Configuring NAS Package for MGCP

This chapter provides information on configuring the Network Access Server (NAS) Package for MGCP feature. The feature adds support for the MGCP NAS package on universal gateways. Data calls can be terminated on a trunking media gateway that is serving as a NAS. Trunks on the NAS are controlled and managed by a call agent supporting MGCP for both voice and data calls. The call agent must support the MGCP NAS package.

Key feature benefits derive from the presence of universal ports that are able to terminate both voice and data calls under control of the MGCP call agent. These benefits include the following:

- Cost savings
  - Sharing of trunks (T1 or E1) for dial and voice services
  - Collapsed IP backbone infrastructure
  - Simplified operations and management
- Increased revenue
  - Optimized utilization of trunk (T1 or E1) resources
- Flexibility in deploying new services
- Flexibility in access network engineering

For more information about this and related Cisco IOS voice features, see the following:

- "Overview of MGCP and Related Protocols" on page 3
- Entire Cisco IOS Voice Configuration Library--including library preface and glossary, other feature documents, and troubleshooting documentation--at http://www.cisco.com/en/US/docs/ios/12_3/vvf_c/cisco_ios_voice_configuration_library_glossary/vcl.htm

Feature History for NAS Package for MGCP

Release	Modification
12.2(2)XB	This feature was introduced on the Cisco AS5350 and Cisco AS5400.
12.2(11)T	This feature was implemented on the Cisco AS5850.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Prerequisites for NAS Package for MGCP

Prerequisites are described in the "Prerequisites for Configuring MGCP and Related Protocols" section on page 3 . In addition, the following apply:

- Configure a data network.
- Configure MGCP.

Information About NAS Package for MGCP

This feature adds support for the Network Access Server Package for Media Gateway Control Protocol package on the Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateways. With this implementation, data calls can be terminated on a trunking media gateway that is serving as a network access server (NAS). Trunks on the NAS are controlled and managed by a call agent that supports Media Gateway Control Protocol (MGCP) for both voice and data calls. The call agent must support the MGCP NAS package.

These capabilities are enabled by the universal port functionality of the Cisco AS5350, Cisco AS5400, and Cisco AS5850, which allows these platforms to operate simultaneously as network access servers and voice gateways to deliver universal services on any port at any time. These universal services include dial access, real-time voice and fax, wireless data access, and unified communications.

The MGCP NAS package implements signals and events to create, modify, and tear down data calls. The events include signaling the arrival of an outbound call (IP to Public Switched Telephone Network [PSTN]) to the media gateway controller (call agent), reporting carrier loss and call authorization status, and receiving callback requests. The following types of calls can be terminated as data calls:

- Data within the voice band (analog modem)
- ISDN data (digital modem)
- Data over voice when using a call agent that recognizes this call type and delivers these calls as digital data to the NAS

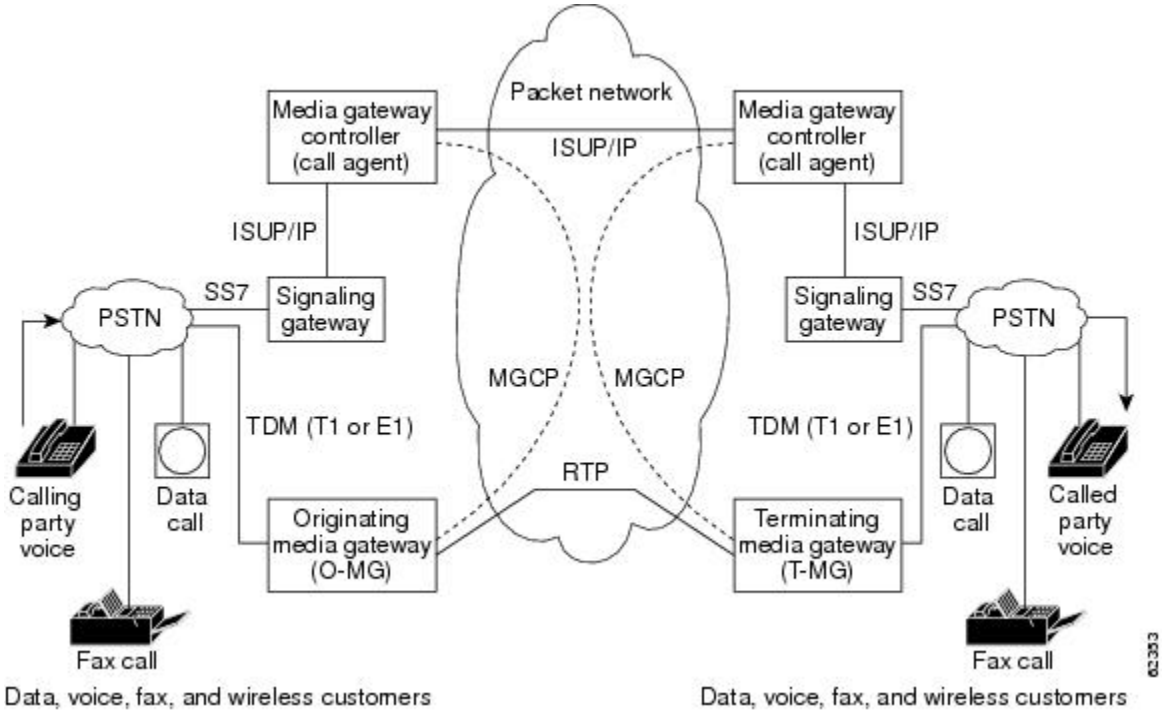
The NAS package provides MGCP capabilities for data calls on the Cisco AS5350, Cisco AS5400, and Cisco AS5850 that support all the dial-in and dial-out services, including the following:

- Virtual Private Network (VPN) with Layer 2 Tunneling Protocol (L2TP)
- Scalable Multichassis Multilink PPP (MMP) across multiple channels
- MGCP 1.0 and MGCP 0.1
- Call preauthentication with MGCP dial calls

Resource pool management can be used to manage dial ports when dialed number identification service (DNIS) preauthentication is enabled. The NAS returns an error with a preauthentication failure code to the call agent, which releases the call gracefully with a busy cause. Refer to the Cisco IOS Release 12.3 Configuration Guides and Command References , for more information about dial-pool management, and for more information about authentication, authorization, and accounting (AAA) preauthentication services.

The figure below shows a typical network topology for universal port media gateways.

Figure 1: Media Gateways Operating As Network Access Servers



How to Configure NAS Package for MGCP

With the Network Access Server Package for Media Gateway Control Protocol feature, the NAS supports both data and voice calls, which can be managed from a single call agent that supports MGCP with the NAS package. The NAS package provides the interface to a call agent (media gateway controller) for handling modem calls that terminate on the NAS and that originate from the PSTN, including callback requests. Results of AAA authorization and preauthorization requests from the NAS are reported to the call agent as notifications.

See the following sections for configuration tasks for the Network Access Server Package for Media Gateway Control Protocol feature. Each task in the list is identified as either required or optional.

Configuring the NAS for MGCP

In this task, MGCP is configured on the trunking gateway (NAS), and the NAS package is set as the default package. The steps that are listed are the minimum needed to configure MGCP on the NAS. For more commands and optional settings for MGCP, see the documents listed in the "Related Documents" section on page xi .

To configure the NAS Package for MGCP feature, use the following commands in global configuration mode:

SUMMARY STEPS

1. **mgcp** [*gw-port*]
2. **mgcp call-agent** {*dns-name* | *ip-address*} [*ca-port*] [**service-type** *type*] [**version** *protocol-version*]
3. **mgcp default-package nas-package**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**mgcp** [*gw-port*] **Example:** `Router(config)# mgcp [gw-port ]`	Allocates resources for MGCP and starts the MGCP daemon. If no port is specified, the command defaults to port 2427.
Step 2	**mgcp call-agent** {*dns-name* | *ip-address*} [*ca-port*] [**service-type** *type*] [**version** *protocol-version*] **Example:** `Router(config)# mgcp call-agent {dns-name | ip-address } [ca-port ] [service-type type ] [version protocol-version ]`	Configures the gateway with the address and protocol of the call agent (media gateway controller). Make sure to specify a call agent that supports the NAS package.
Step 3	**mgcp default-package nas-package** **Example:** `Router(config)# mgcp default-package nas-package`	(Optional) Defines the default package to be used for MGCP signaling. For this feature, specify the NAS-Package. Default generally used on trunking gateways is Trunk-Package and can be left unchanged.

Configuring Controllers

In this task, in addition to the standard controller commands, you configure a T1 or E1 controller for external signaling control by MGCP. You can also set the AAA preauthentication timer to expire after a certain number of milliseconds have elapsed without a response from the AAA server and indicate whether the call should be accepted or rejected if no response occurs before the timer expires.

To configure a controller to use the Network Access Server Package for Media Gateway Control Protocol feature, use the following commands beginning in global configuration mode:

SUMMARY STEPS

1. **controller** {**t1** | **e1**} *slot/port*
2. Do one of the following:
   - **framing** {**sf** | **esf**}
   - for TI lines
   - or for E1 lines
   - **framing** {**crc4** | **no-crc4**} [**australia**]
3. **extsig mgcp**
4. **guard-timer** *milliseconds* [**on-expiry** {**accept** | **reject**}]
5. Do one of the following:
   - **linecode** {**ami** | **b8zs**}
   - for T1 lines
   - or for E1 lines
   - **linecode** {**ami** | **hdb3**}
6. **ds0-group** *channel-number* **timeslots** *range* **type none service mgcp**
7. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**controller** {**t1** | **e1**} *slot/port* **Example:** `Router(config)# controller {t1 | e1} slot/port`	Configures a T1 or E1 controller and enters controller configuration mode.

Step 2	Do one of the following:
	• **framing** {**sf** | **esf**}
	• for TI lines
	• or for E1 lines
	• **framing** {**crc4** | **no-crc4**} [**australia**]
	Example:
	`Router(config-controller)# framing {sf | esf}`
	Example:
	Example:
	`Router(config-controller)# framing {crc4 | no-crc4} [australia]`
		Selects the frame type for the T1 or E1 trunk.
		T1 default is **sf**. E1 default is **crc4**.

	Command or Action	Purpose
Step 3	**extsig mgcp** **Example:** `Router(config-controller)# extsig mgcp`	Configures external signaling control by MGCP for this controller. For T3 trunks, each logical T1 must be configured with the **extsig mgcp**command.
Step 4	**guard-timer** *milliseconds* [**on-expiry** {**accept** | **reject**}] **Example:** `Router(config-controller)# guard-timer milliseconds [on-expiry {accept | reject}]`	(Optional) Sets a guard timer for the number of milliseconds to wait for a AAA server to respond to a preauthentication request before expiring. Also specifies the default action to take when the timer expires without a response from AAA.

Step 5	Do one of the following:
	• **linecode** {**ami** | **b8zs**}
	• for T1 lines
	• or for E1 lines
	• **linecode** {**ami** | **hdb3**}
	Example:
	`Router(config-controller)# linecode {ami | b8zs}`
	Example:
	Example:
	`Router(config-controller)# linecode {ami | hdb3}`
		Specifies the line encoding to use.
		T1 default is **ami**. E1 default is **hdb3**.

Step 6	**ds0-group** *channel-number* **timeslots** *range* **type none service mgcp**
	Example:
	`Router(config-controller)# ds0-group channel-number`
	Example:
	`timeslots range type none service mgcp`
		Specifies the DS0 time slots that make up a logical voice port on a T1 or E1 controller and specifies the signaling type by which the router connects to the PBX or PSTN.

Step 7	**exit**
	Example:
	`Router(config-controller)#`
	`exit`
		Exits the current mode.

Configuring Dialer Interfaces and Routing

This set of tasks configures dial-on-demand routing (DDR) on a dialer interface that is under external call control by MGCP.

DDR refers to a collection of Cisco features that allows two or more Cisco routers to establish a dynamic connection over simple dial-up facilities to route packets and exchange routing updates on an as-needed basis. DDR is used for low-volume, periodic network connections over the PSTN or an ISDN. A connection is automatically established whenever interesting traffic is detected; during configuration you define what constitutes interesting traffic.

ISDN B channels, synchronous serial interfaces, and asynchronous interfaces can all be converted to dialer interfaces using dialer interface configuration commands.

DDR provides several functions. First, DDR spoofs, or pretends, that there are established configured routes to provide the image of full-time connectivity using the dialer interfaces. When the routing table forwards a packet to a dialer interface, DDR filters out the interesting packets for establishing, maintaining, and releasing switched connections. Internetworking is achieved over the DDR-maintained connection using PPP or other WAN encapsulation techniques.

The encapsulation methods available depend on the physical interface being used. Cisco supports PPP, High-Level Data Link Control (HDLC), Serial Line Internet Protocol (SLIP), and X.25 data-link encapsulations for DDR. PPP is the recommended encapsulation method because it supports multiple protocols and is used for synchronous, asynchronous, or ISDN connections. In addition, PPP performs address negotiation and authentication, and it is interoperable with different vendors.

There are two ways of setting up addressing on dialer interfaces:

- Applying a subnet to the dialer interfaces--Each site with a dialer interface is given a unique node address on a shared subnet for use on its dialer interface. This method is similar to numbering a LAN or multipoint WAN, and it simplifies the addressing scheme and creation of static routes.
- Using unnumbered interfaces--Similar to using unnumbered addressing on leased-line point-to-point interfaces, the address of another interface on the router is borrowed for use on the dialer interface. Unnumbered addressing takes advantage of the fact that there are only two devices on the point-to-point link.

DDR uses manually entered static network protocol routes. This eliminates the use of a routing protocol that broadcasts routing updates across the DDR connection, causing unnecessary connections.

Similar to the function provided by an Address Resolution Protocol (ARP) table, dialer map statements translate next-hop protocol addresses to telephone numbers. Without statically configured dialer maps, DDR call initiation cannot occur. When the routing table points at a dialer interface, and the next-hop address is not found in a dialer map, the packet is dropped.

Authentication in DDR network design provides two functions: security and dialer state. As most DDR networks connect to the PSTN, it is imperative that a strong security model be implemented to prevent unauthorized access to sensitive resources. Authentication also allows the DDR code to keep track of what sites are currently connected and provides for building of Multilink PPP bundles.

In summary, the following main tasks are involved in configuring the dialer interface and routing:

- Specification of interesting traffic--What traffic type should enable the link?
- Definition of static routes--What route do you take to get to the destination?

- Configuration of dialer information--What number do you call to get to the next-hop router, and what service parameters do you use for the call?

For MGCP NAS, configuration of dialer interfaces entails the use of the **dialer extsig** command in interface configuration mode, which enables the External Call Service Provider (XCSP) subsystem to provide an interface between the Cisco IOS software and the MGCP protocol. The XCSP subsystem enables services such as modem call setup and teardown for the dialer interface.

To configure the dialer interface and routing, use the following commands beginning in global configuration mode:

SUMMARY STEPS

1. **interface** *dialer-name*
2. Do one of the following:
   - **ip unnumbered** *interface-number*
   -
   - **ip address** *ip-address subnet-mask* [**secondary**]
3. **encapsulation ppp**
4. **dialer in-band** [**no-parity** | **odd-parity**]
5. **dialer idle-timeout** *seconds* [**inbound** | **either**]
6. **dialer map** *protocol next-hop-address* [**name** *host-name*] [*dial-string*[**:** *isdn-subaddress*]]
7. **dialer extsig**
8. **dialer-group** *number*
9. **no cdp enable**
10. **ppp authentication chap**
11. **exit**
12. **dialer list** *number* **protocol** *protocol-name* {**permit** | **deny** [**list** *access-list-number* | *access-group*]}
13. **ip route** *prefix mask* {*ip-address* | *interface-type interface-number*} [*distance*] [**tag** *tag*] [**permanent**]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**interface** *dialer-name* **Example:** `Router(config)# interface dialer-name`	Enters interface mode for the dialer interface.
Step 2	Do one of the following: • **ip unnumbered** *interface-number* • • **ip address** *ip-address subnet-mask* [**secondary**] **Example:** `Router(config-if)# ip unnumbered interface-number` **Example:**	Enables IP processing on the dialer interface, configures the dialer interface not to have an explicit IP address, and assigns the IP address of the loopback interface instead. This command helps conserve IP addresses.

	Command or Action	Purpose
	Example: `Router(config-if)# ip address ip-address subnet-mask [secondary]`	
Step 3	**encapsulation ppp** **Example:** `Router(config-if)# encapsulation ppp`	Sets encapsulation type for PPP.

Step 4	**dialer in-band** [**no-parity** | **odd-parity**]
	Example:
	`Router(config-if)#`
	`dialer in-band [no-parity | odd-parity]`
		Specifies that dial-on-demand routing (DDR) is to be supported. The **in-band** keyword specifies that the same interface that sends the data performs call setup and teardown operations between the router and an external dialing device such as a modem.
		By default, no parity is applied to the dialer string.

Step 5	**dialer idle-timeout** *seconds* [**inbound** | **either**] **Example:** `Router(config-if)# dialer idle-timeout seconds [inbound | either]`	Specifies the duration of idle time before a line is disconnected. Default direction is outbound. Default idle time is 120 seconds.
Step 6	**dialer map** *protocol next-hop-address* [**name** *host-name*] [*dial-string*[**:** *isdn-subaddress*]] **Example:** `Router(config-if)# dialer map protocol next-hop-address [name host-name] [dial-string [:isdn-subaddress]]`	Configures a serial interface to make digital calls or to accept incoming calls from a specified location and to authenticate if so configured.

Step 7	**dialer extsig**
	Example:
	`Router(config-if)#`
	`dialer extsig`
		Specifies an interface for the initiation and termination of digital calls for external signaling protocols. Only one dialer with external signaling per NAS is permitted.

Step 8	**dialer-group** *number* **Example:** `Router(config-if)# dialer-group number`	Controls access by configuring an interface to belong to a specific dialing group.

	Command or Action	Purpose
Step 9	**no cdp enable** **Example:** `Router(config-if)# no cdp enable`	Disables Cisco Discovery Protocol (CDP) on the interface.
Step 10	**ppp authentication chap** **Example:** `Router(config-if)# ppp authentication chap`	Enables Challenge Handshake Authentication Protocol (CHAP) authentication on the interface.
Step 11	**exit** **Example:** `Router(config-if)# exit`	Exits the current mode.
Step 12	**dialer list** *number* **protocol** *protocol-name* {**permit** | **deny** [**list** *access-list-number* | *access-group*]} **Example:** `Router(config)# dialer list number protocol protocol-name {permit | deny [list access-list-number | access-group]}`	Defines a DDR dialer list for dialing by protocol or by a combination of a protocol and a previously defined access list. Each dialer interface can have only one dialer group, but the same dialer list can be assigned to multiple interfaces (using the **dialer-group** command).
Step 13	**ip route** *prefix mask* {*ip-address* | *interface-type interface-number*} [*distance*] [**tag** *tag*] [**permanent**] **Example:** `Router(config)# ip route prefix mask {ip-address | interface-type interface-number} [distance] [tag tag] [permanent]`	Establishes a static route. Because you do not want dynamic routing protocols running across the DDR links, you manually configure static routes.

Verifying the NAS Package for MGCP

To verify configuration, use the following commands.

SUMMARY STEPS

1. Use the following command to display the running configuration to verify configured parameters for MGCP, controllers, dialer interfaces, and routing:
2. Use the following command to display MGCP configurations for NAS:

DETAILED STEPS

Step 1 Use the following command to display the running configuration to verify configured parameters for MGCP, controllers, dialer interfaces, and routing:

Example:

```
Router# show running-configuration
```

The following example shows the configuration for serial interface 1:

Example:

```
Router# show running-configuration interface serial 1
Building configuration...
Current configuration:
!
interface Serial1
no ip address
no ip directed-broadcast
no ip route-cache
no ip mroute-cache
shutdown
!
end
```

Step 2 Use the following command to display MGCP configurations for NAS:

Example:

```
Router# show mgcp nas
 {dump
 slot
 port
 channel |
info
```

The following is sample output from the **show mgcp nas dump** command:

Example:

```
Router# show mgcp nas dump 7 0 23
Slot 7 state= Up
Port 0 state= Up
State  Idle  PortCb=0x630DE864 ss_id=0x0 handle=0x0
bearer cap=Modem call_id= conn_id=
Events req-
4d21h:
 callp=0x62D137D4 - state=MGCP_CALL_IDLE - data_call No
Endpt name=S7/DS1-0/23
```

The following is sample output from the **show mgcp nas info** command:

Example:

```
Router# show mgcp nas info
Slot 7 state= Up
Port 0 state= Up
ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID XX XX XX
XX XX XX XX XX
Channel State Legend
```

```
NP=Not Present, OO=Out Of Service, ID=Idle, US=In Use
CI=Connection in progress, RI=In Release in progress
RO=Out Release in progress, DN=Down, SH=Shutdown
XX=Unconfigurable
```

Troubleshooting Tips

In addition, a number of **show** and **debug** commands are useful for troubleshooting the Network Access Server Package for Media Gateway Control Protocol feature. These commands are listed in the following sections:

MGCP Troubleshooting

To display detailed information on the MGCP application and operations, use the following commands in privileged EXEC mode:

Command	Purpose
show mgcp nas info `Router# show mgcp nas info`	Displays status of the MGCP data channels. See Example Output for show mgcp nas info Command, on page 13.
show mgcp nas dump *slot port chan* `Router# show mgcp nas dump slot port chan`	Displays status and details about the specified MGCP data slot, port, and channel. See Example Output for show mgcp nas dump Command, on page 13.
show mgcp connection `Router# show mgcp connection`	Displays active MGCP connections on the router. See Example Output for show mgcp connection Command, on page 13.
show xcsp slot *slot-num* `Router# show xcsp slot slot-num`	Displays the status of a router slot under the control of the External Call Service Provider (XCSP) subsystem. See Example Output for show xcsp slot Command, on page 14.

Command	Purpose
show xcsp port *slot port* `Router# show xcsp port slot port`	Displays the status of a port under the control of the External Call Service Provider (XCSP) subsystem. See Example Output for show xcsp port Command, on page 14.
show cdapi `Router# show cdapi`	Displays information about the call distributor application programming interface (CDAPI), which is the internal API that provides an interface between the MGCP signaling stacks and applications. See Example Output for show cdapi Command, on page 14.

Example Output for show mgcp nas info Command

The following is sample output from the **show mgcp nas info** command:

```
Router# show mgcp nas info
Slot 7 state= Up
Port 0 state= Up
ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID ID XX XX XX
XX XX XX XX XX
Channel State Legend
NP=Not Present, OO=Out Of Service, ID=Idle, US=In Use
CI=Connection in progress, RI=In Release in progress
RO=Out Release in progress, DN=Down, SH=Shutdown
XX=Unconfigurable
```

Example Output for show mgcp nas dump Command

The following is sample output from the **show mgcp nas dump** command:

```
Router# show mgcp nas dump 7 0 23
Slot 7 state= Up
Port 0 state= Up
State  Idle  PortCb=0x630DE864 ss_id=0x0 handle=0x0
bearer cap=Modem call_id= conn_id=
Events req-
4d21h:
 callp=0x62D137D4 - state=MGCP_CALL_IDLE - data_call No
Endpt name=S7/DS1-0/23
```

Example Output for show mgcp connection Command

The following is sample output from the **show mgcp connection** command for Voice over IP (VoIP) connections:

```
Router# show mgcp connection
Endpoint   Call_ID(C) Conn_ID(I) (P)ort (M)ode (S)tate (C)odec (E)vent[SIFL] (R)esult[EA]
1. S0/DS1-0/1 C=103,23,24 I=0x8 P=16586,16634 M=3 S=4,4 C=5 E=2,0,0,2 R=0,0
2. S0/DS1-0/2 C=103,25,26 I=0x9 P=16634,16586 M=3 S=4,4 C=5 E=0,0,0,0 R=0,0
3. S0/DS1-0/3 C=101,15,16 I=0x4 P=16506,16544 M=3 S=4,4 C=5 E=2,0,0,2 R=0,0
4. S0/DS1-0/4 C=101,17,18 I=0x5 P=16544,16506 M=3 S=4,4 C=5 E=0,0,0,0 R=0,0
5. S0/DS1-0/5 C=102,19,20 I=0,6 P=16572,16600 M=3 S=4,4 C=5 E=2,0,0,2 R=0,0
```

```
6. S0/DS1-0/6 C=102,21,22 I=0x7 P=16600,16572 M=3 S=4,4 C=5 E=0,0,0,0 R=0,0
Total number of active calls 6
```

The following is sample output from the **show mgcp connection** command for VoAAL2 connections:

```
Router# show mgcp connection
Endpoint  Call_ID(C) Conn_ID(I)(V)cci/cid (M)ode (S)tate (C)odec (E)vent[SIFL] (R)esult[EA]
1.aaln/S1/1   C=1,11,12    I=0x2    V=2/10     M=3    S=4,4    C=1    E=3,0,0,3     R=0,0
Total number of active calls 1
```

Example Output for show xcsp slot Command

The following is sample output from the **show xcsp slot** command:

```
Router# show xcsp slot 1
Slot 1 configured
Number of ports configured=1 slot state= Up
```

Example Output for show xcsp port Command

The following is sample output for the **show xcsp port** command:

```
Router# show xcsp port 1 0
Slot 1 configured
Number of ports configured=1 slot state= Up
==================================================
Port 0 State= Up type = 5850 24 port T1
Channel states
  0  Idle
  1  Idle
  2  Idle
  3  Idle
  4  Idle
  5  Idle
  6  Idle
  7  Idle
  8  Idle
  9  Idle
  10  Idle
  11  Idle
  12  Idle
  13  Idle
  14  Idle
  15  Idle
  16  Idle
  17  Idle
  18  Idle
  19  Idle
  20  Idle
  21  Idle
  22  Idle
  23  Idle
```

Example Output for show cdapi Command

The following is output for the **show cdapi** command:

```
Router# show cdapi
Registered CDAPI Applications/Stacks
====================================
Application TSP CDAPI Application
```

```
Application Type(s) Voice Facility Signaling
Application Level Tunnel
Application Mode Enbloc
Signaling Stack ISDN
Interface Se023
Signaling Stack ISDN
Interface Se123
Active CDAPI Calls
==================
Interface Se023
No active calls.
Interface Se123
Call ID = 0x39, Call Type = VOICE, Application = TSP CDAPI Application
CDAPI Message Buffers
=====================
Used Msg Buffers 0, Free Msg Buffers 1600
Used Raw Buffers 1, Free Raw Buffers 799
Used Large-Raw Buffers 0, Free Large-Raw Buffers 80
scarlatti1#
```

MGCP Debugging

To debug MGCP calls, events, and operations, use the following commands in privileged EXEC mode:

Command	Purpose
debug mgcp all `Router# debug mgcp all`	Enables all MGCP debugs. See Example Output for debug mgcp all Command, on page 16.
debug mgcp events `Router# debug mgcp events`	Enables MGCP events debugging, which shows information such as the following: whether the router is detected, the MGCP event that initiates a call, and the reset of an controller that is being serviced by MGCP. See Example Output for debug mgcp events Command, on page 16.
debug mgcp packets `Router# debug mgcp packets`	Enables debugging of MGCP packets. Useful for displaying contents of NTFY, CRCX, DLCX, and other packets. See Example Output for debug mgcp packets Command, on page 16.
debug mgcp parser `Router# debug mgcp parser`	Enables debugging of MGCP parser and builder. Useful to determine whether NTFY, CRCX, and other packets have the format that the router expects. See Example Output for debug mgcp parser Command, on page 17.

Command	Purpose
debug mgcp nas `Router# debug mgcp nas`	Enables debugging for MGCP data channels and events. See Example Output for debug mgcp nas Command, on page 17.
debug xcsp {**all** | **cot** | **event** } `Router# debug xcsp {all | cot | event}`	Enables reporting of the exchange of signaling information between the MGCP protocol stack and end applications, such as call switching module (CSM) and dialer. See Example Output for debug xcsp Command, on page 17.
debug cdapi {**detail** | **events**} `Router# debug cdapi {detail | events}`	Displays real-time information about the call distributor application programming interface (CDAPI). See Example Output for debug cdapi Command, on page 19.

Example Output for debug mgcp all Command

The **debug mgcp all** command and keyword would show a compilation of all this output, including the **debug mgcp voipcac** command and keyword output. Note that using the **debug mgcp all** command and keyword may severely impact network performance.

Example Output for debug mgcp events Command

The following example illustrates the output from the **debug mgcp events** command and keyword:

```
Router# debug mgcp events
Media Gateway Control Protocol events debugging is on
Router#
1w1d: MGC stat - 172.19.184.65, total=44, succ=7, failed=21
1w1d: MGCP msg 1
1w1d: remove_old_under_specified_ack:
1w1d: MGC stat - 172.19.184.65, total=44, succ=8, failed=21
1w1d: updating lport with 2427setup_ipsocket: laddr=172.29.248.193, lport=2427,
faddr=172.19.184.65, fport=2427
1w1d: enqueue_ack: ackqhead=0, ackqtail=0, ackp=1DC1D38, msg=21A037C
```

Example Output for debug mgcp packets Command

The following example illustrates the output from the **debug mgcp packets**command and keyword:

```
Router# debug mgcp packets
Media Gateway Control Protocol packets debugging is on
Router#
1w1d: MGCP Packet received -
DLCX 408631346 * MGCP 0.1
1w1d: send_mgcp_msg, MGCP Packet sent --->
1w1d: 250 408631346
<---
```

Example Output for debug mgcp parser Command

The following example illustrates the output from the **debug mgcp parser** command and keyword:

```
Router# debug mgcp parser
Media Gateway Control Protocol parser debugging is on
Router#
1w1d: -- mgcp_parse_packet() - call mgcp_parse_header
- mgcp_parse_header()- Request Verb FOUND DLCX
- mgcp_parse_packet() - out mgcp_parse_header
- SUCCESS: mgcp_parse_packet()- MGCP Header parsing was OK
- mgcp_val_mandatory_parms()
- SUCCESS: mgcp_parse_packet()- END of Parsing
1w1d: -- mgcp_build_packet()-
1w1d: - mgcp_estimate_msg_buf_length() - 87 bytes needed for header
- mgcp_estimate_msg_buf_length() - 87 bytes needed after checking parameter lines
- mgcp_estimate_msg_buf_length() - 87 bytes needed after checking SDP lines
- SUCCESS: MGCP message building OK
- SUCCESS: END of building
```

Example Output for debug mgcp nas Command

The following example displays output for the **debug mgcp nas** command and keyword, with the **debug mgcp packets**command and keyword enabled as well:

```
Router# debug mgcp nas
Media Gateway Control Protocol nas pkg events debugging is on
Router# debug mgcp packets
Media Gateway Control Protocol packets debugging is on
Router#
01:49:14:MGCP Packet received -
CRCX 58 S7/DS1-0/23 MGCP 1.0
X:57
 M:nas/data
 C:3
 L:b:64, nas/bt:modem, nas/cdn:3000, nas/cgn:1000
mgcp_parse_conn_mode :string past nas = data
mgcp_chq_nas_pkg:Full string:nas/bt:modem
mgcp_chq_nas_pkg:string past slash:bt
mgcp_chq_nas_pkg:string past colon:modem
mgcp_chq_nas_pkg:Full string:nas/cdn:3000
mgcp_chq_nas_pkg:string past slash:cdn
mgcp_chq_nas_pkg:string past colon:3000
mgcp_chq_nas_pkg:Full string:nas/cgn:1000
c5400#
mgcp_chq_nas_pkg:string past slash:cgn
mgcp_chq_nas_pkg:string past colon:1000
CHECK DATA CALL for S7/DS1-0/23
 mgcpapp_xcsp_get_chan_cb -Found - Channel state  Idle
 CRCX Recv
mgcpapp_endpt_is_data:endpt S7/DS1-0/23, slot 7, port 0 chan 23
 mgcpapp_data_call_hnd:mgcpapp_xcsp_get_chan_cb -Found - Channel state  Idle
bw=64, bearer=E1,cdn=3000,cgn=1000
```

Example Output for debug xcsp Command

The following examples show output for the **debug xcsp all** command and keyword and the **debug xcsp event** command and keyword:

```
Router# debug xcsp all
xcsp all debugging is on
```

```
Router# debug xcsp event
xcsp events debugging is on
01:49:14:xcsp_call_msg:Event  Call Indication , channel state =  Idle  for slot port channel
 7
c5400# 0 23
01:49:14:xcsp_process_sig_fsm:state/event  Idle / Call Indication
01:49:14:xcsp_incall:
01:49:14:xcsp_incall CONNECT_IND:cdn=3000 cgn=1000
01:49:14:xcsp:START guard TIMER
01:49:14:xcsp_fsm:slot 7 port 0 chan 23 oldstate =  Idle  newstate= Connection
in progress mgcpapp_process_mgcp_msg PROCESSED NAS PACKAGE EVENT
01:49:14:Received message on XCSP_CDAPI
01:49:14:process_cdapi_msg :slot/port/channel 7/0/23
01:49:14: process_cdapi_msg:new  slot/port/channel 7/0/23
01:49:14:
c5400#Received CONN_RESP:callid=0x7016
01:49:14:process_cdapi:Event CONN_RESP, channel state = 8 for slot port channel 7 0 23
01:49:14:xcsp_process_sig_fsm:state/event  Connection in progress / In Call accept
 mgcpapp_xcsp_alert:
 mgcpapp_xcsp_get_chan_cb -Found - Channel state  Connection in progress
200 58  Alert
I:630AED90
<---:Ack send SUCCESSFUL
01:49:14:xcsp_fsm:slot 7 p
c5400#ort 0 chan 23 oldstate =  Connection in progress  newstate= Connection in progress
01:49:14:Received message on XCSP_CDAPI
01:49:14:process_cdapi_msg :slot/port/channel 7/0/23
01:49:14: process_cdapi_msg:new  slot/port/channel 7/0/23
01:49:14: Received CALL_CONN:callid=0x7016
01:49:14:process_cdapi:Event CONN_, channel state = 8 for slot port channel 7
0 23
01:49:14:xcsp_process_sig_fsm:state/event  Connection in progress / in call connect
 mgcpapp_xcsp_connect:
 mgcpapp_xc
c5400#sp_get_chan_cb -Found - Channel state In Use
01:49:14:STOP TIMER
01:49:14:xcsp_fsm:slot 7 port 0 chan 23 oldstate =  Connection in progress
newstate=In Use
c5400#
01:50:23:Received message on XCSP_CDAPI
01:50:23:process_cdapi_msg :slot/port/channel 7/0/23
01:50:23: process_cdapi_msg:new  slot/port/channel 7/0/23
01:50:23: Received CALL_DISC_REQ:callid=0x7016
01:50:23:process_cdapi:Event DISC_CONN_REQ, channel state = 7 for slot port
channel 7 0 23
01:50:23:xcsp_process_sig_fsm:state/event In Use / release Request
 mgcpapp_xcsp_disconnect
 mgcpapp_xcsp_get_chan_cb -Fou
c5400#nd - Channel state In Use
01:50:23:send_mgcp_msg, MGCP Packet sent --->
01:50:23:RSIP 1 *@c5400 MGCP 1.0
RM:restart
.
DLCX 4 S7/DS1-0/23 MGCP 1.0
C:3
I:630AED90
E:801 /NAS User request
<---
01:50:23:xcsp_fsm:slot 7 port 0 chan 23 oldstate = In Use  newstate=Out
Release in progress
 xcsp_restart Serial7/0:22 vc = 22
 xcsp_restart Put idb Serial7/0:22 in down state
01:50:23:MGCP Packet received -
200 4 bye
```

```
 Data call ack received callp=0x62AEEA70mgcpapp_xcsp
c5400#_ack_recv:mgcpapp_xcsp_get_chan_cb -Found - Channel state Out Release in progress
mgcpapp_xcsp_ack_recv ACK 200 rcvd:transaction id = 4 endpt=S7/DS1-0/23
01:50:23:xcsp_call_msg:Event  Release confirm , channel state = Out Release in progress for
 slot port channel 7 0 23
01:50:23:xcsp_process_sig_fsm:state/event Out Release in progress/ Release confirm
01:50:23:STOP TIMER
01:50:23:xcsp_fsm:slot 7 port 0 chan 23 oldstate = Out Release in progress
newstate= Idle
```

Example Output for debug cdapi Command

The following example shows output for the **debug cdapi** command:

```
003909 ISDN Se123 RX <- SETUP pd = 8 callref = 0x06BB
003909 Bearer Capability i = 0x9090A2
003909 Channel ID i = 0xA18381
003909 Facility i =
0x9FAA068001008201008B0100A1180202274C020100800F534341524C415454492D3530303733
003909 Progress Ind i = 0x8183 - Origination address is non-ISDN
003909 Calling Party Number i = 0xA1, '50073'
003909 Called Party Number i = 0xC1, '3450070'
003909 CDAPI Se123 TX -> CDAPI_MSG_CONNECT_IND to TSP CDAPI Application call = 0x24
003909 From Appl/Stack = ISDN
003909 Call Type = VOICE
003909 B Channel = 0
003909 Cause = 0
003909 Calling Party Number = 50073
003909 Called Party Number = 3450070
003909 CDAPI Se123 TX -> CDAPI_MSG_CONNECT_RESP to ISDN call = 0x24
003909 From Appl/Stack = TSP CDAPI Application
003909 Call Type = VOICE
003909 B Channel = 0
003909 Cause = 0
003909 CDAPI-ISDN Se123 RX <- CDAPI_MSG_CONNECT_RESP from TSP CDAPI Application call = 0x24
003909 Call Type = VOICE
003909 B Channel = 0
003909 Cause = 0
003909 CDAPI Se123 TX -> CDAPI_MSG_SUBTYPE_CALL_PROC_REQ to ISDN call = 0x24
003909 From Appl/Stack = TSP CDAPI Application
003909 Call Type = VOICE
003909 B Channel = 0
003909 Cause = 0
003909 CDAPI-ISDN Se123 RX <- CDAPI_MSG_SUBTYPE_CALL_PROC_REQ from TSP CDAPI Application
call = 0x24
003909 Call Type = VOICE
003909 B Channel = 0
003909 Cause = 0
003909 ISDN Se123 TX -> CALL_PROC pd = 8 callref = 0x86BB
003909 Channel ID i = 0xA98381
```

Controller Troubleshooting

The commands in this section can be helpful in finding sources of problems with call connections and switching. The call switching module (CSM) associated with a controller contains digit collection logic that processes incoming calls for automatic number information (ANI) and dialed number identification service (DNIS) digits.

To display information on controller and CSM configuration and operation, use the following commands in privileged EXEC mode.

Command	Purpose
show controllers t1 | **e1** [*slot* / *port*] Router# show controllers t1 | e1 [*slot*/*port*]	Displays whether the T1 or E1 connection between the router and switch (central office [CO] or PBX) is up or down and whether the connection is functioning properly. See Example Output for show controllers e1 or t1 Command, on page 20.
show voice port [*slot* / *port*] Router# show voice port [*slot* /*port*]	Displays the port state and the parameters configured on the voice ports of Cisco voice interface cards. Voice-port defaults, like all command-line interface default parameters, do not display in the output for the **show running-config**command, but they can be seen with the **show voice port** command. See Example Output for show voice port Command, on page 22.
show csm modem [*slot/port* | *modem-group-number*] Router# show csm modem [*slot* /*port* | *modem-group-number*]	Displays the CSM call statistics for a specific modem, for a group of modems, or for all modems.
debug csm modem [*slot/port* | **group** *modem-group-number*] Router# debug csm modem [*slot* /*port* | group *modem-group-number*]	Traces the complete sequence of switching of incoming and outgoing modem call.

Example Output for show controllers e1 or t1 Command

The following is an output example from the **show controllers e1** command on the Cisco 7500 series:

```
Router# show controllers e1
e1 0/0 is up.
Applique type is Channelized E1 - unbalanced
Framing is CRC4, Line Code is HDB3
No alarms detected.
Data in current interval (725 seconds elapsed):
0 Line Code Violations, 0 Path Code Violations
0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
Total Data (last 24 hours)
0 Line Code Violations, 0 Path Code Violations,
```

```
0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins,
0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
```

The following is an example of the **show controllers e1** display including the board identifier type:

```
Router# show controllers e1
E1 4/1 is up.
No alarms detected.
  Framing is CRC4, Line Code is hdb3
Data in current interval (0 seconds elapsed):
0 Line Code Violations, 0 Path Code Violations 0 Slip Secs, 0 Fr Loss Secs,
0 Line Err Secs, 0 Degraded Mins 0 Errored Secs, 0 Bursty Err Secs,
0 Severely Err Secs, 0 Unavail Secs
Total Data (last 79 15 minute intervals):
0 Line Code Violations, 0 Path Code Violations, 0 Slip Secs, 0 Fr Loss Secs,
0 Line Err Secs, 0 Degraded Mins, 0 Errored Secs, 0 Bursty Err Secs,
0 Severely Err Secs, 0 Unavail Secs
```

The following is an example from the **show controllers t1** command on the Cisco 7500 series routers:

```
Router# show controllers t1
T1 4/1 is up.
No alarms detected.
  Framing is ESF, Line Code is AMI, Clock Source is line
Data in current interval (0 seconds elapsed):
0 Line Code Violations, 0 Path Code Violations 0 Slip Secs, 0 Fr Loss Secs,
0 Line Err Secs, 0 Degraded Mins 0 Errored Secs, 0 Bursty Err Secs,
0 Severely Err Secs, 0 Unavail Secs
Total Data (last 79 15 minute intervals):
0 Line Code Violations, 0 Path Code Violations, 0 Slip Secs, 0 Fr Loss Secs,
0 Line Err Secs, 0 Degraded Mins, 0 Errored Secs, 0 Bursty Err Secs,
0 Severely Err Secs, 0 Unavail Secs
```

The following example shows the status of the T1 controllers connected to the Cisco AS5800 access servers:

```
Router# show controller T1
T1 1/0/0:1 is up.
No alarms detected.
Framing is ESF, Line Code is AMI, Clock Source is Line.
Data in current interval (770 seconds elapsed):
5 Line Code Violations, 8 Path Code Violations
0 Slip Secs, 0 Fr Loss Secs, 7 Line Err Secs, 0 Degraded Mins
0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 7 Unavail Secs
Total Data (last 81 15 minute intervals):
7 Line Code Violations, 4 Path Code Violations,
6 Slip Secs, 20 Fr Loss Secs, 2 Line Err Secs, 0 Degraded Mins,
0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 2 Unavail Secs
T1 1/0/1:5 is down.
Transmitter is sending remote alarm.
Receiver has loss of frame.
Framing is SF, Line Code is AMI, Clock Source is Line.
Data in current interval (770 seconds elapsed):
50 Line Code Violations, 5 Path Code Violations
0 Slip Secs, 7 Fr Loss Secs, 7 Line Err Secs, 0 Degraded Mins
0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 7 Unavail Secs
Total Data (last 81 15 minute intervals):
27 Line Code Violations, 22 Path Code Violations,
0 Slip Secs, 13 Fr Loss Secs, 13 Line Err Secs, 0 Degraded Mins,
0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 13 Unavail Secs
Router#
```

Example Output for show voice port Command

The following is sample output from the Cisco AS5800 for the **show voice port** command:

```
ISDN 1/0/0:D
Type of VoicePort is ISDN
Operation State is DORMANT
Administrative State is UP
No Interface Down Failure
Description is ""
Noise Regeneration is enabled
Non Linear Processing is enabled
Music On Hold Threshold is Set to -38 dBm
In Gain is Set to 0 dB
Out Attenuation is Set to 0 dB
Echo Cancellation is enabled
Echo Cancel Coverage is set to 16 ms
Connection Mode is normal
Connection Number is not set
Initial Time Out is set to 10 s
Interdigit Time Out is set to 10 s
Region Tone is set for US
```

The following example displays voice port configuration information for the digital voice port 0 located in slot 1, DS0 group 1:

```
receEive and transMit Slot is 1, Sub-unit is 0, Port is 1
Type of VoicePort is E&M
Operation State is DORMANT
Administrative State is UP
No Interface Down Failure
Description is not set
Noise Regeneration is enabled
Non Linear Processing is enabled
Music On Hold Threshold is Set to -38 DBMS
In Gain is Set to 0 dBm
Out Attenuation is Set to 0 dB
Echo Cancellation is enabled
Echo Cancel Coverage is set to 8 ms
Connection Mode is normal
Connection Number is not set
Initial Time Out is set to 10 s
Interdigit Time Out is set to 10 s
Region Tone is set for US
```

The following is sample output from the show voice port command for an E&M digital voice port on a Cisco 3600 series:

```
receEive and transMit Slot is 1, Sub-unit is 0, Port is 1
Type of VoicePort is E&M
Operation State is DORMANT
Administrative State is UP
No Interface Down Failure
Description is not set
Noise Regeneration is enabled
Non Linear Processing is enabled
Music On Hold Threshold is Set to -38 dBm
In Gain is Set to 0 dB
Out Attenuation is Set to 0 dB
Echo Cancellation is enabled
Echo Cancel Coverage is set to 8 ms
Connection Mode is normal
```

```
Connection Number is not set
Initial Time Out is set to 10 s
Interdigit Time Out is set to 10 s
Region Tone is set for US
```

The following is sample output from the show voice port command for an FXS analog voice port on a Cisco MC3810 multiservice concentrator:

```
Voice port 1/2 Slot is 1, Port is 2
Type of VoicePort is FXS
Operation State is UP
Administrative State is UP
No Interface Down Failure
Description is not set
Noise Regeneration is enabled
Non Linear Processing is enabled
In Gain is Set to 0 dB
Out Attenuation is Set to 0 dB
Echo Cancellation is enabled
Echo Cancel Coverage is set to 8 ms
Connection Mode is normal
Connection Number is not set
Initial Time Out is set to 10 s
Interdigit Time Out is set to 10 s
Coder Type is g729ar8
Companding Type is u-law
Voice Activity Detection is disabled
Ringing Time Out is 180 s
Wait Release Time Out is 30 s
Nominal Playout Delay is 80 milliseconds
Maximum Playout Delay is 160 milliseconds
Analog Info Follows:
Region Tone is set for northamerica
Currently processing Voice
Maintenance Mode Set to None (not in mtc mode)
Number of signaling protocol errors are 0
Impedance is set to 600r Ohm
Analog interface A-D gain offset = -3 dB
Analog interface D-A gain offset = -3 dB
Voice card specific Info Follows:
Signal Type is loopStart
Ring Frequency is 20 Hz
Hook Status is On Hook
Ring Active Status is inactive
Ring Ground Status is inactive
Tip Ground Status is active
Digit Duration Timing is set to 100 ms
InterDigit Duration Timing is set to 100 ms
Ring Cadence are [20 40] * 100 msec
InterDigit Pulse Duration Timing is set to 500 ms
```

The following is sample output from the show voice port command for a Foreign Exchange Station (FXS) analog voice port on a Cisco 3600 series:

```
Foreign Exchange Station 1/0/0 Slot is 1, Sub-unit is 0, Port is 0
Type of VoicePort is FXS
Operation State is DORMANT
Administrative State is UP
The Interface Down Failure Cause is 0
Alias is NULL
Noise Regeneration is enabled
Non Linear Processing is enabled
Music On Hold Threshold is Set to 0 dBm
```

```
In Gain is Set to 0 dB
Out Attenuation is Set to 0 dB
Echo Cancellation is enabled
Echo Cancel Coverage is set to 16ms
Connection Mode is Normal
Connection Number is
Initial Time Out is set to 10 s
Interdigit Time Out is set to 10 s
Analog Info Follows:
Region Tone is set for northamerica
Currently processing none
Maintenance Mode Set to None (not in mtc mode)
Number of signaling protocol errors are 0
Voice card specific Info Follows:
Signal Type is loopStart
Ring Frequency is 25 Hz
Hook Status is On Hook
Ring Active Status is inactive
Ring Ground Status is inactive
Tip Ground Status is inactive
Digit Duration Timing is set to 100 ms
InterDigit Duration Timing is set to 100 ms
Hook Flash Duration Timing is set to 600 ms
```

The following is sample output from the show voice port command for an E&M analog voice port on a Cisco 3600 series:

```
E&M Slot is 1, Sub-unit is 0, Port is 0
Type of VoicePort is E&M
Operation State is unknown
Administrative State is unknown
The Interface Down Failure Cause is 0
Alias is NULL
Noise Regeneration is disabled
Non Linear Processing is disabled
Music On Hold Threshold is Set to 0 dBm
In Gain is Set to 0 dB
Out Attenuation is Set to 0 dB
Echo Cancellation is disabled
Echo Cancel Coverage is set to 16ms
Connection Mode is Normal
Connection Number is
Initial Time Out is set to 0 s
Interdigit Time Out is set to 0 s
Analog Info Follows:
Region Tone is set for northamerica
Currently processing none
Maintenance Mode Set to None (not in mtc mode)
Number of signaling protocol errors are 0
Voice card specific Info Follows:
Signal Type is wink-start
Operation Type is 2-wire
Impedance is set to 600r Ohm
E&M Type is unknown
Dial Type is dtmf
In Seizure is inactive
Out Seizure is inactive
Digit Duration Timing is set to 0 ms
InterDigit Duration Timing is set to 0 ms
Pulse Rate Timing is set to 0 pulses/second
InterDigit Pulse Duration Timing is set to 0 ms
Clear Wait Duration Timing is set to 0 ms
Wink Wait Duration Timing is set to 0 ms
Wink Duration Timing is set to 0 ms
```

```
Delay Start Timing is set to 0 ms
Delay Duration Timing is set to 0 ms
```

Dialer Interface and Routing Troubleshooting

To obtain information on dialer interfaces, routing configuration, and routing operations, use the following commands in privileged EXEC mode.

Command	Purpose
show dialer map `Router# show dialer map`	Displays configured dynamic and static dialer maps. See Example Output for show dialer map Command, on page 25.
show dialer `Router# show dialer`	Displays general diagnostic information about an interface configured for DDR, such as the number of times the dialer string has been successfully reached, and the idle timer and the fast idle timer values for each B channel. Current call-specific information is also provided, such as the length of a call and the number and name of the device to which the interface is currently connected. When external signaling is configured, the output also displays the CDAPI state. See Example Output for show dialer Command, on page 26.
show interface *Dialer-num* `Router# show interface Dialer-num`	Shows whether the interface and protocol are up (spoofing), a state in which the dialer interface pretends to be up/up so that associated routes remain in force and packets can be routed to the interface. See Example Output for show interface Command, on page 27.
show ip route `Router# show ip route`	Displays the routes known to the router, including static and dynamically learned routes. See Example Output for show ip route Command, on page 27.

Example Output for show dialer map Command

The following is sample output from the **show dialer map** command.

```
Router# show dialer map
Static dialer map ip 10.1.1.1 name peer_1 on Dialer1
Static dialer map ip 10.1.1.2 name peer_2 on Dialer1
BAP dialer map ip 10.1.1.2 name peer_2 on Dialer1
Dynamic dialer map ip 10.1.1.3 name peer_3 on Dialer1
BAP dialer map ip 10.1.1.3 name peer_3 on Dialer1
```

Example Output for show dialer Command

The following is sample output from the **show dialer** command for a BRI interface when dialer profiles are configured:

```
Router# show dialer interface bri 0
BRI0 - dialer type = ISDN
Dial String Successes Failures Last called Last status
0 incoming call(s) have been screened.
BRI0: B-Channel 1
Idle timer (120 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)
Dialer state is data link layer up
Dial reason: ip (s=10.1.1.8, d=10.1.1.1)
Interface bound to profile Dialer0
Time until disconnect 102 secs
Current call connected 00:00:19
Connected to 5773872 (wolfman)
BRI0: B-Channel 2
Idle timer (120 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)
Dialer state is idle
```

The following is sample output from the **show dialer** command for a dialer under external signaling control:

```
Router# show dialer
Se7/0:0 - dialer type = IN-BAND SYNC NO-PARITY
Rotary group 1, priority 0
Idle timer (222222 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)
Dialer state is idle
Dialer cdapi state is idle <<<<<<<<<<==================
Se7/0:1 - dialer type = IN-BAND SYNC NO-PARITY
Rotary group 1, priority 0
Idle timer (222222 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)
Dialer state is idle
Dialer cdapi state is idle <<<<<<<<<<=================
```

The following is sample output from the **show dialer** command for an asynchronous interface:

```
Router# show dialer interface async 1
Async1 - dialer type = IN-BAND NO-PARITY
Idle timer (900 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)
Time until disconnect 838 secs
Current call connected 0:02:16
Connected to 8986
Dial String Successes Failures Last called Last status
8986 0 0 never Defaults
8986 8 3 0:02:16 Success Defaults
```

When the show dialer EXEC command is issued for a synchronous serial interface configured for DTR dialing, output similar to the following is displayed:

```
Serial 0 - dialer type = DTR SYNC
Idle timer (120 secs), Fst idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)
Dial String Successes Failures Last called Last status
---- 1 0 1:04:47 Success DTR dialer
8986 0 0 never Defaults
```

Example Output for show interface Command

The following is sample output from the **show interface Dialer0**command:

```
Router# show interface Dialer0
Dialer0 is up (spoofing), line protocol is up (spoofing)
  Hardware is Unknown
  Internet address is 60.0.0.2/24
  MTU 1500 bytes, BW 56 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, loopback not set
  DTR is pulsed for 1 seconds on reset
  Last input never, output never, output hang never
  Last clearing of "show interface" counters 1d17h
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/0/16 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
     Available Bandwidth 42 kilobits/sec
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes
     0 packets output, 0 bytes
```

Example Output for show ip route Command

The following examples display all downloaded static routes. A P designates which route was installed using AAA route download.

```
Router# show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
U - per-user static route, o - ODR, P - periodic downloaded static route
T - traffic engineered route
Gateway of last resort is 172.21.17.1 to network 0.0.0.0
172.31.0.0/32 is subnetted, 1 subnets
P 172.31.229.41 is directly connected, Dialer1 20.0.0.0/24 is subnetted, 3 subnets
P 10.1.1.0 [200/0] via 172.31.229.41, Dialer1
P 10.1.3.0 [200/0] via 172.31.229.41, Dialer1
P 10.1.2.0 [200/0] via 172.31.229.41, Dialer1
Router# show ip route static
172.27.4.0/8 is variably subnetted, 2 subnets, 2 masks
P 172.1.1.1/32 is directly connected, BRI0
P 172.27.4.0/8 [1/0] via 103.1.1.1, BRI0
S 172.31.0.0/16 [1/0] via 172.21.114.65, Ethernet0
S 10.0.0.0/8 is directly connected, BRI0
P 10.0.0.0/8 is directly connected, BRI0
172.21.0.0/16 is variably subnetted, 5 subnets, 2 masks
S 172.21.114.201/32 is directly connected, BRI0
S 172.21.114.205/32 is directly connected, BRI0
S 172.21.114.174/32 is directly connected, BRI0
S 172.21.114.12/32 is directly connected, BRI0
P 10.0.0.0/8 is directly connected, BRI0
P 10.1.0.0/8 is directly connected, BRI0
P 10.2.2.0/8 is directly connected, BRI0
S* 0.0.0.0/0 [1/0] via 172.21.114.65, Ethernet0
S 172.29.0.0/16 [1/0] via 172.21.114.65, Ethernet0
```

To debug dialer and authorization or to clear in-progress calls, use the following commands in privileged EXEC mode.

Command	Purpose
debug dialer `Router# debug dialer`	Displays the activity that triggers a dial attempt. See Example Output for show dialer Command, on page 26.
clear interface `Router# clear interface`	Clears a call that is in progress. In a troubleshooting situation, it is sometimes useful to clear historical statistics to track the current number of successful calls relative to failures. Use this command with care. It sometimes requires that you clear both the local and remote routers. See Example Output for clear interface Command, on page 28.
debug ppp negotiation `Router# debug ppp negotiation`	Displays negotiation of PPP options and Network Control Protocol (NCP) parameters. See Example Output for debug ppp negotiation Command, on page 29.
debug ppp authentication `Router# debug ppp authentication`	Displays exchange of Challenge Handshake Authentication Protocol (CHAP) and Password Authentication Protocol (PAP) packets. See Example Output for debug ppp authentication Command, on page 29.

Example Output for debug dialer Command

Displays the activity that triggers a dial attempt.

```
Dialing cause: Async1: ip (s=172.16.1.111 d=172.16.2.22)
```

Example Output for clear interface Command

The following example demonstrates the use of the **clear interface** command with the RLM feature:

```
Router# clear interface loopback 1
02:48:52: rlm 1: [State_Up, rx ACTIVE_LINK_BROKEN] over link [10.1.1.1(Loopback1), 10.1.4.1]
02:48:52: rlm 1: link [10.1.1.2(Loopback2), 10.1.4.2] requests activation
02:48:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.4.1] is deactivated
02:48:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.4.1] = socket[10.1.1.1, 10.1.4.1]
02:48:52: rlm 1: [State_Recover, rx USER_SOCKET_OPENED] over link [10.1.1.1(Loopback1),
10.1.4.1] for user RLM_MGR
02:48:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.4.1] is opened
02:48:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.5.1] = socket[10.1.1.1, 10.1.5.1]
```

```
02:48:52: rlm 1: [State_Recover, rx USER_SOCKET_OPENED] over link [10.1.1.1(Loopback1),
10.1.5.1] for user RLM_MGR
02:48:52: rlm 1: link [10.1.1.1(Loopback1), 10.1.5.1] is opened
02:48:52: rlm 1: [State_Recover, rx START_ACK] over link [10.1.1.2(Loopback2), 10.1.4.2]
02:48:52: rlm 1: link [10.1.1.2(Loopback2), 10.1.4.2] is activated
02:48:52: rlm 1: [State_Up, rx LINK_OPENED] over link [10.1.1.1(Loopback1), 10.1.4.1]
```

Example Output for debug ppp negotiation Command

The following is sample output from the **debug ppp negotiation** command. This is a normal negotiation, where both sides agree on Network Control Program (NCP) parameters. In this case, protocol type IP is proposed and acknowledged.

```
Router# debug ppp negotiation
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 3D56CAC
ppp: received config for type = 4 (QUALITYTYPE) acked
ppp: received config for type = 5 (MAGICNUMBER) value = 3D567F8 acked (ok)
PPP Serial4: state = ACKSENT fsm_rconfack(C021): rcvd id 5
ppp: config ACK received, type = 4 (CI_QUALITYTYPE), value = C025
ppp: config ACK received, type = 5 (CI_MAGICNUMBER), value = 3D56CAC
ppp: ipcp_reqci: returning CONFACK.
(ok)
PPP Serial4: state = ACKSENT fsm_rconfack(8021): rcvd id 4
```

The following is sample output from the debug ppp negotiation command when the remote side of the connection is unable to respond to LQM requests:

```
Router# debug ppp negotiation
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44B7010
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44B7010
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44B7010
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44B7010
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44B7010
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44B7010
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44B7010
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44B7010
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44B7010
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44B7010
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44B7010
ppp: sending CONFREQ, type = 4 (CI_QUALITYTYPE), value = C025/3E8
ppp: sending CONFREQ, type = 5 (CI_MAGICNUMBER), value = 44C1488
```

Example Output for debug ppp authentication Command

The following is sample output from the **debug ppp authentication** command. Use this debug command to determine why an authentication fails.

```
Router# debug ppp authentication
Serial0: Unable to authenticate. No name received from peer
```

```
Serial0: Unable to validate CHAP response. USERNAME pioneer not found.
Serial0: Unable to validate CHAP response. No password defined for USERNAME pioneer
Serial0: Failed CHAP authentication with remote.
Remote message is Unknown name
Serial0: remote passed CHAP authentication.
Serial0: Passed CHAP authentication with remote.
Serial0: CHAP input code = 4 id = 3 len = 48
```

Configuration Examples for NAC Package for MGCP

NAS Package for MGCP Example

This example configures the Network Access Server Package for Media Gateway Control Protocol Feature on a Cisco AS5400:

```
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname 54iwo
!
no boot startup-test
logging rate-limit console 10 except errors
!
resource-pool disable
!
resource-pool profile service user1sample
!
voice-fastpath enable
ip subnet-zero
ip host 54ccxv 172.18.16.25
!
no ip dhcp-client network-discovery
isdn switch-type primary-ni
!
fax interface-type modem
mta receive maximum-recipients 0
!
controller T1 7/0
 framing esf
 extsig mgcp
 guard-timer 10 on-expiry reject
 linecode b8zs
 ds0-group 1 timeslots 1-24 type none service mgcp
!
controller T1 7/1
 framing esf
 linecode ami
 pri-group timeslots 1-24
!
controller T1 7/2
 framing sf
 linecode ami
!
controller T1 7/3
 framing sf
 linecode ami
```

```
!
controller T1 7/4
 framing sf
 linecode ami
!
controller T1 7/5
 framing sf
 linecode ami
!
controller T1 7/6
 framing sf
 linecode ami
!
controller T1 7/7
 framing sf
 linecode ami
!
interface Loopback0
 ip address 172.16.0.3 255.255.255.0
!
interface FastEthernet0/0
 ip address 172.18.184.183 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface Serial0/0
 no ip address
 shutdown
 clockrate 2000000
!
interface Serial0/1
 no ip address
 shutdown
 clockrate 2000000
!
interface Serial7/1:23
 no ip address
 encapsulation ppp
 dialer rotary-group 9
 dialer-group 1
 isdn switch-type primary-ni
 isdn incoming-voice modem
 no cdp enable
!
interface Async1/00
 ip unnumbered Loopback0
 dialer in-band
 dialer map ip 172.23.0.1 234567
 dialer-group 1
!
interface Async1/01
 ip address 10.17.1.1 255.255.255.0
 encapsulation ppp
 dialer in-band
 dialer map ip 10.17.1.2 22222
 dialer-group 1
!
interface Async1/02
```

```
 no ip address
!
interface Async1/03
 no ip address
!
interface Async1/04
 no ip address
!
interface Async1/05
 no ip address
!
interface Async3/102
 no ip address
!
interface Async3/103
 no ip address
!
interface Async3/104
 no ip address
!
interface Async3/105
 no ip address
!
interface Async3/106
 no ip address
!
interface Async3/107
 no ip address
!
interface Group-Async0
 no ip address
 no group-range
!
interface Dialer1
 ip unnumbered Loopback0
 encapsulation ppp
 dialer in-band
 dialer idle-timeout 222222
 dialer map ip 172.16.0.1 name 53bxbv 1000
 dialer extsig
 dialer-group 1
 no cdp enable
 ppp authentication chap
 ppp direction dedicated
!
interface Dialer9
 ip address 10.1.1.1 255.255.255.0
 encapsulation ppp
 dialer in-band
 dialer map ip 10.1.1.2 23456
 dialer-group 1
 no cdp enable
!
ip classless
ip route 0.0.0.0 0.0.0.0 172.18.184.1
ip route 172.16.0.1 255.255.255.255 Dialer1
ip route 172.23.0.1 255.255.255.255 Async1/00
no ip http server
!
dialer-list 1 protocol ip permit
!
call rsvp-sync
!
voice-port 7/0:1
```

```
!
voice-port 7/1:D
!
mgcp
mgcp call-agent 172.18.64.242 service-type mgcp version 1.0
no mgcp timer receive-rtcp
!
mgcp profile default
 max2 retries 5
!
line con 0
 exec-timeout 0 0
 logging synchronous
line aux 0
 logging synchronous
line vty 0 4
 password mango
 login
line 1/00 1/107
 no flush-at-activation
 modem InOut
line 3/00 3/107
 no flush-at-activation
 modem InOut
!
scheduler allocate 10000 400
end
```

Note See the "Additional References for MGCP and SGCP" section on page x for related documents, standards, and MIBs and see the " Glossary " for definitions of terms in this guide.