Chapter 3: Configuring PPP and Controlling Network Access with PAP and CHAP

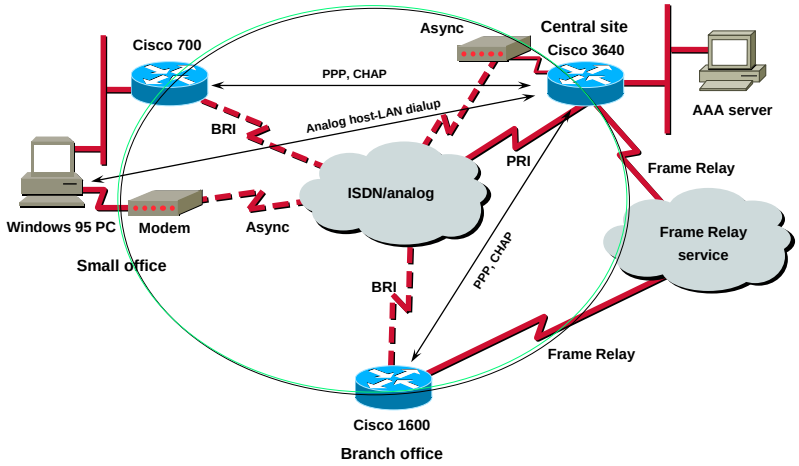
5-1

Objectives

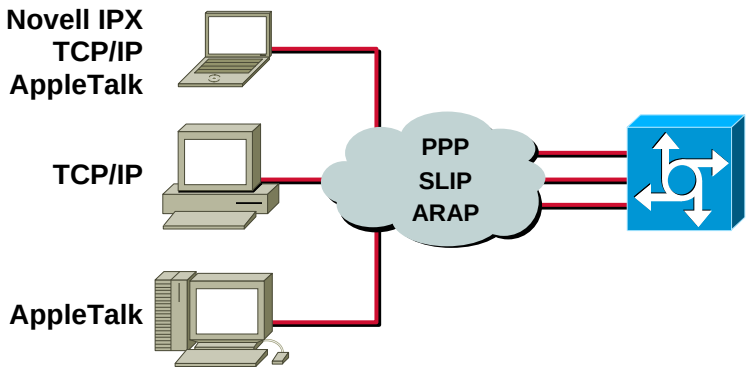
Upon completion of this chapter, you will be able to perform the following tasks:

- **Configure PPP between a central site and a remote site**
- **Configure PAP or CHAP authentication**
- **Verify and troubleshoot a PPP link**

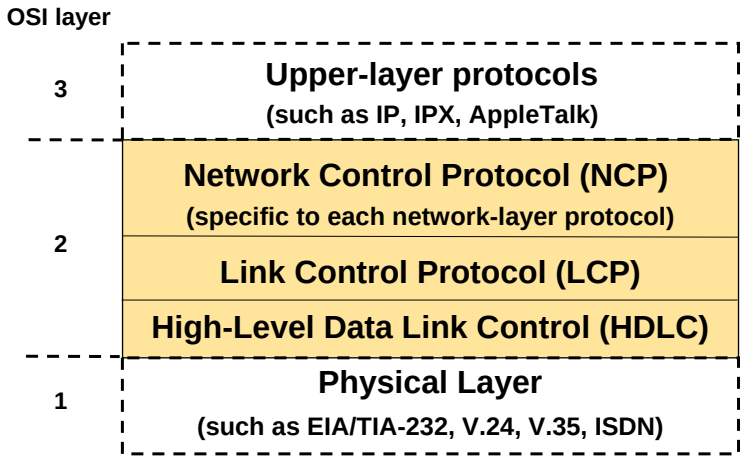
Chapter Activities



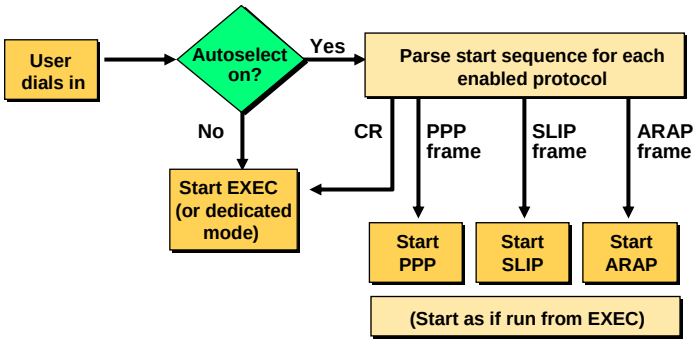
Remote Node Connections



PPP Architecture



Autoselect



Enabling PPP and Async Interface Commands

```
Router(config-if)#encapsulation {ppp | slip}
```

- Defines encapsulation type

```
Router(config-if)#async mode dedicated
```

- Places the line in dedicated PPP/SLIP mode

OR

```
Router(config-if)#async mode interactive
```

- Places the interface in interactive mode (allows an EXEC process)

Async Interface Commands for Addressing

```
Router(config-if)#peer default ip address
            {address | pool pool-name | dhcp}
```

- Assigns an IP address to a remote node

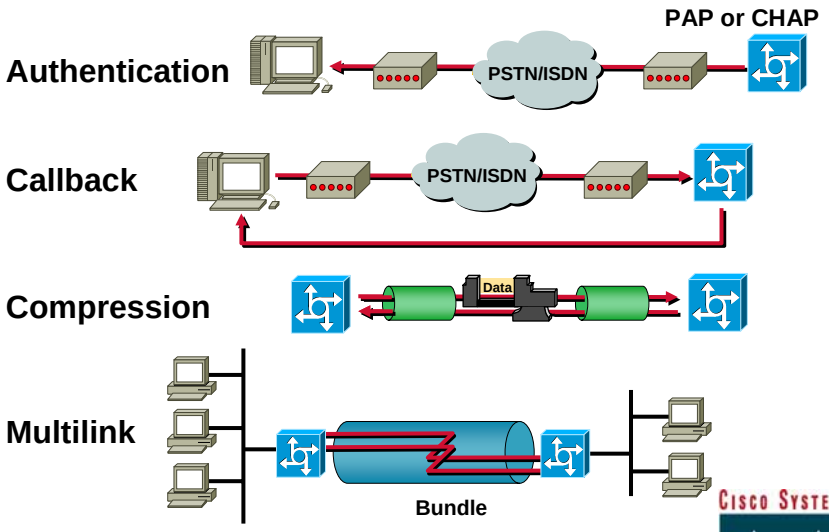
```
Router(config-if)#async dynamic address
```

- Allows a remote user to specify the IP address

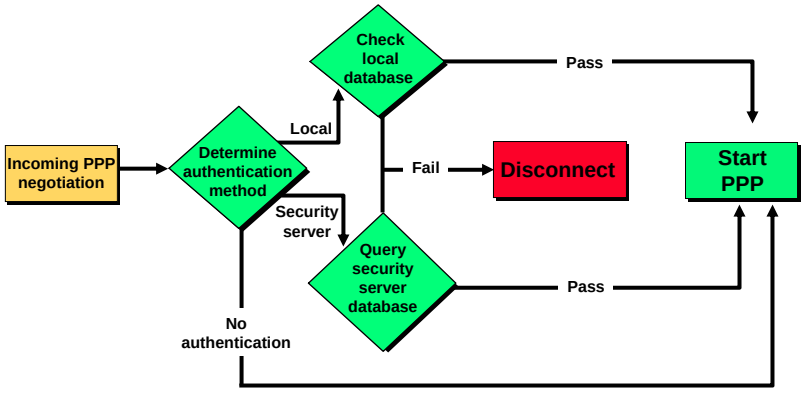
```
Router(config-if)#ip unnumbered type number
```

- Configures the asynchronous interface to be unnumbered

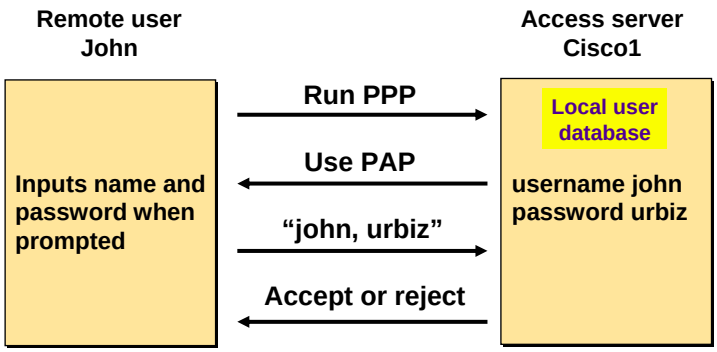
PPP LCP Options



PPP Authentication



PPP Negotiating PAP Authentication



- One-way PAP

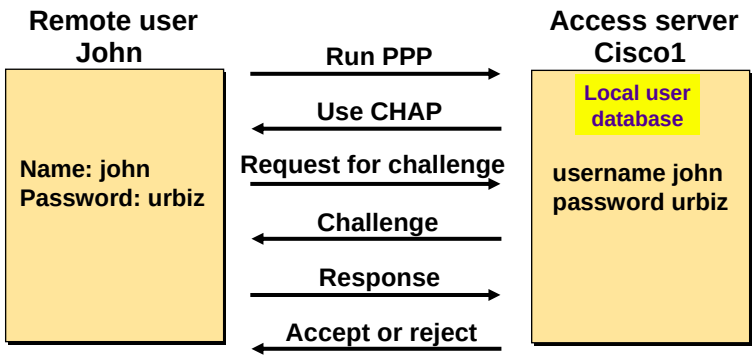
Configuring PAP Example


```
hostname left
int async 0
encapsulation ppp
ppp authentication PAP
ip add 10.0.0.1 255.255.255.0
dialer-map ip 10.0.0.2
  name right 555-2345
ppp pap sent-username left
  password left1
```

```
hostname right
int async 0
encapsulation ppp
ppp authentication PAP
ip add 10.0.0.2 255.255.255.0
dialer-map ip 10.0.0.1
  name left 555-4321
ppp pap sent-username right
  password right1
```

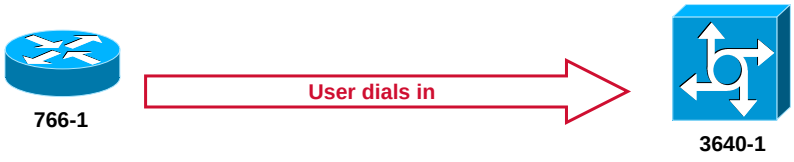
- Two-way PAP

PPP Using CHAP Authentication

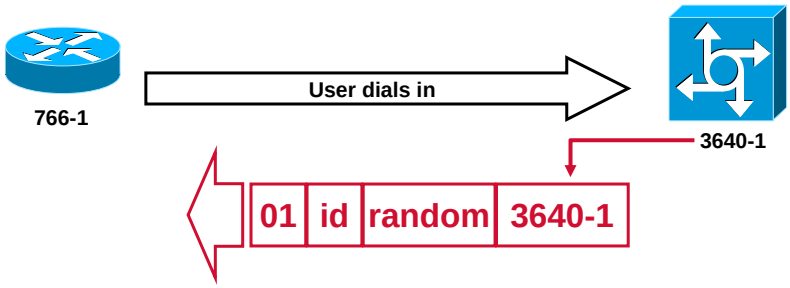


- One-way CHAP

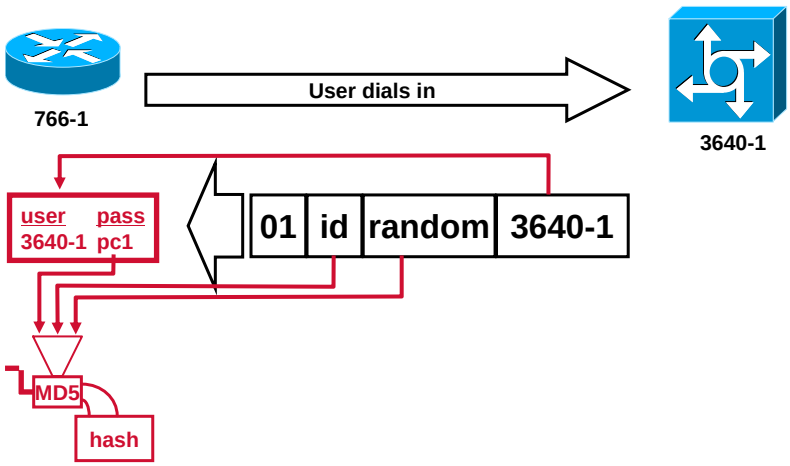
CHAP in Action—Call



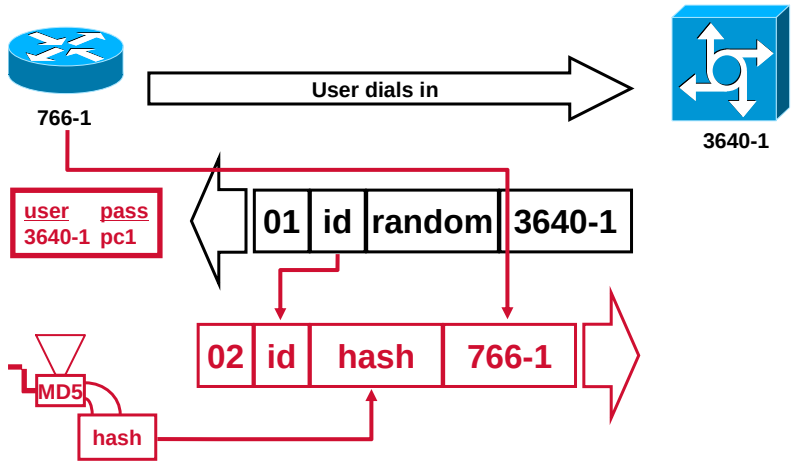
CHAP in Action—Challenge



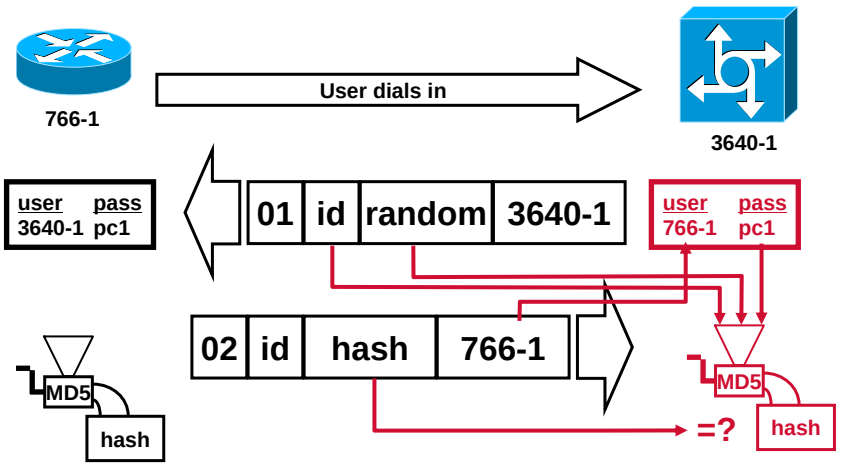
CHAP in Action—Response



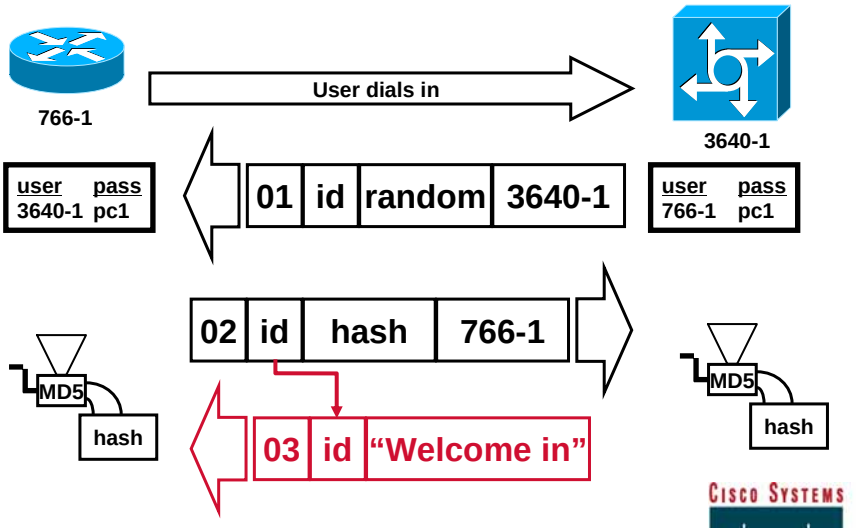
CHAP in Action—Response (cont.)



CHAP in Action—Verification



CHAP in Action—Result

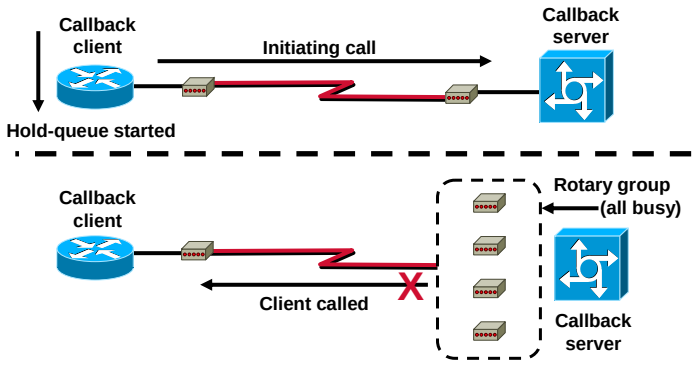


Configuring CHAP Example


```
hostname left
username right password
  sameone
int async 0
encapsulation ppp
ppp authentication CHAP
```

```
hostname right
username left password
  sameone
int async 0
encapsulation ppp
ppp authentication CHAP
```

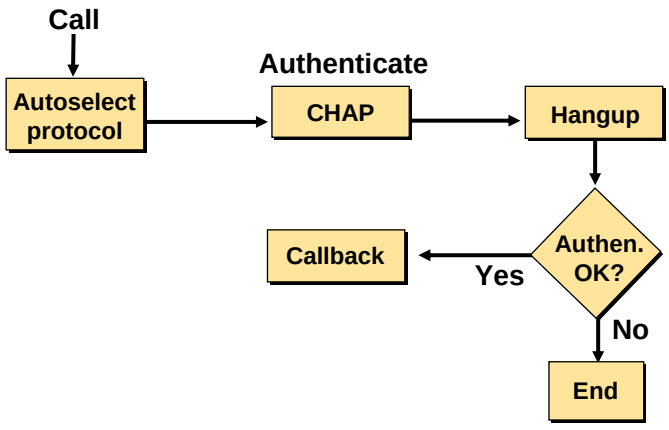
PPP Callback Implementation Considerations



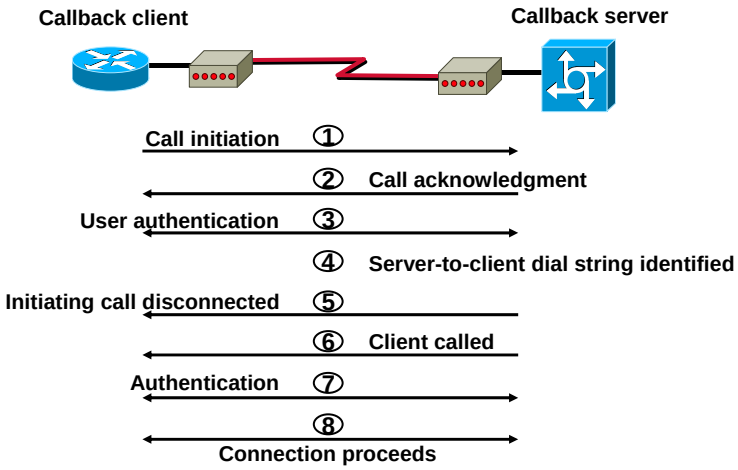
Return call is not made if:

- **The last interface is in use when callback is attempted**
- **A DDR interesting packet used last available interface**

Asynchronous Callback Operation Flowchart



PPP Callback Operation



Asynchronous Callback Global Commands

```
Router(config)#username username
     [password password]
     [callback-dialstring phone-number]
     [callback-line line-number]
     [callback-rotary rotary-group-number]
```

- On the callback server

Asynchronous Callback Line/Interface Commands

```
Router(config-if)#ppp callback accept
```

```
Router(config-if)#ppp callback initiate
```

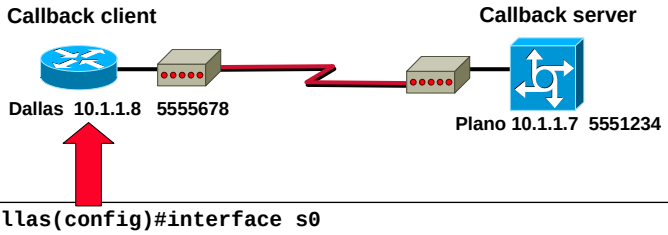
```
Router(config)#line line-number
Router(config-line)#callback forced-wait seconds
Router(config-line)#script callback script-name
```

- On the callback server

Configuring a PPP Callback Server

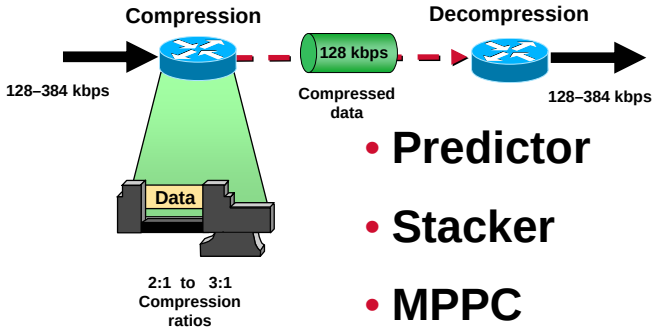

```
Plano(config)#interface s2
① Plano(config-if)#ip address 10.1.1.7  255.255.255.0
  Plano(config-if)#encapsulation ppp
② Plano(config-if)#dialer callback-secure
③ Plano(config-if)#dialer map ip 10.1.1.8 name Dallas class dial1 5555678
  Plano(config-if)#dialer-group1
④ Plano(config-if)#ppp callback accept
⑤ Plano(config-if)#ppp authentication chap
  !
  Plano(config)#map-class dialer dial1
⑥ Plano(config-map-class)#dialer callback-server username
⑦ Plano(config-map-class)#dialer hold-queue timeout 60
```

Configuring a PPP Callback Client




```
Dallas(config)#interface s0
Dallas(config-if)#ip address 10.1.1.8 255.255.255.0
① Dallas(config-if)#encapsulation ppp
② Dallas(config-if)#dialer map ip 10.1.1.7 name Plano 5551234
  Dallas(config-if)#dialer-group 1
③ Dallas(config-if)#ppp callback request
④ Dallas(config-if)#ppp authentication chap
```


Supported Compression Algorithms



- Predictor
- Stacker
- MPPC
- TCP header

Configuring Compression

```
Router(config)#int s2
Router(config-if)#compress {predictor | stac | mppc}
```

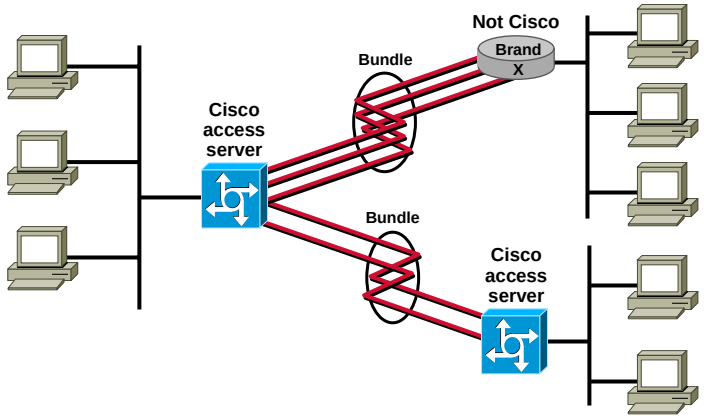
- Interface compression algorithms

```
Router(config)#int async 2
Router(config-int)#ip tcp header-compression
```

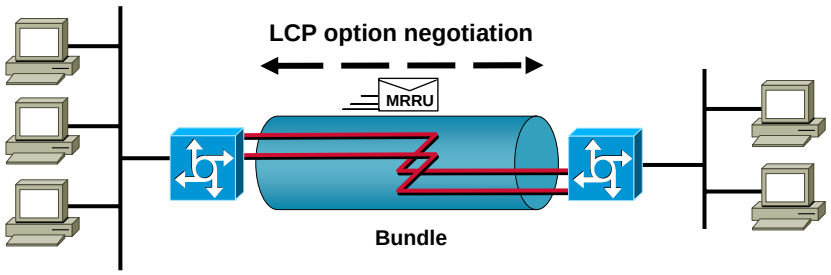
```
Router(config)#int async 2
Router(config-int)#ip tcp header-compression passive
```

- TCP header

Why Use Multilink PPP?



Multilink PPP Operation

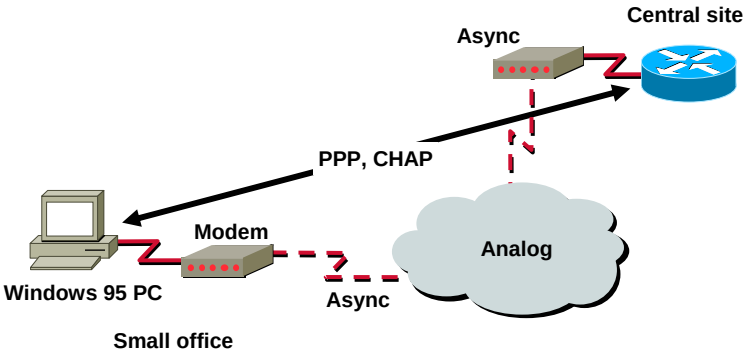


- Synchronize multiple PPP data streams

show dialer Command Example

```
LA#show dialer int bri0

BRI0 - dialer type = ISDN

Dial String      Successes   Failures    Last called   Last status
2002                     7          0    00:00:05       successful
0 incoming call(s) have been screened.

BRI0:1 - dialer type = ISDN
Idle timer (121 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)
Dialer state is data link layer up
Dial reason: ip (s=10.130.0.1, d=192.168.2.1)
Time until disconnect 117 secs
Connected to 2002 (Boise)

BRI0:2 - dialer type = ISDN
Idle timer (121 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)
Dialer state is idle
```

Laboratory Exercise: Visual Objective



Summary

After completing this chapter, you should be able to perform the following tasks:

- **Configure PPP between a central site and a remote site**
- **Configure PAP or CHAP authentication**
- **Verify and troubleshoot a PPP link**

Review Questions

- What are the LCP options for PPP?
- Describe why PPP callback is important.
- Describe how CHAP provides security.

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