Computer Networks Lab
Oct 26, 2021
Experiment -14

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L2 - SWE

Aim: To configure HDLC configuration using CLI.
Theory:
a.   HDLC is a bit-oriented synchronous data link layer protocol developed by the International Organization for Standardization (ISO). The current standard for HDLC is ISO 13239.

b.   HDLC was developed from the synchronous data link control (SDLC) standard proposed in the 1970s. In addition, it provides connection-oriented and offline service.

c.   HDLC uses synchronous serial transmission, which provides error-free communication between two points. It also defines a layer 2 frame structure that allows flow and error control through the use of acknowledgments. Each frame has the same format as either a data frame or a control frame.

d.   When frames are transmitted by synchronous or asynchronous links, those links have no mechanism to mark either the beginning or the end of the frames. For this reason, HDLC uses a frame delimiter, or indicator, to mark the beginning and end of each frame.

e.   HDLC is a layer two protocol that provides an encapsulation method for serial link. Serial link and Ethernet link both use different encapsulation methods for data transmission. Serial link cannot carry the frame formatted with Ethernet encapsulation and vice versa Ethernet link cannot carry the frame formatted through the Serial encapsulation. HDLC is an encapsulation method for serial links.

Experiment 14: HDLC

Se2/0 ⊙ 1.0.0.1 1.0.0.2 Se2/0

Router-PT
Router0

Router-PT
Router1

CLI:

```
Router1

Physical   Config   CLI   Attributes

Would you like to enter the initial configuration dialog? [yes/no]: n


Press RETURN to get started!



Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Serial2/0
Router(config-if)#ip address 1.0.0.2 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config-if)#encapsulation hdlc
Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show interface se2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 1.0.0.2/8
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/0/256 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
     Available Bandwidth 96 kilobits/sec
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
     DCD=up  DSR=up  DTR=up  RTS=up  CTS=up

Router#
```

Physical   Config   CLI   Attributes

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Serial2/0
Router(config-if)#ip address 1.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config-if)#encapsulation hdlc
Router(config-if)#clock rate 128000
Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
Router#show interface Se2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 1.0.0.1/8
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/0/256 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
     Available Bandwidth 96 kilobits/sec
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
     DCD=up  DSR=up  DTR=up  RTS=up  CTS=up

Router#
```

Result: HDLC configuration was successfully verified.