Lab – Troubleshoot PPPoE

1. Topology



1. Addressing Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device | Interface | IP Address | Subnet Mask | Default Gateway |
| Cust1 | G0/1 | Learned via PPP | Learned via PPP | Learned via PPP |
| ISP | G0/1 | N/A | N/A | N/A |

1. Objectives

Part 1: Build the Network

Part 2: Troubleshoot PPPoE on Cust1

1. Background / Scenario

ISPs sometimes 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.

In this lab, you will troubleshoot the Cust1 router for PPPoE configuration problems.

**Note**: The routers used with CCNA hands-on labs are Cisco 1941 Integrated Services Routers (ISRs) with Cisco IOS Release 15.2(4)M3 (universalk9 image). The switches used are Cisco Catalyst 2960s with Cisco IOS Release 15.0(2) (lanbasek9 image). Other routers, switches, and Cisco IOS versions can be used. Depending on the model and Cisco IOS version, the commands available and output produced might vary from what is shown in the labs. Refer to the Router Interface Summary Table at the end of this lab for the correct interface identifiers.

**Note**: Ensure that the routers and switches have been erased and have no startup configurations. If you are unsure, contact your instructor.

1. Required Resources

* 2 Routers (Cisco 1941 with Cisco IOS Release 15.2(4)M3 universal image or comparable)
* 2 Switches (Cisco 2960 with Cisco IOS Release 15.0(2) lanbasek9 image or comparable)
* Console cables to configure the Cisco IOS devices via the console ports
* Ethernet cables as shown in the topology

1. Build the Network
   1. Cable the network as shown in the topology.
   2. Initialize and reload the routers and switches.
   3. Copy the configurations on to routers.
      1. Copy and paste the Cust1 configuration to the Cust1 router.

hostname Cust1

enable secret class

no aaa new-model

no ip domain lookup

interface GigabitEthernet0/1

no ip address

duplex auto

speed auto

pppoe enable group global

pppoe-client dial-pool-number 1

no shut

interface Dialer1

mtu 1492

ip address negotiated

encapsulation ppp

dialer pool 1

ppp authentication chap callin

ppp chap hostname Cust1

ppp chap password 0 ciscoppp

ip route 0.0.0.0 0.0.0.0 Dialer1

banner motd ^C

Unauthorized Access Prohibited.

^C

line con 0

password cisco

logging synchronous

login

line aux 0

line vty 0 4

password cisco

login

end

* + 1. Copy and paste the ISP configuration to the ISP router.

hostname ISP

enable secret class

username Cust1 password 0 ciscopppoe

bba-group pppoe global

virtual-template 1

interface GigabitEthernet0/1

no ip address

duplex auto

speed auto

pppoe enable group global

no shut

interface Virtual-Template1

ip address 10.0.0.254 255.255.255.0

mtu 1492

peer default ip address pool PPPoEPOOL

ppp authentication chap callin

ip local pool PPPoEPOOL 10.0.0.1 10.0.0.10

ip forward-protocol nd

banner motd ^C

Unauthorized Access Prohibited.

^C

line con 0

password cisco

logging synchronous

login

line vty 0 4

password cisco

login

end

**Note**: Many of the ISP router PPPoE configuration commands are beyond the scope of the course.

* + 1. Save the router configurations.

1. Troubleshoot PPPoE on Cust1

In Part 2, you will troubleshoot PPPoE on the Cust 1 router. The privileged EXEC mode password is **class**, and console and vty passwords are **cisco**. The ISP has provided a username of **Cust1** and a password of **ciscopppoe** for PPPoE CHAP authentication.

The following log messages should be appearing on your console session to Cust1:

Cust1#

\*Nov 5 22:53:46.999: %DIALER-6-BIND: Interface Vi2 bound to profile Di1

\*Nov 5 22:53:47.003: %LINK-3-UPDOWN: Interface Virtual-Access2, changed state to up

\*Nov 5 22:53:47.035: %DIALER-6-UNBIND: Interface Vi2 unbound from profile Di1

\*Nov 5 22:53:47.039: %LINK-3-UPDOWN: Interface Virtual-Access2, changed state to down

Cust1#

* 1. Verify that IPv4 Address is assigned to the Cust1 Dialer interface.

The Dialer virtual interface did not receive an IP address.

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 unassigned YES manual up up

Virtual-Access1 unassigned YES unset up up

Virtual-Access2 unassigned YES unset down down

* 1. Debug PPP to determine if the problem is with authentication.
     1. Turn on debug for PPP authentication.

Cust1# **debug ppp authentication**

PPP authentication debugging is on

Cust1#

\*Nov 5 23:09:00.283: %DIALER-6-BIND: Interface Vi2 bound to profile Di1

\*Nov 5 23:09:00.287: %LINK-3-UPDOWN: Interface Virtual-Access2, changed state to up

\*Nov 5 23:09:00.287: Vi2 PPP: Using dialer call direction

\*Nov 5 23:09:00.287: Vi2 PPP: Treating connection as a callout

\*Nov 5 23:09:00.287: Vi2 PPP: Session handle[8A000036] Session id[54]

\*Nov 5 23:09:00.315: Vi2 PPP: No authorization without authentication

\*Nov 5 23:09:00.315: Vi2 CHAP: I CHALLENGE id 1 len 24 from "ISP"

\*Nov 5 23:0

Cust1#9:00.315: Vi2 PPP: Sent CHAP SENDAUTH Request

\*Nov 5 23:09:00.315: Vi2 PPP: Received SENDAUTH Response FAIL

\*Nov 5 23:09:00.315: Vi2 CHAP: Using hostname from interface CHAP

\*Nov 5 23:09:00.315: Vi2 CHAP: Using password from interface CHAP

\*Nov 5 23:09:00.315: Vi2 CHAP: O RESPONSE id 1 len 26 from "Cust1"

\*Nov 5 23:09:00.315: Vi2 CHAP: I FAILURE id 1 len 25 msg is "Authentication failed"

\*Nov 5 23:09:00.315: %DIALER-6-UNBIND: Interface Vi2 unbound from profile Di1

\*Nov 5 23:09:00.319: %LINK-3

Cust1#-UPDOWN: Interface Virtual-Access2, changed state to down

Cust1#

* + 1. End debug mode.

Cust1# **u all**

All possible debugging has been turned off

Cust1#

* 1. Verify that the PPPoE username and password matches what was given by the ISP.
     1. Display the running configuration; apply a filter to display only the Dialer section. Verify that the username and password matches what was provided by the ISP.

Cust1# **show run | section Dialer**

interface Dialer1

mtu 1492

ip address negotiated

encapsulation ppp

dialer pool 1

ppp authentication chap callin

ppp chap hostname Cust1

ppp chap password 0 ciscoppp

ip route 0.0.0.0 0.0.0.0 Dialer1

* + 1. The problem appears to be with the password. Enter Global configuration mode and fix the ppp password.

Cust1# **conf t**

Enter configuration commands, one per line. End with CNTL/Z.

Cust1(config)# **interface Dialer1**

Cust1(config-if)# **ppp chap password ciscopppoe**

Cust1(config-if)# **end**

Cust1#

\*Nov 5 23:42:07.343: %SYS-5-CONFIG\_I: Configured from console by console

Cust1#

\*Nov 5 23:42:25.039: %DIALER-6-BIND: Interface Vi2 bound to profile Di1

\*Nov 5 23:42:25.043: %LINK-3-UPDOWN: Interface Virtual-Access2, changed state to up

Cust1#

\*Nov 5 23:42:25.063: %LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access2, changed state to up

* 1. Verify PPPoE connectivity.
     1. Verify that this change resolved the problem and that an IP address has been assigned to the Dialer1 interface.

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

* + 1. Display the routing table to verify a route to the ISP router.

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

a - application route

+ - replicated route, % - next hop override

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

* + 1. Display information about the active PPPoE sessions.

Cust1# **show pppoe session**

1 client session

Uniq ID PPPoE RemMAC Port VT VA State

SID LocMAC VA-st Type

N/A 1 30f7.0da3.1641 Gi0/1 Di1 Vi2 UP

30f7.0da3.0da1 UP

* 1. Adjust the maximum segment size on the physical interface.

The PPPoE header adds an additional 8 bytes to each segment. To prevent TCP sessions from being dropped, the maximum segment size (MSS) needs to be adjusted to its optimum value on the physical interface.

* + 1. Display G0/1s configuration setting to see if the MSS has been adjusted.

Cust1# **show run interface g0/1**

Building configuration...

Current configuration : 136 bytes

!

interface GigabitEthernet0/1

no ip address

duplex auto

speed auto

pppoe enable group global

pppoe-client dial-pool-number 1

end

* + 1. Adjust the MSS to its optimum value of 1452 bytes.

Cust1(config)# **interface g0/1**

Cust1(config-if)# **ip tcp adjust-mss 1452**

Cust1(config-if)# **end**

1. Reflection

Explain why the TCP segment size needs to be adjusted for PPPoE.

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1. Router Interface Summary Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Router Interface Summary | | | | |
| Router Model | Ethernet Interface #1 | Ethernet Interface #2 | Serial Interface #1 | Serial Interface #2 |
| 1800 | Fast Ethernet 0/0 (F0/0) | Fast Ethernet 0/1 (F0/1) | Serial 0/0/0 (S0/0/0) | Serial 0/0/1 (S0/0/1) |
| 1900 | Gigabit Ethernet 0/0 (G0/0) | Gigabit Ethernet 0/1 (G0/1) | Serial 0/0/0 (S0/0/0) | Serial 0/0/1 (S0/0/1) |
| 2801 | Fast Ethernet 0/0 (F0/0) | Fast Ethernet 0/1 (F0/1) | Serial 0/1/0 (S0/1/0) | Serial 0/1/1 (S0/1/1) |
| 2811 | Fast Ethernet 0/0 (F0/0) | Fast Ethernet 0/1 (F0/1) | Serial 0/0/0 (S0/0/0) | Serial 0/0/1 (S0/0/1) |
| 2900 | Gigabit Ethernet 0/0 (G0/0) | Gigabit Ethernet 0/1 (G0/1) | Serial 0/0/0 (S0/0/0) | Serial 0/0/1 (S0/0/1) |
| **Note**: To find out how the router is configured, look at the interfaces to identify the type of router and how many interfaces the router has. There is no way to effectively list all the combinations of configurations for each router class. This table includes identifiers for the possible combinations of Ethernet and Serial interfaces in the device. The table does not include any other type of interface, even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in Cisco IOS commands to represent the interface. | | | | |