WorldSkills 2026 – IT Network Systems Administration

National Semi-final

Module C

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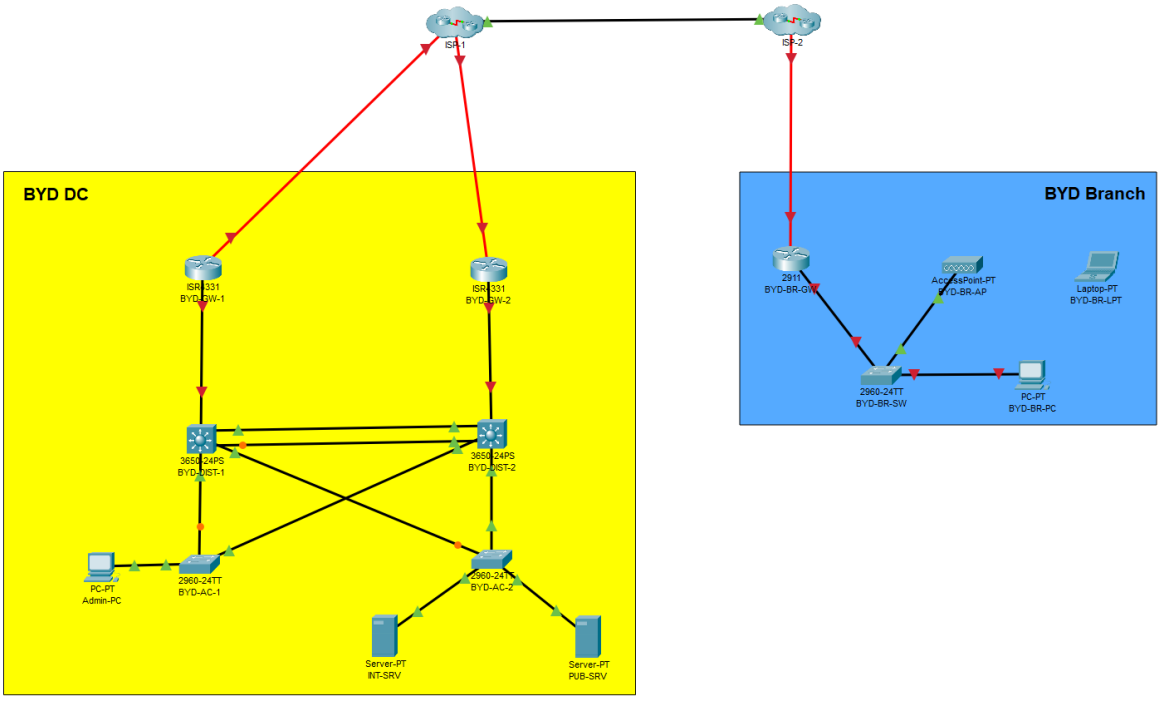

Introduction

BYD is one of the largest manufacturers of electric vehicles in the world and they are building a new private data center and a new branch site here in Hungary. They heard about the work you did for Lotus Global Trading a few weeks ago and now they want to give you the opportunity to setup their infrastructure at the new sites.

Additional information

Anywhere you need to use a password/secret/key use the following: **Ws2026-S39$**

You don’t need to configure any devices that are in the ISP’s possession.

INT-SRV is running a RADIUS and web service. PUB-SRV is only running a web service. These services are preconfigured and in a working status.

祝你好运！(Good luck)

Task 1 – Basic configurations

- Set the hostname of every device based on the topology
- Based on the table below, configure the IP addresses of the networking devices.
- The end devices in the DC (Admin-PC, INT-SRV, PUB-SRV) and the PC in the BR site (BYD-BR-PC) are **already configured** with their respective IP addresses

Device name	Interface	IPv4 address	IPv6 address
BYD-GW-1	GigabitEthernet 0/0/2	109.110.128.1/28	2000::1/64, fe80::1 (link-local)
BYD-GW-1	GigabitEthernet 0/0/0	10.100.200.2/30	fe80::1 (link-local)
BYD-GW-2	GigabitEthernet 0/0/2	109.199.32.1/29	2001::1/64, fe80::2 (link-local)
BYD-GW-2	GigabitEthernet 0/0/0	10.100.200.6/30	fe80::2 (link-local)
BYD-BR-GW	GigabitEthernet 0/0/0	139.28.140.1/30	-
BYD-BR-GW	GigabitEthernet 0/0.5	192.168.5.254/24	-
BYD-BR-GW	GigabitEthernet 0/0.6	192.168.6.254/24	-
BYD-DIST-1	GigabitEthernet 1/0/1	10.100.200.1/30	fe80::3 (link-local)
BYD-DIST-1	VLAN 10	10.100.10.125/25	2010:ff::125/64, fe80::3 (link-local)
BYD-DIST-1	VLAN 20	10.100.20.5/29	2020:ff::5/64, fe80::3 (link-local)
BYD-DIST-1	VLAN 99	10.100.99.1/28	2099:ff::1/64, fe80::3 (link-local)
BYD-DIST-2	GigabitEthernet 1/0/1	10.100.200.5/30	fe80::4 (link-local)
BYD-DIST-2	VLAN 10	10.100.10.124/25	2010:ff::124/64, fe80::4 (link-local)
BYD-DIST-2	VLAN 20	10.100.20.4/29	2020:ff::4/64, fe80::4 (link-local)
BYD-DIST-2	VLAN 99	10.100.99.2/28	2099:ff::2/64, fe80::4 (link-local)
Admin-PC	FastEthernet 0	10.100.10.1/25	2010:ff::1/64
INT-SRV	FastEthernet 0	10.100.20.1/29	2020:ff::1/64
PUB-SRV	FastEthernet 0	10.100.20.2/29	2020:ff::2/64
BYD-BR-PC	FastEthernet 0	192.168.5.1/24	-
BYD-BR-LPT	Wireless 0	DHCP	-

Task 2 – Layer 2 configurations

- Configure the following VLANs on every switch in the DC
  - VLAN 10 – INTERNAL
  - VLAN 20 – DMZ
  - VLAN 99 – MANAGEMENT
- Configure the following VLANs on BYD-BR-SW
  - VLAN 5 – OFFICE_WIRED
  - VLAN 6 – OFFICE_WIFI

- In the DC, configure access ports that are connected to endpoints on BYD-AC-1 and BYD-AC-2. Admin-PC is in VLAN 10 and the servers are in VLAN 20.
- In the Branch site, configure access ports that are connected to endpoints and APs on BYD-BR-SW. BYD-BR-PC is in VLAN 5 and the AP is in VLAN 6.
- Configure trunk ports between switches in the DC. Set the native VLAN to the MANAGEMENT VLAN.
- Configure the trunk port between BYD-BR-SW and BYD-BR-GW. On the router configure the subinterfaces to use the correct VLAN.
- Configure Etherchannel between the 2 distribution switches.
    - Use channel 1 and a non-vendor specific protocol.
    - Both switches should be able to initiate a connection.
- Configure Rapid PVST on every DC switch.
    - In every VLAN, BYD-DIST-1 should always be the root switch. In case of failure BYD-DIST-2 should be the secondary switch. Achieve this by setting the priority of BYD-DIST-1 to the lowest possible value and setting BYD-DIST-2 to the second lowest value.

Task 3 – IPv4 HSRP

- Configure HSRP in VLAN 10 and VLAN 20 on the Distribution switches. The group numbers should be the same as the VLAN numbers.
- The virtual IP address should be the last address in the range.
- BYD-DIST-1 should be the active device in every VLAN, so set its priority to 200.

Task 4 – Dynamic and static routing

- Configure an IPv4 default static route on BYD-BR-GW and the two gateways in the DC towards the ISP. Use the last IP address in the range.
- Configure an IPv6 default static route on both DC gateways using the egress interface and a next-hop address.
    - On BYD-GW-1, use next-hop address 2000::ff
    - On BYD-GW-2, use next-hop address 2001::ff
- Configure IPv4 BGP on the DC gateways.
    - Use AS 65010 on both routers.
    - The neighbor's AS is 35264 and their addresses are the last in the range.
    - You don't have to advertise any networks towards the ISP.
- Configure IPv4 EIGRP on the DC gateways and distribution switches.
    - Use AS 100.
    - Advertise every VLAN in the DC and the point-to-point networks between the switches and routers.
    - Advertise a default route from the gateways.

    - Configure authentication between the switches and routers using MD5. The key chain's name is EIGRP-KEY and use key number 100.
- Configure IPv6 OSPFv3 on the DC gateways and distribution switches.
    - Use PID 100 and area 0 for every advertised network.
    - Advertise every VLAN in the DC.
    - Advertise a default route from the gateways.

Task 5 – NAT

- Configure Static NAT in order to access the website that is hosted on PUB-SRV. Use the following public addresses on the gateways
    - BYD-GW-1: 109.110.128.5
    - BYD-GW-2: 109.199.32.5
- Configure PAT on the DC gateways and on BYD-BR-GW
    - Use ACL number 1
    - On the DC gateways, permit only (**in this order**) VLAN 10 and VLAN 20
    - On BYD-BR-GW, permit only (**in this order**) VLAN 5 and VLAN 6

Task 6 – Security

- Configure BPDUguard and Portfast on the access ports in the DC.
- Shutdown every unused port on the access switches in the DC.
- Configure an enable password on the DC gateways. Make sure the password is encrypted in the running configuration of the device.
- Configure SSH access on every VTY line on the DC gateways.
    - Create a local user in-case the RADIUS server is unavailable: localadmin
        - Make sure the user's password is encrypted and has maximum privileges.
    - Configure the following domain name: byd.com.
    - Create 2048 bit RSA key.
    - Use SSH version 2.
    - Telnet access should be disabled.
    - SSH access should be permitted only from Admin-PC. Use a standard named ACL called SSH-ACCESS to achieve this.
    - Authentication should be done by the RADIUS service running on INT-SRV.
        - The service is running on port UDP/1812.
        - For the RADIUS server group name use the following: RAD-GRP
        - A shared key is also configured on the RADIUS server.
        - Use the following AAA authentication list: RAD-AUTH
        - Make sure that we can use local users in-case the RADIUS server is unavailable. (Don't check for case sentivity)
    - For testing try to log in with username: raduser

Task 7 – DHCP

- Configure DHCP service on BYD-BR-GW for devices using Wi-Fi in the Branch site.
    - The pool name should be the same as the VLAN name.
    - The network range is: 192.168.6.0/24
    - Configure the following DNS server: 8.8.8.8

Task 8 – Access Point configuration

- Configure the AP with the following parameters:
    - The SSID should be: OFFICE_WIFI
    - Use channel number 11
    - For authentication use WPA2-PSK
    - Use AES encryption
- Connect BYD-BR-LPT to the Wi-Fi and set its IP address configuration to DHCP.

Task 9 – Troubleshooting the Branch site PC

- We salvaged an old PC temporarly from our warehouse, while we are waiting for a new one. One of your colleagues connected it to the switch but the port doesn't want to come up.
- The PC had some problems with its NIC and had some default configurations changed in the past in order to work properly, but we have no idea what they are.
- Try to find out what was changed and why it is affecting the switch, then configure the switch in order for the link to come up.

Testing

- Endpoints in the Branch site should be able to access the following websites
    - pub.byd.com
    - isp.com
- The Admin-PC should be able to access the website int.byd.com and isp.com.
- From the Admin-PC you should be able to log into the DC gateways using SSH and using the username raduser.