



ISDN BCAC and Round-Robin Channel Selection Enhancements

First Published: May 20, 2003
Last Updated: April 12, 2011

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

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the [“Feature Information for ISDN BCAC and Round-Robin Channel Selection Enhancements”](#) section on page 12.

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Prerequisites for ISDN BCAC and Round-Robin Channel Selection Enhancements

You need to be familiar with the BCAC service message signaling procedure and the procedure for 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 ISDN BCAC and Round-Robin Channel Selection Enhancements

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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:

- Provides improved 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 the 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 nonfacility 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 not all network-side features are supported.

How to Configure the ISDN BCAC and Round-Robin Channel Selection Enhancements

- [Configuring BCAC Service Audit Triggers, page 3](#) (optional)
- [Configuring BCAC Service State Triggers, page 4](#) (optional)
- [Configuring BCAC Message Retransmission, page 5](#) (optional)
- [Configuring B-Channel Selection Order, page 6](#) (optional)
- [Configuring ISDN Syslog Messages, page 7](#) (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`
7. `end`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code> Example: Router> <code>enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	<code>configure terminal</code> Example: Router# <code>configure terminal</code>	Enters global configuration mode.
Step 3	<code>interface serial port:channel</code> Example: Router(config)# <code>interface serial 2:23</code>	Enters interface configuration mode on the specified serial port and channel.
Step 4	<code>isdn bcac service audit</code> Example: Router(config-if)# <code>isdn bcac service audit</code>	Enables BCAC service audits.
Step 5	<code>isdn bcac service audit trigger number</code> Example: Router(config-if)# <code>isdn bcac service audit trigger 2</code>	Enables individual BCAC service audit triggers.
Step 6	<code>isdn bcac service audit interface</code> Example: Router(config-if)# <code>isdn bcac service audit interface</code>	Specifies that BCAC service audits must be triggered on the entire interface.
Step 7	<code>end</code> Example: Router(config-if)# <code>end</code>	Exits interface configuration mode and returns to privileged EXEC mode.

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**
6. **end**

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 the 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.
Step 6	end Example: Router(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.

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`
7. `end`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code> Example: Router> <code>enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	<code>configure terminal</code> Example: Router# <code>configure terminal</code>	Enters global configuration mode.
Step 3	<code>interface serial port:channel</code> Example: Router(config)# <code>interface serial 2:23</code>	Enters interface configuration mode on the specified serial port and channel.
Step 4	<code>isdn bcac service timer timer-value</code> Example: Router(config-if)# <code>isdn bcac service timer 600</code>	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	<code>isdn bcac service retry max retries</code> Example: Router(config-if)# <code>isdn bcac service retry max retries 5</code>	Specifies the maximum number of times that 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	<code>isdn bcac service retry in-serv-on-fail</code> Example: Router(config-if)# <code>isdn bcac service retry in-serv-on-fail</code>	Specifies that the BCAC service state of the channel needs to be changed to In-Service, because no acknowledgment message was received.
Step 7	<code>end</code> Example: Router(config-if)# <code>end</code>	Exits interface configuration mode and returns to privileged EXEC mode.

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**]
5. **end**

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 bchan-number-order { ascending descending } [round-robin] 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 the round-robin selection functionality to the selection order.
Step 5	end Example: Router(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.

Configuring ISDN Syslog Messages

Perform this task to configure logging of ISDN syslog messages.

SUMMARY STEPS

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

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code> Example: <code>Router> enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	<code>configure terminal</code> Example: <code>Router# configure terminal</code>	Enters global configuration mode.
Step 3	<code>isdn logging</code> Example: <code>Router(config)# isdn logging</code>	Enables logging of ISDN syslog messages.
Step 4	<code>end</code> Example: <code>Router(config)# end</code>	Exits global configuration mode and returns to privileged EXEC mode.

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

- [Example: Configuring BCAC Service Audit Triggers, page 8](#)
- [Example: Configuring BCAC Service State Triggers, page 9](#)
- [Example: Configuring BCAC Message Retransmission, page 9](#)
- [Example: Configuring B-Channel Selection Order, page 9](#)
- [Example: Configuring ISDN Syslog Messages, page 9](#)

Example: Configuring BCAC Service Audit Triggers

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 triggers that can be disabled.

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

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


Example: Configuring BCAC Service State Triggers

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
```

Example: Configuring BCAC Message Retransmission

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
```

Example: Configuring B-Channel Selection Order

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
```

Example: Configuring ISDN Syslog Messages

The following example shows how to configure ISDN syslog logging:

```
isdn logging
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
Dial commands	Cisco IOS Dial Technologies Command Reference
Fax, modem, and text support over IP configuration	Cisco IOS Fax, Modem, and Text Support over IP Configuration Guide
ISDN voice commands	Cisco IOS Voice Command Reference
ISDN voice configuration	Cisco IOS ISDN Voice Configuration Guide

Standards

Standard	Title
AT&T PRI	Technical Report 41459— <i>AT&T ISDN Primary Rate Interface and Special Application Specification</i> ; “User Network Interface Description,” 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.

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
None	—

Technical Assistance

Description	Link
<p>The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.</p>	<p>http://www.cisco.com/cisco/web/support/index.html</p>

Feature Information for ISDN BCAC and Round-Robin Channel Selection Enhancements

Table 1 lists the release history for this feature.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



Note

Table 1 lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 1 Feature Information for ISDN BCAC and Round-Robin Channel Selection Enhancements

Feature Name	Releases	Feature Information
ISDN BCAC and Round-Robin Channel Selection Enhancements	12.3(1)	<p>The ISDN BCAC and Round-Robin Channel Selection Enhancements feature allows more dynamic control of the ISDN B channels by providing the 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.</p> <p>The following commands were introduced or modified: 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 bchan-number-order, isdn logging, isdn protocol-emulate (dial).</p>

Glossary

PBX—private branch exchange.

RESTART—restart message.

RESTART ACK—restart acknowledge message.

SERV—service message.

SERV ACK—service acknowledge message.

STATUS ENQ—status enquiry message.

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