



DLSw+ Configuration Commands

This chapter describes the commands to configure data-link switching plus (DLSw+), our implementation of the DLSw standard. For DLSw+ configuration tasks and examples, refer to the “Configuring Data-Link Switching Plus” chapter of the *Bridging and IBM Networking Configuration Guide*. For specific SDLC commands to configure DLSw+ for SDLC, refer to the “LLC2 and SDLC Commands” chapter in this publication.

dlsw allroute-netbios

Use the **dlsw allroute-netbios** global configuration command to change the single-route explorer to an all-route broadcast for NetBIOS. Use the **no** form of this command to return to the default single-route explorer.

dlsw allroute-netbios
no dlsw allroute-netbios

Syntax Description

This command has no arguments or keywords.

Default

Single-route explorer.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

Example

The following example specifies all-route broadcasts:

```
dlsw allroute-netbios
```

dlsw allroute-sna

Use the **dlsw allroute-sna** global configuration command to change the single-route explorer to an all-route broadcast for SNA. Use the **no** form of this command to return to the default single-route explorer.

```
dlsw allroute-sna  
no dlsw allroute-sna
```

Syntax Description

This command has no arguments or keywords.

Default

Single-route explorer.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

Example

The following example specifies all-route broadcasts:

```
dlsw allroute-sna
```

dlsw bgroup-list

Use the **dlsw bgroup-list** global configuration command to map traffic on the local Ethernet bridge group interface to remote peers. Use the **no** form of this command to cancel the map.

```
dlsw bgroup-list list-number bgroups number  
no dlsw bgroup-list
```

Syntax Description

<i>list-number</i>	The ring list number. This number is subsequently used in the dlsw remote-peer command to define the segment to which the bridge-group belongs.
bgroups	The transparent bridge group to which DLSw+ will be attached. The valid range is 1 to 63.
<i>number</i>	The transparent bridge group list number. The valid range is 1 to 255.

Default

There is no default setting.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Traffic received from a remote peer is forwarded only to the bridge group specified in the bridge group list. Traffic received from a local interface is forwarded to peers if the input bridge group number appears in the bridge group list applied to the remote peer definition. The definition of a bridge group list is optional. Each remote peer has a single list number associated with it; therefore, if you want traffic to go to a bridge group and to either a ring list or port list, you should specify the same list number in each definition.

Example

The following example configures bgroup list 1:

```
dlsw bgroup-list 1 bgroups 33
```

Related Commands

```
dlsw bridge-group  
dlsw port-list  
dlsw ring-list
```

dlsw bridge-group

Use the **dlsw bridge-group** global configuration command to link DLSw+ to the bridge group of the Ethernet LANs. Use the **no** form of this command to disable the link.

dlsw bridge-group *group-number*
no dlsw bridge-group *group-number*

Syntax Description

group-number The transparent bridge group to which DLSw+ will be attached.
The valid range is 1 to 63.

Default

There is no default setting.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Example

The following example links DLSw+ to bridge group 1:

```
dlsw bridge-group 1
```

Related Command

dlsw bgroup-list

dlsw disable

Use the **dlsw disable** global configuration command to disable and reenables DLSw+ without altering the configuration.

dlsw disable

Syntax Description

This command has no arguments or keywords.

Default

There is no default setting.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Example

The following example disables and reenables DLSw+:

```
dlsw disable
```

Related Command

show dlsw capabilities

dlsw duplicate-path-bias

Use the **dlsw duplicate-path-bias** global configuration command to specify how DLSw+ handles duplicate paths to the same Media Access Control (MAC) address or NetBIOS name. Use the **no** form of the command to return to the default (fault-tolerance).

```
dlsw duplicate-path-bias [load-balance]  
no dlsw duplicate-path-bias [load-balance]
```

Syntax Description

load-balance (Optional) Specifies that sessions are load-balanced across duplicate paths.

Default

Fault-tolerance is the default logic used to handle duplicate paths.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

A path is either a remote peer or a local port.

In full-tolerance mode, the preferred path is always used unless it is unavailable. The preferred path is either the path over which the first response to an explorer was received, or, in the case of remote peers, the peer with the least cost.

Example

The following example specifies load balancing to resolve duplicate paths:

```
dlsw duplicate-path-bias load-balance
```

Related Command

show dlsw capabilities

dlsw explorerq-depth

Use the **dlsw explorerq-depth** global configuration command to configure the depth of the DLSw explorer packet processing queue. Use the **no** form of this command to disable the explorer packet processing queue.

dlsw explorerq-depth *queue-max*
no dlsw explorerq-depth *queue-max*

Syntax Description

queue-max Maximum queue size in packets. The valid range is 25 to 500 packets.

Default

No default *queue-max* is configured.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Example

The following example sets the explorer packet processing queue to 256:

```
dlsw explorerq-depth 256
```

Related Command

show dlsw capabilities

dlsw icannotreach saps

Use the **dlsw icannotreach saps** global configuration command to configure a list of service access points (SAPs) not locally reachable by the router. Use the **no** form of this command to remove the list.

```
dlsw icannotreach saps sap [sap...]  
no dlsw icannotreach saps sap [sap...]
```

Syntax Description

sap sap... Array of SAPs.

Default

No lists are configured.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3

The **dlsw icannot reach saps** command causes the local router to send a control vector to its peers during the capabilities exchange, which tells the peers not to send canureach messages to the local router for sessions using those DSAPs. (They are DSAPs from the peer's perspective, and SSAPs from the perspective of the devices attached to the local router.) The effect is that devices attached to the peer will not be able to initiate sessions to devices attached to the local router using the listed DSAPs. Devices attached to the local router, however, will still be able to start sessions with devices on its peers using the listed saps as SSAPs. The reason is that the local router can still send canureach requests to its peers, since no filtering is actually done on the local router. The filtering done by the peers does not prohibit the peers from responding to canureach requests from the local router sending the control vector, only sending canureach requests to the local router.

Example

The following example specifies a list of SAPs that are not reachable:

```
dlsw icannotreach saps F0
```

Related Command

show dlsw capabilities

dlsw icanreach

Use the **dlsw icanreach** global configuration command to configure a resource that is locally reachable by this router. Use the **no** form of this command to remove the resource.

```
dlsw icanreach { mac-exclusive | netbios-exclusive | mac-address mac-addr
                 [mask mask] | netbios-name name }
no dlsw icanreach { mac-exclusive | netbios-exclusive | mac-address mac-addr
                   [mask mask] | netbios-name name }
```

Syntax Description

mac-exclusive	Router can reach only the MAC addresses that are user configured.
netbios-exclusive	Router can reach only the NetBIOS names that are user configured.
mac-address <i>mac-addr</i>	Configures a MAC address that this router can locally reach.
mask <i>mask</i>	(Optional) MAC address mask in hexadecimal <i>h.h.h</i> . The mask indicates which bits in the MAC address are relevant.
netbios-name <i>name</i>	Configures a NetBIOS name that this router can locally reach. Wildcards are allowed. The wildcard is either an asterisk (*) at the end or a question mark (?) in the middle of the name.

Default

No resources are configured.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

This command can be entered at any time. It causes a capabilities exchange to relay the information to all active peers. By specifying resource names or MAC addresses in this command, you can avoid broadcasts from remote peers that are looking for this resource. By specifying “exclusive” you can avoid broadcasts to this router or any resources. For example, you could configure the front-end processor (FEP) MAC address or corporate site LAN servers in central site routers to avoid any broadcasts over the WAN for these resources.

Example

The following example indicates that this peer only has information about a single NetBIOS server, and that no peers should send this peer explorers searching for other NetBIOS names:

```
dlsw icanreach netbios-exclusive
dlsw icanreach netbios-name lanserv
```

Related Commands

show dls w capabilities

show dls w peers

dlsw local-peer

Use the **dlsw local-peer** global configuration command to define the parameters of the DLSw+ local peer. Use the **no** form of this command to cancel the definitions.

```
dlsw local-peer [peer-id ip-address] [group group] [border] [cost cost]
  [if size] [keepalive seconds] [passive] [promiscuous] [biu-segment]
no dlsw local-peer [peer-id ip-address] [group group] [border] [cost cost]
  [if size] [keepalive seconds] [passive] [promiscuous] [biu-segment]
```

Syntax Description

peer-id <i>ip-address</i>	(Optional) Local peer IP address; required for Fast-Sequenced Transport (FST) and TCP.
group <i>group</i>	(Optional) Peer group number for this router. The valid range is 1 to 255.
border	(Optional) Enables as a border peer.
cost <i>cost</i>	(Optional) Peer cost advertised to remote peers in the capabilities exchange. The valid range is 1 to 5.
if <i>size</i>	(Optional) Largest frame size for this local peer. Valid sizes are the following: 516-516 byte maximum frame size 1470-1470 byte maximum frame size 1500-1500 byte maximum frame size 2052-2052 byte maximum frame size 4472-4472 byte maximum frame size 8144-8144 byte maximum frame size 11407-11407 byte maximum frame size 11454-11454 byte maximum frame size 17800-17800 byte maximum frame size
keepalive <i>seconds</i>	(Optional) Default remote peer keepalive interval in seconds. The valid range is 0 to 1200 seconds.
passive	(Optional) Specifies that this router will not initiate remote peer connections to configured peers.
promiscuous	(Optional) Accepts connections from nonconfigured remote peers.
biu-segment	(Optional) Causes DLSw+ to spoof the maximum receivable I-frame size in XID so that each end station sends the largest frame it can.

Default

No parameters are defined.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

When there are multiple peers to a given destination, use the **cost** keyword to determine which router is preferred and which is capable. The **cost** keyword only applies in fault tolerance mode.

The **biu-segment** option is a performance/utilization improvement. If a frame that arrives from a remote peer is too large for the destination station to handle, DLSw+ segments the frame. If you choose to implement this option, you must add the option to both DLSw peer partners.

Example

The following command defines the local peer IP address and specifies the peer group number for this router:

```
dlsw local-peer peer-id 10.2.17.1 group 2
```

Related Commands

dlsw duplicate-path-bias

show dlsw capabilities

show dlsw peers

dlsw mac-addr

Use the **dlsw mac-addr** global configuration command to configure a static MAC address. Use the **no** form of this command to cancel the configuration.

```
dlsw mac-addr mac-addr {ring-group ring | remote-peer {interface serial number |  
ip-address ip-address}} | group group }  
no dlsw mac-addr mac-addr {ring-group ring | remote-peer {interface serial number |  
ip-address ip-address}} | group group }
```

Syntax Description

<i>mac-addr</i>	Specifies the MAC address.
ring-group <i>ring</i>	Maps the MAC address to a ring number or ring group number. The valid range is 1 to 4095.
remote-peer	Maps the MAC address to a specific remote peer.
interface serial <i>number</i>	Specifies the remote peer by direct serial interface.
ip-address <i>ip-address</i>	Specifies the remote peer by IP address.
group <i>group</i>	Maps the MAC address to a specified peer group. Valid numbers are in the range 1 to 255.

Default

No static MAC address is configured.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

You can statically define resources to prevent the Cisco IOS software from sending explorer frames for the specified resource. For example, you can include the MAC address of a FEP in the configuration for each remote router to eliminate any broadcasts that are searching for a FEP. Alternatively, you can specify a single **dlsw icanreach** statement in the router attached to the FEP indicating the MAC address of the FEP. This information is sent to all remote routers as part of the capabilities exchange.

Example

The following example maps the static MAC address 1000.5A12.3456 to the remote peer at IP address 10.17.3.2:

```
dlsw mac-addr 1000.5A12.3456 remote-peer ip-address 10.17.3.2
```

Related Commands

show dls w capabilities

show dls w peers

dlsw netbios-name

Use the **dlsw netbios-name** global configuration command to configure a static NetBIOS name. Use the **no** form of this command to cancel the configuration.

```
dlsw netbios-name netbios-name {ring-group ring | remote-peer {interface serial number |  
ip-address ip-address}} | group group }  
no dlsw netbios-name netbios-name {ring-group ring | remote-peer {interface serial number |  
ip-address ip-address}} | group group }
```

Syntax Description

<i>netbios-name</i>	Specifies the NetBIOS name. Wildcards are allowed.
ring-group <i>ring</i>	Maps the NetBIOS name to a ring number or ring group number. Test frames for this name will only be sent to LAN ports in this ring group.
remote-peer	Maps the NetBIOS name to a specific remote peer.
interface serial <i>number</i>	Specifies the remote peer by direct interface.
ip-address <i>ip-address</i>	Specifies the remote peer by IP address.
group <i>group</i>	Maps the NetBIOS name to a specified peer group. Valid numbers are in the range 1 to 255.

Default

No static NetBIOS name is configured.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Example

The following example configures a static NetBIOS name and links it to ring group 3:

```
dlsw netbios-name netname ring-group 3
```

Related Commands

```
show dlsw capabilities  
show dlsw peers
```

dlsw peer-on-demand-defaults fst

Use the **dlsw peer-on-demand-defaults fst** global configuration command to configure FST for peer-on-demand transport. Use the **no** form of this command to disable the previous assignment.

```
dlsw peer-on-demand-defaults fst [bytes-netbios-out bytes-list-name [cost cost]
host-netbios-out host-list-name] [keepalive seconds] [lsap-output-list list] [port-list
port-list-number].
no dlsw peer-on-demand-defaults fst [bytes-netbios-out bytes-list-name [cost cost]
host-netbios-out host-list-name] [keepalive seconds] [lsap-output-list list] [port-list
port-list-number]
```

Syntax Description

bytes-netbios-out <i>bytes-list-name</i>	Configures NetBIOS bytes output filtering for peer-on-demand peers. The <i>bytes-list-name</i> is the name of the previously defined netbios bytes access list filter.
cost <i>cost</i>	Specifies the cost to reach peer-on-demand peers. The valid range is 1 to 5. The default cost is 3.
host-netbios-out <i>host-list-name</i>	Configures NetBIOS host output filtering for peer-on-demand peers. The <i>host-list-name</i> is the name of the previously defined NetBIOS host access list filter.
inactivity <i>minutes</i>	(Optional) Configures the length of time after the peer's circuit count is zero that the peer-on-demand is disconnected. The default is 10 minutes.
keepalive <i>seconds</i>	Configures the peer-on-demand keepalive interval. The valid range is 0 to 1200 seconds. The default is 30 seconds.
if <i>size</i>	(Optional) Largest frame size for this remote peer. Valid sizes are the following: 516-516 byte maximum frame size 1470-1470 byte maximum frame size 1500-1500 byte maximum frame size 2052-2052 byte maximum frame size 4472-4472 byte maximum frame size 8144-8144 byte maximum frame size 11407-11407 byte maximum frame size 11454-11454 byte maximum frame size 17800-17800 byte maximum frame size
lsap-output-list <i>list</i>	Configures local service access point (LSAP) output filtering for peer-on-demand peers. Valid numbers are in the range 200 to 299.
port-list <i>port-list-number</i>	Configures a port list for peer-on-demand peers. Valid numbers are in the range 0 to 4095.

Default

The default peer-on-demand transport is TCP.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Example

The following example configures FST for peer-on-demand transport:

```
dlsw peer-on-demand-defaults fst
```

Related Commands

show dlsw capabilities

show dlsw peers

dlsw peer-on-demand-defaults tcp

Use the **dlsw peer-on-demand-defaults tcp** global configuration command to configure TCP for peer-on-demand transport. Use the **no** form of this command to disable the previous assignment.

```
dlsw peer-on-demand-defaults tcp [bytes-netbios-out bytes-list-name] [cost cost]  
  [host-netbios-out host-list-name] [keepalive seconds] [local-ack] [lsap-output-list  
  list] [port-list port-list-number] [priority]  
no dlsw peer-on-demand-defaults tcp [bytes-netbios-out bytes-list-name] [cost cost]  
  [host-netbios-out host-list-name] [keepalive seconds] [local-ack] [lsap-output-list  
  list] [port-list port-list-number] [priority]
```

Syntax Description

bytes-netbios-out <i>bytes-list-name</i>	(Optional) Configures NetBIOS bytes output filtering for peer-on-demand peers. The <i>bytes-list-name</i> is the name of the previously defined NetBIOS bytes access list filter.
cost <i>cost</i>	(Optional) Specifies the cost to reach peer-on-demand peers. The valid range is 1 to 5. The default cost is 3.
host-netbios-out <i>host-list-name</i>	(Optional) Configures NetBIOS host output filtering for peer-on-demand peers. The <i>host-list-name</i> is the name of the previously defined NetBIOS host access list filter.
inactivity <i>minutes</i>	(Optional) Configures the length of time after the peer's circuit count is zero that the peer-on-demand is disconnected. The default is 10 minutes.
keepalive <i>seconds</i>	(Optional) Configures the peer-on-demand keepalive interval. The valid range is 0 to 1200 seconds. The default is 30 seconds.
if <i>size</i>	(Optional) Largest frame size for this remote peer. Valid sizes are the following: 516-516 byte maximum frame size 1470-1470 byte maximum frame size 1500-1500 byte maximum frame size 2052-2052 byte maximum frame size 4472-4472 byte maximum frame size 8144-8144 byte maximum frame size 11407-11407 byte maximum frame size 11454-11454 byte maximum frame size 17800-17800 byte maximum frame size
local-ack	(Optional) Configures local acknowledgment for peer-on-demand sessions.
lsap-output-list <i>list</i>	(Optional) Configures LSAP output filtering for peer-on-demand peers. Valid numbers are in the range 200 to 299.
port-list <i>port-list-number</i>	(Optional) Configures a port-list for peer-on-demand peers. Valid numbers are in the range 0 to 4095.
priority	(Optional) Configures prioritization for peer-on-demand peers. The default state is off.

Default

The default peer-on-demand transport is TCP.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Example

The following example configures TCP for peer-on-demand transport:

```
dls w peer-on-demand-defaults tcp
```

Related Commands

show dls w capabilities

show dls w peers

dlsw port-list

Use the **dlsw port-list** global configuration command to map traffic on a local interface (Ethernet, Token Ring, or serial) to remote peers. Use the **no** form of this command to disable the previous map assignment.

```
dlsw port-list list-number type number  
no dlsw port-list list-number type number
```

Syntax Description

<i>list-number</i>	Port list number. The valid range is 1 to 255.
<i>type</i>	Interface type.
<i>number</i>	Interface number.

Default

No port list is configured.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Traffic received from a remote peer is forwarded only to the ports specified in the port list. Traffic received from a local interface is forwarded to peers if the input port number appears in the port list applied to the remote peer definition. The definition of a port list is optional.

Example

The following example configures a DLSw peer port list for Ethernet interface 1:

```
dlsw port-list 3 ethernet 1
```

Related Commands

dlsw bgroup-list
dlsw ring-list

dlsw remote-peer frame relay

Use the **dlsw remote-peer frame relay** global configuration command to specify the remote peer with which the router will connect. Use the **no** form of this command to disable the previous assignments.

```
dlsw remote-peer list-number frame-relay interface serial number dlsi-number
  [backup-peer ip-address] [bytes-netbios-out bytes-list-name] [cost cost]
  [dest-mac mac-address] [dmac-output-list access-list-number]
  [host-netbios-out host-list-name] [keepalive seconds] [lf size] [linger minutes]
  [lsap-output-list list] [pass-thru]
no dlsw remote-peer list-number frame-relay interface serial number dlsi-number
  [backup-peer ip-address] [bytes-netbios-out bytes-list-name] [cost cost]
  [dest-mac mac-address] [dmac-output-list access-list-number]
  [host-netbios-out host-list-name] [keepalive seconds] [lf size] [linger minutes]
  [lsap-output-list list] [pass-thru]
```

Syntax Description

<i>list-number</i>	Ring list number. The valid range is 1 to 255. The default is 0, which means DLSw+ forwards explorers over all ports or bridge groups on which DLSw+ is enabled.
interface serial <i>number</i>	Serial interface number of the remote peer with which the router is to communicate.
<i>dlsi-number</i>	DLCI number of the remote peer.
backup-peer <i>ip-address</i>	(Optional) Configures a backup to an existing peer.
bytes-netbios-out <i>bytes-list-name</i>	(Optional) Configures NetBIOS bytes output filtering for this peer. The <i>bytes-list-name</i> is the name of the previously defined NetBIOS bytes access list filter.
cost <i>cost</i>	(Optional) Cost to reach this remote peer. The valid range is 1 to 5.
dest-mac <i>mac-address</i>	(Optional) Permits the connection to be established only when there is an explorer frame destined for the specified 48-bit MAC address written in dotted triplet form.
dmac-output-list <i>access-list-number</i>	(Optional) Permits the connection to be established only when the explorer frame passes the specified access list, where <i>access-list-number</i> is the list number specified in an access-list command.
host-netbios-out <i>host-list-name</i>	(Optional) Configures NetBIOS host output filtering for this peer. The <i>host-list-name</i> is the name of the previously defined NetBIOS host access list filter.
keepalive <i>seconds</i>	(Optional) Sets the keepalive interval for this remote peer. The range is 0 to 1200 seconds.

if size	(Optional) Largest frame size for this local peer. Valid sizes are the following: 516-516 byte maximum frame size 1470-1470 byte maximum frame size 1500-1500 byte maximum frame size 2052-2052 byte maximum frame size 4472-4472 byte maximum frame size 8144-8144 byte maximum frame size 11407-11407 byte maximum frame size 11454-11454 byte maximum frame size 17800-17800 byte maximum frame size
linger minutes	(Optional) Configures length of time the backup peer remains connected after the primary peer connection has been re-established. The valid range is 1 to 300 minutes. The default is 5 minutes.
lsap-output-list list	(Optional) Filters output IEEE 802.5 encapsulated packets. Valid access list numbers are in the range 200 to 299.
pass-thru	(Optional) Selects passthrough mode. (The default, if nothing is specified, is local acknowledgment mode.)

Default
No defaults are specified.

Command Mode
Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0. The following keywords and arguments first appeared in Cisco IOS Release 11.2: **dest-mac** *mac-address*, **dmac-output-list** *access-list-number*, **linger** *minutes*.

The **cost** keyword specified in a remote peer statement takes precedence over the cost learned as part of the capabilities exchange with the remote peer. The **cost** keyword is relevant only in fault tolerance mode.

When you need to permit access to only a single MAC address, the **dest-mac** option is a shortcut over the **dmac-output-list** option.

Example

The following example specifies Frame Relay encapsulation connection for remote peer transport:

```
dlsw remote-peer 0 frame-relay interface 0 30
```

Related Commands

dls w local-peer
show dls w capabilities
show dls w peers

dlsw remote-peer fst

Use the **dlsw remote-peer fst** global configuration command to specify an FST encapsulation connection for remote peer transport. Use the **no** form of this command to disable the previous assignments.

```
dlsw remote-peer list-number fst ip-address [backup-peer ip-address]
  [bytes-netbios-out bytes-list-name][cost cost] [dest-mac mac-address]
  [dmac-output-list access-list-number] [host-netbios-out host-list-name]
  [keepalive seconds] [lf size] [linger minutes] [lsap-output-list list] [pass-thru]
no dlsw remote-peer list-number fst ip-address [backup-peer ip-address]
  [bytes-netbios-out bytes-list-name][cost cost] [dest-mac mac-address]
  [dmac-output-list access-list-number] [host-netbios-out host-list-name]
  [keepalive seconds] [lf size] [linger minutes] [lsap-output-list list] [pass-thru]
```

Syntax Description

<i>list-number</i>	Ring list number. The valid range is 1 to 255. The default is 0, which means DLSw+ forwards explorers over all ports or bridge groups on which DLSw+ is enabled.
<i>ip-address</i>	IP address of the remote peer with which the router is to communicate.
backup-peer <i>ip-address</i>	(Optional) Configures a backup to an existing TCP/FST peer.
bytes-netbios-out <i>bytes-list-name</i>	(Optional) Configures NetBIOS bytes output filtering for this peer. The <i>bytes-list-name</i> is the name of the previously defined NetBIOS bytes access list filter.
cost <i>cost</i>	(Optional) Cost to reach this remote peer. The valid range is 1 to 5.
dest-mac <i>mac-address</i>	(Optional) Permits the connection to be established only when there is an explorer frame destined for the specified 48-bit MAC address written in dotted triplet form.
dmac-output-list <i>access-list-number</i>	(Optional) Permits the connection to be established only when the explorer frame passes the specified access list, where <i>access-list-number</i> is the list number specified in an access-list command.
host-netbios-out <i>host-list-name</i>	(Optional) Configures NetBIOS host output filtering for this peer. The <i>host-list-name</i> is the name of the previously defined NetBIOS host access list filter.
keepalive <i>seconds</i>	(Optional) Sets the keepalive interval for this remote peer. The range is 0 to 1200 seconds.

if size	(Optional) Largest frame size for this local peer. Valid sizes are the following: 516-516 byte maximum frame size 1470-1470 byte maximum frame size 1500-1500 byte maximum frame size 2052-2052 byte maximum frame size 4472-4472 byte maximum frame size 8144-8144 byte maximum frame size 11407-11407 byte maximum frame size 11454-11454 byte maximum frame size 17800-17800 byte maximum frame size
linger minutes	(Optional) Configures length of time the backup peer remains connected after the primary peer connection has been re-established. The valid range is 1 to 300 minutes. The default is 5 minutes.
lsap-output-list list	(Optional) Filters output IEEE 802.5 encapsulated packets. Valid access list numbers are in the range 200 to 299.
pass-thru	(Optional) Selects passthrough mode. (The default, if nothing is specified, is local acknowledgment mode.)

Default

No FST encapsulation connection is specified.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0. The following keywords and arguments first appeared in Cisco IOS Release 11.2: **dest-mac** *mac-address*, **dmac-output-list** *access-list-number*, **linger** *minutes*.

The **cost** keyword specified in a remote peer statement takes precedence over the cost learned as part of the capabilities exchange with the remote peer. The **cost** keyword is relevant only in fault tolerance mode.

When you need to permit access to only a single MAC address, the **dest-mac** option is a shortcut over the **dmac-output-list** option.

Example

The following example specifies an FST encapsulation connection for remote peer transport:

```
dlsw remote-peer 1 fst 10.2.17.8
```

Related Commands

dlsw local-peer
show dlsw capabilities
show dlsw peers

dlsw remote-peer interface

Use the **dlsw remote-peer interface** global configuration command when specifying a point-to-point direct encapsulation connection. Use the **no** form of this command to disable previous interface assignments.

```
dlsw remote-peer list-number interface serial number [backup-peer ip-address]
  [bytes-netbios-out bytes-list-name] [cost cost] [dest-mac mac-address]
  [dmac-output-list access-list-number] [host-netbios-out host-list-name]
  [keepalive seconds] [lf size] [linger minutes] [lsap-output-list list] [pass-thru]
no dlsw remote-peer list-number interface serial number [backup-peer ip-address]
  [bytes-netbios-out bytes-list-name] [cost cost] [dest-mac mac-address]
  [dmac-output-list access-list-number] [host-netbios-out host-list-name]
  [keepalive seconds] [lf size] [linger minutes] [lsap-output-list list] [pass-thru]
```

Syntax Description

<i>list-number</i>	Ring list number. The valid range is 1 to 255. The default is 0, which means all.
serial <i>number</i>	Specifies the remote peer by direct serial interface.
backup-peer <i>ipaddress</i>	(Optional) Configures a backup to an existing peer.
bytes-netbios-out <i>bytes-list-name</i>	(Optional) Configures NetBIOS bytes output filtering for this peer. The <i>bytes-list-name</i> is the name of the previously defined NetBIOS bytes access list filter.
cost <i>cost</i>	(Optional) Cost to reach this remote peer. The valid range is 1 to 5.
dest-mac <i>mac-address</i>	(Optional) Permits the connection to be established only when there is an explorer frame destined for the specified 48-bit MAC address written in dotted triplet form.
dmac-output-list <i>access-list-number</i>	(Optional) Permits the connection to be established only when the explorer frame passes the specified access list, where <i>access-list-number</i> is the list number specified in an access-list command.
host-netbios-out <i>host-list-name</i>	(Optional) Configures NetBIOS host output filtering for this peer. The <i>host-list-name</i> is the name of the previously defined NetBIOS host access list filter.
keepalive <i>seconds</i>	(Optional) Sets the keepalive interval for this remote peer. The range is 0 to 1200 seconds.

if size	(Optional) Largest frame size for this remote peer. Valid sizes are the following: 516-516 byte maximum frame size 1470-1470 byte maximum frame size 1500-1500 byte maximum frame size 2052-2052 byte maximum frame size 4472-4472 byte maximum frame size 8144-8144 byte maximum frame size 11407-11407 byte maximum frame size 11454-11454 byte maximum frame size 17800-17800 byte maximum frame size
linger minutes	(Optional) Configures length of time the backup peer remains connected after the primary peer connection has been re-established. The valid range is 1 to 300 minutes. The default is 5 minutes.
lsap-output-list list	(Optional) Filters output IEEE 802.5 encapsulated packets. Valid access list numbers are in the range 200 to 299.
pass-thru	(Optional) Selects passthrough mode. (The default, if nothing is specified, is local acknowledgment mode.)

Default

No point-to-point direct encapsulation connection is specified.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0. The following keywords and arguments first appeared in Cisco IOS Release 11.2: **dest-mac** *mac-address*, **dmac-output-list** *access-list-number*, **linger** *minutes*.

The **cost** keyword specified in a remote peer statement takes precedence over the cost learned as part of the capabilities exchange with the remote peer. The **cost** keyword is relevant only in fault tolerance mode.

When you need to permit access to only a single MAC address, the **dest-mac** option is a shortcut over the **dmac-output-list** option.

Example

The following example specifies a point-to-point direct encapsulation connection for remote peer transport:

```
dlsw remote-peer 1 interface serial 2
```

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

show dls w peers
show interfaces †

dlsw remote-peer tcp

Use the **dlsw remote-peer tcp** global configuration command to identify the IP address of a peer with which to exchange traffic using TCP. Use the **no** form of this command to remove a remote peer.

```
dlsw remote-peer list-number tcp ip-address [backup-peer ip-address]
  [bytes-netbios-out bytes-list-name] [cost cost] [dest-mac mac-address]
  [dmac-output-list access-list-number] [dynamic] [host-netbios-out host-list-name]
  [inactivity minutes] [keepalive seconds] [lf size] [linger minutes] [lsap-output-list list]
  [no-llc minutes] [priority] [tcp-queue-max size] [timeout seconds]
no dlsw remote-peer list-number tcp ip-address [backup-peer ip-address]
  [bytes-netbios-out bytes-list-name] [cost cost] [dest-mac mac-address]
  [dmac-output-list access-list-number] [dynamic] [host-netbios-out host-list-name]
  [inactivity minutes] [keepalive seconds] [lf size] [linger minutes] [lsap-output-list list]
  [no-llc minutes] [priority] [tcp-queue-max size] [timeout seconds]
```

Syntax Description

<i>list-number</i>	Remote peer ring group list number. This ring group list number default is 0. Otherwise, this value must match the number you specify with the dlsw ring-list , dlsw port-list or dlsw bgroup-list command.
tcp <i>ip-address</i>	IP address of the remote peer with which the router is to communicate.
backup-peer <i>ip-address</i>	(Optional) Configures a backup to an existing peer.
bytes-netbios-out <i>bytes-list-name</i>	(Optional) Configures NetBIOS bytes output filtering for this peer. The <i>bytes-list-name</i> is the name of the previously defined NetBIOS bytes access list filter.
cost <i>cost</i>	(Optional) The cost to reach this remote peer. The valid range is 1 to 5.
dest-mac <i>mac-address</i>	(Optional) Permits the TCP connection to be established only when there is an explorer frame destined for the specified 48-bit MAC address written in dotted triplet form.
dmac-output-list <i>access-list-number</i>	(Optional) Permits the TCP connection to be established only when the explorer frame passes the specified access list, where <i>access-list-number</i> is the list number specified in an access-list command.
dynamic	(Optional) Permits the TCP connection to be established only when there is DLSw+ data to send.
host-netbios-out <i>host-list-name</i>	(Optional) Configures NetBIOS host output filtering for this peer. The <i>host-list-name</i> is the name of the previously defined NetBIOS host access list filter.
inactivity <i>minutes</i>	(Optional) Configures the length of time a connection can be idle before closing the dynamic remote peer connection. The valid range is 1 to 300 minutes. The default is 5 minutes.

keepalive <i>seconds</i>	(Optional) Sets the keepalive interval for this remote peer. The range is 0 to 1200 seconds.
if <i>size</i>	(Optional) Largest frame size for this remote peer. Valid sizes are the following: 516-516 byte maximum frame size 1470-1470 byte maximum frame size 1500-1500 byte maximum frame size 2052-2052 byte maximum frame size 4472-4472 byte maximum frame size 8144-8144 byte maximum frame size 11407-11407 byte maximum frame size 11454-11454 byte maximum frame size 17800-17800 byte maximum frame size
linger <i>minutes</i>	(Optional) Configures length of time the backup peer remains connected after the primary peer connection has been re-established. The valid range is 1 to 300 minutes. The default is 5 minutes.
lsap-output-list <i>list</i>	(Optional) Filters output IEEE 802.5 encapsulated packets. Valid access list numbers are in the range 200 to 299.
no-llc <i>minutes</i>	(Optional) Configures the length of time a remote peer remains connected after all LLC2 connections are gone. The valid range is 1 to 300 minutes. The default is 5 minutes.
priority	(Optional) Enables prioritization features for this remote peer. Valid TCP port numbers are the following: high: 2065 medium: 1981 normal: 1982 low: 1983
tcp-queue-max <i>size</i>	(Optional) Maximum output TCP queue size for this remote peer. The valid maximum TCP queue size is a number in the range 10 to 2000.
timeout <i>seconds</i>	(Optional) Configures the retransmit time limit for TCP. The valid range is 5 to 1200 seconds. The default is 90 seconds.

Defaults

No peer IP address is identified.

The **linger** option is inactive. If the **linger** option is added with no minutes specified, the default is **linger** 5 minutes.

The **dynamic** option is inactive. If the **dynamic** option is added with neither suboption (**inactivity**, **no-llc**) specified, the default is to terminate the TCP connection to the remote peer after 5 minutes of no active LLC2 connection.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0. The following keywords and arguments first appeared in Cisco IOS Release 11.1: **dynamic**, **inactivity** *minutes*, **linger** *minutes*, **no-llc** *minutes*, **timeout** *seconds*. The following keywords and arguments first appeared in Cisco IOS Release 11.2: **dest-mac** *mac-address*, **dmac-output-list** *access-list-number*, **linger** *minutes*.

SNA dial-on-demand routing (DDR) technology allows switched links to be closed during idle periods. To enable this feature, set the **keepalive** option to 0 and configure the **timeout** option.

To enhance DDR cost-savings, you can configure the TCP connection to a remote peer to be “dynamically” established, that is, established only when there is DLSw data to send. You can further configure the TCP connection to terminate either after a specified period of idle time on the peer or after a specified period of no active LLC sessions on the peer.

You cannot use both **no-llc** and **inactivity** in a command specifying a dynamic peer.

When you need to permit access to only a single MAC address, the **dest-mac** option is a shortcut over the **dmac-output-list** option.

Use the **linger** option to specify that a backup peer will remain connected for a specified period of time after the primary connection is gone.

Example

The following example specifies a TCP encapsulation connection for remote peer transport:

```
dlsw remote-peer 1 tcp 10.2.17.8
```

Related Commands

dlsw ring-list

show dlsw capabilities

show dlsw peers

dlsw ring-list

Use the **dlsw ring-list** to configure a ring list, mapping traffic on a local interface to remote peers. Use the **no** form of this command to cancel the definition.

```
dlsw ring-list list-number rings ring-number  
no dlsw ring-list list-number rings ring-number
```

Syntax Description

<i>list-number</i>	Ring list number. The valid range is 1 to 255.
rings	Specify one or more physical or virtual rings.
<i>ring-number</i>	Physical or virtual ring number. The valid range is 1 to 4095.

Default

There is no default setting.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Traffic received from a remote peer is forwarded only to the rings specified in the ring list. Traffic received from a local interface is forwarded to peers if the input ring number appears in the ring list applied to the remote peer definition. The definition of a ring list is optional.

Example

The following example configures a DLSw ring list, assigning rings 1, 2, and 3 to ring list 3:

```
dlsw ring-list 3 rings 1 2 3
```

Related Commands

```
dlsw bgroup-list  
dlsw port-listt  
show dlsw capabilities  
show dlsw peers
```

dlsw timer

Use the **dlsw timer** global configuration command to tune an existing configuration parameter. Use the **no** form of this command to restore the default parameters.

```
dlsw timer {icannotreach-block-time | netbios-cache-timeout | netbios-explorer-timeout |
netbios-retry-interval | netbios-verify-interval | sna-cache-timeout |
sna-explorer-timeout | sna-retry-interval | sna-verify-interval} time
no dlsw timer {icannotreach-block-time | netbios-cache-timeout |
netbios-explorer-timeout | netbios-retry-interval | netbios-verify-interval |
sna-cache-timeout | sna-explorer-timeout | sna-retry-interval | sna-verify-interval} time
```

Syntax Description

icannotreach-block-time <i>time</i>	Cache life of unreachable resource, during which searches for that resource are blocked. The valid range is 1 to 86400 seconds. The default is 0 (disabled).
netbios-cache-timeout <i>time</i>	Cache life of NetBIOS name location for both local and remote reachability cache. The valid range is 1 to 86400 seconds. The default is 16 minutes.
netbios-explorer-timeout <i>time</i>	Length of time that the Cisco IOS software waits for an explorer response before marking a resource unreachable (LAN and WAN). The valid range is 1 to 86400 seconds. The default is 6 seconds.
netbios-retry-interval <i>time</i>	NetBIOS explorer retry interval (LAN only). The valid range is 1 to 86400 seconds. The default is 1 second.
netbios-verify-interval <i>time</i>	Interval between the creation of a cache entry and when the entry is marked as stale. If a search request comes in for a stale cache entry, a directed verify query is sent to assure that it still exists. The valid range is 1 to 86400 seconds. The default is 4 minutes.
sna-cache-timeout <i>time</i>	Length of time that a System Network Architecture (SNA) MAC/SAP location cache entry exists before it is discarded (local and remote). The valid range is 1 to 86400 seconds. The default is 16 minutes.
sna-explorer-timeout <i>time</i>	Length of time that the Cisco IOS software waits for an explorer response before marking a resource unreachable (LAN and WAN). The valid range is 1 to 86400 seconds. The default is 3 minutes.
sna-retry-interval <i>time</i>	Interval between SNA explorer retries (LAN). The valid range is 1 to 86400 seconds. The default is 30 seconds.
sna-verify-interval <i>time</i>	Interval between the creation of a cache entry and when the entry is marked as stale. If a search request comes in for a stale cache entry, a directed verify query is sent to assure that it still exists. The valid range is 1 to 86400 seconds. The default is 4 minutes.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Example

The following example configures the length of time that an SNA MAC/SAP location cache entry exists before it is discarded:

```
dlsw timer sna-cache-timeout 3
```

qlc dlsw

Use the **qlc dlsw** interface configuration command to enable DLSw+ over Qualified Logical Link Control (QLLC). Use the **no** form of this command to cancel the configuration.

```
qlc dlsw {subaddress subaddress | pvc pvc-low [pvc-high]} [vmac vmacaddr
[poolsize]] [partner partner-macaddr] [sap ssap dsap] [xid xidstring] [npsi-poll]
no qlc dlsw {subaddress subaddress | pvc pvc-low [pvc-high]} [vmac vmacaddr
[poolsize]] [partner partner-macaddr] [sap ssap dsap] [xid xidstring] [npsi-poll]
```

Syntax Description

subaddress <i>subaddress</i>	An X.121 subaddress.
pvc	Map one or more permanent virtual circuits (PVCs) to a particular QLLC service (in this case DLSw+). QLLC will attempt to reach the partner by sending an ID.STN.IND to DLSw+.
<i>pvc-low</i>	Lowest logical channel number (LCN) for a range of X.25 PVCs. Acceptable values for PVCs are decimal numbers between 1 and 4095. There is no default value.
<i>pvc-high</i>	(Optional) Highest LCN. If not specified the range of PVCs consists of just one PVC.
vmac <i>vmacaddr</i>	(Optional) Defines either the only virtual MAC address used for DLSw+ or the lowest virtual MAC address in a pool of virtual MAC addresses.
<i>poolsize</i>	(Optional) Specify the number of contiguous virtual MAC addresses that have been reserved for DLSw+. If the parameter is not present, then just one virtual MAC address is available.
partner <i>partner-macaddr</i>	Virtual MAC address to which an incoming call wishes to connect. The qlc dlsw command must be repeated for each different partner. Each partner is identified by a unique subaddress.
sap <i>ssap dsap</i>	Overrides the default SAP values (04) for a Token Ring connection. <i>dsap</i> refers to the partner's SAP address; <i>ssap</i> applies to the virtual MAC address that corresponds to the X.121 device.
xid <i>xidstring</i>	XID Format 0 Type 2 string.
npsi-poll	Inhibits forwarding a null XID on the X.25 link. Instead the Cisco IOS software will send a null XID response back to the device that sent the null XID command.

Default

No defaults are specified.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Any incoming call whose X.121 destination address matches the router's X.121 address and this subaddress will be dispatched to DLSw+ (with an ID.STN IND). If a router is providing several QLLC services different subaddresses must be used to discriminate between them. Subaddresses can be used even if a remote X.25 device is not explicitly mapped to a specific virtual MAC address. This is most useful when PU 2.1 devices are connecting to a host because the X.25 device's control point name and network name are used to validate the connection, rather than some virtual MAC address. The subaddress is optional. If no subaddress is provided, any incoming call that matches the router's X.121 address will be dispatched to DLSw+. On outgoing calls the subaddress is concatenated to the interface's X.121 address.

When DLSw+ receives a Can You Reach inquiry about a virtual MAC address in the pool, the QLLC code will attempt to set up a virtual circuit to the X.121 address that maps to the virtual MAC address specified. If an incoming call is received, QLLC sends an ID.STN.IND with a virtual MAC address from the pool to DLSw+. If there is no virtual MAC address, then the **x25 map qllc** or **x25 pvc qllc** command must provide a virtual MAC address.

The **npsi-poll** parameter is needed to support PU 2.0 on the partner side that wishes to connect to a FEP on the X.25 side. In a Token Ring or DLSw+ environment the PU 2.0 will send a null XID to the FEP. If the software forwards this null XID to an X.25 attached FEP the FEP will assume that it is connecting to PU2.1, and will break off the connection when the PU 2.0 next send an XID Format 0 Type 2.

Example

The following commands assign virtual MAC address 1000.0000.0001 to a remote X.25-attached 3174, which is then mapped to the X.121 address of the 3174 (31104150101) in an X.25-attached router:

```
x25 address 3110212011
x25 map qllc 1000.000.0001 31104150101
qllc dlsw partner 4000.1161.1234
```

Related Command

A dagger (†) indicates that the command is documented outside this chapter.

show qllc †

sdlc dlsw

Use the **sdlc dlsw** interface configuration command to attach SDLC addresses to DLSw+. Use the **no** form of this command to cancel the configuration.

sdlc dlsw *sdlc-address*
no sdc dlsw *sdlc-address*

Syntax Description

sdlc-address SDLC address in hexadecimal. The valid range is 1 to FE.

Default

No correspondence is defined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Example

The following command attaches SDLC address d2 to DLSw+:

```
sdlc dlsw d2
```

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

encapsulation sdc †
sdlc address †
sdlc role †

show dlsw capabilities

Use the **show dlsw capabilities** privileged EXEC command to display the configuration of the peer specified or of all peers.

```
show dlsw capabilities [interface type number | ip-address ip-address | local]
```

Syntax Description

interface	(Optional) Specifies the interface for which the DLSw+ capabilities are to be displayed.
<i>type</i>	Interface type is indicated by the keyword ethernet , null , serial , or tokenring .
<i>number</i>	Interface number.
ip-address <i>ip-address</i>	(Optional) Specifies a peer by its IP address.
local	(Optional) Specifies the local DLSw peer.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Sample Display

The following is sample output from the **show dlsw capabilities** command:

```
Router# show dlsw capabilities

DLSw: Capabilities for peer 10.2.17.7(2065)
  vendor id (OUI)       : '00C' (cisco)
  version number       : 1
  release number       : 0
  init pacing window   : 10
  unsupported saps     : none
  num of tcp sessions  : 1
  loop prevent support : no
  icanreach mac-exclusive : no
  icanreach netbios-excl. : no
  reachable mac addresses : none
  reachable netbios names : none
  cisco version number  : 1
  local-ack capable    : yes
  priority capable     : no
  peer group number    : 10
  border peer capable  : yes
  peer cost            : 3
  border peer for group 10 : peer 10.2.17.7(2065) cost 3
  version string       :
```

Table 28 describes significant fields shown in the display.

Table 28 Show DLSw Capabilities Field Descriptions

Field	Description
vendor id (OUI)	Vendor ID is cisco
version number	DLSw Version Number = 1
release number	Release = 0
init pacing window	Initial Pacing Window = 10
unsupported saps	Unsupported SAPs = none
num of tcp sessions	Number of TCP sessions = 1
loop prevent support	No Loop Prevent Support = no
icanreach mac-exclusive	icanreach mac-exclusive = no
icanreach netbios-excl.	icanreach netbios-exclusive = no
reachable mac address	Reachable MAC addresses = none
reachable netbios name	Reachable NetBIOS names = none
cisco version number	Cisco version number = 1
local-ack capable	Local acknowledgment capable = yes
priority capable	Priority capability = no
peer group number	Peer group member number = 10
border peer capable	Border peer capability = yes
peer cost	Peer cost = 3
border peer for group 10	Peer 10.2.17.7 (2065) cost = 3
version string	Cisco IOS software version information

show dlsw circuits

Use the **show dlsw circuits** privileged EXEC command to display the state of all circuits involving this MAC address as a source and destination.

```
show dlsw circuits [detail] [mac-address address | sap-value value | major-key {minor-key}]
```

Syntax Description

detail	(Optional) Display circuit state information in expanded format.
mac-address <i>address</i>	(Optional) Specifies the MAC address to be used in the circuit search.
sap-value <i>value</i>	(Optional) Specifies the SAP to be used in the circuit search.
<i>major-key</i>	(Optional) Specifies the major key portion of the circuit index. If a major key is given, it must be followed by a minor key.
<i>minor-key</i>	Specifies the minor key portion of the circuit index.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Sample Displays

The following is sample output from the **show dlsw circuits** command:

```
Router# show dlsw circuits

Index  local addr(lsap)  remote addr(dsap)  state
75-00  1000.5acc.5acc(F0)  1000.5acc.800d(F0)  CONNECTED
119-00  1000.5acc.88ea(04)  1000.5acc.800d(08)  CONNECTED
121-00  4006.315b.568e(F0)  0006.311d.eea1(F0)  CONNECTED
```

The following is sample output from the **show dlsw circuits** command with the **detail** argument:

```
Router# show dlsw circuits detail

Index  local addr(lsap)  remote addr(dsap)  state
194-00  0800.5a9b.b3b2(F0)  0800.5ac1.302d(F0)  CONNECTED
PCEP: 995AA4      UCEP: A52274
Port: To0/0      peer 172.18.15.166(2065)
Flow-Control-Tx CW:20, Permitted:28; Rx CW:22, Granted:25
RIF = 0680.0011.0640
```

Table 29 describes significant fields shown in the display.

Table 29 Show DLSw Circuits Field Descriptions

Field	Description
Index	Index = 4D00
local addr (lsap)	Local Address (LSAP) = 4006.313c.a07f (F0)
remote addr (dsap)	Remote Address (DSAP) = 0800.5a8f.8822
state	Connected

show dlsw fastcache

Use the **show dlsw fastcache** privileged EXEC command to display the fast cache for FST and direct-encapsulated peers.

show dlsw fastcache

Syntax Description

This command has no arguments or keywords.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Sample Display

The following is sample output from the **show dlsw fastcache** command:

```
Router# show dlsw fastcache
      peer          local-mac      remote-mac  l/r sap rif
FST 10.2.32.1      0800.5a8f.881c 0800.5a8f.8822 04/04 0680.02D5.1360
```

Table 30 describes significant fields shown in the display.

Table 30 Show DLSw Fastcache Field Descriptions

Field	Description
peer	Peer = FST 10.2.32.1
local-mac	Local MAC = 0800.5a8f.881c
remote-mac	Remote MAC = 0800.5a8f.8822
l/r sap	Local/Remote SAP 4/4
rif	RIF 0680.02D5.1360

show dlsw peers

Use the **show dlsw peers** privileged EXEC command to display DLSw peer information.

show dlsw peers [**interface** *type number* | **ip-address** *ip-address*]

Syntax Description

interface	(Optional) Specifies the interface for which the DLSw+ peer information is to be displayed.
<i>type</i>	Interface type, indicated by the keyword ethernet , null , serial , or tokenring .
<i>number</i>	Interface number.
ip-address <i>ip-address</i>	(Optional) Specifies a remote peer by its IP address.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Sample Display

The following is sample output from the **show dlsw peers** command:

```
Router# show dlsw peers ip-address 10.2.32.1

Peers:
TCP 10.2.32.1      state  rg_lst  pkts_rx  pkts_tx  type  drops  group  border
CONNECT          0      79170    50816    conf      0      0      no
```

Table 31 describes significant fields shown in the display.

Table 31 Show DLSw Peers Field Descriptions

Field	Description
Peers	Information related to the remote peer, including encapsulation type, IP address (if using FST, TCP), and interface number (if using direct encapsulation.)
state	State of the peer: CONNECT: normal working peer DISCONN: peer is not connected CAP_EXG: capabilities exchange mode. Waiting for capabilities response. WAIT_RD: TCP write pipe (local port 2065) is open and peer is waiting for remote peer to open the read port (local port 2067). This field applies only to TCP peers. WAN_BUSY: TCP outbound queue is full. This field applies only to TCP peers.

Table 31 Show DLSw Peers Field Descriptions (Continued)

Field	Description
rg lst	Port, ring, or bridge group list number. The default is 0. The possible range is 1 to 255. The rg lst number can be used on port, ring, and bgroup lists. The number is the means by which all 3 lists are associated
pkts_rx	Number of received packets.
pkts_tx	Number of transmitted packets.
type	conf : configuration prom : promiscuous pod : peer on demand
drops	Reasons for the counter to increment: WAN interface not up for a direct peer. DLSW tries to send a packet before the peer is fully connected (waiting for TCP event or capabilities event). Outbound TCP queue full. FST sequence number count mismatch. Cannot get buffer to "slow switch" FST packet. CiscoBus controller failure on high end (cannot move packet from receive buffer to transmit buffer, or vice versa). Destination IP address of FST packet does not match local peer-ID. WAN interface not up for an FST peer. No SRB route cache command configured. Madge ring buffer is full on low end systems (WAN feeding LAN too fast).
group	Peer group number. Valid range is 1 to 255.
border	YES = border peer capable NO = not a border peer

show dlsw reachability

Use the **show dlsw reachability** privileged EXEC command to display DLSw reachability information.

show dlsw reachability [**mac-address** *[address]*] [**netbios-names** *[name]*]

Syntax Description

mac-address	(Optional) Display DLSw reachability by MAC address.
<i>address</i>	(Optional) Specifies the MAC address for the reachability check.
netbios-names	(Optional) Display DLSw reachability by NetBIOS name.
<i>name</i>	(Optional) Specifies the NetBIOS name for the reachability check.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Sample Displays

The following is sample output from the **show dlsw reachability** command:

```
Router# show dlsw reachability

DLSw MAC address reachability cache list
Mac Addr      status      Loc.      peer/port      rif
0000.f641.91e8 SEARCHING  LOCAL    TokenRing0/0  0CB0.0011.3E71.A041.0DE5.0640
0006.7c9a.7a48 FOUND      LOCAL    TokenRing0/0  0CB0.0011.3E71.A041.0DE5.0640
0800.5a4b.1cbc SEARCHING  LOCAL
0800.5a54.ee59 SEARCHING  LOCAL
0800.5a8f.9c3f FOUND      LOCAL    TokenRing0/0  08B0.A041.0DE5.0640
4000.0000.0050 FOUND      LOCAL    TokenRing0/0  0CB0.0011.3E71.A041.0DE5.0640
4000.0000.0306 FOUND      LOCAL    TokenRing0/0  0CB0.0011.3E71.A041.0DE5.0640
4000.0000.0307 SEARCHING  LOCAL
4000.0000.0308 SEARCHING  LOCAL
4000.1234.56c1 FOUND      LOCAL    Serial3/7     --no rif--
4000.1234.56c2 FOUND      LOCAL    Serial3/7     --no rif--
4000.3000.0100 FOUND      LOCAL    TokenRing0/0  08B0.A041.0DE5.0640
4000.4000.ff40 SEARCHING  LOCAL
4000.7470.00e7 SEARCHING  LOCAL
4000.ac0b.0001 FOUND      LOCAL    TokenRing0/0  08B0.A041.0DE5.0640
4001.0000.0064 FOUND      LOCAL    TokenRing0/0  0CB0.0011.3E71.A041.0DE5.0640
4001.3745.1088 FOUND      LOCAL    TokenRing0/0  08B0.A041.0DE5.0640
4100.0131.1030 FOUND      LOCAL    TokenRing0/0
10B0.FFF1.4041.0041.3E71.A041.0DE5.0640

DLSw NetBIOS Name reachability cache list
NetBIOS Name  status      Loc.      peer/port      rif
APPNCLT2     FOUND      LOCAL    TokenRing0/0  08B0.A041.0DE5.0640
```

The following is sample output from the **show dlsw reachability** command with the **mac-address** argument:

```
Router# show dlsw reachability mac-address 4000.00000306

DLSw MAC address reachability cache list
Mac Addr      status      Loc.      peer/port      rif
4000.0000.0306 FOUND      LOCAL    TokenRing0/0   0CB0.0011.3E71.A041.0DE5.0640
```

The following is sample output from the **show dlsw reachability** command with the **netbios-names** argument:

```
Router# show dlsw reachability netbios-names

DLSw NetBIOS Name reachability cache list
NetBIOS Name  status      Loc.      peer/port      rif
APPNCLT2      FOUND      LOCAL    TokenRing0/0   08B0.A041.0DE5.0640
```

Table 32 describes significant fields shown in the display.

Table 32 Show DLSw Reachability Field Descriptions

Field	Description
Mac Addr	MAC address of station being sought (destination MAC address of canureach_ex packet).
status	Result of search: FOUND SEARCHING: NOT_FOUND: Negative caching is on, and the station has not responded to queries. UNCONFIRMED: Station is configured, but DLSw has not verified it. VERIFY: Verifying cache information because cache is going stale, or the user configuration is being verified.
Loc	Location of station: LOCAL: On the local network REMOTE: On the remote network
peer/port	Peer/Port Number If the loc field lists a REMOTE station, the peer/port field indicates the peer through which the remote station is reachable. If the loc field lists a LOCAL station, the peer/port field indicates the port through which the local station is reachable. For ports, the port number and slot number are given. "Pxxx-Syyy" denotes port xxx slot yyy. If the station is reachable through a bridge group, that is shown by "TBridge-xxx".
rif	Currently this column applies only to LOCAL stations. If the station was reached through some media that does not support RIFs (such as SDLC or Ethernet) then DLSW shows "--no rif--." Otherwise, the actual RIF in the cache is shown.

show dlsw reachability
