



# Debug Commands

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This chapter contains an alphabetical listing of the **debug** commands and their descriptions. Documentation for each command includes a brief description of its use, command syntax, usage guidelines, sample output, and a description of that output.

Output formats vary with each **debug** command. Some commands generate a single line of output per packet, whereas others generate multiple lines of output per packet. Some generate large amounts of output; others generate only occasional output. Some generate lines of text, and others generate information in field format. Thus, the way **debug** command output is documented also varies. For example, the output for **debug** commands that generate lines of text is usually described line by line, and the output for **debug** commands that generate information in field format is usually described in tables.

By default, the network server sends the output from the **debug** commands to the console. Sending output to a terminal (virtual console) produces less overhead than sending it to the console. Use the privileged EXEC command **terminal monitor** to send output to a terminal. For more information about redirecting output, see the “Using Debug Commands” chapter.

## debug aaa accounting

Use the **debug aaa accounting** EXEC command to display information on accountable events as they occur. Use the **no** form of the command to disable debugging output.

**[no] debug aaa accounting**

### Usage Guidelines

The information displayed by the **debug aaa accounting** command is independent of the accounting protocol used to transfer the accounting information to a server. Use the **debug tacacs** and **debug radius** protocol specific commands to get more detailed information about protocol-level issues.

You can also use the **show accounting** command to step through all active sessions and to print all the accounting records for actively accounted functions. The **show accounting** command allows you to display the active “accountable events” on the system. It provides systems administrators a quick look at what is going on, and may also be useful for collecting information in the event of a data loss of some kind on the accounting server. The **show accounting** command displays additional data on the internal state of the Authentication, Authorization, and Accounting (AAA) security system if **debug aaa accounting** is turned on as well.

### Sample Display

The following is sample output from the **debug aaa accounting** command:

```
Router# debug aaa accounting

16:49:21: AAA/ACCT: EXEC acct start, line 10
16:49:32: AAA/ACCT: Connect start, line 10, glare
16:49:47: AAA/ACCT: Connection acct stop:
task_id=70 service=exec port=10 protocol=telnet address=172.31.3.78 cmd=glare
bytes_in=308 bytes_out=76 paks_in=45 paks_out=54 elapsed_time=14
```

### Related Commands

- debug aaa authentication**
- debug aaa authorization**
- debug radius**
- debug tacacs**

## debug aaa authentication

Use the **debug aaa authentication EXEC** command to display information on AAA/Terminal Access Controller Access Control System Plus (TACACS+) authentication. Use the **no** form of the command to disable debugging command.

**[no] debug aaa authentication**

### Usage Guidelines

Use this command to see what methods of authentication are being used and what the results of these methods are.

### Sample Display

The following is sample output from the **debug aaa authentication** command. A single EXEC login that uses the “default” method list and the first method, TACACS+, is displayed. The TACACS+ server sends a GETUSER request to prompt for the username and then a GETPASS request to prompt for the password, and finally a PASS response to indicate a successful login. The number 50996740 is the session ID, which is unique for each authentication. Use this ID number to distinguish between different authentications if several are occurring concurrently.

```
Router# debug aaa authentication

6:50:12: AAA/AUTHEN: create_user user='' ruser='' port='tty19' rem_addr='172.31.60.15'
authen_type=1 service=1 priv=1
6:50:12: AAA/AUTHEN/START (0): port='tty19' list='' action=LOGIN service=LOGIN
6:50:12: AAA/AUTHEN/START (0): using "default" list
6:50:12: AAA/AUTHEN/START (50996740): Method=TACACS+
6:50:12: TAC+ (50996740): received authen response status = GETUSER
6:50:12: AAA/AUTHEN (50996740): status = GETUSER
6:50:15: AAA/AUTHEN/CONT (50996740): continue_login
6:50:15: AAA/AUTHEN (50996740): status = GETUSER
6:50:15: AAA/AUTHEN (50996740): Method=TACACS+
6:50:15: TAC+: send AUTHEN/CONT packet
6:50:15: TAC+ (50996740): received authen response status = GETPASS
6:50:15: AAA/AUTHEN (50996740): status = GETPASS
6:50:20: AAA/AUTHEN/CONT (50996740): continue_login
6:50:20: AAA/AUTHEN (50996740): status = GETPASS
6:50:20: AAA/AUTHEN (50996740): Method=TACACS+
6:50:20: TAC+: send AUTHEN/CONT packet
6:50:20: TAC+ (50996740): received authen response status = PASS
6:50:20: AAA/AUTHEN (50996740): status = PASS
```

## debug aaa authorization

Use the **debug aaa authorization** EXEC command to display information on AAA/TACACS+ authorization. Use the **no** form of the command to disable debugging output.

**[no] debug aaa authorization**

### Usage Guidelines

Use this command to see what methods of authorization are being used and what the results of these methods are.

### Sample Display

The following is sample output from the **debug aaa authorization** command. In this display, an EXEC authorization for user “carrel” is performed. On the first line, the username is authorized. On the second and third lines, the AV (attribute value) pairs are authorized. The debug output displays a line for each attribute value pair that is authenticated. Next, the display indicates the authorization method used. The final line in the display indicates the status of the authorization process, in this case, a failure.

```
Router# debug aaa authorization

2:23:21: AAA/AUTHOR (0): user='carrel'
2:23:21: AAA/AUTHOR (0): send AV service=shell
2:23:21: AAA/AUTHOR (0): send AV cmd*
2:23:21: AAA/AUTHOR (342885561): Method=TACACS+
2:23:21: AAA/AUTHOR/TAC+ (342885561): user=carrel
2:23:21: AAA/AUTHOR/TAC+ (342885561): send AV service=shell
2:23:21: AAA/AUTHOR/TAC+ (342885561): send AV cmd*
2:23:21: AAA/AUTHOR (342885561): Post authorization status = FAIL
```

The **aaa authorization** command causes a request packet containing a series of attribute value pairs to be sent to the TACACS daemon as part of the authorization process. The daemon responds in one of the following three ways:

- Accepts the request as is
- Makes changes to the request
- Refuses the request, thereby refusing authorization

Table 2 describes attribute value pairs associated with the **aaa authorization** command that may show up in the debug output.

**Table 2** Attribute Value Pairs for Authorization

Attribute Value	Description
service=arap	Authorization for AppleTalk Remote Access is being requested.
service=shell	Authorization for EXEC startup and command authorization is being requested.
service=ppp	Authorization for PPP is being requested.
service=slip	Authorization for SLIP is being requested.
protocol=lcp	Authorization for LCP is being requested (lower layer of PPP).
protocol=ip	Used with service=slip and service=slip to indicate which protocol layer is being authorized.
protocol=ipx	Used with service=ppp to indicate which protocol layer is being authorized.
protocol=atalk	Used with service=ppp or service=arap to indicate which protocol layer is being authorized.
protocol=vines	Used with service=ppp for VINES over PPP.
protocol=unknown	Used for undefined or unsupported conditions.
cmd=x	Used with service=shell, if cmd=NULL, this is an authorization request to start an EXEC. If cmd is not NULL, this is a command authorization request and will contain the name of the command being authorized. For example, cmd=telnet.
cmd-arg=x	Used with service=shell. When performing command authorization, the name of the command is given by a cmd=x pair for each argument listed. For example, cmd-arg=archie.sura.net.
acl=x	Used with service=shell and service=arap. For ARA, this pair contains an access list number. For service=shell, this pair contains an access class number. For example, acl=2.
inacl=x	Used with service=ppp and protocol=ip. Contains an IP input access list for SLIP or PPP/IP. For example, inacl=2.
outacl=x	Used with service=ppp and protocol=ip. Contains an IP output access list for SLIP or PPP/IP. For example, outacl=4.
addr=x	Used with service=slip, service=ppp, and protocol=ip. Contains the IP address that the remote host should use when connecting via SLIP or PPP/IP. For example, addr=172.30.23.11.
routing=x	Used with service=slip, service=ppp, and protocol=ip. Equivalent in function to the /routing flag in SLIP and PPP commands. Can either be true or false. For example, routing=true.
timeout=x	Used with service=arap. The number of minutes before an ARA session disconnects. For example, timeout=60.
autocmd=x	Used with service=shell and cmd=NULL. Specifies an autocommand to be executed at EXEC startup. For example, autocmd=telnet foo.com.
noescape=x	Used with service=shell and cmd=NULL. Specifies a noescape option to the username configuration command. Can be either true or false. For example, noescape=true.
nohangup=x	Used with service=shell and cmd=NULL. Specifies a nohangup option to the username configuration command. Can be either true or false. For example, nohangup=false.
priv-lvl=x	Used with service=shell and cmd=NULL. Specifies the current privilege level for command authorization as a number from 0 to 15. For example, priv-lvl=15.

**Table 2            Attribute Value Pairs for Authorization (Continued)**

<b>Attribute Value</b>	<b>Description</b>
zonelist= <i>x</i>	Used with service=arap. Specifies an AppleTalk zonelist for ARA. For example, zonelist=5.
addr-pool= <i>x</i>	Used with service=ppp and protocol=ip. Specifies the name of a local pool from which to get the address of the remote host.

## debug alps ascu

Use the **debug alps ascu** EXEC command to enable debugging for ALPS ASCUs. Use the **no** form of this command to disable debugging.

```
[no] debug alps ascu {event | packet | detail | all} [interface-id]
```

### Syntax Description

<b>event</b>	Displays ALC abnormal events or protocol errors.
<b>packet</b>	Displays transmitted or received packets.
<b>detail</b>	Displays all ALC protocol events.
<b>all</b>	Enables event, packet, and detail debugging.
<i>interface-id</i>	(Optional) Enables debugging for a specified ASCU.

### Default

If no ASCU is specified, debugging is enabled for all ASCUs.

### Usage Guidelines

To enable debugging for a group of ASCUs, enter a separate command for each ASCU interface and IA combination.

### Sample Display

The following is sample output from the **debug alps ascu** command, showing abnormal events or protocol errors for ASCU 42 on interface Serial7:

```
alps-rcpe#debug alps ascu event Serial7 42
ALPS ASCU: T1 expired for ascu 42 on i/f Serial7
ALPS ASCU: DOWN event while UP for ascu 42 on i/f Serial7 : C1 count = 1
```

The following is sample output from the **debug alps ascu** command, showing all protocol events for ASCU 42 on interface Serial6:

```
alps-rcpe#debug alps ascu detail Serial6 42
ALPS ASCU: TX ALC POLL MSG to ascu 42 on i/f Serial6
ALPS ASCU: RX ALC GO AHD MSG from ascu 42 on i/f Serial6
ALPS ASCU: TX ALC POLL MSG to ascu 42 on i/f Serial6
ALPS ASCU: RX ALC GO AHD MSG from ascu 42 on i/f Serial6
ALPS ASCU: TX ALC POLL MSG to ascu 42 on i/f Serial6
ALPS ASCU: RX ALC DATA MSG (14 bytes + CCC) from ascu 42 on i/f Serial6, fwdRTP_AX25
ALPS ASCU: RX ALC GO AHD MSG from ascu 42 on i/f Serial6
ALPS ASCU: TX ALC DATA MSG (14 bytes + CCC) to ascu 42 on i/f Serial6
ALPS ASCU: TX ALC POLL MSG to ascu 42 on i/f Serial6
```

The following is sample output from the **debug alps ascu** command, showing all packets transmitted or received for ASCU 42 on interface Serial6:

```
alps-rcpe#debug alps ascu packet Serial6 42
ALPS ASCU: TX ALC SERVICE MSG (18 bytes + CCC) to ascu 42 on i/f Serial6
0405B530:                02321D26 0C261616
0405B540: 140C0D18 26163135 0611C6
```

```
ALPS ASCU: RX ALC DATA MSG (14 bytes + CCC) from ascu 42 on i/f Serial6, fwd ckt  
RTP_AX25  
040730B0:                42607866 65717866  
040730C0: 65717966 755124  
ALPS ASCU: TX ALC DATA MSG (14 bytes + CCC) to ascu 42 on i/f Serial6  
0405B540:                022038 26253138  
0405B550: 26253139 263511E4
```

## debug alps circuit event

Use the **debug alps circuit event** EXEC command to enable event debugging for ALPS circuits. Use the **no** form of this command to disable debugging.

**[no] debug alps circuit event** [*name*]

### Syntax Description

*name* (Optional) Enables debugging for a specific circuit.

### Default

If no circuit name is specified, then debugging is enabled for every ALPS circuit.

### Usage Guidelines

To enable debugging for a single ALPS circuit, specify the name of the circuit. To enable debugging for a group of circuits, enter a separate command for each circuit name.

### Sample Display

The following is sample output from the **debug alps circuit event** command for circuit RTP\_AX25:

```
alps-rcpe#debug alps circuit event RTP_AX25
ALPS P1024 CKT: FSM - Ckt= RTP_AX25, State= OPEN, Event= DISABLE:
(CloseAndDisable)->DISC
ALPS P1024 CKT: FSM - Ckt= RTP_AX25, State= DISC, Event= ENABLE:
(TmrStartNullRetry)->INOP
ALPS P1024 CKT: Ckt= RTP_AX25, Open - peer set to 200.100.40.2
ALPS P1024 CKT: Ckt= RTP_AX25, Open - peer open.
ALPS P1024 CKT: FSM - Ckt= RTP_AX25, State= INOP, Event= RETRY_TIMEOUT:
(Open)->OPNG
ALPS P1024 CKT: FSM - Ckt= RTP_AX25, State= OPNG, Event= CKT_OPEN_CFM:
(CacheAndFwdAscuData)->OPEN

alps-ccpe#debug alps circuit event RTP_AX25
ALPS AX.25 FSM: Ckt= RTP_AX25, State= OPEN, Event= CktClose, Rsn= 12:
(PvcKill,CktRemove,TmrStartClose)->INOP
ALPS AX.25 FSM: Ckt= RTP_AX25, State= INOP, Event= X25PvcInact, Rsn= 0:
(-,-,-)->INOP
ALPS AX.25 FSM: Ckt= RTP_AX25, State= INOP, Event= X25VcDeleted, Rsn= 0:
(-, CktDestroy,TmrStop)->INOP
ALPS AX.25 FSM: Ckt= RTP_AX25, State= INOP, Event= CktOpReq, Rsn= 4:
(PvcMake,CktAdd,TmrStartOpen)->OPNG
ALPS AX.25 FSM: Ckt= RTP_AX25, State= OPNG, Event= X25ResetTx, Rsn= 0:
(-,-,-)->OPNG
ALPS AX.25 FSM: Ckt= RTP_AX25, State= OPNG, Event= X25VcUp, Rsn= 0:
(-,OpnCfm,TmrStop)->OPEN
```

## debug alps peer event

Use the **debug alps peer event** EXEC command to enable event debugging for ALPS peers. Use the **no** form of this command to disable debugging.

**[no] debug alps peer event** *ip-address*

### Syntax Description

*ip-address* (Optional) Peer IP address.

### Default

If no IP address is specified, then debugging is enabled for every peer connection.

### Usage Guidelines

To enable debugging for a single remote ALPS peer, specify the peer IP address.

To enable debugging for a set of remote peers, enter the command for each peer IP address.

### Sample Display

The following is sample output from the **debug alps peer event** command:

```
alps-ccpe#debug alps peer event
ALPS PEER: FSM - Peer 200.100.25.2, Event ALPS_CLOSED_IND, State OPENED
ALPS PEER: peer 200.100.25.2 closed - closing peer circuits.
ALPS PEER: Promiscuous peer created for 200.100.25.2
ALPS PEER: TCP Listen - passive open 200.100.25.2(11003) -> 10000
ALPS PEER: FSM - Peer 200.100.25.2, Event ALPS_OPEN_IND, State DISCONN
ALPS PEER: peer 200.100.25.2 opened OK.
```

## debug apple arp

Use the **debug apple arp** EXEC command to enable debugging of the AppleTalk Address Resolution Protocol (AARP). The **no** form of this command disables debugging output.

```
[no] debug apple arp [type number]
```

### Syntax Description

<i>type</i>	(Optional) Interface type.
<i>number</i>	(Optional) Interface number.

### Usage Guidelines

This command is helpful when you experience problems communicating with a node on the network you control (a neighbor). If the **debug apple arp** display indicates that the router is receiving AARP probes, you can assume that the problem does not reside at the physical layer.

### Sample Display

The following is sample output from the **debug apple arp** command:

```
Router# debug apple arp

Ether0: AARP: Sent resolve for 4160.26
Ether0: AARP: Reply from 4160.26(0000.0c00.0453) for 4160.154(0000.0c00.8ea9)
Ether0: AARP: Resolved waiting request for 4160.26(0000.0c00.0453)
Ether0: AARP: Reply from 4160.19(0000.0c00.0082) for 4160.154(0000.0c00.8ea9)
Ether0: AARP: Resolved waiting request for 4160.19(0000.0c00.0082)
Ether0: AARP: Reply from 4160.19(0000.0c00.0082) for 4160.154(0000.0c00.8ea9)
```

Explanations for representative lines of output follow.

The following line indicates that the router has requested the hardware MAC address of the host at network address 4160.26:

```
Ether0: AARP: Sent resolve for 4160.26
```

The following line indicates that the host at network address 4160.26 has replied, giving its MAC address (0000.0c00.0453). For completeness, the message also shows the network address to which the reply was sent and its hardware MAC address (also in parentheses).

```
Ether0: AARP: Reply from 4160.26(0000.0c00.0453) for 4160.154(0000.0c00.8ea9)
```

The following line indicates that the MAC address request is complete:

```
Ether0: AARP: Resolved waiting request for 4160.26(0000.0c00.0453)
```

## debug apple domain

Use the **debug apple domain** EXEC command to enable debugging of the AppleTalk domain activities. The **no** form of this command disables debugging output.

**[no] debug apple domain**

### Usage Guidelines

Use the **debug apple domain** command to observe activity for domains and subdomains. Use this command in conjunction with the **debug apple remap** command to observe interaction between remapping and domain activity. Messages are displayed when the state of a domain changes, such as creating a new domain, deleting a domain, and updating a domain.

### Sample Display

The following is sample output from the **debug apple domain** command intermixed with output from the **debug apple remap** command; the two commands show related events.

```
Router# debug apple domain
Router# debug apple remap

AT-REMAP: RemapProcess for net 30000 domain AURP Domain 1
AT-REMAP: ReshuffleRemapList for subdomain 1
AT-REMAP: Could not find a remap for cable 3000-3001
AT-DOMAIN: atdomain_DisablePort for Tunnel0
AT-DOMAIN: CleanUpDomain for domain 1 [AURP Domain 1]
AT-DOMAIN: Disabling interface Ethernet1
AT-DOMAIN: atdomain_DisablePort for Ethernet1
AT-DOMAIN: CleanUpDomain for domain 1 [AURP Domain 1]
AT-DOMAIN: CleanSubDomain for inbound subdomain 1
AT-REMAP: Remap for net 70 inbound subdomain 1 has been deleted
AT-DOMAIN: DeleteAvRemapList for inbound subdomain 1
AT-DOMAIN: DeleteRemapTable for subdomain 1
AT-DOMAIN: DeleteAvRemapList for inbound subdomain 1
AT-DOMAIN: CleanSubDomain for outbound subdomain 1
AT-DOMAIN: DeleteRemapTable for subdomain 1
AT-REMAP: RemapProcess for net 30000 domain AURP Domain 1 Remapped Net 10000
AT-REMAP: Remap for net 50 outbound subdomain 1 has been deleted
AT-DOMAIN: DeleteAvRemapList for outbound subdomain 1
AT-DOMAIN: DeleteAvRemapList for outbound subdomain 1
AT-DOMAIN: CleanUpDomain for domain 1 [AURP Domain 1]
AT-DOMAIN: CleanSubDomain for inbound subdomain 1
AT-DOMAIN: DeleteRemapTable for subdomain 1
AT-DOMAIN: DeleteAvRemapList for inbound subdomain 1
AT-DOMAIN: CleanSubDomain for outbound subdomain 1
AT-DOMAIN: DeleteRemapTable for subdomain 1
AT-DOMAIN: DeleteAvRemapList for outbound subdomain 1
```

### Related Command

**debug apple remap**

## debug apple eigrp-all

Use the **debug apple eigrp-all** EXEC command to enable debugging output from the Enhanced IGRP routines. The **no** form of this command disables debugging output.

**[no] debug apple eigrp-all**

### Usage Guidelines

The **debug apple eigrp-all** command can be used to monitor acquisition of routes, aging route table entries, and advertisement of known routes through Enhanced IGRP.



**Caution** Because the **debug apple eigrp-all** command can generate many messages, use it only when the router's CPU utilization is less than 50 percent.

### Sample Display

The following is sample output from the **debug apple eigrp-all** command:

```
Router# debug apple eigrp-all

3:54:34: atigrp2_router: peer is 83.195
3:54:37: AT: atigrp2_write: about to send packet
3:54:37: Ethernet2: output AT packet: enctype UNKNOWN, size 65
3:54:37: 07FFFFFF0000FFFFFFFFFFFF00000C1485B00046|0041ACD100000053FF8F58585802059110
3:54:37: 0000000000000000000000000000000010001000C010001000000000F0204000C0053005300
3:54:37: AT: atigrp2, src=Ethernet2:83.143, dst=83-83, size=52, EIGRP pkt sent
3:54:39: atigrp2_router: peer is 83.195
3:54:42: AT: atigrp2_write: about to send packet
3:54:42: Ethernet2: output AT packet: enctype UNKNOWN, size 65
3:54:42: 07FFFFFF0000FFFFFFFFFFFF00000C1485B00046|0041ACD100000053FF8F58585802059110
3:54:42: 0000000000000000000000000000000010001000C010001000000000F0204000C0053005300
3:54:42: AT: atigrp2, src=Ethernet2:83.143, dst=83-83, size=52, EIGRP pkt sent
```

Table 3 describes the fields in the output.

**Table 3** Debug Apple EIGRP Field Descriptions

Field	Description
atigrp2_router:	The neighbor's AppleTalk address.
AT:	Indicates that this is an AppleTalk packet.
Ethernet2:	Name of the interface through which the router received the packet.
src=	Name of the interface sending the Enhanced IGRP packet, as well as its AppleTalk address.
dst=	Cable range of the packet's destination.
size=	Size of the packet (in bytes).

## debug apple errors

Use the **debug apple errors** EXEC command to display errors occurring in the AppleTalk network. The **no** form of this command disables debugging output.

**[no] debug apple errors** [*type number*]

### Syntax Description

<i>type</i>	(Optional) Interface type.
<i>number</i>	(Optional) Interface number.

### Usage Guidelines

In a stable AppleTalk network, the **debug apple errors** command produces little output. To solve encapsulation problems, enable **debug apple errors** and **debug apple packet** together.

### Sample Display

The following is sample output from the **debug apple errors** command when a router is brought up with a zone that does not agree with the zone list of other routers on the network.

```
Router# debug apple errors

%AT-3-ZONEDISAGREES: Ethernet0: AppleTalk port disabled; zone list incompatible with
4160.19
%AT-3-ZONEDISAGREES: Ethernet0: AppleTalk port disabled; zone list incompatible with
4160.19
%AT-3-ZONEDISAGREES: Ethernet0: AppleTalk port disabled; zone list incompatible with
4160.19
```

As the output suggests, a single error message indicates zone list incompatibility; this message is sent out periodically until the condition is corrected or **debug apple errors** is turned off.

Most of the other messages that **debug apple errors** can generate are obscure or indicate a serious problem with the AppleTalk network. Some of these other messages follow.

In the following message, RTMPReq, RTMPReq, ATP, AEP, ZIP, ADSP, or SNMP could replace NBP, and “llap dest not for us” could replace “wrong encapsulation”:

```
Packet discarded, src 4160.12-254,dst 4160.19-254,NBP,wrong encapsulation
```

In the following message, in addition to invalid echo packet, other possible errors are unsolicited AEP echo reply, unknown echo function, invalid ping packet, unknown ping function, and bad responder packet type:

```
Ethernet0: AppleTalk packet error; no source address available
AT: pak_reply: dubious reply creation, dst 4160.19
AT: Unable to get a buffer for reply to 4160.19

Processing error, src 4160.12-254,dst 4160.19-254,AEP, invalid echo packet
```

The **debug apple errors** command can print out additional messages when other debugging commands are also turned on. When you turn on both **debug apple errors** and **debug apple events**, the following message can be generated:

```
Proc err, src 4160.12-254,dst 4160.19-254,ZIP,NetInfo Reply format is invalid
```

In the preceding message, in addition to NetInfo Reply format is invalid, other possible errors are NetInfoReply not for me, NetInfoReply ignored, NetInfoReply for operational net ignored, NetInfoReply from invalid port, unexpected NetInfoReply ignored, cannot establish primary zone, no primary has been set up, primary zone invalid, net information mismatch, multicast mismatch, and zones disagree.

When you turn on both **debug apple errors** and **debug apple nbp**, the following message can be generated:

```
Processing error,...,NBP,NBP name invalid
```

In the preceding message, in addition to NBP name invalid, other possible errors are NBP type invalid, NBP zone invalid, not operational, error handling brq, error handling proxy, NBP fwdreq unexpected, No route to srcnet, Proxy to "\*" zone, Zone "\*" from extended net, No zone info for "\*", and NBP zone unknown.

When you turn on both **debug apple errors** and **debug apple routing**, the following message can be generated:

```
Processing error,...,RTMPReq, unknown RTMP request
```

In the preceding message, in addition to unknown RTMP request, other possible errors are RTMP packet header bad, RTMP cable mismatch, routed RTMP data, RTMP bad tuple, and Not Req or Rsp.

## debug apple events

Use the **debug apple events** EXEC command to display information about AppleTalk special events, neighbors becoming reachable/unreachable, and interfaces going up/down. Only significant events (for example, neighbor and route changes) are logged. The **no** form of this command disables debugging output.

**[no] debug apple events** *[type number]*

### Syntax Description

<i>type</i>	(Optional) Interface type.
<i>number</i>	(Optional) Interface number.

### Usage Guidelines

The **debug apple events** command is useful for solving AppleTalk network problems because it provides an overall picture of the stability of the network. In a stable network, the **debug apple events** command does not return any information. If the command generates numerous messages, those messages can indicate possible sources of the problems.

When configuring or making changes to a router or interface for AppleTalk, enable **debug apple events**. Doing so alerts you to the progress of the changes or to any errors that might result. Also use this command periodically when you suspect network problems.

The **debug apple events** command is also useful to determine whether network flapping (nodes toggling online and offline) is occurring. If flapping is excessive, look for routers that only support 254 networks.

When you enable **debug apple events**, you will see any messages that the configuration command **apple event-logging** normally displays. Turning on **debug apple events**, however, does not cause **apple event-logging** to be maintained in nonvolatile memory. Only turning on **apple event-logging** explicitly stores it in nonvolatile memory. Furthermore, if **apple event-logging** is already enabled, turning on or off **debug apple events** does not affect **apple event-logging**.

### Sample Displays

The following is sample output from the **debug apple events** command that describes a nonseed router coming up in discovery mode.

```

router# debug apple events

Discovery mode state changes
Ether0: AT: Resetting interface address filters
%AT-5-INTRESTART: Ether0: AppleTalk port restarting; protocol restarted
Ether0: AppleTalk state changed; unknown -> restarting
Ether0: AppleTalk state changed; restarting -> probing
%AT-6-ADDRUSED: Ether0: AppleTalk node up; using address 65401.148
Ether0: AppleTalk state changed; probing -> acquiring
%AT-6-ACQUIREMODE: Ether0: AT port initializing; acquiring net configuration
Ether0: AppleTalk state changed; acquiring -> restarting
Ether0: AppleTalk state changed; restarting -> line down
Ether0: AppleTalk state changed; line down -> restarting
Ether0: AppleTalk state changed; restarting -> probing
%AT-6-ADDRUSED: Ether0: AppleTalk node up; using address 4160.148
Ether0: AppleTalk state changed; probing -> acquiring
%AT-6-ACQUIREMODE: Ether0: AT port initializing; acquiring net configuration
Ether0: AppleTalk state changed; acquiring -> requesting zones
Ether0: AT: Resetting interface address filters
%AT-5-INTRESTART: Ether0: AppleTalk port restarting; protocol restarted
Ether0: AppleTalk state changed; requesting zones -> verifying
AT: Sent GetNetInfo request broadcast on Ethernet0
Ether0: AppleTalk state changed; verifying -> checking zones
Ether0: AppleTalk state changed; checking zones -> operational

```

S2542

As the output shows, the **debug apple events** command is useful in tracking the discovery mode state changes through which an interface progresses. When no problems are encountered, the state changes progress as follows:

- 1 Line down
- 2 Restarting
- 3 Probing (for its own address [node ID] using AARP)
- 4 Acquiring (sending out GetNetInfo requests)
- 5 Requesting zones (the list of zones for its cable)
- 6 Verifying (that the router's configuration is correct. If not, a port configuration mismatch is declared.)
- 7 Checking zones (to make sure its list of zones is correct)
- 8 Operational (participating in routing)

Explanations for individual lines of output follow.

The following message indicates that a port is set. In this case, the zone multicast address is being reset.

```
Ether0: AT: Resetting interface address filters
```

The following messages indicate that the router is changing to restarting mode:

```
%AT-5-INTRESTART: Ether0: AppleTalk port restarting; protocol restarted
Ether0: AppleTalk state changed; unknown -> restarting
```

The following message indicates that the router is probing in the startup range of network numbers (65280-65534) to discover its network number:

```
Ether0: AppleTalk state changed; restarting -> probing
```

The following message indicates that the router is enabled as a nonrouting node using a provisional network number within its startup range of network numbers. This type of message only appears if the network address the router will use differs from its configured address. This is always the case for a discovery-enabled router; it is rarely the case for a nondiscovery-enabled router.

```
%AT-6-ADDRUSED: Ether0: AppleTalk node up; using address 65401.148
```

The following messages indicate that the router is sending out GetNetInfo requests to discover the default zone name and the actual network number range in which its network number can be chosen:

```
Ether0: AppleTalk state changed; probing -> acquiring
%AT-6-ACQUIREMODE: Ether0: AT port initializing; acquiring net configuration
```

Now that the router has acquired the cable configuration information, the following message indicates that it restarts using that information:

```
Ether0: AppleTalk state changed; acquiring -> restarting
```

The following messages indicate that the router is probing for its actual network address:

```
Ether0: AppleTalk state changed; restarting -> line down
Ether0: AppleTalk state changed; line down -> restarting
Ether0: AppleTalk state changed; restarting -> probing
```

The following message indicates that the router has found an actual network address to use:

```
%AT-6-ADDRUSED: Ether0: AppleTalk node up; using address 4160.148
```

The following messages indicate that the router is sending out GetNetInfo requests to verify the default zone name and the actual network number range from which its network number can be chosen:

```
Ether0: AppleTalk state changed; probing -> acquiring
%AT-6-ACQUIREMODE: Ether0: AT port initializing; acquiring net configuration
```

The following message indicates that the router is requesting the list of zones for its cable:

```
Ether0: AppleTalk state changed; acquiring -> requesting zones
```

The following messages indicate that the router is sending out GetNetInfo requests to make sure its understanding of the configuration is correct:

```
Ether0: AppleTalk state changed; requesting zones -> verifying
AT: Sent GetNetInfo request broadcast on Ethernet0
```

The following message indicates that the router is rechecking its list of zones for its cable:

```
Ether0: AppleTalk state changed; verifying -> checking zones
```

The following message indicates that the router is now fully operational as a routing node and can begin routing:

```
Ether0: AppleTalk state changed; checking zones -> operational
```

The following shows sample **debug apple events** output that describes a nondiscovery-enabled router coming up when no other router is on the wire.

```

router# debug apple events

Ethernet1: AT: Resetting interface address filters
%AT-5-INTRESTART: Ethernet1: AppleTalk port restarting; protocol restarted
Ethernet1: AppleTalk state changed; unknown -> restarting
Ethernet1: AppleTalk state changed; restarting -> probing
%AT-6-ADDRUSED: Ethernet1: AppleTalk node up; using address 4165.204
Ethernet1: AppleTalk state changed; probing -> verifying
AT: Sent GetNetInfo request broadcast on Ethernet1
Ethernet1: AppleTalk state changed; verifying -> operational
%AT-6-ONLYROUTER: Ethernet1: AppleTalk port enabled; no neighbors found

```

Indicates a nondiscovery-enabled router with no other router on the wire

S2543

As the output shows, a nondiscovery-enabled router can come up when no other router is on the wire; however, it must assume that its configuration (if accurate syntactically) is correct, because no other router can verify it. Notice that the last line indicates this situation.

The following is sample output from the **debug apple events** command that describes a discovery-enabled router coming up when there is no seed router on the wire.

```

Router# debug apple events

Ether0: AT: Resetting interface address filters
%AT-5-INTRESTART: Ether0: AppleTalk port restarting; protocol restarted
Ether0: AppleTalk state changed; unknown -> restarting
Ether0: AppleTalk state changed; restarting -> probing
%AT-6-ADDRUSED: Ether0: AppleTalk node up; using address 65401.148
Ether0: AppleTalk state changed; probing -> acquiring
AT: Sent GetNetInfo request broadcast on Ether0
AT: Sent GetNetInfo request broadcast on Ether0
AT: Sent GetNetInfo request broadcast on Ether0
AT: Sent GetNetInfo request broadcast on Ether0
AT: Sent GetNetInfo request broadcast on Ether0

```

As the output shows, when you attempt to bring up a nonseed router without a seed router on the wire, it never becomes operational; instead, it hangs in the acquiring mode and continues to send out periodic GetNetInfo requests.

The following is sample output from the **debug apple events** command when a nondiscovery-enabled router is brought up on an AppleTalk internetwork that is in compatibility mode (set up to accommodate extended as well as nonextended AppleTalk) and the router has violated internetwork compatibility.

```

router# debug apple events

E0: AT: Resetting interface address filters
%AT-5-INTRESTART: E0: AppleTalk port restarting; protocol restarted
E0: AppleTalk state changed; restarting -> probing
%AT-6-ADDRUSED: E0: AppleTalk node up; using address 41.19
E0: AppleTalk state changed; probing -> verifying
AT: Sent GetNetInfo request broadcast on Ethernet0
%AT-3-ZONEDISAGREES: E0: AT port disabled; zone list incompatible with 41.19
AT: Config error for E0, primary zone invalid
E0: AppleTalk state changed; verifying -> config mismatch

```

Indicates configuration mismatch

S2545

The following three configuration command lines indicate the part of the router's configuration that caused the configuration mismatch:

```

lestat(config)#int e 0
lestat(config-if)#apple cab 41-41
lestat(config-if)#apple zone Marketing

```

The router shown had been configured with a cable range of 41-41 instead of 40-40, which would have been accurate. Additionally, the zone name was configured incorrectly; it should have been “Marketing,” rather than being misspelled as “Marketing.”

## debug apple nbp

Use the **debug apple nbp** EXEC command to display debugging output from the Name Binding Protocol (NBP) routines. The **no** form of this command disables debugging output.

**[no] debug apple nbp** [*type number*]

### Syntax Description

<i>type</i>	(Optional) Interface type.
<i>number</i>	(Optional) Interface number.

### Usage Guidelines

To determine whether the router is receiving NBP lookups from a node on the AppleTalk network, enable **debug apple nbp** at each node between the router and the node in question to determine where the problem lies.

---

**Note** Because the **debug apple nbp** command can generate many messages, use it only when the router's CPU utilization is less than 50 percent.

---

### Sample Display

The following is sample output from the **debug apple nbp** command:

```
Router# debug apple nbp

AT: NBP ctrl = LkUp, ntuples = 1, id = 77
AT: 4160.19, skt 2, enum 0, name: =:ciscoRouter@Low End SW Lab
AT: LkUp =:ciscoRouter@Low End SW Lab

AT: NBP ctrl = LkUp-Reply, ntuples = 1, id = 77
AT: 4160.154, skt 254, enum 1, name: lestat.Ether0:ciscoRouter@Low End SW Lab

AT: NBP ctrl = LkUp, ntuples = 1, id = 78
AT: 4160.19, skt 2, enum 0, name: =:IPADDRESS@Low End SW Lab
AT: NBP ctrl = LkUp, ntuples = 1, id = 79
AT: 4160.19, skt 2, enum 0, name: =:IPGATEWAY@Low End SW Lab
AT: NBP ctrl = LkUp, ntuples = 1, id = 83
AT: 4160.19, skt 2, enum 0, name: =:ciscoRouter@Low End SW Lab
AT: LkUp =:ciscoRouter@Low End SW Lab

AT: NBP ctrl = LkUp, ntuples = 1, id = 84
AT: 4160.19, skt 2, enum 0, name: =:IPADDRESS@Low End SW Lab

AT: NBP ctrl = LkUp, ntuples = 1, id = 85
AT: 4160.19, skt 2, enum 0, name: =:IPGATEWAY@Low End SW Lab
AT: NBP ctrl = LkUp, ntuples = 1, id = 85
AT: 4160.19, skt 2, enum 0, name: =:IPGATEWAY@Low End SW Lab
```

The first three lines describe an NBP lookup request:

```
AT: NBP ctrl = LkUp, ntuples = 1, id = 77
AT: 4160.19, skt 2, enum 0, name: =:ciscoRouter@Low End SW Lab
AT: LkUp =:ciscoRouter@Low End SW Lab
```

Table 4 describes the fields in the first line of output.

**Table 4 Debug Apple NBP Field Descriptions—Part 1**

Field	Description
AT: NBP	Indicates that this message describes an AppleTalk NBP packet.
ctrl = LkUp	Identifies the type of NBP packet. Possible values include LkUp—NBP lookup request. LkUp-Reply—NBP lookup reply.
ntuples = 1	Indicates the number of name-address pairs in the lookup request packet. Range: 1-31 tuples.
id = 77	Identifies an NBP lookup request value.

Table 5 describes the fields in the second line of output.

**Table 5 Debug Apple NBP Field Descriptions—Part 2**

Field	Description
AT:	Indicates that this message describes an AppleTalk packet.
4160.19	Indicates the network address of the requester.
skt 2	Indicates the internet socket address of the requester. The responder will send the NBP lookup reply to this socket address.
enum 0	Indicates the enumerator field. Used to identify multiple names registered on a single socket. Each tuple is assigned its own enumerator, incrementing from 0 for the first tuple.
name: =:ciscoRouter@Low End SW Lab	Indicates the entity name for which a network address has been requested. The AppleTalk entity name includes three components: Object (in this case, a wildcard character (=), indicating that the requester is requesting name-address pairs for all objects of the specified type in the specified zone) Type (in this case, ciscoRouter) Zone (in this case, Low End SW Lab)

The third line in the output essentially reiterates the information in the two lines above it, indicating that a lookup request has been made regarding name-address pairs for all objects of the ciscoRouter type in the Low End SW Lab zone.

Because the router is defined as an object of type ciscoRouter in zone Low End SW Lab, the router sends an NBP lookup reply in response to this NBP lookup request. The following two lines of output show the router’s response:

```
AT: NBP ctrl = LkUp-Reply, ntuples = 1, id = 77
AT: 4160.154, skt 254, enum 1, name: lestat.Ether0:ciscoRouter@Low End SW Lab
```

In the first line, ctrl = LkUp-Reply identifies this NBP packet as an NBP lookup request. The same value in the id field (id = 77) associates this lookup reply with the previous lookup request. The second line indicates that the network address associated with the router's entity name (lestat.Ether0:ciscoRouter@Low End SW Lab) is 4160.154. The fact that no other entity name/network address is listed indicates that the responder only knows about itself as an object of type ciscoRouter in zone Low End SW Lab.

## debug apple packet

Use the **debug apple packet** EXEC command to display per-packet debugging output. The output reports information online when a packet is received or a transmit is attempted. The **no** form of this command disables debugging output.

**[no] debug apple packet** [*type number*]

### Syntax Description

*type* (Optional) Interface type.  
*number* (Optional) Interface number.

### Usage Guidelines

With this command, you can monitor the types of packets being slow switched. It displays at least one line of debugging output per AppleTalk packet processed.

When invoked in conjunction with the **debug apple routing**, **debug apple zip**, and **debug apple nbp** commands, the **debug apple packet** command adds protocol processing information in addition to generic packet details. It also reports successful completion or failure information.

When invoked in conjunction with the **debug apple errors** command, the **debug apple packet** command reports packet-level problems, such as those concerning encapsulation.

---

**Note** Because the **debug apple packet** command can generate many messages, use it only when the router's CPU utilization is less than 50 percent.

---

### Sample Display

The following is sample output from the **debug apple packet** command:

```
Router# debug apple packet

Ether0: AppleTalk packet: enctype SNAP, size 60, encaps000000000000000000000000
AT: src=Ethernet0:4160.47, dst=4160-4160, size=10, 2 rtes, RTMP pkt sent
AT: ZIP Extended reply rcvd from 4160.19
AT: ZIP Extended reply rcvd from 4160.19
AT: src=Ethernet0:4160.47, dst=4160-4160, size=10, 2 rtes, RTMP pkt sent
Ether0: AppleTalk packet: enctype SNAP, size 60, encaps000000000000000000000000
Ether0: AppleTalk packet: enctype SNAP, size 60, encaps000000000000000000000000
```

Table 6 describes the fields in the first line of output.

**Table 6** Debug Apple Packet Field Descriptions—Part 1

Field	Description
Ether0:	Name of the interface through which the router received the packet
AppleTalk packet	Indication that this is an AppleTalk packet
encype SNAP	Encapsulation type for the packet
size 60	Size of the packet (in bytes)
encaps000000000000000000000000	Encapsulation

Table 7 describes the fields in the second line of output.

**Table 7** Debug Apple Packet Field Descriptions—Part 2

Field	Description
AT:	Indication that this is an AppleTalk packet
src = Ethernet0:4160.47	Name of the interface sending the packet and its AppleTalk address
dst = 4160-4160	Cable range of the packet's destination
size = 10	Size of the packet (in bytes)
2 rtes	Indication that two routes in the routing table link these two addresses
RTMP pkt sent	The type of packet sent

The third line indicates the type of packet received and its source AppleTalk address. This message is repeated in the fourth line because AppleTalk hosts can send multiple replies to a given GetNetInfo request.

## debug apple remap

Use the **debug apple remap** EXEC command to enable debugging of the AppleTalk remap activities. The **no** form of this command disables debugging output.

**[no] debug apple remap**

### Usage Guidelines

Use the **debug apple remap** command with the **debug apple domain** command to observe activity between domains and subdomains. Messages from **debug apple remap** are displayed when a particular remapping function occurs, such as creating remaps or deleting remaps.

### Sample Display

The following is sample output from the **debug apple remap** command intermixed with output from the **debug apple domain** command; the two commands show related events.

```
Router# debug apple remap
Router# debug apple domain

AT-REMAP: RemapProcess for net 30000 domain AURP Domain 1
AT-REMAP: ReshuffleRemapList for subdomain 1
AT-REMAP: Could not find a remap for cable 3000-3001
AT-DOMAIN: atdomain_DisablePort for Tunnel0
AT-DOMAIN: CleanUpDomain for domain 1 [AURP Domain 1]
AT-DOMAIN: Disabling interface Ethernet1
AT-DOMAIN: atdomain_DisablePort for Ethernet1
AT-DOMAIN: CleanUpDomain for domain 1 [AURP Domain 1]
AT-DOMAIN: CleanSubDomain for inbound subdomain 1
AT-REMAP: Remap for net 70 inbound subdomain 1 has been deleted
AT-DOMAIN: DeleteAvRemapList for inbound subdomain 1
AT-DOMAIN: DeleteRemapTable for subdomain 1
AT-DOMAIN: DeleteAvRemapList for inbound subdomain 1
AT-DOMAIN: CleanSubDomain for outbound subdomain 1
AT-DOMAIN: DeleteRemapTable for subdomain 1
AT-REMAP: RemapProcess for net 30000 domain AURP Domain 1 Remaped Net 10000
AT-REMAP: Remap for net 50 outbound subdomain 1 has been deleted
AT-DOMAIN: DeleteAvRemapList for outbound subdomain 1
AT-DOMAIN: DeleteAvRemapList for outbound subdomain 1
AT-DOMAIN: CleanUpDomain for domain 1 [AURP Domain 1]
AT-DOMAIN: CleanSubDomain for inbound subdomain 1
AT-DOMAIN: DeleteRemapTable for subdomain 1
AT-DOMAIN: DeleteAvRemapList for inbound subdomain 1
AT-DOMAIN: CleanSubDomain for outbound subdomain 1
AT-DOMAIN: DeleteRemapTable for subdomain 1
AT-DOMAIN: DeleteAvRemapList for outbound subdomain 1
```

### Related Command

**debug apple domain**

## debug apple routing

Use the **debug apple routing** EXEC command to enable debugging output from the Routing Table Maintenance Protocol (RTMP) routines. The **no** form of this command disables debugging output.

**[no] debug apple routing** [*type number*]

### Syntax Description

*type* (Optional) Interface type.

*number* (Optional) Interface number.

### Usage Guidelines

This command can be used to monitor acquisition of routes, aging of routing table entries, and advertisement of known routes. It also reports conflicting network numbers on the same network if the network is misconfigured.

---

**Note** Because the **debug apple routing** command can generate many messages, use it only when router CPU utilization is less than 50 percent.

---

### Sample Display

The following is sample output from the **debug apple routing** command:

```
Router# debug apple routing

AT: src=Ethernet0:4160.41, dst=4160-4160, size=19, 2 rtes, RTMP pkt sent
AT: src=Ethernet1:41069.25, dst=41069, size=427, 96 rtes, RTMP pkt sent
AT: src=Ethernet2:4161.23, dst=4161-4161, size=427, 96 rtes, RTMP pkt sent
AT: Route ager starting (97 routes)
AT: Route ager finished (97 routes)
AT: RTMP from 4160.19 (new 0,old 94,bad 0,ign 0, dwn 0)
AT: RTMP from 4160.250 (new 0,old 0,bad 0,ign 2, dwn 0)
AT: RTMP from 4161.236 (new 0,old 94,bad 0,ign 1, dwn 0)
AT: src=Ethernet0:4160.41, dst=4160-4160, size=19, 2 rtes, RTMP pkt sent
```

Table 8 describes the fields in the first line of sample **debug apple routing** output.

**Table 8** Debug Apple Routing Field Descriptions—Part 1

Field	Description
AT:	Indicates that this is AppleTalk debugging output
src = Ethernet0:4160.41	Indicates the source router interface and network address for the RTMP update packet
dst = 4160-4160	Indicates the destination network address for the RTMP update packet
size = 19	Shows the size of this RTMP packet (in bytes)
2 rtes	Indicates that this RTMP update packet includes information on two routes
RTMP pkt sent	Indicates that this type of message describes an RTMP update packet that the router has sent (rather than one that it has received)

The following two messages indicate that the ager has started and finished the aging process for the routing table and that this table contains 97 entries:

```
AT: Route ager starting (97 routes)
AT: Route ager finished (97 routes)
```

Table 9 describes the fields in the following line of **debug apple routing** output:

```
AT: RTMP from 4160.19 (new 0,old 94,bad 0,ign 0, dwn 0)
```

**Table 9** Debug Apple Routing Field Descriptions—Part 2

Field	Description
AT:	Indicates that this is AppleTalk debugging output
RTMP from 4160.19	Indicates the source address of the RTMP update the router received
new 0	Shows the number of routes in this RTMP update packet that the router did not already know about
old 94	Shows the number of routes in this RTMP update packet that the router already knew about
bad 0	Shows the number of routes the other router indicates have gone bad
ign 0	Shows the number of routes the other router ignores
dwn 0	Shows the number of poisoned tuples included in this packet

## debug apple zip

Use the **debug apple zip** EXEC command to display debugging output from the Zone Information Protocol (ZIP) routines. The **no** form of this command disables debugging output.

**[no] debug apple zip** [*type number*]

### Syntax Description

<i>type</i>	(Optional) Interface type.
<i>number</i>	(Optional) Interface number.

### Usage Guidelines

This command reports significant events such as the discovery of new zones and zone list queries. It generates information similar to that generated by **debug apple routing**, but generates it for ZIP packets instead of RTMP packets.

You can use the **debug apple zip** command to determine whether a ZIP storm is taking place in the AppleTalk network. You can detect the existence of a ZIP storm when you see that no router on a cable has the zone name corresponding to a network number that all the routers have in their routing tables.

### Sample Display

The following is sample output from the **debug apple zip** command:

```
Router# debug apple zip

AT: Sent GetNetInfo request broadcast on Ether0
AT: Recvd ZIP cmd 6 from 4160.19-6
AT: 3 query packets sent to neighbor 4160.19
AT: 1 zones for 31902, ZIP XReply, src 4160.19
AT: net 31902, zonelen 10, name US-Florida
```

The first line indicates that the router has received an RTMP update that includes a new network number and is now requesting zone information:

```
AT: Sent GetNetInfo request broadcast on Ether0
```

The second line indicates that the neighbor at address 4160.19 replies to the zone request with a default zone:

```
AT: Recvd ZIP cmd 6 from 4160.19-6
```

The third line indicates that the router responds with three queries to the neighbor at network address 4160.19 for other zones on the network:

```
AT: 3 query packets sent to neighbor 4160.19
```

The fourth line indicates that the neighbor at network address 4160.19 responds with a ZIP extended reply, indicating that one zone has been assigned to network 31902:

```
AT: 1 zones for 31902, ZIP XReply, src 4160.19
```

The fifth line indicates that the router responds that the zone name of network 31902 is US-Florida, and the zone length of that zone name is 10:

```
AT: net 31902, zonelen 10, name US-Florida
```

## debug appn all

Use the **debug appn all** EXEC command to turn on all possible debugging messages for Advanced Peer-to-Peer Networking (APPN). The **no** form of this command disables debugging output.

**[no] debug appn all**

---

**Note** Refer to the other forms of the **debug appn** command to enable specific debug output selectively.

---

### Usage Guidelines

This command shows all APPN events. Use other forms of the **debug appn** command to display specific types of events.

---

**Note** Because the **debug appn all** command can generate many messages and alter timing in the network node, use it only when instructed by authorized support personnel.

---



**Caution** Debugging output takes priority over other network traffic. The **debug appn all** command generates more output than any other **debug appn** command and can alter timing in the network node. This command can severely diminish router performance or even render it unusable. In virtually all cases, it is best to use specific **debug appn** commands.

Refer to the documentation for specific **debug appn** commands for sample displays and explanations.

### Related Commands

**debug appn cs**  
**debug appn ds**  
**debug appn hpr**  
**debug appn ms**  
**debug appn nof**  
**debug appn pc**  
**debug appn ps**  
**debug appn scm**  
**debug appn ss**  
**debug appn trs**

## debug appn cs

Use the **debug appn cs** EXEC command to display APPN Configuration Services (CS) component activity. The **no** form of this command disables debugging output.

**[no] debug appn cs**

### Usage Guidelines

The Configuration Services (CS) component is responsible for defining link stations, ports, and connection networks. It is responsible for the activation and deactivation of ports and link stations and handles status queries for these resources.

### Sample Display

The following is sample output from the **debug appn cs** command. In this example a link station is being stopped.

```
Router# debug appn cs

Turned on event 008000FF

Router# appn stop link PATTY

APPN: ----- CS ----- Deq STOP_LS message
APPN: ----- CS ----- FSM LS: 75 17 5 8
APPN: ----- CS ----- Sending DEACTIVATE_AS - station PATTY
APPN: ----- CS ----- deactivate_as_p->ips_header.lpid = A80A60
APPN: ----- CS ----- deactivate_as_p->ips_header.lpid = A80A60
APPN: ----- CS ----- Sending DESTROY_TG to PC - station PATTY - lpid=A80A60
APPN: ----- CS ----- Deq DESTROY_TG - station PATTY
APPN: ----- CS ----- FSM LS: 22 27 8 0
APPN: ----- CS ----- Sending TG update for LS PATTY to TRS
APPN: ----- CS ----- ENTERING XID_PROCESSING: 4
%APPN-6-APPNSENDMSG: Link Station PATTY stopped
```

Table 10 describes the fields and messages shown.

**Table 10**      **Debug APPN CS Field Descriptions**

Field	Description
APPN	APPN debugging output.
CS	Configuration Services component output.
Deq	CS received a message from another component.
FSM LS	The link station finite state machine is being referenced.
Sending	CS is sending a message to another component.

### Related Command

**debug appn all**

## debug appn ds

Use the **debug appn ds** EXEC command to display debugging information on APPN Directory Services (DS) component activity. The **no** form of this command disables debugging output.

**[no] debug appn ds**

### Usage Guidelines

The Directory Services (DS) component manages searches for resources in the APPN network. DS is also responsible for registration of resources within the network.

### Sample Display

The following is sample output from the **debug appn ds** command. In this example a search has been received.

```
Router# debug appn ds
Turned on event 080000FF
APPN: NEWDS: LS: search from: NETA.PATTY
APPN: NEWDS: pcid: DD3321E8B5667111
APPN: NEWDS: Invoking FSM NNSolu
APPN: NEWDS: LSfsm_NNSolu: 00A67AA0 pcid: DD3321E8B5667111 row: 0 col: 0 inp: 80200000
APPN: NEWDS: LSfsm_parent: 00A89940 row: 0 col: 0 inp: 80000000
APPN: NEWDS: Rcvd a LMRQ
APPN: NEWDS: LSfsm_NNSolu: 00A67AA0 pcid: DD3321E8B5667111 row: 12 col: 1 inp: 40000000
APPN: NEWDS: LSfsm_parent: 00A89940 row: 8 col: 1 inp: 40000000
APPN: NEWDS: LSfsm_child: 00A89BE8 row: 0 col: 0 inp: 80000080
APPN: NEWDS: PQenq REQUEST_ROUTE(RQ) to TRS
APPN: NEWDS: LSfsm_child: 00A8A1C0 row: 1 col: 0 inp: 80000008
APPN: NEWDS: LSfsm_NNSolu: 00A67AA0 pcid: DD3321E8B5667111 row: 5 col: 1 inp: 80C04000
APPN: NEWDS: LSfsm_child: 00A8A1C0 row: 7 col: 1 inp: 80844008
APPN: NEWDS: Rcvd a LMRQ
APPN: NEWDS: LSfsm_NNSolu: 00A67AA0 pcid: DD3321E8B5667111 row: 16 col: 6 inp: 40800000
APPN: NEWDS: LSfsm_child: 00A8A1C0 row: 14 col: 5 inp: 40800000
APPN: NEWDS: LSfsm_parent: 00A89940 row: 3 col: 1 inp: 80840000
APPN: NEWDS: send locate to node: NETA.PATTY
```

Table 11 describes the fields in the **debug appn ds** output.

**Table 11** Debug APPN DS Field Descriptions

Field	Description
APPN	APPN debugging output.
NEWDS	Directory Services component output.
search from	A locate was received from NETA.PATTY.
LSfsm_	The Locate Search finite state machine is being referenced.
PQenq	A message was sent to another component.
Rcvd	A message was received from another component.
send locate	A locate will be sent to NETA.PATTY.

### Related Command

**debug appn all**

## debug appn hpr

Use the **debug appn hpr** privileged EXEC command to display debugging information related to High Performance Routing (HPR) code execution. The **no** form of this command disables debugging output.

**[no] debug appn hpr**

### Sample Display

The following is sample output from the **debug appn hpr** command:

```
Router# debug appn hpr

APPN: -- ncl.ncl_map_dlc_type() -- mapping TOKEN_RING(4) to NCL_TR(3)
APPN: -- ncl.ncl_port() -- called with port_type:3, cisco_idb:893A14, hpr_ssap:C8
APPN: -- ncl.process_port_change() -- port coming up
APPN: -- ncl.process_port_change() -- PORT_UP
APPN: -- ncl.ncl_port_fsm -- FSM Invoked: Input:0, State:0->1, Action:0
APPN: -- ncl.ncl_port_fsm -- FSM Invoked: Input:1, State:1->2, Action:1
APPN: -- ncl.ncl_unmap_dlc_type() -- mapping NCL(3) to CLS(3)
APPN: ----- ANR ----- Sending ACTIVATE_SAP.req
APPN: -- cswncsnd.main() -- received LSA_IPS ips.
APPN: -- ncl.ncl_port_fsm -- FSM Invoked: Input:3, State:2->3, Action:4
APPN: -- ncl.ncl_assign_anr() -- Assigned ANR,anr:8002
APPN: -- ncl.ncl_map_dlc_type() -- mapping TOKEN_RING(4) to NCL_TR(3)
APPN: -- ncl.ncl_populate_anr() -- anr:8002, dlc_type:3, idb 893A14
APPN: -- ncl.ncl_populate_anr() -- send anr_tbl_update to owning cswncsnd
APPN: -- ncl.ncl_ls_fsm -- FSM Invoked: Input:0, State:0->1, Action:0
APPN: ncl.ncl_send_reqopn_stn_req
APPN: -- ncl.ncl_unmap_dlc_type() -- mapping NCL(3) to CLS(3)
APPN: -- ncl.ncl_ls_fsm() -- send anr_tbl_update to owning cswncsnd
APPN: -- cswncsnd.main() -- received ANR_TBL_UPDATE ips.
APPN: -- cswncsnd.apply_anr_table_update() -- ANR:8002
APPN: -- cswncsnd.main() -- received ANR_TBL_UPDATE ips.
APPN: -- cswncsnd.apply_anr_table_update() -- ANR:8002
APPN: -- cswncsnd.main() -- received LSA_IPS ips.
APPN: -- ncl.ncl_ls_fsm -- FSM Invoked: Input:1, State:1->2, Action:1
APPN: -- ncl.ncl_ls_fsm -- P_CEP_ID:AAF638
APPN: -- ncl.ncl_ls_fsm() -- send anr_tbl_update to owning cswncsnd
APPN: -- cswncsnd.main() -- received ANR_TBL_UPDATE ips.
APPN: -- cswncsnd.apply_anr_table_update() -- ANR:8002
APPN: rtpm: rtp_send() sent data over connection B9D5E8
APPN: hpr timer: rtt start time clocked at 135952 ms
APPN: -- cswncsnd.main() -- received NCL_SND_MSG ips.
APPN: -- cswncsnd.process_nlp_from_rtp() -- label: 8002, send to p_cep 00AAF638.
APPN: hpr timer: rtt end time clocked at 135972 ms
APPN: hpr timer: round trip time measured at 20 ms
```

Table 12 describes the **debug appn hpr** fields.

**Table 12** Debug APPN HPR Field Descriptions

Field	Description
APPN	APPN debugging output.
NCL	Network control layer debugging output. Network control layer is the component that deals with ANR packets.
ncl_port_fsm	Network control layer port finite state machine has been invoked.
ncl_assign_anr	ANR label has been assigned to a activating link station.

**Table 12**      **Debug APPN HPR Field Descriptions (Continued)**

<b>Field</b>	<b>Description</b>
ncl_populate_anr	System is updating the ANR record with information specific to the link station.
ncl_ls_fsm	Network control layer link finite state machine has been invoked.
rtp_send	RTP is about to send a packet.
hpr timer	Debugging output related to an HPR timer.
rtt start time	RTP is measuring the round-rip time for an HPR status request packet. This is the start time.
NCL_SND_MSG	Network control layer has been requested to send a packet.
process_nlp_from_rtp	Network control layer has been requested by RTP to send a packet.
rtt end time	RTP is measuring the round trip time for an HPR status request packet. This is the time.
round trip time	Round-trip time for this HPR status exchange has been computed.

**Related Command****debug appn all**

## debug appn ms

Use the **debug appn ms** EXEC command to display debugging information on APPN Management Services (MS) component activity. The **no** form of this command disables debugging output.

**[no] debug appn ms**

### Usage Guidelines

The Management Services (MS) component is responsible for generating, sending, and forwarding network management information in the form of traps and alerts to a network management focal point, such as Netview, in the APPN network.

### Sample Display

The following is sample output from the **debug appn ms** command. In this example an error occurred that caused an alert to be generated.

```
Router# debug appn ms

APPN: ----- MSS00 ---- Deq ALERT_MSU msg
APPN: --- MSP70 --- ALERT MV FROM APPN WITH VALID LGTH
APPN: --- MSCPL --- Find Active FP
APPN: --- MSP30 --- Entering Build MS Transport
APPN: --- MSP31 --- Entering Building Routing Info.
APPN: --- MSP34 --- Entering Build GDS
APPN: --- MSP32 --- Entering Building UOW correlator
APPN: --- MSP34 --- Entering Build GDS
APPN: --- MSP30 --- Building GDS 0x1310
APPN: --- MSP30 --- Building MS Transport
APPN: --- MSP72 --- ACTIVE FP NOT FOUND, SAVE ONLY
APPN: --- MSUTL --- UOW <= 60, ALL COPIED in extract_uow
APPN: --- MSCAT --- by enq_cached_ms QUEUE SIZE OF QUEUE after enq 4
```

Table 13 describes fields in the **debug appn ms** output.

**Table 13** Debug APPN MS Output Field Descriptions

Field	Description
APPN	Indicates that this is APPN debugging output.
MSP	Indicates that this is MS component output.

### Related Command

**debug appn all**

## debug appn nof

Use the **debug appn nof** EXEC command to display debugging information on APPN Node Operator Facility (NOF) component activity. The **no** form of this command disables debugging output.

**[no] debug appn nof**

### Usage Guidelines

The Node Operator Facility (NOF) component is responsible for processing commands entered by the user such as start, stop, show, and configuration commands. NOF forwards these commands to the proper component and wait for the response.

### Sample Display

The following is sample output from the **debug appn nof** command. In this example, an APPN connection network is being defined.

```
Router# debug appn nof
Turned on event 010000FF

Router# config term

Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# appn connection-network NETA.CISCO
Router(config-appn-cn)# port TR0
Router(config-appn-cn)# complete
router(config)#

APPN: ----- NOF ----- Define Connection Network Verb Received
APPN: ----- NOF ----- send define_cn_t ips to cs
APPN: ----- NOF ----- waiting for define_cn rsp from cs
router(config)#
```

Table 14 describes fields in the **debug appn nof** output.

**Table 14** Debug APPN NOF Field Descriptions

Field	Description
APPN	APPN debugging output.
NOF	NOF component output.
Received	A configuration command was entered.
send	A message was sent to CS.
waiting	A response was expected from CS.

### Related Command

**debug appn all**

## debug appn pc

Use the **debug appn pc** EXEC command to display debugging information on APPN Path Control (PC) component activity. The **no** form of this command disables debugging output.

**[no] debug appn pc**

### Usage Guidelines

The Path Control (PC) component is responsible for passing Message Units (MUs) between the Data Link Control (DLC) layer and other APPN components. PC implements transmission priority by passing higher priority MUs to the DLC before lower priority MUs.

### Sample Display

The following is sample output from the **debug appn pc** command. In this example a MU is received from the network.

```
Router# debug appn pc

Turned on event 040000FF
APPN: ----- PC-----PC Deq REMOTE msg variant_name 2251
APPN: --PC-- mu received to PC lpid: A80AEC
APPN: --PC-- mu received from p_cep_id: 67C6F8
APPN: ----- PC-----PC Deq LSA_IPS from DLC
APPN: --PCX dequeued a DATA.IND
APPN: --- PC processing DL_DATA.ind
APPN: --PC-- mu_error_checker with no error, calling frr
APPN: --PC-- calling frr for packet received on LFSID: 1 2 3
APPN: ----- PC-----PC is sending MU to SC A90396
APPN: ----- SC-----send mu: A90396, rpc: 0, nws: 7, rh.b1: 90
APPN: SC: Send mu.snf: 8, th.b0: 2E, rh.b1: 90, dcf: 8
```

Table 15 describes fields in the **debug appn pc** output.

**Table 15** Debug APPN PC Field Descriptions

Field	Description
APPN	APPN debugging output.
PC	PC component output.
Deq REMOTE	A message was received from the network.
mu received	The message is a MU.
DATA.IND	The MU contains data.
sending MU	The MU is session traffic for an ISR session. The MU is forwarded to the Session Connector component for routing.

### Related Command

**debug appn all**

## debug appn ps

Use the **debug appn ps** EXEC command to display debugging information on APPN Presentation Services (PS) component activity. The **no** form of this command disables debugging output.

**[no] debug appn ps**

### Usage Guidelines

The Presentation Services (PS) component is responsible for managing the Transaction Programs (TPs) used by APPN. TPs are used for sending and receiving searches, receiving resource registration, and sending and receiving topology updates.

### Sample Display

The following is sample output from the **debug appn ps** command. In this example a CP capabilities exchange is in progress.

```
Router# debug appn ps

Turned on event 200000FF
APPN: ---- CCA --- CP_CAPABILITIES_TP has started
APPN: ---- CCA --- About to wait for Partner to send CP_CAP
APPN: ---- CCA --- Partner LU name: NETA.PATTY
APPN: ---- CCA --- Mode Name: CPSVCMG
APPN: ---- CCA --- CGID: 78
APPN: ---- CCA --- About to send cp_cp_session_act to SS
APPN: ---- CCA --- Waiting for cp_cp_session_act_rsp from SS
APPN: ---- CCA --- Received cp_cp_session_act_rsp from SS
APPN: ---- CCA --- About to send CP_CAP to partner
APPN: ---- CCA --- Send to partner completed with rc=0, 0
APPN: ---- RCA --- Allocating conversation
APPN: ---- RCA --- Sending CP_CAPABILITIES
APPN: ---- RCA --- Getting conversation attributes
APPN: ---- RCA --- Waiting for partner to send CP_CAPABILITIES
APPN: ---- RCA --- Normal processing complete with cgid = 82
APPN: ---- RCA --- Deallocating CP_Capabilities conversation
```

Table 16 describes fields in the **debug appn ps** output.

**Table 16** Debug APPN PS Field Descriptions

Field	Description
APPN	APPN debugging output.
CCA	CP Capabilities TP output.
RCA	Receive CP Capabilities TP output.

### Related Command

**debug appn all**

## debug appn scm

Use the **debug appn scm** EXEC command to display debugging information on APPN Session Connector Manager (SCM) component activity. The **no** form of this command disables debugging output.

**[no] debug appn scm**

### Usage Guidelines

The Session Connector Manager (SCM) component is responsible for the activation and deactivation the local resources that route an intermediate session through the router.

### Sample Display

The following is sample output from the **debug appn scm** command. In this example an intermediate session traffic is being routed.

```
Router# debug appn scm

Turned on event 020000FF
Router#
APPN: ----- SCM-----SCM Deq a MU
APPN: ----- SCM-----SCM send ISR_INIT to SSI
APPN: ----- SCM----- (i05) Enter compare_fqpcid()
APPN: ----- SCM-----Adding new session_info table entry. addr=A93160
APPN: ----- SCM-----SCM Deq ISR_CINIT message
APPN: ----- SCM----- (i05) Enter compare_fqpcid()
APPN: ----- SCM-----SCM sends ASSIGN_LFSID to ASM
APPN: ----- SCM-----SCM Rcvd sync ASSIGN_LFSID from ASM
APPN: ----- SCM-----SCM PQenq a MU to ASM
APPN: ----- SCM-----SCM Deq a MU
APPN: ----- SCM----- (i05) Enter compare_fqpcid()
APPN: ----- SCM-----SCM PQenq BIND rsp to ASM
```

Table 17 describes fields in the **debug appn ps** output.

**Table 17** Debug APPN SCM Field Descriptions

Field	Description
APPN	APPN debugging output.
SCM	SCM component output.

### Related Command

**debug appn all**

## debug appn ss

Use the **debug appn ss EXEC** command to display session services (SS) events. The **no** form of this command disables debugging output.

**[no] debug appn ss**

### Usage Guidelines

The Session Services (SS) component generates unique session identifiers, activates and deactivates control point-to-control point (CP-CP) sessions, and assists LUs in initiating and activating LU-LU sessions.

### Sample Display

The following is sample output from the **debug appn ss** command. In this example CP-CP sessions between the router and another node are being activated.

```
Router# debug appn ss

Turned on event 100000FF
APPN: ----- SS ----- Deq ADJACENT_CP_CONTACTED message
APPN: ----- SS ----- Deq SESSST_SIGNAL message
APPN: ----- SS ----- Deq CP_CP_SESSION_ACT message
APPN: Sending ADJACENT_NN_1015 to SCM, adj_node_p=A6B980,cp_name=NETA.PATTY
APPN: ----- SS ----- Sending REQUEST_LAST_FRSN message to TRS
APPN: ----- SS ----- Receiving REQUEST_LAST_FRSN_RSP from TRS
APPN: ----- SS ----- Sending ACTIVE CP_STATUS CONLOSER message to DS
APPN: ----- SS ----- Sending ACTIVE CP_STATUS CONLOSER message to MS
APPN: ----- SS ----- Sending ACTIVE CP_STATUS CONLOSER message to TRS
APPN: ----- SS ----- Sending CP_CP_SESSION_ACT_RSP message to CCA TP
APPN: ----- SS ----- Sending PENDING ACTIVE CP_STATUS CONWINNER message to DS
APPN: ----- SS ----- Sending REQUEST_LAST_FRSN message to TRS
APPN: ----- SS ----- Receiving REQUEST_LAST_FRSN_RSP from TRS
APPN: ----- SS ----- Sending ACT_CP_CP_SESSION message to RCA TP
APPN: ----- SS ----- Deq ASSIGN_PCID message
APPN: ----- SS ----- Sending ASSIGN_PCID_RSP message to someone
APPN: ----- SS ----- Deq INIT_SIGNAL message
APPN: ----- SS ----- Sending REQUEST_COS_TPF_VECTOR message to TRS
APPN: ----- SS ----- Receiving an REQUEST_COS_TPF_VECTOR_RSP from TRS
APPN: ----- SS ----- Sending REQUEST_SINGLE_HOP_ROUTE message to TRS
APPN: ----- SS ----- Receiving an REQUEST_SINGLE_HOP_ROUTE_RSP from TRS
APPN: ----- SS ----- Sending ACTIVATE_ROUTE message to CS
APPN: ----- SS ----- Deq ACTIVATE_ROUTE_RSP message
APPN: ----- SS ----- Sending CINIT_SIGNAL message to SM
APPN: ----- SS ----- Deq ACT_CP_CP_SESSION_RSP message
APPN: -- SS----SS ssp00, act_cp_cp_session_rsp received, sense_code=0, cgid=5C,
ips@=A93790
APPN: Sending ADJACENT_NN_1015 to SCM, adj_node_p=A6B980,cp_name=18s
APPN: ----- SS ----- Sending ACTIVE CP_STATUS CONWINNER message to DS
APPN: ----- SS ----- Sending ACTIVE CP_STATUS CONWINNER message to MS
APPN: ----- SS ----- Sending ACTIVE CP_STATUS CONWINNER message to TRS
```

Table 18 describes fields in the **debug appn ss** output.

**Table 18      Debug APPN SS Field Descriptions**

<b>Field</b>	<b>Description</b>
APPN	APPN debugging output.
SS	SS component output.

Related Command

**debug appn all**

## debug appn trs

Use the **debug appn trs** EXEC command to display debugging information on APPN Topology and Routing Services (TRS) component activity. The **no** form of this command disables debugging output.

**[no] debug appn trs**

### Usage Guidelines

The Topology and Routing Services (TRS) component is responsible for creating and maintaining the topology database, creating and maintaining the class of service database, and computing and caching optimal routes through the network.

### Sample Display

The following is sample output from the **debug appn trs** command:

```
Router# debug appn trs

Turned on event 400000FF
APPN: ----- TRS ----- Received a QUERY_CPNAME
APPN: ----- TRS ----- Received a REQUEST_ROUTE
APPN: ----- TRS ----- check_node node_name=NETA.LISA
APPN: ----- TRS ----- check_node node_index=0
APPN: ----- TRS ----- check_node node_weight=60
APPN: ----- TRS ----- add index 484 to origin description list
APPN: ----- TRS ----- add index 0 to dest description list
APPN: ----- TRS ----- origin_tg_vector is NULL
APPN: ----- TRS ----- weight_to_origin = 0
APPN: ----- TRS ----- weight_to_dest = 0
APPN: ----- TRS ----- u_b_s_f weight = 30
APPN: ----- TRS ----- u_b_s_f prev_weight = 2147483647
APPN: ----- TRS ----- u_b_s_f origin_index = 484
APPN: ----- TRS ----- u_b_s_f dest_index = 0
APPN: ----- TRS ----- b_r_s_f weight = 30
APPN: ----- TRS ----- b_r_s_f origin_index = 484
APPN: ----- TRS ----- b_r_s_f dest_index = 0
APPN: ----- TRS ----- Received a REQUEST_ROUTE
APPN: ----- TRS ----- check_node node_name=NETA.LISA
APPN: ----- TRS ----- check_node node_index=0
APPN: ----- TRS ----- check_node node_weight=60
APPN: ----- TRS ----- check_node node_name=NETA.BART
APPN: ----- TRS ----- check_node node_index=484
APPN: ----- TRS ----- check_node node_weight=60
APPN: ----- TRS ----- add index 484 to origin description list
APPN: ----- TRS ----- add index 0 to dest description list
APPN: ----- TRS ----- origin_tg_weight to non-VN=30
APPN: ----- TRS ----- origin_node_weight to non-VN=60
APPN: ----- TRS ----- weight_to_origin = 90
APPN: ----- TRS ----- weight_to_dest = 0
APPN: ----- TRS ----- u_b_s_f weight = 120
APPN: ----- TRS ----- u_b_s_f prev_weight = 2147483647
APPN: ----- TRS ----- u_b_s_f origin_index = 484
APPN: ----- TRS ----- u_b_s_f dest_index = 0
APPN: ----- TRS ----- b_r_s_f weight = 120
APPN: ----- TRS ----- b_r_s_f origin_index = 484
APPN: ----- TRS ----- b_r_s_f dest_index = 0
```

Table 19 describes fields in the **debug appn trs** output.

**Table 19**      **Debug APPN TRS Field Descriptions**

<b>Field</b>	<b>Description</b>
APPN	APPN debugging output.
TRS	TRS component output.

Related Command

**debug appn all**