

# 8 Configuring IPX

The Internet Packet Exchange (IPX) protocol, developed by Novell for NetWare, is a protocol used to route packets through networks. IPX specifies a connectionless datagram similar to the IP packet of TCP/IP networks. An IPX network address consists of two parts: a network number and a node number. The IPX network number is assigned by the network administrator. The node number is usually the Media Access Control (MAC) address for a network interface in the end node.

IPX exchanges information using its own Routing Information Protocol (RIP), which sends updates every 60 seconds. NetWare also supports a Service Advertising Protocol (SAP) to allow network resources, including file and print servers, to advertise their network addresses and the services they provide. The user can also define a specific route. These routes, called static routes, have higher priority than routes selected by RIP. See the *OmniCore CLI Reference Manual* for more information.

IPX supports multiple encapsulation types for Ethernet. These types are listed below as Novell terms, followed by their CLI name.

## IPX Encapsulation Types

Novell Term	CLI Name	Description
802.3 Raw	raw	Includes an IEEE 802.3 length field, but not an IEEE 802.2 Logical Link Control (LLC) header. This encapsulation is the method Novell originally used in NetWare 2.x and 3.x.
802.3	llc	The standard 802.3 frame format, including an 802. LLC header. With the release of NetWare 3.12 and 4.x, this encapsulation became Novell's new standard frame format.
Ethernet Version 2	etype	Uses the standard Ethernet 2 header.
SNAP	snap	Extends the IEEE 802.3 header by adding a Subnetwork Access Protocol (SNAP) header, which provides an "encapsulation type" code similar to that defined in the Ethernet version 2 specification.

## IPX Commands

The major IPX commands in the OmniCore CLI are listed in the following tables. Other commands are available for fine-tuning your IPX configuration. To see a complete list of these commands or for more information regarding the commands used in this chapter, see the *OmniCore CLI Reference Manual*.

### IPX Global Commands

Command	Default	Description
ipx hw-routing	enable	Enables hardware forwarding of packets.
ipx rip max-paths	3	Designates the maximum number of equal cost paths that are permitted for IPX networks.
ipx rip status	disable	Enables RIP under IPX.
ipx sap status	disable	Enables SAP under IPX.

**IPX Global Commands (Continued)**

ipx static-route	no default	Defines IPX static routes.
ipx static-route hops	1 hop	Defines the number of hops for a static route.
ipx static-route nextencap	no default	Defines the encapsulation type of the next IPX network.
ipx static-route nextnode	no default	Defines the next node that a packet will be forwarded to.
ipx static-route nextvlan	no default	Defines the VLAN to which an IPX packet will be forwarded.
ipx static-route ticks	1 tick	Defines the path cost for a static route.
ipx status	disable	Enables global IPX routing.
ipx sysencap	etype	Defines the IPX encapsulation type.

**IPX Interface Commands**

<b>Command</b>	<b>Default</b>	<b>Description</b>
vlan ipx nbfwd	enable	Enables NetBIOS forwarding.
vlan ipx network	no default	Defines an IPX network.
vlan ipx rip age	4	Determines multiplier factor for aging routes.
vlan ipx rip gap	120 milliseconds	Implements the Novell packet gap between successive RIP updates.
vlan ipx rip interval	60 seconds	Determines frequency of RIP updates.
vlan ipx rip size	402 bytes	Determines maximum update packet size.
vlan ipx rip split	enable	Enables split-horizon routing technique.
vlan ipx rip status	disable	Enables RIP under IPX.
vlan ipx rip ticks	0 ticks	Allows the overriding of the assigned RIP cost.
vlan ipx sap age	4	Determines multiplier factor for aging routes.
vlan ipx sap gap	120 milliseconds	Determines minimum period of time between successive SAP updates.
vlan ipx sap gns-delay	0 milliseconds	Sets delay for responding to GNS requests.
vlan ipx sap gns-reply	enable	Enables response to GNS requests.
vlan ipx sap interval	60 seconds	Designates SAP update frequency.
vlan ipx sap size	450 bytes	Determines maximum SAP update packet size.
vlan ipx sap split	enable	Enables split-horizon routing technique.
vlan ipx sap status	disable	Designates SAP operating status.

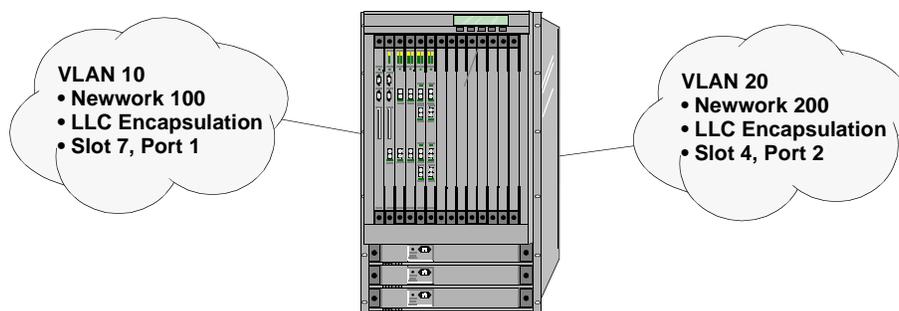
## IPX Interface Commands (Continued)

vlan ipx size	1500 bytes	Defines maximum packet size.
vlan ipx status	disable	Enables an IPX network.

## Configuring IPX

By default, IPX is not enabled on the OmniCore routing switch. Configuring IPX consists of the following tasks:

- Enable IPX and specify an encapsulation type.
- (Optional) Enable hardware routing.
- Enable RIP.
- Enable SAP.
- Create an IPX VLAN interface.
- Several different IPX interfaces operating within a OmniCore routing switch are shown below.



Follow these steps to configure IPX as seen in the proceeding illustration:

1. Enable IPX and specify an encapsulation type.

```
OmniCore> ipx
OmniCore/ipx> status enable
OmniCore/ipx> sysencap raw
```

2. (Optional) Enable hardware routing. For IPX networks, you can choose between fast path routing at wire speed (hardware routing) and slow path routing (software routing). It is recommended that hardware routing remain enabled, except in situations when two or more ports are assigned to an IPX VLAN interface or when two or more IPX encapsulation types are in use.

```
OmniCore/ipx> hw-routing enable
OmniCore/ipx> show
IPX Status                :enable
Hardware Routing          :enable
System Encapsulation      :raw
```

3. Enable RIP.

```
OmniCore/ipx> rip status enable
OmniCore/ipx> rip show
RIP Status                :enable
Maximum RIP Paths        :3
```

### 4. Enable SAP.

```
Omnicores/ipx> sap status enable
Omnicores/ipx> sap show
Sap Status                               :enable
```

### 5. Create the IPX VLAN interfaces. The Omnicores routing switch ships with all ports located in the default VLAN (VLAN 1).

#### a. Create the VLANs.

```
Omnicores/ipx> ..
Omnicores> vlan 10 tag 3 create
Omnicores> vlan 20 tag 4 create
```

#### b. Define the network number, ports and their domain membership, and frame type for each IPX interface. Please note that when asked to provide the <vlan id> value, this value is considered to be the same as an IPX interface. For more information on assigning VLAN membership to a port, see [Chapter 3, "Configuring VLANs and Priority"](#).

```
Omnicores> vlan 10 ipx llc network 100 create
Omnicores> vlan 10
Omnicores/vlan=10> member 7 1 default add
Omnicores/vlan=10> show
Vlan Id                               :10
Vlan Current State                     :enable
Name                                   :VLAN-10
Tag                                     :3
Priority                               :default
Broadcast Priority                     :default
Flood Priority                         :default
Oper Status                            :up
Port Member List                       :7 - 1
Omnicores/vlan=10> ..
Omnicores> vlan 20 ipx llc network 200 create
Omnicores> vlan 20
Omnicores/vlan=20> member 4 2 default add
Omnicores/vlan=20> show
Vlan Id                               :20
Vlan Current State                     :enable
Name                                   :VLAN-20
Tag                                     :4
Priority                               :default
Broadcast Priority                     :default
Flood Priority                         :default
Oper Status                            :up
Port Member List                       :4 - 2
```

#### c. Enable NetBIOS, if necessary.

```
Omnicores/vlan=20> ipx llc nbfwd enable
Omnicores/vlan=20> ipx llc nbfwd show
NetBIOS status                         :enable
Omnicores/vlan=20> ..
Omnicores> vlan 10
Omnicores/vlan=10> ipx llc nbfwd enable
Omnicores/vlan=10> ipx llc nbfwd show
NetBIOS status                         :enable
```

While the default settings for IPX commands should be adequate for most networks, you may need to modify various global and interface settings. See the *OmniCore CLI Reference Manual* for more information on IPX commands.

