

Installing the Standard 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 Standard Edition that uses--

- Solaris 2.6, 7, or 8
- Sun SDK 1.2.2
- IBM HTTP Web Server 1.3.12
- DB2 Universal Database (UDB) 6.1 or DB2 UDB 7.1
- A single node

See the WebSphere Application Server Supported Hardware, Software, and APIs Web site at 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

[Deciding which steps to follow](#)

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

[Installing WebSphere Application Server](#)

[Testing the installation](#)

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 appropriate Solaris patches, Sun SDK, and IBM HTTP Web Server. If you have not already done so, install DB2 UDB and then obtain the product CD for WebSphere Application Server or [download](#) the product from the Web. Information on installation follows:

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

Installing DB2 Universal Database (UDB) 6.1

This document describes the following:

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

Installing DB2 UDB 6.1

The DB2 product CD-ROM contains the files necessary to install and configure DB2 on a local Solaris 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 you have set the following UNIX kernel, shared memory, and semaphore parameters properly:
 - MSGMAX
 - MSGMNB
 - MSGMAP
 - MSGMNI
 - MSGSSZ
 - MSGTQL
 - MSGSEG
 - SHMMAX

- o SHMSEG
- o SHMMNI
- o SEMMNI
- o SEMMAP
- o SEMMNS
- o SEMMNU

The following sample files update settings for these parameters. The files are located in the /db2/install/samples directory on the DB2 product CD-ROM and in the /opt/IBMdb2/V6.1/cfg directory after product installation:

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

Choose the file appropriate for your system and append it to the /etc/system file; then reboot. For information on the proper values for these parameters, refer to *DB2 Quick Beginnings for UNIX* and to related DB2 UDB documentation. 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.

3. Insert the DB2 UDB V6.1 CD-ROM and, if necessary, mount the CD-ROM drive. (On most Solaris systems, the Volume Management daemon (**vold**) mounts the CD-ROM automatically and immediately, as well as each time the machine is rebooted. If the **vold** 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 V6.1 CD-ROM by entering the following command:

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

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

```
# ./db2setup
```

6. 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**, 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.
7. On the Create DB2 Services screen, 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 a fixpack. Installation of fixpacks is discussed in the section [Upgrading DB2 UDB 6.1 with a fixpack.](#))
8. 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.
9. 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.
10. The Summary Report screen lists the products that you have elected to install. DB2 software is installed into the directory /opt/IBMdb2/V6.1. Ensure that **Continue** is highlighted and press Return.
11. 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.
12. A Notice screen informs you whether the installation has been successful. Ensure that **OK** is highlighted and press Return to exit from this screen.
13. The Status Report screen verifies which software packages have been installed. Ensure that **OK** is highlighted and press Return.
14. Ensure that **Close** is highlighted and press Return.

15. 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.
16. 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.
17. 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 verifying installation of 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/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. 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 file installallpatch by entering the following command:

```
# cd delta_install
```

8. Ensure that all DB2 processes are stopped.
9. To install all fixes from the fixpack, enter the following command:

```
# ./installallpatch
```

After you install the fixpack, complete the steps in "[Configuring and verifying installation of DB2 UDB 6.1.](#)"

Configuring and verifying installation of 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 /opt/IBMDb2/V6.1/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. (Ensure that the home directory that you specify already exists 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. (Ensure that the home directory that you specify already exists 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. (Ensure that the home directory that you specify already exists 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:

```
# /opt/IBMDb2/V6.1/cfg/db2ln
```

20. Configure the instance owner (the value that you accepted or designated 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 (/):

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

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

```
source /export/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.

Verifying installation of DB2 UDB 6.1

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

file://D:\temp\info\docsrc\std\three_five\solaris_std_ihs_db2.html

5/10/2001

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/SUN 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 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/winows2unix/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 system 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.
- 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-4.ibm.com/cgi-bin/db2www/data/db2/udb/winows2unix/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:
 - o MSGMAX
 - o MSGMNB
 - o MSGMAP
 - o MSGMNI
 - o MSGSSZ
 - o MSGTQL
 - o MSGSEG
 - o SHMMAX
 - o SHMSEG
 - o SHMMNI
 - o SEMMNI
 - o SEMMAP
 - o SEMMNS
 - o SEMMNU
 - o SEMUME

Refer to the *DB2 Quick Beginnings for UNIX* and related DB2 UDB documentation on the DB2 Online Support Web site at www-4.ibm.com/cgi-bin/db2www/data/db2/udb/winows2unix/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/V7.1/cfg directory in the installed DB2 product:

- o kernel.param.64MB for systems with 64 - 128 MB physical memory
- o kernel.param.128MB for systems with 128 - 256 MB physical memory
- o kernel.param.256MB for systems with 256 - 512 MB physical memory
- o 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, and restart your machine.

3. Insert the DB2 UDB V7.1 CD-ROM and, if necessary, mount the CD-ROM drive. (On most Solaris systems, the

Volume Management daemon (**vold**) mounts the CD-ROM automatically and immediately, as well as each time the machine is restarted. If the **vold** 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 V7.1 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/V7.1. 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. 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 \(UDB\) 7.1 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 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-4.ibm.com/cgi-bin/db2www/data/db2/udb/winix2unix/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 \(UDB\) 7.1 for use with WebSphere Application Server](#)."

Configuring DB2 Universal Database (UDB) 7.1 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 was, which is used by WebSphere Application Server
- Verify connection to the was database

The procedures in this article assume that DB2 is installed in the default location /opt/IBMdb2/V7.1 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 [14](#).
3. Navigate to the directory containing the DB2 Setup Utility by entering the following command:

```
# cd /opt/IBMdb2/V7.1/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 DB2 Distributed Join for DB2 Data Sources window, highlight the option labeled **Do not set up DB2 Distributed Join for DB2 Data Sources** and press Return.
 12. Highlight **OK** and press Return.
 13. In the Create DB2 Services window, highlight the **Create the Administration Server** option and press Return.
 14. 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.
 15. A notice window informs you of the value being created for the DB2SYSTEM environment variable. Ensure that **OK** is highlighted and press Return.
 16. In the Create DB2 Services window, highlight **OK** and press Return.
 17. 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.
 18. A warning window opens, giving you the option of canceling the processes. Ensure that **OK** is highlighted and press Return.
 19. A notice window informs you when the processes are completed. Ensure that **OK** is highlighted and press Return.
 20. 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.
 21. In the DB2 Setup Utility window, highlight **Close** and press Return.
 22. In the notice window, ensure that **OK** is highlighted and press Return.
 23. 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 14 by editing the /etc/group file.
 24. 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/V7.1/cfg/db2ln
```

25. 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.

26. Configure the root user to run the **db2profile** script at login. You can find this script in the directory /export/home/db2inst1/sqllib (assuming that /export/home/db2inst1 is the home directory of the example instance owner db2inst1). This action is required to install and run WebSphere Application Server.
27. Log out and then log back in for your changes to take effect.

Verifying the 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. 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= CHRISTINE
  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 must be the same one (or alias) as you will use for the JDBC URL entry name during the WebSphere Application Server installation. Perform the following steps to create a database named was 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 was. This process can take several minutes to complete.

```
$ db2 create database was
```

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

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

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

```
$ db2stop
```

8. 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 7](#).

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

Verifying connection to the was database

Perform the following steps to verify connection to the was 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 was database by entering the following command:

```
$ db2 connect to was
```

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

Database Connection Information

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

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](#).

Installing WebSphere Application Server--Custom Installation option

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

1. Log onto your machine with superuser (root) privileges.

If your system does not grant you root authority even though you are logged on as *root*, ensure */usr/ucb* is in the path for the root login. Edit the installation script file *install.sh* by adding the following line before the call to the *whoami* command:

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

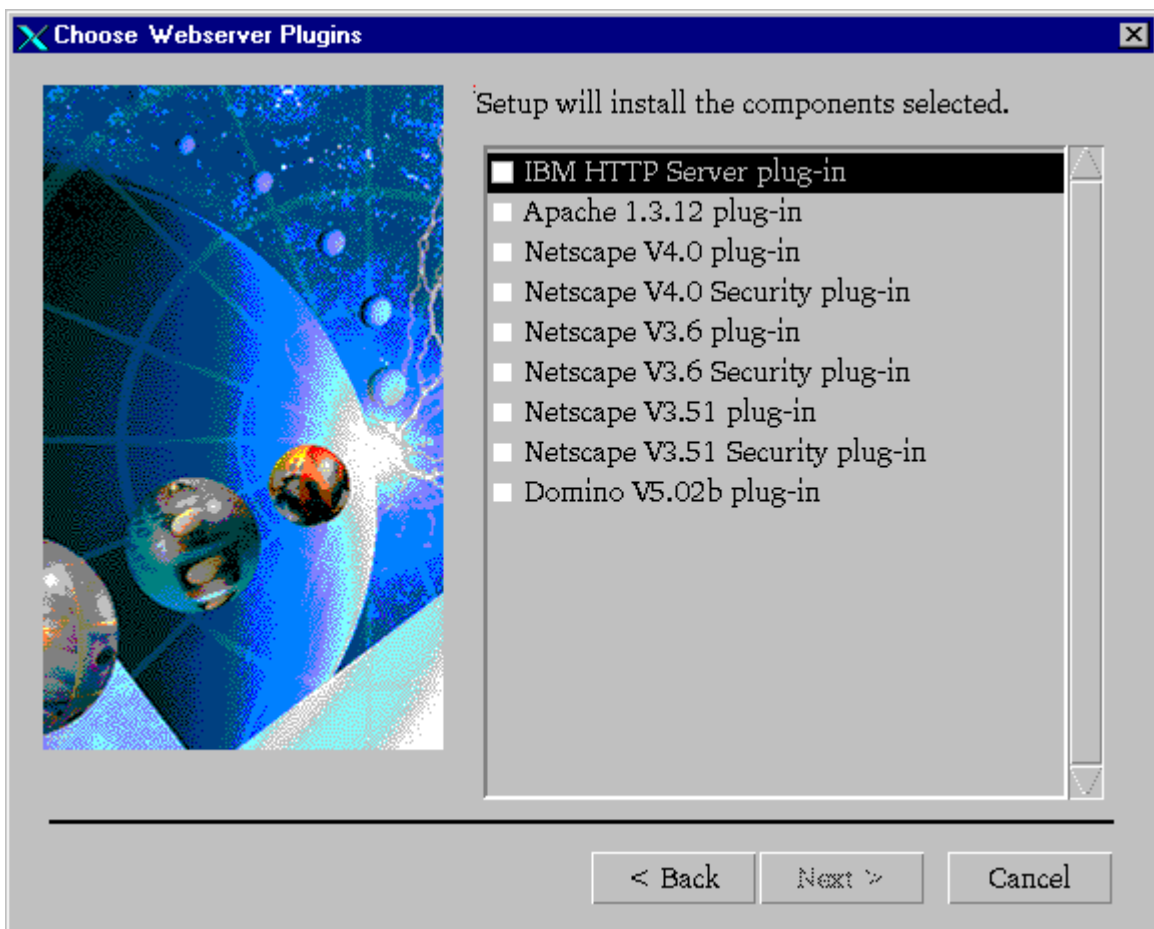
2. If IBM HTTP Server or another Web server on your system is running, stop the Web server.
3. If you plan to use a Web server or database at a level that exceeds the current version required by WebSphere Application Server, you must disable the WebSphere Prerequisite Checker before installing WebSphere Application Server. To do this, perform the following steps:
 - a. Copy the *prereq.properties* file from the */cdrom/cdrom0/sun* 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/cdrom0/sun/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/cdrom0/sun/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. On 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 Web Server Plugins page displays.



Select **IBM HTTP Server plug-in**. Only IBM HTTP Server 1.3.12 is provided with WebSphere Application Server. You must separately purchase and install the other supported Web servers.

10. On the Database Options dialog, do the following:
 - a. For **Database Type**, select **DB2**.
 - b. For **Database Name**, give the name of the database to use. The default is **was**.
 - c. For **DB Home**, specify the path for the database program. The path is `/export/home/db2inst1`.
 - d. 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`.
 - e. For **Database User ID**, specify your user name. If you have already installed DB2 UDB, ensure that you specify the Username specified when installing DB2 UDB.
 - f. For **Database Password** and **Confirm Password**, enter your password. If you have already installed DB2 UDB, ensure that you specify the Password specified when installing DB2 UDB. Note that DB2 UDB requires a password of 8 or fewer characters.
 - g. 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 directory. If you do not have IBM HTTP Server already installed on your system, then a fixed destination directory (`/opt/IBMHTTPD`) for IBM HTTP Server will be shown. 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

If you installed IBM HTTP Server as part of the WebSphere Application Server installation (that is, you did not install the prerequisite product before installing Application Server), you may need to configure it. See "[Verifying installation of IBM HTTP Server 1.3.12](#)" for details.

Further, to ensure that DB2 installed properly and that the WAS database has been created, see "[Configuring and verifying installation of DB2 UDB 6.1](#)" or "[Configuring DB2 Universal Database \(UDB\) 7.1 for use with WebSphere Application Server](#)" if you have not done so already.

Testing the installation

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

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

2. If the server is slow to start or does not start successfully, look at the tracefile log in the /opt/WebSphere/AppServer/logs directory. 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 /opt/WebSphere/AppServer/bin directory as follows:

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

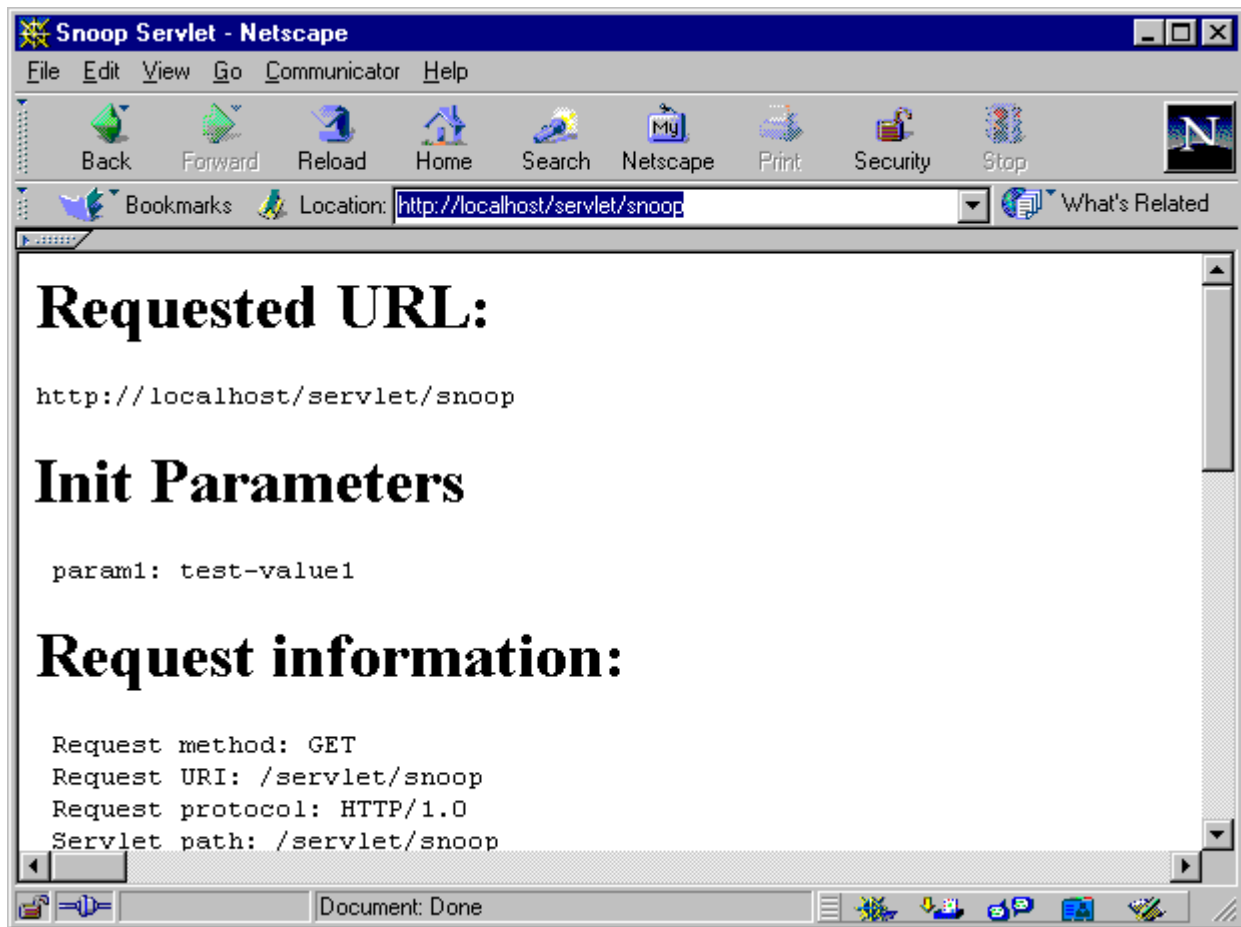
4. Wait until you see the console message *Console Ready*. Then administer the server by doing the following:
 - a. When the Administrative Console opens, the **Topology** tree view is displayed. Click the plus sign (+) next to the **WebSphere Administrative Domain** entry to expand the view.
 - b. Find your host name and expand the view of that node.
 - c. Find the **Default Server** entry and expand the view.
 - d. Find the default container and servletEngine entries.
 - e. Select **Default Server**. If the **Current State** of the **DefaultServer** parameter is *Stopped*, click the **Start** icon on the tool bar. After an information window opens stating that the server is running, click **OK**. Note that the current state changes from *Stopped* to *Running*.

After the server starts, the configuration database is automatically updated to ensure that the server is always running. If the server 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 IBM HTTP Web Server is running. If the IBM HTTP Web Server is not running, start the server by entering the following command in the /opt/IBMHTTPD/bin directory:

```
# ./apachectl start
```

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



Installing IBM HTTP Server 1.3.12

The IBM HTTP Server can be installed from the product CD-ROM or from files downloaded from the IBM Web site. This document contains instructions for installing the IBM HTTP Server from downloaded files and for verifying that the installation was performed correctly.

Installing IBM HTTP Server 1.3.12 from downloaded files

Perform the following steps to install IBM HTTP Server 1.3.12 from .tar or .tar.Z files you downloaded:

1. Ensure that you are logged into the machine with superuser privileges (that is, log in as root).
2. Uncompress and untar any .tar or .tar.Z files to extract the IBM HTTP Server packages.
3. Start the Solaris **admintool** utility, as follows: # **admintool**
4. Click **Browse > Software**. The Software screen is displayed.
5. Click **Edit > Add**. The Set Source Media screen is displayed.
6. From the **Software Location** field's menu, click the **Hard Disk** option.
7. In the **Directory** field, type the path name for the directory that contains the IBM HTTP Server packages, and then click **OK**. The Add Software screen is displayed.
8. From the **Software** list, select the packages that you want to install, and then click **Add**. The **admintool** utility installs the selected packages in the /opt/IBMHTTPD directory.
9. After installation is complete, exit from the **admintool** utility.

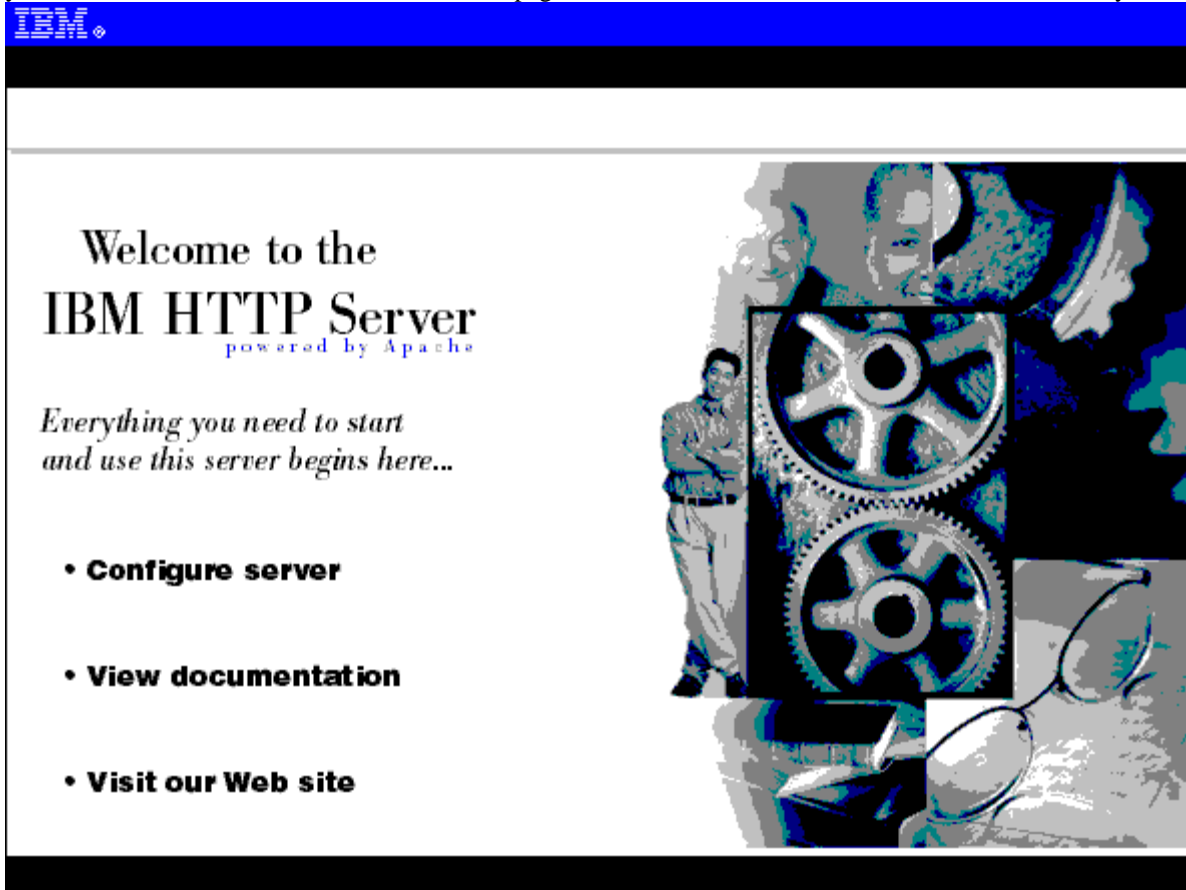
Verifying installation of IBM HTTP Server 1.3.12

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

1. If necessary, start the server by entering the following command:

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

2. Open a Web browser window and type the name of your local machine as the URL (`http://local_machine_name`). If you see the Welcome to the IBM HTTP Server page shown below, the server has been installed correctly.



Note that you can need to make configuration adjustments to the server in order to run it successfully on your system. See the IBM HTTP Server documentation for more information.