DYMEC Industrial L3 Managed Ethernet User Manual



Firmware Version 1.1.36

Models Covered by This Manual

Layer 3 Series	KY-CPG0804
	KY-CPG2404
	KY-CPX2404

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VLAN IP

We usually configure VLANs to divide broadcast domains in the Local Area Network (LAN). To communicate with others in another VLAN, we need the device to support inter-VLAN routing. Users can use VLANs to create Layer 3 interfaces by assigning IP address in different subnets to the VLAN. Before configuring any kind of routing protocols, users have to make sure the VLAN IP Address is configured.

How to Configure a VLAN IP Address

- **Configure VLAN IP Address** (VLAN Mode)
  Cmd: ip address [IP_ADDR] [NETMASK]
- **Display VLAN IP Address** (VLAN Mode)
  Cmd: show ip address
- **Remove VLAN IP Address** (VLAN Mode)
  Cmd: no ip address
- **Display All Configured VLAN IP Address** (Config Mode)
  Cmd: show vlan ip table

Static Route

Static Route is the most basic routing method. Users have to manually-configure routing entries into routing table. **Static Route** is fixed and unchanged if the Network is changed. **Static Route** is good to be configured at a gateway of last resorts. The Network administrator has the full control over the static routing behavior, so the administrator must have enough background ip knowledge to handle it.

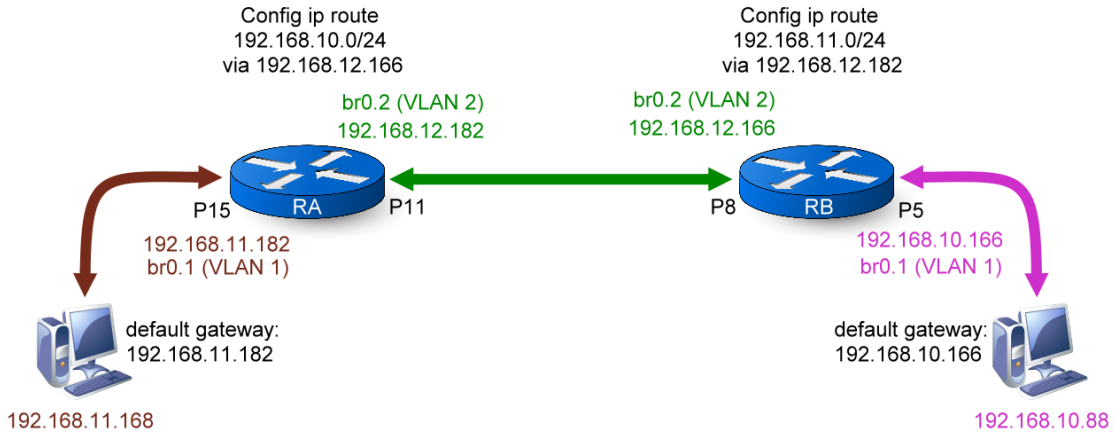
How To Configure Static Route

All the following commands are under **config mode**

- **Add Static Route**
  Cmd: ip route [IP_ADDR] [NETMASK:0-32] [NEXT_HOP]
- **Display Static Route**
  Cmd: show ip route static
- **Delete Static Route**
  Cmd: no ip route [IP_ADDR] [NETMASK:0-32]

Static Route Example

In the following diagram, we are going to configure a topology with Static Route for the system.



- **Configurations for RA**

Command	Description
Switch> enable	Enter “Privileged mode”
Switch# configure terminal	Enter “Configuration mode”
Switch(config)# vlan 1	Enter “VLAN mode” for VLAN 1
Switch(config-vlan1)# ip address 192.168.11.182 255.255.255.0	Configure IP Address to “192.168.11.182” for VLAN 1

Switch(config-vlan1)# vlan 2	Enter “VLAN mode” for VLAN 2
Switch(config-vlan2)# ip address 192.168.12.182 255.255.255.0	Configure IP Address to “192.168.12.182” for VLAN 2
Switch(config-vlan2)# member tag 11	Add Lan11 to VLAN 2 with tagged
Switch(config-vlan2)# exit	Exit “VLAN mode”, back to “Configuration mode”
Switch(config)# ip route 192.168.10.0 24 192.168.12.166	Configure static router for subnet 192.168.10.0/24. The next hop is 192.168.12.166

- **Configurations for RB**

Command	Description
Switch> enable	Enter “Privileged mode”
Switch# configure terminal	Enter “Configuration mode”
Switch(config)# vlan 1	Enter “VLAN mode” for VLAN 1
Switch(config-vlan1)# ip address 192.168.10.166 255.255.255.0	Configure IP Address to “192.168.10.166” for VLAN 1
Switch(config-vlan1)# vlan 2	Enter “VLAN mode” for VLAN 2
Switch(config-vlan2)# ip address 192.168.12.166 255.255.255.0	Configure IP Address to “192.168.12.166” for VLAN 2
Switch(config-vlan2)# member tag 8	Add Lan8 to VLAN 2 with tagged
Switch(config-vlan2)# exit	Exit “VLAN mode”, back to “Configuration mode”
Switch(config)# ip route 192.168.11.0 24 192.168.12.182	Configure static router for subnet 192.168.11.0/24. The next hop is 192.168.12.182

OSPFv2

Open Shortest Path First (OSPF) is one of the **dynamic routing protocols** and OSPFv2 is for **IPv4** Networks. **OSPF** is the most widely used **interior Gateway Protocol (IGP)** and it is designed for medium-and-large-scale enterprise networks. **OSPF** nodes exchange neighbors' information by Link-State and calculate the shortest path with their Cost to transmit packets. **OSPF** is operating under a hierarchical system and divide the system to several Areas by different Area IDs. OSPF nodes only exchange information with the nodes in the same Area.

CONFIGURE OSPFV2

All the following commands are under **Config Mode**

- **Configure OSPF Router ID**
  Cmd: router ospf router-id [ROUTER_ID]
- **Display OSPF Router ID**
  Cmd: show router ospf router-id
- **Clear OSPF Router ID**
  Cmd: no router ospf router-id
- **Configure OSPF Network**
  Cmd: router ospf network [IP_ADDR] [NETMASK:0-32] [AREA_ID]
- **Display OSPF Network**
  Cmd: show router ospf network
- **Remove OSPF Network Rule for Specific Subnet**
  Cmd: no router ospf network [IP_ADDR] [NETMASK:0-32]
- **Enable OSPF Authentication with Text on Specific Area**
  Cmd: router ospf authentication area [AREA_ID]
- **Enable OSPF Authentication with MD5 on Specific Area**
  Cmd: router ospf authentication message-digest area [AREA_ID]
- **Display OSPF Authentication State**
  Cmd: show router ospf authentication
- **Disable OSPF Authentication on Specific Area**
  Cmd: no router ospf authentication area [AREA_ID]
- **Display OSPF Operation Status**
  Cmd: show router ospf
- **Display OSPF Neighbors' Status**
  Cmd: show router ospf neighbor

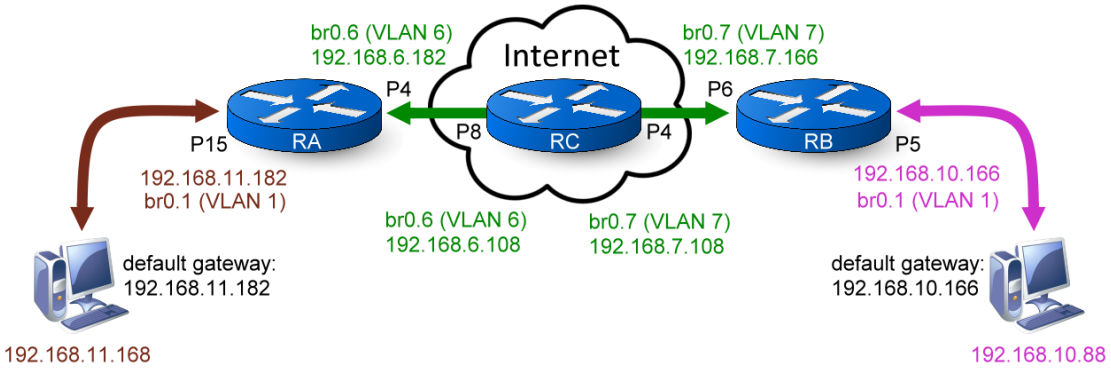
All the following commands are under **VLAN Mode**

- **Configure OSPF Hello Interval**
  Cmd: ip ospf hello-interval [1-65535]
  The default OSPF Hello Interval is **10** seconds.
- **Display OSPF Hello Interval**
  Cmd: show ip ospf hello-interval
- **Clear OSPF Hello Interval**
  Cmd: no ip ospf hello-interval
- **Configure OSPF Dead Interval**
  Cmd: ip ospf dead-interval [1-65535]
  The default OSPF Dead Interval is **4 times** hello interval.
- **Display OSPF Dead Interval**
  Cmd: show ip ospf dead-interval
- **Clear OSPF Dead Interval**
  Cmd: no ip ospf dead-interval
- **Enable OSPF Authentication with Text on Specific VLAN**
  Cmd: ip ospf authentication
- **Enable OSPF Authentication with MD5 on Specific VLAN**
  Cmd: ip ospf authentication message-digest
- **Display OSPF Authentication State**
  Cmd: show ip ospf authentication
- **Disable OSPF Authentication on Specific VLAN**
  Cmd: no ip ospf authentication
- **Configure OSPF Authentication Password**
  Cmd: ip ospf authentication-key [PASSWD]
- **Display OSPF Authentication Password**
  Cmd: show ip ospf authentication-key
- **Clear OSPF Authentication Password**
  Cmd: no ip ospf authentication-key
- **Configure OSPF MD5 Authentication Password**
  Cmd: ip ospf message-digest-key [KEY_ID] md5 [PASSWD]
- **Display OSPF MD5 Authentication Password**
  Cmd: show ip ospf message-digest-key
- **Clear OSPF MD5 Authentication Password**
  Cmd: no ip ospf message-digest-key [KEY_ID]

OSPFv2 Example

In the following diagram, we are going to configure a topology with Dynamic Routing – OSPFv2 for the system. Use the following commands to check the link state after configurations are completed:

- show router ospf
- show router ospf neighbor
- show ip route



Simulation Internet by through RC.

- **Configurations for RA**

Command	Description
Switch> enable	Enter “Privileged mode”
Switch# configure terminal	Enter “Configuration mode”
Switch(config)# vlan 1	Enter “VLAN mode” for VLAN 1
Switch(config-vlan1)# ip address 192.168.11.182 255.255.255.0	Configure IP Address to “192.168.11.182” for VLAN 1
Switch(config-vlan1)# vlan 6	Enter “VLAN mode” for VLAN 6
Switch(config-vlan6)# ip address 192.168.6.182 255.255.255.0	Configure IP Address to “192.168.6.182” for VLAN 6
Switch(config-vlan6)# member tag 4	Add Lan4 to VLAN6 with tagged
Switch(config-vlan6)# exit	Exit “VLAN mode”, back to “Configuration mode”
Switch(config)# router ospf router-id 0.0.0.1	Configure OSPF router id to 0.0.0.1
Switch(config)# router ospf network 192.168.11.0 24 0	Configure subnet 192.168.11.0/24 to join OSPF network area 0
Switch(config)# router ospf network 192.168.6.0 24 0	Configure subnet 192.168.6.0/24 to join OSPF network area 0

- **Configurations for RB**

Command	Description
Switch> enable	Enter “Privileged mode”
Switch# configure terminal	Enter “Configuration mode”
Switch(config)# vlan 1	Enter “VLAN mode” for VLAN 1
Switch(config-vlan1)# ip address 192.168.10.166 255.255.255.0	Configure IP Address to “192.168.10.166” for VLAN 1
Switch(config-vlan1)# vlan 7	Enter “VLAN mode” for VLAN 7
Switch(config-vlan7)# ip address 192.168.7.166 255.255.255.0	Configure IP Address to “192.168.7.166” for VLAN 7
Switch(config-vlan7)# member tag 6	Add Lan6 to VLAN 7 with tagged
Switch(config-vlan7)# exit	Exit “VLAN mode”, back to “Configuration mode”
Switch(config)# router ospf router-id 0.0.0.2	Configure OSPF router id to 0.0.0.2
Switch(config)# router ospf network 192.168.10.0 24 0	Configure subnet 192.168.10.0/24 to join OSPF network area 0
Switch(config)# router ospf network 192.168.7.0 24 0	Configure subnet 192.168.7.0/24 to join OSPF network area 0

- **Configurations for RC**

Command	Description
Switch> enable	Enter “Privileged mode”
Switch# configure terminal	Enter “Configuration mode”
Switch(config)# vlan 1	Enter “VLAN mode” for VLAN 1
Switch(config-vlan1)# ip address 192.168.3.108 255.255.255.0	Configure IP Address to “192.168.3.108” for VLAN 1
Switch(config-vlan1)# vlan 6	Enter “VLAN mode” for VLAN 6
Switch(config-vlan6)# ip address 192.168.6.108 255.255.255.0	Configure IP Address to “192.168.6.108” for VLAN 6
Switch(config-vlan6)# member tag 8	Add Lan8 to VLAN6 with tagged
Switch(config-vlan6)# vlan 7	Enter “VLAN mode” for VLAN 7
Switch(config-vlan7)# ip address 192.168.7.108 255.255.255.0	Configure IP Address to “192.168.7.108” for VLAN 7
Switch(config-vlan7)# member tag 4	Add Lan4 to VLAN 7 with tagged
Switch(config-vlan7)# exit	Exit “VLAN mode”, back to “Configuration mode”
Switch(config)# router ospf router-id 0.0.0.3	Configure OSPF router id to 0.0.0.3
Switch(config)# router ospf network 192.168.6.0 24 0	Configure subnet 192.168.6.0/24 to join OSPF network area 0

Switch(config)# router ospf network 192.168.7.0 24 0	Configure subnet 192.168.7.0/24 to join OSPF network area 0