

# DLSw+ Configuration Commands

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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.

# clear dlsw circuit

Use the **clear dlsw circuit** privileged EXEC command to cause all DLSw+ circuits to be closed.

**clear dlsw circuit** [*circuit id*]

<b>Syntax Description</b>	<i>circuit-id</i>	Circuit ID for a specific remote circuit. The valid range is 0 to 4294967295.
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<b>Command Modes</b>	Privileged EXEC
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.2F	This command was introduced.

**Usage Guidelines** A user can specify a circuit ID of a specific circuit to clear rather than clearing all circuits.



**Caution**

This command also drops the associated LLC2 session. The command usage should be used with caution and under the advice of a Cisco engineer.

**Examples** The following example closes all DLSw+ circuits:

```
clear dlsw circuit
```

# clear dlsw reachability

Use the **clear dlsw reachability** privileged EXEC command to remove all entries from the DLSw+ reachability cache.

**clear dlsw reachability**

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**Syntax Description** This command has no arguments or keywords.

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**Command Modes** Privileged EXEC

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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.2F	This command was introduced.

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**Usage Guidelines** This command does not affect existing sessions.

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**Examples** The following example removes all entries from the DLSw+ reachability cache:

```
clear dlsw reachability
```

# clear dlsw statistics

Use the **clear dlsw statistics** privileged EXEC command to reset to zero the number of frames that have been processed in the local, remote, and group cache.

**clear dlsw statistics**

---

**Syntax Description** This command has no arguments or keywords.

---

**Command Modes** Privileged EXEC

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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.2F	This command was introduced.

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**Examples** The following example resets to zero the number of frames in the local, remote, and group cache:

```
clear dlsw statistics
```

# 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.

---

**Defaults** Single-route explorer

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**Command Modes** Global configuration

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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.1	This command was introduced.

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**Examples** The following example specifies all-route broadcasts for NetBIOS:

```
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.

---

**Defaults** Single-route explorer

---

**Command Modes** Global configuration

---

Command History	Release	Modification
	11.1	This command was introduced.

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**Examples** The following example specifies all-route broadcasts for SNA:

```
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* **bggroups** *number*

**no dlsw bgroup-list**

Syntax Description		
	<i>list-number</i>	The ring list number. This number is subsequently used in the <b>dlsw remote-peer</b> command to define the segment to which the bridge-group should be applied. The valid range is 1 to 255.
	<i>number</i>	The transparent bridge group list number. The valid range is 1 to 63.

**Defaults** There is no default setting.

**Command Modes** Global configuration

Command History	Release	Modification
	11.0	This command was introduced.

**Usage Guidelines** 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.

**Examples** The following example configures bridge-group list 1:

```
dlsw bgroup-list 1 bggroups 33
```

Related Commands	Command	Description
	<b>dlsw bridge-group</b>	Links DLSw+ to the bridge group of the Ethernet LANs.
	<b>dlsw ring-list</b>	Configures a ring list, mapping traffic on a local interface to remote peers.

## 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 [llc2 [N2 number] [ack-delay-time milliseconds][ack-max
number] [idle-time milliseconds] [local-window number] [t1-time milliseconds] [tbusy-time
milliseconds] [tpf-time milliseconds] [trej-time milliseconds][txq-max number]
[xid-neg-val-time milliseconds] [xid-retry-time milliseconds]][locaddr-priority lu address
priority list number] [sap-priority priority list number]
```

```
no dlsw bridge-group group-number [llc2 [N2 number] [ack-delay-time milliseconds] [ack-max
number] [idle-time milliseconds] [local-window number] [t1-time milliseconds][tbusy-time
milliseconds] [tpf-time milliseconds] [trej-time milliseconds][txq-max number]
[xid-neg-val-time milliseconds] [xid-retry-time milliseconds]][locaddr-priority lu address
priority list number] [sap-priority priority list number]
```

### Syntax Description

<i>group-number</i>	The transparent bridge group to which DLSw+ will be attached. The valid range is 1 to 63.
<b>llc2</b>	(Optional) LLC2 interface subcommands.
<i>N2 number</i>	(Optional) Number of times router should retry various operations. The valid range is 1 to 255.
<b>ack-delay-time</b> <i>milliseconds</i>	(Optional) Max time the router allows incoming I-frames to stay unacknowledged. The valid range is 1 to 60000.
<b>ack-max</b> <i>number</i>	(Optional) Max number of I-frames received before an acknowledgment must be sent. The valid range is 1 to 255.
<b>idle-time</b> <i>milliseconds</i>	(Optional) Frequency of polls during periods of idle traffic. The valid range is 1 to 60000.
<b>local-window</b> <i>number</i>	(Optional) Max number of I-frames to send before waiting for an acknowledgment. The valid range is 1 to 127.
<b>t1-time</b> <i>milliseconds</i>	(Optional) How long router waits for an acknowledgment to transmitted I-frames. The valid range is 1 to 60000.
<b>tbusy-time</b> <i>milliseconds</i>	(Optional) Amount of time router waits while the other LLC2 station is in a busy state before attempting to poll the remote station. The valid range is 1 to 60000.
<b>tpf-time</b> <i>milliseconds</i>	(Optional) Amount of time router waits for a final response to a poll frame before re-sending the original poll frame. The valid range is 1 to 60000.
<b>trej-time</b> <i>milliseconds</i>	(Optional) Amount of time router waits for a resend of a rejected frame before sending the reject command. The valid range is 1 to 60000.
<b>txq-max</b> <i>number</i>	(Optional) Queue for holding llc2 information frames. The valid range is 20 to 200.
<b>xid-neg-val-time</b> <i>milliseconds</i>	(Optional) Frequency of exchange of identification (XID). The valid range is 1 to 60000.
<b>xid-retry-time</b> <i>milliseconds</i>	(Optional) How long router waits for reply to XID. The valid range is 1 to 60000.

<b>locaddr-priority</b> <i>lu address</i> <i>priority list number</i>	(Optional) Assign an input SNA LU Addr priority list to this bridge group. The valid range is 1 to 10.
<b>sap-priority</b> <i>priority list</i> <i>number</i>	(Optional) Assign an input sap priority list to this bridge group. The valid range is 1 to 10.

**Defaults** There is no default setting.

**Command Modes** Global configuration

Release	Modification
11.0	This command was introduced.

**Usage Guidelines** More than one bridge group can be attached to DLSw+ by using this command multiple times. Multiple bridge group support is available in Cisco IOS Release 11.3.

**Examples** The following example links DLSw+ to bridge group 1, 2, and 3:

```
dlsw local-peer peer-id 1.1.1.1
dlsw remote-peer 0 tcp 2.2.2.2
dlsw bridge-group 1
dlsw bridge-group 2
dlsw bridge-group 3

interface Ethernet0
 bridge-group 1

interface Ethernet1
 bridge-group 2

interface Ethernet2
 bridge-group 3

bridge 1 protocol ieee
bridge 2 protocol ieee
bridge 3 protocol ieee
```

Related Commands	Command	Description
	<b>dlsw bgroup-list</b>	Maps traffic on the local Ethernet bridge group interface to remote peers.

# dlsw disable

Use the **dlsw disable** global configuration command to disable DLSw+ without altering the configuration. Use the **no** form of this command to reenables DLSw+.

**dlsw disable**

**no dlsw disable**

---

**Syntax Description** This command has no arguments or keywords.

---

**Defaults** There is no default setting.

---

**Command Modes** Global configuration

---

Command History	Release	Modification
	11.0	This command was introduced.

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**Examples** The following example reenables DLSw+:

```
no dlsw disable
```

# 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 this command to return to the default (fault-tolerance).

**dlsw duplicate-path-bias [load-balance]**

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

<b>Syntax Description</b>	<b>load-balance</b> (Optional) Specifies that sessions are load-balanced across duplicate paths.
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**Defaults** Fault-tolerance is the default logic used to handle duplicate paths.

**Command Modes** Global configuration

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.0	This command was introduced.

**Usage Guidelines** 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.

**Examples** The following example specifies load balancing to resolve duplicate paths:

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

# dlsw group-cache disable

Use the **dlsw group cache disable global** configuration command to disable the border peer caching feature. Use the **no** form of this command to return to the default peer caching feature.

**dlsw group-cache disable**

**no dlsw group-cache disable**

---

**Syntax Description** This command has no arguments or keywords.

---

**Defaults** Border peer caching is enabled.

---

**Command Modes** Global configuration

---

Command History	Release	Modification
	11.2F	This command was introduced.

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**Usage Guidelines** If a border peer becomes a nonborder peer, then the group cache is automatically deleted. This command prevents a border peer from learning reachability information from relay responses. This command also prevents a border peer from using local or remote caches to make forwarding decisions.

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**Examples** The following example disables the group cache:

```
dlsw group-cache disable
```

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Related Commands	Command	Description
	<b>dlsw group-cache max-entries</b>	Limits the number of entries in the group cache.

---

# dls w group-cache max-entries

Use the **dls w group-cache max entries** global configuration command to limit the number of entries in the group cache. Use the **no** form of this command to return to the default.

**dls w group-cache max-entries** *number*

**no dls w group-cache max entries**

<b>Syntax Description</b>	<i>number</i>	Maximum number of entries allowed in the group cache. The valid range is 0 through 12000. If the value is set to 0, then there is no limit to the number of entries. The default is 2000.
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<b>Defaults</b>	The default setting is 2000.
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<b>Command Modes</b>	Global configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.2F	This command was introduced.

<b>Usage Guidelines</b>	Once the number of entries has reached the maximum number specified, if a new entry needs to be added an entry will be removed to make room. The value set for <i>number</i> applies to both the NetBIOS and SNA group cache.
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<b>Examples</b>	The following configuration defines the maximum number of entries allowed in the NetBIOS or SNA group cache as 1800:  dls w group-cache max-entries 1800
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<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	dls w group-cache disable	Disables the border peer caching feature.

# 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...]
```

<b>Syntax Description</b>	<i>sap</i> [sap...]                      One or more SAPs.
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<b>Defaults</b>	No lists are configured.
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<b>Command Modes</b>	Global configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.3	This command was introduced.

<b>Usage Guidelines</b>	<p>The <b>dlsw icannotreach saps</b> 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.</p>
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<b>Examples</b>	<p>The following example specifies that NetBIOS traffic will be denied:</p> <pre>dlsw icannotreach saps F0</pre>
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# dls w icanreach

Use the **dls w 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.

**dls w icanreach** { **mac-exclusive** | **netbios-exclusive** [**remote**] | **mac-address** *mac-addr* [**mask** *mask*] | **netbios-name** *name* | **saps** }

**no dls w icanreach** { **mac-exclusive** | **netbios-exclusive** [**remote**] | **mac-address** *mac-addr* [**mask** *mask*] | **netbios-name** *name* | **saps** }

Syntax Description		
<b>mac-exclusive</b>		Router can reach only the MAC addresses that are user configured.
<b>netbios-exclusive</b>		Router can reach only the NetBIOS names that are user configured.
<b>remote</b>		Gives the NetBIOS workstations (that are local to the router and that are not already defined in the <b>dls w icanreach netbios-name name</b> statement) access to remote servers.
<b>mac-address</b> <i>mac-addr</i>		Configures a MAC address that this router can locally reach.
<b>mask</b> <i>mask</i>		(Optional) MAC address mask in hexadecimal <i>h.h.h</i> . The “f” value represents the “care” bit and the “0” value represents the “don’t care” bit. The mask indicates which bits in the MAC address are relevant.
<b>netbios-name</b> <i>name</i>		Configures a NetBIOS name that this router can locally reach. Wildcards (*) are allowed at the end of the name. Trailing white spaces are ignored when comparing against an actual name in a NetBIOS frame.
<b>saps</b>		(Optional) Array of SAPs.

**Defaults** No resources are configured.

**Command Modes** Global configuration

Command History	Release	Modification
	11.0	This command was introduced.

**Usage Guidelines** 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.

Configuring the **remote** keyword allows roving workstations to access remote servers. With the **remote** keyword specified, all local NetBIOS stations will be able to make outgoing connections regardless of whether their own NetBIOS name is configured in the **icanreach netbios-name** list. Incoming connections will be limited to those with a destination name that is specified in the list.

In the default case (where the remote keyword is not specified), a local Netbios station that is not configured in the **icanreach netbios-name** list will not be able to make a connection in this router over DLSw+, whether incoming or outgoing.

**Note**


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Because the configuration of the **mac-address** and **netbios-name** keywords prevents the DLSw+ peer from exploring, a misconfiguration could prevent DLSw+ from being able to find a resource actually available elsewhere in the network.

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**Examples**

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. Because the **remote** option is also configured, NetBIOS workstations that are connected to the NetBIOS server “lanserv” will be able to establish a DLSw+ connection:

```
dls w icanreach netbios-exclusive
dls w icanreach netbios-name lanserv
```

**Related Commands**

Command	Description
<b>show dls w capabilities</b>	Displays the configuration of a specific peer or all peers.

# dlsw llc2 nornr

Use the **dlsw llc2 nornr** global configuration command to prevent the receiver not ready (RNR) message from being sent while establishing an LLC2 connection. Use the **no** form of this command to return to the default.

**dlsw llc2 nornr**

**no dlsw llc2 nornr**

## Defaults

The command is disabled by default.

## Command Modes

Global configuration

## Command History

Release	Modification
11.0	This command was introduced.

## Usage Guidelines

This command is used when any device does not handle the LLC2 RNR frames.

## Examples

The following example keeps the receiver not ready message from being sent when establishing an LLC2 connection.

```
dlsw llc2 nornr
```

The following is output from a Sniffer trace showing when it would be appropriate to use the **dlsw llc2 nornr** command because the RNR message is being rejected from the FEP when the router is trying to establish an LLC2 connection

```
SUMMARY Delta T      From 400020401003                From 400023491026
8      0.173
9      0.003  LLC R D=04 S=00 TEST F          LLC C D=00 S=04 TEST P
10     0.002
11     0.059  SNA XID Fmt 2 T4                      SNA XID Fmt 2 T4
12     0.004
13     0.065  SNA XID Fmt 2 T4                      SNA XID Fmt 2 T4
14     0.005
16     0.054  LLC C D=04 S=04 SABME P                SNA XID Fmt 2 T4
17     0.003
                                           LLC R D=04 S=04 UA
```

The router sends a receiver not ready message.

```
18     0.001  LLC C D=04 S=04 RNR NR=0
```

From frames 19 to 35, the FEP does not respond.

```
19     0.002  LLC C D=04 S=04 RR NR=0
20     0.048  SNA C NC NC-ER-OP
21     0.997  LLC C D=04 S=04 RR NR=0 P
22     1.000  LLC C D=04 S=04 RR NR=0 P
24     1.000  LLC C D=04 S=04 RR NR=0 P
```

```

25 1.000 LLC C D=04 S=04 RR NR=0 P
31 1.000 LLC C D=04 S=04 RR NR=0 P
32 1.000 LLC C D=04 S=04 RR NR=0 P
34 1.000 LLC C D=04 S=04 RR NR=0 P
35 1.000 LLC C D=04 S=04 RR NR=0 P

```

The router disconnects the circuit.

```

37 1.000 LLC C D=04 S=04 DISC P
38 0.002 LLC R D=04 S=04 UA F

```

The sequence repeats.

```

39 0.179 LLC C D=00 S=04 TEST P
41 0.767 SNA XID Fmt 2 T4
42 0.634 SNA XID Fmt 2 T4
43 0.173 LLC C D=00 S=04 TEST
44 0.003 LLC R D=04 S=00 TEST F
45 0.002 SNA XID Fmt 2 T4
46 0.060 SNA XID Fmt 2 T4
47 0.004 SNA XID Fmt 2 T4
48 0.063 SNA XID Fmt 2 T4
49 0.005 SNA XID Fmt 2 T4

```

## 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] [init-pacing-window size]
[max-pacing-window size]
```

```
no dlsw local-peer [peer-id ip-address] [group group] [border] [cost cost][If size] [keepalive
seconds] [passive] [promiscuous] [biu-segment][init-pacing-window size]
[max-pacing-window size]
```

Syntax Description	
<b>peer-id</b> <i>ip-address</i>	(Optional) Local peer IP address; required for Fast-Sequenced Transport (FST) and TCP.
<b>group</b> <i>group</i>	(Optional) Peer group number for this router. The valid range is 1 to 255.
<b>border</b>	(Optional) Enables as a border peer. Group option must be specified in order to use the border peer option.
<b>cost</b> <i>cost</i>	(Optional) Peer cost advertised to remote peers in the capabilities exchange. The valid range is 1 to 5.
<b>If</b> <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
<b>keepalive</b> <i>seconds</i>	(Optional) Default remote peer keepalive interval in seconds. The valid range is 0 to 1200 seconds. The default is 30 seconds. The value 0 means no keepalives.
<b>passive</b>	(Optional) Specifies that this router will not initiate remote peer connections to configured peers.
<b>promiscuous</b>	(Optional) Accepts connections from nonconfigured remote peers.
<b>biu-segment</b>	(Optional) Causes DLSw+ to spoof the maximum receivable I-frame size in XID so that each end station sends the largest frame it can.
<b>init-pacing-window</b> <i>size</i>	(Optional) Size of the initial pacing window, as defined in RFC 1795. The valid range is 1-2000.
<b>max-pacing-window</b> <i>size</i>	(Optional) Maximum size of the pacing window, as defined in RFC 1795. The valid range is 1-2000.

## ■ dlsw local-peer

**Defaults** No parameters are defined.

**Command Modes** Global configuration

Command History	Release	Modification
	10.3	This command was introduced.

**Usage Guidelines** 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.

**Examples** 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	Command	Description
	<b>dlsw duplicate-path-bias</b>	Specifies how DLSw+ handles duplicate paths to the same MAC address or NetBIOS name.
	<b>show dlsw capabilities</b>	Displays the configuration of a specific peer or all 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 ring -number | remote-peer {interface serial number |  
ip-address ip-address } | rif rif-string | group group }
```

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

Syntax Description		
<i>mac-addr</i>		Specifies the MAC address.
<b>ring</b> <i>ring-number</i>		Maps the MAC address to a ring number or ring group number. The valid range is 1 to 4095.
<b>remote-peer</b>		Maps the MAC address to a specific remote peer.
<b>interface serial</b> <i>number</i>		Specifies the remote peer by direct serial interface.
<b>ip-address</b> <i>ip-address</i>		Specifies the remote peer by IP address.
<b>rif</b> <i>rif-string</i>		Maps the MAC address to a local interface using a RIF string. The RIF string describes a source-routed path from the router to the MAC address. It starts at the router's ring-group and ends on the ring where the MAC address is located. The direction should be from the router toward the MAC address. See IEEE 802.5 standard for details.
<b>group</b> <i>group</i>		Maps the MAC address to a specified peer group. Valid numbers are in the range 1 to 255.

**Defaults** No static MAC address is configured.

**Command Modes** Global configuration

Command History	Release	Modification
	11.0	This command was introduced.

**Usage Guidelines** 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.



**Note**

Because the configuration of this command prevents the DLSw+ peer from exploring, a misconfiguration could prevent DLSw+ from being able to find a resource actually available elsewhere in the network.

**dls w mac-addr****Examples**

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

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

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>show dls w reachability</b>	Displays DLSw+ reachability information.

# dlsw max-multiple-rifs

Use the **dlsw max-multiple-rifs global** configuration command to enable caching of multiple RIFs per interface. Use the **no** form of this command to turn off the feature.

**dlsw max-multiple-rifs** *multiple-rifs-per-port*

**no dlsw max-multiple-rifs** *multiple-rifs-per-port*

<b>Syntax Description</b>	<i>multiple-rifs-per-port</i>	Number of multiple RIF entries per interface. The valid range is 1 to 4.
---------------------------	-------------------------------	--

<b>Defaults</b>	The default value is 1.
-----------------	-------------------------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.3	This command was introduced.

<b>Usage Guidelines</b>	<p>A MAC address or NetBIOS name can have several RIF entries. Prior to this command, DLSw+ could cache only one of these RIF entries per local Token Ring port. With the <b>dlsw max-multiple-rifs</b> command configured, however, DLSw+ can cache multiple RIF entries (up to 4) for a specific MAC address or NetBIOS name on one Token Ring port.</p>
-------------------------	--

If the value 1 is specified, multiple RIF caching is not enabled.

<b>Examples</b>	The following example enables the router to cache up to 2 RIFs per interface:
-----------------	---

```
dlsw max-multiple-rifs 2
```

# dlsw multicast

To enable a DLSw router to participate in a multicast group, use the **dlsw multicast** command in global configuration mode. To remove the router from the multicast group, use the **no** form of this command.

**dlsw multicast** [*multicast-ip-address*]

**no dlsw multicast** [*multicast-ip-address*]

<b>Syntax Description</b>	<i>multicast-ip-address</i>	(Optional) The IP address used by the multicast group. The default is 224.0.10.0.
---------------------------	-----------------------------	---

<b>Defaults</b>	Disabled
-----------------	----------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.0	This command was introduced.

**Usage Guidelines**

In order for routers to be able to receive multicast traffic through DLSw, they must be properly configured to receive multicasts. The appropriate multicast configuration will depend on the specific topologies used.

The **dlsw multicast** command is implemented together with the DLSw version 2 support (RFC2166). It allows anybody-to-anybody communication without configuring a full mesh of the DLSw peers.

**Examples**

The following example configures a router to be part of the multicast group using 224.0.11.0 as the multicast address:

```
dlsw local-peer peer-id 172.18.62.11 promiscuous
dlsw multicast 224.0.11.0
```

# dlsw netbios-keepalive-filter

Use the **dlsw netbios-keepalive-filter global** configuration command to enable the NetBIOS dial-on-demand routing (DDR) feature. Use the **no** form of this command to turn off the feature.

**dlsw netbios-keepalive-filter**

**no dlsw netbios-keepalive-filter**

---

**Syntax Description** This command has no arguments or keywords.

---

**Defaults** Disabled

---

**Command Modes** Global configuration

---

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.2 F	This command was introduced.

---

---

**Usage Guidelines** See the “Bridging and IBM Networking Overview” chapter of the *Bridging and IBM Networking Configuration Guide* for more details on the NetBIOS DDR feature.

---

**Examples** The following example enables NetBIOS DDR:

```
dlsw netbios-keepalive-filter
```

# 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 ring-number | remote-peer {interface serial number | ip-address ip-address} | rif rif-string | group group}
```

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

Syntax Description		
<i>netbios-name</i>		Specifies the NetBIOS name. Wildcards are allowed.
<b>ring</b> <i>ring number</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.
<b>remote-peer</b>		Maps the NetBIOS name to a specific remote peer.
<b>interface serial</b> <i>number</i>		Specifies the remote peer by direct interface.
<b>ip-address</b> <i>ip-address</i>		Specifies the remote peer by IP address.
<b>rif</b> <i>rif-string</i>		Maps the MAC address to a local interface using a RIF string. The RIF string describes a source-routed path from the router to the MAC address. It starts at the router's ring-group and ends on the ring where the MAC address is located. The direction should be from the router towards the MAC address. See IEEE 802.5 standard for details
<b>group</b> <i>group</i>		Maps the NetBIOS name to a specified peer group. Valid numbers are in the range 1 to 255.

**Defaults** No static NetBIOS name is configured.

**Command Modes** Global configuration

Command History	Release	Modification
	11.0	This command was introduced.

**Usage Guidelines** Because the configuration of this command prevents the DLSw+ peer from exploring, a misconfiguration could prevent DLSw+ from being able to find a resource actually available elsewhere in the network.

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

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

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>show dlsw reachability</b>	Displays DLSw+ reachability information.

# dls w peer-on-demand-defaults

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

**dls w peer-on-demand-defaults** [**fst**] [**bytes-netbios-out** *bytes-list-name*] [**cost** *cost*][**dest-mac** *destination-mac-address*] [**dmac-output-list** *access-list-number*] [**host-netbios-out** *host-list-name*] [**inactivity** *minutes*] [**keepalive** *seconds*] [**if** *size*] [**lsap-output-list** *list*] [**port-list** *port-list-number*] [**priority**] [**tcp-queue-max**]

**no dls w peer-on-demand-defaults** [**fst**] [**bytes-netbios-out** *bytes-list-name*] [**cost** *cost*] [**dest-mac** *destination-mac-address*] [**dmac-output-list** *access-list-number*] [**host-netbios-out** *host-list-name*] [**inactivity** *minutes*] [**keepalive** *seconds*] [**if** *size*] [**lsap-output-list** *list*] [**port-list** *port-list-number*] [**priority**] [**tcp-queue-max**]

## Syntax Description

<b>fst</b>	(Optional) Use FST encapsulation for all peers-on-demand being established by this router.
<b>bytes-netbios-out</b> <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.
<b>cost</b> <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.
<b>dest-mac</b> <i>destination-mac-address</i>	(Optional) Specifies the exclusive destination MAC address for peer-on-demand peers.
<b>dmac-output-list</b> <i>access-list-number</i>	(Optional) Specifies the filter output destination MAC addresses.
<b>host-netbios-out</b> <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.
<b>inactivity</b> <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 valid range is 0 to 1440 seconds. The default is 10 minutes.
<b>keepalive</b> <i>seconds</i>	(Optional) Configures the peer-on-demand keepalive interval. The valid range is 0 to 1200 seconds. The default is 30 seconds.
<b>if</b> <i>size</i>	(Optional) Largest frame size for this remote peer. Valid maximum frame sizes are the following: <ul style="list-style-type: none"> <li>• 516-516 bytes</li> <li>• 1470-1470 bytes</li> <li>• 1500-1500 bytes</li> <li>• 2052-2052 bytes</li> <li>• 4472-4472 bytes</li> <li>• 8144-8144 bytes</li> <li>• 11407-11407 bytes</li> <li>• 11454-11454 bytes</li> <li>• 17800-17800 bytes</li> </ul>

<b>lsap-output-list</b> <i>list</i>	(Optional) Configures local service access point (LSAP) output filtering for peer-on-demand peers. Valid numbers are in the range 200 to 299.
<b>port-list</b> <i>port-list-number</i>	(Optional) Configures a port list for peer-on-demand peers. Valid numbers are in the range 0 to 4095.
<b>priority</b>	(Optional) Configures prioritization for peer-on-demand peers. The default state is off.
<b>tcp-queue-max</b>	(Optional) Configures the maximum output TCP queue size for peer-on-demand peers.

**Defaults**

The default peer-on-demand transport is TCP.

**Command Modes**

Global configuration

**Command History**

Release	Modification
11.0	This command was introduced.

**Usage Guidelines**

A peer-on-demand peer is a non-configured remote-peer that was connected because of an LLC2 session established through a Border Peer DLSw+ network.

**Examples**

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

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

**Related Commands**

Command	Description
<b>show dlsw peers</b>	Displays DLSw peer information.

## dlsw port-list

Use the **dlsw port-list** global configuration command to map traffic on a local interface (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.

### Defaults

No port list is configured.

### Command Modes

Global configuration

### Command History

Release	Modification
11.0	This command was introduced.

### Usage Guidelines

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.

### Examples

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

```
dlsw port-list 3 token ring 1
```

### Related Commands

Command	Description
<b>dlsw bgroup-list</b>	Maps traffic on the local Ethernet bridge group interface to remote peers.
<b>dlsw ring-list</b>	Configures a ring list, mapping traffic on a local interface to remote peers.

# dls w prom-peer-defaults

Use the **dls w prom-peer-defaults** global configuration command to configure defaults for promiscuous transport. Use the **no** form of this command to disable the previous assignment.

**dls w prom-peer-defaults** [**fst**] [**bytes-netbios-out** *bytes-list-name*] [**cost** *cost*] [**dest-mac** *destination-mac-address*] [**dmac-output-list** *access-list-number*] [**host-netbios-out** *host-list-name*] [**keepalive** *seconds*] [**lf** *size*] [**lsap-output-list** *list*] [**tcp-queue-max** *size*]

**no dls w prom-peer-defaults** [**fst**] [**bytes-netbios-out** *bytes-list-name*] [**cost** *cost*] [**dest-mac** *destination-mac-address*] [**dmac-output-list** *access-list-number*] [**host-netbios-out** *host-list-name*] [**keepalive** *seconds*] [**lf** *size*] [**lsap-output-list** *list*] [**tcp-queue-max** *size*]

Syntax Description	
<b>bytes-netbios-out</b> <i>bytes-list-name</i>	(Optional) Configures NetBIOS bytes output filtering for promiscuous peers. The <i>bytes-list-name</i> is the name of the previously defined NetBIOS bytes access list filter.
<b>cost</b> <i>cost</i>	(Optional) Specifies the cost to reach promiscuous peers. The valid range is 1 to 5. The default cost is 3.
<b>dest-mac</b> <i>destination-mac-address</i>	(Optional) Specifies the exclusive destination MAC address for promiscuous peers.
<b>dmac-output-list</b> <i>access-list-number</i>	(Optional) Specifies the filter output destination MAC addresses.
<b>fst</b>	(Optional) Use FST encapsulation for all prom peers being established by this router.
<b>host-netbios-out</b> <i>host-list-name</i>	(Optional) Configures NetBIOS host output filtering for promiscuous peers. The <i>host-list-name</i> is the name of the previously defined NetBIOS host access list filter.
<b>keepalive</b> <i>seconds</i>	(Optional) Configures the promiscuous keepalive interval. The valid range is 0 to 1200 seconds. The default is 30 seconds.
<b>lf</b> <i>size</i>	(Optional) Largest frame size for this promiscuous peer. Valid maximum frame sizes are the following: <ul style="list-style-type: none"> <li>• 516-516 bytes</li> <li>• 1470-1470 bytes</li> <li>• 1500-1500 bytes</li> <li>• 2052-2052 bytes</li> <li>• 4472-4472 bytes</li> <li>• 8144-8144 bytes</li> <li>• 11407-11407 bytes</li> <li>• 11454-11454 bytes</li> <li>• 17800-17800 bytes</li> </ul>

<b>lsap-output-list</b> <i>list</i>	(Optional) Configures LSAP output filtering for promiscuous peers. Valid numbers are in the range 200 to 299.
<b>tcp-queue-max</b> <i>size</i>	(Optional) Configures the maximum output TCP queue size for promiscuous peers.

**Defaults**

The default prom-peer transport is TCP.

**Command Modes**

Global configuration

**Command History**

Release	Modification
11.0	This command was introduced.

**Usage Guidelines-**

A prom-peer is a peer not configured as a remote-peer on this DLSw+ device, but which initiated a peer connection which was accepted because promiscuous peering was enabled.

**Examples**

The following example configures cost for promiscuous peers:

```
dlsw prom-peer-defaults cost 4
```

**Related Commands**

Command	Description
<b>show dlsw capabilities</b>	Displays the configuration of a specific peer or all peers.

# 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* | **frame-relay interface serial** *number* *dlsi-number* | **interface** *name*]] [**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*] [**passive**] **pass-thru**

**no dlsw remote-peer** *list-number* **frame-relay interface serial** *number* *dlsi-number* [**backup-peer** [*ip-address* | **frame-relay interface serial** *number* *dlsi-number* | **interface** *name*]] [**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*] [**passive**] **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.
<b>interface serial</b> <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.
<b>backup-peer</b> <i>ip-address</i>	(Optional) IP address of the existing TCP/FST peer for which this peer is the backup peer.
<b>backup-peer frame-relay interface serial</b> <i>number</i> <i>dlsi-number</i>	(Optional) Serial interface and DLCI number of the existing Direct /LLC2 frame-relay peer for which this peer is the backup peer.
<b>backup-peer interface</b> <i>name</i>	(Optional) Interface name of the existing direct peer for which this peer is the backup peer.
<b>bytes-netbios-out</b> <i>bytes-list-name</i>	(Optional) Configures NetBIOS bytes output filtering for this peer. The <i>bytes-list-name</i> argument is the name of the previously defined NetBIOS bytes access list filter.
<b>cost</b> <i>cost</i>	(Optional) Cost to reach this remote peer. The valid range is 1 to 5.
<b>dest-mac</b> <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.
<b>dmac-output-list</b> <i>access-list-number</i>	(Optional) Permits the connection to be established only when the explorer frame passes the specified access list. The <i>access-list-number</i> is the list number specified in the <b>access-list</b> command.
<b>host-netbios-out</b> <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.
<b>keepalive</b> <i>seconds</i>	(Optional) Sets the keepalive interval for this remote peer. The range is 0 to 1200 seconds.

<b>if size</b>	(Optional) Largest frame size, in bytes, this local peer will use on a circuit to avoid segmented frames. Valid sizes are 516, 1470, 1500, 2052, 4472, 8144, 11407, 11454, and 17800 bytes.
<b>linger minutes</b>	(Optional) Configures length of time the backup peer remains connected after the primary peer connection is reestablished. The valid range is 1 to 300 minutes. The default is 5 minutes.
<b>lsap-output-list list</b>	(Optional) Filters output IEEE 802.5 encapsulated packets. Valid access list numbers are in the range 200 to 299.
<b>passive</b>	(Optional) Designates this remote peer as passive.
<b>pass-thru</b>	Selects passthrough mode. The default is local acknowledgment mode.

**Defaults**

No remote peers are specified.

**Command Modes**

Global configuration

**Command History**

Release	Modification
11.0	This command was introduced.
11.2	These keywords and arguments were added: <ul style="list-style-type: none"> <li>• <b>dest-mac</b> <i>mac-address</i></li> <li>• <b>dmac-output-list</b> <i>access-list-number</i></li> <li>• <b>linger</b> <i>minutes</i>.</li> </ul>

**Usage Guidelines**

The following keywords and arguments first appeared in Cisco IOS Release 11.2: 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.

When **pass-thru** is not specified, traffic will be locally acknowledged and reliably transported in LLC2 across the WAN.

**Examples**

The following example specifies a DLSw+ Lite peer as a backup to a primary direct peer:

```
dlsw remote-peer 0 frame-relay interface serial 1 40 pass-thru
dlsw remote-peer 0 frame-relay interface serial 0 30 backup-peer frame-relay interface
serial 1 40
```

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

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

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>show dlsw peers</b>	Displays DLSw peer information.

## 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 FST assignments.

```
dlsw remote-peer list-number fst ip-address [backup-peer [ip-address | frame-relay interface
serial number dcli-number | interface name]] [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][passive]
```

```
no dlsw remote-peer list-number fst ip-address [backup-peer [ip-address | frame-relay interface
serial number dcli-number | interface name]] [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] [passive]
```

### 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.
<b>backup-peer</b> <i>ip-address</i>	(Optional) IP address of the existing TCP/FST peer for which this peer is the backup peer.
<b>backup-peer</b> <b>frame-relay-interface</b> <i>serial</i> <i>number</i> <i>dcli-number</i>	(Optional) Serial interface and DLCI number of the existing Direct /LLC2 frame-relay peer for which this peer is the backup peer.
<b>backup-peer</b> <i>interface</i> <i>name</i>	(Optional) Interface name of the existing direct peer for which this peer is the backup peer.
<b>bytes-netbios-out</b> <i>bytes-list-name</i>	(Optional) Configures NetBIOS bytes output filtering for this peer. The <i>bytes-list-name</i> argument is the name of the previously defined NetBIOS bytes access list filter.
<b>cost</b> <i>cost</i>	(Optional) Cost to reach this remote peer. The valid range is 1 to 5.
<b>dest-mac</b> <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.
<b>dmac-output-list</b> <i>access-list-number</i>	(Optional) Permits the connection to be established only when the explorer frame passes the specified access list. The <i>access-list-number</i> is the list number specified in the <b>access-list</b> command.
<b>host-netbios-out</b> <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.
<b>keepalive</b> <i>seconds</i>	(Optional) Sets the keepalive interval for this remote peer. The range is 0 to 1200 seconds.

<b>if size</b>	(Optional) Largest frame size this local peer will use on a circuit to avoid segmented frames. Valid sizes are 516, 1470, 1500, 2052, 4472, 8144, 11407, 11454, and 17800 bytes.
<b>linger minutes</b>	(Optional) Configures length of time the backup peer remains connected after the primary peer connection is reestablished. The valid range is 1 to 300 minutes. The default is 5 minutes.
<b>lsap-output-list list</b>	(Optional) Filters output IEEE 802.5 encapsulated packets. Valid access list numbers are in the range 200 to 299.
<b>passive</b>	(Optional) Designates this remote peer as passive.

**Defaults**

No FST encapsulation connection is specified.

**Command Modes**

Global configuration

**Command History**

Release	Modification
10.3	This command was introduced.
11.2	These keywords and arguments were added: <ul style="list-style-type: none"> <li>• <b>dest-mac</b> <i>mac-address</i></li> <li>• <b>dmac-output-list</b> <i>access-list-number</i></li> <li>• <b>linger minutes</b></li> </ul>

**Usage Guidelines**

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 a single MAC address, the **dest-mac** option is a shortcut over the **dmac-output-list** option.

**Examples**

The following example specifies an FST peer as backup to a primary TCP peer:

```
dlsw remote-peer 0 tcp 10.2.18.1
dlsw remote-peer 1 fst 10.2.17.8 backup-peer 10.2.18.1
```

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

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

**Related Commands**

Command	Description
<b>show dlsw peers</b>	Displays DLSw peer information.

## 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* | **frame-relay interface serial** *number dcli-number* | **interface name**]] [**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*] [**passive**] [**pass-thru**]

**no dlsw remote-peer** *list-number* **interface** *serial number* [**backup-peer** [*ip-address* | **frame-relay interface serial** *number dcli-number* | **interface name**]] [**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*] [**passive**] [**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.
<b>serial</b> <i>number</i>	Specifies the remote peer by direct serial interface.
<b>backup-peer</b> <i>ip-address</i>	(Optional) IP address of the existing TCP/FST peer for which this peer is the backup peer.
<b>backup-peer frame-relay interface</b> <i>serial number dcli-number</i>	(Optional) Serial interface and DLCI number of the existing Direct /LLC2 frame-relay peer for which this peer is the backup peer.
<b>backup-peer interface</b> <i>name</i>	(Optional) Interface name of the existing direct peer for which this peer is the backup peer.
<b>bytes-netbios-out</b> <i>bytes-list-name</i>	(Optional) Configures NetBIOS bytes output filtering for this peer. The <i>bytes-list-name</i> argument is the name of the previously defined NetBIOS bytes access list filter.
<b>cost</b> <i>cost</i>	(Optional) Cost to reach this remote peer. The valid range is 1 to 5.
<b>dest-mac</b> <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.
<b>dmac-output-list</b> <i>access-list-number</i>	(Optional) Permits the connection to be established only when the explorer frame passes the specified access list. The <i>access-list-number</i> is the list number specified in the <b>access-list</b> command.
<b>host-netbios-out</b> <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.
<b>keepalive</b> <i>seconds</i>	(Optional) Sets the keepalive interval for this remote peer. The range is 0 to 1200 seconds.

<b>if size</b>	(Optional) Largest frame size, in bytes, this local peer will use on a circuit to avoid segmented frames. Valid sizes are 516, 1470, 1500, 2052, 4472, 8144, 11407, 11454, and 17800 bytes.
<b>linger minutes</b>	(Optional) Configures length of time the backup peer remains connected after the primary peer connection is reestablished. The valid range is 1 to 300 minutes. The default is 5 minutes.
<b>lsap-output-list list</b>	(Optional) Filters output IEEE 802.5 encapsulated packets. Valid access list numbers are in the range 200 to 299.
<b>passive</b>	(Optional) Designates this remote peer as passive.
<b>pass-thru</b>	(Optional) Selects passthrough mode. The default is local acknowledgment mode.

**Defaults**

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

**Command Modes**

Global configuration

**Command History**

Release	Modification
10.3	This command was introduced.
11.2	These keywords and arguments were added: <ul style="list-style-type: none"> <li>• <b>dest-mac</b> <i>mac-address</i></li> <li>• <b>dmac-output-list</b> <i>access-list-number</i></li> <li>• <b>linger</b> <i>minutes</i></li> </ul>

**Usage Guidelines**

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 a single MAC address only, the **dest-mac** option is a shortcut over the **dmac-output-list** option.

**Examples**

The following example specifies a point-to-point direct peer backup to a primary direct peer:

```
dlsw remote-peer 0 interface serial 1 pass-thru
dlsw remote-peer 1 interface serial 2 pass-thru backup-peer interface serial 1
```

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

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

## ■ dlsw remote-peer interface

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>show dlsw peers</b>	Displays DLSw peer information.

# 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* | **frame-relay interface serial** *number* *dcli-number* | **interface** *name*]] [**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*] [**dynamic**] [**keepalive** *seconds*] [**lfr** *size*] [**linger** *minutes*] [**lsap-output-list** *list*] [**no-llc** *minutes*] [**passive**] [**priority**] [**rif-passthru** *virtual-ring-number*] [**tcp-queue-max** *size*] [**timeout** *seconds*]

**no dlsw remote-peer** *list-number* **tcp** *ip-address* [**backup-peer** [*ip-address* | **frame-relay interface serial** *number* *dcli-number* | **interface** *name*]] [**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*] [**dynamic**] [**keepalive** *seconds*] [**lfr** *size*] [**linger** *minutes*] [**lsap-output-list** *list*] [**no-llc** *minutes*] [**passive**] [**priority**] [**rif-passthru** *virtual-ring-number*] [**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 <b>dlsw ring-list</b> , <b>dlsw port-list</b> or <b>dlsw bgroup-list</b> command.
<b>tcp</b> <i>ip-address</i>	IP address of the remote peer with which the router is to communicate.
<b>backup-peer</b> <i>ip-address</i>	(Optional) IP address of the existing TCP/FST peer for which this peer is the backup peer.
<b>backup-peer frame-relay interface serial</b> <i>number</i> <i>dcli-number</i>	(Optional) Serial interface and DLCI number of the existing Direct /LLC2 frame-relay peer for which this peer is the backup peer.
<b>backup-peer</b> <i>interface name</i>	(Optional) Interface name of the existing direct peer for which this peer is the backup peer.
<b>bytes-netbios-out</b> <i>bytes-list-name</i>	(Optional) Configures NetBIOS bytes output filtering for this peer. The <i>bytes-list-name</i> argument is the name of the previously defined NetBIOS bytes access list filter.
<b>cost</b> <i>cost</i>	(Optional) The cost to reach this remote peer. The valid range is 1 to 5.
<b>dest-mac</b> <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.
<b>dmac-output-list</b> <i>access-list-number</i>	(Optional) Permits the TCP connection to be established only when the explorer frame passes the specified access list. The <i>access-list-number</i> is the list number specified in an <b>access-list</b> command.
<b>dynamic</b>	(Optional) Permits the TCP connection to be established only when there is DLSw+ data to send.

<b>host-netbios-out</b> <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.
<b>inactivity</b> <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.
<b>keepalive</b> <i>seconds</i>	Sets the keepalive interval for this remote peer. The range is 0 to 1200 seconds.
<b>if</b> <i>size</i>	(Optional) Largest frame size, in bytes, this local peer will use on a circuit to avoid segmented frames. Valid sizes are 516, 1470, 1500, 2052, 4472, 8144, 11407, 11454, and 17800 bytes.
<b>linger</b> <i>minutes</i>	(Optional) Configures length of time the backup peer remains connected after the primary peer connection is reestablished. The valid range is 0 to 1440 minutes.
<b>lsap-output-list</b> <i>list</i>	(Optional) Filters output IEEE 802.5 encapsulated packets. Valid access list numbers are in the range 200 to 299.
<b>no-llc</b> <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.
<b>passive</b>	(Optional) Designates this remote peer as passive.
<b>priority</b>	(Optional) Enables prioritization features for this remote peer. Valid TCP port numbers are the following: <ul style="list-style-type: none"> <li>• High: 2065</li> <li>• Medium: 1981</li> <li>• Normal: 1982</li> <li>• Low: 1983</li> </ul>
<b>rif-passthru</b> <i>virtual-ring-number</i>	(Optional) Configures the remote peer as RIF-passthru. The <i>virtual-ring-number</i> value is the same number as the <i>ring number</i> value assigned in the <b>source-bridge ring-group</b> commands of the DLSw+ Passthru peers.
<b>tcp-queue-max</b> <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.
<b>timeout</b> <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 **dynamic** option is not on by default. If the dynamic option is added without either the **inactivity** or **no-llc** argument specified, the default is to terminate the TCP connection to the remote peer after 5 minutes of no active LLC2 connection.

**Command Modes** Global configuration

Command History	Release	Modification
	10.3	This command was introduced.
	11.1	These keywords and arguments were added: <ul style="list-style-type: none"> <li>• <b>dynamic</b></li> <li>• <b>inactivity</b> <i>minutes</i></li> <li>• <b>linger</b> <i>minutes</i></li> <li>• <b>no-llc</b> <i>minutes</i></li> <li>• <b>timeout</b> <i>seconds</i></li> </ul>
	11.2	These keywords and arguments were added: <ul style="list-style-type: none"> <li>• <b>dest-mac</b> <i>mac-address</i></li> <li>• <b>dmac-output-list</b> <i>access-list-number</i></li> <li>• <b>linger</b> <i>minutes</i></li> </ul>

### Usage Guidelines

SNA 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. When the **dynamic** option is configured, the **keepalive** option is automatically set to 0.

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 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 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 reestablished. Setting the **linger** option to 0 causes sessions connected to the backup peer to drop immediately when the primary peer recovers. If the **linger** option is omitted, all sessions connected to the backup peer remain active until they terminate on their own.

When the **priority** option on the **dlsw remote-peer** command is configured, DLSw+ automatically activates four TCP ports to that remote peer (ports 2065, 1981, 1982 and 1983) and assigns traffic to specific ports. Furthermore, if APPN is running with DLSw+ and you specify the **priority** option on the **dlsw remote-peer** command, then the SNA TOS will map APPN class of service (COS) to TCP TOS and will preserve the APPN COS characteristics throughout the network.

The **rif passthru** option works only on Token Ring LANs via SRB. Other LAN types, such as SDLC and QLLC, are not supported. The RIF Passthru feature is supported with TCP encapsulation and it disables local acknowledgment.

The following features are not supported with the DLSw+ RIF Passthru feature:

- Border peers
- Peer-on-demand peers
- Dynamic peers
- Backup peers

---

**Examples**

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

```
dlsw remote-peer 0 tcp 10.2.17.8
```

The following example specifies a TCP peer as backup to a primary FST peer:

```
dlsw remote-peer 0 fst 10.2.18.9  
dlsw remote-peer 0 tcp 10.2.17.8 backup-peer 10.2.18.9
```

---

**Related Commands**

Command	Description
<b>show dlsw peers</b>	Displays DLSw peer information.

---

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

**Defaults** There is no default setting.

**Command Modes** Global configuration

Command History	Release	Modification
	11.0	This command was introduced.

**Usage Guidelines** 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.

**Examples** 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	Command	Description
	<b>dlsw port-list</b>	Maps traffic on a local interface (Token Ring or serial) to remote peers.
	<b>dlsw remote-peer frame-relay</b>	Specifies the remote peer with which the router will connect.
	<b>show dlsw capabilities</b>	Displays the configuration of a specific peer or all peers.

# dls w timer

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

```
dls w timer { icannotreach-block-time | netbios-cache-timeout | netbios-explorer-timeout |
netbios-group-cache | netbios-retry-interval | netbios-verify-interval | sna-cache-timeout
| explorer-delay-time | sna-explorer-timeout | explorer-wait-time | sna-group-cache |
sna-retry-interval | sna-verify-interval } time
```

```
no dls w timer { icannotreach-block-time | netbios-cache-timeout | netbios-explorer-timeout |
netbios-group-cache | netbios-retry-interval | netbios-verify-interval | sna-cache-timeout
| explorer-delay-time | sna-explorer-timeout | explorer-wait-time | sna-group-cache |
sna-retry-interval | sna-verify-interval } time
```

Syntax Description	
<b>icannotreach-block-time</b>	Cache life of unreachable resource; during this time searches for the resource are blocked. The valid range is 1 to 86400 seconds. The default is 0 (disabled).
<b>netbios-cache-timeout</b>	Cache life of NetBIOS name location for the local and remote reachability caches. The valid range is 1 to 86400 seconds. The default is 960 seconds (16 minutes).
<b>netbios-explorer-timeout</b>	Length of time that the Cisco IOS software waits for an explorer response before marking a resource unreachable (on both a LAN and a WAN). The valid range is 1 to 86400 seconds. The default is 6 seconds.
<b>netbios-group-cache</b>	Cache life of NetBIOS entries in the group cache. The valid range is 1 to 86000 seconds. The default is 240 seconds (4 minutes).
<b>netbios-retry-interval</b>	NetBIOS explorer retry interval (on a LAN only). The valid range is 1 to 86400 seconds. The default is 1 second.
<b>netbios-verify-interval</b>	Number of seconds between a cache entry's creation and its marking as stale. If a search request comes in for a stale cache entry, a directed verify query is sent to ensure the cache still exists. The valid range is 1 to 86400 seconds. The default is 240 seconds (4 minutes).
<b>sna-cache-timeout</b>	Length of time that an SNA MAC/service access point (SAP) location cache entry exists before it is discarded (for local and remote caches). The valid range is 1 to 86400 seconds. The default is 960 seconds (16 minutes).
<b>explorer-delay-time</b>	Time to wait before sending or accepting explorers. The valid range is 1 to 5 minutes. The default is 0.
<b>sna-group-cache</b>	Cache life of SNA entries in the group cache. The valid range is 1 to 86000 seconds. The default is 240 seconds (4 minutes).
<b>sna-explorer-timeout</b>	Length of time that the Cisco IOS software waits for an explorer response before marking a resource unreachable (on a LAN and WAN). The valid range is 1 to 86400 seconds. The default is 180 seconds (3 minutes).

<b>explorer-wait-time</b>	Time to wait for all stations to respond to explorers. The valid range is 1 to 86400 seconds. The default is 0.
<b>sna-retry-interval</b>	Interval between SNA explorer retries (on a LAN). The valid range is 1 to 86400 seconds. The default is 30 seconds.
<b>sna-verify-interval</b>	Number of seconds between a cache entry's creation and its marking as stale. If a search request comes in for a stale cache entry, a directed verify query is sent to ensure that the cache still exists. The valid range is 1 to 86400 seconds. The default is 240 seconds (4 minutes).

**Defaults**

The default settings of each timer option is described in the Syntax Description of the **dlsw timer** command.

**Command Modes**

Global configuration

**Command History**

Release	Modification
10.3	This command was introduced.

**Usage Guidelines**

The **netbios-group-cache** and **sna-group-cache** options were added to this command for the border peer caching feature.

**Examples**

The following configuration defines the length of time that an entry will stay in the group cache as 120 seconds (2 minutes):

```
dlsw timers sna-group-cache 120
```

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

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

# dlsw tos disable

Use the **dlsw tos disable global** configuration command to disable any tos bits in DLSw+ generated packets.

**dlsw tos disable**

**no dlsw disable**

---

**Syntax Description** This command has no arguments or keywords.

---

**Defaults** There is no default setting.

---

**Command Modes** Global configuration

---

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.0	This command was introduced.

---

---

**Examples** The following example disables the tos bits in DLSw+ generated packets:

```
dlsw tos disable
```

# dlsw tos map

Use the **dlsw tos map global** configuration command to associate a TOS value for priority peers. Use the **no** form of this command to return to the default setting.

```
dlsw tos map [ high value [ medium value | normal value | low value ] ]
```

```
no dlsw tos map [ high value [ medium value | normal value | low value ] ]
```

<b>Syntax Description</b>	<i>value</i>	The type of service TOS bit value. Valid ranges are 0-7.
---------------------------	--------------	--

<b>Defaults</b>	The default setting, with priority peers configured, is defined in Table 28.
-----------------	--

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Usage Guidelines</b>	By default, DLSw+ peer traffic is set to Critical-ECP. When the <b>priority</b> keyword is specified in the <b>dlsw remote peer tcp</b> command, DLSw+ automatically activates four TCP ports to that remote peer (ports 2065, 1981, 1982 and 1983) and associates a priority level. This command enables the user to customize the prioritization of DLSw+ traffic within the network. If priority peers are not configured, however, high is the only option. See Table 28 for corresponding priority levels and options.
-------------------------	---

**Table 28** Priority Levels and Options

TOS Bit Value	DLSw+ Translation Value	TOS Bit Value Meaning	TCP Port Numbers
0	Routine		
1	Priority		
2	Immediate	Low	1983
3	Flash	Normal	1982
4	Flash Override	Medium	1981
5	Critical ECP	High	2065
6	Internetwork Control		
7	Network Control		

TOS bit values 6 and 7 are not recommended for usage because of potential interference with critical network infrastructure flows. Although using TOS bit values 0 and 1 will not cause negative impact to the network, the values do not prioritize the traffic.

---

**Examples**

The following example changes the default setting on IP packets generated by DLSw+ from high to low:

```
dlsw tos map low 2
```

The following is an example policy routing configuration that shows how to modify the default setting of TCP port 2065. The configuration changes the default setting on IP packets from network control priority to routine priority.

```
ip local policy route-map test
access-list 101 permit tcp any eq 2065 any
access-list 101 permit tcp any any eq 2065
route-map test permit 20
  match ip address 101
  set ip precedence routine
```

# dlsw udp-disable

Use the **dlsw udp-disable** global configuration command to disable the UDP unicast feature. Use the **no** form of this command to return to the default UDP unicast feature.

**dlsw udp-disable**

**no dlsw udp-disable**

---

**Syntax Description** This command has no arguments or keywords.

---

**Defaults** The UDP unicast feature is enabled.

---

**Command Modes** Global configuration

---

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.2 F	This command was introduced.

---

---

**Usage Guidelines** If the **dlsw udp-disable** command is configured, then a DLSw+ node will not send packets via UDP Unicast and will not advertise UDP Unicast support in its capabilities exchange message.

Refer to the “Bridging and IBM Networking Overview” chapter of the *Bridging and IBM Networking Configuration Guide* for more information on the UDP Unicast feature.

---

**Examples** The following example disables the UDP unicast feature:

```
dlsw udp-disable
```

# 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		
<b>subaddress</b> <i>subaddress</i>		An X.121 subaddress.
<b>pvc</b>		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 and 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.
<b>vmac</b> <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.
<b>partner</b> <i>partner-macaddr</i>		Virtual MAC address to which an incoming call wishes to connect. The <b>qlc dlsw</b> command must be repeated for each different partner. Each partner is identified by a unique subaddress.
<b>sap</b> <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.
<b>xid</b> <i>xidstring</i>		XID format 0 type 2 string.
<b>npsi-poll</b>		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.

**Defaults** No defaults are specified.

**Command Modes** Interface configuration

**Command History**

Release	Modification
11.0	This command was introduced.

**Usage Guidelines**

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 qlc** or **x25 pvc qlc** 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.

**Examples**

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:

```
interface serial 0
  x25 address 3110212011
  x25 map qlc 1000.000.0001 31104150101
  qlc dlsw partner 4000.1161.1234
```

# 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 | default | partner mac-address [inbound | outbound]}
```

```
no sdlc dlsw {sdlc-address | default | partner mac-address [inbound | outbound]}
```

## Syntax Description

<i>sdlc-address</i>	SDLC addresses are in hexadecimal. The valid range is 1 to FE.
<b>default</b>	Allows the user to configure an unlimited number of SDLC addresses to DLSw+.
<b>partner</b> <i>mac-address</i>	MAC address for default partner
<b>inbound</b>	(Optional) Partner will initiate connection.
<b>outbound</b>	(Optional) Initiate connection to partner.

## Defaults

No correspondence is defined between SDLC addresses and DLSw+.

## Command Modes

Interface configuration

## Command History

Release	Modification
11.0	This command was introduced.

## Examples

The following command attaches SDLC address d2 to DLSw+:

```
sdlc dlsw d2
```

The following command attaches SDLC addresses d2, d5, e3, e4, e6, b1, c3, d4, a1 and a5:

```
sdlc dlsw d2 d5 e3 e4 e6 b1 c3 d4 a1 a5
```

## Related Commands

Command	Description
<b>encapsulation sdlc</b>	Configures an SDLC interface.
<b>sdlc address</b>	Assigns a set of secondary stations attached to the serial link.
<b>sdlc role</b>	Establishes the router to be either a primary or secondary SDLC station.

# show dlsw capabilities

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

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

Syntax Description		
<b>interface</b> <i>type number</i>	(Optional) Specifies the interface type and number for which the DLSw+ capabilities are to be displayed.	
<b>ip-address</b> <i>ip-address</i>	(Optional) Specifies a peer by its IP address.	
<b>local</b>	(Optional) Specifies the local DLSw+ peer.	

**Command Modes** Privileged EXEC

Command History	Release	Modification
	10.3	This command was introduced.

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

```
Router# show dlsw capabilities

DLSw: Capabilities for peer 1.1.1.6(2065)
 vendor id (OUI)       : '00C' (cisco)
 version number       : 1
 release number       : 0
 init pacing window   : 20
 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
 peer group number     : 0
 border peer capable   : no
 peer cost             : 3
 biu-segment configured : no
 UDP Unicast support   : yes
 local-ack configured  : yes
 priority configured   : no
 configured ip address : 1.1.1.6
 peer type             : conf
 version string        :
Cisco Internetwork Operating System Software
IOS (tm) RSP Software (RSP-JSV-M), Version 11.3(4), RELEASE SOFTWARE (fc1)
Copyright (c) 1986-1998 by cisco Systems, Inc.
Compiled Tue 16-Jun-98 04:29 by phanguye
```

Table 29 describes significant fields shown from the **show dlsw capabilities** command.

**Table 29** *show dlsw capabilities Field Descriptions*

<b>Field</b>	<b>Description</b>
vendor id (OUI)	Vendor ID.
version number	RFC 1795 version of SSP protocol.
release number	RFC 1795 release of SSP protocol
init pacing window	Initial pacing window.
unsupported saps	Unsupported SAPs.
num of tcp sessions	Number of TCP sessions.
loop prevent support	No loop prevent support.
icanreach mac-exclusive	Configured MAC addresses that the router can reach
icanreach netbios-excl.	Configured NetBIOS names that the router can reach
reachable mac addresses	Reachable MAC addresses.
reachable netbios name	Reachable NetBIOS names.
cisco version number	Cisco version number.
peer group number	Peer group member number.
border peer capable	Border peer capability.
peer cost	Peer cost.
biu-segment configured	BIU segment configured.
UDP Unicast support	UDP unicast support.
local-ack configured	Local acknowledgment capable.
priority configured	Priority capability.
configured ip address	Configured IP address.
peer type	Peer type can be peer-on-demand or promiscuous.
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* | **circuit id**]

Syntax Description		
<b>detail</b>	(Optional) Display circuit state information in expanded format.	
<b>mac-address</b> <i>address</i>	(Optional) Specifies the MAC address to be used in the circuit search.	
<b>sap-value</b> <i>value</i>	(Optional) Specifies the SAP to be used in the circuit search.	
<b>circuit id</b>	(Optional) Specifies the circuit ID of the circuit index.	

**Command Modes** Privileged EXEC

Command History	Release	Modification
	10.3	This command was introduced.

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

```
Router# show dlsw circuits

Index          local addr(lsap)  remote addr(dsap)  state          uptime
4060086272    4000.0000.0056(F0)  4001.0000.0049(F0)  CONNECTED      00:00:13
Total number of circuits connected: 1
```

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  uptime
194 0800.5a9b.b3b2(F0)  800.5ac1.302d(F0)  CONNECTED  00:00:13
PCEP: 995AA4      UCEP: A52274
Port: To0/0      peer 172.18.15.166(2065)
Flow-Control-Tx SQ CW:20, Permitted:28; Rx CW:22, Granted:25 Op:
IWO
Congestion: LOW(02), Flow Op: Half: 12/5 Reset 1/0
RIF = 0680.0011.0640
```

Table 30 describes significant fields shown in the display

**Table 30** *show dlsw circuits Field Descriptions*

Field	Description
Index	Number the software uses to reference an individual circuit.
local addr (lsap)	MAC address and SAP value used by end station closest to this DLSw+ peer.
remote addr (dsap)	MAC address and SAP value used by end station that is across the peer connection (remote).
state	Indicates whether circuit has completed establishment.
uptime	Length of time a circuit has been connected.
total number of circuits connected	Number of total connected circuits. If a circuit has not completed connection, it will not show a value.
PCEP, UCEP	Internal correlators used as labels for communication internal to the router between DLSw+ and LLC2, SDLC, or QLLC.
Port	Local port over which this circuit has been established.
Flow Control (Tx and Rx)	Reports DSLw+ flow control windows as described in Section 8 of RFC 1795.
SQ	Two flags indicating congestion toward the remote peer. These flags are only seen when the circuit is congested.
S	Data flow from the local station has been stopped. This results in LLC2 or SDLC sending RNR frames.
Q	Data frames are being queued for transport to the remote peer.
CW	Current pacing window. See RFC 1795.
Permitted	Packet counter for tx. See RFC 1795.
Granted	Packet counter for rx. See RFC 1795.
Op	Next flow indicator (FCI) that will be sent to the remote peer. See RFC 1795.
Congestion	Data flow indicator from router to station is congested. Values are low, medium, high, and max.
Flow Op	Amount of Reset Window Operator and Half Window Operator being sent or received. See RFC 1795.
RIF	Routing Information Field used over the local port for data traversing this circuit (if appropriate).

# show dlsw circuits history

To display the details of the last status of all DLSW circuits either currently active or not active, use the **show dlsw circuits history** command in privileged EXEC mode.

**show dlsw circuits history** [**detail**] [**mac-address** *address* | **sap-value** *value* | **circuit id**]

Syntax Description	detail	(Optional) Displays details for all remote circuits in the connected state
	<b>mac-address</b> <i>address</i>	(Optional) Specifies the MAC address to be used for all remote circuits.
	<b>sap-value</b> <i>value</i>	(Optional) Specifies the service access point (SAP) to be used for all remote circuits.
	<b>circuit id</b>	(Optional) Specifies the circuit ID of a specific remote circuit.

**Command Default** None

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.1	This command was introduced.

**Usage Guidelines** The **show dlsw circuits history** command keeps the history for the last 32 circuits. For every circuit it stores a maximum of 16 entries.

**Examples** The following is a sample output from the **show dlsw circuits history** command

```
Router# c7500-1-r443
Circuit history kept for last 32 circuits using 4096 bytes:
Index      local addr(lsap)    remote addr(dsap)  remote peer
1761607680 0000.6666.4242(04) 4000.1000.2000(04) 172.18.62.198
3657433089 0000.6666.4242(04) 4000.1000.2000(04) 172.18.62.198 Ckt Active
```

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

```
Router# show dlsw circuits history detail
Circuit history kept for last 32 circuits, using 4096 bytes
Index      local addr(lsap)    remote addr(dsap)  remote peer
1761607680 0000.6666.4242(04) 4000.1000.2000(04) 172.18.62.198
Created at   : 08:19:14.440 EDT Wed Sep 21 2005
Connected at : 08:19:14.476 EDT Wed Sep 21 2005
Destroyed at : 08:20:21.159 EDT Wed Sep 21 2005
Local Corr  : 1761607680 Remote Corr: 1962934272
Bytes:      633/731 Info-frames: 7/7
XID-frames: 4/5 UInfo-frames: 0/0
Flags: Remote created, Local connected
Last events:
```

show dlsw circuits history

Current State	Event	Add. Info	Next State
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	WAN halt-noack	0x0	HALT_NOACK_PEND
HALT_NOACK_PEND	DLC DiscCnf	0x0	CLOSE_PEND
CLOSE_PEND	DLC DiscInd	0x0	CLOSE_PEND
CLOSE_PEND	DLC CloseStnCnf	0x0	DISCONNECTED

```

3657433089      0000.6666.4242 (04)  4000.1000.2000 (04)  172.18.62.198 Ckt Active
Created at      : 08:20:51.146 EDT Wed Sep 21 2005
Connected at    : 08:20:51.182 EDT Wed Sep 21 2005
Local Corr     : 3657433089   Remote Corr: 3137339393
Bytes:         633/731      Info-frames:      7/7
XID-frames:    4/5         UInfo-frames:    0/0
Flags: Remote created, Local connected
Last events:

```

Current State	Event	Add. Info	Next State
CONNECT_PENDING	WAN contacted	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	DLC ConnectCnf	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	WAN infoframe	0x0	CONNECTED
CONNECTED	DLC DataInd	0x0	CONNECTED

The following is a sample output from the **show dlsw circuits history** command for specific circuits only

```

Router# show dlsw circuits history mac-address 0000.6666.4242
Circuit history kept for last 32 circuits, using 4096 bytes
Index      local addr(lsap)  remote addr(dsap)  remote peer
1761607680 0000.6666.4242 (04) 4000.1000.2000 (04) 172.18.62.198
3657433089 0000.6666.4242 (04) 4000.1000.2000 (04) 172.18.62.198 Ckt Active
Router# c7500-1-r443 mac-address 4000.1000.2000
Circuit history kept for last 32 circuits, using 4096 bytes
Index      local addr(lsap)  remote addr(dsap)  remote peer
1761607680 0000.6666.4242 (04) 4000.1000.2000 (04) 172.18.62.198
3657433089 0000.6666.4242 (04) 4000.1000.2000 (04) 172.18.62.198 Ckt Active

```

**Table 31** *show dlsw circuits history Field Descriptions*

Field	Description
Index	Number the software uses to reference an individual circuit.
local addr(lsap)	MAC address and SAP value used by end station closest to this data-link switching plus (DLSw+) peer.
remote addr(dsap)	MAC address and SAP value used by end station that is across the peer connection (remote).
remote peer	IP address of the peer used by the individual circuit.
Ckt Active	Indicates circuit is Active.
Local Corr	Circuit ID of the local router.
Remote Corr	Circuit ID of the peer.
Bytes	Transmitted bytes/received bytes.
Info-frames	Transmitted frames/received frames.
Xid-frames	Transmitted XID's/received XID's. XIDs are exchange ids.
Unifo-frames	Unnumbered information frames.
Flags	<p>Created can be either local or remote</p> <ul style="list-style-type: none"> <li>local = This router has started the circuit.</li> <li>remote =Partner DLSW peer has started the circuit.</li> </ul> <p>Connected can be either local or remote:</p> <ul style="list-style-type: none"> <li>local =This router has received the sabme from the end system. and transmitting a UA back in response.</li> <li>remote =This router has received a DLSW contacted primitive from the DLSW partner and is sending out a sabme to the end system, receiving a UA back in response.</li> </ul>
Current State	Current state of the finite state machine.
Next State	The state to which the transition occurs based on the event.
CONNECTED	The DLSW circuit is fully established and connected end to end.
HALT_NOACK_PEND	A state depicting that a dslw peer is lost.
CLOSE_PEND	DLSW is awaiting close_stn.cnf with a disc confirmation from the end station and also from the DLSW partner.
DISCONNECTED	A state where no DLSW circuit exists.
LOCAL_RESOLVE	DLSW is awaiting the req_opn_stn_confirm signal.
REMOTE_RESOLVE	Successful CEP (circuit end point) creation, having received a canureach_ex.
CKT_ESTABLISHED	The two end stations are in XID exchange.
CKT_PENDING	DLSW is awaiting CONTACTED, having received a SABME and sent a CONTACT to the partner. The partner must send out the SABME, get the UA and respond with a CONTACTED
CONTACT_PENDING	DLSW is awaiting DLC_CONTACTED, having received the CONTACT from the partner.

**Table 31** *show dlsw circuits history Field Descriptions (continued)*

Field	Description
CKT_RESTART	The data link switch (DLS) that originated the reset is awaiting the restart of the data link and the DL_RESTARTED response to a RESTART_DL_message.
RESTART_PENDING	The remote DLS is awaiting the DLC_DL_HALTED indication following the DLC_HALT_DL request.
DISC_PENDING	DLSW is awaiting ssp dl_halted.
HALT_PENDING	DLSW is awaiting disc.dnf.
HALT_NOACK_PEND	DLSW is awaiting disc.cnf or close_stn.cnf.
CLOSE_PEND	DLSW is awaiting close_stn.cnf having received a disc confirmation from the end station and also from the DLSW partner.
Event	An incident or occurrence corresponding to a state.
ADM Stop	A clear DLSW circuit or the DLSW peer goes down.
ADM RingStop	DLSW configuration gets removed.
ADM WANFailure	The peer is down. See RFC1795.
WAN contact	The WAN connection is fully established. See RFC1795.
WAN contacted	A UA received in response to a SABME. See RFC1795.
WAN infoframe	An infoframe (data containing a valid payload) received on the WAN.
DLC DataInd	An infoframe received from the local media. See RFC1795.
DLC ConnectCnf	A UA is going out on the local interface. See RFC1795.

**Related Commands**

Command	Description
<b>show dlsw circuits</b>	Displays state of all circuits involving a common MAC address as a source and destination.

# 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 Modes** Privileged EXEC

Command History	Release	Modification
	11.0	This command was introduced.

**Examples** The following is sample output from the **show dlsw fastcache** command with an FST peer:

```
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
```

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

```
Router# show dlsw fastcache

      peer          local-mac      remote-mac  l/r sap rif
IF Se1 0800.5a8f.881c 0800.5a8f.8822 F0/F0 0680.02D5.1360
```

Table 32 describes significant fields shown in the display

**Table 32** *show dlsw+ fastcache Field Descriptions*

Field	Description
peer	The peer in which the router is connected. Could represent either an IP address or interface.
local-mac	Local MAC address
remote-mac	Remote MAC address
l/r sap	Local/remote SAP value.
rif	RIF value.

# 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* | **udp**]

Syntax Description		
<b>interface</b> <i>typenumber</i>	(Optional)	Specifies the interface type and number for which the DLSw+ peer information is to be displayed.
<b>ip-address</b> <i>ip-address</i>	(Optional)	Specifies a remote peer by its IP address.
<b>udp</b>	(Optional)	Shows UDP frame forwarding statistics for specified peers.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	11.0	This command was introduced.

## Examples

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

```
Router# show dlsw peers udp
```

```
Peers: tot-Q'd    total-rx  total-tx    tot-retx  tot-drop  curr-Q'd  TCP uptime
1.1.1.    0          23         0         0         0         0 00:01:02
Total number of connected peers: 2
Total number of connections:    8
```

The following is sample output from the **show dlsw peers** command with a TCP connection:

```
Router# show dlsw peers
```

```
Peers:
TCP 1.1.91.1
  High priority  CONNECT    43         40  conf      0         1 0 00:01:02
  Medium priority  CONNECT    0          0  conf      0         - 0 00:01:02
  Normal priority  CONNECT    4          41  conf      0         - 5 00:01:02
  Low priority    CONNECT    1          0  conf      0         - 0 00:01:02
TCP 1.1.93.1
  High priority  CONNECT    3          3  conf      0         0 0 00:00:58
  Medium priority  CONNECT    0          0  conf      0         - 0 00:00:58
  Normal priority  CONNECT    0          0  conf      0         - 0 00:00:58
  Low priority    CONNECT    0          39  conf      0         - 0 00:00:58
Total number of connected peers: 2
Total number of connections:    8
```

The following is sample output from the **show dlsw peers** command with a Direct Frame Relay connection:

```
Router # show dlsw peers
```

```
Peers:                state  pkts_rx pkts_tx  type  drops ckts TCP   uptime
IF SE116connect652597conf0--00:04:09
Total number of connected peers: 2
Total number of connections:    8
```

The following is sample output from the **show dlsw peers** command with a Direct Frame Relay with local acknowledgment (LLC2) connection:

```
Router # show dlsw peers
```

```
Peers:                state pkts_rx pkts_tx  type  drops ckts TCP uptime
LLC2 SE116connect1179108conf01-00:04:09
Total number of connected peers: 2
Total number of connections:    8
```

Table 33 describes the significant fields shown in the **show dlsw peers** command display

**Table 33** *show dlsw peers Field Descriptions*

Field	Description
Peers	Information related to the remote peer, including encapsulation type, IP address (if using FST or TCP), and interface number (if using direct encapsulation).
tot-Q'd	Number of UDP packets that have been queued because of TCP congestion.
total-rx	Number UDP packets received from the peer.
total-tx	Number of UDP packets transmitted to the peer.
tot-retx	Number of reachability retransmits (for example, DLSw+ retries NQ_ex and CUR_ex) when originally sent via UDP.
tot-drop	Number of queued UDP packets that were dropped because of persistent TCP congestion.
curr-Q'd	Number of current UDP packets queued because of TCP congestion.
TCP	Number of packets currently on TCP output queue.
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.
pkts_rx	Number of received packets.
pkts_tx	Number of transmitted packets.

**Table 33** *show dlsw peers Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
type	Type of remote peer: conf : configured prom : promiscuous pod : peer on demand
drops	The number of drops done by this peer. Reasons for the counter to increment: <ul style="list-style-type: none"> <li>• WAN interface not up for a direct peer.</li> <li>• DLSW tries to send a packet before the peer is fully connected (waiting for TCP event or capabilities event).</li> <li>• Outbound TCP queue full.</li> <li>• FST sequence number count mismatch.</li> <li>• Cannot get buffer to “slow switch” FST packet.</li> <li>• CiscoBus controller failure on high end (cannot move packet from receive buffer to transmit buffer, or vice versa).</li> <li>• Destination IP address of FST packet does not match local peer-ID.</li> <li>• WAN interface not up for an FST peer.</li> <li>• No SRB route cache command configured.</li> <li>• Madge ring buffer is full on low end systems (WAN feeding LAN too fast).</li> </ul>
uptime	How long the connection has been established to this peer.
ckts	Number of active circuits through this peer. This field applies only to TCP and LLC2 transport peer types.
total number of connected peers	Total number of currently connected peers
total number of connections	Total number of active circuit connections

# show dlsw reachability

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

```
show dlsw reachability [[group value] | local | remote] | [mac-address address] |
[netbios-names name]]
```

Syntax Description		
<b>group</b>	(Optional)	Displays contents of group reachability cache only.
<i>value</i>	(Optional)	Specifies the group number for the reachability check. Only displays group cache entries for the specified group. The valid range is 1 to 255.
<b>local</b>	(Optional)	Displays contents of local reachability cache only.
<b>remote</b>	(Optional)	Displays contents of remote reachability cache only.
<b>mac-address</b>	(Optional)	Displays DLSw reachability for MAC addresses only.
<i>address</i>	(Optional)	Specifies the MAC address for which to search in the reachability cache.
<b>netbios-names</b>	(Optional)	Displays DLSw reachability for NetBIOS names only.
<i>name</i>	(Optional)	Specifies the NetBIOS name for which to search in the reachability cache.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	11.0	This command was introduced.

**Usage Guidelines** If none of the group, local, or remote options are specified, then the caches will be displayed in the following order: local, remote, and group.

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

```
Router# show dlsw reachability group

DLSw Group MAC address reachability cache list
Mac Addr Group
0000.3072.1070      10
DLSW Group NetBIOS Name reachability cache list
NetBIOS Name      Group
```

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
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 34 describes the significant fields shown in the **show dlsw reachability** command

**Table 34** show dlsw reachability Field Descriptions

Field	Description
Mac Addr	MAC address of station being sought (destination MAC address of canureach_ex packet).
NetBIOS Name	NetBIOS name of station being sought (destination MAC address of NQ_ex packet).

**Table 34** *show dlsw reachability Field Descriptions (continued)*

Field	Description
status	<p>Result of station search. The status can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>FOUND:</b> Station has recently sent a broadcast or responded to a broadcast.</li> <li>• <b>SEARCHING:</b> Router has sent broadcast to this station and is waiting for a response.</li> <li>• <b>NOT_FOUND:</b> Negative caching is on, and the station has not responded to queries.</li> <li>• <b>UNCONFIRMED:</b> Station is configured, but DLSw has not verified it.</li> <li>• <b>VERIFY:</b> Cache information is being verified because cache is going stale, or the user configuration is being verified.</li> </ul>
Loc.	<p>Location of station. LOCAL indicates that the station is on the local network. REMOTE indicates that the station is on the remote network.</p>
peer/port	<p>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.</p>
rif	<p>Shows the RIF in the cache. This column applies only to LOCAL stations. If the station was reached through a medium that does not support RIFs (such as SDLC or Ethernet) then "--no rif--" is shown.</p>

## show dlsw statistics

Use the **show dlsw statistics** privileged EXEC command to display the number of frames that have been processed in the local, remote, and group cache.

**show dlsw statistics [border-peers]**

<b>Syntax Description</b>	<b>border-peers</b>	(Optional) Displays the number of frames processed in the local, remote, and group caches.
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<b>Command Modes</b>	Privileged EXEC
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.2F	This command was introduced.

**Examples** The following sample is a sample output from the **show dlsw statistics** command. The output displays the number of frames processed in the local, remote, and group cache:

```
router# show dlsw statistics border-peers

100 Border Peer Frames processed
10 Border frames found Local
20 Border frames found Remote
17 Border frames found Group Cache
```