

## Installing the Advanced Edition using IBM HTTP Server and IBM DB2 UDB on Solaris

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

- Solaris 7 or 8
- Java 2 Software Development Kit (SDK) 1.3 (version supplied with WebSphere Application Server)
- IBM HTTP Server 1.3.19
- DB2 Universal Database (UDB) 7.2
- A single node or multiple nodes

See the WebSphere Application Server Supported Hardware, Software, and APIs Web site at [www.ibm.com/software/webservers/appserv/doc/latest/prereq.html](http://www.ibm.com/software/webservers/appserv/doc/latest/prereq.html) to learn which products and fix levels are supported for your level of WebSphere Application Server.

### Steps for installation

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### Deciding which steps to follow

First, check the WebSphere Application Server Supported Hardware, Software, and APIs Web site at <http://www.ibm.com/software/webservers/appserv/doc/latest/prereq.html> to ensure that you have the correct prerequisites, including operating system patches. WebSphere Application Server comes with the Java 2 SDK and IBM HTTP Server. If you have not already done so, install DB2 UDB and then obtain the product CD-ROM for WebSphere Application Server or download the product from the Web site [www.ibm.com/software/webservers/appserv/download.html](http://www.ibm.com/software/webservers/appserv/download.html). Information on installation follows:

1. [Installing DB2 UDB 7.2](#)--the instructions describe how to install DB2 UDB and an appropriate FixPak
2. [Configuring DB2 UDB 7.2](#)
3. [Installing WebSphere Application Server--Custom Installation option](#)
4. [Testing the installation](#)
5. [Testing with an enterprise bean](#)

### Installing DB2 Universal Database (UDB) 7.2

This article describes the following:

- How to install and configure DB2 on a local Solaris SPARC machine
- How to apply a FixPak to the installation

These instructions assume the following:

- You do not have a previous version of DB2 already installed on your machine. If a previous version of DB2 is installed, you might need to migrate servers and instances, depending on the version installed. In this case, do not follow these instructions. Instead, refer to DB2 product documentation on the DB2 Online Support Web site at [www.ibm.com/cgi-bin/db2www/data/db2/udb/win0s2unix/support/v7pubs.d2w/en\\_main](http://www.ibm.com/cgi-bin/db2www/data/db2/udb/win0s2unix/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 default settings documented in these instructions are appropriate only for development and very small production environments. For larger environments where it is preferable to configure the DB2 server on a remote server, 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. For information on this more complicated scenario, refer to the IBM Redbook *WebSphere V3.5 Handbook* at [www.redbooks.ibm.com/redbooks/SG246161.html](http://www.redbooks.ibm.com/redbooks/SG246161.html). Although this Redbook was written for the WebSphere Application Server Version 3.5 product, much of the conceptual information also pertains to the WebSphere Application Server 4.0 product.

- 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/win02unix/support/v7pubs.d2w/en\\_main](http://www.ibm.com/cgi-bin/db2www/data/db2/udb/win02unix/support/v7pubs.d2w/en_main) for the necessary requirements.

**Note:** Install DB2 before installing WebSphere Application Server.

## Installing DB2 UDB

The DB2 software CD-ROM contains the files necessary to install and configure DB2 on a local Solaris SPARC machine.

Perform the following steps to install DB2:

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. Ensure that you have set the following UNIX kernel, shared memory, and semaphore parameters properly:
  - MSGMAX
  - MSGMNB
  - MSGMAP
  - MSGMNI
  - MSGSSZ
  - MSGTQL
  - MSGSEG
  - SHMMAX
  - SHMSEG
  - SHMMNI
  - SEMMNI
  - SEMMAP
  - SEMMNS
  - SEMMNU
  - SEMUME

Refer to the *DB2 Quick Beginnings for UNIX* and related DB2 UDB documentation on the DB2 Online Support Web site at [www.ibm.com/cgi-bin/db2www/data/db2/udb/win02unix/support/v7pubs.d2w/en\\_main](http://www.ibm.com/cgi-bin/db2www/data/db2/udb/win02unix/support/v7pubs.d2w/en_main) to obtain information on the proper values for these parameters. It is recommended that you review these settings with your system administrator to ensure that they do not conflict with settings necessary for other software programs on your system.

You can use the following sample files to update the settings for these parameters. The files are located in the /db2/install/samples directory on the DB2 software CD-ROM or in the /opt/IBMDb2/V7.2/cfg directory in the installed DB2 product:

- kernel.param.64MB for systems with 64 - 128 MB physical memory
- kernel.param.128MB for systems with 128 - 256 MB physical memory
- kernel.param.256MB for systems with 256 - 512 MB physical memory
- kernel.param.512MB for systems with 512 MB to 1 GB physical memory

Choose the file appropriate for your system, append it to the /etc/system file, make any changes to the SHMMAX parameter if needed as outlined in the DB2 product documentation, enter the command `# touch /reconfigure`, and restart your machine.

3. Insert the DB2 UDB CD-ROM and, if necessary, mount the CD-ROM drive. (On most Solaris systems, the Volume Management daemon (**vol**) mounts the CD-ROM automatically and immediately, as well as each time the machine is restarted. If the **vol** process is not running on the local machine, see your Solaris system documentation for

instructions on how to mount the CD-ROM drive.) The following steps assume that the CD-ROM drive is mounted at /cdrom.

4. Navigate to the correct directory on the DB2 UDB CD-ROM by entering the following command:

```
# cd /cdrom/cdrom0
```

5. Enter the following command to start the DB2 Setup Utility:

```
# ./db2setup
```

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

6. In the Install DB2 V7 window, select the products that you want to install by performing the following steps. (Press the Tab key to move among and highlight options and press Return to select or deselect options.)
  - a. Select **DB2 Administration Client**, **DB2 UDB Enterprise Edition**, and **DB2 Application Development Client** by highlighting each option and pressing Return.
  - b. Highlight the **Customize** option beside the **DB2 Product Library** option and press Return.
  - c. In the **DB2 Product Library** section, highlight the option appropriate for your locale (**en\_US** for U.S. English) and press Return.
  - d. In the DB2 Product Library window, highlight **OK** and press Return.
  - e. In the Install DB2 V7 window, highlight **OK** and press Return.
7. In the Create DB2 Services window, accept the default values **Do not create a DB2 Instance** and **Do not create the Administration Server** by ensuring that **OK** is highlighted and pressing Return. (You will create a DB2 Instance and the Administration Server after the installation of any needed FixPak. Installation of FixPaks is discussed in the section "[Upgrading DB2 UDB with a FixPak.](#)")
8. A warning window informs you that you are not creating a DB2 Instance. Ensure that **OK** is highlighted and press Return to exit from the warning window.
9. A warning window informs you that you are not creating an Administration Server. Ensure that **OK** is highlighted and press Return to exit from the warning window.
10. The Summary Report window lists the products that you have elected to install. DB2 software is installed into the directory /opt/IBMdb2/V7.2. Ensure that **Continue** is highlighted and press Return.
11. A warning window gives you a final chance to cancel the installation. Ensure that **OK** is highlighted and press Return to continue with the installation.
12. A notice window informs you whether the installation has been successful. Ensure that **OK** is highlighted and press Return to exit from this window.
13. The Status Report window verifies which software packages are installed. Ensure that **OK** is highlighted and press Return.
14. Ensure that **Close** is highlighted and press Return.
15. A warning window informs you that you are not creating a DB2 Instance. Ensure that **OK** is highlighted and press Return to exit from the warning window.
16. A warning window informs you that you are not creating an Administration Server. Ensure that **OK** is highlighted and press Return to exit from the warning window.
17. A notice window asks whether you want to exit from the DB2 Setup Utility. Ensure that **OK** is highlighted and press Return.
18. Unmount the CD-ROM before removing it from the CD-ROM drive by entering the following command:

```
# umount cdrom/cdrom0
```

19. Determine whether you need to install a DB2 FixPak for your version of WebSphere Application Server by reviewing the information on the WebSphere Application Server Supported Hardware, Software, and APIs Web site at [www.ibm.com/software/webservers/appserv/doc/latest/prereq.html](http://www.ibm.com/software/webservers/appserv/doc/latest/prereq.html). 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.](#)" If you do not have to update your DB2 UDB installation with a FixPak, proceed to the steps in "[Configuring DB2 Universal Database \(UDB\) 7.2 for use with WebSphere Application Server.](#)"

## Upgrading DB2 UDB with a FixPak

To upgrade DB2 with a FixPak, do the following:

1. If you have not already done so, see the WebSphere Application Server Supported Hardware, Software, and APIs Web site at [www.ibm.com/software/webervers/appserv/doc/latest/prereq.html](http://www.ibm.com/software/webervers/appserv/doc/latest/prereq.html) to learn whether you need to install a DB2 FixPak for your level of WebSphere Application Server. Note the required FixPak level.
2. Go to the DB2 Online Support Web site at [www.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/download.d2w/report](http://www.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/download.d2w/report), navigate to the download page for the needed 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 file.
5. Uncompress and untar the file to extract the DB2 files.
6. Ensure that the group root exists on the machine. If it does not, add it by entering the following command:

```
# groupadd root
```

7. Move to the directory containing the **installallpatch** script by entering the following command:

```
# cd delta_install
```

8. Install the FixPak by using the **installallpatch** script, as follows:

```
# ./installallpatch
```

9. After you install the FixPak, complete the steps in "[Configuring DB2 Universal Database \(UDB\) 7.2 for use with WebSphere Application Server](#)."

## Configuring DB2 Universal Database (UDB) 7.2 for use with WebSphere Application Server

This article describes how to do the following:

- Create a DB2 instance and administration server
- Verify installation of DB2 UDB
- 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

The procedures in this article assume that DB2 is installed in the default location /opt/IBMdb2/V7.2 and that any required FixPak is installed.

### Creating a database instance and administration server

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. Create home directories for the DB2 Instance, DB2 Fenced User, and DB2 Administration Server. These directory names must match the values for the **Home Directory** option that you designate when configuring the DB2 Instance, DB2 Fenced User, and DB2 Administration Server in the procedures listed under Steps [7](#), [8](#), and [12](#).
3. Navigate to the directory containing the DB2 Setup Utility by entering the following command:

```
# cd /opt/IBMdb2/V7.2/install
```

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

```
# ./db2setup
```

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. In the Create DB2 Services window, highlight the **Create a DB2 Instance** option and press Return.
7. In the DB2 Instance window, perform the following steps, noting the values that you enter or accept for future reference:
  - a. Enter a user name or accept the default value for the **User Name** option. You will specify this user name when

you configure WebSphere Application Server.

- 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. Enter a group name or accept the default value for the **Group Name** option.
  - 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. You will specify this directory when you configure WebSphere Application Server.
  - f. Type a password for the user in the **Password** and **Verify Password** options. DB2 requires a password of eight or fewer characters. You will specify this password when you configure WebSphere Application Server.
  - g. Highlight **OK** and press Return.
8. In the Fenced User window, perform the following steps, noting the values that you enter or accept for future reference:
    - a. Enter a user name or accept the default value for the **User Name** option.
    - 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. Enter a group name or accept the default value for the **Group Name** option.
    - 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.
    - 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. In the DB2 Warehouse Control Database window, highlight the option labeled **Do not set up DB2 Warehouse Control Database** and press Return.
  10. Highlight **OK** and press Return.
  11. In the Create DB2 Services window, highlight the **Create the Administration Server** option and press Return.
  12. In the Administration Server window, perform the following steps, noting the values that you enter or accept for future reference:
    - a. Enter a user name or accept the default value for the **User Name** option.
    - 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. Enter a group name or accept the default value for the **Group Name** option.
    - 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.
    - 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 window informs you of the value being created for the DB2SYSTEM environment variable. Ensure that **OK** is highlighted and press Return.
  14. In the Create DB2 Services window, highlight **OK** and press Return.
  15. The Summary Report window summarizes the choices you have made so far. When you have determined that the information is correct, ensure that **Continue** is highlighted and press Return.
  16. A warning window opens, giving you the option of canceling the processes. Ensure that **OK** is highlighted and press Return.
  17. A notice window informs you when the processes are completed. Ensure that **OK** is highlighted and press Return.
  18. The Status Report window informs you of process successes and failures. View the Log File for information on how to correct particular failures. To exit from this window, ensure that **OK** is highlighted and press Return.
  19. In the DB2 Setup Utility window, highlight **Close** and press Return.
  20. In the notice window, ensure that **OK** is highlighted and press Return.
  21. Make the root user a member of the administrative group that you accepted or designated for the **Group Name** option during the creation of the Administrative Server in Step 12 by editing the /etc/group file.
  22. If you are developing or running applications and want to avoid specifying the full path to the product libraries and include files, consider creating symbolic links. Create symbolic links for the DB2 files to the /usr/lib directory and for the include files to the /usr/include directory by entering the following command:

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

23. Configure the instance owner (the value that you accepted or designated for the **User Name** option in Step 7, in this example, db2inst1) to run the **db2profile** script at login, by doing one of the following:

- o If the instance owner uses the Korn shell, add the following line to the .profile file of the instance owner. Note the space between the period (.) and the first forward slash (/):

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

- o If the instance owner uses the C shell, add the following line to the .cshrc file of the instance owner:

```
source /export/home/db2inst1/sqllib/db2cshrc
```

**Note:** You might need to create the .profile or .cshrc file if it does not already exist. If the instance owner uses a shell other than the Korn shell or C shell, make appropriate changes to this information.

24. Configure the root user to run the **db2profile** script at login by adding the following line to the .profile or .dtprofile file for the user root (assuming that the user root uses the Korn or Bourne shell and that /export/home/db2inst1 is the home directory of the example instance owner db2inst1):

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

This action is required to install and run WebSphere Application Server. If the user root uses a shell other than the Korn shell or Bourne shell, make appropriate changes to this information.

25. Log out and then log back in for your changes to take effect.

### Verifying the installation of DB2 UDB

To demonstrate that DB2 is functioning correctly, create a sample database and then compile and execute a Java application that accesses this database. To create a sample database and compile and run the Java application, perform the following steps:

1. Log in as the DB2 instance owner (the value that you accepted or designated for the **User Name** option in Step 7 in the procedure in the section "Creating a database instance and administration server"). Logging in as the instance owner places you automatically in the home directory of the instance owner. The command prompt changes in appearance to indicate the change in your login identity.
2. Ensure that your DISPLAY and TERM environment variables are set properly.
3. To ensure that the DB2 environment has been set up correctly, search the environment for the value of the DB2INSTANCE environment variable by entering the following command. The value returned must be the instance owner name (the value that you accepted or designated for the **User Name** option in Step 7 in the procedure in the section "Creating a database instance and administration server"):

```
$ env | grep DB2INSTANCE
```

4. Create the sample database by executing the **db2sampl** script, as follows. This process can take several minutes to complete.

```
$ db2sampl
```

5. Ensure that you are in the home directory of the instance owner (in this example, /export/home/db2inst1) and 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.

6. Ensure that DB2 is running or start it by entering the following command:

```
$ db2start
```



7. Execute the sample by using the **java** command, as follows:

```
$ java DB2Appl
```

Your output appears like the following:

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

8. If you want to stop DB2, enter the following command:

```
$ db2stop
```

9. To log out as the DB2 instance owner, enter the following command:

```
$ exit
```

The DB2 server remains active unless you stop it as detailed in Step 8.

### Creating and configuring a database for WebSphere Application Server

In order for WebSphere Application Server to store the administrative configuration, you must create a database on the database server node. The database name will be the same one (or alias) used for the JDBC URL entry name during the WebSphere Application Server installation. Perform the following steps to create a database named was40 and set the DB2 application heap size:

1. Log in as the DB2 instance owner (the value that you accepted or designated for the **User Name** option in Step 7 in the procedure in the section "Creating a database instance and administration server"). Logging in as the instance owner places you automatically in the home directory of the instance owner. The command prompt changes in appearance to indicate the change in your login identity.
2. Ensure that your DISPLAY and TERM environment variables are set properly.
3. To ensure that the DB2 environment has been set up correctly, search the environment for the value of the DB2INSTANCE environment variable by entering the following command. The value returned must be the instance owner name (the value that you accepted or designated for the **User Name** option in Step 7 in the procedure in the section "Creating a database instance and administration server"):

```
$ env | grep DB2INSTANCE
```

4. Ensure that DB2 is running or start it by entering the following command:

```
$ db2start
```

5. Enter the following command to create a database named was40. This process can take several minutes to complete.

```
$ db2 create database was40
```

6. Enter the following command to set the application heap size:

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

7. 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.

8. To log out as the DB2 instance owner, enter the following command:

```
$ exit
```

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

### Verifying connection to the was40 database

Perform the following steps to verify connection to the was40 database:

1. Log in as the DB2 instance owner (the value that you accepted or designated for the **User Name** option in Step 7 in the procedure in the section "Creating a database instance and administration server"). Logging in as the instance owner places you automatically in the home directory of the instance owner. The command prompt changes in appearance to indicate the change in your login identity.
2. Ensure that your DISPLAY and TERM environment variables are set properly.
3. To ensure that the DB2 environment has been set up correctly, search the environment for the value of the DB2INSTANCE environment variable by entering the following command. The value returned must be the instance owner name (the value that you accepted or designated for the **User Name** option in Step 7 in the procedure in the section "Creating a database instance and administration server"):

```
$ env | grep DB2INSTANCE
```

4. Ensure that DB2 is running or start it by entering the following command:

```
$ db2start
```

5. Connect to the was40 database by entering the following command:

```
$ db2 connect to was40
```

Your output appears like the following (assuming an instance name of db2inst1):

#### Database Connection Information

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

6. If you want to stop DB2, enter the following command:

```
$ db2stop
```

7. To log out as the DB2 instance owner, enter the following command:

```
$ exit
```

The DB2 server remains active unless you stop it as detailed in Step 6.

### 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 directory `/opt/WebSphere/AppServer/bin`.

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 (the value that you accepted or designated for the **User Name** option in Step 7 in the section "Creating a database instance and administration server"). Logging in as the instance owner places you automatically in the home directory of the instance owner. The command prompt changes in appearance to indicate the 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--Custom Installation option

This article describes how to install WebSphere Application Server on a local Solaris SPARC machine. These instructions assume the following:

- Your 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/webervers/appserv/doc/latest/prereq.html](http://www.ibm.com/software/webervers/appserv/doc/latest/prereq.html) for the requirements.
- You do not have a previous version of WebSphere Application Server already installed. If you do have a previous version of WebSphere Application Server installed, do not follow these instructions. Instead, refer to the article "[Migration overview](#)."
- You have installed and configured your database.
- If you are using IBM HTTP Server as your Web server, you will install it at the same time and onto the same node as

you install WebSphere Application Server. If you are using another supported Web server with WebSphere Application Server, you have already installed it onto the same node as WebSphere Application Server.

**Note:** You must purchase and install any Web server except IBM HTTP Server *before* you install WebSphere Application Server. IBM HTTP Server is supplied with WebSphere Application Server and can be installed automatically during installation of WebSphere Application Server.

To install WebSphere Application Server, do the following:

1. Ensure that you are logged onto the host machine with superuser (root) privileges.
2. If a preexisting Web server on your system is running, stop the Web server. If you plan to install IBM HTTP Server 1.3.19 as part of the WebSphere Application Server installation and a version of IBM HTTP Server prior to 1.3.19 is already installed on your system, you must uninstall it in order for the WebSphere Application Server installation program to successfully install IBM HTTP Server 1.3.19.
3. Insert the WebSphere Application Server CD-ROM and, if necessary, mount the CD-ROM drive. (On most Solaris systems, the Volume Management daemon (**vol**) mounts the CD-ROM automatically and immediately, as well as each time the machine is restarted. If the **vol** process is not running on the local machine, see your Solaris documentation for instructions on how to mount the CD-ROM drive.) The following steps assume that the CD-ROM drive is mounted at /cdrom.
4. Navigate to the correct directory on the WebSphere Application Server CD-ROM by entering the following command:

```
# cd /cdrom/cdrom0/sun
```

5. Ensure that the directory /usr/ucb exists in the PATH environment variable for the *root* login. If it does not, you must edit the **install.sh** script. To edit this script, do the following:
  - a. Copy the **install.sh** script from the /cdrom/cdrom0/sun directory to the /tmp directory on the machine on which you will install WebSphere Application Server.
  - b. Open this script in a text editor and find the line USERNAME=`/usr/ucb/whoami`.
  - c. Add the following line *before* the line USERNAME=`/usr/ucb/whoami`:

```
export PATH = $PATH:/usr/ucb
```

- d. Save the edited **install.sh** script.

6. If the supported Web server or database you plan to use with WebSphere Application Server 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](http://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 the prerequisite checking functionality, perform the following steps:

- a. Copy the prereq.properties file from the /cdrom/cdrom0/sun 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.
7. Run the installation script in one of following ways depending on the actions you have taken in Step 5 and Step 6:
    - o If you *have* edited the **install.sh** script as detailed in Step 5 but have *not* downloaded a new prereq.properties file or disabled prerequisite checking functionality as detailed in Step 6, run the installation script file by entering the following commands:

```
# cd /cdrom/cdrom0/sun
# /tmp/install.sh
```

- o If you *have* edited the **install.sh** script as detailed in Step 5 and *have* downloaded a new prereq.properties file

or disabled the prerequisite checking functionality as detailed in Step 6, run the installation script file by entering the following commands:

```
# cd /cdrom/cdrom0/sun
# /tmp/install.sh -prereqfile /tmp/prereq.properties
```

- o If you have *not* edited the **install.sh** script as detailed in Step 5 and have *not* downloaded a new prereq.properties file or disabled the prerequisite checking functionality as detailed in Step 6, run the installation script file by entering the following command:

```
# /cdrom/cdrom0/sun/install.sh
```

- o If you have *not* edited the **install.sh** script as detailed in Step 5 and *have* downloaded a new prereq.properties file or disabled the prerequisite checking functionality as detailed in Step 6, run the installation script file by entering the following command:

```
# /cdrom/cdrom0/sun/install.sh -prereqfile /tmp/prereq.properties
```

8. Click **Next** to pass the introductory page.
9. The Install Options window opens. Select **Custom Installation** and then click **Next**.
10. The Choose Application Server Components window opens. Select the components you want to install and deselect the components you do not want to install. Note the following information:
  - o The Java 2 Software Development Kit (SDK) is installed by default.
  - o 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.
  - o 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.
  - o 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://machine_name:9080/servlet/snoop
```

In this command, *machine\_name* represents the name of the machine on which WebSphere Application Server is running. The internal HTTP transport mechanism is not designed for use in a production environment.

- o 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.
- o These instructions assume that you are installing all of the components.

Click **Next** to continue.

11. A window opens that lets you select the plug-in. In this window, do the following:
  - a. Select the plug-in option for your Web server.
  - b. Click **Next**.

Only IBM HTTP Server 1.3.19 is provided with WebSphere Application Server. You must separately purchase and install the other supported Web servers.

12. The Database Options window opens. From the information that is displayed, do the following:
  - a. For **Database Type**, select your database from the drop-down list.

- b. Ensure that **Remote DB** is not selected. For this example, you will install WebSphere Application Server on the same node as the database.
  - c. For **Database Name (Database SID)**, enter the name of the database to use. This value is the name of the database that you created when you configured your database (for instance, **orcl** for Oracle or **was40** for DB2 UDB).
  - d. For **DB Home**, specify the path of the directory containing the database software.
  - e. For **DB URL**, specify the URL for accessing the database. In most cases, accept the default. (If you are using DB2, Sybase, Merant, or Informix, this field cannot be edited.)
  - f. For **Server Name**, specify the name of the host machine on which the database is located. In most cases, accept the default. (Do not edit this parameter if you are using DB2. To edit this parameter when using another database type, the database must be installed remotely and you must have clicked the **Remote DB** button.)
  - g. For **Port Number**, specify the port number of the host machine on which the database is located. In most cases, accept the default. (Do not edit this parameter if you are using DB2. To edit this parameter when using another database type, the database must be installed remotely and you must have clicked the **Remote DB** button.)
  - h. For **Database User ID**, specify the database user name. Ensure that you specify the same user name that you specified when configuring your database for use with WebSphere Application Server.
  - i. For **Database Password**, enter the database password. Ensure that you specify the same password that you specified when installing your database. If you are using DB2 UDB, your password must be eight or fewer characters in length. If you are using Sybase, your password must be six or more characters in length.
  - j. Click **Next**.
13. The Select Destination Directory window opens. Specify the directory into 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 its destination directory. Click **Next** to continue.
  14. A window opens that lists the options you have selected to install. Click **Install** to begin the installation.
  15. If you are installing IBM HTTP Server automatically at the same time as you install WebSphere Application Server, a window opens, prompting you for the full pathname and file name of the configuration file for the IBM HTTP Server, httpd.conf. Type the location of this file and click **OK**.
  16. The Setup Complete window 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.
  17. The WebSphere Application Server - First Steps window opens. You can use the 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 your Web server, close this window for now. If you later want to access the First Steps window, do the following:
    - a. Navigate to the directory containing the **firststeps.sh** script (by default, /opt/WebSphere/AppServer/bin) by using the **cd** command, as follows:

```
# cd /opt/WebSphere/AppServer/bin
```

- b. Execute the **firststeps.sh** script, as follows:

```
# ./firststeps.sh
```

18. Unmount the CD-ROM by entering the following command:

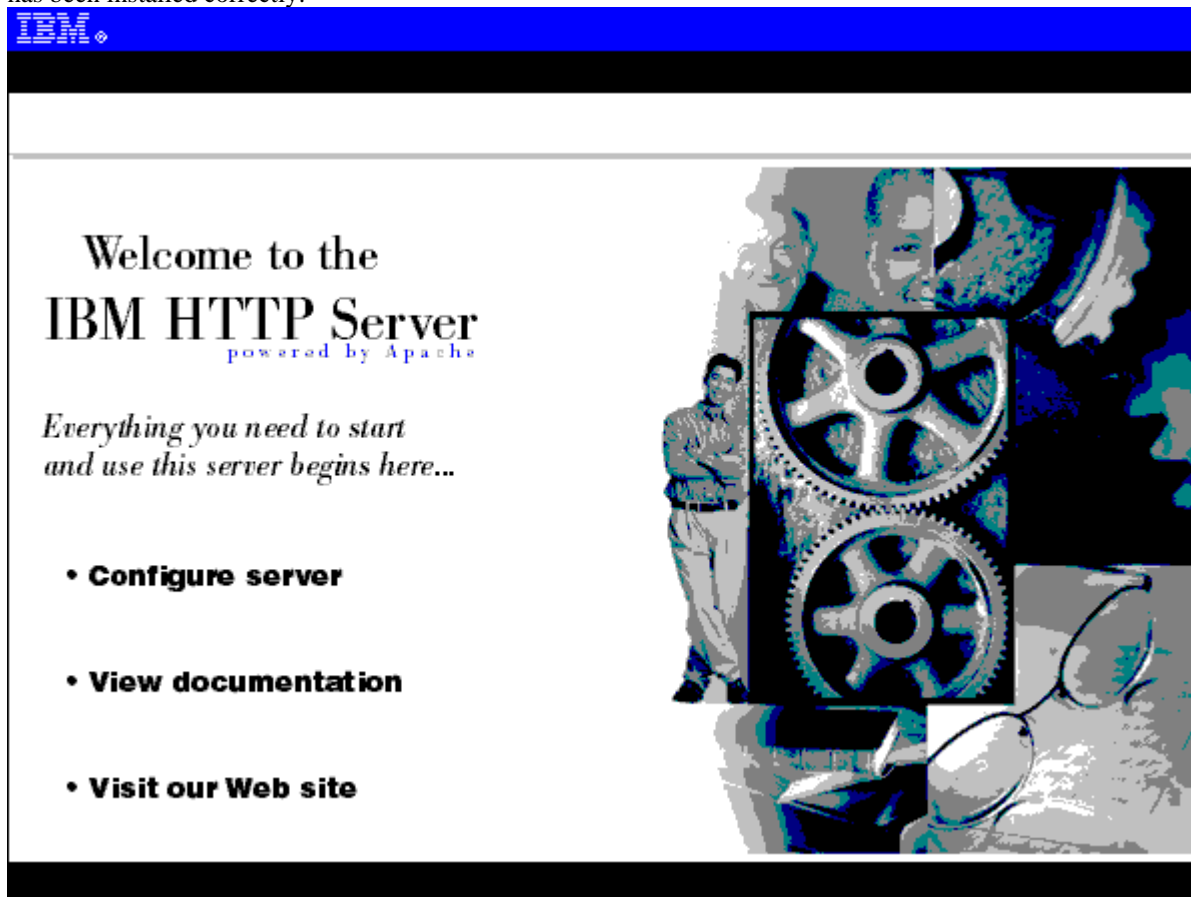
```
# umount cdrom/cdrom0
```

You can now eject the CD-ROM.

19. If you are using a Web server other than IBM HTTP Server, start the server. If you installed IBM HTTP Server as part of the WebSphere Application Server installation, you might need to configure it. Perform the following steps to verify that the IBM HTTP Server is installed correctly:
  - a. Ensure that the Web server is running or start it by entering the following command:

```
# /opt/IBMHTTPD/bin/apachectl start
```

- b. Open a Web browser window and type the name of the host machine as the Universal Resource Locator (URL) ([http://host\\_machine\\_or\\_localhost](http://host_machine_or_localhost)). If you see the Welcome to the IBM HTTP Server page, the server has been installed correctly.



Note that you might need to make configuration adjustments to the server in order to run it successfully on your system. See the IBM HTTP Web Server documentation at [www.ibm.com/software/webservers/htpservers/library.html](http://www.ibm.com/software/webservers/htpservers/library.html) for more information.

To enable the Secure Sockets Layer (SSL) on IBM HTTP Server, see the IBM HTTP Server documentation at [www.ibm.com/software/webservers/htpservers/doc/v1319/9atstart.htm](http://www.ibm.com/software/webservers/htpservers/doc/v1319/9atstart.htm) for more information.

## Testing the installation

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

1. Ensure that you are logged into the host machine with superuser (root) privileges.
2. Navigate to the directory containing the **startupServer.sh** script (located by default in the `/opt/WebSphere/AppServer/bin` directory) by using the **cd** command, as follows:

```
# cd /opt/WebSphere/AppServer/bin
```

3. Start the WebSphere Administrative Server by running the script **startupServer.sh**, as follows:

```
# ./startupServer.sh
```

Ensure that the server has started successfully by checking the file named tracefile located in

the `/opt/WebSphere/AppServer/logs` directory. Use the **tail** command to check the file, as follows:

```
# tail -f tracefile
```

The message `...open for e-business` appears in this file when the server has started successfully.

4. Navigate to the directory containing the **adminclient.sh** script (located by default in the `/opt/WebSphere/AppServer/bin` directory) by using the **cd** command, as follows:

```
# cd /opt/WebSphere/AppServer/bin
```

5. Start the administrative console by running the script **adminclient.sh**, as follows:

```
# ./adminclient.sh
```

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

After the default server is started initially, it will start automatically if it stops or if you restart the machine. Even if the administrative server fails, the application server continues to run.

7. Test the server by doing the following:
  - a. Ensure that the Web Server is running. If it is not running, start it.
  - b. Open a Web browser window and enter the URL for the snoop servlet, which is a standard sample servlet installed by default, as follows:

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

In this command, *machine\_name* represents the name of the machine on which WebSphere Application Server is running. Information on `/servlet/snoop` is displayed.

8. To stop the Default Server, do the following:
  - a. Highlight the entry **Default Server** and click the **Stop** icon on the tool bar. An information window opens stating that the server has stopped.
  - b. Click **OK** to close this window.

## Testing with an enterprise bean

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

1. Ensure that you are logged into the host machine with superuser (root) privileges.
2. Navigate to the directory containing the **startupServer.sh** script (located by default in the `/opt/WebSphere/AppServer/bin` directory) by using the **cd** command, as follows:

```
# cd /opt/WebSphere/AppServer/bin
```

3. Start the WebSphere Administrative Server by running the script **startupServer.sh**, as follows:

```
# ./startupServer.sh
```



Ensure that the server has started successfully by checking the file named `tracefile` located in the `/opt/WebSphere/AppServer/logs` directory. Use the **tail** command to check the file, as follows:

```
# tail -f tracefile
```

The message `...open for e-business` appears in this file when the server has started successfully.

4. Navigate to the directory containing the **adminclient.sh** script (located by default in the `/opt/WebSphere/AppServer/bin` directory) by using the **cd** command, as follows:

```
# cd /opt/WebSphere/AppServer/bin
```

5. Start the administrative console by running the script **adminclient.sh**, as follows:

```
# ./adminclient.sh
```

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

After the default server is started initially, it will start automatically if it stops or if you restart the machine. Even if the administrative server fails, the application server continues to run.

7. Ensure that the Web Server is running. If the Web server is not running, start it.
8. 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 Application Server is running. When the Web page opens, several selection options are displayed.

9. Under the heading **Generate hit count using**, click the radio button for the option **Enterprise Java Bean**.
10. Under the heading **Transaction Type**, click the radio button for the option **None**.
11. Click **Increment**.

If the number of hits is displayed, WebSphere Application Server is operating 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/htpservers/library.html](http://www.ibm.com/software/webservers/htpservers/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.