



Before You Begin

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

Operating System Requirements

On Solaris

You must install Cisco BAC on a Sun SPARC platform that runs Solaris 10 operating system with at least 4 GB of memory. We recommend that you use a Sun SPARC multiprocessor platform.



Note

Before installing Cisco BAC, download and install the recommended Solaris patches from the Sun Microsystems support site.

Cisco BAC ships with the required JRE version 1.6.0_27, which resides in the `<BPR_HOME>/jre` directory.

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 08/11* for Solaris 10 operating system.

You must also download and install the Java Platform Standard Edition (Java SE) cluster patches recommended by Sun Microsystems to install Cisco BAC on a system that runs Solaris 10 operating system, see [Table 2-1](#).

Table 2-1 Java Standard Edition Cluster Patches for Solaris 10

Patch	Description
120900-04	libzonecfg patch
121133-02	Zones library and zones utility patch
119254-44	Install and patch utilities patch, for more information, see Chapter 3, “Installing and Uninstalling Cisco BAC on Solaris” .
118918-24	Solaris crypto framework patch
119042-10	svccfg and svcprop patch
119578-30	FMA patch
144488-09	Kernel patch

Before you install Cisco BAC, you must install the **SUNWxcu4** package available as part of the Solaris OS installation. This is an optional package that you might not have installed while installing Solaris.

On Linux

For Linux, you must install Cisco BAC on Red Hat Enterprise Linux 5.x or 6.1 using x86 and 64 bit hardware system with at least 4 GB of memory. The SELinux should be disabled. Also, ensure that before installing Cisco BAC, you install the **sysstat** package for the proper execution of the diagnostic scripts. This is an optional package which you might have not installed while installing Linux.

If the system has 64-bit libraries, you must also download and install 32-bit glibc and libgcc rpm packages on RHEL 6.1.

Download the two 32-bit packages, and install them using the below commands:

```
rpm -ivh glibc-32bit-2.14.1-14.18.1.x86_64.rpm
rpm -ivh libgcc47-32bit-4.7.1_20120723-47.1.x86_64.rpm
```

Minimum Hardware Requirements

Table 2-2 lists the minimum hardware requirements for the various Cisco BAC components.

Table 2-2 Minimum Hardware Requirements

Component	Model	RAM	CPU	Minimum Disk
DPE	Sun T5210 Solaris 10	4 GB	1 with 4 cores	2,15K rpm
	Linux 5.x or 6.1	4 GB	1 with 4 cores	
RDU	Sun T5210 Solaris 10	16 GB	1 with 8 cores	2,15K rpm
	Linux 5.x or 6.1	16 GB	1 with 8 cores	
STUN (required only for devices behind NAT setup)	Sun T5210 Solaris 10	4 GB	1 with 4 cores	2,15K rpm
	Linux 5.x or 6.1	4 GB	1 with 4 cores	
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 2-3](#)
- [Incremental Scaling, page 2-3](#)

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
- One PAR server
- Two Cisco ACE units
- Two Cisco Network Registrar servers
- STUN server (required only for devices behind NAT setup)
- CMHS server

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.

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 components of Cisco BAC; that is, RDU, DPE, Cisco Network Registrar Extension Points, Cisco Access Registrar Extension Points, and STUN server.

**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 500 MB of disk space available.

You can install RDU, DPE, Cisco Network Registrar, and Cisco Access Registrar through the CLI. For details on Cisco BAC components installation, see [Installing and Uninstalling Cisco BAC on Solaris, page 3-1](#) for Solaris and [Installing and Uninstalling Cisco BAC on Linux, page 4-1](#) for Linux.

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

See [Installation Worksheet, page 2-9](#), for information on Cisco BAC installation parameters.

Installation Checklist for Solaris

Before you run the installation program, use the following checklist to ensure your readiness.

Table 2-3 *Installation Checklist for Solaris*

Task	Checkoff
1. Verify the system hardware and software requirements described in Introduction, page 1-1 .	<input type="checkbox"/>
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 Database Requirements, page 2-6).	<input type="checkbox"/>
3. Ensure that you have root access to the computers on which you intend to install Cisco BAC components.	<input type="checkbox"/>
4. 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. If you have not received your licenses, contact your Cisco representative before you proceed further.	<input type="checkbox"/>
5. Determine the home directory (<code><BPR_HOME></code>) on which you want to install the Cisco BAC component or components. The default directory is <code>/opt/CSCObac</code> . We recommend that you have at least 500 MB of disk space available for the home directory as well as for the <code>/tmp</code> directory and 5 MB of disk space available for <code>/etc/init.d</code> directory.	<input type="checkbox"/>
6. For the RDU, determine where you want to install the data directory <code><BPR_DATA></code> and the database transaction logs <code><BPR_DBLOG></code> . By default, the database transaction logs directory <code><BPR_DBLOG></code> is installed in the same directory as the data directory <code><BPR_DATA></code> . We recommend that you locate the database transaction logs directory on the fastest disk on the system. The installation program, by default, installs the data directory <code><BPR_DATA></code> in a location other than that of the home directory (<code><BPR_HOME></code>). The default location for the data directory is <code>/var/CSCObac</code> . We recommend that the data directory be on a different physical disk than the home directory; for example, <code>/var/disk0/CSCObac</code> . Your disk should have a minimum of 1 GB free space. The specified directory becomes the top-level directory under which the installation program creates a number of subdirectories; for example, <code>/var/disk0/CSCObac/rdu/db</code> .	<input type="checkbox"/>

Table 2-3 *Installation Checklist for Solaris (continued)*

Task	Checkoff
<p>7. Cisco BAC servers use the same password for all components in your network. This password is used as a token to authenticate communication among the different components of the Cisco BAC server.</p> <p>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.</p> <p>To find a list of Cisco BAC installation parameters, see Installation Worksheet, page 2-9.</p>	<input type="checkbox"/>
<p>8. 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.</p>	<input type="checkbox"/>


Installation Checklist for Linux

Before you install Cisco BAC, review the checklist in [Table 2-4](#).

Table 2-4 *Installation Checklist for Linux*

Task	Checkoff
<p>1. Verify whether your system meets the minimum system hardware and software requirements described in Chapter 1, “Introduction.”</p>	<input type="checkbox"/>
<p>2. Ensure that you have access to the computers on which you intend to install Cisco BAC components.</p>	<input type="checkbox"/>
<p>3. Save your license file on the system from which you intend to launch the Cisco BAC administrator user interface through a web browser. You need a valid service license file to configure Cisco BAC licensing.</p>	<input type="checkbox"/>
<p>4. Determine the home directory (<BPR_HOME>) in which you want to install the Cisco BAC component or components. The default directory is /opt/CSCObac. Ensure that the target installation directory has enough disk space.</p> <p>We recommend that you have at least 500 MB of disk space available; otherwise installation will not take place.</p>	<input type="checkbox"/>
<p>5. Verify that you have at least 512 MB of free space available in the /tmp directory for successful installation.</p>	<input type="checkbox"/>
<p>6. For the RDU, determine where you want to install the data directory <BPR_DATA> and the database logs <BPR_DBLOG>. The default directory is /var/CSCObac. Ensure that the target installation directory has enough disk space.</p> <p>We recommend that you locate the data directory on a different physical disk than the home directory; for example, /var/disk0/CSCObac. The disk should have at least 1 GB of free space.</p> <p>The installation program, by default, installs the data directory, the database transaction logs directory, and the logs directory in the same location.</p> <p>We recommend that you locate the database transaction logs directory on the fastest disk on the system. Also, ensure that 1 GB of disk space is available.</p>	<input type="checkbox"/>

Table 2-4 Installation Checklist for Linux (continued)

Task	Checkoff
7. For the RDU, determine the listening port number. The RDU uses this interface to communicate with the other Cisco BAC components, such as DPEs and Cisco Network Registrar extension points. The default port is 49187.	<input type="checkbox"/>
8. For the RDU, determine the shared secret password that Cisco BAC servers on your network use, as a token to authenticate communication with one another. The shared secret password should be the same for all Cisco BAC servers on your network.	<input type="checkbox"/>
9. For the RDU, determine the ports through which you will access the administrator user interface, using HTTP. The default port for HTTP is 80.	<input type="checkbox"/>
10. For the DPE, ensure that 2 GB of disk space is available in the data directory.	<input type="checkbox"/>
11. Ensure that Cisco Network Registrar 7.2 (and above) is installed and running on the servers on which you are installing Cisco BAC extensions.	<input type="checkbox"/>
12. For the Cisco Network Registrar extensions, determine the name of the provisioning group to which the Cisco Network Registrar server belongs.	<input type="checkbox"/>
13. For the Cisco Network Registrar extensions, determine where you want to install the data directory <BPR_DATA>. The default directory is /var/CSCObac. Ensure that 200 MB of disk space is available.	<input type="checkbox"/>
14. Modify the <i>config</i> file to disable SELinux using the following command: <pre># vi /etc/selinux/config</pre> <p><i>config</i>—File that controls the state of SELinux on the system. In this file, set the value of SELINUX to <i>disabled</i> and SELINUXTYPE to <i>targeted</i>.</p>	<input type="checkbox"/>
15. Disable iptables using the following command: <pre># chkconfig iptables off</pre> <p> Note The Admin UI page will not open if iptables is in enabled state on the system.</p>	<input type="checkbox"/>
16. Reboot the Prime Cable Provisioning host using the following command: <pre># reboot</pre>	<input type="checkbox"/>
17. Wait for 30 seconds and re-login to continue with the installation.	<input type="checkbox"/>

Database Requirements

Before you install Cisco BAC, check the following:

- [File System Block Size, page 2-7.](#)
- [Support for Large Files, page 2-8.](#)

File System Block Size

On Solaris, 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 block size cannot be changed after the Unix File System (UFS) is mounted with a value. The value has to be set during Solaris disk partition.

On Linux, block size is selected at the time of high-level formatting. If the `mke2fs` (i.e., make ext2 filesystem) command is used to create the filesystem, valid block size values are 1024, 2048 and 4096 bytes. The block size for any existing ext2 or ext3 file system (the most common file system types on Linux) can be obtained by using the `dumpe2fs` command with the device name as an argument.

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 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:

On Solaris:

```
# 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.

On Linux:

```
# df -k .
Filesystem      1K-blocks      Used Available Use% Mounted on
/dev/sda2        16246460    3248448  12159420   22% /
# /sbin/dumpe2fs /dev/sda2 | grep 'Block size'
Block size:          4096
```

In this example, the block size is 4096 bytes, which is 4 KB.

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 to one another or to 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, 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 2-5 lists the required external inbound ports and their default values.

Table 2-5 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 2-5 Default External Inbound Ports Used by Cisco BAC Components (continued)

Component	Default Port Number	Protocol	Configurable	Used by
CNR-EP (Listening port)	68	UDP	Yes	Lease Query
PAR-EP	7551	HTTP	Yes	FAS
STUN	3478	UDP	Yes	STUN Binding Service
STUN	8000	HTTP	Yes	CXF

Table 2-6 lists the external outbound ports and their default values.

Table 2-6 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
CNR-EP (Server port)	67	UDP	Yes	Lease Query
PAR	1645, 1646	UDP	Yes (in PAR)	FAS (RADIUS)

Table 2-7 lists the internal ports and their default values.

Table 2-7 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 Worksheet

This section describes the basic configuration information required for successful installation of Cisco BAC. Table 2-8 provides the worksheet that you can use to record the information specific to the installation.

Table 2-8 Cisco BAC Installation Parameters

Prompt	Description	Default Value
Home directory	Root directory to install Cisco BAC.	/opt/CSCObac

Table 2-8 Cisco BAC Installation Parameters (continued)

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 for nonsecured access	Port number that you use to access the Cisco BAC administrator user interface using HTTP.	80
Default Cisco BAC administrator	Username 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
STUN HTTP Listening port	STUN CXF RESTful server port.	80
STUN UDP Listening port	STUN server UDP port.	3478
STUN HTTP username	STUN CXF RESTful server username.	bacadmin
STUN HTTP username	STUN CXF RESTful server port.	cisco
Shared secret	Shared secret password for UDP connection request authentication.	secret