SDLC FEP−to−FEP (PU4−to−PU4) with a DLSW Solution

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Introduction

This document provides a solution for the connection of a Synchronous Data Link Control (SDLC) attached IBM Front End Processor (FEP) to another SDLC attached FEP with use of a Data Link Switching (DLSW).

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

The information in this document is based on Cisco IOS® Software with IBM features.

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

Refer to the Cisco Technical Tips Conventions for more information on document conventions.

New SDLC Address Option PRIONLY

This setup is possible with use of this new configuration option under the SDLC interface:

sdlc address *xx* prionly

Where *xx* is the SDLC address in hexadecimal format.

Introduced in Cisco bug ID CSCea39508 (registered customers only) , this command is available in Cisco IOS® Software versions 012.002(017.006), 12.3(01.07)T, 12.2(17.05)S, 012.003(001.007), and later.

This change allows the router, when configured as `prionly`, to send a Set Normal Response Mode (SNRM) to the SDLC address of FF instead of the configured SDLC address on the interface. If configured as the primary, the router sends a SNRM to the SDLC address configured on the interface. If the FEP receives an SNRM to an address other than the FF address, the FEP responds with a disconnect request (DISC). If the SNRM is sent to the FF address, the FEP responds with its SDLC address and a unnumbered acknowledgment (UA).

SDLC Address

In example shown in the SDLC Interface Maximum MTU Size section of this document, one FEP is the primary and the other is the secondary. The SDLC address that is used is determined by the secondary FEP. On the routers, configure `prionly` to connect to the secondary FEP and `seconly` to connect to the primary FEP. It is not necessary to know the SDLC address of the primary FEP. The SDLC address is set by the router that uses `seconly`. You do need to know the SDLC address of the secondary FEP. This is achieved in two ways:

- Count the number of lines in the generation (gen) deck. If this is the fourth line, the address is 04.
- Configure the SDLC address in the Network Control Program (NCP) gen, with use of the TADDR parameter on the NCP LINE definition. In this example, TADDR=04.

SDLC Modulo Support

This feature only supports MODULO 8 for the SDLC connection. You must make sure that the SDLC group or line and SDLCST groups have `MODULO = 8` and `MAXOUT = 7` configured.

SDLC Interface Maximum MTU Size

Complete these steps to set the Maximum Transmission Unit (MTU) size:

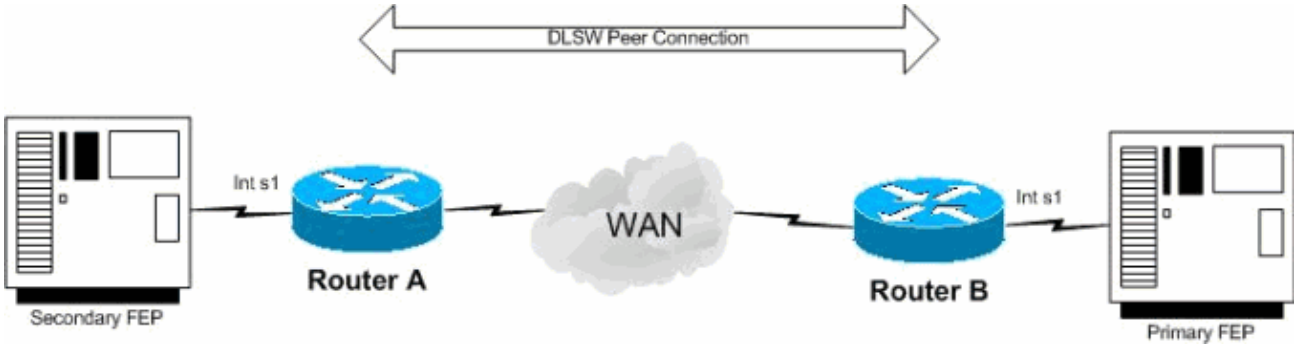
1. Configure the router SDLC interface MTU size to be slightly bigger than the value of the maximum packet size that NCP sends down the line.

   The maximum amount of data a line can send is TRANSFR * BFRS − 18 (BFRS on build statement, TRANSFR is coded on the line, 18 is the NCP buffer header size). Alternatively, check the value of `MAXDATA` in the channel and attach major nodes for the FEP, as the FEP cannot send a packet bigger than it receives from the Virtual Telecommunications Access Method (VTAM).
2. Configure SDLC N1 to equal (MTU + 2) * 8. This is the MTU size plus two bytes (of SDLC header). N1 is coded in bits (therefore * 8). The MTU is coded in bytes.

   For example, these are common values:

   - mtu 4096
   - sdlc n1 32784

This image shows an example of the topology:



This is the sample command output from Router A and B:

Router A

```
!
dlsw local-peer peer-id 1.1.1.1
dlsw remote-peer 0 tcp 2.2.2.2
!
interface Serial1
description SDLC configuration PU4/PU4
mtu 4096
no ip address
encapsulation sdlc
no keepalive
clockrate 19200
sdlc vmac 4000.1111.0000
sdlc N1 32784
sdlc address 04 prionly
sdlc partner
4000.3745.0004 04 sdlc
dlsw 4
!
```

Router B

```
!
dlsw local-peer peer-id 2.2.2.2
dlsw remote-peer 0 tcp 1.1.1.1
!
interface Serial1
description SDLC configuration PU4/PU4
mtu 4096
no ip address
encapsulation sdlc
no keepalive
clockrate 19200
sdlc vmac 4000.3745.0000
sdlc N1 32784
sdlc address 04 seconly
sdlc partner 4000.1111.0004 04
sdlc dlsw 4
!
```

This is an example of the flow between Router B (which is set to the secondary SDLC role) and the FEP with the SDLC role set as primary:

```
FEP                                                    Router B
```

```
     -----------XID, negotiate/echo on--->

                          <------XID, secondary, no echo------

     -----------XID, primary, no echo----->

     <-------------------------XID Exchange--------------------->

     -------------SNRM to the address FF---->
dlsw contact--->

                                          sabme---------->

                 <---------ua

<---------dlsw contacted

                                IOS waits for the next SNRM

      -------------SNRM to the address FF---->

                          <-----------UA ---------------------
```

Note: Notice that echo is turned off. Also, notice that the remote NCP load is *not* supported over this configuration.

Troubleshoot

Use this section to troubleshoot your configuration.

Troubleshooting Procedure

Follow these instructions to troubleshoot your configuration.

1. Ensure the SDLC partner MAC address configured in the router matches the Cisco Channel Interface Processor (CIP) adapter MAC address (if CIP is used), or the FEP Token Ring interface coupler (TIC) MAC address.
2. Make sure that the PU4 MAC address configured in the XCA major node definition (if CIP is used) or in the TIC logical definitions matches the SDLC−attached router Virtual Media Access Control (VMAC) + SDLC address.

   Note: Remember that the SDLC address is used to modify the last byte of the SDLC VMAC.
3. Use the router **show interface serial *x/y*** command to display the statistics related to the SDLC interface. Make sure that input and output packets are being recorded there.

   Note: If any of the counters is equal to zero, check the HDX/FDX and nonreturn to zero (NRZ) or nonreturn to zero inverted (NRZI) settings. By default, Cisco IOS defaults to NRZ encoding and full duplex.
4. If the DLSw+ circuit fails to connect, issue the **show dlsw reachability** command in order to verify that the routers have the correct information with regard to the location of the MAC addresses involved.

If the SDLC VMAC address does not appear, check to see if the SDLC interface is `UP` and that input and output packets counters are incrementing.

If the CIP adapter or FEP TIC MAC address is missing from the reachability table, perform standard CIP Cisco Systems Network Architecture (CSNA) troubleshooting (if CIP is used). Also, check the physical status of the TIC (if an FEP token ring subarea is used).

Remember that the reachability information is only used during circuit setup and never used afterwards. Therefore, one can end up in a situation where the reachability table is empty but there are working DLSw+ circuits.

5. If the exchange identification (XID) is sent on only one side, verify that both sides are pending contact (such as PCTD1 or PCTD2).
6. If both sides continuously send XIDs, check the TG active bit.
7. If the SNRM is answered with a Disconnect Mode (DM), it is possible the FEP is sending a Set Normal Response Mode Extended (SNRME) instead of an SNRM.

   A Cisco router doing local acknowledgment (ACK) for an SDLC interface does not accept an incoming SNRME (which attempts to set the window size to 128). This is not supported, so check that the MAXOUT parameter is not greater than seven (7).
8. Another case in which the router can send a DM is when the FEP is supposed to send an FFSNRM, but sends an @SNRM instead. If echo is `OFF`, the router expects to receive an FFSNRM.
9. Check the XID2 error byte (byte 18) for non−zero values. Bytes 18 and 19 are easy to spot; look for the load module name as it is at byte 20.

   In a case where the SDLC router receives SNRM, Cisco IOS waits for the next SNRM after the DLSW contact is completed. If NCP has a reply to code greater than 40s, the Cisco IOS SDLC code times out the connection. The reply to must be coded between one and three seconds.
10. Issue the **show dlsw circuit** command in order to verify the status of the connection. Look for the `STATE` to be equal to `CONNECTED`.

    If only one router is used (that is, DLSw+ local switching), issue the **show dlsw local** command.

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Related Information

- **SDLLC (Synchronous Data Link Logical Link Control)**
- **Technical Support − Cisco Systems**

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