

## Installing the Advanced Edition using Apache and IBM DB2 UDB on AIX

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

- AIX 4.3.3
- IBM Developer Kit, Java™ 2 Technology Edition, 1.2.2
- Apache HTTP Server 1.3.12
- DB2 Universal Database (UDB) 6.1 or DB2 UDB 7.1
- A single node

See

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

### Steps for installation

[Deciding which steps to follow](#)

[Installing Apache HTTP Server 1.3.12](#)

[Installing DB2 UDB 6.1 or DB2 UDB 7.1](#)

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### 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.htm](http://www.ibm.com/software/webservers/appserv/doc/latest/prereq.htm) 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](http://www.ibm.com/software/webservers/appserv/download.html). WebSphere Application Server comes with the IBM Developer Kit. Instructions for installation follow:

1. [Install Apache HTTP Server 1.3.12](#)
2. Install [DB2 UDB 6.1](#) or [DB2 UDB 7.1](#). Both sets of instructions describe how to install DB2 UDB and an appropriate fixpack.
3. [Install WebSphere Application Server 3.5](#) using the **Custom Install** option

### Installing Apache HTTP Server 1.3.12

You can install Apache HTTP Server from files downloaded from the Apache Software Foundation Web site, <http://www.apache.org>. Apache HTTP Server is available in a source code or binary distribution. The steps below cover how to install compiled Apache HTTP Server binaries and then verify that the installed product runs properly.

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 may function incorrectly.

#### Installing Apache HTTP Server 1.3.12 from downloaded files

Perform the following steps to install Apache HTTP Server 1.3.12 from a downloaded .tar.gz file:

file:///D:/temp/info/docsrc/adv/three\_five/aix\_adv\_apache\_db2.html

5/10/2001

1. Ensure that you are logged into the host machine with superuser (root) privileges.
2. Uncompress the .tar.gz file you downloaded by using the **gunzip** utility, as follows:

```
# gunzip <file_name>.tar.gz
```

3. Untar the uncompressed .tar file to extract the Apache HTTP Server files, as follows:

```
# tar -xvf <file_name>.tar
```

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

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

The Apache HTTP Server is installed in the /usr/local/apache directory, by default. If you want to install the server in a different directory, enter the full path name of that directory as an option to the **install-bindist.sh** installation script.

6. To change the default configuration of the Apache HTTP Server, edit the httpd.conf, srm.conf, and access.conf files as necessary. For more information about editing these files and using Apache HTTP Server runtime configuration directives, go to the Apache Software Foundation Web site <http://www.apache.org/docs/mod/directives.html>.

### Testing installation of Apache HTTP Server 1.3.12

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

1. Start the server by entering the following command:

```
# /usr/local/apache/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 path name of the httpd.conf file by using the **-f** option.

2. Open a Web browser and enter the name of the host machine as the URL ([http://<host\\_machine\\_name>](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. See the Apache HTTP Server documentation at <http://www.apache.org/docs> for more information.

## Installing DB2 Universal Database (UDB) 6.1

This document describes the following:

- How to install and configure DB2 on a local AIX machine
- How to apply a fixpack to the installation

### Installing DB2 UDB 6.1

The DB2 product CD contains the files necessary to install and configure DB2 on a local AIX machine (the machine to which the CD-ROM drive is attached). Perform the following steps to install DB2:

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. Ensure that a CD-ROM drive is installed and configured on the machine. If a CD-ROM drive is not installed or configured on the machine, install and configure one according to the instructions provided with the drive.
3. Insert the DB2 UDB 6.1 CD into the drive, using a caddy if the drive requires one.
4. Use the **mkdir** command to create a mount point for the CD. The following command creates a mount point for the CD at /cdrom; you can mount the CD at any location on the machine's local file system.

```
# mkdir /cdrom
```

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

```
# mount -o ro -v cdrfs /dev/cdnumber /cdrom
```

In this command, *number* is the CD-ROM number for your system, usually 0 (zero).

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

6. Navigate to the correct directory on the DB2 UDB 6.1 CD by entering the following command:

```
# cd /cdrom
```

7. Enter the following command to start the DB2 Installer Program:

```
# ./db2setup
```

8. On the Install DB2 V6.1 screen, select the products that you want to install by performing the steps below. (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**, **DB2 Connect Enterprise Edition**, and **DB2 Software Developer's Kit** 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 (HTML)** section, highlight the option appropriate for your locale (**en\_US** in the United States) and press Return.
  - d. On the DB2 Product Library screen, highlight **OK** and press Return.
  - e. On the Install DB2 V6.1 screen, highlight **OK** and press Return.
9. On the Create DB2 Services screen, accept the default values **Do not create DB2 Instance** and **Do not create the Administration Server** and click **OK**. You will create a DB2 Instance and Administration Server after installing a fixpack. Installation of fixpacks is discussed in the section "[Upgrading DB2 UDB 6.1 with a fixpack](#)."
10. A Warning screen informs you that you are not creating a DB2 Instance. Ensure that **OK** is highlighted, and press return to exit from the Warning screen.
11. A Warning screen informs you that you are not creating an Administration Server. Ensure that **OK** is highlighted, and press return to exit from the Warning screen.
12. The Summary Report screen lists the products that you have elected to install. DB2 software is installed into the directory /usr/lpp/IBMdb2/V6.1. Ensure that **Continue** is highlighted and press Return.
13. A Warning screen gives you a final chance to opt out of the installation. Ensure that **OK** is highlighted and press Return to continue with the installation.
14. A Notice screen informs you whether the installation has been successful. Ensure that **OK** is highlighted and press Return to exit from this screen.
15. The Status Report screen verifies which software packages have been installed. Ensure that **OK** is highlighted and press Return.
16. Ensure that **Close** is highlighted and press Return.
17. A Warning screen informs you that you are not creating a DB2 Instance. Ensure that **OK** is highlighted and press Return to exit from the Warning screen.
18. A Warning screen informs you that you are not creating an Administration Server. Ensure that **OK** is highlighted and press Return to exit from the Warning screen.
19. A Notice screen asks if you want to exit from the DB2 Installer. Ensure that **OK** is highlighted and press Return.

If you installed DB2 UDB from the current WebSphere Application Server CD-ROM, any needed DB2 UDB fixpack was installed as well. In this case, proceed to the steps in "[Configuring and testing DB2 UDB 6.1](#)."

If you did not install DB2 UDB from the current WebSphere Application Server CD-ROM, see the [Software Prerequisites Web site](#) to learn whether you need to install a fixpack for your level of WebSphere Application Server. If you do need to update your DB2 UDB installation with a fixpack, note the fixpack level and proceed to the steps in "[Upgrading DB2 UDB 6.1 with a fixpack](#)."

## Upgrading DB2 UDB 6.1 with a fixpack

To upgrade DB2 UDB 6.1 with a fixpack, do the following:

1. If you have not already done so, see the [Software Prerequisites Web site](#) to learn whether you need to install a fixpack for your level of WebSphere Application Server. Note the fixpack level needed.
2. Go to <http://www-4.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/download.d2w/report>, navigate to the download page for the needed fixpack, and download the appropriate file. Read the accompanying README file for installation tips.
3. Ensure that you are logged into the machine with superuser (root) privileges.
4. Move to the directory containing the downloaded file.
5. Uncompress and untar the file to extract the DB2 files.
6. Remove the .toc file from the download directory. This action causes smit to create a new table of contents that matches the contents of the download directory.
7. Ensure that all DB2 processes are stopped.
8. To install all fixes from the fixpack, use the following command:

```
# smit update_all
```

9. In the **INPUT device / directory for software** field, specify the path where the installation images are located and click **OK**.
10. Click **OK** to take the default file choices for DB2 software.
11. Click **OK** to continue with the installation.

To check the installation, see "[Configuring and testing DB2 UDB 6.1.](#)"

## Configuring and testing DB2 UDB 6.1

Before you can run WebSphere Application Server, you must create a DB2 UDB instance and the database named *was*, which WebSphere Application Server uses.

### Creating a database instance

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. Navigate to the directory containing the DB2 Installer by entering the following command:

```
# cd /usr/lpp/db2_06_01/install
```

3. Start the DB2 Installer by entering the following command:

```
# ./db2setup
```

4. On the DB2 Installer screen, highlight the **Create** button beside the option labeled **To create a DB2 Instance, or the Administration Server**, select **Create** and press Return.
5. On the Create DB2 Services screen, highlight the **Create the Administration Server** option and press Return.
6. On the Administration Server screen, 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. (It is recommended that you create the home directory that you specify on your system before trying to create the Administration Server.)
  - f. Type a password for the user in the **Password** and **Verify Password** options. DB2 requires a password of 8 or

fewer characters.

- g. Highlight **OK** and press Return.
7. A Notice screen informs you of the value being created for the DB2SYSTEM environment variable. Ensure that **OK** is highlighted and press Return.
8. On the Create DB2 Services screen, highlight the **Create a DB2 Instance** option and press Return.
9. On the DB2 Instance screen, 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. The user ID is the DB2 instance owner and is needed for installing WebSphere Application Server.
  - 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. (It is recommended that you create the home directory that you specify on your system before trying to create the Instance.)
  - f. Type a password for the user in the **Password** and **Verify Password** options. DB2 requires a password of 8 or fewer characters.
  - g. Highlight **OK** and press Return.
10. On the Fenced User screen, 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. (It is recommended that you create the home directory that you specify on your system before trying to create the Fenced User.)
  - f. Type a password for the user in the **Password** and **Verify Password** options.
  - g. Highlight **OK** and press Return.
11. On the Create DB2 Services screen, highlight **OK** and press Return. The Summary Report screen is displayed, summarizing all of the choices you have made so far.
12. Verify the information on the Summary Report screen. When you have determined that it is correct, ensure that **Continue** is highlighted and press Return. A Warning screen is displayed, giving you the option of canceling the processes.
13. On the Warning screen, ensure that **OK** is highlighted and press Return.
14. A Notice screen informs you when the processes have completed. Ensure that **OK** is highlighted and press Return.
15. The Status Report screen informs you of process successes and failures. View the Log File for information on how to correct particular failures. To exit this screen, ensure that **OK** is highlighted and press Return.
16. On the DB2 Installer screen, highlight **Close** and press Return.
17. On the Notice screen, ensure that **OK** is highlighted and press Return.
18. Make root 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 6.
19. Create symbolic links by entering the following command:

```
# /usr/lpp/db2_06_01/cfg/db2ln
```

20. Configure the instance owner (the value that you specified for the **User Name** option in Step 9) to run db2profile on startup, by doing one of the following:
  - o For the Korn shell, add the following line to the .profile file of the instance owner (for instance, db2inst1). Note the space between the period (.) and the first forward slash (/):

```
. /home/db2inst1/sqlllib/db2profile
```

- o For the C shell, add the following line to the .cshrc file of instance owner (for instance, db2inst1):

```
source /home/db2inst1/sqlllib/db2cshrc
```

21. Configure root to run db2profile on startup. This is required to install and run WebSphere Application Server.

## Creating and configuring a database for WebSphere Application Server

Create a database named *was* and set its DB2 application heap size by performing the following steps:

1. Log in as the DB2 instance owner (the value that you specified for the **User Name** option in Step 9 in "Creating a database instance"). Note that when you log in as the instance owner, the command prompt appears as \$, rather than #, to indicate your login identity.
2. Enter the following command to start DB2:

```
$ db2start
```

3. Enter the following command to create a database named *was*. This process can take several minutes to complete.

```
$ db2 create database was
```

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

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

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

It is recommended that you set up the database manager to use TCP/IP to remotely connect to WebSphere. Note that if you are using a local DB2 database with WebSphere Application Server (for example, both DB2 and WebSphere Application Server are installed on the same machine) all of the steps in the following procedure will be performed on the same machine:

1. On the server machine, log in as the DB2 instance owner. (Note that, in these steps, the server and client may be the same machine.) Then, do the following:
  - a. Set DB2COMM to TCP/IP using a command such as the following:

```
db2set DB2COMM=tcPIP
```

- b. Open an editor on the */etc/services* file. If it does not specify DB2 connection and interrupt service ports, then add lines such as the following to specify the ports:

```
server1      50000/tcp  # DB2 connection service port
server1i    50001/tcp  # DB2 interrupt connection service port
```

- c. Update the database manager configuration:

```
db2 update dbm cfg using svcename <DB2_connection_service_port>
```

For *DB2\_connection\_service\_port*, specify the name used in the */etc/services* file (for example, *server1*).

2. On the client machine:
  - a. Catalog the node using a command such as the following:

```
db2 catalog tcPIP node node1 remote <hostname> server \
<DB2_connection_service_port>
```

- b. Catalog the database:

```
db2 catalog database was as wasAlias at node node1
```

3. Stop and start DB2.

## Verifying installation of DB2 UDB V6.1

To demonstrate that DB2 is functioning correctly, create a sample database and then compile and execute a Java application that accesses this database. The steps below establish that the correct environment is available for DB2 and the IBM Java Development Kit (JDK) and that the Java Database Connectivity (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 (the value that you specified for the **User Name** option in Step 9 in "Creating a database instance"). Note that when you log in as the instance owner, the command prompt appears as \$, rather than #, to indicate your login identity.
2. To ensure that the DB2 profile has been set correctly, search the environment for the value of DB2INSTANCE by entering the following command. The value returned must be the instance owner name (the value that you specified for the **User Name** option in Step 9 in "Creating a database instance"):

```
$ env | grep DB2INSTANCE
```

3. Enter the following command to create the sample database. This process can take several minutes to complete.

```
$ db2sampl
```

4. Compile an example Java application, placing the resulting class file in the local directory, by entering the following command:

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

5. Start DB2 by entering the following command:

```
$ db2start
```

6. Execute the sample by entering the following command:

```
$ java DB2Appl
```

Your output appears like 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.
```

7. To log out, enter control-D (^D) at the command prompt.

## Verifying connection to the *was* database

To verify connection to the *was* database, perform the following steps:

1. Log in as the DB2 instance owner (the value that you specified for the **User Name** option in Step 9 in "Creating a database instance"). Note that when you log in as the instance owner, the command prompt appears as \$, rather than #, to indicate your login identity.
2. Enter the command:

```
$ db2 connect to was
```



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

#### Database Connection Information

```
Database server      = DB2/6000 6.1.0
SQL authorization ID = DB2INST1
Local database alias = WAS
```

3. To log out, enter control-D (^D) at the command prompt.

## Installing DB2 Universal Database (UDB) 7.1

This document describes the following:

- How to install and configure DB2 on a local AIX machine
- How to apply a fixpack to the installation

### Installing DB2 UDB 7.1

The DB2 product CD contains the files necessary to install and configure DB2 on a local AIX machine (the machine to which the CD-ROM drive is attached). Perform the following steps to install DB2:

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. Ensure that a CD-ROM drive is installed and configured on the machine. If a CD-ROM drive is not installed or configured on the machine, install and configure one according to the instructions provided with the drive.
3. Insert the DB2 UDB V7.1 CD into the CD-ROM drive and, if necessary, mount the CD.
4. If necessary, use the **mkdir** command to create a mount point for the CD. The following command creates a mount point at /cdrom; you can mount the CD at any location on the machine's local file system.

```
# mkdir /cdrom
```

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

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

```
# mount -o ro -v cdrfs /dev/cd number /cdrom
```

In this command, *number* is the CD-ROM number for your system, usually 0 (zero). Note that this command assumes that the CD is mounted at /cdrom.

6. Navigate to the /cdrom directory by entering the following command:

```
# cd /cdrom
```

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

```
# ./db2setup
```

8. On the Install DB2 V7 screen, select the products that you want to install by performing the steps below. (Press the Tab key to move among and highlight options and press the Return key to select or deselect options.)
  - a. Select **DB2 Administration Client**, **DB2 UDB Enterprise Edition**, **DB2 Connect 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 (HTML)** section, highlight the option appropriate for your locale (**en\_US** for U.S. English) and press Return.



- d. On the DB2 Product Library screen, highlight **OK** and press Return.
- e. On the Install DB2 V7 screen, highlight **OK** and press Return.
9. On the Create DB2 Services screen, accept the default values **Do not create DB2 Instance** and **Do not create the Administration Server** and click **OK**. You will create a DB2 Instance and Administration Server after installing a fixpack. Installation of fixpacks is discussed in the section "[Upgrading DB2 UDB 7.1 with a fixpack.](#)"
10. A Warning screen informs you that you are not creating a DB2 Instance. Ensure that **OK** is highlighted, and press Return to exit from the Warning screen.
11. A Warning screen informs you that you are not creating an Administration Server. Ensure that **OK** is highlighted, and press Return to exit from the Warning screen.
12. Ensure that **OK** is highlighted, and press Return to continue with the installation. You are notified when the installation completes successfully, and are then prompted to register your DB2 software.
13. A Warning screen informs you that you are not creating a DB2 instance. Ensure that **OK** is highlighted, and press Return.
14. A Warning screen informs you that you are not creating the Administration Server. Ensure that **OK** is highlighted, and press Return.
15. A notice asks if you want to exit from the DB2 Setup Utility. Exit from the DB2 Setup Utility by ensuring that **OK** is highlighted, and pressing Return.

Determine whether you need to update the basic DB2 installation with a fixpack by reviewing the information on the WebSphere Application Server Supported Hardware, Software, and APIs Web site at [www.ibm.com/software/webervers/appserv/doc/latest/prereq.htm](http://www.ibm.com/software/webervers/appserv/doc/latest/prereq.htm). If you must install a fixpack, note the fixpack level and proceed to the section "[Upgrading DB2 UDB 7.1 with a fixpack.](#)"

### Upgrading DB2 UDB 7.1 with a fixpack

To upgrade DB2 UDB 7.1 with a fixpack, 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.htm](http://www.ibm.com/software/webervers/appserv/doc/latest/prereq.htm) to learn whether you need to install a fixpack for your level of WebSphere Application Server. Note the fixpack level needed.
2. Go to <http://www-4.ibm.com/cgi-bin/db2www/data/db2/udb/win02unix/support/download.d2w/report>, navigate to the download page for the needed fixpack, and download the appropriate file. Read the accompanying README file for installation tips.
3. Ensure that you are logged into the machine with superuser (root) privileges.
4. Move to the directory containing the downloaded file.
5. Uncompress and untar the file to extract the DB2 files.
6. Remove the .toc file from the download directory. This action causes smit to create a new table of contents that matches the contents of the download directory.
7. Ensure that all DB2 processes are stopped.
8. To install all fixes from the fixpack, use the following command:

```
# smit update_all
```

9. In the **INPUT device / directory for software** field, specify the path where the installation images are located and click **OK**.
10. Click **OK** to take the default file choices for DB2 software.
11. Click **OK** to continue with the installation.

To verify your DB2 installation, see "[Configuring and testing DB2 UDB 7.1.](#)"

### Creating a database instance

Perform the following steps to create the resources required by a DB2 instance and to create the instance:

1. Ensure that you are logged into the machine with superuser (root) privileges.
2. Invoke SMIT to create an administrative group for DB2 (named db2adm for this example), by entering the following command:

```
# smit mkgroup
```

3. On the Add a Group screen, do the following:
  - a. In the **Group NAME** field, type `db2adm`.
  - b. Click **OK**. When this process is complete, exit from SMIT.
4. Create a user to administer the DB2 instance (named `db2inst1` for this example), by entering the following command:

```
# smit mkuser
```

5. In the Add a User screen, complete the steps below. Note that the values that you add for the **HOME directory** and **Initial PROGRAM** fields can differ from those shown here.
  - a. In the **User NAME** field, type `db2inst1`. Note that the user name you specify here identifies the database instance owner. When you install WebSphere Application Server you will specify this user name for the database user ID.
  - b. In the **Primary Group** field, type `db2adm`.
  - c. In the **HOME directory** field, type `/home/db2inst1`.
  - d. In the **Initial PROGRAM** field, type `/usr/bin/ksh`.
  - e. Click **OK**. When this process is complete, exit from SMIT.
6. Assign an initial password for user `db2inst1` by entering the following command:

```
# smit passwd
```

7. In the Change a User's Password screen, do the following:
  - a. In the **User NAME** field, type `db2inst1` and click **OK**.
  - b. In the Change a User's Password pop-up window, type the new password for user `db2inst1`. For this example, use the password `changeme` and press Return. Note that DB2 requires a password of 8 or fewer characters.
  - c. You are prompted to enter the new password again. Type `changeme` and press Return. When this process is complete, exit from SMIT.
8. Ensure that the user `root` is a member of the `db2adm` group by entering the command:

```
# smit user
```

9. From the Users screen menu, choose **Change / Show Characteristics of a User**.
10. In the Change / Show Characteristics of a User pop-up window, type `root` in the **User NAME** field, and click **OK**.
11. In the Change / Show Characteristics of a User screen, do the following:
  - a. In the **Group SET** field, ensure that the group `db2adm` is included by clicking the field and scrolling to the end of the entries. If `db2adm` is not listed, append it to the list of entries.
  - b. Click **OK**. When this process is complete, exit from SMIT.
12. Create a database instance (named `db2inst1` in this example) by entering the following command:

```
# /usr/lpp/db2_07_01/instance/db2icrt -u db2inst1 db2inst1
```

Note that you may get an error message stating that your machine is out of space. Increase the free space in the `/home` directory.

13. Create symbolic links from the home directory of the instance to the DB2 installation directory by entering the following command:

```
# /usr/lpp/db2_07_01/cfg/db2ln
```

14. Configure the instance owner (`db2inst1` in this example) to run the `db2profile` script on startup:
  - o For the Korn shell (ksh), add the following text to the `.profile` file of the instance owner `db2inst1`. Note the space between the period (`.`) and the first slash (`/`).

```
. /home/db2inst1/sqlllib/db2profile
```

- o For the C shell (csh), add the following line to the .cshrc file of instance owner *db2inst1*:

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

15. Configure root to run db2profile on startup. This is required to install and run WebSphere Application Server.

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

Perform the following steps to create a database named *was* and set its DB2 application heap size:

1. Log in as the DB2 instance owner named *db2inst1*, which was defined in the steps above. Note that when you log in as *db2inst1*, the command prompt changes from # to \$ to indicate a change in your login identity.
2. If this is the first time that you have authenticated as the DB2 instance owner, you are prompted to change the password. Type in a new password and press Return. Note that DB2 requires a password of 8 or fewer characters.
3. When prompted, type the new password again and press Return.
4. To ensure that the DB2 environment has been set correctly, verify the value of the DB2INSTANCE environment variable by issuing the following command. The value returned should be *db2inst1*:

```
$ env | grep DB2INSTANCE
```

5. Enter the following command to start DB2:

```
$ db2start
```

6. Enter the following command to create a database named *was*. This process can take several minutes.

```
$ db2 create database was
```

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

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

8. Restart the machine for your changes to take effect. If an application heap size of 256 does not work for your system, increase the application heap size to 512.

It is recommended that you set up the database manager to use TCP/IP to remotely connect to WebSphere. Note that if you are using a local DB2 database with WebSphere Application Server (for example, both DB2 and WebSphere Application Server are installed on the same machine) all of the steps in the following procedure will be performed on the same machine:

1. On the server machine, log in as the DB2 instance owner. (Note that, in these steps, the server and client may be the same machine.) Then, do the following:
  - a. Set DB2COMM to TCP/IP using a command such as the following:

```
db2set DB2COMM=tcPIP
```

- b. Open an editor on the /etc/services file. If it does not specify DB2 connection and interrupt service ports, then add lines such as the following to specify the ports:

```
server1      50000/tcp  # DB2 connection service port
serverli     50001/tcp  # DB2 interrupt connection service port
```

- c. Update the database manager configuration:

```
db2 update dbm cfg using svcename <DB2_connection_service_port>
```

For *DB2\_connection\_service\_port*, specify the name used in the /etc/services file (for example, *server1*).

2. On the client machine:
  - a. Catalog the node using a command such as the following:

```
db2 catalog tcpip node node1 remote <hostname> \
server <DB2_connection_service_port>
```

- b. Catalog the database:

```
db2 catalog database was as wasAlias at node node1
```

3. Stop and start DB2.

### Verifying installation of DB2 UDB 7.1

To demonstrate that DB2 is functioning correctly, create a sample database and then compile and execute a Java application that accesses this database. The steps below establish that the correct environment is available for DB2 and the IBM JDK, 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 (the value that you specified for the **User Name** option in Step 5 in "Creating a database instance"). Note that when you log in as the instance owner, the command prompt appears as \$, rather than #, to indicate your login identity.
2. If this is the first time that you have authenticated as the DB2 instance owner, you are prompted to change the password. Type in a new password and press Return. Note that DB2 requires a password of 8 or fewer characters.
3. When prompted, type the new password again and press Return.
4. To ensure that the DB2 profile has been set correctly, search the environment for the value of DB2INSTANCE by entering the following command. The value returned must be the instance owner name (the value that you specified for the **User Name** option in Step 5 in "Creating a database instance"):

```
$ env | grep DB2INSTANCE
```

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

```
$ db2sampl
```

6. Compile an example Java application, placing the resulting class file in the local directory, by entering the following command:

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

7. Start DB2 by entering the following command:

```
$ db2start
```

8. Execute the sample by entering the following command:

```
$ java DB2Appl
```

Your output appears like 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.

9. To log out, enter control-D (^D) at the command prompt.

### Verifying connection to the *was* database

To verify connection to the *was* database, perform the following steps:

1. Log in as the DB2 instance owner (the value that you specified for the **User Name** option in Step 5 in "Creating a database instance"). Note that when you log in as the instance owner, the command prompt appears as \$, rather than #, to indicate your login identity.
2. Enter the command:

```
$ db2 connect to was
```

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

#### Database Connection Information

```
Database server      = DB2/6000 7.1.0
SQL authorization ID = DB2INST1
Local database alias = WAS
```

3. To log out, enter control-D (^D) at the command prompt.

## Installing WebSphere Application Server 3.5

To install WebSphere Application Server using the GUI installer, do the following:

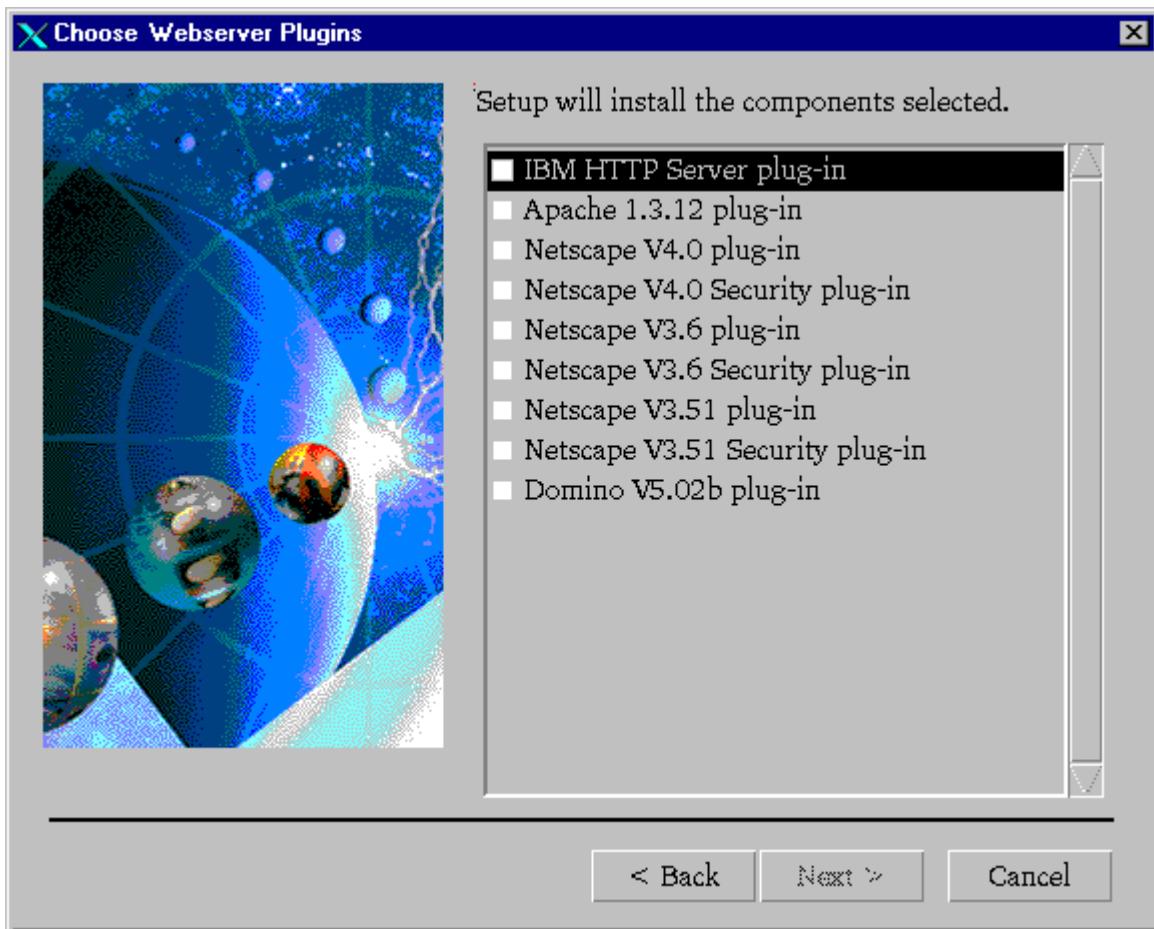
1. Log into your machine with superuser (root) privileges.
2. If Apache HTTP Server or another Web server on your system is running, stop the Web server. Also, if a version of WebSphere Application Server Version is already installed on your system and running, stop all Application Server processes.
3. If you plan to use a Web server or database at a level that exceeds the current version required by WebSphere Application Server, you must disable the WebSphere Prerequisite Checker before installing WebSphere Application Server. To do this, perform the following steps:
  - a. Copy the `prereq.properties` file from the `/cdrom/aix` directory to the `/tmp` directory on the machine on which you will install WebSphere Application Server.
  - b. Edit this file by finding the line `prereq_checker=1` and changing it to `prereq_checker=0`.
4. If you have not disabled the Prerequisite Checker as detailed in Step 3, run the installation script file by entering the following command:

```
# /cdrom/aix/install.sh
```

If you have disabled the Prerequisite Checker as detailed in Step 3, run the installation script file by entering the following command:

```
# /cdrom/aix/install.sh /prereqfile /tmp/prereq.properties
```

5. Click **Next** to pass the introductory page.
6. In the Install Options dialog, select **Custom Installation**; then click **Next**.
7. In the Choose Application Server Components dialog, select those components you want and deselect those components you do not want. You will likely want to include the default options. Ensure that **Configure Default Server and Application** is selected. If you plan on running WebSphere Application Server with a supported Web server, then also select **Web Server Plugins**.
8. Click **Next**. If necessary, shut down all Web servers you plan to run with WebSphere Application Server and proceed.
9. If you opted to install a plug-in, the Choose Webserver Plugins page displays.



Select **Apache 1.3.12 plug-in**. You must separately purchase and install Apache HTTP Server. Only IBM HTTP Server 1.3.12 is provided with WebSphere Application Server.

10. On the Database Options dialog, do the following:
  1. For **Database Type**, select **DB2**.
  2. For **Database Name**, give the name of the database to use. The default is **was**.
  3. For **DB Home**, specify the path for the database program. It is `/home/db2inst1`.
  4. For **DB URL**, specify the URL for accessing the database. You will likely want to take the default, which has the form `jdbc:db2:was`.
  5. For **Database User ID**, specify your user name. If you have already installed DB2 UDB, ensure that you specify the DB2 instance owner (`db2inst1`).
  6. For **Database Password** and **Confirm Password**, enter your password. If you have already installed DB2 UDB, ensure that you specify the password for the DB2 instance owner (`db2inst1`). Note that DB2 UDB requires a password of 8 or fewer characters.
  7. Click **Next**.
11. On the Security Options dialog, fill in the user ID, security password, and confirming password to use for the application server. If you do not need special key ring files, click **Next** to take the default key ring files and to move to the Product Directory dialog.

If you need special key ring files, move to the key ring section, designate client and server files and passwords, and then click **Next** until you are at the Product Directory dialog.

12. Specify the destination directories and click **Next**.
13. Click **Next** again and then **OK** to begin the installation.
14. The next page points you to the README. If you select to view the README and a Netscape browser does not open on the README, look in the `<main_Application_Server_directory>/web/InfoCenter/was` directory for the `readme.html` file. For the most recent version of the README or release notes, go to **Library** section of the product

Web site at <http://www.ibm.com/software/webservers/appserv/>.

Click **Finish**.

### Finishing prerequisite configuration

To ensure that DB2 installed properly and that the WAS database has been created, see "[Configuring and testing installation of DB2 UDB 6.1](#)" or "[Configuring and testing installation of DB2 UDB 7.1](#)" if you have not done so already.

### Testing the installation

1. Start the WebSphere Administrative Server by running the startupServer script in the /usr/WebSphere/AppServer/bin directory:

```
./startupServer.sh
```

2. Wait patiently. If the server is slow to start or does not start successfully, look at the tracefile log. If the trace file says *server is open for e-business*, the server has started.
3. Start the administrative console by running the adminclient script in the /usr/WebSphere/AppServer/bin directory:

```
./adminclient.sh
```

4. Wait until you see the console message *Console Ready*. Then administer the server:
  1. When the Administrative Console opens, the **Topology** tree view is shown. Click on the + sign next to **WebSphere Administrative Domain** to expand the view.
  2. Your host name should be listed. Expand the view of that node, and you should see an entry called **Default Server**. Expand that and you will see the default container and servletEngine.
  3. Select **Default Server**. If the **Current State** of DefaultServer is *Stopped*, click the **Start** icon on the tool bar. After an information dialog displays, stating that the server is running, click **OK**. Note that the current state changes from *Stopped* to *Running*.

Once the server starts, it is marked in the configuration database that it should be running. If it stops, or if you reboot the machine, the administrative server will automatically restart it. Even if the administrative server fails, it will continue to run.

5. Test the server. Ensure that the Apache HTTP Server is running. If the Apache HTTP Server is not running, start the server by entering the following in the /usr/local/apache directory:

```
httpd
```

Then, open a browser and go to `http://<host_machine_name>/servlet/snoop`, which is a standard sample servlet installed by default. You should see information on /servlet/snoop.

### Testing with an Enterprise Bean

After you install WebSphere Application Server, you can test an enterprise bean by using the Inc sample:

1. Go to the administrative console.
2. Ensure that default server and the Inc bean are already started.
3. Start your Web browser and specify for the URL address: `http://<your_host>/webapp/examples/HitCount`. You should see a Web page with selection options.
4. From the list **Generate hit count using**, select **Enterprise JavaBean**. From the list **Transaction Type**, select **None**.
5. Click on **Increment**.

The number of hits is displayed.