IBM Product Connectivity Scenarios information center
Version 1 Release 0

Connecting WebSphere Application Server to IBM MessageSight; getting started

IBM

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Chapter 1. Scenario: Connecting IBM MessageSight, WebSphere MQ, and WebSphere Application Server getting started

By connecting to IBM MessageSight, an existing solution involving WebSphere MQ and a Java EE application on WebSphere Application Server can be extended to process a high volume of messages. This scenario leads you through the key tasks required to connect an existing WebSphere MQ and WebSphere Application Server installation to IBM MessageSight and check it works with a sample application.

This scenario was developed using a sample WebSphere MQ installation, and uses sample applications to demonstrate the use of WebSphere Application Server connected to WebSphere MQ and MessageSight. If you want to try the scenario, you can set up a copy of the sample installation as described in the scenario. You can use the sample applications provided with the scenario to verify your progress through each stage.

Notes

This scenario applies to WebSphere® Application Server Version 8 with IBM® MessageSight version 1.0.1.
> This scenario was developed and tested with WebSphere Application Server Version 8 and IBM MessageSight version 1.0.1. If you use WebSphere Application Server Version 7, you will notice some differences like using the IBM Installation Manager instead of the installation wizard described in this scenario.

Optional information to help you learn while implementing the solution
> The scenario contains blocks of optional information marked by Why? or What else?. You do not need to read this information to complete the scenario, but might choose to learn more:

> **Why?** Describes *why* you are instructed to do something. For example:

> > ┌─ **Why am I doing this?** ─────────────────────────┐
> > You use the **Scope** property to set the level at which the activation specification is visible. The cell scope is the highest level, giving the activation specification the greatest visibility.
> > └──┘

> **What else?**
> > Describes *what else* you might do, or want to learn about, related to what you are reading in the main window. For example:

> > ┌─ **What else might I do or be interested in?** ─────┐
> > You can also create activation specifications at other levels. For example, if you have multiple servers you might create an activation specification for each server, using the server scope, so that you can specify different settings to be used for each server.
> > └──┘

Tip: Some "Why?" and "What else?" information provides links that would take you to information resources outside the scenario. To complete a scenario, you do not need to follow such links; they are provided only as optional aids for your learning.

Related information:

⇥ Scenarios and Patterns
This scenario in the Scenarios and Patterns information center

⇥ Product web page
IBM MessageSight product web page

⇥ Product web page
WebSphere Application Server product web page

⇥ Library page
WebSphere Application Server library page

⇥ Product web page
WebSphere MQ product web page

⇥ Library page
WebSphere MQ library page

What's new?

This scenario has been updated to add an electronic book (ebook) version of the scenario in EPUB format.

The EPUB file is linked in the "Related resource" list on the scenario welcome page.

You can read EPUB files with many eBook readers; for example, the iBooks app for Apple products, a variety of ebook reader apps for Android devices, and dedicated eBook reader devices like the Barnes & Noble Nook eReader range and the Sony Reader. You can also read ePub files in your web browser with EPUBReader add-on for Firefox and MagicScroll for Chrome. If you want to read an EPUB file on the Amazon Kindle, you can convert EPUB files to kindle format with a converter like Calibre.

Chapter 2. Planning the solution

You can connect IBM MessageSight to WebSphere MQ and WebSphere Application Server in a number of different ways. Review the topics in this section to understand what is covered in this scenario, the reasons why a business might want to follow the scenario, the user roles involved, and an overview of the solution proposed by the scenario.

Assumptions

This scenario makes several assumptions about your system, such as the version of the products that you are using.

This scenario assumes the following points:
- You are using the Windows operating system.
- This scenario was developed by using WebSphere Application Server V8.5. Instructions are provided for obtaining and installing fix packs for WebSphere Application Server.

  Note: This scenario applies to the use of WebSphere Application Server Version 8 with IBM MessageSight version 1.1.
- You do not consider full hardening of security for MessageSight. This scenario does not describe security configuration. However, if you do have security configured for MessageSight, you should still be able to complete the scenario.

What else might I do or be interested in?

IBM MessageSight is scalable to deliver large amounts of data to analytics engines and other types of big data application. The HA nature of IBM MessageSight is its ability to withstand software or hardware outages so that it is available as much of the time as possible. See IBM MessageSight Information Center for more information.

Business overview

A company has an existing messaging infrastructure using WebSphere Application Server and WebSphere MQ and now wants to add IBM MessageSight to deal with a large amount of data from outside of the existing system.

A company has an existing messaging infrastructure provided by WebSphere MQ for some existing applications. The company wants to extend this to include communication with devices over the internet using machine to machine (M2M) messaging. The sample in this scenario is a car manufacturer who wants to analyze data from a large number of cars in real time.

In general, the following must be taken into account:
- Volume and cost of data that is transmitted, especially in machine to machine (M2M) messaging with limited data plans
- Power consumption of battery-powered devices
- Responsiveness (near-real time delivery of information)

- Reliable delivery over fragile connections
- Security and privacy
- Scalability

Limited data plans and power consumption are not as important for the car manufacturer since the devices will be attached to specific cars, but might be important considerations for other similar scenarios. The MQ Telemetry Transport (MQTT) protocol is designed to meet these challenges.

Additionally, the company is concerned about the security of implementing this with their existing WebSphere MQ messaging infrastructure. IBM MessageSight is more suitable for this situation since it is not affected by Operating System vulnerabilities and is capable of handling a much higher load. This means the system is more secure and can handle the number of messages being sent by all of its cars.

User roles and interactions

Roles used throughout these scenarios, with interactions between roles for scenario tasks.

Although roles to develop the solution are listed, this scenario focuses on deploying a solution that connects IBM MessageSight to WebSphere MQ and WebSphere Application Server.

Develop the solution

Develop the software aspects of the solution.

Software Architect
> The Software Architect is responsible for dividing the required function between the components that make up a software solution. This person works with the specifications and standards used by existing IT systems, and determines where enhancements or new components must be written by the Developer.

Developer
> The Developer is responsible for creating and testing the software components and linking them together. In some cases the Developer might need information from the Administrator, for example if the Developer must use an existing queue name in their software code. After the Developer finishes creating the software components, the Developer gives those components to the Administrator for deployment.

Deploy the solution

Deploy the solution for production use, by installing, configuring, and testing the components that provide the solution.

Administrator
> The Administrator installs and configures the components that support the solution, in this case MessageSight, WebSphere MQ, and WebSphere Application Server. The business might have a different Administrator for each product, or one Administrator might perform installation and configuration for all components. If the Administrators are different they might need to exchange information. For example, in this scenario the MessageSight administrator and WebSphere MQ administrator must share

information for the MQ Connectivity feature in MessageSight. The Administrator also deploys the software components given to them by the Developer.

Test Implementer

The Test Implementer runs the tests to validate the solution and that the solution is ready for production use. For example, can the solution be started, stopped, backed up, and recovered after a system failure as well as be maintained?
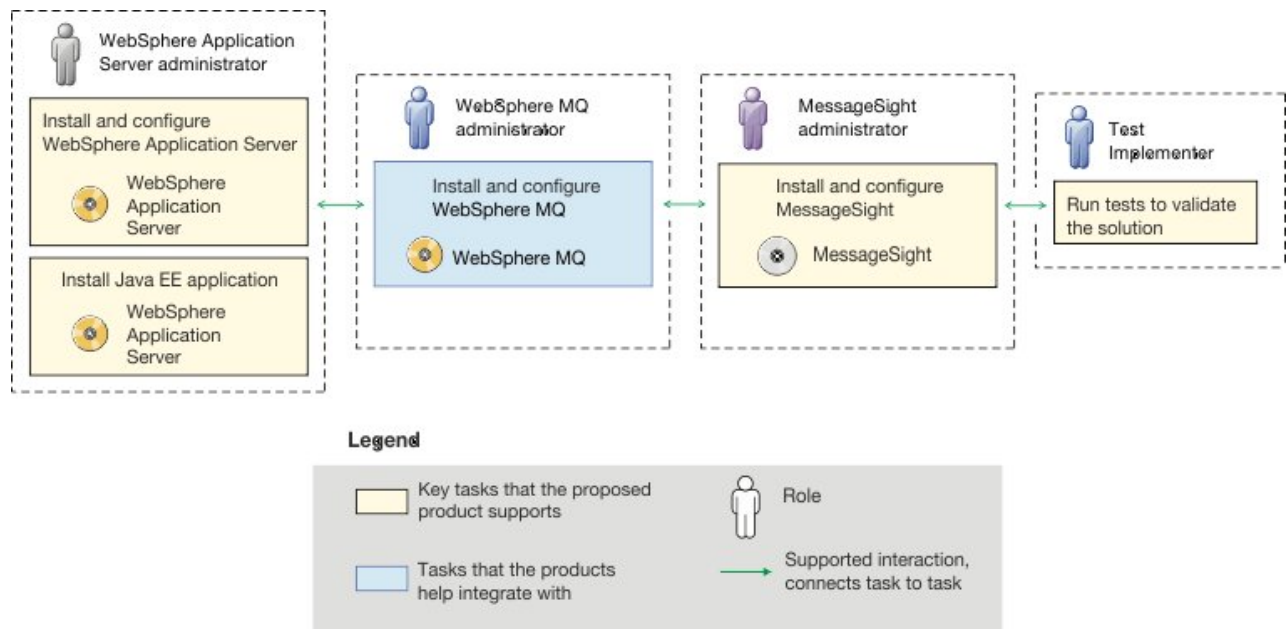
Figure 1. User role interactions to deploy the solution

Technical solution

This scenario describes one way of connecting IBM MessageSight to WebSphere MQ and WebSphere Application Server.

Overview: Initial IT configuration

Company A has an existing IT configuration that uses WebSphere MQ for its messaging infrastructure. This scenario describes adding IBM MessageSight to that initial messaging infrastructure.

The initial IT configuration includes several components that an administrator configures or uses, as shown in Figure 2 on page 9:

JMS application

A stand-alone application that business users interact with, for example to register an order. The application uses the Java™ Message Service (JMS) for asynchronous messaging.

Note: The JMS application will not be provided for verification.

> **Why am I doing this?**
>
> - JMS is the Java EE messaging standard that is widely supported. JMS-based applications are therefore portable across many messaging products.
> - JMS provides a level of abstraction from the details of the messaging layer, simplifying the application development process.
> - JMS provides asynchronous communication, enabling applications to run without having to wait for a reply, unlike tightly coupled systems such as remote procedure call (RPC).
> - Applications that use JMS do not directly specify details to access resources. Instead, they look up and use administered JMS objects such as a connection factory and a destination.

> **What else might I do or be interested in?**
>
> For some situations, other messaging standards might be more suitable than JMS. For example IBM Message Service Clients for C, C++ and .NET, also known as XMS, are APIs that provide similar benefits to JMS for non-Java applications. XMS is therefore more suitable if you are using the .NET platform, or you want to integrate existing C++ applications with newer Java EE applications.

The application uses point-to-point messaging to send messages to a queue in the infrastructure and processes reply messages, to provide the business user with an appropriate response.

> **Why am I doing this?**
>
> In this messaging model, an application sends a message to a queue, and another application receives the message from the queue and acknowledges receipt of the message. This model is the simplest form of messaging because it involves only two endpoints. This model is also the most appropriate for the scenario sample application: a single client requests information from a single server.

> **What else might I do or be interested in?**
>
> In the alternative messaging model, publish/subscribe, a publisher publishes a message to a message topic. Subscribers subscribe to the topic to receive messages. The publisher and subscriber do not have any information about each other, and the message is received by zero or more recipients.

Q1 [Message queue]
   The WebSphere MQ queue that the JMS application sends messages to.

Queue manager, sampleQM
   The WebSphere MQ queue manager that provides the initial messaging infrastructure. It hosts the queue that the JMS application works with.

Java EE application

The application consumes and works with messages on the MessageSight queue, Q1. This application runs on an *application server* of the WebSphere Application Server product that has been installed and connected with MessageSight.

The sample application in this scenario provides a *message-driven bean (MDB)* as an asynchronous message consumer. When a message arrives at the queue, the MDB automatically processes the message without the application having to explicitly poll the queue.

> **Why am I doing this?**
> MDBs are activated by the EJB container in WebSphere Application Server on receipt of a message. A typical MDB performs messaging functions, and calls one or more session beans to perform business logic. Because of this separation of function, you can easily change and reuse units of business logic without affecting the messaging function of the application.

Application server

A server program in WebSphere Application Server that provides the execution environment for Java EE application programs.

WebSphere Application Server JNDI namespace

WebSphere Application Server includes a name server which provides access to the following JMS administered objects through the Java Naming and Directory Interface (JNDI).

Activation specification

A JMS activation specification can be associated with one or more MDBs and provides the configuration necessary for them to listen for messages arriving at a destination. Activation specifications process inbound messages to the MDB.

> **Why am I doing this?**
> Activation specifications are part of the Java EE Connector architecture (JCA) 1.5 standard. JCA 1.5 provides a standard way to integrate JMS providers, such as WebSphere MQ, with Java EE application servers such as WebSphere Application Server.

> **What else might I do or be interested in?**
> Use of listener ports is an older configuration method for MDBs to listen for messages arriving at a destination. The use of listener ports is stabilized in WebSphere Application Server Version 7 and later. If you are using WebSphere Application Server for the first time avoid using listener ports.

Connection factory, myCF

A JMS connection factory object defines a set of standard configuration properties for connections. An application uses a connection factory to create a connection to WebSphere MQ.

Destination, myQueue

A JMS destination can be a topic or a queue. In this scenario, the destination is a queue, and identifies the WebSphere MQ queue that applications send messages to, or from which an application receives messages, or both. An application looks up the destination in the JNDI namespace to create a connection to the WebSphere MQ queue.

In this scenario, when creating JMS objects in WebSphere Application Server, you specify full details rather than use a *client channel definition table (CCDT)* that has been exported from WebSphere MQ.

Why am I doing this?

A CCDT makes configuring objects in WebSphere Application Server easier, because it contains information that is required to connect to WebSphere MQ. If you do not specify a CCDT you must enter this information yourself. This scenario does not use a CCDT, so that you can see more clearly what information is required to make a connection.

What else might I do or be interested in?

A CCDT is particularly useful if your client applications might need to connect to a number of alternative queue managers. This scenario does not cover that situation.

Tip: This scenario was developed by using a sample version of the initial IT configuration described. If you want to try out the scenario, you can either follow the instructions to configure WebSphere Application Server to communicate with your own MessageSight system, or set up a copy of the sample IT configuration.
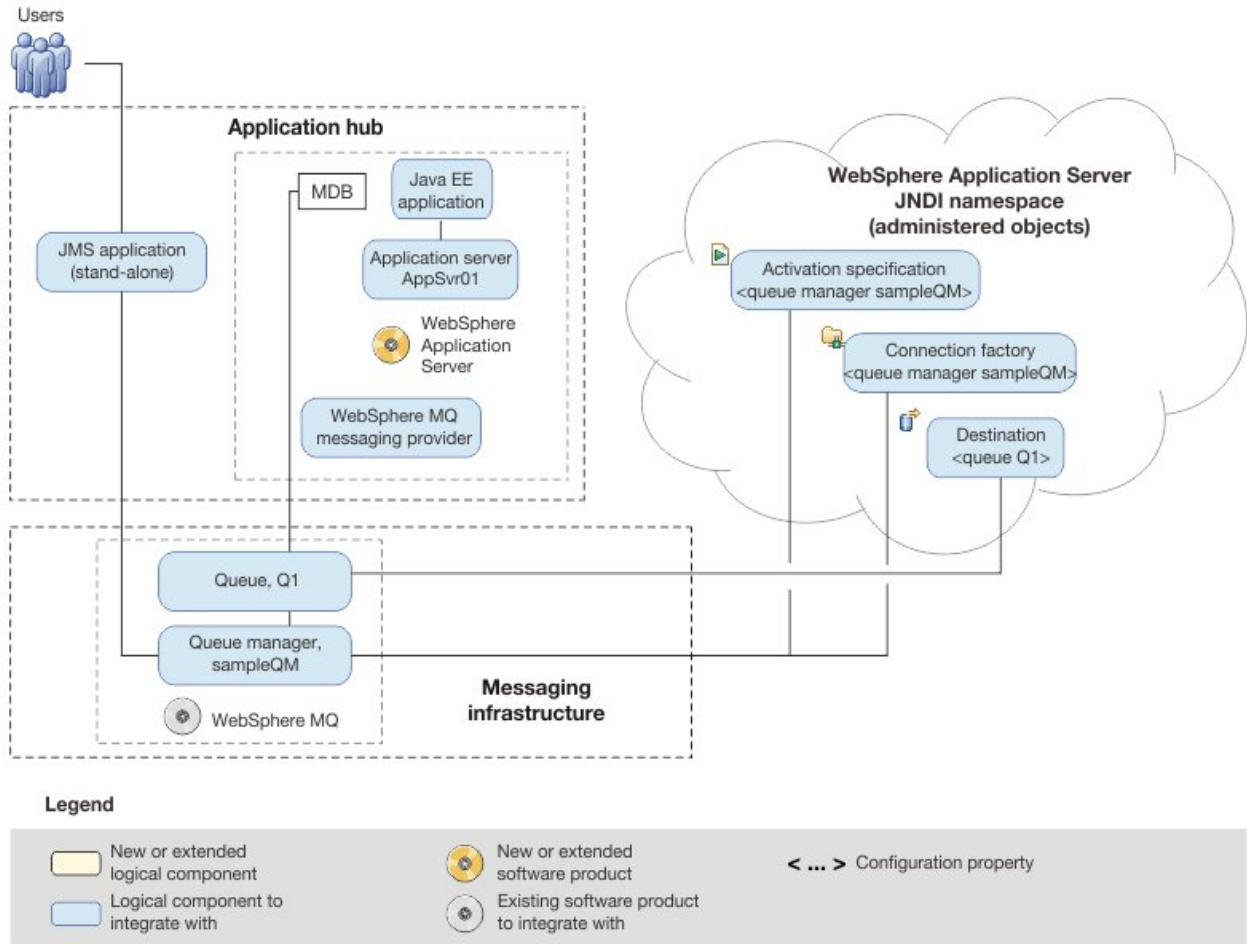
Figure 2. Delivered logical topology. The high-level logical topology diagram for the initial WebSphere MQ messaging infrastructure.

Extending the Initial IT configuration with IBM MessageSight

The company adds a Java EE application on WebSphere Application Server to consume and work with messages from an existing messaging infrastructure provided by WebSphere MQ.

The delivered IT configuration includes all the components in "Overview: Initial IT configuration" on page 5 and IBM MessageSight as a *messaging provider* for WebSphere Application Server. See Figure 3 on page 11.

IBM MessageSight as a *messaging provider* **for WebSphere Application Server**
The MessageSight messaging provider in WebSphere Application Server makes JMS messaging available to WebSphere Application Server applications by using the existing capabilities in the MessageSight environment.

> **Why am I doing this?**
>
> WebSphere Application Server applications can interact with
> MessageSight destinations to send and receive messages in the same
> way as any JMS application in the MessageSight environment.

Java EE application

The application consumes and works with messages from MessageSight.
This application runs on an *application server* of the WebSphere Application
Server product that has been installed and connected with MessageSight.

The sample application in this scenario provides a *message-driven bean
(MDB)* as an asynchronous message consumer. When a message arrives at
the queue, the MDB automatically processes the message without the
application having to explicitly poll the queue.

> **Why am I doing this?**
>
> MDBs are activated by the EJB container in WebSphere Application
> Server on receipt of a message. A typical MDB performs messaging
> functions, and calls one or more session beans to perform business
> logic. Because of this separation of function, you can easily change
> and reuse units of business logic without affecting the messaging
> function of the application.

You can download the sample applications:

- SampleCarApp.ear
- AutoRemote.war
- SampleCarApp.ear
- AutoRemote.war
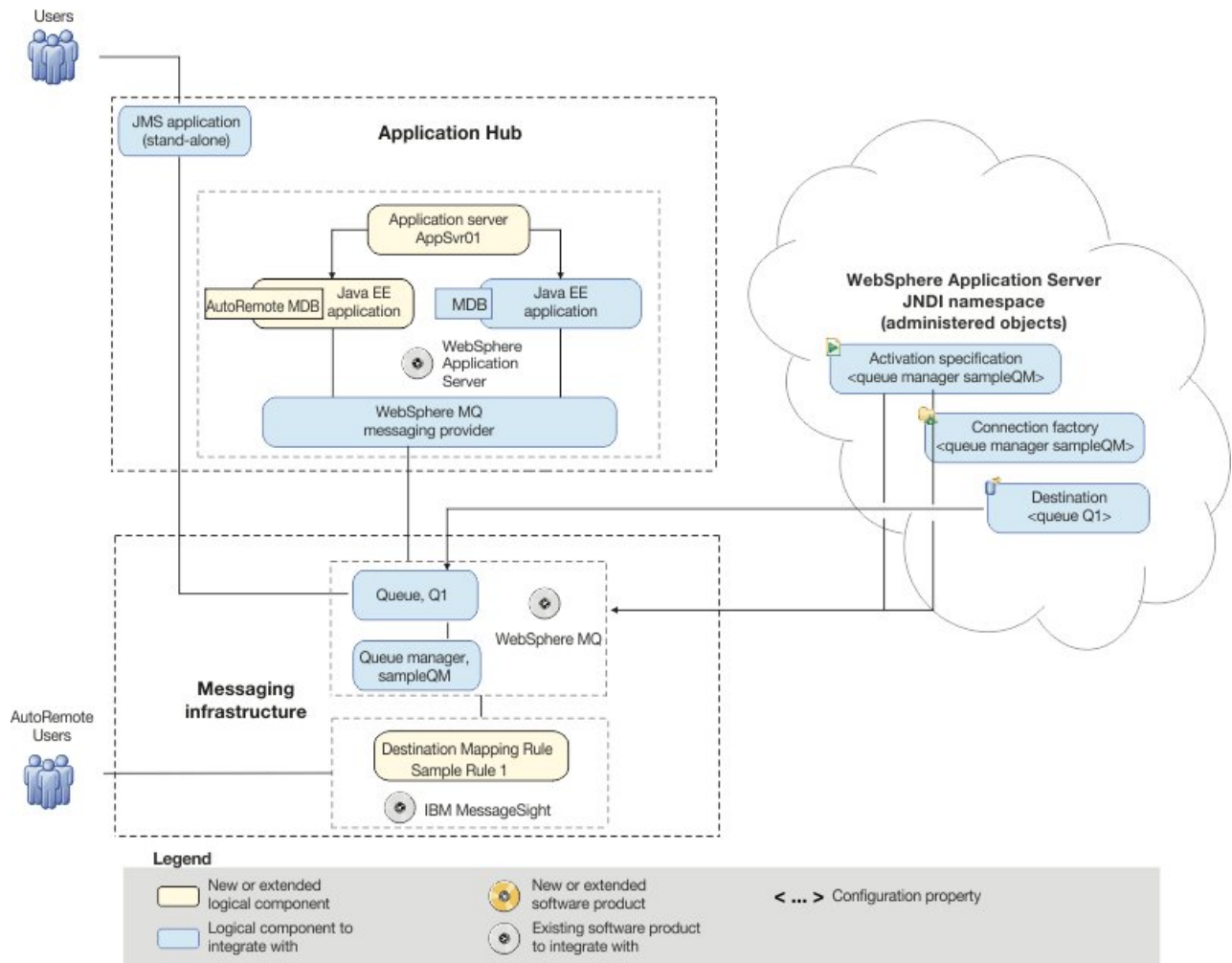
Figure 3. Delivered logical topology. The high-level logical topology diagram for new software functions delivered by integrating IBM MessageSight into the initial WebSphere MQ messaging infrastructure. This delivered logical topology shows the new functions as new or extended logical components, integrated with the software functions and products from the initial logical topology.

Production physical topology and product mapping

The production physical topology specifies the recommended operational environment (machines, operating systems, and software products) for running the applications and services of the solution.

Figure 4. Production physical topology

Node	Operating system and hardware	Software
Host 1 (runtime node)	• Windows Server 2003 or 2008, Standard or Enterprise Edition. You can use Windows 7, or for 32-bit environments, Windows Vista or Windows XP Professional, but these operating systems are not supported for production use of WebSphere Application Server. • Intel EM64T, AMD Opteron, or for 32-bit environments, Intel Pentium processor at 2.33 GHz or faster • 1 GB physical memory • 3 GB free disk space	• WebSphere Application Server • IBM MessgaeSight Prerequisite software: • A web browser for use by the Launchpad, Windows Explorer, and WebSphere Application Server administrative console: Microsoft Internet Explorer Version 6.0, or Mozilla-based browsers Version 1.7 or higher

Chapter 3. Implementing the solution

Implementing the solution in this scenario involves connecting IBM MessageSight to WebSphere Application Server and WebSphere MQ, which provided the initial messaging infrastructure for a company.

Before you begin

The starting point for this scenario is an existing, verified, WebSphere Application Server and WebSphere MQ installation as the initial messaging infrastructure.

This scenario was developed using a sample installation, and uses sample applications to demonstrate connecting to MessageSight. If you want to try the scenario, you can set up a copy of the sample installation as described in the scenario. You can use the sample applications provided with the scenario to verify your progress through each stage.
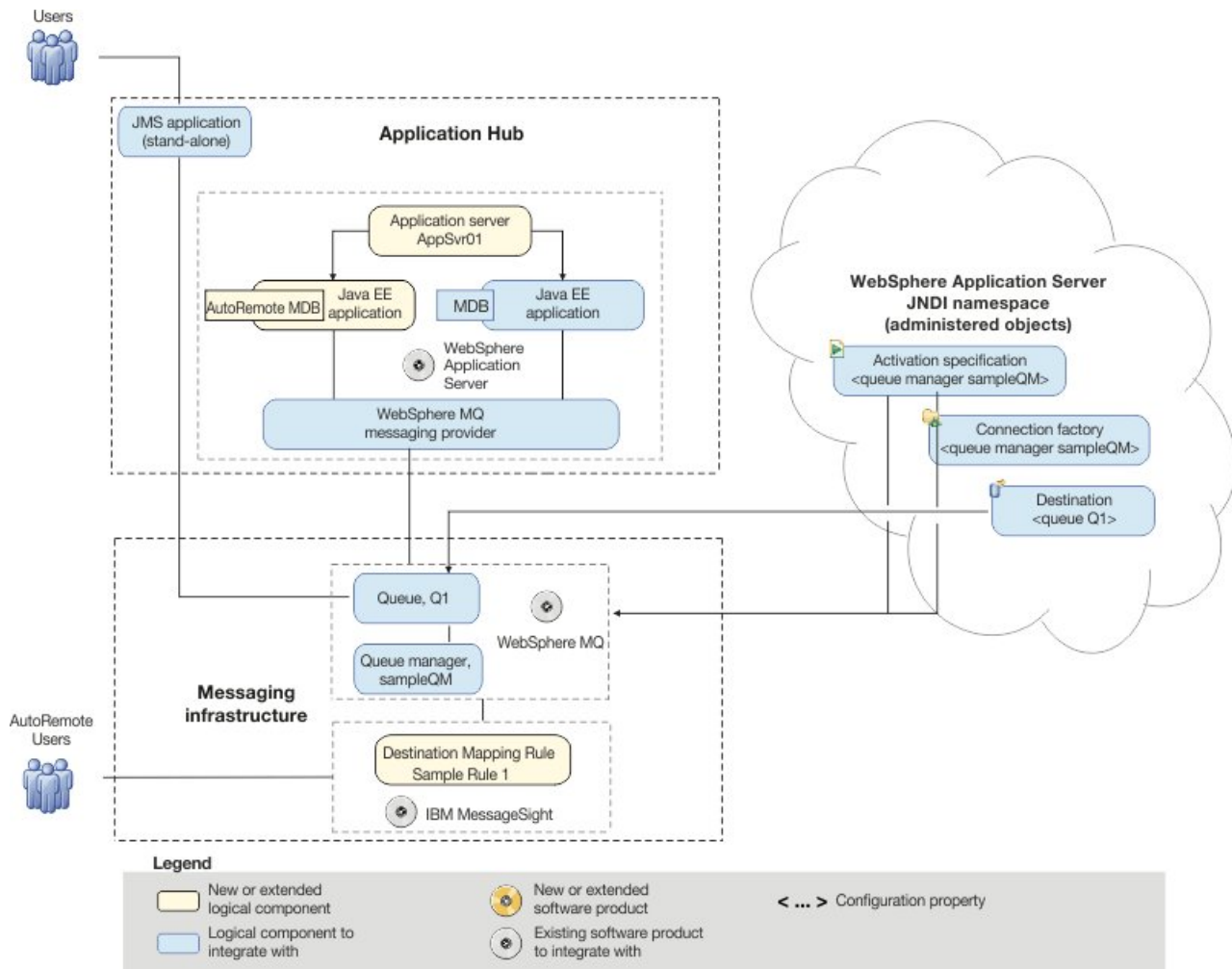
About this task

Figure 5. Delivered logical topology, including MessageSight. The high-level logical topology diagram for new software functions delivered by integrating MessageSight into the initial messaging infrastructure. This delivered logical topology shows the new functions as new or extended logical components, integrated with the software functions and products from the initial logical topology.

After connecting MessageSight to WebSphere MQ and WebSphere Application Server, you can use the connection by deploying a Java EE application to run on WebSphere Application Server. This scenario describes use of a sample Java EE application that is deployed onto WebSphere Application Server and used to verify the solution.

Creating a sample initial IT configuration

This scenario was developed by using a sample initial IT configuration. Follow the instructions to set up the sample initial IT configuration to try out the scenario in the same way as it was originally developed.

Installing WebSphere MQ

To complete this scenario you must have a functioning WebSphere MQ messaging network. This task provides basic instructions to install WebSphere MQ if you do not already have it installed on your system.

Before you begin

- You must have local administrator authority when you are installing. Define this authority through the Windows facilities.
- Ensure that the machine name does not contain any spaces.
- Ensure that you have sufficient disk space, up to 600 MB, to fully install WebSphere MQ for Windows.
- Determine whether any WebSphere MQ users are defined on Windows 2000 or later domain controllers.

> **Why am I doing this?**
>
> WebSphere MQ checks that only authorized users can access queue managers or queues. When a user attempts such access, WebSphere MQ uses its own local account to query information about the user. However, domain controllers running on Windows 2000 or later can be configured such that WebSphere MQ cannot use local accounts to make these queries. In this situation, you must provide WebSphere MQ with a special account to use. This account is necessary when both of the following conditions apply:
>
> - Any domain controller on your network is running on Windows 2000 or later
> - Local user accounts are not authorized to query the group membership of the domain user accounts
>
> If you require a special account, refer your domain administrator to the instructions in Creating and setting up domain accounts for WebSphere MQ in the WebSphere MQ information center.

If you want to investigate the requirements for installing WebSphere MQ in more detail, see System Requirements for IBM MQ.

About this task

This task describes the basic steps to install WebSphere MQ on the Windows operating system.

The installation programs contain links to further information if you require it during the installation process. The installation process has four parts:

1. Use the Launchpad to check and install software requirements, specify network information, and start the WebSphere MQ installation wizard.
2. Use the WebSphere MQ installation wizard to install the software, and start the Prepare WebSphere MQ wizard.
3. Use the Prepare MQ wizard to start the WebSphere MQ service and start the Default Configuration wizard.
4. Optionally, use the Default Configuration wizard to create objects for verifying the installation using the Postcard application supplied with WebSphere MQ.

Procedure

1. Insert the WebSphere MQ for Windows Server DVD into the DVD drive. If autorun is enabled, the installation process starts. Otherwise, double-click the Setup icon in the root folder of the DVD to start the installation process.
2. Use the buttons on the left of the Launchpad to review and, if necessary, modify the software requirements and network configuration.

WebSphere Eclipse Platform 3.3 is required for using the WebSphere MQ Explorer and Managed File Transfer Application components. You can use the launchpad to install this software if required: after you choose whether to install from a DVD or your file system, the Launchpad opens a dialog box with the Eclipse Setup.exe program selected. Click **Open** to run the WebSphere Studio IES 3.3 installation wizard. After installing, click **Refresh** in the Launchpad to update the status of the software requirements.

3. On the WebSphere MQ Installation page of the Launchpad, Select installation language and click **Launch IBM WebSphere MQ Installer** to start the IBM WebSphere MQ - InstallShield Wizard.

4. On the setup wizard, select the **Custom** setup type and click **Next**.

5. On the Installation Details page, specify the **Installation Name** and the **Installation Description** field and click **Next**.

6. Optional: You can click the **Change** button to change the Installation folder for program files. Click **Next**.

7. Select folder for log files and click **Next**.

8. On the Features page, click the icon and select **Install this feature** for the following features:

   • Server
   • Telemetry Service
   • MQ Explorer
   • Telemetry Clients
   • Development Toolkit
   • Java and .NET Messaging and Web Services

   Click **Next** to go to the Ready to Install WebSphere MQ page.

9. On the Ready to Install WebSphere MQ page, click **Install** and go to the Installing WebSphere MQ page. It takes several minutes to install the WebSphere MQ. At the end of the process, the WebSphere MQ Setup window displays the message Installation Wizard Completed Successfully. Click Finish. The Prepare WebSphere MQ wizard starts automatically.

10. Follow the instructions in the Prepare WebSphere MQ wizard.

   ┌─ **Why am I doing this?** ──────────────────────────────────┐
   │ The Prepare WebSphere MQ wizard helps you to configure WebSphere │
   │ MQ files and a user account for your network. You must run the wizard │
   │ to configure the WebSphere MQ Service before you can start any queue │
   │ managers. │
   └──┘

   a. On the Welcome to the Prepare WebSphere MQ wizard page of the wizard, click **Next**. The wizard performs some configuration and displays status messages, then displays the WebSphere MQ Network Configuration page. The contents of this page vary according to your use of domain controllers.

   b. Follow the instructions forWebSphere MQ Network Configuration page and then click **Next** to continue through the wizard until the wizard displays the Completing the Prepare WebSphere MQ Wizard page.

11. Optional: If you want to use the WebSphere MQ Postcard application to verify your installation, click the **Set up the Default Configuration** link to display the WebSphere MQ Default Configuration window.

> **Why am I doing this?**
> The default configuration creates objects, such as a queue manager called QM_*machine_name*, that you can use to verify the success of your installation by using the Postcard application that is supplied as part of WebSphere MQ. If you do not create the default configuration, you can still use the Postcard application later on, after you have created your own objects in WebSphere MQ.

Note: You cannot create the default configuration if you have already created other queue managers; you must first delete the other queue managers then run the Default Configuration wizard.

a. The WebSphere MQ Default Configuration window shows an initial summary of the configuration you are about to create. This window remains on screen while you proceed through the pages of the Default Configuration wizard. Click the **Set up Default Configuration...** button to start the Default Configuration wizard.

b. Click **Next** to move through the information pages.

c. On the Select Options page, clear both the **Allow remote administration of the queue manager** and **Join the queue manager to the default cluster** check boxes, then click **Next**.

> **Why am I doing this?**
> This scenario assumes that you have one machine on which you are installing WebSphere Application Server and WebSphere MQ. You therefore do not need to administer the queue from another machine. Clustering is not described in this scenario.

d. On the summary page, click **Finish**. A dialog box is displayed while the default configuration is created.

> **What else might I do or be interested in?**
> You can use this window after installation to change the default configuration. To display this window after installation, use the Windows **Start** menu to start the Prepare WebSphere MQ wizard, then follow the steps.

The existing WebSphere MQ Default Configuration window is updated with the results of the configuration.

e. Click **Close** to close the Default Configuration wizard.

12. Leave the **Launch WebSphere MQ Explorer** check box selected, choose whether to start Notepad to view the release notes, then click **Finish**. The WebSphere MQ Explorer starts.

13. If you created a default configuration, verify your installation by using the Postcard application that is supplied with WebSphere MQ.

a. If the Welcome page is not already displayed, click **Help** > **Welcome** to display it.

b. Click the **Get Started** icon.

c. Click the **Launch the Postcard Application** icon to display the Postcard - Sign On dialog box.

d. Click **Help** in this and other Postcard application dialog boxes to view instructions about running the Postcard application.

If you did not create a default configuration, you can still follow these steps to verify your installation, but you must first configure a queue manager as described in the next task of this scenario.

Note: Running the Postcard application on a non-default configuration automatically creates a queue called `postcard` on your queue manager. You can delete this queue after using the postcard application.

Results

You have installed WebSphere MQ and are ready to configure objects such as queues and queue managers.

If there were problems during installation, use the `.log` files in the `C:\Documents and Settings\`*userID*`\Local Settings\Temp` directory, and the `amqmsccw.txt` and `amqmjpse.txt` files in the installation directory, to investigate. The default installation directory is `C:\Program Files\IBM\WebSphere`.

What to do next

Follow the instructions in Configuring the JNDI namespace and administered objects to configure WebSphere MQ for use by the sample application.

Configuring the MQTT service with WebSphere MQ

The MQTT service for WebSphere MQ can be installed and ready to use with the following steps.

Before you begin

- Set up and configure the sample IT configuration from Creating a sample initial IT configuration on your system.
- You must have local administrator authority when you are installing. Define this authority through the Windows facilities.

About this task

This task modifies an existing WebSphere MQ installation and creates an MQTT service to listen on port 1883. The configuration gives everyone permission to publish and subscribe to any topic.

Procedure

1. Optional: If you do not install **Telemetry Service** and **Telemetry Clients** when you install WebSphere MQ in Installing WebSphere MQ, you can modify the existing installation to include the MQTT service.

   a. Run the same WebSphere MQ installer as in the initial sample IT configuration. This is the IBM WebSphere MQ InstallShield Wizard. For more information, see steps 1-3 in Installing WebSphere MQ.

   b. In the installer, select **Maintain or upgrade an existing instance**.

   c. Select your existing installation and click **Next**.

   d. Leave **Modify** selected and click **Next**.

e. Click the icons for **Telemetry Service** and **Telemetry Clients**, and select **Install this feature** to install each feature.

f. Click **Next** and then click **Modify**. The installer will stop any WebSphere MQ activity if it is running.

2. Open WebSphere MQ Explorer.

3. Run the Telemetry "Define sample configuration" wizard.

a. Optional: If the "MQ Explorer - Content" window is closed, click **Window** > **Reset Perspective**.

b. Expand sampleQM and select the **Telemetry** folder.

c. Click **Define sample configuration** to start the wizard.

d. Click **Finish** to create the telemetry service and run the MQTT Client Utility.

4. Test the connection in the MQTT Client Utility window.

a. In the Connection section, click **Connect** .

b. In the Subscription section, click **Subscribe**.

c. In the Publication section, click **Publish**. In the Client History section, you can see that a message has been published and received.

Results

You have installed the MQTT service.

Installing WebSphere Application Server Version 8 or later

Install WebSphere Application Server 8 or later by using Installation Manager. At the end of this task, you are ready to configure WebSphere Application Server to communicate with MessageSight.

Before you begin

- You must have local administrator authority when you are installing. Define this authority through the Windows operating system facilities. The administrator ID must not contain spaces.

- Ensure that you have sufficient disk space. You require up to 2 GB for all components.

- Ensure that prerequisites and corequisites are at the required release levels. On the WebSphere Application Server detailed system requirements page, click the link for your operating system and the link for software to see information about supported operating systems and browsers, and hardware requirements.

About this task

This task describes the basic steps to install WebSphere Application Server 8.5 on the Windows 7 (SP1) operating system by using Installation Manager.

Procedure

1. If you haven't installed IBM Installation Manager before, install it.

a. Extract the Installation Manager archive file.

b. Switch to Installation Manager archive directory and double-click the `install.exe` file.

c. In the Install Packages window, select the version number, for example **Version 1.5.2** , and then click **Next**.

d. Click **I accept the terms in the license agreement**, and then click **Next.**

e. In **Installation Manager Directory** field, type the file path. The file path is the location where you want to install IBM Installation Manager.

f. Click **Next**, and then click **Install**. A progress bar is displayed, which shows that the installation is in progress.

When the installation is complete, a window is displayed, indicating that IBM Installation Manager is installed.

2. Click **Restart Installation Manager** in the lower right of the window. Alternatively, you can click **Start** > **All Programs** > **IBM Installation Manager** > **IBM Installation Manager** to start Installation Manager.

3. Click **Install**.

4. If a message is displayed that states `Installation Manager cannot find any packages to install`, add WebSphere Application Server to the repository.

   a. Click the **Repositories** link in the **Repository connections** field.

   b. Click **Add Repository** in the upper right of the Preference window.

   c. Click **Browse** and find the `repository.config` file for WebSphere Application Server.

   d. Click **OK**.

   e. Click **Test Connections** on the right of the Preference window. If a message is displayed that states `All the selected repositories are connected`, WebSphere Application Server is added to the repository.

   f. Click **OK** to close the window and click **OK** again to confirm adding the repository.

5. Select the version number of WebSphere Application Server, for example **Version 8.5.0.0**, and then click **Next**.

6. Click **I accept the terms in the license agreement**, and then click **Next.**

7. Click **Next**, then click **Next** again.

8. Select the languages that you want and click **Next**.

9. Select the components that you want and click **Next**.

10. Click **Install**. A progress bar is displayed, which shows that the installation is in progress.

11. When the installation is complete, a window is displayed, which indicates that the packages are installed. Select the programs that you want to start and click **Finish**. WebSphere Application Server is successfully installed.

12. Create an application server profile

    a. Start Profile Management Tool. For example, click **Start** > **All Programs** > **IBM WebSphere** > **IBM WebSphere Application Server V8.5** > **Tools** > **Profile Management Tool**.

    b. Click **Create**.

    c. In Environment Selection window, expand **WebSphere Application Server**, and click **Application server**, and then click **Next**.

    d. In Profile Creation Options window, leave the option as **Typical profile creation**, and then click **Next**.

    e. Choose whether to enable administrative security and click **Next**. If you choose to enable it, every time you use WebSphere Application Server, you must prove your identity.

    f. Confirm your settings and click **Create**.

    g. When the profile creation is complete, the Profile Creation Complete window is displayed. Clear **Launch the First steps console** and click **Finish**. An application server profile is successfully created.

Results

WebSphere Application Server is installed. If you encountered a problem when installing, see the IBM Installation Manager Information Center. For further information about where to find this information center, see About IBM Installation Manager Information Center.

What to do next

Follow the instructions in "Configuring WebSphere Application Server" to configure WebSphere Application Server to communicate with MessageSight.

Configuring WebSphere Application Server

Create an activation specification, connection factory, and topic for WebSphere Application Server applications to use.

About this task

To use JMS messaging between WebSphere Application Server and MessageSight, you create the following objects in WebSphere Application Server.
- Activation specification
- Connection factory
- Topic (a type of JMS destination)

These objects are described in "Extending the Initial IT configuration with IBM MessageSight" on page 9.

Procedure

1. If WebSphere Application Server is not already started, click **Start** > **All Programs** > **IBM WebSphere** > **IBM WebSphere Application Server V8.5** > **Profiles** > **AppSrv01** > **Start the server** for example. A command window is displayed until the server is started; this process might take a few minutes.

2. If the administrative console is not already started, click **Start** > **All Programs** > **IBM WebSphere** > **IBM WebSphere Application Server V8.5** > **Profiles** > **AppSrv01** > **Administrative console** for example.

   Note: You must log on even if you did not enable administrative security when you installed the product. If you did not enable administrative security, the user ID is used only to distinguish changes that you make in the administrative console from changes made by other users.

3. Create a connection factory.

   ┌─ **Why am I doing this?** ─────────────────────────────────────┐
   │ A JMS connection factory contains information about how to create a
   │ connection. When an application needs a JMS connection, the factory
   │ creates a connection instance. The connection factory requires the same
   │ connection information as the activation specification that you created
   │ earlier, but is used for outbound messages from the MDB, whereas the
   │ activation specification is used for inbound messages.
   └──┘

> **What else might I do or be interested in?**
> With previous versions of the JMS specification, you had to create either a queue connection factory or a topic connection factory, depending on your required messaging pattern (point-to-point or publish/subscribe). With the *common interfaces* of the JMS 1.1 specification, you can now create a generic connection factory, which creates connections to both types of messaging destination. You can therefore use both messaging models in the same session.

a. In the administrative console, click **Resources** > **JMS** > **Connection factories** and go to the Connection factories page.

b. In the **Scope** field, click the drop-down list and set the scope to **Cell=***cell_name*, then click **New** under the **Preferences** field.

c. Select **WebSphere MQ messaging provider**, then click **OK** and go to the Create WebSphere MQ JMS resource page. The "Create WebSphere MQ JMS resource" wizard starts.

d. On the "Step 1: Configure basic attributes" page enter a **Name** of your choice, enter jms/replyCF for the **JNDI name**, then click **Next**.

> **Why am I doing this?**
> The name you choose is used to display the connection factory in the administrative console. The JNDI name is used to reference the object in the JNDI namespace. The JNDI name is also used in the sample MDB application code; if you want to use a different JNDI name you must change the MDB to match, then redeploy the application.

e. On the "Step 2: Select connection method" page, select **Enter all the required information into this wizard** and click **Next**.

f. On the "Step 2.1: Supply queue manager details" page, type sampleQM in the **Queue manager or queue-sharing group name** field then click **Next**.

g. On the "Step 2.2: Enter connection details" page, enter the following details then click **Next**.

Transport
    Select **Bindings, then client** from the drop-down list.

> **Why am I doing this?**
> In this mode, WebSphere Application Server first attempts to connect in bindings mode, where the WebSphere MQ messaging provider within WebSphere Application Server connects directly to the WebSphere MQ queue manager. If this connection attempt fails, the WebSphere MQ messaging provider then attempts to connect by using client mode, which uses a TCP/IP-based network. Bindings mode usually has better performance, but can be used only when WebSphere Application Server and WebSphere MQ are installed on the same machine. The host name, port, and server connection channel information is required for client mode. Bindings mode requires the configuration of native library path information, which you will add in a later step in this task.

Keep **Enter host and port information in the form of separate host name and port values** as selected and enter the following information:

Host name
The name of your machine.

Port The port number of the WebSphere MQ queue manager sampleQM.

This port number is displayed in WebSphere MQ Explorer under **Queue managers** > *sampleQM* > **Listeners**, in the **Port** column of the **LISTENER.TCP** row.

Server connection channel
The name of the WebSphere MQ channel to use for communication.

If you do not have a specific channel that you want to use, specify the default channel that is created when you created the queue manager, SYSTEM.DEF.SVRCONN.

h. Click **Next**

i. On the "Steps 3: Test connection" page, click **Test connection**.

> **Why am I doing this?**
> The **Test connection** button verifies that the connection factory contains the necessary details to create a connection to WebSphere MQ. To use this connection, you must create a queue, as described in the rest of the steps.

If successful, the wizard displays the message A connection was successfully made to WebSphere MQ. If not successful, check that the queue manager name, port, and server channel that you specified are correct, then match the values in WebSphere MQ. For example, the following error indicates that the channel name was not found on the queue manager that you specified.

```
A connection could not be made to WebSphere MQ for the following reason:
JMSCMQ0001: WebSphere MQ call failed with compcode '2' ('MQCC_FAILED')
reason '2540' ('MQRC_UNKNOWN_CHANNEL_NAME').
```

If the following error message is displayed,

```
A connection could not be made to WebSphere MQ for the following reason:
JMSCMQ0001: WebSphere MQ call failed with compcode '2' ('MQCC_FAILED')
reason '2035' ('MQRC_NOT_AUTHORIZED').
```

1) Open WebSphere MQ Explorer and expand **IBM WebSphere MQ** > **Queue Managers**.

2) Right click **sampleQM**.

3) Click **Properties** > **Communication** and select **Disabled** in **Channel authentication records** list.

4) On the WebSphere Application Server Administrative console, click **Previous** and go back to the Steps 3: Test connection page.

5) Click **Test connection**.

j. Click **Next**, then on the Summary page, click **Finish**. The Messages window is displayed. Click **Save** to save the changes directly to the master configuration.

4. Add a Topic.

a. In the console, click **Resources** > **JMS** > **Topics** and go to the Topics page.

b. In the **Scope** field, click the drop-down list and set the scope to **Cell=***cell_name*, then click **New** under the **Preferences** field.

c. Select **WebSphere MQ messaging provider** then click **OK**.

d. Under General Properties, enter the following values for the required fields.

Name   A name of your choice.

This name is used to display the queue in the administrative console.

JNDI name
jms/myTopic

The JNDI name is used to reference this queue in the WebSphere Application Server JNDI namespace. The value matches the destination name that you specified when creating the activation specification.

Topic name
#

This value is the administrative name of the topic that you want to communicate with. This is different from the JNDI name of the topic.

e. Click **OK**.

The Messages window is displayed. Click **Save** to save the changes directly to the master configuration.

5. Add an activation specification.

a. In the administrative console, click **Resources** > **JMS** > **Activation specifications** and go to the Activation specifications page.

b. In the **Scope** field, click the drop-down list and set the scope to **Cell=***cell_name*, then click **New** under the **Preferences** field.

Why am I doing this?

You use the **Scope** property to set the level at which the activation specification is visible. The cell scope is the highest level, giving the activation specification the greatest visibility.

What else might I do or be interested in?

You can also create activation specifications at other levels. For example, if you have multiple servers you might create an activation specification for each server, using the server scope, so that you can specify different settings to be used for each server.

---

c. Select **WebSphere MQ messaging provider** then click **OK**. The "Create WebSphere MQ JMS resource" wizard starts.

d. On the "Step 1: Configure basic attributes" page, add a **Name** of your choice, then type jms/SampleCarApp in the **JNDI name** field. Click **Next**.

e. On the "Step 1.1: Specify MDB destination data" page, type `jms/myTopic` in the **Destination JNDI name** field and ignore the **Message selector** filed. Select `Topic` as the Destination type and then click **Next**.

f. On the "Step 1.2: Configure Durable Subscription" page, leave the default option, **Nondurable subscription**, and click **Next**.

g. On the "Step 2: Select connection method" page, select**Enter all the required information into this wizard** and click **Next**.

h. On the "Step 2.1: Supply queue manager details" page type the name of the WebSphere MQ queue manager, `sampleQM` in the **Queue manager or queue-sharing group name** field, then click **Next**.

i. On the "Enter connection details" page, enter the following information:

Transport
Select **Bindings, then client** from the drop-down list.

Keep **Enter host and port information in the form of separate host name and port values** as selected and enter the following information:

Host name
The name of your machine.

Port The port number of the WebSphere MQ queue manager sampleQM.

This port number is displayed in WebSphere MQ Explorer under **Queue managers** > *sampleQM* > **Listeners**, in the **Port** column of the **LISTENER.TCP** row.

Server connection channel
The name of the WebSphere MQ channel to use for communication.

If you do not have a specific channel that you want to use, specify the default channel that is created when you created the queue manager, SYSTEM.DEF.SVRCONN.

j. Click **Next**

    k. On the "Test connection" page, click **Test connection**.

> **Why am I doing this?**
> The **Test connection** button verifies that the activation specification
> contains the necessary details to create a connection to WebSphere MQ.

    If successful, the wizard displays the message `A connection was`
`successfully made to WebSphere MQ`. If not successful, check that the queue
manager name, port, and server channel that you specified are correct, and
match the corresponding values in WebSphere MQ.

    l. Click **Next**, then on the Summary page click **Finish**. The Messages window
is displayed. Click **Save** to save the changes directly to the master
configuration.

Results

You have configured WebSphere Application Server with the necessary objects to
enable communication with WebSphere MQ and MessageSight.

Installing IBM MessageSight for Developers on Oracle VirtualBox 4.3.10

IBM MessageSight for Developers is an open virtual appliance (OVA) package that
you can import into your virtualization environment. You can install IBM
MessageSight for Developers on Oracle VirtualBox 4.3.10 according to the
following procedure.

Before you begin

Minimum system requirements

The host system must have these minimum system requirements:
- A 2-core 64-bit processor with VT-x/AMD-V support
- 16 GB of available space on a hard disk
- 4 GB RAM, with a minimum of 2 GB available for the virtual appliance
  By default, the OVA is configured to run with 4 GB RAM. You can change this
  value to a lower setting.

Supported browsers

To use IBM MessageSight for Developers, you need access to one of the supported
browsers. For more information about the supported browsers, see "Supported
browsers" on page 27.

Procedure

1. Click **Oracle VirtualBox** on your computer and open it.
2. In Oracle VirtualBox, import the IBM MessageSight for Developers virtual
   image OVA package.
   a. Click **File** > **Import Applicance**.
   b. Click the `Import Virtual Application` icon and navigate to the IBM
   MessageSight OVA file on your computer.

        c. Click on the file name, and then click **Open**.

        d. Click **Next** and then **Import**. The `IBMMessageSightV1.1.ova` file is now importing.

3. After the `IBMMessageSightV1.1.ova` file is imported, click **Start**. The IBM MessageSight for Developers image is now loading.

4. After the IBM MessageSight for Developers image is loaded, enter the default user ID: `admin` and the default password: `admin` at the login prompt.

5. For `Which interface would you like to configure (default is eth0)`, enter `eth0`, and then press `Enter`.

6. For `Use DHCP for the Ethernet port (yes/no: default no)`, enter `Yes` , and then press `Enter`.

7. The URL to connect to IBM MessageSight UI is now displayed on the screen. Open a supported browser, enter the IP address that is displayed on the screen to connect to the IBM MessageSight Web UI.

8. Click **Add Exception** and then **Confirm Securtiy Exception** to add the IBM MessageSight Web UI as an exception.

9. In the `MessageSight Login` page, enter the default user ID: `admin` and the default password `admin`, and click **Log in**. The License Agreement page is displayed.

10. Click **I Agree** and the `License Accepted` window is displayed. Click **Close**.

11. Follow the steps on the `First Steps` tab to get started with IBM MessageSight. When you finish, click **Save and Close**.

Results

You have now installed IBM MessageSight for Developers on Oracle VirtualBox 4.3.10, and it is ready to be configured.

Supported browsers

You need one of the following supported web browsers. The browser must be installed on a system that is connected to the same network as the management port of the appliance:

Table 1. Supported web browsers by platform

	Linux RHEL 6 Linux SLES 11	Windows 7 Windows 8	Mac OS X	iOS 6
Firefox 10 ESR	Yes	Yes	Yes	No
Firefox 17 ESR	Yes	Yes	Yes	No
Chrome 18	Yes	Yes	No	No
Chrome 21	Yes	Yes	Yes	Yes
Internet Explorer 9	No	Yes	No	No
Internet Explorer 10	No	Yes	No	No
Safari 6	No	No	Yes	Yes

Note: If you are using Internet Explorer, you must ensure that you are running in Internet Explorer 9 standards mode. To change the mode, press F12.

Configuring IBM MessageSight

To configure MessageSight, you must configure the WebSphere MQ server connection channel, then configure MQ Connectivity in MessageSight, and then add a Destination Mapping rule.

Procedure

1. Configure the WebSphere MQ server connection channel.

   a. Create a Windows user account called MSG. The user cannot be an administrator.

   b. Use the `DEFINE CHANNEL` MQSC command to create a server-connection channel that is called SYSTEM.MSG.SVRCONN for `sampleQM`. Click **Start** > **Run**, type cmd to open a command prompt. On the command prompt, type the following command:

```
runmqsc sampleQM
DEFINE CHANNEL(SYSTEM.MSG.SVRCONN) CHLTYPE(SVRCONN) TRPTYPE(TCP) MCAUSER(MSG)
```

   c. Grant general WebSphere MQ access to the user account MSG:

```
SET AUTHREC OBJTYPE(QMGR) PRINCIPAL('MSG') AUTHADD(CONNECT, INQ, DSP)
```

   d. Grant authority for the user account MSG to issue requests to WebSphere MQ:

```
SET AUTHREC PROFILE('SYSTEM.DEFAULT.MODEL.QUEUE') OBJTYPE(QUEUE) PRINCIPAL('MSG') AUTHADD(DSP, GET)
SET AUTHREC PROFILE('SYSTEM.ADMIN.COMMAND.QUEUE') OBJTYPE(QUEUE) PRINCIPAL('MSG') AUTHADD(DSP, PUT)
```

   e. Grant authority for the user account MSG to create a WebSphere MQ queue for IBM MessageSight synchronization records:

```
SET AUTHREC PROFILE('SYSTEM.IMA.*') OBJTYPE(QUEUE) PRINCIPAL('MSG') AUTHADD(CRT, PUT, GET, BROWSE)
SET AUTHREC PROFILE('SYSTEM.DEFAULT.LOCAL.QUEUE') OBJTYPE(QUEUE) PRINCIPAL('MSG') AUTHADD(DSP)
```

   f. Grant publish and subscribe authority to `AutoRemote`:

```
DEFINE TOPIC(MSGTOPIC.sampleQM) TOPICSTR(AutoRemote)
SET AUTHREC PROFILE(MSGTOPIC.sampleQM) OBJTYPE(TOPIC) PRINCIPAL('MSG') AUTHADD(PUB, DSP)
```

2. Configure MQ Connectivity in MessageSight.

   a. In MessageSight, click **Messaging** > **MQ Connectivity**.

   b. Under Queue Manager Connection Properties, click the ➕ icon.

   c. Enter the following details:

   Name myQMC

   Queue Manager
   sampleQM

   Connection Name
   The IP address and port number where your WebSphere MQ is installed, for example, 224.0.138.177(1414). If there are more than one connection names, use comma to separate them.

   Channel Name
   SYSTEM.MSG.SVRCONN

   SSL CipherSpec
   Ignore this field.

   d. Click **Test Connection**.

> **Why am I doing this?**
>
> The **Test connection** button verifies that the activation specification contains the necessary details to create a connection to WebSphere MQ.

- If successful, the wizard displays the message `Test connection succeeded`.
- If test connection failed with error message CWLNA0309, click the message to see the detail. If the detail is `Channel error while connecting to queue manager.`, run the queue manager with a different CCSID and then restart WebSphere MQ. For example, you can open a command prompt and type **ALTER QMGR CCSID(819)** in the command prompt, and then restart WebSphere MQ and click **Test Connection** again.
- If test connection failed with error message CWLNA0315, click the message to see the detail. If the detail is `The operation is not authorized at the queue manager.`, disable the **Channel authentication records** of sampleQM in WebSphere MQ. To disable the **Channel authentication records** in sampleQM,

    1) Open WebSphere MQ Explorer and expand **IBM WebSphere MQ** > **Queue Managers**.
    2) Right click **sampleQM**.
    3) Click **Properties** > **Communication** and select **Disabled** in **Channel authentication records** list.

    After the **Channel authentication records** is disabled, restart WebSphere MQ and click **Test Connection** again.

   e. Click **Save**.

3. Add a Destination Mapping Rule.

   a. Under Destination Mapping Rules, click the ➕ icon.

   b. Enter the following details:

Name `Sample Rule 1`

Rule Type
> Select the following type from the dropdown list: `MessageSight topic subtree to MQ topic subtree`

Source
> `AutoRemote`

Destination
> `AutoRemote`

Max Messages
> Specify the maximum number of messages that can be buffered on the destination. The default is 5000.

Retained Messages
> `All`

   c. Under the Associated queue manager connections section, select **myQMC** and click **Save**.

Results

You have now configured MessageSight to work with the sample application.

Deploying the sample application to WebSphere Application Server

After you deploy the sample message driven bean (MDB) application, you can use it to verify that WebSphere Application Server is communicating with IBM MessageSight.

Before you begin

- Download the sample applications:
  - SampleCarApp.ear
  - AutoRemote.war
  - SampleCarApp.ear
  - AutoRemote.war

Procedure

1. Start WebSphere Application Server if it is not already started and open the administrative console.
2. Install the application.
   a. Click **Applications** > **Application Types** > **WebSphere enterprise applications**.
   b. In the Enterprise Applications pane, click **Install**.
   c. On the Preparing for the application installation page, select **Local file system**, then browse to where you downloaded the formatter MDB application, `SampleCarApp.ear` and click **Next**.
   d. For "How do you want to install the application?", leave the default option, **Fast path** selected.

   > **Why am I doing this?**
   > By choosing the "fast path" option, you can skip many of the steps on the Install New Application page; you are prompted only when additional information is required. For more information, see the topic Preparing for application installation binding settings in the WebSphere Application Server information center.

   Click **Next**.
   e. Click the **Step 3** link to go to the "Step 3: Bind listeners for message-driven beans" page. Select **Activation Specification** and enter `jms/SampleCarApp` in the Target Resource JNDI Name field.
   f. On the "Step 5: Summary" page, click **Finish**. The program displays messages to indicate that the application is being installed.
   g. When the application is installed successfully, click the **Save** link that is displayed at the end of the messages, to save your changes to the master configuration.
   h. On the Enterprise Applications page, if your new application is not running then select it and click **Start**.
3. Install the web application.

a. Click **Applications** > **Application Types** > **WebSphere enterprise applications**.

b. In the Enterprise Applications pane, click **Install**.

c. On the Preparing for the application installation page, select **Local file system**, then browse to where you downloaded the `AutoRemote.war` file and click **Next**.

d. For "How do you want to install the application?", leave the default option, **Fast path** selected and click **Next**.

e. On the Step 1, Step 2, and Step 3 pages, click **Next**.

f. On the "Step 4: Map context roots for Web modules" page, enter `/AutoRemote` in the Context Root field and click **Next**. Then, click **Next** again.

g. On the "Step 6: Summary" page, click **Finish**. The program displays messages to indicate that the application is being installed.

h. When the application is installed successfully, click the **Save** link that is displayed at the end of the messages, to save your changes to the master configuration.

i. On the Enterprise Applications page, if your new application is not running then select it and click **Start**.

Results

You have deployed the MDB application, which is now visible in the Enterprise Applications pane.

Verifying the solution

Run the sample JMS and message drive bean (MDB) applications to verify that they can communicate with each other through MessageSight and WebSphere MQ.

About this task

You have now connected MessageSight to WebSphere MQ and WebSphere Application Server, and installed a web application and Java EE application on WebSphere Application Server. To verify that this has been done correctly, use the web application to send messages with some example cars.

Procedure

1. Ensure that MessageSight, WebSphere MQ, and WebSphere Application Server are started and configured according to the sample IT configuration.

2. Open your browser. The application uses the WebSocket protocol, which is supported by Mozilla Firefox 6.0 and later, Google Chrome 14.0 and later, and Safari 6.0 and later.

3. Load the web application. If you are on the same machine where WebSphere Application Server is running, then this is http://localhost:9080/AutoRemote by default.

4. In each of the windows, enter the server address and default port (16102) of your MessageSight server.

5. There are three Remote/Car pairs. In order for the remote to connect to a car, the driver name should be the same for that pair. You may have a different driver name for each Remote/Car pairing. Click **Connect** to connect the car and remote pair.

6. Change the state of the cars through the remote and observe how the store page updates the statistics. The remotes and cars are communicating through only MessageSight.

7. Use the remote to change the state of the cars.

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