MẠNG MÁY TÍNH

CHƯƠNG 4 (Bài 3)

THỰC HÀNH PPP – FRAME RELAY

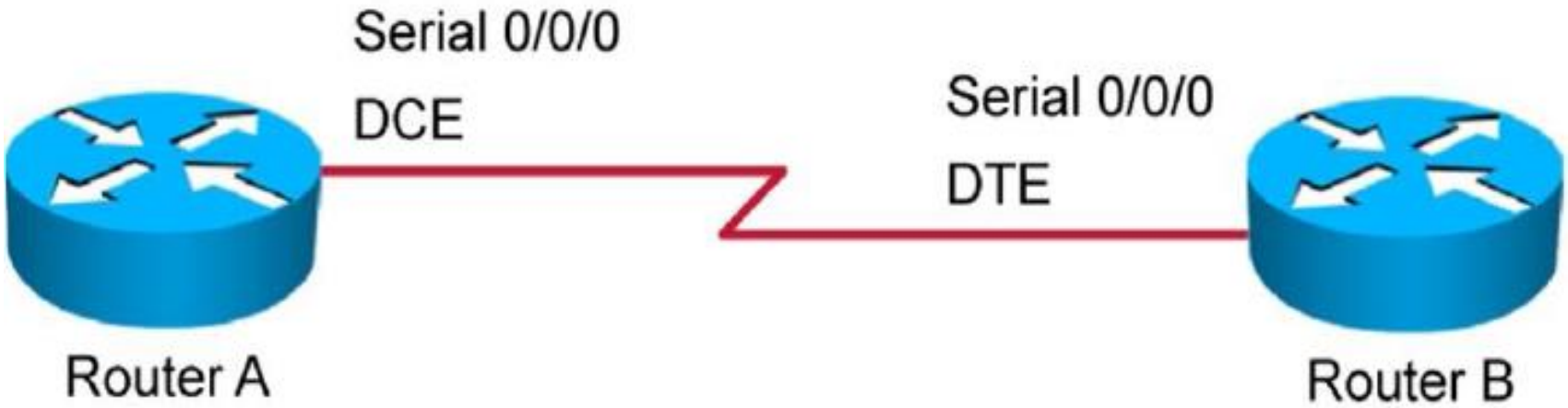
Khoa CNTT – HV KTMM

Nội dung

- Cấu hình PPP với các giao thức xác thực:
  - PAP
  - CHAP
- Bài tập thực hành
  - PPP: PAP, CHAP
  - Frame Relay

KẾT NỐI SERIAL

Configuration of a Serial Interface

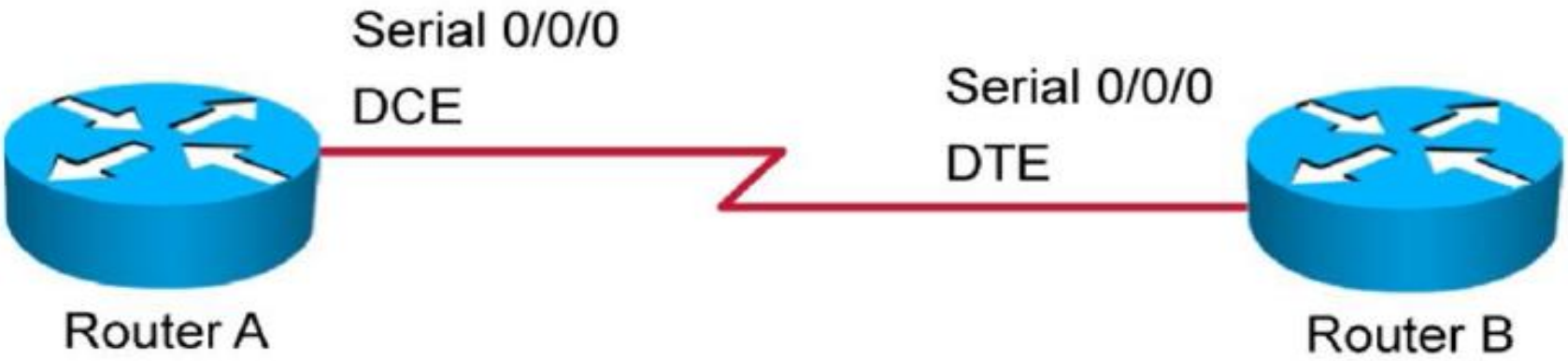



```
RouterA(config)#interface Serial 0/0/0
RouterA(config-if)#clockrate 64000
RouterA(config-if)#bandwidth 64
RouterA(config-if)#no shutdown
```

Configuration of serial interface on Router A

KẾT NỐI SERIAL

Configuration of a Serial Interface (Cont.)



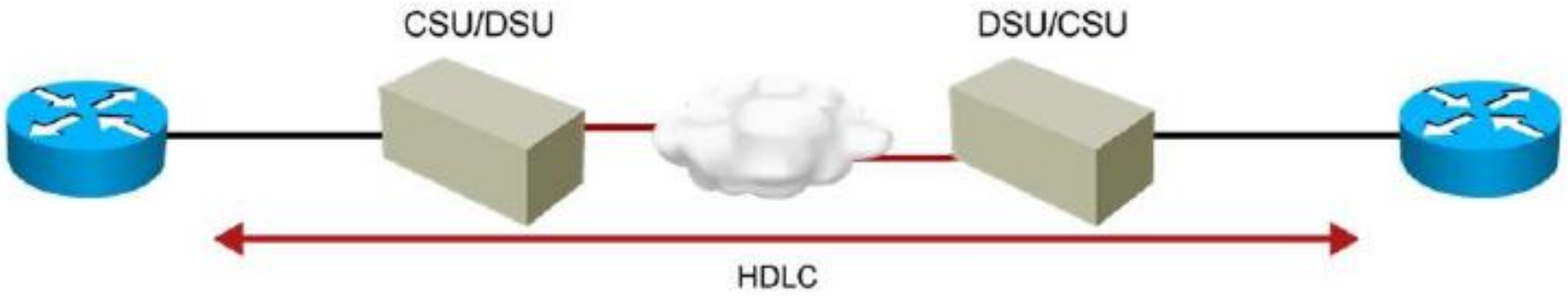

```
RouterB(config)#interface Serial 0/0/0
RouterB(config-if)#bandwidth 64
RouterB(config-if)#no shutdown
```

Configuration of serial interface on Router B

```
RouterB#show controllers Serial 0/0/0
Interface Serial0/0/0
Hardware is GT96K
DTE V.35idb at 0x4753C1F4, driver data structure at 0x47543900
wic_info 0x47543F2C
Physical Port 1, SCC Num 1
<text omitted>
```

HDLC PROTOCOL

HDLC specifies an encapsulation method for data on synchronous serial data links.



HDLC

Flag	Address	Control	Data	FCS	Flag

Cisco HDLC

Flag	Address	Control	Proprietary	Data	FCS	Flag

FCS = Frame Check Sequence

HDLC PROTOCOL

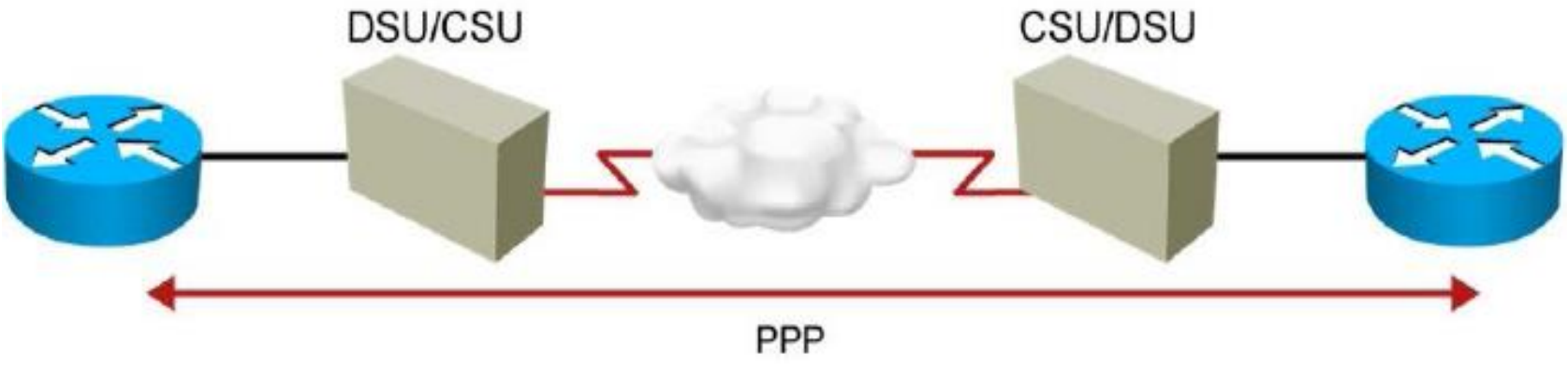
```
RouterA#show interfaces Serial 0/0/0
Serial0/0/0 is up, line protocol is up
 Hardware is GT96K Serial
  Description: Link to HQ
  Internet address is 192.168.1.1/24
  MTU 1500 bytes, BW 1544 Kbit/sec, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set
  Keepalive set (10 sec)
  CRC checking enabled
  Last input 00:00:02, output 00:00:05, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/1/256 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
     Available Bandwidth 1158 kilobits/sec
<output omitted>
```

- Verifies correct configuration of HDLC encapsulation on RouterA Serial 0/0/0 interface. By default, Cisco devices use the Cisco HDLC serial encapsulation method on synchronous serial lines.

POINT-TO-POINT PROTOCOL (PPP)

Overview of PPP:

- PPP provides a standard method for transporting datagrams over point-to-point links.
- PPP supports authentication.

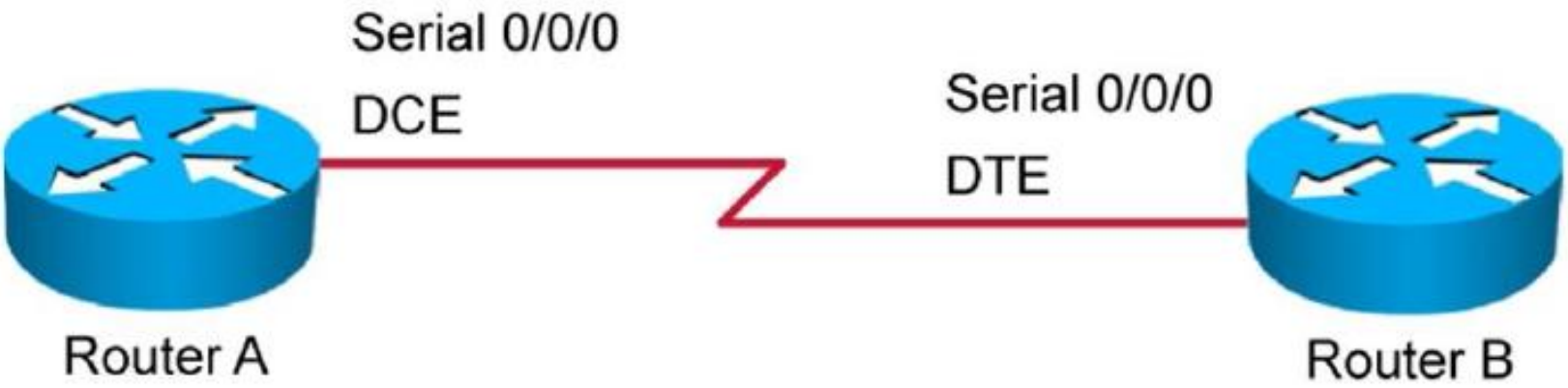


PPP

Flag	Address	Control	Protocol	Data	FCS	Flag

POINT-TO-POINT PROTOCOL (PPP)

PPP Configuration

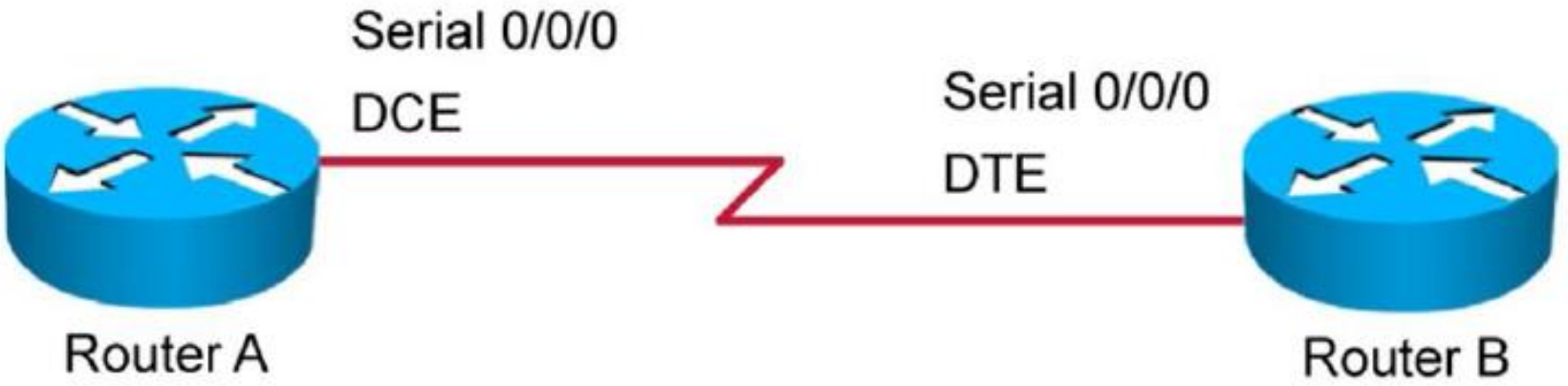



```
RouterA(config)#interface Serial 0/0/0
RouterA(config-if)#ip address 10.0.1.1 255.255.255.0
RouterA(config-if)#encapsulation ppp
RouterA(config-if)#bandwidth 512
RouterA(config-if)#clockrate 64000
RouterA(config-if)#no shutdown
```

PPP configuration on Router A

POINT-TO-POINT PROTOCOL (PPP)

PPP Configuration (Cont.)




```
RouterB(config)#interface Serial 0/0/0
RouterB(config-if)#ip address 10.0.1.2 255.255.255.0
RouterB(config-if)#encapsulation ppp
RouterB(config-if)#bandwidth 512
RouterB(config-if)#no shutdown
```

PPP configuration on Router B

POINT-TO-POINT PROTOCOL (PPP)

PPP Configuration (Cont.)

```
RouterA#show interfaces Serial 0/0/0
Serial0/0/0 is up, line protocol is up
  Hardware is GT96K Serial
  Description: Link to RouterB
  Internet address is 10.0.1.1/24
  MTU 1500 bytes, BW 512 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, LCP Open
  Open: IPCP, CDPCP, loopback not set
  Keepalive set (10 sec)
  CRC checking enabled
  Last input 00:00:36, output 00:00:01, output hang never
  Last clearing of "show interface" counters 00:01:09
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/1/256 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
     Available Bandwidth 384 kilobits/sec
<output omitted>
```

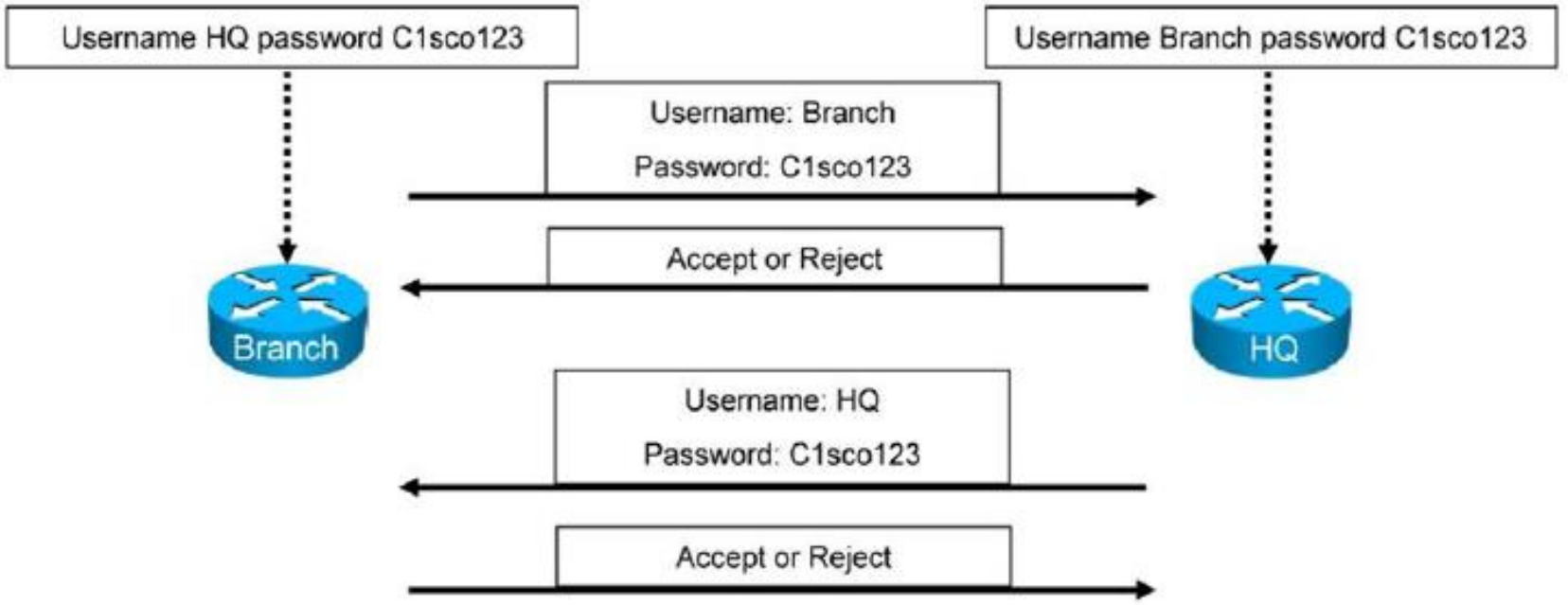
Verifies that proper encapsulation is enabled on the Serial 0/0/0 interface.

POINT-TO-POINT PROTOCOL (PPP)

PPP Authentication: PAP

Password Authentication Protocol:

- Passwords are sent in plaintext.
- The peer is in control of attempts.

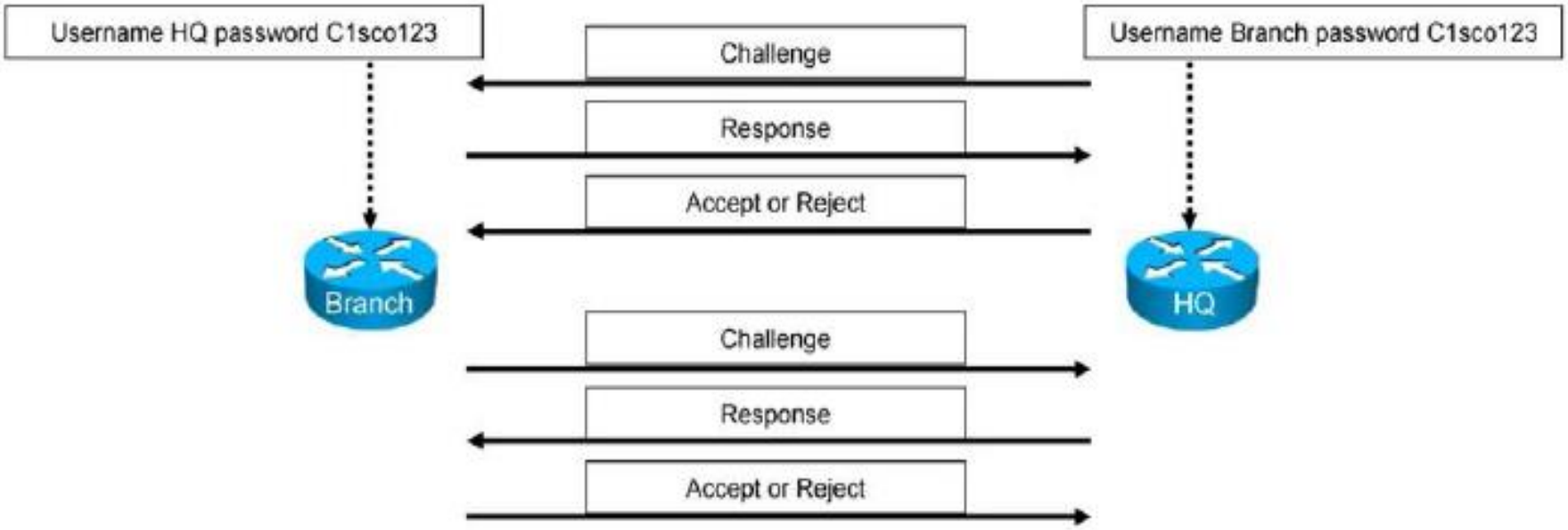


POINT-TO-POINT PROTOCOL (PPP)

PPP Authentication: CHAP

Challenge Handshake Authentication Protocol:

- Hash values, not actual passwords, are sent across the link.
- The local router or external server is in control of authentication attempts.



POINT-TO-POINT PROTOCOL (PPP)

Configuring CHAP for PPP Authentication

Enabling PPP

- ☑ PPP encapsulation

Enabling PPP Authentication

- ☑ Hostname
- ☑ Username and password
- ☑ PPP authentication

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- ☑ Username and password
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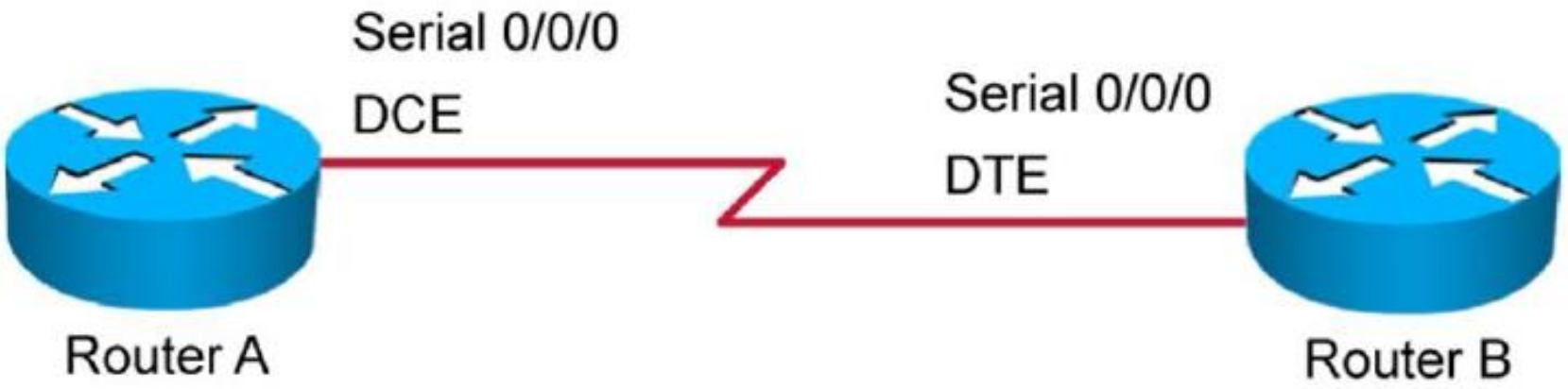
POINT-TO-POINT PROTOCOL (PPP)

Configuring CHAP for PPP Authentication

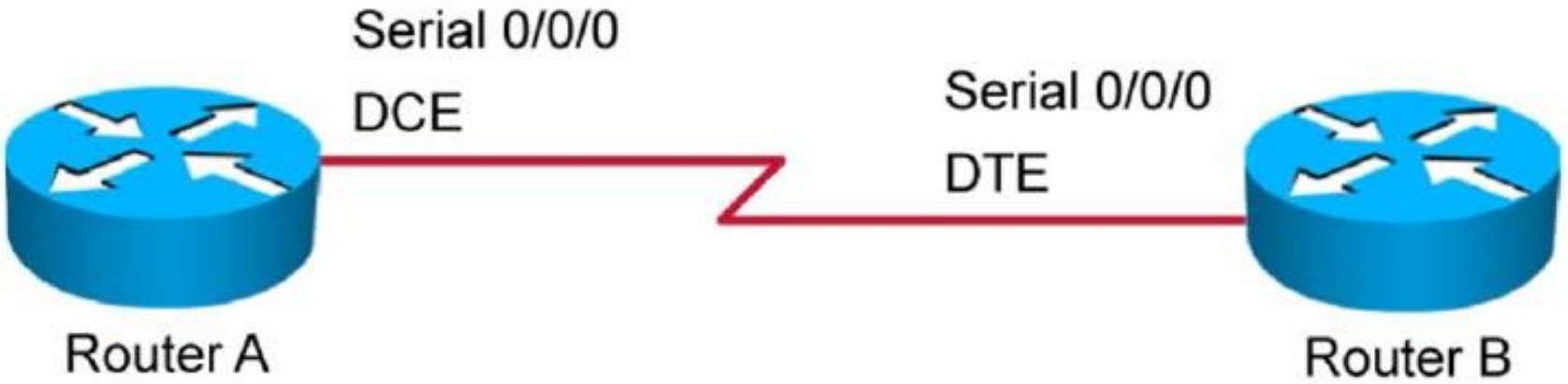



```
Router(config)#hostname RouterA
RouterA(config)#username RouterB password C1sco123
RouterA(config)#interface Serial 0/0/0
RouterA(config-if)#ip address 10.0.1.1 255.255.255.0
RouterA(config-if)#encapsulation ppp
RouterA(config-if)#ppp authentication chap
RouterA(config-if)#clockrate 64000
```

Configuring CHAP authentication on Router A

POINT-TO-POINT PROTOCOL (PPP)

Configuring CHAP for PPP Authentication




```
Router(config)#hostname RouterB
RouterB(config)#username RouterA password C1sco123
RouterB(config)#interface Serial 0/0/0
RouterB(config-if)#ip address 10.0.1.2 255.255.255.0
RouterB(config-if)#encapsulation ppp
RouterB(config-if)#ppp authentication chap
```

Configuring CHAP authentication on Router B

POINT-TO-POINT PROTOCOL (PPP)

Verifying CHAP Configuration (Cont.)

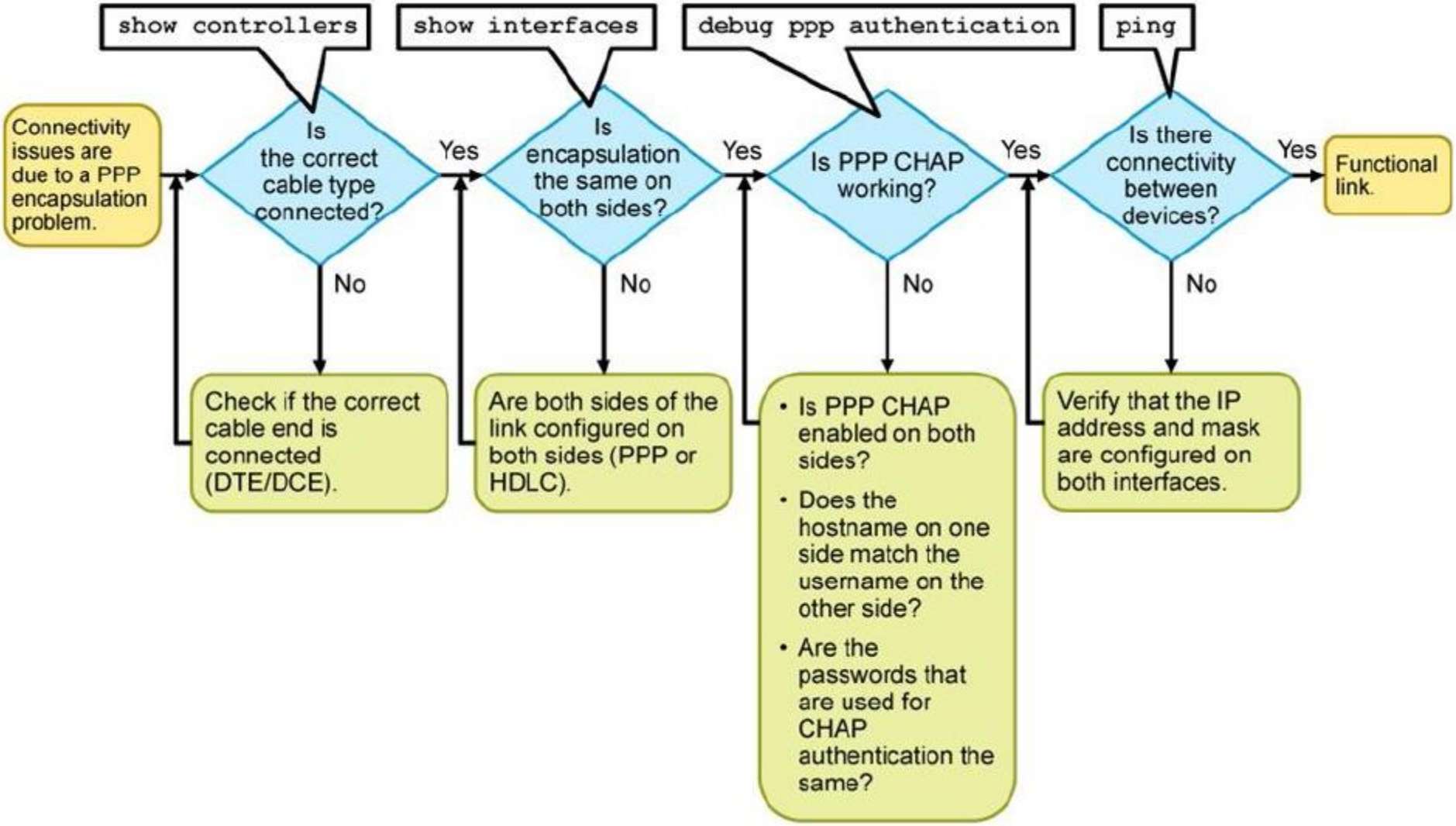
```
RouterA#show interfaces Serial 0/0/0
```

```
RouterA#debug ppp authentication
Oct 23 11:08:10.642: %LINK-3-UPDOWN: Interface Serial0/0/0, changed state
to up
Oct 23 11:08:10.642: Se0/0/0 PPP: Authorization required
Oct 23 11:08:10.674: Se0/0/0 CHAP: O CHALLENGE id 4 len 28 from "RouterX"
Oct 23 11:08:10.718: Se0/0/0 CHAP: I CHALLENGE id 1 len 28 from "RouterY"
Oct 23 11:08:10.718: Se0/0/0 CHAP: Using hostname from unknown source
Oct 23 11:08:10.718: Se0/0/0 CHAP: Using password from AAA
Oct 23 11:08:10.718: Se0/0/0 CHAP: O RESPONSE id 1 len 28 from "RouterX"
Oct 23 11:08:10.722: Se0/0/0 CHAP: I RESPONSE id 4 len 28 from "RouterY"
Oct 23 11:08:10.722: Se0/0/0 PPP: Sent CHAP LOGIN Request
Oct 23 11:08:10.726: Se0/0/0 PPP: Received LOGIN Response PASS
Oct 23 11:08:10.726: Se0/0/0 PPP: Sent LCP AUTHOR Request
Oct 23 11:08:10.726: Se0/0/0 PPP: Sent IPCP AUTHOR Request
Oct 23 11:08:10.726: Se0/0/0 LCP: Received AAA AUTHOR Response PASS
Oct 23 11:08:10.726: Se0/0/0 IPCP: Received AAA AUTHOR Response PASS
Oct 23 11:08:10.726: Se0/0/0 CHAP: O SUCCESS id 4 len 4
Oct 23 11:08:10.742: Se0/0/0 CHAP: I SUCCESS id 1 len 4
Oct 23 11:08:11.742: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to up
```

The **debug ppp authentication** command shows the successful CHAP output and verifies PPP authentication.

POINT-TO-POINT PROTOCOL (PPP)

Troubleshooting Serial Connections



PPP - HDLC

- Ngoài giao thức HDLC được ISO phát triển, có giao thức HDLC thực thi trên riêng các thiết bị Cisco, và là phương thức đóng gói mặc định cho các đường kết nối Serial trên các Router Cisco
- PPP là giao thức lớp 2 phổ dụng cho WAN. PPP có 2 thành phần: LCP thỏa thuận kết nối, và NCP đóng gói luồng dữ liệu
- Để cài đặt PPP như là giao thức đóng gói được sử dụng bởi các interface serial, sử dụng câu lệnh ***encapsulation ppp*** trong chế độ cấu hình interface
- Có thể cấu hình PPP sử dụng các phương thức xác thực PAP hay CHAP. PAP gửi mọi thứ dưới dạng rõ (plaintext), trong khi CHAP sử dụng hàm băm MD5
- Với xác thực CHAP, thiết bị ở xa phải có đầu vào trên router cục bộ (local router) là username chính xác, cùng với một password phù hợp.

Bài tập thực hành

- 04 bài tập cuối Chương 4 – Giáo trình

Khoa CNTT – HV KTMM