sco – Using the show isdn status Command for BRI Troublesho

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Using the show isdn status Command for BRI Troubleshooting

Introduction

Note: The information in this document is based on Cisco IOS® Software Release 12.0.

This document explains troubleshooting Integrated Services Digital Network (ISDN) using the **show isdn status** command to verify that ISDN BRI Layer 1 is ACTIVE, LAYER 2 State is MULTIPLE_FRAME_ESTABLISHED, and the service profile identifiers (SPIDs) are valid. If all of these conditions are satisfied, your problem is not likely to be an ISDN layer 1 or layer 2 problem, and you should refer to Troubleshooting ISDN BRI Layer 3 using the **debug isdn q931** Command for further troubleshooting. Continue with this document for a thorough explanation of how to use the **show isdn status** command to isolate the problem. However, if you have used the **show isdn status** command and have isolated the problem to one of the symptoms shown below, you can go directly to that section for troubleshooting and configuration resources.

- Layer 1 Status: DEACTIVATED

- Layer 2 Status: Layer 2 NOT Activated

- Spid Status: spid *number* NOT valid

- Layers 1 and 2 are Active; SPIDs are Valid

- Configuring ISDN BRI with DDR Dialer Profiles

- Configuring BRI–to–BRI Dialup with DDR Dialer Maps

The **show isdn status** command displays the status of all ISDN interfaces or a specific ISDN interface. When troubleshooting ISDN Basic Rate Interface (BRI), it is necessary to first determine if the router can properly communicate with the telco ISDN switch. Once this has been verified, you can proceed on to higher level troubleshooting issues such as dialer interfaces, interesting traffic definitions, PPP negotiation, and authentication failures.

Note: In certain parts of the world (notably in Europe) telco ISDN switches may deactivate Layer 1 or 2 when there are no active calls. Hence, when there are no active calls, **show isdn status** will indicate the Layer 1 and 2 are down. But when a call occurs Layers 1 and 2 will be brought up. Make a test BRI call to verify whether the BRI is functioning. If the call succeeds, then you need no further ISDN troubleshooting.

BRI Configuration

The configuration necessary for the router to communicate with the telco ISDN switch is fairly simple.

1.
   You must have the switch type correctly configured for the BRI interface. Contact the telco to find out your circuit switch type.

2.
   You may be required to have Service Profile IDentifiers (SPIDs) configured. If you are connecting to a DMS−100 or NI−1 switch, you will most likely need to configure spids. Most 5ess switches don't require spids, However, always contact your telco to determine if you need to configure the spids and what they are. For more information on SPID formats, refer to Known SPID Formats.

   Note: If the telco informs you that spids are not required, then configure the interface as normal, skipping the **isdn spid1** and **isdn spid2** commands.

A typical BRI interface configuration section, just sufficient to allow the router to properly establish connectivity to the telco ISDN switch, is provided below.

```
interface BRI0

isdn switch-type basic-ni

isdn spid1 51255544440101 5554444

isdn spid2 51255544450101 5554445
```

Note: The above configuration does not have all the necessary commands to permit the router to send or receive calls. Refer to Configuring ISDN DDR with Dialer Profiles or Configuring BRI−to−BRI Dialup with DDR Dialer Maps for more information on configuring the router to send and receive calls.

Understanding the `show isdn status` Output

The **show isdn status** output shown below is an example of a properly functioning BRI circuit. In the following example, Layer 1 is MULTIPLE_FRAME_ESTABLISHED , the Terminal Endpoint Identifiers (TEIs) have been successfully negotiated, and ISDN Layer 3 (end−to−end) is ready to make or receive calls. The items you should pay attention to are linked to each corresponding field in the table shown below.

```
maui-nas-01#show isdn status
The current ISDN Switchtype = basic-ni1
ISDN BRI0 interface
Layer 1 Status:
ACTIVE
Layer 2 Status:
TEI = 109, State = MULTIPLE_FRAME_ESTABLISHED
TEI = 110, State = MULTIPLE_FRAME_ESTABLISHED
Spid Status:
TEI 109, ces = 1, state = 8(established)
spid1 configured, spid1 sent, spid1 valid
```

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```
Endpoint ID Info: epsf = 0, usid = 1, tid = 1
TEI 110, ces = 2, state = 8(established)
spid2 configured, spid2 sent, spid2 valid
Endpoint ID Info: epsf = 0, usid = 3, tid = 1
Layer 3 Status:
0 Active Layer 3 Call(s)
Activated dsl 0 CCBs = 0
Total Allocated ISDN CCBs = 0
```

Table: Show ISDN Status Field Descriptions

Field	Description
Switchtype	
Layer 1 Status	
ACTIVE	Layer 1 Status: Verifies physical layer connectivity with the telco ISDN switch. The most common states are ACTIVE or DEACTIVATED. Some of the other Layer 1 states are: GOINGDOWN INIT TESTING RESET DELEATED (sic) SHUTDOWN ACTIVATING ACTIVE_ErrorInd Most of the above Layer 1 states are temporary. Use the command **clear interface bri** *number* to clear them. If those states persist for extended periods contact the telco for further troubleshooting. If the Layer 1 status is not ACTIVE, refer to Troubleshooting BRI Layer 1.
Layer 2 Status	

TEI = 109,state = MULTIPLE_FRAME_ESTABLISHED TEI = 110, state = MULTIPLE_FRAME_ESTABLISHED	Status of ISDN Layer 2 with Terminal Endpoint Identifier (TEI) number and multiframe structure state. The valid TEI number range is 64 to 126. The most often seen Layer 2 states are MULTIPLE_FRAME_ESTABLISHED and TEI_ASSIGNED. A state=MULTIPLE_FRAME_ESTABLISHED indicates there is data link connectivity to the telco ISDN switch. This is the state that you should see under normal operations. Any other state usually indicates a problem on the circuit. A state=TEI_ASSIGNED indicates that the router has lost connectivity to the switch. This is normal if the telco (commonly in Europe) deactivates Layers 1 and 2 when there are no active calls. If this is not the case, proceed to Troubleshooting BRI Layer 2 for more information on Layer 2 issues. Refer to Annex B in the ITU Q.921 specifications for more information on all the other possible Layer 2 states such as: TEI_UNASSIGNED ASSIGN_AWAITING_TEI ESTABLISH_AWAITING_TEI AWAITING_ESTABLISHMENT AWAITING_RELEASE TIMER_RECOVERY The above states are often temporary. Use the command **clear interface bri** *number* to restablish Layer 2 connectivity. If those states persist for extended periods use the **debug isdn q921** command for further troubleshooting. A Layer 2 Status of down is indicated by **Layer 2 NOT Activated.** Refer to Troubleshooting BRI Layer 2 for more information on Layer 2 issues.
Spid Status	
TEI 109, ces = 1, state = 8(established)	Terminal Endpoint Identifier (TEI) number and state. Valid dynamic TEI assignment range is 64–126. The most common state values are: state = 1(terminal down) state = 3(await establishment) state = 5(init)

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	state = 6(not initialized) state = 8(established) Only states 5(init) and 8(established) indicate a working BRI circuit. The other states mean the circuit is not properly established.
spid1 configured, spid1 sent, spid1 valid	Spid configuration information for a working BRI. In this example, the spid is valid. Other commonly observed states are: spid1 configured, no LDN, spid1 sent, spid1 valid spid1 NOT configured, spid1 NOT sent, spid1 NOT valid spid1 configured, spid1 NOT sent, spid1 NOT valid spid1 configured, spid1 sent, spid1 NOT valid The last 3 states indicate that either the spid was not configured or that it is incorrect.
Endpoint ID Info: epsf = 0, **usid = 1, tid = 1** Endpoint ID Info: epsf = 0, **usid = 3, tid = 1**	Endpoint identifier information that can be used by the router to decide which channel will answer the call. The message **ENDPOINT ID** in the incoming **debug isdn q931** can be associated to the usid and tid. Refer to Configuring SPIDs for Multiple BRIs in a Hunt group for more information. usid – User Service IDentifier tid – Terminal Identifier
Layer 3 Status:	
0 Active Layer 3 Call(s)	Number of active calls.
Activated dsl 0 CCBs = 0	Number of the Digital Signal Link activated. Number of call control blocks in use.
CCB:callid=27, callref=0, sapi=0, ces=1, B−chan=1	Information about the active call. This line will not appear until a call is connected. For a connected call, it displays the caller id information, call reference, and the B−channel it is occupying.
Number of active calls =	Number of active calls. For a BRI this can be a maximum of 2. This line may not appear until a call is connected.
Number of available B−channels =	Number of B channels that are not being used. This line may not appear until a call is connected.
Total Allocated ISDN CCBs =	Number of ISDN call control blocks that are allocated.

Layer 1 Physical Layer Deactivated –Example

The example below shows BRI layers 1 and 2 down. The common reasons are that the bri interface is shut or there is bad cabling. However, to properly troubleshoot this, refer to **Troubleshooting ISDN BRI Layer 1**.

```
superchicken#show isdn status
Global ISDN Switchtype = basic-ni
ISDN BRI0 interface dsl 0, interface ISDN Switchtype = basic-ni
Layer 1 Status:
DEACTIVATED
! -- Layer 1 is down
Layer 2 Status:
Layer 2 NOT Activated
! -- Layer 2 is down
Spid Status:
TEI Not Assigned, ces = 1, state = 3(await establishment)
spid1 configured, spid1 NOT sent, spid1 NOT valid
TEI Not Assigned, ces = 2, state = 1(terminal down)
spid2 configured, spid2 NOT sent, spid2 NOT valid
Layer 3 Status:
0 Active Layer 3 Call(s)
Activated dsl 0 CCBs = 0
The Free Channel Mask: 0x80000003
Total Allocated ISDN CCBs = 0
superchicken#
```

Layer 2 : NOT Activated –Example

The example below shows that BRI layer 1 is up while Layer 2 is down. Refer to **Troubleshooting BRI Layer 2** for more information on correcting this issue.

```
superchicken#show isdn status
Global ISDN Switchtype = basic-ni
ISDN BRI0 interface
dsl 0, interface ISDN Switchtype = basic-ni
Layer 1 Status:
ACTIVE
! -- Layer 1 is up
Layer 2 Status:
Layer 2 NOT Activated
! -- Layer 2 is down
Spid Status:
TEI Not Assigned, ces = 1, state = 3(await establishment)
spid1 configured, spid1 NOT sent, spid1 NOT valid
TEI Not Assigned, ces = 2, state = 1(terminal down)
spid2 configured, spid2 NOT sent, spid2 NOT valid
Layer 3 Status:
TWAIT timer active
0 Active Layer 3 Call(s)
Activated dsl 0 CCBs = 0
The Free Channel Mask: 0x80000003
Total Allocated ISDN CCBs = 0
superchicken#
```

Invalid SPIDs – Example

The examples below show that Layer 1 is up and Layer 2 is down due to invalid SPIDs If you configure the SPIDs correctly, this error should be resolved. Refer to **Troubleshooting ISDN BRI SPID** for more information.

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```
checker#show isdn status
Global ISDN Switchtype = basic-ni
ISDN BRI0 interface
dsl 0, interface ISDN Switchtype = basic-ni
!-- interface switch type
Layer 1 Status:
ACTIVE
!-- Layer 1 is up.
Layer 2 Status:
Layer 2 NOT Activated
!-- Layer 2 is not up
TEI Not Assigned, ces = 1, state = 3(await establishment)
spid1 configured, spid1 NOT sent, spid1 NOT valid
!-- spid was configured but not sent
TEI Not Assigned, ces = 2, state = 1(terminal down)
spid2 configured, spid2 NOT sent, spid2 NOT valid
Layer 3 Status:
TWAIT timer active
0 Active Layer 3 Call(s)
Activated dsl 0 CCBs = 0
The Free Channel Mask: 0x80000003
Total Allocated ISDN CCBs = 0
```

The following output shows an example where only one of the spids on the BRI interface was configured incorrectly. Even in such a case, the BRI circuit is not considered fully operational since neither TEI state is established.

```
maui-soho-02#show isdn status
Global ISDN Switchtype = basic-ni
ISDN BRI0 interface
dsl 0, interface ISDN Switchtype = basic-ni
!-- interface switch type
Layer 1 Status:
ACTIVE
Layer 2 Status:
TEI = 73, Ces = 2, SAPI = 0, State = TEI_ASSIGNED
TEI = 104, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED
!-- indicates the circuit is partially up, hence this is probably
!-- a configuration issue
Spid Status:
TEI 104, ces = 1, state = 6(not initialized)
!-- TEI is down
spid1 configured, spid1 sent, spid1 NOT valid
!-- spid 1 is NOT configured correctly
TEI 73, ces = 2, state = 1(terminal down)
!-- TEI is down
spid2 configured, spid2 sent, spid2 valid
!-- spid 2 is configured correctly
Endpoint ID Info: epsf = 0, usid = 1, tid = 1
Layer 3 Status:
0 Active Layer 3 Call(s)
Activated dsl 0 CCBs = 0
The Free Channel Mask: 0x80000003
Total Allocated ISDN CCBs = 0
```

Related Information

- **Troubleshooting ISDN BRI Layer 1**
- **Troubleshooting BRI Layer 2**
- **Troubleshooting ISDN BRI SPIDs**
- **Troubleshooting ISDN BRI Layer 3 using the `debug isdn q931` Command**

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- **Dialup Technology: Troubleshooting Techniques**
- **Access−Dial Technical Tips**
- **Access−Dial Top Issues**
- **Access Products Support Page**
- **Access Technology Support Page**