



# Release Notes for Broadband Access Center for Cable Release 2.6.2

---

**September 17, 2004**

The release notes, describe fixes to certain software issues, provide descriptions of the Solaris-based software Device Provisioning Engine (DPE), introduce the Device Provisioning Engine model 2115, and describe new features being implemented in release 2.6.2.

## Contents

- Introduction page 3
  - Related Documentation page 3
  - System Components page 4
  - System Requirements page 4
  - Hardware Considerations page 4
    - Device Provisioning Engine 590 page 4
    - Device Provisioning Engine 2115 page 5
- New Features page 5
- Component Installation of a Solaris Device Provisioning Engine page 6
- Installing Broadband Access Center for Cable page 6
  - Installing Broadband Access Center for Cable Release 2.6.2 page 6
  - Currently Running BACC 2.6.x page 6
  - Currently Running BACC 2.5.0.2 page 7
- Upgrading From BACC Release 2.6.X page 7
  - Upgrading the RDU page 8
  - Upgrading the Solaris DPE page 9
  - Upgrading Hardware DPEs page 10
  - Upgrading Network Registrar Extensions page 11
  - Upgrading the KDC page 12
- Migrating the RDU Database page 12
  - Premigration Procedure page 13
  - Migrating From Release 2.5.0.2 page 13



---

Corporate Headquarters:  
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Copyright © 2004 Cisco Systems, Inc. All rights reserved.

- Migration Log Files page 13
- Device Affinity page 14
- Improved PacketCable DHCP Option Handling page 14
- PacketCable BASIC Provisioning Flow page 14
  - PacketCable TLV 38 Support page 15
  - SNMP v2C Notifications page 15
  - PacketCable MIB Support page 15
    - The RunCfgUtil Tool page 15
- Key Distribution Center page 16
- API Installation Component Removal page 16
- Bugs page 16
- Resolved Issues page 17
- Known Software Problems page 18
- Obtaining Documentation page 25
  - Cisco.com page 25
  - Ordering Documentation page 26
- Obtaining Technical Assistance page 26
  - Cisco Technical Support Website page 26
  - Submitting a Service Request page 27
  - Definitions of Service Request Severity page 27
- Obtaining Additional Publications and Information page 27

---

# Introduction

Broadband Access Center for Cable (BACC) is a high-speed provisioning application that is easy to install, configure, and maintain. It provides a simple and easy way to deploy high-speed data, voice technology, and home networking technology services.

The BACC Java provisioning API allows easy integration into an existing operations support system (OSS) environment.

This release note provides information for the BACC 2.6.2 release and includes a summary of the complete set of fixes incorporated into the product since the BACC 2.6.1 release.

This patch release provides:

- Bug fixes for various issues that had previously affected BACC performance.
- Other bug fixes related to extensions and troubleshooting.
- Support for the migration of RDU databases from BACC release 2.5.0.2 to BACC 2.6.2.
- Support for the PacketCable BASIC provisioning flows.

## Related Documentation

This release of the BACC product is supported by these related guides:

- *Broadband Access Center for Cable Administrator's Guide* (Release 2.6)
- *Broadband Access Center for Cable Installation Guide* (Release 2.5)
- To support the DPE-590:
  - *Device Provisioning Engine 590 Recovery CD-ROM Release Notes*
  - *Cisco Content Engine 500 Series Hardware Installation Guide*. This can be found at:  
[http://www.cisco.com/en/US/products/hw/contnetw/ps761/products\\_installation\\_guide\\_book09186a00800801e0.html](http://www.cisco.com/en/US/products/hw/contnetw/ps761/products_installation_guide_book09186a00800801e0.html)



Caution

---

The new feature descriptions found in this release note supersede those found in both the installation and administrator's guide.

---

- To support the DPE-2115:
  - *Device Provisioning Engine 2115 Recovery CD-ROM Release Notes*
  - *Installation and Setup Guide for the Cisco 1102 VLAN Policy Server* This can be found at:  
[http://www.cisco.com/en/US/products/sw/secursw/ps2136/products\\_installation\\_and\\_configuration\\_guide\\_book09186a00801f0d02.html](http://www.cisco.com/en/US/products/sw/secursw/ps2136/products_installation_and_configuration_guide_book09186a00801f0d02.html)



Caution

---

Refer to the VLAN Policy Server guide for port and connector identification and to perform hardware installation only. Do not attempt to perform any of the configuration instructions found in the VLAN Policy Server guide.

---

- *Cisco Network Registrar User's Guide (Release 6.0)*
- *Cisco Network Registrar CLI Reference (Release 6.0)*
- *PacketCable MTA Device Provisioning Specification PKT-SP-PROV-109-040402*

## System Components

The BACC product comprises these major components:

- The regional distribution unit (RDU), which is software that you install on your server.
- The device provisioning engine (DPE), which is available in two versions:
  - A software DPE that is installed on a Solaris SPARC computer.
  - A rack-mountable DPE with the required BACC software already installed. Two such devices are currently in use: the original DPE-590 and the new DPE-2115.
- Extension points that must be installed on the Network Registrar DHCP servers.
- The Key Distribution Center (KDC), which is an authentication server used to authenticate PacketCable MTAs and grant security tickets.
- An administrator's user interface from which you can monitor and manage BACC.
- A sample user interface (SUI) that you can use to demonstrate BACC's power and flexibility.

## System Requirements

You must have either the Solaris 8 or 9 operating system and Network Registrar installed on your system to successfully use the BACC software.



Note

---

The minimum Network Registrar version required to install BACC 2.6.2 is Network Registrar 5.5 although the recommended version is 6.1.

---

## Hardware Considerations

The minimum hardware requirements needed to support both a lab and a fully deployed network are completely described in the *Cisco Broadband Access Center for Cable Installation Guide*.



Note

---

Processing capacity, disk storage, and memory requirements depend on the size of the network deployment and the amount of log information needed.

---

## Device Provisioning Engine 590

All installation and connection issues are discussed in the 500 Series installation guide that accompanies this product.

## Device Provisioning Engine 2115

All installation and connection issues are discussed in the *Installation and Setup Guide for the Cisco 1102 VLAN Policy Server*. You should refer to that guide to identify various ports and connectors and to install the device.

## New Features

This section briefly describes new or modified features found in the BACC 2.6.2 release:

- **Solaris DPE Installation**—Although the introduction of the Solaris DPE occurred with BACC Release 2.6, the installation of this device is included in these release notes. These instructions are not currently provided in the *Broadband Access Center for Cable Installation Guide*. See the [“Component Installation of a Solaris Device Provisioning Engine” section on page 6](#) for specific installation instructions.
- **BACC 2.6.2 Installation**—As with previous versions of this product, BACC 2.6.2 has two forms of installation: Lab and component installations. While the differences are clearly described in the *Cisco Broadband Access Center for Cable Installation Guide* for release 2.5, the introduction of the new Solaris DPE affects the installation process. See the [“Installing Broadband Access Center for Cable” section on page 6](#) for specific instructions.



### Note

Before installing BACC, refer to the SunSolve web site from Sun Microsystems Inc. to download and install the latest Solaris Patch Cluster.

- **Upgrade Capability**—The BACC 2.6.2 release supports upgrading from BACC release 2.5.x and 2.6.x.
- **RDU database migration**—The BACC 2.6.2 release now supports migration of the RDU database from the BACC 2.5.0.2 release. See the [“Migrating the RDU Database” section on page 12](#) for information on the migration script and instructions on how to perform data migration.
- **Device Affinity**—The BACC 2.6.2 release introduces an improved method of load balancing requests made of DPEs within a provisioning group by the Network Registrar extensions. See the [“Device Affinity” section on page 14](#) for additional information.
- **Improved DHCP Option 122 Handling**—See the [“Improved PacketCable DHCP Option Handling” section on page 14](#) for additional information.
- **PacketCable BASIC Flow**—See the [“PacketCable BASIC Provisioning Flow” section on page 14](#) for additional information.
- **Key Distribution Center**—The Key Distribution Center (KDC) component in BACC release 2.6.2, now supports both the use of tComLabs certificate chains (Euro-certificates) and its use on multi-processor Solaris computers. See the [“Key Distribution Center” section on page 16](#) for additional information.

In addition, BACC 2.6.2 provides fixes for a number of software limitations found in previous BACC releases. See the [“Resolved Issues” section on page 17](#) for specific details.



### Note

The new feature descriptions found in this release note supersede those found in both the installation and Administrator’s Guides.

# Component Installation of a Solaris Device Provisioning Engine

During a component installation, you are prompted to select the components you want to install. With this BACC release, you can now select and install a specific DPE component.

If, during DPE installation, the installation program detects the presence of a TFTP server running on the same computer where the DPE is being installed, the installation is immediately terminated and an error message appears on the screen.

During the DPE installation, you are prompted to provide the locations of these directories:

- Home Directory
- Data Directory

After you enter this information, refer to Chapter 5 of the *Cisco Broadband Access Center for Cable Installation Guide* and perform the Configuring a Device Provisioning Engine for Data procedure.



## Caution

After Solaris DPE installation is complete, you must configure the DPE using the command line interface (CLI). Refer to the *Cisco Broadband Access Center for Cable Administrator's Guide* for these configuration instructions. Do not attempt to start the DPE until after you have completed this configuration.

## Installing Broadband Access Center for Cable

You must follow one of two processes to get BACC 2.6.2 installed on your system. Each is based on the version of BACC that you have currently running on your system.



## Note

Please refer to the *Cisco Broadband Access Center for Cable Installation Guide* and *Release Notes for Broadband Access Center for Cable 2.6.1* for basic installation instructions to supplement those provided here.

## Installing Broadband Access Center for Cable Release 2.6.2

If you installing BACC 2.6.2 for the first time please refer to the *Cisco Broadband Access Center for Cable Installation Guide* for the appropriate instructions.

## Currently Running BACC 2.6.x

If you are currently running BACC version 2.6 or 2.6.1, you need to perform the upgrade procedure. See the [“Upgrading From BACC Release 2.6.X” section on page 7](#) for instructions on upgrading BACC components to release 2.6.2.



## Note

Throughout the following instructions 2.6.(x) indicates BACC version 2.6 or 2.6.1. What appears on your screen depends on the release you are running.

## Currently Running BACC 2.5.0.2

If you are currently running BACC version 2.5.0.2, you must run the **setup.bin** file normally associated with a new installation of BACC. Given that you already have BACC 2.5.0.2 installed, the **setup.bin** file automatically detects the previous installation and, at the appropriate point in the installation, prompts you to perform the database migration procedure. See the “[Migrating the RDU Database](#)” section on [page 12](#) for instructions on migrating the RDU Database to release 2.6.2.



Note

Throughout the following instructions 2.5.(x) indicates BACC versions 2.5 through 2.5.0.2. What appears on your screen depends on the release you are running.

## Upgrading From BACC Release 2.6.X

The BACC upgrade procedure requires that the components be updated in the exact order described below. Performing the upgrade in any other order may result in errors during provisioning.

- [Upgrading the RDU, page 8](#)
- [Upgrading the Solaris DPE, page 9](#)
- [Upgrading Hardware DPEs, page 10](#)
- [Upgrading Network Registrar Extensions, page 11](#)
- [Upgrading the KDC, page 12](#)

The BACC 2.6.2 installation instructions in this section assume that you have BACC release 2.6 or 2.6.1 already installed and that you have downloaded the BACC 2.6.2 update file from CCO and decompressed its contents to a folder such as `/opt/CSCObpr/patch262`.



Note

Refer to your Cisco customer service representative if there are any questions.

## Starting the Upgrade

Complete these steps to start the upgrade procedure. After you complete the procedure you can select the appropriate script to upgrade the desired component.

- 
- Step 1** Untar the release package (`262upgrade.tar`) onto the computer where the BACC RDU resides. For example:
- ```
tar -xvf 262upgrade.tar
```
- Step 2** Change to the **patch262/bin** directory and display the directory contents. Within this directory you should see the various component upgrade scripts.
-

## Upgrading the RDU

Complete these steps to upgrade the installed RDU component to release 2.6.2:

**Step 1** Complete the [Starting the Upgrade](#) procedure found on page 7.

**Step 2** Run this script from the upgrade folder:

```
./262-upgrade-rdu.sh
```

An output similar to this displays.

```
BPR Located
BPR Home directory is /opt/CSCObpr
Current version is 2.6.(x)
RDU Component Installed
Stopping the BPR Agent

BPR Agent is stopped.

BPR Agent stopped
Copying the Upgrade Files
Precompiling jsps this may take few moments
Upgrading Package Information
Upgrade for BPR 2.6.2 Completed Successfully
Please start your BPR Agent to finish the upgrade Process
```



**Note** You must manually start the BACC Agent to finish the upgrade process.

**Step 3** Run this command to verify that the output indicates it is BACC release 2.6.2:

```
# pkgparam CSCObpr VERSION
```

The version information returned should be 2.6.2.



**Note** The previous version of the file bpr.jar is renamed as bpr-26(x).jar and is located in the <BACC\_HOME>/lib directory.

**Step 4** Check the list of installed files. An output similar to this displays.

```
# cd /opt/CSCObpr/lib
# ls -l
total 82992
-rw-r--r--          1 root  oldother   1107051   Aug 10  2004  AdventNetSnmp.jar
drwxr-xr-x          2 root  oldother     512      Feb  4  11:55  SnmpAgent
-rw-r--r--          1 root  oldother   452107   Aug 10  2004  adminui.war
-rw-r--r--          1 root  oldother   934636   Aug 10  2004  bcprov-jdk14-116.jar
-rw-r--r--          1 root  oldother   8573142   Aug 10  2004  bpr-26x.jar
-rw-r--r--          1 root  oldother   8610759   Feb  4  12:28  bpr.jar
-rw-r--r--          1 root  oldother   187162   Aug 10  2004  crimson.jar
drwxr-xr-x          4 root  oldother     512      Feb  4  11:55  electric
-rw-r--r--          1 root  oldother   28404    Aug 10  2004  jaxp.jar
-rwxr-xr-x          1 root  oldother   623324   Aug 10  2004  libInformManager.so
```

```

-rwxr-xr-x      1 root  oldother  1479524   Aug 10  2004  libbprextensions.so
-rwxr-xr-x      1 root  oldother  11837004  Aug 10  2004  libcrypto.so.0.9.6
-rw-r--r--      1 root  oldother   750816   Aug 10  2004  libdb_java-3.3.so
-rwxr-xr-x      1 root  oldother    61128   Aug 10  2004  libnative.so
-rwxr-xr-x      1 root  oldother  1481856   Aug 10  2004  libsntp-0.4.2.3.so
-rwxr-xr-x      1 root  oldother  2478752   Aug 10  2004  libssl.so.0.9.6
-rw-r--r--      1 root  oldother   13070   Aug 10  2004  pkcerts.jar
-rw-r--r--      1 root  oldother   25900   Aug 10  2004  sleepycat.jar
-rw-r--r--      1 root  oldother   28404   Aug 10  2004  sun_jaxp.jar
-rw-r--r--      1 root  oldother  187162   Aug 10  2004  sun_parser.jar
-rw-r--r--      1 root  oldother  1728861   Aug 10  2004  xercesImpl.jar
-rw-r--r--      1 root  oldother   131919   Aug 10  2004  xmlParserAPIs.jar

```

## Upgrading the Solaris DPE

Complete these steps to upgrade the installed Solaris DPE component to release 2.6.2:

**Step 1** Complete the [Starting the Upgrade](#) procedure found on page 7.

**Step 2** Run this script from the upgrade folder:

```
./262-upgrade-dpe.sh
```

**Step 3** You must manually restart the agent to finish the upgrade process.

An output similar to this displays.

```

BPR Located
BPR Home directory is /opt/CSCObpr
Current version is 2.6.(x)
DPE Component Installed
Stopping the BPR Agent

BPR Agent is stopped.

BPR Agent stopped
Copying the Upgrade Files
Upgrading Package Information
Upgrade for BPR 2.6.2 Completed Successfully
Please start your BPR Agent to finish the upgrade Process

```

**Step 4** Run this command to verify that the output indicates it is BACC release 2.6.2:

```
# pkgparam CSCObpr VERSION
```

The version information returned should be 2.6.2.



**Note** The previous version of the file bpr.jar is renamed as bpr-26(x).jar and is located in the <BACC\_HOME>/lib directory.

- Step 5** Check the list of installed files. An output similar to that shown in the “[Upgrading the RDU](#)” section on [page 8](#).

## Upgrading Hardware DPEs

You may remotely patch your DPE devices, or if you have local access to these devices, you can fully reimage them. Refer to the recovery CD-ROM release notes that accompanied the DPE device for the required reimaging procedure.

Complete these steps to upgrade the DPE component to release 2.6.2:



**Caution**

If the hardware DPE is rebooted or powered off while a patch is being applied, the device is left in an unknown state and must be completely reimaged. Refer to either the DPE-590 or DPE-2115 *Recovery CD-ROM Release Notes* that accompany the DPE device, for reimaging instructions.

- Step 1** Open an FTP connection to each DPE to be patched and upload the patch bundle to the DPE. See step 3 for the appropriate DPE file name.



**Note**

When opening the FTP connection, you must enter the username **admin** and the login password chosen for the selected DPE.

- Step 2** After an FTP connection is established, change directory to ‘incoming’ using this command at the FTP prompt:

```
cd incoming
```

This will locate the patch file so that the DPE can easily find it.

- Step 3** Select the upgrade file corresponding to the BACC version currently running on your DPE and FTP it to the DPE.

| If you have this DPE model... | Running this BACC release... | Use this file to upgrade to BACC 2.6.2 |
|-------------------------------|------------------------------|----------------------------------------|
| DPE 590                       | BACC 2.5.0.2                 | dpe-590-2502to262-upgrade.bpr          |
|                               | BACC 2.6                     | dpe-590-262-upgrade.bpr                |
|                               | BACC 2.6.1                   | dpe-590-262-upgrade.bpr                |
| DPE-2115                      | BACC 2.5.0.2                 | dpe-2115-2502to262-upgrade.bpr         |
|                               | BACC 2.6.1                   | dpe-2115-262-upgrade.bpr               |

For example, you use this command to FTP the DPE-590 upgrade file from either BACC 2.6 or BACC 2.6.1 to BACC 2.6.2:

```
bin
put dpe-590-262-upgrade.bpr
```

- Step 4** Log into each DPE, in the enable mode, and run the **upgrade** command. You are prompted to select the 2.6.2 patch bundle and apply it. After the upgrade is finished, the DPE will reboot.

- Step 5** Log into each DPE, in the enable mode, and run the **show version** command. This should identify the current version running on the DPE as BACC 2.6.2.

## Upgrading Network Registrar Extensions

Use this procedure to upgrade the Network Registrar extensions from BACC 2.5.0.2, 2.6, or 2.6.1 to BACC 2.6.2:

- Step 1** Complete the [Starting the Upgrade](#) procedure found on page 7.
- Step 2** Run the **262-upgrade-cnrep.sh** script.
- Step 3** Stop the Network Registrar Server Agent when prompted.  
The upgrade script automatically copies the upgraded extension point files into the required directories. When complete, it prompts you to restart the Network Registrar Server Agent.
- Step 4** Run this command to verify that the output indicates it is BACC release 2.6.2:
- ```
# pkgparam CSCObpr VERSION
```
- The version information returned should be 2.6.2.
- Step 5** Go to the `/opt/CSCObpr/lib` directory. Provided that the upgrade was successful, this directory content should appear similar to this:

```
-rw-r--r--      1 root  oldother  1107051   Aug 10  2004  AdventNetSnmp.jar
-rw-r--r--      1 root  other    9771256   Aug 10  16:30  bpr-2502.jar1
-rw-r--r--      1 root  other    9772266   Aug 10  18:30  bpr.jar
-rwxr-xr-x      1 root  other    115420    Aug 10  16:30  libosstatus.so
-rwxr-xr-x      1 root  other    1560748   Aug 10  16:30  libbprextensions.so
                -25021
-rwxr-xr-x      1 root  other    1560748   Aug 10  16:30  libbprextensions.so
-rwxr-xr-x      1 root  other    938100    Aug 10  16:30  libdb_java-4.1.so
-rwxr-xr-x      1 root  other    840148    Aug 10  16:30  libdb-4.1.so
-rwxr-xr-x      1 root  other    832960    Aug 10  16:30  libgcc_s.so.1
-rwxr-xr-x      1 root  other    62624     Aug 10  16:30  TelnetD.jar
-rwxr-xr-x      1 root  other    8661944   Aug 10  16:30  libstdc++.so.5
-rwxr-xr-x      1 root  other    29411     Aug 10  16:30  comm.jar
-rwxr-xr-x      1 root  other    2370312   Aug 10  16:30  libssl.so.0.9.7
```

1. The file name will depend on the previous version installed, for example, `/bpr-26` or `bpr-261`.

- Step 6** If a second check is required to verify upgrade success, go to the `$CNR_HOME/extensions/dhcp/dex` directory and verify that these files appear:

```
-rwxr-xr-x      1 root  bin 6      0904      Oct 29 2003  libdextension.so
-rwxr-xr-x      1 root  other    1530628   Jul 22 12:43  libbprextensions.so
                -25021
-rwxr-xr-x      1 root  other    1560748   Aug 11 12:49  libbprextensions.s
```

1. The file name will depend on the previous version installed, for example, `/bpr-26` or `bpr-261`.



Note

The actual directory contents displayed in this procedure may differ, from those shown above, depending on the components installed on the computer.

## Upgrading the KDC

Use this procedure to upgrade the KDC from BACC 2.5.0.2, 2.6, or 2.6.1 to BACC 2.6.2:

- Step 1 Complete the [“Starting the Upgrade” procedure on page 7](#).
- Step 2 Run the **262-upgrade-KDC.sh** script.
- Step 3 Manually start the BACC agent to complete the upgrade process.
- Step 4 Run this command to verify that the output indicates it is BACC release 2.6.2:

```
# pkgparam CSCObpr VERSION
```

The version information returned should be 2.6.2.

- Step 5 Go to the /opt/CSCObpr/kdc directory. Provided that the upgrade was successful, this directory content should appear similar to this:

```
-rwxr-xr-x      1 root  smmsp   6728896   Aug 10 16:30  keygen
-rwx-----      1 root  smmsp   7843192   Aug 10 18:03  kdc
-rwx-----      1 root   snmp    7841456   Aug 10 16:30  kdc-26      1
drwxr-xr-x      5 root  smmsp     512      Aug 10 16:30  solaris
-r-x-----      1 root  smmsp     298      Aug 10 16:30  runKDC.sh3737
-r-x-----      1 root   snmp     489      Aug 10 16:30  PKCert.sh
drwxr-xr-x      2 root   snmp     512      Aug 10 16:30  lib
```

1. The file name will depend on the previous version installed. If BACC 2.6.1 was previously installed, this file is named kdc-261. If BACC 2.5.0.2 was installed there is no back up file.



Note

The actual directory content that is displayed may differ, from that shown above, depending on the components installed on the computer.

## Migrating the RDU Database

The Regional Distribution Unit (RDU) database migration script lets you migrate your RDU database from BACC 2.5.0.2 into BACC 2.6.2.

The migration script is automatically installed, and unpacked, whenever the BACC 2.6.2 installation program (**setup.bin**) is run. The installation program unpacks the migration script file into the <BACC\_HOME>/migration directory. You run the RDU database migration script using the **migrateDb.sh** script.

## Premigration Procedure

Prior to installing the new BACC version you must run the **backupDb.sh** script to back up the database files. See the *Cisco Broadband Access Center for Cable Administrator's Guide* for additional information.

## Migrating From Release 2.5.0.2

When migrating from release 2.5.0.2, you must use command line parameters to specify the file system directory for temporary storage when running the **migrateDb.sh** script. This script is located in the <BACC\_HOME>/migration directory.

When performing this migration, you must allow for the available disk space required for temporary storage. The available disk space must be at least the same as the size of the old database files. However, for performance reasons, Cisco recommends that you locate this directory on a different disk from the database and the database log files.

When running this script, use this syntax:

```
./migratedb.sh temp_dir
```

Where *temp\_dir* identifies the temporary directory.

If migration is interrupted and restarted again, migration will continue running from where it left off. If a clean restart of migration is required, you must:

- 
- Step 1** Delete all files from the temporary directory.
  - Step 2** Run the **restoreDb.sh** command as indicated in the *Cisco Broadband Access Center for Cable Administrator's Guide*.
  - Step 3** Rerun the database migration script.
  - Step 4** Start the RDU to initialize the database.
  - Step 5** Stop the RDU and run the **verifyDb.sh** script to verify database consistency.
  - Step 6** Restart the RDU after migration is complete and the database verified.



### Caution

---

The RDU should not be started while migration is in progress; any attempt to restart the RDU results in a series of error messages being written into the rdu.log file. These messages will indicate that database migration is needed before the RDU can be restarted.

---

## Migration Log Files

Each time a migration is performed, information is recorded in the migration25to26.log file, which is stored in <BACC\_DATA>/rdu/logs directory. The migration.log file identifies which version of the database is being migrated.

## Device Affinity

In previous BACC releases, the Network Registrar extensions alternated between the best available DPEs in a provisioning group to assign devices to a DPE. The DPE assigned during the DHCP exchange would handle subsequent steps in the devices provisioning flow. This might include, for example, the TOD, TFTP, or PacketCable provisioning.

The provisioning group DPEs would be ordered in the Network Registrar extensions by their state (for example, ready, populating, synchronizing, and connecting) and their primary or secondary assignment within the provisioning group. Using this approach, it was likely that within a typical provisioning group containing one or more DPEs, the DPE selected during the DHCP exchange would be different each time a device performed its DHCP exchange. Since the MTA would have to obtain a new Kerberos ticket each time the DPE assignment changed, this would result in a reduction in system performance.

The BACC 2.6.2 release now performs the same function using a different approach. Rather than using the round-robin process, BACC 2.6.2 establishes an affinity between devices and a specific DPE by using a hashing algorithm to map a device to one of the best available DPEs. This affinity is retained as long as the DPE state within the provisioning group remains stable. Because a specific device will normally be assigned to the same DPE, expensive Kerberos ticketing is avoided.

## Improved PacketCable DHCP Option Handling

BACC supports both PacketCable DHCP option 122 (as specified in RFC 3495 and 3594) and the deprecated PacketCable DHCP option 177. Earlier releases of BACC required configuration for whatever 122 and/or 177 content was requested by the EMTA. Failure to do so resulted in the EMTA's DHCP request being ignored. For example, if an EMTA requests DHCP option 122, but BACC was not configured to populate 122, the DHCP request would be ignored as BACC was unable to populate the 122 option content.

Two improvements have been made in this area, driven by recent changes in the PacketCable specifications.

1. BACC will no longer ignore DHCP requests when it cannot populate option 122 and/or 177 content. BACC will populate whatever 122/177 content it can and leave the decision to ignore the option up to the EMTA.
2. When BACC receives a DHCP request asking for both option 122 and 177, BACC will ignore the request for option 177 and populate only option 122 content.



Note

---

Refer to Appendix E of the *Cisco Broadband Access Center for Cable Administrator's Guide* for additional information.

---

## PacketCable BASIC Provisioning Flow

BACC 2.6.2 now supports the PacketCable BASIC provisioning flow, as defined by the PacketCable specification PKT-SP-PROV-109-040402.

The BASIC flow is similar to the DOCSIS flow, with a few differences. The BASIC flow can use an optional provisioning status SNMP INFORM at the end of the flow. This INFORM notifies BACC that the MTAs provisioning either completed successfully or there was a provisioning problem. In the event of a problem, an error can be generated and an event sent from the DPE, to the RDU, then on to a BACC client.



Note

Before using the PacketCable BASIC provisioning flow, you must ensure that you are using a PacketCable BASIC capable EMTA. The EMTA must report that it is BASIC capable with its DHCP DISCOVER option 60, TLV 5.18 (supported flows).

## PacketCable TLV 38 Support

Broadband Access Center for Cable release 2.6.2, now supports the new TLV 38 in PacketCable configuration templates. This TLV lets you configure multiple SNMP notification targets. Configuration of this TLV means that all notifications including and following the step 25 provisioning status INFORM are also issued to the targets configured through TLV 38.



Note

See the PacketCable specification PKT-SP-PROV-109-040402 for additional information.

## SNMP v2C Notifications

Broadband Access Center for Cable supports both SNMP v2C TRAP and INFORM notifications from the PacketCable MTA.

## PacketCable MIB Support

The BACC 2.6.2 release includes the recent update to the PacketCable MTA MIB. See the PacketCable MTA MIB Specification I09, PKT-SP-MIB-MTA-I09-040402.

## The RunCfgUtil Tool

The `runCfgUtil.sh` script has been modified to support a `-t (basic/secure)` option that controls generation and insertion of the PacketCable BASIC Flow integrity hash into a BASIC flow static configuration file.



Note

See the *Cisco Broadband Access Center for Cable Administrator's Guide* for specifics on the use of this script.

- `-t basic`—This calculates and inserts a PacketCable BASIC flow integrity hash into an MTA static configuration file.
- `-t secure`—This is the script's default setting and it does not insert the PacketCable BASIC flow integrity hash into an MTA static configuration file.

# Key Distribution Center

The Key Distribution Center (KDC) component in BACC release 2.6.2, now supports EuroPacketCable (tComLabs) certificate chains. The BACC 2.6.2 KDC is also multiprocessor enabled on Solaris computers. [Example 1](#) shows a sample EuroPacketCable enabled KDC configuration file.

*Example 1 Example EuroPacketCable Enabled KDC Configuration File*

```
[general]
interface address = 10.10.10.1
FQDN = servername.cisco.com
maximum log file size = 10000
n saved log files = 100
log debug level = 5 minimum
ps backoff = 150 maximum
ps backoff = 300
euro-packetcable = true
```



**Note**

---

With the exception of this KDC description the KDC descriptions found in the *Cisco Broadband Access Center for Cable Administrator's Guide* remain valid.

---

## API Installation Component Removal

The installation programs for previous BACC releases provided for the installation of an API component. The installation of this component has been removed in the BACC 2.6 release although the API is still available as in previous releases. See the *Cisco Broadband Access Center for Cable Installation Guide* for specific instructions.

## Bugs

For information on BACC bugs, see the BACC262\_BugList.html file in the docs/ subdirectory of the BACC CD-ROM or electronic distribution.

# Resolved Issues

Table 1 identifies software issues that have been resolved in the BACC 2.6.2 release.

**Table 1** *Resolved Software Issues*

| Number     | Description  | Notes   |
|------------|--|---|
| CSCee46901 | <p>A memory leak existed in early BACC releases. This leak consumed up to 70 bytes each time a provisioned cable modem was reset. This memory leak became a significant issue when a large number of cable modems were affected. For example, if one million cable modems were affected, the potential existed that as much as 70 MBytes of memory could be lost.</p> <p>This memory loss could be sufficient to cause the RDU to crash.</p> | This condition has been corrected in BACC 2.6.2.  |
| CSCee69982 | <p>The hardware DPE reloads with a resource unavailable exception.</p> <p>This problem would occur whenever a UDP packet, with an invalid checksum, was sent to the DPE.</p>   | This condition has been corrected in BACC 2.6.2.  |
| CSCee85475 | When the hardware length in a DHCP message was 0, the DPE would reload due to an array index out of bounds exception.  | This condition has been corrected in BACC 2.6.2.  |
| CSCef28708 | Network Registrar extensions previously communicated with the DPE via the DPE's public interface. The RDU learned this interface when the DPE gets registered.   | You can now configure the Network Registrar extensions to communicate with the DPE on a different interface rather than the public interface.   |
| CSCef29446 | Previous BACC releases failed to notice changes, such as a firmware upgrade, in a device's capabilities. This could have caused problems since the configuration generated for the device would have represented the device's previous capabilities. For example, a DOCSIS modem was requesting DHCP option 177 but is now requesting 122.   | The configurations generated for DOCSIS modems, PacketCable MTAs, and CableHome WAN MAN devices contain validation rules for DHCP option 55 (parameter request list) and DHCP option 60 (vendor class id). These rules ensure that changes to the values of these options, result in notification being sent to the RDU which then generates the appropriate configuration. |
| CSCef55020 | The SNMP svc does not accept log level changes.  | Logging levels can now be changed dynamically.  |

# Known Software Problems

Table 2 identifies software issues that are known to exist in this release of BACC.

**Table 2** *Broadband Access Center for Cable Known Software Problems*

| Number     | Description   | Resolution   |
|------------|---|--|
| CSCdy22648 | MTA file encryption property not handled correctly.<br><br>It is not currently possible to control whether MTA files are encrypted, on a per device or Class Of Service basis, using properties at the RDU.   | To correct this problem, set the encryption property at each DPE. This results in all files handed out by that DPE following that DPE setting.   |
| CSCed08053 | The KDC is unable to start unless a KDC certificate called <i>KDC_private_key_proprietary</i> is present.   | The KDC requires that the private key corresponding to the KDC certificate be named <i>KDC_private_key_proprietary</i> and that it be installed under the <code>&lt;BACC_HOME&gt;/kdc/solaris</code> directory. This must be done regardless of the format of the key. |
| CSCed27889 | When a DPE is configured with provisioning enabled on both interfaces, all UDP responses from the DPE may be directed to an interface other than the incoming request. This causes the external requester to reject the response.   | To avoid this problem, use only one provisioning interface on each DPE.  |
| CSCed40157 | When performing a search using the CPE DHCP Criteria, the results displayed may not be usable.<br><br>This search type displays results that include all modems and custom CPEs associated with that CPE DHCP criteria. These modems and custom CPEs are related to the default CPE DHCP Criteria even if they are not in the promiscuous mode. This is not updated if the default CPE DHCP criteria changes. | Do not rely on the search results obtained from CPE DHCP criteria searches, in order to retrieve modems associated with a given CPE DHCP criteria.   |

*Table 2 Broadband Access Center for Cable Known Software Problems (Continued)*

| <b>Number</b> | <b>Description</b>  | <b>Resolution</b>  |
|---------------|---|--|
| CSCed40162    | <p>After booting a DOCSIS modem, with a computer behind it, and enabling the promiscuous mode, the computer and the modem should both receive the correct DHCP criteria and class of service. The computer should receive the system default for provisioned promiscuous DHCP criteria.</p> <p>After disabling the promiscuous mode on the modem, the computer continues to receive the default provisioned promiscuous DHCP criteria rather than the default computer DHCP criteria.</p> | The computer's configuration must be manually regenerated to force it to receive the correct service level.  |
| CSCed40628    | The BACC API does not validate the value for the cpeDHCPCriteria property. If an invalid DHCP criteria value is entered, a large number of errors will be generated in the RDU logs.  | Enter only valid DHCP criteria names as the value for the cpeDHCPCriteria property. Avoid the use of punctuation and space characters.                       |
| CSCed44803    | <p>The PKCert utility does not support Euro PacketCable.</p> <p>The PKCert utility cannot operate on certificates issued by tComLabs. The utility only supports certificates issued by CableLabs.</p>   | This utility fails in both the certify and create modes when attempting to operate on tComLabs certificates.   |
| CSCed52904    | When PACEConnection objects are continually created and released in the BACC API client, the API client eventually runs out of memory.  | When integrating with the BACC API client, open the required number of PACEConnections once, then re-use them. There is no need to release a PACEConnection. |

Table 2 Broadband Access Center for Cable Known Software Problems (Continued)

| Number     | Description   | Resolution   |
|------------|---|--|
| CSCed67898 | <p>SNMPv3 cloning ignores the privacy setting.</p> <p>When the SNMPv3 security association (SA) between a DPE and MTA is created, it could require privacy based upon the policy setting for SNMPv3 privacy at the DPE. Since the user-initiated portion of cloning requires a new SA be created at the RDU, the RDU may be unaware of the type of SA that was originally created (privacy on or off) between the DPE and MTA.</p> <p>To increase the likelihood of success for SA creation (cloning), the RDU first attempts to create a privacy enabled SA and, when this fails, the RDU attempts to create a privacy disabled SA. This does not compromise security since the MTA only allows creation of the SA based on its SNMP VACM settings. Therefore, the success of this follow on cloning operation is dependent upon the MTA settings and the VACM entries created at or after provisioning.</p> | There is no workaround to this issue.  |
| CSCed75181 | <p>Solaris DPE and CLI do not check for minimum memory requirements.</p> <p>In some instances insufficient memory or swap space could result in the DPE command line interface commands failing to execute.</p>   | Install a minimum of 512 Mbytes of memory and install a swap file on the Solaris computer.                           |
| CSCed76193 | <p>JRUN install fails if Root Home Directory is not set.</p> <p>If you do not set the HOME directory an attempt to install BACC 2.6.2, the installation will fail and an exit code zero (0) is generated.</p>   | The only workaround to this problem is to ensure that you set the HOME directory before attempting the installation. |
| CSCed95991 | The API client running JDK 1.4.2_04 can cause the RDU to crash.   | Do not use JDK version 1.4.2_04, or newer, when running the API.   |
| CSCee26369 | Occasionally, after completing a device search, clicking <b>Regenerate All</b> may result in the generation of a Broadband Access Center for Cable error.   | There is no workaround to this issue.  |

Table 2 Broadband Access Center for Cable Known Software Problems (Continued)

| Number     | Description   | Resolution   |
|------------|---|--|
| CSCee50907 | <p>In certain circumstances the generated options may have the instance attribute set incorrectly.</p>  | <p>To generate a binary file, remove the “Instance #” from the template file, as illustrated below.</p> <p>If your template contained this:</p> <pre>Option 22.1.10 Option 22.3.10 Option 22.5.64 Option 22.6.Active Option 22.9.2.17 <b>Option 22.9.7 instance 2 2427</b> <b>Option 22.9.8 instance 3 2427</b></pre> <p>Change it to:</p> <pre>Option 22.1.10 Option 22.3.10 Option 22.5.64 Option 22.6.Active Option 22.9.2.17 <b>Option 22.9.7 2427</b> <b>Option 22.9.8 2427</b></pre> |
| CSCee51023 | <p>The runCfgUtil.sh tool does not consistently use rdu.properties.</p> <p>In prior BACC releases prior the runCfgUtil.sh tool did not use rdu.properties consistently. This resulted in files not being validated properly.</p> <p>For example, the <b>-l</b> parameter (specifying local files) uses rdu.properties, but the <b>-r</b> parameter (specifying external files in the RDU database) does not. The net effect is that a template is properly validated with local files, but fails to validate the RDU file.</p> <p>This is due, in part, to the local file being recognized, through the use of the a private MIB, and the RDU file not being recognized because it uses an unrecognized private MIB file.</p> | <p>There is no specific resolution to this issue. When using the runCfgUtil.sh tool you should pay close attention to the instructions for this tools use, in Chapter 8 of the <i>Cisco Broadband Access Center for Cable Administrator’s Guide</i>.</p>   |

Table 2 Broadband Access Center for Cable Known Software Problems (Continued)

| Number     | Description   | Resolution  |
|------------|---|---|
| CSCee54414 | <p>DPE CLI sets the same hostname on all interfaces.</p> <p>This problem is common to all hardware DPEs but does not apply to the Solaris DPE.</p> <p>The <b>hostname</b> command sets the contents of the /etc/hosts so each IP gets the identical hostname, as specified in the command use. This is not consistent with standard UNIX administration best practices, where each IP should be given a unique hostname.</p> <p>The DPE PacketCable binds to the interface that resolves from the hostname.</p> <p>On a Solaris DPE, it is possible to set the hostname to the name assigned to any specific interface in /etc/hosts. You can not use this technique with hardware DPEs as the hostnames in the /etc/hosts file are identical on each interface, thus resulting in the primary interface or first interfaced listed being selected.</p> | <p>There is currently no workaround to this problem; you must use the first interface (eth0) for MTA traffic.</p>   |
| CSCee54461 | <p>Admin UI went into a state where COS could not be displayed.</p> <p>When using the administrator's user interface to select a device's class of service earlier versions of BACC might not have displayed the device details.</p> <p>This can occur when using either Netscape 7.1 or Internet Explorer 6.0.2. In either case, clearing browser cache or refreshing the displayed page will not correct the problem.</p>   | <p>Whenever this happens, restart the RDU to correct the problem.</p>   |
| CSCef16492 | <p>Template parser does not ignore commas without double quotes.</p> <p>Some SNMP string values can contain commas and the template parser sees these commas and splits the string inappropriately.</p> <p>In the "Cable Labs, Inc." string for example, the template parser splits the option value by comma and passes the values to the SNMP TLV processor and this causes an error.</p>   | <p>The only workaround to this problem is to specify the SNMP string value as a sequence of octet string bytes.</p> <p>For example, "Cable Labs, Inc." would be expressed as :</p> <pre>" 43:61:62:6C:65:4C:61:62:73:2C:20:49:6E:63:2E"</pre> |

Table 2 Broadband Access Center for Cable Known Software Problems (Continued)

| Number     | Description   | Resolution  |
|------------|---|---|
| CSCef21239 | <p>Solaris DPE does not work with multipath interfaces.</p> <p>When the Solaris DPE starts up, it attempts to determine the IP address of interfaces it has been configured to use.</p> <p>While this simplifies changing a device's IP address, it does not work when multipathing (two interfaces supporting the same IP address) is configured.</p> <p>In multipathing, one interface is configured as a standby for the other and test addresses are configured for both interfaces. The DPE cannot be configured to use both interfaces because it incorrectly picks up the test address on the standby interface.</p> | <p>Complete this procedure to correct the problem on a Solaris DPE:</p> <ol style="list-style-type: none"> <li>1. Configure the provisioning interfaces using the DPE CLI name, not the IP address. For example: bge0 or hme0. This causes an issue with multipathing as only one interface is really to be used (the one that is currently active).</li> <li>2. Add these two lines to the dpe.properties configuration file: <pre>/server/provIPAddr=10.10.10.1 /server/provFQDNs=fqdn[10.10.10.1]:49186</pre> <p>Where:</p> <ul style="list-style-type: none"> <li>- 10.10.10.1—specifies the actual IP address</li> <li>- fqdn—specifies the devices fully qualified domain name and its IP address</li> <li>- 49186—identifies the DPE port number</li> </ul> <p><b>Note</b> The dpe.properties configuration file is located under &lt;BACC_HOME&gt;/dpe/conf.</p> </li> <li>3. Run either the bprAgent restart dpe command or the dpe reload CLI command to restart the DPE.</li> </ol> <p>When this procedure is complete, these CLI commands no longer function:</p> <ul style="list-style-type: none"> <li>• interface ethernet [intf0/intf1] provisioning enabled interface ethernet</li> <li>• [intf0/intf1] provisioning fqdn</li> </ul> |

*Table 2 Broadband Access Center for Cable Known Software Problems (Continued)*

| Number     | Description  | Resolution  |
|------------|--|---|
| CSCef21253 | <p>Reinstall does not install the required libraries.</p> <p>If you attempt to reinstall any BACC component into a system that already has the Network Registrar Extension Point component installed, that new component may not operate correctly.</p> <p>This is due, in part, to libraries required by the new component not being installed properly.</p>  | <p>If you need to install a new component in a system where the Network Registrar Extension Point component already exists, you must uninstall BACC and then reinstall it with the newly required component.</p>  |
| CSCef24972 | <p>When stopping the KDC with the BACC watchdog, all processes with the name 'kdc' are killed.</p>   | <p>Do not name any processes 'kdc'.</p>   |
| CSCef29404 | <p>The runCfgUtil.sh template generates errors in binary files .</p> <p>When using the runCfgUtil.sh to generate a binary file, from a template file which references a proprietary MIB, errors are generated whenever the proprietary MIB cannot be accessed.</p>   | <p>Ensure that the proprietary MIB referenced in the template file is properly located in the &lt;BACC_HOME&gt;/rd/mibs directory.</p>  |
| CSCef29434 | <p>BACC does not support the use of EuroPacketCable SNMP MIBs. Consequently, BACC is unable to performance SNMP operations to the MTAs including disruption, cloning, or incremental provisioning.</p>   | <p>There is no workaround to this issue.</p>  |
| CSCef37280 | <p>The DPE log file incorrectly shows that no provisioning interfaces are enabled when the interfaces are actually enabled but do not have a provisioning FQDN set. For example:</p> <ul style="list-style-type: none"> <li>• interface ethernet 0 ip address 10.10.10.10 255.255.255.255</li> <li>• interface ethernet 0 ip enabled true</li> <li>• interface ethernet 0 provisioning enabled true</li> </ul> <p>From this example the DPE log file entries could appear similar to:</p> <ul style="list-style-type: none"> <li>• BACC-DPE-5-0236: [Device Provisioning Engine] starting up</li> <li>• BACC-DPE-5-0982: Configured provisioning interfaces: []</li> </ul> | <p>Set a provisioning FQDN for the interfaces that have provisioned enabled. This could include, for example:</p> <ul style="list-style-type: none"> <li>• interface ethernet 0 ip address 10.10.10.10 255.255.255.255</li> <li>• interface ethernet 0 ip enabled true</li> <li>• interface ethernet 0 provisioning enabled true</li> <li>• interface ethernet 0 provisioning fqdn baclab-dpe-3.cisco.com</li> </ul> <p>From this example the DPE log file entries could appear similar to:</p> <ul style="list-style-type: none"> <li>• BACC-DPE-5-0982: Configured provisioning interfaces:</li> <li>• [baclab-dpe-3.cisco.com[10.10.10.10]]</li> </ul> |

**Table 2** *Broadband Access Center for Cable Known Software Problems (Continued)*

| Number     | Description  | Resolution   |
|------------|--|--|
| CSCef45093 | Setting any of the /dhcp/client-policy/response/option 122.1 through /dhcp/client-policy/response/option 122.10 properties, for a device that requests DHCP option 122, causes the device to fail to obtain a lease from the DHCP server.  | There is no need to set any of these properties. See Appendix E in the <i>Cisco Broadband Access Center for Cable Administrator's Guide</i> for information on PacketCable DHCP options to BACC property mapping.  |
| CSCef45131 | When a deployment uses multiple instances of Network Registrar (regional and local), Network Registrar logs the first instance as its base directory.<br><br>When a lab version of BACC is installed over Network Registrar, the installation configures the Network Registrar Extension Points under the first instance (specified in the base directory) of Network Registrar. | To install and configure the Network Registrar Extension Points on another instance, refer to the <i>Cisco Broadband Access Center for Cable Installation Guide</i> and complete the component installation instructions for the Network Registrar Extension Points. |
| CSCef57921 | The RDU, DPE, CLI, and SNMP agent are unable to start when the directory name specified for BACC_HOME contains more than 20 characters.  | Ensure that whatever directory you use as BACC_HOME contains no more than 20 characters.   |
| CSCef66966 | Upgrading multiple BACC component that have previously been installed on the same computer is not supported.   | There is no workaround to this issue. Please contact your Cisco representative for additional information.   |

## Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

### Cisco.com

You can access the most current Cisco documentation at this URL:

<http://www.cisco.com/univercd/home/home.htm>

You can access the Cisco website at this URL:

<http://www.cisco.com>

You can access international Cisco websites at this URL:

[http://www.cisco.com/public/countries\\_languages.shtml](http://www.cisco.com/public/countries_languages.shtml)

## Ordering Documentation

You can find instructions for ordering documentation at this URL:

[http://www.cisco.com/univercd/cc/td/doc/es\\_inpk/pdi.htm](http://www.cisco.com/univercd/cc/td/doc/es_inpk/pdi.htm)

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:

<http://www.cisco.com/en/US/partner/ordering/index.shtml>

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

## Documentation Feedback

You can send comments about technical documentation to [bug-doc@cisco.com](mailto:bug-doc@cisco.com).

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems  
Attn: Customer Document Ordering  
170 West Tasman Drive  
San Jose, CA 95134-9883

We appreciate your comments.

## Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, Cisco Technical Support provides 24-hour-a-day, award-winning technical assistance. The Cisco Technical Support Website on Cisco.com features extensive online support resources. In addition, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not hold a valid Cisco service contract, contact your reseller.

## Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year at this URL:

<http://www.cisco.com/techsupport>

Access to all tools on the Cisco Technical Support Website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

<http://tools.cisco.com/RPF/register/register.do>

## Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool automatically provides recommended solutions. If your issue is not resolved using the recommended resources, your service request will be assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

<http://www.cisco.com/techsupport/servicerequest>

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553 2447

For a complete list of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/techsupport/contacts>

## Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

## Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

<http://www.cisco.com/go/marketplace/>

- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:  
<http://cisco.com/univercd/cc/td/doc/pcat/>
- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:  
<http://www.ciscopress.com>
- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:  
<http://www.cisco.com/packet>
- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:  
<http://www.cisco.com/go/iqmagazine>
- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:  
<http://www.cisco.com/ipj>
- World-class networking training is available from Cisco. You can view current offerings at this URL:  
<http://www.cisco.com/en/US/learning/index.html>

CCSP, the Cisco Square Bridge logo, Cisco Unity, Follow Me Browsing, FormShare, and StackWise are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn, and iQuick Study are service marks of Cisco Systems, Inc.; and Aironet, ASIST, BPX, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Empowering the Internet Generation, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Fast Step, GigaDrive, GigaStack, HomeLink, Internet Quotient, IOS, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, LightStream, Linksys, MeetingPlace, MGX, the Networkers logo, Networking Academy, Network Registrar, *Packet*, PIX, Post-Routing, Pre-Routing, ProConnect, RateMUX, Registrar, ScriptShare, SlideCast, SMARTnet, StrataView Plus, SwitchProbe, TeleRouter, The Fastest Way to Increase Your Internet Quotient, TransPath, and VCO are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website 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. (0406R)

Copyright © 2004 Cisco Systems, Inc. All rights reserved.

♻️ Printed in the USA on recycled paper containing 10% postconsumer waste.