

Configuring Point-to-Point Protocol over Ethernet

This chapter describes how to configure Point-to-Point protocol over Ethernet interfaces on your ERX system.

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Overview

Your system uses PPP over Ethernet (PPPoE) to enable multiple hosts to open PPP sessions to your system using one or more bridging modems. When service providers want to maintain the session abstraction associated with PPP, PPPoE is used with Broadband Remote Access Server (B-RAS) technologies that provide a bridged Ethernet topology. PPPoE can be configured over ATM or on Ethernet modules with or without VLANs.

Figure 16-1 shows how PPPoE allows your system to handle multiple PPP sessions originating on an Ethernet module to be multiplexed over one PVC on an ATM interface. PPP, as documented in *Chapter 13, Configuring Point-to-Point Protocol*, runs above the PPPoE layer.

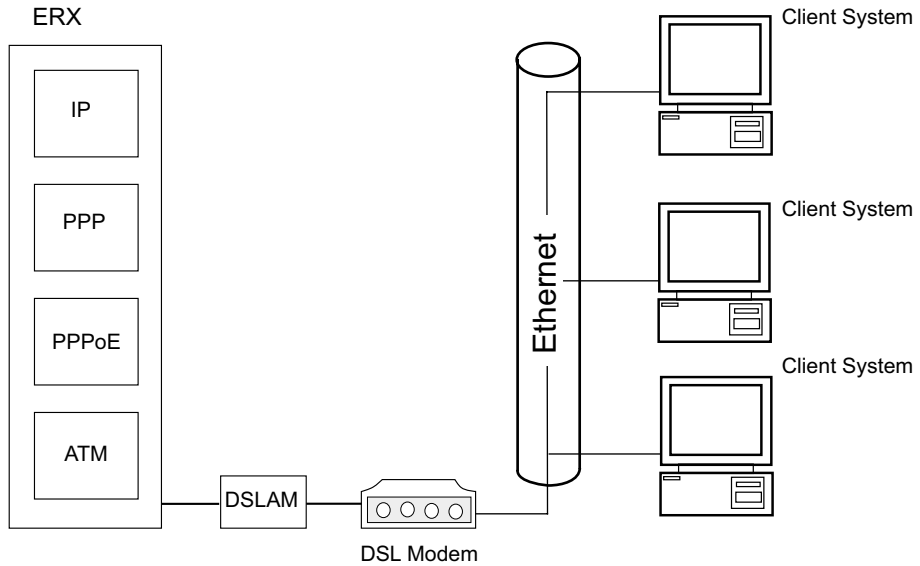


Figure 16-1 PPPoE over ATM

The system handles the server part of PPPoE session management and never initiates a setup of a PPPoE session. The system only responds to session requests that are sent to it by the remote PPP client. After the sessions are set up, the system demultiplexes the sessions based on session identifiers assigned to a specific connection.

PPPoE has two distinct stages: Discovery and Session.

Discovery

PPPoE includes a Discovery protocol that allows each PPP session to learn the Ethernet address of the remote peer, as well as establish a unique session identifier. When a host wishes to initiate a PPPoE session, it must first perform Discovery to identify the Ethernet MAC address of the peer and establish a PPPoE session ID.

Although PPP defines a peer-to-peer relationship, Discovery is inherently a client-server relationship. In the Discovery process, a host acting as a client discovers a remote access concentrator (AC), which acts as the server.

Based on the network topology, there may be more than one remote AC with whom the host can communicate. The Discovery stage allows the host to discover all remote ACs and then select the one to which it wants to connect.

Session

When Discovery is successfully completed, both the host and the selected remote AC have the information they need to build their point-to-point connection over Ethernet.

The only parameter that you can configure is the number of PPPoE sessions.



Note: The system supports dynamic PPPoE interfaces. Also, profiles support PPPoE interfaces. See Chapter 21, *Configuring Dynamic Interfaces*.

References

Our implementation of PPPoE complies with the following specifications:

- RFC 2516 – Method for Transmitting PPP over Ethernet (PPPoE) (February 1998)
- Extensions to a Method for Transmitting PPP over Ethernet (PPPoE) – draft-carrel-info-pppoe-ext-00.txt (November 2000 expiration)
- IEEE 802.1q (FE and GE)

Before You Configure PPPoE

Before you attempt to configure a PPPoE interface, you should configure the physical interface over which PPPoE traffic will flow. The procedures described in this chapter assume that a physical interface has been configured.

Configuring PPPoE over ATM

This section provides an example of a common PPPoE over ATM configuration. See Figure 16-2. Additional information is provided in the following chapters:

- *Chapter 10, Configuring ATM* – Provides detailed information about ATM technology and line interface module capabilities.
- *Chapter 18, Configuring Bridged Ethernet* – Provides configuration information about Bridged Ethernet, which allows multiple upper-layer interface types (IP, PPPoE, and CBF) to be simultaneously multiplexed over the same interface.
- *Chapter 21, Configuring Dynamic Interfaces* – Provides detailed information about configuring ATM to support dynamic interfaces.

To configure PPPoE over ATM:

- 1 Configure a physical interface.

```
host1(config)#interface atm 0/1
```
- 2 Configure the ATM 1483 subinterface.

```
host1(config-if)#interface atm 0/1.20
```
- 3 Configure a PVC by specifying the *vcd* (virtual circuit descriptor), the *vci* (virtual channel identifier), the *vpi* (virtual path identifier), and the encapsulation type.

```
host1(config-if)#atm pvc 10 22 100 aa15snap
```
- 4 Select PPPoE as the encapsulation method.

```
host1(config-subif)#encapsulation pppoe
```
- 5 Configure a maximum number of PPPoE sessions on the interface.

```
host1(config-if)#pppoe sessions 128
```
- 6 Create a PPPoE subinterface.

```
host1(config-subif)#interface atm 0/1.20.1
```
- 7 Select PPP as the encapsulation method.

```
host1(config-subif)#encapsulation ppp
```
- 8 (Optional) Configure an access concentrator (AC) name on the PPPoE interface.

```
host1(config-subif)#pppoe acname CYM9876
```
- 9 (Optional) Set up the system to prevent a client from establishing more than one session using the same MAC address

```
host1(config-subif)#pppoe duplicate-protection
```
- 10 Assign an IP address and subnet mask to the PVC.

```
host1(config-subif)#ip address 192.32.10.20 255.255.255.
```
- 11 (Optional) Configure additional PPPoE subinterfaces by completing steps 6 through 8 using unique numbering.

```
host1(config-subif)#interface atm 0/1.20.2
```

9 Create new PPPoE subinterface stack by repeating steps 6, 7, and 8 using unique numbers.

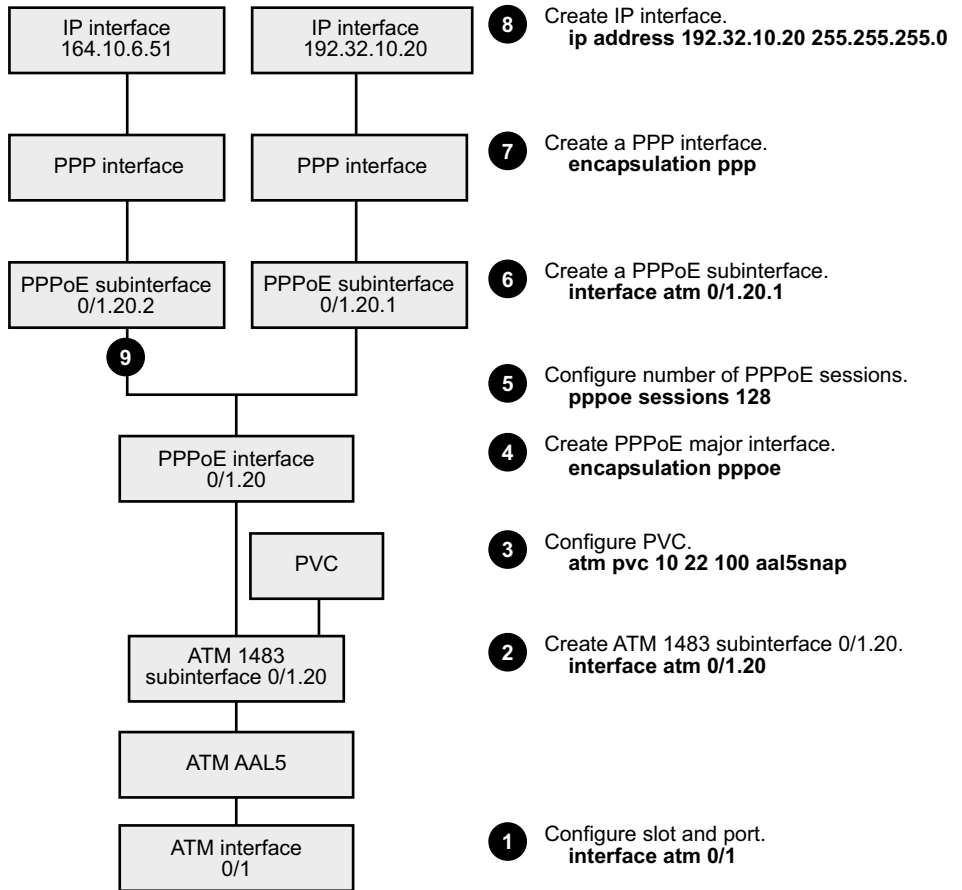


Figure 16-2 Example of PPPoE over ATM stacking configuration steps

atm pvc

- Use to configure a PVC on an ATM interface.
- The following parameters are mandatory:
 - › *vcd* – virtual circuit descriptor, which identifies a virtual circuit in the range 1–2147483647. The *vcd* is a unique number that you assign, which identifies a virtual circuit. The *vcd value* has no relationship to the *vpi* and *vci* values and has meaning only to the ERX-700 series or ERX-1400 series edge router.
 - › *vpi* – virtual path identifier of the PVC. The VPI is an 8-bit field in the ATM cell header. The VPI value is unique on a single link, not throughout the ATM network, because it has meaning only to the ERX-700 series or ERX-1400 series edge router. The VPI value must match the value on the switch. The

parameters *vpi* and *vci* cannot be both set to 0; if one is 0, the other cannot be 0.

- › *vci* – virtual channel identifier. The VCI is a 16-bit field in the ATM cell header. The VCI value is unique on a single link, not throughout the ATM network, because it has meaning only to the ERX-700 series or ERX-1400 series edge router. The parameters *vpi* and *vci* cannot be both set to 0; if one is 0, the other cannot be 0.
- › encapsulation type:
 - **aal5snap** – specifies a logical link control (LLC) encapsulated circuit. An LLC/Subnetwork Access Protocol (LLC/SNAP) precedes the protocol datagram.
 - **aal5mux ip** – specifies a multiplexed circuit used for IP only
 - **aal5autoconfig** – enables the autodetection of a 1483 encapsulation (LLC/SNAP or VC multiplexed)
- Example


```
host1(config-if)#atm pvc 10 100 22 aal5autoconfig
```
- Use the **no** version to remove the specified PVC.

encapsulation ppp

- Use to specify PPP as the encapsulation method for the interface.
- Example


```
host1(config-subif)#encapsulation ppp
```
- Use the **no** version to disable PPP on an interface.

encapsulation pppoe

- Use to specify PPPoE as the encapsulation method for the interface.
- Example


```
host1(config-subif)#encapsulation pppoe
```
- Use the **no** version to disable PPPoE on an interface.

interface atm

- Use to configure an ATM interface in *slot/port.subinterface* format:
 - › A *slot* refers to a system chassis slot.
 - › A *port* refers to a T3 module port.
 - › A *subinterface* is a mechanism that allows a single physical interface to support multiple logical interfaces or networks. Several logical interfaces or networks can be associated with a single hardware interface. Protocols, such as ATM, require that you create one or more virtual circuits over which your data traffic is transmitted to higher layers in the protocol stack. A *subinterface* is identified by a user-defined number from 1 to 4294967293.
- Example


```
host1(config)#interface atm 0/1.19
```
- Use the **no** version to remove the interface or subinterface.

ip address

- Use to assign an IP address and subnet mask to a subinterface.
- Example

```
host1(config-if)#ip address 192.1.1.1 255.255.255.0
```
- Use the **no** version to remove an IP address or disable IP processing.

pppoe acName

- Use to configure an access concentrator (AC) name on the PPPoE interface. When the AC (the server) receives a PPPoE Active Discovery Initiation (PADI) packet that it can serve, it replies by sending a PPPoE Active Discovery Offer (PADO) packet. The PADO packet will contain the AC name as configured.
- If the AC name is not configured, the system name is used.
- The AC name can be a maximum of 64 characters.
- Example

```
host1(config-subif)#pppoe acname CYM9876
```
- The **no** version removes the AC name.

pppoe duplicate-protection

- Use to prevent a client from establishing more than one session using the same MAC address.
- This feature is disabled by default
- Example

```
host1(config-subif)#pppoe duplicate-protection
```
- Use the **no** version to disable duplicate protection

pppoe sessions

- Use to specify the maximum number of PPPoE subinterfaces permitted on an interface in the range 1–4094. The default value is 4094.
- The **pppoe sessions** command affects only subinterfaces that are created *after* the command is entered. *Previously* created interfaces remain, even if their number exceeds the new value of the *sessions* parameter.
- Example

```
host1(config-if)#pppoe sessions 128
```
- Use the **no** version to restore the default value.

Configuring PPPoE for Ethernet Modules

Dual-port Fast Ethernet (FE-2), eight-port Fast Ethernet (FE-8), and Gigabit Ethernet (GE) interfaces support PPPoE. You can configure Ethernet interfaces with IP only, with PPPoE only, with both IP and PPPoE, and with or without VLANs.

This section provides information only on configuring PPPoE without VLANs. If you want to configure PPPoE with VLANs, see *Chapter 6, Configuring Ethernet Interfaces*, which shows common VLAN configurations, such as:

- PPPoE over VLAN
- IP over VLAN and PPPoE over VLAN

Limits

PPPoE for FE and GE modules have the following limits:

- One IP-only interface per port or per VLAN
- One PPPoE interface per port or per VLAN
- 4,094 PPPoE subinterfaces per module
- 8,000 IP interfaces on GE, including those over PPPoE

PPPoE subinterfaces can be distributed in any way across ports. For example, there could be 4094 PPPoE subinterfaces on one port of an FE-2 module and no PPPoE subinterfaces on the other port.

Configuring PPPoE Without VLANs

There are two methods to configure multiple protocols, such as IP and PPPoE, over Ethernet without VLANs. The older method, described in *Alternative Method* on page 16-10, requires the use of Ethernet subinterfaces. This method is still supported for backward compatibility, but is not recommended for new configurations.



Note: *There are two variations of the procedure to create a multiprotocol configuration without VLANs. Follow the current methods if you are running the current system software version. Follow the alternative method if you are using a software version earlier than Release 3.0.0, or if you are running scripts or macros that were created based on a software version earlier than Release 3.0.0.*

Current Method

Always use this method unless you have an earlier version of software. See note above. This method is illustrated in Figure 16-3.

To configure PPPoE over an Ethernet interface:

- 1 Specify an FE or a GE port.

```
host1(config)#interface fastethernet 4/1
```

- 2 Specify PPPoE as the encapsulation method on the interface.

```
host1(config-if)#pppoe
```

- 3 Create a PPPoE subinterface.

```
host1(config-if)#pppoe subinterface fastethernet 4/1.1
```

- 4 Specify PPP as the encapsulation method on the interface.

```
host1(config-subif)#encapsulation ppp
```

- 5 (Optional) Configure an access concentrator (AC) name on the PPPoE interface.

```
host1(config-subif)#pppoe acname CYM9876
```

- 6 (Optional) Set up the system to prevent a client from establishing more than one session using the same MAC address

```
host1(config-subif)#pppoe duplicate-protection
```

- 7 Assign an IP address and mask.

```
host1(config-if)#ip address 192.6.129.5 255.255.255.0
```

- 8 (Optional) Configure additional PPPoE subinterfaces by completing steps 3 through 5 using unique numbering.

- 6 Create new PPPoE subinterface stack by repeating steps 3, 4, and 5 using unique numbers.

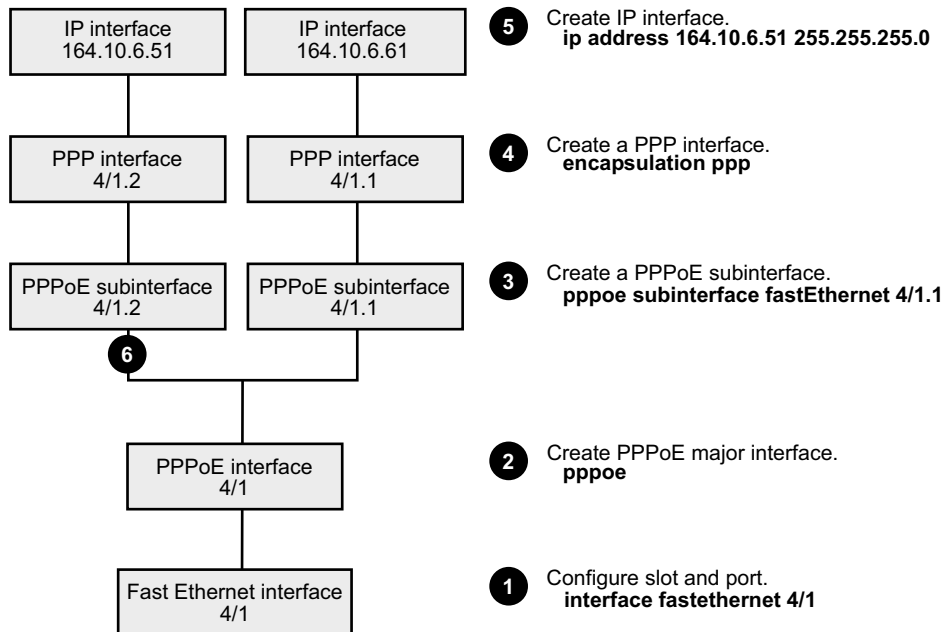


Figure 16-3 Example of PPPoE stacking configuration steps

Alternative Method

Use the following configuration method if you are using a software version earlier than Release 3.0.0, or if you are running scripts or macros that were created based on a version of software earlier than Release 3.0.0. MPLS interfaces were not supported in earlier software versions. See Figure 16-4.

The protocol subinterface is distinguished when you add a subinterface number to the interface identification string **fastEthernet** or **gigabitEthernet**.



Note: Remove the upper-layer interface stack before removing a protocol subinterface.

To configure IP and PPPoE over an Ethernet interface:

- 1 Specify an FE or a GE port.
`host1(config)#interface fastethernet 2/0`
- 2 Create a Fast Ethernet subinterface.
`host1(config-if)#interface fastethernet 2/0.1`
- 3 Assign an IP address and subnet mask to the interface.
`host1(config-if)#ip address 192.1.1.1 255.255.255.0`
- 4 Create a new Fast Ethernet subinterface.
`host(config-if)#interface fastethernet 2/0.2`
- 5 Specify PPPoE as the encapsulation method on the interface.
`host1(config-if)#encapsulation pppoe`
- 6 Create a PPPoE subinterface.
`host1(config-if)#interface fastethernet 2/0.2.1`
- 7 Specify PPP as the encapsulation method on the interface.
`host1(config-if)#encapsulation ppp`
- 8 Assign an IP address and mask.
`host1(config-if)#ip address 192.6.129.5 255.255.255.0`
- 9 (Optional) Configure additional PPPoE subinterfaces by completing steps 5 through 7 using unique numbering.

9 Create new PPPoE subinterface stack by repeating steps 6, 7, and 8 using unique numbers.

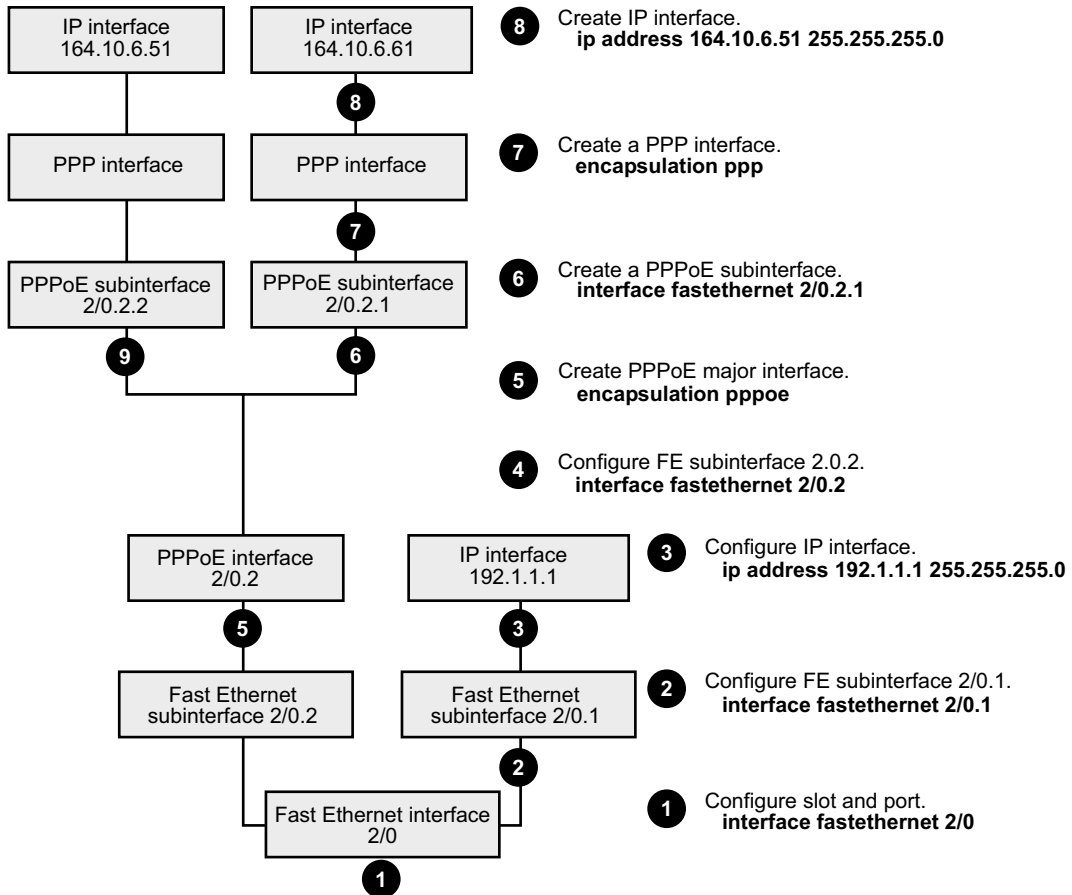


Figure 16-4 Example of alternative method stacking configuration steps



Note: Chapter 6, *Configuring Ethernet Interfaces*, provides other non-VLAN configuration examples, such as configurations using MPLS.

encapsulation ppp

- Use to specify PPP as the encapsulation method for the interface.
- Example


```
host1-0-1-90(config-if)#encapsulation ppp
```
- Use the **no** version to disable PPP on an interface.

encapsulation pppoe

- Use to specify PPPoE as the encapsulation method for the interface.
- Example

```
host1-0-1-90(config-if)#encapsulation pppoe
```
- Use the **no** version to disable PPPoE on an interface.

interface fastEthernet

- Use to select an FE interface on a line module or SRP module.
- Example

```
host1(config)#interface fastEthernet 1/0
```
- Use the **no** version to remove IP from an interface or subinterface. You must issue the **no** version from the highest level down; you cannot remove an interface or subinterface if the one above it still exists.



Note: For more details on the use of this command, see the syntax discussion in the Command Reference Guide.

interface gigabitEthernet

- Use to select a GE interface.
- **Note:** You can configure only the primary port, 0, on the Gigabit Ethernet module. The system automatically uses the redundant port if the primary fails.
- Example

```
host1(config)#interface gigabitEthernet 1/0
```
- Use the **no** version to remove IP from an interface. You must issue the **no** version from the highest level down; you cannot remove an interface or subinterface if the one above it still exists.



Note: For more details on the use of this command, see the syntax discussion in the Command Reference Guide.

ip address

- Use to assign an IP address and subnet mask to an interface or subinterface.
- Example

```
host1-0-1-90(config-if)#ip address 192.1.1.1 255.255.255.0
```
- Use the **no** version to remove an IP address or disable IP processing.

pppoe acName

- Use to configure an access concentrator (AC) name on the PPPoE interface. When the AC (the server) receives a PPPoE Active Discovery Initiation (PADI) packet that it can serve, it replies by sending a PPPoE Active Discovery Offer (PADO) packet. The PADO packet will contain the AC name as configured.
- If the AC name is not configured, the system name is used.
- The AC name can be a maximum of 64 characters.
- Example

```
host1(config-subif)#pppoe acname CYM9876
```
- The **no** version removes the AC name.

pppoe duplicate-protection

- Use to prevent a client from establishing more than one session using the same MAC address.
- This feature is disabled by default.
- Example

```
host1(config-subif)#pppoe duplicate-protection
```
- Use the **no** version to disable duplicate protection.

Configuring PADM Messages

You can configure new PPPoE commands to issue and display a PPPoE Active Discovery Message (PADM). The PADM message is a control message that servers send to clients. The clients may act on the control message, but are not required to do so. There are two types of PADM messages:

- Message of the minute (MOTM) – informs clients of interesting system information
- URL – typically spawns an Internet browser with the specified URL as the initial page.

You can configure the system to send PADM messages as follows:

- Send MOTM messages to all clients connected to the system.
- Send MOTM and URL messages to all clients connected to a subinterface.
- Configure profiles to send MOTM and URL messages to new clients created when the profile is dynamically attached to an IP interface.



Note: The `pppoe motm` command can be used at three different points in the configuration process: Privileged Exec, Interface Configuration, and Profile Configuration modes. The `pppoe url` command can be used at two different points in the configuration process: Interface Configuration and Profile Configuration modes. Note the differences described in guidelines below.

pppoe motm

- Use to cause the PPPoE application to send a PADM message of the minute (MOTM) message to all PPPoE clients connected to the system. The MOTM string is passed with no changes.
- The message *string* is not saved in nonvolatile storage (NVS).
- Example

```
host1#pppoe motm System going down at 10:00 p.m.
```
- Use in Privileged Exec mode.
- Use the **no** version to disable the message.

pppoe motm

- Use in the context of a PPPoE subinterface to cause the PPPoE application to send the specified PADM message to the client as it is configured (if connected).
- The message is also sent whenever the subinterface transitions from down to up.
- Example

```
host1(config-if)#interface fa 1/0.1.1
host1(config-if)#pppoe motm System going down at 10:00 p.m.
```
- The message *string* is saved in nonvolatile storage (NVS).
- Use in Interface Configuration mode.
- Use the **no** version to disable the message.

pppoe motm

- Use in a profile to cause the PPPoE application to send the string to the new client that is created when the profile is dynamically attached to an IP interface.
- Example

```
host1(config-profile)#pppoe motm string
```
- The message *string* is saved in nonvolatile storage (NVS).
- Use in Profile Configuration mode.
- Use the **no** version to disable the message.

pppoe url

- Use in the context of a PPPoE subinterface to cause the PPPoE application to send the specified PADM message to the client as it is configured (if connected).
- The message is also sent whenever the subinterface transitions from down to up.

- Example

```
host1(config-if)#interface fa 1/0.1.1
host1(config-if)#pppoe url http://www.relevanturl.com
```

- The message *string* is saved in nonvolatile storage (NVS).
- Use in Interface Configuration mode.
- Use the **no** version to disable the message.

pppoe url

- Use in a profile to cause the PPPoE application to send the string to the new client that is created when the profile is dynamically attached to an IP interface.

- Example

```
host1(config-profile)#pppoe url http://www.relevanturl.com
```

- The message *string* is saved in nonvolatile storage (NVS).
- PPPoE substitutes certain characters for information in the specified URL string before transmitting:
 - › %U user and domain name
 - › %u user name
 - › %d domain name
 - › %D profile name
 - › %% % character
- Use in Profile Configuration mode.
- Use the **no** version to disable the message.

Configuring PADN Messages

You can configure PPPoE to receive PPPoE Active Discovery Network (PADN) messages. When a client connects to a PPPoE server, such as an ERX system, the client receives configuration information from the server via the PADN message. This PADN information associates the PPPoE sessions with a set of routes. The client can use this set of routes to determine which session to use based on the destination IP address.

The PADN packet data is relevant only when the PPP network layer is “up.” To reach an up state, PPP alerts PPPoE after the Network Control Protocol (NCP) completes negotiation.

The routes of interest can be maintained on the ERX system in domain maps. The route information is conveyed to PPPoE through a user profile via AAA.

The PADN data can also be maintained on a RADIUS server. The PADN information is delivered to the ERX system as a VSA during the PPP authentication process.



Note: For information about domain mapping, see the *ERX Broadband Access Configuration Guide, Chapter 1, Configuring Remote Access to the ERX System*.

aaa domain-map

- Use to map a domain name between a PPP client's domain name and a virtual router.
- Example

```
host1(config)#aaa domain-map xyz.com
host1(config-domain-map)#padn 10.2.25.6 255.255.255.0 10
host1(config-domain-map)#padn 20.2.0.0 255.255.0.0 11
```
- Use the **no** version to delete the map entry.

padn

- Use to configure PADN parameters for a domain name.
- Example

```
host1(config-domain-map)#padn 10.2.25.6 255.255.255.255 13
```
- You may send up to a maximum of 16 PADNs per domain name.
- Use the **no** version to delete PADN parameters for the domain name.

Monitoring PPPoE

Use the commands in this section to display information about PPPoE interfaces and subinterfaces.

You can set a statistics baseline for PPPoE interfaces, subinterfaces, and/or circuits using the **baseline pppoe interface** command.

You can use the output filtering feature of the **show** command to include or exclude lines of output based on a text string you specify. Refer to *ERX System Basics Configuration Guide, Chapter 2, Command Line Interface*, for details.

baseline pppoe interface

- Sets a statistics baseline for PPPoE interfaces, subinterfaces, and/or circuits.
- The system implements the baseline by reading and storing the statistics at the time the baseline is set and then subtracting this baseline whenever baseline-relative statistics are retrieved.
- Use the *interfaceValue* parameter to specify an interface or subinterface.
 - › Specify an interface using the *slot/port:channel/subchannel* format
 - › Specify a subinterface using the *slot/port:channel/subchannel.subinterface* format
- You cannot set a baseline for groups of interfaces, subinterfaces, or circuits. You must set them one at a time.
- When baselining is requested, the time since the last baseline was set is displayed in *hours:minutes:seconds* or *days/hours* format. If a baseline has not been set, the message “No baseline has been set” is displayed instead.
- Use the optional **delta** keyword with PPPoE **show** commands to specify that baselined statistics are to be shown.
- Example

```
host1#baseline pppoe interface atm 2/0.1.1
```

show pppoe interface

- Use to display parameters on a PPPoE interface or a PPPoE subinterface.
- If you do not specify an interface and subinterface, the system displays the *PPPoE interface* and *Status* parameters for all configured interfaces.
- If you specify an interface with no subinterface, the system displays the *PPPoE interface* and *Status* parameters for that interface.
- If you specify an interface and subinterface, the system displays detailed parameters available for that subinterface.
- Field descriptions
 - › PPPoE interface – interface identifier in slot/port.subinterface format
 - › Status – operational status of the interface. Possible values are:
 - operStatusUP – interface or subinterface is operational
 - Down – interface or subinterface is not operational
 - LowerLayerDown – subinterface is not operational, because an underlying interface is down
 - › max sessions – number of maximum allowable PPP sessions configured
 - › acName – PPPoE ACNAME – access concentrator name
 - › duplicate-protection – whether or not duplicate protection is enabled
 - › active connections – number of live PPP connections
 - › configured subinterfaces – PPPoE subinterfaces you configured on an interface
 - › PADI-rx/PADI-tx – initiation control packets received/transmitted
 - › PADO-rx/PADO-tx – offer control packets received/transmitted
 - › PADR-rx/PADR-tx – response control packets received/transmitted
 - › PADS-rx/PADS-tx – session confirm control packets received/transmitted

- › PADT-rx/PADT-tx – termination control packets received/transmitted
 - › PADM-rx/PADM-tx – message control packets received/transmitted on the interface
 - › BadPackets – number of defective packets received on the interface
 - › Insufficient resources – requests denied because of an inadequate number of sessions; check the number of active clients
- Example

```
host1-A0-0-2E:v1#show pppoe interface atm 3/0.1
PPPoE interface ATM 1/0.1 is operStatusUp (dynamic)
  PPPoE interface ATM 1/0.1 has max sessions = 4000
  PPPoE interface ATM 1/0.1 has acName of 1111111111111111
  PPPoE interface ATM 1/0.1 is in duplicate-protection
  PPPoE interface ATM 1/0.1 has 1 active connections,
    out of 1 configured subinterfaces
PPPoE Statistics
  PADI-rx 3
  PADI-tx 0
  PADO-rx 0
  PADO-tx 3
  PADR-rx 3
  PADR-tx 0
  PADS-rx 0
  PADS-tx 3
  PADT-rx 0
  PADT-tx 0
  PADM-tx 0
  PADM-rx 0
  BadPackets 0
  Insufficient Resources 0
```

show pppoe interface summary

- Use to display the operational and administrative status of all configured PPPoE interfaces.
- Field descriptions
 - › Total PPPoE interfaces – number of configured PPPoE interfaces included in summary
 - › Administrative Status
 - Up – number of interfaces not affected by manual administrative intervention
 - Down – number of interfaces that cannot flow because of manual administrative intervention
 - › Operational Status
 - Up – number of interfaces that are operational
 - Down – number of interfaces that are not operational
 - LowerLayerDown – number of interfaces that are not operational because an underlying interface is down

- NotPresent – number of interfaces that are not operational because hardware is unavailable
- Example

```

host1:01#show pppoe interface summary
Total PPPoE interfaces: 16

Administrative Status:
    Up: 15
    Down: 1

Operational Status:
    Up: 15
    Down: 1
    LowerLayerDown: 1
    NotPresent: 0

```

show pppoe subinterface

- Use to display parameters for PPPoE subinterfaces.
- If you do not specify a subinterface, the system displays the configured PPPoE subinterface number and status for all configured PPPoE subinterfaces.
- If you specify an interface with no subinterface, the system displays the status for the subinterfaces associated with the interface.
- If you specify an interface and subinterface, the system displays detailed parameters available for that subinterface.
- Field descriptions
 - › PPPoE subinterface – interface number in *slot/port.subinterface 1.subinterface 2* format
 - › Status – operational status of the interface. Possible values are:
 - operStatusUP – interface or subinterface is operational
 - Down – interface or subinterface is not operational
 - LowerLayerDown – subinterface is not operational because an underlying interface or subinterface is down
 - › URL String – URL string sent in PADM message to PPPoE clients
 - › MOTM String – message of the minute string sent in the PADM message to PPPoE clients
 - › session ID – session ID of the subinterface
 - › In Octets – number of octets received on the subinterface
 - › Out Octets – number of octets transmitted on the subinterface
 - › In Packets – number of packets received on the subinterface
 - › Out Packets – number of packets transmitted on the subinterface

- Example

```
host1:v0#show pppoe sub fa 1/1.1.1
PPPoE subinterface fastEthernet 1/1.1.1 is operStatusUp
    URL String: http://www.urlofinterest.com
    MOTM String: a horse walks into a bar
PPPoE subinterface fastEthernet 1/1.1.1 has a session id of
  1
PPPoE Statistics
    In Octets: 480
    Out Octets: 256
    In Packets: 8
    Out Packets: 8
```

show pppoe subinterface summary

- Use to display the operational and administrative status of all configured PPPoE subinterfaces.
- Field descriptions
 - › Total PPPoE subinterfaces – number of configured PPPoE subinterfaces included in summary
 - › Administrative Status
 - Up – number of subinterfaces not affected by manual administrative intervention
 - Down – number of subinterfaces that cannot flow because of manual administrative intervention
 - › Operational Status
 - Up – number of subinterfaces that are operational
 - Down – number of subinterfaces that are not operational
 - LowerLayerDown – number of subinterfaces that are not operational because an underlying interface is down
 - NotPresent – number of subinterfaces that are not operational because hardware is unavailable
- Example

```
host1:01#show pppoe subinterface summary
Total PPPoE subinterfaces: 116

Administrative Status:
    Up: 115
    Down: 1

Operational Status:
    Up: 115
    Down: 1
    LowerLayerDown: 1
    NotPresent: 0
```

show profile

- Use to display information about a specific IP profile.
- Field descriptions
 - › Profile – name of the profile that is displayed
 - › IP address – IP address and subnet mask of the interface or none if the interface is unnumbered
 - › Unnumbered interface – specifier for the unnumbered interface or none if the interface is not unnumbered
 - › Router – name of the VR assigned to the profile; interfaces created by the profile are attached to this VR
 - › Directed Broadcast – enabled or disabled
 - › ICMP Redirects – enabled or disabled
 - › Access Route Addition – enabled or disabled
 - › Source-Address Validation – enabled or disabled
 - › Ignore DF Bit – enabled or disabled
 - › Administrative MTU – MTU size configured on the profile
 - › Input policy – name of input policy and whether statistics are enabled or disabled
 - › Output policy – name of output policy and whether statistics are enabled or disabled
 - › Local input policy – name of the local input policy and whether statistics are enabled or disabled
 - › PPPoE Max Sessions – maximum number of PPPoE subinterfaces permitted on an interface
 - › PPPoE Always-offer – enabled, disabled
 - › PPPoE ACNAME – access concentrator name
 - › PPPoE Log PPPoEControlPacket – enabled, disabled
 - › PPPoE duplicate-protect – enabled, disabled
 - › PPPoE URL – URL sent in PADM message to PPPoE clients
 - › PPPoE MOTM – message of the minute sent in the PADM message to PPPoE clients

• Example

```

host1#show profile name rige14
Profile                : rige14
IP address             : 10.1.23.23/255.255.255.0
Unnumbered interface  : none
Router                 : Boston
Directed Broadcast    : Enabled
ICMP Redirects        : Disabled
Access Route Addition : Enabled
Source-Address Validation : Disabled
Ignore DF Bit         : Disabled
Administrative MTU     : 10240

```


Enter configuration commands, one per line. End with CNTL/Z.

```
RX-a0-00-2e:v0(config)#interface atm 10/1.1.1
RX-a0-00-2e:v0(config-if)#ppp shut
RX-a0-00-2e:v0(config-if)#DEBUG 07/25/2000 15:13:38 pppoeControlPacket (interface atm
 10/0.1): PADT rx from 00-09-01-a0-00-2e

RX-a0-00-2e:v0(config-if)#
RX-a0-00-2e:v0(config-if)#no ppp shut
RX-a0-00-2e:v0(config-if)#pppoe test
RX-a0-00-2e:v0(config-if)#DEBUG 07/25/2000 15:13:49 pppoeControlPacket (interface atm
 10/0.1): PADI rx from 00-09-01-a0-00-2e
DEBUG 07/25/2000 15:13:49 pppoeControlPacket (interface atm 10/0.1): PADO tx to
 00-09-01-a0-00-2e
DEBUG 07/25/2000 15:13:49 pppoeControlPacket (interface atm 10/0.1): PADR rx from
 00-09-01-a0-00-2e
DEBUG 07/25/2000 15:13:49 pppoeControlPacket (interface atm 10/0.1): PADS tx to
 00-09-01-a0-00-2e, connection made using session id 4 on sub interface 1

RX-a0-00-2e:v0(config-if)#
RX-a0-00-2e:v0(config-if)#exit
```