Configuring DLSw+ Over QLLC

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Contents

Introduction

In this configuration, two different X.25 resources (we have used dspu−host to simulate the end devices in this setup). For more information on downstream physical unit (DSPU), refer to these documents:

- Configuring DSPU and SNA Service Point Support
- Downstream Physical Unit Frequently Asked Questions

These two end devices communicate with different adapters in the mainframe site over X.25. The remote X.25 resources were configured for different destination addresses (in different lengths and different addresses). Any incoming call whose X.121 destination address matches the router's "qllc dlsw subaddress" is dispatched to Data Link Switching Plus (DLSw+) (with an ID.STN IND). When DLSw+ receives a "Can You Reach" inquiry about a virtual MAC address in the pool, the Qualified Logical Link Control (QLLC) code attempts to set up a Virtual Circuit (VC) 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+.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

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

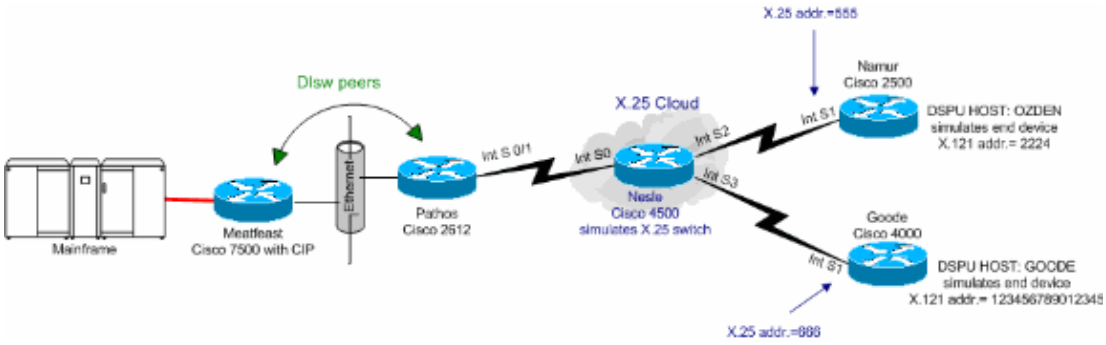
- Cisco IOS® Software Release 12.2(6a) was used in Pathos (Cisco 2612)
- Cisco IOS Software Release 12.0(20) was used in Namur & Goode (Cisco 2500, Cisco 4000)
- Cisco IOS Software Release 12.1(7) was used in Nesle (Cisco 4500)

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 the Cisco Technical Tips Conventions.

Topology Diagram



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) .

Configurations

The MAC addresses of the mainframe are as follows:

- 4000.7507.0000
- 4000.7507.ffff

This document uses the configurations shown here:

- Cisco 7507 (Meatfeast)
- Cisco 2612 (Pathos)
- Cisco 4500 (Nesle)
- Cisco 2500 (Namur)
- Cisco 4000 (Goode)

Cisco 7507 (Meatfeast)

```
source-bridge ring-group 100
dlsw local-peer peer-id 10.48.64.75 promiscuous
!
interface Channel4/2
 ip address 10.48.64.225 255.255.255.240
 no keepalive
 lan TokenRing 0
  source-bridge 88 1 100
  adapter 0 4000.7507.0000
  adapter 1 4000.7507.ffff
```

Cisco 2612 (Pathos)

```
!
```

```
source-bridge ring-group 200
dlsw local-peer peer-id 10.48.64.40
dlsw remote-peer 0 tcp 10.48.64.75
!
interface Ethernet0/0
 ip address 10.48.64.40 255.255.255.0
 half-duplex
!
interface Serial0/0
 no ip address
!
interface TokenRing0/0
 no ip address
 ring-speed 16
!
interface Serial0/1
 no ip address
 encapsulation x25
 x25 alias .*

!--- It is used against the destination
!--- address of a received call.

 x25 htc 10
 x25 win 7
 x25 wout 7
 qllc accept-all-calls
 qllc dlsw subaddress 123456789012345 vmacaddr 4000.3333.0000 2 partner 4000.7507.0000
 qllc dlsw subaddress 2224 vmacaddr 4000.2222.0000 2 partner 4000.7507.ffff
!
ip default-gateway 10.48.64.1
ip classless
no ip http server
ip pim bidir-enable
!
!
dial-peer cor custom
!
```

Cisco 4500 (Nesle)

```
!
x25 routing
!
!
!
interface Ethernet0
 ip address 10.48.64.34 255.255.255.0
 media-type 10BaseT
!
interface Ethernet1
 no ip address
 shutdown
 media-type 10BaseT
!
interface Ethernet2
 no ip address
 media-type 10BaseT
!
interface Serial0
 no ip address
 encapsulation x25 dce
 clockrate 250000
!
interface Serial1
```

```
 no ip address
!
interface Serial2
 no ip address
 encapsulation x25 dce
 no ip mroute-cache
 clockrate 250000
!
interface Serial3
 no ip address
 encapsulation x25 dce
 clockrate 250000
 !
interface TokenRing0
 no ip address
 ring-speed 16
!
ip default-gateway 10.48.64.1
ip classless
no ip http server
x25 route input-interface Serial2 interface Serial0
x25 route input-interface Serial3 interface Serial0
x25 route 555 interface Serial2
x25 route 666 interface Serial3
!
line con 0
 exec-timeout 0 0
line aux 0
 exec-timeout 0 0
line vty 0 4
 exec-timeout 0 0
 password 7 071836
 login
!
ntp clock-period 17179258
ntp server 10.48.64.100
end
```

Cisco 2500 (Namur)

```
hostname namur
!
logging buffered 150000 debugging
enable password 7 120E12
!
dspu host OZDEN xid-snd 00000000 x25 2224 qllc 12 interface Serial1
!
interface Ethernet0
 no ip address
 no ip directed-broadcast
 shutdown
!
interface Serial0
 no ip address
 no ip directed-broadcast
 shutdown
!
interface Serial1
 no ip address
 no ip directed-broadcast
 encapsulation x25
 no ip mroute-cache
 x25 address 555
 x25 htc 10
 x25 win 7
```

```
 x25 wout 7
 dspu enable-host qllc 12
 dspu start OZDEN
!
interface TokenRing0
 no ip address
 no ip directed-broadcast
 shutdown
!
```

Cisco 4000 (Goode)

```
dspu host GOODE xid-snd 11132323 x25 123456789012345 qllc 20 interface Serial1
!
interface Ethernet0
 ip address 10.48.64.17 255.255.255.0
 no ip directed-broadcast
 media-type 10BaseT
!
interface Serial0
 no ip address
 no ip directed-broadcast
 shutdown
!
interface Serial1
 no ip address
 no ip directed-broadcast
 encapsulation x25
 no ip mroute-cache
 x25 address 666
 x25 htc 10
 x25 win 7
 x25 wout 7
 dspu enable-host qllc 20
 dspu start GOODE
!
```

Verify

This section provides information you can use to confirm your configuration is active.

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

- **show llc2** Displays the LLC2 connections active in the router.
- **show version** Displays software version information.
- **show dlsw peer** Displays dlsw peer connection information.
- **show dlsw circuit detail** Displays the details of the DLSW circuit.
- **show qllc serial 0/1** Displays information on QLLC serial 0/1.
- **show x25 interface serial 0/1** Displays the status of the line and protocol on X.25 serial interface 0/1.
- **show x25 route** Displays the X.25 routing table.
- **show x25 interface serial 0** Displays the status of the line and protocol on X.25 serial interface 0.
- **show dspu** Displays the status of the DSPU feature.
- **show x25 interface serial 1** Displays the status of the line and protocol on X.25 serial interface 1.

Meatfeast

```
#show llc2
....
```

```
Channel4/2 DTE: 4000.7507.ffff 4000.2222.0000 04 04 state NORMAL
   V(S)=1, V??)=1, Last N??)=1, Local window=7, Remote Window=127
   akmax=3, n2=8,
   xid-retry timer      0/0       ack timer       0/1000
   p timer              0/1000    idle timer   5430/10000
   rej timer            0/3200    busy timer      0/9600
   adm timer            0/60000   llc1 timer      0/1000
   akdelay timer        0/100     txQ count       0/200
   RIF: 06B0.0581.0640
Channel4/2 DTE: 4000.7507.0000 4000.3333.0000 04 04 state NORMAL
   V(S)=6, V??)=6, Last N??)=6, Local window=7, Remote Window=127
   akmax=3, n2=8,
   xid-retry timer      0/0       ack timer       0/1000
   p timer              0/1000    idle timer   5630/10000
   rej timer            0/3200    busy timer      0/9600
   adm timer            0/60000   llc1 timer      0/1000
   akdelay timer        0/100     txQ count       0/200
   RIF: 06B0.0581.0640
```

Pathos

```
pathos#show version
Cisco Internetwork Operating System Software
IOS (tm) C2600 Software (C2600-IS-M), Version 12.2(6a), RELEASE SOFTWARE (fc1)
Copyright ??) 1986-2001 by cisco Systems, Inc.
Compiled Sat 01-Dec-01 22:30 by pwade
Image text-base: 0x80008088, data-base: 0x810616B4
pathos#show dlsw peer
Peers:                state     pkts_rx   pkts_tx  type  drops ckts TCP   uptime
 TCP 10.48.64.75     CONNECT        118        91  conf      0    2   0 00:32:12
Total number of connected peers: 1
Total number of connections:     1
pathos#show dlsw circuit detail
Index           local addr(lsap)    remote addr(dsap)  state          uptime
234881048       4000.2222.0000(04)  4000.7507.ffff(04) CONNECTED      00:29:50
        PCEP: 81C25730   UCEP: 81D88528
        Port:Se0/1          peer 10.48.64.75(2065)
        Flow-Control-Tx  CW:20, Permitted:19; Rx CW:20, Granted:39; Op: Repeat
        Congestion: Low(02), Flow Op: Half: 0/0 Reset 0/0
        RIF = --no rif--
        Bytes:             429/453        Info-frames:           1/1
        XID-frames:          5/4          UInfo-frames:          0/0
        HPR saps: local 0x0, remote 0x4
1426063385      4000.3333.0000(04)  4000.7507.0000(04) CONNECTED      00:29:49
        PCEP: 81D081B4   UCEP: 81D108B0
        Port:Se0/1          peer 10.48.64.75(2065)
        Flow-Control-Tx  CW:20, Permitted:34; Rx CW:20, Granted:34; Op: Repeat
        Congestion: Low(02), Flow Op: Half: 0/0 Reset 0/0
        RIF = --no rif--
        Bytes:             554/513        Info-frames:           6/6
        XID-frames:          5/4          UInfo-frames:          0/0
        HPR saps: local 0x0, remote 0x4
Total number of circuits connected: 2
pathos#show qllc serial 0/1
Interface Serial0/1
 vc 2 66620
   Circuit State P4/D1, Logical Link State QLOpened 4000.3333.0000(04)->4000.7507.0000(04)
   0 packets held
 vc 1 55512
   Circuit State P4/D1, Logical Link State QLOpened 4000.2222.0000(04)->4000.7507.ffff(04)
   0 packets held
pathos#
pathos#show x25 interface  serial 0/1
SVC 1,  State: D1,  Interface: Serial0/1
  Started 00:30:51, last input 00:30:50, output 00:30:50
```

```
  Connects 55512 <-->
   qllc 4000.2222.0000
  Window size input: 7, output: 7
  Packet size input: 128, output: 128
  PS: 0  PR: 7  ACK: 6  Remote PR: 0  RCNT: 1  RNR: no
  P/D state timeouts: 0  timer (secs): 0
  data bytes 463/441 packets 8/7 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
SVC 2,  State: D1,  Interface: Serial0/1
  Started 00:30:51, last input 00:30:50, output 00:30:50
  Connects 66620 <-->
   qllc 4000.3333.0000
  Window size input: 7, output: 7
  Packet size input: 128, output: 128
  PS: 5  PR: 4  ACK: 2  Remote PR: 5  RCNT: 2  RNR: no
  P/D state timeouts: 0  timer (secs): 0
  data bytes 523/566 packets 13/12 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
pathos#
```

Nesle

```
nesle#show x25 route
  #  Match                          Substitute          Route to
  1  input-int Serial2                                  Serial0
  2  input-int Serial3                                  Serial0
  3  dest 555                                           Serial2
  4  dest 666                                           Serial3

nesle#show x25 interface serial 0
SVC 1,  State: D1,  Interface: Serial0
  Started 00:32:47, last input 00:32:46, output 00:32:46
  Connects 55512 <--> 2224 from Serial2 SVC 10
  Window size input: 2, output: 2
  Packet size input: 128, output: 128
  PS: 7  PR: 0  ACK: 0  Remote PR: 6  RCNT: 0  RNR: no
  P/D state timeouts: 0  timer (secs): 0
  data bytes 441/463 packets 7/8 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
SVC 2,  State: D1,  Interface: Serial0
  Started 00:32:47, last input 00:32:46, output 00:32:46
  Connects 66620 <--> 123456789012345 from Serial3 SVC 1024
  Window size input: 2, output: 2
  Packet size input: 128, output: 128
  PS: 4  PR: 5  ACK: 5  Remote PR: 2  RCNT: 0  RNR: no
  Window is closed
  P/D state timeouts: 0  timer (secs): 0
  data bytes 566/523 packets 12/13 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
nesle#show x25 interface serial 2
SVC 10,  State: D1,  Interface: Serial2
  Started 00:32:51, last input 00:32:50, output 00:32:50
  Connects 55512 <--> 2224 to Serial0 SVC 1
  Window size input: 2, output: 2
  Packet size input: 128, output: 128
  PS: 0  PR: 7  ACK: 6  Remote PR: 0  RCNT: 1  RNR: no
  P/D state timeouts: 0  timer (secs): 0
  data bytes 463/441 packets 8/7 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
nesle#show x25 interface serial 3
SVC 1024,  State: D1,  Interface: Serial3
  Started 00:32:53, last input 00:32:52, output 00:32:52
  Connects 66620 <--> 123456789012345 to Serial0 SVC 2
  Window size input: 2, output: 2
  Packet size input: 128, output: 128
  PS: 5  PR: 4  ACK: 2  Remote PR: 5  RCNT: 2  RNR: no
  P/D state timeouts: 0  timer (secs): 0
  data bytes 523/566 packets 13/12 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
```

Namur

```
namur#show dspu
dspu host OZDEN Serial1 (QLLC) PU STATUS Active
     FRAMES RECEIVED 8 FRAMES SENT 8
     LUs USED BY DSPU 0 LUs ACTIVE 0
     LUs USED BY API 0 LUs ACTIVE 0
     LUs ACTIVATED BY HOST BUT NOT USED 0

namur#show x25 interface serial 1
SVC 10,  State: D1,  Interface: Serial1
  Started 00:34:55, last input 00:34:54, output 00:34:54
  Connects 2224 <-->
   qllc
  Window size input: 7, output: 7
  Packet size input: 128, output: 128
  PS: 7  PR: 0  ACK: 0  Remote PR: 6  RCNT: 0  RNR: no
  P/D state timeouts: 0  timer (secs): 0
  data bytes 441/463 packets 7/8 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
namur#
```

Goode

```
goode#show dspu
dspu host GOODE Serial1 (QLLC) PU STATUS Active
     FRAMES RECEIVED 18 FRAMES SENT 18
     LUs USED BY DSPU 0 LUs ACTIVE 0
     LUs USED BY API 0 LUs ACTIVE 0
     LUs ACTIVATED BY HOST BUT NOT USED 5

goode#show x25 interface serial 1
SVC 1024,  State: D1,  Interface: Serial1
  Started 00:41:25, last input 00:41:25, output 00:41:25
  Connects 123456789012345 <-->
   qllc
  Window size input: 2, output: 2
  Packet size input: 128, output: 128
  PS: 4  PR: 5  ACK: 5  Remote PR: 2  RCNT: 0  RNR: no
  Window is closed
  P/D state timeouts: 0  timer (secs): 0
  data bytes 566/523 packets 12/13 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
goode#
```

Troubleshoot

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

Related Information

- **Data−Link Switching Plus (DLSw+) Technology Support Page**
- **IBM Technology Support**
- **Technical Support & Documentation − Cisco Systems**

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