

# Configuring PPP Callback Over ISDN

Document ID: 9575

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## Introduction

This document provides a sample configuration for Point-to-Point Protocol (PPP) callback over Integrated Services Digital Network (ISDN). You can use Callback for:

- Consolidation and centralization of phone billing.
- Cost savings on toll calls.
- Access control.

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

The information in this document is based on these software and hardware versions:

- Cisco IOS® Software Release 11.0(3) or later.
- Cisco 3640 (maui-nas-04) with Cisco IOS Software Release 12.0(5)XK1.
- Cisco 1604 (maui-soho-01) with Cisco IOS Software Release 12.0(4)T.

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

### Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

# Background Information

In this sample configuration, callback uses PPP and the facilities that RFC 1570 specifies. ISDN PPP callback completion occurs in this order:

1. Router A brings up a circuit-switched connection to Router B.
2. Routers A and B negotiate PPP Link Control Protocol (LCP). Router A can request a callback or Router B can initiate a callback.
3. Router A authenticates itself to Router B through PPP Password Authentication Protocol (PAP) or Challenge Handshake Authentication Protocol (CHAP). Router B can optionally authenticate to Router A.
4. Both routers drop the circuit-switched connection.
5. Router B brings up a circuit-switched connection to Router A.

## Configure

In this section, you are presented with the information to configure the features described in this document.

**Note:** To find additional information on the commands used in this document, use the Command Lookup tool

## Network Diagram

This document uses this network setup:



## Configurations

This document uses these configurations:

- maui-soho-01: callback client
- maui-nas-04: callback server

maui-soho-01: callback client
<pre>version 12.0 no service pad service timestamps debug datetime msec service timestamps log datetime msec no service password-encryption ! hostname maui-soho-01 ! aaa new-model aaa authentication login default local aaa authentication ppp default local  !---- Basic AAA configuration for PPP calls.  !</pre>

```

username maui-nas-04 password 0 happy

!--- Username for remote router (maui-nas-04) and shared secret password.
!--- Shared secret (for CHAP authentication) must be the same on both sides.

username admin password 0 <deleted>
!
ip subnet-zero
!
isdn switch-type basic-ni
!
interface Ethernet0
 ip address 172.22.85.1 255.255.255.0
 no ip directed-broadcast
!
interface BRI0
 ip address 172.22.82.2 255.255.255.0
 no ip directed-broadcast
 encapsulation ppp
 dialer map ip 172.22.82.1 name maui-nas-04 20007

!--- Dialer map statements for the remote router.
!--- The name must match the name that the remote router uses to identify itself.

dialer-group 1

!--- Apply interesting traffic definition from dialer-list 1.

 isdn switch-type basic-ni
 isdn spid1 20009
 ppp callback request

!--- Request PPP callback from the server.

 ppp authentication chap

!--- Use CHAP authentication.

!
no ip http server
ip classless
ip route 172.22.80.0 255.255.255.0 172.22.82.1
!
dialer-list 1 protocol ip permit

!--- Interesting traffic definition.
!--- Apply this to BRI0 with dialer-group 1.

line con 0
 transport input none
 stopbits 1
line vty 0 4
!
end

```

#### maui-nas-04: callback server

```

version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname maui-nas-04
!
aaa new-model

```

```
aaa authentication login default local
aaa authentication ppp default local
!
username admin password <deleted>
username maui-soho-01 password happy

!--- Username for remote router (maui-soho-01) and shared secret password.
!--- Shared secret(for CHAP authentication) must be the same on both sides.

!
ip subnet-zero
no ip domain-lookup
!
isdn switch-type basic-ni
!
process-max-time 200
!
interface Ethernet0/0
 ip address 172.22.80.4 255.255.255.0
 no ip directed-broadcast
!
interface BRI1/1
 no ip address
 no ip directed-broadcast
 encapsulation ppp
 dialer rotary-group 10

!--- Assign BRI 1/1 to the rotary-group 10.
!--- Rotary-group properties are defined in interface Dialer 10.

 isdn switch-type basic-ni
 isdn spid1 20007
!
interface dialer10

!--- Interface for the dialer rotary-group 10 configuration.

 ip address 172.22.82.1 255.255.255.0
 no ip directed-broadcast
 encapsulation ppp
 dialer in-band
 dialer callback-secure

!--- Disconnect calls that are not properly configured for callback.
!--- Disconnects any unconfigured dial-in users.

dialer map ip 172.22.82.2 name maui-soho-01 class dial1 20009

!--- Dialer map statements for the callback.
!--- The name must match the name that the remote router uses to identify itself.
!--- Use map-class dialer dial1 for this connection.

dialer-group 1
 ppp callback accept

!--- Allows the interface to accept a callback request to a remote host.

 ppp authentication chap
!
ip classless
ip route 172.22.85.0 255.255.255.0 172.22.82.2
no ip http server
!
map-class dialer dial1

!--- The dialer map statement uses this map class for the callback.
```

```
dialer callback-server username

!--- Use authenticated username to identify return call dial string.

dialer-list 1 protocol ip permit
!
line con 0
  transport input none
line 65 70
line aux 0
line vty 0 4
!
end
```

## Verify

This section provides information you can use to confirm your configuration is working properly.

Certain **show** commands are supported by the Output Interpreter tool, which allows you to view an analysis of **show** command output.

- **show dialer interface type number** displays general diagnostic information for interfaces that you configure for dial-on-demand routing (DDR). The source and destination addresses of the packet that initiated the dialing are shown in the dial reason line. This command also displays the connection timers.
- **show isdn status** ensures that the router properly communicates with the ISDN switch. In the output, verify that Layer 1 Status is ACTIVE, and that the Layer 2 Status state = MULTIPLE\_FRAME\_ESTABLISHED appears. This command also displays the number of active calls.
- **dialer enable-timeout seconds** enables the timeout of the callback server, and determines the time between call disconnect and callback initiation.
- **dialer hold-queue** allows the callback client and server to hold packets destined to the remote destination until the connection is made.

## Troubleshoot

This section provides information you can use to troubleshoot your configuration.

### Troubleshooting Commands

Certain **show** commands are supported by the Output Interpreter tool, which allows you to view an analysis of **show** command output.

**Note:** Before issuing **debug** commands, please see Important Information on Debug Commands.

- **debug ppp [ packet / negotiation / error / authentication ]** displays information on traffic and exchanges in an internetwork that implements PPP.
  - ◆ **packet** displays PPP packets being sent and received. (This command displays low-level packet dumps.)
  - ◆ **negotiation** displays PPP packets transmitted during PPP startup, where PPP options are negotiated.
  - ◆ **error** displays protocol errors and error statistics associated with PPP connection negotiation and operation.

- ◆ **authentication** displays authentication protocol messages, and includes Challenge Handshake Authentication Protocol (CHAP) packet exchanges and Password Authentication Protocol (PAP) exchanges.
- **debug isdn q931** shows call setup and tear down of the ISDN network connection (Layer 3).
- **debug isdn q921** shows data link layer messages (Layer 2) on the D channel between the router and the ISDN switch. Use this **debug** command if the **show isdn status** command does not display Layer 1 and Layer 2 up.
- **debug dialer [ events / packets ]** displays DDR debugging information about the packets received on a dialer interface.

## Sample debug Output

```

!--- maui-soho-01 (callback client:172.22.82.2) pings maui-nas-04.
!--- (Callback server:172.22.80.4 - Ethernet interface).
!--- and starts the callback process.
!--- Debugs are collected on maui-soho-01.

maui-soho-01#debug dialer events
maui-soho-01#show debugging
Dial on demand:
  Dial on demand events debugging is on
maui-soho-01#ping 172.22.80.4
  Type escape sequence to abort.
  Sending 5, 100-byte ICMP Echos to 172.22.80.4, timeout is 2 seconds:
  *Mar 8 23:13:02.117: BRI0 DDR: Dialing cause ip (s=172.22.82.2, d=172.22.80.4)
  *Mar 8 23:13:02.117: BRI0 DDR: Attempting to dial 20007
  *Mar 8 23:13:02.333: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up
  *Mar 8 23:13:02.353: isdn_call_connect: Calling lineaction of BRI0:1
  *Mar 8 23:13:02.417: BRI0:1 DDR: Callback negotiated - waiting for
    server disconnect
  *Mar 8 23:13:02.493: %LINK-3-UPDOWN: Interface BRI0:1, changed state to down.
  *Mar 8 23:13:02.509: DDR: Callback client for maui-nas-04 20007 created
  *Mar 8 23:13:02.509: isdn_call_disconnect: Calling lineaction of BRI0:1
  *Mar 8 23:13:02.513: BRI0:1 DDR: disconnecting call....
  Success rate is 0 percent (0/5)

!--- A few seconds later, maui-soho-01 receives the callback from maui-nas-04.

maui-soho-01#
  *Mar 8 23:13:17.537: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up
  *Mar 8 23:13:17.553: isdn_call_connect: Calling lineaction of BRI0:1
  *Mar 8 23:13:19.697: BRI0:1 DDR: No callback negotiated
  *Mar 8 23:13:19.717: BRI0:1 DDR: dialer protocol up
  *Mar 8 23:13:19.717: BRI0:1 DDR: Callback received from maui-nas-04 20007
  *Mar 8 23:13:19.721: DDR: Freeing callback to maui-nas-04 20007
  *Mar 8 23:13:20.697: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1,
    changed state to up
  *Mar 8 23:13:23.553: %ISDN-6-CONNECT: Interface BRI0:1 is now connected to
    20007 maui-nas-04

!--- Verifies that the connection was successful

maui-soho-01#ping 172.22.80.4
  Type escape sequence to abort.
  Sending 5, 100-byte ICMP Echos to 172.22.80.4, timeout is 2 seconds:
  !!!!!
  Success rate is 100 percent (5/5), round-trip min/avg/max = 36/36/36 ms

```

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## Related Information

- [Async–PPP Callback Between an Access Server and a PC](#)
  - [EXEC Callback](#)
  - [Configuring PPP Callback for DDR](#)
  - [Configuring ISDN Caller ID Callback](#)
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Updated: Nov 03, 2005

Document ID: 9575

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