

Network II Lab 05

Part01 : Configuring Switches

The **Config** tab for the switch offers three (four for multilayer switch) general levels of configuration:

global, routing ,switching, and interface.

The global level offers the same settings as a router.

The routing level also offers the same configuration parameters as a router.

The switching level, however, is where you can manage the VLAN database of the switch.

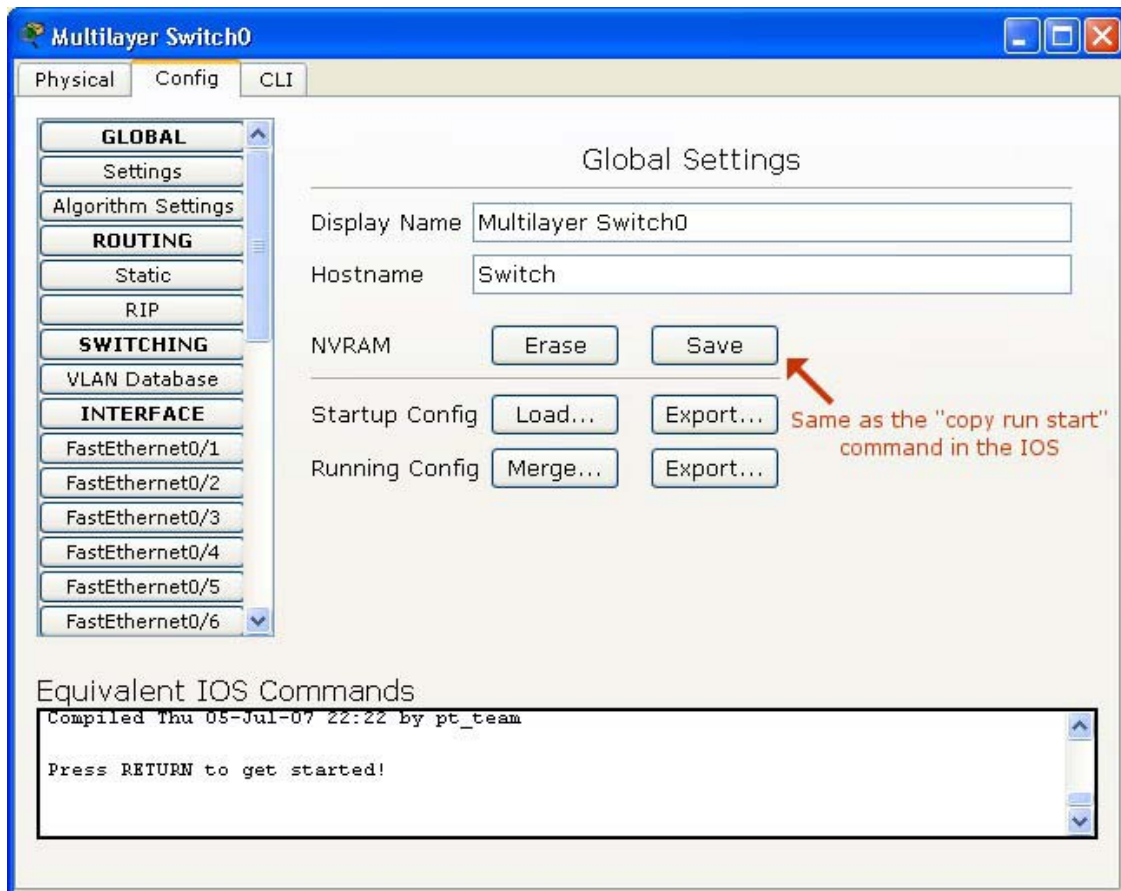
The interface level configurations also offer access to the VLAN settings of the switch.

Note that the **Config** tab provides an alternative to the Cisco IOS CLI (command line interface) only for some simple, common features; to access the full set of switch commands that have been modeled you must use the Cisco IOS CLI.

Throughout your configurations in the **Config** tab, the lower window will display the equivalent Cisco IOS commands for all your actions.

1. Global Settings

In global settings, you can change the switch display name as it appears on the workspace and the hostname as it appears in the Cisco IOS. You can also manipulate the switch configuration files in these various ways:

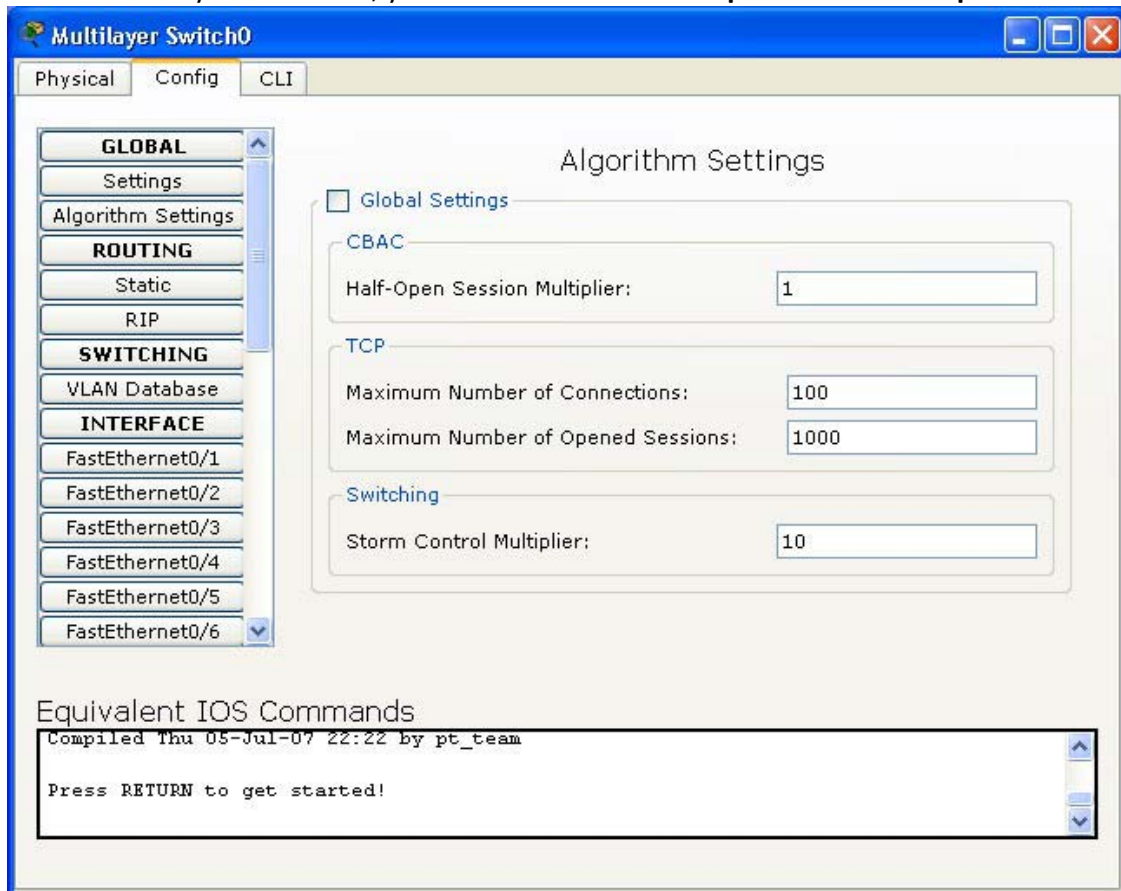


The screenshot shows the configuration interface for a Multilayer Switch0. The window has three tabs: Physical, Config, and CLI. The Config tab is active, showing a tree view on the left with categories: GLOBAL, ROUTING, SWITCHING, and INTERFACE. The GLOBAL category is selected, displaying the 'Global Settings' panel. This panel includes fields for 'Display Name' (Multilayer Switch0) and 'Hostname' (Switch). Below these are buttons for 'NVRAM' (Erase, Save), 'Startup Config' (Load..., Export...), and 'Running Config' (Merge..., Export...). A red arrow points to the 'Export...' button for the Running Config, with a note: 'Same as the "copy run start" command in the IOS'. At the bottom, a text area titled 'Equivalent IOS Commands' shows the command 'Compiled Thu 05-Jul-07 22:22 by pt_team' and the instruction 'Press RETURN to get started!'.

- Erase the NVRAM (where the startup configuration is stored).
- Save the current running configuration to the NVRAM.
- Export the startup and running configuration to an external text file.
- Load an existing configuration file (in .txt format) into the startup configuration.
- Merge the current running configuration with another configuration file.

Algorithm Settings

In the **Algorithm Settings**, you can override the global Algorithm Settings by unchecking **Global Settings** and then set your own values for the **Maximum Number of connections**, **Maximum Number of Opened Sessions**, and **Storm Control Multiplier**. For the Cisco Catalyst 3560-24PS, you can also set the **Half-Open Session Multiplier**.



The screenshot shows the configuration interface for a Multilayer Switch0. The 'Config' tab is active, and the 'Algorithm Settings' section is expanded. The 'Global Settings' checkbox is unchecked. The settings are as follows:

Section	Parameter	Value
CBAC	Half-Open Session Multiplier:	1
	Storm Control Multiplier:	10
TCP	Maximum Number of Connections:	100
	Maximum Number of Opened Sessions:	1000

Below the settings, the 'Equivalent IOS Commands' section shows the following text:

```
Compiled Thu 05-Jul-07 22:22 by pt_team
Press RETURN to get started!
```

Notes:

“**Context-based access control (CBAC)** intelligently filters TCP and UDP packets based on application layer protocol session information and can be used for intranets, extranets and internets. CBAC can be configured to permit specified TCP and UDP traffic through a firewall only when the connection is initiated from within the network needing protection. (In other words, CBAC can inspect traffic for sessions that originate from the external network.)”



“A traffic storm occurs when packets flood the LAN, creating excessive traffic and degrading network performance. The traffic storm control feature prevents LAN ports from being disrupted by a broadcast, multicast, or unicast traffic storm on physical interfaces.”

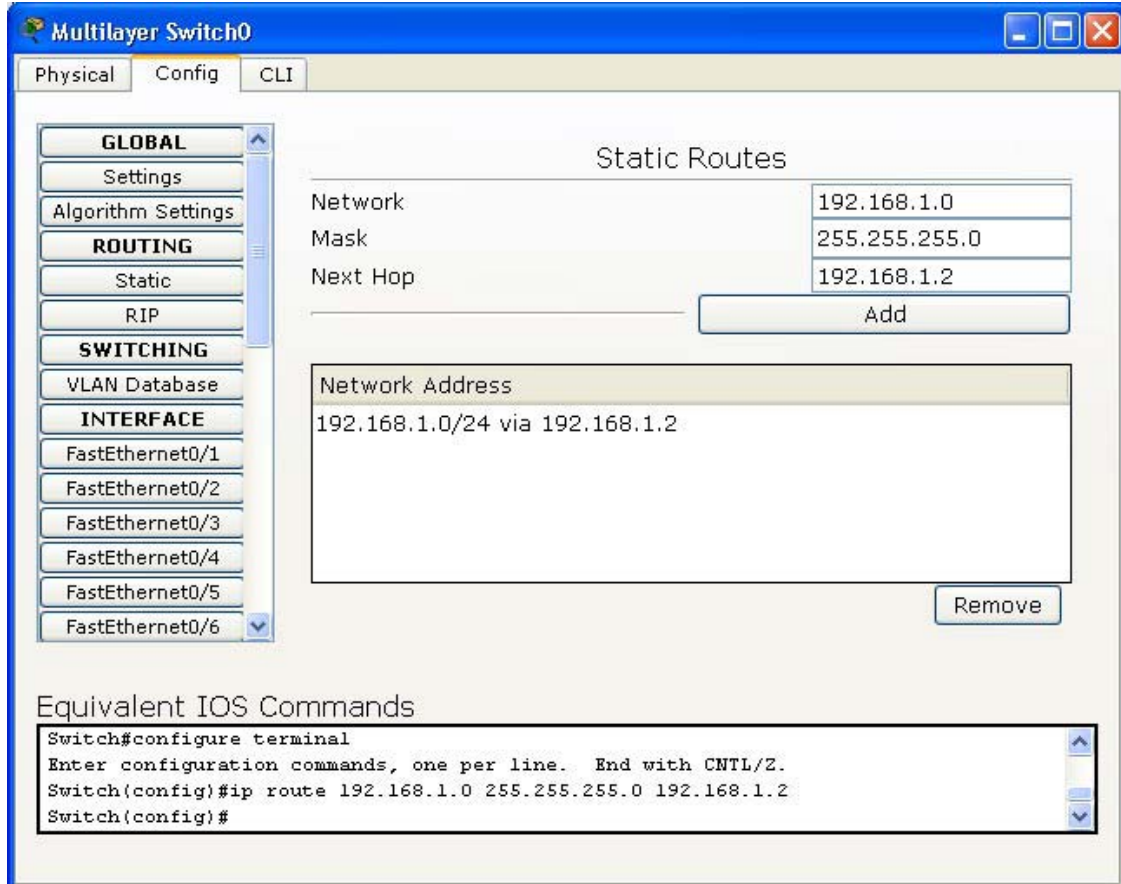
“Traffic storm control (also called traffic suppression) monitors incoming traffic levels over a 1-second traffic storm control interval and, during the interval, compares the traffic level with the traffic storm control level that you configure. The traffic storm control level is a percentage of the total available bandwidth of the port. Each port has a single traffic storm control level that is used for all types of traffic (broadcast, multicast, and unicast).”

2. Routing Configuration (Cisco Catalyst 3560-24PS only)

The Cisco Catalyst 3560-24PS multilayer switch supports IP routing.

Static configuration

You can make static routes on the router by choosing the **Static** sub-panel. Each static route you add requires a network address, subnet mask, and next hop address.



The screenshot shows the configuration interface for a Multilayer Switch0. The 'Config' tab is active, and the 'Static' sub-panel is selected. The 'Static Routes' section contains a table with the following entries:

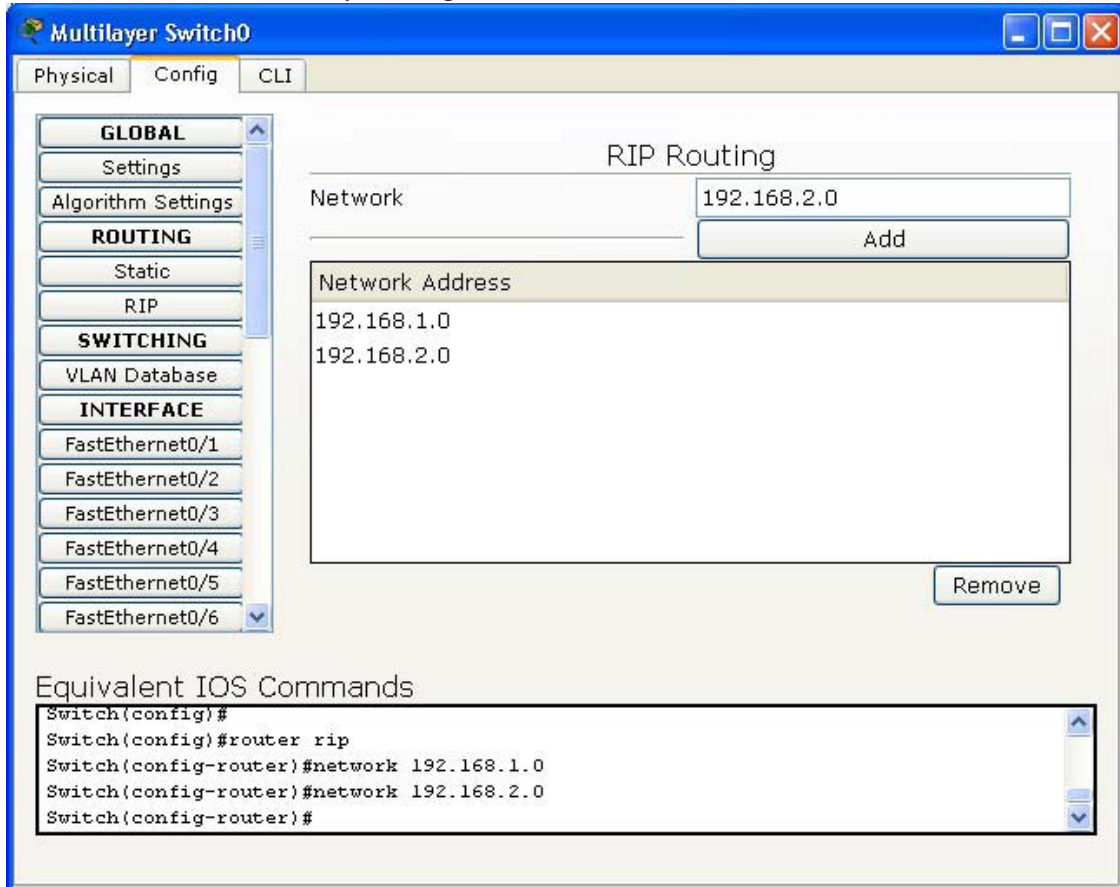
Network	192.168.1.0
Mask	255.255.255.0
Next Hop	192.168.1.2

Below the table is an 'Add' button. A 'Network Address' box contains the text '192.168.1.0/24 via 192.168.1.2'. A 'Remove' button is located below this box. The 'Equivalent IOS Commands' section shows the following commands:

```
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#ip route 192.168.1.0 255.255.255.0 192.168.1.2
Switch(config)#
```

RIP configuration

You can enable RIP (Routing Information Protocol) version 1 on specified networks by choosing the **RIP** sub-panel. Enter an IP address into the **Network** field and press the **Add** button. The RIP-enabled network is added to the **Network Address** list. You can disable RIP on a network by clicking the **Remove** button to remove it from the list.



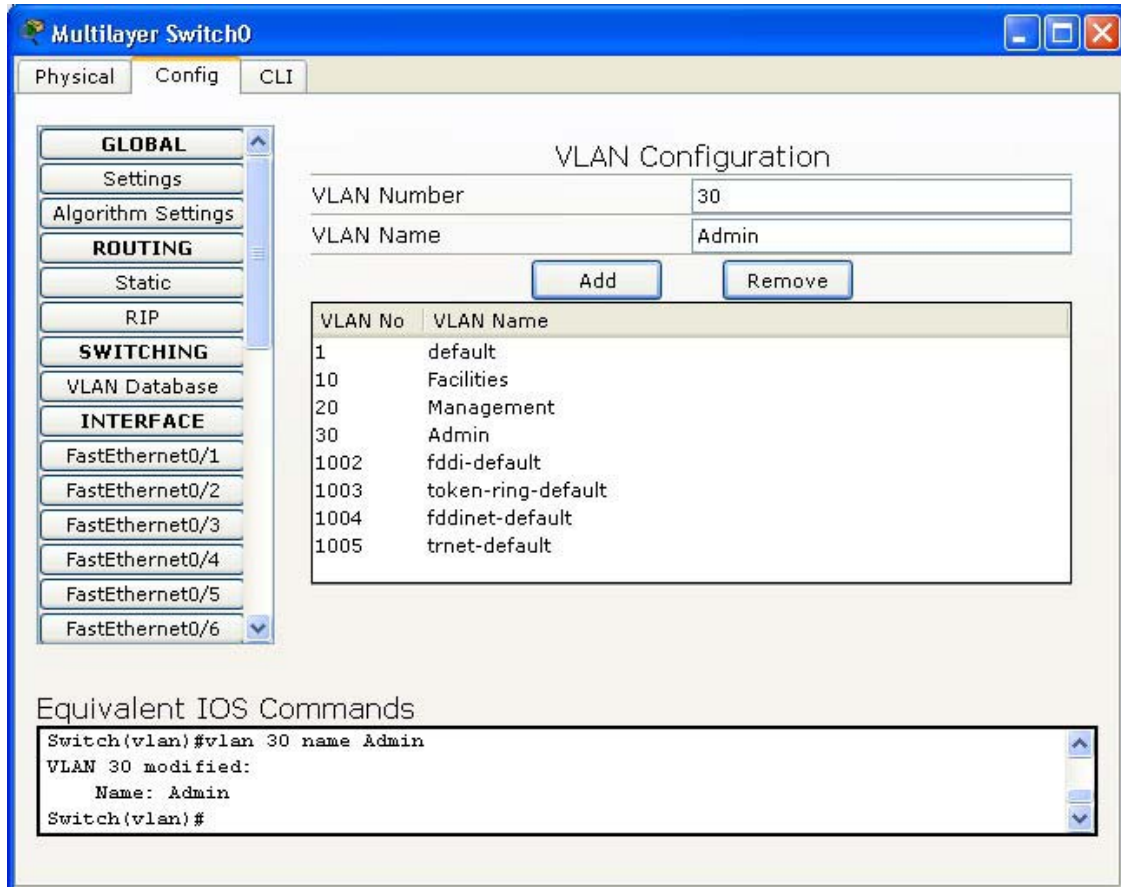
Note:

“The **Routing Information Protocol (RIP)** is a distance-vector routing protocol, which employs the hop count as a routing metric. RIP prevents routing loops by implementing a limit on the number of hops allowed in a path from the source to a destination”

3. switching configuration

VLAN Database Configuration

You can manage the VLANs of the switch from the **VLAN Database** sub-panel. You can add VLANs by entering a name and a VLAN number and pressing the **Add** button. You can see all existing VLAN entries in the list below the button. You can remove a VLAN by selecting it in the list and then pressing the **Remove** button. To associate a particular interface with a VLAN, go to the configuration panel of that interface.



The screenshot shows the 'VLAN Configuration' window in a network management tool. It features a left-hand navigation menu with categories like GLOBAL, ROUTING, SWITCHING, and INTERFACE. The 'VLAN Database' option is selected under SWITCHING. The main area contains input fields for 'VLAN Number' (30) and 'VLAN Name' (Admin), with 'Add' and 'Remove' buttons below them. A table lists existing VLANs with their numbers and names. At the bottom, there is a text area for 'Equivalent IOS Commands' showing the command 'Switch(vlan)#vlan 30 name Admin' and its output.

VLAN No	VLAN Name
1	default
10	Facilities
20	Management
30	Admin
1002	fddi-default
1003	token-ring-default
1004	fdnet-default
1005	trnet-default

```

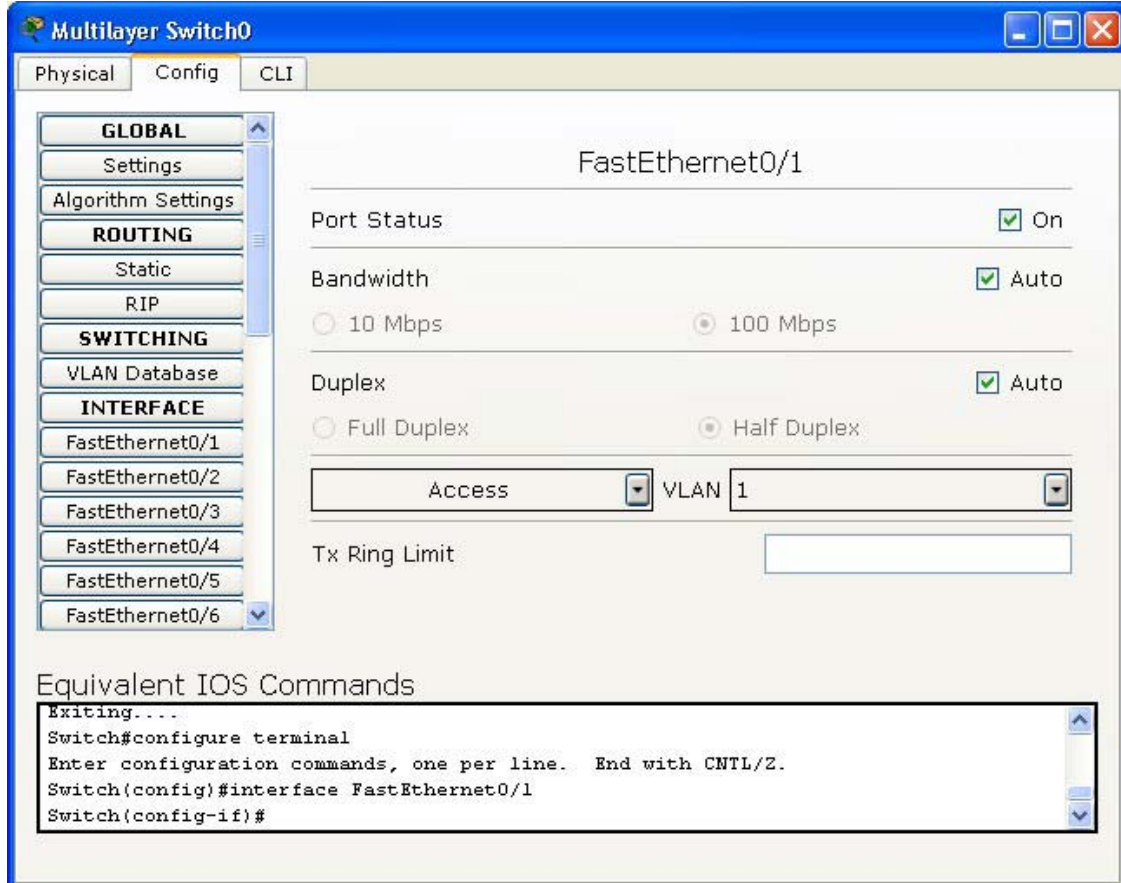
Switch(vlan)#vlan 30 name Admin
VLAN 30 modified:
  Name: Admin
Switch(vlan)#
  
```

Note:

“A **virtual local area network, virtual LAN or VLAN**, is a group of hosts with a common set of requirements that communicate as if they were attached to the same broadcast domain, regardless of their physical location. A VLAN has the same attributes as a physical local area network (LAN), but it allows for end stations to be grouped together even if they are not located on the same network switch. VLAN membership can be configured through software instead of physically relocating devices or connections.”

Interface Configuration

Switches have only Ethernet-type interfaces. For each interface, you can set the **Port Status** (on or off), **Bandwidth**, **Duplex** setting, **VLAN Switch Mode**, and **Tx Ring Limit**. By default, an interface is a VLAN access port assigned to VLAN 1. You can use the drop-down menu on the right side of the screen to reassign the port to another existing VLAN. You can also change an interface into a VLAN trunk port, and then use the drop-down menu on the right to select the VLANs you want that trunk to handle.



In Packet Tracer, the switch allows all VLANs (1 to 1005) on a trunk port by default, even if the VLAN does not actually exist on the switch. In the drop-down menu, you can see the current VLANs and block (uncheck) them from the trunk. However, you cannot block VLANs that do not exist. This does not affect the functionality of the switch. It is simply a way to display VLANs (or a range of VLANs) that the trunk supports.

Note:

“The impact of **tx-ring-limit** parameter (the size of the FIFO hardware queue between the interface hardware and the sophisticated software queuing mechanism offered by Cisco IOS) should be obvious: larger parameter values cause more delay and jitter, resulting in reduced quality-of-service of time-critical applications (like voice-over-IP). A series of tests performed in a small tightly controlled test-bed quantifies the actual impact.

Conclusions



The default value of **tx-ring-limit** is a good compromise between the latency/jitter requirements of medium speed links and increased CPU utilization due to I/O interrupts caused by low tx-ring-limit values. On low-speed links (128 kbps and below), the **tx-ring-limit** should be decreased to 1. ”

Part02 : Configuring Routers

The **Config** tab offers four general levels of configuration: global, routing, switching (Cisco 1841 and Cisco 2811 only), and interface.

To perform a global configuration, press the **GLOBAL** button to expand the **Settings** button (if it has not already been expanded).

To configure routing, press the **ROUTING** button, and then choose **Static** or **RIP**.

To configure switching, press the **SWITCHING** button to expand the VLAN Database button.

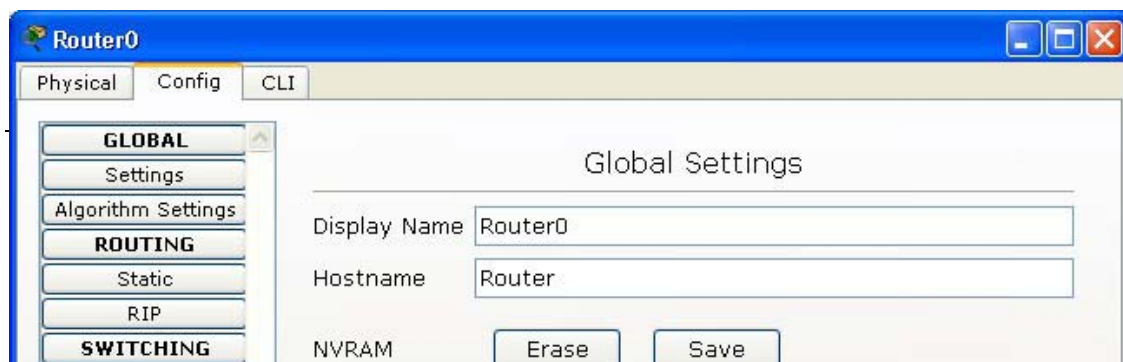
To configure an interface, press the **INTERFACE** button to expand the list of interfaces, and then choose the interface. Note that the **Config** tab provides an alternative to the Cisco IOS CLI only for some simple, common features; to access the full set of router commands that have been modeled you must use the Cisco IOS CLI.

Throughout your configurations in the Config tab, the lower window will display the equivalent Cisco IOS commands for all your actions.

Global Settings

In global settings, you can change the display name of the router as it appears on the workspace and the hostname as it appears in the Cisco IOS. You can also manipulate the router configurations files in these various ways:

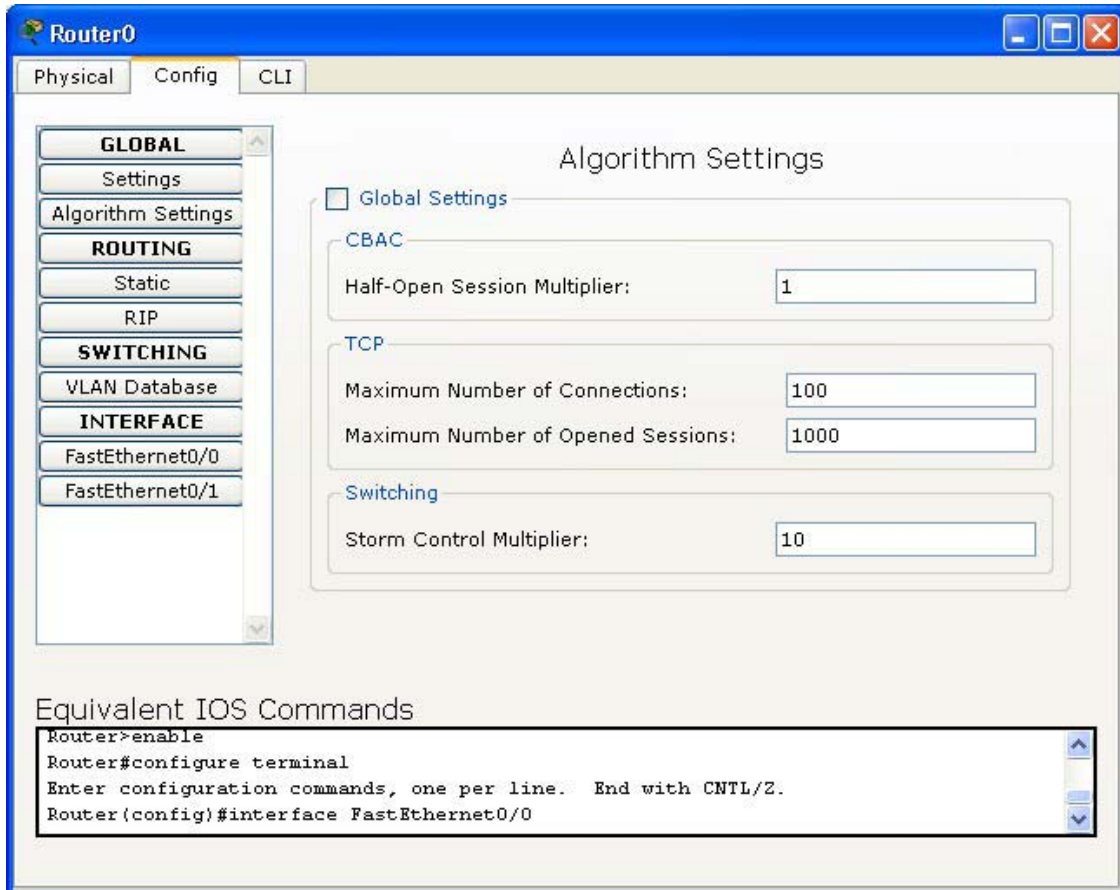
- Erase the NVRAM (where the startup configuration is stored).
- Save the current running configuration to the NVRAM.
- Export the startup and running configuration to an external text file.
- Load an existing configuration file (in .txt format) into the startup configuration.
- Merge the current running configuration with another configuration file.



Algorithm Settings

In the **Algorithm Settings**, you can override the global Algorithm Settings by unchecking

Global Settings and then set your own values for the **Half-Open Session Multiplier**, **Maximum Number of Connections**, and **Maximum Number of Opened Sessions**. For the Cisco 1841 and Cisco 2811, you can also set the **Storm Control Multiplier**.



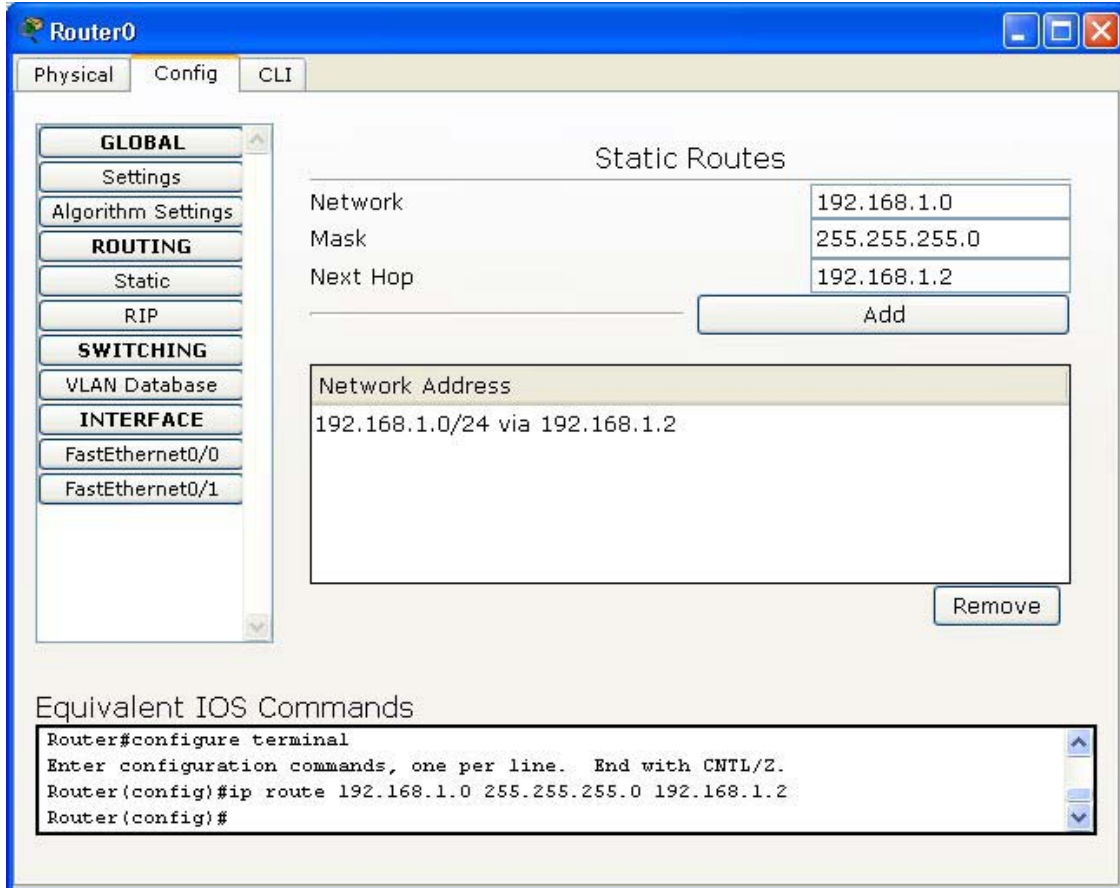
The screenshot shows the configuration interface for Router0. The 'Config' tab is active, and the 'Algorithm Settings' section is expanded. The 'Global Settings' checkbox is checked. The 'CBAC' section has 'Half-Open Session Multiplier' set to 1. The 'TCP' section has 'Maximum Number of Connections' set to 100 and 'Maximum Number of Opened Sessions' set to 1000. The 'Switching' section has 'Storm Control Multiplier' set to 10. The left sidebar shows a tree view with 'GLOBAL' selected. Below the configuration area, the 'Equivalent IOS Commands' section shows the following commands:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
```

Routing Configuration

Static configuration

You can make static routes on the router by choosing the **Static** sub-panel. Each static route you add requires a network address, subnet mask, and next hop address.



The screenshot shows the Router0 configuration window with the 'Static Routes' sub-panel selected. The configuration fields are as follows:

Network	192.168.1.0
Mask	255.255.255.0
Next Hop	192.168.1.2

Below the fields is an 'Add' button. A list of configured routes is shown in a text area:

```
Network Address
192.168.1.0/24 via 192.168.1.2
```

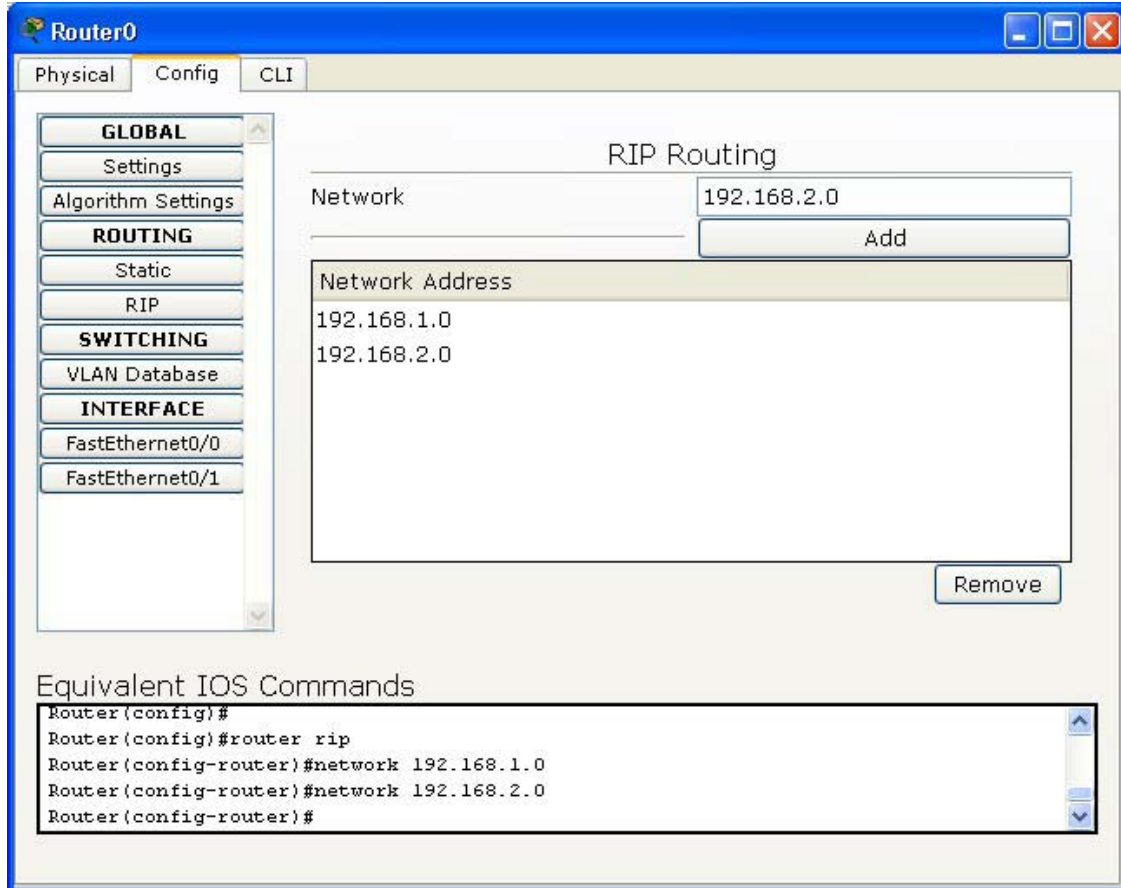
At the bottom right of the list is a 'Remove' button. Below the configuration area, the 'Equivalent IOS Commands' section shows the following commands:

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 192.168.1.0 255.255.255.0 192.168.1.2
Router(config)#
```

RIT settings

You can enable RIP version 1 on specified networks by choosing the **RIP** sub-panel. Enter an IP address into the **Network** field and press the **Add** button. The RIP-enabled

network is added to the **Network Address** list. You can disable RIP on a network by clicking the **Remove** button to remove it from the list.



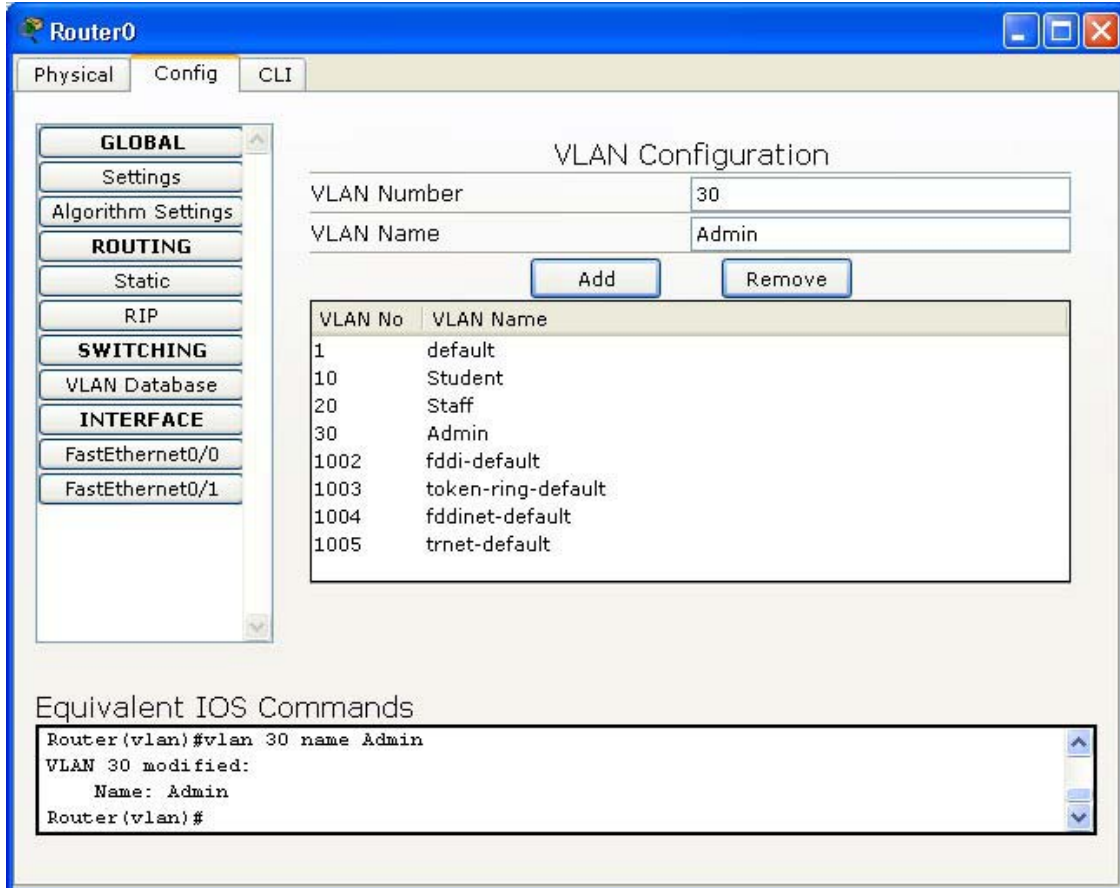
The screenshot shows the configuration window for Router0, specifically the RIP Routing section. The window has tabs for Physical, Config, and CLI. The left sidebar contains a tree view with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE (FastEthernet0/0, FastEthernet0/1). The main area is titled 'RIP Routing' and features a 'Network' field with the value '192.168.2.0' and an 'Add' button. Below this is a 'Network Address' list containing '192.168.1.0' and '192.168.2.0'. A 'Remove' button is located at the bottom right of this list. At the bottom of the window, there is a section for 'Equivalent IOS Commands' with a text area containing the following commands:

```
Router(config)#  
Router(config)#router rip  
Router(config-router)#network 192.168.1.0  
Router(config-router)#network 192.168.2.0  
Router(config-router)#
```

VLAN Database Configuration (Cisco 1841 and Cisco 2811 only)

The Cisco 1841 and 2811 routers support VLAN configuration. You can manage the VLANs on the router from the **VLAN Database** sub-panel. You can add VLANs by

entering a name and a VLAN number and pressing the **Add** button. You can see all existing VLAN entries in the list below the button. You can remove a VLAN by selecting it in the list and then pressing the **Remove** button.



The screenshot shows the Router0 configuration window with the 'Config' tab selected. The 'VLAN Configuration' section is active, showing a form for adding a new VLAN. The 'VLAN Number' field is set to 30 and the 'VLAN Name' field is set to 'Admin'. Below the form are 'Add' and 'Remove' buttons. A table lists existing VLANs:

VLAN No	VLAN Name
1	default
10	Student
20	Staff
30	Admin
1002	fddi-default
1003	token-ring-default
1004	fddinet-default
1005	trnet-default

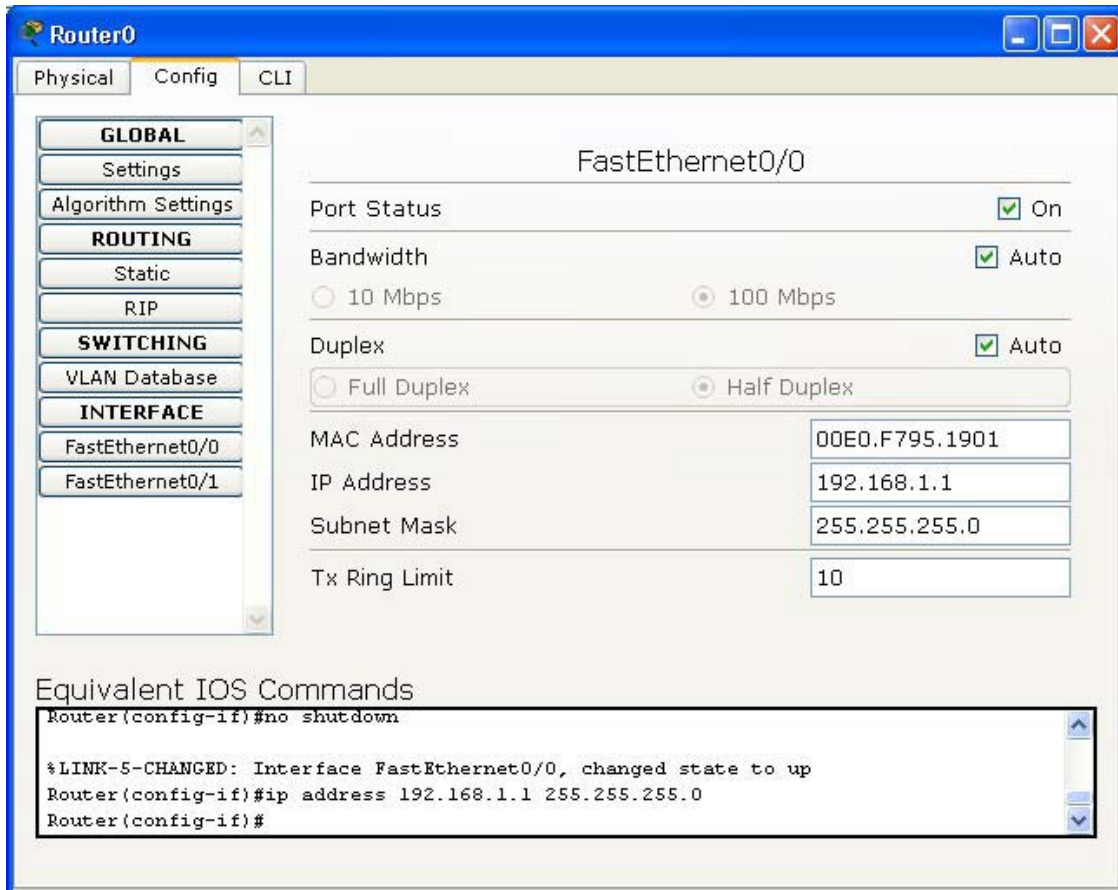
At the bottom, the 'Equivalent IOS Commands' section shows the following commands:

```
Router(vlan)#vlan 30 name Admin
VLAN 30 modified:
  Name: Admin
Router(vlan)#
```

Interface Configuration

A router can support a wide range of interfaces including serial, modem, copper Ethernet, and fiber Ethernet. Each interface type may have different configuration

options, but in general, you can set the **Port Status** (on or off), **IP Address**, **Subnet Mask**, and **Tx Ring Limit**. For Ethernet interfaces, you can also set the **MAC Address**, **Bandwidth**, and **Duplex** setting. For serial interfaces, you can set the **Clock Rate** setting



The screenshot shows the configuration window for Router0, specifically for the FastEthernet0/0 interface. The window is divided into three tabs: Physical, Config, and CLI. The Config tab is active, showing various configuration options for the interface. The left sidebar contains a tree view with categories: GLOBAL, ROUTING, SWITCHING, and INTERFACE. Under INTERFACE, FastEthernet0/0 is selected. The main area displays the following configuration:

Parameter	Value
Port Status	<input checked="" type="checkbox"/> On
Bandwidth	<input checked="" type="checkbox"/> Auto
10 Mbps	<input type="radio"/>
100 Mbps	<input checked="" type="radio"/>
Duplex	<input checked="" type="checkbox"/> Auto
Full Duplex	<input type="radio"/>
Half Duplex	<input checked="" type="radio"/>
MAC Address	00E0.F795.1901
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Tx Ring Limit	10

Below the configuration fields, there is a section titled "Equivalent IOS Commands" with a text area containing the following commands:

```
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#
```