

ENT-AN1113-3.66 Application Note

Configuring IP Static Routes



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1 Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

1.1 Revision 1.0

Revision 1.0 was the first publication of this document.

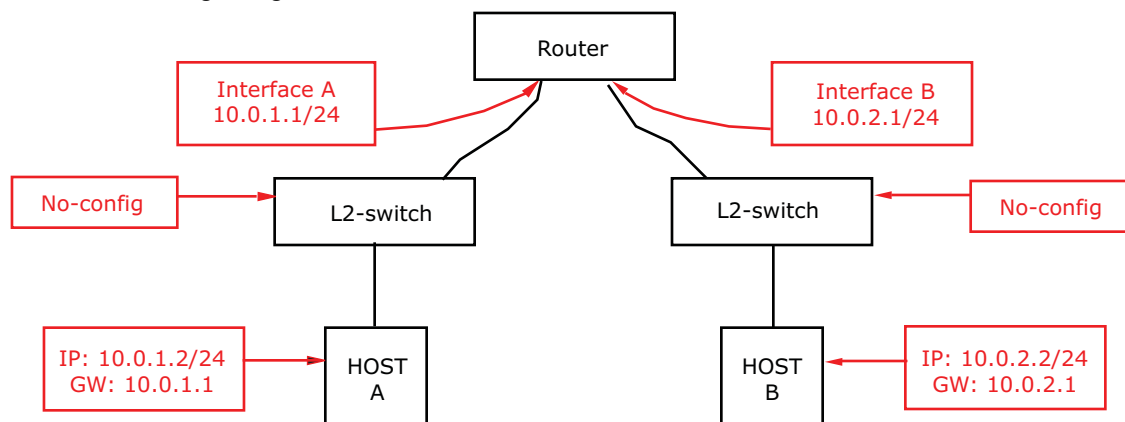
2 Configuring IP Static Routes

An IP address identifies a device on an IP network. The IP version 4 (IPv4) address is 32 bits long. An IPv4 address can only be assigned through a VLAN interface. The address can be set manually (called a static IP) or automatically by using the DHCP protocol. For more information, see [Configure the DHCP Client](#). The switch application software implements software to handle static IPv4 routing.

2.1 Traditional Network

Routing involves both a TCP/IP host and an IP router. The following illustration shows the configuration for a traditional network with two IP networks and a router. Each IP network needs to have an IP address assigned and a gateway where packets can be forwarded to.

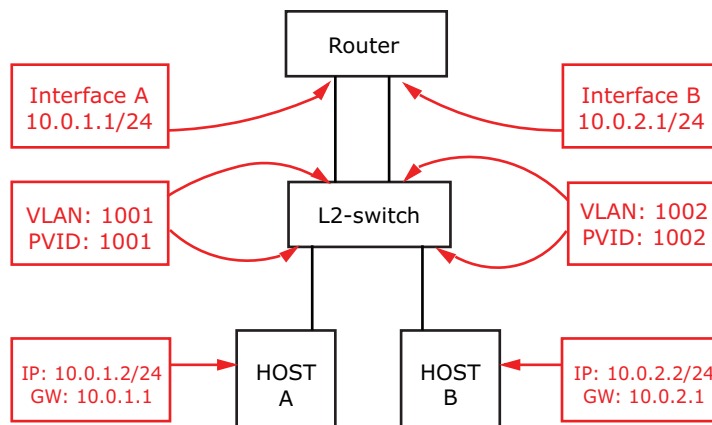
Figure 1 • IP Routing using a Router and Switches



2.2 Using a VLAN-Aware Switch

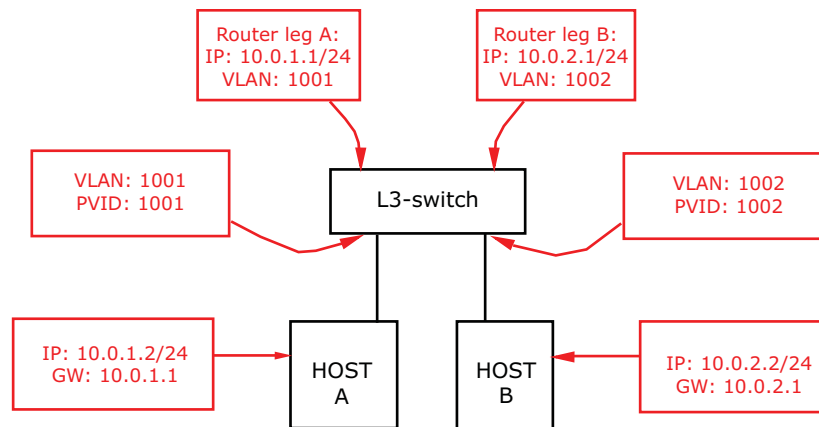
The following illustration shows the same network configured to use a VLAN-aware switch. Using VLANs is a method of separating flows within the same switch.

Figure 2 • IP Routing using a Router and VLAN-Aware Switch



2.3 Using a Layer 3 Switch

The following illustration shows the same network configured to use an L3 switch.

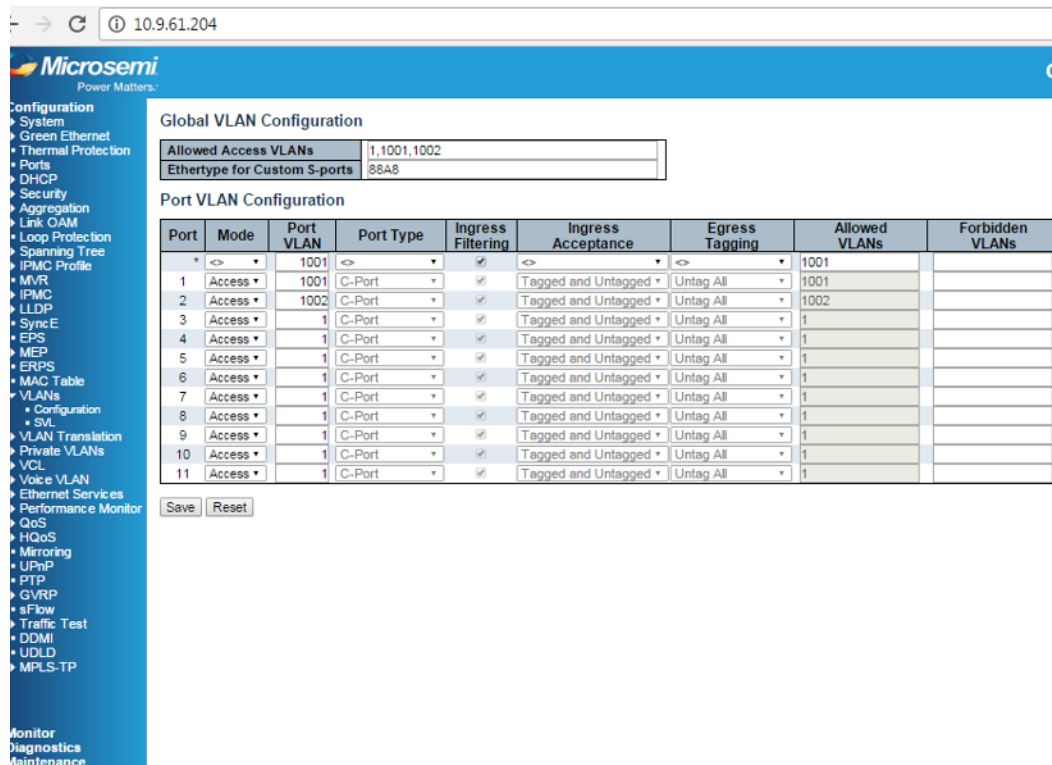
Figure 3 • IP Routing using a Router and L3 Switch

IP routing is fundamentally a destination-driven process. All frames that enter the router are inspected to determine the destination IP address. Based on that address the router looks up the routing table to determine where to send the frame.

2.4 Configuring Layer 3 Switch

To configure a layer 3 switch, perform the following steps.

1. Click **Configuration > VLANs > Configuration**, and then create VLAN 1001 and 1002 by defining the port VLAN for each port as shown in the following illustration.

Figure 4 • VLAN Port Configuration


Global VLAN Configuration

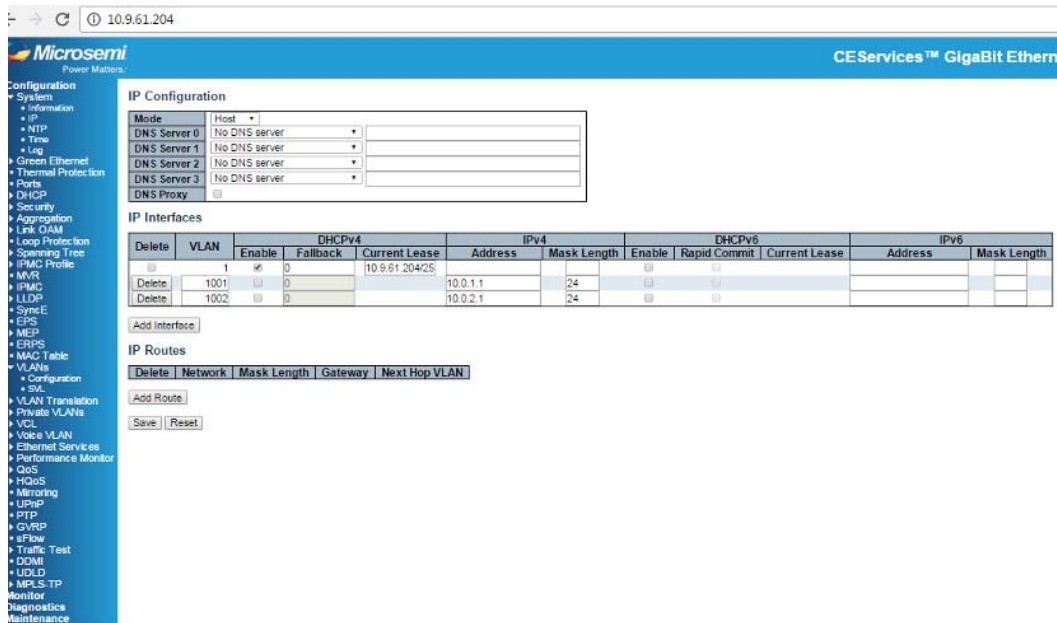
Allowed Access VLANs	1,1001,1002
Ethertype for Custom S-ports	88A8

Port VLAN Configuration

Port	Mode	Port VLAN	Port Type	Ingress Filtering	Ingress Acceptance	Egress Tagging	Allowed VLANs	Forbidden VLANs
1	Access	1001	C-Port	✓	Tagged and Untagged	Untag All	1001	
2	Access	1002	C-Port	✓	Tagged and Untagged	Untag All	1002	
3	Access	1	C-Port	✓	Tagged and Untagged	Untag All	1	
4	Access	1	C-Port	✓	Tagged and Untagged	Untag All	1	
5	Access	1	C-Port	✓	Tagged and Untagged	Untag All	1	
6	Access	1	C-Port	✓	Tagged and Untagged	Untag All	1	
7	Access	1	C-Port	✓	Tagged and Untagged	Untag All	1	
8	Access	1	C-Port	✓	Tagged and Untagged	Untag All	1	
9	Access	1	C-Port	✓	Tagged and Untagged	Untag All	1	
10	Access	1	C-Port	✓	Tagged and Untagged	Untag All	1	
11	Access	1	C-Port	✓	Tagged and Untagged	Untag All	1	

Save Reset

2. Click **Configuration > System > IP**, and then in the **IP Configuration** page configure router leg A and B to set the primary IP address for the newly created interfaces as shown in the following illustration.

Figure 5 • Router IP Configuration


The screenshot shows the Microsemi CE Services GigaBit Ethernet configuration interface. The left sidebar contains a navigation menu with categories like Configuration, System, Information, and various protocols. The main content area is titled 'IP Configuration' and includes sections for 'IP Configuration' (with fields for DNS Servers and Proxy) and 'IP Interfaces' (a table for configuring VLANs and IP addresses). Below the table are buttons for 'Add Interface', 'IP Routes', 'Add Route', 'Save', and 'Reset'.

Delete	VLAN	DHCPv4			IPv4		DHCPv6			IPv6	
		Enable	Fallback	Current Lease	Address	Mask Length	Enable	Rapid Commit	Current Lease	Address	Mask Length
☐	1	☒	☐	10.9.61.204/25			☐	☐			
Delete	1001	☐	☐		10.0.1.1	24	☐	☐			
Delete	1002	☐	☐		10.0.2.1	24	☐	☐			

The equivalent CLI commands are:

- Create VLAN 1001 and 1002 to separate the two IP networks

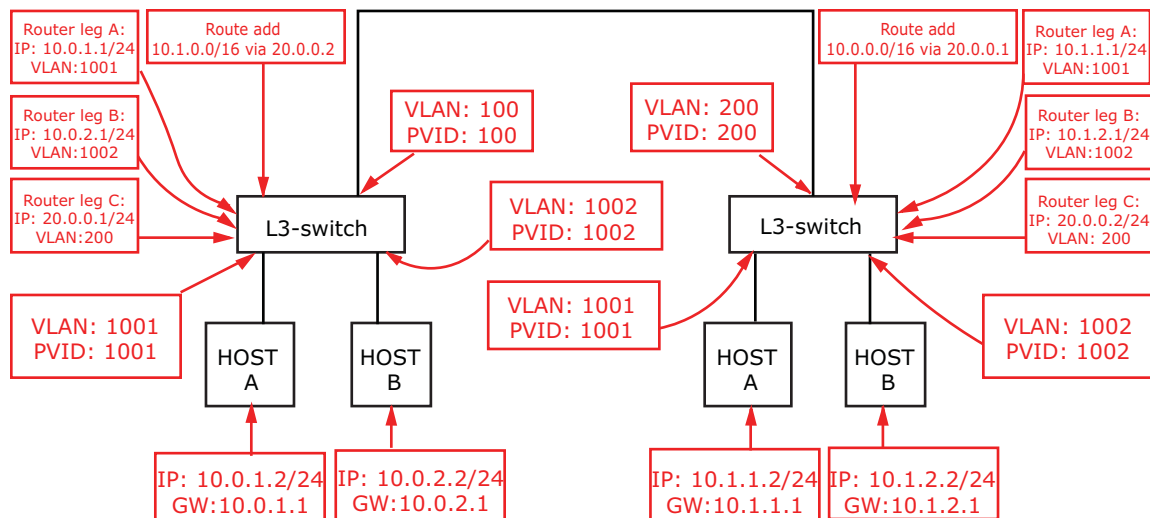
```
Switch# configure terminal
Switch(config)# vlan 1001
Switch(config-vlan)# vlan 1002
Switch(config-vlan)# exit
```
- Define the port VLAN for each port by using the switchport access vlan command to specify the VLAN for each interface. Untagged frames are then classified to this VLAN.

```
Switch(config)# interface GigabitEthernet 1/1
Switch(config-if)# switchport access vlan 1001
Switch(config-if)# exit
Switch(config)# interface GigabitEthernet 1/2
Switch(config-if)# switchport access vlan 1002
Switch(config-if)# exit
```
- Configure router leg A and B by using the ip address command to set primary IP address for the interfaces.

```
Switch(config)# interface vlan 1001
Switch(config-if-vlan)# ip address 10.0.1.1 255.255.255.0
Switch(config-if-vlan)# exit
Switch(config)# interface vlan 1002
Switch(config-if-vlan)# ip address 10.0.2.1 255.255.255.0
Switch(config-if-vlan)# end
```

2.5 Connecting Two L3 Switches

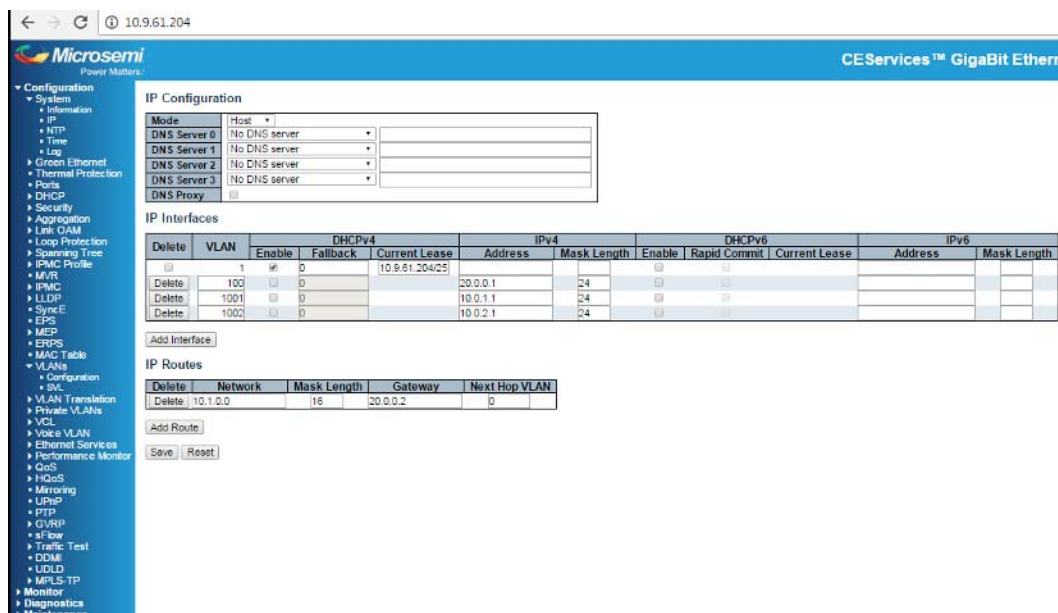
The following illustration shows how two L3 switches can be interconnected.

Figure 6 • IPv4 Static Route

2.6 Configuring the Left Switch

To configure the left switch, perform the following step.

- Click **Configuration > System > IP**, and then in the **IP Configuration** page, click the **Add Interface** button and provide configure details for 100, 1001, and 1002 as shown in the following illustration.

Figure 7 • Left Switch Configuration

The equivalent CLI commands are:

- Create VLAN 100, 1001, and 1002. Set up port VLAN for each port on the left switch.

```
Switch-left# configure terminal
Switch-left(config)# vlan 100
Switch-left(config-vlan)# vlan 1001
Switch-left(config-vlan)# vlan 1002
Switch-left(config-vlan)# exit
Switch-left(config)# interface GigabitEthernet 1/1
Switch-left(config-if)# switchport access vlan 1001
Switch-left(config-if)# exit
```

```
Switch-left(config)# interface GigabitEthernet 1/2
Switch-left(config-if)# switchport access vlan 1002
Switch-left(config-if)# exit
Switch-left(config)# interface GigabitEthernet 1/8
Switch-left(config-if)# switchport access vlan 100
Switch-left(config-if)# exit
2. Configure router leg A, B, and C to set IP address for each interface on the left switch.
Switch-left(config)# interface vlan 1001
Switch-left(config-if-vlan)# ip address 10.0.1.1 255.255.255.0
Switch-left(config-if-vlan)# exit
Switch-left(config)# interface vlan 1002
Switch-left(config-if-vlan)# ip address 10.0.2.1 255.255.255.0
Switch-left(config-if-vlan)# exit
Switch-left(config)# interface vlan 100
Switch-left(config-if-vlan)# ip address 20.0.0.1 255.255.255.0
Switch-left(config-if-vlan)# exit
3. Configure IP route on the left switch by using the ip route command to add a static route entry
   with next-hop set to 20.0.0.2.
Switch-left(config)# ip route 10.1.0.0 255.255.0.0 20.0.0.2
Switch-left(config)# end
4. Show the static route's for the left switch.
Switch-left# show ip route
0.0.0.0/0 via 10.10.132.1 <UP GATEWAY HW_RT>
10.0.1.0/24 via interface index 200001001 <UP HW_RT>
10.0.2.0/24 via interface index 200001002 <UP HW_RT>
10.1.0.0/16 via 20.0.0.2 <UP GATEWAY HW_RT>
10.10.132.0/23 via interface index 200000001 <UP HW_RT>
127.0.0.1/32 via 127.0.0.1 <UP HOST>
Switch-left#
5. Create VLAN 200, 1001, and 1002. Set up port VLAN for each port on the right switch.
Switch-right# configure terminal
Switch-right(config)# vlan 200
Switch-right(config-vlan)# vlan 1001
Switch-right(config-vlan)# vlan 1002
Switch-right(config-vlan)# exit
Switch-right(config)# interface GigabitEthernet 1/1
Switch-right(config-if)# switchport access vlan 1001
Switch-right(config-if)# exit
Switch-right(config)# interface GigabitEthernet 1/2
Switch-right(config-if)# switchport access vlan 1002
Switch-right(config-if)# exit
Switch-right(config)# interface GigabitEthernet 1/8
Switch-right(config-if)# switchport access vlan 200
Switch-right(config-if)# exit
6. Configure router leg A, B, and C to set IP address for each interface on the right switch.
Switch-right(config)# interface vlan 1001
Switch-right(config-if-vlan)# ip address 10.1.1.1 255.255.255.0
Switch-right(config-if-vlan)# exit
Switch-right(config)# interface vlan 1002
Switch-right(config-if-vlan)# ip address 10.1.2.1 255.255.255.0
Switch-right(config-if-vlan)# exit
Switch-right(config)# interface vlan 200
Switch-right(config-if-vlan)# ip address 20.0.0.2 255.255.255.0
Switch-right(config-if-vlan)# exit
7. Configure IP route on the right switch by using the ip route command to add a static route entry
   with next-hop set to 20.0.0.1.
Switch-right(config)# ip route 10.0.0.0 255.255.0.0 20.0.0.1
Switch-right(config)# end
```