

Configuring ANCP

SYSTEM ADMINISTRATOR GUIDE

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1 Overview

This document provides an overview of Access Node Control Protocol (ANCP) features supported on the SmartEdge® router and describes the tasks used to configure, monitor, and administer ANCP. This document also provides examples of ANCP configuration.

The ANCP is a communications control protocol that allows the SmartEdge router to communicate with an access node device and gather information about the parameters for the individual access lines on the access node.

Note: In this document, access lines are also referred to as digital subscriber lines (DSLs) and access nodes are referred to as DSL access multiplexers (DSLAMs) or ANCP neighbor peers.

The ANCP is an out-of-band control protocol that is compared to the subscriber sessions that are carried on the access lines. Beneath the ANCP, the SmartEdge router uses General Switch Management Protocol (GSMP) version 3 (GSMPv3) to communicate with the ANCP neighbor peers; GSMPv3 messages are encapsulated using Transmission Control Protocol (TCP).

Although ANCP is primarily used to provision access network attributes on subscriber circuits coming through a DSLAM, it can also be used for non-subscriber circuits coming from other aggregators, such as when the SmartEdge router acts as a Metro Ethernet device in front of a Broadband Remote Access Server (BRAS). Which kind of traffic (subscriber or non-subscriber) is affected depends on where you configure access line information:

- Configuring access line information in a subscriber profile allows provisioning of ANCP attributes for subscriber circuits associated with the profile.
- Configuring access line information in a dot1q profile allows provisioning of ANCP attributes to 802.1Q PVCs associated with the profile, regardless of the circuit type. This option is intended for provisioning ANCP attributes on non-subscriber devices.

You can configure ANCP under a subscriber profile or under a dot1q profile, but you should not configure it in both places—a "mixed" configuration. Mixed configuration is not supported, and may cause unpredictable behavior.

Figure 1 shows the information flow from the individual subscribers to the SmartEdge router. In the network, the SmartEdge router, which is labeled "Aggregation Router," acts as a broadband remote access server (BRAS) with Ethernet aggregation capability.

The ANCP control information for individual subscriber access lines is stored on the SmartEdge router, along with other subscriber session information, and



sent to RADIUS servers during the subscriber authentication and accounting process. Other sources from which the SmartEdge router can learn access-line information are a Dynamic Host Control Protocol (DHCP) option 82 tag and a Point-to-Point Protocol (PPP) over Ethernet (PPPoE) tag.

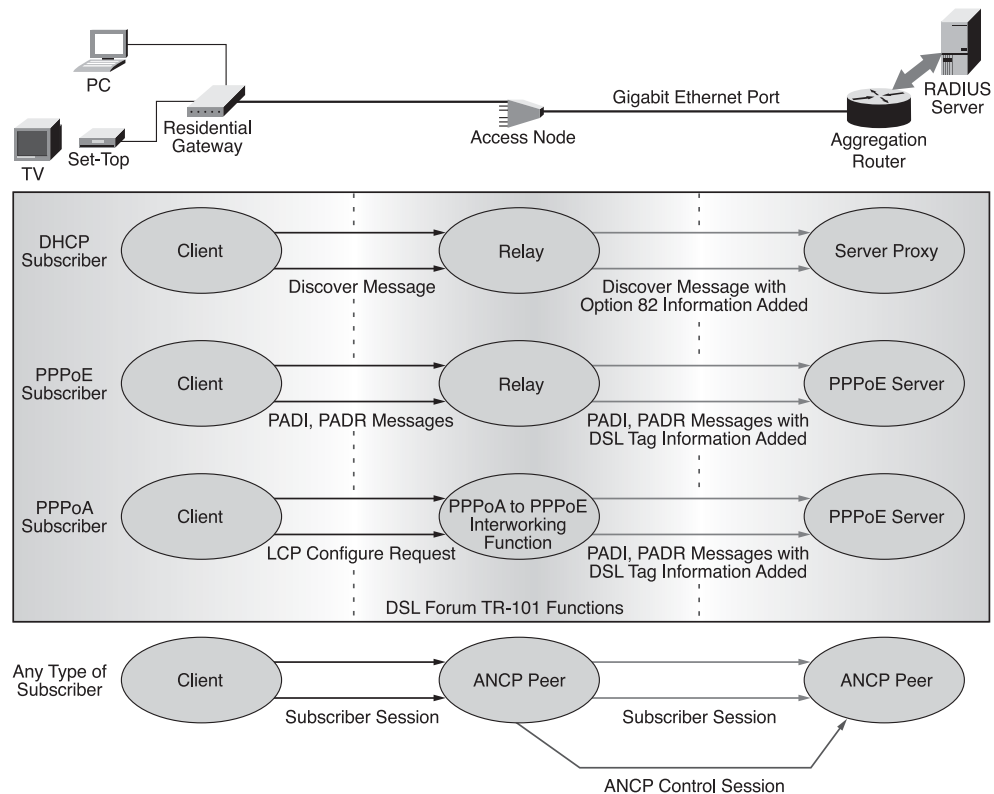


Figure 1 Access Node to SmartEdge Router Information Flow (900)

The SmartEdge router can adjust the performance of the subscriber sessions from access-line information by modifying the quality of service (QoS) policy attached to the subscriber session or its parent 802.1Q permanent virtual circuit (PVC). The SmartEdge router can also adjust the performance of 802.1Q tunnels.

You configure all ANCP functions under the umbrella of the ANCP router, which you create in the local context. The ANCP router is characterized by a system ID, which identifies the SmartEdge router to an ANCP neighbor peer; a TCP port, on which the SmartEdge router listens for incoming ANCP sessions; and a keepalive timer, which is used by the SmartEdge router to maintain communication with its ANCP neighbor peers.

If the SmartEdge router does not receive keepalive messages from an ANCP neighbor peer, the router disconnects the session. Each of these attributes has a default value that the SmartEdge router uses if you do not specify values.

For security, incoming sessions are validated against an ANCP neighbor profile to limit the peers that can connect to the SmartEdge router. If an incoming



ANCP neighbor peer does not match the attributes specified by the profile, the connection is rejected.

The profile can specify a peer ID, a peer IP address, the TCP port on which an ANCP neighbor peer sends and receives ANCP sessions (GSMP messages), and the interface to which you bind the circuit on which the ANCP sessions are transmitted and received. All these attributes are optional; if you leave an attribute unspecified, it acts as a wild card and accepts any value for the attribute.

You can modify the configuration of each subscriber record, profile, or the default subscriber profile to allow the learned access-line rates to override the rates specified by the QoS policies attached to the subscriber session or its 802.1Q PVC.

The circuit agent ID is used as a unique key to map ANCP information to specific subscriber sessions or to its 802.1Q parent PVC; it identifies the access line that is transmitting and receiving traffic on that 802.1Q PVC. The SmartEdge router can learn the subscriber's circuit agent ID dynamically from DHCP option 82 information or from the PPPoE vendor tag; you can also configure it statically for the subscriber's parent 802.1Q PVC.

ANCP features comply with the standards found in the draft-wadhwa-gsmp-l2c control-configuration-02 document, *GSMP Extensions for Layer 2 Control (L2C) Topology Discovery and Line Configuration* document.

The SmartEdge router supports dynamic learning of access-line information and agent circuit ID as described in the DSL Forum TR-101 document, *Migration to Ethernet-Based DSL Aggregation* document.





2 Configuration and Operations Tasks

Note: In this section, the command syntax in the task tables displays only the root command; for the complete command syntax, see the *Command List*.

2.1 ANCP Configuration Guidelines

This section includes configuration guidelines for ANCP features that affect more than one command or a combination of commands:

- You must configure the ANCP router in the local context.
- You must create the interface to which you bind the circuits that carry ANCP sessions in the local context.
- ANCP sessions are supported on any type of circuit.

2.2 Configuring the ANCP Router

To configure the ANCP router, perform the tasks described in Table 1; enter all commands in ANCP configuration mode, unless otherwise noted.

Table 1 Configure the ANCP Router

Task	Root Command	Notes
Create the ANCP router in the local context and access ANCP configuration mode.	<i>router ancp</i>	Enter this command in context configuration mode.
Optional. Assign an ID to identify the SmartEdge router in ANCP sessions transmitted to an ANCP neighbor peer.	<i>system-id</i>	
Optional. Assign a TCP port on which the SmartEdge router listens for ANCP sessions.	<i>tcp-port local</i>	
Optional. Configure the parameters for sending and receiving keepalive messages to and from ANCP neighbor peers.	<i>keepalive (ANCP)</i>	



2.3 Configuring an ANCP Neighbor Profile

To configure an ANCP neighbor profile, perform the tasks described in Table 2; enter all commands in ANCP neighbor configuration mode, unless otherwise noted.

Table 2 Configure an ANCP Neighbor Profile

Task	Root Command	Notes
Optional. Create an empty ANCP profile for an ANCP neighbor peer and access ANCP neighbor configuration mode.	<i>neighbor profile</i>	Enter this command in ANCP configuration mode.
Optional. Filter incoming new neighbor connections using the sender name of an ANCP neighbor peer.	<i>peer id</i>	
Optional. Filter incoming new neighbor connections using the IP address of an ANCP neighbor peer.	<i>peer ip-address</i>	
Optional. Filter incoming new neighbor connections using the TCP port on which the SmartEdge router receives the GSMP messages from an ANCP neighbor peer.	<i>tcp-port remote</i>	
Optional. Filter the incoming new neighbor connections using the interface on which ANCP sessions are transmitted and received for this ANCP neighbor profile.	<i>interface (ANCP)</i>	

2.4 Mapping an 802.1Q PVC to a DSL Line

To map an 802.1Q PVC to a DSL line, perform the task described in Table 3; enter the command in dot1q PVC configuration mode. Configure only one of the commands.



Table 3 Map an 802.1Q PVC to a DSL Line

Task	Root Command	Notes
Specify the agent circuit ID that the system uses to match an ANCP message to a circuit, thereby mapping a DSL line to a circuit.	<i>access-line agent-circuit-id</i>	The access-line agent-circuit-id command is an alternative to the access-line access-node-id command.
Specify the agent circuit ID that the system uses to match an ANCP message to a circuit, thereby mapping a DSL line to a circuit.	<i>access-line access-node-id</i>	The access-line access-node-id command is an alternative to the access-line agent-circuit-id command.

2.5 Mapping an 802.1Q Tunnel to a DSL Line

To map an 802.1Q tunnel to a DSL line, perform the task described in Table 4; enter the command in dot1q PVC configuration mode and specify the **encapsulation 1qtunnel** keywords with the **dot1q pvc** command. Configure only one of the commands.

Table 4 Map an 802.1Q Tunnel to a DSL Line

Task	Root Command	Notes
Specify the agent circuit ID that the system uses to match an ANCP message to a circuit, thereby mapping a DSL line to a circuit.	<i>access-line agent-circuit-id</i>	The access-line agent-circuit-id command is an alternative to the access-line access-node-id command.
Specify the agent circuit ID that the system uses to match an ANCP message to a circuit, thereby mapping a DSL line to a circuit.	<i>access-line access-node-id</i>	The access-line access-node-id command is an alternative to the access-line agent-circuit-id command.

2.6 Configuring a Subscriber Record for ANCP Sessions

To configure a subscriber record for ANCP sessions, perform one of the tasks described in Table 5; enter the command in subscriber configuration mode.



Table 5 Configure a Subscriber Record for ANCP Sessions

Task	Root Command
Override the rates specified by the QoS policies attached to this subscriber record with the actual rates.	<i>access-line rate</i>
Override the rates specified by the QoS policies attached to this subscriber record with the rates learned from the DSLAM.	<i>access-line agent-circuit-id</i>

2.7 Operations Tasks

To monitor and administer ANCP features, perform the appropriate task listed in Table 6. Enter the **clear debug** and **ping** commands in exec mode; enter all **show** commands in any mode.

Table 6 ANCP Operations Tasks

Task	Root Command
Delete DSL attributes that the system has learned from the DSLAM for the selected DSLs.	<i>clear access-line</i>
Terminate the Transmission Control Protocol (TCP) connection for ANCP sessions for one or more ANCP neighbor peers.	<i>clear ancp neighbor</i>
Clear ANCP neighbor statistics for ANCP sessions for one or more ANCP neighbor peers.	<i>clear ancp neighbor statistics</i>
Enable the generation of debug messages for GSMP or ANCP packets.	<i>debug packet</i>
Send an ANCP General Switch Management Protocol (GSMP) port management message to the ANCP neighbor peer (the DSLAM) to test the peer.	<i>ping ancp</i>
Display DSL information for one or more DSLs.	<i>show access-line</i>
Display ANCP global information.	<i>show ancp</i>
Display ANCP session information for one or more ANCP neighbor peers or for an ANCP profile.	<i>show ancp neighbor</i>
Display ANCP neighbor statistics for one or more ANCP neighbor peers.	<i>show ancp neighbor statistics</i>



3 Configuration Examples

The following examples show how to configure the ANCP router, an ANCP neighbor profile, an 802.1Q tunnel for ANCP sessions, and an 802.1Q PVC to map to a DSL line:

```
! Create the interface and ANCP router in the local context
[local]Redback(config)#context local
[local]Redback(config-ctx)#interface ancp multibind
[local]Redback(config-ctx)#interface untagged
[local]Redback(config-ctx)#router ancp

! Configure the ANCP router
[local]Redback(config-ancp)#system-id 12:34:56:78:9a:bc
[local]Redback(config-ancp)#tcp-port local 6070
[local]Redback(config-ancp)#keepalive interval 5 retries 5

!Configure an ANCP profile for the ANCP neighbor peer (DSLAM)
[local]Redback(config-ancp)#neighbor profile ancp-profile
[local]Redback(config-ancp-neighbor)#peer id 01:02:03:04:05:06
[local]Redback(config-ancp-neighbor)#peer ip-address 30.100.1.20
[local]Redback(config-ancp-neighbor)#tcp-port remote 7070
[local]Redback(config-ancp-neighbor)#interface ancp

! Configure an Ethernet port for the DSLAM and DSL
[local]Redback(config)#context local
[local]Redback(config-ctx)#port ethernet 2/1
[local]Redback(config-port)#no shutdown
[local]Redback(config-port)#encapsulation dot1q
[local]Redback(config-port)#bind interface untagged local

! Configure an 802.1Q tunnel to carry the ANCP protocol messages for out-of-band
for the ANCP session traffic (to and from the DSLAM)
[local]Redback(config-port)#dot1q pvc 1 encapsulation lqtunnel
[local]Redback(config-dot1q-pvc)#bind interface ancp local

! Configure an 802.1Q PVC for the subscriber traffic
[local]Redback(config-dot1q-pvc)#dot1q pvc 1:1 encapsulation ppoe
```



```
[local]Redback(config-dot1q-pvc)#bind authentication chap
[local]Redback(config-dot1q-pvc)#access-line agent-circuit-id "abc-2.1:1:1"

! Configure the default subscriber profile to allow the learned rate of the
DSL to override the rate specified in a QoS policy attached to the subscriber
circuit or its parent circuit in the outbound direction.

[local]Redback(config)#context subscribers
[local]Redback(config-ctx)#subscriber default
[local]Redback(config-sub)#access-line rate out ancp
```

The following examples show how to configure the ANCP router, an ANCP neighbor profile, an 802.1Q tunnel for ANCP sessions, and an 802.1Q tunnel to map to a DSL line:

```
! Create the interface and ANCP router in the local context
[local]Redback(config)#context local
[local]Redback(config-ctx)#interface ancp multibind
[local]Redback(config-ctx)#interface untagged
[local]Redback(config-ctx)#router ancp

! Configure the ANCP router
[local]Redback(config-ancp)#system-id 12:34:56:78:9a:bc
[local]Redback(config-ancp)#tcp-port local 6070
[local]Redback(config-ancp)#keepalive interval 5 retries 5

!Configure an ANCP profile for the ANCP neighbor peer (DSLAM)
[local]Redback(config-ancp)#neighbor profile ancp-profile
[local]Redback(config-ancp-neighbor)#peer id 01:02:03:04:05:06
[local]Redback(config-ancp-neighbor)#peer ip-address 30.100.1.20
[local]Redback(config-ancp-neighbor)#tcp-port remote 7070
[local]Redback(config-ancp-neighbor)#interface ancp

! Configure an Ethernet port for the DSLAM and DSL
[local]Redback(config)#context local
[local]Redback(config-ctx)#port ethernet 2/1
[local]Redback(config-port)#no shutdown
[local]Redback(config-port)#encapsulation dot1q
[local]Redback(config-port)#bind interface untagged local

! Configure an 802.1Q profile to allow the learned rate of the DSL to override
the rate specified in a QoS policy attached to the circuit in the inbound and
outbound direction.
[local]Redback(config)#dot1q profile pwfq
```



```
[local]Redback(config-dot1q-profile)#access-line rate in
[local]Redback(config-dot1q-profile)#access-line rate out

! Map an 802.1Q tunnel (circuit) to a DSL line by specifying the agent circuit
! ID that the system uses to match an ANCP message to a circuit. This configuration
! also allows the learned rate of the DSL line to override the rate specified in the
! QoS policy attached to the 802.1Q tunnel (circuit) for the L2VPN cross-connection and the VPLS instances.
[local]Redback(config-dot1q-profile)#port ether 3/3
[local]Redback(config-port)#encapsulation dot1q
[local]Redback(config-port)#dot1q pvc 3 profile pwfq encapsulation lqtunnel
[local]Redback(config-dot1q-pvc)#access-line access-node-id "2.2.2.2/3.3.3.3" slot
[local]Redback(config-dot1q-pvc)#access-line access-node-id "2.2.2.2/3.3.3.3" slot-port "10/0"
[local]Redback(config-dot1q-pvc)#qos policy queuing triple-play
[local]Redback(config-dot1q-pvc)#dot1q pvc 3:1
[local]Redback(config-dot1q-pvc)#l2vpn local
[local]Redback(config-dot1q-pvc)#dot1q pvc 3:2
[local]Redback(config-dot1q-pvc)#bridge profile access-bp1
[local]Redback(config-dot1q-pvc)#bind interface cust1 vpls1
[local]Redback(config-dot1q-pvc)#end
```