IBM WebSphere eXtreme Scale
Version 8.6.0.2

Installation Guide

June 2013

IBM

Contents

About the *Installation Guide*

The WebSphere® eXtreme Scale documentation set includes three volumes that provide the information necessary to use, program for, and administer the WebSphere eXtreme Scale product.

WebSphere eXtreme Scale library

The WebSphere eXtreme Scale library contains the following books:

- The *Product Overview* contains a high-level view of WebSphere eXtreme Scale concepts, including use case scenarios, and tutorials.
- The *Installation Guide* describes how to install common topologies of WebSphere eXtreme Scale.
- The *Administration Guide* contains the information necessary for system administrators, including how to plan application deployments, plan for capacity, install and configure the product, start and stop servers, monitor the environment, and secure the environment.
- The *Programming Guide* contains information for application developers on how to develop applications for WebSphere eXtreme Scale using the included API information.

To download the books, go to the WebSphere eXtreme Scale library page.

You can also access the same information in this library in the WebSphere eXtreme Scale Version 8.6 information center. .

Using the books offline

All of the books in the WebSphere eXtreme Scale library contain links to the information center, with the following root URL: `http://pic.dhe.ibm.com/infocenter/wxsinfo/v8r6`. These links take you directly to related information. However, if you are working offline and encounter one of these links, you can search for the title of the link in the other books in the library. The API documentation, glossary, and messages reference are not available in PDF books.

Who should use this book

This book is intended for anyone that is interested in installing WebSphere eXtreme Scale. To learn more about basic concepts, see the *Product Overview* before you install the product.

Getting updates to this book

You can get updates to this book by downloading the most recent version from the WebSphere eXtreme Scale library page.

How to send your comments

Contact the documentation team. Did you find what you needed? Was it accurate and complete? Send your comments about this documentation by e-mail to wasdoc@us.ibm.com.

Chapter 1. Installing

WebSphere eXtreme Scale is an in-memory data grid that you can use to dynamically partition, replicate, and manage application data and business logic across multiple servers. After determining the purposes and requirements of your deployment, install eXtreme Scale on your system.

Before you begin

- Before you begin the installation, you should have an understanding of WebSphere eXtreme Scale caching architectures, cache and database integration, serialization, scalability and availability. See the *Product Overview* or Product overview for more information.
- Plan your WebSphere eXtreme Scale deployment. For more information about the different caching topologies, sizing information, and more, see Planning.
- Verify that your environment meets the prerequisites to install eXtreme Scale. See "Hardware and software requirements" on page 8 for more information.
- For more information on environments and other requirements, see "Planning for installation" on page 4.
- If you are installing an upgrade on a previous version of WebSphere eXtreme Scale, follow the steps described in "Updating eXtreme Scale servers" on page 57.

Installation overview

You can install WebSphere eXtreme Scale in a stand-alone or WebSphere Application Server environment. To install WebSphere eXtreme Scale , you must first install the IBM Installation Manager and obtain product files. After installing the Installation Manager and setting up access to the appropriate product repositories, you can then choose your installation and environment types. You must install a server and one or more clients. Servers can run in stand-alone or WebSphere Application Server environments. You can also install WebSphere eXtreme Scale as an in-memory data grid for use with both .NET and Java applications with extreme transaction processing (XTP) capabilities.

WebSphere eXtreme Scale environment types

- **Java** **.NET** **WebSphere Application Server environment:**

  By installing WebSphere eXtreme Scale on the nodes in your WebSphere Application Server environment, you can automatically start catalog servers and container servers in the same cell as your deployment manager and other application servers.

- **Java** **.NET** **Stand-alone environment:**

  In a stand-alone installation, you install WebSphere eXtreme Scale in an environment that does not have WebSphere Application Server. With a stand-alone environment, you manually configure and start the catalog server and container server processes.

WebSphere eXtreme Scale installation types

If you have servers that are running client applications that access the data grid, you can use a client-only installation. Choose the server-only installation or server and client installation on nodes that run catalog servers or container servers.

- **Java** **Full (Client and Server) installation:**
  - When you are installing on WebSphere Application Server, you can choose to install the client only or both the server and the client.
  - When you are installing in a stand-alone environment, you can install both the client and server.

- **Java** **Client installation:**

  You can use the client-only installation on nodes that are running the client applications.

- **.NET** **Client installation:**

  The WebSphere eXtreme Scale Client for .NET is installed with a setup wizard that does not require the Installation Manager. The .NET client can access a data grid that is hosted by WebSphere Application Server.

Java
IBM Installation Manager

Installation Manager is a single installation program that can use remote or local software flat-file repositories to install, modify, or update new WebSphere eXtreme Scale products. It determines and shows available packages—including products, fix packs, interim fixes, and so on—checks prerequisites and interdependencies, and installs the selected packages. You also use Installation Manager to easily uninstall the packages that it installed.

Overview of IBM® Installation Manager: IBM Installation Manager is a general-purpose software installation and update tool that runs on a range of computer systems. Installation Manager can be invoked through a graphical user interface (GUI) or a command-line interface. You can also create response files in XML and use them to direct the performance of Installation Manager tasks in silent mode.

For more information on using Installation Manager, read the IBM Installation Manager Version 1.5 Information Center.

Packages and package groups: Each software product that can be installed with Installation Manager is referred to as a package. An installed package has a product level and an installation location. A package group consists of all of the products that are installed at a single location.

Installation Manager modes: IBM Installation Manager can be installed in one of the following three modes:
- In admin mode, the Installation Manager is installed from an administrator or a root ID and can be invoked by any administrator or root user.
- In nonAdmin mode (also called user mode), the Installation Manager can be invoked only by the user that installed it.
- **UNIX** **Linux** In group mode, the Installation Manager can be invoked by any user ID that is connected to the default group of the user that installed it.

This does not mean that two people can use the single instance of IBM Installation Manager at the same time.

How many Installation Managers do you need: You only need to run Installation Manager on those systems on which you install or update product code. You normally need only one Installation Manager on a system because one Installation Manager can keep track of any number of product installations.

Installing Installation Manager: When the installation kit is available on your system, you can install Installation Manager. Installation Manager consists of a set of binaries that are copied from the installation kit and a set of runtime data that describe the products that have been installed by this particular Installation Manager. Before installing Installation Manager, you must decide in which mode the Installation Manager will run as well as where the binaries and runtime data—called agent data or appdata—will reside. Then, you issue an Installation Manager installation command from the appropriate user ID to install Installation Manager.

Accessing product repositories: All software materials that will be installed with IBM Installation Manager are stored in flat-file repositories. Each repository contains program objects and metadata for one or more packages—that is, software products at a particular level. Repositories can also contain product maintenance, such as fix packs and interim fixes. Whenever you install a new product, you can choose from any of the available product levels in any accessible repository.

Installing the product: After you have installed Installation Manager and have access to all necessary product repositories, you can use the Installation Manager GUI, command-line commands, or response files to perform the actual product installations. When you install a product, you provide the package name, optionally the product level to be installed, the product location, and any other optional properties. For example, some products have optional features that you can select at installation time or a list of optional supported language packs from which you can select.

Working with installed products: You can use Installation Manager commands to list installed products and product levels. You can also obtain this information for installed copies of WebSphere eXtreme Scale products by issuing the `versionInfo` command from the product file system. You can use Installation Manager commands or response files to install a new product level, roll back to a previous level, or modify the product by adding or removing optional features or language packs.

Using the IBM Packaging Utility: With the Packaging Utility, you can create and manage packages for installation repositories. You can copy multiple packages into one repository or copy multiple disks for one product into a repository. You can copy packages from Passport Advantage® into a repository for example. For more information on the Packaging Utility, go to the IBM Installation Manager Version 1.5 Information Center.

Restrictions:

- Windows If a non-administrator installs WebSphere eXtreme Scale Version 8.5 on a Windows Vista, Windows 7, or Windows Server 2008 operating system into the `Program Files` or `Program Files (x86)` directory with User Account Control (UAC) enabled, WebSphere eXtreme Scale will not function correctly.

UAC is an access-control mechanism that allows non-administrative users to install a software product into the `Program Files` or `Program Files (x86)` directory; but it then prohibits any write access to that directory after the installation has completed. WebSphere eXtreme Scale requires write access in the *app_server_root* directory in order to function correctly.

To resolve this issue, perform one of the following actions:

– Install WebSphere eXtreme Scale into a directory other than `Program Files` or `Program Files (x86)`.

For example:

`C:\IBM\WebSphere\AppServer`

– Disable UAC.

- When you install a product using Installation Manager with local repositories, the installation takes a significantly longer amount of time if you use a compressed repository file directly without extracting it.

Before you install a product using local repositories, extract the compressed repository file to a location on your local system before using Installation Manager to access it.

- Installation Manager console mode, which is included in Installation Manager Version 1.4.3 and later, does not work with WebSphere eXtreme Scale Version 8.5 offerings on systems other than z/OS®.

Important: Do not transfer the content of a repository in non-binary mode and do not convert any content on extraction.

Tip: Although almost all of the instructions in this section of the information center will work with earlier versions of IBM Installation Manager, the information here is optimized for users who have installed or upgraded to Installation Manager Version 1.5 or later.

Java

Available product offerings in Installation Manager

After you have installed Installation Manager and have access to all necessary product repositories, the Installation Manager lists the product offerings that are available to you. When you point to our product repository, you should see the following product offerings:

- WebSphere eXtreme Scale in a stand-alone environment
- WebSphere eXtreme Scale Client in a stand-alone environment
- WebSphere eXtreme Scale for WebSphere Application Server Version 7.0
- WebSphere eXtreme Scale for WebSphere Application Server Version 8.0
- WebSphere eXtreme Scale Client for WebSphere Application Server Version 7.0
- WebSphere eXtreme Scale Client for WebSphere Application Server Version 8.0

Important: You must point to the WebSphere Application Server product repository if you want to install the product offering WebSphere eXtreme Scale for WebSphere Application Server. These are installed as two separate products, but can be installed at the same time in Installation Manager.

Planning for installation

Before you install the product, you must consider your environment.

Installation topologies

With WebSphere eXtreme Scale, you can create many installation topologies that include stand-alone servers, WebSphere Application Server, or both.

Development node

The simplest installation scenario is creating a development node. In this scenario, you install the client and server installation of WebSphere eXtreme Scale one time on the node where you want to develop your application.
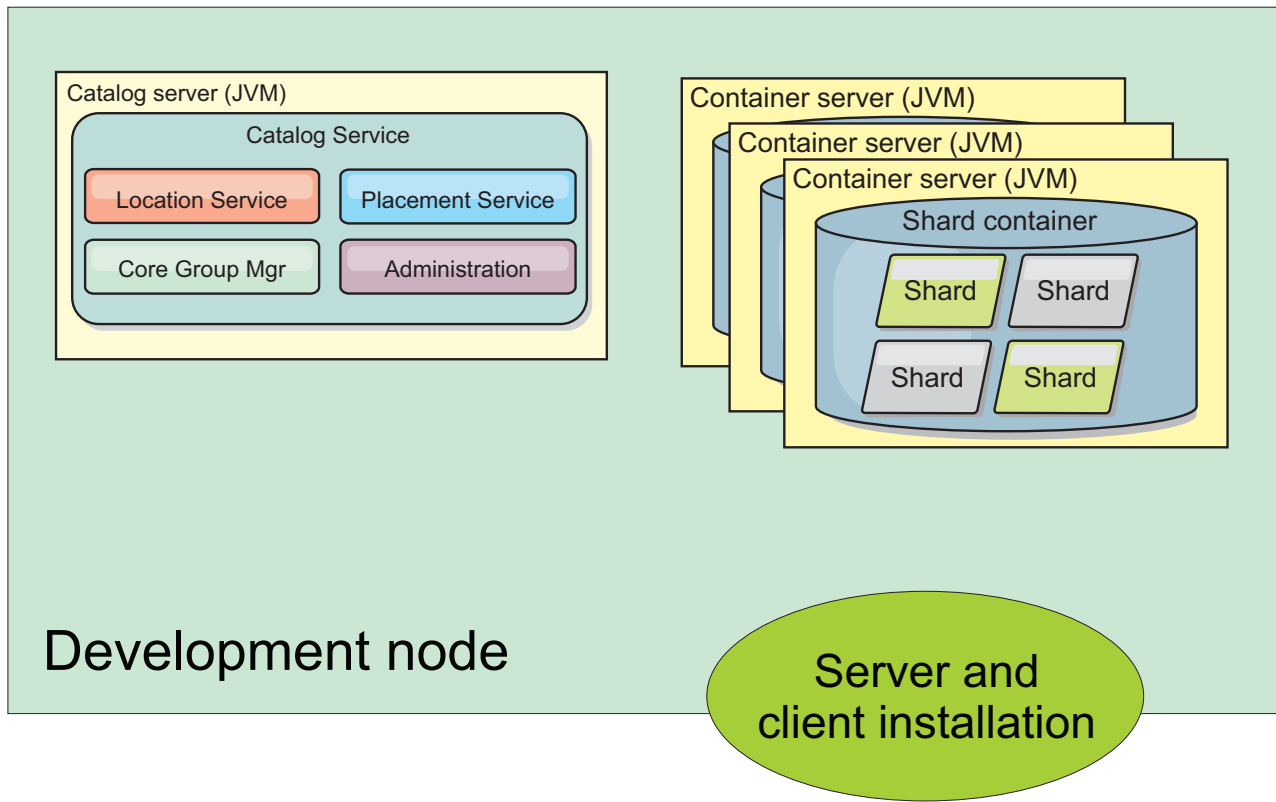
Figure 1. Development node

After you complete the installation on your development node, you can configure your development environment and begin writing your applications.

Stand-alone topology

A stand-alone topology consists of servers that are not running on WebSphere Application Server. You can create many different stand-alone topologies, but the following topology is included as an example. In this topology, two data centers are present. In each data center, WebSphere eXtreme Scale full installations (client and server) and client-only installations are installed on the physical servers. The client-only installations are on the nodes that are running the web applications that are using the data grid. These nodes do not run any catalog or container servers, so the server installation is not required. A multi-master link connects the two catalog service domains in the configuration. The multi-master link enables replication between the shards in the container servers in the different data centers.
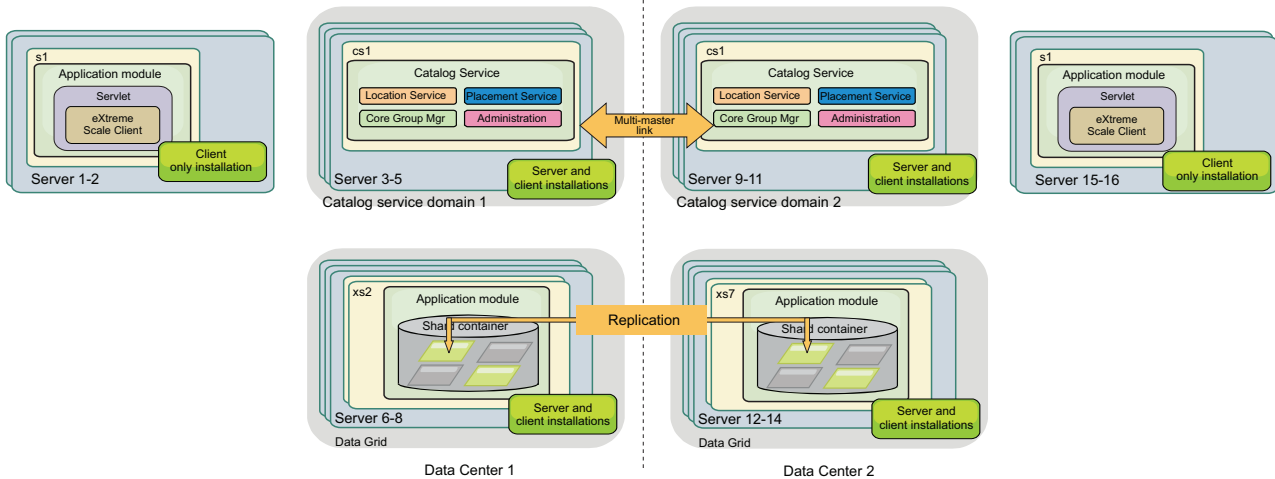
Figure 2. Stand-alone topology with two data centers

Advantages to using a stand-alone topology:

- Flexible integration options that can be embedded with vendor frameworks and libraries.
- Smaller footprint than a WebSphere Application Server topology.
- Fewer licensing requirements than a WebSphere Application Server topology.
- Expanded Java Runtime Environment (JRE) options.

WebSphere Application Server topology

You can also create an installation that runs entirely in a WebSphere Application Server cell. The clients, catalog servers, and container servers each have an associated cluster. The nodes that run the application have the client-only installation. The other nodes have the client and server installation.
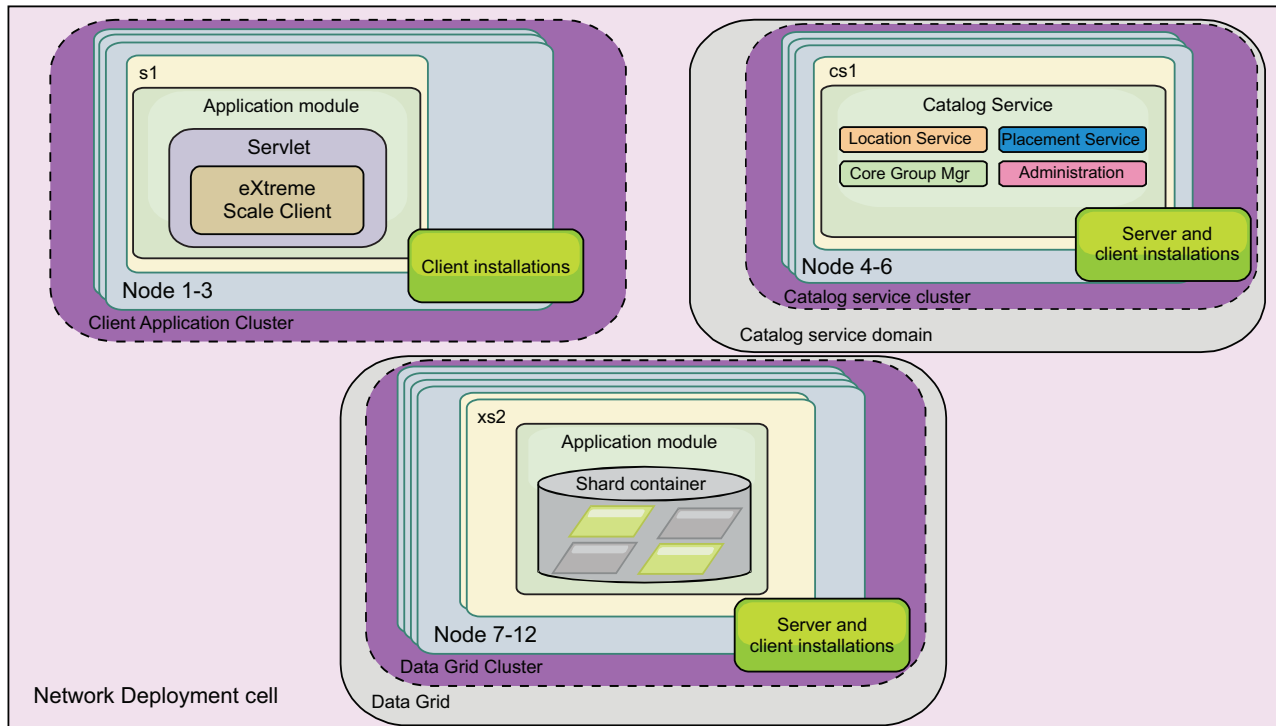
Figure 3. WebSphere Application Server topology example

Advantages of using a WebSphere Application Server topology.
- Centralized and consistent administration and configuration.
- Security integration.
- Java EE application integration.
- Performance monitoring infrastructure (PMI) integration.
- Integration with the following WebSphere Application Server components: OpenJPA L2 cache, dynamic cache, and HTTP session persistence.

Mixed topology

You can create a mixed topology that contains both WebSphere Application Server and stand-alone servers. In the following example, the client applications are running in the WebSphere Application Server cell, while the catalog servers and container servers are running in stand-alone mode.
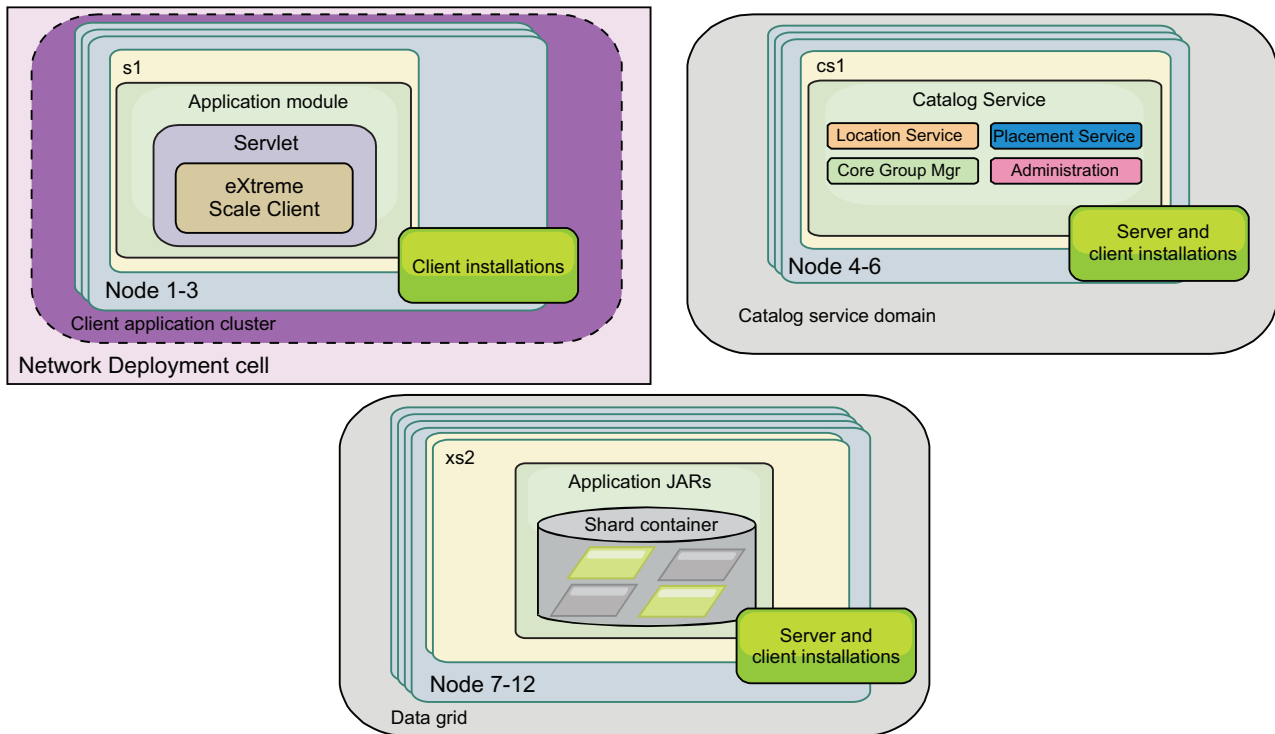
Figure 4. Mixed topology example

Hardware and software requirements

Browse an overview of hardware and operating system requirements. Although you are not required to use a specific level of hardware or operating system for WebSphere eXtreme Scale, formally supported hardware and software options are available on the Systems Requirements page of the product support site. If a conflict exists between the information center and the System Requirements page, the information at the website takes precedence. Prerequisite information in the information center is provided as a convenience only.

See the System Requirements page for the official set of hardware and software requirements.

You can install and deploy the product in Java™ EE and Java SE environments. You can also bundle the client component with Java EE applications directly without integrating with WebSphere Application Server.

Hardware requirements

WebSphere eXtreme Scale does not require a specific level of hardware. The hardware requirements are dependent on the supported hardware for the Java Platform, Standard Edition installation that you use to run WebSphere eXtreme Scale. If you are using eXtreme Scale with WebSphere Application Server or another Java Platform, Enterprise Edition implementation, the hardware requirements of these platforms are sufficient for WebSphere eXtreme Scale.

Operating system requirements

.NET **8.6+** For details about the requirements for a .NET client environment, see Microsoft .NET considerations.

Java Each Java SE and Java EE implementation requires different operating system levels or fixes for problems that are discovered during the testing of the Java implementation. The levels required by these implementations are sufficient for eXtreme Scale.

Installation Manager requirements

Before you can install WebSphere eXtreme Scale, you must install Installation Manager. You can install Installation Manager using the product media, using a file obtained from the Passport Advantage site, or using a file containing the most current version of Installation Manager from the IBM Installation Manager download website. See "Installing IBM Installation Manager and WebSphere eXtreme Scale product offerings" on page 20 for more information.

Web browser requirements

The web console supports the following Web browsers:
- Mozilla Firefox, version 3.5.x and later
- Microsoft Internet Explorer, version 7 and later

WebSphere Application Server requirements

8.6+
- WebSphere Application Server Version 7.0.0.21 or later
- WebSphere Application Server Version 8.0.0.2 or later

See the Recommended fixes for WebSphere Application Server for more information.

Java requirements

8.6+ Other Java EE implementations can use the eXtreme Scale run time as a local instance or as a client to eXtreme Scale servers. To implement Java SE, you must use Version 6 or later.

Offering IDs for WebSphere eXtreme Scale product offerings

When installing product updates or rolling back fixes, you are required to specify the offering ID from the command line. Use the following tables to identify the product offerings and required and optionally installable features.

Table 1. Offering IDs for WebSphere eXtreme Scale product offerings

Product name	Offering ID
WebSphere eXtreme Scale in a stand-alone environment	`com.ibm.websphere.WXS.v86`
WebSphere eXtreme Scale Client in a stand-alone environment	`com.ibm.websphere.WXSCLIENT.v86`
WebSphere eXtreme Scale for WebSphere Application Server Version 6	**Note:** WebSphere eXtreme Scale Version 8.6 does not support WebSphere Application Server Version 6
WebSphere eXtreme Scale for WebSphere Application Server Version 7	`com.ibm.websphere.WXS.was7.v86`
WebSphere eXtreme Scale for WebSphere Application Server Version 8	`com.ibm.websphere.WXS.was8.v86`

Table 1. Offering IDs for WebSphere eXtreme Scale product offerings (continued)

Product name	Offering ID
WebSphere eXtreme Scale Client for WebSphere Application Server Version 6	**Note:** WebSphere eXtreme Scale Version 8.6 does not support WebSphere Application Server Version 6
WebSphere eXtreme Scale Client for WebSphere Application Server Version 7	`com.ibm.websphere.WXSCLIENT.was7.v86`
WebSphere eXtreme Scale Client for WebSphere Application Server Version 8	`com.ibm.websphere.WXSCLIENT.was8.v86`

Table 2. Installable features for WebSphere eXtreme Scale; offering ID `com.ibm.websphere.WXS.v86`

Feature name	Feature ID
WebSphere eXtreme Scale	`xs.core.feature`
WebSphere eXtreme Scale Java Runtime Environment	`xs.jre.feature`
WebSphere eXtreme Scale server in a stand-alone environment (Optional)	`xs.server.standalone.feature`
WebSphere eXtreme Scale Client in a stand-alone environment	`xs.client.standalone.feature`
WebSphere eXtreme Scale monitoring console (Optional)	`xs.console.feature`
WebSphere eXtreme Scale Samples (Optional)	`xs.samples.feature`

Table 3. Installable features for WebSphere eXtreme Scale Client; offering ID `com.ibm.websphere.WXSCLIENT.v86`

Feature name	Feature ID
WebSphere eXtreme Scale Client	`xs.client.core.feature`
WebSphere eXtreme Scale Java Runtime Environment	`xs.jre.feature`
WebSphere eXtreme Scale Client in a stand-alone environment	`xs.client.standalone.feature`
WebSphere eXtreme Scale monitoring console (Optional)	`xs.console.feature`
WebSphere eXtreme Scale Samples (Optional)	`xs.samples.feature`

Table 4. Installable features for WebSphere eXtreme Scale for WebSphere Application Server Version 7; offering ID `com.ibm.websphere.WXS.was7.v86`

Feature name	Feature ID
WebSphere eXtreme Scale	`xs.core.feature`
WebSphere eXtreme Scale server	`xs.server.feature`
WebSphere eXtreme Scale Client	`xs.client.feature`
WebSphere eXtreme Scale monitoring console (Optional)	`xs.console.feature`
WebSphere eXtreme Scale Samples (Optional)	`xs.samples.feature`

Table 5. Installable features for WebSphere eXtreme Scale Client for WebSphere Application Server Version 7; offering ID `com.ibm.websphere.WXSCLIENT.was7.v86`

Feature name	Feature ID
WebSphere eXtreme Scale Client	`xs.client.core.feature`
WebSphere eXtreme Scale Client in a stand-alone environment	`xs.client.feature`
WebSphere eXtreme Scale monitoring console (Optional)	`xs.console.feature`
WebSphere eXtreme Scale Samples (Optional)	`xs.samples.feature`

Table 6. Installable features for WebSphere eXtreme Scale for WebSphere Application Server Version 8; offering ID `com.ibm.websphere.WXS.was8.v86`

Feature name	Feature ID
WebSphere eXtreme Scale for WebSphere Application Server Version 8.5.5	`xs.core.feature` This feature is required on WebSphere Application Server V8, WebSphere Application Server V8.5 (with or without the WebSphere Application Server Liberty profile), WebSphere Application Server V8.5.5 and the Liberty profile for WebSphere Application Server V8.5.5

Table 6. Installable features for WebSphere eXtreme Scale for WebSphere Application Server Version 8; offering ID `com.ibm.websphere.WXS.was8.v86` *(continued)*

Feature name	Feature ID
WebSphere eXtreme Scale server for WebSphere Application Server (Optional)	`xs.server.feature` You can install this feature with WebSphere Application Server versions 8, 8.5 and 8.5.5. You cannot install this feature with the Liberty profile for WebSphere Application Server V8.5.5 and higher.
WebSphere eXtreme Scale Client for WebSphere Application Server	`xs.client.feature` This feature is required for WebSphere Application Server versions 8, 8.5 and 8.5.5. You cannot install this feature with the Liberty profile.
WebSphere eXtreme Scale monitoring console (Optional)	`xs.console.feature` This feature can be installed on WebSphere Application Server versions 8, 8.5 and 8.5.5. You cannot install this feature with the Liberty profile.
WebSphere eXtreme Scale Samples (Optional)	`xs.samples.feature` This feature can be installed on WebSphere Application Server versions 8, 8.5 and 8.5.5. You cannot install this feature with the Liberty profile.
WebSphere eXtreme Scale Client for WebSphere Application Server Version 8.5 (Optional)	`xs.liberty.feature`
WebSphere eXtreme Scale for WebSphere Application Server (Optional; Required for the Liberty profile for WebSphere Application Server Version 8.5.5)	`xs.liberty.standalone.feature` You cannot install this feature with WebSphere Application Server. This feature is the Liberty profile for WebSphere Application Server V8.5.5, and it is intended to be installed by itself.

Table 7. Installable features for WebSphere eXtreme Scale Client for WebSphere Application Server Version 8; offering ID `com.ibm.websphere.WXSCLIENT.was8.v86`

Feature name	Feature ID
WebSphere eXtreme Scale for WebSphere Application Server Version 8.5.5	`xs.client.core.feature` This feature is required on WebSphere Application Server V8, WebSphere Application Server V8.5 (with or without the Liberty profile), WebSphere Application Server V8.5.5 and the Liberty profile for WebSphere Application Server V8.5.5
WebSphere eXtreme Scale Client for WebSphere Application Server	`xs.client.feature` You can install this feature with WebSphere Application Server versions 8, 8.5 and 8.5.5. You cannot install this feature with the Liberty profile.
WebSphere eXtreme Scale monitoring console (Optional)	`xs.console.feature` This feature can be installed on WebSphere Application Server versions 8, 8.5 and 8.5.5. You cannot install this feature with the Liberty profile.
WebSphere eXtreme Scale Samples (Optional)	`xs.samples.feature` This feature can be installed on WebSphere Application Server versions 8, 8.5 and 8.5.5. You cannot install this feature with the Liberty profile.
WebSphere eXtreme Scale for WebSphere Application Server Version 8.5 (Optional)	`xs.liberty.feature` You can install this feature with WebSphere Application Server V8.5 with the Liberty profile installed.
WebSphere eXtreme Scale for WebSphere Application Server (Optional; Required for the Liberty profile for WebSphere Application Server Version 8.5.5)	`xs.liberty.standalone.feature` You cannot install this feature with WebSphere Application Server. This feature is the Liberty profile for WebSphere Application Server V8.5.5, and it is intended to be installed by itself.

Java SE considerations

Java

WebSphere eXtreme Scale requires Java SE 6, or Java SE 7. In general, newer versions of Java SE have better functionality and performance.

Supported versions

You can use WebSphere eXtreme Scale with Java SE 6, and Java SE 7. The version that you use must be currently supported by the Java Runtime Environment (JRE) vendor. If you want to use Secure Sockets Layer (SSL), you must use an IBM Runtime Environment.

IBM Runtime Environment, Java Technology Edition Version 6 , and Version 7 are supported for general use with the product. Version 6 Service Release 9 Fix Pack 2 is a fully supported JRE that is installed as a part of the stand-alone WebSphere eXtreme Scale and WebSphere eXtreme Scale Client installations in the *wxs_install_root*/java directory and is available to be used by both clients and servers. If you are installing WebSphere eXtreme Scale within WebSphere Application Server, you can use the JRE that is included in the WebSphere Application Server installation. For the web console, you must use IBM Runtime Environment, Java Technology Edition Version 6 Service Release 7 and later service releases only.

WebSphere eXtreme Scale takes advantage of Version 6 , and Version 7 functionality as it becomes available. Generally, newer versions of the Java Development Kit (JDK) and Java SE have better performance and functionality.

For more information, see Supported software.

WebSphere eXtreme Scale features that are dependent on Java SE

Table 8. Features that require Java SE 6, and Java SE 7.

WebSphere eXtreme Scale uses functionality that is introduced in Java SE 6 to provide the following product features.

Feature	Supported in Java SE 5 and later service releases Note: Java SE 5 is not supported in WebSphere eXtreme Scale Version 8.6	Supported in Java SE Version 6 , Version 7 and later service releases
EntityManager API annotations (Optional: You can also use XML files)	X	X
Java Persistence API (JPA): JPA loader, JPA client loader, and JPA time-based updater	X	X
Memory-based eviction (uses MemoryPoolMXBean)	X	X

Table 8. Features that require Java SE 6, and Java SE 7 (continued).

WebSphere eXtreme Scale uses functionality that is introduced in Java SE 6 to provide the following product features.

Feature	Supported in Java SE 5 and later service releases **Note:** Java SE 5 is not supported in WebSphere eXtreme Scale Version 8.6	Supported in Java SE Version 6 , Version 7 and later service releases
Instrumentation agents: • `wxssizeagent.jar`: Increases the accuracy of the used bytes map metrics. • `ogagent.jar`: Increases the performance of field-access entities.	X	X
Web console for monitoring		X

Upgrading the JDK in WebSphere eXtreme Scale

Common questions about the upgrade process for releases of WebSphere eXtreme Scale in both stand-alone and WebSphere Application Server environments follow:

- How do I upgrade the JDK that is included with WebSphere eXtreme Scale for WebSphere Application Server?

  You need to use the JDK upgrade process that is made available by WebSphere Application Server. For more information, see http://www-304.ibm.com/support/docview.wss?uid=swg21427178.

- Which version of the JDK should I use when using WebSphere eXtreme Scale in a WebSphere Application Server environment?

  You can use any level of JDK that is supported by WebSphere Application Server, for the supported version of WebSphere Application Server.

Java EE considerations

Java

As you prepare to integrate WebSphere eXtreme Scale in a Java Platform, Enterprise Edition environment, consider certain items, such as versions, configuration options, requirements and limitations, and application deployment and management.

Running eXtreme Scale applications in a Java EE environment

A Java EE application can connect to a remote eXtreme Scale application. Additionally, the WebSphere Application Server environment supports starting an eXtreme Scale server as an application starts in the application server.

If you use an XML file to create an ObjectGrid instance, and the XML file is in the module of the enterprise archive (EAR) file, access the file by using the getClass().getClassLoader().getResource("META-INF/objGrid.xml") method to obtain a URL object to use to create an ObjectGrid instance. Substitute the name of the XML file that you are using in the method call.

You can use startup beans for an application to bootstrap an ObjectGrid instance when the application starts, and to destroy the instance when the application stops. A startup bean is a stateless session bean with a com.ibm.websphere.startupservice.AppStartUpHome remote location and a com.ibm.websphere.startupservice.AppStartUp remote interface. The remote interface has two methods: the start method and the stop method. Use the start method to bootstrap the instance, and use the stop method to destroy the instance. The application uses the ObjectGridManager.getObjectGrid method to maintain a reference to the instance. See the information about accessing an ObjectGrid with the ObjectGridManager in the *Programming Guide* for more information.

Using class loaders

When application modules that use different class loaders share a single ObjectGrid instance in a Java EE application, verify the objects that are stored in eXtreme Scale and the plug-ins for the product are in a common loader in the application.

Managing the life cycle of ObjectGrid instances in a servlet

To manage the life cycle of an ObjectGrid instance in a servlet, you can use the init method to create the instance and the destroy method to remove the instance. If the instance is cached, it is retrieved and manipulated in the servlet code. See the information about accessing an ObjectGrid with the ObjectGridManager interface in the *Programming Guide* for more information.

Directory conventions

The following directory conventions are used throughout the documentation to must reference special directories such as *wxs_install_root* and *wxs_home*. You access these directories during several different scenarios, including during installation and use of command-line tools.

wxs_install_root
> The *wxs_install_root* directory is the root directory where WebSphere eXtreme Scale product files are installed. The *wxs_install_root* directory can be the directory in which the trial archive is extracted or the directory in which the WebSphere eXtreme Scale product is installed.
>
> * Example when extracting the trial:
>   **Example:** `/opt/IBM/WebSphere/eXtremeScale`
> * Example when WebSphere eXtreme Scale is installed to a stand-alone directory:
>
>   > `UNIX`   **Example:** `/opt/IBM/eXtremeScale`
>
>   > `Windows`   **Example:** `C:\Program Files\IBM\WebSphere\eXtremeScale`
>
> * Example when WebSphere eXtreme Scale is integrated with WebSphere Application Server:
>   **Example:** `/opt/IBM/WebSphere/AppServer`

wxs_home
> The *wxs_home* directory is the root directory of the WebSphere eXtreme Scale product libraries, samples, and components. This directory is the same as the *wxs_install_root* directory when the trial is extracted. For stand-alone installations, the *wxs_home* directory is the `ObjectGrid` subdirectory within the *wxs_install_root* directory. For installations that are integrated with

WebSphere Application Server, this directory is the `optionalLibraries/`
`ObjectGrid` directory within the *wxs_install_root* directory.

- Example when extracting the trial:

  Example: `/opt/IBM/WebSphere/eXtremeScale`

- Example when WebSphere eXtreme Scale is installed to a stand-alone
  directory:

   UNIX **Example:** `/opt/IBM/eXtremeScale/ObjectGrid`

   Windows **Example:** *wxs_install_root*`\ObjectGrid`

- Example when WebSphere eXtreme Scale is integrated with WebSphere
  Application Server:

  Example: `/opt/IBM/WebSphere/AppServer/optionalLibraries/ObjectGrid`

was_root

    The *was_root* directory is the root directory of a WebSphere Application Server
installation:

    Example: `/opt/IBM/WebSphere/AppServer`

 .NET **8.6+** **net_client_home**

    The *net_client_home* directory is the root directory of a .NET client
installation.

    Example: `C:\Program Files\IBM\WebSphere\eXtreme Scale .NET Client`

restservice_home

    The *restservice_home* directory is the directory in which the WebSphere
eXtreme Scale REST data service libraries and samples are located. This
directory is named `restservice` and is a subdirectory under the *wxs_home*
directory.

- Example for stand-alone deployments:

  Example: `/opt/IBM/WebSphere/eXtremeScale/ObjectGrid/restservice`
  Example: *wxs_home*`\restservice`

- Example for WebSphere Application Server integrated deployments:

  Example: `/opt/IBM/WebSphere/AppServer/optionalLibraries/ObjectGrid/`
  `restservice`

tomcat_root

    The *tomcat_root* is the root directory of the Apache Tomcat installation.

    Example: `/opt/tomcat5.5`

wasce_root

    The *wasce_root* is the root directory of the WebSphere Application Server
Community Edition installation.

    Example: `/opt/IBM/WebSphere/AppServerCE`

java_home

    The *java_home* is the root directory of a Java Runtime Environment (JRE)
installation.

     UNIX **Example:** `/opt/IBM/WebSphere/eXtremeScale/java`

     Windows **Example:** *wxs_install_root*`\java`

samples_home

    The *samples_home* is the directory in which you extract the sample files that are
used for tutorials.

| | UNIX | **Example:** *wxs_home*/samples |

| | Windows | **Example:** *wxs_home*\samples |

dvd_root
> The *dvd_root* directory is the root directory of the DVD that contains the product.
>
> **Example:** dvd_root/docs/

equinox_root
> The *equinox_root* directory is the root directory of the Eclipse Equinox OSGi framework installation.
>
> **Example:**/opt/equinox

user_home
> The *user_home* directory is the location where user files are stored, such as security profiles.
>
> | Windows | c:\Documents and Settings*user_name* |
>
> | UNIX | /home/*user_name* |

Runtime files for WebSphere eXtreme Scale integrated with WebSphere Application Server

Java archive (JAR) files are included in the installation. You can see the JAR files that are included and the location to which they are installed.

Table 9. Runtime files for WebSphere eXtreme Scale. The following table lists the Java archive (JAR) files that are included in the installation. The installation location is relative to the *wxs_home* directory that you choose during the installation.

File name	Environment	Installation location	Description
wxsdynacache.jar	Client and server	lib	The wxsdynacache.jar file contains the necessary classes to use with the dynamic cache provider.
wsobjectgrid.jar	Local and client	lib	The wsobjectgrid.jar contains the eXtreme Scale local, client, and server run times.
ogagent.jar	Local, client, and server	lib	The ogagent.jar file contains the runtime classes that are required to run the Java instrumentation agent that is used with the EntityManager API.
ogsip.jar	Server	lib	The ogsip.jar file contains the eXtreme Scale Session Initiation Protocol (SIP) session management runtime that is compatible with WebSphere Application Server Version 7.0 and later.
sessionobjectgrid.jar	Client and server	lib	The sessionobjectgrid.jar file contains the eXtreme Scale HTTP session management runtime.
sessionobjectgridsip.jar	Server	lib	The sessionobjectgridsip.jar file contains the eXtreme Scale SIP session management runtime that is compatible with with WebSphere Application Server Version 7.0 and later.
wsogclient.jar	Local and client	lib	The wsogclient.jar file installed when you use an environment that contains WebSphere Application Server Version 7.0 and later. This file contains only the local and client runtime environments.
wxssizeagent.jar	Local, client, and server	lib	The wxssizeagent.jar file is used to provide more accurate cache entry sizing information when using Java runtime environment (JRE) Version 1.6 or later.
oghibernate-cache.jar	Client and server	optionalLibraries/ObjectGrid	The oghibernate-cache.jar file contains the eXtreme Scale level 2 cache plug-in for JBoss Hibernate.
ogspring.jar	Local, client, and server	optionalLibraries/ObjectGrid	The ogspring.jar file contains support classes for the SpringSource Spring framework integration.
xsadmin.jar	Utility	optionalLibraries/ObjectGrid	The xsadmin.jar file contains the eXtreme Scale administration sample utility.

Table 9. Runtime files for WebSphere eXtreme Scale (continued). The following table lists the Java archive (JAR) files that are included in the installation. The installation location is relative to the *wxs_home* directory that you choose during the installation.

File name	Environment	Installation location	Description
ibmcfw.jar ibmorb.jar ibmorbapi.jar	Client and server	optionalLibraries/ObjectGrid/endorsed	This set of files includes the Object Request Broker (ORB) runtime that is used for running applications in Java SE processes.
wxshyperic.jar	Utility	optionalLibraries/ObjectGrid/hyperic/lib	The WebSphere eXtreme Scale server detection plug-in for the SpringSource Hyperic monitoring agent.
restservice.ear	Client	optionalLibraries/ObjectGrid/restservice/lib	The restservice.ear file contains the eXtreme Scale REST data service application enterprise archive for WebSphere Application Server environments.
restservice.war	Client	optionalLibraries/ObjectGrid/restservice/lib	The restservice.war file contains the eXtreme Scale REST data service Web archive for application servers acquired from another vendor.
splicerlistener.jar	Utility	optionalLibraries/ObjectGrid/session/lib	The splicerlistener.jar file contains the splicer utility for the eXtreme Scale HTTP session manager filter.
splicer.jar	Utility	optionalLibraries/ObjectGrid/legacy/session/lib	The splicer.jar contains the Version 7.0 splicer utility for the eXtreme Scale HTTP session manager filter.
wxsra.rar	Utility	optionalLibraries/ObjectGrid/wxsra.rar	The wxsra.rar contains the eXtreme Scale resource adapter to connect to the grid using a connection factory.

Table 10. Runtime files for WebSphere eXtreme Scale Client. The following table lists the Java archive (JAR) files that are included in the installation. The installation location is relative to the *wxs_home* directory that you choose during the installation.

File name	Environment	Installation location	Description
wxsdynacache.jar	Client and server	lib	The wxsdynacache.jar file contains the necessary classes to use with the dynamic cache provider.
ogagent.jar	Local, client, and server	lib	The ogagent.jar file contains the runtime classes that are required to run the Java instrumentation agent that is used with the EntityManager API.
ogsip.jar	Server	lib	The ogsip.jar file contains the eXtreme Scale Session Initiation Protocol (SIP) session management runtime that is compatible with WebSphere Application Server Version 7.0 and later.
sessionobjectgrid.jar	Client and server	lib	The sessionobjectgrid.jar file contains the eXtreme Scale HTTP session management runtime.
sessionobjectgridsip.jar	Server	lib	The sessionobjectgridsip.jar file contains the eXtreme Scale SIP session management runtime that is compatible with WebSphere Application Server Version 7.0 and later.
wsogclient.jar	Local and client	lib	The wsogclient.jar file installed when you use an environment that contains WebSphere Application Server Version 7.0 and later. This file contains only the local and client runtime environments.
wxssizeagent.jar	Local, client, and server	lib	The wxssizeagent.jar file is used to provide more accurate cache entry sizing information when using Java runtime environment (JRE) Version 1.6 or later
oghibernate-cache.jar	Client and server	optionalLibraries/ObjectGrid	The oghibernate-cache.jar file contains the eXtreme Scale level 2 cache plug-in for JBoss Hibernate.
ogspring.jar	Local, client, and server	optionalLibraries/ObjectGrid	The ogspring.jar file contains support classes for the SpringSource Spring framework integration.
xsadmin.jar	Utility	optionalLibraries/ObjectGrid	The xsadmin.jar file contains the eXtreme Scale administration sample utility.
ibmcfw.jar ibmorb.jar ibmorbapi.jar	Client and server	optionalLibraries/ObjectGrid/endorsed	This set of files includes the Object Request Broker (ORB) runtime that is used for running applications in Java SE processes.

Table 10. Runtime files for WebSphere eXtreme Scale Client (continued). The following table lists the Java archive (JAR) files that are included in the installation. The installation location is relative to the *wxs_home* directory that you choose during the installation.

File name	Environment	Installation location	Description
wxshyperic.jar	Utility	optionalLibraries/ObjectGrid/ hyperic/lib	The WebSphere eXtreme Scale server detection plug-in for the SpringSource Hyperic monitoring agent.
restservice.ear	Client	optionalLibraries/ObjectGrid/ restservice/lib	The restservice.ear file contains the eXtreme Scale REST data service application enterprise archive for WebSphere Application Server environments.
restservice.war	Client	optionalLibraries/ObjectGrid/ restservice/lib	The restservice.war file contains the eXtreme Scale REST data service Web archive for application servers acquired from another vendor.
splicerlistener.jar	Utility	optionalLibraries/ObjectGrid/ session/lib	The splicerlistener.jar file contains the splicer utility for the eXtreme Scale HTTP session manager filter.
splicer.jar	Utility	optionalLibraries/ObjectGrid/ legacy/session/lib	The splicer.jar contains the Version 7.0 splicer utility for the eXtreme Scale HTTP session manager filter.

Runtime files for WebSphere eXtreme Scale stand-alone installation

Java archive (JAR) files are included in the installation. You can see the JAR files that are included and the location to which they are installed.

Table 11. Runtime files for WebSphere eXtreme Scale full installation. WebSphere eXtreme Scale relies on ObjectGrid processes and related APIs. The following table lists the JAR files that are included in the installation. The installation location is relative to the *wxs_home* directory that you choose during the installation.

File name	Environment	Installation location	Description
wxsdynacache.jar	Client and server	dynacache/lib	The wxsdynacache.jar file contains the necessary classes to use with the dynamic cache provider. The file is automatically included in the server runtime environment when you use the supplied scripts.
wxshyperic.jar	Utility	hyperic/lib	The WebSphere eXtreme Scale server detection plug-in for the SpringSource Hyperic monitoring agent.
objectgrid.jar	Local, client, and server	lib	The objectgrid.jar file is an OSGi bundle that is used by the server runtime environment of Java SE 1.6 and later. The file is automatically included in the server runtime environment when you use the supplied scripts.
ogagent.jar	Local, client, and server	lib	The ogagent.jar file contains the runtime classes that are required to run the Java instrumentation agent that is used with the EntityManager API.
ogclient.jar	Local and client	lib	The ogclient.jar file is an OSGi bundle that contains only the local and client runtime environments. You can use this file with Java SE 1.6 and later.
ogspring.jar	Local, client, and server	lib	The ogspring.jar file contains support classes for the SpringSource Spring framework integration.
wsogclient.jar	Local and client	lib	The wsogclient.jar file installed when you use an environment that contains WebSphere Application Server and later. This file contains only the local and client runtime environments.
wxssizeagent.jar	Local, client, and server	lib	The wxssizeagent.jar file is used to provide more accurate cache entry sizing information when using Java runtime environment (JRE) Version 1.6 and later.
ibmcfw.jar ibmorb.jar ibmorbapi.jar	Client and server	lib/endorsed	This set of files includes the Object Request Broker (ORB) runtime that is used for running applications in Java SE processes.
restservice.ear	Client	restservice/lib	The restservice.ear file contains the eXtreme Scale REST data service application enterprise archive for WebSphere Application Server environments.

Table 11. Runtime files for WebSphere eXtreme Scale full installation (continued). WebSphere eXtreme Scale relies on ObjectGrid processes and related APIs. The following table lists the JAR files that are included in the installation. The installation location is relative to the *wxs_home* directory that you choose during the installation.

File name	Environment	Installation location	Description
restservice.war	Client	restservice/lib	The restservice.war file contains the eXtreme Scale REST data service Web archive for application servers acquired from another vendor.
xsadmin.jar	Utility	samples	The xsadmin.jar file contains the eXtreme Scale administration sample utility.
sessionobjectgrid.jar	Client and server	session/lib	The sessionobjectgrid.jar file contains the eXtreme Scale HTTP session management runtime.
splicerlistener.jar	Utility	session/lib	The splicerlistener.jar file contains the splicer utility for the eXtreme Scale Version 7.1 and later HTTP session listener.
xsgbean.jar	Server	wasce/lib	The xsgbean.jar file contains the GBean for embedding eXtreme Scale servers in WebSphere Application Server Community Edition application servers.
splicer.jar	Utility	legacy/session/lib	The splicer utility for the WebSphere eXtreme Scale Version 7.0 HTTP session manager filter.
wxsra.rar	Client and server	session/lib	The wxsra.rar contains the eXtreme Scale resource adapter to connect to the grid using a connection factory.

Table 12. Runtime files for WebSphere eXtreme Scale Client. WebSphere eXtreme Scale Client relies on ObjectGrid processes and related APIs. The following table lists the JAR files that are included in the installation. The installation location is relative to the *wxs_home* directory that you choose during the installation.

File name	Environment	Installation location	Description
wxsdynacache.jar	Client and server	dynacache/lib	The wxsdynacache.jar file contains the necessary classes to use with the dynamic cache provider. The file is automatically included in the server runtime environment when you use the supplied scripts.
wxshyperic.jar	Utility	hyperic/lib	The WebSphere eXtreme Scale server detection plug-in for the SpringSource Hyperic monitoring agent.
ogagent.jar	Local, client, and server	lib	The ogagent.jar file contains the runtime classes that are required to run the Java instrumentation agent that is used with the EntityManager API.
ogclient.jar	Local and client	lib	The ogclient.jar file is an OSGi bundle that contains only the local and client runtime environments. You can use this file with Java SE 1.6 and later.
ogspring.jar	Local, client, and server	lib	The ogspring.jar file contains support classes for the SpringSource Spring framework integration.
wsogclient.jar	Local and client	lib	The wsogclient.jar file installed when you use an environment that containsWebSphere Application Server and later. This file contains only the local and client runtime environments.
wxssizeagent.jar	Local, client, and server	lib	The wxssizeagent.jar file is used to provide more accurate cache entry sizing information when using Java runtime environment (JRE) Version 1.6 and later.
ibmcfw.jar ibmorb.jar ibmorbapi.jar	Client and server	lib/endorsed	This set of files includes the Object Request Broker (ORB) runtime that is used for running applications in Java SE processes.
restservice.ear	Client	restservice/lib	The restservice.ear file contains the eXtreme Scale REST data service application enterprise archive for WebSphere Application Server environments.
restservice.war	Client	restservice/lib	The restservice.war file contains the eXtreme Scale REST data service Web archive for application servers acquired from another vendor.
xsadmin.jar	Utility	samples	The xsadmin.jar file contains the eXtreme Scale administration sample utility.
sessionobjectgrid.jar	Client and server	session/lib	The sessionobjectgrid.jar file contains the eXtreme Scale HTTP session management runtime.
splicerlistener.jar	Utility	session/lib	The splicerlistener.jar file contains the splicer utility for the eXtreme Scale Version 7.1 and later HTTP session listener.

Table 12. Runtime files for WebSphere eXtreme Scale Client (continued). WebSphere eXtreme Scale Client relies on ObjectGrid processes and related APIs. The following table lists the JAR files that are included in the installation. The installation location is relative to the *wxs_home* directory that you choose during the installation.

File name	Environment	Installation location	Description
splicer.jar	Utility	legacy/session/lib	The splicer utility for the WebSphere eXtreme Scale Version 7.0 HTTP session manager filter.
wxsra.rar	Client and server	session/lib	The wxsra.rar contains the eXtreme Scale resource adapter to connect to the grid using a connection factory.

Installing IBM Installation Manager and WebSphere eXtreme Scale product offerings

Java

WebSphere eXtreme Scale product offerings are available in product repositories. In order to access these repositories, you must first install IBM Installation Manager.

You can install Installation Manager using files available on the product media, or using a file obtained from the Passport Advantage site, or using a file from the IBM Installation Manager download website. A file is a compressed file that contains installation images.

Note: 8.6+
Installation Manager is available for download as a 32-bit or a 64-bit version. You can use either version of Installation Manager to install WebSphere eXtreme Scale.

Installation Manager gives you access to the necessary product repositories. You must access these repositories in order to install the WebSphere eXtreme Scale product offerings.

There are two options to access product repositories.

Option 1: Access product repositories on the physical media, and use local installation

1. Install Installation Manager on your system.
2. Use Installation Manager to install the product offering from the product repositories on the media.

Option 2: Download product repositories from Passport Advantage, and use local installation

1. Download the repositories from the Passport Advantage site.

   Note: See see Supported software for a list of the IBM WebSphere eXtreme Scale installation images downloadable from the IBM Passport Advantage Online website and other information.

2. Install Installation Manager on your system.
3. Use Installation Manager to install the product from downloaded product repositories.

Installing IBM Installation Manager using the GUI

Java

To access the necessary product repositories so that you can install WebSphere eXtreme Scale product offerings, you must install IBM Installation Manager. You can install Installation Manager using a wizard console.

Before you begin

You must install IBM Installation Manager and have access to necessary repositories. For more information, see "Installing IBM Installation Manager and WebSphere eXtreme Scale product offerings" on page 20.

Procedure

1. From the location that contains the Installation Manager installation files, run one of the following commands:

   Administrative installation:

   - `Windows` `install.exe`
   - `UNIX` `Linux` `./install`

   Non-administrative installation:

   - `Windows` `userinst.exe`
   - `UNIX` `Linux` `./userinst`

   For more information about administrative and non-administrative installations, see Install as an administrator, nonadministrator, or group

   Group-mode installation:

   `UNIX` `Linux` `./groupinst`

   Notes on group mode:
   - With group mode, multiple users can use a single instance of IBM Installation Manager to manage software packages.

     Group mode does not enable two people to use a single instance of IBM Installation Manager at the same time.

   - `Windows` Group mode is not available on Windows operating systems.

   - If you do not install Installation Manager with group mode, you cannot use group mode to manage any of the products that you install later using this Installation Manager instance.

   - Change the installation location for the current user from the default location to a location that is accessible by all users in the group.

   - Set up your groups, permissions, and environment variables as described in the Group mode road maps in the IBM Installation Manager Version 1.5 Information Center before installing in group mode.

   - For more information about using group mode, read the Group mode road maps in the IBM Installation Manager Version 1.5 Information Center.

2. Verify that the Installation Manager package is selected, and click **Next**.
3. Accept the terms in the license agreements, and click **Next**.
4. Click **Next**.

5. Review the summary information, and click **Install**. If the installation is successful, the program displays a message indicating that installation is successful. If the installation is not successful, click **View Log File** to troubleshoot the problem.

6. Add the product repository to your Installation Manager preferences.

   a. Start Installation Manager.

   b. In the top menu, click **File > Preferences**.

   c. Select **Repositories**.

   d. Click **Add Repository**.

   e. Enter the path to the `repository.config` file in the location that contains the repository files, for example:

      - Windows `C:\repositories\`*product_name*`\local-repositories`

      - UNIX   Linux `/var/repositories/`*product_name*`/local-repositories`

   f. Click **OK**.

7. Clear any locations listed in the Repositories window that you are not using.

8. Click **Apply**.

9. Click **OK**.

10. Click **File > Exit** to close Installation Manager.

What to do next

After you successfully install Installation Manager and set up the repository, you can continue to install any WebSphere eXtreme Scale stand-alone or WebSphere eXtreme Scale for WebSphere Application Server for product offering. For more information, see "Installing the product using the GUI"

Installing the product using the GUI

 Java

Use the Installation Manager from the wizard console to install WebSphere eXtreme Scale product offerings.

Before you begin

You must install the necessary product files for the Installation Manager and have access to necessary repositories. For more information, see"Installing IBM Installation Manager and WebSphere eXtreme Scale product offerings" on page 20.

Procedure

1. Start Installation Manager.

   Tip: UNIX   Linux You can start Installation Manager in group mode with the **./IBMIM** command.
   - Group mode allows multiple users to use a single instance of IBM Installation Manager to manage software packages.
   - For more information about using group mode, read the Group mode road maps in the IBM Installation Manager Version 1.5 Information Center.

2. Click **Install**.

Note: If you are prompted to authenticate, use the IBM ID and password that you registered with on the program website.

Installation Manager searches its defined repositories for available packages.

3. Select one of the following product offerings and the appropriate version.
   - WebSphere eXtreme Scale in a stand-alone environment
   - WebSphere eXtreme Scale Client in a stand-alone environment
   - WebSphere eXtreme Scale for WebSphere Application Server Version 7
   - WebSphere eXtreme Scale for WebSphere Application Server Version 8
   - WebSphere eXtreme Scale Client for WebSphere Application Server Version 7
   - WebSphere eXtreme Scale Client for WebSphere Application Server Version 8

If you already have the product installed on your system, a message indicates that the product is already installed. To create another installation of the product in another location, click **Continue**.

Tip: If **Search service repositories during installation and updates** option is selected on the Installation Manager Repository preference page and you are connected to the Internet, you can click **Check for Other Versions and Extensions**. By doing so, you can search for updates in the default update repositories for the selected packages. In this case, you do not need to add the specific service-repository URL to the Installation Manager Repository preference page.

   a. Select the fixes to install.

   Any recommended fixes are selected by default.

   If there are recommended fixes, you can select the option to show only recommended fixes and hide non-recommended fixes.

   b. Click **Next**.

Note: Installation Manager might prompt you to update to the latest level of Installation Manager when it connects to the repository. If you are prompted, update to the newer version before you continue. Read the IBM Installation Manager Version 1.5 Information Center for information about automatic updates.

4. Accept the terms in the license agreements, and click **Next**.

5. Specify the installation root directory for the product.

The panel also specifies the shared resources directory and disk-space information.

Note: The first time that you install a package using Installation Manager, specify the shared resources directory. The shared resources directory is where installation artifacts are located that can be used by one or more package groups. Use your largest drive for this installation. You cannot change the directory location until after you uninstall all packages.

Restrictions:
   - Deleting the default target location and leaving an installation-directory field empty prevents you from continuing.
   - Do not use symbolic links as the destination directory.

   Symbolic links are not supported.
   - Do not use a semicolon in the directory name.

If the target directory includes a semicolon, the WebSphere eXtreme Scale does not install as expected.

Windows A semicolon is the character used to construct the class path on Windows systems.

- Windows The maximum path length on the Windows Server 2008, Windows Vista, and Windows 7 operating systems is 60 characters.

6. Click **Next**.
7. Select the languages for which translated should content be installed.

English is always selected.
8. Click **Next**.
9. Select the features that you want to install.

Depending on which product offering you selected, you can choose from the following features:

- Client

Available as a required feature if you install either WebSphere eXtreme Scale in a stand-alone environment or WebSphere eXtreme Scale for WebSphere Application Server product offerings. The client must be installed for these product offerings.

- Server

Available if you to install either WebSphere eXtreme Scale in a stand-alone environment or WebSphere eXtreme Scale for WebSphere Application Server. You can choose not to install the server for these product offerings.

- Console

Available for all WebSphere eXtreme Scale product offerings. You can choose to install the monitoring console. With the web console, you can chart current and historical statistics. This console provides some charts for high-level overviews, and has a custom reports page that you can use to build charts from the available statistics. You can use the charting capabilities in the monitoring console of WebSphere eXtreme Scale to view the overall performance of the data grids in your environment.

- Samples

Available for all WebSphere eXtreme Scale product offerings.

10. Click **Next**.
11. Review the summary information, and click **Install**.

- If the installation is successful, the program gives you a message to indicate that installation is successful.

Note: The program might also specify important post-installation instructions as well.

- If the installation is not successful, click **View Log File** to troubleshoot the problem.

12. Select which tool you want to start when this installation is finished.

- Select **Profile Management Tool to create a profile** if you want to create a new application server profile with settings appropriate for a production environment.
- Select **Profile Management Tool to create an application server profile for a development environment** if you want to create an application server profile with settings appropriate for a development environment.

Note: The development settings are appropriate for a development environment where frequent application updates are performed and system resources are at a minimum. Do not use the development settings for production servers.

- Select **None** if you do not want to create a new profile when this installation is finished.

Restriction: The option to start the Profile Management Tool is only available when a version of WebSphere Application Server containing the Profile Management Tool is installed.

13. Click **Finish**.
14. Click **File > Exit** to close Installation Manager.

Installing IBM Installation Manager using the command line

Java

In order to access the necessary product repositories so that you can install WebSphere eXtreme Scale product offerings, you must install IBM Installation Manager. You can install Installation Manager from the command line.

Before you begin

You must install the necessary product files for the Installation Manager and have access to necessary repositories. For more information, see "Installing IBM Installation Manager and WebSphere eXtreme Scale product offerings" on page 20.

Procedure

1. Change to the location containing the Installation Manager installation files, and run one of the following commands:

   Administrative installation:

   - Windows `installc.exe -acceptLicense -log` *log_file_path_and_name*
   - UNIX   Linux   `./installc -acceptLicense -log` *log_file_path_and_name*

   Non-administrative installation:

   - Windows `userinstc.exe -acceptLicense -log` *log_file_path_and_name*
   - UNIX   Linux   `./userinstc -acceptLicense -log` *log_file_path_and_name*

   Group-mode installation:

   UNIX   Linux   `./groupinstc -acceptLicense -dataLocation` *application_data_location* `-log` *log_file_path_and_name* `-installationDirectory` *Installation_Manager_home*

   Notes on group mode:
   - Group mode allows multiple users to use a single instance of IBM Installation Manager to manage software packages.
   - Windows Group mode is not available on Windows operating systems.

- If you do not install Installation Manager using group mode, you will not be able to use group mode to manage any of the products that you install later using this Installation Manager.
- Make sure that you change the installation location from the default location in the current user's home directory to a location that is accessible by all users in the group.
- Set up your groups, permissions, and environment variables as described in the Group mode road maps in the IBM Installation Manager Version 1.5 Information Center before installing in group mode.
- For more information about using group mode, read the Group mode road maps in the IBM Installation Manager Version 1.5 Information Center.

2. Optional: If the repository requires a user name and password, create a keyring file to access this repository.

   For more information about creating a keyring file for Installation Manager, read the IBM Installation Manager Version 1.5 Information Center.

   Tip: When creating a keyring file, append /repository.config at the end of the repository URL location if the **imutilsc** command is unable to find the URL that is specified.

What to do next

After successfully installing Installation Manager and setting up the repository, you can continue to install any WebSphere eXtreme Scale stand-alone or WebSphere eXtreme Scale for WebSphere Application Server product offering. For more information, see "Installing the product using the GUI" on page 22.

Installing the product using the command line

| Java |

Use the Installation Manager from the command line to install WebSphere eXtreme Scale product offerings.

Before you begin

You must install the necessary product files for the Installation Manager and have access to necessary repositories. For more information, see "Installing IBM Installation Manager and WebSphere eXtreme Scale product offerings" on page 20.

Procedure

1. Log on to your system.
2. Change to the eclipse/tools subdirectory in the directory where you installed Installation Manager.
3. Verify that the product repository is available.

   | Windows |

   ```
   imcl.exe listAvailablePackages -repositories source_repository
   ```

   | UNIX | | Linux |

   ```
   ./imcl listAvailablePackages -repositories source_repository
   ```

   You should see one or more levels of the offering.

4. Use the **imcl** command to install the product.

```
imcl.exe install com.ibm.websphere.v85_offering_version,optional_feature_ID
  -repositories source_repository
  -installationDirectory installation_directory
  -sharedResourcesDirectory shared_directory
  -accessRights access_mode
  -preferences preference_key=value
  -properties property_key=value
  -keyring keyring_file -password password
  -acceptLicense
```

```
./imcl install com.ibm.websphere.offering_version,optional_feature_ID
  -repositories source_repository
  -installationDirectory installation_directory
  -sharedResourcesDirectory shared_directory
  -accessRights access_mode
  -preferences preference_key=value
  -properties property_key=value
  -keyring keyring_file -password password
  -acceptLicense
```

Tips:

- The *offering_ID* is the offering ID that is listed in "Offering IDs for WebSphere eXtreme Scale product offerings" on page 9.
- The *offering_version*, which optionally can be attached to the offering ID with an underscore, is a specific version of the offering to install (8.6.0.20110503_0200 for example).
  - If *offering_version* is **not** specified, the latest version of the offering and **all** interim fixes for that version are installed.
  - If *offering_version* is specified, the specified version of the offering and **no** interim fixes for that version are installed.

  The offering version can be found attached to the end of the offering ID with an underscore when you run the following command against the repository:

  ```
  imcl listAvailablePackages -repositories source_repository
  ```

- You can also specify `none`, `recommended` or `all` with the `-installFixes` argument to indicate which interim fixes you want installed with the offering.
  - If the offering version is **not** specified, the `-installFixes` option defaults to `all`.
  - If the offering version is specified, the `-installFixes` option defaults to `none`.
- You can add a list of features that are separated by commas. An example follows:

```
imcl -acceptLicense install com.ibm.websphere.WXS.v85,xs.console.feature,xs.samples.feature
imcl -acceptLicense install com.ibm.websphere.WXS.v86,xs.console.feature,xs.samples.feature
```

  - `xs.client.standalone.feature` Available as a required feature if you install WebSphere eXtreme Scale in a stand-alone environment or WebSphere eXtreme Scale for WebSphere Application Server product offerings.
  - `xs.server.standalone.feature` Depending on which product offering you want to install, you can choose to install the server. The server is a selectable feature in the following product offerings:
    - WebSphere eXtreme Scale in a stand-alone environment

- WebSphere eXtreme Scale for WebSphere Application Server Version 7
- WebSphere eXtreme Scale for WebSphere Application Server Version 8
- `xs.console.feature` Available for all product offerings. You can choose to install the monitoring console. With the web console, you can chart current and historical statistics. This console provides some preconfigured charts for high-level overviews, and has a custom reports page that you can use to build charts from the available statistics. You can use the charting capabilities in the monitoring console of WebSphere eXtreme Scale to view the overall performance of the data grids in your environment
- `xs.samples.feature` Available for all product offerings. You can choose to install samples.

Notes:

- If you previously specified the mode in which to install Installation Manager, the -accessRights parameter is not required
- If you experience issues later, Installation Manager can save earlier versions of a package to roll back to. When Installation Manager rolls back a package to a previous version, the current version of the files is uninstalled and the earlier versions are reinstalled. If you choose not to save the files for rollback, you can prevent the files from being saved by specifying a preference:

  `-preference com.ibm.cic.common.core.preferences.preserveDownloadedArtifacts=False`

  For more information about setting your Installation Manager preferences, see the IBM Installation Manager Version 1.5 Information Center.

  Tip: Even if you choose not to save files for rollback, you can still access product files for rollback from the repository.
- The program might write important post-installation instructions to standard output.

For more information about using the `imcl` command to install the product, see the IBM Installation Manager Version 1.5 Information Center.

Installing IBM Installation Manager using response files

Java

In order to access the necessary product repositories so that you can install WebSphere eXtreme Scale product offerings, you must install IBM Installation Manager. You can install Installation Manager using response files.

Before you begin

You must install the necessary product files for the Installation Manager and have access to necessary repositories. For more information, see "Installing IBM Installation Manager and WebSphere eXtreme Scale product offerings" on page 20.

Procedure

Change to the location containing the Installation Manager installation files, and run one of the following commands to install Installation Manager.

Administrative installation:

- Windows   `installc.exe -acceptLicense -log` *log_file_path_and_name*

- **UNIX** **Linux** `./installc -acceptLicense -log` *log_file_path_and_name*

Non-administrative installation:

- **Windows** `userinstc.exe -acceptLicense -log` *log_file_path_and_name*
- **UNIX** **Linux** `./userinstc -acceptLicense -log` *log_file_path_and_name*

Group-mode installation:

UNIX **Linux** `./groupinstc -acceptLicense -dataLocation` *application_data_location* `-log` *log_file_path_and_name* `-installationDirectory` *Installation_Manager_home*

Notes on group mode:

- Group mode allows multiple users to use a single instance of IBM Installation Manager to manage software packages.

  Group mode does not mean that two people can use the single instance of IBM Installation Manager at the same time.

- **Windows** Group mode is not available on Windows operating systems.
- If you do not install Installation Manager using group mode, you will not be able to use group mode to manage any of the products that you install later using this Installation Manager.
- Make sure that you change the installation location from the default location in the current user's home directory to a location that is accessible by all users in the group.
- Set up your groups, permissions, and environment variables as described in the Group mode road maps in the IBM Installation Manager Version 1.5 Information Center before installing in group mode.
- For more information about using group mode, read the Group mode road maps in the IBM Installation Manager Version 1.5 Information Center.

What to do next

After successfully installing Installation Manager and setting up the repository, you can continue to install any WebSphere eXtreme Scale stand-alone or WebSphere eXtreme Scale for WebSphere Application Server for product offering. For more information, see "Installing the product using the GUI" on page 22.

Installing the product using a response file

Java

Use the Installation Manager with a response file to install WebSphere eXtreme Scale product offerings.

Before you begin

You must install the necessary product files for the Installation Manager and have access to necessary repositories. For more information, see"Installing IBM Installation Manager and WebSphere eXtreme Scale product offerings" on page 20.

About this task

Using Installation Manager, you can work with response files to install the product in various ways. You can record a response file using the GUI.

Procedure

1. From a command line, change to the Eclipse subdirectory in the directory where you installed Installation Manager.
2. Start Installation Manager from the command line using the -record option.

   For example:

   - `Windows` **Administrator or non-administrator:**

     ```
     IBMIM.exe -skipInstall "C:\temp\imRegistry"
       -record C:\temp\install_response_file.xml
     ```

   - `UNIX` `Linux` **Administrator:**

     ```
     ./IBMIM -skipInstall /var/temp/imRegistry
       -record /var/temp/install_response_file.xml
     ```

   - `UNIX` `Linux` **Non-administrator:**

     ```
     ./IBMIM -skipInstall user_home/var/temp/imRegistry
       -record user_home/var/temp/install_response_file.xml
     ```

   Tip: When you record a new response file, you can specify the -skipInstall parameter. Using this parameter has the following benefits:

   - No files are installed, and this speeds up the recording.
   - If you use a temporary data location with the -skipInstall parameter, Installation Manager writes the installation registry to the specified data location while recording. When you start Installation Manager again without the -skipInstall parameter, you then can use your response file to install against the real installation registry.

     The -skipInstall operation should not be used on the actual agent data location used by Installation Manager. This operation is unsupported. Use a clean writable location, and reuse that location for future recording sessions.

   For more information, read the IBM Installation Manager Version 1.5 Information Center.

3. Add the appropriate repositories to your Installation Manager preferences.
   a. In the top menu, click **File > Preferences**
   b. Select **Repositories**
   c. Perform the following actions for each repository:
      1) Click **Add Repository**.
      2)
      3) Enter the path to the `repository.config` file in the remote web-based repository or the local directory into which you unpacked the repository files.

         For example:
         - Remote repositories:
           ```
           https://downloads.mycorp.com:8080/WXS_85_repository
           ```
         - Local repositories:
           - `Windows` `C:\repositories\wxs85\local-repositories`
           - `UNIX` `Linux` `/var/repositories/wxs85/local-repositories`

4) Click **OK**.

5) Click **Apply**.

6) Click **OK**.

d. Click **Install**.

Note: If you are prompted to authenticate, use the IBM ID and password that you registered with on the program website.

Installation Manager searches its defined repositories for available packages.

4. Select one the following product offerings and the appropriate version:

- WebSphere eXtreme Scale in a stand-alone environment
- WebSphere eXtreme Scale Client in a stand-alone environment
- WebSphere eXtreme Scale for WebSphere Application Server Version 7
- WebSphere eXtreme Scale for WebSphere Application Server Version 8
- WebSphere eXtreme Scale Client for WebSphere Application Server Version 7
- WebSphere eXtreme Scale Client for WebSphere Application Server Version 8

If you already have the product installed on your system, a message indicates that the product is already installed. To create another installation of the product in another location, click **Continue**.

Tip: If **Search service repositories during installation and updates** option is selected on the Installation Manager Repository preference page and you are connected to the Internet, you can click **Check for Other Versions and Extensions**. By doing so, you can search for updates in the default update repositories for the selected packages. In this case, you do not need to add the specific service-repository URL to the Installation Manager Repository preference page.

5. Select the fixes to install.

Any recommended fixes are selected by default.

If there are recommended fixes, you can select the option to show only recommended fixes and hide non-recommended fixes.

6. Click **Next**.

7. Accept the terms in the license agreements, and click **Next**.

8. Specify the installation root directory for the product.

The panel also specifies the shared resources directory and disk-space information.

Note: The first time that you install a package using Installation Manager, specify the shared resources directory. The shared resources directory is where installation artifacts are located that can be used by one or more package groups. Use your largest drive for this installation. You cannot change the directory location until after you uninstall all packages.

Restrictions:
- Deleting the default target location and leaving an installation-directory field empty prevents you from continuing.
- Do not use symbolic links as the destination directory.
  Symbolic links are not supported.

- `Windows` The maximum path length on the Windows Server 2008, Windows Vista, and Windows 7 operating systems is 60 characters.

9. Click **Next**.

10. Select the languages for which translated content should be installed. English is always selected.

11. Click **Next**.

12. Select the features that you want to install.
    - Client

      Available as a required feature if you install either WebSphere eXtreme Scale in a stand-alone environment or WebSphere eXtreme Scale for WebSphere Application Server product offerings. The client must be installed for these product offerings.
    - Server

      Available if you to install either WebSphere eXtreme Scale in a stand-alone environment or WebSphere eXtreme Scale for WebSphere Application Server. You can choose not to install the server for these product offerings.
    - Console

      Available for all WebSphere eXtreme Scale product offerings. You can choose to install the monitoring console. With the web console, you can chart current and historical statistics. This console provides some charts for high-level overviews, and has a custom reports page that you can use to build charts from the available statistics. You can use the charting capabilities in the monitoring console of WebSphere eXtreme Scale to view the overall performance of the data grids in your environment.
    - Samples

      Available for all WebSphere eXtreme Scale product offerings.

13. Click **Next**.

14. Review the summary information, and click **Install**.
    - If the installation is successful, the program gives you a message to indicate that installation is successful.

      Note: The program might also specify important post-installation instructions as well.
    - If the installation is not successful, click **View Log File** to troubleshoot the problem.

15. Click **Finish**.

16. Click **File > Exit** to close Installation Manager.

Creating a keyring: `Java`

After using the Installation Manager to record a response file to install WebSphere eXtreme Scale product offerings, you can choose to create a keyring file. If you are using a remote repository that requires authentication, then you can create a keyring for installation.

Before you begin

You must record a response file. For more information, see "Installing the product using a response file" on page 29.

Procedure

1. From a command line, change to the Eclipse subdirectory in the directory where you installed Installation Manager.

2. Start Installation Manager from the command line using the -record option.

   For example:

   - **`Windows`** **Administrator or non-administrator:**

     ```
     IBMIM.exe -skipInstall "C:\temp\imRegistry"
       -keyring C:\IM\im.keyring
       -record C:\temp\keyring_response_file.xml
     ```

   - **`UNIX`** **`Linux`** **Administrator:**

     ```
     ./IBMIM -skipInstall /var/temp/imRegistry
       -keyring /var/IM/im.keyring
       -record /var/temp/keyring_response_file.xml
     ```

   - **`UNIX`** **`Linux`** **Non-administrator:**

     ```
     ./IBMIM -skipInstall user_home/var/temp/imRegistry
       -keyring user_home/var/IM/im.keyring
       -record user_home/var/temp/keyring_response_file.xml
     ```

3. When a window opens that requests your credentials for the authenticated remote repository, enter the correct credentials and **save** them.

4. Click **File > Exit** to close Installation Manager.

   For more information, read the IBM Installation Manager Version 1.5 Information Center.

Installing WebSphere eXtreme Scale Client for .NET overview

`.NET`

You can install WebSphere eXtreme Scale Client for .NET in either a runtime environment, or both a runtime and development environment.

To build and test your own .NET applications, install WebSphere eXtreme Scale Client for .NET in your development environment. A development environment installation always includes the runtime environment installation. The runtime assemblies are installed on disk and in the global assembly cache (GAC). The development environment installation additionally installs sample code, Visual Studio IntelliSense integration (for fly-over class and method descriptions), and API documentation. The sample WebSphere eXtreme Scale Client for .NET source code and Visual Studio project are installed in the *net_client_home*\sample directory, and the API documentation is installed in the *net_client_home*\doc directory.

Installing WebSphere eXtreme Scale Client for .NET

`.NET`

You can install WebSphere eXtreme Scale Client in a .NET environment if you have applications that run in this framework.

Before you begin

- Obtain WebSphere eXtreme Scale Client for .NET from the DVD. You can locate the setup.exe file in the root directory, /ClientForDotNet/setup.exe, or you can download it from the Support site.

- If you plan on installing WebSphere eXtreme Scale Client for .NET in a development environment, you must be using a Windows system that meets the hardware and software requirements. For more information, see Microsoft .NET considerations.

About this task

WebSphere eXtreme Scale Client for .NET can install in a runtime environment or in both a runtime and a development environment.

Procedure

1. Use the wizard to install the client from the DVD. You can locate the `setup.exe` in the root directory, `/ClientForDotNet/setup.exe`, or you can download it from the Support site.
2. Run the `setup.exe` file.
3. Follow the prompts in the wizard, and click **Next** to the Setup Type page.
4. If you decided to install WebSphere eXtreme Scale Client for .NET into a runtime environment, click **Runtime**. Complete the following step:

   Click **Install** to run the installer and click **Finish**. The default installation directory follows: `C:\Program Files (x86)\IBM\WebSphere\eXtreme Scale .NET Client`
5. If you decided to install WebSphere eXtreme Scale Client into both a runtime and a development environment, then choose **Custom** and complete the following steps:

   a. Install WebSphere eXtreme Scale Client into the default installation directory, or choose your own installation directory and click **Next**.
   b. By default, both runtime and development environment are selected as features. Verify you have enough disk space if you want to install both. Click **Next**.
   c. Choose a location for the log files and click **Next**.
   d. Click **Install** to run the installer and click **Finish**.

What to do next

- Test your WebSphere eXtreme Scale Client for .NET by running the getting started application. For more information, see Tutorial: Getting started with WebSphere eXtreme Scale.
- Configure the WebSphere eXtreme Scale Client for .NET. For more information, see Configuring WebSphere eXtreme Scale Client for .NET.

Installing WebSphere eXtreme Scale Client for .NET with silent mode

.NET

You can install WebSphere eXtreme Scale Client in a .NET environment in silent mode if you do not want to see the installation as it happens or need to install the product on multiple machines. Installing in silent mode means that you need to first record a response file and pass parameters to this file.

Before you begin

- Obtain WebSphere eXtreme Scale Client from the DVD. You can locate the `setup.exe` in the root directory, `/net_client_home/setup.exe`, or you can download it from the Support site.
- If you plan on installing WebSphere eXtreme Scale Client for .NET in a development environment, you must be using a Windows system that meets the hardware and software requirements described in Microsoft .NET consideration. For more information, see Microsoft .NET considerations.

About this task

WebSphere eXtreme Scale Client for .NET can install in a runtime or in both a runtime and a development environment.

Procedure

1. Open a command prompt and run the following script: `setup.exe /r /f1"<Response_Files_Directory>\Setup.iss"` The `<Response_Files_Directory>` is the location where you want to create the response file.
2. Follow the prompts in the wizard, and click **Next** to the Setup Type page.
3. Depending on what options you choose, you can pass the following values to create your `Setup.iss` response file:
   - Choose to install WebSphere eXtreme Scale Client in a runtime environment, or choose a custom installation. A custom installation lets you install the product in both environments.
   - If you decided to install WebSphere eXtreme Scale Client into a runtime environment, click **Runtime** and do the following:
     a. Click **Install** and click **Finish**. The default installation directory is: `C:\Program Files (x86)\IBM\WebSphere\eXtreme Scale .NET Client`
   - If you decided to install WebSphere eXtreme Scale Client into both a runtime and a development environment, then choose **Custom** and do the following:
     a. Install WebSphere eXtreme Scale Client into the default installation directory, or choose your own installation directory. Click **Next**.
     b. Select both runtime and development environment. If you want to install in both environments, verify you have enough disk space. Click **Next**
     c. Choose a location for the log files and click **Next**.
4. Click **Install** and click **Finish**.
5. Open a command prompt and run the following script to install WebSphere eXtreme Scale Client in silent mode: `setup.exe /s /f1"<Response_Files_Directory>\Setup.iss"`, where `<Response_Files_Directory>` is the location where your response file resides.

What to do next

You can update or modify the `SimpleClient` to try the available eXtreme Scale client for .NET APIs. Locate the `SimpleClient` in the `<installation_directory>\sample\SimpleClient` in the installation directory, and load this file into Visual Studio to view the sample application that uses simple create, retrieve, update, and delete operations. Use the `SimpleClient` as a guide for accessing the data grid. You can modify this application or write new applications that use the eXtreme Scale for .NET client supported API set. For more information, see Tutorial: Getting started with WebSphere eXtreme Scale.

Installing WebSphere eXtreme Scale Client for .NET without the installation program

.NET

If you do not have permission to run the `setup.exe` file, you can copy files from an existing installation to another Windows system.

Before you begin

You must have a completed installation of WebSphere eXtreme Scale Client for .NET from which you can copy files. For more information, see "Installing WebSphere eXtreme Scale Client for .NET overview" on page 33.

About this task

If you do not have permission to run the `setup.exe` file on your client server, you can copy files from an existing WebSphere eXtreme Scale Client for .NET to the runtime directory of your .NET application.

Note: Automatic upgrades and migration are available with the WebSphere eXtreme Scale Client for .NET installation program only. If you use the following procedure to install the product, manual upgrades and migrations are required.

Procedure

1. Windows From your WebSphere eXtreme Scale Client for .NET installation, copy the following files onto the target Windows system. The target Windows system directory must be the runtime directory of the process that runs the .NET application for your data grid. This process must have read and write access to the target directory. Log files are generated in a `logs` folder under this directory.

   - *net_client_home*\bin\IBM.WebSphere.Caching.dll
   - *net_client_home*\bin\IBM.WebSphere.Caching.CredentialGenerator.dll (Required only if the WebSphere eXtreme Scale Client for .NET application is configured to use the provided credential generator.)
   - *net_client_home*\config\Client.Net.properties
   - *net_client_home*\config\Client.Net.Log.config

2. Optional: Manually install the `IBM.WebSphere.Caching.dll` assembly into the global assembly cache (GAC). The exact procedure to install the GAC varies depending on the Windows environment.

What to do next

Configure the WebSphere eXtreme Scale Client for .NET. For more information, see Configuring WebSphere eXtreme Scale Client for .NET.

Uninstalling WebSphere eXtreme Scale Client for .NET

.NET

To remove WebSphere eXtreme Scale Client for .NET from your environment, you can uninstall it from your Windows Control Panel, or record a response file in

order to uninstall in silent mode. Recording a response file is best when you have multiple installations of WebSphere eXtreme Scale Client and you want to remove these installations quickly.

Before you begin

If you want to uninstall the product from a development environment, then make sure you shut down Visual Studio.

Attention: The uninstaller removes all binary files and all maintenance, such as fix packs and interim fixes, at the same time.

Procedure

1. Stop any .NET eXtreme Scale processes.
2. You can uninstall WebSphere eXtreme Scale Client for .NET using one of the following methods:
   - Uninstall from the Windows Control Panel, click Add or Remove Programs and select IBM WebSphere eXtreme Scale Client for .NET.
   - If you want to record a response file, then open a command prompt and run the following script:

     ```
     setup.exe /uninst /r /f1"<Response_Files_Directory>\Setup.iss"
     ```

     a. The uninstallation wizard opens and a confirmation window appears to verify that you want to remove WebSphere eXtreme Scale Client for .NET and all its features. Click **OK**.

     b. When the uninstallation process completes, click **Finish**.
3. Optional: If you want to use your response file to uninstall an existing installation of WebSphere eXtreme Scale Client, then run your recorded response file as follows:

   a. Open a command prompt, and run the following script to uninstall WebSphere eXtreme Scale Client for .NET in silent mode:

     ```
     setup.exe /uninst /s /f1"<Response_Files_Directory>\Setup.iss"
     ```

What to do next

Check your Windows Explorer to make sure all folders were removed from your installation directory. You should also check your Windows Control panel to make sure the product is no longer listed. The installer does not delete folders with files that were generated after the installation, such as log files, custom configuration files, and any artifacts created by building the `SimpleClient` sample.

Installing WebSphere eXtreme Scale or WebSphere eXtreme Scale Client with WebSphere Application Server

| Java |

You can install WebSphere eXtreme Scale or WebSphere eXtreme Scale Client in an environment in which WebSphere Application Server or WebSphere Application Server Network Deployment is installed. You can use the existing features of WebSphere Application Server or WebSphere Application Server Network Deployment to enhance your eXtreme Scale applications.

Before you begin

- Verify that the target installation directory does not contain an existing installation of WebSphere eXtreme Scale or WebSphere eXtreme Scale Client.
- Stop all processes that are running in your WebSphere Application Server or WebSphere Application Server Network Deployment environment. See Command-line utilities for more information about the **stopManager**, **stopNode**, and **stopServer** commands.

  CAUTION:
  Verify that any running processes are stopped. If the running processes are not stopped, the installation proceeds, creating unpredictable results. On some platforms, the installation might be left in an undetermined state.

Important: When you install WebSphere eXtreme Scale or WebSphere eXtreme Scale Client, it should be in the same directory in which you installed WebSphere Application Server. For example, if you installed WebSphere Application Server in C:*was_root*, then you should also choose C:*was_root* as the target directory for your WebSphere eXtreme Scale or WebSphere eXtreme Scale Client installation.

About this task

Integrate eXtreme Scale with WebSphere Application Server or WebSphere Application Server Network Deployment to apply the features of eXtreme Scale to your Java Platform, Enterprise Edition applications. Java EE applications host data grids and access the data grids using a client connection.

You can also run the grid as a client inside a Liberty profile that serves systems. To obtain the Liberty profile, you must install WebSphere Application Server .

Procedure

- If you want to install WebSphere eXtreme Scale or WebSphere eXtreme Scale Client within a WebSphere Application Server Version 8 environment, then complete the following steps:

  1. Install IBM Installation Manager. For more information, see "Installing IBM Installation Manager using the GUI" on page 20.
  2. Using Installation Manager, install the appropriate eXtreme Scale product offering:
     - WebSphere eXtreme Scale for WebSphere Application Server Version 8
     - WebSphere eXtreme Scale Client for WebSphere Application Server Version 8

     For more information, see "Installing the product using the GUI" on page 22.
  3. Download the necessary WebSphere Application Server Version 8 repositories from the Passport Advantage site. For more information, see How to download WebSphere Application Server - Express V8.5 from Passport Advantage.
  4. Install WebSphere Application Server Version 8 For more information, see Installing the product using distributed operating systems using the GUI.

- If you want to install WebSphere eXtreme Scale or WebSphere eXtreme Scale Client within a WebSphere Application Server Version 7 environment, then complete the following steps:

  1. Install IBM Installation Manager. For more information, see "Installing IBM Installation Manager using the GUI" on page 20.

2. Install WebSphere Application Server Version 7 using InstallShield MultiPlatform (ISMP) installer. For more information, see Installing your application serving environment.

3. After installation, you must import WebSphere Application Server Version 7 into Installation Manager to complete the installation. Importing WebSphere Application Server Version 7 into the Installation Manager allows you to manage and install fix packs for the product from one location. You must ensure you have the necessary repositories set up within Installation Manager for access to fix packs and updates. For more information on how to import an existing installation of WebSphere Application Server 7 into Installation Manager, see Importing IBM WebSphere Application Server product information into the IBM Installation Manager registry.

4. Using Installation Manager, install the appropriate eXtreme Scale product offering:
   – WebSphere eXtreme Scale for WebSphere Application Server Version 7
   – WebSphere eXtreme Scale Client for WebSphere Application Server Version 7

   For more information, see "Installing the product using the GUI" on page 22.

What to do next

• Start configuring your WebSphere eXtreme Scale or WebSphere eXtreme Scale Client installation. For more information, see "Taking the first steps after installation" on page 54.

Installing the Liberty profile

Java

You install the Liberty profile application-serving environment by using the Installation Manager, or by running a Java archive (JAR) file.

About this task

To install the Liberty profile, you can use IBM Installation Manager to install WebSphere Application Server Version 8.5 or higher with WebSphere eXtreme Scale, or you can install the Liberty profile by running a provided JAR file. If you install the WebSphere Application ServerLiberty profile using Installation Manager, then you must also install WebSphere eXtreme Scale Version 8.5 or higher using Installation Manager. Likewise, if you install the WebSphere Application ServerLiberty profile by running a JAR file, then you must also install the WebSphere eXtreme Scale Version 8.5 or higher product image by running a JAR file.

On z/OS operating systems, the Liberty profile provides an operations environment. You can work natively with this environment using the MVS™ console. For application development, consider using the Eclipse-based developer tools on a separate distributed system, on Mac OS, or in a Linux shell on z/OS.

Procedure

• Install the WebSphere Application Server Liberty profile:
   – Install the Liberty profile by using Installation Manager. For more information about installing WebSphere Application Server Version 8.5 or higher with

WebSphere eXtreme Scale, see "Installing IBM Installation Manager and WebSphere eXtreme Scale product offerings" on page 20.

- Install the Liberty profile application-serving environment by running a Java archive (JAR) file.

- Install WebSphere eXtreme Scale Version 8.5 or higher.
- Migrate your Liberty profile environment. When you migrate from one major release of the Liberty profile to a higher major release, you must change the feature version numbers in your Liberty profile server.xml file.

  For example, in the initial version of the Liberty profile that the product supported, feature version numbers were at the 1.0 level. In WebSphere eXtreme Scale Version 8.6 and higher, feature version numbers are at the 1.1 level.

  Note: When you upgrade to WebSphere Application Server V8.5.5, the Liberty profile is removed. WebSphere eXtreme Scale supports the removal of the feature. However, if you roll back to WebSphere Application Server V8.5, the Liberty profile is added again, which causes problems in WebSphere eXtreme Scale.

Installing the Liberty profile application-serving environment by running a JAR file

Java

By running the Java archive (JAR) file that contains the distribution image, you install the application-serving environment, and you are ready to create a Liberty server.

About this task

You can install the Liberty profile application-serving environment by running a JAR file as described in this topic, or by using the Installation Manager.

When you run the JAR file for WebSphere Application Server to install the Liberty profile, you must extract the JAR file first. Then, extract the Liberty profile JAR file for WebSphere eXtreme Scale. If you use IBM Installation Manager to install WebSphere Application Server Version 8.5 and obtain the Liberty profile, then you must use Installation Manager to also install WebSphere eXtreme Scale.

This task supports the following editions:
- WebSphere Application Server Liberty Core
- WebSphere Application Server, Base and Developer editions
- WebSphere Application Server, Network Deployment
- WebSphere Application Server for z/OS

For download information for the Liberty profile application-serving and data caching environments, see the WASdev community downloads page.

Procedure

1. Extract the WebSphere Application Server Liberty profile distribution image to your preferred directory.

   This image is packaged as a JAR file; for example, wlp-*edition*-8.6.0.0.jar. Use one of the following actions to extract this JAR file:

- To extract the distribution image by using the wizard, run `java -jar wlp-`*`edition`*`-8.6.0.0.jar` .
- To extract the distribution image by accepting the license terms and conditions silently, run `java -jar wlp-edition-8.6.0.0.jar -acceptLicense`
.
- To view all available options, run `java -jar wlp-edition-8.6.0.0.jar -help`.

All the application server files are stored in subdirectories of the `wlp` directory.

2. Optional: Set the `JAVA_HOME` property for your environment.

The Liberty profile requires a JRE in which to run. It does not share the JDK or JRE that the WebSphere Application Server full profile uses. You can specify the JDK or JRE location using the **JAVA_HOME** property in the `server.env` file, as described in Customizing the Liberty profile environment. On Linux or UNIX systems, you can instead set **JAVA_HOME** in the user `.bashrc` file, or append the JDK or JRE path to the **PATH** environment variable. On Windows systems, you can instead set **JAVA_HOME** as a system environment variable, or append the JDK or JRE path to the **PATH** system variable.

 Windows For example, on Windows systems you can use the following commands to set the **JAVA_HOME** property, and to add the Java `/bin` directory to the path:

```
set JAVA_HOME=C:\Progra~1\Java\JDK16
set PATH=%JAVA_HOME%\bin;%PATH%
```

Notes:

- The Liberty profile runtime environment searches for the **java** command in this order: **JAVA_HOME** property, **JRE_HOME** property, and system **PATH** property.
- For more information about supported Java environments, and where to get them, see Minimum supported Java levels in the Liberty profile: Runtime environment known restrictions.

3. Download WebSphere eXtreme Scale for Developers -Liberty profile. Extract the WebSphere eXtreme Scale distribution image to the directory where you extracted the `wlp-`*`edition`*`-8.6.0.0.jar` file.

This image is packaged as a JAR file called `wxs-wlp_8.6.0.0.jar` in V8.6 and `wxs-wlp_8.6.0.2.jar` in V8.6 Fix Pack 2. To extract the distribution image, run the JAR file; for example, run the following command, depending on your version of eXtreme Scale:

```
java -jar wxs-wlp_8.6.0.0.jar
```

8.6.0.2

```
java -jar wxs-wlp_8.6.0.2.jar
```

Results

If you extract the file the `wxs-wlp_8.6.0.0.jar` file for V8.6 and the `wxs-wlp_8.6.0.2.jar` file for V8.6 Fix Pack 2, eXtreme Scale is installed on top of the WebSphere Application Server Liberty profile when you extract both JAR files to the same directory.

Uninstalling the product using IBM Installation Manager

 Java

Use IBM Installation Manager to uninstall WebSphere eXtreme Scale product offerings.

Uninstalling the product using the GUI

Java

You can use wizard console of IBM Installation Manager to uninstall the product .

Before you begin

You must remove the WebSphere eXtreme Scale augment from all WebSphere Application Server profiles before uninstalling WebSphere eXtreme Scale. You will be unable to perform the unaugment after uninstalling WebSphere eXtreme Scale. Use the manageprofiles command to unaugment existing profiles in a WebSphere eXtreme Scale environment. .

Procedure

1. Uninstall the product.
   a. Stop all processes that are running in your environment.
      - To stop all processes that are running in your stand-alone eXtreme Scale environment, see Stopping stand-alone servers that use the ORB transport.
      - To stop all processes that are running in your WebSphere Application Server environment, see Command-line utilities.
   b. Start Installation Manager.
   c. Click **Uninstall**.
   d. In the **Uninstall Packages** window, perform the following actions.
      1) Select one of the following and the appropriate version:
         - WebSphere eXtreme Scale in a stand-alone environment
         - WebSphere eXtreme Scale Client in a stand-alone environment
         - WebSphere eXtreme Scale for WebSphere Application Server Version 6
         - WebSphere eXtreme Scale for WebSphere Application Server Version 7
         - WebSphere eXtreme Scale for WebSphere Application Server Version 8
         - WebSphere eXtreme Scale Client forWebSphere Application Server Version 6
         - WebSphere eXtreme Scale Client for WebSphere Application Server Version 7
         - WebSphere eXtreme Scale Client for WebSphere Application Server Version 8
      2) Click **Next**.
   e. If the uninstallation wizard displays a list of augmented WebSphere Application Server profiles, then you must unaugment these profiles in order to proceed with the uninstallation.
   f. Review the summary information.
   g. Click **Uninstall**.
      - If the uninstallation is successful, the program displays a message that indicates success.
      - If the uninstallation is not successful, click **View log** to troubleshoot the problem.

h. Click **Finish**.

   i. Click **File > Exit** to close Installation Manager.

2. Optional: Uninstall IBM Installation Manager.

   Important: Before you can uninstall IBM Installation Manager, you must uninstall all of the packages that were installed by Installation Manager.

   Read the IBM Installation Manager Version 1.5 Information Center for information about performing this procedure.

Uninstalling the product using the command line

Java

You can uninstall the product using IBM Installation Manager from the command line.

Before you begin

You must remove the WebSphere eXtreme Scale augment from all WebSphere Application Server profiles before uninstalling WebSphere eXtreme Scale. You will be unable to perform the unaugment after uninstalling WebSphere eXtreme Scale. Use the manageprofiles command to unaugment existing profiles in a WebSphere eXtreme Scale environment.

Procedure

1. Log on to your system.

2. Stop all processes that are running in your environment.

   - To stop all processes that are running in your stand-alone eXtreme Scale environment, see Stopping stand-alone servers that use the ORB transport.
   - To stop all processes that are running in your WebSphere Application Server environment, see Command-line utilities.
   - To stop Liberty servers that are running in your WebSphere Application Server, see the Liberty profile server command.

3. Change to the `eclipse/tools` subdirectory in the directory where you installed Installation Manager.

4. Use the **imcl** command to uninstall the product.

   Windows

   ```
   imcl.exe uninstall com.ibm.websphere.v85,optional_feature_ID
     -installationDirectory installation_directory
   ```

   UNIX   Linux

   ```
   ./imcl uninstall com.ibm.websphere.v85,optional_feature_ID
     -installationDirectory installation_directory
   ```

   Tips:

   - The *offering_ID* is the offering ID that is listed in "Offering IDs for WebSphere eXtreme Scale product offerings" on page 9.
   - You can remove a list of features that are separated by commas—the feature ID. For example,

     ```
     imcl uninstall com.ibm.websphere.WXS.v85,xs.console.feature,xs.samples.feature
     ```

     – `client` indicates the stand-alone client feature
     – `server` indicates the stand-alone server feature

- – `console` indicates the web based monitoring console
- – `samples` indicates the samples
- • If a list of features is not specified, the entire product is uninstalled.

Go to the IBM Installation Manager Version 1.5 Information Center for more information.

5. If the uninstallation process displays a list of augmented WebSphere Application Server profiles, then you must unaugment these profiles in order to proceed with the uninstallation.

6. Optional: Uninstall IBM Installation Manager.

   Important: Before you can uninstall IBM Installation Manager, you must uninstall all of the packages that were installed by Installation Manager.

   Read the IBM Installation Manager Version 1.5 Information Center for information about using the uninstall script to perform this procedure.

Uninstalling the product using response files

```
Java
```

You can uninstall the product using IBM Installation Manager with response files.

Before you begin

You must remove the WebSphere eXtreme Scale augment from all WebSphere Application Server profiles before uninstalling WebSphere eXtreme Scale. You will be unable to perform the unaugment after uninstalling WebSphere eXtreme Scale. Use the manageprofiles command to unaugment existing profiles in a WebSphere eXtreme Scale environment.

Optional: Perform or record the installation of Installation Manager and installation of the product to a temporary installation registry on one of your systems so that you can use this temporary registry to record the uninstallation without using the standard registry where Installation Manager is installed.

About this task

Using Installation Manager, you can work with response files to uninstall the product in a variety of ways. You can record a response file using the GUI as described in the following procedure, or you can generate a new response file by hand or by taking an example and modifying it.

Procedure

1. Stop all processes that are running in your environment.
   - • To stop all processes that are running in your stand-alone eXtreme Scale environment, see Stopping stand-alone servers that use the ORB transport.
   - • To stop all processes that are running in your WebSphere Application Server environment, see Command-line utilities.
   - • To stop Liberty servers that are running in your WebSphere Application Server, see the Liberty profile server command.

2. Optional: **Record a response file to uninstall the product:** On one of your systems, perform the following actions to record a response file that will uninstall the product:

a. From a command line, change to the eclipse subdirectory in the directory where you installed Installation Manager.

b. Start Installation Manager from the command line using the -record option.

For example:

- `Windows` **Administrator or non-administrator:**

  ```
  IBMIM.exe -skipInstall "C:\temp\imRegistry"
    -record C:\temp\uninstall_response_file.xml
  ```

- `UNIX` `Linux` **Administrator:**

  ```
  ./IBMIM -skipInstall /var/temp/imRegistry
    -record /var/temp/uninstall_response_file.xml
  ```

- `UNIX` `Linux` **Non-administrator:**

  ```
  ./IBMIM -skipInstall user_home/var/temp/imRegistry
    -record user_home/var/temp/uninstall_response_file.xml
  ```

Tip: If you choose to use the -skipInstall parameter with a temporary installation registry created as described in *Before you begin*, Installation Manager uses the temporary installation registry while recording the response file. It is important to note that when the -skipInstall parameter is specified, no product packages are installed or uninstalled. All of the actions that you perform in Installation Manager simply update the installation data that is stored in the specified temporary registry. After the response file is generated, it can be used to uninstall the product, removing the product files and updating the standard installation registry.

The -skipInstall operation should not be used on the actual agent data location used by Installation Manager. This is unsupported. Use a clean writable location, and re-use that location for future recording sessions.

For more information, read the IBM Installation Manager Version 1.5 Information Center.

c. Click **Uninstall**.

d. In the **Uninstall Packages** window, perform the following actions.

1) Select one of the following and the appropriate version:
   - WebSphere eXtreme Scale in a stand-alone environment
   - WebSphere eXtreme Scale Client in a stand-alone environment
   - WebSphere eXtreme Scale for WebSphere Application Server Version 7
   - WebSphere eXtreme Scale for WebSphere Application Server Version 8
   - WebSphere eXtreme Scale Client for WebSphere Application Server Version 7
   - WebSphere eXtreme Scale Client for WebSphere Application Server Version 8

2) Click **Next**.

3) Click **Next**.

e. Review the summary information.

f. Click **Uninstall**.
   - If the uninstallation is successful, the program displays a message that indicates success.
   - If the uninstallation is not successful, click **View log** to troubleshoot the problem.

g. Click **Finish**.

h. Click **File > Exit** to close Installation Manager.

3. **Use the response file to uninstall the product:** From a command line on each of the systems from which you want to uninstall the product, change to the `eclipse/tools` subdirectory in the directory where you installed Installation Manager and use the response file that you created to uninstall the product.

For example:

- Windows **Administrator or non-administrator:**

```
imcl.exe
  input C:\temp\uninstall_response_file.xml
  -log C:\temp\uninstall_log.xml
```

- UNIX Linux **Administrator:**

```
./imcl
  input /var/temp/uninstall_response_file.xml
  -log /var/temp/uninstall_log.xml
```

- UNIX Linux **Non-administrator:**

```
./imcl
  input user_home/var/temp/uninstall_response_file.xml
  -log user_home/var/temp/uninstall_log.xml
```

Go to the IBM Installation Manager Version 1.5 Information Center for more information.

4. Optional: List all installed packages to verify the uninstallation.

UNIX Linux

```
./imcl listInstalledPackages
```

Windows

```
imcl listInstalledPackages
```

5. If the uninstallation process displays a list of augmented WebSphere Application Server profiles, then you must unaugment these profiles in order to proceed with the uninstallation.

6. Optional: Uninstall IBM Installation Manager.

Important: Before you can uninstall IBM Installation Manager, you must uninstall all of the packages that were installed by Installation Manager.

Read the IBM Installation Manager Version 1.5 Information Center for information about using the uninstall script to perform this procedure.

Creating and augmenting profiles for WebSphere eXtreme Scale

After you install the product, create unique types of profiles and augment existing profiles for WebSphere eXtreme Scale.

Before you begin

Install WebSphere eXtreme Scale. See "Installation overview" on page 1 for more information.

About this task

Augmenting profiles for use with WebSphere eXtreme Scale is optional, but is required in the following usage scenarios:

- To automatically start a catalog service or container in a WebSphere Application Server process. Without augmenting the server profiles, servers can only be

started programmatically using the ServerFactory API or as separate processes with the **startOgServer** or **startXsServer** scripts.

- To use Performance Monitoring Infrastructure (PMI) to monitor WebSphere eXtreme Scale metrics.
- To display the version of WebSphere eXtreme Scale in the WebSphere Application Server administrative console.

If you are running WebSphere eXtreme Scale within WebSphere Application Server Version 7.0, you can use the Profile Management Tool plug-in or the **manageprofiles** command to create and augment profiles.

Using the graphical user interface to create profiles

Use the graphical user interface (GUI), which is provided by the Profile Management Tool plug-in, to create profiles for WebSphere eXtreme Scale. A profile is a set of files that define the runtime environment.

Before you begin

You cannot use the GUI to augment profiles in the following scenario:

- **64-bit installations of WebSphere Application Server**:

  The profile management tool does not exist for 64-bit installations of WebSphere Application Server. Use the **manageprofiles** script from the command line for these installations.

About this task

To use the product features, the Profile Management Tool plug-in enables the GUI to assist you in setting up profiles, such as a WebSphere Application Server profile, a deployment manager profile, a cell profile, and a custom profile. You can augment profiles during or after the installation of WebSphere eXtreme Scale.

Procedure

Use the Profile Management Tool GUI to create profiles. Choose one of the following options to start the wizard:

- Select **Profile Management Tool** from the First steps console.
- Access the Profile Management Tool from the **Start** menu.
- Run the ./pmt.sh|bat script from the *install_root*/bin/ProfileManagement directory.

What to do next

You can create additional profiles or augment existing profiles. To restart the Profile Management tool, run the **./pmt.sh|bat** command from the *was_root*/bin/ProfileManagement directory, or select **Profile Management Tool** in the First steps console.

Start a catalog service, start containers, and configure TCP ports in your WebSphere Application Server environment. See the information about administering WebSphere eXtreme Scale with WebSphere Application Server in the *Administration Guide* for more information.

Using the graphical user interface to augment profiles

After you install the product, you can augment an existing profile to make it compatible with WebSphere eXtreme Scale.

About this task

When you augment an existing profile, you change the profile by applying a product-specific augmentation template. For example, WebSphere eXtreme Scale servers do not start automatically unless the server profile is augmented with the xs_augment template.

- Augment the profile with the xs_augment template if you installed the eXtreme Scale client or the client and server.

Procedure

Use the Profile Management Tool GUI to augment profiles for eXtreme Scale. Choose one of the following options to start the wizard:

- Select **Profile Management Tool** from the First steps console.
- Access the Profile Management Tool from the **Start** menu.
- Run the ./pmt.sh|bat script from the *was_root*/bin/ProfileManagement directory.

What to do next

You can augment additional profiles. To restart the Profile Management tool, run the **./pmt.sh|bat** command from the *was_root*/bin/ProfileManagement directory, or select **Profile Management Tool** in the First steps console.

Start a catalog service, start containers, and configure TCP ports in your WebSphere Application Server environment.

manageprofiles command

You can use the **manageprofiles** utility to create profiles with the WebSphere eXtreme Scale template, and augment and unaugment existing application server profiles with the eXtreme Scale augment templates. To use the features of the product, your environment must contain at least one profile augmented for the product.

- Before you can create and augment profiles, you must install eXtreme Scale . See "Installing WebSphere eXtreme Scale or WebSphere eXtreme Scale Client with WebSphere Application Server" on page 37 for more information.

Purpose

The **manageprofiles** command creates the runtime environment for a product process in a set of files called a profile. The profile defines the runtime environment. You can perform the following actions with the **manageprofiles** command:

- Create and augment a deployment manager profile
- Create and augment a custom profile
- Create and augment stand-alone application server profile
- Create and augment a cell profile
- Unaugment any type of profile

When you augment an existing profile, you change the profile by applying a product-specific augmentation template.

- Augment the profile with the xs_augment template if you installed the eXtreme Scale client or both the client and server.

Location

The command file is in the *install_root*/bin directory.

Usage

For detailed help, use the **-help** parameter:

```
./manageprofiles.sh|bat -create -templatePath install_root/profileTemplates/xs_augment/dmgr -help
```

In the following sections, each task that you can perform using the **manageprofiles** command, along with a list of required parameters, is described. For details on the optional parameters to specify for each task, see the **manageprofiles** command in the WebSphere Application Server Information Center.

Create a deployment manager profile

You can use the **manageprofiles** command to create a deployment manager profile. The deployment manager administers the application servers that are federated into the cell.

Parameters

-create
  Creates a profile. (Required)

-templatePath *template_path*
  Specifies the file path to the template. (Required)

  Use the following format:

  -templatePath *install_root*/profileTemplates/*template_type*/dmgr

Example

- Using the xs_augment template:

  ```
  ./manageprofiles.sh|bat -create -templatePath install_root/profileTemplates/xs_augment/dmgr
  ```

Create a custom profile

You can use the **manageprofiles** command to create a custom profile. A custom profile is an empty node that you customize through the deployment manager to include application servers, clusters, or other Java processes.

Parameters

-create
  Creates a profile. (Required)

-templatePath *template_path*
  Specifies the file path to the template. (Required)

  Use the following format:

  -templatePath *install_root*/profileTemplates/*template_type*/managed

Example

- Using the xs_augment template:

```
./manageprofiles.sh|bat -create -templatePath install_root/profileTemplates/xs_augment/managed
```

Create a stand-alone application server profile

You can use the **manageprofiles** command to create a stand-alone application server profile.

Parameters

-create
    Creates a profile. (Required)

-templatePath *template_path*
    Specifies the file path to the template. (Required)

    Use the following format:

    `-templatePath install_root/profileTemplates/template_type/default`

Example

- Using the xs_augment template:

```
./manageprofiles.sh|bat -create -templatePath install_root/profileTemplates/xs_augment/default
```

Create a cell profile

You can use the **manageprofiles** command to create a cell profile, which consists of a deployment manager and an application server.

Parameters

Specify the following parameters in the deployment manager template:

-create
    Creates a profile. (Required)

-templatePath *template_path*
    Specifies the file path to the template. (Required)

    Use the following format:

    `-templatePath install_root/profileTemplates/template_type/cell/dmgr`

Specify the following parameters with the application server template:

-create
    Creates a profile. (Required)

-templatePath *template_path*
    Specifies the file path to the template. (Required)

    Use the following format:

    `-templatePath install_root/profileTemplates/template_type/cell/default`

Example

- Using the xs_augment template:

```
./manageprofiles.sh|bat -create -templatePath install_root/profileTemplates/xs_augment/cell/dmgr
-nodeProfilePath install_root/profiles/AppSrv01 -cellName cell01dmgr -nodeName node01dmgr
-appServerNodeName node01

./manageprofiles.sh|bat -create -templatePath install_root/profileTemplates/xs_augment/cell/default
```

```
-dmgrProfilePath install_root/profiles/Dmgr01 -portsFile
install_root/profiles/Dmgr01/properties/portdef.props -nodePortsFile
install_root/profiles/Dmgr01/properties/nodeportdef.props -cellName cell01dmgr
-nodeName node01dmgr -appServerNodeName node01
```

Augment a deployment manager profile

You can use the **manageprofiles** command to augment a deployment manager
profile.

Parameters

-augment
Augments the existing profile. (Required)

-profileName
Specifies the name of the profile. (Required)

-templatePath *template_path*
Specifies the path to the template files that are located in the installation root
directory. (Required)

Use the following format:

-templatePath *install_root*/profileTemplates/*template_type*/dmgr

Example
- Using the xs_augment template:

```
./manageprofiles.sh|bat -augment -profileName profile01
-templatePath install_root/profileTemplates/xs_augment/dmgr
```

Augment a custom profile

You can use the **manageprofiles** command to augment a custom profile.

Parameters

-augment
Augments the existing profile. (Required)

-profileName
Specifies the name of the profile. (Required)

-templatePath *template_path*
Specifies the path to the template files that are located in the installation root
directory. (Required)

Use the following format:

-templatePath *install_root*/profileTemplates/*template_type*/managed

Example
- Using the xs_augment template:

```
./manageprofiles.sh|bat -augment -profileName profile01
-templatePath install_root/profileTemplates/xs_augment/managed
```

Augment a stand-alone application server profile

You can use the **manageprofiles** command to augment a stand-alone application
server profile.

Parameters

-augment
>   Augments the existing profile. (Required)

-profileName
>   Specifies the name of the profile. (Required)

-templatePath *template_path*
>   Specifies the path to the template files that are located in the installation root directory. (Required)
>
>   Use the following format:
>
>   -templatePath *install_root*/profileTemplates/*template_type*/default

Example

- Using the xs_augment template:

  ```
  ./manageprofiles.sh|bat -augment -profileName profile01
  -templatePath install_root/profileTemplates/xs_augment/default
  ```

Augment a cell profile

You can use the **manageprofiles** command to augment a cell profile.

Parameters

Specify the following parameters for the deployment manager profile:

-augment
>   Augments the existing profile. (Required)

-profileName
>   Specifies the name of the profile. (Required)

-templatePath *template_path*
>   Specifies the path to the template files that are located in the installation root directory. (Required)
>
>   Use the following format:
>
>   -templatePath *install_root*/profileTemplates/*template_type*/cell/dmgr

Specify the following parameters for the application server profile:

-augment
>   Augments the existing profile. (Required)

-profileName
>   Specifies the name of the profile. (Required)

-templatePath *template_path*
>   Specifies the path to the template files that are located in the installation root directory. (Required)
>
>   Use the following format:
>
>   -templatePath *install_root*/profileTemplates/*template_type*/cell/default

Example

- Using the xs_augment template:

  ```
  ./manageprofiles.sh|bat -augment -profileName profile01 -templatePath install_root
      /profileTemplates/xs_augment/cell/dmgr
  ```

  ```
  ./manageprofiles.sh|bat -augment -profileName profile01 -templatePath install_root
      /profileTemplates/xs_augment/cell/default
  ```

Unaugment a profile

To unaugment a profile, specify the **-ignoreStack** parameter with the
-templatePath parameter in addition to specifying the required **-unaugment** and
-profileName parameters.

Parameters

-unaugment

Unaugments a previously augmented profile. (Required)

-profileName

Specifies the name of the profile. The parameter is issued by default if no
values are specified. (Required)

-templatePath *template_path*

Specifies the path to the template files that are located in the installation root
directory. (Optional)

Use the following format:

-templatePath *install_root*/profileTemplates/*template_type*/*profile_type*

where *template_type* is `xs_augment` or `pf_augment` and *profile_type* is one of four
profile types:
- `dmgr`: deployment manager profile
- `managed`: custom profile
- `default`: stand-alone application server profile
- `cell`: cell profile

-ignoreStack

Used with the **-templatePath** parameter to unaugment a particular profile that
has been augmented. (Optional)

Example

- Using the xs_augment template:

    ./manageprofiles.sh|bat -unaugment -profileName profile01 -ignoreStack
    -templatePath *install_root*/profileTemplates/xs_augment/*profile_type*

Non-root profiles

Give a non-root user permissions for files and directories so that the non-root user
can create a profile for the product. The non-root user can also augment a profile
that was created by a root user, a different non-root user, or the same non-root
user.

In a WebSphere Application Server environment, non-root (non-administrator)
users are limited in being able to create and use profiles in their environment.
Within the Profile Management tool plug-in, unique names and port values are
disabled for non-root users. The non-root user must change the default field values
in the Profile Management tool for the profile name, node name, cell name, and
port assignments. Consider assigning non-root users a range of values for each of
the fields. You can assign responsibility to the non-root users for adhering to their
proper value ranges and for maintaining the integrity of their own definitions.

The term *installer* refers to either a root or non-root user. As an installer, you can
grant non-root users permissions to create profiles and establish their own product
environments. For example, a non-root user might create a product environment to

test application deployment with a profile that the user owns. Specific tasks that you can complete to allow non-root profile creation include the following items:

- Creating a profile and assigning ownership of the profile directory to a non-root user so that the non-root user can start WebSphere Application Server for a specific profile.
- Granting write permission of the appropriate files and directories to a non-root user, which allows the non-root user to then create the profile. With this task, you can create a group for users who are authorized to create profiles, or give individual users the ability to create profiles.
- Installing maintenance packages for the product, which includes required services for existing profiles that are owned by a non- user. As the installer, you are the owner of any new files that the maintenance package creates.

For more information about creating profiles for non-root users, see Creating profiles for non-root users .

As an installer, you can also grant permissions for a non-root user to augment profiles. For example, a non-root user can augment a profile that is created by an installer, or augment a profile that they create. Follow the WebSphere Application Server Network Deployment non-root user augmentation process.

However, when a non-root user augments a profile that is created by the installer, the non-root user does not need to create the following files before augmentation. The following files were established during the profile creation process:

- *was_root*/logs/manageprofiles.xml
- *was_root*/properties/fsdb.xml
- *was_root*/properties/profileRegistry.xml

When a non-root user augments a profile that the user creates, the non-root user must modify the permissions for the documents that are located within the eXtreme Scale profile templates.

Attention: You can also use a non-root (non-administrator) profile for WebSphere eXtreme Scale in a stand-alone environment, one outside of WebSphere Application Server. You must change the owner of the ObjectGrid directory to the non-root profile. Then you can log in with that non-root profile and operate eXtreme Scale as you normally would for a root (administrator) profile.

Taking the first steps after installation

After complete and verify the installation, you can begin to use WebSphere eXtreme Scale to create your data grid.

Procedure

1. Update your installation by applying maintenance.

   More information: "Updating eXtreme Scale servers" on page 57.

2. If you are using WebSphere eXtreme Scale for the first time, you can use the Getting started information to learn more about how to use the product.

   More information: Getting started

3. Configure the product. Create properties and XML files to define the configuration for data grids, servers, and clients. You can also configure cache or database integration, REST data services, or OSGi plug-ins.

   More information: Configuring

4. Develop an application that accesses the data grid.

   More information: Developing applications

5. Start and administer container and catalog servers with your configuration files and data grid application.

   More information: Administering

6. Monitor the performance of your configuration with the various monitoring tools.

   More information: Monitoring

Troubleshooting the product installation

IBM Installation Manager is a common installer for many IBM software products that you use to install this version of WebSphere eXtreme Scale.

Results

Logging and tracing:

- An easy way to view the logs is to open Installation Manager and go to **File > View Log**. An individual log file can be opened by selecting it in the table and then clicking the **Open log file** icon.
- Logs are located in the `logs` directory of Installation Manager's application data location. For example:

  – `Windows` **Administrative installation:**

     `C:\Documents and Settings\All Users\Application Data\IBM\Installation Manager`

  – `Windows` **Non-administrative installation:**

     `C:\Documents and Settings\user_name\Application Data\IBM\Installation Manager`

  – `UNIX` `Linux` **Administrative installation:**

     `/var/IBM/InstallationManager`

  – `UNIX` `Linux` **Non-administrative installation:**

     `user_home/var/ibm/InstallationManager`

- The main log files are time-stamped XML files in the `logs` directory, and they can be viewed using any standard web browser.
- The `log.properties` file in the `logs` directory specifies the level of logging or tracing that Installation Manager uses. To turn on tracing for the WebSphere eXtreme Scale plug-ins, for example, create a `log.properties` file with the following content:

  ```
  com.ibm.ws=DEBUG
  com.ibm.cic.agent.core.Engine=DEBUG
  global=DEBUG
  ```

  Restart Installation Manager as necessary, and Installation Manager outputs traces for theWebSphere eXtreme Scale plug-ins.

Notes on troubleshooting:

- `UNIX` `Linux` By default, some HP-UX systems are configured to not use DNS to resolve host names. This could result in Installation Manager not being able to connect to an external repository.

  You can ping the repository, but nslookup does not return anything.

  Work with your system administrator to configure your machine to use DNS, or use the IP address of the repository.

- In some cases, you might need to bypass existing checking mechanisms in Installation Manager.
  - On some network file systems, disk space might not be reported correctly at times; and you might need to bypass disk-space checking and proceed with your installation.

    To disable disk-space checking, specify the following system property in the config.ini file in *IM_install_root*/eclipse/configuration and restart Installation Manager:

    ```
    cic.override.disk.space=sizeunit
    ```

    where *size* is a positive integer and *unit* is blank for bytes, k for kilo, m for megabytes, or g for gigabytes. For example:

    ```
    cic.override.disk.space=120 (120 bytes)
    cic.override.disk.space=130k (130 kilobytes)
    cic.override.disk.space=140m (140 megabytes)
    cic.override.disk.space=150g (150 gigabytes)
    cic.override.disk.space=true
    ```

    Installation Manager will report a disk-space size of Long.MAX_VALUE. Instead of displaying a very large amount of available disk space, N/A is displayed.
  - To bypass operating-system prerequisite checking, add disableOSPrereqChecking=true to the config.ini file in *IM_install_root*/eclipse/configuration and restart Installation Manager.

  If you need to use any of these bypass methods, contact IBM Support for assistance in developing a solution that does not involve bypassing the Installation Manager checking mechanisms.
- For more information on using Installation Manager, read the IBM Installation Manager Version 1.5 Information Center.

  Read the release notes to learn more about the latest version of Installation Manager. To access the release notes, complete the following task:

  - Windows Click **Start > Programs > IBM Installation Manager > Release Notes**®.
  - UNIX Linux Go to the documentation subdirectory in the directory where Installation Manager is installed, and open the readme.html file.
- If a fatal error occurs when you try to install the product, take the following steps:
  - Make a backup copy of your current product installation directory in case IBM support needs to review it later.
  - Use Installation Manager to uninstall everything that you have installed under the product installation location (package group). You might run into errors, but they can be safely ignored.
  - Delete everything that remains in the product installation directory.
  - Use Installation Manager to reinstall the product to the same location or to a new one.

Note on version and history information: The **versionInfo** and **historyInfo** commands return version and history information based on all of the installation, uninstallation, update, and rollback activities performed on the system.

Chapter 2. Upgrading and migrating WebSphere eXtreme Scale

You can migrate to Version 8.6 from previous versions, or you can apply maintenance packages. To avoid outages, you must consider the order in which you apply the updates to the servers in your configuration.

Updating eXtreme Scale servers

You can upgrade WebSphere eXtreme Scale to a new version, either by applying maintenance or installing a new version, without interrupting service.

Before you begin

You must have the binary file for the major version release or maintenance that you want to apply. You can get the latest information about the available releases and maintenance packages from the IBM support portal for WebSphere eXtreme Scale.

About this task

To upgrade without service interruption, you must first upgrade catalog servers, then upgrade the container servers, and lastly client servers.

To support enterprise data grid configurations, you must upgrade your transport mechanism from Object Request Broker (ORB) to IBM eXtremeIO (XIO). If you are not already using XIO, all of your servers and clients must be migrated to version 8.6 before you can switch to using the XIO transport. Your servers and clients can use the ORB transport while you are upgrading. When the upgrade is complete, you can move to XIO.

Procedure

1. Upgrade the catalog service tier, repeating the following steps for each catalog server in the data grid. Upgrade the catalog service tier before upgrading any container servers or clients. Individual catalog servers can interoperate with version compatibility, so you can apply upgrades to one catalog server at a time without interrupting service.

   a. Check for a healthy quorum status. Run the following command:

      ```
      xscmd -c showQuorumStatus
      ```

      This result indicates that all the catalog servers are connected.

   b. If you are using multi-master replication between two catalog service domains, dismiss the link between the two catalog service domains while you are upgrading the catalog servers.

      ```
      xscmd –c dismissLink –cep host:2809 -fd domain_name
      ```

      You only need to run this command from one of the catalog service domains to remove the link between two catalog service domains.

   c. Shut down one of the catalog servers. You can use the **stopOgServer** or **stopXsServer** command, the **xscmd -c teardown** command, or shut down the application server that is running the catalog service in WebSphere

Application Server. There are no requirements for the order in which you stop the catalog servers, but shutting down the primary catalog server last reduces turnover. To determine which catalog server is the primary, look for the CWOBJ8106 message in the log files. Under normal conditions, quorum is maintained when a catalog server is shut down, but it is a best practice to query quorum status after each shutdown with the **xscmd -c showQuorumStatus** command.

If you use the **xscmd -c teardown** command, you can filter the server names. The **stopOgServer** or **stopXsServer** command requires an exact server name or list of server names to stop in parallel to be entered. You should group the shutdown process instead of calling the stop or teardown process for many servers in parallel. By grouping the servers to be shut down, the data grid can react to the servers that are being shut down by moving shards around the data grid. You can use one of the following commands to shut down your servers:

You can provide a specific list of servers to stop to the **stopOgServer** or **xscmd -c teardown** commands:

```
stopOgServer <server_name>[,<server_name>]
```

8.6+

```
stopXsServer <server_name>[,<server_name>]
xscmd –c teardown -sl <server_name>[,<server_name>]
```

With the previous examples, the **stopOgServer** or **stopXsServer**, or **xscmd -c teardown** commands are completing the same shutdown tasks. However, you can filter the servers to stop with the **xscmd -c teardown** command. See Stopping servers gracefully with the **xscmd** utility for more information about filtering the servers by zone or host name. The teardown command filters out the matching servers and asks if the selected servers are correct.

d. Install the updates on the catalog server. You can either migrate the catalog server to a new major release of the product or apply a maintenance package. See the following topics for more information:

- To migrate from a Version 7.1.x installation: "Migrating to WebSphere eXtreme Scale Version 8.6" on page 60

- **8.6+** To migrate from a Version 8.5 installation: "Installing fix packs using IBM Installation Manager" on page 61.

e. **8.6+** Update the *JAVA_HOME* environment variable to point to a supported Java Development Kit (JDK) installation. For supported JDK versions and instructions on updating the JDK, see "Java SE considerations" on page 12.

f. Restart the catalog server.

If you are using a stand-alone environment, see Starting a stand-alone catalog service that uses the ORB transportor Starting a stand-alone catalog service that uses the IBM eXtremeIO (XIO) transport for more information. If you are using a WebSphere Application Server environment, see Starting and stopping servers in a WebSphere Application Server environment for more information.

The catalog server runs in compatibility mode until all the catalog servers are moved to the same level. Compatibility mode mostly applies to major release migrations because new functions are not available on the servers that are not migrated. No restrictions exist on how long catalog servers can run in compatibility mode, but the best practice is to migrate all catalog servers to the same level as soon as possible.

g. Apply updates to the remaining catalog servers in your configuration.

2. Upgrade the container servers, repeating the following steps for each container server in the data grid. You can upgrade container servers in any order. However, consider updating the servers first, then the clients, if you are using new functions in the upgrade.

   a. Stop the container servers that you want to upgrade. You can stop the container server tier in groups with the **stopOgserver** or **stopXsServer** command or the **teardown** command. By batching teardown operations and running start server operations in parallel, the placement mechanism can move shards in larger groups.

      ```
      xscmd -c teardown -z DefaultZone

      Connecting to Catalog service at localhost:1099

      Processing filter options for Server teardown

      The following servers will be torn down:

        container00
        container01
        container02
        container03
        container04


      Do you want to tear down the listed servers? (Y/N)
      ```

   b. Install the updates on the container servers. You can either migrate the container servers to a new major release of the product or apply a maintenance package. See the following topics for more information:
      - To migrate from a Version 7.1.x installation: "Migrating to WebSphere eXtreme Scale Version 8.6" on page 60
      - **8.6+** To migrate from a Version 8.5 installation: "Installing fix packs using IBM Installation Manager" on page 61.

   c. **8.6+** Update the *JAVA_HOME* environment variable to point to a supported Java Development Kit (JDK) installation. For supported JDK versions and instructions on updating the JDK, see "Java SE considerations" on page 12.

   d. Restart your container servers.

   e. Upgrade any remaining container servers in your configuration.

3. If you are using multi-master replication, reconnect your catalog service domains. Use the **xscmd -c establishLink** command to reconnect the catalog service domains.

   ```
   xscmd –c establishLink -cep host:2809 -fd dname -fe fdHostA:2809,fdHostB:2809
   ```

4. To check that all servers are using the new version of WebSphere eXtreme Scale, issue the **xscmd -c showinfo** command.

   ```
   xscmd –c showinfo
   ```

5. Upgrade the client installations.

   .NET **8.6.0.2+** If your environment includes WebSphere eXtreme Scale Client for .NET, see "Upgrading WebSphere eXtreme Scale Client for .NET" on page 72.

What to do next

- You can also use these steps to revert to an older version or to uninstall maintenance packages. However, if you revert to Version 7.1.0 when you are

using multi-master replication, the two-way replication might not function correctly when you re-establish the links. In this situation, restart both catalog service domains and re-link the catalog service domains with the **establishLink** command.

- **8.6+** After all of your servers and clients are migrated to Version 8.6, you can update your configuration to use IBM eXtremeIO (XIO) to support enterprise data grids. For more information, see Configuring IBM eXtremeIO (XIO).

Migrating to WebSphere eXtreme Scale Version 8.6

With the WebSphere eXtreme Scale installer, you cannot upgrade or modify a previous installation. You must uninstall the previous version before you install the new version. You do not need to migrate your configuration files because they are backward compatible. However, if you changed any of the script files that are shipped with the product, you must reapply these changes to the updated script files.

Before you begin

Verify that your systems meet the minimum requirements for the product versions you plan to migrate and install. See the information about hardware and software requirements in the *Administration Guide* for more information.

About this task

Merge any modified product script files with new product script files in the /bin directory to maintain your changes.

Tip: If you did not modify the script files that are installed with the product, you are not required to complete the following migration steps. Instead, you can upgrade to Version 8.6 by uninstalling the previous version and installing the new version in the same directory.

Procedure

1. Stop all processes that are using WebSphere eXtreme Scale.
   - Stop all processes that are running in your stand-alone WebSphere eXtreme Scale environment. For more information, see Stopping stand-alone servers that use the ORB transport.
   - Read about command-line utilities to stop all processes that are running in your WebSphere Application Server or WebSphere Application Server Network Deployment environment.
2. Save any modified scripts from your current installation directory to a temporary directory.
3. Uninstall the product. For more information, see "Uninstalling the product using IBM Installation Manager" on page 41.
4. Install WebSphere eXtreme Scale Version 8.6. See Chapter 1, "Installing," on page 1 for more information.
5. Merge your changes from the files in the temporary directory to the new product script files in the /bin directory.
6. Start all of your WebSphere eXtreme Scale processes to begin using the product. For more information, see Administering.

Installing fix packs using IBM Installation Manager

Java

You can use IBM Installation Manager to update the product with the fix packs that are available for WebSphere eXtreme Scale product offerings. Fix packs can be installed from the GUI, the command line, or using response files.

Installing fix packs using the GUI

Java

You can update this product to a later version using the IBM Installation Manager wizard.

Before you begin

Contact the IBM Software Support Center for information about upgrades for WebSphere eXtreme Scale stand-alone or WebSphere eXtreme Scale for WebSphere Application Server product offerings. The most current information is available from the IBM Software Support Center and Fix Central.

IBM Installation Manager is used to apply product maintenance to the following product offerings:
- WebSphere eXtreme Scale in a stand-alone environment
- WebSphere eXtreme Scale Client in a stand-alone environment
- WebSphere eXtreme Scale for WebSphere Application Server Version 7
- WebSphere eXtreme Scale for WebSphere Application Server Version 8
- WebSphere eXtreme Scale Client for WebSphere Application Server Version 7
- WebSphere eXtreme Scale Client for WebSphere Application Server Version 8

Make sure that the web-based or local service repository location is listed and checked or that the **Search service repositories during installation and updates** option is selected on the Repositories panel in your Installation Manager preferences. For more information on using service repositories with Installation Manager, read the IBM Installation Manager Version 1.5 Information Center.

About this task

Restriction: You cannot use the Installation Manager to upgrade an installation and add or remove the full WebSphere Application Server profile feature or the Liberty profile feature.

Procedure

1. Stop all processes that are running in your environment.
   - To stop all processes that are running in your stand-alone eXtreme Scale environment, see Stopping stand-alone servers that use the ORB transport.
   - To stop all processes that are running in your WebSphere Application Server environment, see Command-line utilities.
2. Log on to your system.
3. Stop all servers and applications on the WebSphere Application Server installation that is being updated.
4. Start Installation Manager.

5. Click **Update**.

   Note: If you are prompted to authenticate, use the IBM ID and password that you use to access protected IBM software websites.
6. Select the package group to update.

   Tip: If you select **Update all**, Installation Manager will search all of the added and predefined repositories for updates to all of the package groups that it has installed. Use this feature only if you have full control over which fixes are contained in the targeted repositories. If you create and point to a set of custom repositories that include only the specific fixes that you want to install, you should be able to use this feature confidently. If you enable searching service repositories or install fixes directly from other live web-based repositories, then you might not want to select this option so that you can select only the fixes that you want to install for each offering on subsequent panels.
7. Click **Next**.
8. Select the version to which you want to update under:
   * WebSphere eXtreme Scale in a stand-alone environment
   * WebSphere eXtreme Scale Client in a stand-alone environment
   * WebSphere eXtreme Scale for WebSphere Application Server Version 7
   * WebSphere eXtreme Scale for WebSphere Application Server Version 8
   * WebSphere eXtreme Scale Client for WebSphere Application Server Version 7
   * WebSphere eXtreme Scale Client for WebSphere Application Server Version 8
9. Select any fixes that you want to install.

   Any recommended fixes are selected by default.

   If there are recommended fixes, you can select the option to show only recommended fixes and hide non-recommended fixes.
10. Click **Next**.
11. Accept the terms in the license agreements, and click **Next**.
12. Select the optional features that you want in your updated installation.
13. Review the summary information, and click **Update**.
    * If the installation is successful, the program displays a message indicating that installation is successful.
    * If the installation is not successful, click **View Log File** to troubleshoot the problem.
14. Click **Finish**.
15. Click **File > Exit** to close Installation Manager.

Installing fix packs using the command line

Java

You can use the IBM Installation Manager from the command line to update the product with the fix packs that are available for WebSphere eXtreme Scale product offerings.

Before you begin

. Contact the IBM Software Support Center for information about upgrades for WebSphere eXtreme Scale stand-alone or WebSphere eXtreme Scale for WebSphere Application Server product offerings. The most current information is available from the IBM Software Support Center and Fix Central.

IBM Installation Manager is used to apply product maintenance to the following product offerings:
* WebSphere eXtreme Scale in a stand-alone environment
* WebSphere eXtreme Scale Client in a stand-alone environment
* WebSphere eXtreme Scale for WebSphere Application Server Version 7
* WebSphere eXtreme Scale for WebSphere Application Server Version 8
* WebSphere eXtreme Scale Client for WebSphere Application Server Version 7
* WebSphere eXtreme Scale Client for WebSphere Application Server Version 8

About this task

Restriction: You cannot use the Installation Manager to upgrade an installation and add or remove the full WebSphere Application Server profile feature or the Liberty profile feature.

Procedure

1. For a list of interim fixes and fix packs that are available forWebSphere eXtreme Scale 8.5 and specific information about each fix, perform the following actions.

   a. Go to Fix Central.
   b. Select **WebSphere** as the product group.
   c. Select WebSphere eXtreme Scale as the product.
   d. Select **8.5** as the installed version.
   e. Select your operating system as the platform, and click **Continue**.
   f. Select **Browse for fixes**, and click **Continue**.
   g. Click **More Information** under each fix to view information about the fix.
   h. **Recommendation:** Make a note of the name of the fix pack that you would like to install.

2. Update WebSphere eXtreme Scale Version 8.5 with the fix pack using the following procedure.

   * Download the file that contains the fix pack from Fix Central, and use local updating.

     You can download a compressed file that contains the fix pack from Fix Central. Each compressed fix-pack file contains an Installation Manager repository for the fix pack and usually has a .zip extension. After downloading and extracting the fix-pack file, use Installation Manager to update WebSphere Application Server Version 8.x with the fix pack.

     a. To download the fix pack, perform the following actions:

        1) Go to Fix Central.
        2) Select **WebSphere** as the product group.
        3) Select **WebSphere eXtreme Scale** as the product.
        4) Select **8.5** as the installed version.
        5) Select your operating system as the platform, and click **Continue**.
        6) Select **Browse for fixes**, and click **Continue**.

7) Select the fix pack that you want to download, and click **Continue**.

8) Select your download options, and click **Continue**.

9) Click **I agree** to agree to the terms and conditions.

10) Click **Download now** to download the fix pack.

11) Transfer the compressed file in binary format to the system on which it will be installed.

12) Extract the compressed repository files to a directory on your system.

b. To install a fix pack from a downloaded file, perform the following actions:

1) Log on to your system.

2) Stop all processes that are running in your environment. To stop all processes that are running in your WebSphere Application Server environment, see Command-line utilities.

3) Change to the *Installation_Manager_binaries*/eclipse/tools directory, where *Installation_Manager_binaries* is the installation root directory for the Installation Manager.

4) Install the fix pack.

 UNIX   Linux

```
./imcl install offering_ID_offering_version,optional_feature_ID
  -installationDirectory product_installation_location
  -repositories location_of_expanded_files
  -acceptLicense
```

 Windows

```
imcl.exe install offering_ID_offering_version,optional_feature_ID
  -installationDirectory product_installation_location
  -repositories location_of_expanded_files
  -acceptLicense
```

Tips:

– The *offering_ID* is the offering ID that is listed in "Offering IDs for WebSphere eXtreme Scale product offerings" on page 9.

– The *offering_version*, which optionally can be attached to the offering ID with an underscore, is a specific version of the offering to install (8.5.0.20110503_0200 for example).

  - If *offering_version* is **not** specified, the latest version of the offering and **all** interim fixes for that version are installed.

  - If *offering_version* is specified, the specified version of the offering and **no** interim fixes for that version are installed.

  The offering version can be found attached to the end of the offering ID with an underscore when you run the following command against the repository:

  ```
  imcl listAvailablePackages -repositories source_repository
  ```

– You can also specify none, recommended or all with the -installFixes argument to indicate which interim fixes you want installed with the offering.

  - If the offering version is **not** specified, the -installFixes option defaults to all.

  - If the offering version is specified, the -installFixes option defaults to none.

– You can add a list of features that are separated by commas. If a list of features is not specified, the default features are installed.

5) **Optional:** List all installed packages to verify the installation:

UNIX   Linux

```
./imcl listInstalledPackages -long
```

Windows

```
imcl.exe listInstalledPackages -long
```

Installing fix packs using a response file

Java

You can update this product to a later version using IBM Installation Manager with a response file.

Before you begin

Tip: As an alterative to the procedure that is described in this article, Installation Manager allows you to use the **updateAll** command in a response file or on the command line to search for and update all installed packages. Use this command only if you have full control over which fixes are contained in the targeted repositories. If you create and point to a set of custom repositories that include only the specific fixes that you want to install, you should be able to use this command confidently. If you enable searching service repositories or install fixes directly from other live web-based repositories, then you might not want to select this option so that you can select only the fixes that you want to install using the -installFixes option with the **install** command on the command line or the installFixes attribute in a response file.

Procedure

1. For a list of interim fixes and fix packs that are available for WebSphere eXtreme Scale and specific information about each fix, perform the following actions.

   a. Go to Fix Central.

   b. Select **WebSphere** as the product group.

   c. Select WebSphere eXtreme Scale as the product.

   d. Select **8.x** as the installed version.

   e. Select your operating system as the platform, and click **Continue**.

   f. Select **Browse for fixes**, and click **Continue**.

   g. Click **More Information** under each fix to view information about the fix.

   h. **Recommendation:** Make a note of the name of the fix pack that you would like to install.

2. Update WebSphere eXtreme Scale with the fix pack using the following procedure.

   - Download the file that contains the fix pack from Fix Central, and use local updating.

     You can download a compressed file that contains the fix pack from Fix Central. Each compressed fix-pack file contains an Installation Manager repository for the fix pack and usually has a .zip extension. After downloading and extracting the fix-pack file, use Installation Manager to update WebSphere eXtreme Scale with the fix pack.

a. To download the fix pack, perform the following actions:
   1) Go to Fix Central.
   2) Select **WebSphere** as the product group.
   3) Select **WebSphere eXtreme Scale** as the product.
   4) Select **8.6** as the installed version.
   5) Select your operating system as the platform, and click **Continue**.
   6) Select **Browse for fixes**, and click **Continue**.
   7) Select the fix pack that you want to download, and click **Continue**.
   8) Select your download options, and click **Continue**.
   9) Click **I agree** to agree to the terms and conditions.
   10) Click **Download now** to download the fix pack.
   11) Transfer the compressed file in binary format to the system on which it will be installed.
   12) Extract the compressed repository files to a directory on your system.

b. Perform the following actions:
   1) Log on to your system.
   2) If the repository requires a user name and password, create a keyring file to access this repository.

      For more information on creating a keyring file for Installation Manager, read the IBM Installation Manager Version 1.5 Information Center.

      Tip: When creating a keyring file, append /repository.config at the end of the repository URL location if the **imutilsc** command is unable to find the URL that is specified.
   3) To stop all processes that are running in your stand-alone eXtreme Scale environment, see Stopping stand-alone servers that use the ORB transportTo stop all processes that are running in your WebSphere Application Server environment, see Command-line utilities.
   4) Change to the *Installation_Manager_binaries*/eclipse/tools directory, where *Installation_Manager_binaries* is the installation root directory for the Installation Manager.
   5) Install the fix pack using a response file.

      For example:

      – `Windows` **Administrator or non-administrator:**

      ```
      imcl.exe -acceptLicense
        input C:\temp\update_response_file.xml
        -log C:\temp\update_log.xml
        -keyring C:\IM\im.keyring
      ```

      – `UNIX` `Linux` **Administrator:**

      ```
      ./imcl -acceptLicense
        input /var/temp/update_response_file.xml
        -log /var/temp/update_log.xml
        -keyring /var/IM/im.keyring
      ```

      – `UNIX` `Linux` **Non-administrator:**

      ```
      ./imcl -acceptLicense
        input user_home/var/temp/update_response_file.xml
        -log user_home/var/temp/update_log.xml
        -keyring user_home/var/IM/im.keyring
      ```

Uninstalling fix packs using IBM Installation Manager

> Java

You can use IBM Installation Manager to rollback WebSphere eXtreme Scale product offerings to an earlier version. You can uninstall fix packs from the GUI, the command line, or using response files.

Uninstalling fix packs using the GUI

> Java

You can roll back this product to an earlier version using the IBM Installation Manager GUI.

Before you begin

During the rollback process, Installation Manager must access files from the earlier version of the package. By default, these files are stored on your computer when you install a package. If you change the default setting or delete the saved files, Installation Manager requires access to the repository that was used to install the earlier version.

About this task

Restriction: You cannot use the Installation Manager to roll back an installation and add or remove a feature.

Procedure

1. Stop all processes that are running in your environment.
   - To stop all processes that are running in your stand-alone eXtreme Scale environment, see Stopping stand-alone servers that use the ORB transport.
   - To stop all processes that are running in your WebSphere Application Server environment, see Command-line utilities.
2. Start Installation Manager.
3. Click **Roll Back**.
4. Select the package group to roll back.
5. Click **Next**.
6. Select the version to which you want to roll back under.
7. Click **Next**.
8. Review the summary information, and click **Roll Back**.
   - If the rollback is successful, the program displays a message indicating that the rollback is successful.
   - If the rollback is not successful, click **View Log File** to troubleshoot the problem.
9. Click **Finish**.
10. Click **File > Exit** to close Installation Manager.

Uninstalling fix packs using the command line

> Java

You can roll back this product to an earlier version using IBM Installation Manager from the command line.

Before you begin

Restriction: In order to use this procedure, you must have Installation Manager Version 1.5 or later installed on your system.

During the rollback process, Installation Manager must access files from the earlier version of the package. By default, these files are stored on your computer when you install a package. If you change the default setting or delete the saved files, Installation Manager requires access to the repository that was used to install the earlier version.

About this task

Restriction: You cannot use the Installation Manager to roll back an installation and add or remove the full WebSphere Application Server profile feature or the Liberty profile feature.

Procedure

1. Optional: If the repository requires a user name and password, create a keyring file to access this repository.

   For more information on creating a keyring file for Installation Manager, read the IBM Installation Manager Version 1.5 Information Center.

   Tip: When creating a keyring file, append /repository.config at the end of the repository URL location if the **imutilsc** command is unable to find the URL that is specified.

2. Log on to your system.

3. Stop all processes that are running in your environment.

   - To stop all processes that are running in your stand-alone eXtreme Scale environment, see Stopping stand-alone servers that use the ORB transport.
   - To stop all processes that are running in your WebSphere Application Server environment, see Command-line utilities.

4. Change to the `eclipse/tools` subdirectory in the directory where you installed Installation Manager.

5. Use the **imcl** command to roll back the product.

   | UNIX | Linux |

   ```
   ./imcl rollback offering_ID_offering_version
     -repositories source_repository
     -installationDirectory installation_directory
     -preferences preference_key=value
     -properties property_key=value
     -keyring keyring_file -password password
     -acceptLicense
   ```

   | Windows |

   ```
   imcl.exe rollback offering_ID_offering_version
     -repositories source_repository
     -installationDirectory installation_directory
     -preferences preference_key=value
     -properties property_key=value
     -keyring keyring_file -password password
     -acceptLicense
   ```

Tips:

- The *offering_ID* is the offering ID that is listed in "Offering IDs for WebSphere eXtreme Scale product offerings" on page 9.
- The *offering_version*, which optionally can be attached to the offering ID with an underscore, is a specific version of the offering to which to roll back (8.5.0.20110503_0200 for example).
    - If *offering_version* is **not** specified, the installation rolls back to the previously installed version of the offering and **all** interim fixes for that version are installed.
    - If *offering_version* is specified, the installation rolls back to the specified earlier version of the offering and **no** interim fixes for that version are installed.

  The offering version can be found attached to the end of the offering ID with an underscore in the Package section of the report that is generated when you run the **historyInfo** or **genHistoryReport** command from the *app_server_root*/bin directory.

  For more information on using Installation Manager, read the IBM Installation Manager Version 1.5 Information Center.

6. Optional: List all installed packages to verify the roll back.

   UNIX   Linux

   ```
   ./imcl listInstalledPackages -long
   ```

   Windows

   ```
   imcl.exe listInstalledPackages -long
   ```

Uninstalling fix packs using response files

   Java

You can roll back this product to an earlier version using IBM Installation Manager with a response file.

Before you begin

During the rollback process, Installation Manager must access files from the earlier version of the package. By default, these files are stored on your computer when you install a package. If you change the default setting or delete the saved files, Installation Manager requires access to the repository that was used to install the earlier version.

About this task

Restriction: You cannot use the Installation Manager to roll back an installation and add or remove the full WebSphere Application Server profile feature or the Liberty profile feature.

Procedure

1. Optional: If the repository requires a username and password, create a keyring file to access this repository.

   For more information on creating a keyring file for Installation Manager, read the IBM Installation Manager Version 1.5 Information Center.

Tip: When creating a keyring file, append /repository.config at the end of the repository URL location if the **imutilsc** command is unable to find the URL that is specified.

2. Log on to your system.

3. Stop all processes that are running in your environment.

   - To stop all processes that are running in your stand-alone eXtreme Scale environment, see Stopping stand-alone servers that use the ORB transport.
   - To stop all processes that are running in your WebSphere Application Server environment, see Command-line utilities.

4. Use a response file to roll back the product.

   Change to the eclipse/tools subdirectory in the directory where you installed Installation Manager, and roll back the product.

   For example:

   - `Windows` **Administrator or non-administrator:**

   ```
   imcl.exe
     input C:\temp\rollback_response_file.xml
     -log C:\temp\rollback_log.xml
     -keyring C:\IM\im.keyring
   ```

   - `UNIX` `Linux` **Administrator:**

   ```
   ./imcl
     input /var/temp/rollback_response_file.xml
     -log /var/temp/rollback_log.xml
     -keyring /var/IM/im.keyring
   ```

   - `UNIX` `Linux` **Non-administrator:**

   ```
   ./imcl
     input user_home/var/temp/rollback_response_file.xml
     -log user_home/var/temp/rollback_log.xml
     -keyring user_home/var/IM/im.keyring
   ```

   Note: The program might write important post-installation instructions to standard output.

   For more information on using Installation Manager, read the IBM Installation Manager Version 1.5 Information Center.

5. Optional: List all installed packages to verify the roll back.

   `UNIX` `Linux`

   ```
   ./imcl listInstalledPackages -long
   ```

   `Windows`

   ```
   imcl.exe listInstalledPackages -long
   ```

Updating WebSphere eXtreme Scale on WebSphere Application Server

When you migrate WebSphere Application Server to a new version, you can also migrate the WebSphere eXtreme Scale configuration to the new WebSphere Application Server installation.

Before you begin

- It is assumed that both WebSphere eXtreme Scale Version 7 and WebSphere eXtreme Scale Version 8 are being installed on the same server.
- Migrate WebSphere Application Server Version 7 to WebSphere Application Server Version 8. For more information, see Migrating product configurations.

- Install WebSphere eXtreme Scale Version 8 on your WebSphere Application Server Version 8 installation. For more information, see "Installing WebSphere eXtreme Scale or WebSphere eXtreme Scale Client with WebSphere Application Server" on page 37. All WebSphere eXtreme Scale migration scripts must be run from WebSphere eXtreme Scale Version 8.5 or later. For example, if you are migrating from Version 7.x to Version 8, run the scripts for migration from the *<WXS_v8_install_root>*/bin directory.

About this task

When you install a new version of WebSphere Application Server that has WebSphere eXtreme Scale integration, you first upgrade WebSphere Application Server with the normal process. Then, install the new version of WebSphere eXtreme Scale on your new installation. Then, you can use the **xsmigration** script to move the WebSphere eXtreme Scale configuration information to the new WebSphere Application Server installation.

Procedure

1. Migrate the deployment manager-related configuration from Version 7 to Version 8.

   a. Run the WebSphere Application Server backup script. For more information, see WASPreUpgrade command.

   b. Stop the deployment manager.

   c. Access the deployment manager server in your WebSphere eXtreme Scale configuration and run the migration script.

      1) Change the directory to: *<WXS_v8_install_root>*/bin

      2) Run the following command:

         ```
         xsmigration.bat|sh -targetwashome <WAS8x_HOME>
         -sourcewashome <WAS7x_HOME> -targetprofilepath <WAS8x_DmgrProfile>
          -sourceprofilepath <WAS7x_DmgrProfile>
         ```

         where

         - *<WAS8x_HOME>* is the root location of the WebSphere Application Server Version 8.x installation. Example /opt/IBM/WebSphere8

         - *<WAS7x_HOME>* is the root location of the WebSphere Application Server Version 7.x installation Example:/opt/IBM/WebSphere7

         - *<WAS8x_DmgrProfile>* is the location of the WebSphere Application Server Version 8.x deployment manager profile. Example: /opt/IBM/WebSphere8/profiles/DMgr01

         - *<WAS7x_DmgrProfile>* is the location of the WebSphere Application Server Version 7.x deployment manager profile. Example: /opt/IBM/WebSphere7/profiles/DMgr01

2. Migrate the application server related configuration from Version 7 to Version 8.

   a. Change the directory to: *<WXS_v8_install_root>*/bin.

   b. Run the following command:

      ```
      xsmigration.bat|sh -targetwashome <WAS8x_HOME>
      -sourcewashome <WAS7x_HOME> -targetprofilepath <WAS8x_AppServerProfile>
       -sourceprofilepath <WAS7x_AppServerProfile>
      ```

      where

      - *<WAS8x_HOME>* is the root location of the WebSphere Application Server Version 8.x installation. Example /opt/IBM/WebSphere8

- *<WAS7x_HOME>* is the root location of the WebSphere Application Server Version 7.x installation Example:`/opt/IBM/WebSphere7`
- *<WAS8x_AppServerProfile>* is the location of the WebSphere Application Server Version 8.x application server profile. Example: `/opt/IBM/WebSphere8/profiles/AppServer01`
- *<WAS7x_AppServerProfile>* is the location of the WebSphere Application Server Version 7.x application server profile. Example: `/opt/IBM/WebSphere7/profiles/AppServer01`

3. Restart the WebSphere Application Server Version 8 deployment manager and synchronize all the managed nodes.

Upgrading WebSphere eXtreme Scale Client for .NET

.NET

You can upgrade an existing WebSphere eXtreme Scale Client for .NET installation by running the installation program. The program detects the existing installation and replaces the appropriate files.

Before you begin

- Download the upgrade for WebSphere eXtreme Scale Client for .NET. The most current information is available from the IBM Software Support Center and Fix Central. The available downloads apply to both new installations and upgrades.

About this task

This installation procedure immediately replaces your existing installation.

Procedure

1. Stop all processes that are running in your environment.
2. Run the wizard to install the WebSphere eXtreme Scale Client for .NET upgrade. When you run the installation wizard and a previous installation is detected, you must confirm that you want to upgrade the existing installation. The progress panel of the wizard specifies the previous version and the upgraded version.

Results

All existing WebSphere eXtreme Scale Client for .NET code is replaced, both on disk and in the global assembly cache (GAC). The published policy file is installed on disk and into the GAC, replacing the existing file.

What to do next

- Configure the WebSphere eXtreme Scale Client for .NET. For more information, see Configuring WebSphere eXtreme Scale Client for .NET.
- Develop .NET applications. For more information, see Developing data grid applications with .NET APIs.

Creating a side-by-side installation of fix packs for WebSphere eXtreme Scale Client for .NET

.NET

When you create a side-by-side installation, you can run multiple versions of fix packs for WebSphere eXtreme Scale Client for .NET on the same server. Your existing .NET applications that were built against the previous version can continue to run against the previous client.

Before you begin

- You must have a system that has a previous version of WebSphere eXtreme Scale Client for .NET installed and a separate system to which you install the more recent fix pack.
- Install the more recent version of WebSphere eXtreme Scale Client for .NET on a system that is separate from your production systems. For more information, see "Installing WebSphere eXtreme Scale Client for .NET" on page 33.

About this task

When you run a fix pack installation of WebSphere eXtreme Scale Client for .NET, the existing installation is replaced with the new version. Depending on your environment, you might want to test before you upgrade to the new version. You also might want to have some applications use the previous version and some use the more recent version. By manually installing the WebSphere eXtreme Scale Client for .NET, you can use multiple versions side by side.

When you install a new major release of WebSphere eXtreme Scale Client for .NET, the side-by-side installation occurs automatically.

Procedure

1. From the system that has the most recent installation, copy the entire *net_client_home* installation directory and all its subfolders. Put these files in a separate directory from the existing installation on the target system that has the previous version installed. This directory is referred to as *sidebyside_home*.

2. Manually install the more recent WebSphere eXtreme Scale Client for .NET assemblies from the *sidebyside_home*/bin directory into the GAC. After this installation is complete, the GAC contains both the older and newer versions of the WebSphere eXtreme Scale Client for .NET assemblies. How you manually install assemblies into the GAC depends on the version of Windows and .NET framework that are installed. For example, you might use Windows explorer to copy the assembly files into the %systemroot%\assembly directory. You also might download and use the gacutil.exe utility from Microsoft.

3. Update WebSphere eXtreme Scale Client for .NET applications to use the new version. Use one of the following options:

   - In each application that you want to update, add an assembly redirect element to the configuration file. This element redirects any reference to the older WebSphere eXtreme Scale Client for .NET assembly to the newer assembly.

     ```
     <runtime>
       <assemblyBinding xmlns="urn:schemas-microsoft-com:asm.v1">
         <dependentAssembly>
           <assemblyIdentity name="IBM.WebSphere.Caching" publicKeyToken="b439a24ee43b0816" />
           <bindingRedirect oldVersion="8.6.0.0-8.6.0.1" newVersion="8.6.0.2" />
         </dependentAssembly>
       </assemblyBinding>
     </runtime>
     ```

   - Rebuild your WebSphere eXtreme Scale Client for .NET application with the newer assembly file in the list of assembly references for your application project.

Results

- The applications that you updated use the newer version of WebSphere eXtreme Scale Client for .NET, while the other applications use the previous version.
- The log files for the applications that are using the newer version are in the same log directory that is used by the existing applications.
- The default client configuration is still obtained from the older WebSphere eXtreme Scale Client for .NET installation in the *net_client_home*/config directory. To use a different properties file, explicitly pass the path of the new properties file to the Connect() API.

Note: You must manually uninstall your changes. Manual installations are not upgraded by the WebSphere eXtreme Scale Client for .NET installation program.

Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product, program, or service. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, is the user's responsibility.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

> IBM Director of Licensing
> IBM Corporation
> 500 Columbus Avenue
> Thornwood, New York 10594 USA

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

> IBM Corporation
> Mail Station P300
> 522 South Road
> Poughkeepsie, NY 12601-5400
> USA
> Attention: Information Requests

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at www.ibm.com/legal/copytrade.shtml.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Linux is a trademark of Linus Torvalds in the U.S., other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product, and service names may be trademarks or service marks of others.

Index

IBM ®

Printed in USA