



Cisco Broadband Access Center Installation Guide

Release 3.6

Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Text Part Number: OL-23850-01

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Cisco and the Cisco Logo are trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and other countries. A listing of Cisco's trademarks can be found at www.cisco.com/go/trademarks. Third party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1005R)

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

Installation Guide for Cisco Broadband Access Center 3.6
© 2011 Cisco Systems, Inc. All rights reserved.



CONTENTS

Preface v

Audience v

Organization 1-v

Conventions 1-vi

Product Documentation vii

Obtaining Documentation and Submitting a Service Request viii

CHAPTER 1

Introduction 1-1

Product Overview 1-1

Operating System Requirements 1-1

Cisco BAC Components 1-2

Minimum Hardware Requirements 1-3

Deployment Requirements 1-3

Smallest Fully Redundant Deployment 1-3

Incremental Scaling 1-4

Types of Installation 1-4

CHAPTER 2

Before Installing Broadband Access Center 2-1

Cisco BAC Components 2-1

Installation and Startup Process 2-2

Database Requirements 2-4

File System Block Size 2-4

Support for Large Files 2-5

Required Port Information 2-6

Installation Checklist 2-7

CHAPTER 3

Installing Broadband Access Center 3-1

Installation Notes 3-1

Installing Cisco BAC 3-2

Installing the RDU 3-2

Installing the DPE 3-5

Installing CNR Extension Point 3-7

CNR Extension Point Prerequisite 3-7

Enabling CNR Extension Point	3-10
Installing the CAR Extension Point	3-10
CAR Extension Point Prerequisite	3-10
Setting up CAR Extension Points	3-13
Upgrading Cisco Broadband Access Center	3-13
Backing up the RDU	3-14
Upgrading the RDU	3-15
Upgrading the DPE	3-16

CHAPTER 4

Adding a DPE 4-1

Adding a DPE from the CLI	4-1
DPE Properties	4-3

CHAPTER 5

Uninstalling Cisco Broadband Access Center 5-1

Uninstalling Cisco BAC	5-1
Uninstalling from the CLI	5-2
Post-Uninstallation Task	5-3

CHAPTER 6

Configuring the Syslog Utility to Receive Cisco BAC Alerts 6-1

APPENDIX A

Reinstalling Broadband Access Center A-1

Reinstalling from the CLI	A-1
---------------------------	-----

APPENDIX B

Installation Worksheet B-1

INDEX



Preface

The *Installation Guide for Cisco Broadband Access Center 3.6* describes general requirements and installation procedures for Cisco Broadband Access Center, which is referred to as Cisco BAC throughout this installation guide.

This chapter provides an outline of the other chapters in this guide, details information about related documents that support this Cisco BAC release, and demonstrates the styles and conventions used in the guide.

This chapter contains the following sections:

- [Audience, page v](#)
- [Organization, page v](#)
- [Product Documentation, page vii](#)
- [Product Documentation, page vii](#)
- [Obtaining Documentation and Submitting a Service Request, page viii](#)

Audience

System integrators, network administrators, and network technicians use this installation guide to install Cisco BAC on a Solaris operating system.

Organization

This guide includes the following sections:

Section	Title	Description
Chapter 1	Introduction	Describes general requirements for a successful installation of Cisco BAC.
Chapter 2	Before Installing Broadband Access Center	Describes factors to consider as you prepare to install Cisco BAC; for example, the individual components of Cisco BAC, the database requirements, and the order of operations for installing the software.

Section	Title	Description
Chapter 3	Installing Broadband Access Center	Describes how to install the individual components of Cisco BAC from the command line interface (CLI).
Chapter 4	Adding a DPE	Describes how to add a Cisco BAC component, the DPE, from the CLI.
Chapter 5	Uninstalling Cisco Broadband Access Center	Describes how to uninstall Cisco BAC from the CLI.
Chapter 6	Configuring the Syslog Utility to Receive Cisco BAC Alerts	Describes how to configure the syslog file to receive alerts after Cisco BAC is installed.
Appendix A	Reinstalling Broadband Access Center	Describes how to reinstall Cisco BAC from the CLI in case of a corrupted installation.
Appendix B	Installation Worksheet	Describes the various Cisco BAC Installation Parameters that you need to consider before installing Cisco BAC.

Conventions

This document uses the following conventions:

Convention	Indication
bold font	Commands and keywords and user-entered text appear in bold font .
<i>italic font</i>	Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic font</i> .
[]	Elements in square brackets are optional.
{ x y z }	Required alternative keywords are grouped in braces and separated by vertical bars.
[x y z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
courier font	Terminal sessions and information the system displays appear in <code>courier font</code> .
< >	Nonprinting characters such as passwords are in angle brackets.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.



Note

Means *reader take note*.



Tip

Means *the following information will help you solve a problem*.

**Caution**

Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

Product Documentation

**Note**

We sometimes update the printed and electronic documentation after original publication. Therefore, you should also review the documentation on Cisco.com for any updates.

Table 1 describes the documentation that is available for this Cisco BAC release.

Table 1 Product Documentation

Document Title	Available Formats
<i>Release Notes for Cisco Broadband Access Center, Release 3.6</i>	<ul style="list-style-type: none"> • PDF on the product CD-ROM. • On Cisco.com at this URL: http://cisco.com/en/US/products/sw/netmgts/ps529/prod_release_notes_list.html • On Software download page.
<i>Installation Guide for Cisco Broadband Access Center, Release 3.6</i>	<ul style="list-style-type: none"> • PDF on the product CD-ROM. • On Cisco.com at this URL: http://cisco.com/en/US/products/sw/netmgts/ps529/prod_installation_guides_list.html • On Software download page.
<i>Cisco Broadband Access Center Administrator's Guide, Release 3.6</i>	<ul style="list-style-type: none"> • PDF on the product CD-ROM • On Cisco.com at this URL: http://cisco.com/en/US/products/sw/netmgts/ps529/prod_maintenance_guides_list.html • On Software download page.
<i>Integration Developer's Guide for Cisco Broadband Access Center, Release 3.6</i>	<ul style="list-style-type: none"> • PDF on the product CD-ROM • On Cisco.com at this URL: http://cisco.com/en/US/products/sw/netmgts/ps529/prod_command_reference_list.html • On Software download page.
<i>Cisco Broadband Access Center DPE CLI Reference, Release 3.6</i>	<ul style="list-style-type: none"> • PDF on the product CD-ROM • On Cisco.com at this URL: http://cisco.com/en/US/products/sw/netmgts/ps529/prod_command_reference_list.html • On Software download page.
<i>Cisco Broadband Access Center 3.6 Third Party and Open Source Copyrights</i>	On Cisco.com at this URL: http://cisco.com/en/US/products/sw/netmgts/ps529/prod_release_notes_list.html

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.



CHAPTER 1

Introduction

This chapter gives an overview of Cisco Broadband Access Center (Cisco BAC), and describes the factors that you must consider before you install Cisco BAC.

This chapter details:

- [Product Overview, page 1-1](#)
- [Operating System Requirements, page 1-1](#)
- [Cisco BAC Components, page 1-2](#)
- [Minimum Hardware Requirements, page 1-3](#)
- [Deployment Requirements, page 1-3](#)
- [Types of Installation, page 1-4](#)

Product Overview

Cisco BAC is a distributed and scalable application that automates the tasks of provisioning and managing the Customer Premises Equipment (CPE) in a broadband service provider network. It enables secure provisioning and management of CPE by using the Broadband Forum's CPE WAN Management Protocol (CWMP), a standard defined in the TR-069 specification.

Based on open standards, Cisco BAC provides a simple and easy way to deploy high-speed data and voice technology.

Cisco BAC can be scaled to suit networks of virtually any size. It also offers high availability, made possible by the product's distributed architecture with centralized management.

Operating System Requirements

You must install Cisco BAC on Sun SPARC computers that run the Solaris 10 operating system.

Ensure that you have the latest Solaris patch bundle for the operating system installed in your system before you install Cisco BAC. We recommend *Solaris 10 05/08* for Solaris 10 operating system.



Note

Before you install Cisco BAC, download and install the recommended patch bundle from the Sun Microsystems support website and then restart your computer.

Cisco BAC Components

A Cisco BAC installation requires:

- A Regional Distribution Unit (RDU).

The RDU is the primary server in a Cisco BAC deployment. It contains the central Cisco BAC database and is the sole entry point for processing requests from the application programming interface (API).

- One or more Device Provisioning Engines (DPEs).

A DPE caches provisioning information and configuration requests, including the transfer of configuration files to devices. It is the major component of the provisioning group, handling all device interactions with the RDU.

- Cisco Network Registrar extensions (CNR extensions)

The CNR extensions are the links between Cisco BAC and Cisco Network Registrar. You should install this component on all Cisco Network Registrar servers in your Cisco BAC environment. If you are deploying Cisco BAC in a failover environment, ensure that you install the extensions on the fail-over servers also.

**Note**

You must install the Cisco BAC CNR extensions on a server running Cisco Network Registrar 7.2. If you do not want to install these extensions, you are not required to install Cisco Network Registrar.

- Cisco Access Registrar extensions (CAR extensions)

The CAR extensions are the links between Cisco BAC and Cisco Access Registrar. You should install this component on all Cisco Access Registrar servers in your Cisco BAC environment. If you are deploying Cisco BAC in a failover environment, ensure that you install the extensions on the fail-over servers also.

**Note**

You must install the Cisco BAC CAR extensions on a server running Cisco Access Registrar 5.0.0.3 or later. If you do not want to install these extensions, you are not required to install Cisco Access Registrar.

- SSL Accelerator and Load Balancer.

SSL Accelerator and Load Balancer manage the traffic from the CPE to DPEs. The SSL accelerator and the Load Balancer enable you to effectively deploy the various hardware devices in the provisioning group.

**Note**

We recommend that you use the Cisco ACE 4710 as SSL accelerator and load balancer.

Minimum Hardware Requirements

Table 1-1 lists the minimum hardware requirements for the various Cisco BAC components.

Table 1-1 Minimum Hardware Requirements

Component	Model	RAM	CPU	Minimum Disk
DPE	Sun T5210 Solaris 10	4 GB	1 with 4 cores	2,15K rpm
RDU	Sun T5210 Solaris 10	16 GB	1 with 8 cores	2,15K rpm
RAID Array	Storage Tek 3320	512 MB	—	8,15K rpm Two RAID 1+0 volumes
SSL Accelerator and Load Balancer	Cisco ACE 4710 or module for Cisco 7600	—	—	—

Deployment Requirements

This section details the minimum hardware requirements that you need to successfully deploy Cisco BAC in your environment. This section contains:

- [Smallest Fully Redundant Deployment, page 1-3](#)
- [Incremental Scaling, page 1-4](#)

Smallest Fully Redundant Deployment

A smallest fully redundant deployment of about 500,000 devices can be configured with one provisioning group that has two DPEs. This setup requires:

- Two RDU servers
- One RAID unit
- Two DPE servers
- Two Cisco ACE units
- Two Cisco Network Registrar servers

Incremental Scaling

For every additional 500,000 devices that you add, you need two DPEs configured in a new provisioning group. A single deployment can handle up to eight million devices.

**Note**

A single pair of load balancers can handle DPEs in multiple provisioning groups. We recommend that you determine the number of load balancers based on the network configuration of your service provider.

Types of Installation

This section describes how to install individual Cisco BAC components. The installation program enables you to install one or all the components of Cisco BAC—RDU, DPE, CNR Extension Points and CAR Extension Points.

**Note**

This release does not feature a lab installation, but you can perform its equivalent by installing all components on a single machine. To perform the activity, we recommend that you have at least 350MB of disk space available.

You can install RDU, DPE, Cisco Network Registrar and Cisco Access Registrar through the CLI. For details on component installation, see the [Installing Cisco BAC, page 3-2](#).

Before you install Cisco BAC, familiarize yourself with the installation startup processes and checklists described in [Before Installing Broadband Access Center, page 2-1](#).

See the [Installation Worksheet](#), for information on Cisco BAC installation parameters.



CHAPTER 2

Before Installing Broadband Access Center

This chapter describes the requirements and dependencies for installing Cisco BAC successfully.

This chapter has the following sections:

- [Cisco BAC Components, page 2-1](#)
- [Installation and Startup Process, page 2-2](#)
- [Database Requirements, page 2-4](#)
- [Required Port Information, page 2-6](#)
- [Installation Checklist, page 2-7](#)

Cisco BAC Components

The Cisco BAC component installation program prompts you to install either or both of the following components:

- Regional Distribution Unit (RDU).

The RDU is the primary server in the Cisco BAC provisioning system. You should install the RDU on a Solaris 10 server that meets the requirements described in [Minimum Hardware Requirements, page 1-3](#).

The RDU:

- Generates instructions that direct responses from the provisioning group to various customer premises equipment (CPE).
- Processes application programming interface (API) requests for all Cisco BAC functions.
- Manages the Cisco BAC system.



Note The installation program preloads the required data into the RDU database, and starts the RDU daemon through the Cisco BAC watchdog process. For details on configuring the SNMP agent, see the *Cisco Broadband Access Center DPE CLI Reference, Release 3.6*. For information on the Cisco BAC watchdog process, see the *Cisco Broadband Access Center Administrator's Guide, Release 3.6*.

- Device Provisioning Engine (DPE).

The DPE is the major component of the provisioning group, handling all device interactions with the RDU.

The DPE:

- Caches instructions generated at the RDU.
- Manages the CPE WAN Management Protocol (CWMP) and communicates with the TR-069 enabled devices.



Note The installation program installs a CLI on your system to help configure the DPE. The Cisco BAC watchdog process and the SNMP agent are installed for the DPE also. For information on configuring the DPE and SNMP agent, see the *Cisco Broadband Access Center DPE CLI Reference, Release 3.6*.

- CNR extensions

The CNR extensions are the links between Cisco BAC and Cisco Network Registrar. You should install this component on all Cisco Network Registrar servers in your Cisco BAC environment. If you are deploying Cisco BAC in a fail-over environment, ensure that you install the extensions on the failover servers also.



Note You must install the Cisco BAC CNR extensions on a server running Network Registrar 7.2. If you do not want to install these extensions, you are not required to install Cisco Network Registrar.

- CAR extensions

The CAR extensions are the links between Cisco BAC and Cisco Access Registrar. You should install this component on all Cisco Access Registrar servers in your Cisco BAC environment. If you are deploying Cisco BAC in a fail-over environment, ensure that you install the extensions on the failover servers also.



Note You must install the Cisco BAC CAR extensions on a server running Cisco Access Registrar 5.0.0.3 or later. If you do not want to install these extensions, you are not required to install Cisco Access Registrar.

Installation and Startup Process

To ensure a smooth installation and startup process, complete the following steps:

-
- Step 1** Determine the computers and the servers on which you need to install the individual components of Cisco BAC.
 - Step 2** Verify the file system block size of the directory in which you intend to install the Cisco BAC database and the database transaction log files (see the [Database Requirements, page 2-4](#)).
 - Step 3** Review the installation checklist (see the [Installation Checklist, page 2-7](#)).

Step 4 Install the RDU. Ensure that you:

- Know the target location for the following directories:
 - Home Directory
 - Data Directory
 - Database Transaction Logs Directory
- Verify the existence of a text file called *log.txt*, which indicates that errors occurred during the installation process. This file is located under the *BPR_HOME* directory.

Step 5 Install a DPE. Ensure that you know the target location for the following directories:

- Home Directory
- Data Directory



Note If you exit the Cisco BAC installation after the database is installed, you must uninstall the *BPR_HOME* and the *BPR_DATA* directories before you install Cisco BAC again. (For information on uninstallation, see [Uninstalling Cisco BAC, page 5-1.](#)) Also, stopping the installation mid-way does not generate the log file.

If you rerun the installation without uninstalling the specified directories, you cannot change the location of the *BPR_DATA* or the *BPR_DBLOG* directories.

Step 6 After you install the RDU, ensure that you:

- Obtain a valid Cisco BAC license key for each technology that you provision, specifically for the CWMP and DPE component.



Note If you have not received your licenses, contact your Cisco representative before you proceed further.

- Launch the Cisco BAC administrator user interface to verify if the RDU is running.
 - To launch the administrator user interface, enter the administrator's location by using this syntax:

`http://machine_name:port_number/`

where *machine_name* identifies the computer on which the RDU is running.



Note To access the administrator user interface using HTTP over SSL/TLS, enter `https://machine_name:port_number/`

The server-side of the administrator application runs on a computer port. By default, this port number is set at 80 for HTTP and 443 for HTTP over SSL/TLS.

The main login page appears.

- Change the Cisco BAC administrator password.

To change the password, enter the default username (**bacadmin**) and password (**changeme**), and click **Login**.

The **Change Password** screen appears and prompts you to change the default password. Enter a new password, and click **Login**.

Step 7 Optionally, configure the syslog file for alerts.



Note

You can set up the syslog file on any Cisco BAC component server.

Step 8 After you install the DPE, ensure that you:

- Change the DPE login password and the enable password from the CLI. The default DPE login password and enable password is *changeme*.

- To change the login password, access the CLI in the enabled mode, and enter:

```
dpe# password password
```

where *password* identifies the new DPE password.

- To change the DPE enable password, enter the following command:

```
dpe# enable password password
```

where *password* identifies the local configured password currently in effect or, optionally, provides a new password. If this parameter is omitted, you are prompted for the password.

For more information, see the *Cisco Broadband Access Center DPE CLI Reference, Release 3.6*.

- Configure the DPE from the CLI. For more information, refer to the *Cisco Broadband Access Center DPE CLI Reference, Release 3.6*.

Step 9 Optionally, configure the syslog file for alerts.



Note

You can set up the syslog file on any Cisco BAC component server.

Database Requirements

Before you install Cisco BAC, check the following:

- [File System Block Size, page 2-4](#).
- [Support for Large Files, page 2-5](#).

File System Block Size

For optimum performance and reliability of the Cisco BAC database, configure the file system or systems that contain the database files and database transaction log files with an 8-KB block size or greater. If your system configuration does not support an 8-KB block size, then configure the block size in multiples of 8 KB; for example, 16 KB or 32 KB.

The installation program prompts you to specify a directory in which you prefer to install database files and database transaction log files; these directories are identified in Cisco BAC with system variables *BPR_DATA* and *BPR_DBLOG*, respectively.

To verify that a directory resides on a file system with a minimum 8-KB block size:

-
- Step 1** Run the UNIX **mount** command without any parameters to determine on which file system device the directory resides. The default directory is */var/CSCObac*.

For example:

```
# mount
/var on /dev/dsk/c0t0d0s4 read/write/setuid/intr/largefiles/onerror=panic/dev=2200004 on
Mon Nov 26 08:07:53
```

In this example, the file system device is */dev/dsk/c0t0d0s4*.

- Step 2** To determine the block size of the file system, use the **df** command.

For example:

```
# df -g /dev/dsk/c0t0d0s4
/var      (/dev/dsk/c0t0d0s4 )      8192 block size      1024 frag size
          961240 total blocks      851210 free blocks    755086 available     243712 total
files
          239730 free files         35651588 filesys id    ufs fstype           0x00000004
flag              255 filename length
```

In this example, the block size is 8192 bytes, which is 8 KB. The block size of the selected directory, therefore, is correct.

Support for Large Files

Ensure that the file system in which you place database files is configured to support files larger than 2 GB.

To verify large file support:

-
- Step 1** Run the UNIX **mount** command without parameters.
- Step 2** Note whether the intended file system contains the keyword **largefiles**.

For example:

```
# mount
/var on /dev/dsk/c0t0d0s4 read/write/setuid/intr/largefiles/onerror=panic/dev=2200004 on
Mon Nov 26 08:07:53
```

In this example, the output contains the keyword **largefiles**. This file system, therefore, can support files greater than 2 GB.

Required Port Information

Before you install Cisco BAC, determine the ports on which the Cisco BAC components, the RDU, the DPE, CNR extensions and CAR extensions, listen during communication with each other or with the CPE.

The installation program checks for the availability of all ports: both configurable and nonconfigurable.

If the port that you have specified is unavailable, the installation program displays a message; otherwise, the message similar to the following one appears:

```
Not a valid port number
```

In the case of a nonconfigurable port, the installation program notifies you and exits the program without making any changes to the system.

[Table 2-1](#) lists the required external inbound ports and their default values.

Table 2-1 *Default External Inbound Ports Used by Cisco BAC Components*

Component	Default Port Number	Protocol	Configurable	Used by
RDU	161	UDP	No	SNMP Get
RDU	49187	TCP	Yes	DPE and API access
RDU	80	TCP	No	Admin Web UI HTTP
DPE	49186	UDP	Yes	CPE Prov Group locator
DPE	2323	TCP	Yes	DPE CLI
DPE	7547	TCP	Yes	TR-069 CWMP 1
DPE	7548	TCP	Yes	TR-069 CWMP 2
DPE	7549	TCP	Yes	HTTP File Service 1
DPE	7550	TCP	Yes	HTTP File Service 2

[Table 2-2](#) lists the external outbound ports and their default values.

Table 2-2 *Default External Outbound Ports Used by Cisco BAC Components*

Component	Number	Protocol	Configurable	Used by
RDU	162	UDP	No	SNMP Traps
DPE	49186	UDP	Yes	CPE Prov Group locator
DPE	162	UDP	Yes	SNMP Traps

Table 2-3 lists the internal ports and their default values.

Table 2-3 Default Internal Ports Used by Cisco BAC Components

Component	Number	Protocol	Configurable	Used by
RDU	49887	TCP	Yes	Internal watchdog and SNMP agent communication
DPE	49887	TCP	Yes	Internal watchdog and SNMP agent communication
RDU	8001	SNMP (UDP)	Yes	SNMP Internal
DPE	8001	SNMP (UDP)	No	SNMP Internal

Installation Checklist

Before you run the installation program, use the following checklist to ensure your readiness. In addition, see the [Installation Notes, page 3-1](#).

1. Verify the system hardware and software requirements described in [Introduction, page 1-1](#).
2. Ensure that you have *root* access to the computers on which you intend to install Cisco BAC components.
3. Have your Cisco BAC license key or keys at hand. You need a valid license key for each technology that you want to provision with Cisco BAC, namely CWMP and the DPE.
4. Determine the home directory (*BPR_HOME*) on which you want to install the Cisco BAC component or components. The default directory is */opt/CSCObac*.



Note We recommend that you have at least 400 MB of disk space available for the home directory, 512 MB of disk space available for */tmp* directory and 5 MB of disk space available for */etc/init.d* directory. For detailed information, see [Installation Notes, page 3-1](#).

5. For the RDU, determine where you want to install the data directory (*BPR_DATA*) and the database transaction logs (*BPR_DBLOG*). The default directory is */var/CSCObac*.



Note We recommend that you install the database transaction logs on a different physical disk than the home directory or the data directory. For detailed information, see [Installation Notes, page 3-1](#).

6. Cisco BAC servers use the same password for all the components in your network. This password is used as a token to authenticate communication between the different components of the Cisco BAC server. Enter the shared secret password used by the Cisco BAC components for the RDU in the network. The shared secret password is the same for all Cisco BAC servers in your network.

**Note**

To find a list of Cisco BAC installation parameters, see [Installation Worksheet, page B-1](#).



CHAPTER 3

Installing Broadband Access Center

This chapter describes how to work with the Cisco BAC program to install the Cisco BAC components—RDU, DPE, Cisco Network Registrar Extension Points and Cisco Access Registrar Extension Points.

You can install the Cisco BAC components from the CLI. Both interfaces are supplied with the product.



Caution

If you interrupt the installation program after it begins copying files, you must manually clean up the locations of copied files, specifically *BPR_HOME*. For detailed information, see [Uninstalling Cisco BAC, page 5-1](#).

This chapter includes:

- [Installation Notes, page 3-1](#)
- [Installing Cisco BAC, page 3-2](#)
- [Upgrading Cisco Broadband Access Center, page 3-13](#)

Installation Notes

This section describes some notes and recommendations to consider before and during the installation process. Use this information along with the installation startup processes and checklists described in [Before Installing Broadband Access Center, page 2-1](#).

- Be sure to install the RDU before installing the DPE. If you choose to install the DPE without installing the RDU, or without an RDU already installed on your system, the DPE fails to function normally.
- When the program prompts you to enter a value during installation, note that the values in square brackets are default values. If you press **Enter** without entering fresh values, the program takes the default value.
- The installation program, by default, installs the data directory (*BPR_DATA*) in a location other than that of the home directory (*BPR_HOME*). The default location for the data directory is */var/CSCObac*.

We recommend that the data directory be on a different physical disk than the home directory; for example, */var/disk0/CSCObac*. Your disk should have a free space of minimum 1 GB and maximum of 30 GB. The disk should have at least 1 GB and up to 30 GB of free space.

The directory specified becomes the top-level directory under which the installation program creates a number of subdirectories; for example, */var/disk0/CSCObac/rdu/db*.

- The installation program, by default, installs the database transaction logs directory (*BPR_DBLOG*) in the same directory as the data directory (*BPR_DATA*). The default location for the database transaction logs is */var/CSCObac*.

We recommend that you locate the database transaction logs directory on the fastest disk on the system. Also, ensure that 1 GB disk space is available.

- You must enter a listening port number for the RDU. This port is the interface that the RDU uses to communicate with the DPE. The default port is 49187.
- During installation, the program generates a definitions file (*bpr_definitions.sh*), which is copied to the target home directory (*BPR_HOME*). The definition file stores the values for the:
 - Installation location (*BPR_HOME*)
 - Data location (*BPR_DATA*)
 - Database transactions log location (*BPR_DBLOG*)
 - Cisco BAC class path (*BPR_CP*)
 - All installed components (*COMPONENTS*)

The *bpr_definitions.sh* file is updated whenever new components are installed or added.

Installing Cisco BAC

This section describes the procedures that you follow to install the individual components of Cisco BAC: the RDU, the DPE, Cisco Network Registrar and Cisco Access Registrar.

**Note**

To ensure a smooth installation, we recommend that you install the RDU before you install the DPE.

You can install the Cisco BAC components from the CLI, as described in:

- [Installing the RDU, page 3-2](#)
- [Installing the DPE, page 3-5](#)
- [Installing CNR Extension Point, page 3-7](#)
- [Installing the CAR Extension Point, page 3-10](#)

Installing the RDU

This section describes how to install the RDU. You must install the RDU on a Solaris 10 server that meets the requirements described in the [Minimum Hardware Requirements, page 1-3](#).

**Note**

Before installation, remove */rdu/db* from */var/CSCObac/* directory.

To install RDU:

-
- Step 1** Log in to the intended Cisco BAC host as *root*.
- Step 2** At the solaris system prompt, change directory to your CD-ROM drive or other installation media. The installation program, *pkgadd* is at the root of this drive.

Step 3 Enter this command to start the installation program:

```
# pkgadd -d file-path/BAC_3.6_SolarisK9/CSCObac.pkg CSCObac
```

where file-path specifies the complete path to the directory in which the BAC_3.6_SolarisK9 directory has been created.

The installation program verifies that you have installed the required patches to the Solaris operating system. When the verification ends, the following welcome information appears:

```
Welcome to the Cisco Broadband Access Center for TW (BAC 3.6) installation
program. This installation program installs BAC 3.6 on your system.
```

Step 4 Press **Enter** to continue.

The installation program prompts you to select one or more components.

Step 5 Enter **y** and press **Enter** at the RDU prompt.

To skip installing a DPE, CNR extension points and CAR 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] y
Device Provisioning Engine (DPE) (y/n)? [n] n
Cisco Network Registrar extension points (y/n)? [n] n
Cisco Access Registrar extension points (y/n)? [n] n
```

Step 6 Enter **y** and press **Enter**.

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

```
----- Confirmation -----

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

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

The Home Directory Destination prompt appears.

Step 8 To accept the default directory, */opt/CSCObac*, press **Enter**; or enter a different directory.

For example:

```
----- Home Directory -----

Home Directory [/opt/CSCObac]
```

Step 9 Enter **y** and press **Enter** to confirm the directory. The data directory destination prompt appears. To accept the default directory, */var/CSCObac*, press **Enter**; or enter another directory.

For example:

```
----- Data Directory -----

DB Data Directory [/var/CSCObac]
```

Step 10 Enter **y** and press **Enter** to confirm the directory.

- Step 11** Enter the database transaction logs destination. To accept the default directory, `/var/CSCObac`, press **Enter**; or enter another directory.

For example:

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

Enter **y** and press **Enter** to confirm the directory.

- Step 12** Enter the listening port for the RDU. To accept the default value, 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. See the *Cisco Broadband Access Center DPE CLI Reference, Release 3.6*, for details on configuring the DPE.

The installation program obtains the IP address of the RDU automatically. You need not enter this value manually.

For example:

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

RDU Listening Port [49187]
```

- Step 13** Enter **y** and press **Enter** to confirm the listening port number.
- Step 14** Enter the shared secret password that you want to use for authentication between the Cisco BAC servers; the default password is **secret**.



Note You must use the same shared secret password for all RDUs and DPEs in your network.

For example:

```
Enter the Shared Secret Password [secret]
```

Press **Enter** to continue the installation.

- Step 15** The program displays the installation parameters that you selected. Enter **y** and press **Enter** to confirm the parameters, and install the RDU component.

For example:

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

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


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

The program prompts you to continue with the installation.

For example:

```
This package contains scripts which will be executed with super-user
permission during the process of installing this package.
Do you want to continue with the installation of <CSCObac> [y,n,?] y
```

Step 17 Enter **y** and press **Enter**.

After a successful installation, the following message appears:

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



Note When the previously backed-up database is being restored to Cisco BAC 3.6 RDU, the user must run the script *AddProperties.kiwi script*, available in `<file-path>/BAC_3.6_SolarisK9/kiwi/` directory, through the Cisco BAC tools.

Here `<file-path>` specifies the complete path to the directory in which the *BAC_3.6_SolarisK9* directory has been created.

Installing the DPE

This section describes how to install the DPE.



Note Before proceeding to install the DPE, ensure that the RDU resides on your system. For details on installing the RDU, see the [Installing the RDU, page 3-2](#).

To install the DPE from the CLI:

Step 1 Log in to the intended Cisco BAC host as *root*.

Step 2 At the Solaris system prompt, change directory to your CD-ROM drive or other installation media. The installation program, *pkgadd*, is at the root of this drive.

Step 3 Enter this command to start the installation program:

```
# pkgadd -d file-path/BAC_3.6_SolarisK9/CSCObac.pkg CSCObac
```

where `file-path` specifies the complete path to the directory in which the *BAC_3.6_SolarisK9* directory has been created.

The installation program verifies that you have installed the required patches to the Solaris operating system. When the verification ends, welcome information appears as:

```
Welcome to the Cisco Broadband Access Center for TW (BAC 3.6) installation
program. This installation program installs BAC 3.6 on your system.
```

Step 4 Press **Enter** to continue. The installation program prompts you to select one or more components.

Step 5 Enter **y** and press **Enter** at the DPE prompt.

To skip installing a RDU, CNR extension points and CAR 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)? [y] y
Cisco Network Registrar extension points (y/n)? [n] n
Cisco Access Registrar extension points (y/n)? [n] n
```

Step 6 Confirm the components that you want to install; enter **y** and press **Enter**.

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

```
----- Confirmation -----

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

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

The Home Directory Destination prompt appears.

Step 8 To accept the default directory, */opt/CSCObac*, press **Enter**; or enter a different directory.

For example:

```
----- Home Directory -----

Home Directory [/opt/CSCObac]
```

Step 9 Enter **y** and press **Enter** to confirm the directory. The data directory destination prompt appears. To accept the default directory, */var/CSCObac*, press **Enter**; or enter another directory.

For example:

```
----- Data Directory -----

DB Data Directory [/var/CSCObac]
```

Step 10 To confirm the directory, press **y** and **Enter**. The program prompts you to enter the RDU information required to install DPE.

Step 11 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.

For example:

```
----- CNR EP Info -----

Enter RDU IP Address or Hostname [bacdev3-t5240-1-d3]
Enter RDU Listening Port [49187]
```

- 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.

For example:

```
----- DPE Information -----  
Enter RDU IP Address or Hostname [bacdev3-t5240-1-d3]  
Enter RDU Listening Port [49187]
```

- Step 13** Enter the shared secret password that you want to use for authentication between the Cisco BAC servers; the default password is secret. Press **Enter** to continue.



Note You must use the same shared secret password for all RDUs and DPEs in your network.

For example:

```
Enter the Shared Secret Password [secret]  
Press Enter to continue the installation.
```

The program prompts you to continue with the installation.

For example:

```
This package contains scripts which will be executed with super-user  
permission during the process of installing this package.  
Do you want to continue with the installation of <CSCObac> [y,n,?] y
```

- Step 14** Enter **y** and press **Enter**.

After a successful installation, the following message appears:

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

Installing CNR Extension Point

Install Cisco BAC extensions on all Cisco Network Registrar 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.

CNR Extension Point Prerequisite

As a prerequisite to install CNR_EP, you must have installed Cisco Network Registrar. For Cisco Network Registrar installation information, see [Installation Guide for Cisco Network Registrar, Release 7.2](#).

This section explains how to install, configure, and validate these extensions.



Note Cisco BAC 3.6 has been tested with Cisco Network Registrar 7.2. Cisco Network Registrar 7.2 has the fix for co-resident Cisco Network Registrar and Cisco Access Registrar.

We recommend that you configure the Cisco Network Registrar server to use a static IP address.

To install the CNR Extension Point from the CLI:

Step 1 Log in to the intended Cisco BAC host as *root*.

Step 2 At the Solaris system prompt, change directory to your CD-ROM drive or other installation media. The installation program, *pkgadd* is at the root of this drive.

Step 3 Enter this command to start the installation program:

```
# pkgadd -d file-path/BAC_3.6_SolarisK9/CSCObac.pkg CSCObac
```

where file-path specifies the complete path to the directory in which the BAC_3.6_SolarisK9 directory has been created.

The installation program verifies that you have installed the required patches to the Solaris operating system. When the verification ends, the following welcome information appears:

```
Welcome to the Cisco Broadband Access Center for TW (BAC 3.6) installation
program. This installation program installs BAC 3.6 on your system.
```

Step 4 Press **Enter** to continue.

The installation program prompts you to select one or more components.

Step 5 Enter **y** and press **Enter** at the CNR prompt.

To skip installing a RDU, DPE and CAR 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)? [y] y
Cisco Access Registrar extension points (y/n)? [n] n
```

Step 6 Enter **y** and press **Enter**.

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

```
----- Confirmation -----

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

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

The Home Directory Destination prompt appears. To accept the default directory, */opt/CSCObac*, press **Enter**; or enter a different directory.

For example:

```
----- Home Directory -----

Home Directory [/opt/CSCObac]
```

Step 8 Enter **y** and press **Enter** to confirm the directory.

The data directory destination prompt appears.

- Step 9** To accept the default directory, `/var/CSCObac`, press **Enter**; or enter another directory.
For example:

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

- Step 10** Enter **y** and press **Enter** to confirm the directory.

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

- Step 11** Enter the IP address (or hostname) and the listening port of the host on which you have installed the RDU. Press **Enter** to accept the default information,; or enter alternative information.

For example:

```
----- CNR EP Info -----
Enter RDU IP Address or Hostname [bacdev3-t5240-1-d3]
Enter RDU Listening Port [49187]
```

You are then prompted to enter the name of the extension point provisioning group.

The program prompts you to confirm the installation.

For example:

```
----- Confirmation -----
RDU IP Address: 10.10.10.10
RDU IP Port: 49187
Extention Point Provisioning Group: default

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

- Step 12** Press **y** and **Enter** to confirm and continue.

The program prompts you to continue with the installation.

For example:

```
This package contains scripts which will be executed with super-user
permission during the process of installing this package.
Do you want to continue with the installation of <CSCObac> [y,n,?] y
```

- Step 13** Enter **y** and press **Enter**.

After a successful installation, the following message appears:

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

Enabling CNR Extension Point

To enable the CNR Extension Point.

Step 1 After installing CNR Extension Point, run the below command to enable the CNR extension points:

```
NR_HOME/local/usrbin/nrcmd -s < BPR_HOME/cnr_ep/bin/bpr_cnr_enable_extpts.nrcmd
```

In case the default setting are changed, use the below options instead of -s.

List of options are:

```
-C <cluster>    the Cluster to log in to
-N <name>       the Name to log in as
-P <password>   the Password to log in with
```

Step 2 And then restart the Cisco Network Registrar server using the below command:

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



Note Before you can use the Cisco Network Registrar server, you must configure scopes required for DHCP server.

Installing the CAR Extension Point

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

CAR Extension Point Prerequisite

As a prerequisite to install CAR Extension Point, the user must have installed CAR 5.0.0.3 or later. For CAR Extension Point installation information, see *Installation Guide for Cisco Access Registrar, release 5.0*.



Note The default value for tomcat server port (8005) and web UI port (8080) are the same for both Cisco Network Registrar and Cisco Access Registrar servers. Hence, you need to change either the tomcat server port or web UI port before installing CAR Extension Point.

The tomcat server port of the Cisco Access Registrar server and web UI port can be changed in `/opt/CSCOar/apache-tomcat-5.5.27/conf/server.xml`.

The tomcat server port of the Cisco Network Registrar server and web UI port can be changed in `/opt/nwreg2/local/tomcat/conf/server.xml`.

You may choose to install Cisco Network Registrar or Cisco Access Registrar, first. However, we recommend that you install Cisco Access Registrar before Cisco Network Registrar. Cisco Network Registrar allows you to change the Web UI (tomcat) port as part of the installation.

Cisco Access Registrar 5.0.0.6 requires either JRE 1.5.x or 1.6.x, but CAR_EP needs JRE 1.6.x, so use JRE 1.6.x for CAR 5.0.0.6.

We recommend that you configure the Cisco Access Registrar server to use a static IP address.

To install the CAR Extension Point from the CLI:

-
- Step 1** Log in to the intended Cisco BAC host as *root*.
- Step 2** At the Solaris system prompt, change directory to your CD-ROM drive or other installation media. The installation program, *pkgadd* is at the root of this drive.
- Step 3** Enter this command to start the installation program:

```
# pkgadd -d file-path/BAC_3.6_SolarisK9/CSCObac.pkg CSCObac
```

where *file-path* specifies the complete path to the directory in which the BAC_3.6_SolarisK9 directory has been created.

The installation program verifies that you have installed the required patches to the Solaris operating system. When the verification ends, the following welcome information appears:

```
Welcome to the Cisco Broadband Access Center for TW (BAC 3.6) installation
program. This installation program installs BAC 3.6 on your system.
```

- Step 4** Press **Enter** to continue.
- The installation program prompts you to select one or more components.
- Step 5** Enter **y** and press **Enter** at the CAR Extension Point prompt.
- To skip installing the RDU and DPE 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
Cisco Access Registrar extension points (y/n)? [n] y
```

- Step 6** Enter **y** and press **Enter**.
- The program prompts you to confirm the components that you want to install.

```
----- Confirmation -----

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

- Step 7** Enter **y** and press **Enter** to continue. The Home Directory Destination prompt appears. To accept the default directory, */opt/CSCObac*, press **Enter**; or enter a different directory.

For example:

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

- Step 8** Enter **y** and press **Enter** to confirm the directory. The data directory destination prompt appears.

- Step 9** To accept the default directory, */var/CSCObac*, press **Enter**; or enter another directory.

For example:

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

- Step 10** Enter **y** and press **Enter** to confirm the directory. The program prompts you to enter information on the RDU required to install the extensions.

- Step 11** 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.

For example:

```
----- CNR EP Info -----
Enter RDU IP Address or Hostname [bacdev3-t5240-1-d3]
Enter RDU Listening Port [49187]
```

The program prompts you to confirm the installation.

For example:

```
----- Confirmation -----
RDU IP Address: 10.10.10.10
RDU IP Port: 49187
Is this correct (y/n/q)? [y]
```

- Step 12** Enter **y** and press **Enter** to confirm and continue.

The program prompts you to continue with the installation.

For example:

```
This package contains scripts which will be executed with super-user
permission during the process of installing this package.
Do you want to continue with the installation of <CSCObac> [y,n,?] y
```

- Step 13** Enter **y** and press **Enter**.

After a successful installation, the following message appears:

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

Setting up CAR Extension Points

To setup the CAR Extension Point:

- Step 1** After installing CAR Extension Point, run the below script to create and setup extension points in Cisco Access Registrar:

```
BPR_HOME/car_ep/bin/configAREExtension.sh
```

The DPE Auth Service hosts address and port will have to be manually provisioned. By default, the host address is *localhost* and auth service port is 7551. To change the default properties run the following script with appropriate options:

```
BPR_HOME/car_ep/bin/changeARProperties.sh
```

- To configure the DPE Auth service interface run the above script with the following option:

```
sh changeARProperties.sh -host <address>
```

- Step 2** To configure the DPE Auth service port run the script with the following option:

```
sh changeARProperties.sh -port <port_number>
```

- Step 3** To display the configured properties for CAR Extension Point, run the script with the following option:

```
sh changeARProperties.sh -d
```

- Step 4** To list the options of the script, run the following script:

```
sh changeARProperties.sh -help
```

Cisco BAC displays the following list of options:

```
-C <cluster>   the Cluster to log in to
-N <name>      the Name to log in as
-P <password> the Password to log in with
```

Upgrading Cisco Broadband Access Center

This section describes how to upgrade a Cisco BAC 3.5.x installation to Cisco BAC 3.6.

Before upgrading to Cisco BAC 3.6, ensure that you obtain the license file that this release supports. After the upgrade is complete, the installation program deletes all existing license keys. You must then install the license file that Cisco BAC 3.6 supports, using the administrator user interface. For details on obtaining and installing the license file, see the *Release Notes for the Cisco Broadband Access Center 3.6*.

The Cisco BAC upgrade procedure requires that you upgrade the components as recommended in the following sections. Performing the upgrade in any other sequence results in error during provisioning.

1. [Backing up the RDU, page 3-14](#)
2. [Upgrading the RDU, page 3-15](#)
3. [Upgrading the DPE, page 3-16](#)

Backing up the RDU

Before upgrading Cisco BAC components, ensure that you backup the RDU database files. Throttling limits the I/O bandwidth used by the DB with backup utility. Throttle option specifies the rate at which the backup tool reads the files it copies. While using this option, if the reading rate is high, the tool goes to sleep mode till the rate comes down.

**Note**

It is recommended to use the throttle option always since it is not an I/O intensive operation.

To back up the RDU database, run the **backupDb.sh** script in the *BPR_HOME/rdu/bin* directory.

For example:

```
# backupDb.sh /var/backup -throttle 500/opt/
```

where */var/backup* identifies the database backup directory.

In this example, all backup database files are stored in a directory called */var/backup/rdu-backup-20071116-031028*. The last subdirectory (*rdu-backup-20070316-111028*) is automatically created with a current time stamp.

**Note**

The time-stamped subdirectory format is *rdu-backup-yyyyMMdd-HH:mm:ss*. In this example, the subdirectory would be *rdu-backup-20071116-031028*, meaning that the directory contains a backup that was started at 3:10:28 a.m. on November 16, 2007.

For additional information on using the **backupDb.sh** tool, see the *Cisco Broadband Access Center Administrator Guide 3.6*.

Upgrading the RDU

Before upgrading the RDU, we recommend that you archive your files in the *BPR_HOME/rdu/conf* directory.

To upgrade the RDU:

-
- Step 1** To create the necessary package information, run the script *updatepackage.sh* from *<file-path>/BAC_3.6_SolarisK9/updatepackage*
- When requested, enter the directory where the current version of Cisco BAC product was installed.
For example: */opt/CSCObac*
 - When requested, select the current installed Cisco BAC product version from the displayed list.
- Step 2** To upgrade to Cisco BAC 3.6, run the following command:
- ```
pkgadd -d <file-path>/BAC_3.6_SolarisK9/CSCObac.pkg -a
<file-path>/BAC_3.6_SolarisK9/bacadmin CSCObac
```
- When requested, press Enter to continue, the following message is displayed:  
For example:  
*Upgrading BAC from 3.5.2 to 3.6. Are you sure? (y/n) [n]:*
  - Enter y to start the upgrade process.
- Step 3** To verify if the version information indicates Cisco BAC release 3.6, enter:
- ```
# pkgparam CSCObac VERSION
```
- Step 4** Manually restart the RDU process to finish the upgrade process.
- For example, from the command line, run:
- ```
/etc/init.d/bprAgent start rdu
```
- Step 5** Run *AddProperties.kiwi* script, available in *<file-path>/BAC\_3.6\_SolarisK9/kiwi/* directory, through Cisco BAC Tools.
- where *<file-path>* specifies the complete path to the directory in which the BAC\_3.6\_SolarisK9 directory has been created.

**Note**

While upgrading from Cisco BAC 3.5.2 or 3.5.2.1 or 3.5.2.2, the program displays warning messages for the properties that are already present in the DB. For example, "*A custom property with the name [/server/rdu/allow-unknown-cpe] already exists in the system.*" Such warning messages can be ignored.

---

## Upgrading the DPE

Before upgrading the DPE, we recommend that you archive your files in the *BPR\_HOME/dpe/conf* directory.

To upgrade the DPE:

- 
- Step 1** To create the necessary package information, run the script *updatepackage.sh* from *<file-path>/BAC\_3.6\_SolarisK9/updatepackage*
- When requested, enter the directory where the current version of Cisco BAC product was installed.  
For example: */opt/CSCObac*
  - When requested, select the current installed Cisco BAC product version from the displayed list.
- Step 2** To upgrade to Cisco BAC 3.6, run the following command:
- ```
# pkgadd -d <file-path>/BAC_3.6_SolarisK9/CSCObac.pkg -a  
<file-path>/BAC_3.6_SolarisK9/bacadmin CSCObac
```
- When requested, press Enter to continue, the following message is displayed:
For example:
Upgrading BAC from 3.5.2 to 3.6. Are you sure? (y/n) [n]:
 - Enter *y* to start the upgrade process.
- Step 3** To verify if the version information indicates Cisco BAC release 3.6, enter:
- ```
pkgparam CSCObac VERSION
```
- Step 4** You must manually restart the DPE process to finish the upgrade process.
- For example, from the command line, run:
- ```
# /etc/init.d/bprAgent start dpe
```
- where *<file-path>* specifies the complete path to the directory in which the *BAC_3.6_SolarisK9* directory has been created.
-



CHAPTER 4

Adding a DPE

This chapter describes how to add a Cisco Broadband Access Center (Cisco BAC) Device Provisioning Engine (DPE) from the CLI.

This situation arises largely in a lab deployment, where, for the purposes of testing, both the Cisco BAC components are installed on a single machine.



Note

Before you proceed to add the DPE, ensure that the RDU and the DPE belong to the BAC 3.6 version.

When the installation program detects the presence of an RDU on your system, it does not provide you the option to add the RDU. It prompts you to add or install only the DPE.



Note

To ensure a smooth installation, we recommend that you install the RDU before you install the DPE. (See the [Installing Cisco BAC, page 3-2](#)).

Unlike the procedure in a fresh installation, while adding a DPE, you cannot install the home (*BPR_HOME*) and data (*BPR_DATA*) directories in a location of your choice. The directories are installed only in the location where you chose to install the RDU directories.

Adding a DPE from the CLI

To add the DPE from the CLI:

Step 1 Log in to the computer on which you intend to install Cisco BAC components, with *root* access. Use an X-Window client to log in.

Step 2 At the Solaris system prompt, change directory to your CD-ROM drive or other installation media. The installation program, *pkgadd*, is at the root of this drive.

Step 3 Enter the following command to start the installation program:

```
# pkgadd -d file-path/BAC_3.6_SolarisK9/CSCObac.pkg CSCObac
```

The installation program verifies that you have installed the correct patches to the Solaris operating system. When the verification is complete, the program displays welcome screen.

Step 4 Press **Enter** to continue.

The installation program prompts you to select one or more components,

- Step 5** Enter **y** and press **Enter** at the DPE prompt. The installation program prompts you to add only the DPE. For example:

```
Installation Components
```

```
Select one or more components to install BAC.
```

```
Device Provisioning Engine (DPE) (y/n/?) [no] y
```

- Step 6** Confirm the components that you want to install; enter **y** and press **Enter** to continue. The program displays a message that it is starting individual component validation.

- Step 7** Press **Enter** to continue.

When validation is complete, the program prompts you to enter the IP address and the listening port of the RDU.

- Step 8** Press **Enter** to accept the hostname of the RDU.



Note The installation program obtains the IP address of the RDU automatically. You do not need to enter this value.

- Step 9** 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. Refer to the *Cisco Broadband Access Center Administrator's Guide, Release 3.6*, for information on configuring the DPE.

For example:

```
Enter RDU IP Address or Hostname [bacdev3-t5240-1-d8]
Enter RDU Listening Port [49187]
```

- Step 10** Confirm the IP address and the listening port number; enter **y** and press **Enter**. The program prompts you to enter the shared secret password.

- Step 11** Enter the password that you want to use for authentication between the Cisco BAC servers, and press **Enter**.



Note You must use the same shared secret password for all RDUs and DPEs in your network. The default password is **secret**.

For example:

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

```
Enter the shared secret password [secret]
----- Confirmation -----
RDU IP Address: bacdev3-t5240-1-d8
RDU IP Port: 49187

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

- Step 12** Press **Enter** to continue. The installation parameters that you selected appear. Enter **y** and press **Enter** to confirm the parameters, and add the DPE.

For example:

```
Installation Parameters
```

```
This screen shows the installation parameters that you have chosen:
```

```
===== Confirmation =====
The Component Installation will use the following parameters
to install the DPE component:
Home directory: /opt/CSCObac
Data directory: /var/CSCObac
```

The Installation Summary appears when the installation is complete.

- Step 13** Press **Enter** to exit the installation program.

The Installation Summary appears when the installation is complete.

- Step 14** Press **Enter** to exit the installation program.

DPE Properties

Following is the list of DPE properties introduced in Cisco BAC 3.6.

Table 4-1 *DPE Properties*

Parameter	Description	Default	Property Name
Lease Query Client Port	The port for local end of the socket	68	<code>/cnrQuery/clientPort</code>
DHCP Server Port	This is the port to send the DHCP messages.	67	<code>/cnrQuery/serverPort</code>
Lease Query Threads	The maximum number of threads for lease query reads.	16	<code>/cnrQuery/threads/maximum</code>
GIADDR	The GIADDR to use when sending lease queries.	localhost	<code>/cnrQuery/giaddr</code>
Cisco Network Registrar Echo	A flag indicating that the DHCP lease query must use Cisco Network Registrar echo.	false	<code>/cnrQuery/useEcho</code>
Lease Query Timeout	The period of time that the LeaseQuery object will wait for a response from the DHCP server before giving up.	500ms	<code>/dhcpLeaseQuery/timeout</code>
Lease Query Retry	The number of times to attempt a retry with a DHCP server before giving up.	1	<code>/dhcpLeaseQuery/retries</code>
Lease Query client socket address	Local socket address for listening for DHCPv4 packets.	0.0.0.0:68	<code>/cnrQuery/clientSocketAddress</code>

Table 4-1 DPE Properties

Parameter	Description	Default	Property Name
Lease Query wait for all Responses	A flag to indicate if the first response should be returned or else wait for all DHCP servers to respond. Returning the latest lease info.	false	/dhcpLeaseQuery/requireAllAnswers
Cisco Access Registrar Shared Secret	The shared secret used between Cisco Access Registrar BAC extension and the DPE.	secret	/CAR/sharedSecret
DPE Auth Service IP Address	The address used by the auth service to bind on.	127.0.0.1	/server/http/services/5
DPE Auth Service Port	The port used by the auth service.	7551	/server/http/services/5/port
Auth Service SSL	Enables or disables the use of SSL by the auth service	Disabled	/server/http/services/5/ssl/enable
Auth Service Authentication mode	Sets the HTTP authentication mode for the auth service	digest	/server/http/services/5/auth/mode
Enabling Auth Service	Enables or disables the auth service	enabled	/server/http/services/5/enable
Auth service SSL authentication mode	Sets Auth service SSL authentication mode.	none	/server/http/services/5/ssl/auth/mode
Auth service SSL store password	Sets Auth service SSL store password	110a110419150e0510	/server/http/services/5/ssl/storepassword
Auth service SSL key password	Sets Auth service SSL key password	500450560a14030d4f	/server/http/services/5/ssl/keypassword
Auth service SSL key store	Sets Auth service SSL key store	server-certs	/server/http/services/5/ssl/keystore
Auth service SSL cipher	Enables or disables Auth service SSL cipher suits	enabled	/server/http/services/5/ssl/cipher/all-cipher-suites
Auth service trace prefix	Sets Auth service trace prefix	/server/log/trace/auth/1/	/server/http/services/5/trace/prefix
Auth service all authentication trace log	Enables or disables Auth service all authentication trace log	disabled	/server/log/trace/auth/1/auth/all/enable
Auth service authentication failures trace log	Enables or disables Auth service authentication failures trace log	disabled	/server/log/trace/auth/1/auth/failures/enable
Auth service HTTP details trace log	Enables or disables Auth service HTTP details trace log	disabled	/server/log/trace/auth/1/http/details/enable
Auth service HTTP faults trace log	Enables or disables Auth service HTTP faults trace log	disabled	/server/log/trace/auth/1/http/faults/enable

Table 4-1 *DPE Properties*

Parameter	Description	Default	Property Name
Auth service HTTP headers trace log	Enables or disables Auth service HTTP headers trace log	disabled	/server/log/trace/auth/1/http/headers/enable
Auth service errors trace log	Enables or disables Auth service errors trace log	disabled	/server/log/trace/auth/1/errors/enable

**Note**

Unless the property values are changed either in DPE properties or via DPE CLI, the default values will be used.



CHAPTER 5

Uninstalling Cisco Broadband Access Center

This chapter describes how to uninstall Cisco Broadband Access Center (Cisco BAC) from the CLI.



Note

You cannot uninstall the RDU and the DPE that are installed in a same server separately. Both components are uninstalled together.

The uninstall program removes all the DPE and RDU component files under the installation directory (the default installation directory is */opt/CSCObac*) that are installed in the same server when the uninstall command is executed. It also shuts down and removes these processes if they are detected: RDU, SNMP Agent, Tomcat, Watchdog, 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 transaction logs directories under */var/CSCObac*. These files must be manually removed. (Subsequent sections describe how to delete these files.) But, if you choose to install the home, data, and database transaction log directories in the same location, the uninstallation program warns you that continuing the uninstallation will remove the data and log files.

Should the program fail to uninstall Cisco BAC, error messages appear.

This chapter describes:

- [Uninstalling Cisco BAC, page 5-1](#)
- [Post-Uninstallation Task, page 5-3](#)

Uninstalling Cisco BAC

This section describes the procedures to uninstall Cisco BAC.

After uninstalling Cisco BAC, manually remove the Data and Database Transaction Logs directories (see the [Post-Uninstallation Task, page 5-3](#)).

Uninstalling from the CLI

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 3-68.

To uninstall Cisco BAC from the command line:

Step 1 Log in as *root*.

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 Manually remove the Cisco Access Registrar extensions on the Cisco Access Registrar server using the below command.

```
rm -rf CAR_HOME/scripts/radius/java/dpeext.jar
```

Step 4 At the CLI prompt, enter:

```
# pkgrm CSCObac
```

The following information appears:

```
The following package is currently installed:
```

```
CSCObac  Cisco BAC product
          (sparc) 3.6
```

```
Do you want to remove this package? [y,n,?,q] y
```

Step 5 Enter *y*, and press **Enter** to start uninstalling. The following message appears:

```
## Removing installed package instance <CSCObac>
```

```
This package contains scripts which will be executed with super-user
permission during the process of removing this package.
```

```
Do you want to continue with the removal of this package [y,n,?,q] y
```

Step 6 Enter **y** and press **Enter**.

When uninstalling is complete, the following message appears:

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

Post-Uninstallation Task

After uninstalling Cisco BAC, manually remove the data and database transaction logs directories. To remove these directories:

Step 1 Log in as *root*.

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

For example, enter:

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

The data and the database transaction logs directories are deleted.



CHAPTER 6

Configuring the Syslog Utility to Receive Cisco BAC Alerts

This chapter describes how to configure the syslog utility after you install the Cisco Broadband Access Center (BAC). You can configure the syslog file on any Cisco BAC component server to receive alerts and debugging information from the system.



Note Configuring the syslog file is an optional task.

Syslog is a client-server protocol that manages the logging of information on UNIX. Cisco BAC generates alerts through the Solaris syslog service. Cisco BAC syslog alerts are not a logging service; they notify that a problem exists, but do not necessarily define the specific cause of the problem. The information related to the problem resides in the appropriate Cisco BAC log files (*rdu.log* and *dpe.log*). If you choose to configure the syslog file, syslog alerts are directed to a separate log file.

For more information on error messages and alerts, refer to the *Cisco Broadband Access Center Administrator's Guide, Release 3.6*.

To configure the syslog utility on the RDU:

-
- Step 1** Log in as *root* on the RDU server.
- Step 2** At the command line, create the log file.
- For example:
- ```
touch /var/log/bac.log
```
- Step 3** Open the */etc/syslog.conf* file with a text editor, such as *vi*.
- Step 4** Add the following lines to the */etc/syslog.conf* file:
- ```
local6.alert      /var/log/bac.log
local6.info       /var/log/bac.log
```



Note You must insert one or more tabs between the *local6:info* and */var/log/bac.log* information.

- Step 5** Save and close the */etc/syslog.conf* file.

Step 6 To force the syslog utility to take the new configuration, at the command line, enter:

```
# ps -ef | grep syslogd
root      217    1    0      Nov  26      ?    0:00      /usr/sbin/syslogd

kill -HUP 217
```



Note The process ID (PID) in this example is 217, but may change when you run **ps -ef | grep syslogd**. Use the correct output from that command as the input to **kill -HUP**.

Syslog is now ready to receive alerts from Cisco BAC.



APPENDIX A

Reinstalling Broadband Access Center

This chapter describes the procedures to reinstall Cisco Broadband Access Center (Cisco BAC). Reinstallation in Cisco BAC is enabled only for the purpose of restoring an installation that is corrupted.

This release does not support reinstalling the Regional Distribution Unit (RDU), the Device Provisioning Engine (DPE) and Cisco Network Registrar that are already installed on your system. If you need to reinstall, first uninstall the RDU and DPE, and then reinstall them.




Caution

You cannot retrieve a corrupted database after a reinstallation. You must have a backup of the database before it was corrupted.

Reinstalling from the CLI

To reinstall Cisco BAC from the CLI:

-
- Step 1** Back up your database by running the `BPR_HOME/rdu/bin/backupDb.sh` command, where `BPR_HOME` is the home directory. The default directory is `/opt/CSCObac`.
- To use this command, you must provide the target directory in which to place the backup files. This directory should be on a disk or partition that has available disk space equivalent to 120% of the current database file size. For detailed information, see the *Cisco Broadband Access Center Administrator's Guide, Release 3.6*.
-  **Caution** You must back up your database before proceeding with the reinstallation procedure. If you do not save your database before uninstalling Cisco BAC (the next step in the procedure), you will lose the information in the database because the `BPR_HOME` directory is deleted during an uninstallation.
-
- Step 2** Uninstall Cisco BAC from your system (see [Uninstalling from the CLI, page 5-2](#)).
- Step 3** Install Cisco BAC as described in [Installing Cisco BAC, page 3-2](#).
- Step 4** After you install Cisco BAC 3.6 on your system, restore the database from the backup, and copy the recovered database to the database location that the RDU uses. For detailed information, see the *Cisco Broadband Access Center Administrator's Guide, Release 3.6*.
-



APPENDIX **B**

Installation Worksheet

This chapter describes the basic configuration information that you need to ensure a successful installation of Cisco Broadband Access Center (Cisco BAC). [Table B-1](#) is a worksheet that you can use to record the information specific to the installation.

Table B-1 Cisco BAC Installation Parameters

Prompt	Description	Default Value
Home directory	Root directory to install Cisco BAC.	/opt/CSCObac
Data directory	Root directory that stores the Data directory for the Cisco BAC components.	/var/CSCObac
Database logs directory	Root directory that Cisco BAC uses to install the database transaction logs for Cisco BAC components.	/var/CSCObac
Logs directory	Root directory to install the general transaction logs for Cisco BAC Components.	/var/CSCObac
RDU port number	Port number that the RDU uses to communicate with the other Cisco BAC Components.	49187
Port number of administrator user interface	Port number that you use to access the Cisco BAC administrator user interface via HTTP.	80
Default Cisco BAC administrator	User name that you use to access the Cisco BAC administrator user interface.	bacadmin
Default administrator password	Password to access the Cisco BAC administrator user interface.	changeme
Installation password	Password that you use to install Cisco BAC from the CLI.	secret
Default DPE CLI password	Password that you use to access the DPE CLI.	changeme
CNR extension points provisioning group name	Name of the provisioning group for CNR extensions.	None



INDEX

A

- administrator password [2-4](#)
- API
 - RDU [1-2](#)

B

- BAC
 - components
 - about DPE [2-1](#)
 - about RDU [2-1](#)
 - adding DPE [4-1](#)
 - installation
 - database transaction logs directory [3-2](#)
 - data directory [3-1](#)
 - default ports [2-6](#)
 - definitions file [3-2](#)
 - error file [2-3](#)
 - home directory [3-1](#)
 - interrupting [2-3, 3-1](#)
 - notes [3-1](#)
 - requirements, hardware [1-2](#)
 - requirements, operating system [1-1, 1-3](#)
 - overview [1-1](#)
 - scalability [1-1](#)
 - uninstallation
 - from CLI [5-2](#)
 - post-uninstallation task [5-3](#)
- backupDb.sh command [A-1](#)
- Broadband Access Center
 - See* BAC

C

- components
 - Network Registrar extensions [2-2](#)
- configuration [B-1](#)
- CPE [1-2](#)
- CPE WAN Management Protocol [1-1](#)
- Customer Premises Equipment [1-1](#)
- CWMP [1-1](#)

D

- Database [B-1](#)
- database
 - file locations [2-5](#)
 - performance optimization [2-4](#)
 - requirements [2-4](#)
 - verifying large file support [2-5](#)
- Data Directory [B-1](#)
- device provisioning engine
 - See* DPE
- df command [2-5](#)
- directory
 - data [3-2, 3-3, 3-6, 3-8, 3-12](#)
 - database transaction logs [3-4](#)
 - database transactions log [3-2](#)
 - home [3-2, 3-3, 3-6, 3-8, 3-12](#)
- documentation
 - related documents [1-vii](#)
- DPE
 - adding
 - from CLI [4-1](#)
 - configuring [2-4](#)

hardware requirements [1-2](#)
 installation checklist [2-3 to 2-4](#)
 installing
 requirements [3-2](#)
 password
 enable [2-4](#)
 login [2-4](#)
 syslog
 configuring [2-4](#)

H

Home Directory [B-1](#)

I

individual component
 about DPE [2-1](#)
 about RDU [2-1](#)
 adding DPE
 from CLI [4-1](#)
 requirement [4-1](#)
 installation
 checklist [2-7](#)
 operating system requirements [1-1](#)
 ports required [2-6 to ??](#)
 installation and startup process [2-2](#)
 installation types
 lab [1-4](#)

L

launching the administrator user interface [2-3](#)
 license key [2-3](#)
 Logs [B-1](#)

M

Minimum Hardware Requirements [1-3](#)
 mount command [2-5](#)

N

Network Registrar
 about [2-2](#)

P

Parameters [B-1](#)
 product
 overview [1-1](#)

R

RDU
 hardware requirements [1-2](#)
 installation
 Solaris [3-2](#)
 installation checklist [2-3 to 2-4](#)
 installing
 port number, changing [3-4](#)
 listening port [3-2](#)
 syslog
 configuring [2-4, 6-1](#)

S

Solaris installation
 Network Registrar extensions [2-2](#)
 syslog
 alerts [6-1](#)
 configuring [2-4, 6-1](#)

T

TR-069 [1-1](#)

U

uninstalling BAC

 from CLI [5-2](#)

 post-uninstallation task [5-3](#)

User Interface [B-1](#)

