



# Installing z System Development and Test Environment

*Version 11 Release 0*



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# Chapter 1. Installing z System Development and Test Environment

Learn how to install the product.

The installation programs install the z Systems™ Development and Test Environment system, they do not install a z/OS® distribution. A z/OS distribution must either be migrated from a current z/OS system or an existing z/OS system that is running on z Systems Development and Test Environment, or be downloaded from Passport Advantage® and installed separately.

The installation programs must be run from the root user ID.

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## z Systems Development and Test Environment prerequisites

Learn about hardware and software requirements for IBM z Systems Development and Test Environment.

For the latest and most up-to-date hardware and software requirements, you can go to Software Product Compatibility Reports and generate the reports for hardware and software requirements. Hardware and software requirements are also documented in the zPDT® Guide and Reference.

### Hardware provisioning

Learn about the hardware systems that can be used for z Systems Development and Test Environment.

#### PC System

A range of personal computer systems and Linux distributions can be used for z Systems Development and Test Environment. These configurations change over time, due to frequent personal computer hardware advances and new Linux releases. As a general statement, zDT works with any modern Intel compatible processor that is fully supported by the recommended Linux distributions.

The following sections list the hardware and software requirements to install and run z Systems Development and Test Environment. Ensuring your PC meets these requirements is the first step in installing z Systems Development and Test Environment. These requirements are a sufficient guide for that process, assuming your PC is dedicated to Linux. The zPDT Guide and Reference gives additional information that can be valuable. It lists the PC hardware that was used to test zPDT Version 1 Release 6, gives more detailed guidelines on the hardware and software requirements, and gives some considerations if either your PC is not dedicated to Linux or it runs in a virtual environment. For more information, see section 2.4, “Base configurations” and chapter 5, “zPDT installation” in the *zPDT Guide and Reference*.

#### USB Hardware Device

A USB hardware device is required for z Systems Development and Test Environment Personal Edition and releases before v10.0.

When licensing by using a USB hardware device, z Systems Development and Test Environment requires access to a USB hardware device that is activated with a license key called an update file. The USB hardware device is ordered through Passport Advantage in a media pack that is separate from the electronic media that contains the offering software. It can be connected directly to the USB port on a computer that is hosting the offering or it can be plugged in to the USB port of a separate computer, that is called a Sentinel Hardware Keys (SHK) license server and hosts the offering for distributing authentication to remote instances of the product through a TCP/IP network. Ideally, the USB hardware device is ordered at the same time as z Systems Development and Test Environment, or you are already running a separate computer that is acting as a license server.

Even in its simplest environment, which is a single USB hardware device that is connecting to a single PC that hosts z Systems Development and Test Environment, you must consider several issues. USB hardware devices must be activated. Depending on the type of license, the USB hardware device or a license manager must be activated with the number of CPs needed for all instances that use that device. The license key files have expiration dates, and they can interact with Rational® tokens. In more complex environments, license servers can be activated. For an in-depth explanation of software-based licensing and USB hardware device planning, acquisition, and activation, see Enabling product operation.

## **Software Based license - License Manager instance on cloud Machine or VM Machine**

Software based License Manager is introduced in IBM z Systems Development and Test Environment v10.0 and enables licenses to be obtained from software files.

When you use software-based licensing, z Systems Development and Test Environment requires access to a license manager that is activated with a software-based license key file to control the licensee's access to all or portions of the program. The license manager, sometimes referred as a software-based license server, manages all software-based license key files. License key files are obtained from the Rational License Key Center, and are specific to a customer account.

Each license key file is generated with a number of entitled emulated central processors which are referred as Central Processors or CPs. A single instance of z Systems Development and Test Environment requires at least 1 CP, and can run with a maximum of eight CPs. The number of CPs needed depends on the number of users, the types and amount of processing required.

The software-based license key file that is generated by the Rational License Key Center is called a license manager update file. It is created by the Rational License Key Center for a specific license manager, and only that license manager can be activated with that license manager update file. A license manager is activated with only one license manager update file. To change the number of entitled emulated CPs on a license manager, or to renew a software-based license key that is currently installed on a license manager, you must first return the license key, and then generate a new one. A single activated license manager can authenticate many instances of z Systems Development and Test Environment. The number of instances that can be authenticated varies based on the number of emulated Central Processors or CPs used in each instance.

When an instance of the offering starts, it seeks an activation from the license manager for the number of CPs specified in the emulator's device mapping file.

When an instance of the emulator is stopped, the CPs authenticated by the license manager become available for another instance. The activated license manager must remain available to the instance while the instance is running.

**Note:** License manager needs to be a static resource in any infrastructure configuration. In a virtualized or cloud infrastructure, it does not tolerate physical moving. If the license manager is manually or automatically moved inside the infrastructure, it will stop working. If you would like to move the License Manager, you need to return the license before moving, acquire the license after movement, and configure the License manager again.

## Hardware requirements

Learn about the hardware platforms that are supported by z Systems Development and Test Environment.

### z Systems Development and Test Environment instance

#### Hardware platforms that are supported:

- 64-bit x86 Intel or compatible servers

#### Minimum processor rating:

- As a general statement, zPDT works with any modern Intel processor that is fully supported by the recommended Linux distributions

#### Processor core requirement:

- The hardware or virtual machine system must have at least 1 more PC core than the total number of z Systems CPs for all concurrently running zPDT instances. The number of z Systems CPs allowed for each instance is defined in the processor statement of the device map for each instance, requiring a minimum of 1 CP and a maximum of 8 CPs. For an example of the processor statement, see Defining the device map.
- For standard installations, the following configuration is recommended: a 4-Core system with one core that is devoted to Linux and three cores that are devoted to z/OS.
- For Sysplex installations, use this configuration: an 11-Core system with three cores that are devoted to Linux and eight cores that are devoted to z/VM<sup>®</sup> and its guests.

#### Memory requirement:

- You need PC memory of *at least* 1 GB larger than the intended size of the emulated z Systems memory for ALL the concurrently running zPDT instances. The size of the z Systems memory to be used for zPDT operation is defined in the memory statement of the device map for each instance. 2 GB is a bare minimum for z Systems memory. 2 GB to 4 GB per emulated CP is a more realistic starting point.
- For the sysplex capability, because extra memory is required for z/VM, the coupling facility, and multiple z/OS guests, a minimum of 16 GB is needed.

Because z Systems Development and Test Environment reserves the full amount of physical memory that is assigned to the virtual z Systems machine, ensure that you have at least as much physical memory as your virtual z Systems machine requires, plus 1 GB for Linux.

#### Removable media requirements:

- If you are not using a product license server or a license manager, a suitable USB port must be available for the 1091 hardware key. Do not use an unpowered USB port expander when you are using zPDT. In particular, do not install the USB Hardware Device in an unpowered USB port expander. (The product license server, sometimes called a product license server, is described in zPDT license servers, and provides an alternative way to manage the device.)

#### **Hard disk requirements:**

50 GB to 100 GB of disk space is required for z/OS. The minimum required available disk space is twice the total required memory that is defined for the server instance. If you are using the sysplex capability, an extra 54 GB of disk space is required to hold the z/VM software distribution. Depending on how much software you load into each z/OS system that is running in a parallel sysplex configuration, you might need up to 220 GB per z/OS system.

#### **Other hardware requirement:**

- Disable Hyper-threading (if available) at the BIOS level. Hyper-threading can produce extreme slowdowns when z/OS is running spinloops. If many PC cores are available the slowdowns might be resolved before z/OS console messages are produced, indicating no problem other than reduced performance.

### **Product license server or license manager**

When you activate the product with a USB hardware device, one option for making the license key files available to the program is to set up a remote license server and use network communications to enable independent installations of z Systems Development and Test Environment to be authenticated by a single server. Otherwise, each machine that is hosting z Systems Development and Test Environment requires a hardware device to be installed locally to make it available to the program.

Setting up a product license server to authenticate with a high capacity USB hardware device involves installing z Systems Development and Test Environment on a platform and installing a license key file, which is also called an update file, on a USB hardware device on the license server. The product license server must then be started and the clients must be configured to access it. For more information, see Quick setup instructions for using and migrating the product license server.

With software-based licensing, you can authenticate without a USB hardware device. Setting up a license manager to authenticate software-based licenses involves installing the z Systems Development and Test Environment license manager on a platform, starting the license manager, and installing a license key file on the license manager to activate it. The clients that use the license manager must then be configured to access it, and the license manager client function must be started. For more information, see Software-based licensing.

The systems that host the product license server or the license manager have a different set of requirements.

#### **Hardware platforms that are supported:**

- 64-bit x86 Intel or compatible servers

#### **Minimum processor rating:**



- 2.0 GHz or higher Intel Core 2 Duo, Generation 1 Intel i3, or equivalent processor required

**Memory requirement:**

- 2 GB of RAM is required.

**Hard disk requirements:**

- 12 GB of disk space is required for Linux and workspace.

**Removable media requirements:**

- If you are using a product license server, a suitable USB port must be available for the 1091 hardware key. Do not use an unpowered USB port expander when you are using zPDT. In particular, do not install the USB Hardware Device in an unpowered USB port expander. (The product license server, sometimes called a product license server, is described in zPDT license servers, and provides an alternative way to manage the device.)

## Software requirements

Learn about software requirements for z Systems Development and Test Environment

### **z Systems Development and Test Environment instance**

With z Systems Development and Test Environment, you can install the product directly on the operating system that is running on a supported hardware platform (native installations), or you can install the product on a supported operating system that is running in a supported virtualization environment (virtual installations). These operating systems and platforms are required:

**Operating System requirements for native installations:**

- Red Hat Enterprise Linux (RHEL) 6.0 or later minor release
- Red Hat Enterprise Linux (RHEL) 7.0 or later minor release
- Ubuntu 16.04.2 LTS or later minor release

**Operating System platforms that are supported for virtual installations:**

- Red Hat Enterprise Linux (RHEL) 6.0 or later minor release
- Red Hat Enterprise Linux (RHEL) 7.0 or later minor release
- Ubuntu 16.04.2 LTS or later minor release

You can run on later releases within each version. The recommended Linux version is RHEL 7.0 and Ubuntu 16.04.2 LTS. If problems are encountered, support for releases within the supported version is provided.

**Virtualization Technologies supported:**

- VMWare ESXi 5.1
- Support for KVM kernel modules
- Support for XEN hypervisor.

VMWare ESXi 5.1 must be run on 64-bit Intel compatible hardware.

Directly attached SCSI tape drives are not supported by z Systems Development and Test Environment within any virtualized environment.

When you are running z Systems Development and Test Environment in a virtual environment, you must have sufficient physical memory and processor cores to completely provision each instance of z Systems Development and Test Environment.

- For each instance of z Systems Development and Test Environment, the machine that is running your virtualization software must have one physical core for each CP in the instance, plus one physical core for Linux.
- Physical memory on the machine that is running the virtualization software must be sufficient to contain the total memory of all z Systems Development and Test Environment instances.
- Processors and memory that is used for virtual machines that are running z Systems Development and Test Environment are considered dedicated to z Systems Development and Test Environment. Careful planning must be done if other virtual machines are to run on the same hardware.
- Failure to provide sufficient physical processors and memory, or the over-commitment of memory or processor cores, might lead to severe performance problems and might cause unpredictable errors, or errors that are difficult to diagnose.

## **Product license server or license manager**

### **Operating System requirements:**

- Red Hat Enterprise Linux (RHEL) 6.0 or later minor release
- Red Hat Enterprise Linux (RHEL) 7.0 or later minor release

### **Virtualization Technologies supported:**

- VMWare ESXi 5.1
- Support for KVM kernel modules (packaged with supported levels of RHEL)

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## **Configuring the base Linux system**

Install a supported Linux distribution, including the 32-bit runtimes.

To configure Linux to install and run z Systems Development and Test Environment:

- Disk Planning

Create at least three partitions for the hard disk drive:

- One for the root partition, containing all the normal root directories such as /usr, /lib, /home, /etc. Make this partition 10 - 20 GB.
- One for a swap partition for Linux. Make this partition 4 GB or larger.
- A large partition for emulated z Systems volumes and any other user data.

This suggested disk layout usage is not required. It is a starting point solely because it is simple and it isolates emulated z Systems volumes from the normal Linux files. This isolation is useful if you reinstall Linux (without disturbing your emulated volumes) and it might have minor performance benefits because it tends to reduce fragmentation in the disk space that is used for large emulated volumes.

Disk images for z/OS can be on any partition with sufficient space. When you install Linux, a separate partition for user data, including disk images, is needed

so that data is not lost during Linux system maintenance or upgrades. Disk space requirements depend on the number of z/OS volumes you use. If most of your z/OS volumes are 3390-3 images, a minimum amount of disk space that is required by the Development and Test Environment operation can be approximated by the calculation

$(3 \text{ GB} \times (\text{number of volumes})) + (2 \times (\text{memory in your z/OS machine}))$

These examples assume that you are running z Systems Development and Test Environment under the user ID of `ibmsys1`.

Most of the z Systems Development and Test Environment related files that are mentioned in the customization scenario are stored within the `ibmsys1` home directory. The scripts are in `/home/ibmsys1/z`, and the virtual 3390 volumes are stored in `/home/ibmsys1/z1090/disks`. The directory structure `home/ibmsys1/z1090/disks` was used because that directory structure complies with the structure created when you start the z Systems Development and Test Environment. The hardware clock was set to use Coordinated Universal Time (UTC) because that is required by the USB hardware device. The Linux user ID that was used is `ibmsys1`.

- **Important:** You must include Linux 32-bit support, which is an option during Linux installation. Before you install z Systems Development and Test Environment, you must ensure that the 32-bit runtime libraries in Linux are installed. These runtime libraries can be installed as part of the installation of Linux or can be added later by installing the `libstdc++ 32-bit` package for your Linux distribution. Currently, Red Hat distributions do not install the 32-bit libraries during a default installation.

Use the Linux command `rpm -qa | grep libstdc` to verify the 32-bit runtime library installation. If you see rpms with the name `libstdc` in formats similar to the following, then 32-bit runtime libraries are installed. Formats vary based on operating system.

```
libstdc++xx-32bit
libstdc++xx-*32bit
libstdc++-xx-xx.i686.rpm
libstdc++*.i686.rpm
```

After you finish installing z Systems Development and Test Environment, one of the final steps is to run the `z1090instcheck` command. This command verifies the proper Linux 32-bit runtime libraries are installed.

- If you are using software-based licensing, the license manager and the license manager client function also require a 32-bit version of the Linux `glibc` libraries. Before you install the license manager or start the license manager client on an instance of z Systems Development and Test Environment, you must ensure that the 32-bit versions of the Linux `glibc` libraries are installed.

These `glibc` libraries can be installed as part of the installation of Linux or can be added later by installing the `glibc-32bit` package for your Linux distribution. Currently, Red Hat distributions do not install the 32-bit libraries during a default installation.

Use the Linux command `rpm -qa | grep glibc-32bit` to verify the 32-bit `glibc` library installation. If you see rpms with the name `glibc` in formats similar to the following, then the 32-bit `glibc` library is installed. Formats vary according to operating system and level.

```
Glibc.i686
Glibc-32bit
```

- **System Time**

Set your hardware clock to UTC time to avoid problems when Daylight Saving Time starts and stops. The USB Hardware Device is sensitive to the hardware clock time and does not operate if the time appears to move backward. If the machine is shared with another operating system that expects local time (instead

of UTC time), you might experience a one-hour non-operational time when you shift from Daylight Saving Time to standard time.

- Install a TN3270e client for the MVS™ console

The following TN3270e clients are examples of clients that can be used with the recent z Systems Development and Test Environment offerings:

- x3270 (recent versions)
- Recent Personal Communications releases (running on Windows systems)

The most commonly used TN3270e client is x3270 running on the native Linux host. This client is used in the sample start script for z Systems Development and Test Environment. Frequently, it is not included with Linux distributions. An x3270 package is usually a single rpm, such as:

```
x3270-3.2.20-467.1.x86_64.rpm
```

**Note:** Other x3270 levels can be used or another 3270 emulator can be used for the MVS console. Also, 3270 emulators can be used for the MVS console that are installed remotely, and remove the need to have a 3270 emulator on the native Linux. For more information, see IPLing z Systems Development and Test Environment from a remote emulated terminal for the system console.

- Firewall considerations

You must manage whatever firewall and other security functions that you install with your Linux. Initially disabling any firewall when first working with zPDT simplifies configuration and operation. After you are familiar with zPDT operation, you can reestablish the firewall functions. If you have external TCP/IP connections (for example, local 3270 connections, OSA connections, product license server or license manager connections, or CTC connections) you must provide appropriate port *holes* in any firewall you use.

Paragraph 13.15, “TCP/UDP ports” in the zPDT Guide and Reference, describes the ports that are used for normal zPDT operations. Port 1947 is also used by the license manager, and must be allowed through the firewall. If your firewall is based on iptables (as is common for most current Linux releases), commands such as those shown in the following example might be used. This example is for setting a rule to allow any emulated local 3270 session traffic through the firewall, and then displaying the rules for the filter table afterward

```
$ su (switch to root)
# iptables -I INPUT -p tcp --dport 3270 -j ACCEPT
# iptables -L -n
# exit (leave root)
```

These commands would need to be entered from a *root* user ID each time the server Linux system is started, and you want to pursue some form of automation for entering these commands. Depending on how you connect z/OS to the external network, you might also need to provide appropriate port *holes* in your firewall to allow traffic to access z/OS ports, or you might need to use Network Address Translation functions in your firewall for this traffic.

The customizations described in this Guide eliminate the need to modify your firewall for z/OS ports. For more information, see Setting up TCP/IP.

For more considerations for Linux installation and configuration, see chapter 5.2, “Linux installation” in the zPDT Guide and Reference.

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## Migrating from previous version of z Systems Development and Test Environment

If migrating from z Systems Development and Test Environment V10.0, 10.0.1, or migrating from Rational Development and Test Environment version 9.5 or earlier, you must uninstall the previously installed version, and then install z Systems Development and Test Environment version 11.0.

Use the following two steps to uninstall a previous version, and then install z Systems Development and Test Environment version 11.0.

1. To uninstall the older version of z Systems Development and Test Environment, see “Uninstalling a previous version of z Systems Development and Test Environment” on page 10
2. To install z Systems Development and Test Environment v11.0, see Chapter 1, “Installing z System Development and Test Environment,” on page 1

**Note:** z Systems Development and Test Environment Tools doesn't support older version of z Systems Development and Test Environment. So, to use z Systems Development and Test Environment Tools, you need to uninstall older version of z Systems Development and Test Environment and install z Systems Development and Test Environment V11.0.

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## Uninstalling a previous version of z Systems Development and Test Environment

Learn how to uninstall a previous version of z Systems Development and Test Environment.

To uninstall any supported version, use the following steps.

Version 9.0 or above	<ul style="list-style-type: none"><li>• Stop any currently active instance of z Systems Development and Test Environment.<ul style="list-style-type: none"><li>– To stop a base instance of z Systems Development and Test Environment, see Starting and stopping z Systems Development and Test Environment.</li><li>– To stop a license manager, see Stopping and uninstalling the license manager.</li><li>– If you are running a product license server:<ol style="list-style-type: none"><li>1. Enter the <b>uimserverstop</b> command from the user ID that started the UIM server on the product license server. Do not enter this command as root.</li><li>2. Enter these two commands to stop the product license server:<pre># cd /opt/safenet_sentinel/common_files/sentinel_k # ./loadserv stop</pre></li></ol></li></ul></li><li>• Start Installation Manager</li><li>• Select <b>Uninstall</b></li><li>• Select the Installation package for Rational Development and Test Environment for z Systems</li><li>• Select <b>Uninstall</b></li><li>• Uninstall Installation Manager</li></ul>
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Version 8.5	<ul style="list-style-type: none"> <li>• Stop any currently active instance of Rational Development and Test Environment for z Systems</li> <li>• From a Linux console that is running as root, go to the directory that contains Rational Developer for z Systems Unit Test. The default installation directory is /tmp/IBM® Rational Development and Test Environment for z Systems V8.5.x where x is the version that is installed.</li> <li>• Go to the subdirectory entitled Uninstall_IBM Rational Development and Test Environment for z Systems V8.5.x</li> <li>• Run the command ./'Uninstall IBM Rational Development and Test Environment for z Systems V8.5.x' This command starts an InstallAnywhere uninstall wizard.</li> <li>• When the wizard finishes, you see the message “All items were successfully uninstalled”</li> </ul>
Version 8.0	<ul style="list-style-type: none"> <li>• Stop any currently active instance of Rational Development and Test Environment for z Systems</li> <li>• From a Linux console that is running as root, go to the directory that contains Rational Developer for z Unit Test. The default installation directory is /tmp/Rational Developer for z Unit Test V8.0.x where x is the version that is installed.</li> <li>• Go to the subdirectory entitled Uninstall_Rational Developer for z Unit Test V8.0.x</li> <li>• Run the command ./"Uninstall_Rational Developer for z Unit Test V8.0.x". This command starts an InstallAnywhere uninstall wizard</li> <li>• When prompted, select to do a complete uninstall</li> <li>• When the wizard finishes, you see the message “All items were successfully uninstalled”</li> </ul>

**Note:** z Systems Development and Test Environment Tools doesn't support older version of z Systems Development and Test Environment. So, to use z Systems Development and Test Environment Tools, you need to uninstall older version of z Systems Development and Test Environment and install z Systems Development and Test Environment V11.0.

Uninstalling a version of z Systems Development and Test Environment and then reinstalling a newer version does not affect any previously installed z/OS distribution. In other words, any existing z/OS distribution that runs with one level of z Systems Development and Test Environment runs with a newer version, without requiring any form of reinstallation of the z/OS volumes. The z/OS

volumes store all of the customizations and data from the last time the distribution was run. The DEVMAP developed for running with that z/OS distribution on the older version runs unchanged with the newer version. For more information, see Defining the device map.

For information about uninstalling the license manager, see Stopping and uninstalling the license manager.

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## Installing z Systems Development and Test Environment interactively

Learn how to install the product interactively.

In order to install the product, you need to acquire the z Systems Development and Test Environment image from Passport Advantage. Download the package to your desired directory. Please remember you should have proper accesses to the directory to run the program. If not, change the access level of directory or installation file using the following Linux command:

```
chmod 755 <file name> or <directory name>
```

### Installing z Systems Development and Test Environment Personal Edition

Learn how to install z Systems Development and Test Environment Personal Edition interactively.

To install z Systems Development and Test Environment Personal Edition interactively, follow these steps:

1. Go to the directory where installation program is present.
2. Execute the following command

```
./zDT_Install.x86_64
```

Then the following menu is displayed.

```
The following products can be installed/updated/uninstalled. Please select one:
  1) IBM® z Systems Development and Test Environment Personal Edition
  2) IBM® z Systems Development and Test Environment License Manager
  3) IBM® z Systems Development and Test Environment Tools
==> _
```

3. Type **1** to select IBM z Systems Development and Test Environment Personal Edition to install. Then the following menu is displayed.

```
What do you want to do with IBM® z Systems Development and Test Environment Personal Edition?
  1) Install
  2) Update
  3) Uninstall
```

4. Type **1** to install the product.
5. Press ENTER, and read the license agreements carefully. Then at the end of license, enter 'Yes' to accept or 'No' to decline the terms.

```
If you accept the terms in the license agreements, type 'yes' and then ENTER
If you do not accept the terms in the license agreements, type 'no' and then ENTER
```

To install the network configurations. Select "Yes" when the following message is displayed. By selecting Yes, your z/OS will start using the IP of your Linux machine. This option is useful, if you want to share your Linux IP address with your z/OS. Without providing a dedicated and static IP address to z/OS, you



can interact with your z/OS and applications directly. Also, before selecting "Yes", consider that the network configuration will make changes in your Linux and networking functions, allow Linux firewall to reroute TCP/IP packets to z/OS, and update the TCP/IP specifications in the z/OS disks.

Do you want to install Network Configuration for IBM® z Systems Development and Test Environment Personal

**Important:** Remember to download the volumes of ADCD May 2017 edition from passport advantage and unzip the \*.gz volume on the same machine where you are performing the installation of z Systems Development and Test Environment v11.

6. Wait for the installation to complete.
7. Run following command to see if installation is successful.

```
RHEL
rpm -qa | grep z1091
rpm -qa | grep shk-server
rpm -qa | grep sntl-sud
UBUNTU
dpkg -l | grep z1091
dpkg -l | grep shk-server
dpkg -l | grep sntl-sud
```

You should get the output respectively as below.

```
z1091-1-7.49.31.01.x86_64
zpdtd-shk-server-1.3.1.5-0.i386
sntl-sud-7.5.5-0.i386
```

**Note:** The above procedure needs to be executed from root User ID.

## Installing z Systems Development and Test Environment License Manager

Learn how to install z Systems Development and Test Environment License Manager interactively.

To install z Systems Development and Test Environment License Manager interactively, follow these steps:

1. Go to the directory where installation program is present.
2. Execute the following command

```
./zDT_Install.x86_64
```

Then the following menu is displayed.

```
The following products can be installed/updated/uninstalled. Please select one:
  1) IBM® z Systems Development and Test Environment Personal Edition
  2) IBM® z Systems Development and Test Environment License Manager
  3) IBM® z Systems Development and Test Environment Tools
==> _
```

3. Type 2 to select IBM z Systems Development and Test Environment License Manager to install. Then the following menu is displayed.

```
What do you want to do with IBM® z Systems Development and Test Environment License Manager?
  1) Install
  2) Update
  3) Uninstall
```

4. Type 1 to install the product.

5. Press ENTER, and read the license agreements carefully. Then at the end of license agreements, enter 'Yes' to accept or 'No' to decline the terms.

If you accept the terms in the license agreements, type 'yes' and then ENTER  
If you do not accept the terms in the license agreements, type 'no' and then ENTER

6. Wait for the installation to complete.
7. Read the following warning message carefully.

\*\*\*\*\*Warning\*\*\*\*\*  
License manager needs to be a static resource in any infrastructure configuration. In a virtualized or cloud infrastructure, it does not tolerate physical moving. If the license manager is manually or automatically moved, return the license before moving, acquire the license after movement, and configure the License Manager again.  
Do you accept the above terms?(y/n)

8. Run following command to see if installation is successful.

```
RHEL
rpm -qa | grep aksusbd
rpm -qa | grep UIM
UBUNTU
dpkg -l | grep aksusbd
dpkg -l | grep UIM
```

You should get the output respectively as below

```
aksusbd-7.40-1.i386
UIM-1-7.49.31.01.x86_64
```

**Note:** The above procedure needs to be executed from root User ID.

---

## Installing IBM z Systems Development and Test Environment silently

Learn how to install the product silently.

In order to install the product, you need to acquire the z Systems Development and Test Environment image from Passport Advantage. Download the package to your desired directory. Please remember you should have proper accesses to the directory to run the program. If not, change the access level of directory or installation file using the following Linux command:

```
Chmod 755 <file name> or <Directory Name>
```

**Note:** If you install silently, you will not see the option to review the license. Installation process assumes that you have reviewed the license before installation. Read the license as in the installation media or use command line installation option.

## Installing z Systems Development and Test Environment Personal Edition

Learn how to install z Systems Development and Test Environment Personal Edition silently.

To install z Systems Development and Test Environment Personal Edition silently, follow these steps:

1. Go to the directory where installation program is present.
2. Execute the following command

```
./zDT_Install.x86_64 --install --zdtpedition
```

**Note:** If you install silently, you will not see the option to review the license. Installation process assumes that you have reviewed the license before installation. Read the license as in the installation media or use command line installation option.

3. Execute the following command to install the personal edition with automated network installation.

```
zDT_Installx86_64 --install --zdtpeidition --net
```

**Important:** Remember to download the volumes of ADCD May 2017 edition from passport advantage and unzip the \*.gz volume on the same machine where you are performing the installation of z Systems Development and Test Environment v11.

4. Run the following command to see if installation is successful.

```
RHEL
rpm -qa | grep z1091
rpm -qa | grep shk-server
rpm -qa | grep sntl-sud
UBUNTU
dpkg -l | grep z1091
dpkg -l | grep shk-server
dpkg -l | grep sntl-sud
```

You should get the output respectively as below.

```
z1091-1-7.49.31.01.x86_64
zpdtt-shk-server-1.3.1.5-0.i386
sntl-sud-7.5.5-0.i386
```

**Note:** The above procedure needs to be executed from root User ID.

## Installing z Systems Development and Test Environment License Manager

Learn how to install z Systems Development and Test Environment License Manager silently.

To install z Systems Development and Test Environment License Manager silently, follow these steps:

1. Go to the directory where installation program is present.
2. Execute the following command

```
./zDT_Install.x86_64 --install --zdtlicense
```

**Note:** If you install silently, you will not see the option to review the license. Installation process assumes that you have reviewed the license before installation. Read the license as in the installation media or use command line installation option.

3. Run following command to see if installation is successful.

```
RHEL
rpm -qa | grep aksusbd
rpm -qa | grep UIM
UBUNTU
dpkg -l | grep aksusbd
dpkg -l | grep UIM
```

You should get the output respectively as below

```
aksusbd-7.40-1.i386
UIM-1-7.49.31.01.x86_64
```

**Note:** The above procedure needs to be executed from root User ID.

---

## Updating IBM z Systems Development and Test Environment

Learn how to use graphical user interface or silent install method to update the product.

In order to update the product, please remember you should have proper accesses to the directory to run the program. If not, change the access level of directory or installation file using the following Linux command:

```
Chmod 755 <file name> or <Directory Name>
```

### Updating z Systems Development and Test Environment interactively

Learn how to update the product interactively.

To update the product interactively, follow these steps:

1. Go to the directory where installation program is present.
2. Execute following command.

```
./zDT_Install.x86_64
```

Then the following menu is displayed.

```
The following products can be installed/updated/uninstalled. Please select one:
  1) IBM® z Systems Development and Test Environment Personal Edition
  2) IBM® z Systems Development and Test Environment License Manager
  3) IBM® z Systems Development and Test Environment Tools
==> _
```

3. Type the corresponding numbers (1, 2, 3) to select the product to update.
4. Type 2 to update the selected product in step 3.
5. Press ENTER, and read the license agreements carefully. Then at the end of license, Enter 'Yes' to accept or 'No' to decline the terms.

```
If you accept the terms in the license agreements, type 'yes' and then ENTER
If you do not accept the terms in the license agreements, type 'no' and then ENTER
```

6. Wait for the process to get finish.

**Note:** This process of uninstall or update is valid only for IBM z Systems Development and Test Environment version 11 or above. For lower IBM z Systems Development and Test Environment or RD&T version, follow respective documentation.

### Updating z Systems Development and Test Environment silently

Learn how to update the product silently.

To update the product silently, follow these steps:

1. Go to the directory where installation program is present.
2. Use program usage:

```
./zDT_Install.x86_64 --update --<product>
```

where '<product>' can be one of the following:

**zdtpeedition**

IBM z Systems Development and Test Environment Personal Edition

### **zdtlicense**

IBM z Systems Development and Test Environment License Manager

### **zdttools**

IBM z Systems Development and Test Environment Tools

3. Wait for the process to complete.

**Note:** This process of uninstall or update is valid only for z Systems Development and Test Environment version 11 or above. For lower z Systems Development and Test Environment or RD&T version, follow respective documentation.

---

## **Uninstalling IBM z Systems Development and Test Environment**

Learn how to use interactive or silent method to uninstall the product.

In order to uninstall the product, please remember you should have proper accesses to the directory to run the program. If not, change the access level of directory or installation file using the following Linux command:

Chmod 755 <file name> or <Directory Name>

### **Uninstalling z Systems Development and Test Environment interactively**

Learn how to uninstall the product interactively.

To uninstall the product interactively, follow these steps:

1. Go to the directory where installation program is present.
2. Execute following command.

```
./zDT_Install.x86_64
```

Then the following menu is displayed.

```
The following products can be installed/updated/uninstalled. Please select one:
  1) IBM® z Systems Development and Test Environment Personal Edition
  2) IBM® z Systems Development and Test Environment License Manager
  3) IBM® z Systems Development and Test Environment Tools
==> _
```

3. Type the corresponding numbers (1, 2, 3) to select the product to uninstall.
4. Type **3** to uninstall the selected product in step 3.
5. Wait for the process to get finish.

**Note:** This process of uninstall or update is valid only for z Systems Development and Test Environment version 11 or above. For lower z Systems Development and Test Environment or RD&T version, follow respective documentation.

### **Uninstalling z Systems Development and Test Environment silently**

Learn how to uninstall the product silently.

To uninstall the product silently, follow these steps:

1. Go to the directory where installation program is present.
2. Use program usage:

```
./zDT_Install.x86_64 --uninstall --<product>
```

where '<product>' can be one of the following:

**zdtpedition**

IBM z Systems Development and Test Environment Personal Edition

**zdtlicense**

IBM z Systems Development and Test Environment License Manager

**zdttools**

IBM z Systems Development and Test Environment Tools

3. Wait for the process to complete.

**Note:** This process of uninstall or update is valid only for z Systems Development and Test Environment version 11 or above. For lower z Systems Development and Test Environment or RD&T version, follow respective documentation.

---

## After you install z Systems Development and Test Environment

After you install z Systems Development and Test Environment, you must make minor changes to your kernel configuration and add a few environment variables for the user IDs that are going to run z Systems Development and Test Environment.

After the installation is complete, you must complete these steps before you can enable and start the product.

If you installed the License Manager feature, you must start the UIM Server. For more information, see “Starting the license manager” on page 19.

If you installed the base z Systems Development and Test Environment and not the License Manager feature, you must add a few lines to `/etc/sysctl.conf` and `$HOME/.bashrc` on your Linux system. These updates can be made by using the two zPDT commands **aws\_sysctl** and **aws\_bashrc**. For more information about these two commands, see the following topics. The zPDT Guide and Reference includes additional information to consider, based on your specific Linux installation.

### Updating `/etc/sysctl.conf`

Run the **aws\_sysctl** zPDT command to update several of the Linux kernel parameters in `etc/sysctl.conf` that allow for zPDT execution.

Run the `aws_sysctl` zPDT command from root:

```
# /usr/z1090/bin/aws_sysctl
```

This command updates several of the Linux kernel parameters in `etc/sysctl.conf` that allow for zPDT execution, and then runs `/sbin/sysctl` to put them in effect. When prompted, enter yes to proceed. These changes are sufficient for most zPDT users. For the details on which parameters are updated, and which parameters might require change for especially large zPDT instances, see the *zPDT Guide and Reference* (SG24-8205).

### Updating `$HOME/.bashrc`

Run the **aws\_bashrc** command to update the `.bashrc` file in the home directory of the user IDs that run z Systems Development and Test Environment.

After you update the `/etc/sysctl.conf` file, you must update the `.bashrc` file in the home directory of the user IDs that run z Systems Development and Test Environment. Because it is assumed that you are running as `ibmsys1`, from the `/home/ibmsys1/` directory, run the following zPDT command as follows:

```
$ /usr/z1090/bin/aws_bashrc
```

This command adds the appropriate zPDT PATH statements and updates some user limits in `.bashrc` to allow zPDT execution. When prompted, enter `yes` to proceed. See the zPDT Guide and Reference for the details on which statements are added or updated.

Double-check the entries in these Linux files. Errors here might be difficult to detect later.

After the `.bashrc` file is updated for a user ID, and a new Linux console is started for that user ID to activate those changes, any zPDT commands that can be validly run by that user ID can be run from any directory. These commands include the ones that are identified in the IBM Knowledge Center, such as the `z1090instcheck` command, and the commands that are identified in the zPDT Guide and Reference.

**Note:** You must be in the `/usr/z1090/bin` directory to enter the zPDT commands that are run from root.

## Checking the installation

After you update `$HOME/.bashrc`, start a new Linux console as user `ibmsys1` to activate the changes and run the `z1090instcheck` command.

If the command result shows errors, fix the errors before proceeding. The zPDT Guide and Reference contains more detailed information on the output that is returned from this command.

**Note:** The `z1090instcheck` instruction works for both z1090 machine types and z1091 machine types. There is no `z1091instcheck` instruction.

## Starting the license manager

If you installed the License Manager feature, the license manager function is automatically started. However, you must start the UIM server, generate and install software-based license key files, and configure the license manager clients to access those keys.

For the remaining steps to configure the license manager and clients, see these topics:

- Installing and starting the license manager
- Activating a license manager
- Activating and configuring a license manager client

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## Installing Rational Test Control Panel 9.1.0

z Systems Development and Test Environment includes access to the e-assembly for Rational Test Control Panel 9.1.0, one of the components of Rational Integration Tester.

Using Rational Integration Tester, you can test applications on IBM z/OS systems by using the mainframe support capabilities of IBM Rational Integration Tester. For

an overview of Rational Integration Tester, see Rational Integration Tester overview. For an overview of testing applications on z/OS with Rational Integration Tester, see Testing applications on z/OS.

If you already use Rational Integration Tester and want to test applications on z/OS distributions that are running on z Systems Development and Test Environment, download the IBM Rational Integration Test Control Panel V9.1.0 e-assembly and install it. While Rational Test Control Panel itself does not run on z/OS, it is required to download the Rational Integration Tester tool packages needed for all supported z/OS testing. For an overview of how the IBM Rational Test Control Panel installation interacts with Rational Integration Tester, see Rational Integration Tester installation topology. For information on how to download the IBM Rational Integration Test V9.1.0 Control Panel Multiplatform Multilingual e-assembly (CN4P7ML), follow the instructions in the *z Systems Development and Test Environment download information technote*. The installation instructions for installing the Rational Test Control Panel from the e-assembly can be found in Installing Rational Test Control Panel.

After you install Rational Integration Test Control Panel V9.1.0, you can then download, install, and configure the appropriate Rational Integration Tester tool packages that are needed for z/OS testing. Rational Integration Tester tool packages describes all available tool packages with installation and configuration instructions. Any of the packages that require z/OS installation or configuration can be installed and configured on the z/OS distribution that is running on z Systems Development and Test Environment.

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## Installing an operating system on z Systems Development and Test Environment

Learn how to install supported operating systems on the z Systems Development and Test Environment machine emulator.

### Installing z/OS volume images

Learn how to install and configure z/OS volume images for z Systems Development and Test Environment. You can install and customize a z/OS distribution, whether it is a migrated customer z/OS system, a z/OS Application Developers Controlled Distribution (ADCD) for z Systems Development and Test Environment, or a z/OS distribution from a previous release of z Systems Development and Test Environment.

**Note:** Any z/OS distribution that is supplied with z Systems Development and Test Environment is a unique distribution that was created specifically for installations that are entitled to z Systems Development and Test Environment, based on the Application Developers Controlled Distribution (ADCD). They are referred to in this IBM Knowledge Center as the z/OS ADCD.

The customizations in this IBM Knowledge Center provide insight into the configuration process and security considerations and result in some additional working subsystems. While you can use any z/OS distribution without implementing these customizations, connectivity to your z/OS system might be limited.

### Obtaining a z/OS distribution

You can obtain a z/OS distribution to run with z Systems Development and Test Environment from three sources.



- If you currently have a z/OS license, you can migrate the z/OS volumes from your z/OS system to your z Systems Development and Test Environment instance.
- You can download from Passport Advantage the z/OS ADCD volumes made available with z Systems Development and Test Environment
- You can use a previous z/OS distribution that runs with an older version of Rational Development and Test Environment for z Systems.

z Systems Development and Test Environment requires every z/OS volume in a z/OS distribution be a Linux file in an emulated 3390 format compatible with zPDT. The z/OS volumes in the z/OS ADCD for z Systems Development and Test Environment and in previous releases of z Systems Development and Test Environment are in the Linux file format. If you migrate volumes from your own z/OS distribution, migration tools are provided for the conversion.

Each method of obtaining the z/OS distribution is described. After it is obtained, any z/OS volume image in the emulated 3390 format can then be transmitted between Linux systems by any available file transfer protocol, such as FTP.

### **Migrating z/OS volumes from a z/OS system:**

You can use several methods to migrate z/OS volumes from your z/OS system to your z Systems Development and Test Environment instance.

One method is to use the migration utility that is supplied in the `/usr/z1090/bin` directory after installation of z Systems Development and Test Environment. This utility uses a client/server approach in which the server transmits the requested z/OS volumes from the z/OS system to the Linux image. The client formats each volume to the emulated 3390 format that is used by zPDT. For information on how to use this migration utility to migrate z/OS volumes, see Chapter 15, DASD Volume Migration, in the zPDT Guide and Reference.

If you already have a running z/OS distribution with z Systems Development and Test Environment, another method of moving z/OS volumes between systems is using the ADRDSSU utility. This method is described in section 12.12, "Moving 3390 Volumes." In this scenario, you can move z/OS volumes to a z/OS system that is running on z Systems Development and Test Environment. After the volumes are moved, they are in the proper emulated format. Chapter 12, "Minor z/OS notes," has other helpful information on how to use a z/OS distribution.

z Systems Development and Test Environment Version offers a new method to migrate z/OS volumes from your z/OS system by using z Systems Development and Test Environment Tools. For more information, see Option 2: Creating an application image from ADCD

### **Installing May 2017 Edition z/OS 2.2 ADCD for z Systems Development and Test Environment:**

Learn how to download and install the z/OS 2.2 Application Developers Controlled Distribution for z Systems Development and Test Environment May 2017 edition.

This z/OS 2.2 distribution is a unique distribution that was created specifically for sites that are entitled to z Systems Development and Test Environment, based on the Application Developers Controlled Distribution (ADCD). It is referred to as the z/OS 2.2 ADCD. It contains many of the products and subsystems you expect in a

z/OS system. For a list of the products, volumes, and information about the system itself, see z/OS 2.2 ADCD for z Systems Development and Test Environment.

Before you install this z/OS 2.2 ADCD, you must first install z Systems Development and Test Environment. For instructions, see Chapter 1, “Installing z System Development and Test Environment,” on page 1. Then do these steps to download and install the z/OS 2.2 ADCD for IBM z Systems Development and Test Environment.

**Important:** Any z/OS ADCD for IBM z Systems Development and Test Environment, and any related software, are supplied as a convenience. IBM does not support the operating system distributions that are made available with z Systems Development and Test Environment. You can apply fixes to any z/OS distribution through normal SMP/E facilities.

*Downloading a z/OS 2.2 ADCD:*

For the steps to download, install, and customize your z/OS ADCD for z Systems Development and Test Environment, select the appropriate version tab and follow the instructions in the z Systems Development and Test Environment download information technote.

The download information technote is available at <http://www.ibm.com/support/docview.wss?uid=swg21682519>.

z/OS 2.2 ADCD for z Systems Development and Test Environment describes what volumes can be downloaded with this distribution and their general contents. To reduce the amount of disk space you use, you can download and install only the volumes that are required and the subsystems you use. In particular, the volume images for CICS®, IMS™, DB2®, and WebSphere® Application Server products can be selectively installed as required, choosing which products and which releases are appropriate for your needs. To determine the subsystems that are contained on each volume, see the description of each volume. Download and install the volumes on the instance that runs z Systems Development and Test Environment.

At a minimum, install all the base z/OS products, which are all the volume images that are not associated with the following products:

- CICS 5.3, and 5.2
- IMS versions 14 and 13
- DB2 version 12 and 11
- WebSphere Application Server versions 9.0 and 8.5

This set of volumes includes the base z/OS products:

- SARES1, D2RES1, D2RES2, D2CFG1, D2SYS1, D2USS1, D2USS2, D2PRD1, D2PRD2
- D2PRD3, D2DIS1, D2DIS2, D2PAGA, D2PAGB, D2PAGC, D2KAN1, D2BLZ1

Most of the z Systems Development and Test Environment related files that are mentioned in the customization scenario are stored within the ibmsys1 home directory. This IBM Knowledge Center assumes that the 2 MVS IPL volume images, with file extension ZPD, are downloaded into the directory structure /home/ibmsys1/z1090. The remaining virtual 3390 volumes, with file extension gz, are downloaded into the directory structure /home/ibmsys1/z1090/disks. Any z Systems Development and Test Environment scripts are assumed in

/home/ibmsys1/z. The directory structure home/ibmsys1/z1090/disks was used because that directory structure complies with the structure created when you start the z Systems Development and Test Environment, as described in “Configuring the base Linux system” on page 6.

#### *Installing the z/OS volume images:*

The downloaded z/OS volume images are in the ZPD and gz file extension formats. ZPD files require installation by using the **Z1091\_ADCD\_install** command, and are stored with a name *volser*.ZPD. All other z/OS volume images are compressed files that are stored with a name *volser*.gz, requiring only the **gunzip** command for installation. In both cases, *volser* is a six character volume serial of the z/OS volume. In z/OS Version 2 Release 2, only 2 IPL volume images require installation by using the **Z1091\_ADCD\_install** command: D2RES1.ZPD and SARES1.ZPD.

The process of installing the z/OS volume images is to use the **Z1091\_ADCD\_install** command to install ZPD volume images, and use the **gunzip** command to decompress any other z/OS volumes needed. When installed or decompressed, most volumes are in emulated 3390-9 format, which are approximately 8.5 GB. Run all commands as the user that runs z Systems Development and Test Environment, in this example ibmsys1.

Perform the following two commands to install the ZPD volume images into the /home/ibmsys1/z1090/disks directory:

```
$ Z1091_ADCD_install /home/ibmsys1/z1090/D2RES1.ZPD /home/ibmsys1/z1090/disks/D2RES1
$ Z1091_ADCD_install /home/ibmsys1/z1090/SARES1.ZPD /home/ibmsys1/z1090/disks/SARES1
```

Perform these three commands to decompress all other z/OS volume images in that directory, and give the correct permissions for all z/OS volume image files.

**Note:** For some images, the **gunzip** command might produce a message about an unexpected end of file. If the \*.gz files were correctly downloaded, that message can be safely ignored. Also, the **gunzip** command as shown here deletes the original .gz files. To keep the original file, enter **gunzip -k \*.gz**. The **-k** parameter is available on later versions of **gunzip**.

```
$ cd /home/ibmsys1/z1090/disks
$ gunzip *.gz
$ chmod 755 *
```

All MVS volume images are in /home/ibmsys1/z1090/disks.

Most of these products and subsystems run without any customization, and some need some customization or initialization to make them work. The customizations to establish TCP/IP connectivity and update the infrastructure to allow z/OS 2.2 to properly run on z Systems Development and Test Environment are described in Customizing the May 2017 Edition z/OS 2.2 ADCD for z Systems Development and Test Environment.

#### **Using a previous z/OS distribution:**

Any existing z/OS distribution that runs with one level of z Systems Development and Test Environment and is a z/OS release that was tested with the level of zPDT contained in the newer version of z Systems Development and Test Environment runs with the newer version of the product.

See "zPDT Releases" in the zPDT Guide and Reference for information on which z/OS releases were tested with all zPDT releases. These z/OS volume images are already in the emulated 3390 format. The data and customizations are stored on those volumes from the last time z Systems Development and Test Environment was run. The DEVMAP developed for running with that z/OS distribution on the older version also runs unchanged with the newer version. For more information about device maps, see Defining the device map.

You can also install or reinstall a previous z/OS ADCD distribution. Use the installation instructions that are supplied with the release of Rational Development and Test Environment that has entitlement to that previous z/OS ADCD. Beginning with the z/OS 2.1 ADCD for Rational Development and Test Environment for z Systems, access to a license key is required to install the system resident volumes of the z/OS ADCD by using the Z1091\_ADCD\_install command. Therefore, this command requires access to either an activated USB hardware device or an activated license manager.

### **Making the z/OS volume images available to z Systems Development and Test Environment**

After all the z/OS volume images in your z/OS distribution are converted to the emulated 3390 format and decompressed, they must be made available to z Systems Development and Test Environment.

Put all of the images that compose your z/OS distribution in the \$HOME/z1090/disks directory. Then, enter these two commands that are run under the authority of ibmsys1:

```
cd /home/ibmsys1/z1090/disks      #change to destination directory
chmod 755 *
```

## **Installing z/VM**

If you purchased z Systems Development and Test Environment with Parallel Sysplex®, you have entitlement to z/VM 6.3.

For the instructions to download and install z/VM 6.3, and enable the coupling facility, see Deploying z Systems Development and Test Environment for Parallel Sysplex and the coupling facility.

After you finish installing z Systems Development and Test Environment, one of the final steps is to run the **z1090instcheck** command. This command verifies the proper Linux 32-bit runtime libraries are installed.

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## Chapter 2. Installing an operating system on z Systems Development and Test Environment

Learn how to install supported operating systems on the z Systems Development and Test Environment machine emulator.

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### Installing z/OS volume images

Learn how to install and configure z/OS volume images for z Systems Development and Test Environment. You can install and customize a z/OS distribution, whether it is a migrated customer z/OS system, a z/OS Application Developers Controlled Distribution (ADCD) for z Systems Development and Test Environment, or a z/OS distribution from a previous release of z Systems Development and Test Environment.

**Note:** Any z/OS distribution that is supplied with z Systems Development and Test Environment is a unique distribution that was created specifically for installations that are entitled to z Systems Development and Test Environment, based on the Application Developers Controlled Distribution (ADCD). They are referred to in this IBM Knowledge Center as the z/OS ADCD.

The customizations in this IBM Knowledge Center provide insight into the configuration process and security considerations and result in some additional working subsystems. While you can use any z/OS distribution without implementing these customizations, connectivity to your z/OS system might be limited.

### Obtaining a z/OS distribution

You can obtain a z/OS distribution to run with z Systems Development and Test Environment from three sources.

- If you currently have a z/OS license, you can migrate the z/OS volumes from your z/OS system to your z Systems Development and Test Environment instance.
- You can download from Passport Advantage the z/OS ADCD volumes made available with z Systems Development and Test Environment
- You can use a previous z/OS distribution that runs with an older version of Rational Development and Test Environment for z Systems.

z Systems Development and Test Environment requires every z/OS volume in a z/OS distribution be a Linux file in an emulated 3390 format compatible with zPDT. The z/OS volumes in the z/OS ADCD for z Systems Development and Test Environment and in previous releases of z Systems Development and Test Environment are in the Linux file format. If you migrate volumes from your own z/OS distribution, migration tools are provided for the conversion.

Each method of obtaining the z/OS distribution is described. After it is obtained, any z/OS volume image in the emulated 3390 format can then be transmitted between Linux systems by any available file transfer protocol, such as FTP.

### Migrating z/OS volumes from a z/OS system

You can use several methods to migrate z/OS volumes from your z/OS system to your z Systems Development and Test Environment instance.

One method is to use the migration utility that is supplied in the `/usr/z1090/bin` directory after installation of z Systems Development and Test Environment. This utility uses a client/server approach in which the server transmits the requested z/OS volumes from the z/OS system to the Linux image. The client formats each volume to the emulated 3390 format that is used by zPDT. For information on how to use this migration utility to migrate z/OS volumes, see Chapter 15, DASD Volume Migration, in the zPDT Guide and Reference.

If you already have a running z/OS distribution with z Systems Development and Test Environment, another method of moving z/OS volumes between systems is using the ADRDSSU utility. This method is described in section 12.12, "Moving 3390 Volumes." In this scenario, you can move z/OS volumes to a z/OS system that is running on z Systems Development and Test Environment. After the volumes are moved, they are in the proper emulated format. Chapter 12, "Minor z/OS notes," has other helpful information on how to use a z/OS distribution.

z Systems Development and Test Environment Version offers a new method to migrate z/OS volumes from your z/OS system by using z Systems Development and Test Environment Tools. For more information, see Option 2: Creating an application image from ADCD

## **Installing May 2017 Edition z/OS 2.2 ADCD for z Systems Development and Test Environment**

Learn how to download and install the z/OS 2.2 Application Developers Controlled Distribution for z Systems Development and Test Environment May 2017 edition.

This z/OS 2.2 distribution is a unique distribution that was created specifically for sites that are entitled to z Systems Development and Test Environment, based on the Application Developers Controlled Distribution (ADCD). It is referred to as the z/OS 2.2 ADCD. It contains many of the products and subsystems you expect in a z/OS system. For a list of the products, volumes, and information about the system itself, see z/OS 2.2 ADCD for z Systems Development and Test Environment.

Before you install this z/OS 2.2 ADCD, you must first install z Systems Development and Test Environment. For instructions, see Chapter 1, "Installing z System Development and Test Environment," on page 1. Then do these steps to download and install the z/OS 2.2 ADCD for IBM z Systems Development and Test Environment.

**Important:** Any z/OS ADCD for IBM z Systems Development and Test Environment, and any related software, are supplied as a convenience. IBM does not support the operating system distributions that are made available with z Systems Development and Test Environment. You can apply fixes to any z/OS distribution through normal SMP/E facilities.

### **Downloading a z/OS 2.2 ADCD:**

For the steps to download, install, and customize your z/OS ADCD for z Systems Development and Test Environment, select the appropriate version tab and follow the instructions in the z Systems Development and Test Environment download information technote.

The download information technote is available at <http://www.ibm.com/support/docview.wss?uid=swg21682519>.

z/OS 2.2 ADCD for z Systems Development and Test Environment describes what volumes can be downloaded with this distribution and their general contents. To reduce the amount of disk space you use, you can download and install only the volumes that are required and the subsystems you use. In particular, the volume images for CICS, IMS, DB2, and WebSphere Application Server products can be selectively installed as required, choosing which products and which releases are appropriate for your needs. To determine the subsystems that are contained on each volume, see the description of each volume. Download and install the volumes on the instance that runs z Systems Development and Test Environment.

At a minimum, install all the base z/OS products, which are all the volume images that are not associated with the following products:

- CICS 5.3, and 5.2
- IMS versions 14 and 13
- DB2 version 12 and 11
- WebSphere Application Server versions 9.0 and 8.5

This set of volumes includes the base z/OS products:

- SARES1, D2RES1, D2RES2, D2CFG1, D2SYS1, D2USS1, D2USS2, D2PRD1, D2PRD2
- D2PRD3, D2DIS1, D2DIS2, D2PAGA, D2PAGB, D2PAGC, D2KAN1, D2BLZ1

Most of the z Systems Development and Test Environment related files that are mentioned in the customization scenario are stored within the `ibmsys1` home directory. This IBM Knowledge Center assumes that the 2 MVS IPL volume images, with file extension `ZPD`, are downloaded into the directory structure `/home/ibmsys1/z1090`. The remaining virtual 3390 volumes, with file extension `gz`, are downloaded into the directory structure `/home/ibmsys1/z1090/disks`. Any z Systems Development and Test Environment scripts are assumed in `/home/ibmsys1/z`. The directory structure `home/ibmsys1/z1090/disks` was used because that directory structure complies with the structure created when you start the z Systems Development and Test Environment, as described in “Configuring the base Linux system” on page 6.

### Installing the z/OS volume images:

The downloaded z/OS volume images are in the `ZPD` and `gz` file extension formats. `ZPD` files require installation by using the **Z1091\_ADCD\_install** command, and are stored with a name `volser.ZPD`. All other z/OS volume images are compressed files that are stored with a name `volser.gz`, requiring only the **gunzip** command for installation. In both cases, `volser` is a six character volume serial of the z/OS volume. In z/OS Version 2 Release 2, only 2 IPL volume images require installation by using the **Z1091\_ADCD\_install** command: `D2RES1.ZPD` and `SARES1.ZPD`.

The process of installing the z/OS volume images is to use the **Z1091\_ADCD\_install** command to install `ZPD` volume images, and use the **gunzip** command to decompress any other z/OS volumes needed. When installed or decompressed, most volumes are in emulated 3390-9 format, which are approximately 8.5 GB. Run all commands as the user that runs z Systems Development and Test Environment, in this example `ibmsys1`.

Perform the following two commands to install the `ZPD` volume images into the `/home/ibmsys1/z1090/disks` directory:

```
$ Z1091_ADCD_install /home/ibmsys1/z1090/D2RES1.ZPD /home/ibmsys1/z1090/disks/D2RES1
$ Z1091_ADCD_install /home/ibmsys1/z1090/SARES1.ZPD /home/ibmsys1/z1090/disks/SARES1
```

Perform these three commands to decompress all other z/OS volume images in that directory, and give the correct permissions for all z/OS volume image files.

**Note:** For some images, the **gunzip** command might produce a message about an unexpected end of file. If the \*.gz files were correctly downloaded, that message can be safely ignored. Also, the **gunzip** command as shown here deletes the original .gz files. To keep the original file, enter **gunzip -k \*.gz**. The **-k** parameter is available on later versions of **gunzip**.

```
$ cd /home/ibmsys1/z1090/disks
$ gunzip *.gz
$ chmod 755 *
```

All MVS volume images are in /home/ibmsys1/z1090/disks.

Most of these products and subsystems run without any customization, and some need some customization or initialization to make them work. The customizations to establish TCP/IP connectivity and update the infrastructure to allow z/OS 2.2 to properly run on z Systems Development and Test Environment are described in Customizing the May 2017 Edition z/OS 2.2 ADCD for z Systems Development and Test Environment.

### Using a previous z/OS distribution

Any existing z/OS distribution that runs with one level of z Systems Development and Test Environment and is a z/OS release that was tested with the level of zPDT contained in the newer version of z Systems Development and Test Environment runs with the newer version of the product.

See "zPDT Releases" in the zPDT Guide and Reference for information on which z/OS releases were tested with all zPDT releases. These z/OS volume images are already in the emulated 3390 format. The data and customizations are stored on those volumes from the last time z Systems Development and Test Environment was run. The DEVMAP developed for running with that z/OS distribution on the older version also runs unchanged with the newer version. For more information about device maps, see Defining the device map.

You can also install or reinstall a previous z/OS ADCD distribution. Use the installation instructions that are supplied with the release of Rational Development and Test Environment that has entitlement to that previous z/OS ADCD. Beginning with the z/OS 2.1 ADCD for Rational Development and Test Environment for z Systems, access to a license key is required to install the system resident volumes of the z/OS ADCD by using the Z1091\_ADCD\_install command. Therefore, this command requires access to either an activated USB hardware device or an activated license manager.

## Making the z/OS volume images available to z Systems Development and Test Environment

After all the z/OS volume images in your z/OS distribution are converted to the emulated 3390 format and decompressed, they must be made available to z Systems Development and Test Environment.

Put all of the images that compose your z/OS distribution in the \$HOME/z1090/disks directory. Then, enter these two commands that are run under the authority of ibmsys1:

```
cd /home/ibmsys1/z1090/disks      #change to destination directory
chmod 755 *
```



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## Installing z/VM

If you purchased z Systems Development and Test Environment with Parallel Sysplex, you have entitlement to z/VM 6.3.

For the instructions to download and install z/VM 6.3, and enable the coupling facility, see *Deploying z Systems Development and Test Environment for Parallel Sysplex* and the coupling facility.

After you finish installing z Systems Development and Test Environment, one of the final steps is to run the **z1090instcheck** command. This command verifies the proper Linux 32-bit runtime libraries are installed.



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