

Routing IP, IPX, & AppleTalk Between Port-Based VLANs

This example configuration provides IP, IPX, and AppleTalk routing between port-based VLANs. All protocols are switched within each VLAN.

This configuration example applies to the following products:

- J4138A HP ProCurve Routing Switch 9308M
- J4139A HP ProCurve Routing Switch 9304M
- J4840A HP ProCurve Routing Switch 6308M-SX

Here are specific design parameters for this example:

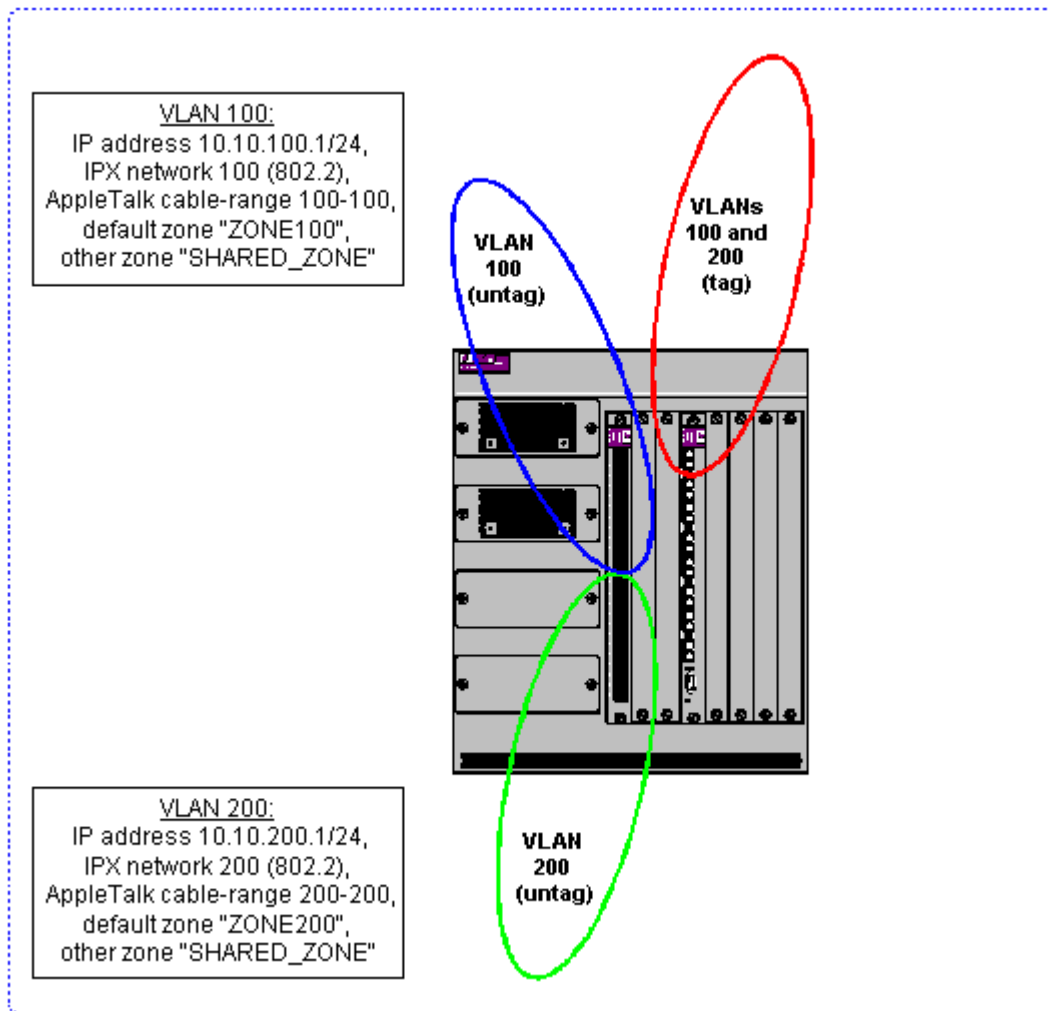
- clients on the network are directly-connected to 10/100 ports
- the 10/100 ports are divided into two VLANs
- client NICs are not 802.1Q-aware, so they must send and receive untagged packets
- one Gigabit port is configured to carry traffic from both VLANs to a connected device
- IP, IPX, and AppleTalk traffic is routed between the two VLANs; all protocols are switched within each VLAN
- For IP, RIP version 1 routing updates are sent on both VLANs
- For IPX, RIP and SAP updates are sent on both VLANs (by default)
- IPX (type 20) diagnostic packet forwarding is enabled on both VLANs
- For AppleTalk, RTMP routing updates are sent on both VLANs (by default)

Port, VLAN, and tagging values for this example:

<u>port(s)</u>	<u>VLAN(s)</u>	<u>tag or untag</u>
e1/1 to 1/12	100	untag
e1/13 to 1/24	200	untag
e4/1	100 and 200	tag

IP, IPX, and AppleTalk parameters for this example:

<u>parameter</u>	<u>VLAN 100</u>	<u>VLAN 200</u>
IP address	10.10.100.1	10.10.200.1
IP subnet mask	255.255.255.0	255.255.255.0
IPX network	100	200
IPX frametype	802.2	802.2
A'Talk cable-range	100-100	200-200
A'Talk node	99	99
default zone	ZONE100	ZONE200
other zone	SHARED_ZONE	SHARED_ZONE



WARNING:

The example configuration below was created from a factory default configuration on the Routing Switch. We recommend saving your current configuration if necessary. To reset a Routing Switch to a factory default configuration use the following commands:

```
HP9304> enable
HP9304# erase startup-config
HP9304# reload
```

NOTES:

1. The interface port numbers (e.g. interface e 1/1) and the IP address (e.g. 10.10.10.1) may differ in your network, so adjust these values accordingly. The Routing Switch model (e.g. HP 9304M), type of module(s), and software version number below may not accurately reflect the device(s) you are configuring.
2. Some older versions of Routing Switch software do not include the version in the output of the `show configuration` command. For those versions, use the `show version` command to see the software version.
3. The configuration example below was created on software version 06.6.05.

CONFIGURATION COMMANDS: (created on software version 06.6.05):

```
HP9308>enable
  No password has been assigned yet...
HP9308#config term
HP9308 (config)#hostname route3protocols
```

First step is to enable all 3 routing protocols: IP, IPX, and AppleTalk. To activate IPX routing, save the configuration and reload. For this example, all 3 routing protocols are enabled first, then the configuration is saved (write mem), then the reload to activate the IPX routing protocol.

```
route3protocols(config)#router rip
route3protocols(config-rip-router)#router ipx
  ipx routing enabled for next power cycle.
  Please save configuration to flash and reboot.
route3protocols(config-rip-router)#router appletalk
route3protocols(config-rip-router)#write mem
route3protocols(config-rip-router)#.Write startup-config in progress.
.Write startup-config done.
route3protocols(config-rip-router)#end
route3protocols#reload
  Are you sure? (enter 'y' or 'n'):y
  Halt and reboot...
```

Next step is to configure the VLANs, then assign ports and a virtual ethernet (ve) interface to each VLAN.

```
route3protocols>enable
  No password has been assigned yet...
route3protocols#config term
route3protocols(config)#vlan 100 name VLAN100 by port
route3protocols(config-vlan-100)#untag e1/1 to 1/12
  added untagged port ethe 1/1 to 1/12 to port-vlan 100.
route3protocols(config-vlan-100)#tag e4/1
  added tagged port ethe 4/1 to port-vlan 100.
route3protocols(config-vlan-100)#router-interface ve1

route3protocols(config-vlan-100)#vlan 200 name VLAN200 by port
route3protocols(config-vlan-200)#untag e1/13 to 1/24
  added untagged port ethe 1/13 to 1/24 to port-vlan 200.
route3protocols(config-vlan-200)#tag e4/1
  added tagged port ethe 4/1 to port-vlan 200.
route3protocols(config-vlan-200)#router-interface ve2
```

Now define the IP, IPX, and AppleTalk parameters for each virtual ethernet interface. The IPX interface-level "netbios-allow" parameter is included in the IPX network number configuration command. Follow this sequence to configure an interface as an AppleTalk "seed" router:

- a) configure the cable range,
- b) configure the AppleTalk network.node address,
- c) configure the zone(s) (first zone name is the "default" zone), and
- d) enable AppleTalk routing on that interface.

```
route3protocols(config-vlan-200)#int ve1
route3protocols(config-vif-1)#ip address 10.10.100.1/24
route3protocols(config-vif-1)#ip rip v1-only
route3protocols(config-vif-1)#ipx network 100 ethernet_802.2 netbios-allow
route3protocols(config-vif-1)#apple cable-range 100 - 100
route3protocols(config-vif-1)#apple address 100.99
```

```

route3protocols(config-vif-1)#apple zone-name ZONE100
route3protocols(config-vif-1)#apple zone-name SHARED_ZONE
route3protocols(config-vif-1)#apple routing

```

```

route3protocols(config-vif-1)#int ve2
route3protocols(config-vif-2)#ip address 10.10.200.1/24
route3protocols(config-vif-2)#ip rip v1-only
route3protocols(config-vif-2)#ipx net 200 ethernet_802.2 netbios-allow
route3protocols(config-vif-2)#apple cable-range 200 - 200
route3protocols(config-vif-2)#apple address 200.99
route3protocols(config-vif-2)#apple zone-name ZONE200
route3protocols(config-vif-2)#apple zone-name SHARED_ZONE
route3protocols(config-vif-2)#apple routing

```

Finally, save the configuration.

```

route3protocols(config-vif-2)#write mem
route3protocols(config-vif-2)#.Write startup-config in progress.
.Write startup-config done.

```

RESULTING CONFIGURATION:

```

route3protocols#sho config
Startup configuration:
!
ver 06.6.05T43
module 1 24-port-copper-module
module 4 8-port-gig-management-module
!
global-protocol-vlan
!
!
vlan 1 name DEFAULT-VLAN by port
!
vlan 100 name VLAN100 by port
tagged ethe 4/1
untagged ethe 1/1 to 1/12
router-interface ve 1
!
vlan 200 name VLAN200 by port
tagged ethe 4/1
untagged ethe 1/13 to 1/24
router-interface ve 2
!
router ipx
router appletalk
hostname route3protocols
!
interface ve 1
 appletalk cable-range 100 - 100
 appletalk address 100.99
 appletalk zone-name ZONE100
 appletalk zone-name SHARED_ZONE
 appletalk routing
 ip address 10.10.100.1 255.255.255.0
 ip rip v1-only
 ipx net 00000100 ethernet_802.2 netbios-allow
!
interface ve 2
 appletalk cable-range 200 - 200
 appletalk address 200.99
 appletalk zone-name ZONE200
 appletalk zone-name SHARED_ZONE
 appletalk routing
 ip address 10.10.200.1 255.255.255.0
 ip rip v1-only
 ipx net 00000200 ethernet_802.2 netbios-allow
!

```

```
!  
!  
router rip  
!  
end
```

```
route3protocols#
```

ADDITIONAL NOTES:

1. The act of configuring a VLAN on a Routing Switch results in an extra line in the config: a "DEFAULT-VLAN" with VLAN ID (VID) = 1. All ports on the Routing Switch are members of the "DEFAULT-VLAN" - until ports are configured as members of another VLAN (in which case they are automatically removed from the "DEFAULT-VLAN").
2. The "DEFAULT-VLAN" cannot be deleted, and it cannot be renamed.
3. For those reasons, it is recommended to not use the "DEFAULT-VLAN". Instead, create additional VLANs using a convenient naming/numbering sequence for your network.
4. By default, there can be a maximum of 8 port-based VLANs. If needed, the maximum number of port-based VLANs can be increased, up to a value of 256 (on software version 06.6.05). An example command to increase the maximum number of port-based VLANs to 30 is:

```
HP9308# system-max vlan 30
```
5. IPX type 20 diagnostic packet forwarding can be enabled both globally and on an interface. If the global command is set, subsequent IPX networks configured on any interface will use the global setting. Without a global setting, the default for each interface is IPX netbios-disallow. The global command is `ipx netbios-allow`. The interface command is implemented by appending to the IPX network definition the words `netbios-allow`.
6. For AppleTalk zones, the "default zone" is the first zone name configured on an interface.

VERIFICATION COMMANDS:

IP "show" commands, and their outputs:

sho ip display IP configuration of this device
sho ip route display IP routing table
sho ip interface display interfaces configured for IP routing

```
route3protocols#sho ip
Global Settings
  ttl: 64, arp-age: 10, bootp-relay-max-hops: 4
  router-id : 10.10.100.1
  enabled : UDP-Broadcast-Forwarding Source-Route IRDP Load-Sharing RARP RIP
  disabled: Directed-Broadcast-Forwarding BGP4 Proxy-ARP RIP-Redist OSPF DVMRP
SRP VRRP
route3protocols#
```

```
route3protocols#sho ip rou
Total number of IP routes: 2
Start index: 1 B:BGP D:Connected R:RIP S:Static O:OSPF *:Candidate default
  Destination            NetMask            Gateway            Port    Cost    Type
1    10.10.100.0        255.255.255.0      0.0.0.0            v1     1     D
2    10.10.200.0        255.255.255.0      0.0.0.0            v2     1     D
route3protocols#
```

```
route3protocols#sho ip int
Interface            IP-Address            OK?    Method            Status            Protocol
Ve 1                10.10.100.1            YES    manual            up                up
Ve 2                10.10.200.1            YES    manual            up                up
route3protocols#
```

IPX "show" commands, and their outputs:

sho ipx display IPX configuration of this device
sho ipx route display IPX routing table
sho ipx servers display IPX services table
sho ipx interface display interfaces configured for IPX routing

```
route3protocols#sho ipx
IPX Enabled
NetBIOS (type 20): Disallowed

Maximum RIP entries: 2048
Maximum SAP entries: 4096

Maximum IPX RIP filters: 32
Maximum IPX SAP filters: 32
Maximum IPX forward filters: 32

route3protocols#
```

```
route3protocols#sho ipx rou
```

```
Total number of IPX route entries 2
```

Index	Network	Forwarding Router	Hops	Ticks	Port
1	00000200	0000.0000.0000	0	1	v2
2	00000100	0000.0000.0000	0	1	v1

```
route3protocols#
```

```
route3protocols#sho ipx servers
```

```
Total number of IPX server entries 5
```

Index	Network	Node	Socket	Type	Hops	Port
1	00AAA312	0000.0000.0001	0451	0004	1	1/8
		Server-name: ACCOUNTING				
2	00AAA411	0000.0000.0001	0451	0004	2	4/1
		Server-name: ENGINEERING				
3	00AAA411	0000.0000.0001	8104	0107	3	4/1
		Server-name: ENGINEERING				
4	0BBB8022	0800.095e.9ec0	400C	030C	1	1/7
		Server-name: 0800095E9EC090C4LASERJET_4P				
5	0BBB8022	0800.098b.03d8	4002	07DE	1	1/2
		Server-name: HP_J2624A_8B03D8				

```
route3protocols#
```

```
route3protocols#sho ipx int
```

```
Interface Ethernet Ve 1
```

```
members: ethe 1/1 to 1/12 ethe 4/1
```

```
active: ethe 1/4 ethe 4/1
```

```
MAC address: 00e0.5289.6800 Port state: UP
```

```
IPX network: 00000100 Frame type: ethernet_802.2 Allow NetBIOS: YES
```

```
rip-interval: 60 rip-max-packet-size: 432 rip-multiplier: 3
```

```
sap-interval: 60 sap-max-packet-size: 480 sap-multiplier: 3
```

```
Interface Ethernet Ve 2
```

```
members: ethe 1/13 to 1/24 ethe 4/1
```

```
active: ethe 1/15 ethe 4/1
```

```
MAC address: 00e0.5289.6800 Port state: UP
```

```
IPX network: 00000200 Frame type: ethernet_802.2 Allow NetBIOS: YES
```

```
rip-interval: 60 rip-max-packet-size: 432 rip-multiplier: 3
```

```
sap-interval: 60 sap-max-packet-size: 480 sap-multiplier: 3
```

```
route3protocols#
```

AppleTalk "show" commands, and their outputs:

```
sho apple route    display AppleTalk routing table
sho apple zone     display AppleTalk zone list
sho apple interface display interfaces configured for AppleTalk routing
sho apple globals  display AppleTalk general routing parameters
```

```
route3protocols#sho apple rou
```

Index	Cable Range	Next Hop	Distance	State	Port
1	100 - 100	0.0	0	0	v1
2	200 - 200	0.0	0	0	v2

```
route3protocols#
```

```
route3protocols#sho apple zone
```

1	100 - 100	ZONE100
2	100 - 100	SHARED_ZONE
3	200 - 200	SHARED_ZONE
4	200 - 200	ZONE200

```
route3protocols#
```

```
route3protocols#sho apple int
Interface v1
members: ethe 1/1 to 1/12 ethe 4/1
active: ethe 1/4 ethe 4/1
port state: UP
routing : Enabled
operation mode : Seed Router
address: 100.99, cable-range: 100 - 100 arp-age 10
Zone List:
ZONE100
SHARED_ZONE
Zone Filter List: No zone filters are configured.
Additional Zones Action : Permit, No RTMP Filtering
Interface v2
members: ethe 1/13 to 1/24 ethe 4/1
active: ethe 1/15 ethe 4/1
port state: UP
routing : Enabled
operation mode : Seed Router
address: 200.99, cable-range: 200 - 200 arp-age 10
Zone List:
ZONE200
SHARED_ZONE
Zone Filter List: No zone filters are configured.
Additional Zones Action : Permit, No RTMP Filtering
route3protocols#
```

```
route3protocols#sho apple globals
AppleTalk Routing Global Settings :
enabled : Routing
disabled: Glean Packets
rtmp-update-interval: 10
zip-query-interval: 10, arp-retransmit-interval: 1, arp-retransmit-count: 2
QOS Priority 0 Sockets : 1 - 254
QOS Priority 1 Sockets : None
QOS Priority 2 Sockets : None
QOS Priority 3 Sockets : None
QOS Priority 4 Sockets : None
QOS Priority 5 Sockets : None
QOS Priority 6 Sockets : None
QOS Priority 7 Sockets : None
route3protocols#
```