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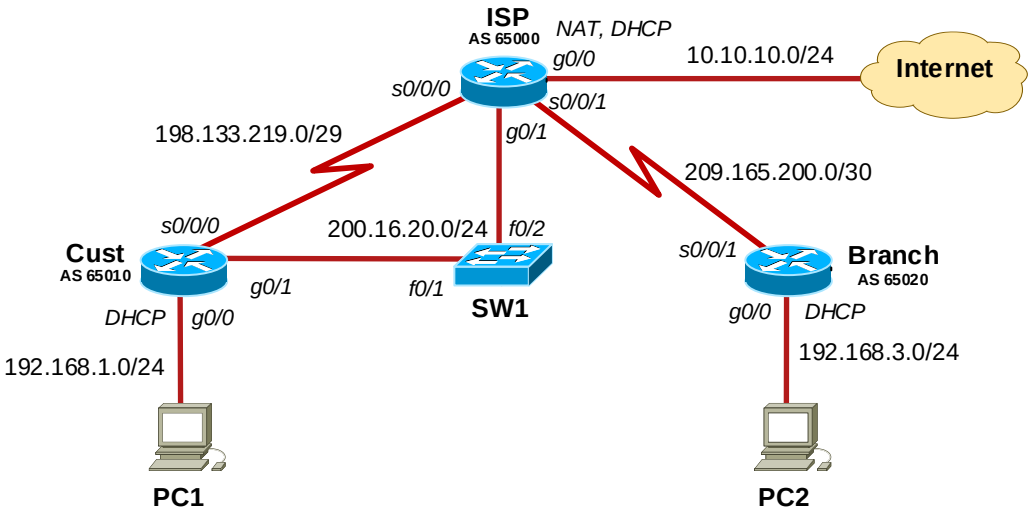
CCNA R&S 4 — Multi-homed Connection with eBGP (1/2)



Scenario — Connecting Remote Branch Offices

A customer is connected to ISP via multi-homed connection: using a serial link and a PPPoE connection. BGP is used to distributed a default route to the ISP and other connected networks. BGP will be distributed over PPPoE.

Task 1 — Configure Basic Device Settings, Serial Connections and NAT on ISP.

1. **Prepare your network.**
   Cable network topology.
2. **Perform basic router configuration.**
   Configure the router hostnames to match the topology diagram.
   Disable DNS lookup.
   Configure serial links between ISP and Cust/Branch.
   Configure DHCP server for LANs on Cust and Branch routers. Exclude the first 10 addresses. Set DNS to 10.10.10.1.
   Configure NAT translation on ISP towards the Internet for all customers.
3. **Verify settings and test connection on the links.**

Task 2 — Configuring eBGP Routing.

1. **Configure eBGP routing on the ISP.**
   router(conf)# router bgp <ISP-AS-number>
   router(conf-router)# bgp log-neighbor-changes
   router(conf-router)# network 0.0.0.0
   router(conf-router)# neighbor <Branch-IP-address> remote-as <Branch-AS-number>
   router(conf-router)# neighbor <Cust-IP-address> remote-as <Cust-AS-number>

2. **Configure eBGP routing on Cust and Branch. Advertise the local network using eBGP.**
   router(conf)# router bgp <AS-number>
   router(conf-router)# neighbor <ISP-IP-address> remote-as <ISP-AS-number>
   router(conf-router)# network <network-address> mask <network-mask>

Task 3 — Verify eBGP Configuration.

1. **Display the IPv4 routing tables.**
   router# show ip route
2. **Display the eBGP table and connection status.**
   router# show ip bgp ; shows received and advertised networks
   router# show ip bpg summary ; show BPG neighbors
3. **What happens if the serial link between Cust and ISP goes down?**
   (i) Break the link. Test routing tables and BGP tables on all routers.
   (ii) Restore the connection.

Task 4 — Configure Backup PPPoE Connection: ISP router.

1. **Create a local user database for PPPoE customer. Configure username cust and password *cust123* for Cust router.**
   router(conf)# username <user> password <passwd>
2. **Create a local pool for PPPoE clients using IP address 200.16.20.20-50.**
   router(conf)# ip local pool <pool-name> <starting-IP> <ending-IP>
3. **Create a virtual template with IP address 200.16.20.1.**
   router(conf)# interface virtual-template 1
   router(conf-if)# ip address <IP-address> <mask>
   router(conf-if)# mtu 1492
   router(conf-if)# peer default ip address pool <pool-name>
   router(conf-if)# ppp authentication chap callin
4. **Assign the template to the global broadband aggregation group.**
   router(conf)# bba-group pppoe global
   router(conf-bba-group)# virtual-template 1
5. **Associate the group with the physical interface**
   router(conf)# interface g0/1
   router(conf)# pppoe enable group global
   router(conf)# no shutdown

Task 5 — Configure Backup PPPoE Connection: Cust router.

1. **Create a virtual dialer interface for PPP.**
   router(conf)# interface dialer 1
   router(conf-if)# encapsulation ppp
   router(conf-if)# dialer pool 1
   router(conf-if)# mtu 1492
   router(conf-if)# ip address negotiated
   router(conf-if)# ppp authentication chap callin
   router(conf-if)# ppp chap hostname <hostname>
   router(conf-if)# ppp chap password <passwd>
2. **Associate the g0/1 interface with a dialer interface.**
   router(conf)# interface g0/1
   router(conf-if)# pppoe enable
   router(conf-if)# pppoe-client dial-pool-number 1
   router(conf-if)# no shutdown
3. **Verify and test the connection**
   router# show pppoe session
   router# show ip interface brief

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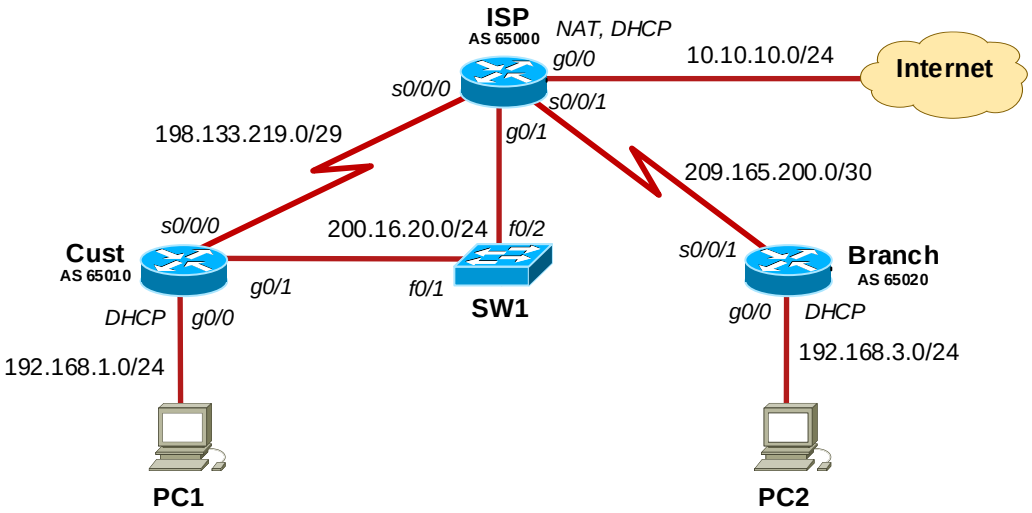
CCNA R&S 4 — Multi-homed Connection with eBGP (2/2)



Task 6 — Configuring Backup PPP Connection: BGP Routing.

1. **Verify current routing tables on all routers.**
   router# show ip route
   router# show ip bgp
   router# show ip bgp summary
2. **Add a new eBGP connection on ISP and Cust router on PPPoE line.**
   router(conf)# router bgp <AS-number>
   router(conf-router)# neighbor <remote-IP-address> remote-as <remote-AS-number>
3. **Verify updated routing tables.**
   router# show ip route
   router# show ip bgp
   router# show ip bgp summary

Task 7 — Verifying Backup Connection.

1. **Run ping from PC1 to PC2 in loop.**
   PC1> ping -t <PC2>
2. **Break the serial link between Cust and ISP**
   router(conf)# interface serial s0/0/0
   router(conf-if)# shutdown
3. **Verify routing information on all routers.**
   router# show ip route
   router# show ip bgp
   router# show ip bgp summary
4. **Restore the connection and verify routing tables.**
   router(conf)# interface serial s0/0/0
   router(conf-if)# no shutdown

Task 8 — Save the Config Files on TFTP Server.

1. **Run TFTPd32 on PC1.**
2. **Copy running-config to TFTP server.**
   router# copy running tftp
3. **Restart routers, remove cables, switch off PCs.**

Hints — Useful Commands for Verification and Debugging.

 # show ip protocols
 # show ip route

 # show ip bgp
 # show ip bgp summary
 # clear ip bgp *

 # show interfaces <if-name>
 # show ip interface brief
 # show ip interface <if-name>

 # show access-lists

 # show ip dhcp server statistics
 # show ip dhcp pool
 # show ip dhcp bindings

 # show ip nat translations
 # show ip nat translations verbose
 # clear ip nat translation *
 # clear ip nat statistics
 # show ip nat statistics

 # show pppoe session
 # show ppp authentication
 # show ppp negotiation