



**Program Directory for  
WebSphere Application Server  
for z/OS V9.0.0**

Version 9 Release 0 Modification 0

Program Number 5655-WAS

FMID HBBO900

for Use with  
z/OS V2.1 or higher

Document Date: June 2016

GI13-4320-00

**Note**

Before using this information and the product it supports, be sure to read the general information under 7.0, "Notices" on page 27.

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# Contents

<b>1.0 Introduction</b>	1
1.1 New Features in WebSphere Application Server for z/OS V9.0.0	1
1.2 WebSphere Application Server for z/OS Description (including Liberty)	4
1.3 WebSphere Application Server for z/OS V9.0.0 FMIDs	6
<b>2.0 Program Materials</b>	7
2.1 Basic Machine-Readable Material	7
2.2 Optional Machine-Readable Material	7
2.3 Program Publications	7
2.3.1 Basic Program Publications	8
2.3.2 Optional Program Publications	8
2.4 Program Source Materials	8
2.5 Publications Useful During Installation	8
<b>3.0 Program Support</b>	10
3.1 Program Services	10
3.2 Preventive Service Planning	10
3.3 Statement of Support Procedures	11
<b>4.0 Program and Service Level Information</b>	12
4.1 Program Level Information	12
4.2 Service Level Information	12
<b>5.0 Installation Requirements and Considerations</b>	13
5.1 Driving System Requirements	13
5.1.1 Machine Requirements	13
5.1.2 Programming Requirements	13
5.2 Target System Requirements	14
5.2.1 Machine Requirements	14
5.2.2 Programming Requirements	14
5.2.2.1 Installation Requisites	14
5.2.2.2 Operational Requisites	15
5.2.2.3 Toleration/Coexistence Requisites	15
5.2.2.4 Incompatibility (Negative) Requisites	16
5.2.3 DASD Storage Requirements	16
5.3 FMIDs Deleted	19
5.4 Special Considerations	19
<b>6.0 Installation Instructions</b>	21
6.1 Installing WebSphere Application Server for z/OS V9.0.0 Sample Jobs	21
6.1.1 Sample Jobs for WebSphere Application Server for z/OS V9.0.0 base	21
6.1.2 Perform SMP/E RECEIVE	24

6.1.3 Allocate SMP/E Target and Distribution Libraries . . . . .	24
6.1.4 Create DDDEF Entries . . . . .	24
6.1.5 Perform SMP/E APPLY . . . . .	25
6.1.6 Perform SMP/E ACCEPT . . . . .	25
6.2 Installing WebSphere Application Server for z/OS V9.0.0 Components . . . . .	25
6.3 Activating WebSphere Application Server for z/OS V9.0.0 . . . . .	26
<b>7.0 Notices . . . . .</b>	<b>27</b>
7.1 Trademarks . . . . .	28
<b>Reader's Comments . . . . .</b>	<b>29</b>

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## Figures

1. Basic FMIDs . . . . .	6
2. Basic Material: Unlicensed Publications . . . . .	8
3. Publications Useful During Installation . . . . .	8
4. PSP Upgrade and Subset ID . . . . .	10
5. PSP Upgrade and Subset ID . . . . .	10
6. Component IDs . . . . .	11
7. Driving System Software Requirements . . . . .	14
8. Target System Mandatory Installation Requisites . . . . .	14
9. Target System Mandatory Operational Requisites . . . . .	15
10. Total DASD Space Required by WebSphere Application Server for z/OS V9.0.0 . . . . .	16
11. Storage Requirements for SMP/E Work Data Sets . . . . .	17
12. Storage Requirements for SMP/E Data Sets . . . . .	18
13. Storage Requirements for Target Libraries . . . . .	19
14. Storage Requirements for Distribution Libraries . . . . .	19
15. Sample Installation Jobs - HBBO900 . . . . .	21

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## 1.0 Introduction

This program directory is intended for system programmers who are responsible for program installation and maintenance. It contains information about the material and procedures associated with the installation of WebSphere Application Server for z/OS Version 9.0.0. This publication refers to WebSphere Application Server for z/OS V9.0.0 as WebSphere Application Server for z/OS.

The Program Directory contains the following sections:

- 2.0, “Program Materials” on page 7 identifies the basic and optional program materials and documentation for WebSphere Application Server for z/OS.
- 3.0, “Program Support” on page 10 describes the IBM support available for WebSphere Application Server for z/OS.
- 4.0, “Program and Service Level Information” on page 12 lists the APARs (program level) and PTFs (service level) that have been incorporated into WebSphere Application Server for z/OS.
- 5.0, “Installation Requirements and Considerations” on page 13 identifies the resources and considerations that are required for installing and using WebSphere Application Server for z/OS.
- 6.0, “Installation Instructions” on page 21 provides detailed installation instructions for WebSphere Application Server for z/OS V9.0.0. It also describes the procedures for activating the functions of WebSphere Application Server for z/OS V9.0.0, or refers to appropriate publications.

Before installing WebSphere Application Server for z/OS, read the *CBPDO Memo To Users* and the *CBPDO Memo To Users Extension* that are supplied with this program in softcopy format and this Program Directory; then keep them for future reference. Section 3.2, “Preventive Service Planning” on page 10 tells you how to find any updates to the information and procedures in this Program Directory.

WebSphere Application Server for z/OS is supplied in a Custom-Built Product Delivery Offering (CBPDO, 5751-CS3). The Program Directory that is provided in softcopy format on the CBPDO tape is identical to the hardcopy format that is provided with your order. All service and HOLDDATA for WebSphere Application Server for z/OS V9.0.0 are included on the CBPDO tape.

**Note:** DO NOT use this non-SMP/E installation method if you install WebSphere Application Server for z/OS with a SystemPac or ServerPac.

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### 1.1 New Features in WebSphere Application Server for z/OS V9.0.0

This product excels as the foundation for a service-oriented architecture with the following main benefits and features:

- Dramatic reduction in install package size on z/OS

The SMP/E deliverable consists of a small library of sample jobs that install the product from the Web, downloaded repositories, or physical media. The SMP/E component for WebSphere Application Server for z/OS V9.0.0 ships only the sample jobs required to install the product from cloud-based or

downloaded product and service repositories. As a result, disk space requirements for Version 9.0.0 are 75-90% smaller than for Version 8.5.5. New sample jobs are also provided for the installation of corrective service when necessary.

- Product customization improvements

The customization jobs generated by the WebSphere Customization Toolkit or the *zpmc.sh* command have been simplified and improved. In particular, the */tmp* directory is no longer used during customization if \$TMPDIR is set.

- WebSphere Application Server for z/OS V9.0.0 has transitioned entirely to 64-bit support.
- Support for running more than 256 servers on one z/OS logical partition (LPAR)
- Enhancements to the *Display Work* operator command
  - To include messages/work processed by the WebSphere Application Server adjunct region
  - To show 'High Water' levels for various types of work
- Exploitation of z/OS Workload Manager (WLM) Health API to pace work into newly started servant regions
- Support for tracing and logging of large call stacks and BUFFER OVERFLOW condition
- Dynamic expansion of Control Region thread pool (an elastic control region)
- Improved wild-carding for Classification XML file
- Trace filtering by Task Control Block (TCB)- What is that task doing?
- Simpler z/OS Modify commands automation - added support for CART write-to-operator (WTO) option
- Improvements to MSGROUTE options
- Pause-Resume Listeners enhanced to include Activation Specifications
- WebSphere Optimized Local Adapter (WOLA) enhancements
  - Enhancements to support IMS two phase commit global transactions
  - Enhancements for Link Server control transaction, List Servers command (BBOC LIST\_SRVR)
  - Support for CICS shutdown Program List Table program to clean up registrations at CICS shutdown automatically (see supplied sample BBOACPLS.cicsasm)
  - Enhancements in support of RAD 7.0.1 for WebSphere Optimized Local Adapter (WOLA) - For more information see  
[http://www.ibm.com/developerworks/websphere/techjournal/1312\\_mulvey/1312\\_mulvey.html](http://www.ibm.com/developerworks/websphere/techjournal/1312_mulvey/1312_mulvey.html)
  - Round robin routing support for sharing registrations for WebSphere Application Server application outbound calls (ola\_locate\_service\_search\_algorithm=2)
  - WOLA-CICS correlator token for WebSphere Application Server/CICS SMF record correlation
  - Enhanced CICS channels/containers support (support for MappedRecords and multiple containers in a channel)

- Support for shared APIs between WOLA for traditional WAS and Liberty

### **Java Platform, Standard Edition 8**

IBM, SDK, Java Technology Edition, Version 8 is the default Java SDK for WebSphere Application Server for z/OS.

### **Java Platform, Enterprise Edition 7**

WebSphere Application Server for z/OS **adds support** for the full Java, Platform, Enterprise Edition (Java EE) 7. To learn more about the full profile and web profile of the Java EE programming model.

- Easier delivery of HTML5 dynamic scalable applications for desktops, tablets, and smartphones through Java EE 7 web profile.
- Java EE 6 introduced the web profile to assist developers of dynamic web applications, providing technologies such as Enterprise JavaBeans (EJB) Lite, Java Persistence API (JPA), and Java Transaction API (JTA).
- Java EE 7 web profile adds support for HTML5. Two new technologies, WebSocket and JSON, speed up data exchanges and simplify data parsing for portable applications. Updates to existing technologies, JAX-RS 2.0, Java Server Faces (JSF) 2.2, and Servlet 3.1 enhance your ability to develop dynamic HTML5 applications. For example, JAX-RS 2.0 provides asynchronous response processing through scalable, high performance RESTful Services.
- Increased developer productivity.

A simplified application architecture reduces the amount of boilerplate code needed for business logic, such as in JMS 2.0 and the JAX-RS 2.0 client API. A more robust POJO development model enables broader use of annotations, such as in JAX-RS 2.0 Interceptors and Filters and in CDI. Bean Validation 1.1 offers method-level validation.

- Improved support for enterprise demands.

Java EE continues to support enterprise demands with Java EE Connector Architecture (JCA), Java Transaction API (JTA), and Java Message Service (JMS). Java EE 7 introduces the ability to write batch applications in Java that use a standard API and are portable across multiple runtime environments. Batch applications enable a better use of computing resources by shifting processing times to when resources are typically idle. Concurrency utilities enable developers to write scalable applications that integrate with the Java EE runtime in a secure, reliable manner.

- Deprecation of older technologies

Older technologies are optional: Application Deployment (JSR-88); JAXR, for interfacing with UDDI registries (JSR-93); JAX-RPC, for XML-based RPC (JSR-101); and EJB 2.x Container Managed Persistence, which Java Persistence API (JSR-338) replaces.

- Java Enterprise Edition 7 sample applications

You can experiment with the following deployed samples in the cloud offering of the WebSphere Application Server for z/OS. To access the sample code, visit the WASdev project space on GitHub. For more information about using and deploying the samples, see [Accessing the samples](#).

### **WebSphere Application Server Liberty for z/OS**

- Re-directing of messages to z/OS console for use with automation
- Configure RunAs authentication via SAF resource profiles (SAF delegation)
- Support for copying messages.log to MSGLOG DD in Liberty started task output
- z/OS Connect file system logging interceptor
- z/OS Connect REST client service provider
- WebSphere Optimized Local Adapter (WOLA) performance improvements
- installUtility replaces featureManager for install
  - 'zosBundle' name allows all Liberty features including z/OS features to be installed with one command
- Full Java, Platform, Enterprise Edition (Java EE) 7 support on all platforms including z/OS since June, 2015.
- Support for IBM, SDK, Java Technology Edition, Version 8 on z13 with SMT
- featureManager install using firewall proxy

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## **1.2 WebSphere Application Server for z/OS Description (including Liberty)**

WebSphere Application Server for z/OS helps you build, deploy and run applications with flexible, secure and Java EE-certified runtime environments-from lightweight production environments to large enterprise deployments. WebSphere Application Server for z/OS delivers near-continuous availability with advanced performance and management capabilities for mission-critical applications by leveraging the qualities of services of IBM z Systems and z/OS. These include items like policy-driven workload management, advanced transactional integrity, unsurpassed scalability and availability, optimized performance and connectivity with existing business platform assets, and built-in enterprise security capabilities.

WebSphere Application Server for z/OS Liberty delivers near-continuous availability, with advanced performance and management capabilities for mission-critical applications by leveraging the qualities of services of IBM z Systems and z/OS. It offers the complete set of capabilities that are available in WebSphere Application Server for z/OS Liberty Network Deployment. In addition, it adds in the unique qualities of service of IBM z Systems hardware and the z/OS operating system, including items like policy-driven workload management, advanced transactional integrity, unsurpassed scalability and



availability, optimized performance and connectivity with existing platform business assets, and built-in enterprise security capabilities.

WebSphere Application Server for z/OS is a proven, high-performance transaction engine that can help you build, run, integrate, and manage dynamic business applications.

WebSphere Application Server for z/OS provides significant enhancements in terms of developer experience and high-end resiliency. For developers requiring a quick and simple development run time, the Liberty profile is a significant option for building web applications that do not require the full Java Platform, Enterprise Edition environment of traditional enterprise application server profiles. For administrators and businesses that strive for operational excellence through management efficiency, responsiveness, and performance, Intelligent Management capabilities are included in the full profile application server, enabling resiliency, virtualization, enterprise-level batch processing, and autonomic responsiveness to problems.

For additional functional capability information about WebSphere Application Server for z/OS, please use the following link.

[http://www14.software.ibm.com/webapp/wsbroker/redirect?version=cord&product=was-nd-mp&topic=zos\\_welcome](http://www14.software.ibm.com/webapp/wsbroker/redirect?version=cord&product=was-nd-mp&topic=zos_welcome)

### ***DMZ secure proxy server***

The DMZ secure proxy server for WebSphere Application Server for z/OS is no longer available on z/OS in WebSphere Application Server for z/OS (traditional) V9.0.0. WebSphere Application Server customers on z/OS can continue to install and use the DMZ secure proxy server on distributed platforms.

**Note:** The DMZ secure proxy server is available as **remote access only**.

### ***WebSphere Application Server plug-ins V9.0.0***

WebSphere Application Server for z/OS works with a web server to route requests for dynamic content, such as servlets, from web applications. The web servers are necessary for directing traffic from browsers to the applications that run on an application server. The web server plug-in uses the XML configuration file to determine whether a request is for an application server.

The WebSphere Application Server for z/OS Web server plug-ins are used to establish and maintain persistent HTTP and HTTPS connections to application servers.

When the plug-in is ready to send a request to the application server, it first checks its connection pool for existing connections. If an existing connection is available the plug-in checks its connection status. If the status is still good, the plug-in uses that connection to send the request. If a connection does not exist, the plug-in creates one. If a connection exists but has been closed by the application server, the plug-in closes that connection and opens a new one.

### ***IBM HTTP Server for z/OS V9.0***

IBM HTTP Server for WebSphere Application Server for z/OS provides advanced web server capabilities with consistent management and security in a WebSphere Application Server for z/OS environment. IBM HTTP Server for WebSphere Application Server for z/OS is based on Apache HTTP Server.

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### 1.3 WebSphere Application Server for z/OS V9.0.0 FMIDs

WebSphere Application Server for z/OS consists of the following FMIDs:

<i>Figure 1. Basic FMIDs</i>	
<b>FMID</b>	<b>Description</b>
HBBO900	WebSphere Application Server for z/OS V9.0.0 sample jobs for product installation

The WebSphere Application Server for z/OS V9.0.0 product consists of HBBO900.

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## 2.0 Program Materials

An IBM program is identified by a program number. The program number for WebSphere Application Server for z/OS V9.0.0 is 5655-WAS.

Basic Machine-Readable Materials are materials that are supplied under the base license and feature numbers, and are required for the use of the product. Optional Machine-Readable Materials are orderable under separate feature numbers, and are not required for the product to function.

The program announcement material describes the features supported by WebSphere Application Server for z/OS V9.0.0. Ask your IBM representative for this information if you have not already received a copy.

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### 2.1 Basic Machine-Readable Material

The distribution medium for this program is magnetic tape or downloadable files. This program is in SMP/E RELFILE format and is installed by using SMP/E. See 6.0, "Installation Instructions" on page 21 for more information about how to install the program.

You can find information about the physical tape for the basic machine-readable materials for WebSphere Application Server for z/OS V9.0.0 in the *CBPDO Memo To Users Extension*.

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### 2.2 Optional Machine-Readable Material

WebSphere Application Server for z/OS V9.0.0 has no optional machine-readable materials.

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### 2.3 Program Publications

The following sections identify the basic and optional publications for WebSphere Application Server for z/OS V9.0.0.

Please note that the main documentation distribution medium for WebSphere Application Server for z/OS V9.0.0 is the Knowledge Center, which can be accessed via the product documentation page at

<http://www.ibm.com/software/webservers/appserv/was/library>

In addition to the Knowledge Center, relevant WebSphere Application Server for z/OS product documentation is available in PDF format at the same URL.

## 2.3.1 Basic Program Publications

Figure 2 on page 8 identifies the basic unlicensed program publications for WebSphere Application Server for z/OS V9.0.0.

<i>Figure 2. Basic Material: Unlicensed Publications</i>	
<b>Publication Title</b>	<b>Form Number</b>
Program Directory for WebSphere Application Server for z/OS V9.0.0	GI13-4320-00
License Information WebSphere Application Server for z/OS V9.0.0	LC27-9002-00
Carefully read the WebSphere Application Server for z/OS V9.0.0 IBM International Program License Agreement LC27-9002-00, a copy of which will be provided to you with the order (Hardcopy or Electronic format); The License Agreement may contain terms that supersede the Licensed terms included with this program component.	

The latest product documentation for WebSphere Application Server for z/OS V9.0.0 is found in the IBM Knowledge Center. Locate WebSphere Application Server for z/OS V9.0.0 in the Knowledge Center product list to obtain the product documentation.

## 2.3.2 Optional Program Publications

WebSphere Application Server for z/OS V9.0.0 has no optional publications provided.

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## 2.4 Program Source Materials

No program source materials or viewable program listings are provided for WebSphere Application Server for z/OS V9.0.0.

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## 2.5 Publications Useful During Installation

You might want to use the publications listed in Figure 3 during the installation of WebSphere Application Server for z/OS V9.0.0. To order copies, contact your IBM representative or visit the IBM Publications Center at <http://ehone.ibm.com/publications/servlet/pbi.wss?CTY=US>.

<i>Figure 3 (Page 1 of 2). Publications Useful During Installation</i>	
<b>Publication Title</b>	<b>Form Number</b>
<i>IBM SMP/E for z/OS User's Guide</i>	SA22-7773
<i>IBM SMP/E for z/OS Commands</i>	SA22-7771
<i>IBM SMP/E for z/OS Reference</i>	SA22-7772

*Figure 3 (Page 2 of 2). Publications Useful During Installation*

<b>Publication Title</b>	<b>Form Number</b>
<i>IBM SMP/E for z/OS Messages, Codes, and Diagnosis</i>	GA22-7770
<i>IBM Software Delivery Standard Packaging Rules for z/OS-Based Products</i>	SC23-3695
<i>z/OS MVS JCL Reference</i>	SA22-7597
<i>z/OS System Codes</i>	SA22-7626
<i>Installation Manager for z/OS V1 Program Directory</i>	GI13-3016-00

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## 3.0 Program Support

This section describes the IBM support available for WebSphere Application Server for z/OS.

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### 3.1 Program Services

Contact your IBM representative for specific information about available program services.

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### 3.2 Preventive Service Planning

Before you install WebSphere Application Server for z/OS, make sure that you have reviewed the current Preventive Service Planning (PSP) information. The PSP Buckets maintain current lists (which have been identified since the package was created) of any recommended or required service for the installation of this package. This service includes software PSP information that contains HIPER and required PTFs against the base release.

If you obtained WebSphere Application Server for z/OS as part of a CBPDO, HOLDDATA is included.

If the CBPDO for WebSphere Application Server for z/OS is older than two weeks old by the time you install the product materials, you should contact the IBM Support Center or use S/390 Software Xcel to obtain the latest PSP Bucket information. You can also obtain the latest PSP Bucket information by going to the following Web site:

<http://www14.software.ibm.com/webapp/set2/psearch/search?domain=psp>

For program support, access the Software Support Web site at <http://www-01.ibm.com/software/support/>.

PSP Buckets are identified by UPGRADEs, which specify product levels; and SUBSETs, which specify the FMIDs for a product level. The UPGRADE and SUBSET values for WebSphere Application Server for z/OS V9.0.0 are shown as follows:

*Figure 4. PSP Upgrade and Subset ID*

UPGRADE	SUBSET	Description
WASAS900	HBBO900	WebSphere Application Server for z/OS V9.0.0

You should also consult the following PSP bucket for information related to the IBM Installation Manager.

*Figure 5. PSP Upgrade and Subset ID*

UPGRADE	SUBSET	Description
IIMZOSV1	HGIN140	Installation Manager for z/OS V1

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### 3.3 Statement of Support Procedures

Report any problems which you feel might be an error in the product materials to your IBM Support Center. You may be asked to gather and submit additional diagnostics to assist the IBM Support Center in their analysis.

Figure 6 on page 11 identifies the component IDs (COMPID) for WebSphere Application Server for z/OS V9.0.0.

<i>Figure 6. Component IDs</i>			
<b>FMID</b>	<b>COMPID</b>	<b>Component Name</b>	<b>RETAIN Release</b>
HBBO900	5655I3500	WebSphere Application Server for z/OS V9.0.0	900
HBBO900	5655I3513	WebSphere Application Server for z/OS V9.0.0 sample jobs	900
HBBO900	5655I3511	Web server plug-ins V9.0	900
HBBO900	5655I3510	IBM HTTP Server V9.0	900
HBBO900	5655W6514	Liberty	900

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## 4.0 Program and Service Level Information

This section identifies the program and relevant service levels of WebSphere Application Server for z/OS. The program level refers to the APAR fixes that have been incorporated into the program. The service level refers to the Fix Packs that have been incorporated into the program.

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### 4.1 Program Level Information

No APARs have been incorporated into WebSphere Application Server for z/OS V9.0.0.

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### 4.2 Service Level Information

No Fix Packs against this release of WebSphere Application Server for z/OS V9.0.0 have been incorporated into the product tape.

Over time it is HIGHLY recommended that you frequently check the WebSphere Application Server for z/OS V9.0.0 PSP bucket for HIPER and SPECIAL Attention PTFs against all FMID(s) which should be installed.

**Note:** WebSphere Application Server for z/OS V9.0.0 is serviced with Fix Packs. WebSphere Application Server for z/OS V9.0.0 sample jobs (compid 5655I3513) is serviced with PTFs



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## 5.0 Installation Requirements and Considerations

The following sections identify the system requirements for installing and activating WebSphere Application Server for z/OS V9.0.0. The following terminology is used:

- *Driving system*: the system used to install the program; where SMP/E executes.

The program might have specific operating system or product level requirements for using processes, such as binder or assembly utilities during the installation.

- *Target system*: the system on which the program is configured and run.

The program might have specific product level requirements, such as needing access to the library of another product for link-edits. These requirements, either mandatory or optional, might directly affect the element during the installation or in its basic or enhanced operation.

In many cases, you can use a system as both a driving system and a target system. However, you can make a separate IPL-able clone of the running system to use as a target system. The clone must include copies of all system libraries that SMP/E updates, copies of the SMP/E CSI data sets that describe the system libraries, and your PARMLIB and PROCLIB.

Use separate driving and target systems in the following situations:

- When you install a new level of a product that is already installed, the new level of the product will replace the old one. By installing the new level onto a separate target system, you can test the new level and keep the old one in production at the same time.
- When you install a product that shares libraries or load modules with other products, the installation can disrupt the other products. By installing the product onto a separate target system, you can assess these impacts without disrupting your production system.

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### 5.1 Driving System Requirements

This section describes the environment of the driving system that is required to install WebSphere Application Server for z/OS V9.0.0.

#### 5.1.1 Machine Requirements

The driving system can run in any hardware environment that supports the required software.

#### 5.1.2 Programming Requirements

<i>Figure 7. Driving System Software Requirements</i>				
<b>Program Number</b>	<b>Product Name</b>	<b>Minimum VRM</b>	<b>Minimum Service Level will satisfy these APARs</b>	<b>Included in this product's shipment?</b>
5694-A01	z/OS	V02.01.00	N/A	No
5655-G44	IBM SMP/E for z/OS	V 3.5	N/A	No

**Note:** Installation may require migration to new z/OS releases to be service supported. See the following for more information.

<http://www-01.ibm.com/software/support/lifecycle/>

## 5.2 Target System Requirements

This section describes the environment of the target system that is required to install and use WebSphere Application Server for z/OS V9.0.0.

### 5.2.1 Machine Requirements

The target system can run in any hardware environment that supports the required software.

### 5.2.2 Programming Requirements

**5.2.2.1 Installation Requisites:** Installation requisites identify products that are required by and *must* be present on the system or products that are not required by but *should* be present on the system for the successful installation of this product.

Mandatory installation requisites identify products that are required on the system for the successful installation of this product. These products are specified as PREs or REQs.

<i>Figure 8 (Page 1 of 2). Target System Mandatory Installation Requisites</i>				
<b>Program Number</b>	<b>Product Name</b>	<b>Minimum VRM</b>	<b>Minimum Service Level will satisfy these APARs</b>	<b>Included in this product's shipment?</b>
5694-A01	z/OS	V02.01.00	N/A	No
5655-G44	IBM SMP/E for z/OS	V03.5.0	N/A	No

<i>Figure 8 (Page 2 of 2). Target System Mandatory Installation Requisites</i>				
<b>Program Number</b>	<b>Product Name</b>	<b>Minimum VRM</b>	<b>Minimum Service Level will satisfy these APARs</b>	<b>Included in this product's shipment?</b>
5655-IMZ	IBM Installation Manager	V1.8.5	N/A	No

**Note:** Installation may require migration to new z/OS releases to be service supported. See [http://www-03.ibm.com/systems/z/os/zos/support/zos\\_eos\\_dates.html](http://www-03.ibm.com/systems/z/os/zos/support/zos_eos_dates.html).

Conditional installation requisites identify products that are *not* required for successful installation of this product but can resolve such things as certain warning messages at installation time. These products are specified as IF REQs.

WebSphere Application Server for z/OS V9.0.0 has no conditional installation requisites.

**5.2.2.2 Operational Requisites:** Operational requisites are products that are required by and *must* be present on the system or products that are not required by but *should* be present on the system for this product to operate all or part of its functions.

Mandatory operational requisites identify products that are required for this product to operate its basic functions. These products are specified as PREs or REQs.

<i>Figure 9. Target System Mandatory Operational Requisites</i>	
<b>Program Number</b>	<b>Product Name and Minimum VRM/Service Level</b>
5694-A01	z/OS V02.01.00

Conditional operational requisites identify products that are *not* required for this product to operate its basic functions but are required at run time for this product to operate specific functions. These products are specified as IF REQs.

WebSphere Application Server for z/OS V9.0.0 has no conditional operational requisites.

**5.2.2.3 Toleration/Coexistence Requisites:** Toleration/coexistence requisites identify products that must be present on sharing systems. These systems can be other systems in a multisystem environment (not necessarily sysplex), a shared DASD environment (such as test and production), or systems that reuse the same DASD environment at different time intervals.

WebSphere Application Server for z/OS V9.0.0 has no toleration/coexistence requisites.

**5.2.2.4 Incompatibility (Negative) Requisites:** Negative requisites identify products that must *not* be installed on the same system as this product.

WebSphere Application Server for z/OS V9.0.0 has no negative requisites.

## 5.2.3 DASD Storage Requirements

WebSphere Application Server for z/OS V9.0.0 libraries can reside on all supported DASD types.

Figure 10 lists the total space that is required for each type of library.

<i>Figure 10. Total DASD Space Required by WebSphere Application Server for z/OS V9.0.0</i>			
Product	Library Type	Total Space Required (3390 Trks)	File System Requirements
WebSphere Application Server base HBBO900			
	Target	20	
	Distribution	20	
	File Systems		
		45000	For each copy of WebSphere Application Server for z/OS product (traditional)
		6000	For each copy of WebSphere Application Server for z/OS Liberty. Add an additional 7500 tracks if IBM WebSphere SDK Java Technology Edition V8.0 will also be installed.
		900	For each copy of Web server plug-ins code
		1350	For each copy of IBM HTTP Server for z/OS V9.0 code

### Notes:

- For non-RECFM U data sets, IBM recommends using system-determined block sizes for efficient DASD utilization. For RECFM U data sets, IBM recommends using a block size of 32760, which is most efficient from the performance and DASD utilization perspective.
- Abbreviations used for data set types are shown as follows.
  - U** Unique data set, allocated by this product and used by only this product. This table provides all the required information to determine the correct storage for this data set. You do not need to refer to other tables or program directories for the data set size.
  - S** Shared data set, allocated by this product and used by this product and other products. To determine the correct storage needed for this data set, add the storage size given in this table to those given in other tables (perhaps in other program directories). If the data set already exists, it must have enough free space to accommodate the storage size given in this table.

**E** Existing shared data set, used by this product and other products. This data set is *not* allocated by this product. To determine the correct storage for this data set, add the storage size given in this table to those given in other tables (perhaps in other program directories). If the data set already exists, it must have enough free space to accommodate the storage size given in this table.

If you currently have a previous release of this product installed in these libraries, the installation of this release will delete the old release and reclaim the space that was used by the old release and any service that had been installed. You can determine whether these libraries have enough space by deleting the old release with a dummy function, compressing the libraries, and comparing the space requirements with the free space in the libraries.

For more information about the names and sizes of the required data sets, see 6.1.3, "Allocate SMP/E Target and Distribution Libraries" on page 24.

3. Abbreviations used for the file system path type are as follows.

- N** New path, created by this product.
- X** Path created by this product, but may already exist from a previous release.
- P** Previously existing path, created by another product.

4. All target and distribution libraries listed have the following attributes:

- The default name of the data set may be changed.
- The default block size of the data set may be changed.
- The data set may be merged with another data set that has equivalent characteristics.
- The data set may be either a PDS or a PDSE.

5. All target libraries listed have the following attributes:

- These data sets can be SMS-managed, but they are not required to be SMS-managed.
- These data sets are not required to reside on the IPL volume.
- The values in the "Member Type" column are not necessarily the actual SMP/E element types that are identified in the SMPMCS.

6. All target libraries that are listed and contain load modules have the following attributes:

- These data sets can be in the LPA, but they are not required to be in the LPA.
- These data sets can be in the LNKLIST.
- These data sets are not required to be APF-authorized.

*Figure 11 (Page 1 of 2). Storage Requirements for SMP/E Work Data Sets*

<b>Library DDNAME</b>	<b>T Y P E</b>	<b>O R G</b>	<b>R E C F M</b>	<b>L R E C L</b>	<b>No. of 3390 Trks</b>	<b>No. of DIR Blks</b>
SMPWRK1	S	PDS	FB	80	120	10
SMPWRK2	S	PDS	FB	80	30	10
SMPWRK3	S	PDS	FB	80	300	150

Figure 11 (Page 2 of 2). Storage Requirements for SMP/E Work Data Sets

Library DDNAME	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
SMPWRK4	S	PDS	FB	80	80	10
SMPWRK5	S	PDS	FB	80	300	400
SYSUT1	U	SEQ	--	--	300	0
SYSUT2	U	SEQ	--	--	30	0
SYSUT3	U	SEQ	--	--	30	0
SYSUT4	U	SEQ	--	--	30	0

The following table provides an estimate of the storage needed in the SMP/E data sets for WebSphere Application Server for z/OS V9.0.0. You must add the estimates to those of any other programs and service that you install to determine the total additional storage requirements.

If the table indicates that the SMPLTS data set must be a PDSE and your existing SMPLTS is a PDS, you must allocate a new PDSE and copy your SMPLTS into it; then change the SMPLTS DDDEF entry to indicate the new PDSE data set.

Figure 12. Storage Requirements for SMP/E Data Sets

Library DDNAME	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
SMPLTS	E	PDS	U	0	50	1
SMPMTS	E	PDS	FB	80	15	5
SMPPTS	E	PDS	FB	80	300	10
SMPSCDS	E	PDS	FB	80	15	2
SMPSTS	E	PDS	FB	80	15	2

The following figures describe the target and distribution libraries and file system paths required to install WebSphere Application Server for z/OS V9.0.0. The storage requirements of WebSphere Application Server for z/OS must be added to the storage required by other programs having data in the same library or path.

**Note:** The data in these tables should be used when determining which libraries can be merged into common data sets. In addition, since some ALIAS names may not be unique, ensure that no naming conflicts will be introduced before merging libraries.

Figure 13. Storage Requirements for Target Libraries

Library DDNAME	Member Type	Target Volume	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
SBBOJCL	Sample	TVOL2	U	PDS	FB	80	20	5

Figure 14. Storage Requirements for Distribution Libraries

Library DDNAME	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
ABBOJCL	U	PDS	FB	80	20	5

WebSphere Application Server for z/OS requires several thousand additional tracks (3390 tracks) for run-time data sets. The amount of space depends on the application server structure to be used, the applications to be run, and the amount of data storage the applications require.

### 5.3 FMIDs Deleted

Installing WebSphere Application Server for z/OS might result in the deletion of other FMIDs. To see which FMIDs will be deleted, examine the ++VER statement in the SMPMCS of the product.

If you do not want to delete these FMIDs at this time, install WebSphere Application Server for z/OS into separate SMP/E target and distribution zones.

**Note:** These FMIDs are not automatically deleted from the Global Zone. If you want to delete these FMIDs from the Global Zone, see the SMP/E manuals for instructions.

### 5.4 Special Considerations

The installation of WebSphere Application Server for z/OS requires a minimum IBM Installation Manager level of Version 1.8.5. Apply PTF UI90052 to the Installation Manager install kit, FMID HGIN140 before creating your Installation Manager on z/OS.

If you already have an Installation Manager at a lower level than Version 1.8.5, then:

- Apply PTF UI90052 to the Installation Manager install kit, FMID HGIN140, to update the install kit.

- Rerun the GIN2INST sample job to invoke the *installc*, *userinstc*, or *groupinstc* command from the updated install kit, while specifying the same parameters you used to create the Installation Manager. This process will update your Installation Manager to the level in the Installation Manager install kit.



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## 6.0 Installation Instructions

This chapter describes the installation method and the step-by-step procedures to install and to activate the functions of WebSphere Application Server for z/OS V9.0.0.

WebSphere Application Server for z/OS V9.0.0 components are installed with the IBM Installation Manager, using product repositories that are accessed directly from the Web or downloaded from ShopzSeries and Fix Central.

---

### 6.1 Installing WebSphere Application Server for z/OS V9.0.0 Sample Jobs

This document explains how to install the sample installation jobs for WebSphere Application Server for z/OS. See the following article in the Knowledge Center for complete installation instructions. system.

[http://www14.software.ibm.com/webapp/wsbroker/redirect?version=cord&product=was-nd-zos&topic=tins\\_install](http://www14.software.ibm.com/webapp/wsbroker/redirect?version=cord&product=was-nd-zos&topic=tins_install)

Additional usage information on IBM Installation Manager can be found in the following technote:

<http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP102554>

#### 6.1.1 Sample Jobs for WebSphere Application Server for z/OS V9.0.0 base

The following sample installation jobs are provided as part of the product to help you install WebSphere Application Server for z/OS:

*Figure 15 (Page 1 of 3). Sample Installation Jobs - HBBO900*

Job Name	Job Type	Description	RELFILE
BBOALLOC	ALLOCATE	Sample job to allocate target and distribution libraries for the WebSphere Application Server for z/OS product	IBM.HBBO900.F1
BBODDDEF	DDDEF	Sample job to define SMP/E DDDEFs for the WebSphere Application Server for z/OS product	IBM.HBBO900.F1
BBOAPPLY	APPLY	Sample APPLY job for the WebSphere Application Server for z/OS product	IBM.HBBO900.F1
BBOACCEP	ACCEPT	Sample ACCEPT job for the WebSphere Application Server for z/OS product	IBM.HBBO900.F1
BBO1CFS	ALLOCIM	Sample job to allocate a file system for the WebSphere Application Server for z/OS traditional	IBM.HBBO900.F1

Figure 15 (Page 2 of 3). Sample Installation Jobs - HBBO900

<b>Job Name</b>	<b>Job Type</b>	<b>Description</b>	<b>RELFILE</b>
BBO1INS	INSTALL	Sample job to install WebSphere Application Server for z/OS (traditional) from the Web-based product repository with the IBM Installation Manager	IBM.HBBO900.F1
BBO1INSL	INSTALL	Sample job to install WebSphere Application Server for z/OS (traditional) from local repositories with the IBM Installation Manager	IBM.HBBO900.F1
BBO1UNIN	UNINSTALL	Sample job to uninstall WebSphere Application Server for z/OS (traditional) with the IBM Installation Manager	IBM.HBBO900.F1
BBO2CFS	ALLOCIM	Sample job to allocate a file system for WebSphere Application Server for z/OS Liberty	IBM.HBBO900.F1
BBO2INS	INSTALL	Sample job to install WebSphere Application Server for z/OS Liberty from the Web-based product repository with the IBM Installation Manager	IBM.HBBO900.F1
BBO2INSL	INSTALL	Sample job to install WebSphere Application Server for z/OS Liberty from local repositories with the IBM Installation Manager	IBM.HBBO900.F1
BBO2ADD1	POSTINSTALL	Sample job to list available Liberty features and other assets	IBM.HBBO900.F1
BBO2ADD2	POSTINSTALL	Sample job to install Liberty features and other assets	IBM.HBBO900.F1
BBO2ADD3	POSTINSTALL	Sample job to uninstall Liberty features and other assets	IBM.HBBO900.F1
BBO2UNIN	UNINSTALL	Sample job to uninstall WebSphere Application Server for z/OS Liberty with the IBM Installation Manager	IBM.HBBO900.F1
BBO3CFS	ALLOCIM	Sample job to allocate a file system for the WebSphere Application Server for z/OS Web server plugins	IBM.HBBO900.F1
BBO3INS	INSTALL	Sample job to install the WebSphere Application Server for z/OS Web server plugins from the Web-based product repository with the IBM Installation Manager	IBM.HBBO900.F1
BBO3INSL	INSTALL	Sample job to install the WebSphere Application Server for z/OS Web server plugins from local repositories with the IBM Installation Manager	IBM.HBBO900.F1
BBO3UNIN	UNINSTALL	Sample job to uninstall the WebSphere Application Server for z/OS Web server plugins with the IBM Installation Manager	IBM.HBBO900.F1
BBO4CFS	ALLOCIML	Sample job to allocate a file system for IBM HTTP Server	IBM.HBBO900.F1

Figure 15 (Page 3 of 3). Sample Installation Jobs - HBBO900

Job Name	Job Type	Description	RELFILE
BBO4INS	INSTALL	Sample job to install IBM HTTP Server from the Web-based product repository with the IBM Installation Manager	IBM.HBBO900.F1
BBO4INSL	INSTALL	Sample job to install IBM HTTP Server from local repositories repository with the IBM Installation Manager	IBM.HBBO900.F1
BBO4UNIN	UNINSTALL	Sample job to uninstall IBM HTTP Server with the IBM Installation Manager	IBM.HBBO900.F1
BBO5INS	INSTALL	Sample job to install IBM SDK, Java Technology Edition, Version 8 from the Web-based product repository with the IBM Installation Manager	IBM.HBBO900.F1
BBO5INSL	INSTALL	Sample job to install IBM SDK, Java Technology Edition, Version 8 from local repositories with the IBM Installation Manager	IBM.HBBO900.F1
BBO5UNIN	UNINSTALL	Sample job to uninstall IBM SDK, Java Technology Edition, Version 8 with the IBM Installation Manager	IBM.HBBO900.F1

You can access the sample installation jobs by performing an SMP/E RECEIVE and then copying the jobs from the relfiles to a work data set for editing and submission. See Figure 15 on page 21 to find the appropriate relfile data set.

You can also copy the sample installation jobs from the tape or product files by submitting the following job. Depending on your distribution medium, use either the //TAPEIN or the //FILEIN DD statement and comment out or delete the other statement. Before you submit the job, add a job card and change the lowercase parameters to uppercase values to meet the requirements of your site.

```
//STEP1 EXEC PGM=IEBCOPY
//SYSPRINT DD SYSOUT=*
//TAPEIN DD DSN=IBM.HBBO900.F1,UNIT=tunit,
// VOL=SER=volser,LABEL=(x,SL),
// DISP=(OLD,KEEP)
//FILEIN DD DSN=IBM.HBBO900.F1,UNIT=SYSALLDA,DISP=SHR,
// VOL=SER=filevol
//OUT DD DSNAME=jcl-library-name,
// DISP=(NEW,CATLG,DELETE),
// VOL=SER=dasdvol,UNIT=SYSALLDA,
// SPACE=(TRK,(primary,secondary,dir))
//SYSUT3 DD UNIT=SYSALLDA,SPACE=(CYL,(1,1))
//SYSIN DD *
COPY INDD=xxxxIN,OUTDD=OUT
/*
```

See the following information to update the statements in the previous sample:

TAPEIN:

**tunit** is the unit value that matches the product tape.

**volser** is the volume serial that matches the product tape.

**x** is the tape file number that indicates the location of the data set name on the tape.

See the documentation that is provided by CBPDO for the location of IBM.fmid.Fy on the tape.

FILEIN:

**filevol** is the volume serial of the DASD device where the downloaded files reside.

OUT:

**jcl-library-name** is the name of the output data set where the sample jobs are stored.

**dasdvol** is the volume serial of the DASD device where the output data set resides.

SYSIN:

**xxxxIN** is either TAPEIN or FILEIN depending on your input DD statement.

## 6.1.2 Perform SMP/E RECEIVE

If you have obtained WebSphere Application Server for z/OS as part of a CBPDO, use the RCPDO job in the CBPDO RIMLIB data set to receive the WebSphere Application Server for z/OS sample jobs FMID, service, and HOLDDATA that are included on the CBPDO tape. For more information, see the documentation that is included in the CBPDO.

The FMID for the WebSphere Application Server for z/OS sample jobs is HBBO900.

**Expected Return Codes and Messages:** You will receive return code of 0 if the job runs correctly.

## 6.1.3 Allocate SMP/E Target and Distribution Libraries

Edit and submit sample job BBOALLOC to allocate the SMP/E target and distribution libraries for the WebSphere Application Server for z/OS sample jobs. Consult the instructions in the sample job for more information.

**Expected Return Codes and Messages:** You will receive return code of 0 if the job runs correctly.

## 6.1.4 Create DDDEF Entries

Edit and submit sample job BBODDDEF to create DDDEF entries for the SMP/E target and distribution libraries for the WebSphere Application Server for z/OS sample jobs. Consult the instructions in the sample job for more information.

**Expected Return Codes and Messages:** You will receive return code of 0 if the job runs correctly.

## 6.1.5 Perform SMP/E APPLY

Edit and submit sample job BBOAPPLY to perform an SMP/E APPLY CHECK for the WebSphere Application Server for z/OS sample jobs. Consult the instructions in the sample job for more information. After you take actions that are indicated by the APPLY CHECK, remove the CHECK operand and run the job again to perform the APPLY.

**Note:** The GROUPEXTEND operand indicates that SMP/E applies all requisite SYSMODs. The requisite SYSMODS might be applicable to other functions.

**Expected Return Codes and Messages from APPLY CHECK:** You will receive a return code of 0 if this job runs correctly, unless one or more HOLDs was bypassed, in which case you will receive a return code of 4.

**Expected Return Codes and Messages from APPLY:** You will receive a return code of 0 if this job runs correctly, unless one or more HOLDs was bypassed, in which case you will receive a return code of 4.

## 6.1.6 Perform SMP/E ACCEPT

Edit and submit sample job BBOACCEP to perform an SMP/E ACCEPT CHECK for WebSphere Application Server for z/OS sample jobs. Consult the instructions in the sample job for more information.

After you take actions that are indicated by the ACCEPT CHECK, remove the CHECK operand and run the job again to perform the ACCEPT.

**Note:** The GROUPEXTEND operand indicates that SMP/E accepts all requisite SYSMODs. The requisite SYSMODS might be applicable to other functions.

**Expected Return Codes and Messages from ACCEPT CHECK:** You will receive a return code of 0 or 4 if this job runs correctly, unless one or more HOLDs was bypassed, in which case you will receive a return code of 4.

**Expected Return Codes and Messages: from ACCEPT** You will receive a return code of 0 or 4 if this job runs correctly, unless one or more HOLDs was bypassed, in which case you will receive a return code of 4.

---

## 6.2 Installing WebSphere Application Server for z/OS V9.0.0 Components

See the following Knowledge Center article for complete instructions on using the sample jobs to install WebSphere Application Server for z/OS V9.0.0 components.

[http://www14.software.ibm.com/webapp/wsbroker/redirect?version=cord&product=was-nd-zos&topic=tins\\_install](http://www14.software.ibm.com/webapp/wsbroker/redirect?version=cord&product=was-nd-zos&topic=tins_install)

See the following Knowledge Center article for complete instructions on using the sample jobs to install IBM HTTP Server for z/OS V9.0. (This is only necessary for z/OS V2R1 customers, since IBM HTTP Server Version 9.0 is included in z/OS V2R2 and above.)

[http://www14.software.ibm.com/webapp/wsbroker/redirect?version=cord&product=ihs-dist&topic=tihs\\_installz](http://www14.software.ibm.com/webapp/wsbroker/redirect?version=cord&product=ihs-dist&topic=tihs_installz)

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### **6.3 Activating WebSphere Application Server for z/OS V9.0.0**

For instructions on how to activate and use WebSphere Application Server for z/OS, including Web server plug-ins V9.0, and the WebSphere Application Server Liberty, see the WebSphere Application Server for z/OS V9.0.0 knowledge center, accessible from this URL:

<http://www.ibm.com/software/webservers/appserv/was/library/>

For instructions on how to activate and use IBM HTTP Server, see the IBM HTTP Server for z/OS V9.0 information center, accessible from this URL:

<http://www.ibm.com/software/webservers/appserv/was/library/>

At this URL, click the V9.0 tab, then find either the WebSphere Application Server for z/OS V9.0.0 or IBM HTTP Server for z/OS V9.0 information centers and click "view page".

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## 7.0 Notices

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very satisfied	<----->				very dissatisfied	not applicable
1	2	3	4	5	N	

	Satisfaction					
Ease of product installation	1	2	3	4	5	N
Contents of Program Directory	1	2	3	4	5	N
Installation Verification Programs	1	2	3	4	5	N
Time to install the product	1	2	3	4	5	N
Readability and organization of Program Directory tasks	1	2	3	4	5	N
Necessity of all installation tasks	1	2	3	4	5	N
Accuracy of the definition of the installation tasks	1	2	3	4	5	N
Technical level of the installation tasks	1	2	3	4	5	N
Ease of getting the system into production after installation	1	2	3	4	5	N

How did you order this product?

- CBPDO
- CustomPac
- ServerPac
- Independent
- Other

Is this the first time your organization has installed this product?

- Yes
- No

Were the people who did the installation experienced with the installation of z/OS products?

- Yes







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