

Laboratório 2.5.1: Laboratório de configuração PPP básica

Diagrama de topologia

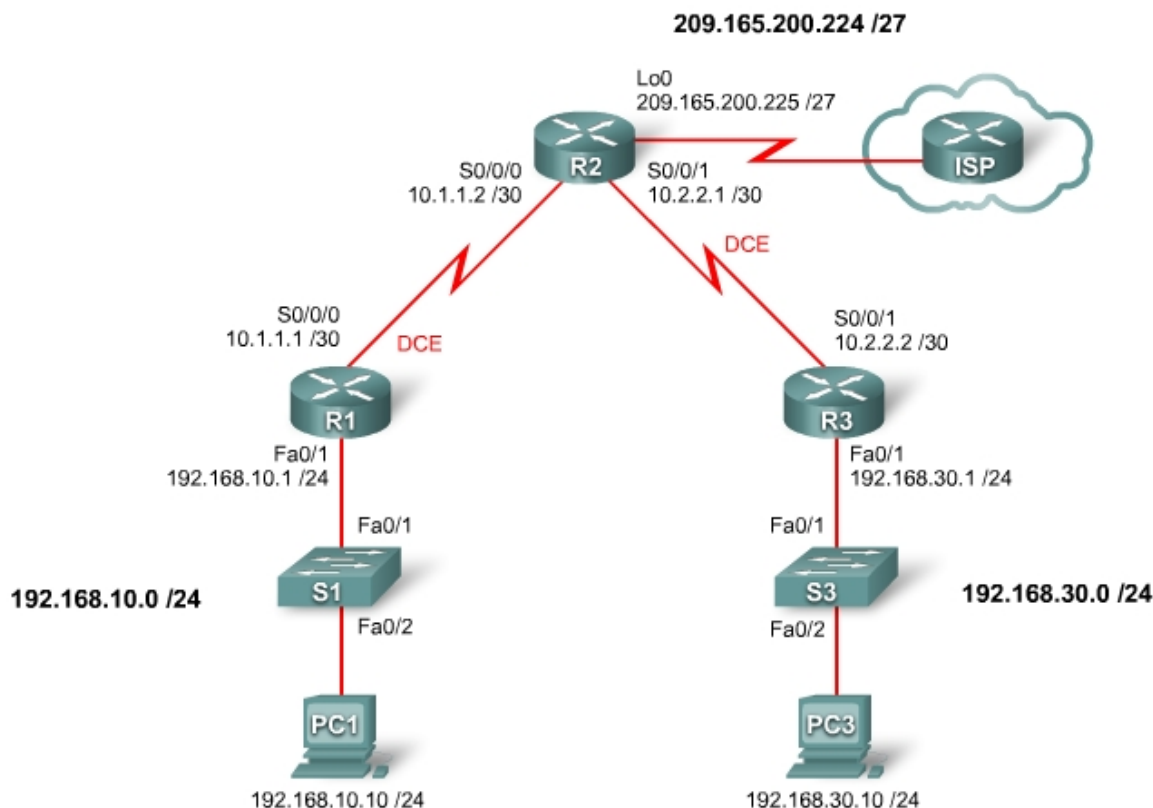


Tabela de endereçamento

Dispositivo	Interface	Endereço IP	Máscara de sub-rede	Gateway padrão
R1	Fa0/1	192.168.10.1	255.255.255.0	N/A
	S0/0/0	10.1.1.1	255.255.255.252	N/A
R2	Lo0	209.165.200.225	255.255.255.224	N/A
	S0/0/0	10.1.1.2	255.255.255.252	N/A
	S0/0/1	10.2.2.1	255.255.255.252	N/A
R3	Fa0/1	192.168.30.1	255.255.255.0	N/A
	S0/0/1	10.2.2.2	255.255.255.252	N/A
PC1	Placa de rede	192.168.10.10	255.255.255.0	192.168.10.1
PC3	Placa de rede	192.168.30.10	255.255.255.0	192.168.30.1

Objetivos de aprendizagem

Após concluir este laboratório, você será capaz de:

- Cabo de rede de acordo com o diagrama de topologia.
- Apagar a configuração de inicialização e recarregar o roteador no estado padrão.
- Executar tarefas de configuração básica em um roteador.
- Configurar e ativar interfaces.
- Configurar o roteamento OSPF em todos os roteadores.
- Configurar o encapsulamento PPP em todas as interfaces seriais.
- Obter informações sobre os comandos **debug ppp negotiation** e **debug ppp packet**.
- Saber como alterar o encapsulamento nas interfaces seriais de PPP para HDLC.
- Interrromper intencionalmente e restaurar o encapsulamento PPP CHAP.
- Configurar a autenticação PPP PAP e CHAP.
- Interrromper intencionalmente e restaurar a autenticação PPP PAP e CHAP.

Cenário

Neste laboratório, você irá aprender a configurar o encapsulamento PPP em links seriais usando a rede mostrada no diagrama da topologia. Você também aprenderá a restaurar links seriais aos seus encapsulamentos de HDLC padrão. Preste atenção especial na saída do roteador quando você interrompe intencionalmente o encapsulamento PPP. Isso o ajudará no laboratório de identificação e solução de problemas associado a este capítulo. Por fim, você irá configurar as autenticações PPP PAP e PPP CHAP.

Tarefa 1: Preparar a rede

Etapla 1: Cabear uma rede de maneira semelhante à presente no diagrama de topologia.

Você pode utilizar qualquer roteador atual em seu laboratório contanto que ele tenha as interfaces exigidas mostradas no diagrama da topologia.

Nota: se você utilizar roteadores 1700, 2500 ou 2600, as saídas do comando do roteador e as descrições da interface serão exibidas de maneira diferente.

Etapla 2: Apagar todas as configurações existentes nos roteadores.

Tarefa 2: Executar as configurações básicas do roteador

Configure os roteadores R1, R2 e R3 de acordo com as seguintes diretrizes:

- Configure o nome de host do roteador.
- Desabilite a pesquisa DNS.
- Configure uma senha no modo EXEC.
- Configure um banner da mensagem do dia.
- Configure uma senha para as conexões de console.

- Configure o log síncrono.
- Configure uma senha para as conexões vty.

Tarefa 3: Configurar e ativar endereços Ethernet e Serial

Etapa 1: Configurar interfaces em R1, R2 e R3.

Configure as interfaces nos roteadores R1, R2 e R3 com os endereços IP da tabela de endereçamento no início do laboratório. Não se esqueça de incluir o clock rate nas interfaces DCE seriais.

Etapa 2: Verificar endereçamento IP e interfaces.

Utilize o comando **show ip interface brief** para verificar se o endereçamento IP está correto e se as interfaces estão ativas.

Quando você terminar, não se esqueça de salvar a configuração de execução na NVRAM do roteador.

Etapa 3: Configurar as interfaces Ethernet de PC1 e PC3.

Configure as interfaces Ethernet de PC1 e PC3 com os endereços IP e os gateways padrão da tabela de endereçamento.

Etapa 4: Testar a configuração, executando ping para o gateway padrão a partir do PC.

Tarefa 4: Configurar OSPF nos roteadores

Se você precisar revisar os comandos OSPF, consulte Exploration 2, módulo 11.

Etapa 1: Habilitar roteamento OSPF em R1, R2 e R3.

Utilize o comando **router ospf** com um ID de processo 1. Não se esqueça de anunciar as redes.

```
R1(config)#router ospf 1
R1(config-router)#network 192.168.10.0 0.0.0.255 area 0
R1(config-router)#network 10.1.1.0 0.0.0.3 area 0
*Aug 17 17:49:14.689: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.200.225 on
Serial0/0/0 from LOADING to FULL, Loading Done
R1(config-router)#
```

```
R2(config)#router ospf 1
R2(config-router)#network 10.1.1.0 0.0.0.3 area 0
*Aug 17 17:48:40.645: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.10.1 on
Serial0/0/0 from LOADING to FULL, Loading Done
R2(config-router)#network 10.2.2.0 0.0.0.3 area 0
R2(config-router)#network 209.165.200.224 0.0.0.31 area 0
R2(config-router)#
*Aug 17 17:57:44.729: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.30.1 on
Serial0/0/1 from LOADING to FULL, Loading Done
R2(config-router)#
```

```
R3(config)#router ospf 1
R3(config-router)#network 10.2.2.0 0.0.0.3 area 0
*Aug 17 17:58:02.017: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.200.225 on
Serial0/0/1 from LOADING to FULL, Loading Done
R3(config-router)#network 192.168.30.0 0.0.0.255 area 0
R3(config-router)#
```

Etapa 2: Verificar se você tem total conectividade de rede.

Use os comandos **show ip route** e **ping** para verificar a conectividade.

R1#**show ip route**

<saída do comando omitida>

```
O    192.168.30.0/24 [110/1563] via 10.1.1.2, 00:33:56, Serial0/0/0
C    192.168.10.0/24 is directly connected, FastEthernet0/1
    209.165.200.0/27 is subnetted, 1 subnets
O      209.165.200.225 [110/782] via 10.1.1.2, 00:33:56, Serial0/0/0
    10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
O      10.2.2.0/30 [110/1562] via 10.1.1.2, 00:33:56, Serial0/0/0
C      10.1.1.0/30 is directly connected, Serial0/0/0
```

R1#**ping 192.168.30.1**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.30.1, timeout is 2 seconds:

!!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 32/32/32 ms

R1#

R2#**show ip route**

<saída do comando omitida>

```
O    192.168.30.0/24 [110/782] via 10.2.2.2, 00:33:04, Serial0/0/1
O    192.168.10.0/24 [110/782] via 10.1.1.1, 00:33:04, Serial0/0/0
    209.165.200.0/27 is subnetted, 1 subnets
C      209.165.200.224 is directly connected, Loopback0
    10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C      10.2.2.0/30 is directly connected, Serial0/0/1
C      10.1.1.0/30 is directly connected, Serial0/0/0
```

R2#**ping 192.168.30.1**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.30.1, timeout is 2 seconds:

!!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 16/16/16 ms

R2#**ping 192.168.10.1**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.10.1, timeout is 2 seconds:

!!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 16/16/16 ms

R2#

R3#**show ip route**

<saída do comando omitida>

```
C    192.168.30.0/24 is directly connected, FastEthernet0/1
O    192.168.10.0/24 [110/1563] via 10.2.2.1, 00:32:01, Serial0/0/1
    209.165.200.0/27 is subnetted, 1 subnets
```

```
O      209.165.200.225 [110/782] via 10.2.2.1, 00:32:01, Serial0/0/1
      10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C      10.2.2.0/30 is directly connected, Serial0/0/1
O      10.1.1.0/30 [110/1562] via 10.2.2.1, 00:32:01, Serial0/0/1

R3#ping 209.165.200.225

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.225, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/16/16 ms
R3#ping 192.168.10.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/32/32 ms
R3#
```

Tarefa 5: Configurar o encapsulamento PPP em interfaces seriais

Etapa 1: Utilizar o comando show interface para verificar se HDLC é o encapsulamento serial padrão.

```
R1#show interface serial0/0/0
Serial0/0/0 is up, line protocol is up
  Hardware is GT96K Serial
  Internet address is 10.1.1.1/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set
```

<saída do comando omitida>

```
R2#show interface serial 0/0/0
Serial0/0/0 is up, line protocol is up
  Hardware is GT96K Serial
  Internet address is 10.1.1.2/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set
```

<saída do comando omitida>

```
R2#show interface serial 0/0/1
Serial0/0/1 is up, line protocol is up
  Hardware is GT96K Serial
  Internet address is 10.2.2.1/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set
```

<saída do comando omitida>

```
R3#show interface serial 0/0/1
Serial0/0/1 is up, line protocol is up
  Hardware is GT96K Serial
  Internet address is 10.2.2.2/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set
```

<saída do comando omitida>

Etapa 2: Utilizar comandos de depuração em R1 e R2 para ver os efeitos da configuração de PPP.

```
R1#debug ppp negotiation
PPP protocol negotiation debugging is on
R1#debug ppp packet
PPP packet display debugging is on
R1#
```

```
R2#debug ppp negotiation
PPP protocol negotiation debugging is on
R2#debug ppp packet
PPP packet display debugging is on
R2#
```

Etapa 3: Alterar o encapsulamento das interfaces seriais de HDLC para PPP.

Altere o tipo de encapsulamento no link entre R1 e R2 e observe os efeitos. Se você começar a receber muitos dados de depuração, utilize o comando **undebug all** para desativá-la.

```
R1(config)#interface serial 0/0/0
R1(config-if)#encapsulation ppp
R1(config-if)#
*Aug 17 19:02:53.412: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.200.225 on
Serial0/0/0 from FULL to DOWN, Neighbor Down: Interface down or
detached
R1(config-if)#
*Aug 17 19:02:53.416: Se0/0/0 PPP: Phase is DOWN, Setup
*Aug 17 19:02:53.416: Se0/0/0 PPP: Using default call direction
*Aug 17 19:02:53.416: Se0/0/0 PPP: Treating connection as a dedicated
line
*Aug 17 19:02:53.416: Se0/0/0 PPP: Session handle[E4000001] Session
id[0]
*Aug 17 19:02:53.416: Se0/0/0 PPP: Phase is ESTABLISHING, Active Open
*Aug 17 19:02:53.424: Se0/0/0 LCP: O CONFREQ [Closed] id 1 len 10
*Aug 17 19:02:53.424: Se0/0/0 LCP:      MagicNumber 0x63B994DE
(0x050663B994DE)
R1(config-if)#
*Aug 17 19:02:55.412: Se0/0/0 PPP: Outbound cdp packet dropped
*Aug 17 19:02:55.432: Se0/0/0 LCP: TIMEout: State REQsent
*Aug 17 19:02:55.432: Se0/0/0 LCP: O CONFREQ [REQsent] id 2 len 10
*Aug 17 19:02:55.432: Se0/0/0 LCP:      MagicNumber 0x63B994DE
(0x050663B994DE)
*Aug 17 19:02:56.024: Se0/0/0 PPP: I pkt type 0x008F, datagramsize 24
link[illegal]
*Aug 17 19:02:56.024: Se0/0/0 UNKNOWN(0x008F): Non-NCP packet,
discarding
```

```
R1(config-if)#
*Aug 17 19:02:57.252: Se0/0/0 PPP: I pkt type 0x000F, datagramsize 84
link[illegal]
*Aug 17 19:02:57.252: Se0/0/0 UNKNOWN(0x000F): Non-NCP packet,
discarding
*Aug 17 19:02:57.448: Se0/0/0 LCP: TIMEout: State REQsent
*Aug 17 19:02:57.448: Se0/0/0 LCP: O CONFREQ [REQsent] id 3 len 10
*Aug 17 19:02:57.448: Se0/0/0 LCP:      MagicNumber 0x63B994DE
(0x050663B994DE)
R1(config-if)#
*Aug 17 19:02:58.412: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to down

R2(config)#interface serial 0/0/0
R2(config-if)#encapsulation ppp
R2(config-if)#
*Aug 17 19:06:48.848: Se0/0/0 PPP: Phase is DOWN, Setup
*Aug 17 19:06:48.848: Se0/0/0 PPP: Using default call direction
*Aug 17 19:06:48.848: Se0/0/0 PPP: Treating connection as a dedicated line
*Aug 17 19:06:48.848: Se0/0/0 PPP: Session handle[C6000001] Session id[0]
*Aug 17 19:06:48.848: Se0/0/0 PPP: Phase is ESTABLISHING, Active Open
*Aug 17 19:06:48.856: Se0/0/0 LCP: O CONFREQ [Closed] id 1 len 10
*Aug 17 19:06:48.856: Se0/0/0 LCP:      MagicNumber 0x63BD388C
(0x050663BD388C)
*Aug 17 19:06:48.860: Se0/0/0 PPP: I pkt type 0xC021, datagramsize 14
link[ppp]
*Aug 17 19:06:48.860: Se0/0/0 LCP: I CONFACK [REQsent] id 1 len 10
R2(config-if)#
*Aug 17 19:06:48.860: Se0/0/0 LCP:      MagicNumber 0x63BD388C
(0x050663BD388C)
R2(config-if)#
*Aug 17 19:06:50.864: Se0/0/0 LCP: TIMEout: State ACKrcvd
*Aug 17 19:06:50.864: Se0/0/0 LCP: O CONFREQ [ACKrcvd] id 2 len 10
*Aug 17 19:06:50.864: Se0/0/0 LCP:      MagicNumber 0x63BD388C
(0x050663BD388C)
*Aug 17 19:06:50.868: Se0/0/0 PPP: I pkt type 0xC021, datagramsize 14
link[ppp]
*Aug 17 19:06:50.868: Se0/0/0 LCP: I CONFREQ [REQsent] id 61 len 10
*Aug 17 19:06:50.868: Se0/0/0 LCP:      MagicNumber 0x63BDB9A8
(0x050663BDB9A8)
*Aug 17 19:06:50.868: Se0/0/0 LCP: O CONFACK [REQsent] id 61 len 10
*Aug 17 19:06:50.868: Se0/0/0 LCP:      MagicNumber 0x63BDB9A8
(0x050663BDB9A8)
*Aug 17 19:06:50.868: Se0/0/0 PPP: I pkt type 0xC021, datagramsize 14
link[ppp]
*Aug 17 19:06:50.868: Se0/0/0 LCP: I CONFACK [ACKsent] id 2 len 10
*Aug 17 19:06:50.868: Se0/0/0 LCP:      MagicNumber 0x63BD388C
(0x050663BD388C)
*Aug 17 19:06:50.868: Se0/0/0 LCP: State is Open
*Aug 17 19:06:50.872: Se0/0/0 PPP: Phase is FORWARDING, Attempting
Forward
*Aug 17 19:06:50.872: Se0/0/0 PPP: Phase is ESTABLISHING, Finish LCP
*Aug 17 19:06:50.872: Se0/0/0 PPP: Phase is UP
*Aug 17 19:06:50.872: Se0/0/0 IPCP: O CONFREQ [Closed] id 1 len 10
*Aug 17 19:06:50.872: Se0/0/0 IPCP:      Address 10.1.1.2
(0x03060A010102)
```

```
*Aug 17 19:06:50.872: Se0/0/0 CDPCP: O CONFREQ [Closed] id 1 len 4
*Aug 17 19:06:50.872: Se0/0/0 PPP: Process pending ncp packets
*Aug 17 19:06:50.876: Se0/0/0 PPP: I pkt type 0x8021, datagramsize 14
link[ip]
*Aug 17 19:06:50.876: Se0/0/0 IPCP: I CONFREQ [REQsent] id 1 len 10
*Aug 17 19:06:50.876: Se0/0/0 IPCP:      Address 10.1.1.1
(0x03060A010101)
*Aug 17 19:06:50.876: Se0/0/0 PPP: I pkt type 0x8207, datagramsize 8
link[cdp]
*Aug 17 19:06:50.876: Se0/0/0 IPCP: O CONFACK [REQsent] id 1 len 10
*Aug 17 19:06:50.876: Se0/0/0 IPCP:      Address 10.1.1.1
(0x03060A010101)
*Aug 17 19:06:50.876: Se0/0/0 CDPCP: I CONFREQ [REQsent] id 1 len 4
*Aug 17 19:06:50.876: Se0/0/0 CDPCP: O CONFACK [REQsent] id 1 len 4
*Aug 17 19:06:50.876: Se0/0/0 PPP: I pkt type 0x8021, datagramsize 14
link[ip]
*Aug 17 19:06:50.876: Se0/0/0 IPCP: I CONFACK [ACKse
R2(config-if)#nt] id 1 len 10
*Aug 17 19:06:50.876: Se0/0/0 IPCP:      Address 10.1.1.2
(0x03060A010102)
*Aug 17 19:06:50.876: Se0/0/0 IPCP: State is Open
*Aug 17 19:06:50.876: Se0/0/0 PPP: I pkt type 0x8207, datagramsize 8
link[cdp]
*Aug 17 19:06:50.876: Se0/0/0 IPCP: Install route to 10.1.1.1
*Aug 17 19:06:50.880: Se0/0/0 CDPCP: I CONFACK [ACKsent] id 1 len 4
*Aug 17 19:06:50.880: Se0/0/0 CDPCP: State is Open
*Aug 17 19:06:50.880: Se0/0/0 PPP: O pkt type 0x0021, datagramsize 80
*Aug 17 19:06:50.880: Se0/0/0 IPCP: Add link info for cef entry
10.1.1.1
*Aug 17 19:06:50.884: Se0/0/0 PPP: I pkt type 0x0021, datagramsize 80
link[ip]
*Aug 17 19:06:51.848: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to up
R2(config-if)#
*Aug 17 19:06:51.888: Se0/0/0 LCP-FS: I ECHOREQ [Open] id 1 len 12
magic 0x63BDB9A8
*Aug 17 19:06:51.888: Se0/0/0 LCP-FS: O ECHOREP [Open] id 1 len 12
magic 0x63BD388C
```

<saída do comando omitida>

```
*Aug 17 19:07:00.936: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.10.1 on
Serial0/0/0 from LOADING to FULL, Loading Done
```

O que acontece quando uma extremidade do link serial é encapsulado com PPP e a outra extremidade do link é encapsulado com HDLC?

Por quais etapas o PPP passa quando a outra extremidade do link serial em R2 está configurada com encapsulamento PPP?

O que acontece quando o encapsulamento PPP é configurado em cada extremidade do link serial?

Etapa 4: Desativar depuração.

Desative a depuração caso você ainda não tenha utilizado o comando **undebug all**.

```
R1#undebug all
```

```
Port Statistics for unclassified packets is not turned on.
```

```
All possible debugging has been turned off
```

```
R1#
```

```
R2#undebug all
```

```
Port Statistics for unclassified packets is not turned on.
```

```
All possible debugging has been turned off
```

```
R2#
```

Etapa 5: Alterar o encapsulamento de HDLC para PPP nas duas extremidades do link serial entre R2 e R3.

```
R2(config)#interface serial0/0/1
```

```
R2(config-if)#encapsulation ppp
```

```
R2(config-if)#
```

```
*Aug 17 20:02:08.080: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.30.1 on  
Serial0/0/1 from FULL to DOWN, Neighbor Down: Interface down or  
detached
```

```
R2(config-if)#
```

```
*Aug 17 20:02:13.080: %LINEPROTO-5-UPDOWN: Line protocol on Interface  
Serial0/0/1, changed state to down
```

```
R2(config-if)#
```

```
*Aug 17 20:02:58.564: %LINEPROTO-5-UPDOWN: Line protocol on Interface  
Serial0/0/1, changed state to up
```

```
R2(config-if)#
```

```
*Aug 17 20:03:03.644: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.30.1 on
Serial0/0/1 from LOADING to FULL, Loading Done
R2(config-if)#

*Aug 17 20:03:46.988: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/1, changed state to down
R3(config)#interface serial 0/0/1
R3(config-if)#encapsulation ppp
R3(config-if)#
*Aug 17 20:04:27.152: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/1, changed state to up
*Aug 17 20:04:30.952: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.200.225 on
Serial0/0/1 from LOADING to FULL, Loading Done
```

Quando o protocolo de linha no link serial é ativado e a adjacência OSPF é restaurada?

Etapas 6: Verificar se PPP agora é o encapsulamento nas interfaces seriais.

```
R1#show interface serial0/0/0
Serial0/0/0 is up, line protocol is up
  Hardware is GT96K Serial
  Internet address is 10.1.1.1/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, LCP open
  Open: CDPCP, IPCP, loopback not set
```

<saída do comando omitida>

```
R2#show interface serial 0/0/0
Serial0/0/0 is up, line protocol is up
  Hardware is GT96K Serial
  Internet address is 10.1.1.2/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, LCP open
  Open: CDPCP, IPCP, loopback not set
```

<saída do comando omitida>

```
R2#show interface serial 0/0/1
Serial0/0/1 is up, line protocol is up
  Hardware is GT96K Serial
  Internet address is 10.2.2.1/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, LCP open
  Open: CDPCP, IPCP, loopback not set
```

<saída do comando omitida>

```
R3#show interface serial 0/0/1
```

```
Serial0/0/1 is up, line protocol is up
  Hardware is GT96K Serial
  Internet address is 10.2.2.2/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, LCP open
  Open: CDPCP, IPCP, loopback not set
```

<saída do comando omitida>

Tarefa 6: Interromper e restaurar encapsulamento PPP

Interrompendo o encapsulamento PPP intencionalmente, você obterá informações sobre as mensagens de erro geradas. Isso ajudará posteriormente no laboratório de Identificação e solução de problemas.

Etapa 1: Restaurar o encapsulamento HDLC padrão nas duas interfaces seriais de R2.

```
R2(config)#interface serial 0/0/0
R2(config-if)#encapsulation hdlc
R2(config-if)#
*Aug 17 20:36:48.432: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.10.1 on
Serial0/0/0 from FULL to DOWN, Neighbor Down: Interface down or
detached
*Aug 17 20:36:49.432: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to down
R2(config-if)#
*Aug 17 20:36:51.432: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to up
R2(config-if)#interface serial 0/0/1
*Aug 17 20:37:14.080: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to down
R2(config-if)#encapsulation hdlc
R2(config-if)#
*Aug 17 20:37:17.368: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.30.1 on
Serial0/0/1 from FULL to DOWN, Neighbor Down: Interface down or
detached
*Aug 17 20:37:18.368: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/1, changed state to down
R2(config-if)#
*Aug 17 20:37:20.368: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/1, changed state to up
R2(config-if)#
*Aug 17 20:37:44.080: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/1, changed state to down
R2(config-if)#
```

Por que é útil interromper uma configuração intencionalmente?

Por que as duas interfaces seriais são desativadas, ativadas, e então desativadas novamente?

Você consegue pensar em outra forma de alterar o encapsulamento de uma interface serial do PPP para o encapsulamento HDLC padrão que não seja utilizando o comando **encapsulation hdlc**? (Dica: isso tem a ver com o comando **no**.)

Etapa 2: Restaurar o encapsulamento PPP nas duas interfaces seriais de R2.

```
R2(config)#interface s0/0/0
R2(config-if)#encapsulation ppp
*Aug 17 20:53:06.612: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to up
R2(config-if)# interface s0/0/1
*Aug 17 20:53:10.856: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.10.1 on
Serial0/0/0 from LOADING to FULL, Loading Done
R2(config-if)#encapsulation ppp
*Aug 17 20:53:23.332: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/1, changed state to up
R2(config-if)#
*Aug 17 20:53:24.916: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.30.1 on
Serial0/0/1 from LOADING to FULL, Loading Done
R2(config-if)#
```

Tarefa 7: Configurar autenticação PPP

Etapa 1: Configurar autenticação PPP PAP no link serial entre R1 e R2.

```
R1(config)#username R1 password cisco
R1(config)#int s0/0/0
R1(config-if)#ppp authentication pap
R1(config-if)#
*Aug 22 18:58:57.367: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to down
R1(config-if)#
```

```
*Aug 22 18:58:58.423: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.200.225 on  
Serial0/0/0 from FULL to DOWN, Neighbor Down: Interface down or  
detached
```

```
R1(config-if)#ppp pap sent-username R2 password cisco
```

O que acontece quanto a autenticação PPP PAP é configurada somente em uma extremidade do link serial?

```
R2(config)#username R2 password cisco  
R2(config)#interface Serial0/0/0  
R2(config-if)#ppp authentication pap  
R2(config-if)#ppp pap sent-username R1 password cisco  
R2(config-if)#  
*Aug 23 16:30:33.771: %LINEPROTO-5-UPDOWN: Line protocol on Interface  
Serial0/0/0, changed state to up  
R2(config-if)#  
*Aug 23 16:30:40.815: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.10.1 on  
Serial0/0/0 from LOADING to FULL, Loading Done  
R2(config-if)#
```

O que acontece quando a autenticação PPP PAP é configurada nas duas extremidades do link serial?

Etapas 2: Configurar autenticação PPP CHAP no link serial entre R2 e R3.

Na autenticação PAP, a senha não é criptografada. Embora isso seja certamente melhor do que nenhuma autenticação, ainda é altamente preferível criptografar a senha que estiver sendo enviada pelo link. O protocolo CHAP criptografa a senha.

```
R2(config)#username R3 password cisco  
R2(config)#int s0/0/1  
R2(config-if)#ppp authentication chap  
R2(config-if)#  
*Aug 23 18:06:00.935: %LINEPROTO-5-UPDOWN: Line protocol on Interface  
Serial0/0/1, changed state to down  
R2(config-if)#  
*Aug 23 18:06:01.947: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.30.1 on  
Serial0/0/1 from FULL to DOWN, Neighbor Down: Interface down or  
detached  
R2(config-if)#  
  
R3(config)#username R2 password cisco  
*Aug 23 18:07:13.074: %LINEPROTO-5-UPDOWN: Line protocol on Interface  
Serial0/0/1, changed state to up  
R3(config)#int s0/0/1  
R3(config-if)#
```

```
*Aug 23 18:07:22.174: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.200.225 on
Serial0/0/1 from LOADING to FULL, Loading Done
R3(config-if)#ppp authentication chap
R3(config-if)#
```

Observe que o protocolo de linha na interface serial 0/0/1 altera o estado para UP mesmo antes da interface ser configurada para autenticação CHAP. Você pode adivinhar por que isso acontece?

Etapa 3: Revisar a saída do comando debug.

Para compreender o processo CHAP, exiba a saída do comando **debug ppp authentication** em R2 e R3. Em seguida, desative a interface serial 0/0/1 em R2 e emita o comando **no shutdown** na interface serial 0/0/1 em R2.

```
R2#debug ppp authentication
A depuração da autenticação PPP está ativa
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int s0/0/1
R2(config-if)#shutdown
R2(config-if)#
*Aug 23 18:19:21.059: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.30.1 on
Serial0/0/1 from FULL to DOWN, Neighbor Down: Interface down or
detached
R2(config-if)#
*Aug 23 18:19:23.059: %LINK-5-CHANGED: Interface Serial0/0/1, changed
state to administratively down
*Aug 23 18:19:24.059: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/1, changed state to down
R2(config-if)#no shutdown

*Aug 23 18:19:55.059: Se0/0/1 PPP: Using default call direction
*Aug 23 18:19:55.059: Se0/0/1 PPP: Treating connection as a dedicated
line
*Aug 23 18:19:55.059: Se0/0/1 PPP: Session handle[5B000005] Session
id[49]
*Aug 23 18:19:55.059: Se0/0/1 PPP: Authorization required
*Aug 23 18:19:55.063: %LINK-3-UPDOWN: Interface Serial0/0/1, changed
state to up
*Aug 23 18:19:55.063: Se0/0/1 CHAP: O CHALLENGE id 48 len 23 from "R2"
*Aug 23 18:19:55.067: Se0/0/1 CHAP: I CHALLENGE id 2 len 23 from "R3"
*Aug 23 18:19:55.067: Se0/0/1 CHAP: Using hostname from unknown source
*Aug 23 18:19:55.067: Se0/0/1 CHAP: Using password from AAA
*Aug 23 18:19:55.067: Se0/0/1 CHAP: O RESPONSE id 2 len 23 from "R2"
*Aug 23 18:19:55.071: Se0/0/1 CHAP: I RESPONSE id 48 len 23 from "R3"
*Aug 23 18:19:55.071: Se0/0/1 PPP: Sent CHAP LOGIN Request
*Aug 23 18:19:55.071: Se0/0/1 PPP: Received LOGIN Response PASS
```

```
*Aug 23 18:19:55.071: Se0/0/1 PPP: Sent LCP AUTHOR Request
*Aug 23 18:19:55.075: Se0/0/1 PPP: Sent IPCP AUTHOR Request
*Aug 23 18:19:55.075: Se0/0/1 LCP: Received AAA AUTHOR Response PASS
*Aug 23 18:19:55.075: Se0/0/1 IPCP: Received AAA AUTHOR Response PASS
*Aug 23 18:19:55.075: Se0/0/1 CHAP: O SUCCESS id 48 len 4
*Aug 23 18:19:55.075: Se0/0/1 CHAP: I SUCCESS id 2 len 4
*Aug 23 18:19:55.075: Se0/0/1 PPP: Sent CDPCP AUTHOR Request
*Aug 23 18:19:55.075: Se0/0/1 CDPCP: Received AAA AUTHOR Response PASS
*Aug 23 18:19:55.079: Se0/0/1 PPP: Sent IPCP AUTHOR Request
*Aug 23 18:19:56.075: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/1, changed state to up
R2(config-if)#
*Aug 23 18:20:05.135: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.30.1 on
Serial0/0/1 from LOADING to FULL, Loading Done
```

R3#**debug ppp authentication**

A depuração da autenticação PPP está ativa

```
R3#
*Aug 23 18:19:04.494: %LINK-3-UPDOWN: Interface Serial0/0/1, changed
state to down
R3#
*Aug 23 18:19:04.494: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.200.225 on
Serial0/0/1 from FULL to DOWN, Neighbor Down: Interface down or
detached
*Aug 23 18:19:05.494: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/1, changed state to down
R3#
*Aug 23 18:19:36.494: %LINK-3-UPDOWN: Interface Serial0/0/1, changed
state to up
*Aug 23 18:19:36.494: Se0/0/1 PPP: Using default call direction
*Aug 23 18:19:36.494: Se0/0/1 PPP: Treating connection as a dedicated
line
*Aug 23 18:19:36.494: Se0/0/1 PPP: Session handle[3C000034] Session
id[52]
*Aug 23 18:19:36.494: Se0/0/1 PPP: Authorization required
*Aug 23 18:19:36.498: Se0/0/1 CHAP: O CHALLENGE id 2 len 23 from "R3"
*Aug 23 18:19:36.502: Se0/0/1 CHAP: I CHALLENGE id 48 len 23 from "R2"
*Aug 23 18:19:36.502: Se0/0/1 CHAP: Using hostname from unknown source
*Aug 23 18:19:36.506: Se0/0/1 CHAP: Using password from AAA
*Aug 23 18:19:36.506: Se0/0/1 CHAP: O RESPONSE id 48 len 23 from "R3"
*Aug 23 18:19:36.506: Se0/0/1 CHAP: I RESPONSE id 2 len 23 from "R2"
R3#
*Aug 23 18:19:36.506: Se0/0/1 PPP: Sent CHAP LOGIN Request
*Aug 23 18:19:36.506: Se0/0/1 PPP: Received LOGIN Response PASS
*Aug 23 18:19:36.510: Se0/0/1 PPP: Sent LCP AUTHOR Request
*Aug 23 18:19:36.510: Se0/0/1 PPP: Sent IPCP AUTHOR Request
*Aug 23 18:19:36.510: Se0/0/1 LCP: Received AAA AUTHOR Response PASS
*Aug 23 18:19:36.510: Se0/0/1 IPCP: Received AAA AUTHOR Response PASS
*Aug 23 18:19:36.510: Se0/0/1 CHAP: O SUCCESS id 2 len 4
*Aug 23 18:19:36.510: Se0/0/1 CHAP: I SUCCESS id 48 len 4
*Aug 23 18:19:36.514: Se0/0/1 PPP: Sent CDPCP AUTHOR Request
*Aug 23 18:19:36.514: Se0/0/1 PPP: Sent IPCP AUTHOR Request
*Aug 23 18:19:36.514: Se0/0/1 CDPCP: Received AAA AUTHOR Response PASS
R3#
*Aug 23 18:19:37.510: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/1, changed state to up
```

```
R3#  
*Aug 23 18:19:46.570: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.200.225 on  
Serial0/0/1 from LOADING to FULL, Loading Done  
R3#
```

Tarefa 8: Interromper intencionalmente e restaurar autenticação PPP CHAP

Etapa 1: Interromper autenticação PPP CHAP.

No link serial entre R2 e R3, altere o protocolo de autenticação na interface serial 0/0/1 para PAP.

```
R2#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
R2(config)#int s0/0/1  
R2(config-if)#ppp authentication pap  
R2(config-if)#^Z  
R2#  
*Aug 24 15:45:47.039: %SYS-5-CONFIG_I: Configured from console by  
console  
R2#copy run start  
Destination filename [startup-config]?  
Building configuration...  
[OK]  
R2#reload
```

Alterar o protocolo de autenticação para PAP na interface serial 0/0/1 interrompe a autenticação entre R2 e R3?

Etapa 2: Restaurar autenticação PPP CHAP no link serial.

Observe que não é necessário dar reload no roteador para que essa alteração entre em vigor.

```
R2#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
R2(config)#int s0/0/1  
R2(config-if)#ppp authentication chap  
R2(config-if)#  
*Aug 24 15:50:00.419: %LINEPROTO-5-UPDOWN: Line protocol on Interface  
Serial0/0/1, changed state to up  
R2(config-if)#  
*Aug 24 15:50:07.467: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.30.1 on  
Serial0/0/1 from LOADING to FULL, Loading Done  
R2(config-if)#
```

Etapa 3: Interromper intencionalmente autenticação PPP CHAP, alterando a senha em R3.

```
R3#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
R3(config)#username R2 password cisco  
R3(config)#^Z  
R3#
```



```
*Aug 24 15:54:17.215: %SYS-5-CONFIG_I: Configured from console by
console
R3#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R3#reload
```

Após dar o comando reload, qual é o status do protocolo de linha na serial 0/0/1?

Etapa 4: Restaurar autenticação PPP CHAP, alterando a senha em R3.

```
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#username R2 password cisco
R3(config)#
*Aug 24 16:11:10.679: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/1, changed state to up
R3(config)#
*Aug 24 16:11:19.739: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.200.225 on
Serial0/0/1 from LOADING to FULL, Loading Done
R3(config)#
```

Tarefa 9: Documentar as configurações do roteador

Em cada roteador, emita o comando **show run** e capture as configurações.

```
R1#show run
!<saída do comando omitida>
!
hostname R1
!
!
enable secret class
!
!
!
no ip domain lookup
!
username R1 password 0 cisco
!
!
!
interface FastEthernet0/1
 ip address 192.168.10.1 255.255.255.0
 no shutdown
!
!
interface Serial0/0/0
 ip address 10.1.1.1 255.255.255.252
 encapsulation ppp
```

```
clockrate 64000
ppp authentication pap
ppp pap sent-username R2 password 0 cisco
no shutdown
!
!
!
router ospf 1
 network 10.1.1.0 0.0.0.3 area 0
 network 192.168.10.0 0.0.0.255 area 0
!
!
banner motd ^CCUnauthorized access strictly prohibited and prosecuted
to the full extent of the law^C
!
line con 0
 exec-timeout 0 0
 password cisco
 logging synchronous
 login
line aux 0
line vty 0 4
 password cisco
 login
!
end
```

R2#show run

!<saída do comando omitida>

```
!
hostname R2
!
!
enable secret class
!
!
no ip domain lookup
!
username R3 password 0 cisco
username R2 password 0 cisco
!
!
!
interface Loopback0
 ip address 209.165.200.225 255.255.255.224
!
!
!
interface Serial0/0/0
 ip address 10.1.1.2 255.255.255.252
 encapsulation ppp
 ppp authentication pap
 ppp pap sent-username R1 password 0 cisco
 no shutdown
!
```

```
interface Serial0/0/1
 ip address 10.2.2.1 255.255.255.252
 encapsulation ppp
 clockrate 64000
 ppp authentication chap
 no shutdown
!
!
router ospf 1
 network 10.1.1.0 0.0.0.3 area 0
 network 10.2.2.0 0.0.0.3 area 0
 network 209.165.200.224 0.0.0.31 area 0
!
!
banner motd ^CUnauthorized access strictly prohibited and prosecuted to
the full extent of the law^C
!
line con 0
 exec-timeout 0 0
 password cisco
 logging synchronous
 login
line aux 0
line vty 0 4
 password cisco
 login
!
end
```

R3#show run

!<saída do comando omitida>

```
!
hostname R3
!
!
enable secret class
!
!
!
no ip domain lookup
!
username R2 password 0 cisco
!
!
!
interface FastEthernet0/1
 ip address 192.168.30.1 255.255.255.0
 no shutdown
!
!
interface Serial0/0/1
 ip address 10.2.2.2 255.255.255.252
 encapsulation ppp
 ppp authentication chap
 no shutdown
```

```
!  
router ospf 1  
  network 10.2.2.0 0.0.0.3 area 0  
  network 192.168.30.0 0.0.0.255 area 0  
!  
!  
banner motd ^CUnauthorized access strictly prohibited and prosecuted to  
the full extent of the law^C  
!  
line con 0  
  exec-timeout 0 0  
  password cisco  
  logging synchronous  
  login  
line aux 0  
line vty 0 4  
  password cisco  
  login  
!  
end
```

Tarefa 10: Limpar

Apague as configurações e recarregue os roteadores. Desconecte e guarde o cabeamento. Para PCs normalmente conectados a outras redes, como a LAN escolar ou a Internet), reconecte o cabeamento apropriado e restaure as configurações TCP/IP.