



ISDN BCAC and Round-Robin Channel Selection Enhancements

The ISDN BCAC and Round-Robin Channel Selection Enhancements feature allows more dynamic control of the ISDN B channels by providing additional B-Channel Availability Control (BCAC) functionality for configuring message signaling, and an enhanced channel selection scheme that adds round-robin configuration to the existing ascending and descending channel selection schemes already available.

Feature Specifications for the ISDN BCAC Enhancements

Feature History

Release	Modification
12.3(1)	This feature was introduced.

Supported Platforms

Cisco AS5300, Cisco AS5350, Cisco AS5400, Cisco AS5800, Cisco AS5850, Cisco 2600 series, Cisco 3640, Cisco 3660

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at <http://www.cisco.com/go/fn>. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

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

- [Command Reference, page 11](#)

Prerequisites for ISDN BCAC Enhancements

You need to be familiar with the BCAC service message signaling procedure and configuring ISDN PRI before configuring the commands described in this document. See the “Standards” section on [page 10](#) for a list of references.

Information About the ISDN BCAC and Round-Robin Channel Selection Enhancements

The following functionality is introduced in the ISDN BCAC and Round-Robin Channel Selection Enhancements:

- [BCAC Enhancements, page 2](#)
- [Round-Robin Selection Scheme for ISDN B Channels, page 3](#)
- [Logging of ISDN Events, page 3](#)
- [Additional ISDN Switch Types Supported for Network Emulation, page 3](#)

BCAC Enhancements

BCAC is a service message signaling procedure used to control the availability of ISDN B channels. BCAC provides a coordinated capability between both ends of a PRI to simultaneously preclude selection of specified B channels for outgoing calls, and reject calls (if channel negotiation is employed, calls may go on another channel) for those same channels. The basic BCAC functionality for the handling of SERV and SERV ACK messages already exists on Cisco routers. In Cisco IOS Release 12.3(1), the software has been enhanced with the following BCAC functionality:

- Processing of SERV and SERV ACK messages. Even though these messages are already handled in the Cisco IOS software, their processing has been enhanced to more closely align with the behavior described in the standards.
- Provides a mechanism to allow the retransmission of SERV messages.
- Handles SERV message collision cases.
- Provides service status audits for various audit triggers.
- Provides an option that when set triggers the exchange of service messages on all channels of the interface when the router is rebooted and when the signaling link comes up.
- Provides a mechanism so that if there is a flood of service messages that need to be sent, the service messages can be throttled to avoid losing them.
- Initializes B-channel service status upon provisioning.

Round-Robin Selection Scheme for ISDN B Channels

ISDN enhancements introduced in Cisco IOS Release 12.3(1) enable you to select a B channel on a PRI or a Non-Facility Associated Signaling (NFAS) interface in a round-robin fashion. This option is in addition to the ascending or descending channel selection schemes already available.

Logging of ISDN Events

ISDN enhancements introduced in Cisco IOS Release 12.3(1) support syslog logging of the following ISDN events:

- ISDN Layer 2 Up and Down events at severity 3.
- ISDN SERV, SERV ACK, RESTART, RESTART ACK, and STATUS ENQ messages at severity 4.
- ISDN SERV status audit messages for various triggers at different severities.

Additional ISDN Switch Types Supported for Network Emulation

ISDN enhancements introduced in Cisco IOS Release 12.3(1) extend network emulation capability to the Lucent 4ESS, 5ESS, and Nortel DMS-100 ISDN switch types. These switch types can be configured as network, but no additional changes were made and not all network-side features are supported.

How to Configure the ISDN Enhancements

This section contains the following procedures. Each procedure is optional and depends upon the settings required for your network.

- [Configuring BCAC Service Audit Triggers, page 3](#) (optional)
- [Configuring BCAC Service State Triggers, page 5](#) (optional)
- [Configuring BCAC Message Retransmission, page 6](#) (optional)
- [Configuring B-Channel Selection Order, page 7](#) (optional)
- [Configuring ISDN Syslog Messages, page 8](#) (optional)

Configuring BCAC Service Audit Triggers

Perform this task to configure BCAC service audit triggers:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface serial** *port:channel*
4. **isdn bcac service audit**
5. **isdn bcac service audit trigger** *number*
6. **isdn bcac service audit interface**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface serial port:channel Example: Router(config)# interface serial 2:23	Enters interface configuration mode on the specified serial port and channel.
Step 4	isdn bcac service audit Example: Router(config-if)# isdn bcac service audit	Enables BCAC service audits.
Step 5	isdn bcac service audit trigger number Example: Router(config-if)# isdn bcac service audit trigger 2	Enables individual BCAC service audit triggers.
Step 6	isdn bcac service audit interface Example: Router(config-if)# isdn bcac service audit interface	Specifies that BCAC service audits need to be triggered on the entire interface.

Examples

The following example shows how to enable service audits on serial interface 4:23:

```
interface serial 4:23
  isdn bcac service audit
```

The following example shows how to disable service trigger 4 on serial interface 4:23:

```
interface serial 4:23
  no isdn bcac service audit trigger 4
```

See the command page for the **isdn bcac service audit trigger** command for a list of the triggers that are set.

The following example shows how to configure service audits on the entire interface:

```
interface serial 4:23
  isdn bcac service audit interface
```

Configuring BCAC Service State Triggers

Perform this task to configure BCAC service state triggers:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface serial** *port:channel*
4. **isdn bcac service update provision**
5. **isdn bcac service update linkup**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface serial <i>port:channel</i> Example: Router(config)# interface serial 2:23	Enters interface configuration mode on the specified serial port and channel.
Step 4	isdn bcac service update provision Example: Router(config-if)# isdn bcac service update provision	Enables BCAC service status functionality for provisioning the B channels.
Step 5	isdn bcac service update linkup Example: Router(config-if)# isdn bcac service update linkup	Triggers updates of the BCAC service states between peer nodes through exchange of SERV and SERV ACK messages.

Examples

The following example shows how to enable the SERV status message for provisioning the B channels on serial interface 4:23:

```
interface serial 4:23
 isdn bcac service update provision
```

The following example shows how to trigger service state updates on serial interface 4:23:

```
interface serial 4:23
 isdn bcac service update linkup
```

Configuring BCAC Message Retransmission

Perform this task to configure retransmission of BCAC service messages:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface serial** *port:channel*
4. **isdn bcac service timer** *timer-value*
5. **isdn bcac service retry max** *retries*
6. **isdn bcac service retry in-serv-on-fail**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface serial <i>port:channel</i> Example: Router(config)# interface serial 2:23	Enters interface configuration mode on the specified serial port and channel.
Step 4	isdn bcac service timer <i>timer-value</i> Example: Router(config-if)# isdn bcac service timer 600	Changes the value of the BCAC T3M1 or T323 service message timer. <ul style="list-style-type: none"> • Valid range is from 500 to 120000 ms, and the default is 120000 ms.
Step 5	isdn bcac service retry max <i>retries</i> Example: Router(config-if)# isdn bcac service retry max retries	Specifies the maximum number of times a BCAC service message can be retransmitted when unacknowledged. <ul style="list-style-type: none"> • The default is 2 attempts, and you can enter a number from 0 to 127.
Step 6	isdn bcac service retry in-serv-on-fail Example: Router(config-if)# isdn bcac service retry in-serv-on-fail	Specifies that the BCAC service state of the channel needs to be changed to In-Service, because no acknowledgment message was received.

Examples

The following example shows how to configure an option whereby, on service message exchange failure, the service state of the concerned channel or channels will be set to In-Service:

```
interface serial 2:23
  isdn bcac service retry in-serv-on-fail
```

The following example shows how to set the maximum number of service message retransmissions on serial interface 2:23 to 50:

```
interface serial 2:23
  isdn bcac service retry max 50
```

The following example shows how to change the service timers to 600 ms on serial interface 2:23:

```
interface serial 2:23
  isdn bcac service timer 600
```

Configuring B-Channel Selection Order

Perform this task to configure selection order of the ISDN B channels:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface serial** *port:channel*
4. **isdn bchan-number-order** {ascending | descending} [round-robin]

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
Step 3	<code>interface serial port:channel</code> Example: Router(config)# interface serial 2:23	Enters interface configuration mode on the specified serial port and channel.
Step 4	<code>isdn bchan-number-order {ascending descending} [round-robin]</code> Example: Router(config-if)# isdn bchan-number-order ascending round-robin	Configures an ISDN PRI interface to make outgoing call selection in ascending or descending order. <ul style="list-style-type: none"> The optional round-robin keyword adds round-robin selection functionality to the selection order.

Examples

The following example configures the outgoing B channel selection order on a PRI interface to be round-robin in ascending order:

```
interface serial 5:10
  isdn bchan-number-order ascending round-robin
```

Configuring ISDN Syslog Messages

Perform this task to configure logging of ISDN syslog messages:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **isdn logging**

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code> Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	<code>configure terminal</code> Example: Router# configure terminal	Enters global configuration mode.
Step 3	<code>isdn logging</code> Example: Router(config)# isdn logging	Enables logging of ISDN syslog messages.

Examples

The following example shows how to configure ISDN syslog logging:

```
isdn logging
```

Configuration Examples for ISDN BCAC and Round-Robin Channel Selection Enhancements

See the examples following each task in the preceding sections, for ideas about how the ISDN CBAC enhancements and other new ISDN features can be introduced into your network.

Additional References

For additional information related to the ISDN enhancements, see the following sections:

- [Related Documents, page 10](#)
- [Standards, page 10](#)
- [MIBs, page 10](#)
- [RFCs, page 10](#)
- [Technical Assistance, page 11](#)

Related Documents

Related Topic	Document Title
ISDN PRI configuration	Refer to the “ <i>Configuring ISDN PRI</i> ” chapter in the “ <i>Signaling Configuration</i> ” part of the <i>Cisco IOS Dial Technologies Configuration Guide</i> , Release 12.3.
ISDN PRI configuration commands	<i>Cisco IOS Dial Technologies Command Reference</i> , Release 12.3.
ISDN PRI configuration for voice, video, and fax	Refer to the chapter “ <i>Configuring ISDN Interfaces for Voice</i> ” in the <i>Cisco IOS Voice, Video, and Fax Configuration Guide</i> , Release 12.3.
ISDN PRI voice, video, and fax configuration commands	<i>Cisco IOS Voice, Video, and Fax Command Reference</i> , Release 12.3

Standards

Standards ¹	Title
AT&T PRI	Technical Report 41459– <i>AT&T ISDN Primary Rate Interface and Special Application Specification</i> ; “ <i>User Network Interface Description</i> ,” 1999.
National ISDN Council (NIC) PRI	SR (Special Report)–NWT-002343– <i>ISDN Primary Rate Interface Generic Guidelines for Customer Premises Equipment</i> , June 1993. SR-3887– <i>National ISDN Primary Rate Interface Customer Premises Equipment Generic Guidelines</i> , 1996.
Nortel PRI	NIS (Network Interface Specification)–A211-1– <i>DMS100 ISDN Primary Rate Network User Interface</i> , 1993.

1. Not all supported standards are listed.

MIBs

MIBs	MIBs Link
None	To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

RFCs	Title
None	—

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p>http://www.cisco.com/techsupport</p>

Command Reference

The following commands are introduced or modified in the feature or features documented in this module. For information about these commands, see the *Cisco IOS Dial Technologies Command Reference* at http://www.cisco.com/en/US/docs/ios/dial/command/reference/dia_book.html. For information about all Cisco IOS commands, go to the Command Lookup Tool at <http://tools.cisco.com/Support/CLILookup> or to the *Cisco IOS Master Commands List*.

New Commands

- **isdn bcac service audit**
- **isdn bcac service audit interface**
- **isdn bcac service audit trigger**
- **isdn bcac service retry in-serv-on-fail**
- **isdn bcac service retry max**
- **isdn bcac service timer**
- **isdn bcac service update linkup**
- **isdn bcac service update provision**
- **isdn logging**

Modified Commands

- **isdn bchan-number-order**
- **isdn protocol-emulate (dial)**

Glossary

PBX—private branch exchange.

RESTART—restart message.

RESTART ACK—restart acknowledge message.

STATUS ENQ—status enquiry message.

SERV—service message.

SERV ACK—service acknowledge message.

**Note**

Refer to the *Internetworking Terms and Acronyms* for terms not included in this glossary.

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