



# CHAPTER 4

## Installation of 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. It covers the following topics:

- [Installing Cisco Broadband Access Center, page 4-1](#)
- [Uninstalling Cisco Broadband Access Center, page 4-9](#)



**Note**

Only DPE and CNR components can be installed in Linux.

## Installing Cisco Broadband Access Center

This section explains the procedures you must follow to install Cisco Broadband Access Center (Cisco BAC) in a Linux operating system environment.

This chapter includes:

- [Installing Cisco BAC, page 4-2](#)
- [Installing Components in Interactive Mode, page 4-3](#)

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 <a href="#">Chapter 1, “Overview.”</a>	<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"/>

Table 4-1 Installation Checklist (continued)

Task	Checkoff
<p>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.</p> <p> <b>Note</b> We recommend that you have at least 200 MB of disk space available otherwise installation will not take place.</p>	<input type="checkbox"/>
5. Verify that you have minimum 500 MB of free space available in the <i>/tmp</i> directory for successful installation.	<input type="checkbox"/>
<p>6. Ensure that CNR 7.1.2.1 is installed and running on the servers on which you are installing Cisco BAC extensions.</p> <p><b>Note</b> To enable IPv6 support in Cisco BAC, you must install version 7.1.2.1 of CNR.</p>	<input type="checkbox"/>
7. For the CNR extensions, determine the name of the provisioning group to which the CNR server belongs.	<input type="checkbox"/>
8. For the CNR extensions, determine where you want to install the data directory ( <i>BPR_DATA</i> ). The default directory is <i>/var/CSCObac</i> with a disk space requirement of 200 MB.	<input type="checkbox"/>
9. Verify that you have the necessary CNR configuration files. For an example of these configuration files, see <a href="#">Appendix A, “Network Registrar Configuration File Example.”</a>	<input type="checkbox"/>
<p>10. 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=&lt;ipv6address&gt; 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"/>

## 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 to decompress and unpack the Cisco BAC installation file, and:
- Change to the directory in which you will decompress and extract the installation file.
  - Decompress the file with the *.gtar.gz* extension. Enter:

```
gunzip -d BAC_41_LinuxK9.gtar.gz
```

- c. Unpack the file with the `.gtar` extension that gunzip decompressed. Enter:

```
gtar -xvf BAC_41_LinuxK9.gtar
```

The utility creates the `BAC_41_Linux` 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 or noninteractive mode.

- [Installing Components in Interactive Mode, page 4-3](#)
- [Uninstalling Cisco Broadband Access Center, page 4-9](#)

## 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 [Installing Cisco Broadband Access Center, page 4-1](#).

This section provides instructions on installing components in interactive mode:

- [Installing CNR Extensions in Interactive Mode, page 4-5](#)
- [Installing DPE in Interactive Mode, page 4-3](#)

## 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 [Installing Cisco Broadband Access Center, page 4-1](#). Then:

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

```
# install-path/BAC_41_Linux/install_bac.sh
```

where *install-path* specifies the complete path to the directory in which the *BAC\_41\_Linux* directory has been created.

The installation program verifies that you have installed the required patches to 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 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; 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; 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** The installation program will prompt you to configure CNR extension points.

For example:

```
Configure the Cisco Network Registrar extension points (y/n/q)? [n]:
```

**Step 9** Enter **n** and press **Enter**.

**Step 10** The installation program will prompt you to configure DPE.

For example:

```
Configure the Cisco Device Provisioning (DPE) (y/n/q)? [n]:
```

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

**Step 12** The installation proceeds, and displays the following message after successful installation:

```
Finished
```

## Installing CNR Extensions in Interactive Mode

Install Cisco BAC extensions on all CNR servers in your Cisco BAC environment. If you are deploying Cisco BAC in a failover environment, you also must install the extensions on the failover servers. After you install extensions, you must configure them. This section explains how to install, configure, and validate these extensions.



### Note

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

Before you install CNR extensions, complete the initial installation described in [Installing Cisco Broadband Access Center, page 4-1](#). Also, ensure that CNR is running. Then:

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

```
# install-path/BAC_41_Linux/install_bac.sh
```

where *install-path* specifies the complete path to the directory in which the *BAC\_41\_Linux* directory has been created.

The installation program verifies that you have installed the required patches to 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 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; 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; 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** The installation program will prompt you to configure CNR extension points.

For example:

```
Configure the Cisco Network Registrar extension points (y/n/q)? [n]:
```

**Step 9** Enter **y** and press **Enter**.

**Step 10** The installation program will prompt you to enter details for RDU component.

For example:

```
Enter RDU IP Address or Hostname [bachost-rdu.example.com]: bacdevlab-linux-5
Enter RDU Listening Port [49187]: 49187
Enter the provisioning group name: group1
Are you going to use devices that support PacketCable voice technology (y/n)? [n]:
```

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

**Step 11** Enter **y** and press **Enter** if you are using PacketCable devices, else enter **n** and press Enter.

**Step 12** If you enter **n**, follow Step 13. If you enter **y**, the program prompts you to enter several voice technology properties.

For example:

```
Enter the KDC realm name [CISCO.COM]:
Enter IP address for the primary DHCP server [10.81.89.144]:
Enter IP address for the primary DNS server [10.81.89.144]:
Enter IP address for the secondary DHCP server []:10.81.89.144
Enter IP address for the secondary DNS server []:10.81.89.144
```

```
----- Confirmation -----
KDC realm: CISCO.COM
Primary DHCP: 10.81.89.144
Primary DNS: 10.81.89.144
Secondary DHCP: 10.81.89.144
Secondary DNS: 10.81.89.144
```

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

**Step 13** Press **y** and **Enter** to continue.

**Step 14** Enter the shared secret password that you want to use for authentication between the Cisco BAC servers.



**Note** You must use the same shared secret password for all DPEs and CNR extension points in your network.

For example:

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

**Step 15** Reenter the password for confirmation, and press **Enter**.

The program prompts you to confirm the installation.

**Step 16** Enter **y** and press **Enter**.



**Note** If you choose not to proceed, the following message appears and the installation quits:

```
Installation of <CSCObac> was terminated due to user request.
No changes were made to the system.
```

The program begins the installation process. After successful installation, the following message appears:

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

## Configuring Extensions

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

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

To configure extensions:

**Step 1** Log in to the CNR 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 CNR 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 CNR 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 7.1](#).

## Validating Extensions

To validate the extensions installed on the CNR server, from the CNR 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 = libdextropras.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: dextropras
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-destructor:
pre-packet-decode:
post-packet-encode:

nrcmd>
```

---

# Uninstalling Cisco Broadband Access Center

This chapter describes how you can uninstall Cisco Broadband Access Center (Cisco BAC).

The procedure described in this chapter uninstalls the DPE and CNR extensions but it does not uninstall the CNR application. Before removing Cisco BAC you must manually remove the Cisco BAC configuration on CNR.

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, 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 CNR directory.

If you have installed Cisco BAC extensions on CNR, 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 CNR extensions differs based on the location where you have installed CNR; the default location is */opt/nwreg2*.

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

This chapter describes:

- [Uninstalling Cisco BAC, page 4-9](#)
- [Post-Uninstallation Task, page 4-10](#)

## Uninstalling Cisco BAC

This section describes the procedures to uninstall Cisco BAC.

After uninstalling Cisco BAC, manually remove the data and database logs directories. See [Post-Uninstallation Task, page 4-10](#).

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 CNR server. You can do this from any server that has **nrcmd** installed and connectivity with CNR.
- To uninstall the Cisco BAC extensions from your CNR configuration, enter:
 

```
# NR_HOME/local/usrbin/nrcmd -N admin -P changeme -b <
BPR_HOME/cnr_ep/bin/bpr_cnr_disable_extpts.nrcmd
```
  - 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 CNR extensions directory, enter:

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

**Step 3** At the CLI prompt, enter:

```
# rpm -e CSCObac
```

Following information appears:

To remove files generated or changed by BAC, please execute the following commands:

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

**Step 4** Execute the commands and press **Enter** to start uninstalling.

**Step 5** The CLI prompt appears once uninstallation is complete.

---

## Post-Uninstallation Task

After you have uninstalled Cisco BAC, you must manually remove the data and database logs directories. To remove these directories, see Step 3 of [Uninstalling Cisco BAC, page 4-9](#).