IBM Business Process Manager for z/OS
Version 8 Release 0

IBM Business Process Manager for z/OS Installation Guide

IBM

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Chapter 1. Task overview of the installation and configuration process for a stand-alone server

A stand-alone configuration consists of a single node running an application server and one daemon server in a single z/OS® system or logical partition (LPAR). Before installing and configuring a stand-alone server, it is useful to understand the task flow for the process.

The IBM® Business Process Manager for z/OS installation and configuration is integrated with, and dependent on, the installation and configuration of WebSphere® Application Server for z/OS. IBM Installation Manager for z/OS is also required to install the product code for both of these products. The installation and configuration task is a multiphase process that can span multiple roles, including system programmer, product administrator, and database administrator.

To create the IBM Business Process Manager for z/OS stand-alone server environment, the default profile, which is created when WebSphere Application Server for z/OS is installed, must be augmented into a profile for IBM Business Process Manager for z/OS. This process adds IBM Business Process Manager for z/OS functions to the existing WebSphere Application Server for z/OS functions.

This task overview outlines the steps that are required to start an instance of the IBM Business Process Manager for z/OS server. The details include preinstallation steps, steps for installing IBM Business Process Manager for z/OS, and initial configuration steps to enable the server to be started. The steps described here apply only to an installation and configuration that are facilitated by the use of the WebSphere Customization Toolbox application and the z/OS Profile Management Tool (zPMT).

The following diagram illustrates the high-level flow of tasks that you need to perform to create and start a complete, customized stand-alone server. Because the process can span multiple roles, it is possible for some of these tasks to be done in parallel.
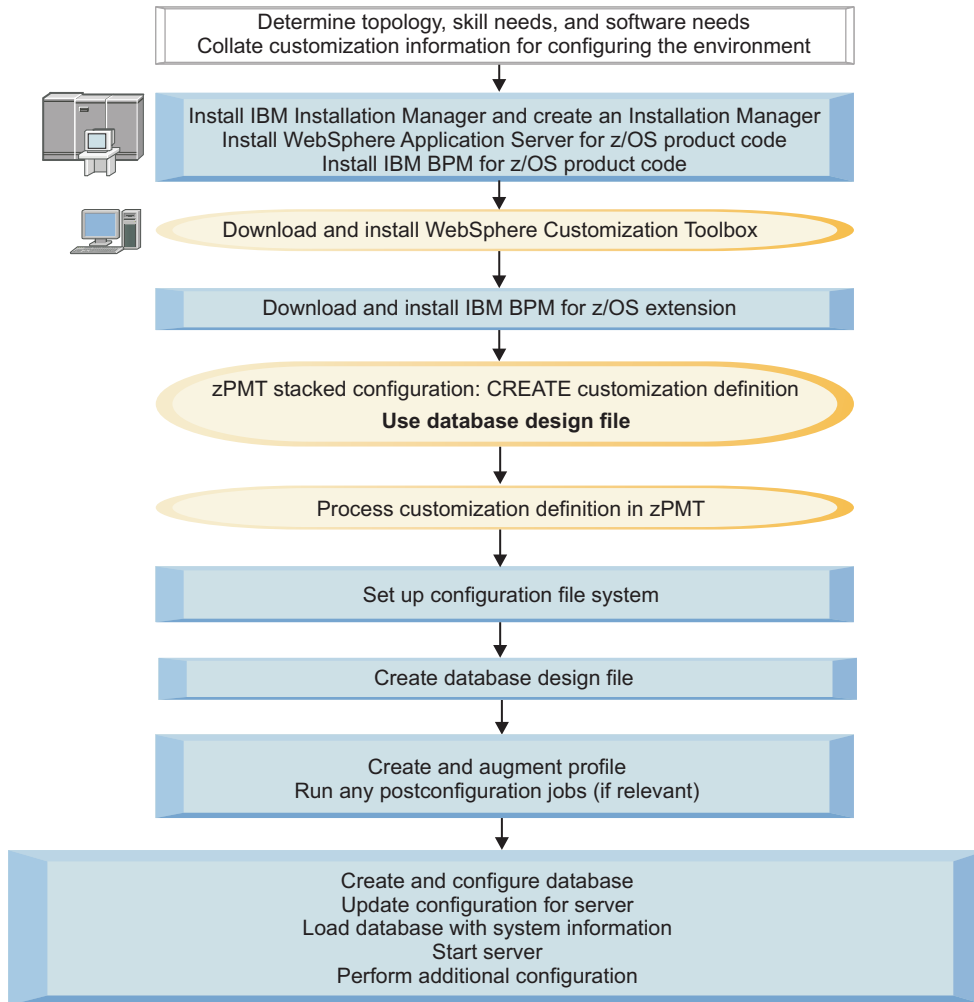
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│ Determine topology, skill needs, and software needs       │
│ Collate customization information for configuring the     │
│ environment                                               │
└─────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────┐
│ Install IBM Installation Manager and create an            │
│ Installation Manager                                       │
│ Install WebSphere Application Server for z/OS product code │
│ Install IBM BPM for z/OS product code                      │
└─────────────────────────────────────────────────────────┘
                            ↓
       Download and install WebSphere Customization Toolbox
                            ↓
┌─────────────────────────────────────────────────────────┐
│ Download and install IBM BPM for z/OS extension           │
└─────────────────────────────────────────────────────────┘
                            ↓
       zPMT stacked configuration: CREATE customization definition
       Use database design file
                            ↓
       Process customization definition in zPMT
                            ↓
┌─────────────────────────────────────────────────────────┐
│ Set up configuration file system                          │
└─────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────┐
│ Create database design file                               │
└─────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────┐
│ Create and augment profile                                │
│ Run any postconfiguration jobs (if relevant)              │
└─────────────────────────────────────────────────────────┘
                            ↓
┌─────────────────────────────────────────────────────────┐
│ Create and configure database                             │
│ Update configuration for server                           │
│ Load database with system information                     │
│ Start server                                              │
│ Perform additional configuration                          │
└─────────────────────────────────────────────────────────┘
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Figure 1. Task flow for installing and configuring IBM Business Process Manager for z/OS

1. Review the planning information to determine which topology best suits your requirements, and to identify your software needs.
   More information: Planning for IBM Business Process Manager

   Also collate the information required for configuring your stand-alone server. This information needs to be specified when you create the customization definition in zPMT. You can use the configuration planning spreadsheet, which is available, to identify the customization parameters and record your values.
   More information: Collating customization information for configuring your environment

2. On the z/OS system, install the product code as follows:

   a. Use System Modification Program/Extended (SMP/E) to install Installation Manager for z/OS. Then create an Installation Manager instance that can be used to install the WebSphere Application Server for z/OS and IBM Business Process Manager for z/OS product code.

   b. Use SMP/E to install WebSphere Application Server for z/OS as an Installation Manager repository. Then use the Installation Manager instance to access the WebSphere Application Server for z/OS product package in the repository and to install the product code.

   c. Use SMP/E to install IBM Business Process Manager for z/OS as an Installation Manager repository. Then use the Installation Manager instance to access the IBM Business Process Manager for z/OS product package in the repository and to install the product code.

   More information: "Obtaining and installing the product code" on page 15

3. Download and install the WebSphere Customization Toolbox on a Windows or Linux workstation.

The WebSphere Customization Toolbox is needed to install the required IBM Business Process Manager for z/OS extension. This extension file provides the customization parameters that you need to configure the product. You can also use zPMT, which runs under the WebSphere Customization Toolbox, to specify customization settings and to generate customized batch jobs and other files for configuring the IBM Business Process Manager for z/OS environment.
More information: Installing the WebSphere Customization Toolbox

4. Download the IBM Business Process Manager for z/OS extension from the z/OS system to a directory on the WebSphere Customization Toolbox workstation, and then install the extension. This extension provides supplementary customization parameters.
More information: Downloading the extension file and sample customization response files and Installing the product extension for zPMT

5. Use zPMT to define the customization settings for the stand-alone server. The main points to consider are as follows:
   - Perform a stacked configuration in a single pass through zPMT, by specifying the customization settings for both WebSphere Application Server for z/OS and IBM Business Process Manager for z/OS.
   - Specify that you want to use a design file to define the database configuration. A database design file provides flexibility for defining the database configuration of the individual IBM Business Process Manager for z/OS components. To generate a database design file, you can either use the configuration planning spreadsheet, or run the database design tool in the z/OS system, as described later.

   zPMT records your customization settings in a customization response file and also generates instructions that you can use to configure the target z/OS system.
   More information: Creating customization definitions for fully customized profiles

6. Using zPMT, process the customization definition to generate an augmentation response file, customized job control language (JCL) jobs, and other data files, and to upload them to your target z/OS system.
More information: Processing customization definitions for fully customized profiles

7. Use the instructions generated in zPMT to perform manual configuration updates, to allocate and mount the configuration file system, and to populate the file system to prepare it for profile creation.
More information: Setting up the configuration file system

8. Generate a database design file by using one of the following methods:
   - Use the database design tool to define the configuration for each component and to generate the database design file in the z/OS system. This tool also generates database scripts, which you can later use to create the DB2® for z/OS database objects for the IBM Business Process Manager for z/OS components.

     Note: This is a manual step that you must run either in UNIX System Services, or by using a UNIX-based terminal emulator.
     More information: Generating a design file and database scripts for the database objects
   - Use the configuration planning spreadsheet to define the database configuration for the IBM Business Process Manager for z/OS components and to generate the database design file. You must transfer this file to the z/OS system in order to generate the database scripts that are required to create the DB2 for z/OS database objects.
     More information: Collating customization information for configuring your environment and Generating scripts for creating database objects in DB2 for z/OS

9. Follow the instructions generated in zPMT to create the WebSphere Application Server for z/OS profile. Then run the job to augment the profile with IBM Business Process Manager for z/OS functions.

   The augmentation job requires input from the augmentation response file that is automatically generated when you process a customization definition in zPMT.
   More information: Augmenting stand-alone and network deployment profiles

10. Create and populate the database by running the database scripts that were generated when you ran the database design tool.
    More information: Creating and configuring the databases

11. Customize properties, such as port numbers, for the server. You can do this by running another script that is supplied with the product code.
    More information: Updating the configuration values for stand-alone servers

12. Run the bootstrap utility to load the database with system information.
    More information: Loading the database with system information

13. Start the stand-alone server, as documented in the customization instructions.
    More information: Starting the server and verifying the installation

When the initial configuration of IBM Business Process Manager for z/OS is complete, you can perform additional tasks to configure the components and administer the system.

Chapter 2. Task overview of the installation and configuration process for a network deployment environment

A network deployment environment contains a deployment manager server in one node, and one or more managed nodes in which application servers can be created. The managed nodes must be federated into the deployment manager cell, to allow the application servers to be created and administered by the deployment manager.

Before installing and configuring a network deployment environment, it is useful to understand the task flow for the process.

The IBM Business Process Manager for z/OS installation and configuration is integrated with, and dependent on, the installation and configuration of WebSphere Application Server for z/OS. IBM Installation Manager for z/OS is also required to install the product code for both of these products. The installation and configuration task is a multiphase process that can span multiple roles, including system programmer, product administrator, and database administrator.

To create the IBM Business Process Manager for z/OS network deployment environment, the default deployment manager profile, which is created when WebSphere Application Server for z/OS is installed, must be augmented into a profile for IBM Business Process Manager for z/OS. This process adds IBM Business Process Manager for z/OS functions to the existing WebSphere Application Server for z/OS functions. The default WebSphere Application Server for z/OS profile for each unmanaged node in the network deployment environment must also be augmented into a profile for IBM Business Process Manager for z/OS.

This task overview outlines the steps that are required to set up a single cluster topology. The details include preinstallation steps, and steps for installing and configuring IBM Business Process Manager for z/OS, creating and configuring databases, and setting up the deployment environment. The steps described here apply to an installation and configuration that are facilitated by the use of the WebSphere Customization Toolbox application and the z/OS Profile Management Tool (zPMT).

The following diagram illustrates the high-level flow of tasks that you need to perform to create and start a cluster in a network deployment environment. Because the process can span multiple roles, it is possible for some of these tasks to be done in parallel.
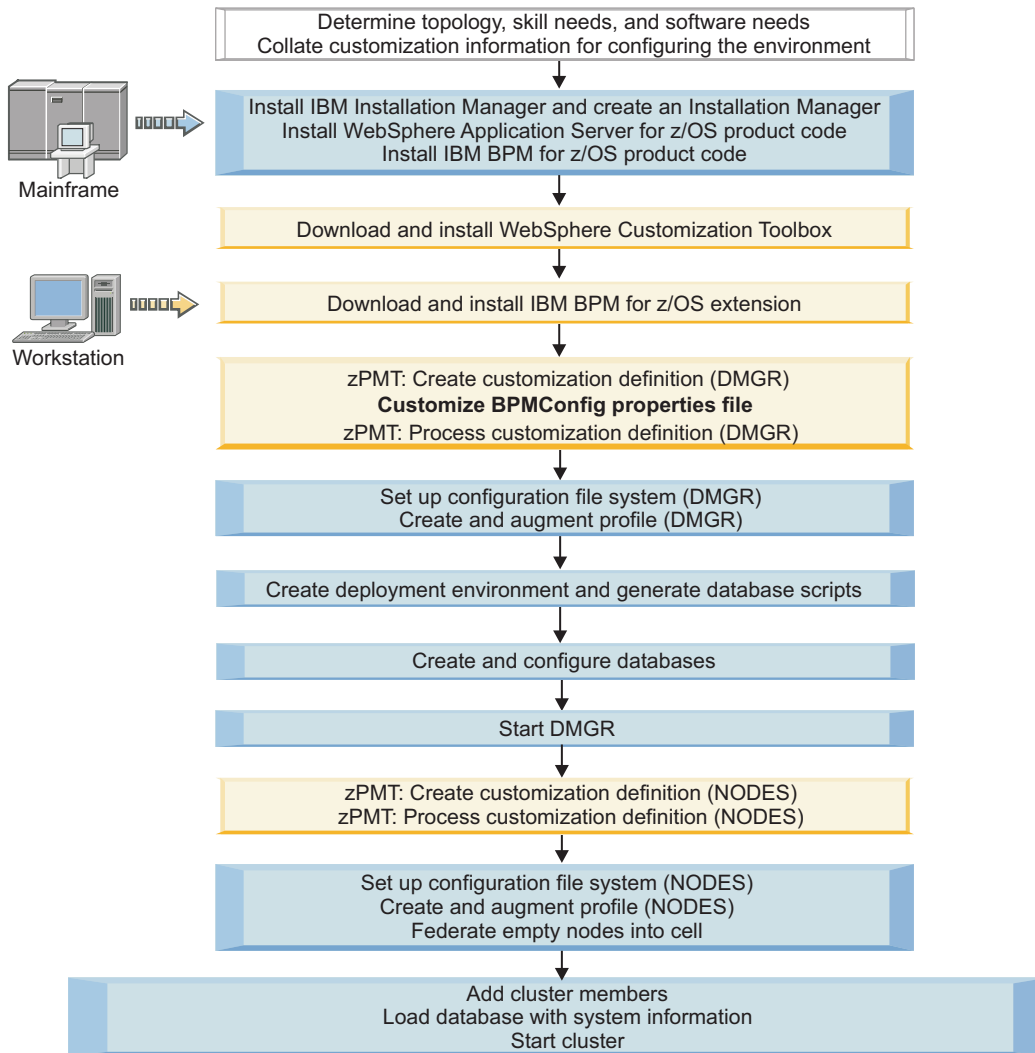
Determine topology, skill needs, and software needs
Collate customization information for configuring the environment

Mainframe

Install IBM Installation Manager and create an Installation Manager
Install WebSphere Application Server for z/OS product code
Install IBM BPM for z/OS product code

Download and install WebSphere Customization Toolbox

Workstation

Download and install IBM BPM for z/OS extension

zPMT: Create customization definition (DMGR)
Customize BPMConfig properties file
zPMT: Process customization definition (DMGR)

Set up configuration file system (DMGR)
Create and augment profile (DMGR)

Create deployment environment and generate database scripts

Create and configure databases

Start DMGR

zPMT: Create customization definition (NODES)
zPMT: Process customization definition (NODES)

Set up configuration file system (NODES)
Create and augment profile (NODES)
Federate empty nodes into cell

Add cluster members
Load database with system information
Start cluster

Figure 2. Task flow for installing and configuring IBM Business Process Manager for z/OS

1. Review the planning information to determine which topology best suits your requirements, and to identify your software needs.
   More information: Planning for IBM Business Process Manager

   Also collate the information required for configuring your deployment manager server and empty managed nodes. This information needs to be specified when you create the customization definition in zPMT. You can use the configuration planning spreadsheet, which is available, to identify the customization parameters and record your values.
   More information: Collating customization information for configuring your environment

2. On the z/OS system, install the product code as follows:

   a. Use System Modification Program/Extended (SMP/E) to install Installation Manager for z/OS. Then create an Installation Manager instance that can be used to install the WebSphere Application Server for z/OS and IBM Business Process Manager for z/OS product code.

   b. Use SMP/E to install WebSphere Application Server for z/OS as an Installation Manager repository. Then use the Installation Manager instance to access the WebSphere Application Server for z/OS product package in the repository and to install the product code.

   c. Use SMP/E to install IBM Business Process Manager for z/OS as an Installation Manager repository. Then use the Installation Manager instance to access the IBM Business Process Manager for z/OS product package in the repository and to install the product code.

More information: "Obtaining and installing the product code" on page 15

3. Download and install the WebSphere Customization Toolbox on a Windows or Linux workstation.

   The WebSphere Customization Toolbox is needed to install the required IBM Business Process Manager for z/OS extension. This extension file provides the customization parameters that you need to configure the product. You can also use zPMT, which runs under the WebSphere Customization Toolbox, to specify customization settings and to generate customized batch jobs and other files for configuring the IBM Business Process Manager for z/OS environment.
   More information: Installing the WebSphere Customization Toolbox

4. Download the IBM Business Process Manager for z/OS extension from the z/OS system to a directory on the WebSphere Customization Toolbox workstation, and then install the extension. This extension provides supplementary customization parameters.
   More information: Downloading the extension file and sample customization response files and Installing the product extension for zPMT

5. To create and configure the deployment manager server, complete the following steps:

   a. Use zPMT to define the customization settings for the deployment manager. The main points to consider are as follows:

      • Perform a stacked configuration in a single pass through zPMT, by specifying the customization settings for both WebSphere Application Server for z/OS and IBM Business Process Manager for z/OS.

      • Specify that you want to use a design file to define your database configuration. A database design file provides flexibility for defining the database configuration of the individual IBM Business Process Manager for z/OS components. To generate a database design file, you can either use the configuration planning spreadsheet, or run the database design tool in the z/OS system, as described later.

      zPMT records your customization settings in a customization response file and also generates instructions that you can use to configure the target z/OS system.
      More information: Creating customization definitions for fully customized profiles

   b. Using zPMT, process the customization definition to generate an augmentation response file, customized job control language (JCL) jobs, and other data files, and to upload them to your target z/OS system.
      More information: Processing customization definitions for fully customized profiles

   c. Use the instructions generated in zPMT to perform manual configuration updates, to allocate and mount the configuration file system, and to populate the file system to prepare it for profile creation.
      More information: Setting up the configuration file system

   d. Generate a database design file by using one of the following methods:

      • Use the database design tool to define the configuration for each component and to generate the database design file in the z/OS system. This tool also generates database scripts, which you can later use to create the DB2 for z/OS database objects for the IBM Business Process Manager for z/OS components.

        Note: This is a manual step that you must run either in UNIX System Services, or by using a UNIX-based terminal emulator.
        More information: Generating a design file and database scripts for the database objects

      • Use the configuration planning spreadsheet to define the database configuration for the IBM Business Process Manager for z/OS components and to generate the database design file. You must transfer this file to the z/OS system in order to generate the database scripts that are required to create the DB2 for z/OS database objects.
        More information: Collating customization information for configuring your environment and Generating scripts for creating database objects in DB2 for z/OS

e. Follow the instructions generated in zPMT to create the WebSphere Application Server for z/OS profile. Then run the job to augment the profile with IBM Business Process Manager for z/OS functions.

   The augmentation job requires input from the augmentation response file that is automatically generated when you process a customization definition in zPMT.
   More information: Augmenting stand-alone and network deployment profiles

6. To create and configure the required empty managed nodes, complete the following steps for each node:
   a. Use zPMT to define the customization settings for the node. You can perform a stacked configuration in a single pass through zPMT, by specifying the customization values for both WebSphere Application Server for z/OS and IBM Business Process Manager for z/OS. zPMT records your customization settings in a customization response file and also generates instructions that you can use to configure the target z/OS system.
   More information: Creating customization definitions for fully customized profiles

   b. Using zPMT, process the customization definition to generate an augmentation response file, customized JCL jobs, and other data files, and to upload them to your target z/OS system.
   More information: Processing customization definitions for fully customized profiles

   c. Use the instructions generated in zPMT to perform manual configuration updates, to allocate and mount the configuration file system, and to populate the file system to prepare it for profile creation.
   More information: Setting up the configuration file system

   d. Follow the instructions generated in zPMT to create the WebSphere Application Server for z/OS profile. Then run the job to augment the profile with IBM Business Process Manager for z/OS functions.

   The augmentation job requires input from the augmentation response file that is automatically generated when you process a customization definition in zPMT.
   More information: Augmenting stand-alone and network deployment profiles

7. Create and populate one or more databases by running the database scripts that were generated when you ran the database design tool.
   More information: Creating and configuring the databases

8. Start the deployment manager server, as documented in the customization instructions.
   More information: Starting the deployment manager

9. Federate each of the empty nodes into the deployment manager cell so that you can use the deployment manager to administer the nodes.
   More information: Federating the empty node into the deployment manager cell

10. Create the deployment environment for the single cluster topology by using the Deployment Environment wizard in the administrative console. You can import a design file to populate the panels and must also specify the database design file that you want to use. After validating the configuration in the panels, generate the cluster.
    More information: Configuring servers, server clusters, and product components

11. Customize properties, such as port numbers, for the cluster members. You can do this by running another script that is supplied with the product code.
    More information: Updating the configuration values for cluster members

12. Run the bootstrap utility to load the database with system information.
    More information: Loading the database with system information

13. Start the cluster from the administrative console.
    More information: Starting the cluster and verifying the installation

When the initial configuration of IBM Business Process Manager for z/OS is complete, you can perform additional tasks to configure the components and administer the system.

Chapter 3. Preparing to install and configure IBM Business Process Manager for z/OS

Because WebSphere Application Server for z/OS is a prerequisite for IBM Business Process Manager for z/OS, you must complete planning activities for both IBM Business Process Manager for z/OS and WebSphere Application Server for z/OS.

It is important that you plan your IBM Business Process Manager for z/OS configuration before you start, especially when configuring a network deployment cell. There are many choices and you must understand the factors that influence these choices to make the correct decisions during the installation and configuration process. To get started, plan to build your initial application-serving environment servers on one system, and then replicate them on other systems as you expand into a cell.

The following table outlines the activities that you need to complete to prepare for installing and configuring IBM Business Process Manager for z/OS, and provides references to documentation resources.

Table 1. Preparing for installation and configuration

Task description	Information center resource
Determine the system requirements.	For information about the hardware and software requirements for IBM Business Process Manager for z/OS, and optional supported software, see the IBM Business Process Manager for z/OS system requirements web page. For a list of system requirements for WebSphere Application Server for z/OS, see WebSphere Application Server detailed system requirements.
Understand security options and prepare for securing your system.	Security options are set in WebSphere Application Server for z/OS. See Security planning overview information in the WebSphere Application Server for z/OS Information Center.
Implement Workload Management in goal mode on each z/OS system if necessary.	See z/OS workload management (WLM) in the WebSphere Application Server for z/OS Information Center.
Implement Resource Recovery Services (if not already implemented) on each z/OS system.	See Preparing Resource Recovery Services (RRS) in the WebSphere Application Server for z/OS Information Center.
Plan for your performance monitoring systems.	See Monitoring end user response time in the WebSphere Application Server for z/OS Information Center.
Plan and define your problem diagnosis procedures.	See Problem diagnostic plan strategy in the WebSphere Application Server for z/OS Information Center.
Consider automatic restart management before you install WebSphere Application Server for z/OS.	See Automatic restart management in the WebSphere Application Server for z/OS Information Center.
Make sure that your database management system is installed.	Consult your database documentation for information about installing and administering your database management system.
Perform planning tasks in preparation for loading the program materials from the installation media to the z/OS system.	For information about planning tasks associated with loading the WebSphere Application Server for z/OS installation media, see Planning for product installation in the WebSphere Application Server for z/OS Information Center.

In addition to these activities, it is also important to establish the z/OS skill sets that are required for installing and configuring IBM Business Process Manager. You must also understand the differences between the stand-alone and network deployment configurations under which you can deploy and run the product.

Skill requirements

When you assemble your project team, consider the skills that you require to implement WebSphere Application Server for z/OS and IBM Business Process Manager for z/OS. Different skill sets are required to support basic configurations and production environments.

Documentation to support the z/OS skills described here can be found in the z/OS Internet Library.

Skill requirements for supporting basic configurations

The following skills are necessary to support a basic configuration:
- z/OS UNIX System Services and the zSeries file system (zFS) to set up a functional zFS and UNIX environment
- eNetwork Communications Server (TCP/IP) or equivalent to configure connectivity for WebSphere Application Server for z/OS clients and servers
- Resource Recovery Services (RRS) to implement resource recovery services and to support two-phase commit transactions
- Security Server (RACF®) or the security product that you use to authenticate WebSphere Application Server for z/OS clients and servers, and authorize access to resources
- Secure Sockets Layer (SSL) to enable security if required
- System Modification Program/Extended (SMP/E), IBM Installation Manager, and job control language (JCL)
- System logger to set up log streams for RRS and the WebSphere Application Server for z/OS error log
- Webserver to support HTTP clients if required
- Workload management (WLM)
- Java™ and WebSphere Application Server tools to support application development and deployment

Depending on the applications that you deploy, you might also need skills to configure the resource managers that your applications require; for example, CICS®, DB2, and IMS™ skills.

Skill requirements for supporting production environments

As you move your system toward a production environment, you must have working knowledge of the following systems:
- Automatic restart management (ARM)
- System Automation, if installed, or another preferred automation
- Sysplex, if you plan to use WebSphere Application Server for z/OS in a cell that spans systems
- Sysplex Distributor (part of eNetwork Communications Server), if you plan to create a high-availability environment
- Resource Management Facility (RMF™) or other performance measurement systems

Considerations for a stand-alone configuration

Choose a stand-alone configuration to evaluate the product or to support development of applications and services.

You must have the following configuration in place to create and configure a stand-alone environment:

- The z/OS system used to install and configure IBM Business Process Manager must run UNIX System Services with a zSeries file system or hierarchical file system configured.
- Your UNIX user ID must have permission to access the UNIX shell to run the installation and configuration commands from inside the shell. Gaining access to the shell involves modifying your RACF profile and creating a home directory in the UNIX shell. The home directory is where you begin a UNIX session, and where you store environment variable files that are required to run programs. You can also use the home directory as the root directory for storing your work data.
- A database management system, typically DB2 for z/OS, must be available.
- The WebSphere Application Server for z/OS product code and IBM Business Process Manager for z/OS product code must be installed in the product file system.

Each stand-alone server node is a separate administrative domain, and has an independent, unshared JNDI namespace. You can start and stop servers independently.

Considerations for a network deployment configuration

Choose a network deployment configuration when your production environment needs features such as capacity, availability, scalability, and failover support.

You must have the following configuration in place to create and configure a network deployment topology:
- The z/OS system used to install and configure IBM Business Process Manager must run UNIX System Services with a zSeries file system or hierarchical file system configured.
- Your UNIX user ID must have permission to access the UNIX shell to run the installation and configuration commands from inside the shell. Gaining access to the shell involves modifying your RACF profile and creating a home directory in the UNIX shell. The home directory is where you begin a UNIX session, and where you store environment variable files that are required to run programs. You can also use the home directory as the root directory for storing your work data.
- A database management system, typically DB2 for z/OS, must be available.
- The WebSphere Application Server for z/OS product code and IBM Business Process Manager for z/OS product code must be installed in the product file system.

When setting up a network deployment environment, WebSphere Application Server for z/OS must be configured on the server with a deployment manager node and an empty managed node that has not been federated to the deployment manager. The empty managed node must be federated only after you have augmented it to contain IBM Business Process Manager for z/OS configuration data.

When configuring a deployment manager node, the following consideration applies when allocating target data sets to hold the configuration JCL. It is possible, though not recommended, to use the same target data sets that you might have used for a stand-alone application server node. The job names for each configuration are very similar to one another, so if you use the same target data sets, it might be difficult to keep the two sets of jobs separate. Therefore, create a new set of target data sets for the deployment manager node and keep the two sets of jobs separate from one another.

All nodes in the network deployment cell are in the same administrative domain, and the JNDI namespace is shared among all servers in the cell. You can start and stop servers independently.

Chapter 4. Installing IBM Business Process Manager Advanced for z/OS: Process Server

To create a complete and customized IBM Business Process Manager for z/OS application-serving environment, you must first install the product code. Before you begin to install, it is useful to understand how the installation process works.

Related tasks:

Chapter 3, "Preparing to install and configure IBM Business Process Manager for z/OS," on page 9 Because WebSphere Application Server for z/OS is a prerequisite for IBM Business Process Manager for z/OS, you must complete planning activities for both IBM Business Process Manager for z/OS and WebSphere Application Server for z/OS.

Overview of the installation process

When you obtain IBM Business Process Manager for z/OS, you receive IBM Installation Manager for z/OS and WebSphere Application Server for z/OS as requisite products. You must use Installation Manager to install the product code for both WebSphere Application Server and IBM Business Process Manager.

Installing IBM Business Process Manager on the z/OS system is the responsibility of a system programmer who plans, maintains, and controls the use of the operating system to improve the overall productivity of an installation. The following diagram illustrates the installation process flow and shows the role played by the system programmer.
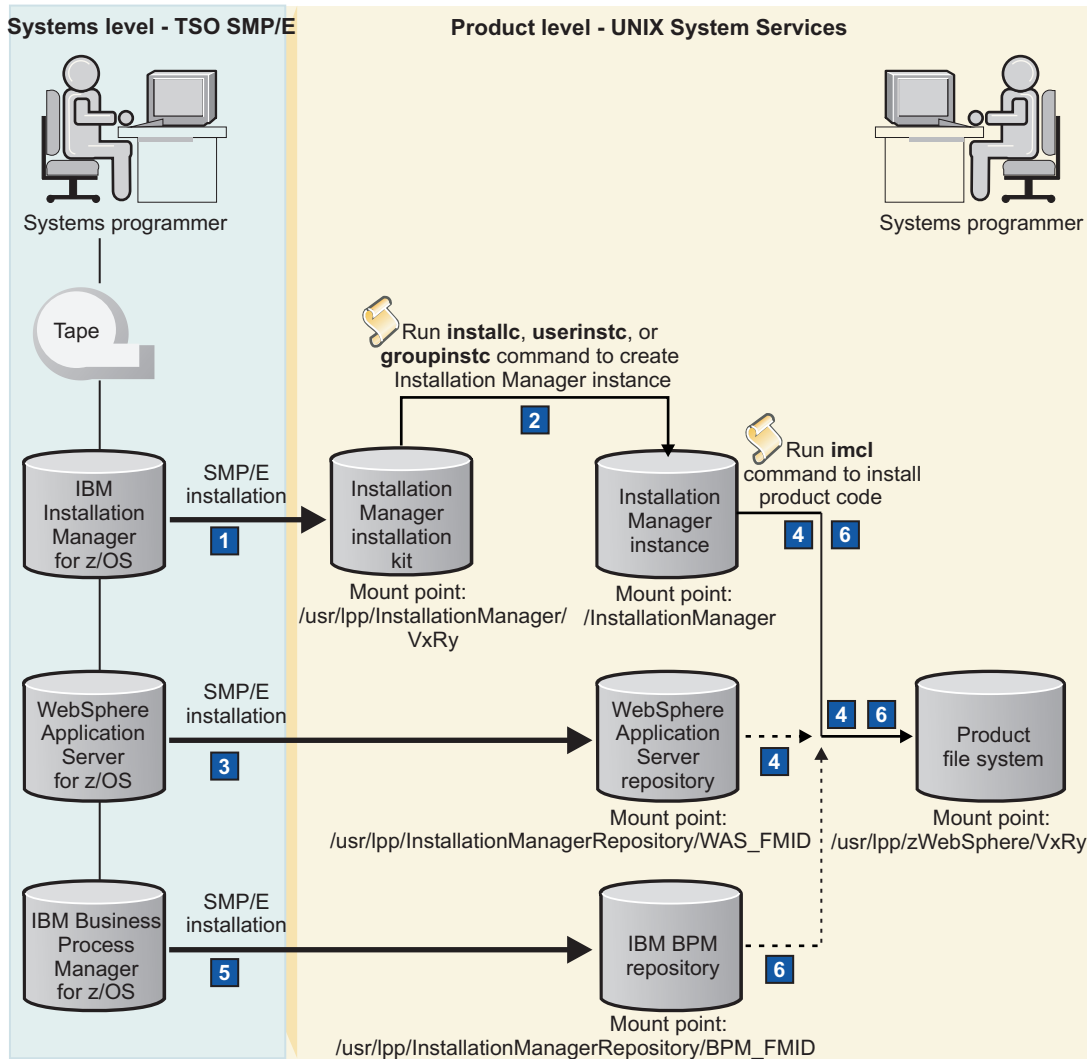
Figure 3. Installation process flow for IBM Business Process Manager for z/OS

The following list describes the installation steps that are illustrated in Figure 3:

1 Install the Installation Manager installation kit by using System Modification Program/Extended (SMP/E)

Use SMP/E to load Installation Manager from the installation media to the z/OS system. You obtain an Installation Manager installation kit that contains the following artifacts:

- A set of commands for creating an instance of Installation Manager
- An Installation Manager repository for a supported level of the Installation Manager product
- Other scripts and files

The installation kit can be mounted at the default location of `/usr/lpp/InstallationManager/V1R4`, or another location of your choice.

2 Create an instance of Installation Manager

From the installation kit file system, run the Installation Manager command in administrator mode, nonadministrator mode, or group mode to create an Installation Manager instance. This instance is required for installing and maintaining WebSphere Application Server and IBM Business Process Manager on the z/OS system. The mode in which you run the Installation Manager command determines whether the instance can be used by a single superuser, a single user, or by multiple user IDs that are connected to a group.

When you create the Installation Manager instance, you must specify read/write directories for storing its executable binary files and agent (or runtime) data files. You can allocate a new physical file system to contain these directories and their contents. The file system that contains the read/write directories can be mounted at the default location of `/InstallationManager`, or another location of your choice.

3 **Install the WebSphere Application Server product repository by using SMP/E**
Use SMP/E to load WebSphere Application Server from the installation media to the z/OS system. You obtain the WebSphere Application Server product repository, which contains the WebSphere Application Server product code.

This repository can be mounted at the default location of `/usr/lpp/InstallationManagerRepository/`*WAS_FMID*, or another location of your choice. In this default path, *WAS_FMID* represents the function modification identifier for WebSphere Application Server.

4 **Install the WebSphere Application Server product code**
Allocate an empty file system to contain the WebSphere Application Server product code, and then run the Installation Manager command to install the product code. Installation Manager accesses the WebSphere Application Server repository to install the package for the product.

The product code is installed in the product file system, which can be mounted at the default location of `/usr/lpp/zWebSphere/V8R0`, or another location of your choice.

5 **Install the IBM Business Process Manager product repository by using SMP/E**
Use SMP/E to load IBM Business Process Manager from the installation media to the z/OS system. You obtain the IBM Business Process Manager product repository, which contains the IBM Business Process Manager product code.

This repository can be mounted at the default location of `/usr/lpp/InstallationManagerRepository/`*BPM_FMID*, or another location of your choice. In this default path, *BPM_FMID* represents the function modification identifier for IBM Business Process Manager.

6 **Install the IBM Business Process Manager product code**
Run the Installation Manager command to install the IBM Business Process Manager product code into the same product file system as the WebSphere Application Server product code. Installation Manager accesses the IBM Business Process Manager repository to install the package for the product.

The result of completing the installation is a read-only product file system, which can be a zSeries file system (zFS) or a hierarchical file system (HFS).

After the product installation is completed, the WebSphere administrator can begin to configure the product for use.

Obtaining and installing the product code

The product code for IBM Business Process Manager for z/OS is available as an IBM CustomPac or an IBM Custom-Built Product Delivery Option (CBPDO). IBM Installation Manager and WebSphere Application Server for z/OS are included in your order.

An IBM CustomPac (SystemPac, ServerPac, or ProductPac®) is a set of preinstalled product data sets that is bundled with an IBM installation dialog. The installation dialog is used to load the data sets to disk and perform initial customization. In general, System Modification Program/Extended (SMP/E) work is not required during installation of a CustomPac offering. Instead, SMP/E data sets that correspond to the CustomPac service level are loaded to the disk along with the product data sets.

An IBM CBPDO is a set of product tapes for one or more IBM software products that are bundled with cumulative service. You can load the data sets to disk by using SMP/E.

After loading the product data sets from the installation media, you can use Installation Manager to install the WebSphere Application Server and IBM Business Process Manager product code as *packages*. A package identifies the product being installed, and is assigned a package ID. Each package ID consists of a *product identifier* (such as com.ibm.websphere.v80.zOS for WebSphere Application Server for z/OS V8), and a *version* that identifies the product version, release, and modification, plus a time stamp (for example, 8.0.1.20110903_0100). An example of a package ID for IBM Business Process Manager for z/OS is com.ibm.bpm.ZOSPS.V80_8.0.1.20120810_0105. When you install a product, you must specify its package ID. If you omit the version, Installation Manager installs the package with the highest version number that is available in the specified repository.

Installation Manager installs WebSphere Application Server and IBM Business Process Manager in a *package group* in a single location. To manage multiple copies of IBM Business Process Manager, you can install the product several times and into separate package groups, each with a distinct installation location. The different copies can be maintained or upgraded separately.

Sample job control language (JCL) jobs are provided to help you install and configure Installation Manager, WebSphere Application Server, and IBM Business Process Manager. These jobs provide an alternative to running installation and configuration commands in UNIX System Services, and include default values for the parameters that you need to specify. The sample jobs are listed in the Program Directory or other documentation that is provided with your order. You can copy the sample jobs to a work data set, and then modify and submit the jobs.

Guidelines for installing from an IBM CustomPac or IBM CBPDO

Use these guidelines when installing IBM Business Process Manager for z/OS from an IBM CustomPac (SystemPac, ServerPac, or ProductPac) or from an IBM Custom-Built Product Delivery Option (CBPDO).

- If you use an IBM ServerPac, follow the instructions in the copy of *ServerPac: Installing your Order* that is provided with your ServerPac delivery. For information about installing a ServerPac, see ServerPac: Using the Installation Dialog (SA22-7815).

    For information about installing the other CustomPac offerings, such as SystemPac, see the CustomPac *Installation Dialog Reference and Messages* documents that are supplied with your order in softcopy and hardcopy format.

- If you use CBPDO, follow the instructions in the copy of *Program Directory for IBM Business Process Manager for z/OS*, GI13-0596, which is supplied with the product. See also the WebSphere Application Server program directory and the Installation Manager program directory that are provided. Each program directory includes installation requirements for the driving and target systems, storage requirements, and instructions for loading the product from the installation media to a z/OS file system by using System Modification Program/Extended (SMP/E).

    You can also download the IBM Business Process Manager program directory as a PDF file from the IBM Business Process Manager for z/OS Library page.

- Ensure that you review the current Preventive Service Planning information for Installation Manager, WebSphere Application Server, and IBM Business Process Manager. For additional program support, you can also access the IBM Support Portal website.

Related information:

Preventive Service Planning buckets

IBM Support Portal

Installing the Installation Manager installation kit

You can use System Modification Program/Extended (SMP/E) to install the Installation Manager installation kit, which is provided with the IBM Business Process Manager for z/OS product. You can also download and install the installation kit to the z/OS system.

The installation kit is used to set up and maintain an instance of the Installation Manager.

1. Install the Installation Manager installation kit by using either of the following methods:

Option	Description
Use SMP/E	Obtain the IBM Business Process Manager for z/OS product either as an IBM CustomPac (SystemPac, ServerPac, or ProductPac) or an IBM Custom-Built Product Delivery Option (CBPDO): • If you ordered IBM Business Process Manager as part of a ServerPac or SystemPac, the Installation Manager installation kit is preinstalled. • If you ordered IBM Business Process Manager as part of a CBPDO, the Installation Manager installation kit is included in the CBPDO. Install this installation kit by following the instructions in the Installation Manager program directory that is supplied with your delivery.
Download and install the installation kit	For information about downloading and installing the installation kit, see the IBM Installation Manager Information Center.

2. Mount the installation kit file system at the default `/usr/lpp/InstallationManager/V1R4` location, or use another location. The installation kit file system is not modified during Installation Manager processing, and can be mounted read-only.

Use the Installation Manager installation kit to create an Installation Manager instance.

Related tasks:

"Creating an Installation Manager instance"
To install and maintain IBM Business Process Manager and WebSphere Application Server, you must create an instance of the Installation Manager on the z/OS system.

Creating an Installation Manager instance

To install and maintain IBM Business Process Manager and WebSphere Application Server, you must create an instance of the Installation Manager on the z/OS system.

Install the Installation Manager installation kit.

The Installation Manager instance can be created in one of three modes. These modes determine whether the instance can be used by a single superuser, a single user, or by a number of user IDs that are connected to a single System Authorization Facility (SAF) group. The modes are as follows:
- Administrator mode. The Installation Manager instance is created from a superuser ID (uid=0) and can be run by any superuser ID. Only one instance of an Installation Manager in administrator mode is permitted on a z/OS system.
- Nonadministrator (or user) mode. The Installation Manager instance can be run only by the user that created it. Only one instance of an Installation Manager in nonadministrator mode is permitted for a user.
- Group mode. The Installation Manager instance can be run by any user ID that is connected to the *owning group* for the Installation Manager. (The owning group is the default group of the user ID that creates the instance.) There is no limit to the number of Installation Manager instances in group mode on a system.

If an appropriate user ID does not yet exist, you must create a user ID (and group) to own the Installation Manager.

You must have a read/write file system for storing the following files, which are used by the running instance of Installation Manager:
- Executable binary files, which are copied from the Installation Manager installation kit
- Agent (or runtime) data files, which describe the products installed by the Installation Manager instance

Both of these sets of files require their own directory in the Installation Manager file system.

The Installation Manager instance also uses another directory to store shared program objects and cached files that are generated when you install product code. You can specify this location later when you install the WebSphere Application Server and IBM Business Process Manager product code.

If you prefer to submit jobs to complete this task, ensure that you review the job output to verify that each job ran without error.

1. Set extended attributes for the installation files as follows:

   a. From the IBM Support Portal, download the fix for z/OS APAR OA34228, which enables files to be copied with extended attributes in UNIX System Services.

   b. Install the fix on the z/OS target system where the Installation Manager instance will be created and run.

   c. Ensure that the installation kit file system is mounted read/write. Then run the **set-ext-attr.sh** command from the mount point root directory to set extended attributes for the installation files.

   After the command completes, you can remount the installation files as read-only.

2. If necessary, create the user ID and group that will own the Installation Manager instance. This user ID requires a read/write home directory, and the following permissions:

   - Read access to FACILITY profile BPX.FILEATTR.APF
   - Read access to FACILITY profile BPX.FILEATTR.PROGCTL
   - Read access to FACILITY profile BPX.FILEATTR.SHARELIB
   - Read access to UNIXPRIV profile SUPERUSER.FILESYS.CHOWN
   - Read access to UNIXPRIV profile SUPERUSER.FILESYS.CHANGEPERMS

   You can use the Installation Manager sample job GIN2ADMN in the SGINJCL data set to create this user ID and group, and to assign the required SAF permissions. When the job is completed successfully, set the password for the user ID, as documented in the job instructions.

3. If necessary, create a file system for storing the binary files, agent data files, and shared resources for the Installation Manager instance to be created.

   You can use the Installation Manager sample job GIN2CFS in the SGINJCL data set to allocate and mount the file system. This job runs the **zCreateFileSystem.sh** script using the following syntax:

   ```
   zCreateFileSystem.sh -name data_set_name -type HFS|ZFS -volume volume -cylinders primary_cylinders
   secondary_cylinders -megabytes primary_megabytes secondary_megabytes
   -mountpoint mount_point -owner owner -group group -perm permissions
   ```

   where:

   -name
   Specifies the name of the data set that is created to contain the file system.

   -type
   Specifies a zSeries file system (**ZFS**) or hierarchical file system (**HFS**).

   -volume
   Specifies the volume serial number for the data set. If you omit this parameter, the volume is managed by the storage management system.

   -cylinders
   Specifies the number of primary and secondary cylinders to be allocated to the file system. You can use either **-cylinders** or **-megabytes**, but not both.

   -megabytes
   Specifies the primary and secondary disk space (in megabytes) to be allocated to the file system. You can use either **-cylinders** or **-megabytes**, but not both.

   -mountpoint
   Specifies the mount point directory for the file system. You can use the default location of

/InstallationManager or another location of your choice. If not specified, the mount point directory is not created and the file system is not mounted.

-owner
Specifies the user ID that owns the Installation Manager file system directories that are created. Set the user ID to the one that was created in step 2 on page 18. The **-owner** parameter is required when **-mountpoint** is specified.

-group
Specifies the default group for the "owning" user ID. Set the group ID to the one that was created in step 2 on page 18. The **-group** parameter is required when **-mountpoint** is specified.

-perm
Sets permissions on the Installation Manager directories. Set the directory permissions to 755 for administrator or nonadministrator mode, and to 775 for group mode.

You can also run the **zCreateFileSystem.sh** script from the `tools` directory in the location where the Installation Manager installation kit was installed. To do so, log in to the UNIX System Services shell with the user ID that was created in step 2 on page 18, and then run the script. For example:

```
cd /usr/lpp/InstallationManager/V1R4/tools
```

```
zCreateFileSystem.sh -name OMVS.PRV.IMINST.SGINHFS -type ZFS -volume PRV005 -cylinders 2500
250 -mountpoint /InstallationManager -owner IMADMIN -group IMGROUP -perm 755
```

Ensure that the file system is mounted read/write at the defined mount point.

4. If necessary, log in to the UNIX System Services shell and then change to the directory where you installed the Installation Manager installation kit files. For example:

```
cd /usr/lpp/InstallationManager/V1R4
```

5. Read the license agreement terms in the product license file that is stored in the `license` directory. You can accept these terms when you create the instance.

6. Create the Installation Manager instance in the required mode.

   You can use sample job GIN2INST in the SGINJCL data set to run the relevant command for the mode.

Mode	Command
Administrator	`installc -installationDirectory` *binaries_location* `-dataLocation` *agent_data_location* `-acceptLicense`
Nonadministrator	`userinstc -installationDirectory` *binaries_location* `-dataLocation` *agent_data_location* `-acceptLicense`
Group	`groupinstc -installationDirectory` *binaries_location* `-dataLocation` *agent_data_location* `-acceptLicense`

In these commands:

-installationDirectory
Specifies the directory to which you want to install the binary files. The default directory is /InstallationManager/bin for administrator or group mode, and *user_home_directory*/ InstallationManager/bin for nonadministrator mode.

Tip: When an Installation Manager is created in nonadministrator mode, all paths are relative to the home directory of the user.

You can omit the **-installationDirectory** parameter if you want to use the default directory.

-dataLocation
Specifies the directory to which you want to install the agent data files. The default directory is /InstallationManager/appdata for administrator or group mode, and *user_home_directory*/ InstallationManager/appdata for nonadministrator mode.

You can omit this parameter if you want to use the default directory.

-acceptLicense
> Accepts the terms of the license agreement for Installation Manager.

From a command shell, you can also run the Installation Manager command from the location where the installation kit was installed. For example:

```
cd /usr/lpp/InstallationManager/V1R4
```

```
installc -installationDirectory /InstallationManager/bin -dataLocation /InstallationManager/
appdata -acceptLicense
```

This example, which creates the instance in administrator mode and installs the binary and agent data files in the default directories, can also be specified as:

```
installc -acceptLicense
```

7. Optional: To verify that the Installation Manager instance is correctly installed, complete the following steps:

   a. Log in to the UNIX System Services shell under the user ID that created the Installation Manager.

   b. From the `eclipse/tools` subdirectory in the location where the Installation Manager binary files are stored, run the Installation Manager **imcl** command with **-version**. For example:

   ```
   cd /InstallationManager/bin/eclipse/tools
   ```

   ```
   imcl -version
   ```

   You can also review the log file in the `logs` subdirectory in the location where the Installation Manager agent data is stored.

8. Optional: If the Installation Manager instance was created to run in group mode, consider adding the following command to an existing or a new `.profile` file in the home directory of each user ID that will run the Installation Manager:

   ```
   umask 002
   ```

   This command ensures that the Installation Manager files and directories are granted group-write permissions. If not added to the `.profile` file, **chmod 775** commands might need to be issued against these directories whenever a different user ID is used to run Installation Manager in group mode.

9. Optional: To allow additional users to run the Installation Manager instance in group mode, make sure that the user IDs meet the requirements listed in step 2 on page 18. Then connect the user IDs to the owning group for the Installation Manager by using the TSO **CONNECT** command. For example:

   ```
   CONNECT additional_userID GROUP(IMGROUP)
   ```

You are now ready to install the WebSphere Application Server product code.

Related tasks:

"Installing the Installation Manager installation kit" on page 16
You can use System Modification Program/Extended (SMP/E) to install the Installation Manager installation kit, which is provided with the IBM Business Process Manager for z/OS product. You can also download and install the installation kit to the z/OS system.

"Installing the WebSphere Application Server for z/OS product repository"
The files that you need for installing the WebSphere Application Server for z/OS product code are distributed in a repository that is available with your IBM Business Process Manager for z/OS order. You can install this repository in the z/OS system by using System Modification Program/Extended (SMP/E).

Installing the WebSphere Application Server for z/OS product repository

The files that you need for installing the WebSphere Application Server for z/OS product code are distributed in a repository that is available with your IBM Business Process Manager for z/OS order. You can install this repository in the z/OS system by using System Modification Program/Extended (SMP/E).

1. Add the WebSphere Application Server for z/OS product repository to the z/OS system as follows:

- If you ordered IBM Business Process Manager as part of an IBM CustomPac (SystemPac, ServerPac, or ProductPac), the WebSphere Application Server product repository is preinstalled.
- If you ordered IBM Business Process Manager as part of a Custom-Built Product Delivery Offering (CBPDO), the WebSphere Application Server product repository is included in the CBPDO. Install the repository by following the instructions in the WebSphere Application Server for z/OS program directory that is supplied with your delivery.

2. Mount the repository at the default `/usr/lpp/InstallationManagerRepository/`*WAS_FMID* location, where *WAS_FMID* represents the function modification identifier, or use another location.

The WebSphere Application Server for z/OS product code is now ready for installation by using Installation Manager.

Related tasks:

"Installing the WebSphere Application Server for z/OS product code"
To install the product code for WebSphere Application Server for z/OS, you must have an instance of Installation Manager on the z/OS system. You also need access to the WebSphere Application Server product repository. You can then install the product code by running the `imcl` Installation Manager command.

Installing the WebSphere Application Server for z/OS product code

To install the product code for WebSphere Application Server for z/OS, you must have an instance of Installation Manager on the z/OS system. You also need access to the WebSphere Application Server product repository. You can then install the product code by running the `imcl` Installation Manager command.

- Install the Installation Manager installation kit.
- Create an Installation Manager instance on the z/OS system.
- Install the WebSphere Application Server product repository that contains the product code.

You must have a file system for storing the installed WebSphere Application Server product code. This product file system must be large enough to also contain the IBM Business Process Manager product code that will be installed at a later stage. The default space allocations that are specified in the WebSphere Application Server Program Directory and sample jobs are considered to be sufficient because the file system can use these values to expand dynamically, provided disk space is available.

When you log in to the UNIX System Services shell to run the `imcl` command, you must do so with the user ID that was used to create the Installation Manager instance, or with a user ID that is connected to the default group for the user ID that created the instance. If you prefer to submit a job instead of working from the UNIX System Services shell, ensure that you run the job under this user ID.

1. To create the product file system and install the product code, see Installing WebSphere Application Server for z/OS in the WebSphere Application Server for z/OS Information Center. See also the WebSphere Application Server Program Directory or other documentation that was supplied with your CustomPac or CBPDO order.
2. If required, also install other WebSphere Application Server offerings such as the DMZ Secure Proxy Server for IBM WebSphere Application Server for z/OS and the Web Server Plug-ins for IBM WebSphere Application Server for z/OS.

Install the IBM Business Process Manager product repository on the z/OS system.

Related tasks:

"Installing the WebSphere Application Server for z/OS product repository" on page 20
The files that you need for installing the WebSphere Application Server for z/OS product code are distributed in a repository that is available with your IBM Business Process Manager for z/OS order. You can install this repository in the z/OS system by using System Modification Program/Extended (SMP/E).

"Installing the IBM Business Process Manager for z/OS product repository"
The files that you need for installing the IBM Business Process Manager for z/OS product code are distributed in a repository that is available with your IBM Business Process Manager for z/OS order. You can install this repository in the z/OS system by using System Modification Program/Extended (SMP/E).

Related information:

WebSphere Application Server product offerings

Installing DMZ Secure Proxy Server for IBM WebSphere Application Server for z/OS

Installing Web Server Plug-ins for IBM WebSphere Application Server for z/OS

Installing the IBM Business Process Manager for z/OS product repository

The files that you need for installing the IBM Business Process Manager for z/OS product code are distributed in a repository that is available with your IBM Business Process Manager for z/OS order. You can install this repository in the z/OS system by using System Modification Program/Extended (SMP/E).

1. Add the IBM Business Process Manager product repository to the z/OS system as follows:
   * If you ordered IBM Business Process Manager as part of an IBM CustomPac (SystemPac, ServerPac, or ProductPac), the IBM Business Process Manager product repository is preinstalled.
   * If you ordered IBM Business Process Manager as part of a Custom-Built Product Delivery Offering (CBPDO), the IBM Business Process Manager product repository is included in the CBPDO. Install the repository by following the instructions in the IBM Business Process Manager program directory that is supplied with your delivery.
2. Mount the repository at the default `/usr/lpp/InstallationManagerRepository/BPM_FMID` location, where *BPM_FMID* represents the function modification identifier, or use another location.

The IBM Business Process Manager product code is now ready for installation by using Installation Manager.

Related tasks:

"Installing the IBM Business Process Manager for z/OS product code"
To install the product code for IBM Business Process Manager for z/OS, you must have an instance of Installation Manager on the z/OS system. You also need access to the IBM Business Process Manager for z/OS product repository, and to the file system that contains the WebSphere Application Server for z/OS product code.

Installing the IBM Business Process Manager for z/OS product code

To install the product code for IBM Business Process Manager for z/OS, you must have an instance of Installation Manager on the z/OS system. You also need access to the IBM Business Process Manager for z/OS product repository, and to the file system that contains the WebSphere Application Server for z/OS product code.

You can then install the IBM Business Process Manager product code by running the `imcl` Installation Manager command.
* Install the Installation Manager installation kit.
* Create an Installation Manager instance on the z/OS system.
* Install the WebSphere Application Server product repository that contains the product code.
* Install the WebSphere Application Server product code by using Installation Manager.
* Install the IBM Business Process Manager product repository that contains the product code.

You must install the IBM Business Process Manager product code into the product file system that contains the product code for WebSphere Application Server.

When you log in to the UNIX System Services shell to run the **imcl** command, you must do so with the user ID that was used to create the Installation Manager instance, or with a user ID that is connected to the default group for the user ID that created the instance. If you prefer to submit a job instead of working from the UNIX System Services shell, ensure that you run the job under this user ID.

1. If the product file system that contains the WebSphere Application Server product code is mounted read-only, remount the file system read/write so that the IBM Business Process Manager product code can be installed.

2. Log in to the UNIX System Services shell by using the Installation Manager user ID.

3. Change to the `eclipse/tools` subdirectory where the Installation Manager binary files are stored. For example:

   `cd /InstallationManager/bin/eclipse/tools`

4. Verify that the IBM Business Process Manager package is available in the product repository by running the **imcl** command with the following syntax:

   `imcl listAvailablePackages -repositories` *repository_path*

   where **-repositories** specifies the fully qualified path of the product repository.

   For example:

   `imcl listAvailablePackages -repositories /usr/lpp/InstallationManagerRepository/`*BPM_FMID*

   You should see the package ID for IBM Business Process Manager; for example, com.ibm.bpm.ZOSPS.V80.

5. Read the terms of the license agreement in the product license file that is stored in the `bpm_lafiles` subdirectory of the product repository. You can accept these terms when you install the product code.

6. To install the product code, run the Installation Manager command-line tool.

   You can use sample job BPZY1INS in the SBPZJCL data set to install the product code. This job runs **imcl** with the **install** command and related command-line parameters using the following syntax:

   `imcl install` *packageID* `-installationDirectory` *installation_directory* `-sharedResourcesDirectory` *shared_directory*
   `-repositories` *source_repository* `-preferences` *key_1=value_1, key_2=value_2* `-acceptLicense`

   where:

   install
   > Installs the IBM Business Process Manager package that is identified by the package ID.

   -installationDirectory
   > Specifies the mount point of the file system where the WebSphere Application Server product code is installed.

   -sharedResourcesDirectory
   > Specifies a shared resources directory to which Installation Manager caches artifacts from the repository during installation processing. Only one shared resources directory is required per Installation Manager instance, so set this value to the same directory that you specified when you installed WebSphere Application Server.
   >
   > Although you can omit this parameter if a shared resources directory is already specified for the Installation Manager, make sure that you include **-sharedResourcesDirectory** if you also intend to use the **-preferences** parameter to delete cached objects from the shared resources directory.

   -repositories
   > Specifies the IBM Business Process Manager repository path.

   -preferences
   > Specifies one or more preference keys that can be used to customize the package installation. Separate each preference with a comma. For a list of the preference keys that are available, see Silent installation preference keys in the IBM Installation Manager Information Center.

Tip: To free up space in the Installation Manager file system, include the preference setting **com.ibm.cic.common.core.preferences.preserveDownloadedArtifacts=false**. This setting deletes cached objects from the shared resources directory as soon as the installation completes. However, if all cached objects are deleted and the shared resources directory becomes empty, the shared resources directory might become "unset" at the end of the installation. Therefore, if you use this preference setting, ensure that you always use the **-sharedResourcesDirectory** parameter whenever you install IBM Business Process Manager.

-acceptLicense
Accepts the terms of the license agreement for IBM Business Process Manager.

For information about additional `imcl` command-line parameters that you can include, see Command-line arguments for imcl in the IBM Installation Manager Information Center.

You can also run `imcl` manually from the `eclipse/tools` subdirectory in the location where the Installation Manager binary files are stored. For example:

```
cd /InstallationManager/bin/eclipse/tools
```

```
imcl install com.ibm.bpm.ZOSPS.V80 -installationDirectory /usr/lpp/zWebSphere/V8R0
-sharedResourcesDirectory
/InstallationManager/sharedResources -repositories
/usr/lpp/InstallationManagerRepository/BPM_FMID -preferences
com.ibm.cic.common.core.preferences.preserveDownloadedArtifacts=false -acceptLicense
```

7. Review the job output to verify that the job ran without error. You can also review the installation log file in the `logs` subdirectory in the location where the Installation Manager agent data is stored.

8. After the product code is successfully installed, unmount the product file system and remount it in read-only mode for use by the IBM Business Process Manager nodes and servers.

The product administrator can begin to configure the system by creating customization definitions for the profile to be created.

Related tasks:

"Installing the WebSphere Application Server for z/OS product repository" on page 20
The files that you need for installing the WebSphere Application Server for z/OS product code are distributed in a repository that is available with your IBM Business Process Manager for z/OS order. You can install this repository in the z/OS system by using System Modification Program/Extended (SMP/E).

"Installing the WebSphere Application Server for z/OS product code" on page 21
To install the product code for WebSphere Application Server for z/OS, you must have an instance of Installation Manager on the z/OS system. You also need access to the WebSphere Application Server product repository. You can then install the product code by running the `imcl` Installation Manager command.

"Installing the IBM Business Process Manager for z/OS product repository" on page 22
The files that you need for installing the IBM Business Process Manager for z/OS product code are distributed in a repository that is available with your IBM Business Process Manager for z/OS order. You can install this repository in the z/OS system by using System Modification Program/Extended (SMP/E).

IBM Business Process Manager file system directories

After installation, the IBM Business Process Manager for z/OS product code is stored in z/OS partitioned data sets and z/OS UNIX System Services file systems.

IBM Business Process Manager product file system

All IBM Business Process Manager product files are stored in the product file system, together with the WebSphere Application Server product files.

The product file system is defined when you use System Modification Program/Extended (SMP/E) to load WebSphere Application Server from the installation media, and then use Installation Manager to install the WebSphere Application Server product code. The product file system is typically mounted read-only.

In the examples in the documentation, the path `/usr/lpp/zWebSphere/V8R0` is generally used as the location of the product file system.

The installation jobs assume that a unique data set is allocated to be used for IBM Business Process Manager. The sample job to create a zFS product file system is identified in the WebSphere Application Server Program Directory, which is provided with your order. The system programmer can run this job during the installation process.

Configuration file system

Each IBM Business Process Manager application-serving environment (stand-alone application server node or network deployment cell) has configuration files in one or more WebSphere Application Server configuration directories. These configuration directories are created during the configuration process, and they contain symbolic links to files in the product file system.

The default location of the configuration directories varies by node type, and can be denoted by the WAS_HOME variable, where WAS_HOME is the top directory for the WebSphere Application Server node.

WAS_HOME represents the *configuration_root/nodetype_directory* location, where:
- *configuration_root* refers to the mount point for the configuration file system in WebSphere Application Server. For example, `/wasv8config/`*cell_name*`/`*node_name*, for a read/write file system that was created at `/wasv8config`.
- *nodetype_directory* refers to a unique directory for the application server, deployment manager, or unmanaged node in the configuration file system. For example, `DeploymentManager` for the deployment manager, or `AppServer` for each stand-alone application server or unmanaged server node.

Sample values for the WAS_HOME variable are as follows:
- `/wasv8config/bbobase/bbonode/AppServer`
- `/wasv8config/bbocell/bbodmgr/DeploymentManager`
- `/WebSphere/V8T3Z1/AppServer`
- `/WebSphere/V8T8DM/DeploymentManager`

Configuring with symbolic links

In the runtime environment, the configuration file system uses symbolic links to access the product code in the product file system. When you define the customization values for WebSphere Application Server and IBM Business Process Manager, you can define a directory path for an intermediate symbolic link that can be used in place of a direct symbolic link between the configuration and product file systems. As a result, the configuration file system will point to the intermediate symbolic link, which in turn will point to the product file system. This level of indirection makes it possible to switch to a new or different server level of IBM Business Process Manager by changing the single intermediate symbolic link. You can stop the servers that use a particular intermediate symbolic link, change the link to point to the new product directory, and then restart the affected servers.

During the configuration process, the symbolic links are automatically created in the configuration file system for most of the directories that are stored in the root directory of the product file system. These symbolic links are defined at the directory level because all of the files contained in a given directory are stored in the same product file system. IBM Business Process Manager itself does not provide symbolic

link scripts because it shares the product file system with WebSphere Application Server.

Chapter 5. Installation reference information

Supporting conceptual and reference information, which is related to installing IBM Business Process Manager, is available here.

Differences between stand-alone and network deployment configurations

A stand-alone application server cell, also known as a base application server node, is the simplest configuration you can use to deploy and run IBM Business Process Manager for z/OS applications. A network deployment configuration is intended to support multiple application servers, which can be clustered to provide high availability and reliability.

A stand-alone configuration provides a framework for a quick start or development environment, and if you are configuring for a small environment you might find that a single server topology is all you need to meet your requirements. However, you are probably more likely to use a network deployment configuration because it can administer application servers that can be dispersed among multiple sysplexes in a network environment.

The main differences between a stand-alone and a network deployment configuration are as follows:

Table 2. Stand-alone and network deployment configuration differences

Stand-alone configuration	Network deployment configuration
A minimum of four address spaces are allocated for the following processes: • Location service daemon • Controller • Servant • Control region adjunct The maximum amount of address spaces is limited only by resources.	A minimum of seven address spaces are allocated for the following processes: • Location service daemon • Application server controller • Application server servant • Application server control region adjunct • Deployment manager controller • Deployment manager servant • Node agent The maximum amount of address spaces is limited only by resources.
Each server node is in a separate administrative domain.	All nodes in the cell are in the same administrative domain.
You can start and stop servers independently. Each server has an independent, unshared JNDI namespace.	You can start and stop servers independently; however, the JNDI namespace is shared among all servers in the cell.
Multiple servants are allowed.	Multiple servants are allowed.
Clustering is not available.	Clustering is available.

IBM Business Process Manager for z/OS installation media contents

The IBM Business Process Manager for z/OS components that are to be installed on z/OS systems are supplied on a single tape or as a download package; components that are to be installed on non-z/OS systems are supplied on DVDs.

Software supplied with IBM Business Process Manager for z/OS

The IBM Business Process Manager for z/OS package contains all the software that you need to install and configure IBM Business Process Manager for z/OS, and to assemble and deploy applications.

The tape, or download package, includes IBM Installation Manager for z/OS and WebSphere Application Server for z/OS, which are provided as prerequisite software for IBM Business Process Manager for z/OS. The following table lists the software that is supplied on the tape or in the download package.

Software	Description
IBM Business Process Manager for z/OS	Provides the main IBM Business Process Manager for z/OS software.
WebSphere Application Server for z/OS	Provides the WebSphere Application Server for z/OS software that you must install before you install the IBM Business Process Manager for z/OS software.
IBM Installation Manager for z/OS	Provides the IBM Installation Manager for z/OS software that you can use to install both WebSphere Application Server for z/OS and IBM Business Process Manager for z/OS into a z/OS product file system.
WebSphere Application Server Application Clients	Provides a stand-alone client runtime environment for your client applications so that you do not need to install a full instance of WebSphere Application Server for z/OS. The application client module is a Java Archive (JAR) file that contains a client for accessing a Java application.

The DVDs contain optional supplemental software that provides tool support for your production and development environments. The following table lists the software that is supplied on the DVDs.

Software	Description
IBM Business Process Manager Clients	Provides the WebSphere Application Server for z/OS configuration with SOA Core and Business Process Choreographer functionality without needing a full IBM Business Process Manager installation. • IBM Business Process Manager 8.0 Client for Windows: 32-bit and 64-bit • IBM Business Process Manager 8.0 Client for AIX® • IBM Business Process Manager 8.0 Client for Solaris SPARC • IBM Business Process Manager 8.0 Client for Linux: 32-bit and 64-bit • IBM Business Process Manager 8.0 Client for Linux on System z®
WebSphere Application Server Edge Components	Provides load balancing, caching, and centralized security. See the WebSphere Application Server Edge Components web page for more information.
WebSphere Application Server Network Deployment V8.0 Supplements	Provides WebSphere Application Server Network Deployment functions, licensed for use with IBM Business Process Manager.
IBM Tivoli® Access Manager Servers	Provides authentication and authorization APIs and integration to help you to secure access to business-critical applications and data that is spread across the extended enterprise. See IBM Tivoli Access Manager for e-business for more information.

Software	Description
Rational® Agent Controller	The Rational Agent Controller provides a technology for problem determination. The Rational Agent Controller is an enhancement to the Agent Controller from the Autonomic Computing Toolkit. Install the Rational Agent Controller on one of the supported z/OS system environments. Another z/OS system (perhaps an administrator workstation) can use the Log and Trace Analyzer to establish communication with the agent on the remote z/OS system. The Analyzer can request a specific log file from the Rational Agent Controller. The agent uses the appropriate log file parser to normalize the native log to a Common Base Event format and transfers the log file to the Log and Trace Analyzer. Create log file parsers for the Rational Agent Controller with the Common Base Event model builder, which is included in the Autonomic Computing Toolkit.

How to acquire IBM Business Process Manager for z/OS

You can obtain the product code in any of the following ways:

- IBM Custom-Built Product Delivery Option (CBPDO): The system programmer uses SMP/E to unload the product code onto the z/OS system.
- IBM SystemPac or ServerPac: The system programmer copies SMP/E data sets that correspond to the CustomPac service level onto the z/OS system.

To buy the software, contact your IBM representative or IBM reseller, or visit the IBM Business Process Manager home page at http://www.ibm.com/software/integration/business-process-manager/advanced/ and select the *How to buy* link.

Sample customization response files

When using the z/OS Profile Management Tool (zPMT) to create a customization definition for the IBM Business Process Manager for z/OS runtime environment, you can import a sample customization response file in order to populate the zPMT windows with standard configuration values. You can then amend these values as you progress through the windows.

The sample customization response files contain default values for the parameters that you can use to configure a stand-alone server or deployment manager server. Sample files are not supplied for a managed node because the values that you need to configure for the node will be specific to your z/OS environment.

The sample customization response files are available in the IBM Business Process Manager for z/OS product file system. Use these sample files to augment the base WebSphere Application Server profile with IBM Business Process Manager for z/OS functions. To use these files, you must first download them in binary format to a directory on the workstation where the WebSphere Customization Toolbox application is installed. You can then import the relevant sample file in zPMT, and amend the default configuration values as necessary for your runtime environment.

The database configuration in the samples files is for a DB2 for z/OS database.

The default z/OS locations of these files are shown in the following table.

Table 3. Sample customization response files for a DB2 for z/OS database

File description	File location and name
Response file for a stand-alone application server	`/usr/lpp/zWebSphere/V8R0/zOS-config/` `samples/ZBPMPSStandaloneDB2Stacked.WCT.responseFile`

Table 3. Sample customization response files for a DB2 for z/OS database (continued)

File description	File location and name
Response file for a deployment manager server	`/usr/lpp/zWebSphere/V8R0/zOS-config/` `samples/ZBPMPSDMgrDB2Stacked.WCT.responseFile`