Access Node Control Protocol

The Access Node Control Protocol (ANCP) feature enhances communication between Digital Subscriber Line Access Multiplexers (DSLAMs) and a broadband remote access server (BRAS), enabling the exchange of events, actions, and information requests between the multiplexer end and the server end. As a result, either end can implement appropriate actions.

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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 at the end of this module.

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 Access Node Control Protocol

To run ANCP over Transmission Control Protocol (TCP), IP must be enabled on broadband remote access servers (BRAS). Interactions from RADIUS to the BRAS are not required for ANCP and are dependent on the RADIUS server.
For information about release and platform support, see the Feature Information for Access Node Control Protocol, on page 15.

Restrictions for Access Node Control Protocol

Cisco IOS XE Release 2.4 supports interactions with the RADIUS server from the broadband remote access server (BRAS). Interactions from RADIUS to the BRAS are not required for ANCP and are dependent on the RADIUS server.

Information About Access Node Control Protocol

ANCP is used to aggregate traffic from multiple subscribers and deliver information for any application, while remaining independent from the application. ANCP is currently used in the application between DSLAMs and the broadband remote access server in a digital subscriber line (DSL) broadband environment.

The ANCP feature enables close communication between DSL aggregation multiplexers (DSLAMs) and network edge devices. Using ANCP between DSLAMs and a BRAS enables exchange of events, actions, and information requests so that the appropriate actions occur at the DSLAM and BRAS.

The ANCP architecture supports the following uses of ANCP:

Rate Adaptive Mode

Rate adaptive mode helps to maximize the line bit rate for a given line, and the rate is dependent on the quality of the signal achieved on the line. Rate adaptive mode conveys DSL modem line rate from a DSLAM to a broadband remote access server.

A BRAS running ANCP listens for TCP requests from its ANCP neighbors (DSLAMs).

- After a TCP session is established--ANCP begins exchanging messages to establish adjacency between the BRAS and its neighbors.
- After adjacency is established--ANCP event messages can be sent from the DSLAM to the BRAS.

Rate adaptive DSL uses signal quality to adjust line speeds. A BRAS typically sets the subscriber interfaces to the maximum bandwidth agreed to in the service license agreement (SLA).

When customer premises equipment (CPE) is synchronized to a data rate that is lower than the line speed, cell or packet loss occurs on the DSLAM. To prevent this, the DSLAM can use ANCP to notify the BRAS of newly adjusted circuit rates.

When a customer-facing port:

- Activates -- The DSLAM sends a Port Up message to the BRAS. The appropriate quality of service (QoS) takes effect in accordance with the ANCP-delivered information.
- Deactivates -- The DSLAM sends a Port Down message to the BRAS. ANCP reports the DSL state sent by the DSLAM, which is typically Silent or Idle. If the broadband remote access server receives another Port Up message, the subscriber sessions either time out or are renewed with a new shaping rate. The shaping rate on the interface does not change until the router receives a new Port Up message.
RADIUS Interaction

Interactions between the broadband remote access server and the RADIUS server are from the router to RADIUS.

The BRAS sends the following attributes and attribute-value pairs (AVPs) to the RADIUS server:

<table>
<thead>
<tr>
<th>ANCP Line Rates</th>
<th>Upstream Data Rate</th>
<th>Downstream Data Rate</th>
<th>Output Policy Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSA 39</td>
<td>Attribute 197, Ascend-Data-Rate</td>
<td>Attribute 255, Ascend-Xmit-Rate</td>
<td>Attribute 77, Connect-Speed-Info</td>
</tr>
<tr>
<td></td>
<td>Attribute Type 38, Rx Connect Speed AVP</td>
<td>Attribute Type 24, Tx Connect Speed AVP</td>
<td></td>
</tr>
</tbody>
</table>

The BRAS uses Point-to-Point Protocol (PPPoE) to interact with the authentication, authorization, and accounting (AAA) module. RADIUS processes the information and then takes appropriate action.

Port Mapping

Port mapping associates customer premises equipment (CPE) clients of a DSLAM with VLAN subinterfaces on the BRAS. The VLANs include 802.1Q or queue-in-queue (Q-in-Q) hierarchical VLANs. Port mapping is configured in global configuration mode on the BRAS by grouping CPE client IDs with a specific DSLAM neighbor.

There are two methods you can use to map ports: configure all VLAN subinterfaces first, and the ANCP neighbor mappings next. Or, you can configure the mappings directly under the interface.

For example, the following commands configure port mapping for Q-in-Q VLAN subinterfaces:

```
ancp neighbor name dslam-name
   id
   dslam-id
dot1q
   outer-vlanid
   second-dot1q
   inner-vlanid
   [interface
type number ]
   client-id
   ""
cid
   or
```

```
ancp neighbor name dslam-name
   id
   dslam-id
dot1q
   outer-vlanid
   client-id
   ()
```
The client-id is a unique access-loop-circuit-id that the DSLAM sends to the BRAS for each unique port. The DSLAM sends this ID in the ANCP Port Up event message. The access-loop-circuit-id uses a defined format consisting of an access node identifier and digital subscriber line (DSL) information as mentioned below:

ATM/DSL

"access-node-identifier atm slot/module/port . subinterface : vpi . vci"

Ethernet/DSL

"access-node-identifier ethernet slot / module / port . subinterface [: vlan-id]"

The BRAS sets the default state as Down, on all ports of the router, until the DSLAM sends a Port Up message.

Noninteractive Operation Administration and Maintenance

ANCP provides an out-of-band control channel for performing noninteractive operation, administration, and maintenance (OAM) operations from the broadband remote access server. This channel enables router operators to view the ANCP port state of specific DSLAM ports. ANCP port state information is stored in the ANCP dynamic database on the BRAS.

Interactive OAM

The Interactive OAM and Scaling Improvements feature adds on-demand ping capability to ANCP for operations and troubleshooting.

**Note**

This feature is enabled by default and requires no configuration.

General Switch Management Protocol and ANCP

ANCP is an extension of the General Switch Management Protocol (GSMP). GSMP defines a master-slave neighbor relationship in which the master initiates a connection to a slave. In ANCP, this master-slave relationship is reversed--the BRAS (master) listens and accepts incoming ANCP connections from the DSLAM (slave). The DSLAM uses event messages to communicate asynchronous events to the BRAS, such as topology changes and Port Down or Port Up events.

GSMP connectivity between the BRAS and the DSLAM occurs over TCP/IP (RFC 3293). The DSLAM initiates the connection to the router and the router accepts the connection if the appropriate interface is ANCP enabled.

The GSMP Adjacency Protocol establishes GSMP neighbor relationships.

1. During the adjacency-building:

   1. The DSLAM and router negotiate their capabilities and determine the synchronization state between the two ends.
2 GSMP detects whether the router and the DSLAM have retained a local information database state in case of a transport failure, or whether both devices require a state update.

3 If GSMP determines that it must resynchronize the adjacency, it restarts the adjacency synchronization process, which includes the capability negotiation defined in the ANCP extension draft available at:

http://tools.ietf.org/id/draft-wadhwa-gsmp-l2control-configuration-02.txt

1 In an ANCP, if a neighbor (neighbor1) contains capabilities that its neighbor (neighbor2) does not support, neighbor1 turns off the capabilities and recomunicates the packets to neighbor2 with the same set of capabilities as neighbor2.

2 After both the neighbors agree to the same set of capabilities, adjacency is established.

**How to Configure Access Node Control Protocol**

To configure ANCP, perform the following global or interface configuration tasks:

**Enabling ANCP on an Ethernet Interface**

Perform this task to enable ANCP on an Ethernet interface.

**SUMMARY STEPS**

1. enable
2. configure terminal
3. ancp adjacency timer interval
4. interface type number
5. ip address address mask
6. ancp enable
7. interface type number subinterface
8. encapsulation dot1q vlanid [second-dot1q second-vlanid]
9. exit

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>Example: Router&gt; enable</td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td>Step</td>
<td>Command or Action</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Step 2</td>
<td>configure terminal</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Router# configure terminal</td>
</tr>
<tr>
<td>Step 3</td>
<td>ancp adjacency timer  interval</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Router(config)# ancp adjacency timer 100</td>
</tr>
<tr>
<td>Step 4</td>
<td>interface  type  number</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Router(config)# interface FastEthernet1/0/0</td>
</tr>
<tr>
<td>Step 5</td>
<td>ip  address  address  mask</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Router(config-if)# ip address 10.16.1.2 255.255.0.0</td>
</tr>
<tr>
<td>Step 6</td>
<td>ancp enable</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Router(config-if)# ancp enable</td>
</tr>
<tr>
<td>Step 7</td>
<td>interface  type  number  .  subinterface</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Router(config-if)# interface FastEthernet1/0/0.1</td>
</tr>
<tr>
<td>Step 8</td>
<td>encapsulation  dot1q  vlanid  [second-dot1q  second-vlanid]</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Router(config-subif)# encapsulation dot1q 100 second-dot1q 200</td>
</tr>
<tr>
<td>Step 9</td>
<td>exit</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Router(config-subif)# exit</td>
</tr>
</tbody>
</table>
Enabling ANCP on an ATM Interface

The `ancp enable` command should be configured only for the control VCs on which the ANCP message is sent from the DSLAM. Perform this task to enable ANCP on ATM interfaces.

**SUMMARY STEPS**

1. `enable`
2. `configure terminal`
3. `ancp adjacency timer interval`
4. `interface atm slot / subslot / port . subinterface`
5. `ip address ip-address mask`
6. `pvc vpi / vci`
7. `ancp enable`
8. `exit`

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>enable</td>
</tr>
<tr>
<td>Example:</td>
<td>Router&gt; enable</td>
</tr>
<tr>
<td></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td></td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>configure terminal</td>
</tr>
<tr>
<td>Example:</td>
<td>Router# configure terminal</td>
</tr>
<tr>
<td></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>ancp adjacency timer interval</td>
</tr>
<tr>
<td>Example:</td>
<td>Router(config)# ancp adjacency timer 100</td>
</tr>
<tr>
<td></td>
<td>Sets the ANCP adjacency timer interval, which specifies the amount of time to wait before sending an ANCP hello packet to the DSLAM.</td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>interface atm slot / subslot / port . subinterface</td>
</tr>
<tr>
<td>Example:</td>
<td>Router(config)# interface atm 2/0/1.1</td>
</tr>
<tr>
<td></td>
<td>Enters subinterface configuration mode to define a subinterface.</td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td>ip address ip-address mask</td>
</tr>
<tr>
<td>Example:</td>
<td>Router(config-subif)# ip address 10.16.1.2 255.255.0.0</td>
</tr>
<tr>
<td></td>
<td>Assigns an IP address and subnet mask to the subinterface.</td>
</tr>
</tbody>
</table>
### Purpose

Command or Action | Purpose
---|---
Step 6 | **pvc vpi / vci**<br>**Example:**<br>Router(config-subif)# pvc 2/100
Step 7 | **ancp enable**<br>**Example:**<br>Router(config-if-atm-vc)# ancp enable
Step 8 | **exit**<br>**Example:**<br>Router(config-if-atm-vc)# exit

### Mapping DSLAM Ports to VLAN Interfaces on Broadband Remote Access Servers

Perform this task to map DSLAM ports to VLAN interfaces on the BRAS.

**SUMMARY STEPS**

1. enable
2. configure terminal
3. ancp atm shaper percent-factor factor
4. interface type number.subinterface
5. encapsulation dot1q vlan-id
6. ancp neighbor name dslam-name [id dslam-id] client-id client-id
7. exit

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td><strong>enable</strong>&lt;br&gt;<strong>Example:</strong>&lt;br&gt;Router&gt; enable</td>
</tr>
</tbody>
</table>
| | Enables privileged EXEC mode.  
  * Enter your password if prompted. |
<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 2</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example: Router# configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> ancp atm shaper percent-factor factor</td>
<td>Enables ANCP cell tax accounting for ATM U-interface connections</td>
</tr>
<tr>
<td>Example: Router(config)# ancp shaper percent-factor 95</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong> interface type number.subinterface</td>
<td>Enters interface configuration mode for the specified subinterface.</td>
</tr>
<tr>
<td>Example: Router(config)# interface FastEthernet0/0.1</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong> encapsulation dot1q vlan-id</td>
<td>Enables IEEE 802.1Q encapsulation of traffic on a specified VLAN.</td>
</tr>
<tr>
<td>Example: Router(config-subif)# encapsulation dot1q 411</td>
<td></td>
</tr>
<tr>
<td><strong>Step 6</strong> ancp neighbor name dslam-name [id dslam-id] client-id client-id</td>
<td>Specifies the ANCP access DSLAM to which VLAN subinterfaces are mapped.</td>
</tr>
<tr>
<td>Example: Router(config-subif)# ancp neighbor name dslam1 id 1.2.3.4 client-id &quot;1.2.3.4. eth 0/0.1&quot;</td>
<td></td>
</tr>
<tr>
<td><strong>Step 7</strong> exit</td>
<td>Exits subinterface configuration mode.</td>
</tr>
<tr>
<td>Example: Router(config-subif)# exit</td>
<td></td>
</tr>
</tbody>
</table>

**Mapping DSLAM Ports to PVC Interfaces on Broadband Remote Access Servers**

The *ancp neighbor name* command is available under *pvc* and *pvc-in-range* command modes. This command creates a one-to-one mapping between a PVC and a DSLAM port. Perform this task to map DSLAM ports to PVC interfaces on the BRAS.
### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `ancp atm shaper percent-factor factor`
4. `interface atm slot / subslot / port . subinterface`
5. Do one of the following:
   - `pvc vpi / vci`
   - `range pvc start-vpi / start-vci end-vpi / end-vci`
6. `pvc-in-range vpi / vci`
7. `ancp neighbor name dslam-name [id dslam-id] client-id client-id`
8. `end`

### DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Router&gt; enable</td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td><strong>Step 2</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Router# configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> ancp atm shaper percent-factor factor</td>
<td>Enables ANCP cell tax accounting for ATM U-interface connections.</td>
</tr>
<tr>
<td><strong>Example:</strong> Router(config)# ancp shaper percent-factor 95</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong> interface atm slot / subslot / port . subinterface</td>
<td>Enters interface configuration mode for the specified ATM subinterface.</td>
</tr>
<tr>
<td><strong>Example:</strong> Router(config)# interface atm 2/0/1.1</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong> Do one of the following:</td>
<td>Creates a one-to-one mapping between a PVC and DSLAM port and enters ATM virtual circuit configuration mode.</td>
</tr>
<tr>
<td>• <code>pvc vpi / vci</code></td>
<td>or</td>
</tr>
<tr>
<td>• <code>pvc-in-range vpi / vci</code></td>
<td></td>
</tr>
</tbody>
</table>
### Command or Action

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>• range pvc start-vpi / start-vci end-vpi / end-vci</td>
<td>Defines a range of ATM PVCs and enters PVC range configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>• If a range of ATM PVCs are defined, use the <code>pvc-in-range</code> command to configure an individual PVC.</td>
</tr>
</tbody>
</table>

Example:

Router(config-subif)# pvc 1/101

Example:

Example:

Example:

Router(config-subif)# range pvc 9/100 9/102

### Step 6

**pvc-in-range** vpi / vci

Example:

Router(config-if-atm-range-pvc)# pvc-in-range 9/100

### Step 7

**ancp neighbor name** dslam-name [id dslam-id] client-id client-id

Example:

Router(config-if-atm-range-pvc)# ancp neighbor name/dslam1 id 1.2.3.4 client-id "1.2.3.4.atm0/0.1"

### Step 8

**end**

Example:

Router(config-if-atm-range-pvc)# end

---

**Configuration Examples for Access Node Control Protocol**

### Enabling Access Node Control Protocol on Ethernet Interfaces Example

The following example shows how to enable ANCP on Ethernet subinterface 2/0/1.

```plaintext
interface GigabitEthernet 2/0/1
ip address 192.168.64.16 255.255.255.0
```
Enabling Access Node Control Protocol on ATM Interfaces Example

The following example shows how to enable ANCP on ATM subinterface 2/0/1.1.

```cisco
interface ATM2/0/0.1 point-to-point
description ANCP Link to one DSLAM
no ip mroute-cache
ip address 192.168.0.2 255.255.255.252
pvc 254/32
  protocol ip 192.168.0.1
  ancp enable
  no snmp trap link-status
```

Mapping DSLAM Ports to VLAN Interfaces on the BRAS Example

The following example shows how to map the CPE client ports of a DSLAM to Q-in-Q VLAN subinterfaces on the BRAS. In the example, the DSLAM neighbor named dslam1 with an IP address of 192.68.10.5 has a CPE client port mapped to Q-in-Q VLANs 100 and 200 configured on Ethernet interface 1/0/0.2. Another CPE client port is mapped to Q-in-Q VLANs 100 and 100 configured on Ethernet interface 1/0/0.1.

```cisco
interface GigabitEthernet1/0/0.1
  encapsulation dot1q 100 second-dot1q 100
  ancp neighbor name dslam1 id 192.168.10.5 client-id "192.168.10.5 ethernet1/0/0.2"

interface GigabitEthernet1/0/0.2
  encapsulation dot1q 100 second-dot1q 200
  ancp neighbor name dslam1 id 192.168.10.5 client-id "192.168.10.5 ethernet1/0/0.1"
  ancp atm shaper percent-factor 95
```

The example shown above maps the ports directly at the subinterface level. You can also configure all VLAN subinterfaces first, and perform the mappings under ANCP neighbor next, as shown in the following example:

```cisco
interface GigabitEthernet1/0/0.1
  encapsulation dot1q 100 second-dot1q 100
interface GigabitEthernet1/0/0.2
  encapsulation dot1q 100 second-dot1q 200
  ancp atm shaper percent-factor 95

ancp neighbor name dslam1 id 192.168.10.5
dot1q 100 second-dot1q 100 interface GigabitEthernet1/0/0.1 client-id "192.168.10.5 ethernet1/0/0.2"

ancp neighbor name dslam1 id 192.168.10.5
dot1q 100 second-dot1q 200 interface GigabitEthernet1/0/0.2 client-id "192.168.10.5 ethernet1/0/0.2"
```
Mapping DSLAM Ports to PVC Interfaces on the BRAS Example

The **ancp neighbor name** command maps the CPE client ports of a DSLAM to PVC interfaces on the BRAS. This command can be configured either globally or under PVC/PVC-in-Range mode.

**In PVC or PVC-in-Range Configuration Mode**

In this example, the router interfaces with one DSLAM which has two ports or clients.

```plaintext
interface ATM2/0/0.1 point-to-point
description ANCP Link to one DSLAM
no ip mroute-cache
ip address 192.168.0.2 255.255.255.252
pvc 254/32
  protocol ip 192.168.0.1 255.255.255.252
  ancp neighbor name dslam1 id 192.168.10.5 client-id "dslam-port-x-identifier"
  no snmp trap link-status

interface ATM1/0/0.1 multipoint
description TDSL clients - default TDSL 1024
class-int speed:ubr:1184:160:10
range pvc 10/41 10/160
  service-policy input SET-PRECEDENCE-0
  service-policy output premium-plus:12c:25088
  pvc-in-range 10/103
    description TDSL client 16 Mbps with ANCP
    class-vc speed:ubr:17696:1184:05
    ancp neighbor name dslam1 id 192.168.10.5 client-id "dslam-port-x-identifier"

range pvc 11/41 11/160
  service-policy input SET-PRECEDENCE-0
  service-policy output premium-plus:12c:25088
  pvc-in-range 11/108
    description TDSL client 16 Mbps with ANCP
    class-vc speed:ubr:17696:1184:05
    ancp neighbor name dslam1 id 192.168.10.5 client-id "dslam-port-y-identifier"
```

**In Global Configuration Mode**

When the **ancp neighbor** command is configured globally, the PVC information for the ATM interface must also be specified, as shown in the following example:

```plaintext
interface ATM1/0/0.1 multipoint
description TDSL clients - default TDSL 1024
class-int speed:ubr:1184:160:10
range pvc 10/41 10/160
  service-policy input SET-PRECEDENCE-0
  service-policy output premium-plus:12c:25088
  pvc-in-range 10/103
    description TDSL client 16 Mbps with ANCP
    class-vc speed:ubr:17696:1184:05
      !
    range pvc 11/41 11/160
      service-policy input SET-PRECEDENCE-0
      service-policy output premium-plus:12c:25088
      pvc-in-range 11/108
        description TDSL client 16 Mbps with ANCP
        class-vc speed:ubr:17696:1184:05
        !
      ancp neighbor name dslam1 id 192.168.10.5
      atm 10/103 interface ATM1/0/0.1 client-id "dslam-port-x-identifier"
      atm 11/108 interface ATM1/0/0.1 client-id "dslam-port-y-identifier"
```

# Additional References

## Related Documents

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
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<td>Cisco IOS commands</td>
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## RFCs

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<td>RFC 3292</td>
<td>General Switch Management Protocol (GSMP) V3</td>
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<tr>
<td>RFC 3293</td>
<td>General Switch Management Protocol (GSMP), Packet Encapsulations for Asynchronous Transfer Mode (ATM), Ethernet and Transmission Control Protocol (TCP)</td>
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## Technical Assistance

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<td>The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.</td>
<td><a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a></td>
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Feature Information for Access Node Control Protocol

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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.

Table 1: Feature Information for Access Node Control Protocol

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<tr>
<th>Feature Name</th>
<th>Releases</th>
<th>Feature Information</th>
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| Access Node Control Protocol               | Cisco IOS XE Release 2.4 | In Cisco IOS XE Release 2.4, this feature was introduced on the Cisco ASR 1000.  
                                          |                      | The following command was introduced: **ancp vdsl ethernet shaper**.               |
| Interactive OAM and Scaling Improvements   | Cisco IOS XE Release 2.4 | The Interactive OAM and Scaling Improvements feature adds on demand ping capability to ANCP for operations and troubleshooting. 
                                          |                      | In Cisco IOS XE Release 2.4, this feature was introduced on the Cisco ASR 1000.   
                                          |                      | The following commands were introduced or modified: **ping ancp**, **show ancp neighbor port**, **show ancp port**, **show ancp session**, **show ancp session adjacency**, **show ancp session event**, and **show ancp statistics**. |