Installing the Advanced Edition using Apache HTTP Server and IBM DB2 UDB on Linux (Intel)

The following articles describe how to install a WebSphere Application Server Advanced Edition configuration that uses the following--

- One of the following distributions of Linux for Intel processors:
  - Red Hat Linux 7.1, 2.4 kernel
  - SuSE Linux 7.1, 2.4 kernel
- IBM Java 2™ Software Developer's Kit (SDK) 1.3.0
- Apache HTTP Server 1.3.20
- IBM DB2 Universal Database (UDB) 7.2
- A single node

See the WebSphere Application Server Supported Software and APIs Web site at www.ibm.com/software/webservers/appserv/doc/latest/prereq.html to determine the products and fix levels that are supported for use with your version of WebSphere Application Server.

Note: All installation and configuration procedures for WebSphere Application Server Advanced Edition 4.0 on Linux were created and tested using Red Hat Linux. If you are using a different distribution of Linux, some operating system procedures can be different than what is documented in the InfoCenter. Consult your Linux distribution's documentation as necessary.

Steps for installation

Deciding which steps to follow
Installing Apache HTTP Server 1.3.20
Installing DB2 UDB 7.2
Configuring and testing DB2 UDB 7.2
Installing WebSphere Application Server 4.0
Testing the installation
Testing with an enterprise bean (optional)

Deciding which steps to follow

First, check the WebSphere Application Server Supported Hardware, Software, and APIs Web site at www.ibm.com/software/webservers/appserv/doc/latest/prereq.html to ensure that you have the correct prerequisites, including operating system patches. If you have not already done so, install Apache HTTP Server and DB2 UDB, and then obtain the product CD for WebSphere Application Server or download the product from the WebSphere Application Server Download Web site at www.ibm.com/software/webservers/appserv/download.html. WebSphere Application Server comes with the IBM Java 2™ Software Developer's Kit (SDK). Instructions for installation follow:

1. Installing Apache HTTP Server 1.3.20 describes how to download and install Apache HTTP Server.
2. Installing DB2 UDB 7.2 describes how to install DB2 UDB and an appropriate FixPak.
3. Configuring and testing DB2 UDB 7.2 describes how to configure DB2 UDB for use with WebSphere Application Server.
4. Installing WebSphere Application Server 4.0 describes how to install WebSphere Application Server by using the **Custom Installation** option.
5. Testing the installation describes how to test the installation and configuration of your WebSphere system.
6. Testing with an enterprise bean describes how to test your WebSphere configuration by using an enterprise bean and the Increment sample.

Installing Apache HTTP Server 1.3.20

This article describes how to do the following:

- Install Apache HTTP Server on a Linux (Intel) machine from files downloaded from the Apache HTTP Server Download Web site at httpd.apache.org/dist.
- Test the installation of Apache HTTP Server.

These instructions assume the following:

- Your machine has enough memory and disk space for the installation. See the Apache HTTP Server documentation Web site at www.apache.org/docs for more information.
- You do not have a previous version of Apache HTTP Server already installed on your machine. If you do have a previous version of Apache HTTP Server installed, you must remove it before installing Apache HTTP Server 1.3.20. See the Apache HTTP Server documentation Web site at www.apache.org/docs for more information.

Note: It is recommended that you install Apache HTTP Server before installing WebSphere Application Server. The WebSphere Application Server installation process changes a Web server's configuration so that the Web server directs certain requests (such as servlet requests) to WebSphere Application Server. If the Web server is not installed before WebSphere Application Server, WebSphere Application Server could function incorrectly.

Installing Apache HTTP Server from downloaded files

You can install Apache HTTP Server from a binary distribution downloaded from the Apache Software Foundation Web site at httpd.apache.org/dist.

Note: Binary distributions of Apache HTTP Server are provided for your convenience; current distributions for specific platforms are not always available. Verify that the binaries you are downloading and installing are for the correct distribution and version of Linux and correct version the kernel.

Perform the following steps to install Apache HTTP Server from a downloaded .tar.gz file:

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. Download the appropriate binary distribution of Apache HTTP Server from the Apache Software Foundation Web site at httpd.apache.org/dist.
3. Uncompress and untar the .tar.gz file you downloaded to extract the Apache HTTP Server packages by using the **tar** command, as follows:

   ```
   # tar -zxvf file_name.tar.gz
   ```

   In this command, *file_name* is the name of the .tar.gz file you downloaded.

4. Ensure that you are in the directory containing the uncompressed and untarred Apache HTTP Server packages.
5. Install the Apache HTTP Server binaries by using the **install-bindist.sh** script, as follows:

   ```
   # ./install-bindist.sh
   ```

   The Apache HTTP Server is installed in the /usr/local/apache directory, by default.

6. To change the default configuration of the Apache HTTP Server, edit the httpd.conf, srm.conf, and access.conf files as necessary. See the Apache Directives Web site at www.apache.org/docs/mod/directives.html for more information about editing these files and using Apache HTTP Server runtime directives.

Testing installation of Apache HTTP Server

Perform the following steps to verify that Apache HTTP Server is installed correctly:

1. Start the server by entering the **httpd** command, as follows:

```
# /usr/local/apache/bin/httpd
```

The httpd command attempts to locate the httpd.conf file in the default directory, /usr/local/apache. If the httpd.conf file is located in a different directory, you can specify the full pathname of the httpd.conf file by using the -f option.

2. Start a Web browser and enter the name of the host machine as the URL (http://*host_machine_name*). If you see a Web site that contains links to the Apache Software Foundation Web site and the Powered by Apache logo, the Apache HTTP Server is running properly. Note that you possibly need to adjust the server's configuration for it to run optimally on your machine. For more information, see the Apache HTTP Server documentation Web site at www.apache.org/docs.

Installing DB2 Universal Database (UDB) 7.2

This article describes how to do the following:

- Install DB2 on a local Linux (Intel) machine.
- Apply a FixPak to the installation.

These instructions assume the following:

- Your machine has enough memory and disk space for your installation. See the DB2 product documentation on the DB2 Online Support Web site at www.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/v7pubs.d2w/en_main for the requirements.
- You do not have a previous version of DB2 already installed on the machine. If a previous version of DB2 is installed, you can need to migrate servers and instances, depending on the version installed. In this case, do not follow these instructions. Instead, refer to the DB2 product documentation on the DB2 Online Support Web site at www.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/v7pubs.d2w/en_main.
- Your DB2 database server will reside on the same machine as WebSphere Application Server. This configuration and the use of the default settings documented in these instructions are appropriate only for development and small production environments. For larger environments where it is preferable to configure the DB2 server on a remote machine, you must install and configure a DB2 client on the same machine on which you install WebSphere Application Server and verify the remote database connectivity. See the IBM Redbook, *WebSphere V3.5 Handbook*, on the IBM Redbooks Web site at www.redbooks.ibm.com/redbooks/SG246161.html for more information about implementing this configuration.

Note: Install DB2 before installing WebSphere Application Server.

Installing DB2 UDB

The DB2 software CD-ROM contains the packages necessary to install and configure DB2 on a local Linux machine.

Note: Before installing DB2, it is recommended that you prepare you Linux distribution for database installation. See the Linux Documentation Project's HOWTO Web site for databases at www.linuxdoc.org/HOWTO/HOWTO-INDEX/apps.html#SERVERDBMS for more information about preparing your specific distribution.

Note: Installing DB2 on a machine running certain Linux distributions requires installation of the Public Domain Korn Shell (pdksh), which is not part of a default Linux installation. For example, if you are using Red Hat Linux 7.1 or later, install the pdksh package from the /RedHat/RPMS directory on the Red Hat software CD-ROM. Refer to your Linux documentation for information about installing this package by using the **rpm** command.

Perform the following steps to install DB2:

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. Insert the DB2 UDB software CD-ROM into the CD-ROM drive.
3. If necessary, use the **mkdir** command to create a mount point for the CD-ROM. The following command creates a mount point at the directory /cdrom; you can mount the CD-ROM at any location on the machine's local file system.

```
# mkdir /cdrom
```

The commands in these steps assume the CD-ROM is mounted at /cdrom. If you mount the CD-ROM at a different location, use that location when issuing commands.

4. Mount the CD-ROM drive by entering the following command:

```
# mount -t iso9660 -o ro  /dev/cdrom /cdrom
```

This command assumes that the CD-ROM is mounted at /cdrom.

Note: Some window managers automatically mount a CD-ROM for you. Consult your operating system documentation for more information.

5. Navigate to the /cdrom directory.
6. Start the DB2 Setup Utility by using the **db2setup** command, as follows:

```
# ./db2setup
```

Note: The DB2 Setup Utility works with only the bash, Bourne, and Korn shells.

7. The Install DB2 V7 window opens. Press Tab to move between available options and fields. Press Return to select or deselect an option. Perform the following steps to select the appropriate products and components for installation:
   a. Highlight and press Return for the following products:
      - **DB2 Administration Client**
      - **DB2 UDB Enterprise Edition**
      - **DB2 Connect Enterprise Edition**
      - **DB2 Application Development Client**
   b. Highlight the **Customize** option for the **DB2 Product Library** option and press Return.
   c. The DB2 Product Library dialog box opens. In the **DB2 Product Library (HTML)** section, highlight the appropriate option for your locale (**en_US** for U.S. English) and press Return.
   d. On the DB2 Product Library dialog, highlight **OK** and press Return.
   e. On the Install DB2 V7 dialog, highlight **OK** and press Return.
8. On the Create DB2 Services dialog, accept the default values **Do not create DB2 Instance** and **Do not create the Administration Server**, ensure that **OK** is highlighted, and press Return. You will create a DB2 instance and Administration Server after installing the required FixPak. Installing a FixPak is discussed in the section Upgrading DB2 UDB with a FixPak.
9. A Warning dialog informs you that you are not creating a DB2 instance. Ensure that **OK** is highlighted, and press Return to exit from the Warning dialog.
10. A Warning dialog informs you that you are not creating an Administration Server. Ensure that **OK** is highlighted, and press Return to exit from the Warning dialog.
11. The Summary Report dialog box opens. Ensure that **Continue** is highlighted, and press Return to continue with the installation.
12. A Warning dialog informs you that it is your last chance to stop the installation. Ensure that **OK** is highlighted, and press Return to continue with the installation. When installation is complete DB2 software is installed in the /usr/IBMdb2/V7.2 directory.
13. A Notice dialog informs you when the installation process has completed successfully. Ensure that **OK** is highlighted, and press Return.
14. You can be prompted to register the DB2 software. Enter the information required to register DB2, or exit from the registration window by clicking **Exit**.
15. The Status Report dialog displays the status of each component you selected for installation. You can choose to view the contents of the installation log file by highlighting **View Log** and pressing Return, or highlight **OK** and press Return to continue.
16. The DB2 Setup Utility dialog box opens. Highlight **Close** and press Return to exit from the DB2 Setup Utility.
17. A Warning dialog informs you that a DB2 instance has not been created. Ensure that **OK** is highlighted, and press Return.
18. A Warning dialog informs you that the Administration Server has not been created. Ensure that **OK** is highlighted, and press Return.
19. A Notice dialog prompts you to exit from the DB2 Installer. Ensure that **OK** is highlighted and press Return.
20. Unmount the CD-ROM before removing it from the CD-ROM drive by using the **umount** command, as follows:

```
# umount /cdrom
```

21. See the WebSphere Application Server Supported Software and APIs Web site at www.ibm.com/software/webservers/appserv/doc/latest/prereq.html to determine if it is necessary to install a DB2 FixPak for your version of WebSphere Application Server. If you need to update your DB2 UDB installation with a FixPak, note the FixPak level and proceed to the section Upgrading DB2 UDB with a FixPak.

Upgrading DB2 UDB with a FixPak

Perform the following steps to install a FixPak for DB2:

1. See the WebSphere Application Server Supported Software and APIs Web site at www.ibm.com/software/webservers/appserv/doc/latest/prereq.html to determine the required FixPak level for your version of WebSphere Application Server.
2. Go to the DB2 Universal Database and DB2 Connect Online Support Web site at www.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/download.d2w/report, navigate to the download page for the required FixPak, and download the appropriate file. Read the accompanying README file for installation suggestions.
3. Ensure that you are logged into the machine with superuser (root) privileges.
4. Navigate to the directory containing the downloaded tar file.
5. Untar the file you downloaded to extract the DB2 packages by using the **tar** command, as follows:

   ```
   # tar -xvf file_name.tar
   ```

   In this command, *file_name* is the name of the tar file you downloaded.

6. After you untar the file you downloaded, the directory containing the tar file now also contains a new subdirectory. Navigate to the new subdirectory.
7. Install the FixPak by using the **installpatch** script, as follows:

   ```
   # ./installpatch
   ```

8. Proceed to the article Configuring and testing DB2 UDB 7.2.

Configuring and testing DB2 UDB 7.2

This article describes how to do the following:

- Create a DB2 instance named db2inst1 and an administration server named db2as.
- Verify installation of DB2.
- Create and configure a database named `was40`, which is used by WebSphere Application Server.
- Verify connection to the `was40` database.
- Configure WebSphere Application Server when dropping and reinstalling the `was40` administrative database.

These instructions assume that DB2 is installed in the default location (/usr/IBMdb2/V7.2) and that the required FixPak is installed.

Creating a database instance and administration server

Perform the following steps to create a DB2 instance, and the resources it requires:

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. Create a home directory for the DB2 instance owner by using the **mkdir** command, as follows:

   ```
   # mkdir /home/db2inst1
   ```

3. Navigate to the directory containing the DB2 setup utility, /usr/IBMdb2/V7.2/install.

4. Start the DB2 Setup Utility by entering the following command:

```
# ./db2setup
```

Note: The DB2 Setup Utility works with only the bash, Bourne, and Korn shells.

5. Highlight the **Create** button beside the option labeled **To create a DB2 Instance, an Administration Server, or a Data Links Manager Administrator select Create** and press Return.
6. On the Create DB2 Services dialog, highlight the **Create a DB2 Instance** option and press Return.
7. On the DB2 Instance dialog, perform the following steps, noting the values that you enter or accept for future reference:
    a. Accept the default value for the **User Name** option, db2inst1.
    b. Enter a user ID or accept the default user ID by ensuring that the **Use default UID** option has an asterisk (*) beside it.
    c. Accept the default value for the **Group Name** option, db2adm.
    d. Enter a group ID or accept the default group ID by ensuring that the **Use default GID** option has an asterisk (*) beside it.
    e. Accept the default value for the **Home Directory** option, /home/db2inst1.
    f. Type a password for the user in the **Password** and **Verify Password** options. DB2 requires a password of eight or fewer characters.
    g. Highlight **OK** and press Return.
8. On the Fenced User dialog, perform the following steps, noting the values that you enter or accept for future reference:
    a. Accept the default value for the **User Name** option, db2fenc1.
    b. Enter a user ID or accept the default user ID by ensuring that the **Use default UID** option has an asterisk (*) beside it.
    c. Accept the default value for the **Group Name** option, db2fadm1.
    d. Enter a group ID or accept the default group ID by ensuring that the **Use default GID** option has an asterisk (*) beside it.
    e. Enter a home directory or accept the default value for the **Home Directory** option, /home/db2fenc1.
    f. Type a password for the user in the **Password** and **Verify Password** options. DB2 requires a password of eight or fewer characters.
    g. Highlight **OK** and press Return.
9. On the DB2 Warehouse Control Database dialog, highlight the option labeled **Do not set up DB2 Warehouse Control Database** and press Return.
10. Highlight **OK** and press Return.
11. On the Create DB2 Services dialog, highlight the **Create the Administration Server** option and press Return.
12. On the Administration Server dialog, perform the following steps, noting the values that you enter or accept for future reference:
    a. Accept the default value for the **User Name** option, db2as.
    b. Enter a user ID or accept the default user ID by ensuring that the **Use default UID** option has an asterisk (*) beside it.
    c. Accept the default value for the **Group Name** option, db2asgrp.
    d. Enter a group ID or accept the default group ID by ensuring that the **Use default GID** option has an asterisk (*) beside it.
    e. Enter a home directory or accept the default value for the **Home Directory** option, /home/db2as.
    f. Type a password for the user in the **Password** and **Verify Password** options. DB2 requires a password of eight or fewer characters.
    g. Highlight **OK** and press Return.
13. A Notice dialog informs you of the value being created for the DB2SYSTEM environment variable. Ensure that **OK** is highlighted and press Return.
14. On the Create DB2 Services dialog, highlight **OK** and press Return.
15. The Summary Report dialog box opens. Verify the information on the Summary Report dialog and when you have determined that it is correct, ensure that **Continue** is highlighted and press Return.
16. A Warning dialog box opens, giving you the option of canceling the configuration processes. Ensure that **OK** is highlighted and press Return.
17. A Notice dialog informs you when the processes have completed successfully. Ensure that **OK** is highlighted and press Return.
18. The Status Report dialog informs you of process successes and failures. View the Log File for information about how to correct particular failures. Ensure that **OK** is highlighted and press Return to exit from the Status Report dialog.
19. On the DB2 Setup Utility dialog, highlight **Close** and press Return.

20. On the Notice dialog, ensure that **OK** is highlighted and press Return.
21. Ensure that the user named root is a member of the administration server group named db2asgrp by editing the /etc/group file.
22. Create symbolic links from the home directory of the instance owner to the DB2 installation directory by executing the **db2ln** script, as follows:

    ```
    # /usr/IBMdb2/V7.2/cfg/db2ln
    ```

23. Configure the instance owner db2inst1 to run the **db2profile** script at login by adding the following text to the /home/db2inst1/.bash_profile file of the instance owner db2inst1:

    ```
    . /home/db2inst1/sqllib/db2profile
    ```

    Note the space between the period (.) and the first slash (/). If you are using a different shell, edit the appropriate file accordingly.

24. Configure the user root to run the **db2profile** script at login by adding the following text to the /root/.bash_profile file:

    ```
    . /home/db2inst1/sqllib/db2profile
    ```

    Note the space between the period (.) and the first slash (/).

25. Log out then log back in for your changes to take effect.
26. Determine the current setting for the maximum number of message queues by using the **ipcs -l** command, as follows:

    ```
    # ipcs -l
    ```

    A portion of the output should resemble the following:

    ```
    ------ Messages: Limits --------
    max queues system wide = 128
    max size of message (bytes) = 8192
    default max size of queue (bytes) = 16384
    ```

27. If the value of the `max queues system wide` parameter is less than `128`, increase it by entering the following command:

    ```
    # echo 128 > /proc/sys/kernel/msgmni
    ```

    It is recommended that you add this command to a startup script that is executed each time the machine is restarted, such as the /etc/rc.d/rc/local file.

Verifying installation of DB2 UDB

To demonstrate that DB2 is functioning correctly, you will create a sample database and compile and execute a Java application that accesses it. The steps below establish that the environment is set up correctly for DB2 and the IBM Java 2 SDK, and that the JDBC driver is accessible from a Java application.

Perform the following steps to create the sample database and compile and run the Java application:

1. Log in as the DB2 instance owner, db2inst1, by using the **su** command, as follows:

    ```
    # su - db2inst1
    ```

    When you log in as db2inst1, the command prompt changes from the # symbol to a dollar sign ($) to indicate a

change in your login identity.

2. If this is the first time that you have logged in as the DB2 instance owner, you could be prompted to change the password. Enter a new password and press Return. DB2 requires a password of eight or fewer characters.
3. When prompted, type the new password again and press Return.
4. Ensure that the DB2 environment has been set up correctly by using the **echo** command to verify the value of the DB2INSTANCE environment variable, as follows:

   ```
   $ echo $DB2INSTANCE
   ```

   The correct value returned is `db2inst1`.

5. Ensure that the home directory of the instance owner, /home/db2inst1 has write permissions.
6. Create the sample database by executing the **db2sampl** script, as follows:

   ```
   $ db2sampl
   ```

   This process can take several minutes to complete.

7. Ensure that you are in the instance owner's home directory, /home/db2inst1.
8. Compile an example Java application by using the **javac** command, as follows:

   ```
   $ javac -d . sqllib/samples/java/DB2Appl.java
   ```

   The resulting class file is created in the local directory.

9. Start DB2 by using the **db2start** command, as follows:

   ```
   $ db2start
   ```

10. Run the Java sample by using the **java** command, as follows:

    ```
    $ java DB2Appl
    ```

    Correct output resembles the following:

    ```
    Retrieve some data from the database...
    Received results:
       empno= 000010 firstname= CHRISTINE
       empno= 000020 firstname= MICHAEL
       empno= 000030 firstname= SALLY
       . . .
    Update the database...
    Changed 1 row.
    ```

Creating a database for WebSphere Application Server

Perform the following steps to create a database named `was40` and set the DB2 application heap size:

1. Ensure that you are logged in as the DB2 instance owner, db2inst1.
2. Ensure that DB2 is running.
3. Create a database named `was40` by using the **db2 create database** command, as follows:

   ```
   $ db2 create database was40
   ```

   This process can take several minutes to complete.

4. Set the application heap size by using the **db2 update db config** command, as follows:

   ```
   $ db2 update db config for WAS40 using applheapsz 256
   ```

5. Stop and start DB2 for your changes to take effect by using the **db2stop** and **db2start** commands, as follows:

   ```
   $ db2stop

   $ db2start
   ```

   If an application heap size of 256 does not work for your system, increase it to 512.

Verifying the connection to the database

Perform the following steps to verify a connection to database named `was40`:

1. Ensure that you are logged in as the DB2 instance owner, db2inst1.
2. Connect to the database named `was40` by using the **db2 connect** command, as follows:

   ```
   $ db2 connect to was40
   ```

   Correct output resembles the following:

   ```
   Database Connection Information

        Database server        = DB2/LINUX 7.2.1
        SQL authorization ID   = DB2INST1
        Local database alias   = WAS40
   ```

3. To disconnect from the database and log out as the DB2 instance owner, type `exit` at the command prompt.

Configuring WebSphere Application Server when dropping and reinstalling the `was40` administrative database

If you drop and recreate the `was40` database after you have installed and successfully started the WebSphere Application Server administrative server for the first time, you must reset the values of the com.ibm.ejs.sm.adminServer.createTables flag and the install.initial.config flag. These flags are found in the WebSphere Application Server admin.config file, which is located by default in the /opt/WebSphere/AppServer/bin directory.

You must reset the values of these flags because the WebSphere Application Server product automatically changes their values from `true` to `false` when the administration server is started successfully for the first time. The product changes the values of these flags so that the creation of the database tables and installation of the Default Server and sample applications are not repeated with subsequent starts of the administration server.

Perform the following steps to drop, recreate, and set the application heap size for the `was40` database and to change the values for the com.ibm.ejs.sm.adminServer.createTables and install.initial.config flags:

1. Log in as the DB2 instance owner. Logging in as the instance owner places you automatically in the home directory of the instance owner. When you log in as the instance owner, the command prompt changes from the # symbol to a dollar sign ($) to indicate a change in your login identity.
2. Ensure that DB2 is running or start it by entering the following command:

   ```
   $ db2start
   ```

3. Drop, recreate, and set the application heap size for the `was40` database by entering the following commands:

   ```
   $ db2 drop database was40
   ```

```
$ db2 create database was40
$ db2 update db config for WAS40 using applheapsz 256
```

4. In order for your changes to take effect, you must start and stop DB2. To do this, enter the following commands:

   ```
   $ db2stop
   $ db2start
   ```

   If an application heap size of 256 does not work for your system, increase the size to 512.

5. Log out as the DB2 instance owner by entering the following command:

   ```
   $ exit
   ```

   The DB2 server remains active unless you stop it by using the **db2stop** command.

6. As user root, open the admin.config file in a text editor.
7. Change the value for the com.ibm.ejs.sm.adminServer.createTables flag from `false` to `true`.
8. Change the value for the install.initial.config flag from `false` to `true`.
9. Save the edited admin.config file.

Installing WebSphere Application Server 4.0

This article describes how to install WebSphere Application Server on a Linux (Intel) machine by using the Custom Installation option.

These instructions assume the following:

- The machine has enough memory and disk space for your installation. See the WebSphere Application Server Supported Hardware, Software, and APIs Web site at www.ibm.com/software/webservers/appserv/doc/latest/prereq.html for the requirements.
- If you plan to use IBM HTTP Server, you will select it for installation during the WebSphere Application Server installation process. If you plan to use a different supported Web server with WebSphere, you have already installed it on the same machine that will contain WebSphere Application Server.
- You have installed and configured a supported database for use with WebSphere Application Server.
- You do not have a previous version of WebSphere Application Server already installed on this machine. If you do have a previous version of WebSphere Application Server already installed, do not follow these instructions. Instead, see the article Migration overview.

Note: IBM HTTP Server is provided with WebSphere Application Server. If you want to install and use a different supported Web server, you must purchase and install it separately.

Perform the following steps to install WebSphere Application Server:

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. If IBM HTTP Server or another Web server is running on your system, stop the Web server.
3. If you have a version of IBM HTTP Server older than version 1.3.19 installed on your machine, you must uninstall it before using the WebSphere Application Server installation program to install IBM HTTP Server 1.3.19.
4. Insert the WebSphere Application Server CD-ROM into the CD-ROM drive.
5. If necessary, use the **mkdir** command to create a mount point for the CD-ROM. The following command creates a mount point at the directory /cdrom; you can mount the CD-ROM at any location on the machine's local file system.

   ```
   # mkdir /cdrom
   ```

   The commands in these steps assume the CD-ROM is mounted at /cdrom. If you mount the CD-ROM at a different location, use that location when issuing commands.

6. Mount the CD-ROM drive by entering the following command:

```
# mount -t isso9660 -r /dev/cdrom /cdrom
```

Note: Some window managers automatically mount a CD-ROM for you. Consult your operating system documentation for more information.

7. Ensure that your DISPLAY and TERM environment variables are set properly.
8. If the supported Web server or database you plan to use with WebSphere is newer than the version currently required by WebSphere Application Server, you must update the prereq.properties file or disable the prerequisite checking functionality before installing WebSphere Application Server.

   To obtain an updated prereq.properties file, download the latest version from the WebSphere Application Server Tools Web site at www.ibm.com/software/webservers/appserv/tools.html. Ensure that the updated prereq.properties file is downloaded or copied into the local /tmp directory.

   To disable prerequisite checking functionality, perform the following steps:
   a. Copy the prereq.properties file from the /cdrom directory to the /tmp directory on the machine on which you plan to install WebSphere Application Server.
   b. Open the prereq.properties file in a text editor and disable prerequisite checking for an individual component by changing the value of the specific key from `1` to `0`.
   c. Save the edited prereq.properties file.

9. Navigate to the /cdrom directory.
10. If you have not downloaded an updated prereq.properties file or disabled the prerequisite checking functionality, start the WebSphere Application Server installation program by using the **install.sh** command, as follows:

```
# ./install.sh
```

    If you have downloaded an updated prereq.properties file or disabled the prerequisite checking functionality as detailed in Step 8, start the WebSphere Application Server installation program by using the **install.sh** command, as follows:

```
# ./install.sh -prereqfile /tmp/prereq.properties
```

11. The Welcome to the IBM WebSphere Application Server Setup program dialog box opens. Click **Next** to continue.
12. The Install Options dialog box opens. Select **Custom Installation**, and click **Next**.
13. The Choose Application Server Components dialog box opens. Select the components you want to install and deselect the components you do not want to install. Note the following information:
    - The Java 2 Software Developer's Kit (SDK) is installed by default.
    - The **Server**, **Admin**, **Samples**, **Application Assembly and Deployment Tools**, **IBM HTTP Server 1.3.19**, and **WebServer Plugins** components are selected for installation by default.
    - If you plan to use WebSphere Application Server with IBM HTTP Server, ensure that the **IBM HTTP Server 1.3.19** and **Web Server Plugins** options are selected.
    - If you plan to use WebSphere Application Server with a different supported Web server, ensure that the **Web Server Plugins** option is selected.

      Note: No plug-ins are required to launch the Application Server or the administrative console. However, for production applications, you will not be able to serve servlets without having installed a supported Web server and corresponding Web server plug-in.

      For non-production applications, you can use the internal HTTP transport system to serve servlets without installing a Web server plug-in by using the internal HTTP transport port `9080`. For example, to serve the sample snoop servlet by using the internal HTTP transport, enter the URL `http://local_host:9080/servlet/snoop`. The internal HTTP transport mechanism is not designed for use in a production environment.

    - If you plan to install the Web server plug-in for IBM HTTP Server, you must select the **IBM HTTP Server**

1.3.19 option, or have it already installed on the machine.
- These instructions assume that you are installing all of the components.

Click **Next** to continue.

14. If you selected the **Web Server Plugins** option, the Choose Application Server Components dialog box opens. Select the appropriate plug-in for your Web server, and click **Next**.
15. The Database Options dialog box opens. Depending on the database you have installed, complete one of the following set of instructions:
    - If you are using DB2, perform the following steps in the Database Options dialog:
        a. In the **Database Type** field, select **DB2** from the pull-down menu.
        b. Ensure that **Remote DB** is not selected. For this example, the database and WebSphere Application Server are installed on the same node.
        c. In the **Database Name (Database SID)** field, type the name of the database, `was40`.
        d. In the **DB Home** field, type the full pathname of the home directory of the DB2 instance owner, `/home/db2inst1`, or specify the full pathname of the home directory by using the **Browse** button.
        e. The **DB URL** field cannot be edited.
        f. The **Server Name** field cannot be edited.
        g. The **Port Number** field cannot be edited.
        h. In the **Database User ID** field, type the name of the database instance owner, `db2inst1`.
        i. In the **Database Password** field, type the current password for the database instance owner.
        j. Click **Next** to continue.

    - If you are using Oracle, perform the following steps in the Database Options dialog:
        a. In the **Database Type** field, select **Oracle** from the pull-down menu.
        b. Ensure that **Remote DB** is not selected. For this example, the database and WebSphere Application Server are installed on the same node.
        c. In the **Database Name (Database SID)** field, type the name of the Oracle database you created. For example, `ORA817.`*`machine_name`*.
        d. In the **DB Home** field, type the full pathname of the directory you created to contain the Oracle software and to be the home directory of the user named oracle, or specify the full path name of the directory by using the **Browse** button. This path should also be the value of the ORACLE_HOME environment variable.
        e. In the **DB URL** field, accept the default value `jdbc:oracle:thin:@`*`fully_qualified_domain_name`*`:`*`port_number`*`:`*`database_name`*, or specify a different URL for accessing the database.
        f. In the **Server Name** field, type the name of the machine on which the database is installed.
        g. In the **Port Number** field, type the port number used to access the database.
        h. In the **Database User ID** field, type the name of the database owner, `EJSADMIN`.
        i. In the **Database Password** field, type the current password for the database owner.
        j. Click **Next** to continue.

16. The Select Destination Directory dialog opens. Specify the directory in which you want to install WebSphere Application Server. You can either accept the default destination directory or specify a different one by typing the full pathname or by clicking **Browse**. Note that if you've selected IBM HTTP Server for installation, you cannot modify the destination directory. Click **Next** to continue.
17. The Install Options Selected dialog box opens. Verify that the information is correct and click **Install** to complete the installation.
18. Depending on the machine's configuration, the Location of Configuration files dialog box can open. It prompts you to enter the full pathname of the directory in which you want to store the specified Web server configuration file. Specify the full pathname of the file by typing it in the field or by clicking **Browse**.
19. The Setup Complete dialog box opens. To view the ReadMe file, ensure that **Yes, I want to view the ReadMe File** is selected and click **Finish**; the ReadMe file is displayed in a default browser window. To view the ReadMe file at a later time, deselect **Yes, I want to view the ReadMe File** and click **Finish** to exit from the WebSphere Application Server installation program.
20. The WebSphere Application Server - First Steps dialog box opens. You can use this GUI to access product information in the InfoCenter, start the administrative server, launch the administrative console, or launch the application assembly tool. Because you must first start and possibly configure the Web server before using WebSphere, close this dialog for now. You can launch the First Steps GUI at a later time by running the **firststeps.sh**

script located in the /opt/WebSphere/AppServer/bin directory.

21. Unmount the CD-ROM before removing it from the CD-ROM drive by using the **umount** command, as follows:

```
# umount /cdrom
```

22. If you are using a Web server other than IBM HTTP Server, start the server. If you are using IBM HTTP Server and have installed it during the WebSphere Application Server installation, you may need to configure the Web Server to run it successfully.

    Perform the following steps to verify that IBM HTTP Server is installed and configured correctly:
    a. Ensure that the Web server is running. If not, start it by entering the following command:

    ```
    # /opt/IBMHTTPServer/bin/apachectl start
    ```

    b. Start a browser and enter the name of the local machine as the URL. If you see the IBM HTTP Server Web page, the server is installed and configured correctly.

    See the IBM HTTP Server documentation Web site at www.ibm.com/software/webservers/httpservers/library.html for more information about configuring IBM HTTP Server.

    To enable the Secure Sockets Layer (SSL) for IBM HTTP Server, see the IBM HTTP Server documentation Web site at www.ibm.com/software/webservers/httpservers/doc/v1319/index.html for more information.

23. Proceed to the article Testing the installation.

Testing the installation

This article describes how to test the installation and configuration of your WebSphere Application Server system. These instructions assume that you have installed a supported Web server, database, and the WebSphere Application Server component.

Perform the following steps to test your WebSphere installation:

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. Start the WebSphere administrative server by executing the **startupServer** script, as follows:

```
# cd /opt/WebSphere/AppServer/bin
# ./startupServer.sh
```

   Ensure that the administrative server has started successfully by checking the file named tracefile located in the /opt/WebSphere/AppServer/logs directory. The message `Server open for e-business` appears in this file when the server has started successfully.
3. Start the administrative console by running the **adminclient** script, as follows:

```
# cd /opt/WebSphere/AppServer/bin
# ./adminclient.sh
```

4. When the console displays the message `Console Ready`, administer the application server by performing the following steps:
   a. When the console opens, a tree view is displayed. Click the plus sign (+) next to **WebSphere Administrative Domain** entry to expand the view.
   b. Expand the view of the **Nodes** entry.
   c. Identify the name of your host machine and expand the view of that entry.
   d. Expand the view of the **Application Servers** entry.
   e. Select the **Default Server** entry and click the **Start** icon located on the toolbar. An information window opens, and indicates that the server has started. Click **OK** to close the information window.

   After the default server is started initially, it will start automatically if it stops or if you restart the machine. If

the administrative server fails, the default server continues to run.

f. Click **OK**.

5. Ensure that the Web server is running. If the Web server is not running, start it.
6. Start a Web browser and enter the URL for the snoop servlet, which is a standard sample servlet that is installed by default, as follows:

   ```
   http://machine_name/servlet/snoop
   ```

   In this command, *machine_name* represents the name of the machine on which WebSphere is running. Information about /servlet/snoop is displayed.
7. Proceed to the article Testing with an enterprise bean.

Testing with an enterprise bean

This article describes how to test your WebSphere configuration by using an enterprise bean and the Increment sample. These instructions assume that you have installed your WebSphere Application Server system and have tested the installation by using the instructions in the article Testing the installation.

Perform the following steps to test your WebSphere configuration using an enterprise bean:

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. Ensure that the administrative console is running.
3. Ensure that the default server (located under **WebSphere Administrative Domain** > **Nodes** > *node_name* > **Application Servers**) is running.
4. Start a Web browser and specify the following URL:

   ```
   http://machine_name/webapp/examples/HitCount
   ```

   In this command, *machine_name* represents the name of the machine on which WebSphere is running. When the Web page opens, several selection options are displayed.
5. Under the heading **Generate hit count using**, click the radio button for the **Enterprise Java Bean** option.
6. Under the heading **Transaction Type**, click the radio button for the **None** option.
7. Click **Increment**.

   If the number of hits is displayed, WebSphere is functioning properly.

Uninstalling WebSphere Application Server

Perform the following steps to uninstall WebSphere Application Server from a UNIX machine:

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. If IBM HTTP Server or another Web server is running on your system, stop the Web server.

   Note: Although IBM HTTP Server can be installed using the WebSphere Application Server installation program, it is not uninstalled when you uninstall WebSphere Application Server. It must be uninstalled separately. See the IBM HTTP Server Library Web site at www.ibm.com/software/webservers/httpservers/library.html for more information.

3. Ensure that your DISPLAY and TERM environment variables are set properly.
4. Navigate to the root installation directory (/opt/WebSphere/AppServer on HP-UX, Linux, and Solaris; /usr/WebSphere/AppServer on AIX) and execute the **uninstall.sh** script as follows:

   ```
   # ./uninstall.sh
   ```

5. The uninstallation program starts and the Uninstall dialog box opens. Click **Uninstall** to remove WebSphere Application Server from the machine.

6. To ensure that subsequent installations of WebSphere Application Server do not conflict with files left on the machine from a previous installation, use the **rm -r** command to remove the WebSphere directory structure. Use caution when executing this command to prevent the unintentional removal of portions of the file system.