peer default ip address

To specify an IP address, an address from a specific IP address pool, or an address from the Dynamic Host Configuration Protocol (DHCP) mechanism to be returned to a remote peer connecting to this interface, use the **peer default ip address** command in interface configuration mode. To disable a prior peer IP address pooling configuration on an interface, or to remove the default address from your configuration, use the **no** form of this command.

peer default ip address {*ip-address* | **dhcp-pool** | **dhcp** | **pool** [*pool-name*]}

no peer default ip address

Syntax Description

ip-address	Specific IP address to be assigned to a remote peer dialing in to the interface. To prevent duplicate IP addresses from being assigned on more than one interface, this argument cannot be applied to a dialer rotary group nor to an ISDN interface.
dhcp-pool	Retrieves an IP address from an on-demand address pool. This option only supports remote access (PPP) sessions into MPLS VPNs.
dhcp	Retrieves an IP address from the DHCP server.
pool	Uses the global default mechanism as defined by the **ip address-pool** command unless the optional *pool-name* argument is supplied. This is the default.
pool-name	(Optional) Name of a local address pool created using the **ip local pool** command. DHCP retrieves an address from this pool regardless of the global default mechanism setting.

Command Default

The default is **pool**.

Command Modes

Interface configuration

Command History

Release	Modification
11.0	This command was introduced.
12.2(8)T	The **dhcp-pool** keyword was added.

Usage Guidelines

This command applies to point-to-point interfaces that support the PPP or Serial Line Internet Protocol (SLIP) encapsulation. This command sets the address used on the remote (PC) side.

Note This command replaces the **async default ip address** command.

This command allows an administrator to configure all possible address pooling mechanisms on an interface-by-interface basis.

The **peer default ip address** command can override the global default mechanism defined by the **ip address-pool** command on an interface-by-interface basis, as follows:

- For all interfaces not configured with a peer default IP address mechanism (equivalent to selecting the **peer default ip address pool** command), the router uses the global default mechanism that is defined by the **ip address-pool** command.
- If you select the **peer default ip address pool** *pool-name* form of this command, then the router uses the locally configured pool on this interface and does not follow the global default mechanism.
- If you select the **peer default ip address** *ip-address* form of this command, the specified IP address is assigned to any peer connecting to this interface and any global default mechanism is overridden for this interface.
- If you select the **peer default ip address dhcp** form of this command, the DHCP proxy-client mechanism is used by default on this interface and any global default mechanism is overridden for this interface.
- If you select the **peer default ip address dhcp-pool** form of this command, the DHCP on-demand address pooling mechanism is used by default on this interface and any global default mechanism is overridden for this interface.

Examples

The following command specifies that this interface will use a local IP address pool named pool3:

```
peer default ip address pool pool3
```

The following command specifies that this interface will use the IP address 172.19.34.21:

```
peer default ip address 172.19.34.21
```

The following command reenables the global default mechanism to be used on this interface:

```
peer default ip address pool
```

The following example specifies address 192.168.7.51 for asynchronous interface 6:

```
line 20
 speed 115200
interface async 6
 peer default ip address 192.168.7.51
```

Related Commands

Command	Description
async dynamic address	Specifies dynamic asynchronous addressing versus default addressing.
encapsulation slip	Enables SLIP encapsulation.
exec	Allows an EXEC process on a line.
ip address-pool	Enables an address pooling mechanism used to supply IP addresses to dial in asynchronous, synchronous, or ISDN point-to-point interfaces.
ip dhcp-server	Specifies which DHCP servers to use on a network, and specifies the IP address of one or more DHCP servers available on the network.
ip local pool	Configures a local pool of IP addresses to be used when a remote peer connects to a point-to-point interface.
ppp	Starts an asynchronous connection using PPP.

Command	Description
show cot dsp	Displays information about the COT DSP configuration or current status.
slip	Starts a serial connection to a remote host using SLIP.

peer ip address forced

To force the router to assign a peer the next available IP address in the pool for an interface, use the **peer ip address forced** command in interface configuration mode. To allow a peer to negotiate a specific IP address or to allow the router to attempt to assign a peer its previously assigned IP address, use the **no** form of this command.

peer ip address forced

no peer ip address forced

Syntax Description

This command has no arguments or keywords.

Command Default

When a network device dials in to a Cisco network access server (NAS) that is configured to assign an IP address to the network device, the NAS attempts to assign the device the address it was assigned previously. If that address is unavailable or if no address in the pool was assigned previously, the NAS then assigns the next available address in its pool.

Command Modes

Interface configuration

Command History

Release	Modification
12.2T	This command was introduced.

Usage Guidelines

The **peer ip address forced** command is used for point-to-point interfaces that support a link framing protocol such as PPP where the NAS will assign a peer IP address from an address pool as a result of the following conditions:

- The NAS is configured with a pool of network addresses at the interface supporting the peers (configured by use of the **ip local-pool** command).
- The NAS is configured to assign IP addresses to peers from a pool. A pool of IP addresses can be configured and applied at the interface by use of the **ip address-pool** command and the **peer default ip address pool** command or as a RADIUS server directive.
- The peer is configured to request an IP address from the NAS server (for example, as configured by use of the **ip address negotiated** command).

To force the NAS to allocate the next available IP address from the pool for the interface, use the **peer ip address forced** command. Any attempts to allocate a previously held IP address or a specifically requested IP address are suppressed; instead, the NAS allocates the next available IP address from the specified pool. This feature can be used to prevent users from obtaining the same IP address for each dial-in session.

Examples

The following example specifies that the interface will allocate the next available address from the pool whenever an address is requested from a pool:

```
interface Virtual-template 1
 peer default ip address pool poolA poolB
 peer ip address forced
```

The following example specifies that the interface will allow a peer to negotiate an IP address or will attempt to assign a previously assigned address:

```
interface Virtual-template 1
 peer default ip address pool poolA poolB
 no peer ip address forced
```

Related Commands

Command	Description
ip address negotiated	Specifies that the IP address for a particular interface is obtained via PPP IPCP address negotiation.
ip address-pool	Enables an address pooling mechanism used to supply IP addresses to dial-in asynchronous, synchronous, or ISDN point-to-point interfaces.
ip local-pool	Configures a local pool of IP addresses to be used when a remote peer connects to a point-to-point interface.
peer default ip address	Specifies an IP address, an address from a specific IP address pool, or an address from the DHCP mechanism to be returned to a remote peer connecting to this interface.
ppp	Starts an asynchronous connection using PPP when you want to connect from a remote node computer to an EXEC session on the access server and want to connect from the access server to a device on the network.

peer match aaa-pools

To specify that any IP address pool name supplied by authentication, authorization, and accounting (AAA) servers must also be present in the list of pool names specified in the **peer default ip address pool** interface configuration command, use the **peer match aaa-pools** command in interface configuration mode. To configure the software to use any pool name supplied by the AAA server (default configuration), use the **no** form of this command.

peer match aaa-pools

no peer match aaa-pools

Syntax Description

This command has no arguments or keywords.

Command Default

Command is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(6)T	This command was introduced.

Usage Guidelines

This command provides the ability to control or restrict the use of pool names supplied by AAA to only those pool names that are configured on the router. This ability is useful in cases where the AAA server and the router and its local configuration are controlled by different administrators, as would be the case for a wholesale dial supplier where the AAA servers are owned by individual customers.

When the **peer match aaa-pools** command is configured on an interface, the IP address pool names used are those specified in the local configuration as part of the **peer default ip address** command and the pool names supplied by the AAA server.

When the **no peer match aaa-pools** command is used, pool name selection is controlled by the AAA server, as follows: When the AAA server supplies a pool name, that is the only pool used. If AAA does not supply a pool name, then the normal IP default pool name processing is used as described in the **peer default ip address** command page.

Examples

The following example shows how to configure pool name restrictions in a Resource Pool Management (RPM) customer profile template:

```
template Word
  multilink max-fragments
  peer match aaa-pools
  peer default ip address pool poolA poolB
  ppp ipcp dns 10.1.1.1
resource-pool profile customer WORD
  source template Word
  aaa group-configuration AAA-group1
```

```
template user_direct
  peer default ip address pool mypool
  ppp authentication chap isdn-users
  ppp multilink
```

Related Commands

Command	Description
ip local pool	Configures a local pool of IP addresses to be used when a remote peer connects to a point-to-point interface.
peer default ip address	Specifies an IP address, an address from a specific IP address pool, or an address from the DHCP mechanism to be returned to a remote peer connecting to this interface.
peer pool backup	Directs the pool software to use the local pool name configured with the **peer default ip address** interface configuration command to supplement the pool names supplied by AAA.
peer pool static	Suppresses an attempt to load all dynamic pools from the AAA server when a missing pool name is encountered.

peer pool backup

To provide backup IP address pool names supplied by authentication, authorization, and accounting (AAA) with local pool names, use the **peer pool backup** command in interface configuration mode. To disable the local pool name backup feature, use the **no** form of this command.

peer pool backup

no peer pool backup

Syntax Description

This command has no arguments or keywords.

Command Default

No backup IP address pool names are configured

Command Modes

Interface configuration

Command History

Release	Modification
12.2(8)B	This command was introduced.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.

Usage Guidelines

The **peer pool backup** command is useful in large-scale dial-out environments with a large number of independently controlled AAA servers. Difficulties arise when the network access server (NAS) must provide IP address pool name resolution when a new pool is introduced by one of the AAA servers before that pool is set up on the NAS, or when an existing local pool becomes exhausted but the AAA server actually has other pools that would be acceptable as IP address sources.

The **peer pool backup** command uses the local pool names configured with the **peer default ip address pool** interface configuration command to supplement the pool names supplied by AAA. The problems of pool name resolution and exhaustion can be solved by configuring backup pool names on a per-interface basis using both the **peer default ip address pool** and **peer pool backup** interface configuration commands.

You may also configure local restrictions on the use of AAA-supplied pool names to a NAS-specified set by adding the **peer match aaa-pools** interface configuration command to the configuration. The **peer match aaa-pools** command specifies that any AAA-supplied pool name must match one of the pool names supplied with the **peer default ip address pool** command. See the “Examples” section for an example.

Examples

In the following example, the search order for backup pool names set by the **peer default ip address pool** command is pool1 then pool2. These pools will be used when the NAS cannot resolve a pool name or when an existing pool of IP addresses is exhausted.

```
interface Dialer1
 ip unnumbered FastEthernet0
 encapsulation ppp
 dialer pool 1
 dialer idle-timeout 3600
 dialer-group 1
 peer pool backup
 peer default ip address pool pool1 pool2
 no fair-queue
 no cdp enable
 ppp authentication chap
```

In the following example, assume that there is a AAA-supplied IP address pool named poolA. By adding the **peer match aaa-pools** command to the configuration, the AAA-supplied pool named poolA will not be used because it does not appear in the **peer default ip address pool** command; only the pools named pool1 and pool2 will be searched.

```
interface serial 1:23
 ip address 10.4.4.1 255.255.255.0
 encapsulation ppp
 ppp authentication chap
 dialer-group 1
 peer pool backup
 peer match aaa-pools
 peer default ip address pool pool1 pool2
 isdn switch-type primary-5ess
```

Related Commands

Command	Description
ip local pool	Configures a local pool of IP addresses to be used when a remote peer connects to a point-to-point interface.
peer default ip address	Specifies an IP address, an address from a specific IP address pool, or an address from the DHCP mechanism to be returned to a remote peer connecting to this interface.
peer match aaa-pools	Specifies that any AAA-supplied pool name must match one of the pool names supplied with the **peer default ip address pool** command.
peer pool static	Suppresses an attempt to load all dynamic pools from a AAA server when a missing pool name is encountered.

peer pool static

To suppress an attempt to load all dynamic pools from an authentication, authorization, and accounting (AAA) server when a missing pool name is encountered, use the **peer pool static** command in interface configuration mode. To disable the suppression of dynamic pool loading and restore the normal dynamic pool loading behavior, use the **no** form of this command.

peer pool static

no peer pool static

Syntax Description

This command has no arguments or keywords.

Command Default

Dynamic pools are loaded

Command Modes

Interface configuration

Command History

Release	Modification
12.2(8)B	This command was introduced.
12.3(4)T	This feature was integrated into Cisco IOS Release 12.3(4)T.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.

Usage Guidelines

The **peer pool static** command controls attempts by the pool software to load dynamic pools in response to a pool request from a specific interface. These dynamic pools are loaded at system startup and refreshed whenever a pool name not configured on the network access server (NAS) is specified for IP address allocation. Because the behavior of the NAS in response to a missing pool name can be changed using the **peer pool backup** interface configuration command, you may need to use the **peer pool static** command to control attempts to load all dynamic pools when the AAA-supplied pool name is not an existing local pool name. The **peer pool static** command provides a two-minute interval between attempts to download dynamic IP pools when a missing pool name is encountered.

Examples

The following partial example shows how to disable loading dynamic pools using the **peer pool static** command:

```
aaa new-model
aaa authentication ppp default group radius
aaa authorization exec default group radius
aaa authorization network default group radius
!
interface ATM0/0/0
 no ip address
 no ip directed-broadcast
 no ip route-cache
 no atm ilmi-keepalive
.
```

```
.
.
interface Virtual-Template1
 ip address 10.4.4.1 255.255.255.0
 encapsulation ppp
 ppp authentication chap
 no ip directed-broadcast
 peer pool static
 peer pool static
 peer default ip address pool pool3 pool4 pool5
 ip classless
 radius-server host 172.30.166.121
 radius-server key lab
 radius-server vsa send accounting
 radius-server vsa send authentication
!
 ip local pool pool2 10.4.4.2
 ip local pool pool3 10.4.4.3
 ip local pool pool4 10.4.4.4
 ip local pool pool5 10.4.4.5
```

In this configuration, any attempt to load a dynamic pool name is suppressed; only the backup pool names defined by the **peer default ip address pool** command will be used.

Related Commands

Command	Description
ip local pool	Configures a local pool of IP addresses to be used when a remote peer connects to a point-to-point interface.
peer default ip address	Specifies an IP address, an address from a specific IP address pool, or an address from the DHCP mechanism to be returned to a remote peer connecting to this interface.
peer pool backup	Directs the pool software to use the local pool name configured with the **peer default ip address pool** interface configuration command to supplement the pool names supplied by AAA.

permission (dial peer voice)

To specify whether incoming or outgoing calls are permitted on the defined dial peer, use the **permission** command in dial peer voice configuration mode. To remove the specified permission, use the **no** form of this command.

permission {**orig** | **term** | **both** | **none**}

no permission {**orig** | **term** | **both** | **none**}

Syntax Description

orig	This dial peer is permitted to originate calls. Thus, the access server can accept incoming calls from the dial peer.
term	This dial peer is permitted to terminate calls. Thus, the access server can send outgoing calls to the dial peer.
both	This dial peer is permitted to originate and terminate calls. Both incoming and outgoing calls are permitted (default).
none	No incoming or outgoing calls can be made to or from this dial peer.

Command Default

Both incoming and outgoing calls are permitted.

Command Modes

Dial peer voice configuration

Command History

Release	Modification
12.1(3)T	This command was introduced.

Usage Guidelines

After a dial peer is associated with an incoming call, the permission is checked to determine whether incoming calls are permitted on the dial peer. If permission is not set to **orig** or **both**, the incoming call is blocked.

After a dial peer is matched for an outgoing call, the permission is checked to determine whether outgoing calls are permitted on the dial peer. If permission is not set to **term** or **both**, the outgoing call using this dial peer fails.

Note The call may “rotary” to the next dial peer if the current dial peer does not have the **huntstop** command set.

Examples

The following example configures a dial peer and sets its permission to both originate and terminate calls:

```
dial-peer voice 526 pots
 answer-address 408526....
 corlist incoming list2
 direct-inward-dial
 permission both
```

Related Commands

Command	Description
dial-peer voice	Enters dial-peer voice configuration mode and defines a remote VoIP dial peer.

pool-range

To assign a range of modems to a modem pool, use the **pool-range** command in modem-pool configuration mode. To remove the range of modems, use the **no** form of the command.

pool-range [**tty**] {*modem1*-*modemN* | *x*/*y*}

no pool-range [**tty**] {*modem1*-*modemN* | *x*/*y*}

Syntax Description

tty	(Optional) Sets the range to terminal controller (TTY) lines.
modem1-*modemN*	Range of lines, which correspond to a range of modems or to a modem pool. A hyphen (-) is required between the two numbers. The range of modems you can choose from is equivalent to the number of modems in your access server that are not currently associated with another modem pool, up to a maximum of 48.
x/*y*	Slot/port numbers for an internal modem. A range of numbers is not accepted. The slash mark is required.

Command Default

Command is disabled. All modems are configured to be part of the system default modem pool.

Command Modes

Modem pool configuration

Command History

Release	Modification
11.2P	This command was introduced on the Cisco AS5200 and Cisco AS5300.

Usage Guidelines

For a complete description of modem pools and how they are configured on Cisco access servers, see the command page for the **modem-pool** command.

Replace the*modem1*-*modemN* arguments with the modem TTY line numbers that correspond with the range of modems you want in the modem pool. TTY line numbers start from 1, and they map to modem numbers that start from 0. For example, if you want to include modems 1/0 through 1/23 in a pool range, use the TTY line numbers 1 to 24. To verify the modem to TTY line numbering scheme, use the **show modem** *slot*/*port* command.

Note MICA technologies modems and Microcom modems support incoming analog calls over ISDN PRI. However, only MICA modems support modem pooling for CT1 and CE1 configurations with channel–associated signaling.

Examples

The following example assigns modem TTY line numbers 30 to 50 to a modem pool. The Dialed Number Information Service (DNIS) number is set to 2000. The customers dialing 2000 are guaranteed access to 21 modems. The 22nd client to dial in is refused connectivity because the maximum number of allowable connections is exceeded.

```
modem-pool v90service
 pool-range 30-50
 called-number 2000 max-conn 21
 exit
```

The following configuration rejects the **pool-range 30** command, because modem TTY line 30 is already a member of the modem pool v90service, which was configured in the previous example. Each modem in the access server is automatically assigned to a unique TTY line. TTY line numbers are assigned according to your shelf, slot, or port hardware configuration.

```
modem-pool v34service
 pool-range tty 30

% TTY 30 is already in another pool.
```

Related Commands

Command	Description
called-number (modem pool)	Assigns a called party number to a pool of modems.
clear modempool-counters	Clears active or running counters associated with one or more modem pools.
modem-pool	Creates a new modem pool or specifies an existing modem pool, which allows you to physically or virtually partition your access server for dial-in and dial-out access.
show modem-pool	Displays the configuration and connection status for one or more modem pools.

port (global)

To enter the port configuration mode, use the port command in global configuration mode. To exit port configuration mode, use the **no** form of this command.

Cisco AS5400 with NextPort DFC

port {*slot* | *slot*/*port*} [*slot* | *slot*/*port*]

no port {*slot* | *slot*/*port*} [*slot* | *slot*/*port*]

Cisco AS5800 with Universal Port Card

port {*shelf*/*slot* | *shelf*/*slot*/*port*} [*shelf*/*slot* | *shelf*/*slot*/*port*]

no port {*shelf*/*slot* | *shelf*/*slot*/*port*} [*shelf*/*slot* | *shelf*/*slot*/*port*]

Syntax Description

slot	All ports on the specified slot. For the Cisco AS5400, slot values range from 0 to 7. Entering a second slot value will specify a range of slots.
slot/*port*	All ports on the specified slot and SPE. For the Cisco AS5400, slot values range from 0 to 7 and port values range from 0 to 107. The slash mark is required. Entering a second slot and SPE value will specify a range of slots.
shelf/*slot*	All ports on the specified shelf and slot. For the Cisco AS5800, shelf values are 0 and 1, and UPC slot values range from 2 to 11. The slash mark is required. Entering a second shelf and slot value will specify a range of slots.
shelf/*slot*/*port*	All ports on the specified SPE. For the Cisco AS5800, shelf values are 0 and 1, slot values range from 2 to 11, and port values range from 0 to 323. The slash marks are required. Entering a second shelf, slot, and SPE value will specify a range of slots.

Command Default

Command is disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.1(3)T	This command was introduced.

Usage Guidelines

The **port** command helps you to enter the port configuration mode. The port configuration mode allows you to shut down or put individual ports or ranges of ports in busyout mode.

Examples

The following example shows how to enter port configuration mode on ports 1 to 18 to perform further tasks on the ports:

```
Router(config)# port 1/1 1/18
Router(config-port)# shutdown
```

Related Commands

Command	Description
clear port	Resets the port and clears any active calls to the port.

port modem autotest

To automatically and periodically perform a modem diagnostics test for modems inside the universal gateway or router, use the **port modem autotest** command in global configuration mode. To disable or turn off the modem autotest service, use the **no** form of this command.

port modem autotest {**error** *threshold* | **minimum** *modems* | **time** *hh***:***mm* [*hours*]}

no port modem autotest

Syntax Description

error *threshold*	Maximum modem error threshold. When the system detects this many errors with the modems, the modem diagnostics test is automatically triggered. Specify a threshold count from 3 to 50.
minimum *modems*	Minimum number of modems that will remain untested and available to accept calls during each test cycle. You can specify from 5 to 48 modems. The default is 6 modems on the Cisco AS5400. The range for the Cisco AS5800 is from 73 to 756.
time *hh***:***mm*	Time you want the modem autotest to begin. You must use the military time convention and a required colon (:) between the hours and minutes variables for this feature. For example, 1:30 p.m. is issued as 13:30.
hours	(Optional) Long-range time variable used to set the modem autotest more than one day in advance. The range of hours is from 1 hour to 168 hours. For example, if you want to run the test once per week, issue 168. There are 168 hours in one week.

Command Default

Modem diagnostics tests are disabled.

Command Modes

Global configuration

Command History

Release	Modification
11.3	This command was introduced.
12.1(1)XD	This command was introduced on the Cisco AS5400 as the **port modem autotest** command and replaced the **modem autotest** command for the NextPort dial feature card (DFC) only.
12.1(3)T	This command was implemented on the Cisco AS5400 and Cisco AS5800.
12.1(5)XM1	This command was implemented on the Cisco AS5350.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and support was added for the Cisco AS5350.

Examples

The following example shows how to set the modem autotest to run once per week at 3:00 a.m. Additionally, the autotest activates if the system detects a modem error count higher than 40 errors.

Determine the current time set on the access server with the **show clock** EXEC command. In this example, the time and date set is 3:00 p.m, Monday, January 6, 2003:

```
Router# show clock
*15:00:01.031 EST Jan 06 2003
```

Enter global configuration mode and set the time you want the modem autotest to activate. In this example, the access server is configured to run the modem autotest at 3:00 a.m. and every 168 hours (week) thereafter:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# port modem autotest time 03:00 168
```

Configure the autotest to activate if the system detects a high modem error count. In this example, the autotest activates if the system detects a modem error count higher than 40 errors. For the list of modem errors that are monitored by the **modem autotest** command, see the **show modem call-stats** command.

```
Router(config)# port modem autotest error 40
```

Related Commands

Command	Description
modem autotest	Automatically and periodically performs a modem diagnostics test for modems inside the access server or router.
show clock	Displays the system clock.
show modem	Displays a high-level performance report for all the modems or a single modem inside Cisco AS5200 and Cisco AS5300 access servers.
show modem test	Displays the modem test log.

ppp

To start an asynchronous connection using PPP, use the **ppp** command in EXEC mode.

ppp {**/default** | {*remote-ip-address* | *remote-name*} [@*tacacs-server*]} [**/routing**] **negotiate**

Syntax Description

/default	Makes a PPP connection when a default address has been configured. The slash mark is required.
remote-ip-address	IP address of the client workstation or PC. This parameter can be specified only if the line is set for dynamic addresses using the **async address dynamic** line configuration command.
remote-name	Name of the client workstation or PC. This parameter can be specified if the line is set for dynamic addresses using the **async address dynamic** line configuration command.
@*tacacs-server*	(Optional) IP address or IP host name of the TACACS server to which the user's TACACS authentication request is sent. The at sign is required.
/routing	(Optional) Indicates that the remote system is a router and that routing messages should be exchanged over the link. The line must be configured for asynchronous routing using PPP encapsulation. The slash mark is required.
negotiate	Use PPP negotiated IP address.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

When you connect from a remote node computer to an EXEC session on the access server and want to connect from the access server to a device on the network, issue the **ppp** command.

If you specify an address for the TACACS server (either **/default** or @*tacacs-server*), the address must be the first parameter in the command after you type **ppp**. If you do not specify an address or enter the **default keyword**, you are prompted for an IP address or host name. You can enter the **default keyword** at this point.

To terminate a session, disconnect from the device on the network using the command specific to that device. Then, exit from the EXEC by using the **exit** command.

Examples

The following example shows a line that is in asynchronous mode using PPP encapsulation. The name of the computer (ntpc in this example) must be in the Domain Name System (DNS) so that it can be resolved to a real IP address). The computer must be running a terminal emulator program.

```
Router# ppp ntpc@server1
```

ppp accm

To specify the Asynchronous Control Character Map (ACCM) to be negotiated with a mobile station or sent to a peer in PPP outbound requests, use the **ppp accm** command in interface configuration mode. To restore the default state, use the **no** form of this command.

ppp accm *hex-number*

no ppp accm

Syntax Description

hex-number	Specifies the initial value for the ACCM. The value must be a hexadecimal number in the range from 0x0 to 0xFFFFFFFF, where the bit positions from right to left correspond to the characters 0x00 through 0x1F. The default character map (0xA0000) escapes the characters represented by 0x11 (^Q, DC1, and X-on) and 0x13 (^S, DC3, and X-off). **Note** The leading 0x is not necessary when entering the *hex-number* argument , but is accepted by the software.

Command Default

0xA0000.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(3)XS	This command was introduced.
12.2	This command was integrated into Cisco IOS Release 12.2.

Usage Guidelines

The ACCM is a four octet hexadecimal number that is sent to a peer in a PPP outbound Config-Request packet, informing the peer of which characters need to be escaped during transmission of Asynchronous HDLC (AHDLC) frames containing control characters. The escaped characters set by the **ppp accm** command are useful for allowing data to pass uninterpreted through a network that would normally interpret the control sequences as a command.

For example, the ^Q and ^S characters are software flow control commands used by asynchronous modems to start and stop data transmissions. To allow these characters to be sent as part of a data stream and not be interpreted as control codes by intervening devices, the characters must be escaped, and the **ppp accm** command specifies which characters to use.

The TIA/EIA/IS-835-B requires that the PDSN propose an ACCM of 0x00000000. To be compliant with TIA/EIA/IS-835-B, **ppp accm 00000000** must be configured on the virtual template interface on Cisco PDSN.

The **ppp accm** command is meaningful only on asynchronous interfaces. If entered on other interface types, it will be ignored.

Examples

In the following example, all characters can be transmitted intact to the receiver so that it is not necessary for the transmitter to escape anything:

```
interface async 0
 encapsulation ppp
 ppp accm 0
```

Related Commands

Command	Description
ppp authentication	Specifies CHAP or PAP authentication.

ppp acfc local

To configure high-level data link control (HDLC) address and control field compression (ACFC) options in configuration requests, use the **ppp acfc local** command in interface configuration mode. To return the router to the default for ACFC handling, use the **no** form of this command.

ppp acfc local {**request** | **forbid**}

no ppp acfc local

Syntax Description

request	The ACFC option is included in outbound configuration requests.
forbid	The ACFC option is not sent in outbound configuration requests, and requests from a peer to add the ACFC option are not accepted.

Command Default

ACFC handling is automatically selected based on the type of link, as follows: For asynchronous links, the router responds as if the **request** keyword were selected and the router includes the ACFC option in outbound configuration requests. For synchronous links, the router responds as if the **forbid** keyword were selected and the ACFC option is not sent out in configuration outbound requests and requests from a peer to add the ACFC option are not accepted.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(7)	This command was introduced.
12.2(15)B	This command was integrated into Cisco IOS Release 12.2(15)B.

Usage Guidelines

This command configures ACFC requests in outbound configuration requests. The **ppp acfc local** command allows ACFC handling to be disabled, thus allowing the HDLC framing and the protocol field to remain uncompressed.

Prior to the introduction of the **ppp acfc local** command, negotiation and use of ACFC was entirely dependent upon the link type (synchronous or asynchronous) and was not under the independent control of a system administrator, and this is still the default condition. The **ppp acfc local** command allows the system administrator to control over when PPP negotiates the HDLC ACFC options during initial LCP negotiations, and how the results of the PPP negotiation are applied.

Note Using ACFC can result in minor gains in effective bandwidth because they reduce the amount of framing overhead for each packet. However, using ACFC changes the alignment of the network data in the frame, which in turn can impair the switching efficiency of the packets both at the local and remote ends of the connection. For these reasons, it is generally recommended that ACFC not be enabled without carefully considering the potential results.

Examples

The following example shows how to configure a router to exclude ACFC options from its configuration requests:

```
ppp acfc local forbid
```

Related Commands

Command	Description
ppp acfc remote	Configures the ACFC option in configuration requests received from a remote peer.
ppp pfc remote	Configures the PFC option in configuration requests received from a remote peer.
ppp pfc local	Configures the PFC option in configuration requests.

ppp acfc remote

To configure how high-level data link control (HDLC) address and control field compression (ACFC) options in configuration requests are received from a remote peer, use the **ppp acfc remote** command in interface configuration mode. To return the router to the default for ACFC handling, use the **no** form of this command.

ppp acfc remote {**apply** | **reject** | **ignore**}

no ppp acfc remote

Syntax Description

apply	ACFC options are accepted and ACFC may be performed on frames sent to the remote peer.
reject	ACFC options are explicitly ignored.
ignore	ACFC options are accepted, but ACFC is not performed on frames sent to the remote peer.

Command Default

ACFC handling is automatically selected based on the type of link, as follows: For asynchronous links, the router responds as if the **apply** keyword were selected and the router accepts ACFC options received from a remote peer and may perform ACFC on frames sent to the peer. For synchronous links, the router responds as if the **ignore** keyword were selected and ACFC options received from a remote peer are accepted, but ACFC is not performed on frames sent to the remote peer.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(7)	This command was introduced.
12.2(15)B	This command was integrated into Cisco IOS Release 12.2(15)B.

Usage Guidelines

If ACFC is negotiated during PPP negotiation, Cisco routers may omit the HDLC header on links using HDLC encapsulation. This command allows ACFC handling to be disabled during PPP negotiation, thus allowing the HDLC framing and the protocol field to remain uncompressed.

Prior to the introduction of the **ppp acfc remote** command, negotiation and use of ACFC was entirely dependent upon the link type (synchronous or asynchronous) and was not under the independent control of a system administrator, and this is still the default condition. The **ppp acfc remote** command allows the system administrator control over when PPP negotiates the HDLC ACFC options during initial LCP negotiations, and how the results of the PPP negotiation are applied.

Note Using ACFC can result in minor gains in effective bandwidth because they reduce the amount of framing overhead for each packet. However, using ACFC changes the alignment of the network data in the frame, which in turn can impair the switching efficiency of the packets both at the local and remote ends of the connection. For these reasons, it is generally recommended that ACFC not be enabled without carefully considering the potential results.

Examples

The following example configures ACFC options received from a remote peer to be rejected:

```
ppp acfc remote reject
```

Related Commands

Command	Description
ppp acfc local	Configures the ACFC option in configuration requests.
ppp pfc remote	Configures the PFC option in configuration requests received from a remote peer.
ppp pfc local	Configures the PFC option in configuration requests.

ppp bap call

To set PPP Bandwidth Allocation Protocol (BAP) call parameters, use the **ppp bap call** command in interface configuration mode. To disable processing of a specific type of incoming connection, use the **no** form of this command.

ppp bap call {**accept** | **request** | **timer** *seconds*}

no ppp bap call {**accept** | **request** | **timer**}

Syntax Description

accept	Peer initiates link addition. This is the default.
request	Local side initiates link addition.
timer *seconds*	Number of seconds to wait between call requests the router sends, in the range from 2 to 120 seconds. No default value is set.

Command Default

Peers can initiate the addition of links to a multilink bundle; the timer is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

This command can be included in a virtual interface template for configuring virtual interfaces or can be used to configure a dialer interface.

Examples

The following example configures a dialer interface to accept calls. Accepting calls is the default, but the command is included for the sake of the example.

```
interface dialer 1
 ip unnumbered ethernet 0
 encapsulation ppp
 ppp multilink bap
 ppp bap call accept
 ppp bap link types isdn analog
 dialer load threshold 30
 ppp bap timeout pending 60
```

Related Commands

Command	Description
ppp bap callback	Enables PPP BAP callback and set callback parameters.
ppp bap drop	Sets parameters for removing links from a multilink bundle.
ppp bap link types	Specifies the types of links that can be included in a specific multilink bundle.

ppp bap callback

To enable PPP Bandwidth Allocation Protocol (BAP) callback and set callback parameters, use the **ppp bap callback** command in interface configuration mode. To remove the PPP BAP callback configuration, use the **no** form of this command.

ppp bap callback {**accept** | **request** | **timer** *seconds*}

no ppp bap callback {**accept** | **request** | **timer**}

Syntax Description

accept	Local router initiates link addition upon peer notification.
request	Local router requests that a peer initiate link addition.
timer *seconds*	Number of seconds to wait between callback requests the router sends, in the range from 2 to 120 seconds. Disabled by default.

Command Default

Callback is disabled, and no callback parameters are set. The timer is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Examples

The following example configures a BRI interface for active mode BAP:

```
interface bri 0
 ip unnumbered ethernet 0
 dialer load-threshold 10 either
 dialer map ip 172.21.13.101 name bap-peer 14085778899
 encapsulation ppp
 ppp multilink bap
 ppp bap call request
 ppp bap callback accept
 no ppp bap call accept
 no ppp bap drop accept
 ppp bap pending timeout 30
 ppp bap number default 5664567
 ppp bap number secondary 5664568
```

Related Commands

Command	Description
ppp bap drop	Sets parameters for removing links from a multilink bundle.
ppp bap link types	Specifies the types of links that can be included in a specific multilink bundle.
show ppp bap	Displays the configuration settings and run-time status for a multilink bundle.

ppp bap drop

To set parameters for removing links from a multilink bundle, use the **ppp bap drop** command in interface configuration mode. To disable a specific type of default processing, use the **no** form of this command.

ppp bap drop {**accept** | **after-retries** | **request** | **timer** *seconds*}

no ppp bap drop {**accept** | **after-retries** | **request** | **timer**}

Syntax Description

accept	Peer can initiate link removal. Enabled by default.
after-retries	Local router can remove the link without Bandwidth Allocation Protocol (BAP) negotiation when no response to the drop requests arrives.
request	Local router can initiate removal of a link. Enabled by default.
timer *seconds*	Number of seconds to wait between drop requests sent.

Command Default

accept, **request**: Peers can initiate link removal and this router also can initiate link removal.
no ppp bap drop after-retries: The link is not dropped when there is no response to drop requests.
timer: Disabled, no default value is defined.

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

The **no ppp bap drop accept** command disables the router's ability to respond favorably to link drop requests from a peer. However, the router can still remove the link when it receives such requests.

The **no ppp bap drop after-retries** command is the default behavior; the **ppp bap drop after-retries** command must be entered explicitly to be effective.

The **no ppp bap drop request** command disables the router's ability to send link drop requests to a peer. However, the peer can still remove the link on its own behalf; for example, when there is too little traffic to justify keeping the link up.

The **ppp bap max** command specifies the maximum number of requests and retries.

Examples

The following partial example sets a 60-second wait between drop requests:

```
ppp bap drop timer 60
```

Related Commands

Command	Description
ppp bap max	Sets upper limits on the number of retransmissions for PPP BAP.

ppp bap link types

To specify the types of links that can be included in a specific multilink bundle, use the **ppp bap link types** command in interface configuration mode. To remove a type of interface that was previously allowed to be added, use the **no** form of this command.

ppp bap link types [**isdn**] [**analog**]

no ppp bap link types [**isdn**] [**analog**]

Syntax Description

isdn	(Optional) ISDN interfaces can be added to a multilink bundle. This is the default.
analog	(Optional) Asynchronous serial interfaces can be added to a multilink bundle.

Command Default

ISDN interfaces are added to the multilink bundle (**isdn** keyword).

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

The choice of keywords must suit the interfaces configured for Multilink PPP. For example, if you have configured a dialer rotary with only ISDN interfaces, only the **isdn** keyword would be appropriate. If the configuration allows both ISDN and asynchronous interfaces, both **isdn** and **analog** keywords could be used; the multilink bundle could then consist of both ISDN and asynchronous links. Bandwidth Allocation Protocol (BAP) dynamically determines which interfaces are applicable.

Examples

The following example configures a dialer interface for passive mode BAP and for both ISDN and asynchronous serial links:

```
interface dialer 1
 ip unnumbered ethernet 0
 encapsulation ppp
 ppp multilink bap
 ppp bap call accept
 ppp bap link types isdn analog
 dialer load threshold 30
 ppp bap timeout pending 60
```

Related Commands

Command	Description
ppp bap callback	Enables PPP BAP callback and set callback parameters.
show ppp bap	Displays the configuration settings and run-time status for a multilink bundle.

ppp bap max

To set upper limits on the number of retransmissions for PPP Bandwidth Allocation Protocol (BAP), use the **ppp bap max** command in interface configuration mode. To remove any retry limit, use the **no** form of this command.

ppp bap max {**dial-attempts** *number* | **ind-retries** *number* | **req-retries** *number* | **dialers** *number*}

no ppp bap max {**dial-attempts** | **ind-retries** | **req-retries** | **dialers** *number*}

Syntax Description

dial-attempts *number*	Maximum number of dial attempts to any destination number, in the range from 1 to 3. The default is one dial attempt.
ind-retries *number*	Maximum number of retries of a call status indication message, in the range from 1 to 10. The default is three indication retries.
req-retries *number*	Maximum number of retries for a particular request, in the range from 1 to 5. The default is three request retries.
dialers *number*	Maximum number of free dialers logged, in the range from 1 to 10. The default is five free dialers.

Command Default

1 dial attempt
3 indication retries
3 request retries
5 searches for free dialers

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

In compliance with RFC 2125, the **no** form of this command explicitly removes any status indication retry limit and is displayed in the router configuration.

The **ppp bap max dialers** command works in conjunction with the **dialer rotor** and **dialer priority** interface commands**,** which can be used to determine free dialers based upon the priority or the best available. Dialers include all interfaces that are configured under the dialer group leader (the dialer interface itself). The dialer group leader is displayed as the Master Interface in the **show ppp bap group** output.

BAP bases its link type and phone number decisions upon the ordering of the interfaces. This decision is suited to a mixed media environment of both ISDN and analog interfaces, where it may be desirable to choose the ISDN link over the asynchronous or vice versa.

Note that this decision also will limit the number of potential phone numbers that can be included in a CallResponse or CallbackRequest; the maximum number is limited to 20. For example, ten BRI interfaces with two numbers per interface.

Examples

The following partial example accepts the default number of attempts to dial a number and the default number of indication retries, but configures a limit of four times to send requests:

```
ppp bap max req-retries 4
```

Related Commands

Command	Description
dialer priority	Sets the priority of an interface in a dialer rotary group.
dialer rotor	Specifies the method for identifying the outbound line to be used for ISDN or asynchronous DDR calls.
ppp bap drop	Sets parameters for removing links from a multilink bundle.
ppp bap monitor load	Validates peer requests to add or remove links against the current bundle load and the defined dialer load threshold.
ppp bap timeout	Specifies nondefault timeout values for PPP BAP pending actions and responses.
show ppp bap group	Displays the configuration settings and run-time status for a multilink bundle.

ppp bap monitor load

To validate peer requests to add or remove links against the current bundle load and the defined dialer load threshold, use the **ppp bap monitor load** command in interface configuration mode. To specify that incoming link addition requests are not to be subject to the bundle load threshold, use the **no** form of this command.

ppp bap monitor load

no ppp bap monitor load

Syntax Description

This command has no arguments or keywords.

Command Default

Command is enabled.

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

If the load is being monitored and the incoming peer requests that a link be dropped when the current traffic load is above the dialer load (that is, there is enough traffic to justify the current number of links), the router will not drop the link. In addition, when the traffic falls below the threshold, Bandwidth Allocation Protocol (BAP) tries to drop a link.

The **no** form of this command indicates that incoming peer requests to add a link are not subject to the bundle load threshold. However, other criteria must be met before a favorable response is sent.

Examples

The following partial example configures BAP not to validate peer requests against the current bundle load and the configured dialer load threshold:

```
no ppp bap monitor load
```

Related Commands

Command	Description
dialer load-threshold	Configures bandwidth on demand by setting the maximum load before the dialer places another call to a destination.

ppp bap number

To specify a local telephone number that peers can dial to establish a multilink bundle, use the **ppp bap number** command in interface configuration mode. To remove a previously configured number, use the **no** form of this command.

ppp bap number {**default** *phone-number* | **secondary** *phone-number* | **prefix** *prefix-number* | **format** {**national** | **subscriber**}}

no ppp bap number {**default** *phone-number* | **prefix** *prefix-number* | **format** {**national** | **subscriber**}}

Syntax Description

default *phone-number*	Primary (base) phone number for the interface and the number that can be used for incoming dial calls.
secondary *phone-number*	Telephone number for the second B channel. Applies only to BRI interfaces that have a different number for each B channel or to dialer interfaces that are BRIs.
prefix *prefix-number*	Prefix number for the PPP phone number.
format national | **subscriber**	Format for the primary phone number to be dialed should be either national or subscriber where the number of digits assigned to the number is as follows: • Ten-digit number for a national format. • Seven-digit number for a subscriber format.

Command Default

No base number is provided.

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.
11.3T	The **prefix** and **format** keywords were added.

Usage Guidelines

Use this command to supply a local default number to be exchanged between peers in order to establish a multilink bundle.

This command is applicable on both the dialer interface and the individual physical interfaces.

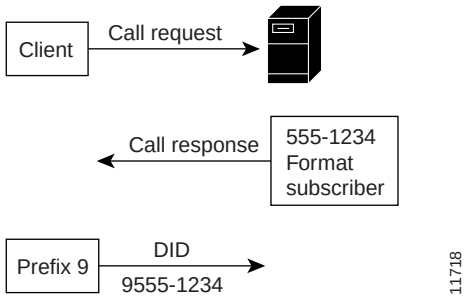
If a peer requests that a number be supplied and no PPP Bandwidth Allocation Protocol (BAP) default number is defined, it might not be possible for the peer to access the interface. However, the peer can access the interface if it has the number already or the number it dialed originally is the same as the number for establishing a Multilink PPP (MLP) bundle.

Note During BAP negotiations between peers, the called party indicates the number to call for BAP if it is different from the number the peer originally dialed. The called party responds with information about the phone number *delta* (the changes to be made in the right-most digits dialed). This information indicates the number of digits that are different from the number originally dialed and what those digits should be.

For example, if the remote peer dialed 5550159876, and the **ppp bap number** command had the default number 5550159912, the local router would respond "3 | 912." In the response, a vertical bar (|) is used to divide the number of digits to change from the number sequence to use instead. In the "3 | 912" response, the local router instructs the calling interface to replace the right-most three digits with "912" for BAP.

This command is used by the client side for dialing instructions when communicating with the server. Use the **prefix** keyword on the Always On/Dynamic ISDN (AO/DI) client side to specify what will precede any number dialed to a multilink peer. For example, the client issues a call request to the server whereby the server issues a call response that includes the dialing number the client should use and the format this number should be in (national or subscriber). The client then dials the number supplied by the server, preceded by any prefix information contained in the **ppp bap number prefix** command. Figure 1 shows an overview about the information exchange between the client and the server.

Figure 1 Client and Server Response Sequence



Use the **format** keyword on the AO/DI server side to specify how many digits should be returned by BAP. BAP will return the numbers based on either a national or subscriber format. The value that is returned is preceded by the prefix before dialing occurs. For example, if the **format national** keywords are configured, then the national format (which is equivalent to ten digits) is returned (during BAP negotiation) from the server.

Note The **ppp bap number prefix** and **ppp bap number format** keyword options cannot be combined to a single-string command line; they must be entered in two separate command strings.

Examples

In the following example, the AO/DI client uses a **ppp bap prefix** value of 9, which indicates that the dialed number of 5550134 will be preceded by a 9. The number that is actually dialed is 95550134. The AO/DI server uses a subscriber format, which indicates that when the client asks the server for the numbers to dial, BAP will return seven digits.

Client Router

```
interface dialer1
 ppp bap number prefix 9
```

Server Router

```
interface dialer1
 ppp bap number format subscriber
 ppp bap number default 5550134
```

In the following example, the AO/DI client uses a **ppp bap prefix** value of 1, which indicates that the dialed number of 5550178 will be preceded by a 1. The number that is actually dialed is 19195550178 because the server is using a national format, and BAP therefore, returns ten digits.

Client Router

```
interface dialer1
 ppp bap number prefix 1
```

Server Router

```
interface dialer1
 ppp bap number format national
 ppp bap number default 9195550178
```

The following example configures a physical interface with both a default number and a secondary number:

```
interface bri 0
 ip unnumbered ethernet 0
 dialer load-threshold 10 either
 dialer map ip 172.21.13.101 name bap-peer 14085550199
 encapsulation ppp
 ppp multilink bap
 ppp bap call request
 ppp bap callback accept
 no ppp bap call accept
 no ppp bap drop accept
 ppp bap pending timeout 30
 ppp bap number default 5550167
 ppp bap number secondary 5550168
```

Related Commands

Command	Description
ppp bap callback	Enables PPP BAP callback and set callback parameters.
show ppp bap	Displays the configuration settings and run-time status for a multilink bundle.

ppp bap timeout

To specify nondefault timeout values for PPP Bandwidth Allocation Protocol (BAP) pending actions and responses, use the **ppp bap timeout** command in interface configuration mode. To reset the response timeout to the default value, or to remove a pending timeout entirely, use the **no** form of this command.

ppp bap timeout {**pending** *seconds* | **response** *seconds*}

no ppp bap timeout {**pending** | **response**}

Syntax Description

pending *seconds*	Number of seconds to wait before timing out pending actions, in the range from 2 to 180 seconds. The default is 20 seconds.
response *seconds*	Number of seconds to wait for a response before timing out, in the range from 2 to 120 seconds. The default is 3 seconds.

Command Default

Enabled
pending: 20 seconds
response: 3 seconds

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

The **no ppp bap timeout response** command resets the timer to the default value.The **no ppp bap timeout pending** command removes the pending-action timeout entirely (in compliance with the BAP specification).

Examples

The following example configures BAP to wait 45 seconds before timing out pending actions:

```
interface dialer 1
 ip unnumbered ethernet 0
 encapsulation ppp
 ppp multilink bap
 ppp bap call accept
 ppp bap link types isdn analog
 dialer load threshold 30
 ppp bap timeout pending 45
```

Related Commands

Command	Description
ppp bap callback	Enables PPP BAP callback and set callback parameters.
ppp bap drop	Sets parameters for removing links from a multilink bundle.
ppp bap max	Sets upper limits on the number of retransmission for PPP BAP.
show ppp bap	Displays the configuration settings and run-time status for a multilink bundle.

ppp bridge appletalk

To enable half-bridging of AppleTalk packets across a serial interface, use the **ppp bridge appletalk** command in interface configuration mode. To disable AppleTalk packet half-bridging, use the **no** form of this command.

ppp bridge appletalk

no ppp bridge appletalk

Syntax Description

This command has no arguments or keywords.

Command Default

Command is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

When you configure a serial or ISDN interface for half-bridging, you configure it to function as a node on an Ethernet subnetwork. It communicates with a bridge on the subnetwork by sending and receiving bridge packets. The serial or ISDN interface converts bridge packets to routed packets and forwards them, as needed.

The serial interface must be configured with an AppleTalk address for communication on the Ethernet subnetwork, and the AppleTalk address must have the same AppleTalk cable range as the bridge.

You cannot configure a serial interface for both half-bridging and for transparent bridging. No more than one half-bridge should be on any subnetwork.

Examples

The following example configures serial interface 0 for half-bridging of AppleTalk. The remote bridge and other Ethernet nodes must be on the same network.

```
interface serial 0
 ppp bridge appletalk
 appletalk cable-range 301-301
 appletalk zone remote-lan
```

Related Commands

Command	Description
appletalk cable-range	Enables an extended AppleTalk network.
appletalk zone	Sets the zone name for the connected AppleTalk network.
ppp bridge ip	Enables half-bridging of IP packets across a serial interface.
ppp bridge ipx	Enables half-bridging of IPX packets across a serial interface.

ppp bridge ip

To enable half-bridging of IP packets across a serial interface, use the **ppp bridge ip** command in interface configuration mode. To disable IP packet half-bridging, use the **no** form of this command.

ppp bridge ip

no ppp bridge ip

Syntax Description

This command has no arguments or keywords.

Command Default

Command is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

When you configure a serial or ISDN interface for half-bridging, you configure it to function as a node on an Ethernet subnetwork. It communicates with a bridge on the subnetwork by sending and receiving bridge packets. The serial interface converts bridge packets to routed packets and forwards them, as needed.

The interface must be configured with an IP address for communication on the Ethernet subnetwork, and the IP address must be on the same subnetwork as the bridge.

You cannot configure a serial interface for both half-bridging and for transparent bridging.

No more than one half-bridge should be on any subnetwork.

Examples

The following example configures serial interface 0 for half-bridging of IP. The remote bridge and other Ethernet nodes must be on the same subnetwork.

```
interface serial 0
 ip address 172.19.5.8
 ppp bridge ip
```

Related Commands

Command	Description
ip address	Sets a primary or secondary IP address for an interface.
ppp bridge appletalk	Enables half-bridging of AppleTalk packets across a serial interfaces.
ppp bridge ipx	Enables half-bridging of IPX packets across a serial interfaces.

ppp bridge ipx

To enable half-bridging of Internetwork Packet Exchange (IPX) packets across a serial interface, use the **ppp bridge ipx** command in interface configuration mode. To return to the default Novell Ethernet_802.3 encapsulation, use the **no** form of this command.

ppp bridge ipx [**novell-ether** | **arpa** | **sap** | **snap**]

no ppp bridge ipx

Syntax Description

novell-ether	(Optional) Novell Ethernet_802.3 encapsulation. This is the default.
arpa	(Optional) Novell Ethernet_II encapsulation.
sap	(Optional) Novell Ethernet_802.2 encapsulation.
snap	(Optional) Novell Ethernet_Snap encapsulation.

Command Default

The default encapsulation is **novell-ether**.

Command Modes

Interface configuration

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

When you configure a serial interface for half-bridging, you configure it to function as a node on an Ethernet subnetwork. It communicates with a bridge on the subnetwork by sending and receiving bridge packets. The serial interface converts bridge packets to routed packets and forwards them, as needed.

The serial interface must be configured with an IPX address for communication on the Ethernet subnetwork, and the IPX address must be on the same subnetwork as the bridge.

You cannot configure a serial interface for both half-bridging and for transparent bridging.

No more than one half-bridge should be on any subnetwork.

Examples

The following example configures serial interface 0 for half-bridging of IPX. The remote bridge and other Ethernet nodes must be on the same subnetwork.

```
interface serial 0
 ppp bridge ipx
 ipx network 1800
```

Related Commands

Command	Description
ipx network	Enables IPX routing on a particular interface and optionally selects the type of encapsulation (framing).
ppp bridge appletalk	Enables half-bridging of AppleTalk packets across a serial interfaces.
ppp bridge ip	Enables half-bridging of IP packets across a serial interfaces.

ppp callback (DDR)

To enable a dialer interface to function either as a callback client that requests callback or as a callback server that accepts callback requests, use the **ppp callback** command in interface configuration mode. To disable a function, use the **no** form of this command.

ppp callback {**accept** | **permit** | **request**}

no ppp callback

Syntax Description

accept	Dialer interface accepts PPP callback requests (and functions as the PPP callback server).
permit	Dialer interface permits PPP callback (and functions as the PPP callback client).
request	Dialer interface requests PPP callback (and functions as the PPP callback client).

Command Default

Callback requests are neither accepted nor requested.

Command Modes

Interface configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

An interface can request PPP callback only if the interface is configured for PPP authentication with Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP).

If an interface of the callback server is configured with **ppp callback accept** and the client attempts to cancel the callback and connect, Cisco IOS software will refuse the request and disconnect the client.

If a client is allowed to cancel callbacks and connects, the **ppp callback permit** command must be used instead of the **ppp callback accept** command on the callback server interface.

Examples

The following example configures a previously defined dialer interface to accept PPP callback requests:

```
ppp callback accept
```

Related Commands

Command	Description
dialer callback-secure	Enables callback security.
map-class dialer	Defines a class of shared configuration parameters associated with the **dialer map** command for outgoing calls from an ISDN interface and for PPP callback.
ppp callback (PPP client)	Enables a PPP client to dial in to an asynchronous interface and request a callback.

ppp callback (PPP client)

To enable a PPP client to dial in to an asynchronous interface and request a callback, use the **ppp callback** command in interface configuration mode. To disable callback acceptance, use the **no** form of this command.

ppp callback {**accept** | **initiate**}

no ppp callback

Syntax Description

accept	Accept callback requests from RFC 1570-compliant PPP clients on the interface.
initiate	Initiate a callback to non-RFC 1570-compliant PPP clients dialing in to an asynchronous interface.

Command Default

Callback requests are not accepted on asynchronous interfaces.

Command Modes

Interface configuration

Command History

Release	Modification
11.0	This command was introduced.

Usage Guidelines

PPP callback can be initiated only if the interface is configured for authentication using CHAP or PAP.

Examples

The following example accepts a callback request from an RFC-compliant PPP client:

```
ppp callback accept
```

The following example accepts a callback request from a non-RFC-compliant PPP client:

```
ppp callback initiate
```

Related Commands

Command	Description
arap callback	Enables an ARA client to request a callback from an ARA client.
autoselect ppp	Configures a line to start a SLIP session.
call progress tone country	Forces the Cisco IOS software to wait before initiating a callback to a requesting client.
ppp authentication	Enables CHAP or PAP or both and specifies the order in which CHAP and PAP authentication are selected on the interface.

Command	Description
ppp callback (DDR)	Enables a dialer interface to function either as a callback client that requests callback or as a callback server that accepts callback requests.
username	Establishes a username-based authentication system, such as PPP CHAP and PAP.

ppp caller name

To set the caller option when no Calling Line Identification (CLID) is available, use the **ppp caller name** command in interface configuration mode. To remove the name, use the **no** form of this command.

ppp caller name *name*

no ppp caller name *name*

Syntax Description

name	Username string for this call.

Command Default

Command is disabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
12.2T	This command was introduced.

Usage Guidelines

This command sets the username used when the CLID is not available. This username is used only in the case where the **ppp dnis** command is configured and the CLID is not available.

Examples

The following example shows how to configure a call to user1:

```
interface Serial0:15
 description "PRI D channel"
 ip unnumbered Loopback0
 encapsulation ppp
 no keepalive
 dialer pool-member 1 max-link 1
 isdn switch-type primary-net5
 isdn incoming-voice modem
 no fair-queue
 no cdp enable
 ppp caller name user1
 ppp authentication pap chap callin USERS&TUNNELS
 ppp chap hostname osh
```

Related Commands

Command	Description
ppp dnis	Sets the DNIS string for a PPP call.

ppp direction

To override the default direction of a PPP connection, use the **ppp direction** command in interface configuration mode. To disable an override setting, use the **no** form of this command.

ppp direction {**callin** | **callout** | **dedicated**}

no ppp direction {**callin** | **callout** | **dedicated**}

Syntax Description

callin	Treat the connection as a received call.
callout	Treat the connection as an initiated call.
dedicated	Treat the connection as a dedicated call.

Defaults

Disabled (no direction configured)

Command Modes

Interface configuration

Command History

Release	Modification
12.2T	This command was introduced.

Usage Guidelines

The **ppp direction** command is useful when a router is connected to an interface type where there is either no inherent call direction, such as with a back-to-back or leased-line connection, or where an external dial device such as a CSU/DSU or an ISDN terminal adapter is connected to the interface.

The configured call direction will always override the automatically detected direction, even on dial interfaces where the true direction is known.

The call direction is used mainly internally by PPP authentication, as follows:

- If doing bidirectional authentication, PPP will wait to send its authentication credentials to the peer if the direction is call-in, and the **no ppp chap wait**, **no ppp pap wait**, or **no ppp eap wait** commands are not configured.
- PPP uses the call direction internally to detect spoofed Challenge Handshake Authentication Protocol (CHAP) sessions.
- If the direction is call-in, PPP requires that the remote names used in a peer's CHAP challenge and CHAP response be the same.

The call direction is also used for callback processing.

Typically, you will not need to configure this command. If you do, you should configure the opposite of the command on the other side of the link, so one side is call-out and one side is call-in.

Examples

The following example determines the call direction on a back-to-back serial connection:

```
interface Serial2/0
 ip address 192.168.1.131 255.255.255.0
 encapsulation ppp
 peer default ip address pool local local_pool
 serial restart-delay 0
 ppp authentication chap
 ppp direction callin
```

Related Commands

Command	Description
ppp chap wait	Configures the router to delay the CHAP authentication until after the peer has authenticated itself to the router.
ppp eap wait	Configures the router to delay the EAP authentication until after the peer has authenticated itself to the server.
ppp pap wait	Configures the router to delay the PAP authentication until after the peer has authenticated itself to the router.

ppp dnis

To configure a set of dialed number identification service (DNIS) numbers to check an incoming call against to automatically authenticate and authorize a user, use the **ppp dnis** command in interface configuration mode. To remove the numbers, use the **no** form of this command.

ppp dnis *DNIS-number* [*DNIS-number*] [*DNIS-number...*]

no ppp dnis

Syntax Description

DNIS-number	Specifies the DNIS number that will be checked when a call comes in. Multiple DNIS numbers can be entered seperated by spaces.

Command Default This command is disabled by default.

Command Modes Interface configuration

Command History

Release	Modification
12.2T	This command was introduced.

Usage Guidelines This command enables a method of authenticating and authorizing a user based on the DNIS. The DNIS is the number dialed by the user. If the dialed number for this session matches one of the numbers configured in the **ppp dnis** command, the user is automatically authenticated and authorized for the session. Any other configured PPP authentication is not performed. In the case of DNIS authentication, the Calling Line Identification (CLID) is used as the username. If the CLID is unavailable, the username is the name configured with the **ppp caller name** command. If neither the CLID nor a caller name is configured, the username will automatically be set to "no-clid."

Examples The following example shows how to set the DNIS for a call:

```
interface Serial0:15
 description "PRI D channel"
 ip unnumbered Loopback0
 encapsulation ppp
 no keepalive
 dialer pool-member 1 max-link 1
 isdn switch-type primary-net5
 isdn incoming-voice modem
 no fair-queue
 no cdp enable
 ppp dnis 13693 132
 ppp authentication pap chap callin USERS&TUNNELS
 ppp chap hostname osh
```

Related Commands

Command	Description
ppp caller name	Sets the caller option when no CLID is available.

ppp encrypt mppe

To enable Microsoft Point-to-Point Encryption (MPPE) on the virtual template, use the **ppp encrypt mppe** command in interface configuration mode. To disable MPPE, use the **no** form of this command.

ppp encrypt mppe {**auto** | **40** | **128**} [**passive** | **required**] [**stateful**]

no ppp encrypt mppe

Syntax Description

auto	All available encryption strengths are allowed.
40	Only 40-bit encryption is allowed.
128	Only 128-bit encryption is allowed.
passive	(Optional) MPPE will not offer encryption, but will negotiate if the other tunnel endpoint requests encryption.
required	(Optional) MPPE must be negotiated, or the connection will be terminated.
stateful	(Optional) MPPE will negotiate only stateful encryption. If the **stateful** keyword is not used, MPPE will first attempt to negotiate stateless encryption, but will allow stateful mode if the other tunnel endpoint requests it.

Command Default

MPPE encryption is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(5)XE5	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.4(5)	This command was modified to explicitly disallow interleaving.

Usage Guidelines

PPP encapsulation must be enabled before you can use the **ppp encrypt mppe** command.

All of the configurable MPPE options must be identical on both tunnel endpoints.

The **auto** keyword is offered only on 128-bit images.

Note The **ppp authentication ms-chap** command must be added to the interface that will carry Point-to-Point Tunnel Protocol (PPTP)-MPPE traffic. All Windows clients using MPPE need the Microsoft Challenge Handshake Authentication Protocol (MS-CHAP) application. This is a Microsoft design requirement.

Stateful encryption is not appropriate for links that have high loss rates because the state information is updated with each packet received, but cannot be updated correctly for packets that are not received. Losing a packet means loss of state (transmissions are no longer synchronous). Losing state triggers expensive resynchronization mechanisms, and more packets will be lost during the recovery period. Any link that experiences more than the occasional random drop is therefore unsuitable for stateful

encryption mechanisms. The same is also true for stateful compressions. For this reason, stateful encryption may not be appropriate for lossy network environments such as Layer 2 tunnels on the Internet.

The interleaving of packets among fragments of larger packets on a Multilink PPP (MLP) bundle (enabled with the **ppp multilink interleave** command) is not supported with this command.

Examples

The following example shows a virtual template configured to perform 40-bit MPPE encryption:

```
interface Virtual-Template1
 ip unnumbered FastEthernet0/0
 no ip directed-broadcast
 ip mroute-cache
 no keepalive
 ppp encrypt mppe 40
 ppp authentication ms-chap
```

Related Commands

Command	Description
encryption mppe	Enables MPPE encryption on the ISA card.
interface virtual-template	Creates a virtual template interface.
ppp authentication	Enables CHAP, PAP, MS-CHAP, or a combination of methods and specifies the order in which the authentication methods are selected on the interface.
ppp multilink interleave	Enables interleaving of packets among the fragments of larger packets on an MLP bundle.

ppp hold-queue

To specify the maximum number of packets to be queued to the PPP process across all interfaces, use the **ppp hold-queue** command in global configuration mode. To restore the default values, use the **no** form of this command.

ppp hold-queue *length*

no ppp hold-queue

Syntax Description

length	The number of packets to be queued. Values are from 1 to 1000000.

Command Default

The default length depends on the platform. That is, the default length is twice the maximum number of PPP-supported interfaces on that platform.

Command Modes

Global configuration

Command History

Release	Modification
12.4(15)T	This command was introduced.

Usage Guidelines

The exact value of the packets queued depends on the number of PPP sessions supported. The default value works in most cases. It is not recommended to set a different value unless your Cisco technical support representative directs you to do so for deployment-specific tuning purposes.

The command specifies that only packets that are actually queued are counted; packets that are discarded at interrupt because they do not pass various checks are not counted. Preprocessed packets are also not counted. Any type of packet queued to the PPP process is counted.

Examples

The following example shows how to specify the maximum number of packets to be queued to the PPP process:

```
Router(config)# ppp hold-queue 64000
```

ppp ipcp

To configure PPP IP Control Protocol (IPCP) features such as the ability to provide primary and secondary Domain Name Server (DNS) and Windows Internet Naming Service (WINS) server addresses, and the ability to accept any address requested by a peer, use the **ppp ipcp** command in template or interface configuration mode. To disable a **ppp ipcp** feature, use the **no** form of this command.

ppp ipcp {**accept-address** | **address** {**accept** | **required** | **unique**} | **dns** {*primary-ip-address* [*secondary-ip-address*] [**aaa**] [**accept**] | **accept** | **reject** | **request** [**accept**]} | **header-compression ack** | **ignore-map** | **mask** {*subnet-mask* | **reject** | **request**} | **username unique** | **wins** {*primary-ip-address* [*secondary-ip-address*] [**aaa**] [**accept**] | **accept** | **reject** | **request** [**accept**]}}

no ppp ipcp {**accept-address** | **address** {**accept** | **required** | **unique**} | **dns** | **header-compression ack** | **ignore-map** | **mask** | **predictive** | **username unique** | **wins**}

Syntax Description

accept-address	Accepts any nonzero IP address from the peer.
address	Specifies IPCP IP address options: • **accept**—Accepts any nonzero IP address from the peer. • **required**—Disconnects the peer if no IP address is negotiated. • **unique**—Disconnects the peer if the IP address is already in use.
dns	Specifies DNS options: • *primary-ip-address*—IP address of the primary DNS server. – *secondary-ip-address*—(Optional) IP address of the secondary DNS server. – **aaa**—(Optional) Use DNS data from the AAA server. – **accept**—(Optional) Specifies that any nonzero DNS address will be accepted. • **accept**—Specifies that any nonzero DNS address will be accepted. • **reject**—Reject the IPCP option if received from the peer. • **request**—Request the DNS address from the peer.
header-compression ack	Enables IPCP header compression.
ignore-map	Ignores dialer map when negotiating peer IP address.
mask	Specifies IP address mask options: • *subnet-mask*—Specifies the subnet mask to offer the peer. • **reject**—Reject subnet mask negotiations. • **request**—Request the subnet mask from the peer.

username unique	Ignores a common username when providing an IP address to the peer.
wins	Specifies WINS options: • *primary-ip-address*—IP address of the primary WINS server. – *secondary-ip-address*—(Optional) IP address of the secondary WINS server. – **aaa**—(Optional) Use WINS data from the AAA server. – **accept**—(Optional) Specifies that any nonzero WINS address will be accepted. • **accept**—Specifies that any nonzero WINS address will be accepted. • **reject**—Reject the IPCP option if received from the peer. • **request**—Request the WINS address from the peer.

Command Default

No servers are configured, and no address request is made.

Command Modes

Template configuration
Interface configuration

Command History

Release	Modification
12.0(6)T	This command was introduced.
12.1(5)T	The **reject** and **accept** keywords were added.

Examples

The following examples show use of the **ppp ipcp** command:

```
ppp ipcp accept-address

ppp ipcp dns 10.1.1.3

ppp ipcp dns 10.1.1.3 10.1.1.4

ppp ipcp dns 10.1.1.1 10.1.1.2 accept

ppp ipcp dns accept

ppp ipcp dns reject

ppp ipcp ignore-map

ppp ipcp username unique

ppp ipcp wins 10.1.1.1 10.1.1.2

ppp ipcp wins accept
```

The following examples show how to use the **no** form of the **ppp ipcp** command:

```
no ppp ipcp wins

no ppp ipcp ignore-map
```

Related Commands

Command	Description
debug ppp	Displays information on traffic and exchanges in an internetwork implementing the PPP.
show interfaces	Displays statistics for all interfaces configured on the router or access server.
show ip interfaces	Displays the usability status of interfaces configured for IP.

ppp ipcp default route

To configure a default route through a PPP virtual access interface, use the **ppp ipcp default route** command in interface configuration mode. To disable a default route for a PPP virtual access interface, use the **no** form of this command.

ppp ipcp default route

no ppp ipcp default route

Syntax Description

This command has no arguments or keywords.

Command Default

No default route

Command Modes

Interface configuration

Command History

Release	Modification
12.3(11)T	This command was introduced.

Usage Guidelines

This command allows a PPP virtual template to dynamically add a default route pointing to the virtual access interface created by the virtual template.

A customer premises equipment (CPE) router with PPP over an ATM or Frame Relay connection can access the Internet without turning on any other routing.

Examples

The following example shows how to configure the PPP default route on the virtual access interface:

```
interface virtual-template 1
 ip address negotiated
 ppp ipcp default route
```

Related Commands

Command	Description
debug ppp negotiation	Displays information on traffic and exchanges in an internetwork implementing PPP.

ppp ipcp predictive

To set the PPP Internet Protocol Control Protocol (IPCP) to a predictive state that reduces negotiation time by predicting responses from peers and sending expected reply and request packets in advance, use the **ppp ipcp predictive** command in interface configuration mode. To disable the IPCP predictive state, use the **no** form of this command.

ppp ipcp predictive

no ppp ipcp predictive

Syntax Description

This command has no arguments or keywords.

Command Default

The PPP IPCP is not set to a predictive state.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(4)T	This command was introduced.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and support was added for the Cisco AS5300, Cisco AS5400 and Cisco AS5800.

Usage Guidelines

The **ppp ipcp predictive** command is useful in networks that accept connections from devices that require a reduction in the IPCP negotiation cycle time. This command reduces the amount of time needed for PPP to negotiate with the peer so that connections can be made in an acceptable amount of time. The following changes to the IPCP negotiation strategy make this time reduction possible:

- Send an IPCP Configure-Ack packet after sending an IPCP Configure-Nak packet.
- Send IPCP Configure-Nak and Configure-Ack packets after rejecting certain configuration options.

These changes can reduce connection delay by approximately 40 percent.

Note Any Configure-Request packet received in the Open state is ignored until the software receives Configure-Request packets with identifying numbers greater than what was last acknowledged, in which case the software disables the predictive mode and processes the Configure-Request packet using normal IPCP negotiation operations.

The **ppp ipcp predictive** command is configured on group asynchronous and dialer interfaces running PPP or Multilink PPP.

Examples

The following example sets the link control protocol (LCP) and IPCP to predictive states on a group asynchronous interface:

```
interface group-async 1
 ip unnumbered loopback 0
 encapsulation ppp
 no ip mroute-cache
 dialer in-band
 dialer pool-member 1
 async dynamic address
 async dynamic routing
 async mode dedicated
 no fair-queue
 ppp lcp predictive
 ppp ipcp predictive
 group-range 1 48
 hold-queue 75 in
```

Related Commands

Command	Description
interface dialer	Defines a dialer rotary group.
interface group-async	Creates a group interface that will serve as master, to which asynchronous interfaces can be associated as members.
ppp lcp predictive	Sets LCP to a predictive state that reduces negotiation time by predicting responses from peers and sending expected reply and request packets in advance.

ppp iphc max-header

To set the maximum size of the largest IP header that may be compressed when configuring Internet Protocol Header Compression (IPHC) control options over PPP, use the **ppp iphc max-header** command in interface configuration mode. To change the configuration, use the **no** form of this command.

ppp iphc max-header *bytes*

no ppp iphc max-header *bytes*

Syntax Description

bytes	Maximum size, in bytes, of the largest IP header that may be compressed. The range is from 60 to 168 bytes, and the default is 168 bytes.

Command Default 168 bytes

Command Modes Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines There are two types of IP header compression used over PPP: Van Jacobsen header compression defined in RFC 1332 and enabled with the **ip tcp header-compression** command, and IPHC defined in RFC 2509 and enabled with the **ip rtp header-compression** command. The **ppp iphc** set of commands controls parameters that pertain to the form of IPHC described in RFC 2509.

The IPHC specification allows low speed links to run more efficiently by reducing the size of the IP headers as transmitted on the link. IPHC supports compressed Real-Time Transport Protocol (cRTP), compressed User Datagram Protocol (cUDP), and compressed Transaction Control Protocol (cTCP).

An IPHC-enabled interface sends only changes to the header instead of sending the entire header with every packet. At the beginning of a transmission, the transmitting end (the compressor) sends a full header packet to the receiving end (the decompressor). After the initial packet is sent, the compressor sends all other packets with headers that contain only the differences between them and the original full header. The decompressor maintains a copy of the original full header and reconstructs all the other packet headers by adding the changes to them.

The header data that is different with each packet is referred to as the session state, and is identified by a session ID or connection ID.

When the decompressor receives a compressed packet, it reconstructs the packet header by adding the difference to the saved uncompressed header. Typically, IPHC enables the header to be compressed to two bytes (four bytes if UDP checksums are used).

The following fields in a packet header usually remain the same throughout a transmission:

- IP source and destination addresses
- UDP and TCP source and destination ports
- RTP synchronization source (SSRC) fields

The following fields in a packet header usually change during a transmission:

- IP packet ID
- Checksum
- Sequence number
- RTP time stamp
- The RTP marker bit

Examples

The following example shows how to change the maximum size of the largest IP header that may be compressed from the default of 168 bytes to 114 bytes:

```
interface Multilink1
 ip address 10.100.253.1 255.255.255.0
 no ip directed-broadcast
 no ip route-cache
 ip tcp header-compression iphc-format
 no ip mroute-cache
 fair-queue 64 256 1000
 no cdp enable
 ppp multilink
 ppp multilink fragment-delay 20
 ppp multilink interleave
 multilink-group 1
 ip rtp header-compression iphc-format
 ip rtp priority 16384 50 64
 ppp iphc max-header 114
 ppp iphc max-time 10
 ppp iphc max-period 512
```

Related Commands

Command	Description
ip rtp header-compression	Enables TCP, UDP, and RTP (RFC 2509) header compression.
ip tcp header-compression	Enables TCP (RFC 1332) header compression.
ppp iphc max-period	Sets the maximum number of compressed packets that can be sent before a full header when configuring IPHC control options over PPP.
ppp iphc max-time	Sets the maximum time allowed between full headers when configuring IPHC control options over PPP.

ppp lcp delay

To configure the link control protocol (LCP) delay timer for initiating LCP negotiations after a link connects and to configure the router to discard incoming setup requests until the LCP delay timer expires, use the **ppp lcp delay** command in interface configuration mode. To disable the LCP delay timer, use the **no** form of this command.

ppp lcp delay *seconds* [*milliseconds*] [**random** *max-delay-seconds*] [**discard**]

no ppp lcp delay

Syntax Description

seconds	Delay, in seconds, before initiating LCP negotiations. Valid values for the *seconds* argument range from 0 to 255. The default value is 2 seconds.
milliseconds	(Optional) Delay, in milliseconds (ms), before initiating LCP negotiations. Valid values for the *milliseconds* argument range from 0 to 999. The default value is 0 ms.
random *max-delay-seconds*	(Optional) Specifies that a random amount of additional time will be added to the configured LCP delay timer. The additional amount of time will not exceed the number of seconds specified with the *max-delay-seconds* argument. Valid values for *max-delay-seconds* range from 1 to 255. Random delay is disabled by default.
discard	(Optional) Specifies that incoming configuration requests (CONFREQs) will be discarded until the LCP delay timer has expired. CONFREQs are not discarded by default.

Command Default

No LCP delay timer is configured.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.1	This command was introduced.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T. The *milliseconds* argument was added.
12.3(11)YS	This command was integrated into Cisco IOS Release 12.3(11)YS. The **random** *max-delay-seconds* and **discard** keywords and argument were added.
12.2(33)SRE	This command was integrated into Cisco IOS Release 12.2(33)SRE.
15.0(1)M	This command was integrated into Cisco IOS Release 15.0(1)M.

Usage Guidelines

Configure an LCP delay timer to allow the peer device a short amount of time to send the first packet after the PPP link comes up. If the LCP delay timer expires before a CONFREQ is received from the peer, the router can initiate LCP negotiations.

The LCP delay timer is applied only to incoming connections. PPP does not delay for outbound connections or connections where PPP cannot determine a direction.

Use the **random** *max-delay-seconds* keyword and argument combination to add a random amount of time to the LCP delay timer. Setting a random delay on the initiation of LCP negotiations prevents overload when many PPP links come up at the same time.

Use the **discard** keyword to specify that incoming CONFREQs should be discarded until the configured delay has expired. LCP negotiations will not be initiated until the LCP delay timer has expired.

Examples

The following example shows how to configure an LCP delay timer of 4 seconds. If a CONFREQ is not received before the LCP delay timer expires, LCP negotiations can be initiated by either peer.

```
Router(config-if)# ppp lcp delay 4
```

The following example shows how to configure an LCP delay timer that will expire at a random time between 5 and 15 seconds after the link comes up. If a CONFREQ is not received before the LCP delay timer expires, LCP negotiations can be initiated by either peer.

```
Router(config-if)# ppp lcp delay 5 random 10
```

The following example shows how to configure an LCP delay timer of 3.25 seconds and specifies that incoming CONFREQs will be discarded until the LCP delay timer has expired. After 3.25 seconds, LCP negotiations can be initiated by either peer.

```
Router(config-if)# ppp lcp delay 3 250 discard
```

The following example shows how to configure an LCP delay timer that will expire at a random time between 10 and 15 seconds after the link comes up, and specifies that incoming CONFREQs will be discarded until the LCP delay timer has expired. After the LCP delay timer expires, negotiations can be initiated by either peer.

```
Router(config-if)# ppp lcp delay 10 random 5 discard
```

Related Commands

Command	Description
debug ppp multilink negotiation	Displays information about events affecting multilink groups controlled by BACP.
show ppp multilink	Displays bundle information for MLP bundles.