Oracle compatibility mode must not be enabled for the separate DB2 database instance that is used for content store.

__ • Update the database manager configuration for the OpenPages database instance.

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

__ • Enable and configure DB2 text search.

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

Before you begin

Ensure that you installed a supported version of the DB2 database server software by checking the supported software environments on the IBM support websitesupported version of DB2 database server software on the IBM support web site (http://www.ibm.com/support/docview.wss?uid=swg27037756).

To verify the current version and service level of the installed DB2 product, use the **db2level** command. By default, output from the command goes to the console.

Examples:

On Windows operating systems, the **db2level** command must show a supported version and service level.

```
DB21085I  This instance or install (instance name, where applicable: "DB2_01")
uses "64" bits and DB2 code release "SQL10011" with level identifier
"0202010E".
Informational tokens are "DB2 v10.1.100.148", "special_30069", "IP23379_30069",
and Fix Pack "1".
Product is installed at "C:\SQLLIB" with DB2 Copy Name "DB2COPY1".
```

On Linux operating systems, the **db2level** command must show a supported version and service level.

```
DB21085I  This instance or install (instance name, where applicable:
"db2inst4") uses "64" bits and DB2 code release "SQL10011" with level
identifier "0202010E".
Informational tokens are "DB2 v10.1.0.1", "special_30155", "IP23384_30155", and
Fix Pack "1".
Product is installed at "/opt/ibm/V10.1_03".
```

On AIX operating systems, the **db2level** command must show a supported version and service level.

```
DB21085I  This instance or install (instance name, where applicable:
"db2inst4") uses "64" bits and DB2 code release "SQL10011" with level
identifier "0202010E".
Informational tokens are "DB2 v10.1.0.1", "special_30070", "IP23384_30070", and
Fix Pack "1".
Product is installed at "/opt/ibm/V10.1_03".
```

Procedure

1. Log on to the DB2 database server as the DB2 instance owner.
2. Go to the location where you extracted the installation files from the IBM OpenPages GRC Platform Installer *version* for WebSphere Application Server DVD.
   - On Windows operating system, go the following directory:
     `\WIN64-OP_`*version*`\OpenPages\Win64\`
     `OP_`*version*`_Non_Embedded_WAS_Oracle_DB2_WIN64\OP_`*version*`_Configuration\`
     `Database\DB2\INSTALL_SCRIPTS`
   - On AIX operating systems, go the following directory:
     `/AIX64-OP_`*version*`/OpenPages/AIX64/OP_`*version*`_Non_Embedded_DB2_AIX64/`
     `OP_`*version*`_Configuration/Database/DB2/INSTALL_SCRIPTS`
   - On Linux operating systems, go to the following directory:
     `\Linux64-OP`*version*`/OpenPages/Linux64/OP_`*version*`_Non_Embedded_LINUX64/`
     `OP_`*version*`_Configuration/Database/DB2/INSTALL_SCRIPTS`
3. On Linux and AIX computers, ensure that 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 others, type the following command:
  `chmod -R 777 /path/INSTALL_SCRIPTS`

4. To enable Oracle compatibility mode, type the following command:
   - On Windows operating systems, from the **Start** menu, click **All Programs** > **IBM DB2** > **DB2COPY1** > **Command Window - Administrator** and type: `enable-ora-compatibility.bat`

     Note: If you have multiple instances of DB2, server, ensure that you choose the DB2COPY of the OpenPages database instance.
   - On AIX or Linux operating systems, type: `./enable-ora-compatibility.sh`

   Restriction: DB2 compatibility features are enabled at the database 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`. One of the DB2 profile variables that are listed is DB2_COMPATIBILITY_VECTOR=ORA
5. Copy the Java routine class files (UDFs) for OpenPages to the DB2 server.
   a. Go to the `/OP_version_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
   b. Copy the following files to the *DB2_HOME*`\FUNCTION` directory:
      - `opconvert.class`
      - `regexp.class`

      On Windows operating systems, the default installation location is *path*`\ibm\SQLLIB\FUNCTION`.

      On AIX or Linux operating systems, the default location is `/home/`*db2_instance_owner*`/sqllib`. Type the following commands:

      ```
      cp opconvert.class $DB2_HOME/function
      cp regexp.class $DB2_HOME/function
      ```
6. Update the database manager configuration for the OpenPages database instance.
   a. At the command prompt, on Window operating systems, type `db2cmd` to initialize the DB2 command line processor (CLP)
   b. In the DB2 CLP, run the `opx-dbm-cfg` script.
      - On Windows operating systems, type the following command:
        `opx-dbm-cfg.bat`
      - On AIX or Linux operating systems, type the following command:
        `./opx-dbm-cfg.sh`
7. Enable and configure text search.

What to do next

Create the database schema manually for OpenPages on the database server or on a database client computer. You can also create the database schema automatically during the installation by selecting **Install Now** for the **Schema** option in the OpenPages Administrative Console

DB2 database client installations

You must install an appropriate DB2 database client to enable connections between the OpenPages application servers and remote DB2 databases.

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 about the panels in the DB2 Setup wizard, see DB2 Setup wizard installation walkthrough

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).

__ • 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.

Creating and configuring a DB2 client instance in AIX and Linux environments

If the OpenPages application server is on a separate Linux or AIX computer than the database server, you must create a DB2 client instance on .

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

For more information, see the db2icrt - Create instance command topic in the DB2 Information Center.

Procedure

1. Log on to the client 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, type the following command:

   db2icrt -s client <*instname*>

   -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 login name of the instance owner.

   Example: db2icrt -s client db2inst2

   The default location for the DB2 instance is in the /home/db2inst2/sqllib directory.

Manually creating the OpenPages database locally on the DB2 server

IBM OpenPages GRC Platform requires an OpenPages database. One option is to manually create the OpenPages database locally on the server.

If you want to automatically create the database during the installation, you can select the **Install now** option in the Administrative Console installation program.

Procedure

1. Log on to the DB2 database server computer as the DB2 database instance owner.
2. Go to the `/OP_version_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
3. Edit the `sql-wrapper.sql` file to ensure that the variables are set correctly for your environment and save the changes.

   Restriction: Do not change the following properties:

   - `define super_admin_username='OpenPagesAdministrator'`
   - `define super_admin_password='OpenPagesAdministrator'`

   To change these settings, from the `INSTALL_SCRIPTS` directory, open the `op-app-global-env.sql` file in a text editor.

   If the DB2 instance owner does not have write permission on the `sql-wrapper.sql` file, switch users, or change the permission on the file by using the **chmod** command.

   - 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'
     ```

   - 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'
     ```

4. From the `INSTALL_SCRIPTS` directory, open the `op-app-global-env.sql` script in a text editor and if required, modify the following values for the Super Administrator.

   ```
   define super_admin_username='OpenPagesAdministrator'
   define super_admin_password='OpenPagesAdministrator'
   ```

5. On Windows, start the DB2 command line processor (CLP) from the **Start** menu, by clicking **All Programs** > **IBM DB2** > **DB2COPY1** > **Command Window - Administrator**
6. To create the database for OpenPages, run the `create-opx-db-srv` 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 18. Options for the `create-opx-db-srv` script.

Variable	Description
database-name	The name of the OpenPages database
path	The location of the database on the server

Table 18. Options for the `create-opx-db-srv` script. (continued)

Variable	Description
catalog_path	The location of the database alias on the local server On Windows operating systems, the *catolog_path* is the drive letter (C: or E:). On Linux or AIX operating systems, *catolog_path* is the absolute path (`/db2data`

- On Windows operating systems, type the following command:

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

  Example: A database named `OPdb621` is created. The database and database alias are on the `D:` drive.

  ```
  create-opx-db-srv.bat OPdb621 D: D:
  ```

- On AIX or Linux operating systems, type the following command:

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

  Tip: Ensure that you grant execute permission on the `create-opx-db-srv.sh` script file before you run it: `chmod u+x opx-dbm-cfg.sh`

  Example: A database named `OPdb621` is created. The database and database alias are in the `/db2data` directory.

  ```
  ./create-opx-db-srv.sh OPdb621 /db2data /db2data
  ```

7. 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>:<portnumber>/<database-name>
   @sql-wrapper dba-grant.sql dba-grant.log <instance.owner.username>
   ```

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

8. If the database server is on a Windows-based 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, run the following script.

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

   - *username* variable 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 DAS user.

What to do next

Run the scripts from the database server or from the OpenPages application server to create the database objects.

Creating the OpenPages database remotely from the OpenPages application server

If your OpenPages application server is not on the same computer as your OpenPages database server, you can create the OpenPages database remotely.

Before you begin

Ensure that you set up the DB2 database instance on the server computer:

__ • Enable the Oracle compatibility mode.
__ • Update the database manager configuration for the OpenPages database instance.
__ • Copy the Java routine class files to the DB2 server from the OpenPages installation files.
__ • Enable and configure DB2 text search.

Procedure

1. Log on to the OpenPages application server computer as the DB2 administrator.
2. Start the DB2 command line processor.

   On Windows operating systems, from the command prompt, type `db2cmd`, or from the **Start** menu, click **All Programs** > **DB2COPY1** > **Command Window - Administrator**.
3. Go to the `/OP_version_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
4. To catalog the node, run the following script:
   - On Windows operating systems, type `db2-catalog-node.bat <node_name> <hostname> <port>`.
   - On AIX or Linux operating systems, type `./db2-catalog-node.sh <node_name> <hostname> <port>`.

Table 19. Command-line variables for the script to catalog a node

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 Windows operating systems:

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

Example: On AIX or Linux operating systems:

```
db2-catalog-node.sh 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 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 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 OPdb621 /usr /usr
     OPNode db2inst1 Db2_1234
     ```

   - On AIX or Linux operating systems, type the following command:

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

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

     ```
     create-opx-db-clt.sh OPdb621 /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>:<portnumber>/<database-name>
   @sql-wrapper dba-grant.sql dba-grant.log <instance.owner.username>
   ```

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

7. If the database server is on a Windows-based 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, run the following script.

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

   - *username* variable 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 DAS user.

Results

If you have problems when you run the scripts to create the database objects, you can remove the database objects and start again. The following table lists the scripts to help you drop the database and to uncatalog the node.

Table 20. . Scripts to drop the database and to uncatalog the node.

Description	Script
Drop the database	drop-opx-db-clt.(*bat*|*sh*) <*database-name*> <*node-name*> <*instance.owner.username*> <*instance.owner.password*>
Uncatalog the node	db2-uncatalog-node.(*bat*|*sh*) <*node-name*>

Related tasks:

"Manually creating database objects in the OpenPages database"
You can run scripts to manually create the required database objects in DB2 for the OpenPages repository.

Manually creating database objects in the OpenPages database

You can run scripts to manually create the required database objects in DB2 for the OpenPages repository.

Procedure

1. Log on to the DB2 database server computer as a user who plans to install OpenPages GRC Platform.
2. Go to the /OP_*version*_Configuration/Database/DB2/INSTALL_SCRIPTS directory.
   - On Windows operating systems, go the following directory:
     \WIN64-OP_*version*\OpenPages\Win64\OP_*version*_Non_Embedded_WAS_Oracle_DB2_WIN64\OP_*version*_Configuration\Database\DB2\INSTALL_SCRIPTS
   - On AIX operating systems, go the following directory:
     /AIX64-OP_*version*/OpenPages/AIX64/OP_*version*_Non_Embedded_DB2_AIX64/OP_*version*_Configuration/Database/DB2/INSTALL_SCRIPTS
   - For Linux operating systems, go the following directory:
     \Linux64-OP*version*/OpenPages/Linux64/OP_*version*_Non_Embedded_LINUX64/OP_*version*_Configuration/Database/DB2/INSTALL_SCRIPTS
3. On Windows operating systems, start the DB2 command line processor (CLP).
4. For Windows operating systems, use the following table to run the required scripts in order.:

Table 21. Scripts to create the OpenPages database in DB2 on Windows-based computers

Script description	Windows-based computers

Create the bufferpool and tablespaces	`clpplus -nw <instance.owner.usrname>/<instance.owner.password>`
	`@<hostname>:<port-number>/<database-name>`
	`@sql-wrapper create-opx-tablespaces.sql`
	`create-opx-tablespaces.log`
	
	Replace the variables with your system values:
	• *instance.owner.usrname* is the user name of the DB2 account that owns the instance.
	• *instance.owner.password* is the password for the account that owns the database instance.
	• *hostname* is the database server computer name. *database-name* is the name of the OpenPages database.
	• *port-number* is the port that the database instance uses.
	• *database name* is the name of the OpenPages database.
	• *-nw* specifies that the CLPPlus session is started in the current command-line window.
	
	Example: The instance owner is `db2admin`. The database instance is on a server named `OP` and uses the default DB2 port, `50000`.
	`clpplus -nw DB2ADMIN/Db2_1234@OP:50000/OPdb621`
	`@sql-wrapper create-opx-tablespaces.sql`
	`create-opx-tablespaces.log`

Grant authorizations and create schema	`clpplus -nw <instance.owner.usrname>/<instance.owner.password>`
	`@<hostname>:<port-number>/<database-name>`
	`@sql-wrapper create-opx-schema-owner.sql`
	`create-opx-schema-owner.log`
	`<openpages.db.username>`
	
	openpages.db.username is the user name that belongs to the user account that owns the OpenPages database schema.
	Example: The `openpages` user owns the database schema for OpenPages.
	`clpplus -nw DB2ADMIN/Db2_1234@OP:50000/OPdb621`
	`@sql-wrapper create-opx-schema-owner.sql`
	`create-opx-schema-owner.log openpages`

Create tables, sequences, and indexes	`clpplus -nw <openpages.db.username>/<openpages.db.password>`
	`@<hostname>:<port-number>/<database-name >`
	`@sql-wrapper AuroraDBCreate.sql AuroraDBCreate.log`
	
	Example: The `openpages` user account logs in to the `OPdb621` to create database objects.
	`clpplus -nw openpages/openpages123@OP:50000/OPdb621`
	`@sql-wrapper AuroraDBCreate.sql AuroraDBCreate.log`

Create views	`clpplus -nw <openpages.db.username>/<openpages.db.password>`
	`@<hostname>:<port-number>/<database-name>`
	`@sql-wrapper AuroraDbViews.sql AuroraDbViews.log`
	
	Example: The `openpages` user account logs in to the `OPdb621` to create database views.
	`clpplus -nw openpages/openpages123@OP:50000/OPdb621`
	`@sql-wrapper AuroraDbViews.sql AuroraDbViews.log`

Table 21. Scripts to create the OpenPages database in DB2 on Windows-based computers (continued)

Script description	Windows-based computers

Load PL/SQL (Procedural Language/ Structured Query Language)	`AuroraProcCreate.bat <database-name> <openpages.db.username> <openpages.db.password>`
	
	Example: The `openpages` user account runs the script to load PL and SQL files.
	`AuroraProcCreate.bat OPdb621 openpages openpages123`
	
	The load might take awhile to complete.

Revalidate PL/SQL	`clpplus -nw <openpages.db.username>/<openpages.db.password> @<hostname>:<port-number>/<database-name> @sql-wrapper revalidate.sql revalidate.log <openpages.db.username>`
	
	Example: Revalidate `OPdb621` packages
	`clpplus -nw openpages/openpages123@OP:50000/OPdb621 @sql-wrapper revalidate.sql revalidate.log openpages`

Rebind all packages	`db2rbind <database-name> -l oprbind.log -u <openpages.db.username> -p <openpages.db.password> -r any`
	
	Example: Rebind `OPdb621` packages
	`db2rbind OPdb621 -l oprbind.log -u openpages -p openpages123 -r any`

Load bootstrap data	`clpplus -nw <openpages.db.username>/<openpages.db.password> @<hostname>:<port-number>/<database-name > @sql-wrapper AuroraDbLoad.sql AuroraDbLoad.log`
	`clpplus -nw <openpages.db.username>/<openpages.db.password> @<hostname>:<port-number>/<database-name> @sql-wrapper load_OP_APP_DATA.sql load_OP_APP_DATA.log`
	
	Example: The `openpages` user account runs the script to load data into the `OPdb621` database.
	`clpplus -nw openpages/openpages123@OP:50000/OPdb621 @sql-wrapper AuroraDbLoad.sql AuroraDbLoad.log`
	
	Note: The scripts take awhile to complete.
	`clpplus -nw openpages/openpages123@OP:50000/OPdb621 @sql-wrapper load_OP_APP_DATA.sql load_OP_APP_DATA.log`

Create the workflow schema and tablespaces	`clpplus -nw <instance.owner.usrname>/<instance.owner.password> @<hostname>:<port-number>/<database-name > @sql-wrapper ibpm-create-ts-schema-owner.sql ibpm-create-ts-schema-owner.log <opworkflow.db.username>`
	
	opworkflow.db.username is the owner of the workflow schema in the OpenPages database.
	Example: The `opworkflow` user owns the workflow database schema. Ensure that the user belongs to the DB2ADMINS group on the operating system.
	`clpplus -nw db2admin/Db2_1234@OP:50000/OPdb621 @sql-wrapper ibpm-create-ts-schema-owner.sql ibpm-create-ts-schema-owner.log opworkflow`

Table 21. Scripts to create the OpenPages database in DB2 on Windows-based computers (continued)

Script description	Windows-based computers

Create workflow tables	`clpplus -nw <opworkflow.db.username>/<opworkflow.db.password> @<hostname>:<port-number>/<database-name > @sql-wrapper ibpm-create-tables.sql ibpm-create-tables.log`
	
	Example: The `opworkflow` user connects to the OpenPages database to create tables.
	`clpplus -nw opworkflow/opworkflow123@OP:50000/OPdb621 @sql-wrapper ibpm-create-tables.sql ibpm-create-tables.log`

Create workflow views	`clpplus -nw <opworkflow.db.username>/<opworkflow.db.password> @<hostname>:<port-number>/<database-name > @sql-wrapper ibpm-create-views.sql ibpm-create-views.log`
	
	Example: The `opworkflow` user connects to the OpenPages database to create views.
	`clpplus -nw opworkflow/opworkflow123@OP:50000/OPdb621 @sql-wrapper ibpm-create-views.sql ibpm-create-views.log`

Load workflow procedures	`ibpm-proc-create.bat <database-name> <opworkflow.db.username> <opworkflow.db.password>`
	
	Example: The `opworkflow` user runs the script to load workflow procedures into the `OPdb621` OpenPages database
	`ibpm-proc-create.bat OPdb621 opworklfow opworkflow123 -ni`

Load workflow bootstrap data	`clpplus -nw <opworkflow.db.username>/<opworkflow.db.password> @<hostname>:<port-number>/<database-name > @sql-wrapper ibpm-data-load.sql ibpm-data-load.log`
	
	Example: The `opworkflow` connects to the `OPdb621` OpenPages database to load the workflow bootstrap data.
	`clpplus -nw opworkflow/opworkflow123@OP:50000/OPdb621 @sql-wrapper ibpm-data-load.sql ibpm-data-load.log`

Create synonyms for database objects in workflow schema into OpenPages schema	`clpplus -nw <instance.owner.usrname>/<instance.owner.password> @<hostname>:<port-number>/<database-name > @sql-wrapper dba_integrate_iflow.sql dba_integrate_iflow.log <openpages.db.username> <opworkflow.db.username>`
	
	Example: The `db2admin` user connects to the `OPdb621` database to create synonyms.
	`clpplus -nw db2admin/Db2_1234@OP:50000/OPdb621 @sql-wrapper dba_integrate_iflow.sql dba_integrate_iflow.log openpages opworkflow`

5. For Linux or AIX installations, use the following table to run the required scripts in order.

Table 22. Scripts to create the OpenPages database in DB2 on AIX or Linux operating systems

Script description	Windows-based computers

Create the bufferpool and tablespaces	`clpplus -nw <instance.owner.usrname>/<instance.owner.password> @<hostname> <port-number>/<database-name> @sql-wrapper create-opx-tablespaces.sql create-opx-tablespaces.log`
	
	Replace the variables with your system values:
	• *instance.owner.usrname* is the user name of the DB2 account that owns the instance.
	• *instance.owner.password* is the password for the account that owns the database instance.
	• *hostname* is the database server computer name. *database-name* is the name of the OpenPages database.
	• *port-number* is the port that the database instance uses.
	• *database name* is the name of the OpenPages database.
	• *-nw* runs the script without being prompted.
	
	Example: The instance owner is `db2inst1`. The database instance is on a server named `OP` and uses the default DB2 port, `50000`.
	`clpplus -nw db2inst1/Db2_1234@OP:50000/OPdb621 @sql-wrapper create-opx-tablespaces.sql create-opx-tablespaces.log`

Grant authorizations and create schema	`clpplus -nw <instance.owner.usrname>/<instance.owner.password> @<hostname>:<port-number>/<database-name> @sql-wrapper create-opx-schema-owner.sql create-opx-schema-owner.log <openpages.db.username>`
	
	openpages.db.username is the user name that belongs to the user account that owns the OpenPages database schema.
	Example: The `opuser` user owns the database schema for OpenPages.Ensure that the user name is less than 8 characters.
	`clpplus -nw db2inst1/Db2_1234@OP:50000/OPdb621 @sql-wrapper create-opx-schema-owner.sql create-opx-schema-owner.log opuser`

Create tables, sequences, and indexes	`clpplus -nw <openpages.db.username>/<openpages.db.password> @<hostname>:<port-number>/<database-name > @sql-wrapper AuroraDBCreate.sql AuroraDBCreate.log`
	
	Example: The `opuser` user account logs in to the `OPdb621` to create database objects.
	`clpplus -nw opuser/opuser123@OP:50000/OPdb621 @sql-wrapper AuroraDBCreate.sql AuroraDBCreate.log`

Create views	`clpplus -nw <openpages.db.username>/<openpages.db.password> @<hostname>:<port-number>/<database-name > @sql-wrapper AuroraDbViews.sql AuroraDbViews.log`
	
	Example: The `opuser` user account logs in to the `OPdb621` to create database views.
	`clpplus -nw opuser/opuser123@OP:50000/OPdb621 @sql-wrapper AuroraDbViews.sql AuroraDbViews.log`

Table 22. Scripts to create the OpenPages database in DB2 on AIX or Linux operating systems (continued)

Script description	Windows-based computers
Load PL/SQL (Procedural Language/ Structured Query Language)	./AuroraProcCreate.sh <*database-name*> <*openpages.db.username*> <*openpages.db.password*> **Example:** The opuser user account runs the script to load PL and SQL files. ./AuroraProcCreate.sh OPdb621 opuser opuser123
Revalidate PL/SQL	clpplus -nw <openpages.db.username>/<openpages.db.password> @<hostname>:<port-number>/<database-name> <openpages.db.username> @sql-wrapper revalidate.sql revalidate.log <openpages.db.username> **Example:** Revalidate OPdb621 packages clpplus -nw opuser/opuser123@OP:50000/OPdb621 @sql-wrapper revalidate.sql revalidate.log opuser
Rebind all packages	db2rbind <database-name> -l oprbind.log -u <openpages.db.username> -p <openpages.db.password> -r any **Example:** Rebind OPdb621 packages db2rbind OPdb621 -l oprbind.log -u opuser -p opuser123 -r any
Load bootstrap data	clpplus -nw <*openpages.db.username*>/<*openpages.db.password*> @<*hostname*>:<*port-number*>/<*database-name* > @sql-wrapper AuroraDbLoad.sql AuroraDbLoad.log clpplus -nw <*openpages.db.username*>/<*openpages.db.password*> @<*hostname*>:<*port-number*>/<database-name> @sql-wrapper load_OP_APP_DATA.sql load_OP_APP_DATA.log **Example:** The opuser user account runs the script to load data into the OPdb621 database. clpplus -nw opuser/opuser123@OP:50000/OPdb621 @sql-wrapper AuroraDbLoad.sql AuroraDbLoad.log **Note:** The scripts take awhile to complete. clpplus -nw opuser/opuser123@OP:50000/OPdb621 @sql-wrapper load_OP_APP_DATA.sql load_OP_APP_DATA.log
Create the workflow schema and tablespaces	clpplus -nw <*instance.owner.usrname*>/<*instance.owner.password*> @<*hostname*>:<*port-number*>/<*database-name* > @sql-wrapper ibpm-create-ts-schema-owner.sql ibpm-create-ts-schema-owner.log <*opworkflow.db.username*> *opworkflow.db.username* is the owner of the workflow schema in the OpenPages database. **Example:** The opwork user owns the workflow database schema. Ensure that the user name is 8 or less characters clpplus -nw db2inst1/Db2_1234@OP:50000/OPdb621 @sql-wrapper ibpm-create-ts-schema-owner.sql ibpm-create-ts-schema-owner.log opwork

Table 22. Scripts to create the OpenPages database in DB2 on AIX or Linux operating systems (continued)

Script description	Windows-based computers

Create workflow tables	`clpplus -nw <opworkflow.db.username>/<opworkflow.db.password>`
	`@<hostname>:<port-number>/<database-name >`
	`@sql-wrapper ibpm-create-tables.sql ibpm-create-tables.log`
	
	Example: The `opwork` user connects to the OpenPages database to create tables.
	`clpplus -nw opwork/opwork123@OP:50000/OPdb621`
	`@sql-wrapper ibpm-create-tables.sql ibpm-create-tables.log`

Create workflow views	`clpplus -nw <opworkflow.db.username>/<opworkflow.db.password>`
	`@<hostname>:<port-number>/<database-name >`
	`@sql-wrapper ibpm-create-views.sql ibpm-create-views.log`
	
	Example: The `opwork` user connects to the OpenPages database to create views.
	`clpplus -nw opwork/opwork123@OP:50000/OPdb621`
	`@sql-wrapper ibpm-create-views.sql`
	`ibpm-create-views.log`

Load workflow procedures	`ibpm-proc-create.sh <database-name>`
	`<opworkflow.db.username> <opworkflow.db.password>`
	
	Example: The `opwork` user runs the script to load workflow procedures into the `OPdb621` OpenPages database
	`./ibpm-proc-create.sh OPdb621 opwork opwork123`

Load workflow bootstrap data	`clpplus -nw <opworkflow.db.username>/<opworkflow.db.password>`
	`@<hostname>:<port-number>/<database-name >`
	`@sql-wrapper ibpm-data-load.sql ibpm-data-load.log`
	
	Example: The `opworkflow` connects to the `OPdb621` OpenPages database to load the workflow bootstrap data.
	`clpplus -nw opwork/opwork123@OP:50000/OPdb621`
	`@sql-wrapper ibpm-data-load.sql ibpm-data-load.log`

Create synonyms for database objects in workflow schema into OpenPages schema	`clpplus -nw <instance.owner.usrname>/<instance.owner.password>`
	`@<hostname>:<port-number>/<database-name >`
	`@sql-wrapper dba_integrate_iflow.sql dba_integrate_iflow.log`
	`<openpages.db.username>`
	`<opworkflow.db.username>`
	
	Example: The `db2admin` user connects to the `OPdb621` database to create synonyms.
	`clpplus -nw db2inst1/Db2_1234@OP:50000/OPdb621`
	`@sql-wrapper dba_integrate_iflow.sql`
	`dba_integrate_iflow.log opuser opwork`

Related tasks:

"Enabling users other than DB2 database instance owner to create the OpenPages repository" on page 43
Users other than those users who installed the DB2 database instance can create the OpenPages and workflow schemas.

Testing the connection between the DB2 client and server

If the OpenPages Application Server is not on the same computer as the database server, test the connection. Ensure that you can connect to the 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. Start the DB2 command line processor.

   On Windows computers, 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. Start the DB2 command line processor.

      On Windows computers, from the command prompt, issue the `db2cmd` command.

      On UNIX computers, from the command prompt, issue `db2` commands.
   b. 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
      ```
   c. To verify that the node was created, issue the following command to list the contents of the node directory:

      ```
      db2 list database directory
      ```

      A list of the databases are displayed.
   d. 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 is displayed:

```
Database Connection Information
Database server = DB2 10.2.0
SQL authorization ID = opuser
Local database alias = opdb
```

Chapter 6. Oracle database server setup for OpenPages installations

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

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

Install the database client software on all computers where OpenPages application and Cognos Business Intelligence reporting servers are installed.

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 IBM 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 special characters due to database requirements and conflicts with OpenPages scripts.

After installing the Oracle Database server, you must install an Oracle Client on all application server computers.

Creating users and groups on the Oracle database server for Linux operating systems

For Linux installations, create and configure the `oinstall`, `dba`, and `opuser` 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 23. 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 client installation directory.	Required by Oracle database installation program. **Important:** The password for this user cannot contain special characters due to conflicts with OpenPages scripts

Procedure

1. Log on to the database server as `root`.
2. To create a group that is called `oinstall`, open an Linux shell and type the following command:

   ```
   groupadd -A oinstall
   groupadd -A dba
   ```

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

   Note: The Oracle database requires these names.
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.

Related tasks:

"Setting the file descriptor limit for OpenPages users on Linux operating systems" on page 89
You must set the soft and hard limits for the file descriptor and update system files to allocate sufficient resources to the OpenPages users.

Oracle package dependencies

To function correctly, the OpenPages Oracle packages must have access to the standard Oracle objects.

If objects are deleted, or access to an object is removed from the PUBLIC group, the OpenPages application user must be granted explicit permissions to them. Also, you must create private synonyms within the OpenPages Database Schema.

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

The following table lists the standard Oracle objects that include the base object, the object name, and the public synonym for Oracle database objects.

Table 24. Base objects for the package object type

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

Table 25. 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

Table 25. Base objects for the view object type (continued)

Base Object	Object Name	Public Synonym
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

Adding an Oracle listener for the OpenPages database

You must manually add an Oracle database listener for the OpenPages database.

Procedure

1. Log on to your database server as a user with administrative privileges.
2. Start the Net Configuration Assistant by using one of the following methods:

If you purchased Oracle from...	Then...
IBM	1. Open a Command Prompt window. 2. Go to `openpages_data\repository\server112_x64\software\bin` directory. 3. To start the Net Configuration Assistant, type the following command: `netca`.
Vendor other than IBM	1. Open a Command Prompt window. 2. Go to the *`Oracle_Home`*`\bin` directory. 3. To start the Net Configuration Assistant, type the following command: `netca`.

3. On the **Welcome** page, select the **Listener configuration** option and click **Next**.
4. On the **Listener Configuration, Listener** page, select **Add** and click **Next**.
5. On the **Listener Configuration, Listener Name** page, type a name for the new listener and click **Next**.

   Each listener name must be unique in the current Oracle Home.
6. On the **Listener Configuration, Select Protocols** page, select **TCP** for the protocol and click **Next**.
7. On the TCP/IP Protocol page, choose a port and click **Next**.
   - If this instance is the only Oracle database instance installed on your computer, select the **Use standard port number of 1521** option.

- If you have other instances of Oracle installed, choose another port number. This port number cannot be used by any other services that are running on your computer.

8. On the **More Listeners** page, select **No** and click **Next**.
9. On the **Listener Configuration Select Listener** page, select the listener you created and click **Next** to start the listener service.
10. On the **Listener Configuration Done** page, click **Next** to return to the **Welcome** page.
11. On the **Welcome** page, click **Finish**.

Creating an Oracle database instance for the OpenPages repository

You must create an Oracle database instance for OpenPages to use.

Procedure

1. Log on to your database server as a user with administrative privileges.
2. Start the Database Configuration Assistant by using one of the following methods:

If you purchased Oracle from...	Then...
IBM	1. As a user with Administrative privileges, open a Command Prompt window. 2. Go to the `openpages_data\repository\server112_se_x64\software\bin` directory. 3. To start the Database Configuration Assistant, type the following command: `dbca`.
a vendor other than IBM	1. As a user with Administrative privileges, open a Command Prompt window. 2. Go to the *`Oracle_Home`*`\bin` directory. 3. To start the Database Configuration Assistant, type the following command: `dbca`.

3. On the **Welcome** page, click **Next** to begin the database configuration.
4. On the **Operations** page, select **Create a Database** and then click **Next**.
5. On the **Database Templates** page, select **Custom Database** and click **Next**
6. On the **Database Identification** page type the **Global Database Identifier** and click **Next**
7. On the **Management Options** page, select **Configure Enterprise Manager**.
   a. Select **Configure Database Control for local management**.
   b. If required, enable **E-mail Notifications and Daily Backups** and click **Next**.
8. On the **Database Credentials** page, set the passwords for the default Oracle accounts and click **Next**.
9. On the **Database File Locations** page, select the following options:
   a. Select **File System** for the Storage Type.
   b. Select the location for the database files.
      - If you want to use the same drive that the Oracle Home directory is located, select **Use Database File Locations from Template**

- If you want to place the files on a different drive or in another location, **Use Common Location for All Database Files, and then type the desired location for the database files**

c. Optionally, click **File Location Variables** to show the current settings for the database template you chose, and click **OK**.

d. Click **Next**.

10. On the **Recovery Configuration** page, clear all options and click **Next**.
11. On the **Database Content** page, clear all check boxes except **Enterprise Manager Repository**.
    a. Click **Standard Database Components**.
    b. Clear all options.

       Note: An Oracle message displays when you clear the Oracle DB XML component. You can click **YES** and ignore this message. The Oracle components affected by clearing this option are not used by the OpenPages environment.

    c. Click **OK** to close the dialog.
    d. Click **Next**.
12. On the **Initialization Parameters** page, change the 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**

       Note: You must create your database with the AL32UTF8 character set.

    d. On the **Connection Mode** tab, select **Dedicated Server Mode**.
13. Click **All Initialization Parameters** > **Show Advanced Parameters**.
    a. Enter the following custom settings:

Table 26. Initialization parameter values for Oracle database instance

Parameter Name	Value	Default
compatible	11.2.0.0	
nls_length_semantics	CHAR **Note:** CHAR is required for globalization.	BYTE
open_cursors	300	
optimizer_index_caching	100	0
optimizer_index_cost_adj	1	100
optimizer_mode	FIRST_ROWS	ALL_ROWS
optimizer_secure_view_merging	false	
processes	250	
sessions	280	

b. Click **Close** and click **Next**.

14. On the **Database Storage** page, if required, modify the database storage parameters and click **Next**.
15. On the **Creation Options** page, select **Create Database** and click **Finish**.
16. On the **Configuration** page, review the settings and click **Finish** to begin the database creation process and then click **OK**.

Adding a local net service name for the OpenPages database

If you did not purchase Oracle database software from IBM OpenPages, you must add a net service name on all servers that run the OpenPages application. The database client uses the net service name to connect to the database.

Procedure

1. To start the Net Configuration Assistant, do one of the following steps:

If you purchased Oracle from...	Then...
IBM	1. Open a Command Prompt window. 2. Go to the `OpenPages_data\repository\server112_x64\software\bin` directory. 3. To start the Net Configuration Assistant, type the following command: `netca`.
a vendor other than IBM	1. Open a Command Prompt window. 2. Go to the *`Oracle_Home`*`\bin` directory. 3. To start the Net Configuration Assistant, type the following command: `netca`.

2. On the **Welcome** page, select **Local Net Service Name configuration** and click **Next**.
3. On the **Net Service Name Configuration** page, select **Add** and click **Next**.
4. On the **Service Name** page, type the global database name for the Oracle instance and click **Next**

   For example, use OP for the service name.
5. On the **Select Protocols** page, choose the **TCP** protocol and click **Next**.
6. On the **TCP/IP Protocol** page, type the name of the server in for the **Host Name** field, use the standard port number, and then click **Next**.

   If you changed the port number when you created the listener for the database instance, type the new value instead.
7. On the **Test** page, select **Yes, perform a test** to confirm the connection.

   The test fails if you changed the password for the SYSTEM user during the database creation procedure. In this case, click **Change Login** after the test failure. Overwrite the SYSTEM password with the value you entered during the database creation procedure (Oracle Server installation), click **OK**, and then click **Next**.
8. On the **Net Service Name** page, modify default Net Service Name if necessary and click **Next**.

   By default, the value matches the **Service Name** you entered at the beginning of the procedure.
9. On the **Another Net Service Name?** page, select **No** and click **Next**.

10. On the **Net Service Name Configuration Done** page, click **Next** to return to the **Welcome** page.
11. Click **Finish** to exit the Net Configuration Assistant.

Scripts to manually create the OpenPages database schema in Oracle before installation

To create the OpenPages schema before you install, use the SQL wrapper scripts that are included in the media kit.

The IBM OpenPages GRC Platform requires that you create an OpenPages database schema, a set of database users, and a tablespace. During the OpenPages GRC Platform installation, you can choose to automatically create the schema. Optionally, you can manually create the OpenPages database schema before you install OpenPages application servers.

Scripts used to create the database schema

To create the OpenPages application tablespace and users, run a SQL wrapper script. The SQL wrapper script calls other scripts.

sql-wrapper.sql
The script runs other required SQL scripts in the correct order. Use this script to manually install the database.

database-install.sql
The wrapper script contains default definition values that you can modify. Change settings in the script file and not the command-line interface. Default values include the OpenPages administrator user account, base currency denomination, and the location of the OpenPages storage folder.

The base currency must match the base currency that is set in any previous installations. You cannot change the base currency after installation.

op-app-global-env.sql
The script is called by the wrapper script and defines the Super Administrator user account. You must verify the user account values in this script.

Changing the database object names for Oracle Automatic Storage Management

The IBMOpenPages GRC Platform includes coded names and locations of table spaces, data directories, and data files in the OpenPages database. To prevent a conflict with internal systems, practices, or IT policies, you must modify some scripted values.

For example, the installation program creates the `aurora.dbf` data file that stores all OpenPages data. Use Oracle Automatic Storage Management to change the name of this data file.

To change the name of the data file in the OpenPages database, a database administrator must update the following scripts before you run the `sql-wrapper.sql` script.

`create-opx-tablespaces.sql`
Creates table spaces for OpenPages database application tables

ibpm-ts-and-schema-owner.sql
Creates table spaces for IBPM application tables.

Procedure

1. Log on to a system as a user with administrator privileges.

   Tip: You can use any system that has access to SQL*Plus and that can connect to the database server.
2. Go to the OP_*version*_Configuration\Database\Oracle directory and copy the /OP_*version*_Configuration/Database/ORACLE/INSTALL_SCRIPTS directory.
3. Open the create-opx-tablespaces.sql script in a text editor.
   a. As appropriate for your environment, modify the SQL script under -- permanent storage, protected by logging, -- dedicated temporary tablespace and --temporary storage, no logging protection:

      ```
      CREATE TABLESPACE iflowdb DATAFILE '&dbf_location/&tablespace_name.dbf'
          SIZE 25M REUSE AUTOEXTEND ON NEXT 25M MAXSIZE
       UNLIMITED ONLINE EXTENT MANAGEMENT LOCAL UNIFORM SIZE 256K';
      ```
   b. Save and close the file.
4. Open the ibpm-ts-and-schema-owner.sql script in a text editor.
   a. Use the following syntax to modify the SQL script under ReCreate the tablespace and RECREATE THE USER:

      ```
      CREATE TABLESPACE iflowdb DATAFILE '&dbf_location/&tablespace_name.dbf'
          SIZE 25M REUSE AUTOEXTEND ON NEXT 25M MAXSIZE
       UNLIMITED ONLINE EXTENT MANAGEMENT LOCAL UNIFORM SIZE 256K';
      ```
   b. Save and close the file.

   For example, the following SQL Syntax creates a table space with a data file called OPdatafile in the Oracle data home location. The table space is managed locally.

   ```
   CREATE TABLESPACE iflowdb DATAFILE '&&10/OPdatafile.dbf'
      SIZE 25M REUSE AUTOEXTEND ON NEXT 25M MAXSIZE
    UNLIMITED ONLINE EXTENT MANAGEMENT LOCAL UNIFORM SIZE 256K';
   ```

   Where &&10 uses the datafile_storage_location parameter that you entered in the database-install.sql command for the data file location. OPdatafile.dbf is the name of the data file.

   The following SQL syntax creates a temporary table space with a data file in **disk_group_1**. The table space is managed locally.

   ```
   CREATE TEMPORARY TABLESPACE OPDATA_TEMP TEMPFILE '+disk_group_1' SIZE 2G
    EXTENT MANAGEMENT LOCAL;
   ```
5. To verify the default definition values, open the sql-wrapper.sql wrapper script in a text editor and modify the values as required for the following definitions.
   - define opx_base_currency_iso_code='USD'
   - define opx_dflt_stor_srv_root='C:\openpages-storage'

   For example, by default, the base currency is set to USD. 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'
   ```
6. From the INSTALL_SCRIPTS directory, open the custom environment script op-app-global-env.sql in a text editor.
   a. Modify the following default values for the Super Administrator.
      - define super_admin_username='OpenPagesAdministrator'
      - define super_admin_password='OpenPagesAdministrator'

b. Save and close the file.

7. Use the following syntax to run the `database-install.sql` wrapper script that creates the database components:

```
sqlplus /nolog @database-install.sql database-install.sql log_file
oracle_tns_alias dba_user dba_password workflow_user
workflow_password op_user op_password
datafile_storage_location
```

The following table provides a list of parameters that are passed to the SQL wrapper script.

Table 27. Examples of SQL wrapper script parameters and descriptions

Parameter Name	Description	Example
log_file	The log file name that the script creates and writes information to.	logfile.txt
oracle_tns_alias	The database alias for the OpenPages database instance, as set during the Oracle database installation. If necessary, you can retrieve this alias from the tnsnames.ora file.	OP
dba_user	The Oracle system user name. If you do not have access to the system user account, then use a database user account with administrative privileges.	system
dba_password	The password for the Oracle system account.	openpages
workflow_user	The workflow database user name. OpenPages uses this account to create and access the workflow database, and to manage workflow-related transactions.	opworkflow
workflow_password	The password for the workflow database user account.	opworkflow
op_user	The user name that is used by OpenPages to create and access the OpenPages database instance	openpages
op_password	The password for the OpenPages database user account.	openpages

Table 27. Examples of SQL wrapper script parameters and descriptions (continued)

Parameter Name	Description	Example
datafile_storage_location	The location of the Oracle data directory on the database server. The location of this directory is set during the Oracle installation process.	• C:\oracle\ora112\oradata\OP • C:\openpages_data\ repository\ database112_se_x64\oradata\ OP

The following sample code shows the SQL*Plus command line with example values from the table from the preceding step as the variables.

```
sqlplus /nolog @sql-wrapper.sql database-install logfile.txt OP
system openpages opworkflow opworkflow openpages openpages
C:\oracle\ora112\oradata\OP
C:\openpages_data\repository\
   database112_se_x64\oradata\OP
```

After the SQL script finishes, the **OpenPages** database schema is created. A log file is created in the directory where you ran the SQL script. The name of the log file matches the value of the **log_file** parameter you entered.

Results

If you have problems when you run the database-install.sql script, you can use the OP_*version*_Configuration\Database\Oracle\init-db-cleanup.sql script. The init-db-cleanup.sql removes the database components that were added. Then, you can run the database-install.sql script in a clean database environment.

Example

```
sqlplus /nolog @sql-wrapper.sql init-db-cleanup.sql log_file
oracle_tns_alias dba_user dba_password workflow_user op_user
```

Starting and stopping the 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 the Windows **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**.

Testing the connections to the database server and the OpenPages repository

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 if the listener is available. It does not test whether the databases behind the listener are working.

To test that the OpenPages repository 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 Database Control, the web-based interface that is used to administer an Oracle database, type the following command:

   `https://oracle_server_name:port/em`

   In a default installation, the port number is 1158.

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 acknowledgement 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 OpenPages repository 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`.

Chapter 7. Cognos Business Intelligence installations

IBM Cognos Business Intelligence is installed on the same server as the OpenPages CommandCenter. This server is referred to as the reporting server.

Reporting server distribution options

For light user loads, with fewer than 50 concurrent users, Cognos BI and CommandCenter can be installed on the same server as the OpenPages application.

For heavier user loads, install Cognos BI and CommandCenter on separate from OpenPages application servers. IBM OpenPages GRC Platform operates at peak performance when components are installed on multiple servers: a database server, an application server, and a reporting server.

Requirements for installing Cognos BI in a Linux environment

Cognos Business Intelligence requires specific Linux packages. For more information, see the Linux operating system requirements on the Cognos supported environments web site (www.ibm.com/support/docview.wss?uid=swg27036131#linux).

The Cognos BI installation program and requires the following 32-bit and 64-bit libraries.

32-bit libraries

- gtk2-2.18.9-6.el6.i686.rpm
- glib2-2.22.5-6.el6.i686.rpm
- libXtst-1.0.99.2-3.el6.i686.rpm
- compat-libstdc++-33-3.2.3-69.el6.i686.rpm
- pam-1.1.1-10.el6.i686.rpm
- openmotif22-2.2.3-19.el6.i686.rpm
- libXp-1.0.0-15.1.el6.i686.rpm
- ibXmu-1.0.5-1.el6.i686.rpm

64-bit libraries

- gtk2-2.18.9-6.el6.x86_64.rpm
- glib2-2.22.5-6.el6.x86_64.rpm
- libXtst-1.0.99.2-3.el6.x86_64.rpm
- compat-libstdc++-33-3.2.3-69.el6.x86_64.rpm
- openmotif22-2.2.3-19.el6.x86_64.rpm
- pam-1.1.1-10.el6.x86_64.rpm
- libXp-1.0.0-15.1.el6.x86_64.rpm
- libXmu-1.0.5-1.el6.x86_64.rpm
- compat-glibc-headers-2.3.4-2.26.x86_64.rpm
- compat-glibc-2.3.4-2.26.x86_64.rpm

DB2 database server requirements

Two separate DB2 database instances are required for the IBM OpenPages GRC Platform installation. The DB2 database instance that hosts the Cognos content store must not be the same DB2 database instance that hosts the OpenPages database. Each DB2 database instance has different requirements.

Installing IBM Cognos Business Intelligence

Before you install OpenPages GRC Platform components, ensure that IBM Cognos Business Intelligence and the IBM Cognos Software Development Kit are installed and running in your environment.

Restriction: Do not install Cognos BI into a directory that contains spaces.

For more information about upgrading to IBM Cognos BI, see the *IBM Cognos Business Intelligence Installation and Configuration Guide*.

Important: In the 64-bit installations, the report server component in Cognos BI is provided in both 32-bit and 64-bit versions. Selecting which version you use is done in IBM Cognos Configuration after installation. By default, the report server component is set to use the 32-bit mode, even on a 64-bit computer. With the 32-bit mode, you run reports from all packages. If you configure the 64-bit mode, you can run only reports that are created from packages that use dynamic query mode. For OpenPages applications, you must use the default 32-bit report server.

For light user loads, with fewer than 50 concurrent users, Cognos BI and CommandCenter can be installed on the same server as the OpenPages application.

For heavier user loads, install Cognos BI and CommandCenter on separate from OpenPages application servers. IBM OpenPages GRC Platform operates at peak performance when components are installed on multiple servers: a database server, an application server, and a reporting server.

Note: The *IBM Cognos Business Intelligence Installation and Configuration Guide* is available in the IBM Cognos documentation library

Before you begin

If the OpenPages database is remote from the Cognos BI server, ensure that the database client software is installed on the Cognos BI server. The database client that Cognos BI uses to connect to the OpenPages database must be a 32-bit client.

Restriction: Do not install the database client software into a directory with spaces.

On Linux operating systems, ensure that the dependent 32-bit and 64-bit libraries are installed.

Important: The 64-bit DB2 database installations includes libraries for both 32-Bit and 64-bit systems. On Linux and AIX operating systems, ensure that the library path points to the 32-bit libraries. Use the following table to add the path to the DB2 32-bit server libraries.

Table 28. DB2 database path environment variables for Cognos installations (DB2DIR=/home/db2inst1/sqllib)

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. Ensure that a web server, such as Microsoft IIS or IBM HTTP Server is installed.

   A web server is required so that users can view content in the IBM Cognos BI portal.
2. On the reporting server, install the new version of Cognos Business Intelligence, IBM Cognos Software Development Kit, and optionally Framework Manager.
   a. Install Cognos BI Server.

      Restriction: In the installation wizard, accept the default components that are selected. Do not select Cognos Content Database. Install Cognos BI into a directory that contains only ASCII characters in the path name.

      After the installation is complete, ensure that the IBM Cognos Configuration check box is clear. Before you configure Cognos BI Server, you must do other tasks to set up your environment.

      For information about installing Cognos BI Server on Windows operating systems, see Installing server components on Windows operating systems in the IBM Cognos BI Information Center.

      For information about installing Cognos BI Server on AIX or Linux operating systems, see Installing server components on UNIX or Linux operating systems in the IBM Cognos BI Information Center.
   b. Install Cognos Software Development Kit in the same installation location as Cognos BI Server.

      In the installation wizard, accept the default components that are selected.

      For more information about installing IBM Cognos Software Development Kit on Windows-based computers, see Installing and configuring the Software Development Kit in the IBM Cognos BI Information Center.
   c. Optional: 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 Cognos BI server and the 32-bit Framework Manager to different directories. The default installation locations for 32 and 64-bit Cognos components are different. For more information about installing Framework Manager, see Installing Framework Manager in the IBM Cognos BI Information Center.
3. Copy the JDBC database driver to the *Cognos_Home*\webapps\p2pd\Web-Inf\lib directory.
   - If the content store is an Oracle database, copy the ojdbc5.jar file from the Oracle installation.

- If the content store is a DB2 database, copy the `db2jcc.jar` and `db2jcc_license_cu.jar` files from the DB2 installation.

4. 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=$LD_LIBRARY_PATH:/opt/ibm/cognos/c10_64/bin64`
   - For AIX operating systems, update the LIBPATH environment variable.

     Example: `export LIBPATH=$LIBPATH:/opt/ibm/cognos/c10_64/bin64`
5. Append the *Cognos_HOME*`/bin64` directory to the PATH environment variable.

Related tasks:

"Manually creating the reporting tablespace and user for Oracle databases" on page 158

After you create the Cognos content store, you can manually create the content store user and the content store tablespace. This user must be able to create, alter, and drop tables, triggers, views, procedures, and sequences, and have the CONNECT and RESOURCE roles.

Creating users and groups on the reporting servers for the Oracle client on Linux operating systems

To install the Oracle client and IBM Cognos Business Intelligence create two users and one group.

About this task

To install the Oracle client, create and configure the `oinstall` group and the `oracle` user on the server that hosts the OpenPages application.

Use the following table to help you create the users and groups

Table 29. Required users for reporting servers

User	Assign to Groups	Permissions	Reason
`oracle`	`oinstall`	Read, write, execute permission to Oracle client installation directory	`oinstall` is required by Oracle client installation program

Table 29. Required users for reporting servers (continued)

User	Assign to Groups	Permissions	Reason
opuser	staff cron security audit bin staff is the primary group for this user.	Read, write, execute permission to the following directories: • Oracle client installation directory • WebSphere installation directory • Cognos installation directory • Java JDK or JRE installation directory • Apache Web Server installation directory User must be able to run SQL*Plus commands.	• staff A standard, default group to which most users have as the primary group.. • cron Optionally, add the user to this group to allow this user to run cron jobs. • security Add the user to this group to allow the user to set user attributes. • audit Add the user to this group to allow the user to be audited or to audit. • bin Add the user to this group to allow access to tools in the bin directory, such as gunzip.

Procedure

1. Log on to the application server as root user and open an AIX shell.
2. To create a group called oinstall, enter the following command.
   ```
   groupadd -A oinstall
   ```
   This group is the primary group for the oracle user.
3. To create a user called oracle 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
   ```
   This user is used to install Oracle client.

   Note: The Oracle 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.

   Restriction: The password for this user cannot contain special characters due to conflicts with OpenPages scripts
6. To install the OpenPages application, create a user, such as opuser user.
   ```
   useradd -m name.
   ```
7. To limit the size of a file the user can create, configure the opuser user.
   ```
   chuser fsize=# name
   ```
   Use a negative number for unlimited.
8. Add the OpenPages user to the bin, security, and audit Oracle groups.
   ```
   usermod -g staff -G bin,security,cron,audit opuser
   ```
   Optionally, you can add the user to the cron group.
9. Use the following command to change the password for the OpenPages user.

`passwd name.`

10. Enter a new password at the **New Password** prompt.

Web server configuration options for Cognos BI

You must configure your Web server before users can connect to the IBM Cognos BI portal.

For more information, see the Configuring a web server in the IBM Cognos Business Intelligence Information Center, which contains details on the following:

- Enable the 64-bit web gateway

  If you want to use the 64-bit version of the IBM Cognos BI gateway, you must manually move the 64-bit gateway files in your installation directory.
- 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.
- Configuring WebDAV to view and browse images

  To view and browse images in the Report Studio, 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 IIS 7.0 Web Server

Before you can view reporting data on Windows computers, you must configure a web server. If your web server is a Windows Server 2008 with IIS 7.0, configure ISAPI and CGI to allow CommandCenter pages to load.

About this task

IIS 7.0 on a Windows Server 2008 server has security features that, by default, prohibit files with web service extensions (cgi) from executing. As a result, Cognos files that have these web service extensions are unable to run. To modify IIS 7.0 security features so that Cognos files with Web Service extensions can execute properly, you must enable IIS to allow CGI.

The following instructions are specific to Windows Server 2008 with IIS 7.0.

For more information, see Configuring the web server in the IBM Cognos Business Intelligence Information Center.

Procedure

1. Log on to the reporting server as a user with administrative privileges.
2. Open the Windows Internet Information Services Manager from the **Start** menu, by clicking **Administrative Tools** > **Internet Information Services Manager**.
3. In Internet Information Services Manager, select the application server that you want to configure.
4. In the **Features** view, locate the ISAPI and CGI Restrictions icon.

- If the ISAPI and CGI Restrictions icon is not displayed, enable ISAPI and CGI extensions as described in the step 5.
- If the ISAPI and CGI Restrictions exists, skip the following step, and continue to step 6.

5. To enable ISAPI and CGI extensions, create a role in the Windows Server Manager.
   a. In Internet Information Services Manage, right-click Roles and select **Add Roles**.
   b. On the **Before You Begin** page in the **Add Role Services** wizard, click **Next**.
   c. On the **Select Server Roles** page, select **WebServer (IIS)** and click **Next**.
   d. In the **Add Server Roles** page, under **Application Development**, select **CGI**, **ISAPI Extensions**, and **ISAPI filters**, and click **Next**.
   e. On the **Confirm Installation Selections** page, click **Install**, and when the installation is complete, click **Close**.
6. In the **Features** view of the Internet Information Services Manager, double-click the ISAPI and CGI Restrictions icon.
7. In the **Actions** pane, select **Add**.
8. In the **Add ISAPI or CGI Restriction** dialog box, click browse.
9. In the **ISAPI and CGI Restrictions** box, change the **File Type filter** from `.dll` to `All Files`.
10. Enter the path to the `cognos.cgi` file in the `Cognos_HOME\cgi-bin` directory.
11. Enter a description for the restriction, such as `Cognos-CGI`.
12. Select **Allow extension path to execute** and click **OK**.
13. Add the module mapping to the `web.config` or the `applicationhost.config` file or both.
    a. Find the `applicationHost.config` file.

       `C:\Windows\System32\inetsrv\config\applicationHost.config.`

       If the `applicationHost.config` does not exist, continue to step 14.
    b. Open the `applicationHost.config` in a text editor and find the following entry:

       ```
       <add name="Cognos-CGI" path= "cognos.cgi" verb="*" modules="CgiModule"
       resourceType="Unspecified" />
       ```
    c. Add `allowPathInfo="true"` to the end of the line:

       ```
       <add name="Cognos-CGI" path= "cognos.cgi" verb="*" modules="CgiModule"
       resourceType="Unspecified" allowPathInfo="true" />
       ```
    d. Save and close the file.
14. Go to the *Cognos_HOME*`\cgi-bin` directory and open the `web.config` file in a text editor.
    a. Find the following entry:

       ```
       <add name="Cognos-CGI" path= "*.cgi" verb="*" modules="CgiModule"
       resourceType="Unspecified" />
       ```
    b. Add `allowPathInfo='true'` to end of the line:

       ```
       <add name="Cognos-CGI" path= "*.cgi" verb="*"
       modules="CgiModule" resourceType="Unspecified" allowPathInfo="true" />
       ```
    c. Save and close the file.

Configuring virtual directories in IIS

You must configure a virtual directory or alias that is used by the Microsoft Internet Information Services to map to a physical location.

Procedure

1. From the Internet Services Manager, expand the tree for the server that you want to configure, and then expand **Default Web Site**.
2. Right-click **Default Web Site** and select **Add Virtual Directory** from the menu.
3. On the **Add Virtual Directory** page, create the `ibmcognos` virtual directory.
   a. In the **Alias** field, type `ibmcognos`.
   b. In the **Physical Path** field, enter the path to the `webcontent` directory under *Cognos_HOME*
   c. Click **OK**.
4. Right-click the `ibmcognos` virtual directory that you created and select **Add Virtual Directory**.
5. On the **Add Virtual Directory** screen, create a `cgi-bin` virtual subdirectory.
   a. In the **Alias** field, type `cgi-bin`.
   b. In the **Physical Path** field, enter the path to the `cgi-bin` directory under *Cognos_HOME*.
   c. Click **OK**.
6. In the **Connections** pane, select the `cgi-bin` virtual director, and double-click **Handler Mappings**.
7. In the Actions pane click **Add Module Mapping**, and in the **Request Path** field, enter `*.cgi.`.
8. In the **Module** list, select **CgiModule** and enter a name, such as `Cognos-CGI`.
9. Click **OK**.
10. Internet Information Services Manager.

Configuring the Apache Web Server on a Windows operating system

You must configure your web server before users can connect to the IBM Cognos Business Intelligence portal.

Procedure

1. Log on to the web server as a user with administrative privileges.
2. From the command prompt, go to the *Apache_Home*`\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:

```
ScriptAlias /ibmcognos/cgi-bin "<Cognos_HOME>\cgi-bin"
<Directory "<Cognos_HOME>\cgi-bin">
Options FollowSymLinks
AllowOverride FileInfo
Order Allow,Deny
Allow from All
</Directory>

Alias /ibmcognos "<Cognos_HOME>\webcontent"
```

```
<Directory "<Cognos_HOME>\webcontent">
Options FollowSymLinks
AllowOverride FileInfo
Order Allow,Deny
Allow from All
</Directory>
```

6. Restart the web server service though the Window Services or by using the Window **Start** menu.

Configuring the Apache Web Server on AIX or Linux operating systems

You must configure your web server before users can connect to the IBM Cognos Business Intelligence portal.

Procedure

1. Log on to web server as a non-root user with administrative privileges.
2. Go to the *Apache_HOME*/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:

```
ScriptAlias /ibmcognos/cgi-bin "<Cognos_HOME>/cgi-bin"
<Directory "<Cognos_HOME>\cgi-bin">
Options FollowSymLinks
AllowOverride FileInfo
Order Allow,Deny
Allow from All
</Directory>

Alias /ibmcognos "<Cognos_HOME>/webcontent"
<Directory "<Cognos_HOME>\webcontent">
Options FollowSymLinks
AllowOverride FileInfo
Order Allow,Deny
Allow from All
</Directory>
```

6. Use the following commands to restart the Apache Web Server:
   - On AIX operating systems:

     Apache_HOME/bin/apachectl stop

     Apache_HOME/bin/apachectl start
   - On Linux operating systems:

     /etc/init.d/httpd start

     /etc/init.d/httpd stop

Configuring a connection to the content store for Oracle database

After you install IBM Cognos Business Intelligence and the IBM Cognos Software Development Kit, configure a connection to the content store database.

Before you begin

Ensure that you copied the JDBC database driver, ojdbc5.jar, file to the *c10_location*\webapps\p2pd\Web-Inf\lib directory.

Procedure

1. Start Cognos Configuration.
   - On Windows computers, from the Start menu, click **All Programs** > **IBM Cognos 10** > **IBM Cognos Configuration**.
   - ON AIX computers, go to the `Cognos_HOME/c10_64/bin64` directory, and type the following command:

     `./cogconfig.sh`
2. 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 dialog box, 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 30. 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.
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 Cognos user you created for the content store database. 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 31. 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.

Table 31. Content store property settings for Oracle database (Advanced) (Oracle RAC 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 Cognos user you created for the content store database. If you used the IBM 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`*`>)))`

3. 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**.
4. To start the Cognos services, click **Actions** > **Start**.

   Note: 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.

Configuring a connection to the content store for DB2 database

After you install IBM Cognos Business Intelligence and the IBM Cognos Software Development Kit, configure a connection to the content store database.

Important: The content store database must be in a separate database instance than the OpenPages database. Oracle compatibility mode must not be enabled for DB2 database instance that is used for content store.

Before you begin

Ensure that you copied the following files from the *DB2_installation*`\sqllib\java` directory to the *Cognos_HOME*`\webapps\p2pd\WEB-INF\lib` directory:

- `db2jcc.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 10** > **IBM Cognos Configuration**.

- ON AIX computers, go to the `Congos_HOME/c10_64/bin64` directory, and type the following command:

  ```
  ./cogconfig.sh
  ```

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 **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 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**.
9. To start the Cognos services, click **Actions** > **Start**.

Chapter 8. OpenPages application server installations

Install the OpenPages application software on either an administrative server or managed server.

The OpenPages application installation program installs the following components:

- OpenPages application
- OpenPages workflow server and notification components
- OpenPages database schema (optional)

Your installation tasks depend on the server role. Use the following table to determine the type of application server installation.

Table 32. Server roles and installation type

Installation type	Server role
Administrative server installation	Used as the administrative server for the OpenPages environment. In a clustered environment, there is one administrative server and all other application servers are managed servers **Important:** If you use LDAP authentication, you must include LDAP connection information in a configured `tnsnames.ora` file on the application server to ensure that OpenPages can connect to the database.
Managed server installation	Used as an extra server in a cluster environment (not intended for administration). **Restriction:** You must install the OpenPages application on the administrative server before you can install the managed servers in your configuration. The installation path must be the same on the administrative server and on all managed servers.

Prerequisite tasks for the OpenPages application installations that use Oracle database

Before you install the IBM OpenPages application, ensure that the Oracle database client is installed on the OpenPages application server.

Oracle environment variable settings

After you install the Oracle database, ensure that you set the Oracle environment variables on Linux and AIX operating systems.

Some of the values are set during the Oracle installation. Ensure that the following environment variables are set on the OpenPages application server computer.

Table 33. Oracle environment variables and descriptions

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.

Example: Use the syntax and delimiters that are appropriate for the shell that you are using.

```
export ORACLE_SID=OP
export ORACLE_HOME=/home/oracle/app/oracle/product/11.2.0/client_2
export NLS_LANG=AMERICAN_AMERICA.AL32UTF8
export TNS_ADMIN=/home/oracle/app/oracle/product/11.2.0/client_2/network/admin
```

Creating users and groups for application servers on Linux operating systems that use Oracle databases

To install the Oracle Client, WebSphere Application Server, and the OpenPages application, you must create two users and one group. You can create a separate user and group to install WebSphere Application Server.

About this task

To install the Oracle client, create and configure the `oinstall` group and the `oracle` user on the server that hosts the OpenPages application.

Table 34. Required users and groups for application servers

User	Assign to Groups	Permissions	Reason
`oracle`	`oinstall`	Read, write, execute permission to the Oracle client installation directory.	Required by Oracle client installation program.
`wasuser`	IBM WebSphere Application Server installation	Read, write, execute permission to the WebSphere Application Server installation directory.	You can create a non-root user to install the WebSphere Application Server software. You can create a separate user and group or use the `opuser` user.

Table 34. Required users and groups for application servers (continued)

User	Assign to Groups	Permissions	Reason
opuser	staff security audit bin cron (optional) WebSphere Application server installation group For this user, staff is the primary group.	Read, write, execute permission to the following directories: • Oracle client installation directory • IBM WebSphere Application Server installation directory • Java JDK or JRE installation directory • Cognos BI installation directory User must be able to run SQL*Plus commands.	• staff The staff group is a standard, default group that most users have as the primary group. • cron Optionally, add the user to the cron group to allow this user to run cron jobs. • security Add the user to the security group to allow the user to set user attributes. • audit Add the user to the audit group to allow the user to be audited or to audit. • bin Add the user to the bin group to allow access to tools in the bin directory, such as gunzip.

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:

   ```
   groupadd oinstall
   ```

   This group is the primary group for the oracle user.

   Restriction: The Oracle Client installer requires that this group is named oinstall.
3. To create a user called oracle 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
   ```

   This user is used to install Oracle client.

   Restriction: The Oracle Client installer requires that this user must be 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, create a user, such as opuser.

   ```
   useradd -m name
   ```
7. Change the password for the OpenPages user by using the following command:

   ```
   passwd name
   ```

Restriction: The password cannot contain spaces or special characters. Otherwise, the `OPBackup` script will fail.

8. At the **New Password** prompt, enter a new password.

Related tasks:

"Setting the file descriptor limit for OpenPages users on Linux operating systems" on page 89
You must set the soft and hard limits for the file descriptor and update system files to allocate sufficient resources to the OpenPages users.

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

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

To install the DB2 database client, create and configure the required users and groups.

Table 35. 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 WebSphere Application Server installation directory.	You can create a non-root user to install the 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.
`opuser`		Read, write, execute permission to the following directories: • DB2 database client installation directory. • IBM WebSphere Application Server installation directory. • Java JDK or JRE installation directory. • Cognos BI installation directory.	The user account that installs IBM OpenPages GRC Platform.

Related concepts:

"Operating system user accounts for OpenPages and Cognos BI installations that use DB2 databases" on page 42
Operating system user accounts affect the procedures that are used to create the OpenPages database and Cognos Business Intelligence content store.

Related tasks:

"Setting the file descriptor limit for OpenPages users on Linux operating systems"
You must set the soft and hard limits for the file descriptor and update system files to allocate sufficient resources to the OpenPages users.

Setting the file descriptor limit for OpenPages users on Linux operating systems

You must set the soft and hard limits for the file descriptor and update system files to allocate sufficient resources to the OpenPages users.

Procedure

1. Log on to the application server as `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 lift 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` command.

64-bit Oracle Client software installations on OpenPages application servers

Depending on your environment, you must install Oracle Client software on multiple OpenPages GRC Platform application server computers to connect to Oracle database. Use the Oracle Client driver files, networking components, and tools to remotely administer the Oracle database.

Setting the ORACLE_HOME environment variable on OpenPages admin and managed 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 all admin and managed servers.

Procedure

1. Log on to the application server as a user with administrative privileges and full access to the local server drives.

   Note: For AIX operating systems, log in as a `non-root` user, such as the `opuser` user that you created for the OpenPages installation.

2. Set the ORACLE_HOME environment variable to point to the Oracle Client installation directory.

   `set ORACLE_HOME=`*`ORACLE_BASE\client_software`*

3. Add the location of the Oracle client installation to the PATH environment variable.

Custom OpenPages Database Schema installations

Instead of loading the default OpenPages database schema, you can load your own custom configuration data. You can install the OpenPages application before you load your custom data. However, you must load your data before you run the OpenPages application.

Creating the OpenPages directories for AIX or Linux operating systems

Create the installation directories for OpenPages and change the ownership of the directory to the installation user.

Procedure

1. Log on to the database server as the `root` user.
2. From the shell prompt, if the installation directory for OpenPages and Fujitsu IBPM do not exist, create them by typing the following command:

   Restriction: Install OpenPages and Fujitsu Interstage BPM software, into a directory that contains only ASCII characters in the path name.

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

```
mkdir -p /OpenPages
mkdir -p /Fujitsu
```

3. Change the ownership of the directories to the installation user.

   Tip: For simplicity, use the same account (`opuser`) to install WebSphere Application Server and the OpenPages application server.

   Optionally, you can create two separate users:
   - One user to install WebSphere Application Server.
   - One user to install the OpenPages application.

   Both users must both belong to the same primary group. If different users install OpenPages and WebSphere, after the installation, you must change the permission of the installation directories and files. To ensure that the group members have write permission, modify the permissions to 775.

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

Extracting the installation files for deploying OpenPages to WebSphere Application Server

To improve performance, copy the installation kit files from the IBM OpenPages GRC Platform media pack to the local system. Then, use an extraction utility to uncompress the IBM OpenPages GRC Platform Administrative Console installation files.

Procedure

1. Log on to the OpenPages application server as a user with administrative privileges.
2. Extract the OpenPages Administrative Console installation files from the IBM OpenPages GRC Platform Installer *version* for WebSphere Application Server DVD or the IBM OpenPages GRC Platform Installer *version* for WebSphere Application Server Linux x86-64 Multilingual DVD.
   - If the source computer is on the Windows operating systems, go to the `\WIN64-OP_`*version*`\OpenPages\Win64\OP_`*version*`_Non_Embedded_WAS_Oracle_DB2_WIN64\OP_`*version*`_Admin_and_Config_Console` directory and extract the `opadminconsole-win32.win32.x86_64.zip` file.
   - If the source computer is on a Linux operating systems, go to the `Linux64/OP_`*version*`_Non_Embedded_LINUX64/OP_`*version*`_Admin_and_Config_Console` directory and extract the contents of the `opadminconsole-linux.gtk.x86_64.zip` file.

   Restriction: To avoid `File path too long` or other extraction errors, use a compression utility, such as 7-Zip. Otherwise, extract the files to the `root` directory or to the `c:\temp` or `/tmp` directory.
   The extraction might take a few moments to finish.
3. To start the OpenPages Administrative Console installation program, go to the *path*`\opadminconsole` directory and run the `opadminconsole` script.

Related concepts:

“"File path too long" error or other errors when extracting installation files” on page 164
When you extract compressed files from the installation media, you might see a `Error 0x80010135: File path too long` error.

Installation options for deploying OpenPages to WebSphere Application Server

Several deployment options are available for installing IBM OpenPages GRC Platform. Use the Select the Installation Option dialog box to select the IBM OpenPages GRC Platform component and the installation environment.

Deploying to WebSphere Application Server with DB2 database

To install and deploy IBM OpenPages GRC Platform to WebSphere Application Server and to use a DB2 database for the OpenPages database, select the deployment option in the **Select the Installation Option** page.

Before you begin

To deploy OpenPages GRC Platform to WebSphere Application Server and use a DB2 database for the OpenPages schema, ensure that the following conditions are met:

- Oracle compatibility mode is set for the DB2 database instance for the OpenPages repository.

  To check whether Oracle compatibility mode is set, run the following command as a DB2 user:

  ```
  db2set DB2_COMPATIBILITY_VECTOR ORA
  ```

  If Oracle compatibility mode s not set, the following message is displayed:

  ```
  db2set DB2_COMPATIBILITY_VECTOR DBI1303W Variable not set.
  ```
- The DB2 client software is installed.
- WebSphere Application Server is installed. and at least one profile is created.

  Restriction: At least one WebSphere Application Server profile is required on the OpenPages non-administrative server. If there is at least one profile on the non-administrative server, you are not required to create one. If there is no profile, you must create one. For more information about creating a profile by using the Profile Management Tool or the **`manageprofiles`** command line tool, see the WebSphere Application Server Information Center (http://pic.dhe.ibm.com/infocenter/wasinfo/v8r5/index.jsp)
- The OpenPages Administrative Console files are extracted to the target installation computer or to the source computer on the Windows operating system.

Important: DB2 Text Search component is required.

DB2 Text Search component is an optional installable component. To install it, you must select the custom installation type and the DB2 Text Search component. For more information, see the Installing and configuring DB2 Text Search in the DB2 Information Center.

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

To determine whether text search is installed, run the **db2ts** command to start or stop the text search. If the command fails, text search is not installed. For more information about running the command, see the DB2 search commands in the DB2 Information Center.

Procedure

1. For AIX and Linux operating systems, ensure that `DB2_HOME/bin` directory is in the PATH environment variable `.profile` file of the OpenPages installation user.

   ```
   export DB2_HOME=<DB2_HOME>
   . $DB2_HOME/db2profile
   ```

2. Log on to the source computer as a user with administrative privileges.
   - For Windows operating systems, you must run the IBM GRC Platform Administrative Console on the target Windows-based computer.
   - For Linux operating systems, you can run the IBM GRC Platform Administrative Console on the target Linux-based computer or on a Windows-based computer.
   - For AIX operating systems, you must run the IBM GRC Platform Administrative Console from a Windows-based computer.
3. Go to the location where you extracted the installation files and run the `opadminconsole` file.
   - If you extracted the files to a Windows-based computer, go to the `path\opadminconsole-win32.win32.x86_64\opadminconsole` directory, right-click `opadminconsole.exe`, and click **Run as administrator**.
   - If you extracted files to a Linux-based computer, go to the `path/opadminconsole-linux.gtk.x86_64/opadminconsole` directory, and run the `opadminconsole` script file.
4. If the license agreement is displayed, accept the terms and click **OK**.
5. From the **Select the Installation Option** page, click the deployment option that represents your target installation environment.
6. On the **Properties** panel, enter the properties that are required to deploy OpenPages application servers and workflow server.

   Tip: A description and online help for each property is displayed in the **Help** view when you click the property. If the **Help** view is not visible, click **View** > **Help** or press F1. For information about using the Administrative Console, in the **Help** view, click **Contents**
7. If required, enter **Connection Information**.

   To connect from the Windows-based computer to an AIX-based or Linux-based computer, for the **Connection Information**, enter the host name and user account information.

   Important: For AIX and Linux operating systems, ensure that the WebSphere Application Server installation user account has read, write, and execute permissions for the IBM OpenPages GRC Platform installation files. For simplicity, use the WebSphere Application Server user account to install and run the OpenPages application server installation.

8. For the **OpenPages Application Server Information** group of properties, choose whether you are installing the OpenPages administrative server or managed server, and then enter the property values.

   In a clustered environment, there is only one administrative server and all other application servers are managed servers.

   You must install the OpenPages administrative server before you install the managed servers.

   Restriction: Install OpenPages and Fujitsu Interstage BPM software into a directory that contains only ASCII characters in the path name.

   Important: The installation path must be the same on the administrative server and on all managed servers.
9. For AIX installations, ensure that the **32 bit JRE directory** property points to the location of a 32-bit Java Runtime Environment (JRE).

   The 32-bit JRE is used during the installation Fujitsu Interstage Business Process Management software (OpenPages workflow server). After the workflow server is installed, OpenPages does not use the JRE.

   Tip: To check the version of the Java Runtime Environment (JRE)
   - Ensure that JAVA_HOME is not set.
   - Go to the `JRE_HOME/bin` directory.
   - Type the following command: `java -version`

     The results display version information.
10. Select the appropriate option for **Do you want to load the OpenPages configuration data**.
    - Select **Yes** under most circumstances.
    - Select **No**, if you already loaded the configuration data.

      Example: In test environments that have multiple installations of IBMOpenPages, the configuration data might already loaded.

      If you select **No**, and the default configuration is not already loaded, you must manually load the level-0 schema. Otherwise, you see garbled text when you are in the OpenPages application. For more information see, "Manually loading the configuration data after a new installation" on page 161.
11. For the **CommandCenter Report Information** group of properties, enter the settings for IBM Cognos Business Intelligence and choose Command Center® installation settings.

    To check Cognos BI configuration settings, you can open IBM Cognos Configuration and review the **Environment** properties.
12. For the **WebSphere Application Server Information** group of properties, enter the settings.

    Restriction: For Windows operating system, if you installed WebSphere Application Server into a directory with spaces, you can enter the short file name convention.

    For `C:\Program Files\IBM\WebSphere\AppServer`, enter `C:\PROGRA~1\IBM\WebSphere\AppServer`.
13. For the **Database Information** group of properties, select whether you installed the OpenPages database schema manually.

- Select **Install now** to automatically install the OpenPages database schema when OpenPages GRC Platform is deployed to WebSphere Application Server.
- Select **Already installed** if the schema is installed.

  The OpenPages database schema must exist before you deploy to WebSphere Application Server. You can manually create the schema before installation.

14. For the **Database Information** group of properties, enter the information for the DB2 database instance that hosts the OpenPages database.
    - For the **Home Directory**, enter the installation location of the DB2 database instance for the OpenPages database.

      Example: On Linux or AIX operating systems, `/home/db2inst1/sqllib` or on Windows operating systems, `C:\ibm\SQLLIB`
    - Ensure that the installation user has write access to the locations that you specify for the **Database Path** and **Catalog Path** properties.
    - On AIX and Linux operating systems, the user accounts for the **OpenPages JDBC User Name** and the **Workflow JDBC User Name** must exist.
15. To verify the settings that you entered, click **Validate Properties**.

    If there are errors, change the settings that require attention.

    Example: For Windows operating systems, if you enter an incorrect UNC path for a property, you might see a `"BasicConfigOperation"` error during the validation phase. Correct the path, and validate the properties again.
16. To install OpenPages GRC Platform, click **Deploy**.

    Monitor the progress of the installation in the **Deployment Steps** or the **Log** view. A message is displayed to indicate whether the installation succeeded. If the installation fails, the OpenPages Administrative Console rolls back the installation to the last successful checkpoint.

Results

If the installation completes with errors, examine the **Log** view in the user interface for errors. Errors are displayed in red text. You can also review the log files that are created during the installation by exporting them from the user interface or by reviewing them in the `path\opadminconsole\workspace\.metadata\.plugins\com.ibm.openpages.config.install.ui\sessions` directory.

For errors related to ObjectManager, review the `ObjectManager.log` file in the *OP_HOME*`/bin/logs` directory and the *<Host_Name>*`-OPNode1Server1-aurora.log` in the *OP_HOME*`/aurora/logs` directory. After you fix the errors, you can manually load the configuration data. For more information, see “Manually loading the configuration data after a new installation” on page 161.

What to do next

Some post-installation tasks are required, such as adding OpenPages application servers to the Cognos Application Firewall safe list. You must also install CommandCenter on the reporting server.

Related tasks:

"Granting control on SYSTOOLS schema objects to the DB2 database instance owner on the Windows operating system" on page 99
After you install IBM OpenPages GRC Platform on Windows operating systems, 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 DB2 database instance owner.

Deploying to WebSphere Application Server with Oracle database

Use the OpenPages Administrative Console to deploy OpenPages application server to WebSphere Application Server with an Oracle database for the OpenPages database.

Before you begin

Ensure that the following conditions are met:

- The Oracle database instance for the OpenPages repository is created.
- Ensure that the Oracle database password for the system user account is not expired.
- If the OpenPages and workflow database user accounts exist, ensure that the Oracle database password for each of these accounts is not expired.
- IBM Cognos Business Intelligence is installed and running.
- The Oracle client software is installed.
- WebSphere Application Server is installed.

  Restriction: At least one WebSphere Application Server profile is required on the OpenPages non-administrative server. If there is at least one profile on the non-administrative server, you are not required to create one. If there is no profile, you must create one. For more information about creating a profile by using the Profile Management Tool or the **manageprofiles** command line tool, see the WebSphere Application Server Information Center (http://pic.dhe.ibm.com/infocenter/wasinfo/v8r5/index.jsp)
- The OpenPages Administrative Console files are extracted to the target installation computer or to the source Windows-based computer.

Procedure

1. Log on to the source computer as a user with administrative privileges.
   - For Windows operating systems, you must run the IBM GRC Platform Administrative Console on the target Windows-based computer.
   - For Linux operating systems, you can run the IBM GRC Platform Administrative Console on the target Linux-based computer or on a Windows-based computer.
2. Go to the location where you extracted the installation files and run the `opadminconsole` file.
   - If you extracted the files to a Windows-based computer, go to the `path\opadminconsole-win32.win32.x86_64\opadminconsole` directory, right-click `opadminconsole.exe`, and click **Run as administrator**.
   - If you extracted files to a Linux-based computer, go to the `path/opadminconsole-linux.gtk.x86_64/opadminconsole` directory, and run the `opadminconsole` file.

3. If the license agreement is displayed, accept the terms and click **OK**.
4. On the **Select the Installation Option** page, under **OpenPages**, double-click the deployment option that represents your target installation environment.
5. On the **Properties** panel, enter the properties that are required to deploy OpenPages application servers and workflow server.

   Tip: A description and online help for each property is displayed in the **Help** view when you click the property. If the **Help** view is not visible, click **View** > **Help** or press F1. For information about using the Administrative Console, in the **Help** view, click **Contents**.
6. To connect from the Windows-based computer to the Linux-based computer, for the **Connection Information**, enter the host name and user account information.

   Restriction: Ensure that the WebSphere Application Server installation user account has read, write, and execute permissions for the IBM OpenPages GRC Platform installation files.

   Important: For simplicity, use the WebSphere Application Server user account to install and run the OpenPages application server installation.
7. For the **OpenPages Application Server Information** group of properties, choose whether you are installing the OpenPages administrative server or managed server, and then enter the property values.

   In a clustered environment, there is only one administrative server and all other application servers are managed servers.

   You must install the OpenPages administrative server before you install the managed servers.

   Restriction: Install OpenPages and Fujitsu Interstage BPM software into a directory that contains only ASCII characters in the path name.

   Important: The installation path must be the same on the administrative server and on all managed servers.
8. Select the appropriate option for **Do you want to load the OpenPages configuration data**.
   - Select **Yes** under most circumstances.
   - Select **No**, if you already loaded the configuration data.

     Example: In test environments where you have multiple installations of IBMOpenPages and you already loaded the configuration data.

     If you select **No**, and the default configuration is not already loaded, you must manually load the level-0 schema. Otherwise, you see garbled text when you are in the OpenPages application. For more information see, "Manually loading the configuration data after a new installation" on page 161.
9. For the **CommandCenter Report Information** group of properties, enter the settings for IBM Cognos Business Intelligence and choose Command Center installation settings.

   To check Cognos BI configuration settings, you can open IBM Cognos Configuration and review the **Environment** properties.
10. For the **WebSphere Application Server Information** group of properties, enter the settings.

Restriction: For Windows operating systems, if you installed WebSphere Application Server into a directory with spaces, you can enter the short file name convention.

For `C:\Program Files\IBM\WebSphere\AppServer`, enter `C:\PROGRA~1\IBM\WebSphere\AppServer`.

11. For the **Database Information** group of properties, select whether you installed the OpenPages database schema manually, and then enter the settings.
    - Select **Install now** to automatically install the OpenPages database schema when OpenPages GRC Platform is deployed to WebSphere Application Server.
    - Select **Already installed** if the schema is installed.

      The OpenPages database schema must exist before you deploy to WebSphere Application Server. You can manually create the schema before installation.

      Restriction: The database passwords for all users, including the **System User Name**, **Sys User Name**, **OpenPages JDBC User Name**, and **Workflow JDEBC User Name** cannot contain spaces or special characters. Otherwise, some OpenPages scripts, such as the `OPBackup` command might fail.
12. To verify the settings that you entered, click **Validate Properties**.

    If there are errors, change the settings that require attention.
13. To install OpenPages GRC Platform, click **Deploy**.

    Monitor the progress of the installation in the **Deployment Steps** or the **Log** view. A message is displayed to indicate whether the installation succeeded. If the installation fails, the Administrative Console rolls back the installation to the last successful checkpoint.

Results

If the installation completes with errors, examine the **Log** view in the user interface for errors. Errors are displayed in red text. You can also review the log files that are created during the installation by exporting them from the user interface or by reviewing them in the `path\opadminconsole\workspace\.metadata\.plugins\com.ibm.openpages.config.install.ui\sessions` directory.

For errors related to ObjectManager, review the `ObjectManager.log` file in the *OP_HOME*`/bin/logs` directory and the *<Host_Name>*`-OPNode1Server1-aurora.log` in the *OP_HOME*`/aurora/logs` directory. After you fix the errors, you can manually load the configuration data. For more information, see "Manually loading the configuration data after a new installation" on page 161.

What to do next

Some post-installation tasks are required, such as adding OpenPages application servers to the Cognos Application Firewall safe list. You must also install CommandCenter on the reporting server.

Granting control on SYSTOOLS schema objects to the DB2 database instance owner on the Windows operating system

After you install IBM OpenPages GRC Platform on Windows operating systems, 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 DB2 database instance owner.

Procedure

1. Log on to the OpenPages application server as the OpenPages installation user.

   The OpenPages installation user is the user account that runs the OpenPages Administrative Console.
2. Start the DB2 command line processor.

   On Windows operating systems, from the command prompt, type `db2cmd`, or from the **Start** menu, click **All Programs** > **DB2COPY1** > **Command Window - Administrator**.
3. Go to the `/OP_version_Configuration/Database/DB2/INSTALL_SCRIPTS` directory.
4. Run the `dba-grant.sql` script

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

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

Testing the connections to the database server and the OpenPages repository

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 if the listener is available. It does not test whether the databases behind the listener are working.

To test that the OpenPages repository 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 Database Control, the web-based interface that is used to administer an Oracle database, type the following command:

   `https://oracle_server_name:port/em`

   In a default installation, the port number is 1158.
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 acknowledgement 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 OpenPages repository 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`.

Chapter 9. OpenPages CommandCenter installations

The OpenPages CommandCenter component integrates the OpenPages application with IBM Cognos Business Intelligence. When you install the CommandCenter, the IBM OpenPages Reporting Framework Generator is installed.

You can generate reports that use the hierarchy of OpenPages compliance objects. You can also report on the metadata that is attached to those objects.

Prerequisite tasks for CommandCenter installations

Some prerequisite tasks are required before you install CommandCenter on the reporting server.

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.

Table 36. 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 IBM Cognos Business Intelligence `bin` directory.

3. Append the `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 repository, set the following environment variables.

Table 37. 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\`*`11.2.0`* If you installed the OpenPages application and IBM Cognos Business Intelligence on the same server, enter the location for the 32-bit Oracle Client. **Example:** ORACLE_HOME=`C:\app\product\`*`11.2.0`*`\client_32bit`

Table 37. Oracle environment variable settings on the reporting server on Windows operating systems (continued)

Environment variable	Setting
TNS_ADMIN	Specifies the location of the tnsnames.ora file The default location is the *Oracle_Home*\network\admin directory
NLS_LANG	Specifies the database character set configured during the database installation. By default, set it to AMERICAN_AMERICA.AL32UTF8 To display non-English characters for Japanese locales, set the NLS_LANG property: NLS_LANG=JAPANESE_JAPAN.JA16SJISTILDE

5. Append the ORACLE_HOME to the PATH environment variable.

   Example: Add %ORACLE_HOME%/bin to the PATH environment variable.

Setting Oracle database environment variables for the reporting server on AIX and Linux operating systems

If you use an Oracle database for the OpenPages repository, you must set some system environment variables on the reporting server.

Procedure

1. Log on to the reporting server as a non-root user with administrative privileges.
2. To determine the version of Java that is in the PATH variable, enter 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 38. 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). /opt/local/jdk1.6.0/bin
COGNOS_HOME	Specifies the installation location of IBM Cognos Business Intelligence. /opt/IBM/cognos/c10

4. Append the JAVA_HOME to the PATH variable.

   Example: PATH=$JAVA_HOME/bin:$PATH

5. If you use an Oracle database for the OpenPages repository, set the following environment variables.

Table 39. 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 /opt/oracle/openpages_data/repository/client112_ac_x64/software If you installed the OpenPages application and CommandCenter on the same server, enter the location to the 32-bit Oracle Client.
TNS_ADMIN	Specifies the location of the tnsnames.ora file The default location is the $Oracle_Home\network\admin directory
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 the ORACLE_HOME to the PATH variable.

   Example: PATH=$ORACLE_HOME/bin:$PATH
7. Refresh the profile.

Enabling the connection to a remote DB2 database from the CommandCenter computer

If the OpenPages database is on a DB2 server that is remote from the reporting server, you must catalog the node and the database.

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.

Tip: If the application server and database server on the same computer, you can ensure that the Cognos installation user has access to the OpenPages data source by cataloging the OpenPages repository node and database.

Before you begin

Ensure that DB2 client software is installed on the OpenPages reporting server.

Procedure

1. Log on to the reporting server with a valid DB2 user ID.
2. Start the DB2 command line processor.
   - On Windows operating systems, issue the **db2cmd** command from a command prompt.

- On Linux or UNIX operating systems, issue the **db2** command from a command prompt.

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:

   ```
   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
   ```

Creating the installation directory for CommandCenter on AIX and Linux operating systems

Create the installation directory for the CommandCenter installation and change the ownership of the directory to the installation user.

Procedure

1. Log on to the reporting server as a `root` user.
2. Open a shell.
3. If the CommandCenter installation directory does not exist, create it by typing the following command:

   Restriction: Install CommandCenter, into a directory that contains only ASCII characters in the path name.

   ```
   mkdir -p <CC_HOME>
   ```

4. To change ownership of the directory, type the following command:

   ```
   chown -R <user>:<group> <CC_HOME>
   ```

   Important: Different users install CommandCenter and Cognos. However, both users must belong to same primary group. Ensure that the installation directories and files have the correct permission. To ensure that the group members have WRITE permission to the files, change the directory and file permissions to 775.

Extracting the installation files for deploying CommandCenter

To improve performance, copy the installation kit files from the IBM OpenPages GRC Platform media pack to the local system. Then, use a compression utility to extract the OpenPagesAdministrative Console installation files.

Procedure

1. Log on to the OpenPages reporting server as a user with administrative privileges.
2. Extract the OpenPages Administrative Console installation files from the IBM OpenPages GRC Platform Installer *version* for WebSphere Application Server DVD or the IBM OpenPages GRC Platform Installer *version* for WebSphere Application Server Linux x86-64 Multilingual DVD.
   - If the source computer is on the Windows operating systems, go to the `\WIN64-OP_version\OpenPages\Win64\OP_version_Non_Embedded_WAS_Oracle_DB2_WIN64\OP_version_Admin_and_Config_Console` directory and extract the `opadminconsole-win32.win32.x86_64.zip` file.
   - If the source computer is on a Linux operating systems, go to the `Linux64/OP_version_Non_Embedded_LINUX64/OP_version_Admin_and_Config_Console` directory and extract the contents of the `opadminconsole-linux.gtk.x86_64.zip` file.

   Restriction: To avoid `File path too long` or other extraction errors, use a compression utility, such as 7-Zip. Otherwise, extract the files to the `root` directory or to the `c:\temp` or `/tmp` directory.
   The extraction might take a few moments to finish.
3. To open the OpenPages Administrative Console installation program, go to *path*`\opadminconsole` directory.
4. Run the `opadminconsole` file.
   - If the source computer is on a Windows operating system, right-click `opadminconsole.exe` and click **Run as Administrator**.
   - If the source computer is on a Linux operating system, double-click `opadminconsole`, or from the command line, type `./opadminconsole`.

Deploying CommandCenter on the reporting server

In the OpenPages GRC Platform Administrative Console, select one of the options to deploy CommandCenter.

Before you begin

For CommandCenter installations, ensure that the following conditions are met

- OpenPages application server is installed and running.
- IBM Cognos Business Intelligence is installed and the Cognos services are running.
- IBM Cognos Configuration is closed
- Database client software is installed.
- JAVA_HOME and the content store database environment variables are set.

Procedure

1. Log on to the reporting server as a user with administrative privileges.

- For local installations on the Windows or Linux operating systems, log on to the computer where IBM Cognos Business Intelligence is installed.
- For remote installations on the UNIX or Linux operating systems, log on to the computer where you extracted the installation files.

  Log on as a non-root user, such as the `opuser` user.

2. Go to the location where you extracted the installation files and run the `opadminconsole` file.
   - If you extracted the files on a Windows operating system, go to the `path\opadminconsole-win32.win32.x86_64\opadminconsole` directory, right-click `opadminconsole.exe`, and click **Run as administrator**.
   - If you extracted files on a Linux operating system, go to the `path/opadminconsole-linux.gtk.x86_64/opadminconsole` directory, and run the `opadminconsole` file.
3. If the license agreement is displayed, accept the terms and click **OK**.
4. From the **Select the Installation Option** page, click the deployment option that represents your target installation environment.
5. Specify the settings that will be applied when you install CommandCenter.

   Tip: A description and online help for each property is displayed in the **Help** view when you click the property. For information about using the OpenPages Administrative Console, in the **Help** view, click **Contents**
6. For target Linux or AIX operating systems, choose the **Connection Method**.

   Depending on the operating system of the target installation computer, you connect to the local or remote target computer
   - To install on an AIX operating system, choose **Remote (SSH)**.
   - To install on a Linux operating system, you can choose **Connect to Local Machine** or **Remote (SSH)**.
7. For the **CommandCenter Report Information** group of properties, enter the settings for IBM Cognos Business Intelligence and choose CommandCenter installation settings.

   To check Cognos BI configuration settings, you can open IBM Cognos Configuration and review the **Environment** properties.

   Restriction: Install CommandCenter into a directory that contains only ASCII characters in the path name.
8. In the **Database Information** group of properties, enter the installation location of the DB2 database instance for the Cognos content store in the **Database Home** property.

   To check the content store settings, you can open IBM Cognos Configuration and review the **Data Access** > **Content Manager** > **Content Store** properties.

   You can use the same Oracle database instance for the content store schema and the OpenPages schema.

   Restriction: You must use separate DB2 database instances for the content store database and the OpenPages database.
9. For the **OpenPages Application Server Information** group of properties, enter the configuration settings for the OpenPages administrative server
10. To verify the settings that you entered, click **Validate Properties**.

    If there are errors, change the settings that require attention.

Example: If you enter an incorrect UNC path for a property, you might see a `BasicConfigOperation` error during the validation phase. Correct the path, and validate the properties again.

11. To install CommandCenter, click **Deploy**.

    Monitor the progress of the installation in the **Deployment Steps** or the **Log** view. A message is displayed to indicate whether the installation succeeded. If the installation fails, the OpenPages Administrative Console rolls back the installation to the last successful checkpoint.

12. Close the OpenPages Administrative Console.

Results

If the installation completes with errors, examine the **Log** view in the user interface for errors. Errors are displayed in red text. You can also review the log files that are created during the installation by exporting them from the user interface or by reviewing them in the `path\opadminconsole\workspace\.metadata\.plugins\com.ibm.openpages.config.install.ui\sessions` directory.

What to do next

Some post-installation tasks are required, such as adding OpenPages application servers to the Cognos Application Firewall safe list.

CommandCenter post installation tasks

After you install CommandCenter, some post installation tasks are required. You must update 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 OpenPages 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.

Creating the reporting schema and framework

To see the default OpenPages reports, you must create a reporting schema and update the reporting framework.

Procedure

1. In a web browser, open the OpenPages application:

   `http://`*`openpages_server`*`:`*`port`*`/openpages`
2. Log on to the OpenPages 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.

What to do next

You must drop the reporting schema before you install the IBM OpenPages GRC Platform Modules.

CommandCenter portal security

After installation, you can restrict which user groups are allowed to modify reports. To grant CommandCenter administrative rights, create a group in the OpenPages application or use an existing group, such as `OPAdministrators`. This is optional.

OpenPages standard reports can be overwritten during an upgrade. If you want to modify these standard reports, copy them to your personal folders. From your folders, you can then change the reports and restrict access to them.

To restrict user access to administrative functions within the Cognos 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 Report Studio, or from modifying CommandCenter reports.

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

Creating an open session command block for the OpenPages 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. Beside 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#);end;</sql>
</sqlCommand>
</commands>
</commandBlock>
```

9. Click **OK** to save your changes.

Chapter 10. Post installation tasks

After installing the OpenPages GRC Platform, you can modify the installation environment to improve performance, enhance security, or change default settings. For example, you can tune the application servers or configure LDAP.

For information about SSL configuration, adding a member to a cluster, or changing ports, see the *IBM OpenPages GRC Platform Administrator's Guide*.

Configuring OpenPages to work on a single computer

For test and development environments, you can install IBM OpenPages GRC Platform, Oracle database, the 32-bit Oracle Client, and Cognos Business Intelligence on a single computer. However, some configuration is required.

About this task

You can install the IBMOpenPages GRC Platform on a single computer as for predeployment testing or proof of concept demonstrations. For single computer installations, ensure that the correct Oracle Client is used by each software component.

If you install OpenPages GRC Platform on a single server, you must install two versions of Oracle Client. Both the 32-bit and 64-bit versions are required. The OpenPages application requires the 64-bit Oracle Client and the Cognos Business Intelligence Software requires the 32-bit Oracle Client.

Procedure

1. Log on to the CommandCenter server as a user with administrative privileges.
2. Ensure that the ORACLE_HOME environment variable points to the 32-bit Oracle 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 *OP_Home*`\CommandCenter\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 client `bin` directory.
7. Save and close the file.
8. Restart the CommandCenter service.

Verification checklist

After installing the OpenPages application, verify that the installation is working as expected.

Use the following checklist to verify whether the installation is successful.

Table 40. Post-installation verification checklist

Task	Guidance
Review all installation logs for errors.	For log file locations and names, see "Log files" on page 157.
Verify that the database parameters are correct.	Review the database parameters, such as `Character set=AL32UTF8` and `NLS_LENGTH_SEMANTICS=CHAR`, to ensure that they are correct.
Verify that a backup copy of the system was made after installing.	If it does not exist, create a backup of your system by running the **OPBackup** command from *OP_HOME*`\aurora\bin` directory. Verify that a compressed file was created with the correct timestamp. The file is in the *OP_Home*`\openpages-backup-restore` directory. For information about on using the backup utility, see the *IBM OpenPages GRC Platform Administrator's Guide*.
Confirm that the reporting schema and framework generated successfully.	For more information, see "Creating the reporting schema and framework" on page 107.
Confirm that base reports are functioning as expected.	Log on to the OpenPages application and run the `All Documentation` CommandCenter report.
If single signon (SSO) is enabled, verify that user accounts can access the environment.	Log on to the OpenPages application with an SSO user account.
If you use TeamMate, confirm that the TeamMate loader-files are implemented and working.	Test the integration from the TeamMate client.
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 primary and secondary application servers.

Table 40. Post-installation verification checklist (continued)

Task	Guidance
For load-balanced environments, confirm that backup scheduling is working. Ensure that services on secondary servers are stopped before backing up the primary server. Ensure that services are started post 7001 (port) availability on the primary server.	On primary and secondary servers, verify backup scheduling and process times.
Test that you can access the IBM Cognos Business Intelligence 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 117.
After backup, confirm that object data is created.	Log on to the OpenPages application and create sample Entity, Process, and Risk objects. Delete these objects.

Related concepts:

"Log files" on page 157
Use the log files to help troubleshoot problems that occur during the installation.

Fix pack installations

IBM provides interim maintenance packages that contain updates to one or more components in your IBM product. If a fix pack is available when you are installing or upgrading, install it after you install the IBM OpenPages GRC Platform.

If a fix pack becomes available after you deploy OpenPages applications:

1. Stop all services.
2. Backup content and directory structures.
3. Install the fix pack in the same location as existing components.
4. Restart services

Fix packs are cumulative. When you install the latest fix pack, it includes updates from all the previous fix packs.

Fix packs are available for download from IBM Support (http://www.ibm.com/support/us/en).

Note: Fix packs are not stand-alone installations. You must install them on computers that have IBM OpenPages components installed. Install the fix packs that are appropriate for your product version.

Database server tuning

To improve performance, tune the Oracle database. You must change some of default values for Oracle server parameters. Other changes are suggested in environments where there are heavy user loads.

Tuning the performance of the database instance

To improve the performance of the Oracle database instance, disable the Oracle skip scan and set **cursor sharing** to force.

The Oracle skip scan feature splits a composite index logically into smaller subindexes. In skip scanning, the initial column of the composite index is not specified in the query. In other words, it is skipped. For larger databases where the data changes frequently, skip scanning can be less efficient than a range scan.

The **cursor sharing** feature specifies how SQL statements are parsed. Issuing many SQL statements that have literal values can result in many nearly identical statements in the cache. The large result set can slow performance and cause latch problems. Setting **cursor sharing** to force causes the SQL statements to be reused if the text is similar except for the literal value.

Procedure

1. Log on to a computer with SQL*Plus and access to the database server.

   Note: For AIX installations, use opuser user or another non-root user.
2. From the command-line, log on to SQL*Plus.

   ```
   sqlplus sys/sys_password@SID as sysdba
   ```
3. At the SQL prompt, type the following command:

   ```
   alter system set "_optimizer_skip_scan_enabled"=false scope=both;
   alter system set cursor_sharing = force scope=both;
   ```
4. Log out from SQL*Plus.

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 4 GB of RAM or more.

Table 41. Memory Tuning Guidelines

For this...	Allocate...
Operating system	1 - 4 GB of physical RAM
SGA Size	75% of remaining physical RAM to the **SGA_TARGET** parameter. Minimum allocation: 2048 MB (or 2 GB)
PGA Size	25% of remaining physical RAM to the PGA_AGGREGATE_TARGET parameter. Minimum allocation: 1024 MB (or 1 GB)

Example 1: Computer with 4 GB of RAM

If a computer has 4 GB of physical RAM:

- SGA (2 GB) and PGA (1 GB)
- 1 GB is available for the Windows OS

Example 2: Computer with 8 GB of RAM

If a computer has 8 GB of physical RAM and you want 2 GB available for the Windows OS, then 6 GB remains for allocation to Oracle. The remaining 6 GB can be allocated to a single database instance:

- SGA: 4608 MB (or 4.5 GB, which is 75% of 6 GB)
- PGA: 1536 MB (or 1.5 GB, which is 25% of 6 GB)

Example 3: 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 OpenPages Repository and CommandCenter Repository services on the same computer with 8 GB of RAM:

- 1 GB of RAM for the OS
- The remaining 7GB of RAM can be split between the OpenPages Repository and CommandCenter Repository as follows:
  - OpenPages Repository instance: 3 GB SGA + 1.5 GB PGA
  - CommandCenter Repository instance: 1.5 GB SGA + 1 GB PGA

Admin server tuning

You can tune your admin server settings to improve performance.

Configuring the database connection pool on AIX computers

The OpenPages and workflow servers each have a pool of JDBC connections that can be used by applications when connecting to the database. You must configure the number of available connections in the pool. Depending on your situation, use your previous settings or the number of named users as a guideline. These connections are returned to the connection pool when the application disconnects from the database.

Procedure

1. Open a web browser.
2. Enter the following URL to go to the IBM Integrated Solutions Console for the OpenPages server.

   `http://`*`OP_server_name`*`:`*`port`*`/ibm/console/`

   The *port* is assigned during installation. By default the port used is 9060.

   Note: Do not use `localhost` for the *OP_server_name*.
3. Expand **Resources** > **JDBC**.
4. Click **Data sources** from the list.
5. On the **Data Sources** page, click the data source.
6. On the data source page, under **Additional Properties**, click **Connection Pool Properties**.
7. On the **Connection Pools** page, enter a value for the **Maximum connections** and **Minimum connections**.

   The default value for **Maximum connections** is 75 and for **Minimum connections** is 1.

For an upgrade installations, enter the value set in your previous system

8. Click **Apply**.
9. To commit the changes to the master configuration, in the **Messages** box, click **Save** and then click **OK**.
10. Log out of the Integrated Solutions Console.
11. Navigate to Integrated Solutions Console for the workflow server

    `http://workflow_server_name:port/ibm/console/`

    The *port* is assigned during installation. By default the port used is 9061.

    Note: Do not use `localhost` for the *workflow_server_name*.
12. Repeat steps 3-10 to configure the database connection pool for the workflow server.

Enabling simultaneous access to OpenPages applications and Fujitsu Interstage BPM for a single user on AIX computers

By default, the IBM WebSphere Application Server does not allow a single user to log on to the OpenPages application and the Fujitsu Interstage BPM console concurrently. Some configuration is required to enable simultaneous access by the same user to both applications.

Procedure

For OpenPages applications:

1. Open a web browser.
2. Enter the following URL in the IBM Integrated Solutions Console for the OpenPages server.

   `http://OP_server_name:port/ibm/console/`

   The *port* is assigned during installation. By default the port used is 9060.

   Note: Do not use `localhost` for the *OP_server_name*.
3. Expand **Servers** > **Server Types**.
4. Click **WebSphere application servers** from the list.
5. On the **Application servers** page, for each OpenPages server listed:
   a. Click the application server you want to configure.
   b. On the *OpenPages-server-name* page, click the **Configuration** tab.
   c. Under **Container Settings**, expand **Web Container Settings** and then click **Web container**.
   d. On the **Web Container** page, click **Session management**.
   e. Under **Session tracking mechanism**, click **Enable cookies**.
   f. On the **Cookies** page, enter `opsosa` in the **Cookie name** field.
   g. Click **Apply**.
   h. To commit the changes to the master configuration, in the **Messages** box, click **Save**.
   i. Click **OK** to exit.

For Fujitsu Interstage BPM:

6. Open a web browser.
7. Type the following URL:

   `http://OP_server_name:port/ibm/console/`

8. Expand **Servers** > **Server Types**.
9. Click **WebSphere application servers** from the list.
10. On the **Application servers** page, for each OpenPages server listed:
    a. On the *OpenPages-server-name* page, click the **Configuration** tab.
    b. Under **Container Settings**, expand **Web Container Settings** and then click **Web container**.
    c. On the **Web Container** page, click **Session management**.
    d. Under **Session tracking mechanism**, click **Enable cookies**.
    e. On the **Cookies** page, enter `opibpm` in the **Cookie name** field.
    f. Click **Apply**.
    g. To commit the changes to the master configuration, in the **Messages** box, click **Save**.
    h. Click **OK** to exit.

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. From the Installer DVD or from your network share location, copy the `/OP_`*`version`*`_Configuration/Database/ORACLE/INSTALL_SCRIPTS` directory to the local system.
3. Run the `enable-session-sleep.sql` script.

   On a command line, use the following syntax:

   ```
   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, then in the **Performance** section, click **Settings**.

3. In the **Performance Options** dialog box, 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** 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** to close the three open dialog boxes.

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`

OpenPages application server tuning

You can tune application server settings to control how the application server provides services for running applications and their components. Each application server instance contains interrelated components that must be properly tuned to support the specific needs of your application.

Enabling LDAP

If you are installing OpenPages GRC Platform into an environment that uses LDAP environment, you must enable LDAP. The **Openpages** module in the LDAP configuration file, `aurora_auth.config`, determines whether LDAP is enabled. If you have a load-balanced system, disable LDAP on the primary and secondary servers.

Procedure

1. Log on to the OpenPages 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 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 modules to **Openpages**
   - If you are using a Microsoft Active Directory server, change the **OpenpagesAD** module name to **Openpages**.
   - If you are using a Sun One Directory Server, change the **OpenpagesIP** module name to **Openpages**.
9. Specify the correct values for the following properties in the appropriate module:

Table 42. Property settings and description

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

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**.

Procedure

1. Log on to the application server as a user with administrative privileges.
2. Stop all OpenPages 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

To view the application login page for your installation, type the OpenPages 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`

Chapter 11. Starting and stopping OpenPages servers

IBM OpenPages GRC Platform runs only if all of the services are started. All of the services for supporting software, such as the database server and Cognos Business Intelligence, must also be running.

Important: If you are running OpenPages GRC Platform in a load-balanced environment, you must start the admin server before you start any managed servers in the cluster.

Procedure

1. Log on to the OpenPages application server as user with administrative privileges.
2. Open a Command Prompt window, and go to the *OP_HOME*\bin directory.
3. Enter the following command to run a script that starts the OpenPages and workflow (Fujitsu Interstage BPM) services:

   ```
   StartAllServers.cmd
   ```
4. Enter the following command to run a script that stops the OpenPages and workflow (Fujitsu Interstage BPM) services:

   ```
   StopAllServers.cmd
   ```

Chapter 12. Configuring clustered environments

To accommodate increased user loads, scale horizontally or vertically by adding nodes to the OpenPages environment. When you scale, load balancing is required to distribute the incoming requests across the nodes.

A node consists of an instance of the OpenPages application server and a corresponding instance of the workflow server. Each node runs on a different port.

You can also scale the CommandCenter, the OpenPages reporting server, vertically or horizontally.

Scaling the reporting server vertically

Scaling vertically increases the number of processes that are available to handle requests. Depending on the load, scaling vertically might involve configuring additional dispatchers

Scaling the reporting server horizontally

Scaling horizontally requires that you install additional report servers. Configure the additional Cognos dispatchers to ensure that the incoming requests are distributed across the multiple servers.

Load balancing configurations

To create a clustered OpenPages environment, install and configure each OpenPages and CommandCenter instance as a stand-alone system. Then, configure each system for load balancing.

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

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

Configuring an OpenPages cluster to run as a Windows operating system service

You can configure an OpenPages and workflow cluster on WebSphere Application Server to run as services on the Windows operating system. When WebSphere Application Server clusters run as a service, the cluster automatically restarts after a failure. Also, cluster member processes remain active after you log out from your Microsoft Windows system account.

Procedure

1. On the OpenPages administrative server, log on as an administrator.
2. Click **Start** > **All Programs** > **Accessories**, and right-click **Command Prompt** > **Run as Administrator**.
3. From the command prompt, go to the *WAS_HOME*\bin directory, and run the following command:

```
wasservice -add OpenPagesDmgr -servername dmgr -profilePath
"<OP_HOME>\profiles\OpenPagesDmgr" -wasHome
"<WAS_HOME>" -logFile
"<OP_HOME>\profiles\OpenPagesDmgr\logs\dmgr\startServer.log"
-logRoot "<OP_HOME>\profiles\OpenPagesDmgr\logs\dmgr
```

4. Run the following command:

```
wasservice -add <HOST_NAME>-OPNode1 -servername nodeagent -profilePath
"<OP_HOME>\profiles\<HOST_NAME>-OPNode1"
-wasHome "<WAS_HOME>" -logFile
"<OP_HOME>\profiles\<HOST_NAME>-OPNode1\logs\nodeagent\startServer.log"
-logRoot "<OP_HOME>\profiles\<HOST_NAME>-OPNode1\logs\nodeagent
```

5. On each OpenPages application server, run the following command:

```
wasservice -add <HOST_NAME>-OPNode1Server<SERVER#> -servername
<HOST_NAME>-OPNode1Server<SERVER#> -profilePath
"<OP_HOME>\profiles\<HOST_NAME>-OPNode1" -wasHome
"<WAS_HOME>" -logFile "<OP_HOME>\profiles\<HOST_NAME>
-OPNode1\logs\<HOST_NAME>-OPNode1Server<SERVER#>\startServer.log"
-logRoot "<OP_HOME>\profiles\<HOST_NAME>-OPNode1\logs\<HOST_NAME>
-OPNode1Server<SERVER#>
```

6. Run the following command:

```
wasservice -add IBPMDmgr -servername dmgr -profilePath
"<WORKFLOW_HOME>\profiles\IBPMDmgr" -wasHome
"<WAS_HOME>" -logFile
"<WORKFLOW_HOME>\profiles\IBPMDmgr\logs\dmgr\startServer.log"
-logRoot "<WORKFLOW_HOME>\profiles\IBPMDmgr\logs\dmgr
```

7. Run the following command:

```
wasservice -add <HOST_NAME>-IBPMNode<SERVER#>
-servername nodeagent -profilePath
"<WORKFLOW_HOME>\profiles\<HOST_NAME>-IBPMNode<SERVER#>"
-wasHome "<WAS_HOME>" -logFile
"<WORKFLOW_HOME>\profiles\<HOST_NAME>
-IBPMNode<SERVER#>\logs\nodeagent\startServer.log" -logRoot
"<WORKFLOW_HOME>\profiles\<HOST_NAME>-IBPMNode<SERVER#>\logs\nodeagent"
```

8. Run the following command:

```
wasservice -add <HOST_NAME>-IBPMNode<SERVER#>Server -servername
<HOST_NAME>-IBPMNode<SERVER#>Server -profilePath
"<WORKFLOW_HOME>\profiles\<HOST_NAME>-IBPMNode<SERVER#>"
-wasHome "<WAS_HOME>" -logFile
"<WORKFLOW_HOME>\profiles\<HOST_NAME>
-IBPMNode<SERVER#>\logs\<HOST_NAME>-IBPMNode<SERVER#>Server\startServer.log"
-logRoot "<WORKFLOW_HOME>\profiles\<HOST_NAME>
-IBPMNode<SERVER#>\logs\<HOST_NAME>-IBPMNode<SERVER#>Server"
```

9. Repeat steps 7 and 8 on each workflow server.

Removing Windows operating system services for OpenPages and workflow servers

To remove OpenPages and workflow clusters that run as a service, use the command prompt window to run commands on each server.

Procedure

1. On the OpenPages administrative server, log on as an administrator.
2. Click **Start** > **All Programs** > **Accessories**, and right-click **Command Prompt** > **Run as Administrator**.
3. From the command prompt, go to the *WAS_HOME*\bin directory, and run the following command:

```
wasservice -remove OpenPagesDmgr
```

4. Run the following command:

```
wasservice -remove <HOST_NAME>-OPNode1
```

5. Run the following command for each OpenPages server:
   ```
   wasservice -remove <HOST_NAME>-OPNode1Server<SERVER#>
   ```
6. Run the following command:
   ```
   wasservice -remove IBPMDmgr
   ```
7. Run the following command:
   ```
   wasservice -remove <HOST_NAME>-IBPMNode<SERVER#>
   ```
8. Run the following command:
   ```
   wasservice -remove <HOST_NAME>-IBPMNode<SERVER#>Server
   ```
9. Repeat steps 6 and 7 on each workflow server.

Clustered OpenPages Configurations

Some configuration tasks are required for clustered OpenPages environments.

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 enter `https://server_name:1158/em`
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 OpenPages application instance, each corresponding Fujitsu Interstage BPM instance, and each corresponding CommandCenter instance.

   For a two-node OpenPages environment, use the following settings:

   OpenPages
   Configure 75 processes for each OpenPages instance.

   Workflow server
   Configure 35 processes for each associated workflow server.

   CommandCenter
   Configure 80 processes for each 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**.

Configuring OpenPages applications to use a domain account on Windows operating systems

In a clustered environment, the OpenPages application services access a file share. The account that starts the services must have permissions to the file share.

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 the shared drive.

The following OpenPages application services must have permissions to the file share:

- OpenPagesAdminServer
- OpenPagesServer#
- IBPMAdminServer
- InterstageBPMCS#

Procedure

1. Log on to each application server as a user with administrative privileges.
2. Open the **Services** control panel.
3. Stop the OpenPages services.
4. For each OpenPages application service, right-click the service name, and select **Properties** from the menu.
   a. In the **Properties** dialog box, click the **Log On** tab.
   b. Select **This account**.
   c. Type a domain, account name, and password for at least one user who has access to the shared drive.
   d. Click **OK** to continue.

Configuring file share permissions on AIX or Linux operating systems

For clustered OpenPages 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 storage directory on Windows operating systems

The OpenPages application installation includes a pointer to the OpenPages storage location. 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, you must change the pointer to a shared network storage location. You can use the `update-storage` script to change the storage directory to a shared directory on the same or another server.

If you specified a shared network storage location, this task is not required.

Before you begin

For installations that use an Oracle database, ensure that the SQL Plus utility is available on the managed application server.

Procedure

1. Log on to a managed application server as a user with administrative privileges and full access to the local server drives.
2. Open a Command Prompt window.
3. Copy the `OP_`*`version`*`_Configuration` directory from the Installer DVD or on your network share location to the local system.
4. Copy the `INSTALL_SCRIPTS` directory to the local system.
   - For Oracle databases, go to the `OP_`*`version`*`_Configuration\Database\ORACLE` directory.
   - For DB2 databases, go to the `OP_`*`version`*`_Configuration\Database\DB2` directory.
5. For Oracle databases, go to the `ORACLE\INSTALL SCRIPTS` directory and run the `update-storage` script:

   ```
   sqlplus /nolog @sql-wrapper.sql update-storage.sql log_file_name TNS_alias_name
    OpenPages_schema_owner_name OpenPages_schema_owner_password
    storage_type storage_server_name computer_name
    OpenPages_storage_platform sharename
   ```

   The following table lists the command-line parameters that must be passed to the SQL wrapper script.

Table 43. Update storage wrapper script parameters for Oracle database

Variable name	Description
log_file_name	The location of the log file that is created by the script. If a location is not specified, the log file is created in the current working directory. If a log with the same name exists in the same location, the log is overwritten by the script.
TNS_alias_name	The database connection identifier, such as TNS alias name.
OpenPages_schema_owner_name	The name of the OpenPages user, created during the OpenPages application installation. By default, `openpages`.
OpenPages_schema_owner_password	The password of the OpenPages user.
storage_type	Enter either `LFS` for local file system, or `UNC` for Universal Naming Convention or Uniform Naming Convention.
storage_server_name	The name of the server where the OpenPages storage is located.
computer_name	The name of the cluster administrator computer.

Table 43. Update storage wrapper script parameters for Oracle database (continued)

Variable name	Description
OpenPages_storage_platform	The operating system on the server where the OpenPages storage is located. Enter `Windows`.
sharename	The name of the shared OpenPages storage directory or the mount point. By default, `openpages-storage`

6. For the DB2 databases, go to the `DB2\INSTALL SCRIPTS` directory and type the following command in the DB2 command line processor (CLP)

```
clpplus -nw <op_db_user>
<op_db_password>@<database_host>:<database_port>/<database_name>
@sql-wrapper update-storage <log-file> <database_server_name>
<database_port> <database_name> <op_db_user> <op_db_password> <storage-type>
<storage-server-name> <host_name> <os_type> <path-or-UNC-name>
```

Example: In the following example, `openpages-storage` is the UNC share name of the storage location. The `openpages-storage` location is accessible to all members in the cluster as `\\testdbserver\openpages-storage`.

```
clpplus -nw openpages/password@testdbserver:50000/OPX
@sql-wrapper update-storage c:\temp\upd-storage-output.log
testdbserver 50000 OPX openpages password UNC testdbserver testdbserver
Windows openpages-storage
```

Table 44. Update storage wrapper script parameters for DB2 database

Variable name	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 computer that contains the OpenPages database.
database_port	Port number of the DB2 database instance that is installed on the database server. ForDB2, 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) **Important:** 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 computer.
os-type	The type of operating system: Use one of the following options: • `Windows` • `Unix`
path-or-UNC-name	The file path or UNC of the storage location.

Sharing a network OpenPages storage directory on AIX or Linux operating systems

The OpenPages application installation includes a pointer to the OpenPages storage location. 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, you must change the pointer to a shared network storage location. You can use the `update-storage` script to change the storage directory to a shared directory on the same or another server.

If you specified a shared network storage location, this task is not required.

Procedure

1. Mount the storage folder on the admin server to the non-admin server.
   a. Log on to the OpenPages managed 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 managed server.
   d. Save and close the `hosts` file.
   e. Create a file with the name `exports` in the `/etc` folder.

      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 folder.

      ```
      /opt/OpenPages/openpages-storage
      ```
   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 by using the following commands:

      ```
      stopsrc -g nfs
      startsrc -g nfs
      ```

      The NFS server processes requests from the NFS clients.
   i. Use following command to check that the `openpages-storage` folder is exported and ready for mounting:

      ```
      showmount -e
      ```

      Ensure that the `openpages-storage` folder is listed.
2. Mount the storage directory from the admin server on the managed server.
   a. Log on to the OpenPages managed server 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 managed server.
   e. Save and close the `hosts` file.
   f. Run the following command to mount the storage folder:

      ```
      mount nfsservername mountpoint
      ```

- *nfsservername* is the name of the OpenPages admin 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 managed server.

Example:

```
mount aix61-1-5.openpages.com:/usr/OpenPages/openpages-storage
/usr/OpenPages/openpages-storage
```

3. For Oracle databases, use the following command to change the storage directory that is used by the OpenPages application to a shared directory on the application server:

   ```
   sqlplus /nolog @sql-wrapper.sql update-storage.sql log_file_name TNS_alias_name
   OpenPages_schema_owner_name OpenPages_schema_owner_password
   storage_type storage_server_name computer_name
   OpenPages_storage_platform sharename
   ```

   The following table lists the command-line parameters that must be passed to the SQL wrapper script.

Table 45. Update storage wrapper script parameters for Oracle database

Variable name	Description
log_file_name	The location of the log file that is created by the script. If a location is not specified, the log file is created in the current working directory. If a log with the same name exists in the same location, the log is overwritten by the script.
TNS_alias_name	The database connection identifier, such as TNS alias name.
OpenPages_schema_owner_name	The name of the OpenPages user, created during the OpenPages application installation. By default, `openpages`.
OpenPages_schema_owner_password	The password of the OpenPages user.
storage_type	Enter either `LFS` for local file system, or `UNC` for Universal Naming Convention or Uniform Naming Convention.
storage_server_name	The name of the server where the OpenPages storage is located.
computer_name	The name of the cluster administrator computer.
OpenPages_storage_platform	The operating system on the server where the OpenPages storage is located. Enter `Unix`.
sharename	The name of the shared OpenPages storage directory or the mount point. The default mount point is `openpages-storage`

4. For DB2 databases, type the following command to change the storage directory that is used by the OpenPages application to a shared directory on the application server:

```
clpplus -nw <op_db_user>
<op_db_password>@<database_host>:<database_port>;/<database_name>
@sql-wrapper update-storage <log-file> <storage-type>
<storage-server-name> <host-name> <os-type> <path-or-UNC-name>
```

Example:

```
clpplus -nw openpages/apassword@testdbserver:50000/opx
@sql-wrapper update-storage /home/op/upd-storage-output.log
UNC aix11 aix11 Unix /usr/opdata/openpages-storage
```

Table 46. Update storage wrapper script parameters for DB2 database

Variable name	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 computer 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) **Important:** 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 computer.
os-type	The type of operating system: Use one of the following options: • `Windows` • `Unix`
path-or-UNC-name	The file path or UNC of the storage location.

Configuring IBM HTTP Server for load balancing

In a typical configuration that uses IBM HTTP Server for load balancing, 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.

Before you begin

If you are configuring the OpenPages environment for SSL, configure SSL before you configure the `plugin-cfg.xml` file. For more information, see the *IBM OpenPages GRC Platform 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 Installer DVD or on your network share location to the local system.
3. Create the web server instances for the OpenPages application and for the workflow server.
   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:9060/ibm/console`
   c. Click **Servers** > **Server Types** > **Web Servers**.
   d. On the **Web Servers** page, click **New**.
   e. On the **Select a node for the Web server** page, select the application server from the **Select node** list.
   f. Enter `opapp` in the **Server name** field.
   g. From the **Type** list, select **IBM HTTP Server** and click **Next**.
   h. On the **Confirm new Web server** page, review the settings and click **Finish**.
   i. In the messages box, click **Save** to commit the changes to the master configuration file.
   j. In a web browser, type `http://admin_server_name:9061/ibm/console`, and repeat step 3 to create a web server instance that uses `ibpmapp` for the server name.
4. To create the plug-in for the OpenPages server instance, open a web browser and type `http://admin_server_name:9060/ibm/console`.
   a. Click **Servers** > **Server Types** > **Web Servers**.
   b. Select the OpenPages server instance that you created and then 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.
   c. To create the plug-in for the workflow server, In a web browser, type `http://WAS_server_name:9061/ibm/console`
   d. Click **Servers** > **Server Types** > **Web Servers**.
   e. Select the workflow server instance that you created and click **Generate Plugin**.
   f. Copy both plug-in files to the load-balancing server.
5. On the load balancing server, create a text file for the merged file.
   a. Open the `plugin-cfg.xml` files for the OpenPages and workflow servers.
   b. Copy the **<Config>** root element from one of the `plugin-cfg.xml` file and paste into the new file.

      Note: Ensure that there is only one **<Config>** element in merged file.
   c. Copy the **<Log>** element from one of the two files, and if required, modify the name, and paste into the new file.
   d. Copy all the **<VirtualHostGroup>** elements from both files and paste into the new file.

      The **<VirtualHostGroup>** name must be unique. There must be only one **<VirtualHostGroup>**.
   e. Copy all **<ServerCluster>** elements from both the files and paste into the new file and ensure that the names are unique.

Ensure that the Server Name is unique across all clusters.

f. In the **<Transport>** element, ensure that the `keyring` and `stashfile` properties use the same location for all the application servers in the merged file.

g. Copy all the **<URIGroup>** elements from both files and paste into the new file, and ensure that the names are unique.

Ensure that the names are unique.

h. Copy all the **<Route>** elements from both files and paste into the new file.

i. Apply any changes that you made to the names of `VirtualHostGroup`, `ServerCluster` or `URIGroup`.

j. Save the new file.

6. Open the `httpd.conf` file and add or modify the following line to point to the new merged plug-in file.

```
WebSpherePluginConfig
/usr/IBM/HTTPServer/Plugins/config/OP/merged_file.xml
```

7. Ensure that the **IgnoreAffinityRequests** setting in the <ServerCluster> section is set to `false`:

8. Save and close the file.

Configuring property files for load balancing on AIX 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 merged 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 OpenPages application to respond to request from a client.

c. For users to access the IBPM console and OpenPages simultaneously, in each of the following **Uri** groups, change the cookie name.

For OpenPages change the cookie name to `opsosa`. For IBPM, change the name to `opibpm`.

```
<UriGroup Name="default_host_OpenPagesCluster_URIs">
<Uri AffinityCookie="opsosa" AffinityURLIdentifier="opsosa" Name="/opws/*"/>

<UriGroup Name="default_host_IBPMCluster_URIs">
<Uri AffinityCookie="opibpm" AffinityURLIdentifier="opibpm"
    Name="/ibpmconsole/PortletWrapper/*"/>
```

d. 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/mod_proxy_ajp.so
LoadModule proxy_balancer_module modules/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.

Configuring property files for each OpenPages instance

You must edit the server properties file on each OpenPages cluster member to point to the load balancer.

Procedure

1. Log on to the OpenPages cluster member 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 *server_name*`-OpenPagesServer#-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.workflow.admin=http\://op-load-balancer.domain.com\:
    port/ibpmconsole
url.path.openpages=http\://op-load-balancer.domain.com\:port/openpages
```

b. Save and close each `server.properties` file.

5. Open each *server_name*`-OpenPagesServer#-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 `server.properties` file.
6. Open each *server_name*`-InterstageBPMCS#-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.workflow.admin=http\://op-load-balancer.domain.com\:
           port/ibpmconsole
      url.path.openpages=http\://op-load-balancer.domain.com\:port/openpages
      ```

   b. Save and close each `server.properties` file.
7. Restart the web server.

Customizing the load balancer for large data sets

For databases with a large data set, some OpenPages reports might timeout 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 reporting server

CommandCenter uses IBM Cognos Business Intelligence, which can scale horizontally. To scale CommandCenter vertically within the same environment, increase the number of processes that are available to handle request. Depending on the load, you can configure additional dispatchers.

To scale CommandCenter horizontally, install additional environments and register the 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 library .

Adding OpenPages servers to Cognos Application Firewall safe list

By default, Cognos Application Firewall (CAF) is enabled. IBM Cognos Application Firewall validates domain and host names to protect URLs that are created. IBM Cognos Application Firewall considers domain names derived from the environment configuration properties as safe domain names. Use the IBM Cognos Configuration to add OpenPages 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** dialog box, 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 **CommandCenter**.

Communication Between CommandCenter Servers

If you install CommandCenter on more than one computer, you must configure the distributed installations to communicate with each other

Configure the following communication paths:

- Configure the primary CommandCenter server as the default active server.
- All CommandCenter servers must know the location of the content store database.
- All CommandCenter servers must know the location of the other CommandCenter servers.
- All CommandCenter servers must use the same cryptographic settings.

- All CommandCenter servers must have their system clock synchronized.

Configuring the primary CommandCenter server

In a clustered environment, one CommandCenter server acts as the primary server, or default active server, and one or more CommandCenter servers act as secondary servers.

Procedure

1. Ensure that CommandCenter is not running on any server.
2. On the reporting server that is designated as the primary server, start IBM Cognos Configuration that you want to designate as the primary CommandCenter server.

   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.
5. For the **Dispatcher URI for Gateway**, click **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 CommandCenter computer.
   a. For each additional CommandCenter computer, click **Add**.
   b. Change the `localhost` portion of the URL to the name of each additional CommandCenter 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 CommandCenter computer.
   b. For each additional CommandCenter computer, click **Add**.
   c. Change the `localhost` portion of the URL to the name of each additional CommandCenter 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 keystore must be created on the default active CommandCenter computer
10. Click **File** > **Save**.
11. Click **Actions** > **Start**.

    When the services start, this computer becomes the default active CommandCenter computer.

Configuring secondary CommandCenter servers

In a clustered environment, configure one or more CommandCenter servers to act as secondary servers.

Procedure

1. Ensure that CommandCenter is running on the primary CommandCenter server.

2. On the reporting server that is designated as secondary server, start IBM Cognos Configuration CommandCenter server.
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 CommandCenter 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 CommandCenter computer.
   c. For each additional CommandCenter computer, click **Add**.
   d. Change the `localhost` portion of the URL to the name of each additional CommandCenter 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 CommandCenter computer.
   c. For each additional CommandCenter computer, click **Add**.
   d. Change the `localhost` portion of the URL to the name of each additional CommandCenter 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 keystore is created on the primary CommandCenter computer. There can be only one keystore in a load balanced CommandCenter 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 CommandCenter server.
    a. Ensure that all other cryptographic settings match the settings that you configured on the primary CommandCenter 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 CommandCenter 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.

Changing the CommandCenter host settings

You must update configuration files to use the CommandCenter server name and port settings.

Procedure

1. Log on to the OpenPages application server as a user with administrative privileges.
2. Open a browser window and go to the OpenPages application by typing the following URL:

   ```
   http://OP_server_name:port/openpages
   ```
3. Log on to the OpenPages application as a user with administrative privileges.
4. Under **Administration**, select **Settings**.
   a. Expand the **OpenPages** > **Platform** > **Reporting Schema** > **Object URL Generator**.
   b. Click **Host**.
   c. In the **Value** field, update the setting to point to the OpenPages server.

      Note: If you use the CommandCenter in a load-balanced environment, you must type the fully qualified domain name of the load balancing server. If required, change the port.
5. Stop OpenPages services.
6. On the application server, go to the *OP_Home*\aurora\conf directory.
7. In the cognos.framework.refresh.servlet=http\://localhost\:8080/crf-refresher property, replace localhost\:8080 with the reporting server name and port.

   ```
   cognos.framework.refresh.servlet=http\://ccserver\:8080/crf-refresher
   ```
8. In the cognos.server=http\://localhost:80/cognos8/cgi-bin/cognos.cgi property, replace localhost:80 with the reporting server name and port number.

   ```
   cognos.server=http\://ccserver:80/cognos8/cgi-bin/cognos.cgi
   ```
9. Add the following value to the logout.url.cognos= property:

   ```
   http\://CommandCenter_server_name\CommandCenter_port\/cognos/cgi-bincognos.cgi?
      b_action\=xts.run&m\=portal/logoff.xts&h_CAM_action\=logoff
   ```

   Example:

   ```
   logout.url.cognos=http\://ccserver\:8080/cognos/cgi-bincognos.cgi?
       b_action\=xts.run&m\=portal/logoff.xts&h_CAM_action\=logoff
   ```

10. Save your changes and exit the editor.

Chapter 13. Single signon integration for OpenPages application server and the reporting server

IBM OpenPages GRC Platform can integrate into a number of single sign-on solutions, such as CA SiteMinder. You can also configure the reporting server for single signon.

Configuring OpenPages applications for single signon

Integrate single signon for IBM OpenPages GRC Platform applications by configuring the settings in the OpenPages application interface.

Procedure

1. Start the OpenPages services.
2. Log on to the OpenPages application interface as a user with administrative privileges.
3. Under **Administration**, select **Settings**.
4. Set the value of the **Show Hidden Settings** setting to `true`
   a. Expand the **OpenPages** > **Applications** > **Common** > **Configuration**.
   b. Click **Show Hidden Settings** to open its detail page.
   c. In the **Value** field on the setting detail page, change the value to `true`
   d. Click **Save**.
5. Set the value of the **Session Attribute** and **Username Attribute** settings:
   a. Expand the **OpenPages** > **Platform** > **Security** > **Single Sign On** > **Implementations** > **Header-based**.
   b. Click **Class Name** to open its detail page.
   c. In the **Value** field, enter `com.openpages.singlesignon.HTTPHeaderBasedModule`.
   d. Click **Session Attribute** to open the detail page.
   e. In the **Value** field, modify the value to match the session attribute for your single signon 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`

   f. Click **Save**.
   g. Click **Username Attribute** to open its detail page.
   h. In the **Value** field on the setting detail page, modify the value 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`

   i. Click **Save**.
6. Enable single sign-on:

a. **OpenPages** > **Platform** > **Security** > **Single Sign On** > **Implementations** > **Header-based**
b. Click **OP** to open its detail page.
c. In the **Value** field on the setting detail page, set the value to `true`.
d. Click **Save**.
e. Click **SOX** to open its detail page.
f. In the **Value** field on the setting detail page, set the value to `true`.
g. Click **Save**.

7. Reset the value in the **Show Hidden Settings** setting to `false`.

Configuring the single signon logout destination

To securely log out from an OpenPages application session where single signon is enabled, configure the system to redirect the user.

Logging out of the OpenPages application does not automatically log the user out of a single signon 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. Under **Administration**, select **Settings**.
3. Expand the **OpenPages** > **Platform** > **Security**.
4. Click **Logout URL** to open its detail page.
5. In the **Value** box, type a fully qualified URL.
6. Click **Save**.

Disabling OpenPages single signon

You must disable single signon registry settings before you upgrade OpenPages GRC Platform. After the upgrade, you can re-enable the settings.

Procedure

1. Start the OpenPages services.
2. Open a web browser and go to the current OpenPages application.
3. Log on as a user with administrative permissions.
4. From the **Administration** menu, select **Settings**.
5. In all versions, disable single sign-on as follows:
   a. Expand the **OpenPages** > **Platform** > **Security** > **Single Sign On**.
   b. Click **OP** to open its detail page.
   c. In the **Value** field on the setting detail page, set the value to `false`.
   d. Click **Save**.
   e. Click **SOX** to open its detail page.
   f. In the **Value** field on the setting detail page, set the value to **false**.
   g. Click **Save**.

Configuring single signon for a reporting server

If you are using a single sign-on system such as CA SiteMinder with the OpenPages application, you must load an updated redirect JavaServer Pages (JSP).

Load the JavaServer Pages through the ObjectManager tool by using the `CommandCenter-integration-op-config.xml` file. The file is located on the OpenPages installation DVD.

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. From the Installer DVD or on your network share location, copy the `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 14. IBM OpenPages GRC Platform uninstallations

Use the uninstallation program and available scripts to remove the IBM OpenPages GRC Platform software.

Uninstalling OpenPages GRC Platform on Windows computers

To uninstall IBM OpenPages GRC Platform on Windows computers, stop the services, remove the application from the WebSphere Application Server, and then delete the profile.

To uninstall the workflow server, use the uninstallation program for Fujitsu Interstage BPM. To remove databases, use the DROP command.

Uninstalling might not remove all installation files and the installation location remains on your computer. You retain these files until you delete them.

Procedure

1. Log on to the OpenPages application server as user with administrative privileges.
2. Open a Command Prompt window, and go to the *OP_HOME*\bin directory.
3. To run a script that stops the OpenPages and workflow (Fujitsu Interstage BPM) services, type the following command:

   ```
   StopAllServers.cmd
   ```
4. Uninstall CommandCenter.
   a. Log on to the reporting server as a user with administrative privileges.
   b. Stop the Cognos service.

      Use the IBM Cognos Configuration interface to stop the service, or run the following command:

      ```
      Cognos_HOME\bin64\cogconfigw.exe -stop -utf8 -log
      ```
   c. To remove the Tomcat service, go the *CC_HOME*\apache-tomcat\bin directory and run the following command:

      ```
      net stop Tomcat6
      ```

      Note: You can also use the **Services** in the administrative tools (Microsoft Management Console) to stop the OpenPages Framework Generator service.
   d. Restore the original Cognos files
      - Copy cogstartup.xml file from *CC_HOME*\crn_backup to *COGNOS_HOME*\configuration directory.
      - Copy fm.ini file from *CC_HOME*\crn_backup to *COGNOS_HOME*\configuration directory.
      - Copy system.xml file from *CC_HOME*\crn_backup to *COGNOS_HOME*\templates\ps\portal directory.
   e. Delete the *COGNOS_HOME*\configuration\OpenPagesSecurityProvider_OpenPagesSecurityRealm.properties file.
   f. Delete the following files from *COGNOS_HOME*\webapps\p2pd\WEB-INF\lib directory:
      - aurora-tools.jar

- op-cc-backup-security.jar
- OpenPagesSecurityProvider.jar
- opwebservices_client.jar

5. Remove the WebSphere Application Server profile for the OpenPages and workflow applications:
   a. To list all the profiles on the server, go the WAS_HOME\bin directory and type the following command:

      ```
      manageprofiles.bat –listProfiles
      ```

      A list of the profiles is displayed. For example, on an admin server where you deployed two servers, the following message is displayed:

      ```
      [OpenPagesDmgr, op-OPNode1, IBPMDmgr, op-IBPMNode1, op-IBPMNode2]
      ```

   b. Run the one of the following commands to delete the profile.
      - If other profiles exist that you do not want to delete, remove each profile individually by running the following command:

        ```
        manageprofiles.bat –delete –profileName profile
        ```

      - If only OpenPages and workflow profiles exist, remove all profiles by running the following command:

        ```
        manageprofiles.bat –deleteAll
        ```

6. To remove the workflow server, run the uninstallation program for the Fujitsu Interstage Business Process Manager.

   Click **Start** > **All Programs** > **Interstage Business Process Manager** > **Uninstall**, right-click **Uninstall**, and click **Run as Administrator**.
7. Remove the OpenPages GRC Platform, CommandCenter, and Fujitsu installation directories.
8. Restart the computer.

Related tasks:

"Uninstalling OpenPages with an Oracle database before you reinstall" on page 165

In test or development environments, you might be required to uninstall OpenPages GRC Platform or remove the OpenPages database in Oracle database server before you reinstall. You must completely uninstall before you reinstall.

Uninstalling OpenPages GRC Platform on Linux or AIX computers

To uninstall IBM OpenPages GRC Platform on Linux or AIX computers, stop the services, remove the application from the WebSphere Application Server, and then delete the profile.

To uninstall the workflow server, use the uninstallation program for Fujitsu Interstage BPM.

Uninstalling might not remove all installation files and the installation location remains on your computer. You retain these files until you delete them.

Procedure

1. Log on to the OpenPages application server as user with administrative privileges.
2. Go to the *OP_HOME*/bin directory.
3. Type the following command to run the script that stops the OpenPages and workflow (Fujitsu Interstage BPM) services:

./stopAllServers.sh

4. Uninstall CommandCenter.
   a. Log on to the reporting server as a user with administrative privileges.
   b. Stop the Cognos service.

      Use the IBM Cognos Configuration interface to stop the service, or run the following command:

      Cognos_HOME/bin64/cogconfig.sh -stop -utf8 -log
   c. To stop the OpenPages Framework Generator, type the following command:

      CC_HOME/apache-tomcat/bin/catalina.sh stop
   d. Restore the original Cognos files
      - Copy cogstartup.xml file from *CC_HOME*/crn_backup to *COGNOS_HOME*/configuration directory.
      - Copy fm.ini file from *CC_HOME*/crn_backup to *COGNOS_HOME*/configuration directory.
      - Copy system.xml file from *CC_HOME*/crn_backup to *COGNOS_HOME*/templates/ps/portal directory.
   e. Delete the *COGNOS_HOME*/configuration/OpenPagesSecurityProvider_OpenPagesSecurityRealm.properties file.
   f. Delete the following files from *COGNOS_HOME*/webapps/p2pd/WEB-INF/lib directory:
      - aurora-tools.jar
      - op-cc-backup-security.jar
      - OpenPagesSecurityProvider.jar
      - opwebservices_client.jar
5. Remove the WebSphere Application Server profile for the OpenPages and workflow applications:
   a. To list all the profiles on the server, go the WAS_HOME/bin directory and type the following command:

      ./manageprofiles.sh –listProfiles

      A list of the profiles is displayed. For example, on an admin server where you deployed two servers, the following message is displayed:

      [OpenPagesDmgr, op-OPNode1, IBPMDmgr, op-IBPMNode1, op-IBPMNode2]
   b. Run one of the following commands to delete the profile.
      - If other profiles exist that you do not want to delete, remove each profile individually by running the following command:

        ./manageprofiles.sh –delete –profileName *profile*
      - If only OpenPages and workflow profiles exist, remove all profiles by running the following command:

        ./manageprofiles.sh –deleteAll
6. To remove the workflow server, go *Workflow_Home*/_uninst/ directory and type ./uninstall.sh
7. Restart the computer.
8. Remove the OpenPages GRC Platform, CommandCenter, and Fujitsu installation directories.

Related tasks:

"Uninstalling OpenPages with an Oracle database before you reinstall" on page 165

In test or development environments, you might be required to uninstall OpenPages GRC Platform or remove the OpenPages database in Oracle database server before you reinstall. You must completely uninstall before you reinstall.

Appendix A. Silent installations

Silent mode installations are useful when you install identical configurations across several computers or when you install the same configuration frequently.

Use the property settings from another installation as input to run the silent installation. Installation actions and results are recorded in a log files.

To silently install components

1. Create the response file to specify the installation settings.

   To minimize errors, use the IBM OpenPages GRC Platform Administrative Console interface to specify the installation properties.

   Before you export the properties, validate them in the user interface.

   Tip: Help for the properties in the response file is available in the OpenPages Administrative Console interface. For each property setting, the corresponding property ID is listed.
2. Run the corresponding silent mode command script by using the response file as input.
3. Check the logs directory to ensure that the installation is successful.

Related concepts:

"Log files" on page 157
Use the log files to help troubleshoot problems that occur during the installation.

Editing properties files to use as response files for silent installations

Use the IBM OpenPages GRC Platform Administrative Console interface to set or change the properties for your selected deployment option.

Export or copy the properties to a properties file. The silent installation command script uses the information in the properties file to deploy similar configuration settings to another computer.

Before you begin

Ensure that the prerequisite software is installed and running.

To deploy OpenPages GRC Platform to WebSphere Application Server, ensure that the prerequisite software is available:

- The OpenPages repository is created.
- IBM Cognos Business Intelligence is installed and running.
- The database client software is installed.
- WebSphere Application Server is installed.

For CommandCenter installations, ensure that the following conditions are met

- OpenPages application server is installed and running.
- IBM Cognos Business Intelligence is installed and the Cognos services are running.
- IBM Cognos Configuration is closed

- Database client software is installed.
- JAVA_HOME and the content store database environment variables are set.

Procedure

1. Log on as a user with administrator privileges.
2. Go to the directory where you extracted the IBM OpenPages GRC Platform Administrative Console files, and run the `opadminconsole` file.
   - On Windows computers, right-click `opadminconsole.exe` and click **Run as administrator**.
   - On Linux computers, type `./opadminconsole`.

   Note: You cannot run the OpenPages Administrative Console on AIX computers. To install on an AIX computer, you must run the OpenPages Administrative Console on a remote.
3. On the **Properties** panel, select the deployment option and modify the property values to suit your environment.
4. Optional: If you plan to run the silent installation on the current computer, you can verify the settings that you entered by clicking **Validate Properties**.

   If there are errors, change the settings that require attention before proceeding.
5. After you validate the settings, click **File** > **Export Properties File**.

   Alternatively, you can click **Copy Properties** to save the settings to the clipboard. Then, you can paste the properties into the default response file in the *path*`\opadminconsole\silent_install` directory.

   The following table lists the response files for each OpenPages component by operating system and database.

Table 47. Response file names for silent installations

Response file	OpenPages component	Target operating system	Database
`was_win_ora_deploy_server.xml`	OpenPages application server	Windows	Oracle
`win_ora_command_center_deploy.xml`	CommandCenter	Windows	Oracle
`was_win_db2_deploy_server.xml`	OpenPages application server	Windows	DB2
`win_db2_command_center_deploy.xml`	CommandCenter	Windows	DB2
`was_linux_ora_deploy_server.xml`	OpenPages application server	Linux	Oracle
`linux_ora_command_center_deploy.xml`	CommandCenter	Linux	Oracle
`was_linux_db2_deploy_server.xml`	OpenPages application server	Linux	DB2
`linux_db2_command_center_deploy.xml`	CommandCenter	Linux	DB2
`was_aix_db2_deploy_server.xml`	OpenPages application server	AIX	DB2
`aix_db2_command_center_deploy.xml`	CommandCenter	AIX	DB2

6. In the **Export Install Properties** dialog box, save the file.
7. Open the file that you exported in an editor and change settings, such as host names.

Ensure that the response file contains properties that are suitable for a similar deployment on a different computer.

8. On the target computer where you plan to install, go to the *path*\opadminconsole\silent_install directory and back up the default response files.
9. Save the new response file to the *path*\opadminconsole\silent_install on the target computer.

Results

The response file for your selected deployment option is ready for your silent mode installation.

Related tasks:

"Reusing property settings for similar deployments" on page 158
Use a saved or exported property file as a template for similar installations. You can import the saved property file to the current installation, or use the exported file as response file for a silent installation.

Running the OpenPages Administrative Console in silent mode

The silent mode installation command uses a response file to set properties and generate log files that record installation steps and results.

Before you begin

Ensure that the following tasks are completed:

- The database instance for the OpenPages repository is created.
- IBM Cognos Business Intelligence is installed and running.
- The database client software is installed.
- WebSphere Application Server is installed.
- The deployment response file is updated to suit your environment.

About this task

Run the OpenPages Administrative Console in silent mode when you do not want to specify configuration information about your environment interactively. The deployment response file contains all environment-specific information that is required to complete the installation in silent mode. Use the command-line prompt to run the installation script and use the response file for input.

Procedure

1. On the computer where you plan to install silently, log on as a user with administrative privileges.
2. Go to the *path*\opadminconsole\silent_install directory.
3. Ensure that the response file that you want to use for the silent installation contains the settings that you need for the new installation.
4. Run the silent installation script (`.cmd` or `.sh`) file.

   The following table lists the command script files for each OpenPages component by operating system and database.

Table 48. Script file names for silent installations

Script file	OpenPages component	Target operating system	Database
`was_win_ora_deploy_server.cmd`	OpenPages application server	Windows	Oracle
`win_ora_command_center_deploy.cmd`	CommandCenter	Windows	Oracle
`was_win_db2_deploy_server.cmd`	OpenPages application server	Windows	DB2
`win_db2_command_center_deploy.cmd`	CommandCenter	Windows	DB2
`was_linux_ora_deploy_server.sh`	OpenPages application server	Linux	Oracle
`linux_ora_command_center_deploy.sh`	CommandCenter	Linux	Oracle
`was_linux_db2_deploy_server.sh`	OpenPages application server	Linux	DB2
`linux_db2_command_center_deploy.sh`	CommandCenter	Linux	DB2
`was_aix_db2_deploy_server.xml`	OpenPages application server	AIX	DB2
`aix_db2_command_center_deploy.sh`	CommandCenter	AIX	DB2

Note: If you created your own batch file for silent installations, run it.

5. To determine whether the installation is successful, review the log files.

   By default, the log file can be found in the *path*`\opadminconsole\silent_install` directory.

   The log directory name corresponds to the script name. For example, if you run the `was_win_ora_deploy_server` script, the log directory is `was_win_ora_deploy_server_log`.

Creating customized scripts for silent installations

If you plan to run the same silent mode installation frequently or in many different environments, you can create script files.

The silent mode installation script uses a response file that contains information about your environment. Create a response file before you create a silent mode installation batch file. To minimize errors, use the OpenPages Administrative Console interface to specify and validate the installation properties, and then export the properties to the response file.

About this task

The silent mode installation script requires three parameter values:

- The **`SI_ACTION`** parameter is the deployment type, including the installation component, target operating system, and database type.
- The **`SI_INPUT`** parameter is the response file name.
- The **`SI_OUTPUT`** parameter is the directory path of the generated log directory.

Procedure

1. Log on to the target computer where you extracted the OpenPages Administrative Console installation files.

2. Go to the *path*\opadminconsole\silent_install directory.
3. Edit the script file that corresponds to the silent installation.

   The following table lists the command script files for each OpenPages component by operating system and database.

Table 49. Script file names for silent installations

Script file	OpenPages component	Target operating system	Database
was_win_ora_deploy_server.cmd	OpenPages application server	Windows	Oracle
win_ora_command_center_deploy.cmd	CommandCenter	Windows	Oracle
was_win_db2_deploy_server.cmd	OpenPages application server	Windows	DB2
win_db2_command_center_deploy.cmd	CommandCenter	Windows	DB2
was_linux_ora_deploy_server.sh	OpenPages application server	Linux	Oracle
linux_ora_command_center_deploy.sh	CommandCenter	Linux	Oracle
was_linux_db2_deploy_server.sh	OpenPages application server	Linux	DB2
linux_db2_command_center_deploy.sh	CommandCenter	Linux	DB2
was_aix_db2_deploy_server.xml	OpenPages application server	AIX	DB2
aix_db2_command_center_deploy.sh	CommandCenter	AIX	DB2

4. Edit the **SI_INPUT** parameter to use the response file that you created.

   set SI_INPUT=*input_was_win_ora_server_deploy.xml*
5. Edit the **SI_OUTPUT** parameter to specify the log directory name.

   set SI_OUTPUT=*output_was_win_ora_server_deploy*
6. Review the contents of the script file.

```
set SI_ACTION=was_win_ora_deploy_server
set SI_INPUT=input_was_win_ora_server_deploy.xml
set SI_OUTPUT=output_was_win_ora_server_deploy
call silent_install.cmd %SI_ACTION% %SI_INPUT% %SI_OUTPUT%
```

7. Save the file.
8. Run the script.

Appendix B. 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 50. 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.
Look up error message codes by selecting the product from the IBM Support Portal (http://www.ibm.com/support/entry/portal) 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 Portal

The IBM Support Portal is a unified, centralized view of all technical support tools and information for all IBM systems, software, and services.

Use IBM Support Portal 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. Familiarize yourself with the IBM Support Portal by viewing the demo videos (https://www.ibm.com/blogs/SPNA/entry/the_ibm_support_portal_videos).

Find the OpenPages GRC Platform content that you need by selecting your products from the IBM Support Portal (http://www.ibm.com/support/entry/portal).

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 (http://www.ibm.com/software/support/exchangeinfo.html). Service requests can also be submitted directly by using the Service requests (PMRs) tool (http://www.ibm.com/support/entry/portal/Open_service_request) or one of the other supported methods that are detailed on the exchanging information page.

OpenPages Customer Center

The IBM OpenPages Customer Center provides specific information, updates, and troubleshooting resources for IBM OpenPages GRC Platform.

To view OpenPages troubleshooting information, access the OpenPages Customer Center (http://www.ibm.com/software/analytics/openpages/customercenter).

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 (http://www.ibm.com/support/fixcentral). You might also want to view Getting started with Fix Central (http://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 Portal

The portal provides tools and information for all IBM systems, software, and services. The IBM Support Portal 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 OpenPages GRC Platform content that you need by selecting your products from the IBM Support Portal (http://www.ibm.com/support/entry/portal).

From the IBM Support Portal, 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 top 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.

You can review the log files for the current session individually or you can collect them to review later.

Session directory

Logs that relate to the OpenPages application installation are created in the *path*\opadminconsole\workspace\.metadata\.plugins\com.ibm.openpages.config.install.ui\sessions directory.

The sessions directory might contain multiple log folders, each one starting with ssn followed by a series of numbers. The bigger the number, the more recent the session. You can use the modified date on the folder to identify the most recent log files.

Silent installations

For silent installations, the log file is in the *path*\opadminconsole\silent_install directory.

The log file name corresponds to the script name appended to _log. For example, if you run the was_win_ora_deploy_server.cmd script, the log file is named was_win_ora_deploy_server_log.

Log files exported from the user interface

If you encounter a problem that you cannot resolve immediately, you can click **Export** in the **Log** view to preserve the information. The current property settings,

the default settings, and a log file that contains deployment actions and results are exported to a compressed file. The compressed file contains information that is needed to troubleshoot installation issues.

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 IBM Cognos Business Intelligence can connect to the database server.

Use the following sequence to stop the servers:

1. Stop the services on the Cognos BI reporting server.
2. Stop the services on the OpenPages application server.
3. 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.
3. Start the services on the Cognos reporting server.

Reusing property settings for similar deployments

Use a saved or exported property file as a template for similar installations. You can import the saved property file to the current installation, or use the exported file as response file for a silent installation.

Procedure

1. Save the property settings from another, similar installation to a property file by using one of the following options:
   - Export the property file to the file system.
   - Copy the properties and then save them to a file.
2. Import the property settings in the saved file to the current installation deployment option, or use the saved file as input for a silent installation.

Related tasks:

"Editing properties files to use as response files for silent installations" on page 149
Use the IBM OpenPages GRC Platform Administrative Console interface to set or change the properties for your selected deployment option.

Manually creating the reporting tablespace and user for Oracle databases

After you create the Cognos content store, you can manually create the content store user and the content store tablespace.

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. From the IBM OpenPages GRC Platform Installer *version* for WebSphere Application Server or your network share location, 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 tablespace in the OpenPages database instance, enter the *oracle_tns_alias* of the OpenPages database. *oracle_tns_alias* is the database alias for the OpenPages database instance, as set during the Oracle database installation. 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 tablespace 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 51. Parameter descriptions for `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: `C:\ORACLE_BASE\oradata\SID` On AIX operating systems: `ORACLE_BASE/oradata/SID`
`tablespace_name`	Specifies the name of the exported tablespace.
`log_file`	Specifies the file name and location of the log file to create.

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.

SQL0569N Authorization ID "*user_name*" does not uniquely identify a user, a group or a role in the system error

The OpenPages Administrative Console might indicate the installation is successful. However, you might see a message similar to the following text in the `session.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 or workflow 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. After the installation is complete, you can export the log files from the **Log** view in the OpenPages Administrative Console interface. You can also view the log files related to the OpenPages application installations in the `path\opadminconsole\workspace\.metadata\.plugins\com.ibm.openpages.config.install.ui\sessions` directory.

OpenPages and software that is installed in a directory that contains spaces

If you installed software that OpenPages uses into a directory with spaces, you must use the Windows short file name convention for the home directory location.

For example, in the OpenPages Administrative Console, when you configure the home directory for the WebSphere Application Server **Home Directory**, instead of entering the `C:\Program Files\IBM\WebSphere\AppServer` directory, enter `C:\PROGRA~1\IBM\WebSphere\AppServer`.

Note: You cannot browse to an installation location that contains spaces.

Garbled characters are displayed on the OpenPages home page when you log in for the first time

You might see garbled characters on the OpenPages 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 161.

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 OpenPages GRC Platform automatically loads the OpenPages GRC Platform data and enables user access to the standard Cognos Business Intelligence reports. In limited situations, you can manually load the level-0 schema.

Before you begin

OpenPages GRC Platform must be installed.

The OpenPages and workflow (IBPM) services must be running.

About this task

When you install the OpenPages application, On the **Storage and Configuration Information** page, you are prompted to choose whether to load configuration data.

If you select **No**, and the default configuration is not already loaded, you must manually load the level-0 schema and the CommandCenter data.

Procedure

To manually load the level-0 schema, use the following steps:

1. Log on to the OpenPages admin server as a user with administrative privileges.
2. Go to the *OP_HOME*/addon_module/loaderdata directory.
3. Make a backup copy of the following script file:
   - For Windows installations, back up the schema_loader_properties.bat file.
   - For AIX or Linux installations, back up the schema_loader_properties.sh file.
4. Open the original schema_loader_properties file in a text editor.
5. In the following line, update the password for the OpenPages application Super Administrator.
   - For Windows installations:

     ```
     SET OPXUserName=Super_Administrator_user_name
     SET OPXUserPassword=********
     ```

   - For AIX or Linux installations:

     ```
     OPXUserName=Super_Administrator_user_name
     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 OpenPages GRC Platform configuration, run the following script:
   - For Windows installations, run the openpages-level0-loader-data.bat file.

     Tip: Redirect the output to a log file so that you can conveniently track the progress:

     ```
     openpages-level0-loader-data.bat > openpages-level0-loader-data.log
     ```

- For AIX or Linux installations, run the `openpages-level0-loader-data.sh` file.

  Tip: Redirect the output to a log file so that you can conveniently track the progress:

  ```
  ./openpages-level0-loader-data.sh > openpages-level0-loader-data.log
  ```

  The script takes awhile to finish loading the data. For example, the data might take two hours to load.

8. Restart the OpenPages services.

Dropping the DB2 database for the OpenPages repository

In development environments, if you encounter problems when you try to create the database objects for the OpenPages repository, you can run clean up scripts. Use the scripts to drop the database and uncatalog the node.

Note: In most situations, uncataloging the node is unnecessary.

Procedure

1. Log on to the OpenPages application server.
2. Go to the location where you extracted the installation files.
   - On Windows operating systems, go the following directory:

     `\WIN64-OP_version\OpenPages\Win64\OP_version_Non_Embedded_WAS_Oracle_DB2_WIN64\OP_version_Configuration\Database\DB2\INSTALL_SCRIPTS`
   - On AIX operating systems, go the following directory:

     `/AIX64-OP_version/OpenPages/AIX64/OP_version_Non_Embedded_DB2_AIX64/OP_version_Configuration/Database/DB2/INSTALL_SCRIPTS`
   - For Linux operating systems, go to the following directory:

     `\Linux64-OPversion/OpenPages/Linux64/OP_version_Non_Embedded_LINUX64/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.
   - On Windows operating systems, type the following command:

     ```
     drop-opx-db-clt.bat <database-name>
     <node-name> <instance.owner.username>
     <instance.owner.password>
     ```
   - In AIX or Linux operating systems, type the following command:

     ```
     drop-opx-db-clt.sh <database-name>
     <node-name> <instance.owner.username>
     <instance.owner.password>
     ```

Table 52. . Scripts to drop the database and to uncatalog the node.

Description	Script
Drop the database	`drop-opx-db-clt.(bat|sh) <database-name> <node-name> <instance.owner.username> <instance.owner.password>`
Uncatalog the node	`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

If you log on to the OpenPages home page, `http://`*server_name*`:7009/openpages`, and have not created the reporting schema, an error message is displayed.

The default OpenPages application port is 7009.

A message similar to 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.
```

To resolve the problem, disable **System Admin Mode**, and generate the reporting schema.

Procedure

1. In a web browser, open the OpenPages application:
   `http://openpages_server:port/openpages`
2. Log on to the OpenPages 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.

"File path too long" error or other errors when extracting installation files

When you extract compressed files from the installation media, you might see a `Error 0x80010135: File path too long` error.

The error is caused when you use Windows Explorer or WinZip to extract files and it encounters a file path that exceeds the maximum character limit.

To resolve this problem, use a decompression utility such as 7-Zip, that can handle long file paths. Otherwise, extract the files to the `root` directory or to the `c:/temp` directory.

Error updating password encryption module during the installation

If a password encryption module error is displayed in the IBM OpenPages GRC Platform Administrative Console after installation, update the password manually.

If the installation program encounters an encryption password algorithm error, the following message is displayed in the user interface:

```
Error updating password encryption algorithm.
Please update the password encryption algorithm manually
after the installation.
```

For more information about manually configuring the password encryption algorithm in the Update Password Encryption Algorithm (UPEA) tool, see the *IBM OpenPages GRC Platform Administrator's Guide*.

Uninstalling OpenPages with an Oracle database before you reinstall

In test or development environments, you might be required to uninstall OpenPages GRC Platform or remove the OpenPages database in Oracle database server before you reinstall. You must completely uninstall before you reinstall.

Procedure

1. Log on a computer that has SQL*Plus as a user, such as SYSTEM, who has database administration permissions.
2. Run the following SQL statements:

   ```
   drop user <workflow_user> CASCADE;
   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 tablespaces 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 IFLOWDB including contents and datafiles;
   drop tablespace IFLOWTEMPDB 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 IBM OpenPages GRC Platform.
   - For Windows operating systems, see "Uninstalling OpenPages GRC Platform on Windows computers" on page 145.
   - For Linux operating systems, see "Uninstalling OpenPages GRC Platform on Linux or AIX computers" on page 146
6. If required, remove environment variables that reference OpenPages GRC Platform, or Cognos BI, or both products.
7. Restart the servers.
8. Remove existing OpenPages application or Cognos BI installation directories.

   The following table lists examples of the installation directories for OpenPages and Cognos BI components

Table 53. Example directory locations for OpenPages and Cognos BI components

Installation directory	Location on Windows operating system	Location on Linux operating system
OpenPages (**OP_HOME**)	`C:\OpenPages`	`/opt/OpenPages`
Fujitsu Interstage BPM (**Workflow_HOME**)	`C:\Fujitsu\InterstageBPM`	`/opt/Fujitsu/InterstageBPM`

Table 53. Example directory locations for OpenPages and Cognos BI components (continued)

Installation directory	Location on Windows operating system	Location on Linux operating system
CommandCenter (**CC_HOME**)	`C:\OpenPages\CommandCenter`	`/opt/OpenPages/CommandCenter`
Cognos BI (**Cognos_HOME**)	`C:\IBM\cognos\c10_64`	`/opt/IBM/cognos/c10_64`

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`

   For Linux operating system, a common temporary file location is `/tmp`.

10. On Linux computers, remove any related remaining files and directories in the home directory of the user who installed or uninstalled OpenPages.

    Remove the `.com.zerog.registry.xml` file.

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