

Configuring ISDN Caller ID Callback

ISDN caller ID callback allows the initial incoming call from the client to the server to be rejected based on the caller ID message contained in the ISDN setup message, and it allows a callback to be initiated to the calling destination.

Before Cisco IOS Release 11.2 F, ISDN callback functionality required PPP or Combinet Packet Protocol (CPP) client authentication and client-server callback negotiation to proceed. If authentication and callback negotiation were successful, the callback server had to disconnect the call and then place a return call. Both the initial call and the return call were subject to tolls, and when service providers charge by the minute, even brief calls could be expensive.

This feature is independent of the encapsulation in effect and can be used with various encapsulations, such as PPP, HDLC, Frame Relay, and X.25.

The ISDN caller ID callback feature allows users to control costs because charges do not apply to the initial, rejected call.

For a complete description of the ISDN caller ID callback commands in this chapter, refer to the *Dial Solutions Command Reference*. To locate documentation of other commands that appear in this chapter, use the command reference master index or search online.

Restrictions

The ISDN caller ID callback feature conflicts with the dialer callback security feature for the Dialer Profiles feature for DDR. If dialer callback security is configured, it takes precedence; ISDN caller ID callback is ignored.

Prerequisites

Caller ID screening requires a local switch that is capable of delivering the caller ID to the router or access server. If you enable caller ID screening but do not have such a switch, no calls will be allowed in.

ISDN caller ID callback requires DDR to be configured and bidirectional dialing to be working between the calling and callback routers. Detailed DDR prerequisites depend on whether you have configured legacy DDR or Dialer Profiles.

For a legacy DDR configuration, ISDN caller ID callback has the following prerequisite:

- A **dialer map** command is configured for the dial string that is used in the incoming call setup message. The dial string is used in the callback.

For a Dialer Profiles configuration, ISDN caller ID callback has the following prerequisites:

- A **dialer caller** command is configured to screen for the dial-in number.
- A **dialer string** command is configured with the number to use in the callback.

How It Works

ISDN caller ID callback allows great flexibility for you to define which calls to accept, which to deny, and which calls to reject initially but for which the router should initiate callback. The feature works by using existing ISDN caller ID screening, which matches the number in the incoming call against numbers configured on the router, determining the best match for number in the incoming call, and then, if configured, initiating callback to the number configured on the router.

When a call is received, the entire list of configured numbers is checked and the configuration of the best match number determines the action:

- If the incoming number is best matched by a number that is configured for callback, then the incoming call is rejected and callback is initiated.
- If the incoming number is best matched by another entry in the list of configured numbers, the call is accepted.
- If the incoming number does not match any entry in the configured list, the call is rejected and no callback is started.

“Don’t care” characters are allowed in the caller ID screening configuration on the router and are used to determine the best match.

For more information and examples, see the “Best Match System Examples” section later in this document.

Callback after the Best Match Is Determined

The details of router activities after it finds a best match with callback depend on the DDR feature that is configured. The ISDN caller ID callback feature works with the following DDR features:

- Legacy DDR
- Dialer Profiles

Legacy DDR

If legacy DDR is configured for the host or user that is identified in the incoming call message, the router performs the following actions:

- 1 Checks the table of configured numbers for caller ID callback.
- 2 Searches the **dialer map** entries for a number that “best matches” the incoming call string.
- 3 Waits for a configured length of time to expire.
- 4 Initiates callback to the number provided in the **dialer map** command.

Dialer Profiles

If the Dialer Profiles feature is configured for the host or user identified in the incoming call message, the router performs the following actions:

- 1 Searches through all the dialer pool members to match the incoming call number to a **dialer caller** number.
- 2 Initiates a callback to the Dialer Profile.
- 3 Waits for a configured length of time to expire.
- 4 Calls the number identified in the **dialer string** command associated with the Dialer Profile.

Timing and Coordinating Callback on Both Sides

When an incoming call arrives and the router finds a best match configured for callback, the router uses the value configured by the **dialer enable-timeout** command to determine the length of time to wait before making the callback.

The minimum value of the timer is 1 second; the default value of the timer is 15 seconds. The interval set for this feature on this router must be much less than that set for DDR fast call rerouting for ISDN (that interval is set by the **dialer wait-for-carrier** command) on the calling (remote) side. We recommend setting the dialer wait-for-carrier timer on the calling side to twice the length of the dialer enable-timeout timer on the callback side.

Note The remote site cannot be configured for multiple dial-in numbers because a busy callback number or a rejected call causes the second number to be tried. That number might be located at a different site, defeating the purpose of the callback.

Configure ISDN Caller ID Callback

The required configuration tasks depend whether you have configured legacy DDR or Dialer Profiles. Complete the configuration tasks in the relevant section:

- Configure ISDN Caller ID Callback for Legacy DDR
- Configure ISDN Caller ID Callback for Dialer Profiles

For configuration examples, see the “ISDN Caller ID Callback Configuration Examples” section at the end of this chapter.

Configure ISDN Caller ID Callback for Legacy DDR

This section provides configuration tasks for the local (server, callback) side and the remote (client, calling) side.

On the callback (local) side, to configure ISDN caller ID callback when legacy DDR is configured, use the following commands in interface configuration mode on the callback side:

Command	Purpose
isdn caller <i>remote-number</i> callback	Configure caller ID screening and callback when a dialer rotary is not configured.
or	
dialer caller <i>number</i> callback	Configure caller ID screening and callback when a dialer rotary (dialer interface) is configured.
dialer enable-timeout <i>seconds</i>	Configure the time to wait before initiating callback.

On the calling (remote) side, to set the timer for fast call rerouting, use the following command in interface configuration mode:

Command	Purpose
dialer wait-for-carrier-time <i>seconds</i>	Change the ISDN fast call rerouting timer to double the length of the enable timeout timer.

Configure ISDN Caller ID Callback for Dialer Profiles

This section provides configuration tasks for the local side and the remote side.

On the callback (local) side, to configure ISDN caller ID callback when the Dialer Profiles feature is configured, use the following command in interface configuration mode:

Command	Purpose
dialer caller <i>number</i> callback	Configure caller ID screening and callback.
dialer enable-timeout <i>seconds</i>	Configure the time to wait before initiating callback.

On the calling (remote) side, to set the timer for fast call rerouting, use the following command in interface configuration mode:

Command	Purpose
dialer wait-for-carrier-time <i>seconds</i>	Change the ISDN fast call rerouting timer to double the length of the enable timeout timer.

Monitor and Troubleshoot ISDN Caller ID Callback

To monitor and troubleshoot ISDN caller ID callback, use the following commands in EXEC mode:

Command	Purpose
show dialer	Display information about the status and configuration of the ISDN interface on the router.
debug isdn event	Display ISDN events occurring on the user side (on the router) of the ISDN interface. The ISDN events that can be displayed are Q.931 events (call setup and teardown of ISDN network connections)

Command	Purpose
<code>debug isdn q931</code>	Display Layer 3 signaling messages, protocol transitions and processes, the line protocol state, and the channel IDs for each ISDN interface.

ISDN Caller ID Callback Configuration Examples

This section provides the following examples:

- Best Match System Examples
- Simple Callback Examples
- ISDN Caller ID Callback with Dialer Profiles Example
- ISDN Caller ID Callback with Legacy DDR Examples

Best Match System Examples

The best match is determined by matching the incoming number against the numbers in the configured callback commands, starting with the right-most character in the numbers and using the letter X for any “don’t care” digits in the configured commands. If multiple configured numbers match an incoming number, the best match is the one with the fewest “don’t care” digits.

The reason for using a system based on right-most matching is that a given number can be represented in many different ways. For example, all the following items might be used to represent the same number, depending on the circumstances (international call, long-distance domestic call, call through a PBX, and so forth):

```
011 1 408 556 7654
  1 408 556 7654
    408 556 7654
      556 7654
        6 7654
```

Best Match Based on the Number of Don't Care Digits

In the following example, suppose that you have an incoming call from one of those numbers (4085567654), and suppose that you configured the following numbers for callback on the router (disregarding for the moment the commands that can be used to configure callback):

```
556xxxx callback
555xxxx callback
559765x
5577654 callback
xxxxx
```

The first number listed is the best match for the incoming number (in the configured number, the three digits and four Xs all match the incoming number); the line indicates that callback is to be initiated. The last line has five Xs; it is not the best match for the calling number.

Note The last number in the list above allows calls from any other number to be accepted without callback. When you use such a line, you must make sure that the number of Xs in the line exceeds the number of Xs in any other line. In the last line above, five Xs are used; the other lines use at most four Xs.

The order of configured numbers is not important; the router searches the entire list and then determines the best match.

Best Match with No Callback Configured

In the following example, suppose that a call comes from the same number (4085567654) and only the following numbers are configured:

```
555xxxx callback
559765x
5577654 callback
xxxxx
```

In this case, the best match is in the final line listed, so the incoming call is accepted but callback is not initiated.

No Match Configured

In the following example, suppose that a call comes from the same number (4085567654) and only the following numbers are configured:

```
555xxxx callback
559765x
5577654 callback
```

In this case, there is no match at all, and the call is just rejected.

Simple Callback Examples

In the following example, callback calls will be made only to numbers in the 555 and 556 exchanges, but any other number can call in:

```
isdn caller 408555xxxx callback
isdn caller 408556xxxx callback
isdn caller xxxxxx
```

The following example configures the router to accept a call with a delivered caller ID equal to 415551234:

```
isdn caller 415551234
```

The following example configures the router to accept a call with a delivered caller ID equal to 4155512 with any digits in the last two positions:

```
isdn caller 4155512xx
```

The following example configures the router to make a callback to a delivered caller ID equal to 4155512 with any digits in the last two positions. (The router rejects the call initially, and then makes the callback.) The router accepts calls from any other numbers.

```
isdn caller 4155512xx callback
isdn caller xxx
```

ISDN Caller ID Callback with Dialer Profiles Example

The following example shows the configuration of a central site that can place or receive calls from three remote sites over four ISDN BRI lines. Each remote site is on a different IP subnet and has different bandwidth requirements. Therefore, three dialer interfaces and three dialer pools are defined.

```

! This is a Dialer Profile for reaching remote subnetwork 1.1.1.1.
interface Dialer1
 ip address 1.1.1.1 255.255.255.0
 encapsulation ppp
 dialer remote-name Smalluser
 dialer string 4540
 dialer pool 3
 dialer-group 1
 dialer caller 14802616900 callback
 dialer caller 1480262xxxx callback

!
! This is a Dialer Profile for reaching remote subnetwork 2.2.2.2.
interface Dialer2
 ip address 2.2.2.2 255.255.255.0
 encapsulation ppp
 dialer remote-name Mediumuser
 dialer string 5264540 class Eng
 dialer load-threshold 50 either
 dialer pool 1
 dialer-group 2
 dialer caller 14805364540 callback
 dialer caller 1480267xxxx callback
 dialer enable-timeout 2

!
! This is a Dialer Profile for reaching remote subnetwork 3.3.3.3.
interface Dialer3
 ip address 3.3.3.3 255.255.255.0
 encapsulation ppp
 dialer remote-name Poweruser
 dialer string 4156884540 class Eng
 dialer hold-queue 10
 dialer load-threshold 80
 dialer pool 2
 dialer-group 2

!
! This map class ensures that these calls use an ISDN speed of 56 kbps.
map-class dialer Eng
 isdn speed 56

!
interface bri 0
 encapsulation PPP
!BRI 0 has a higher priority than BRI 1 in dialer pool 1.
 dialer pool-member 1 priority 100
 ppp authentication chap

!
interface bri 1
 encapsulation ppp
 dialer pool-member 1 priority 50
 dialer pool-member 2 priority 50
!BRI 1 has a reserved channel in dialer pool 3; the channel remains inactive
!until BRI 1 uses it to place calls.
 dialer pool-member 3 min-link 1
 ppp authentication chap

!
interface bri 2
 encapsulation ppp

```

```
! BRI 2 has a higher priority than BRI 1 in dialer pool 2.
dialer pool-member 2 priority 100
ppp authentication chap
!
interface bri 3
encapsulation ppp
! BRI 3 has the highest priority in dialer pool 2.
dialer pool-member 2 priority 150
ppp authentication chap
```

ISDN Caller ID Callback with Legacy DDR Examples

This section provides two examples of caller ID callback with legacy DDR:

- Individual Interface Example
- Dialer Rotary Group Example

Individual Interface Example

The following example configures a BRI interface for legacy DDR and ISDN caller ID callback:

```
interface bri 0
description Connected to NTT 81012345678901
ip address 7.1.1.7 255.255.255.0
no ip mroute-cache
encapsulation ppp
isdn caller 81012345678902 callback
dialer enable-timeout 2
dialer map ip 7.1.1.8 name spanky 81012345678902
dialer-group 1
ppp authentication chap
```

Dialer Rotary Group Example

The following example configures BRI interfaces to connect into a rotary group (dialer-group) and then configures a dialer interface for that dialer-group. This configuration permits IP packets to trigger calls. The dialer interface is configured to initiate callback to any number in the 1-480-261 exchange and to accept calls from two other specific numbers.

```
interface bri 0
description connected into a rotary group
encapsulation ppp
dialer rotary-group 1
!
interface bri 1
no ip address
encapsulation ppp
dialer rotary-group 1
!
interface bri 2
encapsulation ppp
dialer rotary-group 1
!
interface bri 3
no ip address
encapsulation ppp
dialer rotary-group 1
!
interface bri 4
encapsulation ppp
```

```
dialer rotary-group 1
!
interface Dialer 0
description Dialer group controlling the BRIs
ip address 8.1.1.1 255.255.255.0
encapsulation ppp
dialer map ip 8.1.1.2 name angus 14802616900
dialer map ip 8.1.1.3 name moe 14802616901
dialer map ip 8.1.1.4 name larry 14807362060
dialer map ip 8.1.1.5 name curly 19165561424
dialer map ip 8.1.1.6 name shemp 12129767448
dialer-group 1
ppp authentication chap
!
dialer caller 1480261xxxx callback
dialer caller 19165561424
dialer caller 12129767448
!
dialer-list 1 protocol ip permit
```

