



Configuration Examples

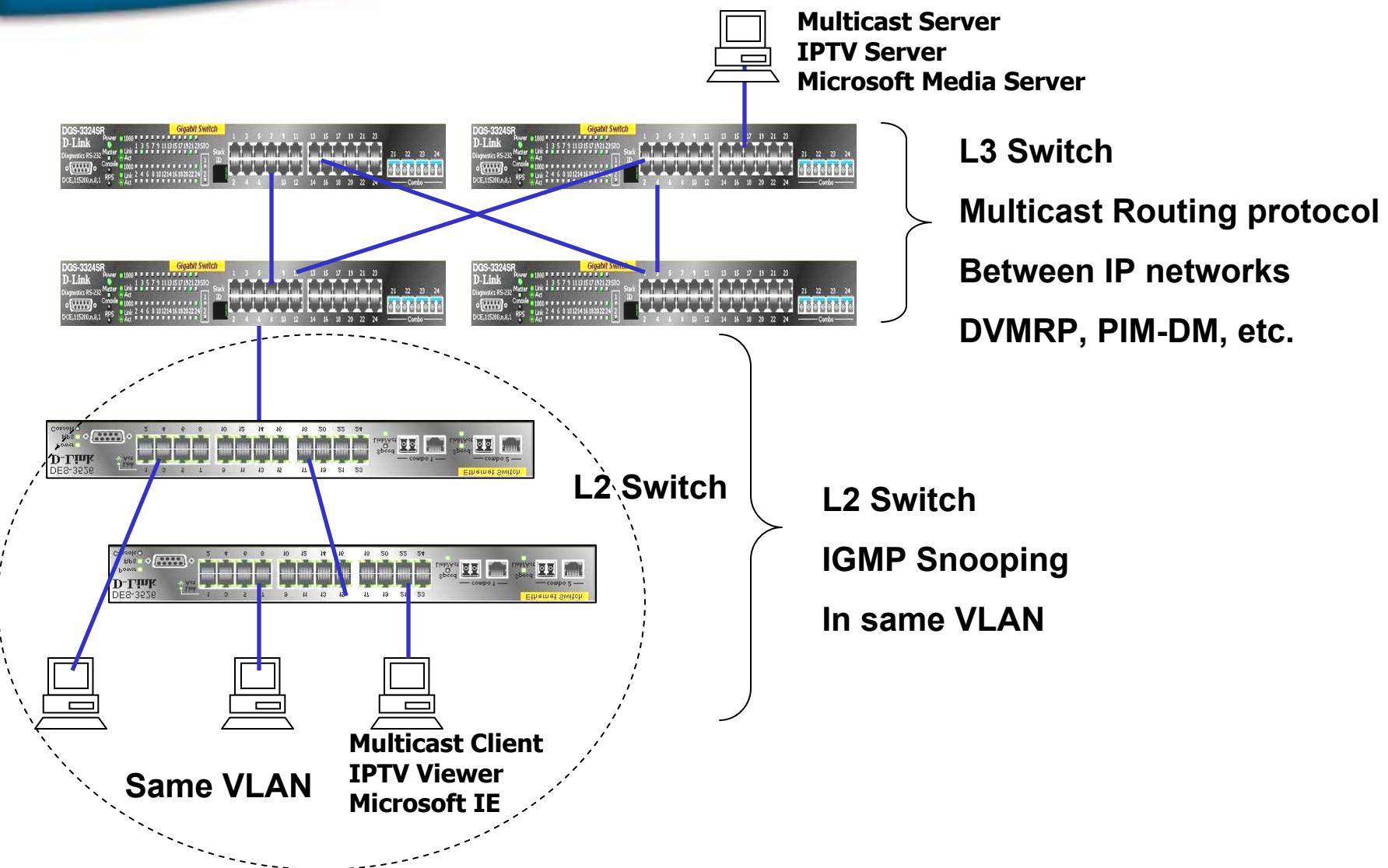
D-Link Switches L3 Features and Examples

IP Multicast Routing

DVMRP + IGMP + IGMP Snooping

- **PIM-DM + IGMP + IGMP Snooping**
- **RIP + Multicast routing**

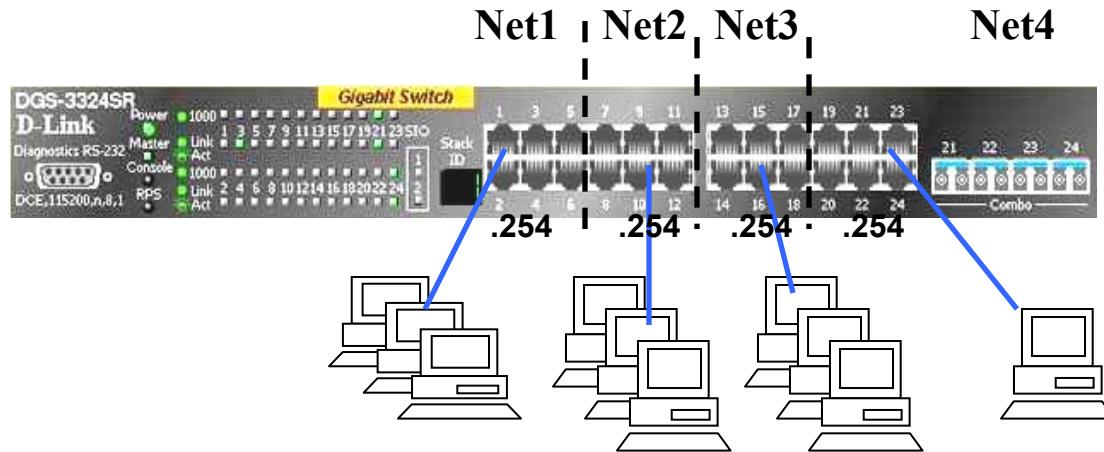
Where is IGMP snooping located



- Distance Vector Multicast Routing Protocol
- RFC 1075
- A distance vector type of multicast routing protocol
- DVMRP constructs delivery trees based on the information on the previous-hop back toward the source.
- Construct a different distribution tree for each source and its group, each tree is a minimum multicast tree.

DVMRP

- The distribution tree provides a shortest path between the source and receiver in the group, based on the number of hops in the path.
- The one that is closest to the source of a multicast message is elected to be in charge of forwarding multicast messages.
- With the same distance from the source, the router with the lowest IP address is elected.
- DVMRP periodically reinitiates the construction of the multicast tree.



DGS-3324SR

Multicast client 192.168.2.x/24 192.168.3.x/24
Running IPTV viewer Gw192.168.2.254 Gw192.168.3.254
 192.168.1.1/24
 Gw192.168.1.254

Multicast Servers
(Cisco IPTV or
Microsoft Media Server)
 192.168.4.2/24
 Gw192.168.4.254

Objective:

- 1. Configure 4 IP subnets and IP packets can be routed (L3) between Subnets.**
- 2. Client at Net1 running multicast client viewer can see the programs played at Multicast server on Net4.**
- 3. Multicast Routing Protocol = DVMRP**

PROCEDURE:

At DGS-3324SR

1. Delete ports from default vlan for other vlan use.

```
config vlan default delete 1:1-1:24
```

2. Create VLAN, add ports into it, and then create IP interface for the VLAN.

```
create vlan v101 tag 101
```

```
config vlan v101 add untagged 1:1-1:6
```

```
create ipif net1 192.168.1.254/24 v101 state enabled
```

```
create vlan v102 tag 102
```

```
config vlan v102 add untagged 1:7-1:12
```

```
create ipif net2 192.168.2.254/24 v102 state enabled
```

```
create vlan v103 tag 103
```

```
config vlan v103 add untagged 1:13-1:18
```

```
create ipif net3 192.168.3.254/24 v103 state enabled
```

```
create vlan v104 tag 104
```

```
config vlan v104 add untagged 1:19-1:24
```

```
create ipif net4 192.168.4.254/24 v104 state enabled
```

3. Enable DVMRP for multicast routing protocol, and enable the Interfaces where multicast Server and Client located, with “all” for all interfaces.

enable dvmrp

config dvmrp all state enabled

4. Enable IGMP for those interfaces where Multicast Client are located, with “all” for all interfaces.

config igmp all state enable

5. Enable the global IGMP snooping, and enable the IGMP Snooping on those VLANs where Multicast client located, with “all” for all VLANs.

enable igmp_snooping

config igmp_snooping all state enable

6. Commands for checking the multicast groups.

sh ipmc cache

sh igmp group

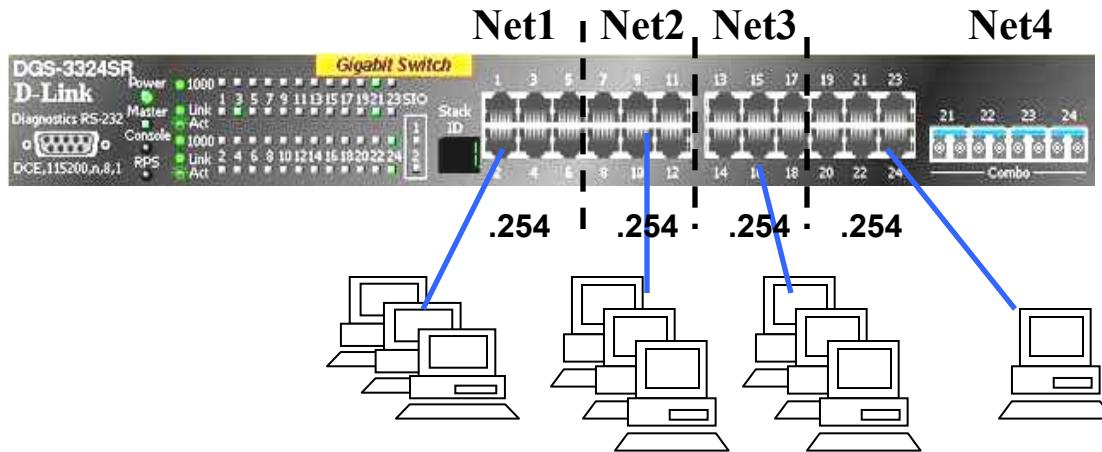
At Multicast Server

1. Manually configure IP address, mask, for the associated IP Network
2. Install and run the Multicast Server program, for example, CISCO IPTV Server or Microsoft’s Media Server.
3. Play the video program using “multicast”

At Client PC

1. Manually configure IP address, mask, for the associated IP Network.Interface IP.
2. Install and run the Multicast client software, for example, CISCO IPTV viewer or Microsoft IE/MediaPlayer.

- PIM - Protocol Independent Multicast
- PIM contains two protocols: PIM – Dense Mode (PIM-DM), and PIM – Sparse Mode (PIM-SM)
- PIM-DM is similar to DVMRP for forming delivery trees
- PIM-DM also forwards multicast messages on all downstream interfaces until it receives prune messages, while DVMRP forwards multicast traffic to child nodes in the delivery tree.
- PIM-DM uses graft messages for attaching a previously pruned branch to the delivery tree, similar to DVMRP.



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 192.168.1.1/24
 Gw192.168.1.254

Multicast Servers
(Cisco IPTV or
Microsoft Media Server)
 192.168.4.2/24
 Gw192.168.4.254

Objective:

1. Configure 4 IP subnets and IP packets can be routed (L3) between Subnets.
2. Client at Net1 running multicast client viewer can see the programs played at Multicast server on Net4.
3. Multicast Routing Protocol = PIM-DM

PROCEDURE:

At DGS-3324SR

1. Delete ports from default vlan for other vlan use.

```
config vlan default delete 1:1-1:24
```

2. Create VLAN, add ports into it, and then create IP interface for the VLAN.

```
create vlan v101 tag 101
```

```
config vlan v101 add untagged 1:1-1:6
```

```
create ipif net1 192.168.1.254/24 v101 state enabled
```

```
create vlan v102 tag 102
```

```
config vlan v102 add untagged 1:7-1:12
```

```
create ipif net2 192.168.2.254/24 v102 state enabled
```

```
create vlan v103 tag 103
```

```
config vlan v103 add untagged 1:13-1:18
```

```
create ipif net3 192.168.3.254/24 v103 state enabled
```

```
create vlan v104 tag 104
```

```
config vlan v104 add untagged 1:19-1:24
```

```
create ipif net4 192.168.4.254/24 v104 state enabled
```

3. Enable PIM-DM for multicast routing protocol, and enable the Interfaces where multicast Server and Client located, with “all” for all interfaces.

enable pim

config pim all state enable

4. Enable IGMP for those interfaces where Multicast Client are located, with “all” for all interfaces.

config igmp all state enable

5. Enable the global IGMP snooping, and enable the IGMP Snooping on those VLANs where Multicast client located, with “all” for all VLANs.

enable igmp_snooping

config igmp_snooping all state enable

6. Commands for checking the multicast groups.

sh ipmc cache

sh igmp group

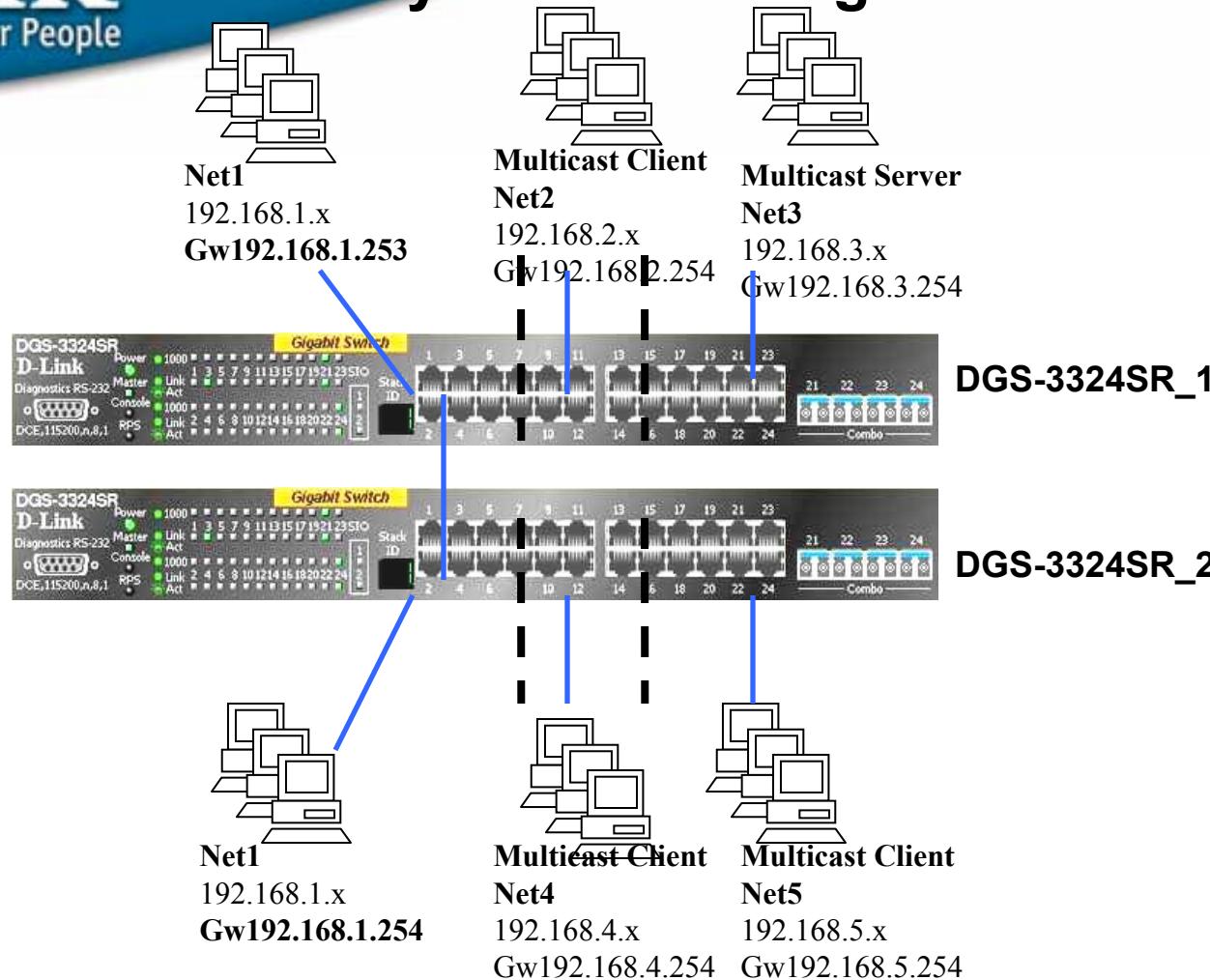
At Multicast Server

1. Manually configure IP address, mask, for the associated IP Network
2. Install and run the Multicast Server program, for example, CISCO IPTV Server or Microsoft’s Media Server.
3. Play the video program using “multicast”

At Client PC

1. Manually configure IP address, mask, for the associated IP Network.Interface IP.
2. Install and run the Multicast client software, for example, CISCO IPTV viewer or Microsoft IE/MediaPlayer.

Dynamic Routing + multicast Routing



Objective:

1. Multicast Client can view the program at multicast Server at “remote” networks.
2. Unicast protocol= RIP
3. Multicast Routing Protocol = PIM-DM

Dynamic Routing + multicast Routing

AT DGS-3324SR_ 1(top)

1. Configure VLAN and IP interfaces.

```
config vlan default delete 1:1-1:24  
create vlan v101 tag 101  
config vlan v101 add untagged 1:1-1:8  
create ipif net1 192.168.1.253/24 v101 state enabled
```

```
create vlan v102 tag 102  
config vlan v102 add untagged 1:9-1:16  
create ipif net2 192.168.2.254/24 v102 state enabled
```

```
create vlan v103 tag 103  
config vlan v103 add untagged 1:17-1:24  
create ipif net3 192.168.3.254/24 v103 state enabled
```

2. Unicast Routing: Enable RIP, and enable the associated Interfaces, with “all” for all interfaces. Also could use OSPF or Static Route.

```
enable rip  
config rip all tx_mode v2_only rx_mode v2_only state enabled
```

Unicast routing + multicast Routing

AT DGS-3324SR_ 1(top)

3. Multicast Routing: Enable PIM-DM for multicast routing protocol, and enable the Interfaces where multicast Server and Client located, with “all” for all interfaces. Also Could use DVMRP as the Multicast routing protocol.

enable pim

config pim all state enable

4. Enable IGMP for those interfaces where Multicast Client are located, with “all” for all interfaces.

config igmp all state enable

5. Enable the global IGMP snooping, and enable the IGMP Snooping on those VLANs where Multicast client located, with “all” for all VLANs.

enable igmp_snooping

config igmp_snooping all state enable

Unicast routing + multicast Routing

PROCEDURE:

AT DGS-3324SR_ 2 (Bottom)

1. Configure VLAN and IP interfaces.

```
config vlan default delete 1:1-1:24  
create vlan v101 tag 101  
config vlan v101 add untagged 1:1-1:8  
create ipif net1 192.168.1.254/24 v101 state enabled
```

```
create vlan v104 tag 104  
config vlan v104 add untagged 1:9-1:16  
create ipif net4 192.168.4.254/24 v104 state enabled
```

```
create vlan v105 tag 105  
config vlan v105 add untagged 1:17-1:24  
create ipif net5 192.168.5.254/24 v105 state enabled
```

2. Unicast Routing: Enable RIP, and enable the associated Interfaces, with “all” for all interfaces. Also could use OSPF or Static Route.

```
enable rip  
config rip all tx_mode v2_only rx_mode v2_only state enabled
```

Unicast routing + multicast Routing

AT DGS-3324SR_ 2(Bottom)

3. Enable PIM-DM for multicast routing protocol, and enable the Interfaces where multicast Server and Client located, with “all” for all interfaces. Or enable the DVMRP, if other connected L3 device runs DVMRP protocol.

enable pim

config pim all state enable

4. Enable IGMP for those interfaces where Multicast Client are located, with “all” for all interfaces.

config igmp all state enable

5. Enable the global IGMP snooping, and enable the IGMP Snooping on those VLANs where Multicast client located, with “all” for all VLANs.

enable igmp_snooping

config igmp_snooping all state enable