



CHAPTER 4

Installing Cisco Broadband Access Center on Linux

This chapter explains the procedure and sequence of event for a successful installation of Cisco Broadband Access Center (Cisco BAC) on Linux 5 or Cent OS 5.



Note

Installation in noninteractive mode on Linux is not supported in Cisco BAC.



Note

The SELinux and iptables should be disabled. Also, ensure that prior to installing Cisco BAC, you install the sysstat package for the proper execution of the diagnostic scripts. This is an optional package which you might have not installed while installing Linux

Installation Checklist

Before you install Cisco BAC, ensure that you are ready by reviewing the checklist that [Table 4-1](#) describes.

Table 4-1 *Installation Checklist*

Task	Checkoff
1. Verify if your system meets the minimum system hardware and software requirements described in Chapter 1, “Overview.”	<input type="checkbox"/>
2. Ensure that you have access to the computers on which you intend to install Cisco BAC components.	<input type="checkbox"/>
3. Save your license file on the system from which you intend to launch the Cisco BAC administrator user interface via a web browser. You need a valid service license file to configure Cisco BAC licensing.	<input type="checkbox"/>
4. Determine the home directory (<i>BPR_HOME</i>) in which you want to install the Cisco BAC component or components. The default directory is <i>/opt/CSCObac</i> . Ensure that the target installation directory has enough disk space.	<input type="checkbox"/>
 Note We recommend that you have at least 500 MB of disk space available otherwise installation will not take place.	

Table 4-1 Installation Checklist (continued)

Task	Checkoff
5. Verify that you have minimum 500 MB of free space available in the /tmp directory for successful installation.	<input type="checkbox"/>
6. For the RDU, determine where you want to install the data directory (BPR_DATA) and the database logs (BPR_DBLOG). The default directory is /var/CSCObac. Ensure that the target installation directory has enough disk space.	<input type="checkbox"/>
 <p>Note We recommend that you locate the data directory on a different physical disk than the home directory; for example, /var/disk0/CSCObac. The disk should have at least 1 GB and up to 30 GB of free space. The installation program, by default, installs the data directory, the database transaction logs directory, and the logs directory in the same location. We recommend that you locate the database transaction logs directory on the fastest disk on the system. Also, ensure that 1 GB of disk space is available.</p>	
7. For the RDU, determine the listening port number. The RDU uses this interface to communicate with the other Cisco BAC components, such as DPEs and Cisco Network Registrar extension points. The default port is 49187.	<input type="checkbox"/>
8. For the RDU, determine the shared secret password that Cisco BAC servers on your network use as a token to authenticate communication with one another. The shared secret password should be the same for all Cisco BAC servers on your network.	<input type="checkbox"/>
9. For the RDU, determine the ports through which you will access the administrator user interface using HTTP or HTTP over SSL (HTTPS). The default ports are: <ul style="list-style-type: none"> – 8100 for HTTP – 8443 for HTTPS 	<input type="checkbox"/>
10. For the DPE, ensure that 2 GB of disk space is available in the data directory.	<input type="checkbox"/>
11. Ensure that Cisco Network Registrar 7.2 is installed and running on the servers on which you are installing Cisco BAC extensions.	<input type="checkbox"/>
Note To enable IPv6 support in Cisco BAC, you must install Cisco Network Registrar 7.2.	
12. For the Cisco Network Registrar extensions, determine the name of the provisioning group to which the Cisco Network Registrar server belongs.	<input type="checkbox"/>
13. For the Cisco Network Registrar extensions, determine where you want to install the data directory (BPR_DATA). The default directory is /var/CSCObac. Ensure that 200 MB of disk space is available.	<input type="checkbox"/>
14. Verify that you have the necessary Cisco Network Registrar configuration files. For an example of these configuration files, see Appendix A, “Cisco Network Registrar Extension Point Configuration.”	<input type="checkbox"/>
15. Verify that you have the necessary KDC servers available.	<input type="checkbox"/>

Table 4-1 Installation Checklist (continued)

Task	Checkoff
<p>16. Enable your machine to support IPv6.</p> <p>To configure a static IPv6 address to an interface, add these lines:</p> <pre># IPv6init="yes" # IPv6addr=<ipv6address> to /etc/sysconfig/network-scripts/ifcfg-<i>ifname</i> file</pre> <p>where <i>ifname</i> matches network interface, reboot the network interface</p>	<input type="checkbox"/>
<p>17. Modify the <i>config</i> file to disable SELinux using the following command:</p> <pre># vi /etc/selinux/config</pre> <p><i>config</i>—File that controls the state of SELinux on the system. In this file, set the value of SELINUX to <i>disabled</i> and SELINUXTYPE to <i>targeted</i>.</p>	<input type="checkbox"/>
<p>18. Disable iptables using the following command:</p> <pre># chkconfig iptables off</pre>	<input type="checkbox"/>
<p> Note The Admin UI page will not open if iptables is in enabled state on the system.</p>	
<p>19. Reboot the Prime Cable Provisioning host using the following command:</p> <pre># reboot</pre>	<input type="checkbox"/>
<p>20. Wait for 30 seconds and re-login to continue with the installation.</p>	<input type="checkbox"/>

Installing Cisco BAC

The initial steps in the Cisco BAC installation program are identical regardless of the component you are installing. This section describes how to work with the installation program and the initial installation steps.

To install Cisco BAC:

-
- Step 1** Log in to the intended Cisco BAC with your user name and password.
- Step 2** At the Linux system prompt, change directory to your CD-ROM drive or other installation media. Ensure that the **gzip** and **gtar** utilities are available on your system under */bin* directory, to decompress and unpack the Cisco BAC installation file, and:
- a. Change to the directory in which you will decompress and extract the installation file.
 - b. Decompress and unpack the file with the *.gtar.gz* extension. Enter:
- ```
gtar zxvf BAC_42_LinuxK9.gtar.gz
```

The utility creates the *BAC\_42\_LinuxK9* directory into which the installation program is extracted.



**Note** If the program displays a checksum error while unpacking, specify the path to the GNU tar on your machine.

- Step 3** After the installation program is extracted, you can choose to install the components in interactive mode.
- [Installing Components in Interactive Mode, page 4-4](#)
  - [Uninstalling Cisco Broadband Access Center, page 4-22](#)
- 

## Installing Components in Interactive Mode

This section explains the procedures that you follow to install one or more Cisco BAC components interactively from the command line.

If you have not enabled IPv6 on your machine, a message similar to the following appears during installation:

Warning: IPv6 is not enabled on this system.

You can choose to enable IPv6 later.



### Note

Before you begin any of these procedures, you must complete the initial procedure described in [Installation Checklist, page 4-1](#).

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This section provides instructions on installing components in interactive mode:

- [Installing RDU in Interactive Mode, page 4-4](#)
  - [Installing DPE in Interactive Mode, page 4-8](#)
  - [Installing Cisco Network Registrar Extensions in Interactive Mode, page 4-10](#)
  - [Installing KDC in Interactive Mode, page 4-14](#)
- 

## Installing RDU in Interactive Mode

Install the RDU on a server running Linux that meets the requirements described in [Operating System Requirements, page 1-2](#).



### Note

We recommend that you configure the RDU server to use a static IP address.

---

To install the RDU, complete the initial installation described in [Installation Checklist, page 4-1](#). After you do this:

- Step 1** Enter the following command to start the installation program in interactive mode:

```
install-path/BAC_42_LinuxK9/install_bac.sh
```

where *install-path* specifies the complete path to the directory in which the *BAC\_42\_LinuxK9* directory has been created.

The installation program verifies that you have installed the required patches on the Linux operating system. When the verification ends, welcome information appears.

```
Welcome to the Cisco Broadband Access Center (BAC) installation program.
```

This installation program installs BAC 4.2 on your system.

**Step 2** Press **Enter** to continue.

The home directory prompt appears.

**Step 3** To accept the default directory, */opt/CSCObac*, press **Enter**; or enter another directory.

For example:

```
----- Home Directory-----
Home Directory Destination [/opt/CSCObac]
```

**Step 4** Confirm the directory location. To do this, enter **y** and press **Enter**.

The data directory prompt appears.

**Step 5** To accept the default directory, */var/CSCObac*, press **Enter**; or enter another directory.

For example:

```
----- Data Directory-----
Data Directory Destination [/var/CSCObac]
```

**Step 6** Confirm the directory location. To do this, enter **y** and press **Enter**.

Before installation, a message appears:

```
Installation is about to begin.
```

**Step 7** Enter **y** and press **Enter** to continue.

The program begins the installation process.

**Step 8** Enter **y** and press **Enter** at the RDU prompt.

**Step 9** To skip installing the DPE, Cisco Network Registrar extension points, and the KDC, enter **n** and press **Enter**. You can choose to install these components later.

For example:

```
----- Installation Components -----
Regional Distribution Unit (RDU) (y/n)? [n] y
Device Provisioning Engine (DPE) (y/n)? [n] n
Cisco Network Registrar extension points (y/n)? [n] n
Key Distribution Center (KDC) (y/n)? [n] n
```

**Step 10** Confirm the components that you want to install. To do this, enter **y** and press **Enter**.

The program prompts you to confirm the components that you want to install.

For example:

```
----- Confirmation -----
Install RDU: y
Install DPE: n
Install KDC: n
Install CNR_EP: n
Is this correct (y/n/q)? [y] y
```

**Step 11** Enter **y** and press **Enter**.

The database log directory prompt appears.

- Step 12** To accept the default directory, `/var/CSCObac`, press **Enter**; or enter another directory.  
For example:

```
----- DB Log Directory -----
DB Logs Directory [/var/CSCObac]

Available disk space for /var/CSCObac is 248856260
kilobytes.
```

A confirmation prompt appears.

- Step 13** To confirm the directory, enter **y** and press **Enter** to continue.  
The program starts preparing for installation.  
For example:

```
Preparing...
[100%]
 1:CSCObac-snmp
[100%]
Preparing...
[100%]
 1:CSCObac-rdu
[100%]
```

The installation proceeds, and displays the following message after successful installation:

```
Installation of <CSCObac> was successful.
```

- Step 14** To accept the default port number, 49187, press **Enter**; or enter another port number.



**Caution**

---

If you change the default listening port value, ensure that the new value does not conflict with any existing port assignments. Also, ensure that you configure all DPEs with the correct RDU port number. For details on configuring the DPE, see the *Cisco Broadband Access Center DPE CLI Reference, 4.2*.

---

- Step 15** For example:

```
----- RDU information -----

Enter the listening port of Regional Distribution Unit (RDU).

RDU Listening Port [49187]
```

- Step 16** Confirm the listening port number; enter **y** and press **Enter** to continue.  
The program prompts you to enter the shared secret password.

- Step 17** Enter the shared secret password that you want to use for authentication among Cisco BAC servers, and confirm the password.



**Note**

---

You must use the same shared secret password for the RDU, all DPEs, and Cisco Network Registrar extension points in your network.

---

For example:

```
Enter the password to be used for authentication between BAC servers.

Enter the shared secret password [] changeme

Enter the shared secret password again [] changeme
```

**Step 18** Press **Enter** to continue.

The program displays the parameters you have selected to install the RDU.

**Step 19** Enter **y** and press **Enter** to confirm the installation parameters.

For example:

```
----- Confirmation -----
Home directory: /opt/CSCObac
DB Data directory: /var/disk0/CSCObac
DB Log directory: /var/disk1/CSCObac
RDU Port: 49187
```

The program prompts you to enter the HTTP port for the administrator user interface.

**Step 20** To accept the default port, 8100, press **Enter**; or enter another port number.

For example:

```
Please enter Admin UI http port [8100]
```

**Step 21** Confirm the HTTP port; enter **y** and press **Enter**.

For example:

```
----- Admin UI Information -----

Please enter Admin UI HTTP port [8100]

----- Confirmation -----
Admin UI HTTP port: 8100

Is this correct (y/n/q)? [y] y
```

The program prompts you to enter the HTTPS port for the user interface.

**Step 22** To accept the default port, 8443, press **Enter**; or enter another port number.

For example:

```
Please enter Admin UI HTTPS port [8443]
```

**Step 23** Confirm the HTTPS port; enter **y** and press **Enter**.

The program displays the parameters you have selected to install the administrator user interface.

**Step 24** Enter **y** and press **Enter**.

For example:

```
----- Confirmation -----
Admin UI information
Installation directory: /opt/CSCObac/rdu
HTTP Port: 8100
HTTPS Port: 8443

Is this correct (y/n/q)? [y] y
```

The program prompts you to continue with the installation.

**Step 25** Enter **y** and press **Enter**.

After a successful installation, the following message appears:

```
Installation of <CSCObac> was successful.
```

## Installing DPE in Interactive Mode

Install the DPE on a server running Linux that meets the requirements described in [Operating System Requirements, page 1-2](#).



### Note

We recommend that you configure the DPE server to use a static IP address. During DPE installation, if the program detects a TFTP server or a ToD server running on the same server as the DPE, the installation displays an error message and quits. To kill the TFTP or ToD server, carry out the steps that the error message lists.

To install the DPE, complete the initial installation described in [Installation Checklist, page 4-1](#). Then:

**Step 1** To start the installation program in interactive mode, run:

```
install-path/BAC_42_LinuxK9/install_bac.sh
```

where *install-path* specifies the complete path to the directory in which the *BAC\_42\_LinuxK9* directory has been created.

The installation program verifies that you have installed the required patches on the Linux operating system. When the verification ends, welcome information appears.

```
Welcome to the Cisco Broadband Access Center (BAC) installation program.
This installation program installs BAC 4.2 on your system.
```

**Step 2** Press **Enter** to continue.

The home directory prompt appears.

**Step 3** To accept the default directory, */opt/CSCObac*, press **Enter**; or enter another directory.

For example:

```
----- Home Directory-----
Home Directory Destination [/opt/CSCObac]
```

**Step 4** Confirm the directory location. To do this, enter **y** and press **Enter**.

The data directory prompt appears.

**Step 5** To accept the default directory, */var/CSCObac*, press **Enter**; or enter another directory.

For example:

```
----- Data Directory-----
Data Directory Destination [/var/CSCObac]
```

**Step 6** Confirm the directory location. To do this, enter **y** and press **Enter**.

Before installation, a message appears:

```
Installation is about to begin.
```

**Step 7** Enter **y** and press **Enter** to continue.

The program begins the installation process.

**Step 8** Enter **y** and press **Enter** at the DPE prompt.

**Step 9** To skip installing the RDU, Cisco Network Registrar extension points, and the KDC, enter **n** and press **Enter**. You can choose to install these components later.

For example:

```
----- Installation Components -----
Regional Distribution Unit (RDU) (y/n)? [n] n
Device Provisioning Engine (DPE) (y/n)? [n] y
Cisco Network Registrar extension points (y/n)? [n] n
Key Distribution Center (KDC) (y/n)? [n] n
```

**Step 10** Confirm the components that you want to install. To do this, enter **y** and press **Enter**.

The program prompts you to confirm the components that you want to install.

For example:

```
----- Confirmation -----
Install RDU: n
Install DPE: y
Install KDC: n
Install CNR_EP: n
Is this correct (y/n/q)? [y] y
```

**Step 11** Enter **y** and press **Enter**.

The program starts preparing for installation.

For example:

```
Preparing...
[100%]
 1:CSCObac-snmppreparing...
[100%]
 1:CSCObac-dpepreparing...
[100%]
 1:CSCObac-dpepreparing...
[100%]
```

The program prompts you to enter the shared secret password. Enter the shared secret password that you want to use for authentication between the Cisco BAC servers.

For example

```
Enter the shared secret password [] <changeme>
Enter the shared secret password again [] <changeme>
```

**Step 12** Re-enter the password for confirmation, and press **Enter**.

The installation proceeds, and displays the following message after successful installation:

```
Installation of <CSCObac> was successful.
```

## Installing Cisco Network Registrar Extensions in Interactive Mode

Install the DPE on a Linux server that meets the requirements described in [Operating System Requirements, page 1-2](#).



### Note

We recommend that you configure the DPE server to use a static IP address. During DPE installation, if the program detects a TFTP server or a ToD server running on the same server as the DPE, the installation displays an error message and quits. To terminate the TFTP or ToD server, follow the procedure that the error message lists.

To install the DPE, complete the initial installation described in [Installation Checklist, page 4-1](#). After you do this:

**Step 1** Enter the following command to start the installation program in interactive mode, run:

```
install-path/BAC_42_LinuxK9/install_bac.sh
```

where *install-path* specifies the complete path to the directory in which the *BAC\_42\_LinuxK9* directory has been created.

The installation program verifies that you have installed the required patches on the Linux operating system. When the verification ends, welcome information appears.

```
Welcome to the Cisco Broadband Access Center (BAC) installation program.
This installation program installs BAC 4.2 on your system.
```

**Step 2** Press **Enter** to continue.

The home directory prompt appears.

**Step 3** To accept the default directory, */opt/CSCObac*, press **Enter**; or enter another directory.

For example:

```
----- Home Directory-----
Home Directory Destination [/opt/CSCObac]
```

**Step 4** Confirm the directory location. To do this, enter **y** and press **Enter**.

The data directory prompt appears.

**Step 5** To accept the default directory, */var/CSCObac*, press **Enter**; or enter another directory.

For example:

```
----- Data Directory-----
Data Directory Destination [/var/CSCObac]
```

**Step 6** Confirm the directory location. To do this, enter **y** and press **Enter**.

Before installation, a message appears:

```
Installation is about to begin.
```

**Step 7** Enter **y** and press **Enter** to continue.

The program begins the installation process.

**Step 8** Enter **y** and press **Enter** at the DPE prompt.

- Step 9** To skip installing the RDU, Cisco Network Registrar extension points, and the KDC, enter **n** and press **Enter**. You can choose to install these components later.

For example:

```
----- Installation Components -----
Regional Distribution Unit (RDU) (y/n)? [n] n
Device Provisioning Engine (DPE) (y/n)? [n] n
Cisco Network Registrar extension points (y/n)? [n] y
Key Distribution Center (KDC) (y/n)? [n] n
```

- Step 10** Confirm the components that you want to install. To do this, enter **y** and press **Enter**.

The program prompts you to confirm the components that you want to install.

For example:

```
----- Confirmation -----
Install RDU: n
Install DPE: n
Install KDC: n
Install CNR_EP: y
Is this correct (y/n/q)? [y] y
```

- Step 11** Enter **y** and press **Enter**.

The program starts preparing for installation.

For example:

```
Preparing...
[100%]
 1:CSCObac-snmpp
[100%]
Preparing...
[100%]
 1:CSCObac-cnr_ep
[100%]
```

The program prompts you to enter information on the RDU required to install the extensions.

- Step 12** Enter the IP address (or hostname) and the listening port of the host on which you have installed the RDU. To accept the default information, press **Enter**; or enter alternative information. The program prompts you to enter the name of the extension point provisioning group.

For example:

```
----- Cisco Network Registrar extension points Configuration-----
Enter RDU IP Address or Hostname [bachost-rdu.example.com]
Enter RDU Listening Port [49187]
Enter the provisioning group name: <example name>
```

The program then asks you if you intend to provision PacketCable or voice technology devices.

- Step 13** Enter **y** and press **Enter** if you are using PacketCable devices; press **Enter** if you are not.

For example:

```
Are you going to use devices that support PacketCable voice technology? [n]
```

- Step 14** If you enter **n**, omit Step 16 to 18. If you enter **y**, the program prompts you to enter several voice technology properties.

The program prompts you to confirm the installation.

```
----- Confirmation -----
RDU IP Address: 10.10.10.10
RDU IP Port: 49187
Extention Point Provisioning Group: group1
PacketCable: y
```

- Step 15** Enter details on the KDC realm name, the IP addresses for the primary and secondary DHCP servers, and the primary and secondary DNS servers.

For example:

```
----- PacketCable Configuration -----
Enter KDC realm Name [CISCO.COM]
Enter IP Address for Primary DHCP [10.81.88.9]
Enter IP Address for Primary DNS [10.81.88.9]
Enter IP Address for Secondary DHCP []
Enter IP Address for Secondary DNS []
```

- Step 16** Confirm the information. To do this, enter **y** and press **Enter**.

```
----- Confirmation -----
KDC Realms: CISCO.COM
Primary DHCP: 10.81.88.9
Primary DNS: 10.81.88.9
Secondary DHCP:
Secondary DNS:
Is this correct (y/n/q)? [y] y
```

- Step 17** Press **Enter** to continue.

- Step 18** Enter the shared secret password that you want to use for authentication between the Cisco BAC servers. You must use the same shared secret password for all the Cisco BAC servers on your network.

For example:

```
Enter the shared secret password [] <changeme>
Enter the shared secret password again [] <changeme>
```

- Step 19** Press **Enter**.

The program displays the installation parameters you have selected.

- Step 20** Enter **y** and press **Enter** to confirm the parameters, and install the Cisco Network Registrar extensions.

For example:

```
----- Confirmation -----
RDU IP Address: 10.10.10.10
RDU IP Port: 49187
Extention Point Provisioning Group: group1
PacketCable: n
```

- Step 21** Enter **y** and press **Enter**.

The installation proceeds, and displays the following message after successful installation:

```
Installation of <CSCObac> was successful.
```

## Configuring Extensions

After you install the Cisco BAC extensions on the Cisco Network Registrar server, you must configure the extensions. The procedure described in this section assumes that:

- The Cisco BAC component is installed in */opt/CSCObac*.
- Cisco Network Registrar is installed in */opt/nwreg2*.
- The Cisco Network Registrar username is **admin** and the password is **changeme**.

To configure extensions:

---

**Step 1** Log in to the Cisco Network Registrar server, with *root* access.

**Step 2** At the command line, enter:

```
NR_HOME/local/usrbin/nrcmd -N admin -P changeme -b <
BAC_HOME/cnr_ep/bin/bpr_cnr_enable_extpts.nrcmd
```

**Step 3** To reload the Cisco Network Registrar server, enter:

```
/etc/init.d/nwreglocal stop
/etc/init.d/nwreglocal start
```

Alternatively, to reload the DHCP server alone, enter:

```
NR_HOME/local/usrbin/nrcmd -N admin -P changeme "dhcp reload"
```



### Note

Before you can use the Cisco Network Registrar server, you must configure client classes, scope-selection tags, policies, and scopes. In an IPv6 environment, you must configure links and prefixes as well. See the [User Guide for Cisco Network Registrar 7.2](#).

---

## Validating Extensions

To validate the extensions installed on the Cisco Network Registrar server, from the Cisco Network Registrar Command Line Tool (**nrcmd**), run:



### Note

Depending on whether you installed a local or regional cluster, the **nrcmd** tool is located in:

- Local—*/opt/nwreg2/local/usrbin*
  - Regional—*/opt/nwreg2/regional/usrbin*
- 

```
nrcmd> extension list
100 Ok
dextropras:
 entry = dextropras
 file = libdextension.so
 init-args =
 init-entry =
 lang = Dex
 name = dextropras
preClientLookup:
 entry = bprClientLookup
 file = libbprextensions.so
 init-args = BPR_HOME=/opt/CSCObac,BPR_DATA=/var/CSCObac
```

```

 init-entry = bprInit
 lang = Dex
 name = preClientLookup
prePacketEncode:
 entry = bprExecuteExtension
 file = libbprextensions.so
 init-args =
 init-entry = initExtPoint
 lang = Dex
 name = prePacketEncode

```

nrcmd>




---

**Note** The *BPR\_HOME* and *BPR\_DATA* values may be different in your installation.

---

Also, in the **nrcmd** program, run:

```

nrcmd> dhcp listextensions
100 Ok
post-packet-decode: dexdropras
pre-packet-encode: prePacketEncode
pre-client-lookup: preClientLookup
post-client-lookup:
post-send-packet:
pre-dns-add-forward:
check-lease-acceptable:
post-class-lookup:
lease-state-change:
generate-lease:
environment-destroyer:
pre-packet-decode:
post-packet-encode:

```

nrcmd>




---

**Note** When you install all the components in the same Linux server, Cisco Network Registrar will not respond to the lease queries from RDU.

---

## Installing KDC in Interactive Mode

You must install the KDC only when configuring a system to support voice technology operations.

Before you install Cisco Network Registrar extensions, complete the initial installation described in [Installation Checklist, page 4-1](#). After you do this:

---

**Step 1** Enter the following command to start the installation program in interactive mode:

```
install-path/BAC_42_LinuxK9/install_bac.sh
```

where *install-path* specifies the complete path to the directory in which the *BAC\_42\_LinuxK9* directory has been created.

The installation program verifies that you have installed the required patches on the Linux operating system. When the verification ends, welcome information appears.

```

Welcome to the Cisco Broadband Access Center (BAC) installation program.
This installation program installs BAC 4.2 on your system.

```

**Step 2** Press **Enter** to continue.

The home directory prompt appears.

**Step 3** To accept the default directory, */opt/CSCObac*, press **Enter**; or enter another directory.

For example:

```
----- Home Directory-----
Home Directory Destination [/opt/CSCObac]
```

**Step 4** Confirm the directory location. To do this, enter **y** and press **Enter**.

The data directory prompt appears.

**Step 5** To accept the default directory, */var/CSCObac*, press **Enter**; or enter another directory.

For example:

```
----- Data Directory-----
Data Directory Destination [/var/CSCObac]
```

**Step 6** Confirm the directory location. To do this, enter **y** and press **Enter**.

Before installation, a message appears:

```
Installation is about to begin.
```

**Step 7** Enter **y** and press **Enter** to continue.

The program begins the installation process.

**Step 8** Enter **y** and press **Enter** at the KDC prompt.

**Step 9** To skip installing the RDU, DPE and Cisco Network Registrar extension points, enter **n** and press **Enter**. You can choose to install these components later.

For example:

```
----- Installation Components -----
Regional Distribution Unit (RDU) (y/n)? [n] n
Device Provisioning Engine (DPE) (y/n)? [n] n
Cisco Network Registrar extension points (y/n)? [n] n
Key Distribution Center (KDC) (y/n)? [n] y
```

**Step 10** Confirm the components that you want to install. To do this, enter **y** and press **Enter**.

The program prompts you to confirm the components that you want to install.

For example:

```
----- Confirmation -----
Install RDU: n
Install DPE: n
Install KDC: y
Install CNR_EP: n
Is this correct (y/n/q)? [y] y
```

**Step 11** Enter **y** and press **Enter**.

The program starts preparing for installation.

For example:

```
Preparing...
[100%]
 1:CSCObac-sntp
[100%]
Preparing...
[100%]
 1:CSCObac-kdc
[100%]
```

The KDC Configuration prompt appears.

**Step 12** Enter the KDC interface address, the fully qualified domain name (FQDN), and the Kerberos realm name. The realm name should be consistent with the realm you give to the DPEs that belong to this provisioning group.

For example:



**Note** The warning in this example appears if there is more than one interface on your system.

```
Key Distribution Center (KDC) Realm Name
Enter the Kerberos realm name for the KDC:
The realm name should be consistent with the realm you give to DPEs in this
provisioning group.
```

```
KDC Interface Address [10.10.10.22]:
KDC FQDN [bachost.example.com]:
KDC Realm [EXAMPLE.COM]:
```

**Step 13** To confirm your entry and continue, enter **y** and press **Enter**.

The program prompts you to enter a password to generate the KDC service key.

**Step 14** For each DPE, enter a password with 6 to 20 characters. The KDC service key mentioned here is one that you must generate on the DPE and the KDC to enable communication between the two components. To generate this service key, the password that you enter for the KDC must match the one that you enter for the corresponding DPE; otherwise, the DPE does not function.

For example:

```
Enter Password to generate Service-Key [] <changeme>

Enter Password to generate Service-Key again [] <changeme>
```

**Step 15** Press **Enter**.

**Step 16** To confirm and continue, enter **y** and press **Enter**.

The program prompts you to enter the DPE FQDN.

**Step 17** Enter the FQDN of the DPE, and press **Enter**.

For example:

```
Enter your DPE FQDN [] bac-dpe1.example.com
```

**Step 18** Enter **y** and press **Enter** to confirm and continue.

- Step 19** To add another DPE, enter **y** and press **Enter**, or enter **n** and press **Enter**. The installation program uses the same voice technology shared key for all DPEs.

The program proceeds with installation and displays the following message after successful installation:

```
Installation of <CSCObac> was successful.
```

## Upgrading Cisco Broadband Access Center

This section describes how to upgrade a Cisco Broadband Access Center for Cable (Cisco BAC) 4.1.0.x installation to Cisco Broadband Access Center 4.2. See [compatibility matrix](#) to know which earlier versions of Cisco BAC can be upgraded to 4.2.

You must stop the process watchdog (bprAgent) before upgrading. After the upgrade is complete, Cisco BAC does not restart the process watchdog automatically.

## Upgrading the DPE and Cisco Network Registrar Extensions

Use this procedure to upgrade the DPE and the Cisco Network Registrar Extensions from Linux to Linux. This upgrade is possible only from Cisco BAC 4.1.0.x to Cisco BAC 4.2.

- Step 1** Stop the *bprAgent*.
- ```
# /etc/init.d/bprAgent stop.
```
- Step 2** Back up the following files. Backup is required only if you have customized these files.
- Files under `<BAC_HOME>/dpe/conf/dpe.properties`.
 - *.xml files under `<BAC_HOME>/snmp/conf/`.
 - Files under `<BAC_HOME>/cnr_ep/conf/cnr_ep.properties`
- Step 3** You need to back-up the DPE cache as explained in [DPE Cache Backup and Restore Tool](#), page 4-21.
- Step 4** Execute the script `install_bac.sh` in the `BAC_42_LinuxK9` directory.
- Output similar to the following appears. The output has been trimmed for brevity.
- ```
Checking for installed BAC components...

Upgrading BAC from 4.1.0.3 to 4.2. Are you sure[y/n]? [n]:y
```
- Step 5** To confirm that you want to upgrade, enter **y** and press **Enter**.
- The program begins the upgrade process.

```
Removing the existing product
warning: /opt/CSCObac/bpr_definitions.sh saved as
/opt/CSCObac/bpr_definitions.sh.rpmsave
Preparing... ##### [100%]
 1:CSCObac ##### [100%]
warning: cannot get shared lock on /var/lib/rpm/Packages
Preparing... ##### [100%]
 1:CSCObac-snmpp ##### [100%]
Preparing... ##### [100%]
```

```

1:CSC0bac-dpe ##### [100%]
Running post install scripts...
Installing the watchdog scripts
Removing link /etc/rc.d/rc0.d/K05bprAgent
Removing link /etc/rc.d/rc1.d/K05bprAgent
Removing link /etc/rc.d/rc2.d/S81bprAgent
Removing link /etc/rc.d/rc3.d/S81bprAgent
Removing link /etc/rc.d/rc4.d/S81bprAgent
Removing link /etc/rc.d/rc5.d/S81bprAgent
Linking /etc/rc.d/rc5.d/S81bprAgent to /etc/init.d/bprAgent
Linking /etc/rc.d/rc4.d/S81bprAgent to /etc/init.d/bprAgent
Linking /etc/rc.d/rc3.d/S81bprAgent to /etc/init.d/bprAgent
Linking /etc/rc.d/rc2.d/S81bprAgent to /etc/init.d/bprAgent
Linking /etc/rc1.d/K05bprAgent to /etc/init.d/bprAgent
Linking /etc/rc0.d/K05bprAgent to /etc/init.d/bprAgent
Starting BAC Process Watchdog...
BAC Process Watchdog has started.

```

After a successful upgrade, the following message appears:

```
Upgrade from 4.1.0.3 to 4.2 was successful.
```

**Step 6** Restore the following files.

- a. Files under `<BAC_HOME>/dpe/conf/dpe.properties`.
- b. Files under `<BAC_HOME>/cnr_ep/conf/cnr_ep.properties`.
- c. \*.xml files under `<BAC_HOME>/snmp/conf/`.



**Note** While restoring the files, make sure that you merge the changes without overwriting the newly installed files.

**Step 7** Restore the DPE cache as explained in [DPE Cache Backup and Restore Tool, page 4-21](#).

**Step 8** Manually start the Cisco BAC process watchdog to complete the upgrade process.

For example, from the command line, run:

```
/etc/init.d/bprAgent start
```



**Note** If DB cache is backed up, it has to be restored to the upgraded location since it takes considerable time to rebuild the cache from scratch. You must restore the DB before restarting the agent. Refer to [DPE Cache Backup and Restore Tool, page 4-21](#) for more details.

## Migrating the RDU Database

### About Backward Compatibility

The Cisco BAC 4.2 RDU with a migrated database can operate with earlier versions of Solaris DPEs and Cisco Network Registrar Extensions servers for gradual online migration.

Migration preserves the device record revision numbers used in DPE synchronization. As a result, DPE repopulation is not triggered after the RDU database upgrade, ensuring least disruption until you upgrade the specific DPE.

**Note**

This Cisco BAC release provides multivendor support via Option 43 and its suboptions. When using this option, ensure that you modify templates used in earlier releases to be compatible with the template grammar that Cisco BAC 4.2 uses.

## Verifying Database Integrity

We recommend that you perform a dry run of the migration process on a staging (nonproduction) system, instead of on a live system, during RDU downtime. These steps may not be practical during a live migration, because in the case of a large database, verification can take an extended length of time.

To verify the database:

- Before migration, run the **verifyDb.sh** tool on a backup snapshot.

**Note**

To verify the database before migration, use the **verifyDb.sh** tool from the Cisco BAC installation corresponding to the version of the database. You cannot verify a nonmigrated database with the Cisco BAC 4.2 version of **verifyDb.sh**.

For example, enter:

```
/opt/<BPR_HOME>/rdu/internal/db/bin/verifyDb.sh -dbdir /disk1/backup
```

This pathname is specific to the Cisco BAC installation version that was installed before migrating to Cisco BAC 4.2.

- After migration, run the **verifyDb.sh** tool on the migrated database.

For example, enter:

```
/opt/<BPR_HOME>/rdu/internal/db/bin/verifyDb.sh -dbdir /disk2/target
```

If any error occurs during the process, the log file, **bpr-verify-db-log.xml**, is generated in the path **<BPR\_HOME>/rdu/internal/db/bin**, which contains the details of the error.

For details about the **verifyDb.sh** tool, see the *Cisco Broadband Access Center Administrator Guide 4.2*.

## Using the RDU Migration Tool

This release of Cisco BAC consists of a migration tool that facilitates DB portability between platforms. You can also use this migration tool to migrate between different platforms. This tool contains JRE 1.6.0\_23, Berkeley db 5.1.19 libraries and Cisco BAC 4.2 *bpr.jar*.

While migrating using this tool, you are given the following options. Based on the selected option, **migrationTool.sh** prompt is displayed.

1. 2.7.1.x
2. 4.0.1/4.0.1.x
3. 4.1.0.x
4. exit

## Cisco BAC 2.7.1.x, 4.0.1.x, 4.1.0.x Solaris to Cisco BAC 4.2 Linux

In Cisco BAC 4.2, Solaris to Linux RDU Database migration can be done using the Migration Tool (*BAC\_42\_MigrationTool.tar.gz*).


**Note**

Before you start with the migration task, ensure you carry out the steps explained in [Using the RDU Migration Tool, page 4-19](#) section.


**Note**

In the following section, steps 1 to 10 have to be done on the Solaris server which would be having the earlier version of Cisco BAC and steps 11 to 13 need to be done on the Linux server where Cisco BAC 4.2 needs to be installed.

To perform a database migration:

- Step 1** Stop the *brpAgent*.
- Step 2** Back up the existing Cisco BAC 2.7.1.x or 4.0.1.x or 4.1.0.x RDU database, using the **backupDb.sh** tool. For details, see the *Cisco Broadband Access Center Administrator Guide 4.2*.

For example:

```
/<BPR_HOME>/rdu/bin/backupDb.sh -nosubdir /disk1/backup
```

- **-nosubdir**—Disables the automatic creation of a subdirectory. If you do not use this option, a subdirectory is created and reported to the console.
- */disk1/backup*—Identifies the location for the database backup files.



**Note** You must stop the *bprAgent* before taking backup of the DB.

- Step 3** Backup the following files. Backup is required only if you have customized these files.
- Files under *<BAC\_HOME>/rdu/conf/*
    - *rdu.properties*
    - *api.properties*
    - Other xml files and dtd files
  - MIB files under *<BAC\_HOME>/rdu/mibs/*
  - \*.xml files under *<BAC\_HOME>/snmp/conf/*
- Step 4** Verify if the database has been backed up by checking the *history.log* file, which resides in the *BPR\_DATA* directory.
- Step 5** Recover the database that you have backed up to a consistent state, using the **recoverDb.sh** tool. For details, see the *Cisco Broadband Access Center Administrator Guide 4.2*.
- For example:
- ```
# /opt/CSCObpr/rdu/bin/recoverDb.sh /disk1/backup
```
- where */disk1/backup* identifies the location of the database backup files.

Step 6 After recovering the database, verify it by running the command:

For example:

```
# /opt/CSCObpr/rdu/internal/db/bin/verifydb.sh -dbdir /disk1/backup
```



Note In case of any error while verifying the database, contact Cisco Support.

Step 7 Copy the *BAC_42_MigrationTool.tar.gz* from Cisco.com location.

Step 8 Go to the directory *BAC_42_MigrationTool/migration*.

Step 9 Run *migrationTool.sh > help* and follow the help instructions.

Step 10 After the migration is complete, copy the whole database directory and backed-up files to the Linux server where Cisco BAC 4.2 is being installed.

Step 11 Restore the following files.

- a. Files under *<BAC_HOME>/rdu/conf/*.
 - *rdu.properties*
 - *api.properties*
 - Other xml files and dtd file
- b. MIB files under *<BAC_HOME>/rdu/mibs/*
- c. *.xml files under *<BAC_HOME>/snmp/conf/*



Note While restoring the files, make sure that you merge the changes without overwriting the newly installed files.

Step 12 Run the *restoreDB.sh* on the newly copied directory.



Note Before running the *restoreDb.sh* tool, you must stop the RDU server by running the */etc/init.d/bprAgent stop rdu* command. Also, remember to back up the database, then remove all files from the *rdu/db* and the *rdu/dblog* directories.

Step 13 Start the *bprAgent*.

Cisco BAC 4.2 Solaris to Cisco BAC 4.2 Linux

The procedure to migrate the RDU database from Cisco BAC 4.2 Solaris to Cisco BAC 4.2 Linux is similar to the procedure described in “[Cisco BAC 2.7.1.x, 4.0.1.x, 4.1.0.x Solaris to Cisco BAC 4.2 Linux](#)” section on page 4-20. The only difference in this scenario being, you need not use the migration tool hence exclude the steps 7 to 9. Execute the steps 1 to 6 on the Solaris server and steps 10 to 13 on the Linux server where Cisco BAC 4.2 needs to be installed.

DPE Cache Backup and Restore Tool

The DPE Cache Backup and Restore Tool tool supports populating the DPE cache from Cisco BAC 4.1.0.x to Cisco BAC 4.2. This reduces the time required for the synchronization with RDU while porting all the devices to the new DPE.

To do DPE migration:

-
- Step 1** Stop the Cisco BAC 4.1.0.x DPE server.
 - Step 2** Execute `<BPR_HOME>/dpe/internal/bin/createDbTar.sh <tarfile>` in the source DPE.
 - Step 3** Stop the Cisco BAC 4.2 DPE server.
 - Step 4** Copy the created database tar to the Cisco BAC 4.2 DPE and then execute the script:

```
# <BPR_HOME>/dpe/internal/bin/extractDbTar.sh <tarfile>
```
 - Step 5** Verify if the cache data is copied properly to `<BPR_DATA>/dpe/cache/` directory.
 - Step 6** Start the Cisco BAC 4.2 DPE. If the caching is successful, there should not be any more synchronization.

Uninstalling Cisco Broadband Access Center

This section describes how to uninstall Cisco Broadband Access Center (Cisco BAC).

The procedure described in this section uninstalls the RDU, DPE, KDC and Cisco Network Registrar extensions but it does not uninstall the Cisco Network Registrar application. Before removing Cisco BAC, manually remove the Cisco BAC configuration on Cisco Network Registrar.

The uninstallation program removes all files found in the installation directory (the default directory is `/opt/CSCObac`). The program also shuts down and removes these processes, if they are detected: SNMP Agent, Tomcat, Cisco BAC agent, RDU, KDC, and DPE.

The uninstallation program does not remove files that were placed outside the installation directory. For example, a component installation places the database and database logs directories under `/var/CSCObac`. These files must be removed manually. (Subsequent sections describe how to delete these files.) Also, the program does not remove any files found in the Cisco Network Registrar directory.

If you have installed Cisco BAC extensions on Cisco Network Registrar, you must uninstall those extensions to completely uninstall the Cisco BAC program; otherwise, an error message similar to the following appears:

```
The uninstall program found a copy of the BAC extensions in the NR extension
directory (/opt/nwreg2/local/extensions/dhcp/dex/libbprextensions.so), please disable
the extensions and remove the library before uninstalling BAC.
```



Note The path to the Cisco Network Registrar extensions differs based on the location where you have installed Cisco Network Registrar; the default location is `/opt/nwreg2`.

If the uninstallation program fails to uninstall Cisco BAC, an error messages appear.

After uninstalling Cisco BAC, manually remove the data and database logs directories. See [Post-Uninstallation Task, page 4-23](#).

To uninstall Cisco BAC from the command line:

-
- Step 1** Log in using user name and password.
 - Step 2** Manually remove the configuration of the Cisco BAC extensions on the Cisco Network Registrar server. You can do this from any server that has **nrcmd** installed and connectivity with Cisco Network Registrar.
 - a.** To uninstall the Cisco BAC extensions from your Cisco Network Registrar configuration, enter:

```
# NR_HOME/local/usrbin/nrcmd -N admin -P changeme -b <
```

```
<BPR_HOME>/cnr_ep/bin/bpr_cnr_disable_extpts.nrcmd
```

- b. To reload your DHCP server, enter:

```
# /etc/init.d/nwreglocal stop  
# /etc/init.d/nwreglocal start
```

Alternatively, enter:

```
# NR_HOME/local/usrbin/nrcmd -N admin -P changeme "dhcp reload"
```

- c. To remove the Cisco BAC extensions from the Cisco Network Registrar extensions directory, enter:

```
# rm -rf NR_HOME/local/extensions/dhcp/dex/libbprextensions.so
```

- Step 3** Run the following command to uninstall:

```
# # install-path/BAC_42_LinuxK9/uninstall_bac.sh
```

The following message is displayed.

```
Do you want to uninstall BAC 4.2?
```

```
Press 'y' continue or 'q' to quit [y]:
```

- Step 4** Enter **y** to continue.

- Step 5** Run the following commands to delete the previously installed directories.

```
rm -rf /opt/CSCObac  
rm -rf /var/CSCObac
```

Post-Uninstallation Task

After you have uninstalled Cisco BAC, manually remove the data and database logs directories. To remove these directories:

-
- Step 1** Log in as *root*.

- Step 2** Remove the data and the database logs directories. (The default directory for both is */var/CSCObac*.)

For example, enter:

```
# rm -rf /var/CSCObac
```

The data and the database logs directories are deleted.
