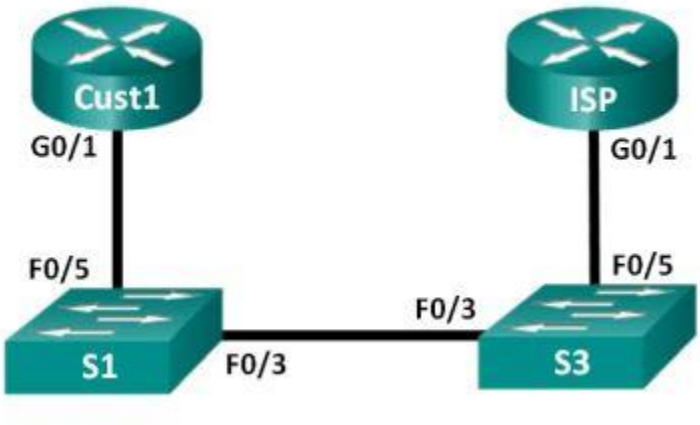
PPPoE Configuration for ISP and Customer Routers

ISPs often use Point-to-Point Protocol over Ethernet (PPPoE) on DSL links to their customers. PPP supports the assignment of IP address information to a device at the remote end of a PPP link. More importantly, PPP supports CHAP authentication. ISPs can check accounting records to see if a customer's bill has been paid, before letting them connect to the Internet



Configure basic settings for each router:

a. Disable DNS lookup. (To decrease user delays if no **DNS** server is configured, **disable** the **DNS lookup** function on the Cisco router.)

Router(config)# no ip domain-**lookup**

b. Configure device name as shown in the topology.

c. Create a message of the day (MOTD) banner warning users that unauthorized access is prohibited.

Router(config)#**banner motd #Unauthorized access to this device is prohibited!#**

d. Assign encrypted privileged EXEC mode password.

e. Assign the console and vty password and enable login.

f. Encrypt plain text passwords.

g. Set console logging to synchronous mode.

Router(config)# line console 0

Router(config-line)# logging synchronous

h. Save your configuration.

Configure the ISP Router

Configure the ISP router with PPPoE parameters for connection from the Cust1 router. Note: ISP router PPPoE configuration commands are beyond the scope of the course; however, they are necessary for completion of the lab.

a. Create a local database username Cust1 with a password of ciscopppoe.

ISP(config)# username Cust1 password ciscopppoe

b. Create a pool of addresses that will be assigned to customers.

ISP(config)# ip local pool PPPoEPOOL 10.0.0.1 10.0.0.10

c. Create the Virtual Template and associate the IP address of G0/1 with it. Associate the Virtual Template with the pool of addresses. Configure CHAP to authenticate customers.

ISP(config)# interface virtual-template 1

ISP(config-if)# ip address 10.0.0.254 255.255.255.0

ISP(config-if)# mtu 1492

ISP(config-if)# peer default ip address pool PPPoEPOOL

ISP(config-if)# ppp authentication chap callin

ISP(config-if)# exit

Broad Band Access

d. Creates a PPPoE profile and enters BBA group. Assign the template to the PPPoE group.

ISP(config)# bba-group pppoe global

ISP(config-bba-group)# virtual-template 1 (virtual template for a PPPoE profile. (range: 1-4095))

ISP(config-bba-group)# exit

e. Associate the bba-group with the Fa0/1 physical interface.

ISP(config)# interface fa0/1

ISP(config-if)# pppoe enable group global

ISP(config-if)# no shutdown

Configure the Cust1 Router

a. Configure Fa0/1 interface for PPPoE connectivity.

Cust1(config)# interface fa0/1

Cust1(config-if)# pppoe enable

Cust1(config-if)# pppoe-client dial-pool-number 1

Cust1(config-if)# no shutdown

Cust1(config-if)# exit

b. Associate the G0/1 interface with a dialer interface. Use the username ISP ~~Cust1~~ and password ciscopppoe configured in Part 2.

Cust1(config)# interface dialer 1

Cust1(config-if)# mtu 1492

Cust1(config-if)# ip address negotiated

Cust1(config-if)# encapsulation ppp

Cust1(config-if)# dialer pool 1

Cust1(config-if)# ppp authentication chap callin

Cust1(config-if)# ppp chap hostname Cust1 ISP

Cust1(config-if)# ppp chap password ciscopppoe

Cust1(config-if)# exit

c. Set up a static default route pointing to the Dialer interface.

Cust1(config)# ip route 0.0.0.0 0.0.0.0 dialer 1

d. Set up debugging on the Cust1 router to display PPP and PPPoE negotiation.

Cust1# debug ppp authentication

Cust1# debug pppoe events

e. Enable the G0/1 interface on the Cust1 router and observe the debug output as the PPPoE dialer session is established and CHAP authentication takes place.

```
*Jul 30 19:28:42.427: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed state to
down
*Jul 30 19:28:46.175: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed state to
up
*Jul 30 19:28:47.175: %LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/1, changed state to up
*Jul 30 19:29:03.839:  padi timer expired
*Jul 30 19:29:03.839:  Sending PADI: Interface = GigabitEthernet0/1
*Jul 30 19:29:03.839: PPPoE 0: I PADO  R:30f7.0da3.0b01 L:30f7.0da3.0bc1 Gi0/1
*Jul 30 19:29:05.887:  PPPOE: we've got our pado and the pado timer went off
```

```
*Jul 30 19:29:05.887: OUT PADR from PPPoE Session
*Jul 30 19:29:05.895: PPPoE 1: I PADS  R:30f7.0da3.0b01 L:30f7.0da3.0bc1 Gi0/1
*Jul 30 19:29:05.895: IN PADS from PPPoE Session
*Jul 30 19:29:05.899: %DIALER-6-BIND: Interface Vi2 bound to profile Di1
*Jul 30 19:29:05.899: PPPoE: Virtual Access interface obtained.
*Jul 30 19:29:05.899: PPPoE : encap string prepared
*Jul 30 19:29:05.899: [0]PPPoE 1: data path set to PPPoE Client
*Jul 30 19:29:05.903: %LINK-3-UPDOWN: Interface Virtual-Access2, changed state to up
*Jul 30 19:29:05.911: Vi2 PPP: Using dialer call direction
*Jul 30 19:29:05.911: Vi2 PPP: Treating connection as a callout
*Jul 30 19:29:05.911: Vi2 PPP: Session handle[C6000001] Session id[1]
*Jul 30 19:29:05.919: Vi2 PPP: No authorization without authentication
*Jul 30 19:29:05.939: Vi2 CHAP: I CHALLENGE id 1 len 24 from "ISP"
*Jul 30 19:29:05.939: Vi2 PPP: Sent CHAP SENDAUTH Request
*Jul 30 19:29:05.939: Vi2 PPP: Received SENDAUTH Response FAIL
*Jul 30 19:29:05.939: Vi2 CHAP: Using hostname from interface CHAP
*Jul 30 19:29:05.939: Vi2 CHAP: Using password from interface CHAP
*Jul 30 19:29:05.939: Vi2 CHAP: O RESPONSE id 1 len 26 from "Cust1"
*Jul 30 19:29:05.955: Vi2 CHAP: I SUCCESS id 1 len 4
*Jul 30 19:29:05.955: %LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access2,
changed state to up
*Jul 30 19:29:05.983: PPPoE : ipfib_encapstr  prepared
*Jul 30 19:29:05.983: PPPoE : ipfib_encapstr  prepared
```

f. Issue a **show ip interface brief** command on the Cust1 router to display the IP address assigned by the ISP router. Sample output is shown below. By what method was the IP address obtained?

```
Cust1# show ip interface brief
Interface                  IP-Address      OK? Method Status                Protocol
Embedded-Service-Engine0/0 unassigned      YES unset  administratively down down
GigabitEthernet0/0         unassigned      YES unset  administratively down down
GigabitEthernet0/1         unassigned      YES unset  up                    up
Serial0/0/0                unassigned      YES unset  administratively down down
Serial0/0/1                unassigned      YES unset  administratively down down
Dialer1                    10.0.0.1        YES IPCP   up                    up
Virtual-Access1            unassigned      YES unset  up                    up
Virtual-Access2            unassigned      YES unset  up                    up
```

g. Issue a **show ip route** command on the Cust1 router. Sample output is shown below.

```
Cust1# show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override
```

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Gateway of last resort is 0.0.0.0 to network 0.0.0.0

S*    0.0.0.0/0 is directly connected, Dialer1
      10.0.0.0/32 is subnetted, 2 subnets
C        10.0.0.1 is directly connected, Dialer1
C        10.0.0.254 is directly connected, Dialer1
```

h. Issue a **show pppoe session** on Cust1 router. Sample output is shown below.

```
Cust1# show pppoe session
     1 client session

Uniq ID  PPPoE  RemMAC          Port                 VT  VA         State
           SID  LocMAC                                  VA-st      Type
    N/A      1  30f7.0da3.0b01  Gi0/1                Di1 Vi2        UP
                30f7.0da3.0bc1                           UP
```

i. Issue a ping to 10.0.0.254 from the Cust1 router. The ping should be successful. If not, troubleshoot until you have connectivity.

```
Cust1# ping 10.0.0.254
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.0.254, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms
```