

Configuring DLSw+ Peer Groups and Border Peers

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Introduction

This document demonstrates how Data Link Switching Plus (DLSw+) peer groups and border peers can be used to provide any-to-any connectivity in large networks, with peer-on-demand. DLSw+ provides a hierarchical means to dynamically search for branch resources. Instead of a single branch router having to query every other branch router, the branch router sends a single broadcast to its border peer. The border peer checks its local, remote, and group cache before it forwards the explorer. If the resource is not found, the border peer propagates the broadcast within its group and to other border peers. Other border peers propagate the broadcast within their group. This method not only minimizes the broadcast replication on each line, it also minimizes the replication work done by any single router. End-to-end TCP connections (called peer-on-demand connections) are set up only when resources are found. DLSw+ border peer was introduced in Cisco IOS® Software Release 10.3.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

The information in this document is based on these software and hardware versions:

- Cisco IOS Software Releases 12.0(7)T, 12.1(2), and 12.1(5)T.

Note: It is recommended that you run the same Cisco IOS Software Release in all DLSw+ peering routers.

- Two Cisco 2500s, one Cisco 4700, and one Cisco 7500.
- For the Channel attachment, a Cisco 7206 with a Channel Port Adapter (CPA).

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

For more information on document conventions, refer to Cisco Technical Tips Conventions.

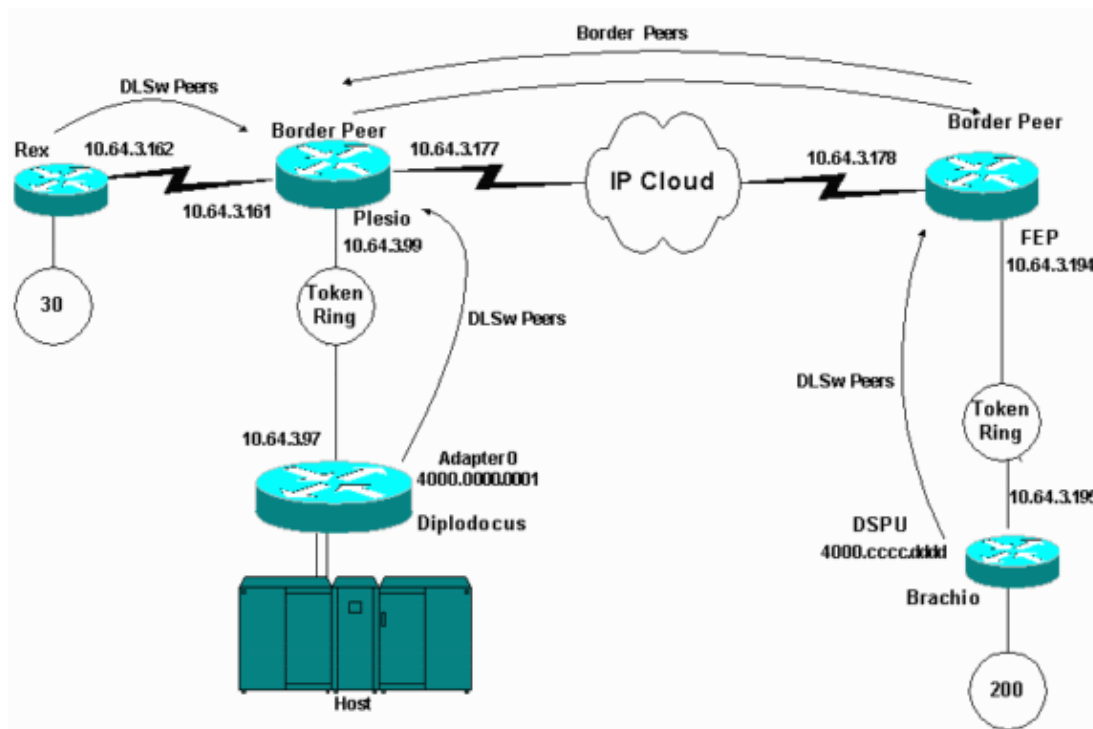
Configure

In this section, you are presented with the information to configure the features described in this document.

Note: To find additional information on the commands used in this document, use the Command Lookup Tool (registered customers only).

Network Diagram

This document uses this network setup:



This setup uses five routers. With this number of routers, there is little advantage for you to configure the DLSw+ routers into peer groups. Similarly, if the only connectivity is for remote routers to connect to a central site (for example, a classic Systems Network Architecture [SNA] hierarchical environment), there is no real advantage from the use of peer groups. The advantage of the use of DLSw+ peer groups and border peers is in large production networks, where connectivity is required between many remote sites. Prior to the introduction of the border peer concept, the only way to achieve this was to fully mesh the DLSw+ peers; however, this does not scale well with a large number of DLSw+ routers.

This example uses two peer groups. Group 1 contains routers Plesio, Diplodocus, and Rex. Group 2 contains the front-end processor (FEP) and Brachio routers. Plesio and FEP are set up as the border peers of Groups 1 and 2, respectively. In this example, DLSw+ peers are established over Token Ring media between Plesio and Diplodocus and between FEP and Brachio. In a production environment, DLSw+ connections are more commonly established over serial WAN connections; however, they can be established over any arbitrary TCP topology.

All the routers are set up as promiscuous. This means that they will accept incoming requests to establish a

peer connection. This is now enforced by the **group** parameter of the **dls w local-peer [peer-id ip-address] [group group] [border] [promiscuous]** command.

The remote routers Diplodocus, Rex, and Brachio are set up with a **dls w remote-peer** statement that points to their DLSw+ border peer routers Plesio and FEP, respectively. The DLSw+ border peer routers must be configured with a **dls w remote-peer** statement for every other border peer router to which they are supposed to forward traffic. Because they are both set up as promiscuous, however, the **dls w remote-peer** statement need only be configured in one of them. The Brachio router uses the Downstream Physical Unit (DSPU) feature to establish a DLSw+ circuit with the Diplodocus router, which has a CPA connection to a mainframe. This causes a DLSw+ peer connection to be established from Brachio to Diplodocus for the duration of the circuit only (see the DLSw+ circuit output on Brachio, in the Verify section).

Configurations

This document uses these configurations:

- Border Router – Plesio
- Remote Router – Diplodocus (7206)
- Remote Router – Rex
- Border Peer Router – FEP
- Remote Router – Brachio

One other command that has not been mentioned here is **dls w peer-on-demand-defaults**. This command is used to change some characteristics for the on-demand peers. The most common option is to change the inactivity timeout after which the peer will be torn down. The default is ten minutes.

Note: Only relevant interfaces are provided.

Border Router – Plesio
<pre>hostname plesio ! ! source-bridge ring-group 1 DLSw local-peer peer-id 10.64.3.99 group 1 border promiscuous DLSw remote-peer 0 tcp 10.64.3.194 !--- To border peer FEP. ! ! ! interface Serial0 ip address 10.64.3.177 255.255.255.240 !--- WAN connection to FEP border peer. no ip directed-broadcast clockrate 64000 ! interface Serial1 ip address 10.64.3.161 255.255.255.240 !--- WAN connection to Rex DLSw remote router. no ip directed-broadcast clockrate 64000 ! interface TokenRing0</pre>

```

ip address 10.64.3.99 255.255.255.240
no ip directed-broadcast
ring-speed 16
!
router eigrp 1
network 10.0.0.0
!
!
ip classless
no ip http server
!
!
!
line con 0
transport input none
line aux 0
line vty 0 4
login
!
end

```

Remote Router – Diplodocus (7206)

```

hostname diplodocus
!
boot system flash slot0:c7200-a3js56i-mz.121-5.T1.bin
logging rate-limit console 10 except errors
enable password cisco
!
username cisco password 0 cisco
microcode pcpa slot0:xcpa28-2
microcode reload
clock timezone aest -9
ip subnet-zero
!
!
source-bridge ring-group 1
dlsw local-peer peer-id 10.64.3.97 group 1 promiscuous
dlsw remote-peer 0 tcp 10.64.3.99

!--- Connection to border peer, Plesio.

!
!
interface Channel2/0
no ip address
no keepalive
csna 0100 41
lan TokenRing 0
source-bridge 4 1 1
adapter 0 4000.0000.0001
!
interface TokenRing5/0
ip address 10.64.3.97 255.255.255.240
no ip route-cache
no ip mroute-cache
ring-speed 16
!
!
!
router eigrp 1
network 10.0.0.0
auto-summary
no eigrp log-neighbor-changes
!

```

```
ip classless
ip route 0.0.0.0 0.0.0.0 10.64.3.1
no ip http server
!
!
```

Remote Router – Rex

```
hostname rex
!
source-bridge ring-group 70
dlsw local-peer peer-id 10.64.3.162 group 1 promiscuous
dlsw remote-peer 0 tcp 10.64.3.99

!--- Connection to border peer, Plesio.

!
!
!
interface Serial1
ip address 10.64.3.162 255.255.255.240

!--- WAN connection to border peer, Plesio.

!
interface TokenRing0
ring-speed 16
source-bridge 30 1 70
source-bridge spanning
!
router eigrp 1
network 10.0.0.0
auto-summary
no eigrp log-neighbor-changes
!
no ip http server
ip classless
!
line con 0
transport input none
line aux 0
line vty 0 4
password cisco
login
!
end
```

Border Peer Router – FEP

```
!
version 12.1
service timestamps debug datetime
service timestamps log datetime
no service password-encryption
!
hostname FEP
!
!
source-bridge ring-group 60
dlsw local-peer peer-id 10.64.3.194 group 2 border promiscuous
!
!
interface TokenRing0/0
ip address 10.64.3.194 255.255.255.240
no ip mroute-cache ring-speed 16
```

```

!
!
interface Serial6/4
ip address 10.64.3.178 255.255.255.240

!--- WAN connection to border peer, Plesio.

!
!
router eigrp 1
network 10.0.0.0
!

```

Remote Router – Brachio

```

!
version 12.1
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname brachio
!
no logging buffered
!
!
!
!
ip subnet-zero
no ip domain-lookup
!
cns event-service server
!
source-bridge ring-group 2
dlsw local-peer peer-id 10.64.3.195 group 2 promiscuous
dlsw remote-peer 0 tcp 10.64.3.194

!--- Connection to border peer, FEP.

!
!
dspu vdlc 2 4000.cccc.dddd

!--- Local virtual ring and virtual MAC address for DSPU.

dspu vdlc enable-host lsap 12
!
dspu host PU5 xid-snd 01700005 rmac 4000.0000.0001 rsap 4 lsap 12

!--- XID to be sent to MAC address 4000.0000.0001,
!--- which is adapter 0 on the Channel Interface in Diplodocus.

dspu vdlc start PU5
!
!
interface TokenRing0
ip address 10.64.3.195 255.255.255.240
ring-speed 16
!
interface TokenRing1
ring-speed 16
source-bridge 200 1 2
source-bridge spanning
!

```

```
router eigrp 1
network 10.0.0.0
```

Verify

This section shows example output of the establishment of the peer-on-demand, when the DSPU is started on Brachio. Initially, both Diplodocus and Brachio have only a single DLSw peer connection with their border peer routers.

Note: Certain **show** commands are supported by the Output Interpreter Tool (registered customers only) , which allows you to view an analysis of **show** command output.

```
diplodocus# show dlsw peer
```

```
Peers:                state  pkts_rx  pkts_tx  type  drops  ckts  TCP  uptime
TCP 10.64.3.99        CONNECT  2         2        conf   0      0    0  00:00:20
Total number of connected peers: 1
Total number of connections: 1
```

```
brachio# show dlsw peer
```

```
Peers:                state  pkts_rx  pkts_TX  type  drops  ckts  TCP  uptime
TCP 10.64.3.194       CONNECT  12        10       conf   0      0    0  00:04:27
Total number of connected peers: 1
Total number of connections: 1
```

Start the DSPU on Brachio

```
brachio# configure terminal
```

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

```
brachio(config)# dspu vdlc start pu5
```

```
brachio(config)# ^Z
```

```
brachio# show dspu
```

```
7w2d: %SYS-5-CONFIG_I: Configured from console by consolspu
dspu host PU5 Vdlc  PU STATUS Active
FRAMES RECEIVED 56 FRAMES SENT 56
LUs USED BY DSPU 0 LUs ACTIVE 0
LUs USED BY API 0 LUs ACTIVE 0
LUs ACTIVATED BY HOST BUT NOT USED 1
```

Notice that another peer is brought up to Diplodocus.

```
brachio# show dlsw peer
```

```
Peers:                state  pkts_rx  pkts_TX  type  drops  ckts  TCP  uptime
TCP 10.64.3.97        CONNECT  11        13       pod    0      1    0  00:00:34
!--- pod means peer-on-demand.

TCP 10.64.3.194       CONNECT  15        13       conf   0      0    0  00:05:26
Total number of connected peers: 2
Total number of connections: 2
```

There is also a circuit connected between the DSPU and adaptor 0 on the Channel Interface CPA.

```
brachio# show dlsw cir
```

Index	local addr(lsap)	remote addr(dsap)	state	uptime
3590324919	4000.cccc.dddd(0C)	4000.0000.0001(04)	CONNECTED	00:00:21

Total number of circuits connected: 1

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

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