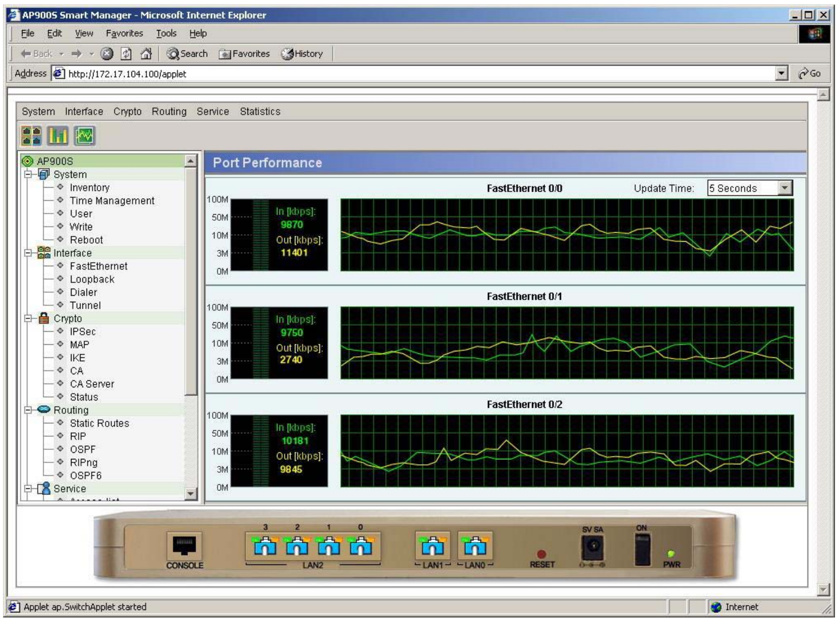
Smart Manager

Operation Guide for AP900S

Release 1.00



AP900S Smart Manager - Microsoft Internet Explorer

Address http://172.17.104.100/applet

Port Performance

FastEthernet 0/0 — Update Time: 5 Seconds — In [kbps]: 9870 — Out [kbps]: 11401

FastEthernet 0/1 — In [kbps]: 9750 — Out [kbps]: 2740

FastEthernet 0/2 — In [kbps]: 10181 — Out [kbps]: 9845

Applet ap.SwitchApplet started

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[CONTENTS]

[Table of Figures]

< Table of Tables >

Chapter 1. AP900S Introduction

SecureFinder AP900S Introduction

SecureFinder AP900S is a residential embedded VPN gateway based on IPSec standard. SecureFinder AP900S is suitable for small companies which require a strong secure policy to have access to important applications such as CRM, ERP, and Groupware of its head office.

SecureFinder AP900S Product Overview

1. Smart VPN gateway with strong features

SecureFinder AP900S is suitable for companies requiring high-performance, multi-functional VPN services. It supports not only protocols such as PPPoE for XDSL, cable modem connection but also various routing protocols such as Static and IEEE 802.1Q VLAN Routing, RIP v1/v2, OSPF v2, BGP v4. This SecureFinder AP900S provides advanced services which residential VPN gateway has never provided before.

2. Adopt Hardware VPN accelerator

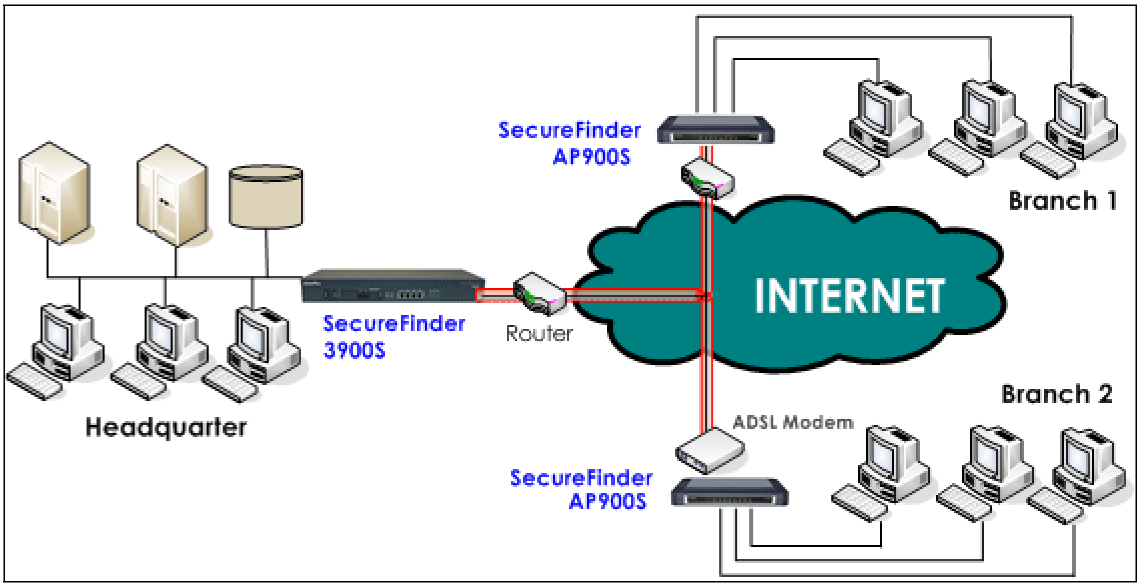
AP900S provides an optimized performance through hardware accelerator which is built in for VPN security. This controls network and system traffics enabling excellent VPN service. Based on AddPac's own embedded OS, APOS™, it delivers reliable VPN service and wide area network expansion service which can be adopted in any network environments. Also it is capable of using various algorithms such as DES, 3DES, AES so it is suitable for encryption algorithm and security policy.

3. The next-generation solution

Even for a small enterprise branch needs to have VPN gateway system for critical data applications, and secure VoIP calls from head office. It has to be prevented and protected by reliable security system such as VPN gateway. However, it is not easy for small business companies to realize secure data communication network and often unpredicted problems can be faced without IT expert. AP900S ensures network protection through the functions of VPN. It guarantees secure internet communications using embedded 4 ports 10/100Mbps hub which also has auto secure networking configuration function.

4. Streaming solution

Effective processing capability of streaming data such as video, audio(example, MP3) and VoIP application is one of the main considerations when it comes to choosing VPN system. SecureFinder AP900S offers excellent performance on processing multimedia data such as VoD, MP3 file, etc using QoS along with AddPac's own QoS features.



(Figure1-1) SecureFinder AP900S의 network diagram

AP900S Main features

- Residential VPN Gateway : embedded system type
- HW based security accelerator to reduce processing delay
- DMZ Zone for secure internet access such as Web, email etc
- Built in 4-Port Fast Ethernet Interface
- Authentication algorithm: MD5, SHA-1, HAS-160
- Encryption algorithm: DES, 3DES, AES etc
- Supports SSL/SSH communication functions
- Key managing : IKE Standard
- CA authentication : ID/Password, LDAP, X.509
- Flexible backup function using VRRP
- Embedded Advanced QoS features for multi-media application
- Real-time monitoring
- Supports Various routing service
- Various management services such as remote upgrade

AP900S Hardware Specification

<Table 1-1> AP900S Hardware Specification

Microprocessor	64bit RISC Microprocessor	
Memory	Flash Memory	8 Mbytes
	SDRAM Memory	64 Mbytes
	Boot Memory	512 Kbytes
Network Interface	2-Port 10/100Mbps Fast Ethernet Interface (RJ-45 interface) - Support Load Balancing - DMZ for Secure Web & E-mail Access - Creates a Public and Private Network Simultaneously	
	4-Port 10/100Mbps Fast Ethernet Interface for LAN - Support Auto Secure Service Configuration	
Console Port	1-Port RS-232C Console Interface(RJ-45 interface)	
Power	External Power, 110~220 VAC free voltage, 50/60Hz, 20Watt	
Operating Temperature	0 ~ 50 ℃ (32 ~ 122 ˚F)	
Store Temperature	-40 ~ +85 ℃ (-40 ~ +185 ˚F)	
Relative humidity	5 ~ 95 %	
Dimension	43 x 265 x 165 (mm, H x W x D)	

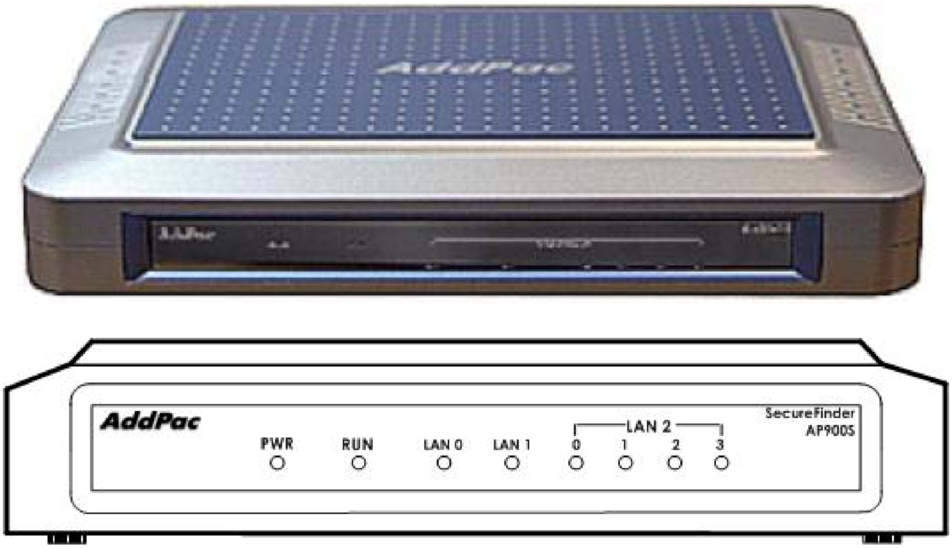
AP900S Software functions

<Table 1-2> AP900S software functions

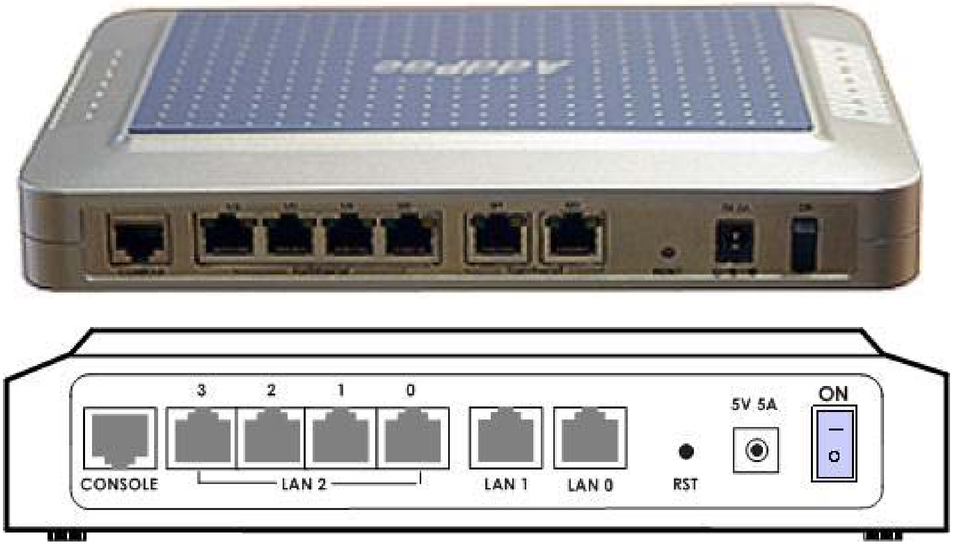
Network & Routing Protocol	Static and Default Routing
	RIP v1/v2, OSPF v2, BGP v4
	IEEE 802.1Q VLAN Routing
WAN Protocol	Point-to-Point over Ethernet Protocol (PPPoE) for ADSL Dynamic Host Configuration Protocol (DHCP) for Cable Modem
VPN function	Authentication Algorithm : MD5, SHA-1, HAS-160
	Key Management : IKE Standard
	CA Authentication : ID/Password, LDAP, X.509
	IP Authentication Header (AH)
	IP Encapsulation Security Payload (ESP)
	Authentication : PAP, CHAP, MS-CHAP, RADIUS
	Tunneling Protocol : PPTP, L2TP, IPSec
	IKE Encryption : DES, 3DES, AES, blowfish, cast
	IKE hash : MD5, SHA1
	IKE Authentication : Preshared-key, RSA-sig
	IKE Key Exchange : DH group 1(768), DH group 2(1024), DH group 5(1536)
	IKE lifetime : Second/Byte
	IKE Phase 1 : Main-mode, Aggressive-mode
	IKE Phase 2 : Quick-mode
	IPSec Protocol : AH(Authentication Header), ESP
	IPSec mode : Transport mode, Tunnel mode
	IPSec Encryption : DES, 3DES, AES, blowfish, cast, null
	IPSec Authentication : hmac-md5, hmac-sha1
	PFS : group1, group2, group5
	IPSec lifetime : Second/Byte
	Compression : LZS, deflate
	CA : CA Server, SCEP, OCSP
	VPN Tunnel Monitoring, Prevent Replay Attack
	NAT-Traversal : IPSEC Communication in NAT Environment with L2TP
Security	Supports IP Packet Filtering
	Supports IP Access-List

	User Authentication function (PAP, CHAP)
	Protocol Enable/Disable function
	Auto-disconnect function for Console, Telnet Session
	Multi-Level User Account Management function
Network management	Web based management feature: Java Based Manager
	Supports SSL/SSH communication
	Supports Standard SNMP Agent (MIB v1/2)
	Remote management using Console, Rlogin, Telnet
Additional services	Traffic Management feature
	Flexible backup using VRRP
	PAT(Port Address Translation)
	NAT(Network Address Translation)
	DHCP server and relay function
	CLI (Command Line Interface)
Other services	System monitoring and debugging function
	Back up for routing configuration data (FTP, TFTP)
	Remote upgrade of system software

AP900S Figure



(Figure1-2) SecureFinder AP900S Front



(Figure1-3) SecureFinder AP900S Rear

Chapter 2. Smart Manager Connection

Smart Manager Introduction

AddPac Smart Manager program is designed for easy control of SecureFinder AP900S. Even the first time users enable to easily access and configure AP900S via GUI (Graphic User Interface) without CLI(Command Line Interface).

Smart Manager Feature Highlights

- Java based Web Management
- Real time monitoring of Link status for each Port
- Assign IP address for managing
- User Account Management
- SNMP Agent setup
- Control two Fast Ethernet Port for WAN and four 10/100 Switch Hub Port for LAN application
- Control Crypto related function such as IPSec, IKE, CA
- Configuring Routing Protocol such as RIP, OSPF
- Standard/Extended/Name Access-List manage
- DHCP Pool writing function Using Wizard
- Maximum of 5 DNS Server/ DNS Host
- Telnet, SSH, FTP, HTTP Service control
- Detail View function for CPU, Memory capability.
- Real-time Performance Graph for each Ethernet Port
- Performance History Graph for each Ethernet Port
- Provide IPSec Performance Information Data

Hardware Requirement for Smart Manager

<Table 2-1> Hardware Requirements

CPU	Minimum Intel Pentium II 300Mhz or more
MEMORY	Minimum 128MB or more
Hard Disk	Minimum 10GB or more

<Table 2-2> Software Requirements

Operating System	MS Windows 2000 / XP / Server 2003
	Minimum Java 2 Runtime Environment SE v1.4.2
	Web browser : Microsoft Internet Explorer

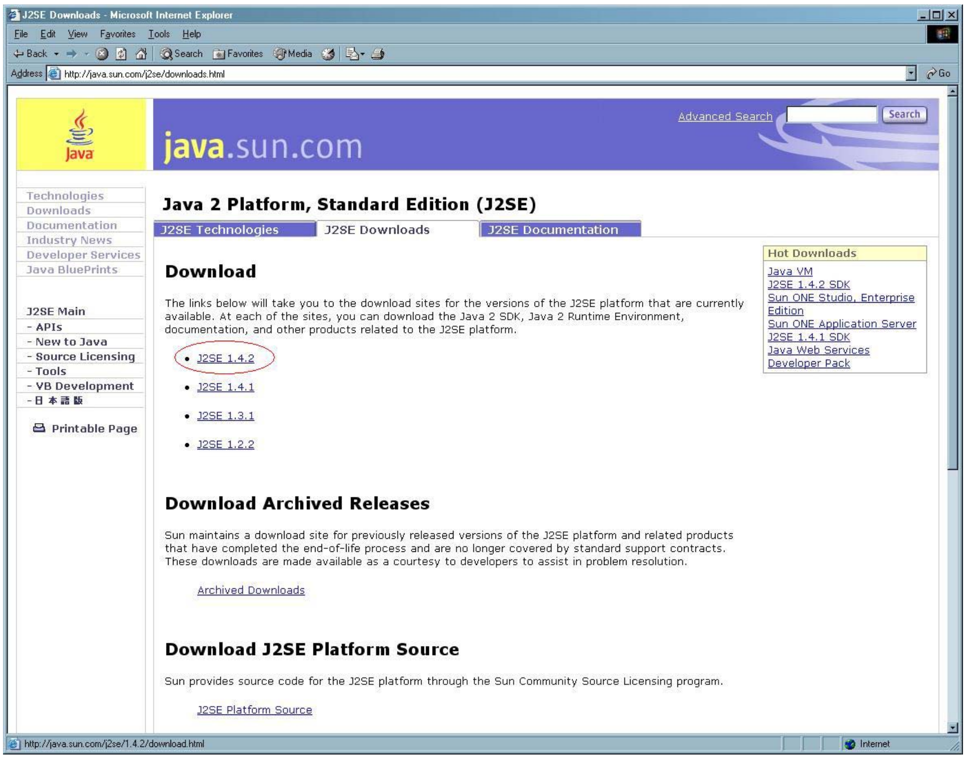
Java 2 Runtime Environment v1.4.2 Download

To access to Smart Manager, Java Virtual Machine is required to execute Java applet on web browser. SUN distributes Java Virtual Machine with the name of J2RE (Java 2 Runtime Environment).

The J2RE version used in this guide is J2RE v1.4.2, the latest version. Visit at "http://java.sun.com/j2se/downloads.html" and download the program.
* J2SE is "Java 2 Platform Standard Edition," A type of the J2RE.

Step 1

Select J2SE 1.4.2



Java 2 Platform, Standard Edition (J2SE)

Download

The links below will take you to the download sites for the versions of the J2SE platform that are currently available. At each of the sites, you can download the Java 2 SDK, Java 2 Runtime Environment, documentation, and other products related to the J2SE platform.

- J2SE 1.4.2
- J2SE 1.4.1
- J2SE 1.3.1
- J2SE 1.2.2

Download Archived Releases

Sun maintains a download site for previously released versions of the J2SE platform and related products that have completed the end-of-life process and are no longer covered by standard support contracts. These downloads are made available as a courtesy to developers to assist in problem resolution.

Archived Downloads

Download J2SE Platform Source

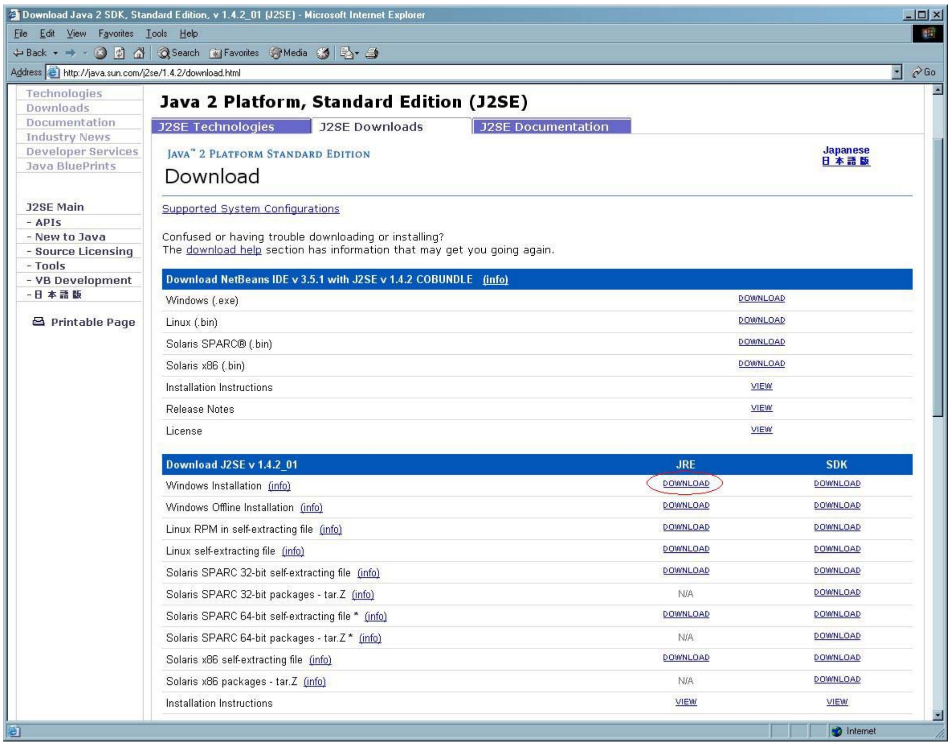
Sun provides source code for the J2SE platform through the Sun Community Source Licensing program.

J2SE Platform Source

(Figure2-1) Select Java 2 Platform Standard Edition

Step 2

Select J2SE Windows.



Java 2 Platform, Standard Edition (J2SE)

JAVA™ 2 PLATFORM STANDARD EDITION

Download

Supported System Configurations

Confused or having trouble downloading or installing?
The download help section has information that may get you going again.

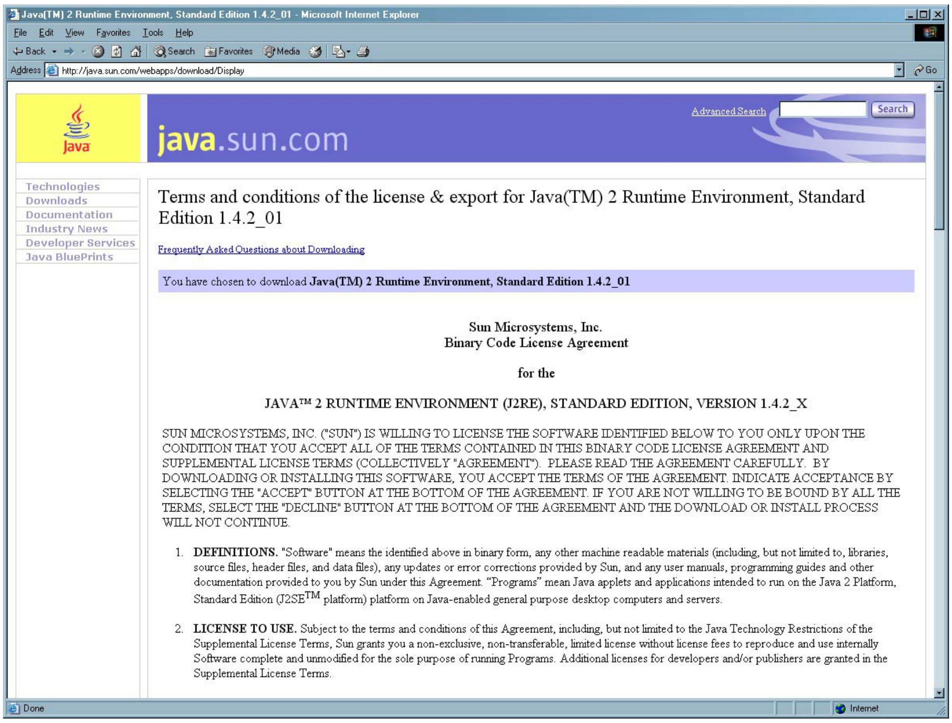
Download NetBeans IDE v 3.5.1 with J2SE v 1.4.2 COBUNDLE (info)	
Windows (.exe)	DOWNLOAD
Linux (.bin)	DOWNLOAD
Solaris SPARC® (.bin)	DOWNLOAD
Solaris x86 (.bin)	DOWNLOAD
Installation Instructions	VIEW
Release Notes	VIEW
License	VIEW

Download J2SE v 1.4.2_01	JRE	SDK
Windows Installation (info)	DOWNLOAD	DOWNLOAD
Windows Offline Installation (info)	DOWNLOAD	DOWNLOAD
Linux RPM in self-extracting file (info)	DOWNLOAD	DOWNLOAD
Linux self-extracting file (info)	DOWNLOAD	DOWNLOAD
Solaris SPARC 32-bit self-extracting file (info)	DOWNLOAD	DOWNLOAD
Solaris SPARC 32-bit packages - tar.Z (info)	N/A	DOWNLOAD
Solaris SPARC 64-bit self-extracting file * (info)	DOWNLOAD	DOWNLOAD
Solaris SPARC 64-bit packages - tar.Z * (info)	N/A	DOWNLOAD
Solaris x86 self-extracting file (info)	DOWNLOAD	DOWNLOAD
Solaris x86 packages - tar.Z (info)	N/A	DOWNLOAD
Installation Instructions	VIEW	VIEW

(Figure2-2) Select J2SE Windows

Step 3

Carefully review "Terms and conditions of the license~" and select "agree."


Java(TM) 2 Runtime Environment, Standard Edition 1.4.2_01 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://java.sun.com/webapps/download/Display
Go
Java
java.sun.com
Advanced Search
Search
Technologies
Downloads
Documentation
Industry News
Developer Services
Java BluePrints
Done
Internet

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Frequently Asked Questions about Downloading

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for the

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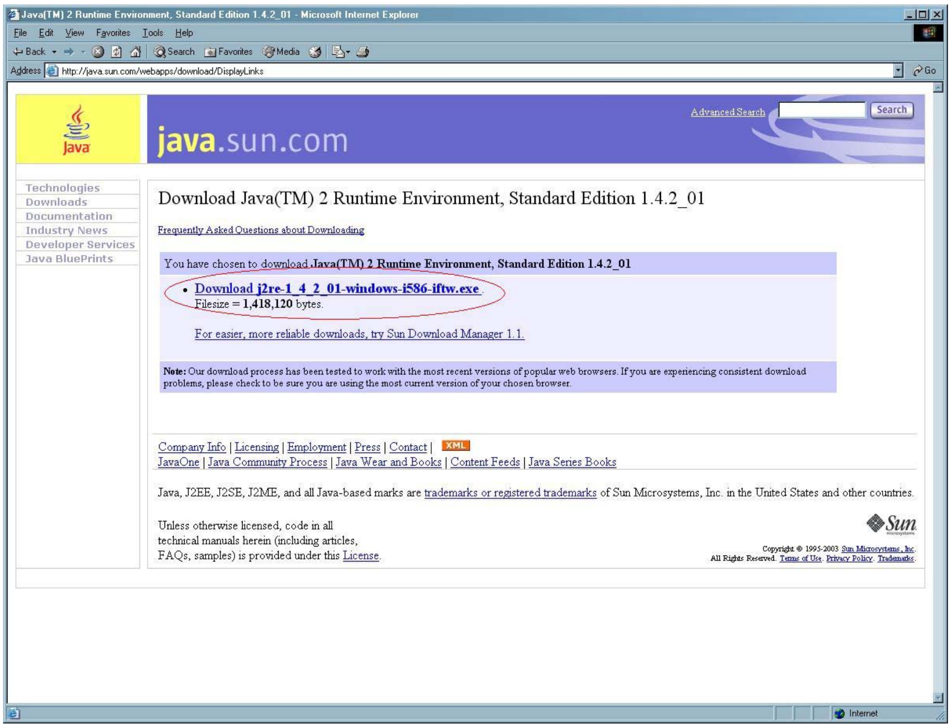
(Figure2-3) License Agreement for J2SE

Step 4

Download “Java 2 Runtime Environment, Standard Edition v1.4.2_01”.



Java(TM) 2 Runtime Environment, Standard Edition 1.4.2_01 - Microsoft Internet Explorer

http://java.sun.com/webapps/download/DisplayLinks

Download Java(TM) 2 Runtime Environment, Standard Edition 1.4.2_01

Frequently Asked Questions about Downloading

You have chosen to download **Java(TM) 2 Runtime Environment, Standard Edition 1.4.2_01**

- **Download j2re-1_4_2_01-windows-i586-iftw.exe**
  Filesize = **1,418,120** bytes.

For easier, more reliable downloads, try Sun Download Manager 1.1.

Note: Our download process has been tested to work with the most recent versions of popular web browsers. If you are experiencing consistent download problems, please check to be sure you are using the most current version of your chosen browser.

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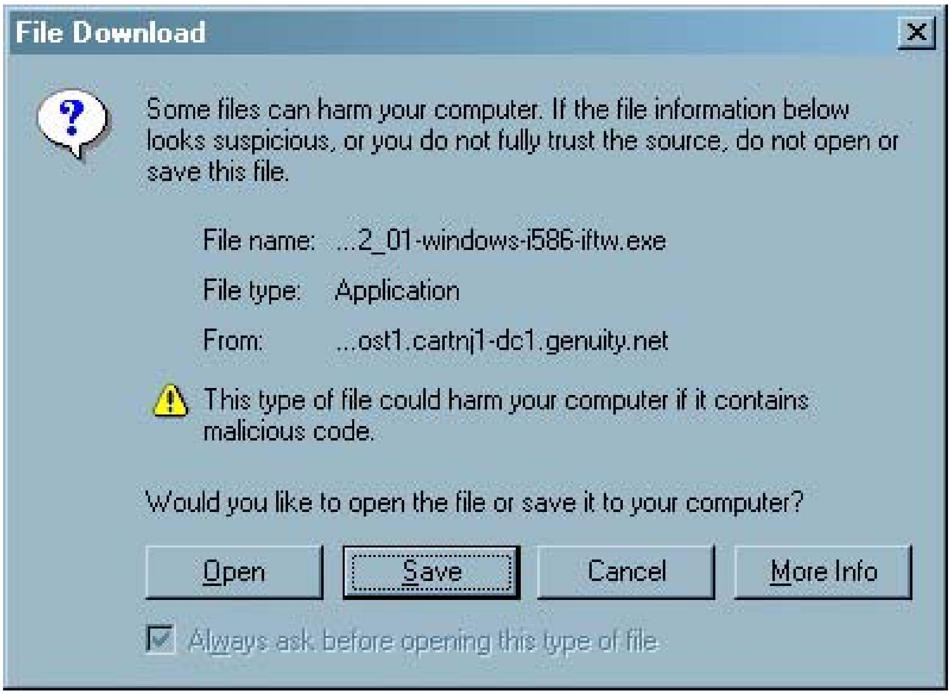
(Figure2-4) Java 2 Runtime Environment, SE v1.4.2_01 downlaod

Step 5

“File Download” dialog box appears. Click “Save” to save the program at the PC.



File Download

Some files can harm your computer. If the file information below looks suspicious, or you do not fully trust the source, do not open or save this file.

File name: ...2_01-windows-i586-iftw.exe

File type: Application

From: ...ost1.cartnj1-dc1.genuity.net

This type of file could harm your computer if it contains malicious code.

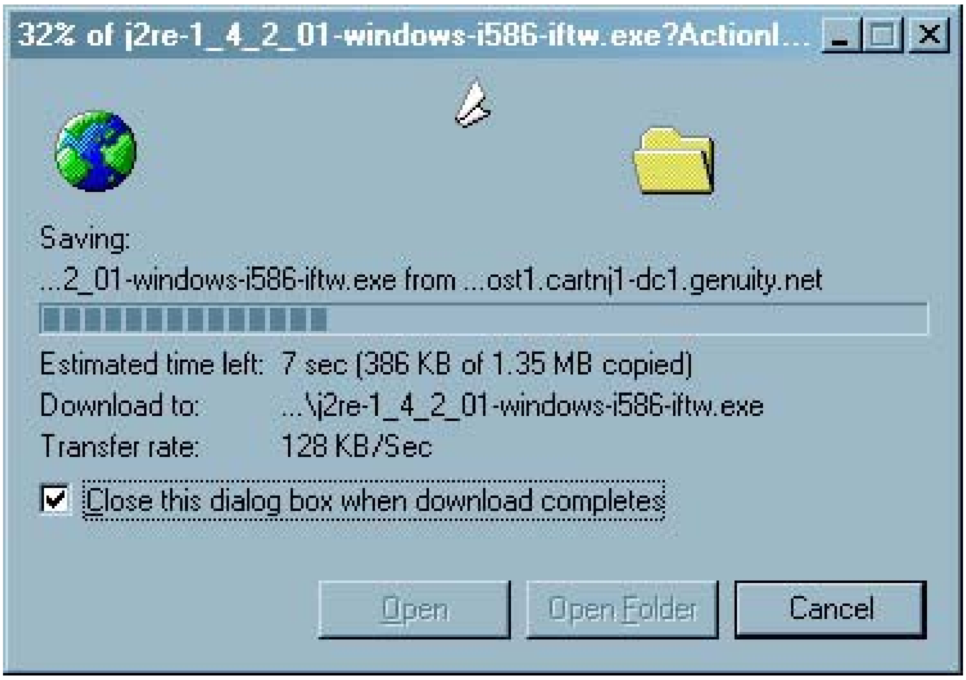
Would you like to open the file or save it to your computer?

☑ Always ask before opening this type of file

(Figure2-5) File Download Dialog Box

Step 6

Then the program is downloaded.



32% of j2re-1_4_2_01-windows-i586-iftw.exe?ActionI...

Saving:
...2_01-windows-i586-iftw.exe from ...ost1.cartnj1-dc1.genuity.net

Estimated time left: 7 sec (386 KB of 1.35 MB copied)
Download to: ...\j2re-1_4_2_01-windows-i586-iftw.exe
Transfer rate: 128 KB/Sec

☑ Close this dialog box when download completes

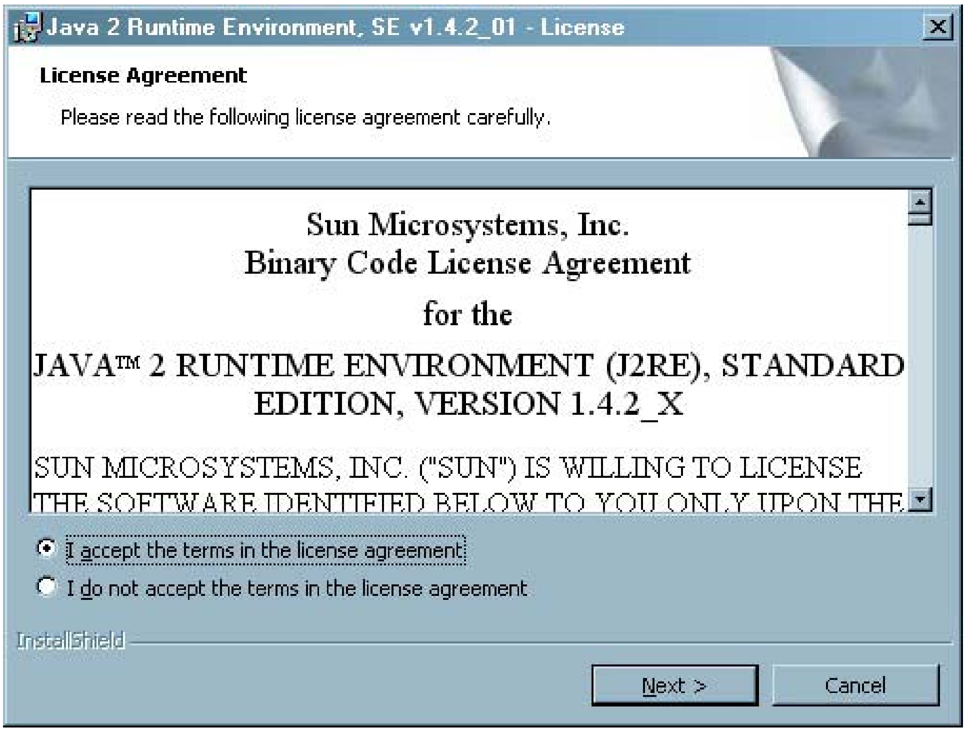
(Figure2-6) Downloading the file

Java 2 Runtime Environment v1.4.2 Installation

This part explains how to install "J2RE v 1.4.2" on the PC

Step 1

Execute "j2re-1_4_2_01-windows-i586-iftw.exe"file. Then the License Agreement appears. Review it carefully and select "I accept~." Then click "Next>" button to proceed.



Java 2 Runtime Environment, SE v1.4.2_01 - License

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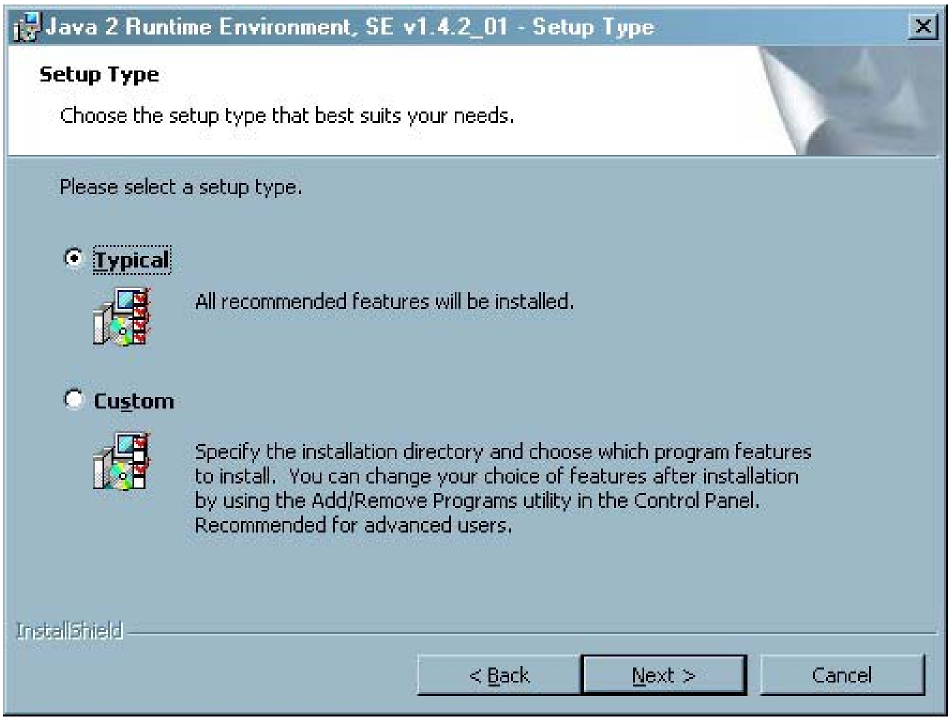
○ I do not accept the terms in the license agreement

(Figure2-7) Java 2 Runtime Environment – License

Step 2

Select "Setup Type" as "Typical" and click "Next>" button.



Setup Type

Choose the setup type that best suits your needs.

Please select a setup type.

● Typical

All recommended features will be installed.

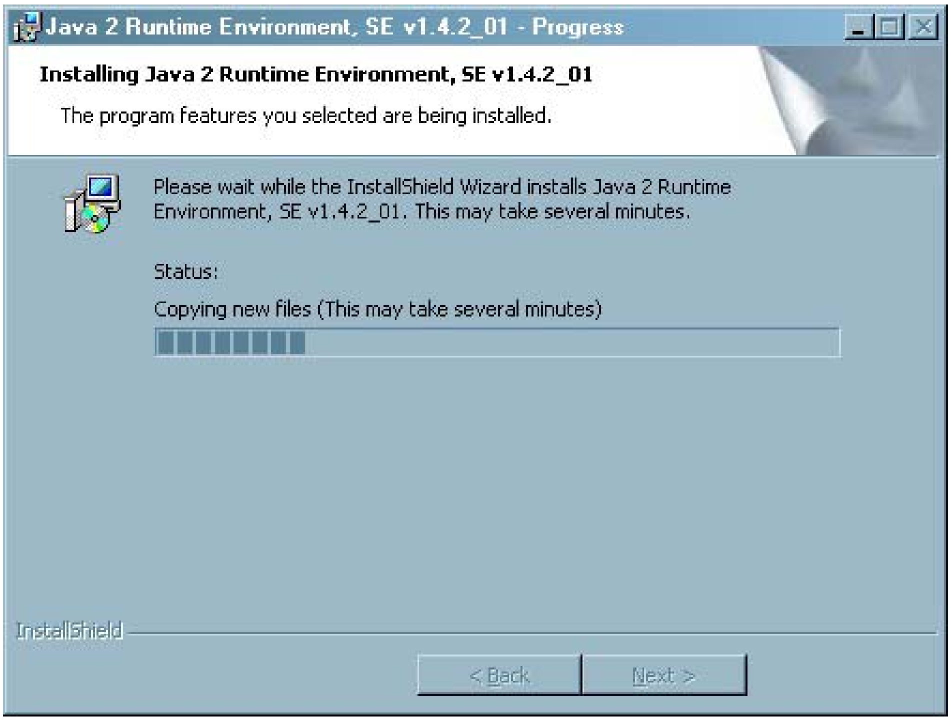
○ Custom

Specify the installation directory and choose which program features to install. You can change your choice of features after installation by using the Add/Remove Programs utility in the Control Panel. Recommended for advanced users.

(Figure2-8) Select Java 2 Setup Type

Step 3

J2SE installation is on processing.



Installing Java 2 Runtime Environment, SE v1.4.2_01

The program features you selected are being installed.

Please wait while the InstallShield Wizard installs Java 2 Runtime Environment, SE v1.4.2_01. This may take several minutes.

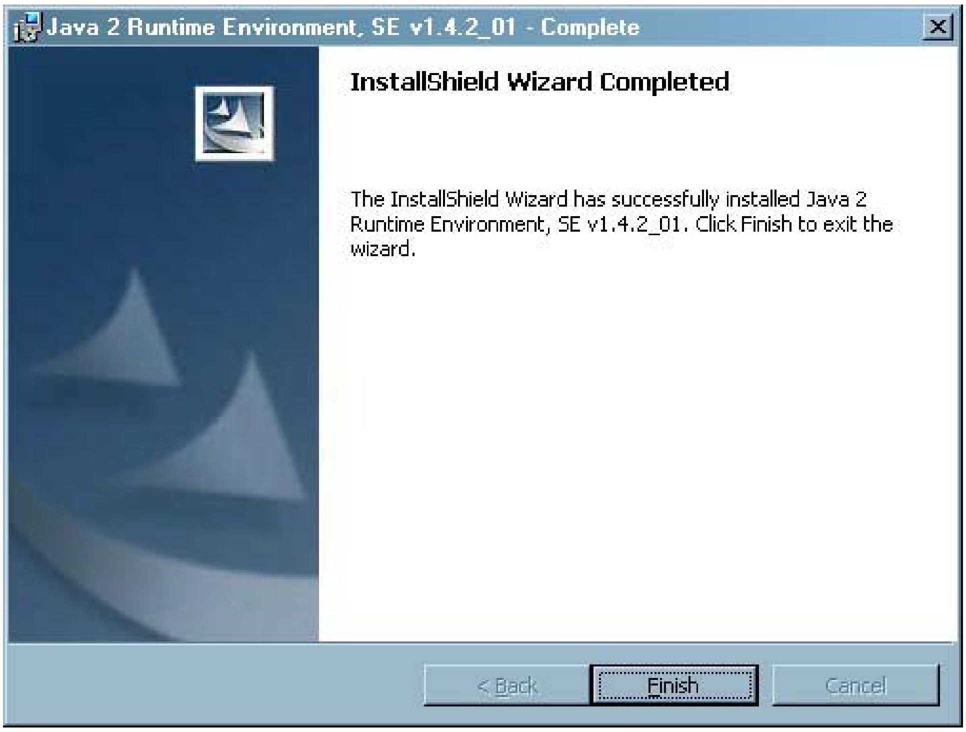
Status:

Copying new files (This may take several minutes)

(Figure2-9) Java 2 installation processing

Step 4

J2SE installation is completed. Click "Finish".



Java 2 Runtime Environment, SE v1.4.2_01 - Complete

InstallShield Wizard Completed

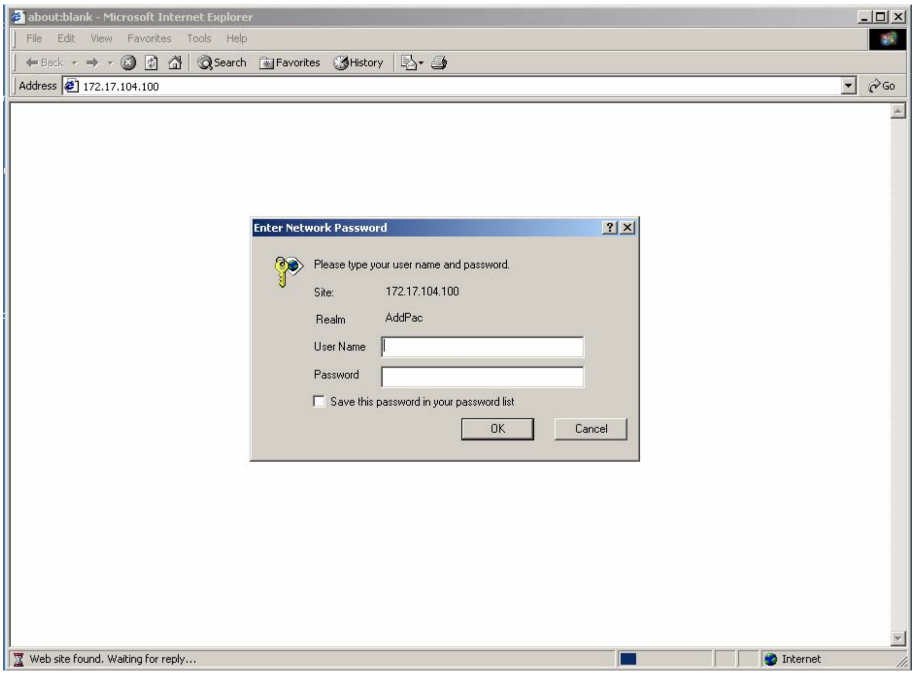
The InstallShield Wizard has successfully installed Java 2 Runtime Environment, SE v1.4.2_01. Click Finish to exit the wizard.

(Figure2-10) Java 2 Runtime installation completion

Smart Manager Access

Step 1

Enter IP address of AP900S at the address bar of the web browser.


about:blank - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address
Go
Internet

Address: 172.17.104.100

Enter Network Password

Please type your user name and password.

Site: 172.17.104.100

Realm: AddPac

User Name:

Password:

□ Save this password in your password list

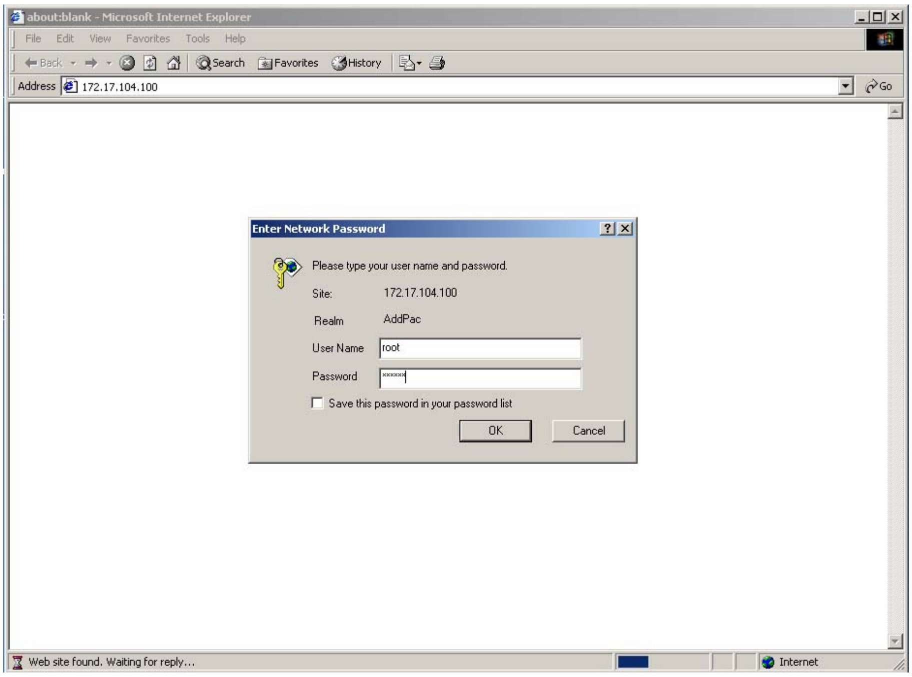
OK Cancel

Web site found. Waiting for reply...

(Figure2-11) Web Management System access

Step 2

Enter User Name ("root") and Password ("router"). Click "OK" button. The User Name and Password are changeable by users.


about:blank - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address
Go
Internet

Address: 172.17.104.100

Enter Network Password

Please type your user name and password.

Site: 172.17.104.100

Realm: AddPac

User Name: root

Password: ******

□ Save this password in your password list

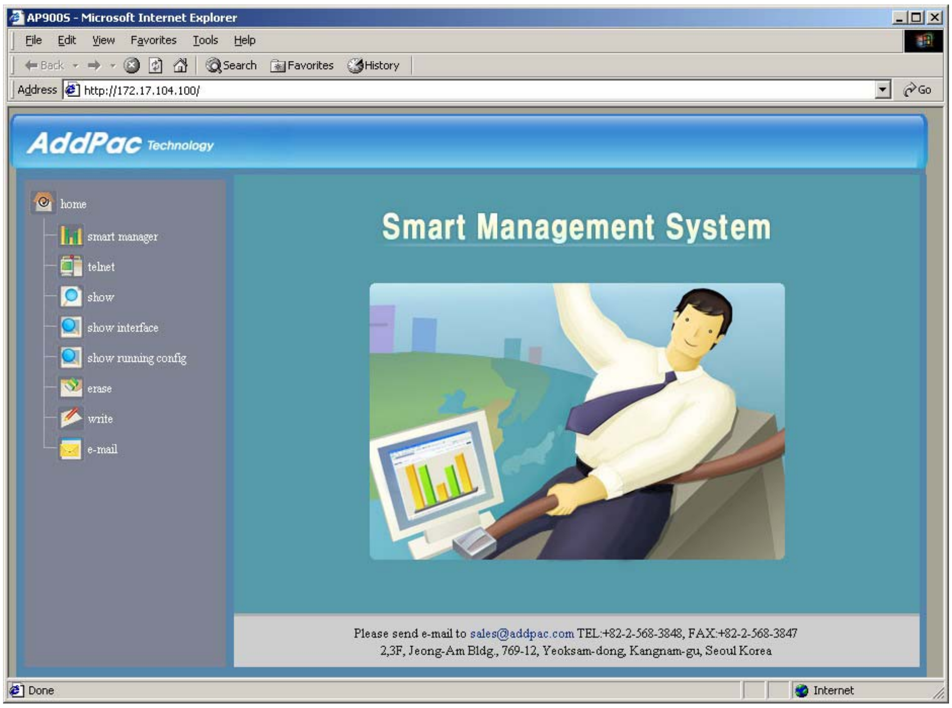
OK Cancel

Web site found. Waiting for reply...

(Figure2-12) Web Management System Login

Step 3

Smart Management System window will be shown after login. Select Smart Manager.


AP900S - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/ Go
AddPac Technology
home
smart manager
telnet
show
show interface
show running config
erase
write
e-mail
Done
Internet

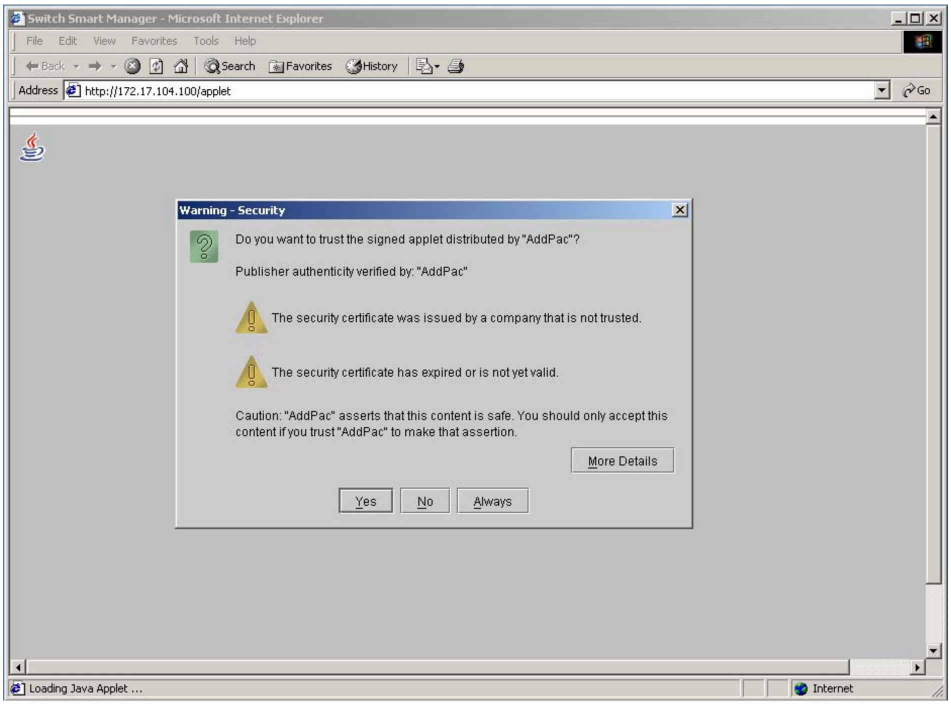
Smart Management System

Please send e-mail to sales@addpac.com TEL:+82-2-568-3848, FAX:+82-2-568-3847
2,3F, Jeong-Am Bldg., 769-12, Yeoksam-dong, Kangnam-gu, Seoul Korea

(Figure2-13) Initial window of Web Management System

Step 4

Java Applet is executed. Select "Yes" or "Always" for security.


Switch Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
Loading Java Applet ...
Internet

Warning - Security

Do you want to trust the signed applet distributed by "AddPac"?

Publisher authenticity verified by: "AddPac"

The security certificate was issued by a company that is not trusted.

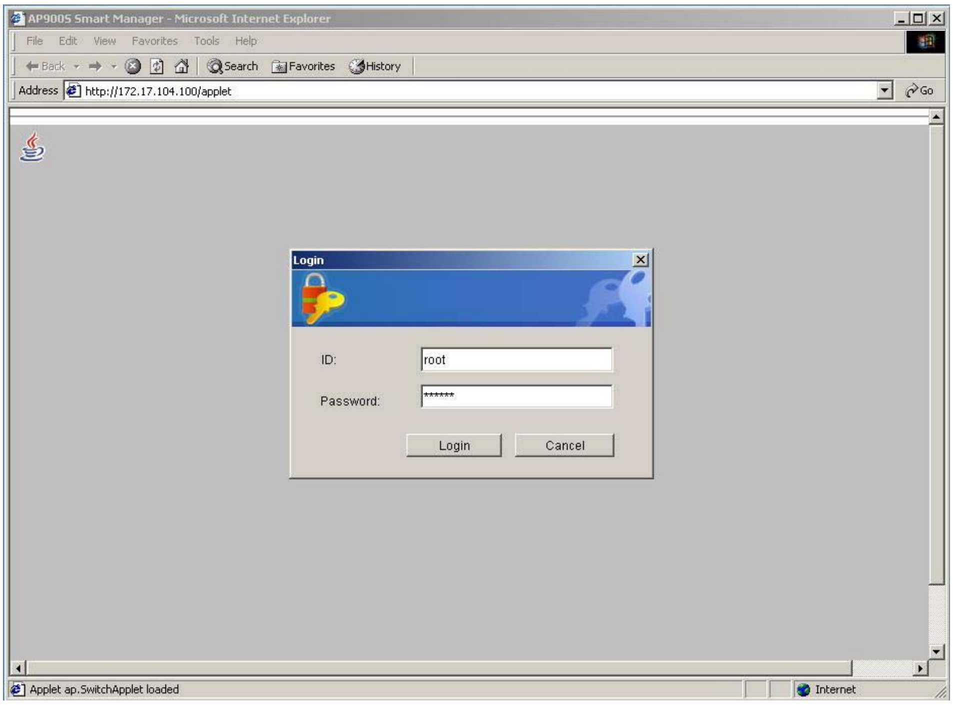
The security certificate has expired or is not yet valid.

Caution: "AddPac" asserts that this content is safe. You should only accept this content if you trust "AddPac" to make that assertion.

(Figure2-14) Java Applet security warning page

Step 5

Login prompt for Smart Manager appears. Enter the same User ID and Password used for the web management system login.


AP900S Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address
Go
Login
Login
Cancel
Internet

http://172.17.104.100/applet

ID: root

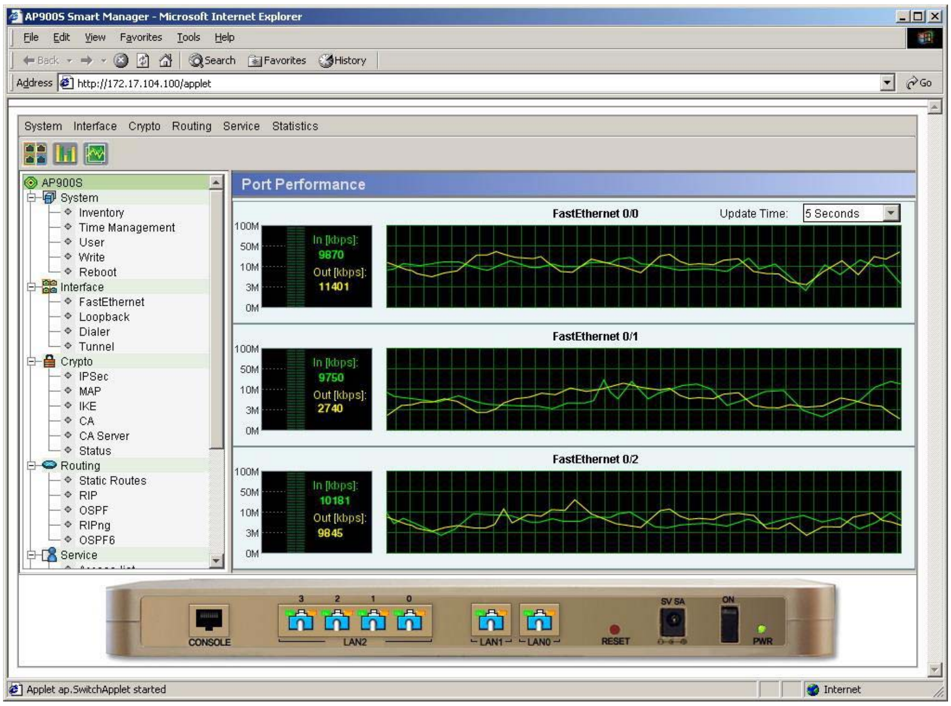
Password: ******

Applet ap.SwitchApplet loaded

(Figure2-15) Java Applet Login

Step 6

It moves to the main page for Smart Manager.



http://172.17.104.100/applet

Update Time: 5 Seconds

FastEthernet 0/0: In [kbps]: 9870 Out [kbps]: 11401

FastEthernet 0/1: In [kbps]: 9750 Out [kbps]: 2740

FastEthernet 0/2: In [kbps]: 10181 Out [kbps]: 9845

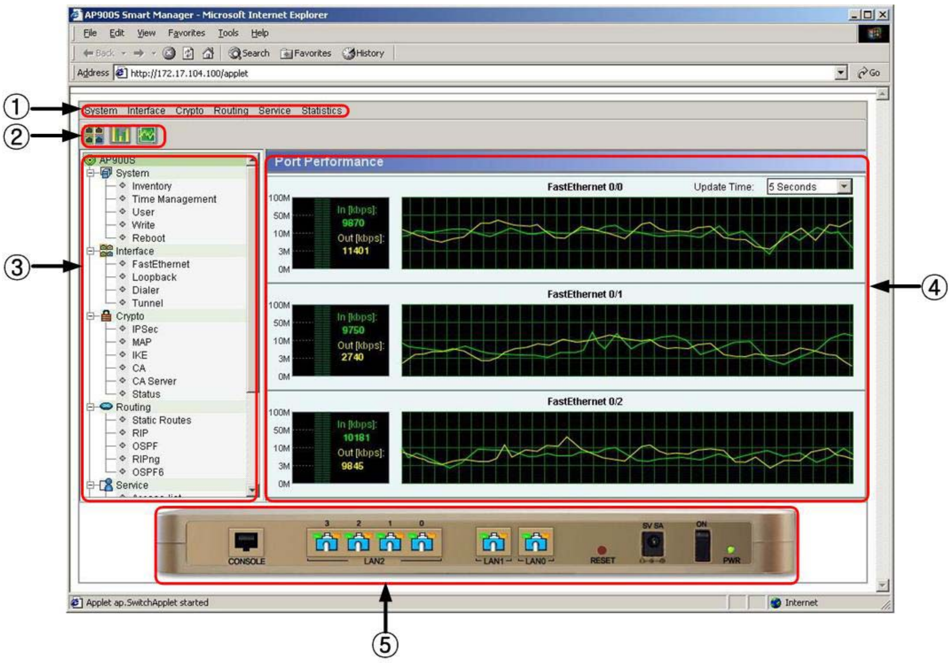
Applet ap.SwitchApplet started

(Figure2-16) Smart Manager main page window

Chapter 3. Smart Manager Menus

Smart Manager Screen Elements

Smart Manager consists of 5 sections.



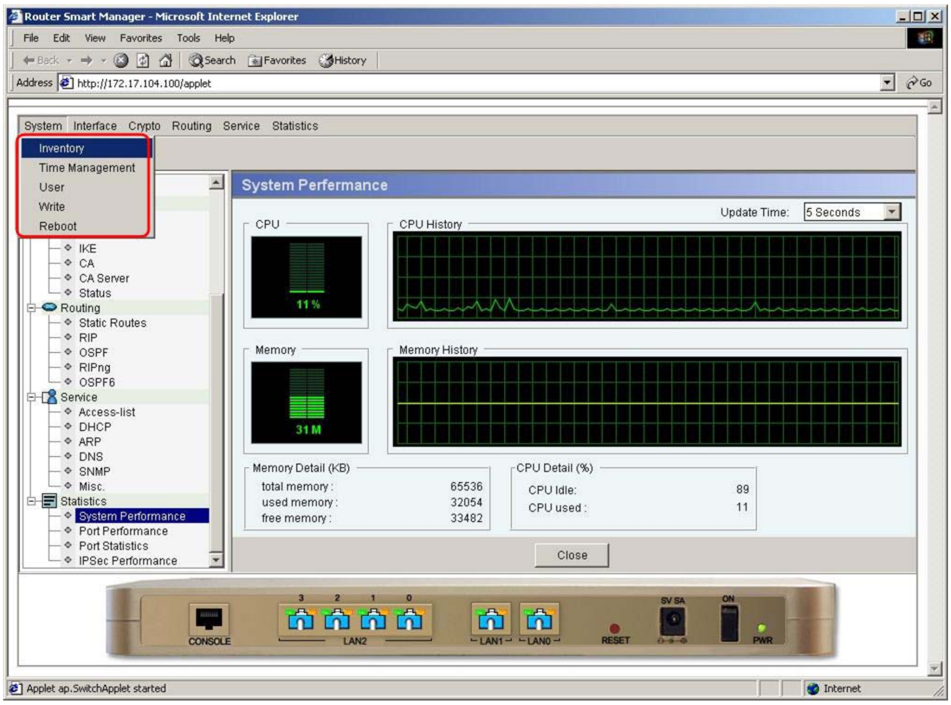
(Figure3-1) Smart Manager Elements Page

<Table 3-1> Smart Manager Main Page Elements and Descriptions

Sections	Description
①	Pull-down menu to access sub-menus of the Smart Manager. The menus are same as the tree type menu at ③.
②	Shortcut Icons for Port Performance, Port Configuration, management and Parametric Information.
③	Tree type menu for sub-menus of the Smart Manager
④	This shows the output window of ①~③
⑤	Real-time monitoring port link status of AP900S. With the mouse right-click, "Port Configuration", "Port Status" can be selected.

How to Use Pull-down Menu

Click the desired menu from the menu bar, and then relevant sub-menus are displayed. Select the right category, and then further information is displayed on the main display area. Figure 3-2 shows the example of selecting Inventory under system menu.



Address http://172.17.104.100/applet

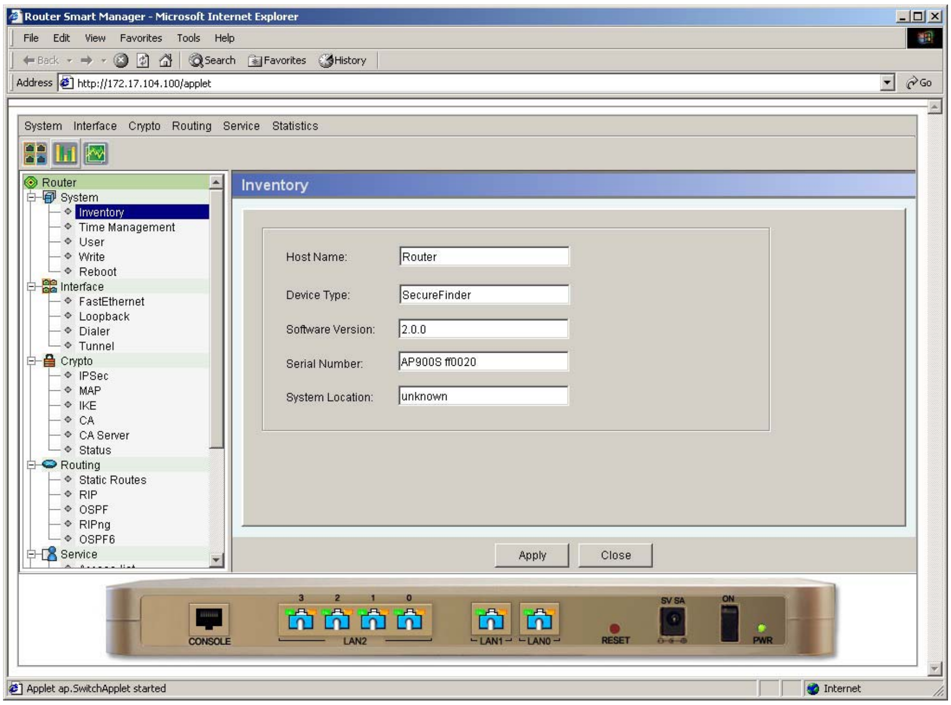
Update Time: 5 Seconds

Memory Detail (KB)
total memory : 65536
used memory : 32054
free memory : 33482

CPU Detail (%)
CPU Idle: 89
CPU used : 11

Applet ap.SwitchApplet started

(Figure3-2) Pull Down Menu – system



Address http://172.17.104.100/applet

Host Name: Router

Device Type: SecureFinder

Software Version: 2.0.0

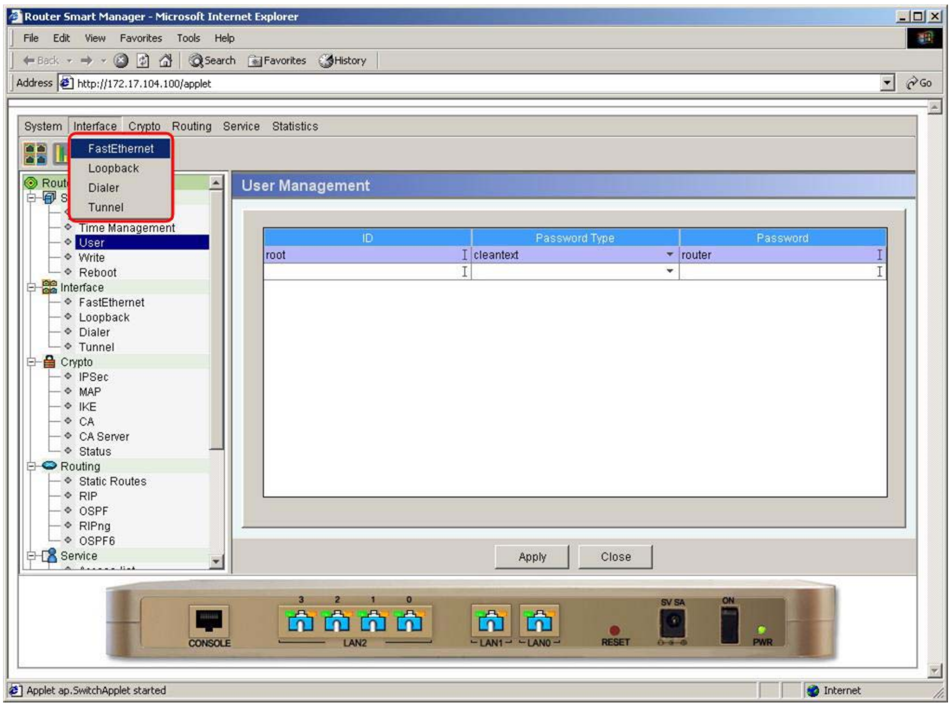
Serial Number: AP900S ff0020

System Location: unknown

Applet ap.SwitchApplet started

(Figure3-3) Pull Down Menu – system -> Inventory

At Figure 3-4, “FastEthernet” is selected from the pull-down menu.

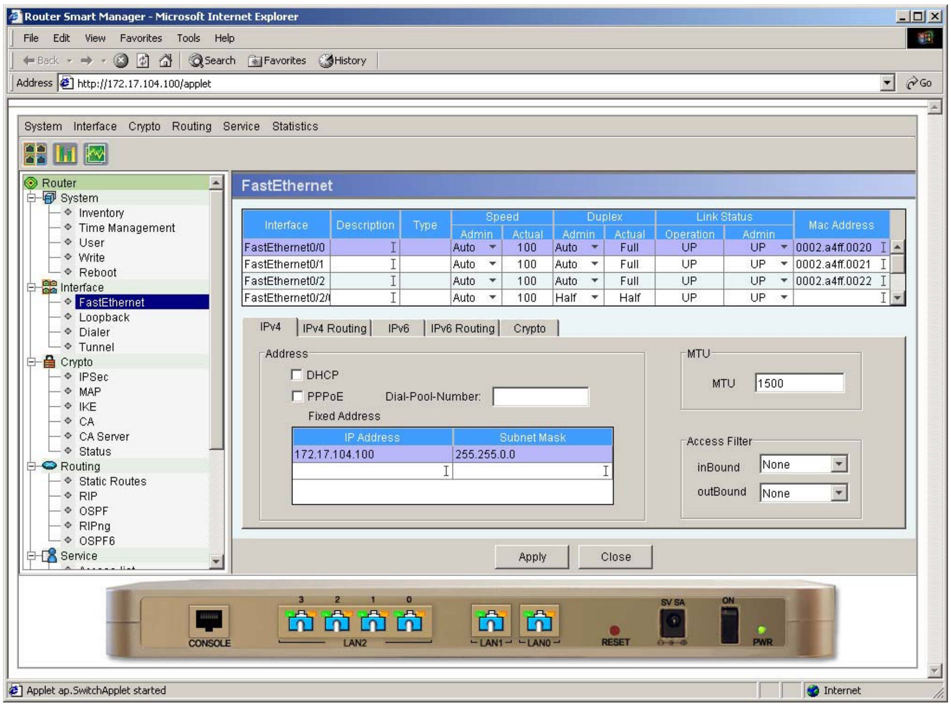


User Management

ID	Password Type	Password
root	cleantext	router

(Figure3-4) Pull Down menu –> FastEthernet

Figure 3-5 shows FastEthernet Page.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

□ DHCP

□ PPPoE Dial-Pool-Number:

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0

MTU

MTU 1500

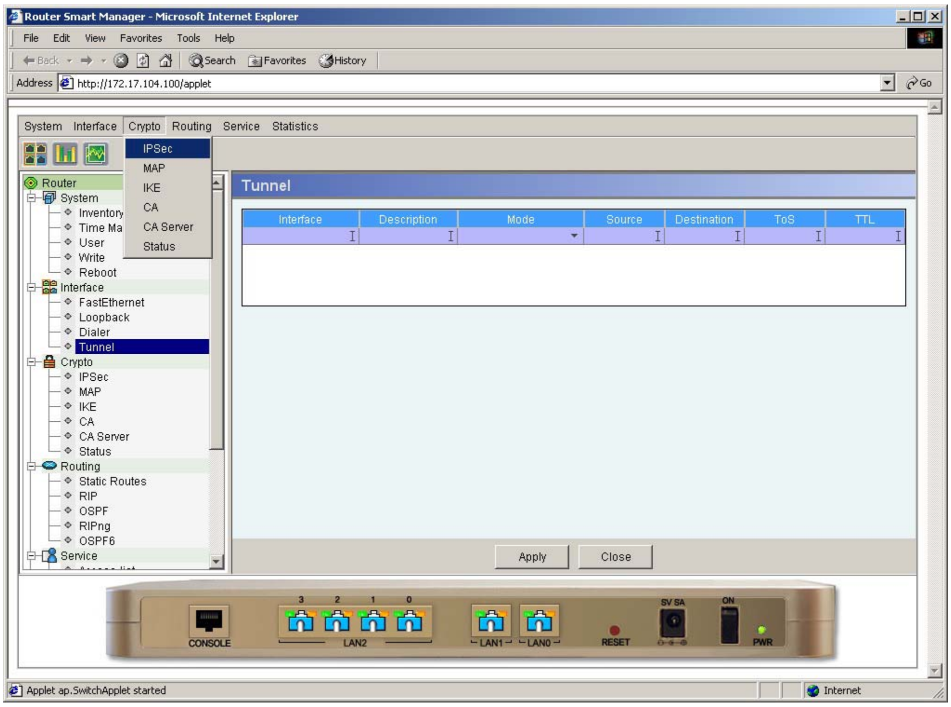
Access Filter

inBound None

outBound None

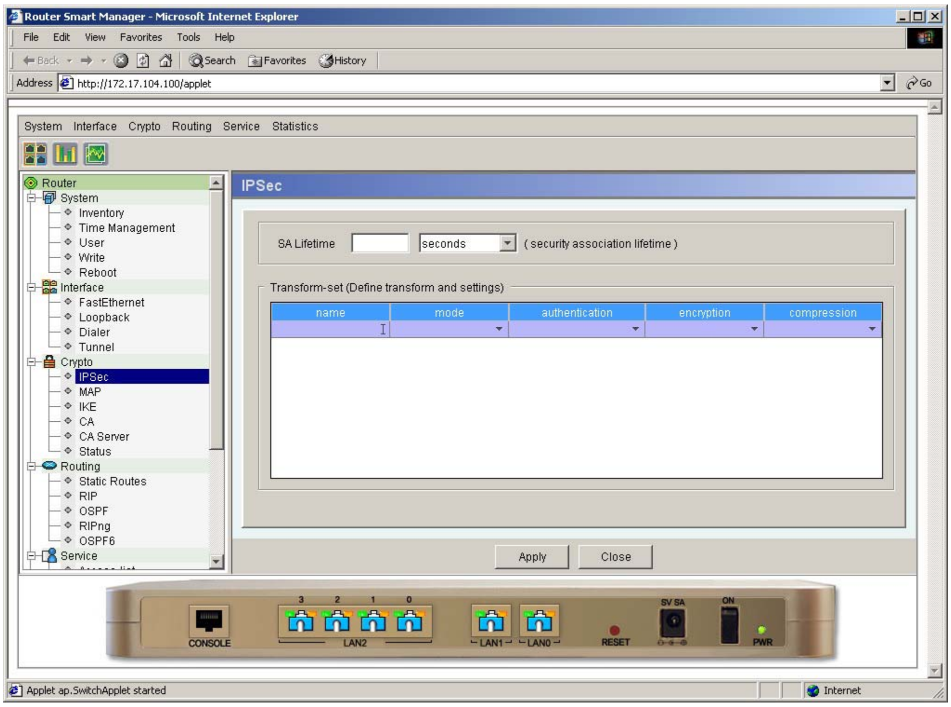
(Figure3-5) Pull Down menu – FastEthernet page

At Figure 3-6, “IPSec” is selected from pull-down menu.



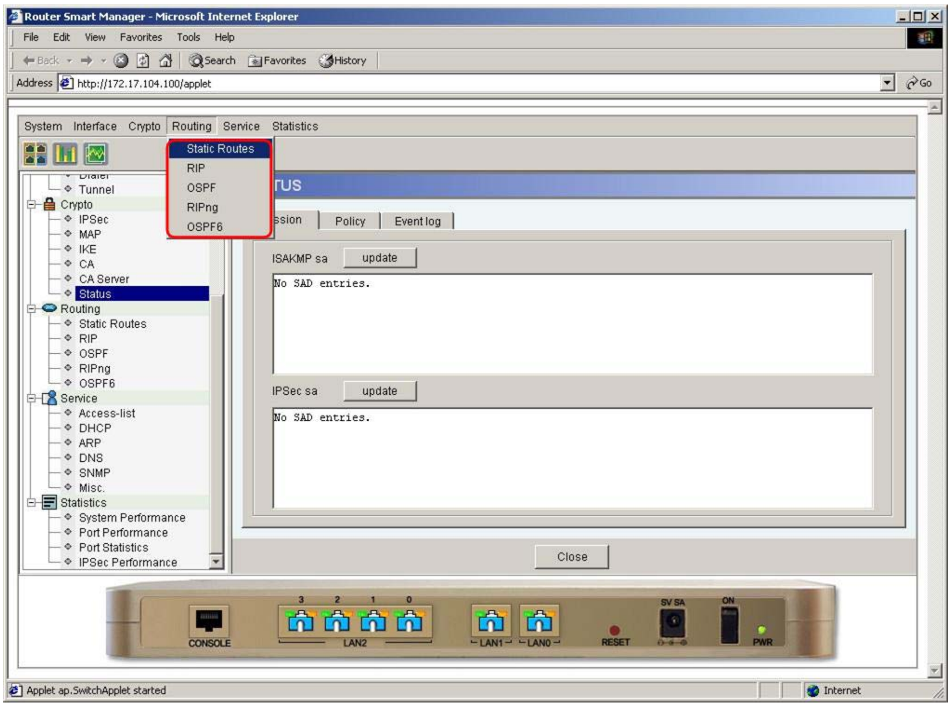
(Figure3-6) Pulll Down menu –> Crypto -> IPSec

Figure 3-7 shows IPSec Config page.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
IPSec
SA Lifetime
seconds
(security association lifetime)
Transform-set (Define transform and settings)
name
mode
authentication
encryption
compression
Apply
Close
CONSOLE
3 2 1 0
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

(Figure3-7) Pull Down menu – IPSec Config page

At Figure 3-8, "Static Routes" is selected from "Routing" of pull-down menu.



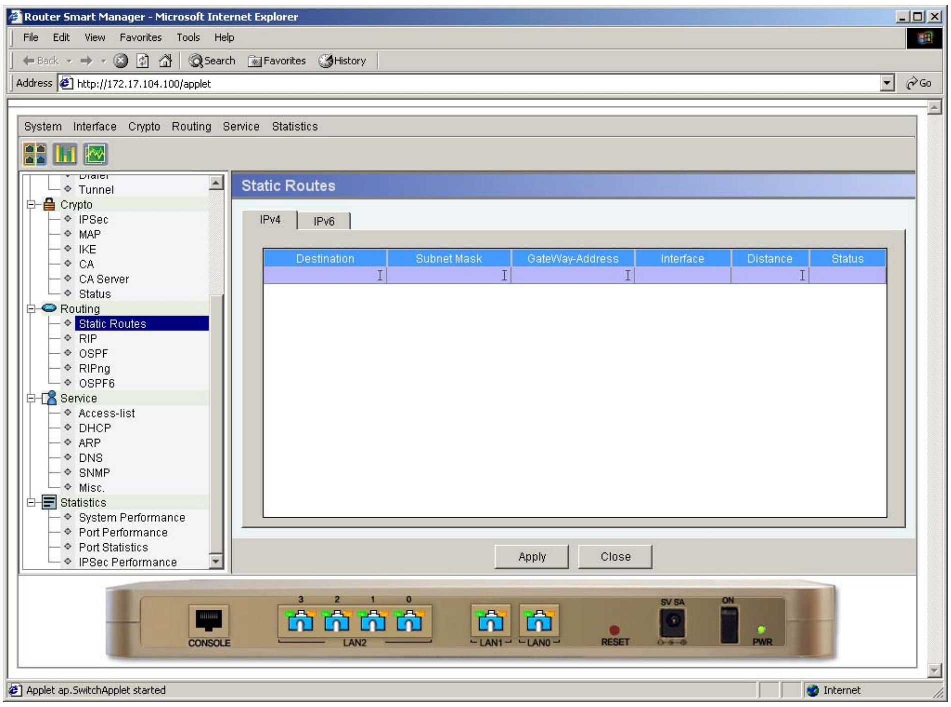
ISAKMP sa

```
No SAD entries.
```

IPSec sa

```
No SAD entries.
```

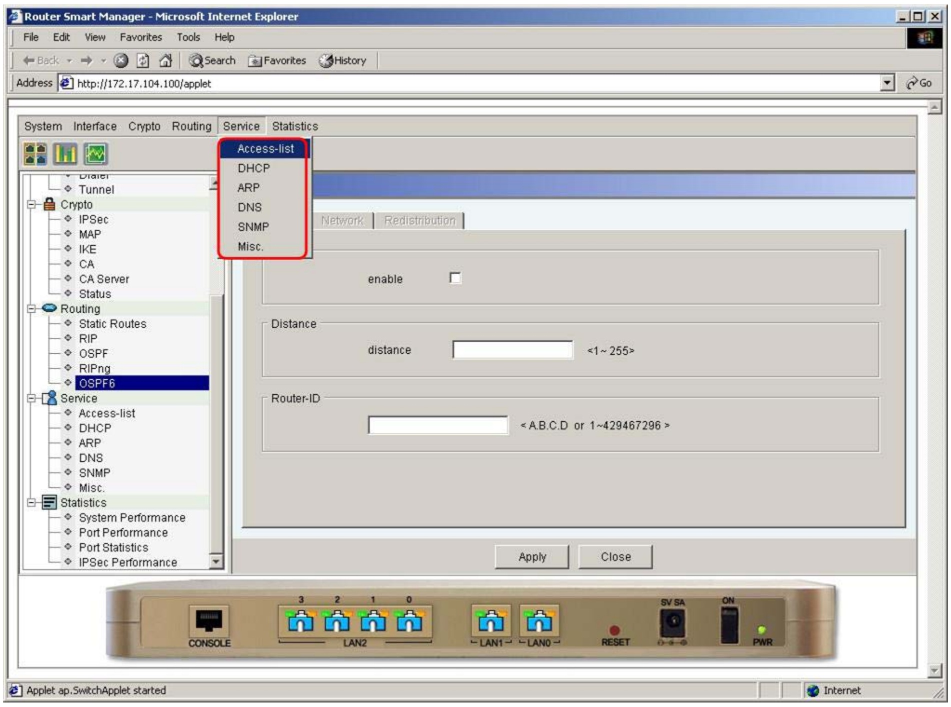
(Figure3-8) Pull Down Menu –>Routing-> Static Routes



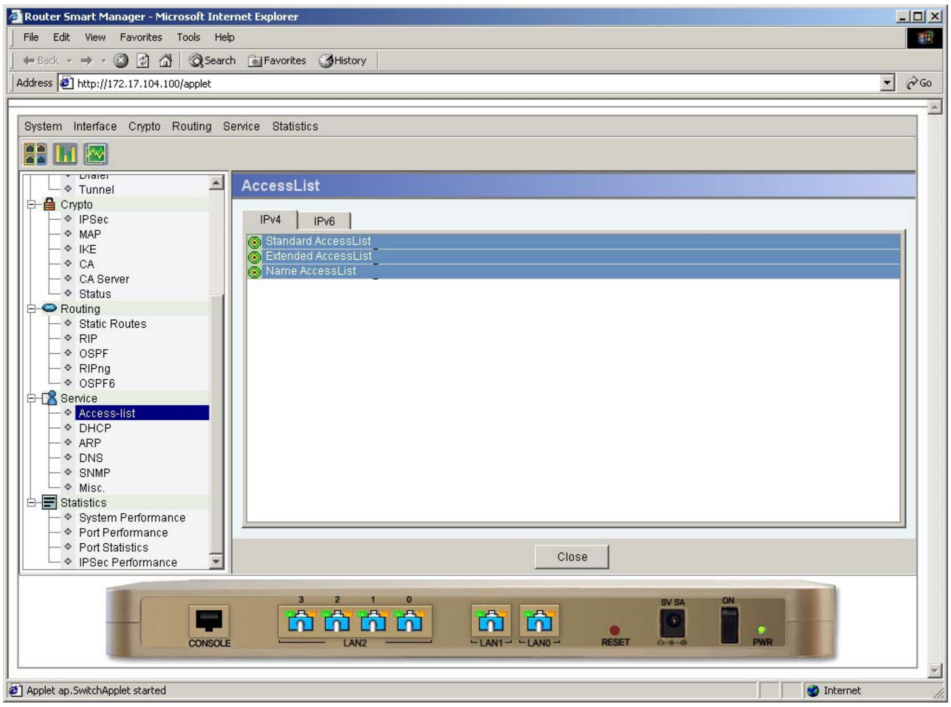
Destination	Subnet Mask	GateWay-Address	Interface	Distance	Status

(Figure3-9) Pull Down Menu– Static Routes page

At the below Figure 3-10, “Access-list” is selected from “Service” of pull-down menu.

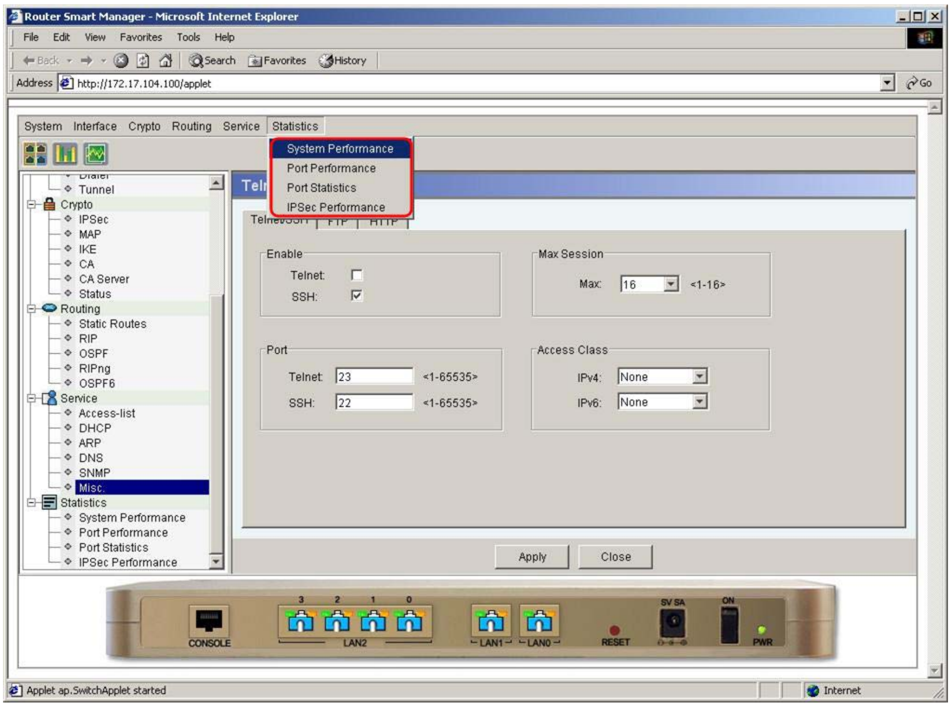


(Figure3-10) Pull Down Menu –>Service-> Access-list



(Figure3-11) Pull Down Menu – Access-list page

At the below Figure 3-12, "System Performance" is selected from "Statistics" of pull-down menu.



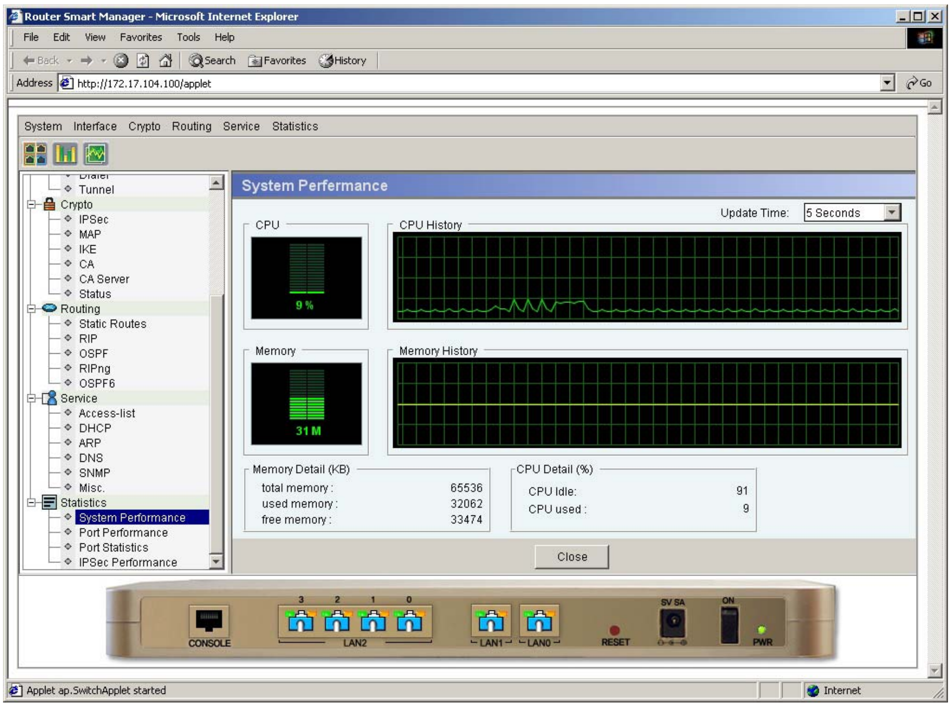
Enable
Telnet: □
SSH: ☑

Max Session
Max: 16 <1-16>

Port
Telnet: 23 <1-65535>
SSH: 22 <1-65535>

Access Class
IPv4: None
IPv6: None

(Figure3-12) Pull Down menu –>Statistics-> System Performance



Update Time: 5 Seconds

CPU: 9 %

Memory: 31 M

Memory Detail (KB)

total memory :	65536
used memory :	32062
free memory :	33474

CPU Detail (%)

CPU Idle:	91
CPU used :	9

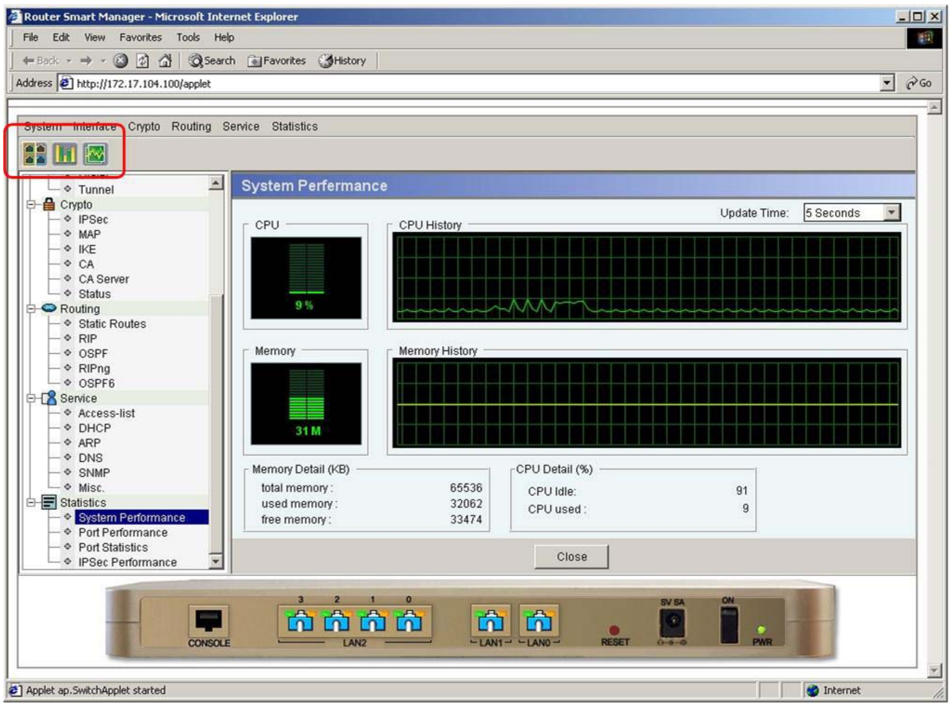
(Figure3-13) Pull Down Menu – System Performance page

<Table 3-2> Pull Down menu elements

Menu	Elements
System	Inventory
	Time Management
	User
	Write
	Reboot
Interface	FastEthernet
	Loopback
	Dialer
	Tunnel
Crypto	IPSec
	MAP
	IKE
	CA
	CA Server
	Status
Routing	Static Routes
	RIP
	OSPF
	RIPng
	OSPF6
Service	Access-List
	DHCP
	ARP
	DNS
	SNMP
	Misc.
Statistics	System Performance
	Port Performance
	Port Statistics
	IPSec Performance

How to Use Shortcut Icons

Frequently used configuration menus such as FastEthernet, Port Performance, Port Statistics are listed as shortcut icons under the pull-down menu bar.



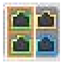
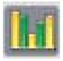
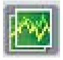
Update Time: 5 Seconds

Memory Detail (KB)
total memory : 65536
used memory : 32062
free memory : 33474

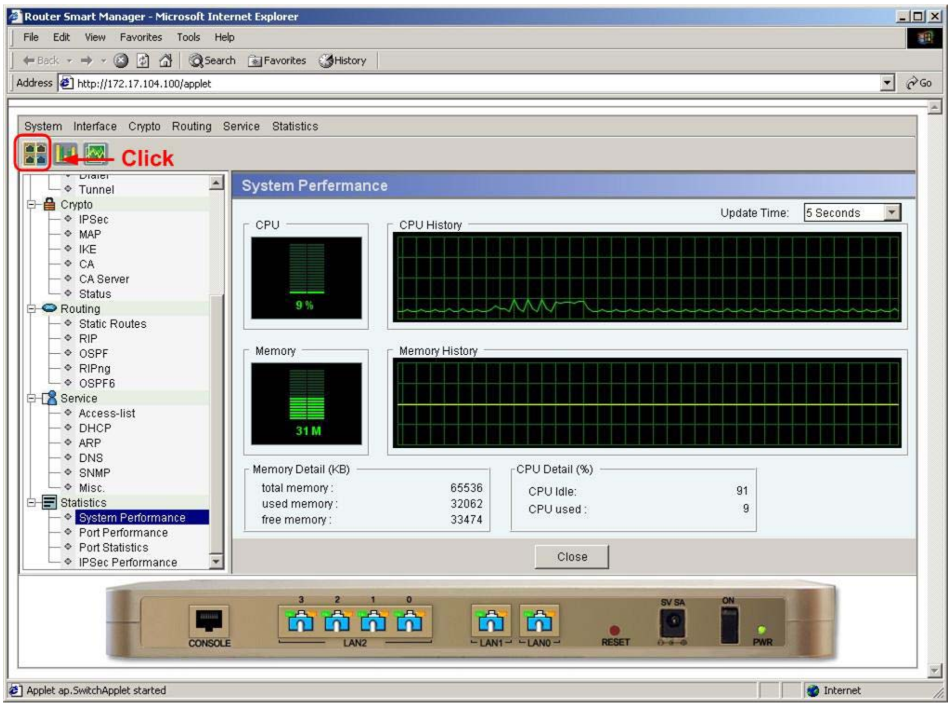
CPU Detail (%)
CPU Idle: 91
CPU used : 9

(Figure3-14) Shortcut Icons

<Table 3-3> Shortcut Icons & Description

Icons	Description
	Move to FastEthernet menu
	Move to Port Performance menu
	Move to Port Statistics menu

Click ▦ icon to go to FastEthernet page.



System Performance

Update Time: 5 Seconds

Memory Detail (KB)

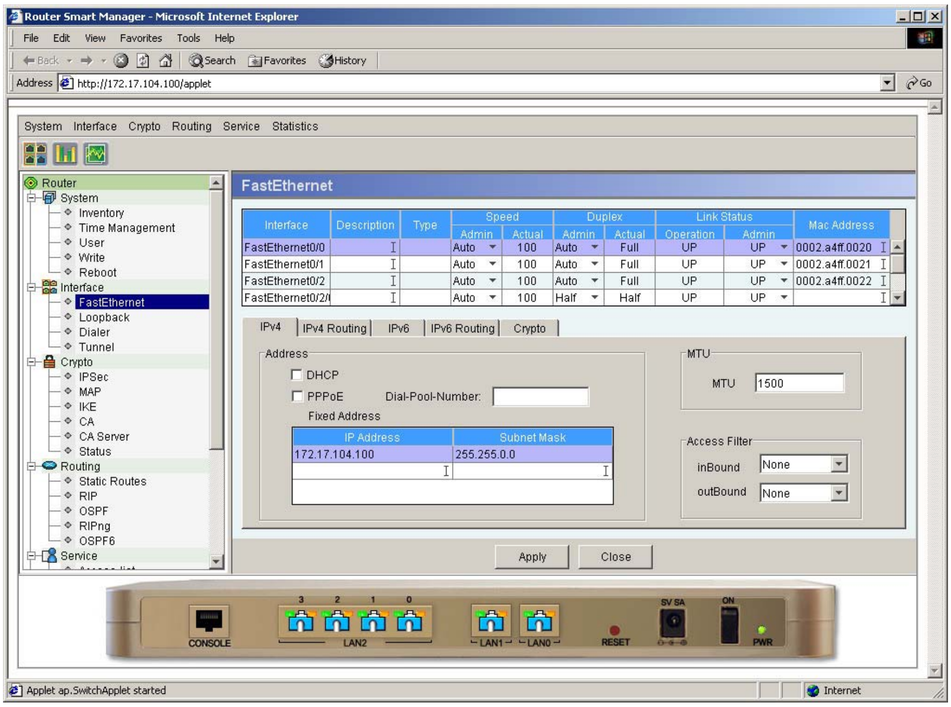
total memory :	65536
used memory :	32062
free memory :	33474

CPU Detail (%)

CPU Idle:	91
CPU used :	9

(Figure3-14) FastEthernet icon

Move to FastEthernet page



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

□ DHCP

□ PPPoE Dial-Pool-Number:

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0

MTU

MTU 1500

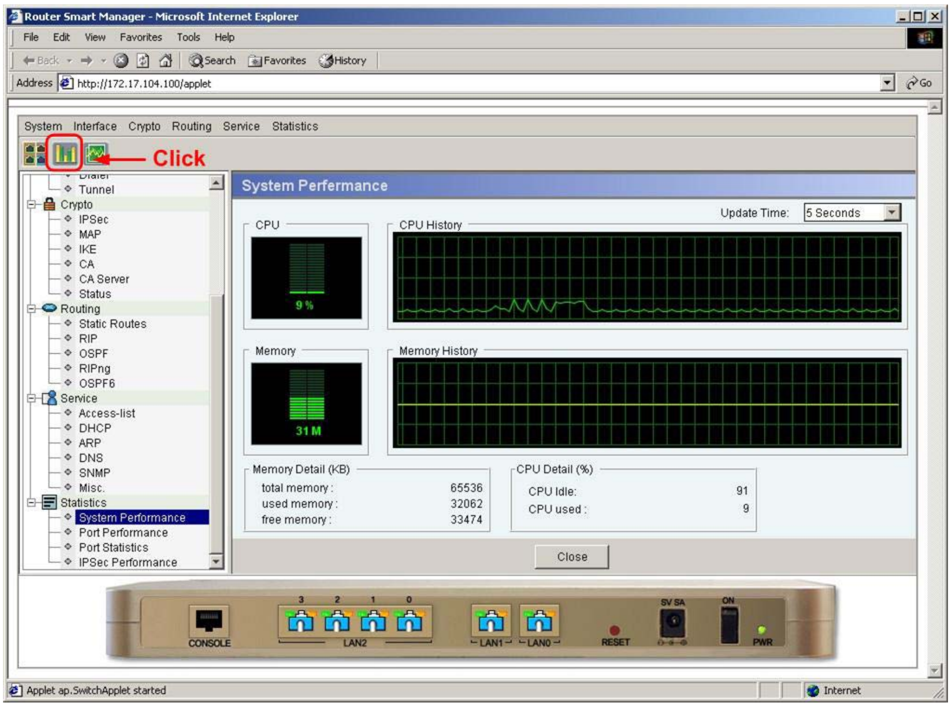
Access Filter

inBound None

outBound None

(Figure3-15) FastEthernet page

At Figure 3-17, Click icon to go to Port Performance directly.



Address http://172.17.104.100/applet

Update Time: 5 Seconds

Memory Detail (KB)

total memory :	65536
used memory :	32062
free memory :	33474

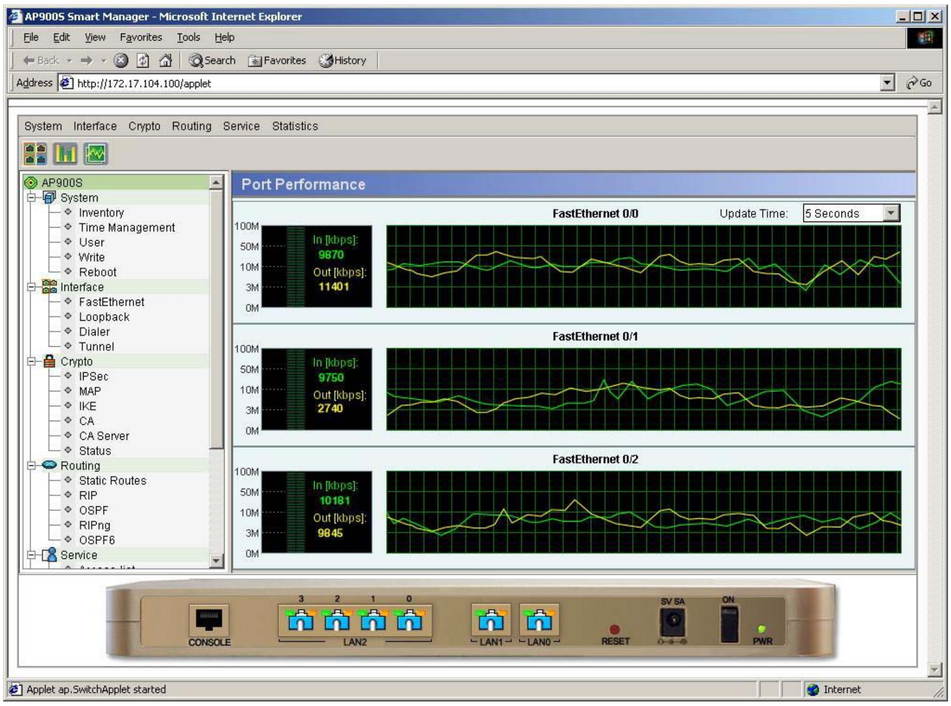
CPU Detail (%)

CPU Idle:	91
CPU used :	9

Applet ap.SwitchApplet started

(Figure3-16) Port Performance Icon

Move to Port Performance.



Address http://172.17.104.100/applet

Update Time: 5 Seconds

FastEthernet 0/0
In [kbps]: 9870
Out [kbps]: 11401

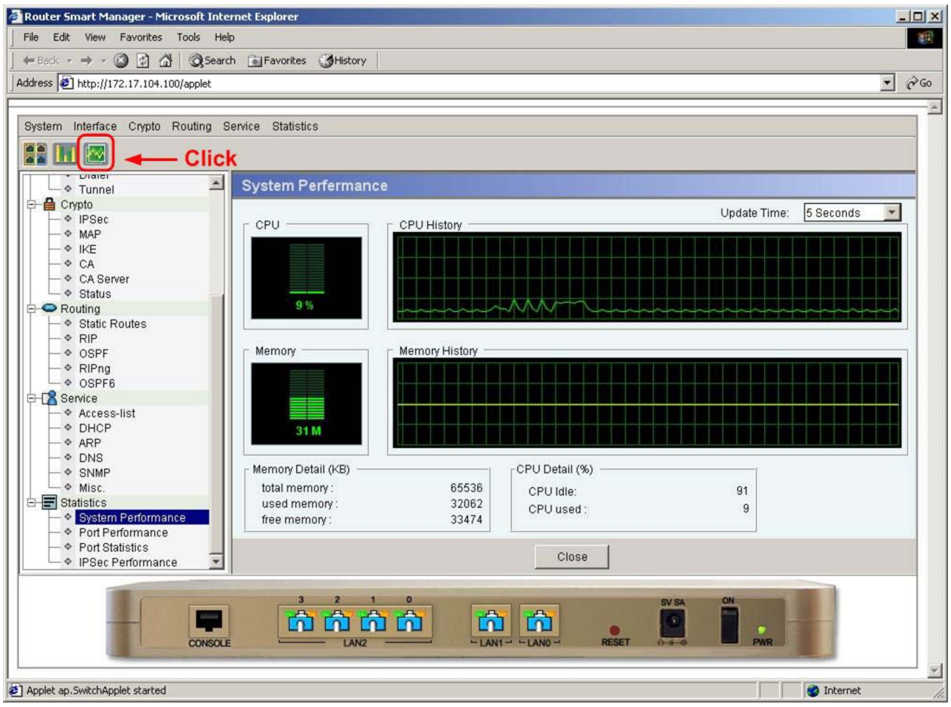
FastEthernet 0/1
In [kbps]: 9750
Out [kbps]: 2740

FastEthernet 0/2
In [kbps]: 10181
Out [kbps]: 9845

Applet ap.SwitchApplet started

(Figure3-17) Port Performance History Shortcut Icon

At Figure 3-19, Click Icon to go to Port Statistics.



Update Time: 5 Seconds

Memory Detail (KB)

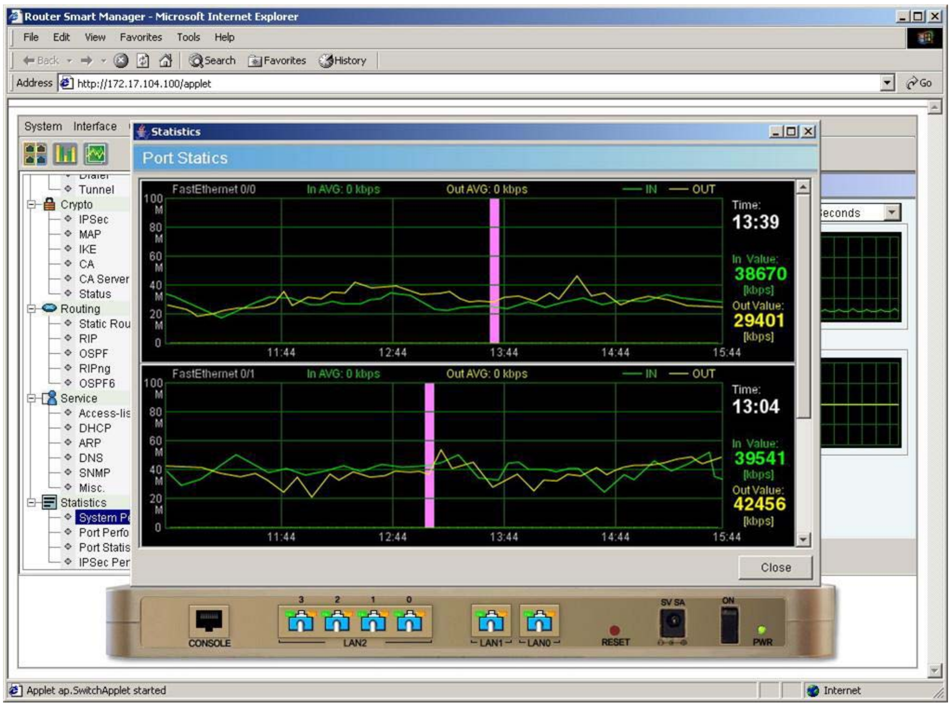
total memory : 65536
used memory : 32062
free memory : 33474

CPU Detail (%)

CPU Idle: 91
CPU used : 9

(Figure3-18) Port Statistics Icon

Move to Port Statistics page



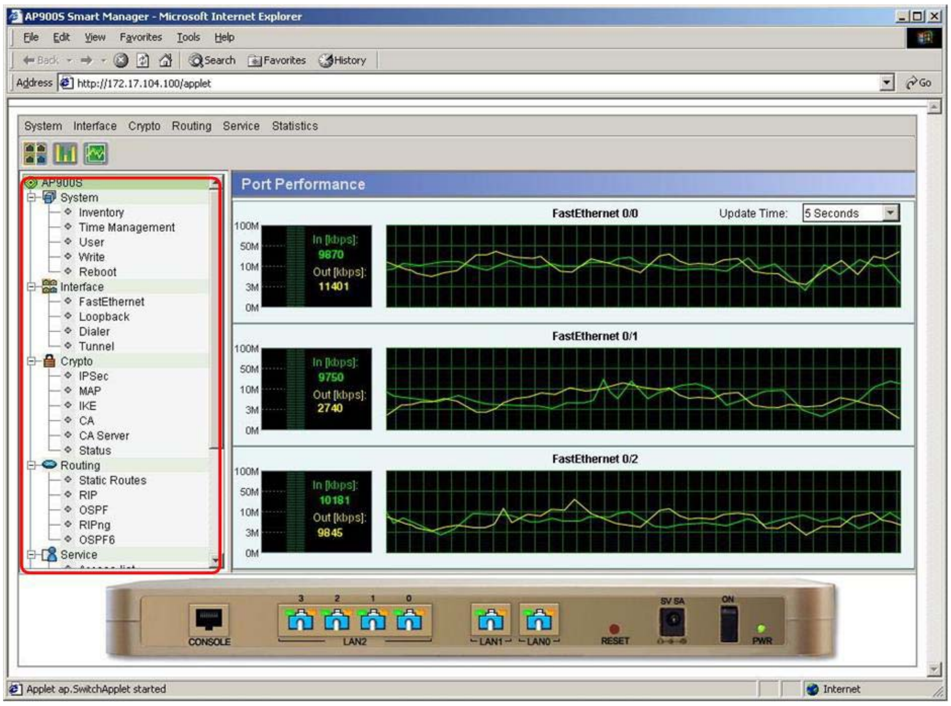
FastEthernet 0/0 — Time: 13:39, In Value: 38670 [kbps], Out Value: 29401 [kbps]

FastEthernet 0/1 — Time: 13:04, In Value: 39541 [kbps], Out Value: 42456 [kbps]

(Figure3-19) Port Statistics page

How to Use Tree Menu

The users enable to control and access overall features of SecureFinder AP900S using the tree menu. This tree menu is divided by 6 parts and the detailed description is listed at the Table 3-4.



AP900S Smart Manager - Microsoft Internet Explorer

Address: http://172.17.104.100/applet

Port Performance

FastEthernet 0/0 — Update Time: 5 Seconds — In [kbps]: 9870 — Out [kbps]: 11401

FastEthernet 0/1 — In [kbps]: 9750 — Out [kbps]: 2740

FastEthernet 0/2 — In [kbps]: 10181 — Out [kbps]: 9845

Applet ap.SwitchApplet started

(Figure3-20) Tree menu of AP900S

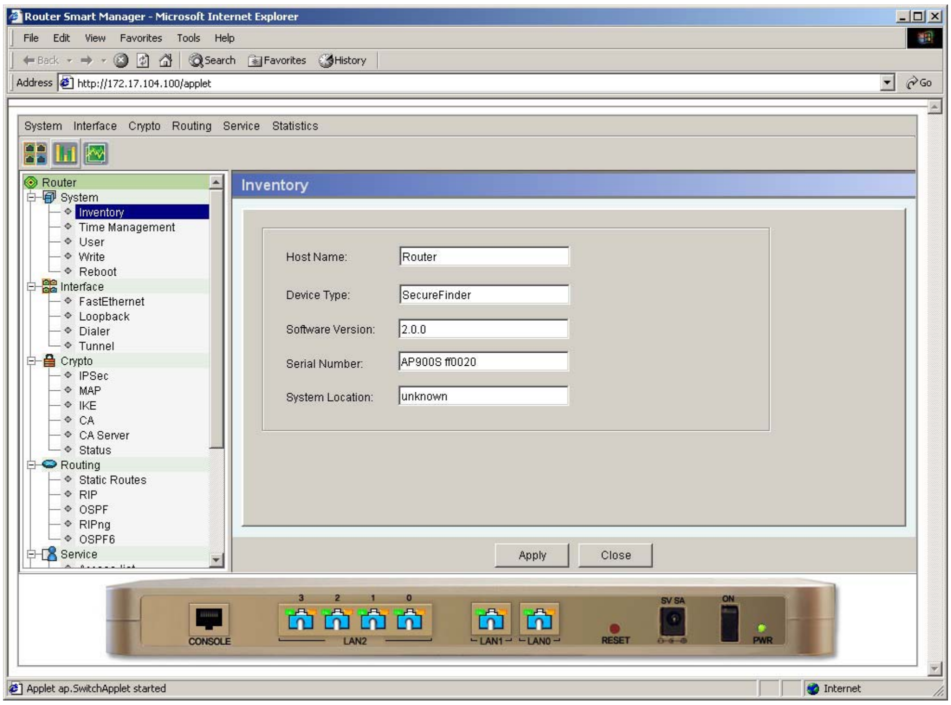
<Table 3-4> Tree Menu & Description

Menu	Description
System	Basic configuration parameters of AP900S. Time setup, User ID, Configuration Write and Reboot menus are included.
Interface	It controls Ethernet Interface functions of AP900S. It includes Dialer and IPv6 Tunnel configuration for PPP Session.
Crypto	It includes controlling VPN related function such as IPSec, Crypto Map, IKE, CA, CA Server etc.
Routing	It includes Routing Protocol related elements such as Static, RIP, OSPF etc.
Service	It includes Access-List, DHCP Pool, ARP, DNS, SNMP, Telnet, FTP etc.
Statistics	This menu shows the statistics and monitoring data such as System Performance, Port Performance, IPSec Performance etc.

System Menu

Inventory

"Inventory" offers the brief information of AP900S.



Host Name: Router

Device Type: SecureFinder

Software Version: 2.0.0

Serial Number: AP900S ff0020

System Location: unknown

(Figure3-21) System-Inventory

<Table 3-5> Inventory Fields

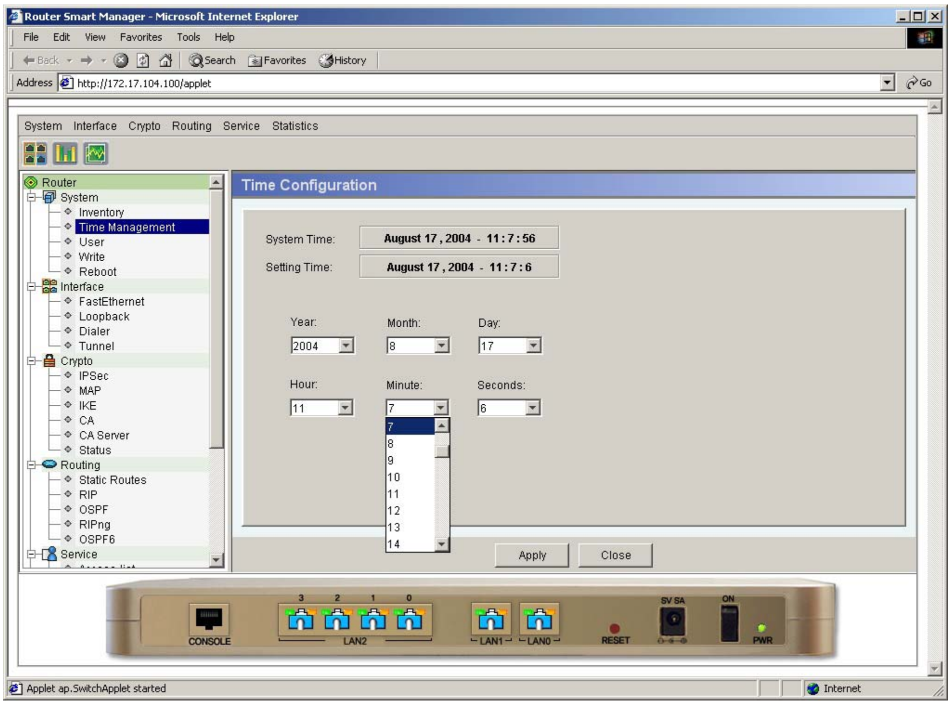
Field	Description
Host Name	The Host Name of AP900S. The user enables to change it from the SNMP Management Page.
Device Type	The Device Type of AP900S. It is set to "SecureFinder" as default.
Software Version	APOS Version of AP900S
Serial Number	MAC Address of AP900S
System Location	The System Location information from SNMP Management page.

Time Management

Time Management changes the system time of SecureFinder AP900S.

With each pull-down menu, users enable to change year, month, day, and hour. Click "Apply" button to save the changed values.

Figure 3-23 shows the example of changing Minutes using the pull down menu.



System Time: August 17 , 2004 - 11 : 7 : 56

Setting Time: August 17 , 2004 - 11 : 7 : 6

Year: 2004

Month: 8

Day: 17

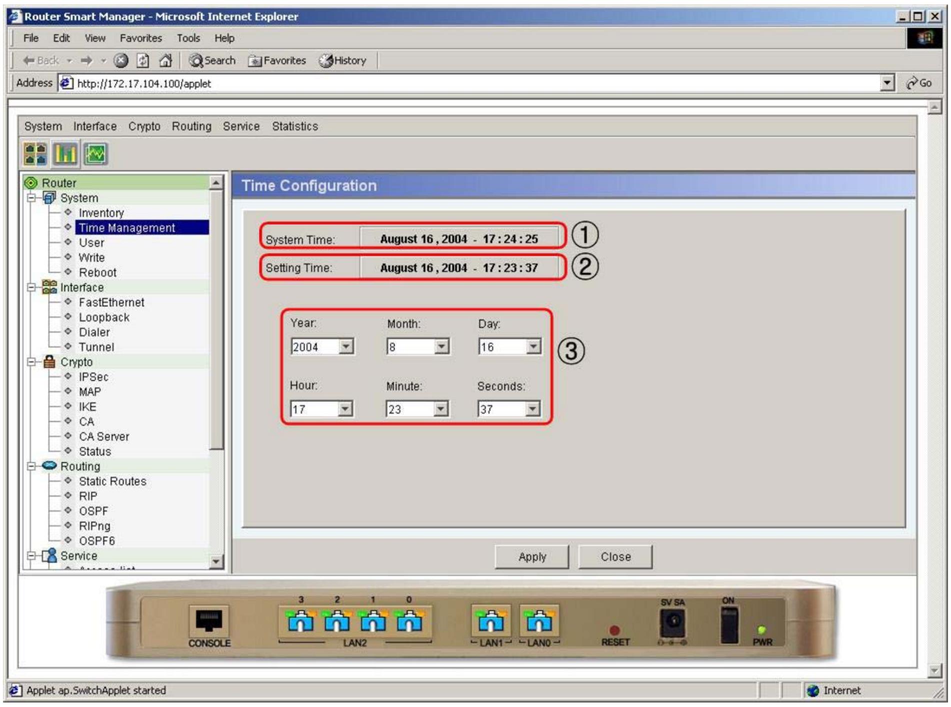
Hour: 11

Minute: 7

Seconds: 6

(Figure3-22) Time Management window

The Time Management elements are described below.



System Time: August 16 , 2004 - 17 : 24 : 25

Setting Time: August 16 , 2004 - 17 : 23 : 37

Year: 2004 Month: 8 Day: 16

Hour: 17 Minute: 23 Seconds: 37

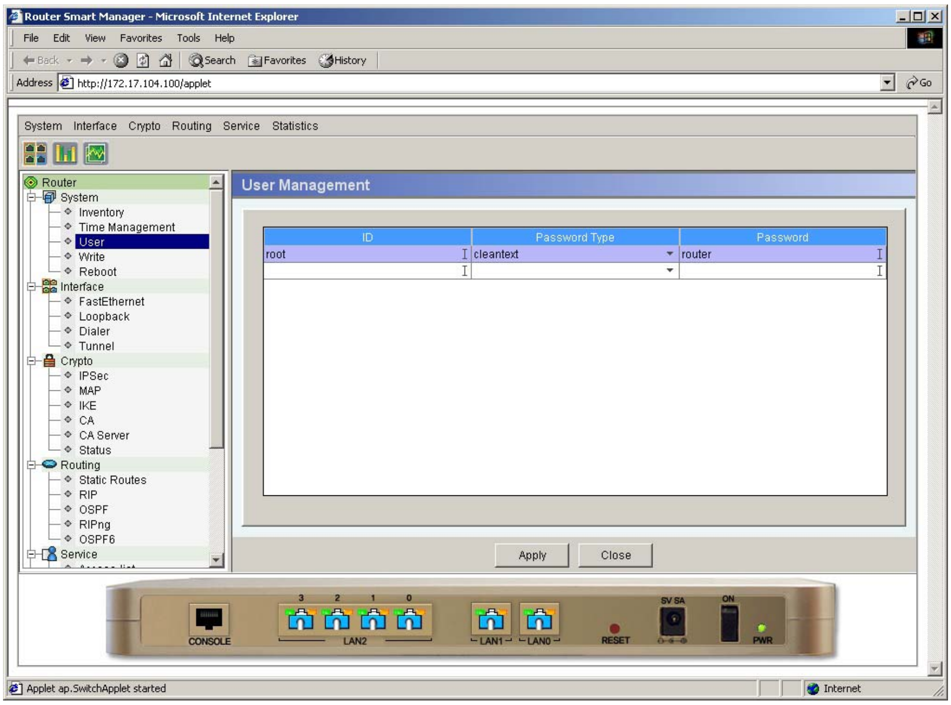
(Figure3-23) Time Management Elements

<Table 3-6> Time Management Elements and Description

Element	Description
① System Time	The current system time of AP900S.
② Setting Time	When a user sets the time in ③bars, it will show the time in this field. The system time is set by user. The default time is synchronized with the time of PC.
③ Year, Month, Day, Hour, Minute, Seconds	Set the year, month, day, hour, minute and seconds with the pull-down menu.

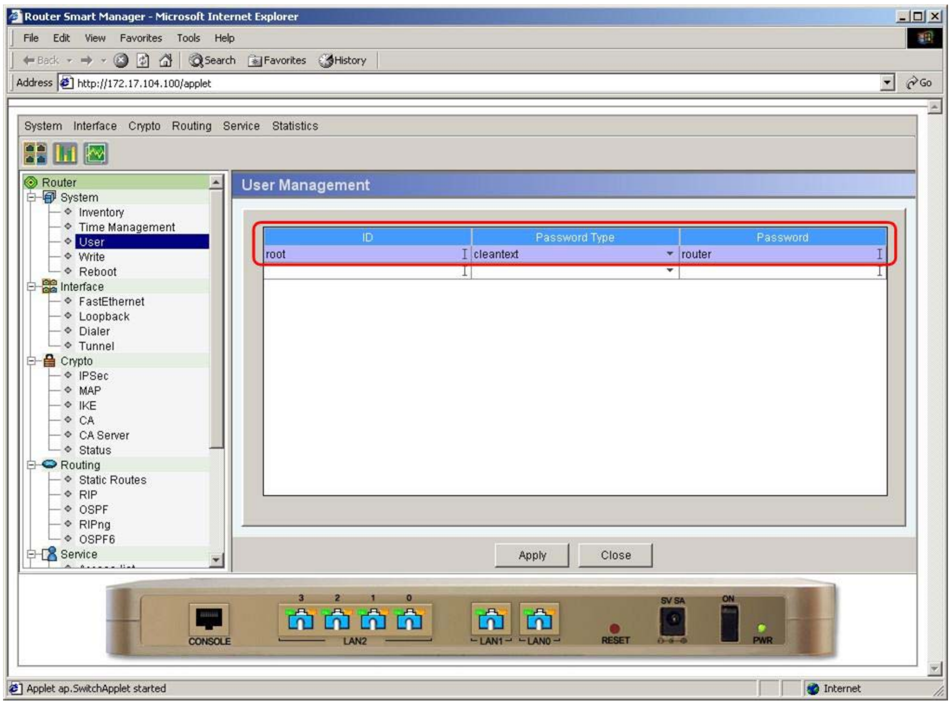
User Management

It configures User Management elements of AP900S. Use this User Management menu when you want to add other user IDs besides “root”.



ID	Password Type	Password
root	cleantext	router

(Figure3-24) User Management main window



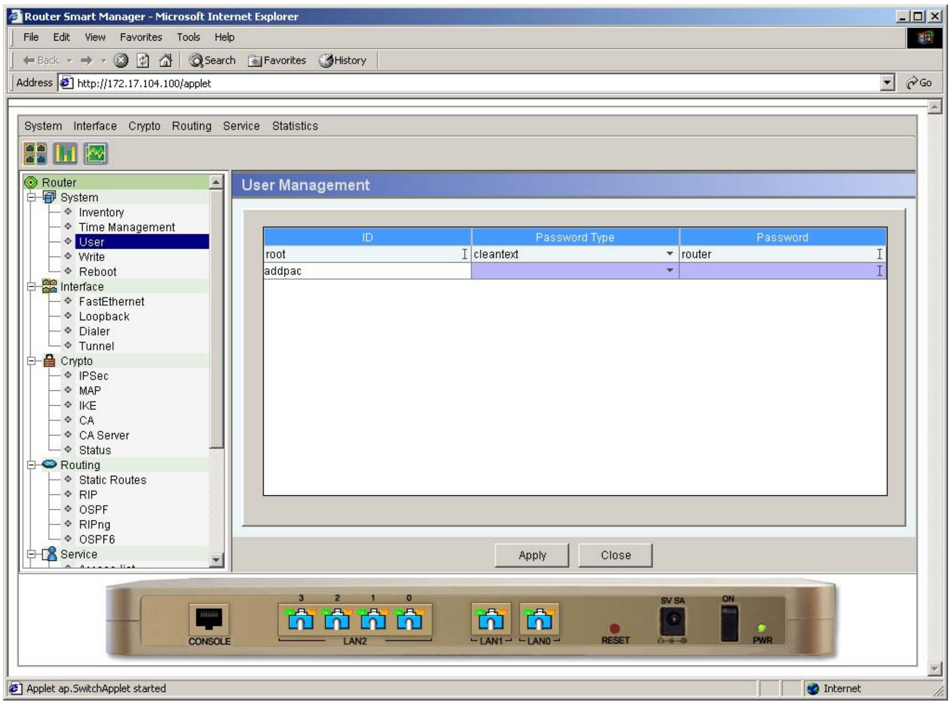
ID	Password Type	Password
root	cleantext	router

(Figure3-25) Configuring User Management elements

<Table 3-7> User Management elements & Description

Elements	Description
ID	Define user ID.
Password Type	Define password type on Smart Manager. "Nopassword" is when you do not use Password, "Encrypt" is when the password is shown as an encryption and "Cleartext" is when password is shown without encryption.
Password	Define Password for specific ID.

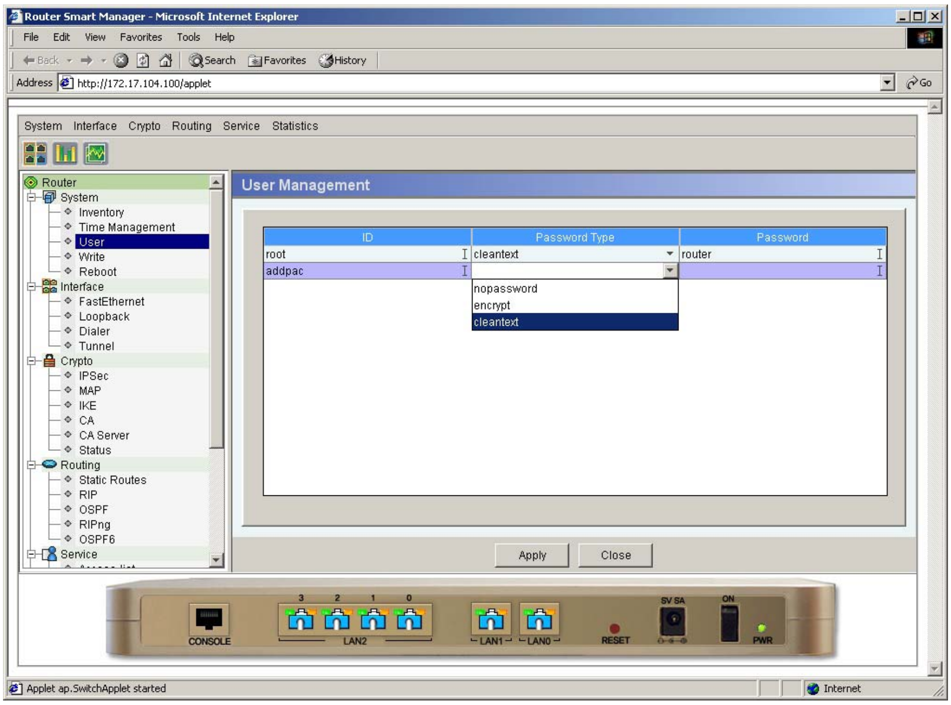
Figure 3-27 shows an example of adding user ID/Password/PasswordType: as ("addpac"/"router"/"ClearText").
First, double click on blank ID field then enter "addpac"



ID	Password Type	Password
root	cleantext	router
addpac		

(Figure3-26) Input User Management ID

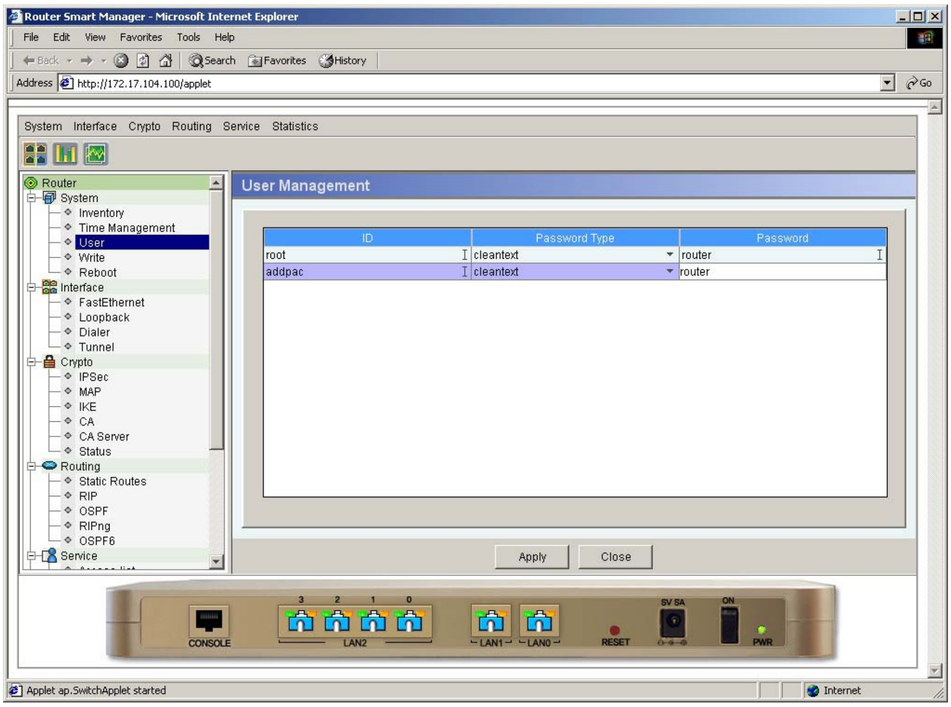
Set Password Type to "ClearText"



ID	Password Type	Password
root	cleantext	router
addpac		

(Figure3-27) Select User Management Password Type

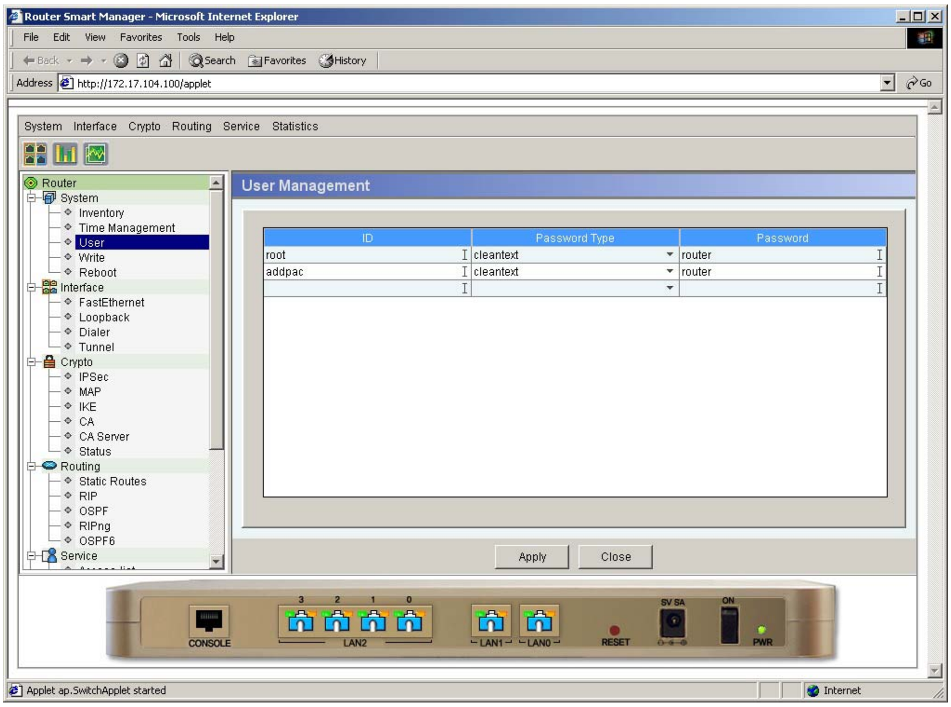
Input “router” in Password field, then Click Enter.



ID	Password Type	Password
root	cleantext	router
addpac	cleantext	router

(Figure3-28) Enter User Management Password

At Figure 3-30, new User IDs are shown.

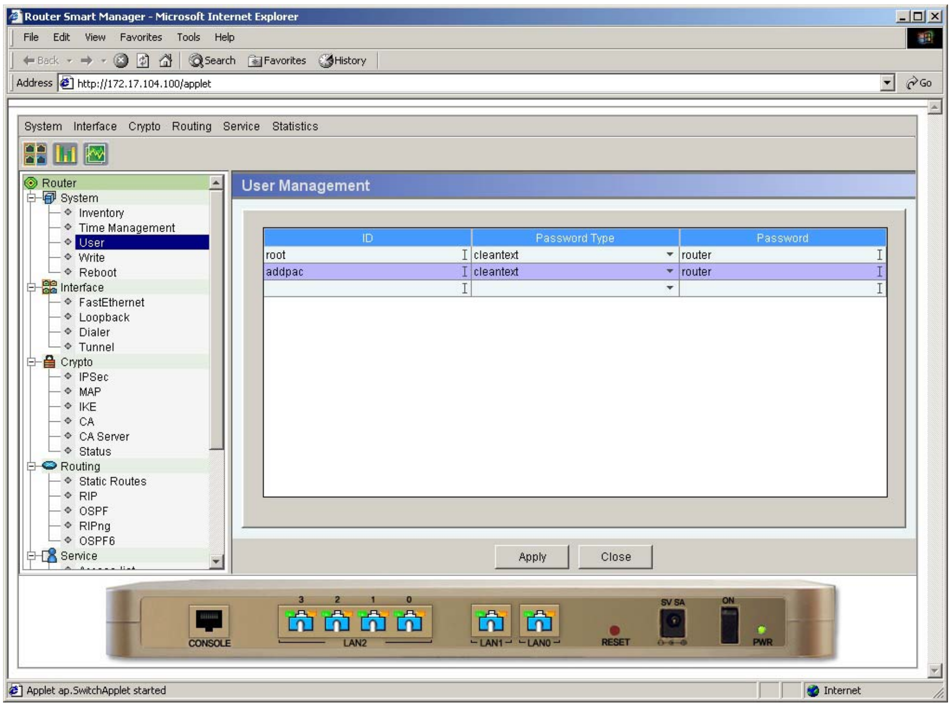


ID	Password Type	Password
root	cleantext	router
addpac	cleantext	router

(Figure3-29) User Management –new ID

Figure 3-31 shows how to delete user ID “addpac”.

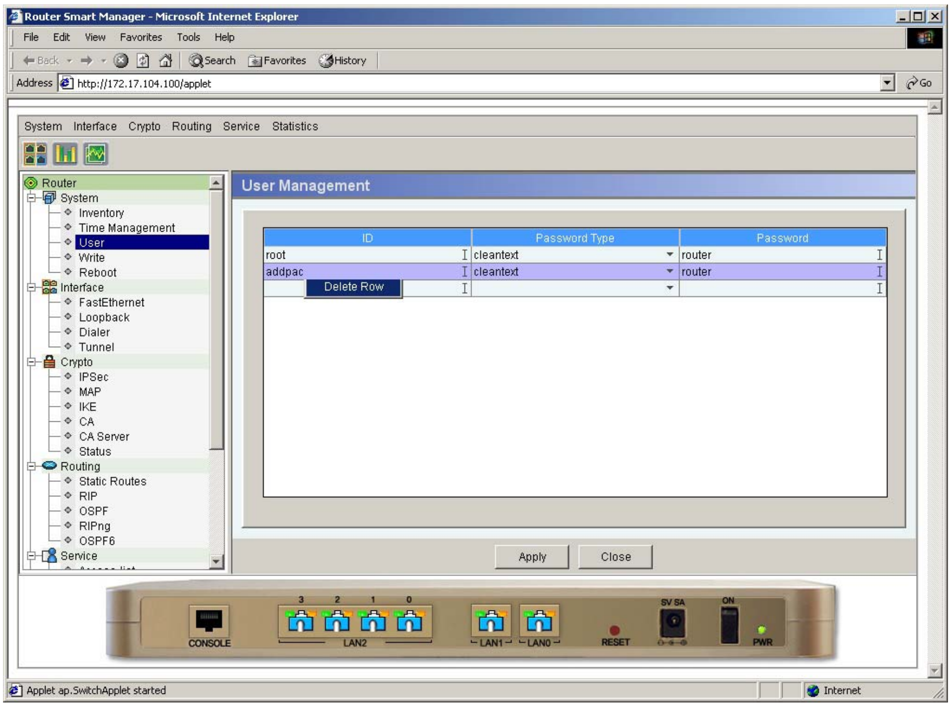
Select the ID you want to delete with a mouse.



ID	Password Type	Password
root	cleantext	router
addpac	cleantext	router

(Figure3-30) User Management-select user ID

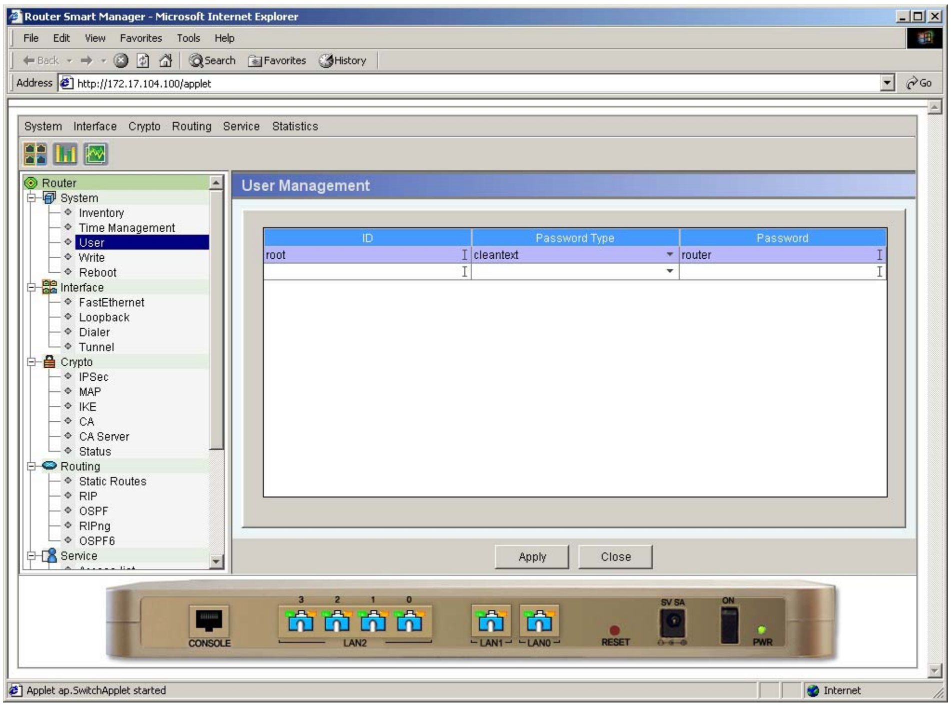
Select “Delete Row” by clicking right side of the mouse.



ID	Password Type	Password
root	cleantext	router
addpac	cleantext	router

(Figure3-31) Select User Management Delete Row

At Figure 3-33, Use ID “addpac” is deleted.

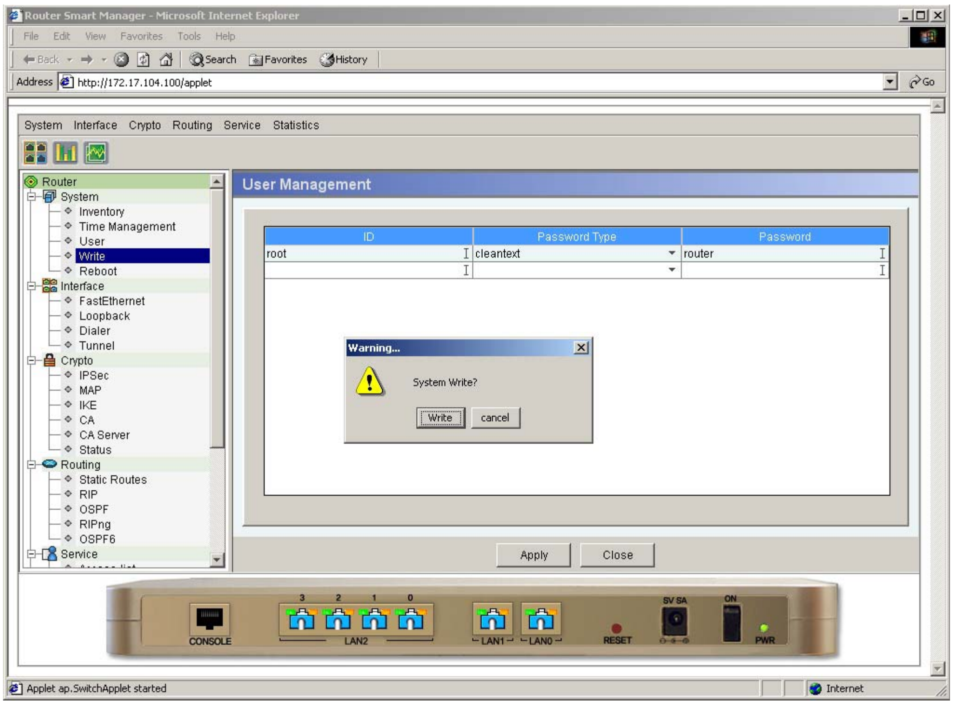


ID	Password Type	Password
root	cleantext	router

(Figure3-32) User Management user ID deleted

Write

The changed parameter values of System, Interface, Crypto, Routing, Service, Statistics menus are stored in the volatile main memory, SDRAM temporarily. Make sure to save the values permanently using Write command. Otherwise, the new values are lost when AP900S power is turned off.



ID	Password Type	Password
root	cleantext	router

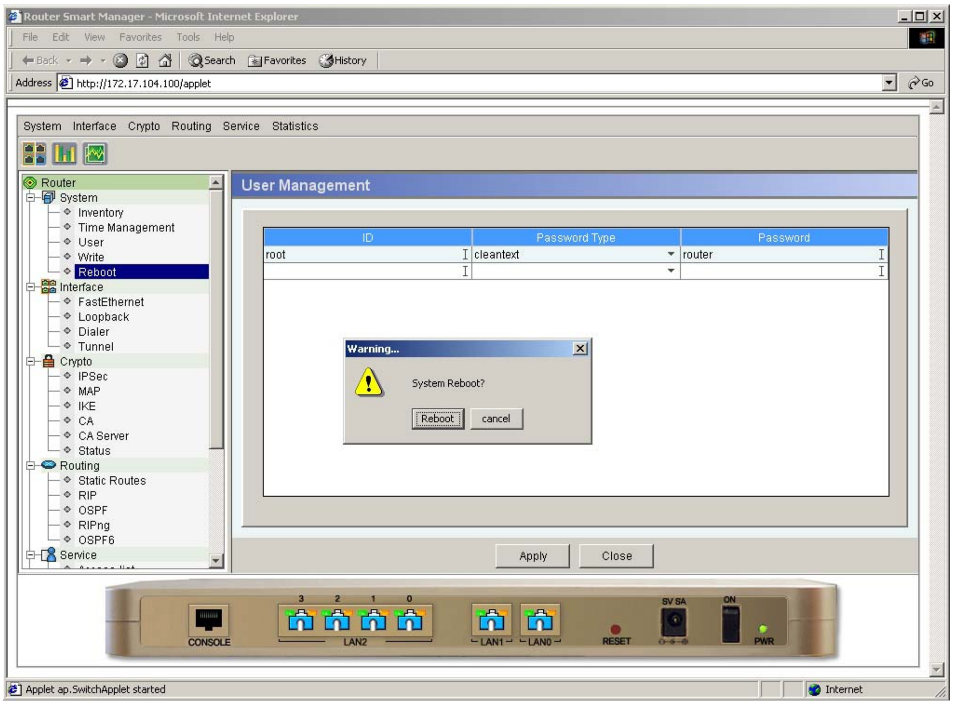
System Write?

(Figure3-33) Write menu page

Reboot

Use "Reboot" when an operator wants to re-start the system without power down(cold start).

Caution: Smart Manager can be stopped for a while when reboot is executed.



ID	Password Type	Password
root	cleantext	router

Warning...

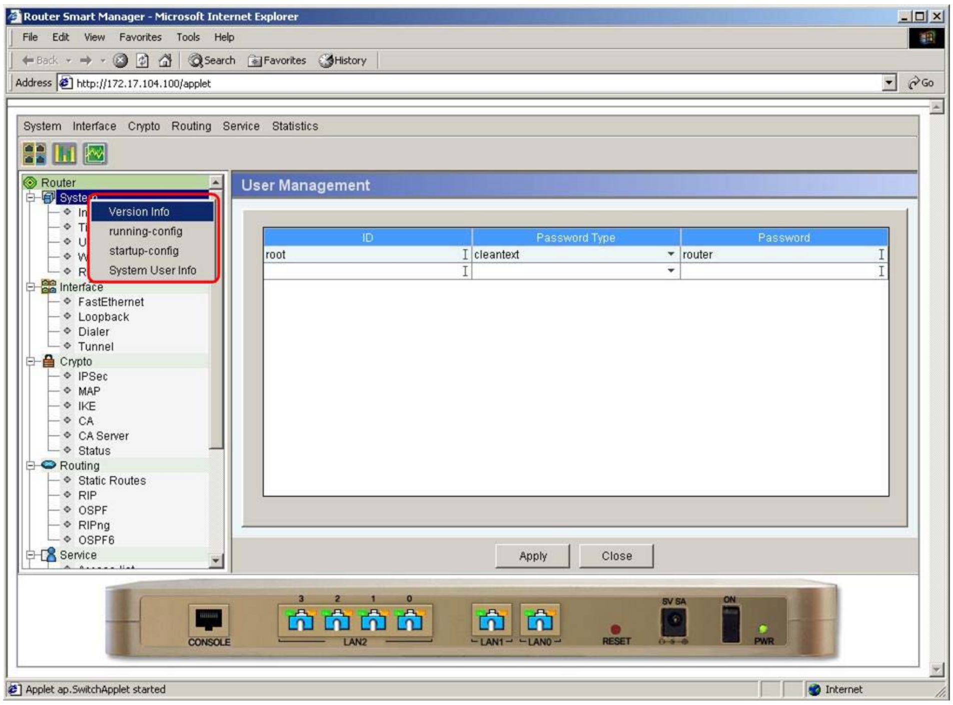
System Reboot?

[Reboot] [cancel]

(Figure3-34) System Reboot main page

System Popup Menu

To use Popup Menu, Select System and click on right side of mouse. This menu consists of APOS Version Info, Running-Configuration, Startup-configuration, and System User Info of AP900S. Click on each element to see the more information.



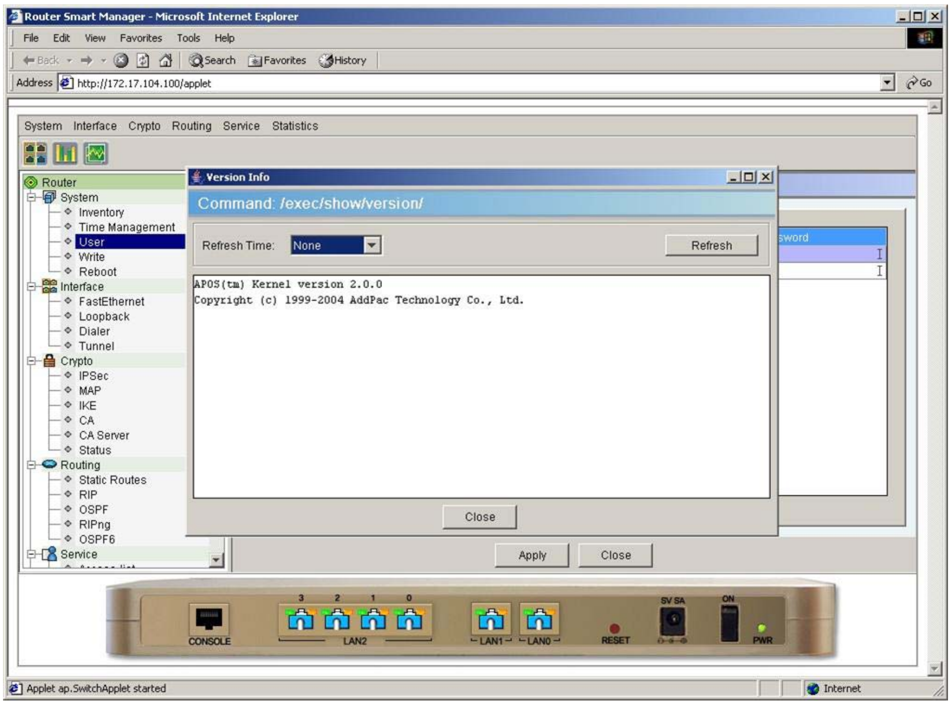
ID	Password Type	Password
root	cleantext	router

(Figure3-35) System Popup Menu page

<Table 3-8> System Popup Menu Description

Elements	Description
Version Info	APOS Version Info of AP900S
Running-Config	Running-Configuration on main memory
Startup-Config	Startup-Configuration information
System User Info	User Account information

Figure 3-37 is “Version Info” page. Refresh Time can take 3 to 5 sec or click “Refresh” button to see the information right away. Version Info of AP900S is the same Version of APOS.



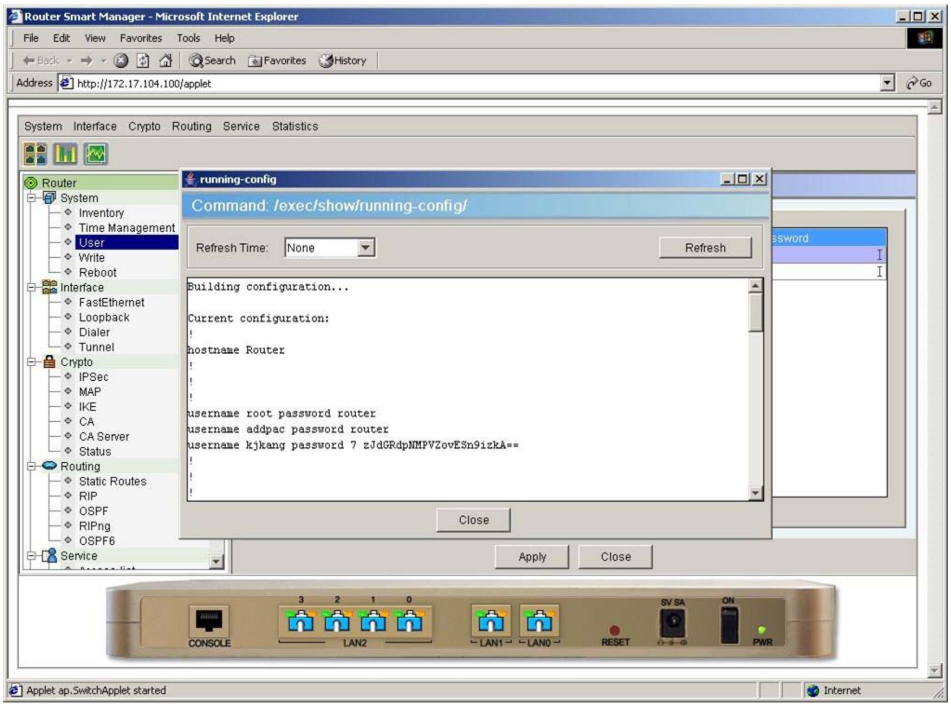
Command: /exec/show/version/

Refresh Time: None

```
APOS(tm) Kernel version 2.0.0
Copyright (c) 1999-2004 AddPac Technology Co., Ltd.
```

(Figure3-36) System Version Info page

Figure 3-38 is Running-Config page. Refresh Time can take 3 to 5 sec or click on "Refresh" button to see the information right away. Running-Config is configuration of current AP900S memory and it controls operations of AP900S.



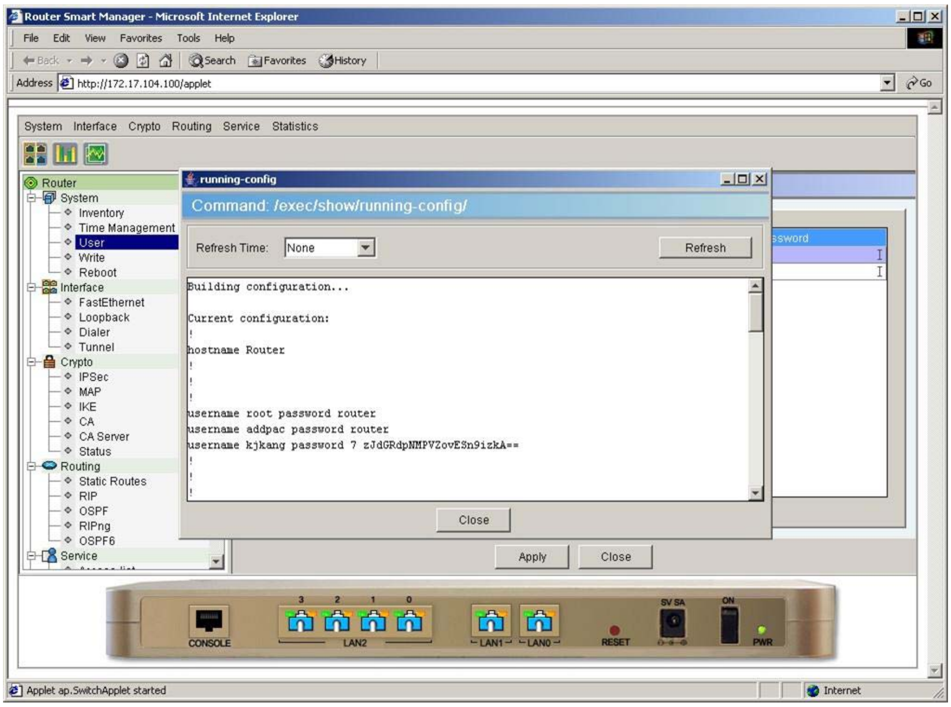
Command: /exec/show/running-config/

Refresh Time: None

```
Building configuration...

Current configuration:
!
hostname Router
!
!
!
username root password router
username addpac password router
username kjkang password 7 zJdGRdpNMPVZovESn9izkA==
!
!
!
```

(Figure3-37) System Running-Config page

Figure 3-39 is Startup-Config page. Refresh Time can take 3 to 5 sec or click on “Refresh” button to see the information right away. Startup-Config is configuration info which is saved in non-volatile flash memory. It is read when initial start up of AP900S, so it is irrelevant with operation of current AP900S.



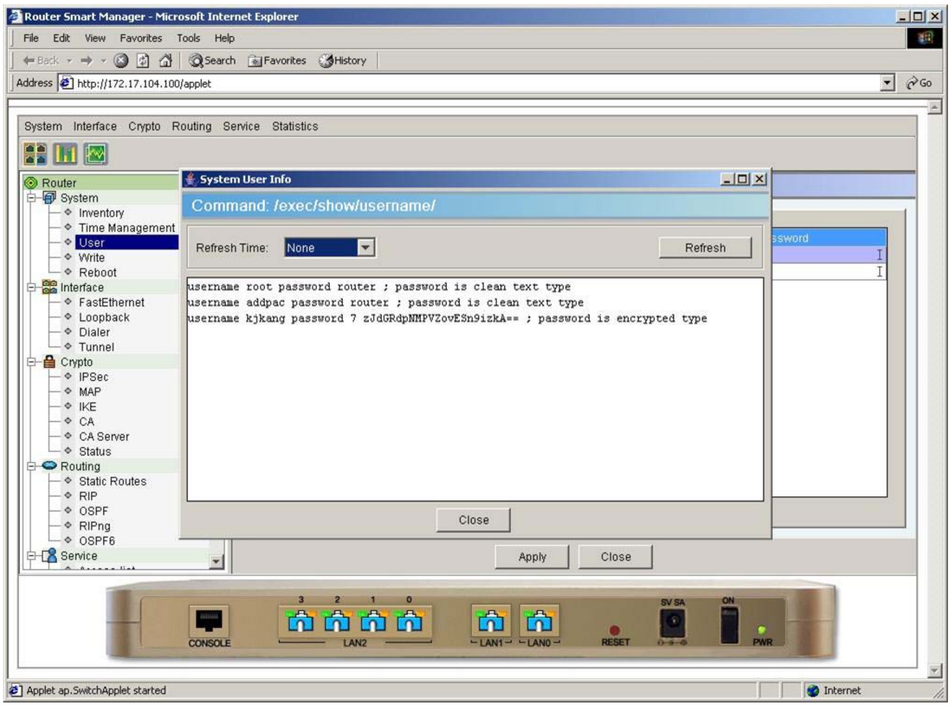
Command: /exec/show/running-config/

Refresh Time: None

```
Building configuration...

Current configuration:
!
hostname Router
!
!
!
username root password router
username addpac password router
username kjkang password 7 zJdGRdpNMPVZovESn9izkA==
!
!
!
```

(Figure3-38) System Startup-Config page

Figure 3-40 is System User Info page. Refresh Time can take 3 to 5 sec or click on "Refresh" button to see the information right away. System User Info shows the information of new ID which is created from User Management.



Command: /exec/show/username/

Refresh Time: None

```
username root password router ; password is clean text type
username addpac password router ; password is clean text type
username kjkang password 7 zJdGRdpNMPVZovESn9izkA== ; password is encrypted type
```

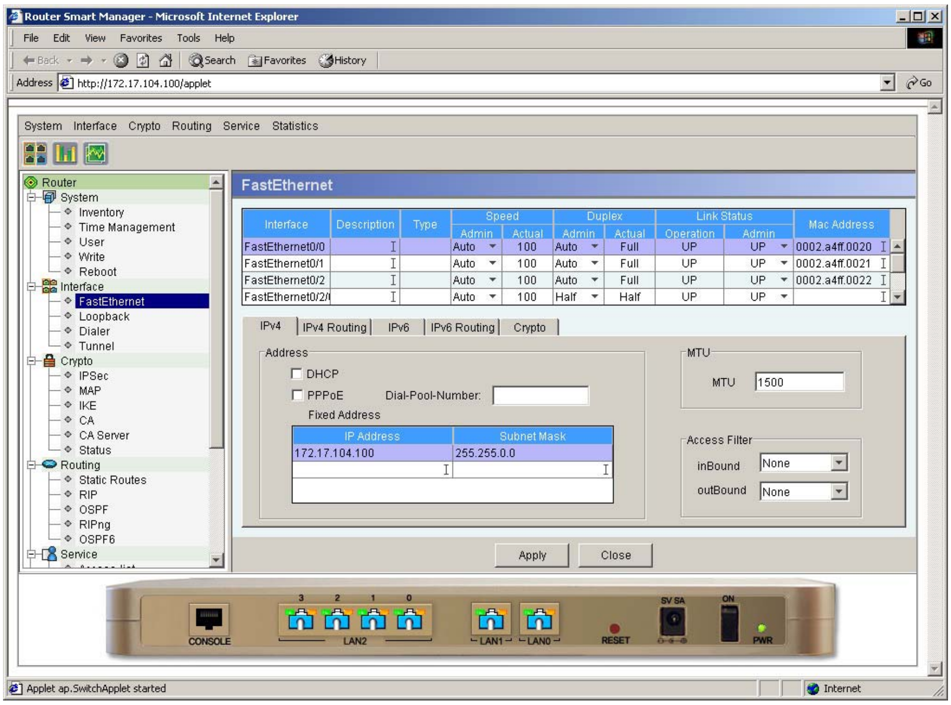
(Figure3-39) System User Info page

Interface Menus

Interface menu consists of FastEthernet, Loopback, Dialer and Tunnel. Operator enables to change settings for all interfaces of AP900S and apply created values from Crypto, Routing, Service, and Statistics to Interface.

FastEthernet

FastEthernet menu not only enable controlling and link status monitoring of all AP900S interfaces but also configures parameter settings for Routing Protocol, IPv6, Crypto, and Access-List. The operator can change parameter setting values for each interface.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
CONSOLE
3
2
1
0
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto

Address

□ DHCP

□ PPPoE Dial-Pool-Number:

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0

MTU

MTU 1500

Access Filter

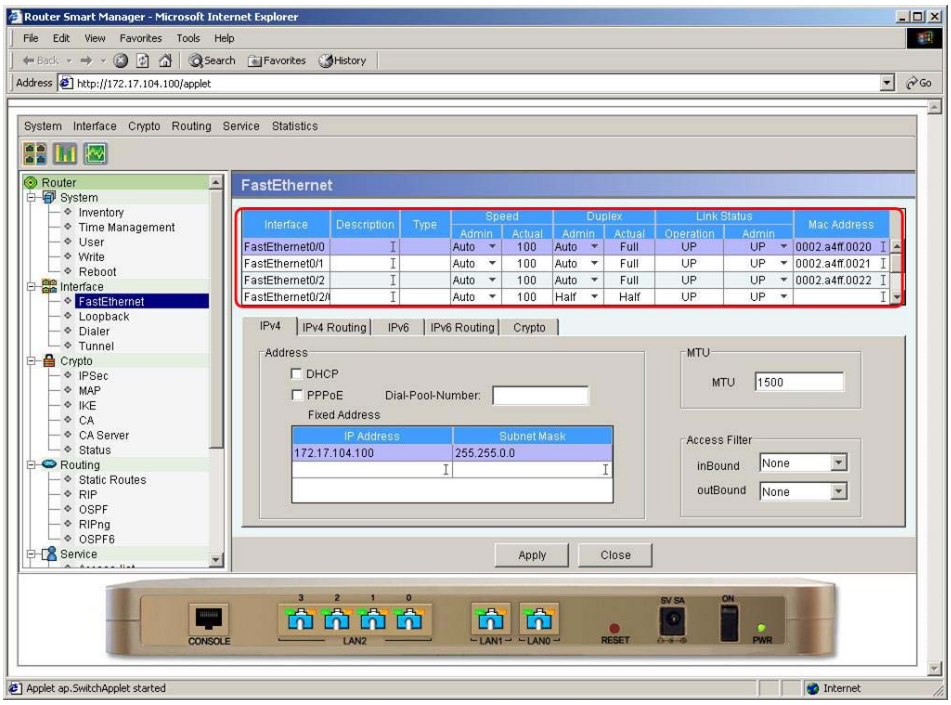
inBound None

outBound None

Apply Close

(Figure3-40) FastEthernet Main page

Figure 3-42 is Link Status Info of each interface.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/			Auto	100	Half	Half	UP	UP	

IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto

Address

□ DHCP

□ PPPoE Dial-Pool-Number:

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0

MTU

MTU: 1500

Access Filter

inBound: None

outBound: None

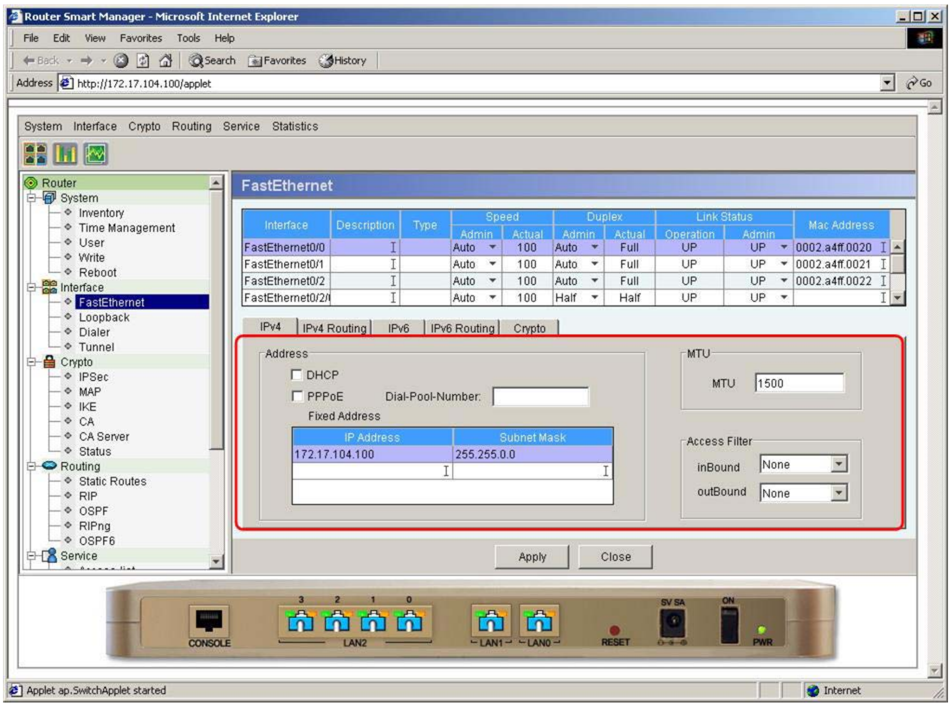
Apply Close

(Figure3-41) FastEthernet Interface Link Status Info

<Table 3-9> Interface Link Status Info Description

Elements	Description
Interface	Shows Ethernet Interface of AP900S
Description	Shows Comment field
Speed	Link Speed of interface. Operator can choose one among 10Mbps, 100Mbps or Auto Negotiation. User can check actual Link Speed on the system.
Duplex	Duplex Mode of Interface. Operator can choose one from Half Duplex, Full Duplex or Auto Negotiation. Actual Duplex Mode can be checked on the system.
Link Status	Link Status of interface. It can be used to shutdown interfaces by user. Actual Link up/down can be checked on operation field.
MAC Address	Shows MAC address of interface

Figure 3-43 shows IPv4 Info of each interface.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

☐ DHCP

☐ PPPoE Dial-Pool-Number:

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0

MTU

MTU 1500

Access Filter

inBound None

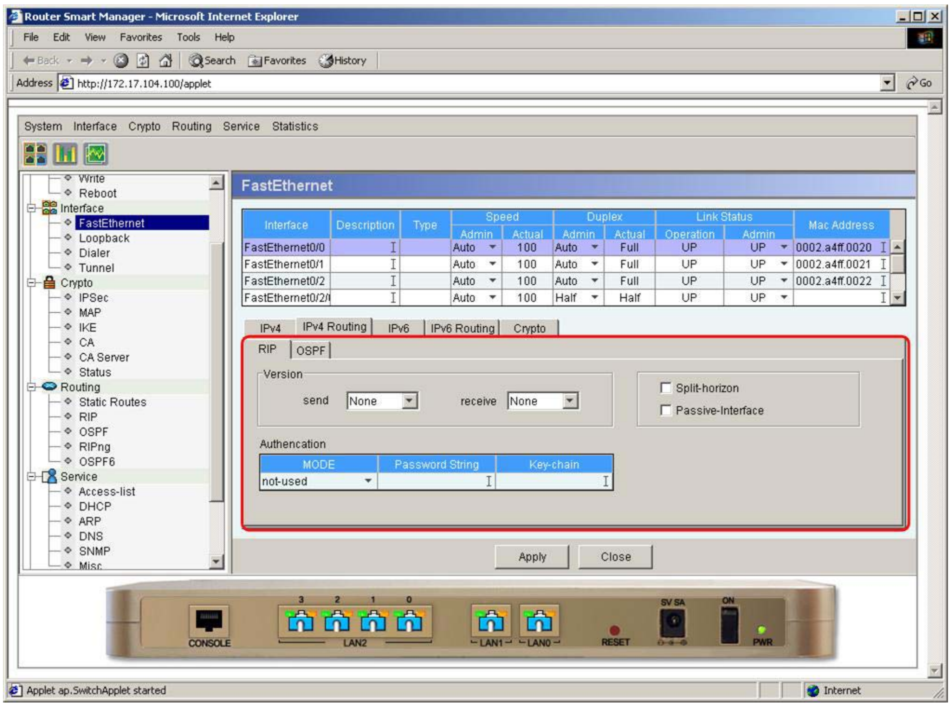
outBound None

(Figure3-42) Interface IPv4 Info

<Table 3-10> Interface IPv4 Info Description

Elements	Description
DHCP	Set Interface to DHCP Client
PPPoE	Set Interface to PPPoE Client
Dial-Pool Number	Assign Dialer. Dialer includes authentication method for PPP Session, user ID info. User has to enter per-written Dialer.
IP Address/ Subnet mask	Enter fixed IP Address to interface.
MTU	MTU(maximum transmission unit), it limits maximum size of packet. Default value is 1500 Bytes.
Access Filter	It is used in Service menu to apply Access-List to interface.

Figure 3-44 shows IPv4 RIP Information of each interface.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Version

send None receive None

□ Split-horizon

□ Passive-Interface

Authencation

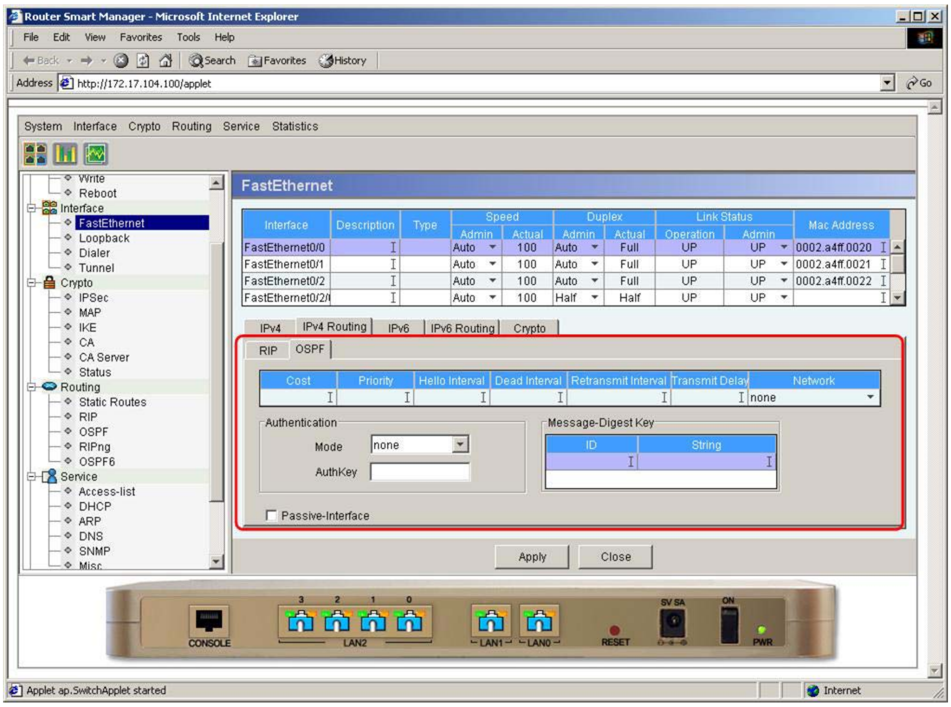
MODE	Password String	Key-chain
not-used		

(Figure3-43) Interface IPv4 RIP Info

<Table 3-11> Interface IPv4 RIP Info Description

Elements	Description
Version Send/ Receive	It decides RIP Version which is used for exchanging RIP Routing Table. Generally RIP Version2 is used, and when it is necessary, send/receive Version can be set differently.
Split-Horizon	Split-Horizon is to prevent Loop phenomenon caused by unreachable network when using RIP as Routing Protocol.
Passive-Interface	Only to receive RIP Routing Table.
Authentication Mode	When there is no authentication : Not-used, When using text authentication: Simple-Text When using MD5 for password encryption : md5
Password String	Enter password when using Simple-Text and MD5.
Key-Chain	Input the KEY value for using MD5 algorithm.

Figure 3-45 shows IPv4 OSPF Information of each interface.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
						none

Authentication

Mode: none

AuthKey:

Message-Digest Key

ID	String

☐ Passive-Interface

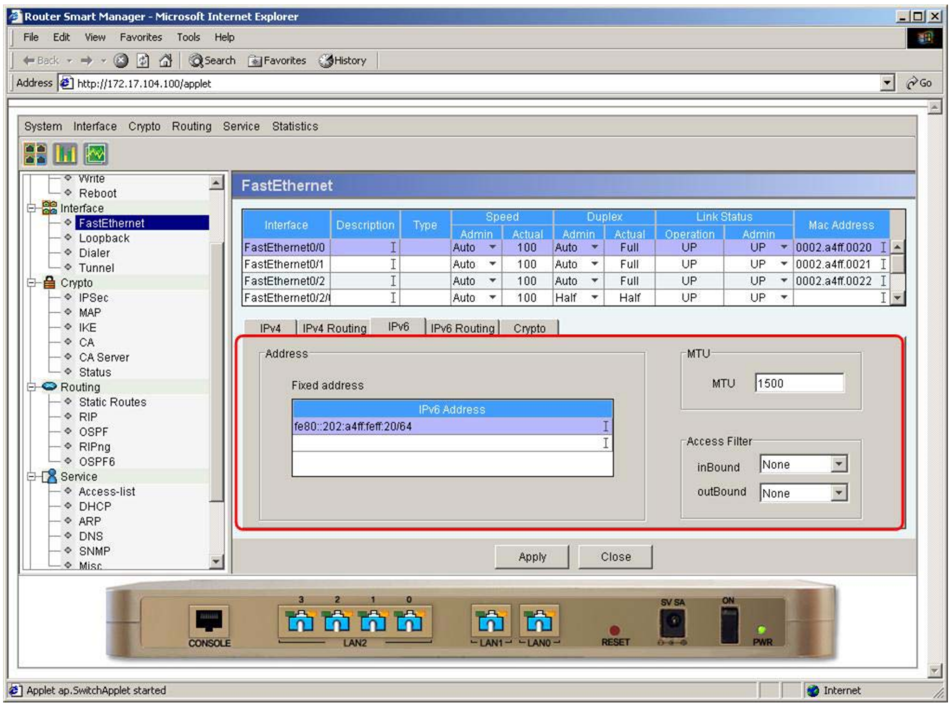
(Figure3-44) Interface IPv4 OSPF Info

<Table 3-12> Interface IPv4 OSPF Info Description

Elements	Description
Cost	Input the cost of interface which is used for comparing path between destinations. Lower Cost has high priority.
Priority	It decides Priority of interface. This is used when deciding Designated Router.
Hello Interval	It decides transfer interval of Hello Packet which checks the status of peer interface.
Dead Interval	It decides waiting time after declaring Dead status on peer Interface.
Retransmit Interval	It decides re-transmit interval when Link State Advertisement Packet is lost.
Transmit Delay	It decides transfer delay for Link State Advertisement Packet.
Network	It configures the network interface.
Authentication Mode	When there is no authentication : Not-used, when using text authentication: Simple-Text when using MD5 for password encryption : md5

Auth Key	Input the key value when Simple-Text is used.
Message-Digest Key	Input ID and String value when MD5 algorithm is used.
Passive-Interface	It is used to receive OSPF Routing Table from a specific interface.

Figure 3-46 shows IPv6 Info of interface.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

Fixed address

IPv6 Address
fe80::202:a4ff:feff:20/64

MTU

MTU 1500

Access Filter

inBound None

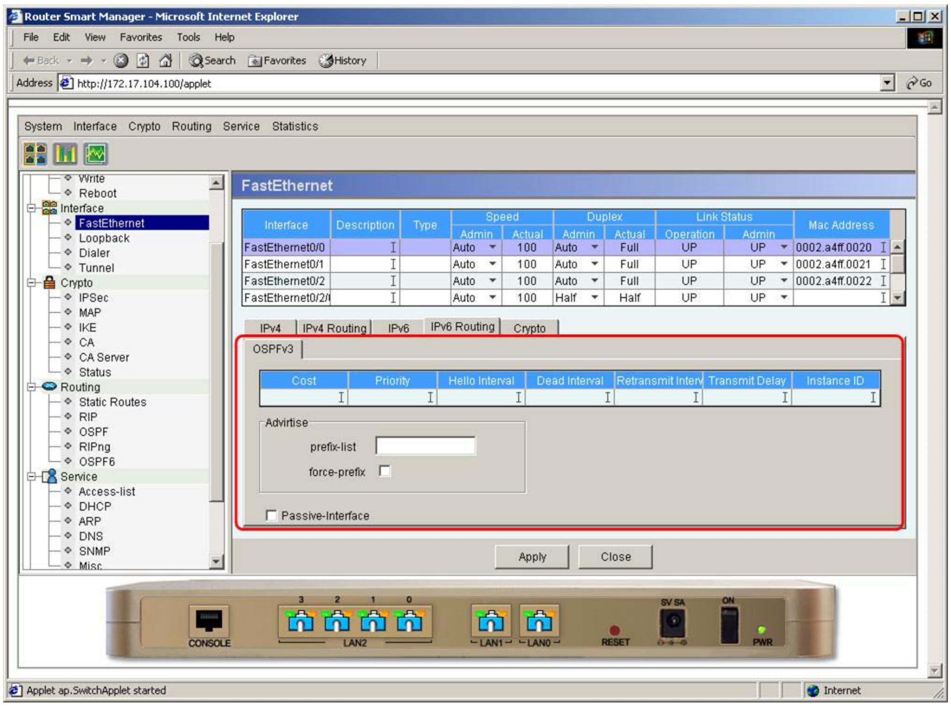
outBound None

(Figure3-45) Interface IPv6 Info

<Table 3-13> Interface IPv6 Info Description

Elements	Description
Fixed IP Address	Input 128 bit Fixed IPv6 Address.
MTU	Maximum Transmission Unit, maximum size of Packet.
Access Filter InBound	It is used to apply Access-List to interface. Inbound is used for filtering receiving packet.
Access Filter OutBound	It is used to apply Access-List to interface. Outbound is used for filtering sending packet.

Figure 3-47 shows IPv6 Routing Information of interface. This is about IPv6 OSPFv3.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID

Advirtise

prefix-list

force-prefix □

□ Passive-Interface

(Figure3-46) Interface IPv6 OSPFv3 Info

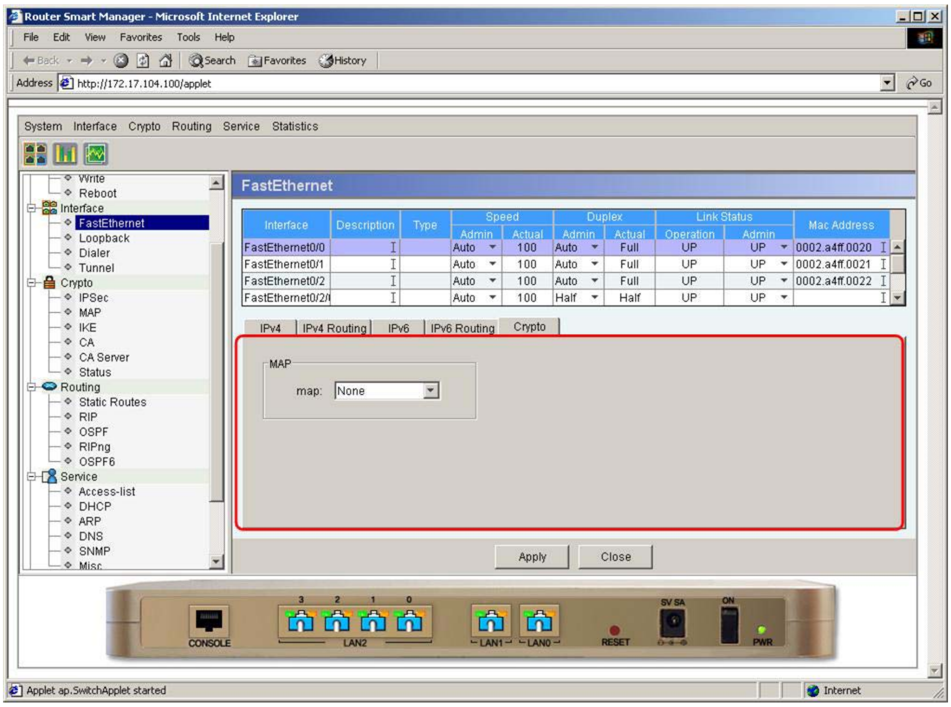
<Table 3-14> Interface IPv6 OSPFv3 Info Description

Elements	Description
Cost	Input the cost of interface which used for comparing path between OSPF to destiny. Lower Cost has high priority.
Priority	It decides Priority of interface. This is used when deciding Designated Router.
Hello Interval	It decides transfer interval of Hello Packet which checks the status of peer interface
Dead Interval	It decides waiting time after declaring Dead status on peer Interface.
Retransmit Interval	It decides re-transmit interval when Link State Advertisement Packet is lost.
Transmit Delay	It decides transfer delay for Link State Advertisement Packet.
Instance ID	Input Instance ID which is used for exchanging OSPF Routing Table.

Advertise Prefix-list	It is to prevent or to accept specific network information when exchanging OSPF Routing Table. Prefix-list has to be pre-written to apply.
Force-Prefix	Even if Interface is Loopback, or Point-to-Point, Prefix-List is forced to be applied.
Passive-Interface	It is used when receiving OSPF Routing Table in a specific interface.

Figure 3-48 shows Crypto Information of interface

It is used when Crypto Map, which is created from Crypto menu, is applied to the interface. Select the Map using scroll bar.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/			Auto	100	Half	Half	UP	UP	

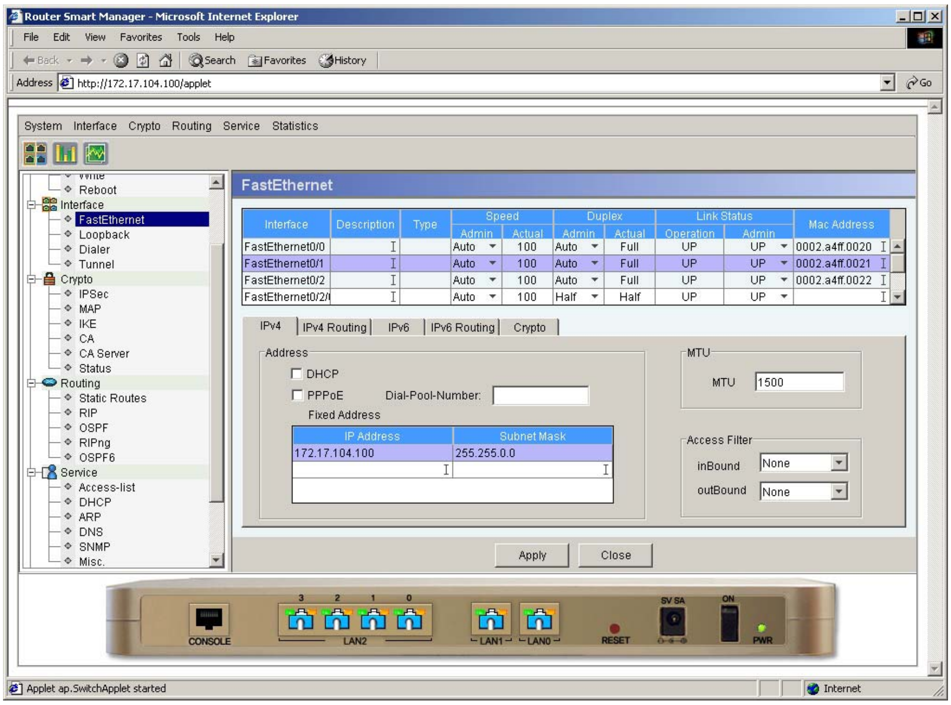
MAP

map: None

(Figure3-47) Interface Crypto Info

Figure 3-49 shows configuration after selecting Fast Ethernet 0/1

First, Select Fast Ethernet 0/1



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

□ DHCP

□ PPPoE Dial-Pool-Number:

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0

MTU

MTU 1500

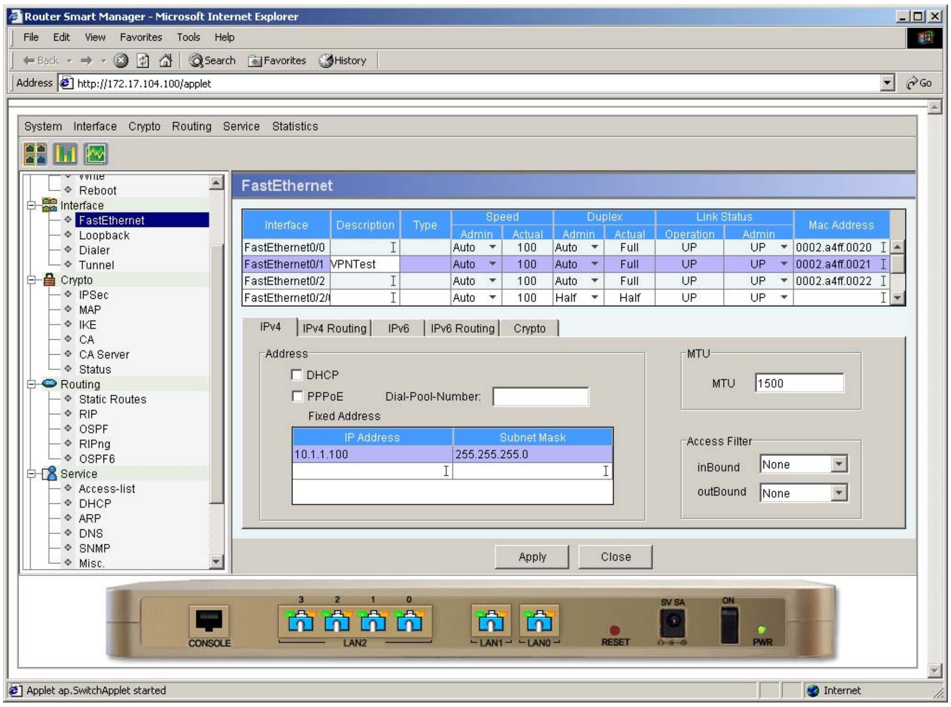
Access Filter

inBound None

outBound None

(Figure3-48) Select Fast Ethernet 0/1

Double click Description field. Input “VPNTest”.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

□ DHCP

□ PPPoE Dial-Pool-Number:

Fixed Address

IP Address	Subnet Mask
10.1.1.100	255.255.255.0

MTU

MTU 1500

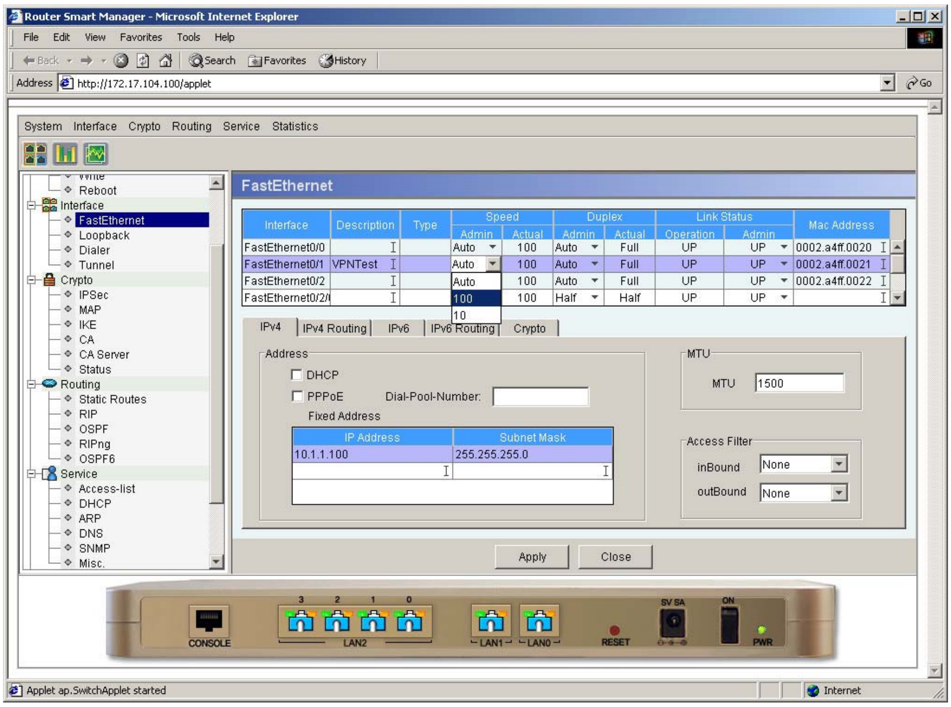
Access Filter

inBound None

outBound None

(Figure3-49) Input Fast Ethernet 0/1 Description

Select 100Mbps in Link Speed field.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			100	100	Half	Half	UP	UP	

Speed drop-down: Auto, 100, 10

Address
☐ DHCP
☐ PPPoE Dial-Pool-Number:
Fixed Address

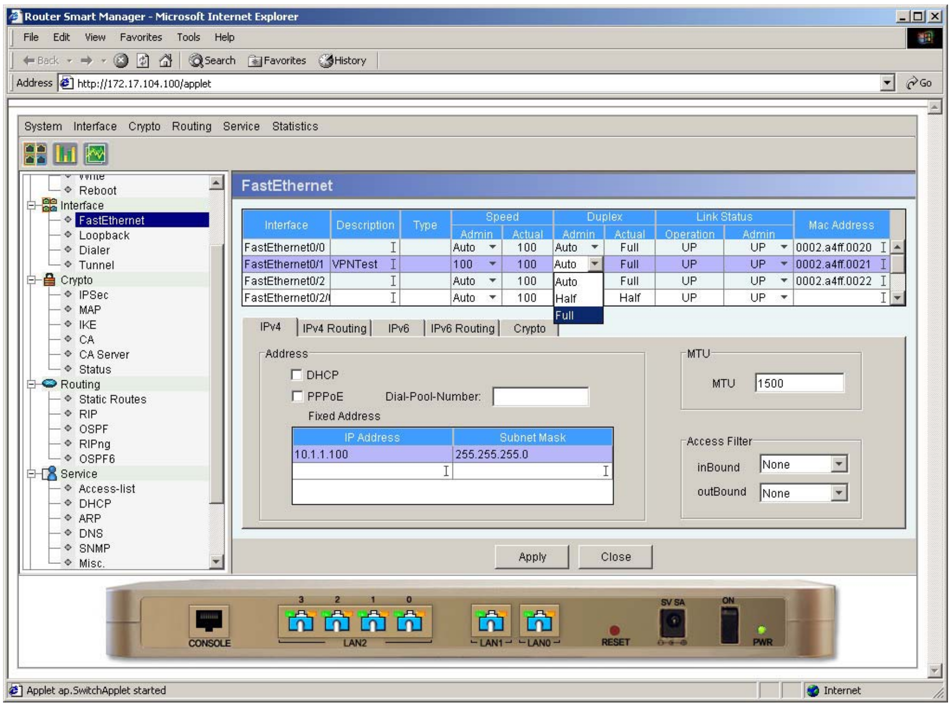
IP Address	Subnet Mask
10.1.1.100	255.255.255.0

MTU: 1500

Access Filter
inBound: None
outBound: None

(Figure3-50) Select Fast Ethernet 0/1 Link Speed

Select Full Duplex in Link Duplex field.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Duplex drop-down: Auto, Half, Full

Address
☐ DHCP
☐ PPPoE Dial-Pool-Number:
Fixed Address

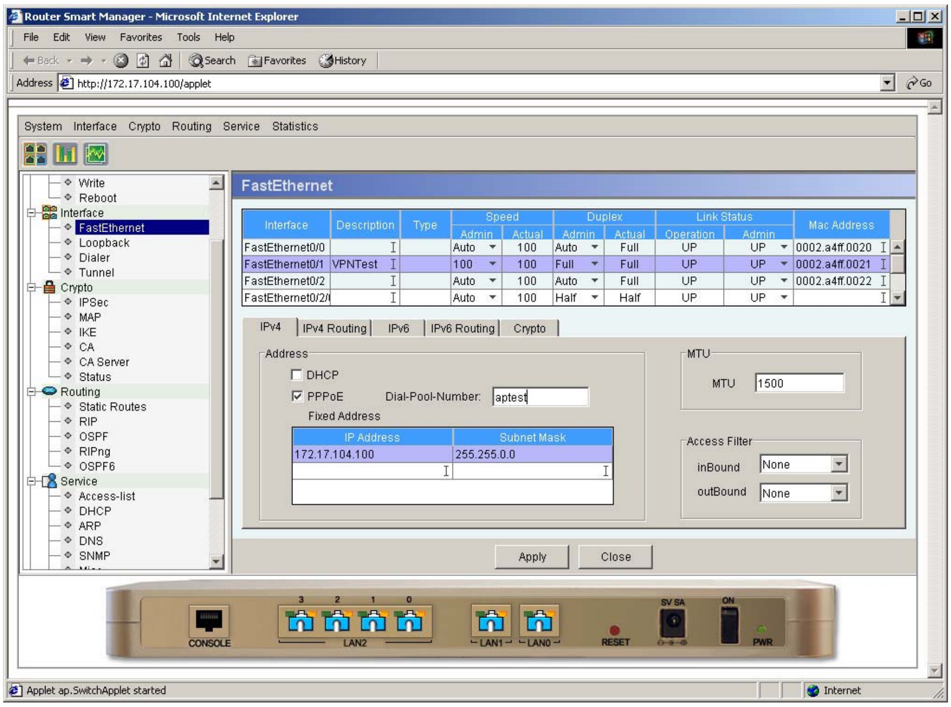
IP Address	Subnet Mask
10.1.1.100	255.255.255.0

MTU: 1500

Access Filter
inBound: None
outBound: None

(Figure3-51) Select Fast Ethernet 0/1 Link Duplex

Check PPPoE to use appropriate interface as PPPoE Client. Then enter Dial-Pool Number. In this Figure, input "aptest" for Dialer.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto

Address

□ DHCP

☑ PPPoE Dial-Pool-Number: aptest

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0

MTU

MTU 1500

Access Filter

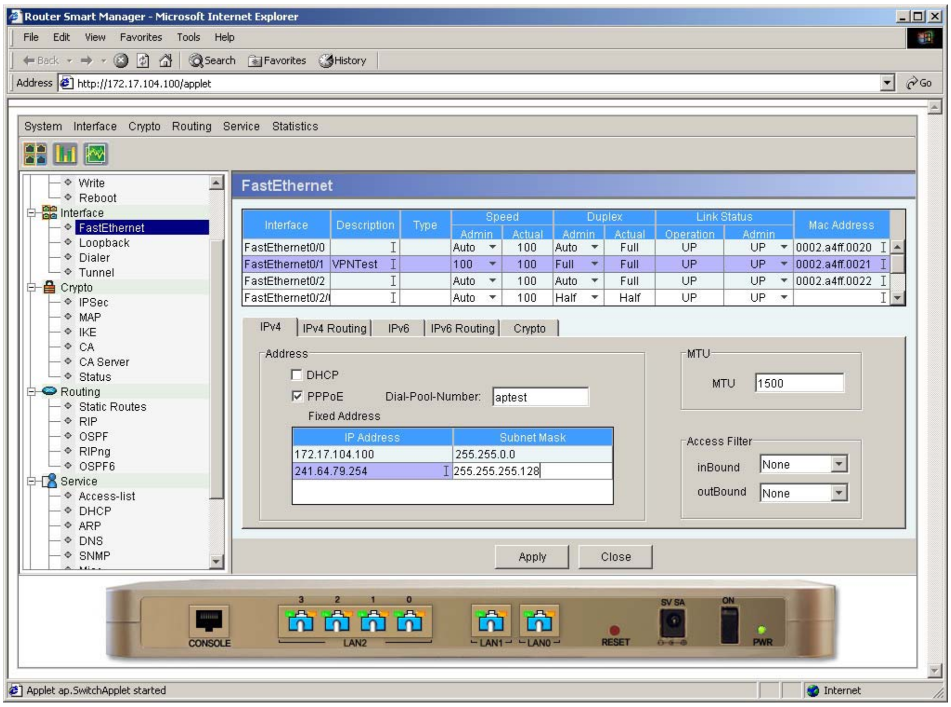
inBound None

outBound None

Apply Close

(Figure3-52) Input Fast Ethernet PPPoE Dialer

To add IP Address in the interface, input the IP Address in Fixed Address field.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto

Address

□ DHCP

☑ PPPoE Dial-Pool-Number: aptest

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0
241.64.79.254	255.255.255.128

MTU

MTU 1500

Access Filter

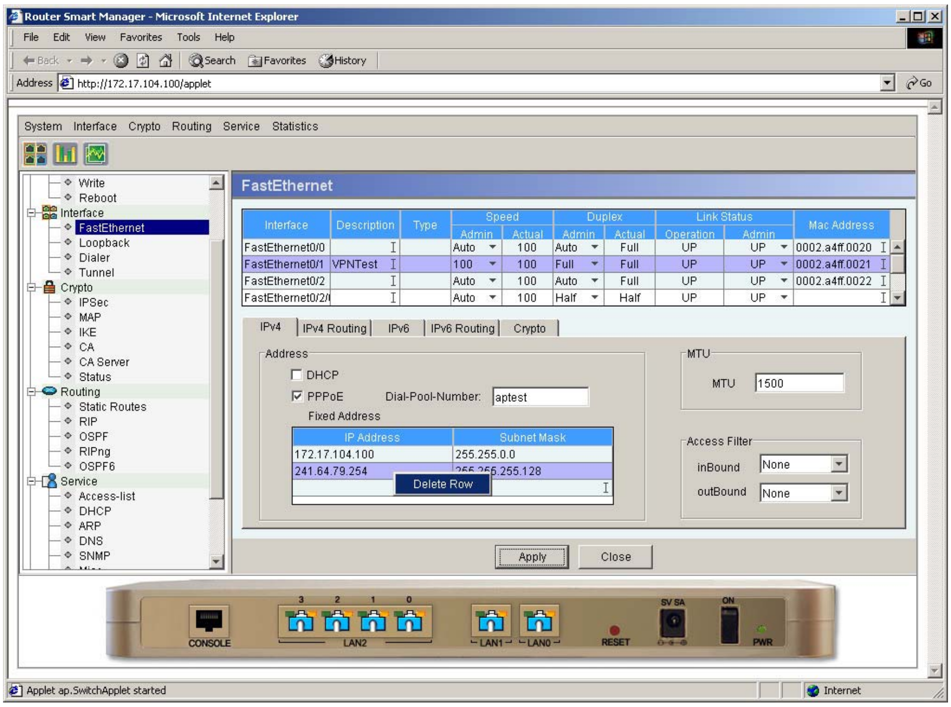
inBound None

outBound None

Apply Close

(Figure3-53) Input Fast Ethernet Fixed IP Address

To delete IP Address in interface, Select "Delete Row" by clicking right side of mouse then, delete IP Address.



Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto

Address

☐ DHCP

☑ PPPoE Dial-Pool-Number: aptest

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0
241.64.79.254	255.255.255.128

Delete Row

MTU

MTU 1500

Access Filter

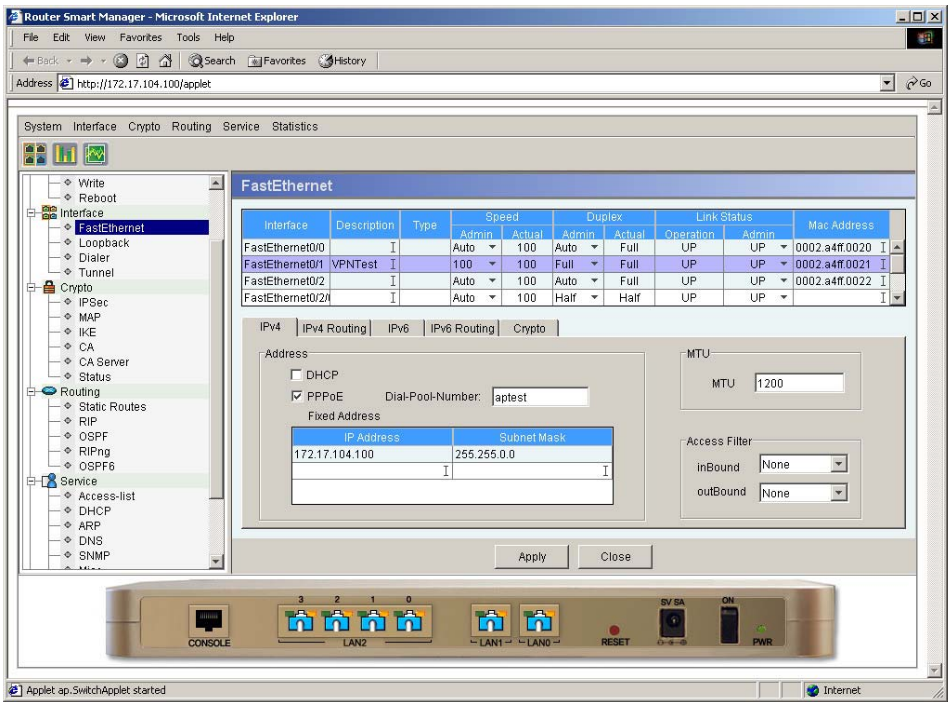
inBound None

outBound None

Apply Close

(Figure3-54) Input Fast Ethernet Fixed IP Address

Change the value of MTU(Maximum Transmission Unit) to 1024.



Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto

Address

☐ DHCP

☑ PPPoE Dial-Pool-Number: aptest

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0

MTU

MTU 1200

Access Filter

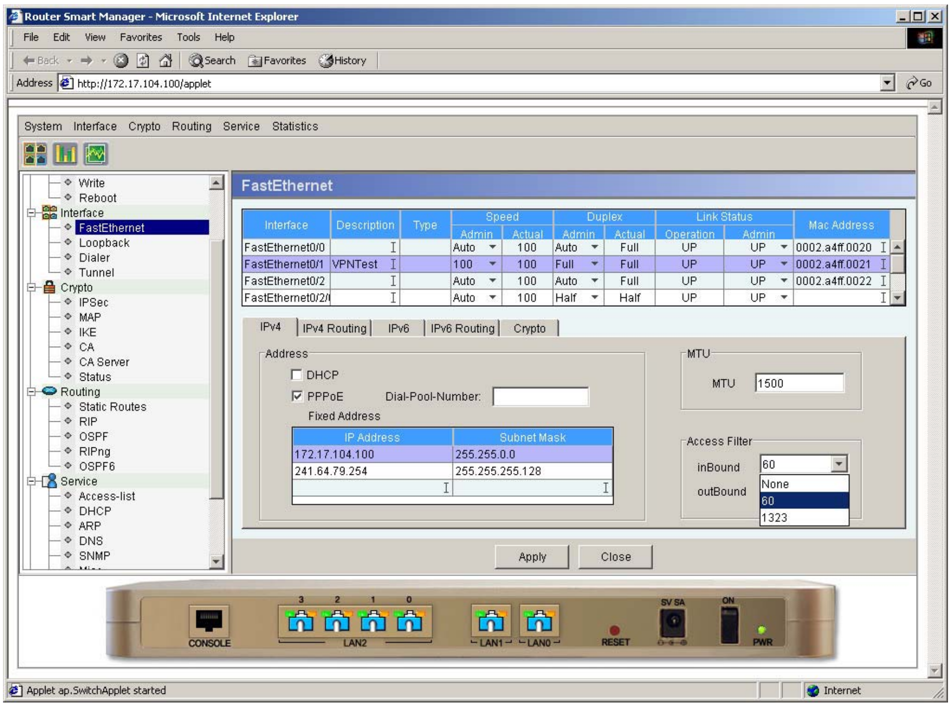
inBound None

outBound None

Apply Close

(Figure3-55) Change Fast Ethernet MTU

Select "Access-List 60" for Access Filter Inbound.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

☐ DHCP

☑ PPPoE Dial-Pool-Number:

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0
241.64.79.254	255.255.255.128

MTU

MTU 1500

Access Filter

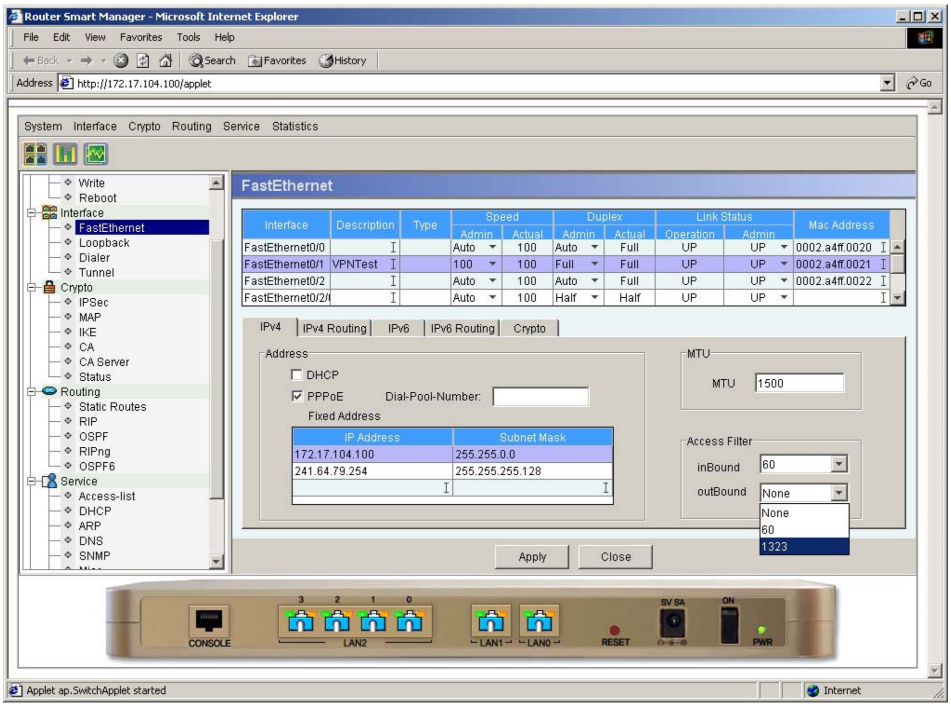
inBound 60

outBound

None
60
1323

(Figure3-56) Select Fast Ethernet Access Filter Inbound

Select "Access-List 1323" for Access Filter Outbound.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

☐ DHCP

☑ PPPoE Dial-Pool-Number:

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0
241.64.79.254	255.255.255.128

MTU

MTU 1500

Access Filter

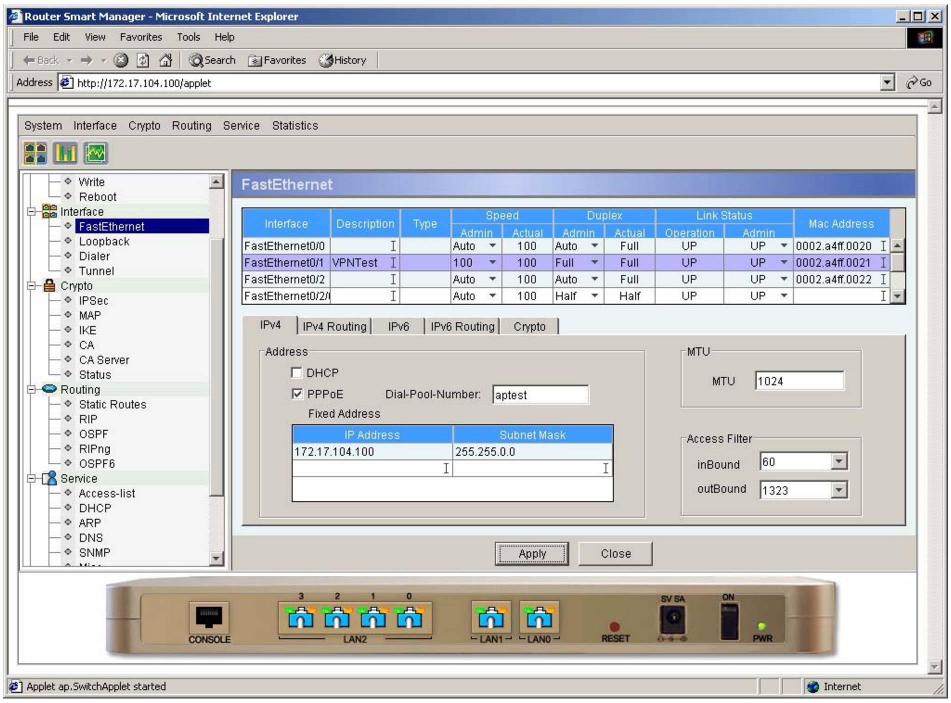
inBound 60

outBound None

None
60
1323

(Figure3-57) Select Fast Ethernet Access Filter Outbound

Figure 3-59 will be shown by clicking “Apply”.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
FastEthernet
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
3 2 1 0
SV SA
ON
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

☐ DHCP

☑ PPPoE Dial-Pool-Number: aptest

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0

MTU

MTU 1024

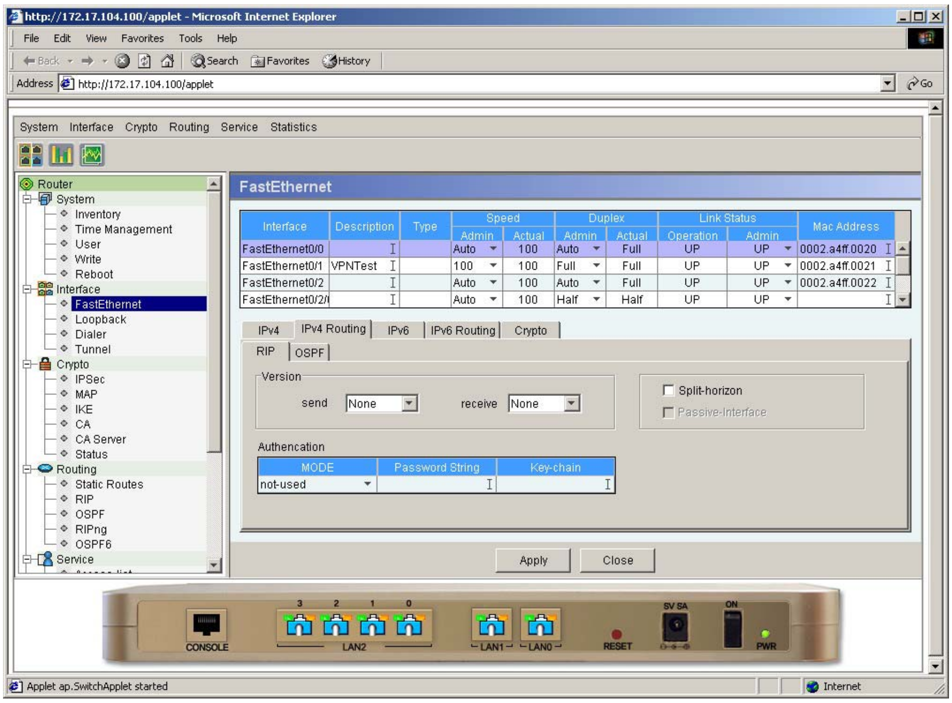
Access Filter

inBound 60

outBound 1323

(Figure3-58) Checking Fast Ethernet IPv4 value

Figure 3-60 shows how to change configuration settings for Fast Ethernet 0/1 RIP. Select Fast Ethernet 0/1 -> select IPv4 Routing RIP.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Version: send None, receive None

☐ Split-horizon

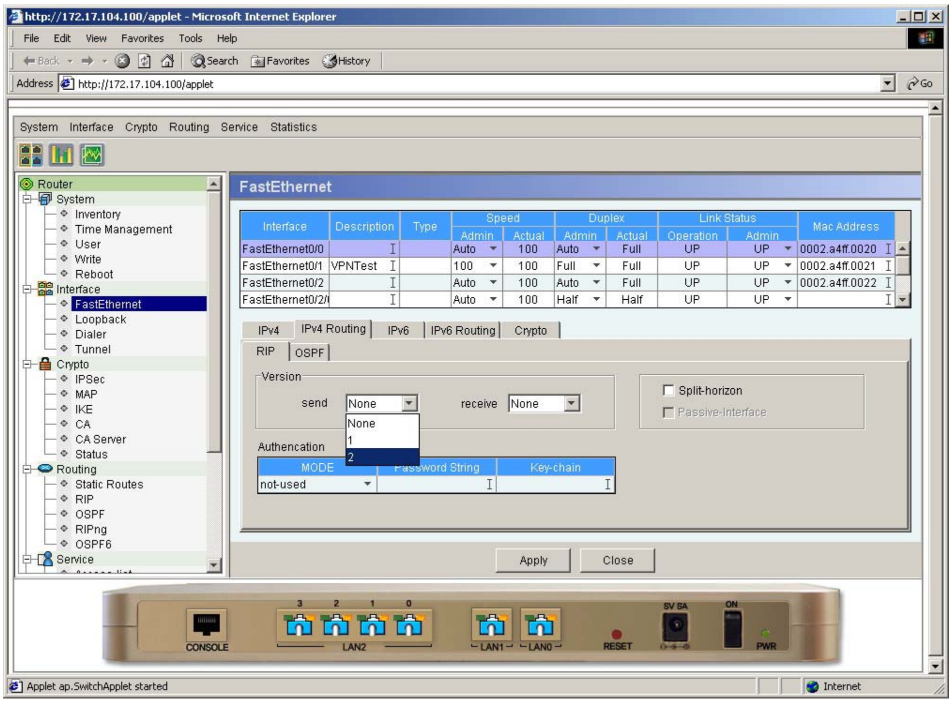
☐ Passive-Interface

Authencation

MODE	Password String	Key-chain
not-used		

(Figure3-59) Select Fast Ethernet IPv4 Routing RIP

Select Version of RIP Routing Table to send.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Version: send None (options: None, 1, 2), receive None

☐ Split-horizon

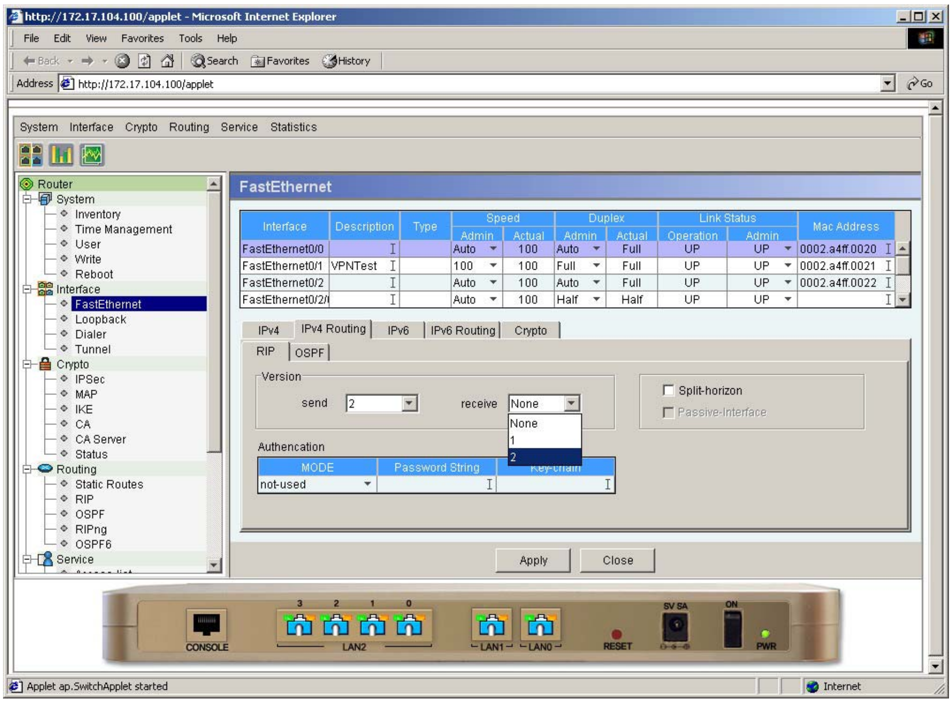
☐ Passive-Interface

Authencation

MODE	Password String	Key-chain
not-used		

(Figure3-60) Select Fast Ethernet RIP Send Version

Select Version of RIP Routing Table to receive.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Version

send 2 receive None (None / 1 / 2)

□ Split-horizon

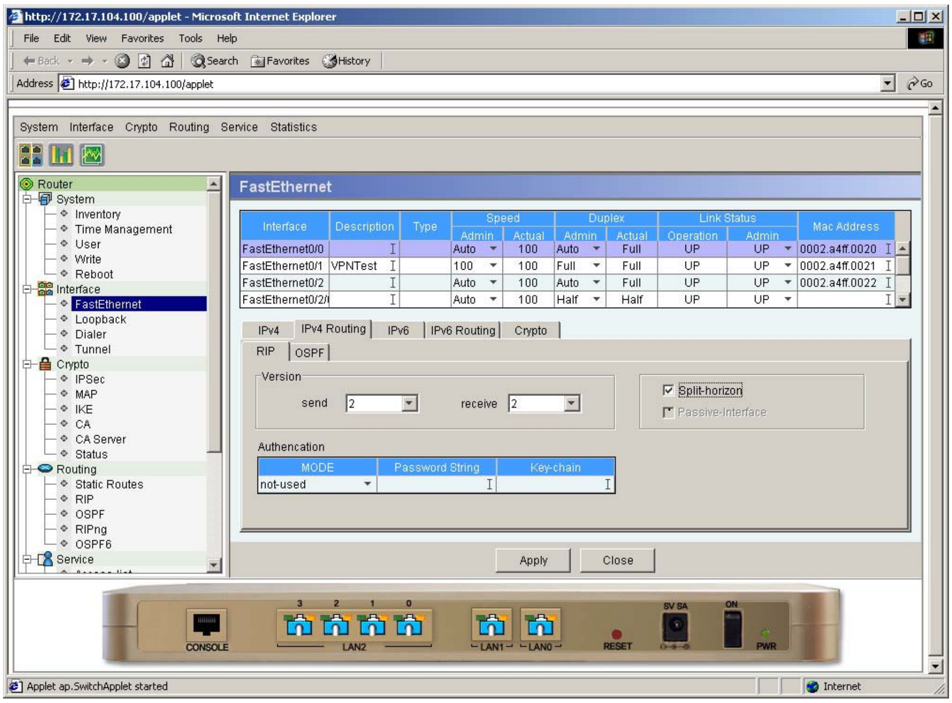
□ Passive-Interface

Authencation

MODE	Password String	Key-chain
not-used		

(Figure3-61) Select Fast Ethernet RIP Receive Version

Check Split-Horizon to prevent Loop phenomenon when RIP Routing.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Version

send 2 receive 2

☑ Split-horizon

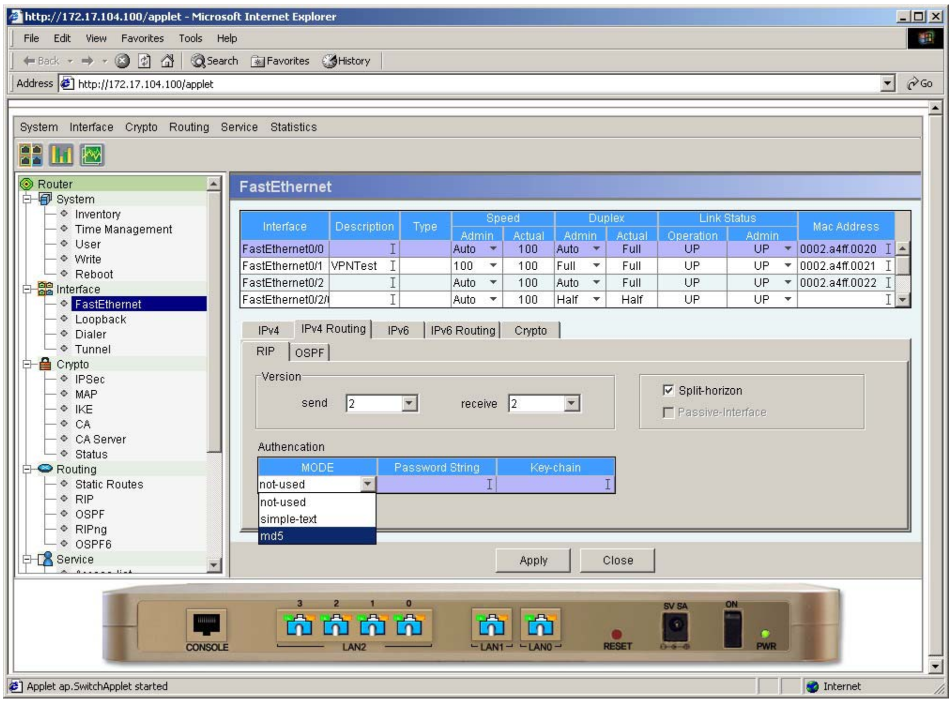
□ Passive-Interface

Authencation

MODE	Password String	Key-chain
not-used		

(Figure3-62) Select Fast Ethernet RIP Split-Horizon

Select MD5 for authentication when exchange Routing Table.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
FastEthernet
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
RIP OSPF
Apply
Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Version

send 2 receive 2

☑ Split-horizon

☐ Passive-Interface

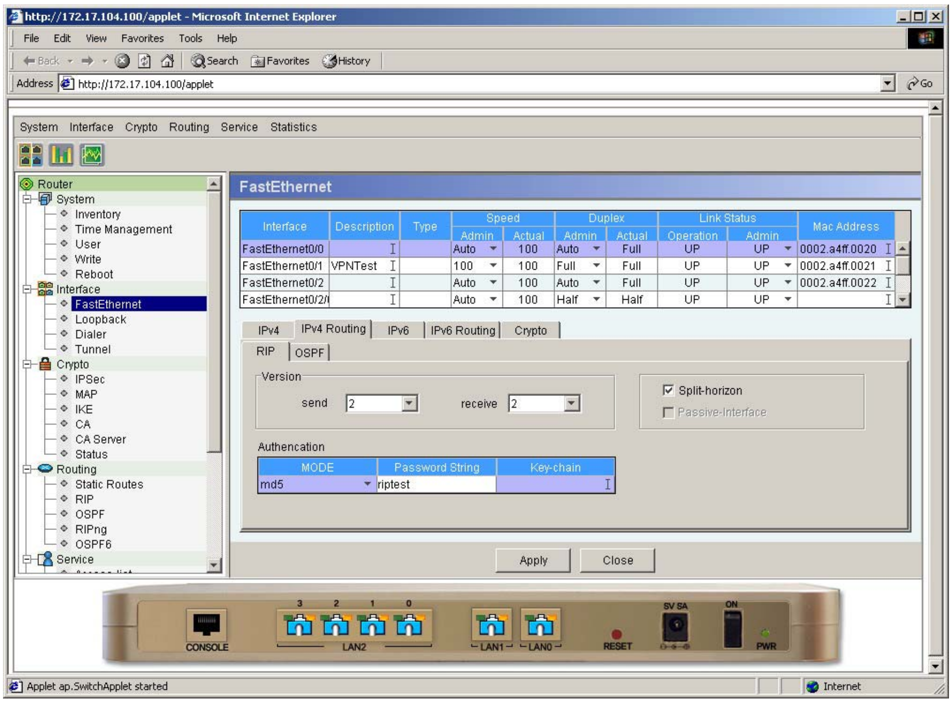
Authencation

MODE	Password String	Key-chain
not-used		

not-used
simple-text
md5

(Figure3-63) Select RIP Authentication Method

Input “riptest” for MD5 Password.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
FastEthernet
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
RIP OSPF
Apply
Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Version

send 2 receive 2

☑ Split-horizon

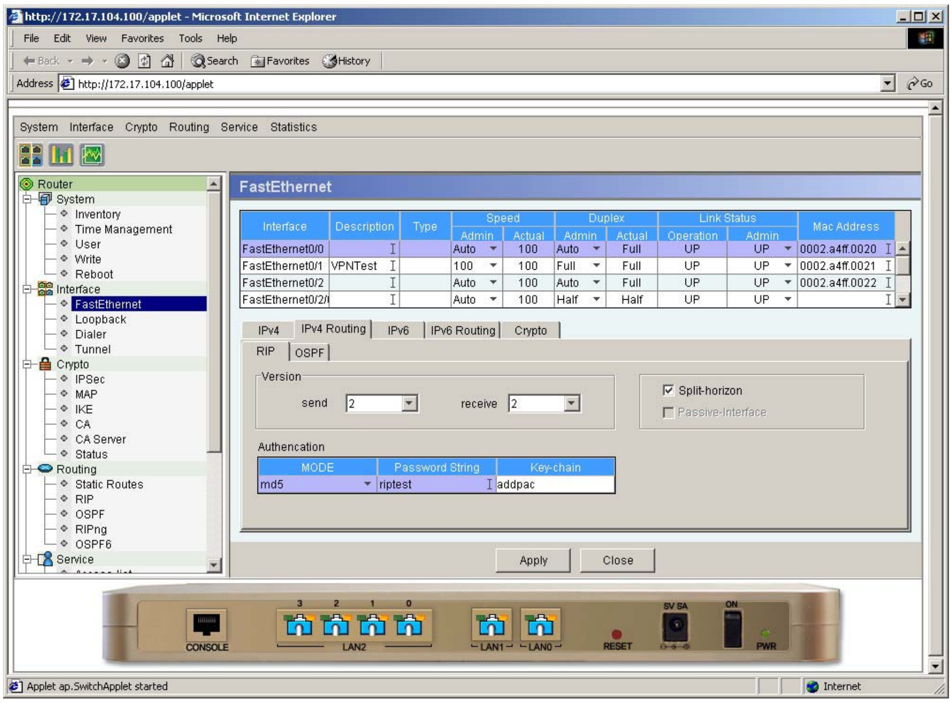
☐ Passive-Interface

Authencation

MODE	Password String	Key-chain
md5	riptest	

(Figure3-64) Input MD5 Password String

Input the key value “addpac” when using Password as MD5 algorithm.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Version

send 2 receive 2

☑ Split-horizon

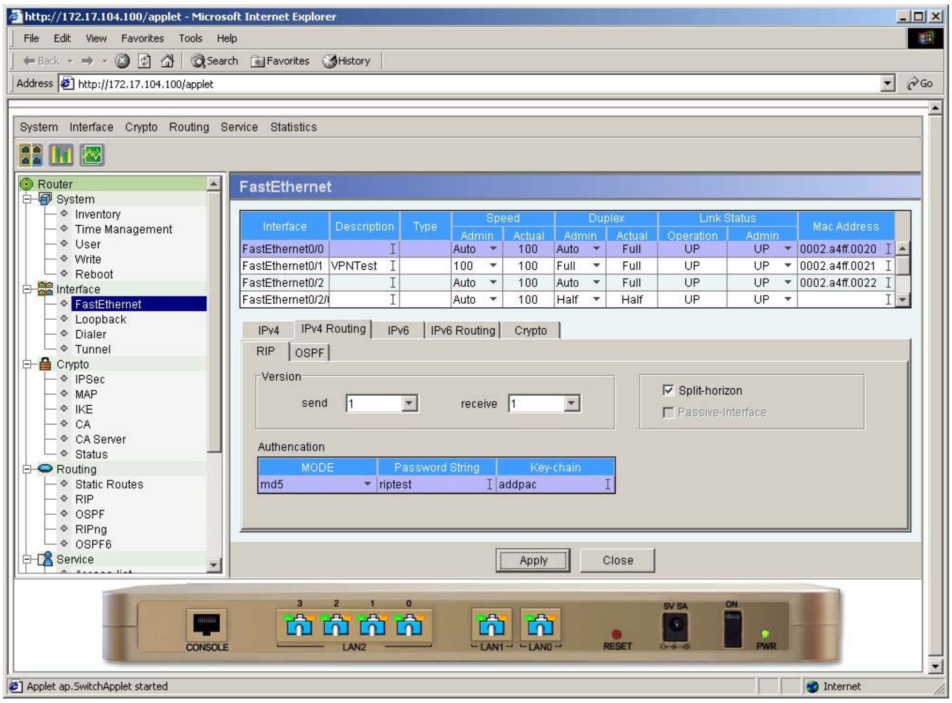
□ Passive-Interface

Authencation

MODE	Password String	Key-chain
md5	riptest	addpac

(Figure3-65) Input MD5 KeyChain

Click “Apply” to see



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Version

send 1 receive 1

☑ Split-horizon

□ Passive-Interface

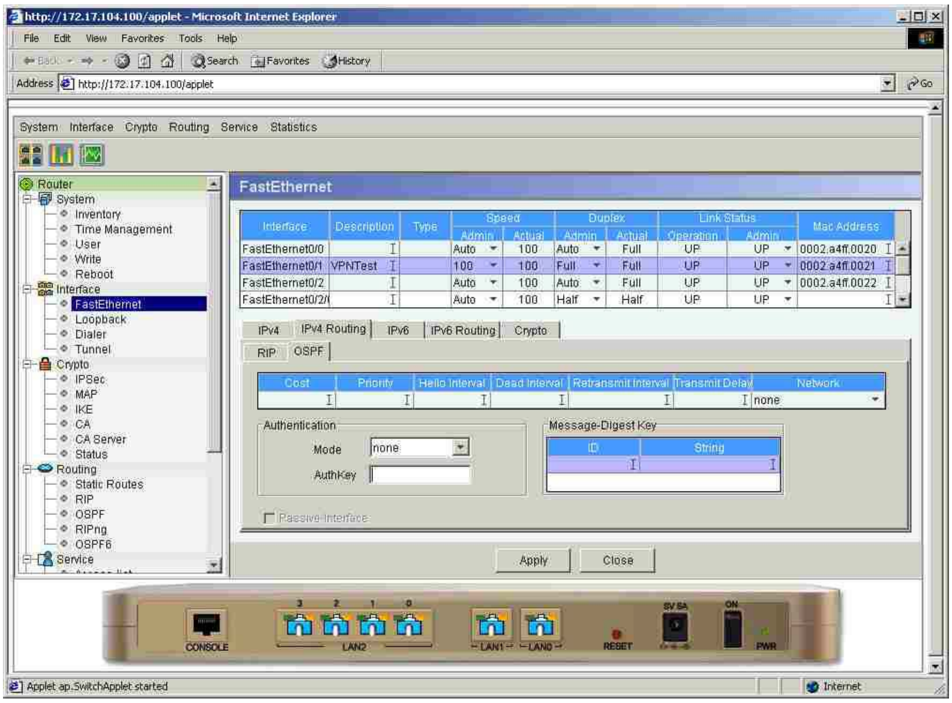
Authencation

MODE	Password String	Key-chain
md5	riptest	addpac

(Figure3-66) Check RIP configuration setting

Figure 3-68 shows how to change configuration settings for OSPF of Fast Ethernet 0/1.

Select FastEthernet 0/1-> Select OSPF on IPv4 Routing.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
						none

Authentication
Mode none
AuthKey

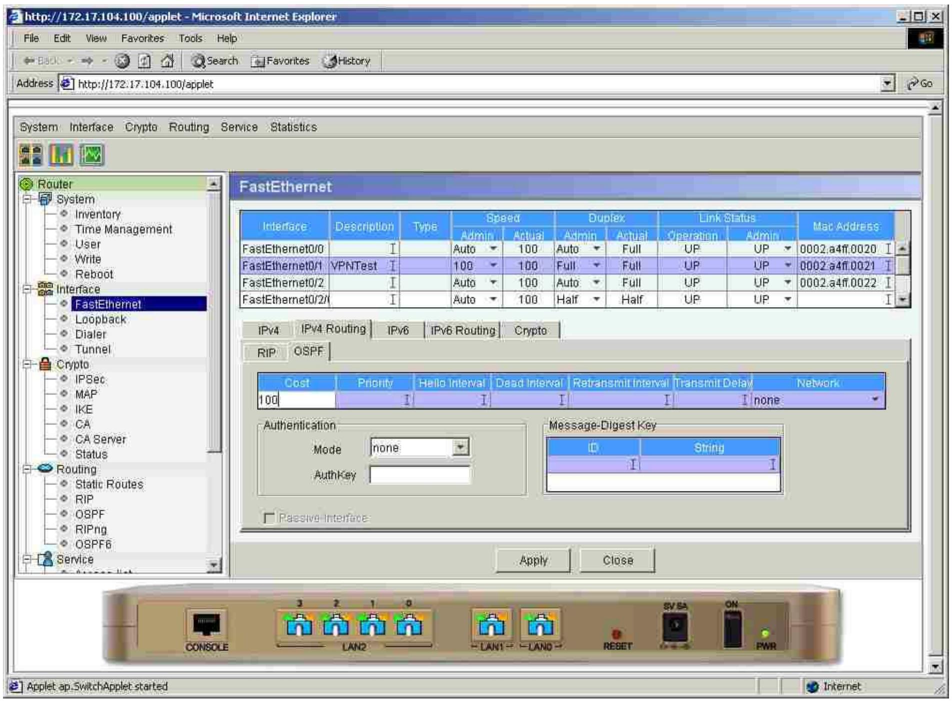
Message-Digest Key

ID	String

□ Passive-Interface

(Figure3-67) Select Fast Ethernet IPv4 Routing OSPF

Input Cost “100” of the Interface.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
100						none

Authentication
Mode none
AuthKey

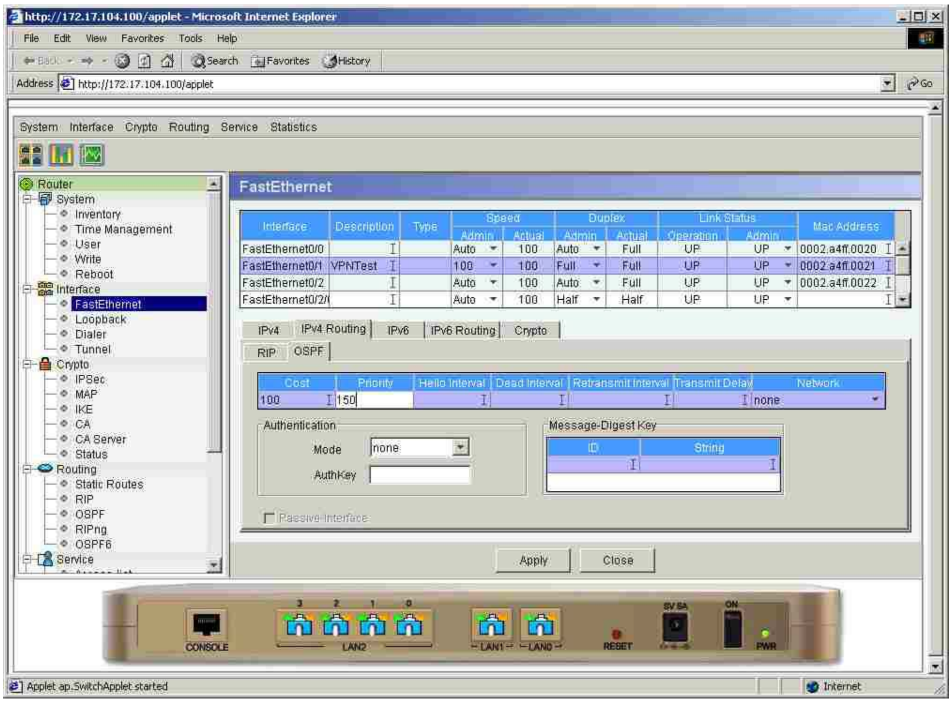
Message-Digest Key

ID	String

□ Passive-Interface

(Figure3-68) Input OSPF Interface Cost

Input Priority “150” to decide “Designed Router”



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
100	150					none

Authentication

Mode: none

AuthKey:

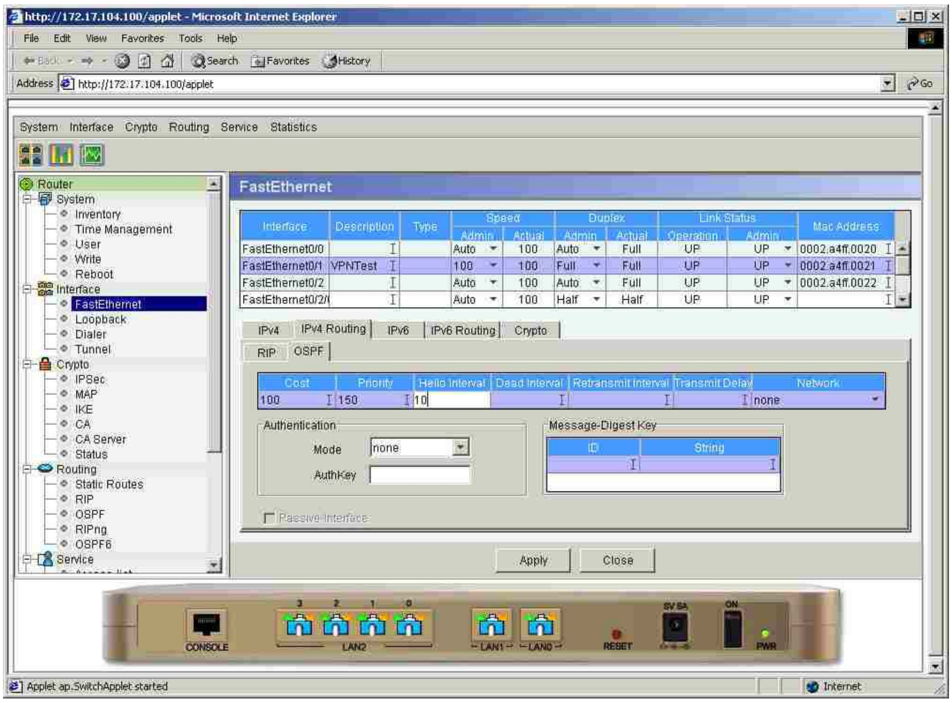
Message-Digest Key

ID	String

□ Passive-Interface

(Figure3-69) Input OSPF Interface Priority

Input “10” for OSPF Hello Packet transfer interval.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
100	150	10				none

Authentication

Mode: none

AuthKey:

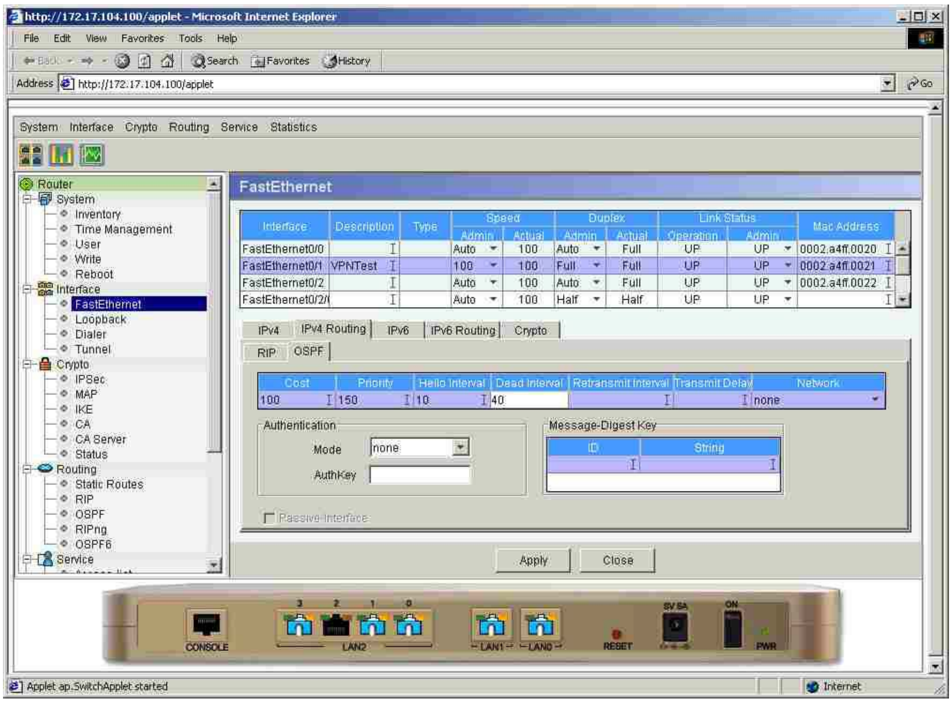
Message-Digest Key

ID	String

□ Passive-Interface

(Figure3-70) Input OSPF Hello Interval

Input “40” for Dead Interval of OSPF. Dead Interval is usually set 4 times more than Hello Interval.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
RIP OSPF
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
100	150	10	40			none

Authentication

Mode: none

AuthKey:

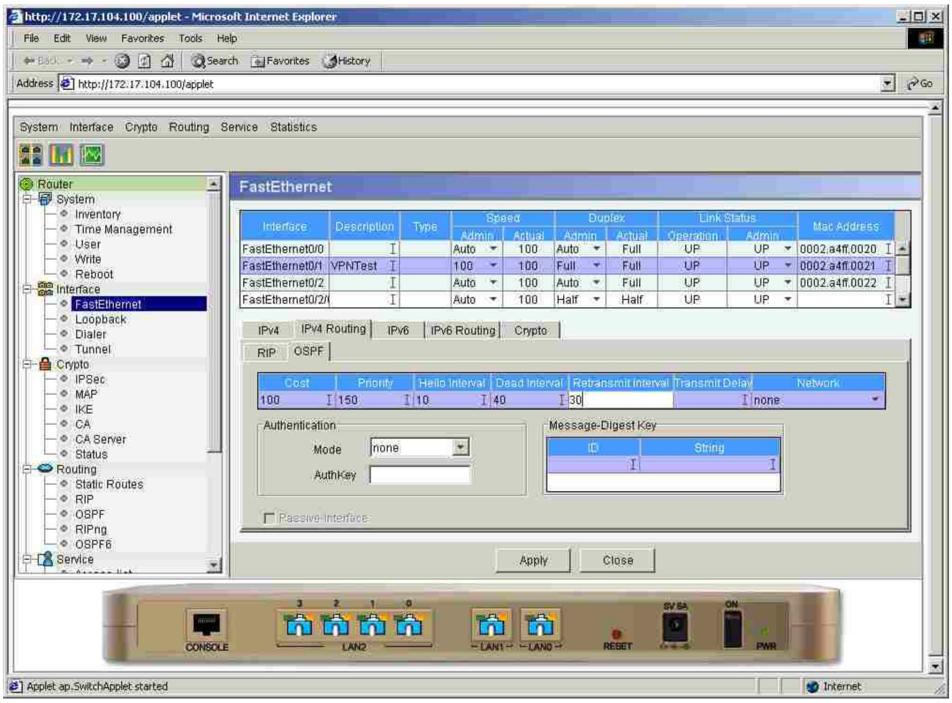
Message-Digest Key

ID	String

□ Passive-Interface

(Figure3-71) Input OSPF Dead Interval

Input “30” value for Retransmit Interval of Advertisement Packet.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
RIP OSPF
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
100	150	10	40	30		none

Authentication

Mode: none

AuthKey:

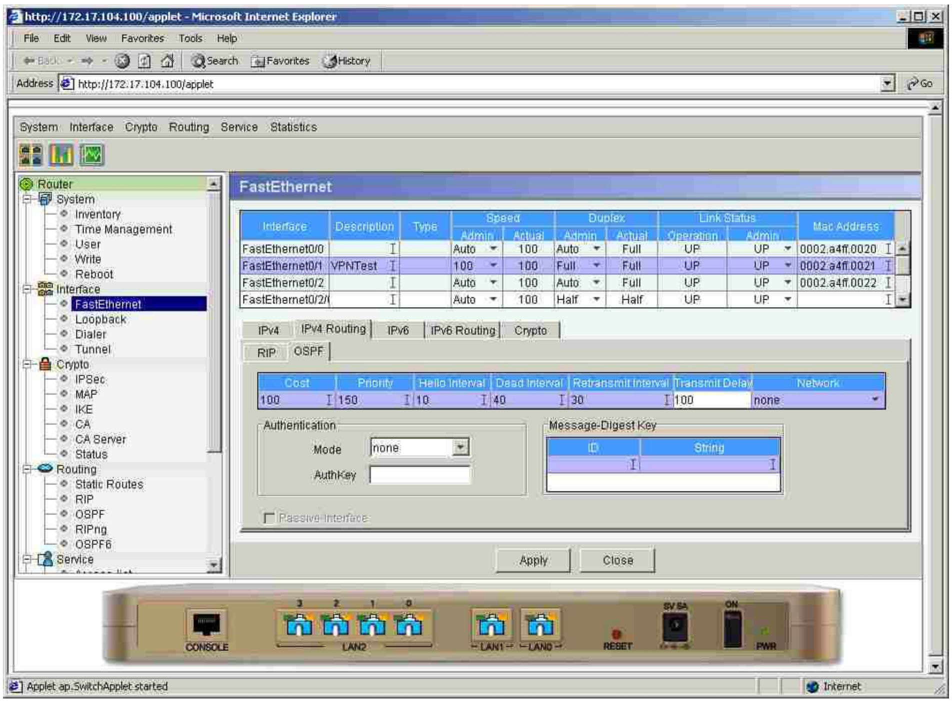
Message-Digest Key

ID	String

□ Passive-Interface

(Figure3-72) Input OSPF Retransmit Interval

Input “100” for Transmit Delay of Link State Packet.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto

RIP | OSPF

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
100	150	10	40	30	100	none

Authentication
Mode: none
AuthKey:

Message-Digest Key

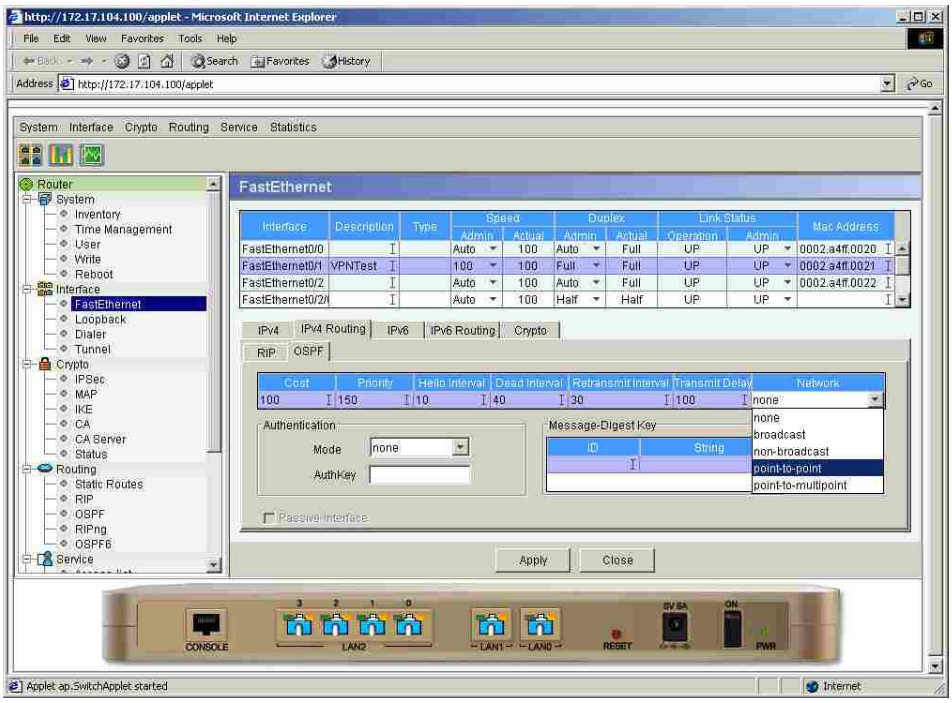
ID	String

□ Passive Interface

Apply Close

(Figure3-73) Input OSPF Transmit Delay

Select Network Type of Interface – “Point-to-Point”.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto

RIP | OSPF

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
100	150	10	40	30	100	none

Network: none / broadcast / non-broadcast / point-to-point (selected) / point-to-multipoint

Authentication
Mode: none
AuthKey:

Message-Digest Key

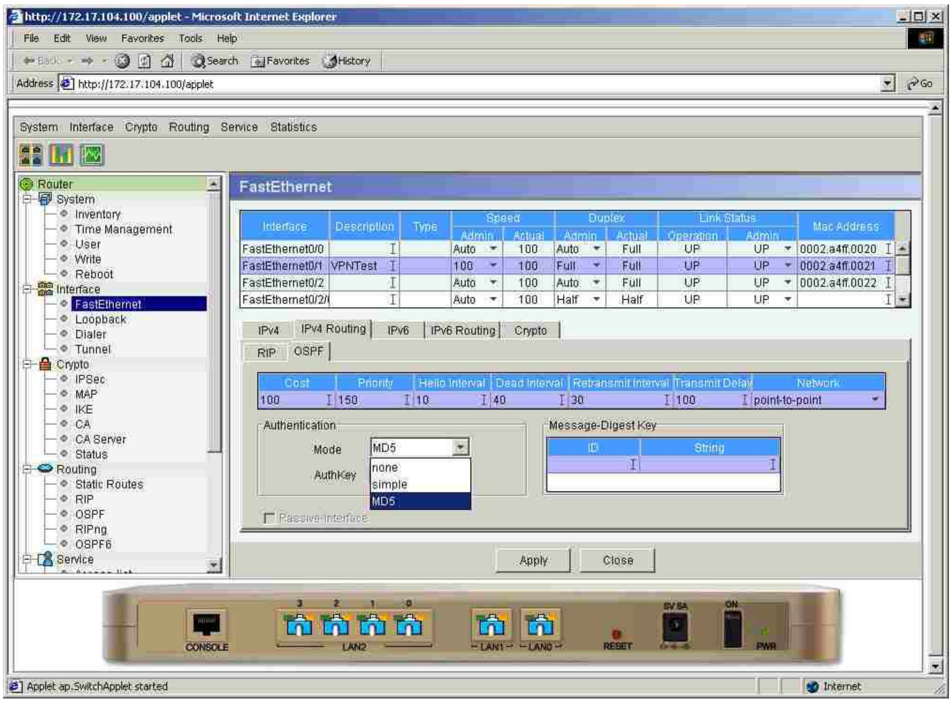
ID	String

□ Passive Interface

Apply Close

(Figure3-74) Select OSPF Network Type

Select Authentication method for exchanging Routing Table. It is “MD5” in below Figure.



FastEthernet

Interface	Description	Type	Speed Admin	Speed Actual	Duplex Admin	Duplex Actual	Link Status Operation	Link Status Admin	Mac Address
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
100	150	10	40	30	100	point-to-point

Authentication

Mode: MD5 (none / simple / MD5)

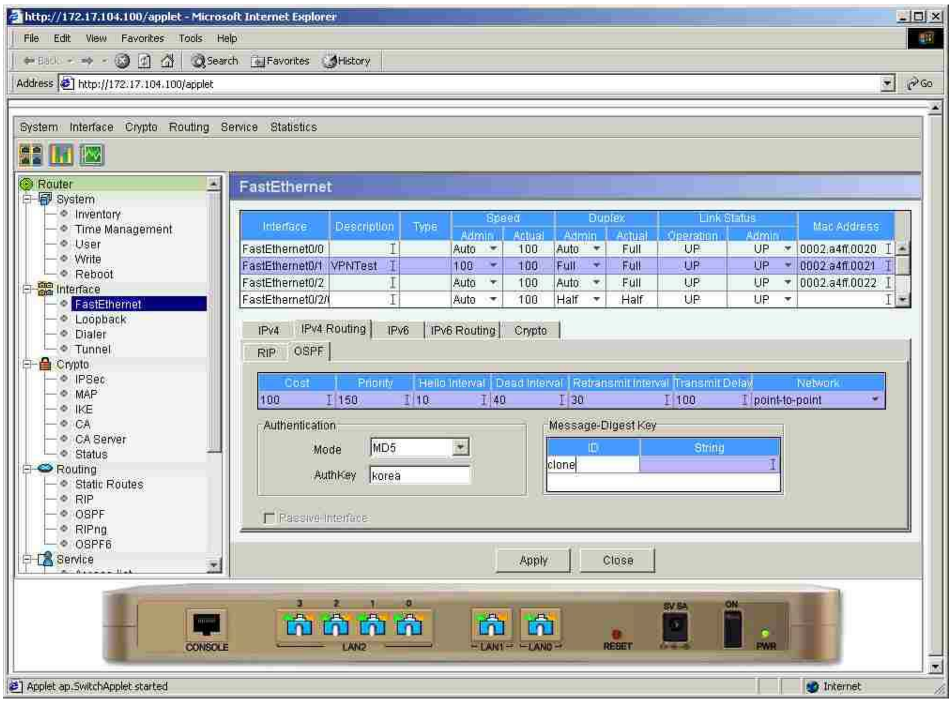
AuthKey:

Message-Digest Key

ID	String

(Figure3-75) Select OSPF Authentication Method

Input ID value for MD5 authentication. Auth-Key is used for SimpleText authentication.



FastEthernet

Interface	Description	Type	Speed Admin	Speed Actual	Duplex Admin	Duplex Actual	Link Status Operation	Link Status Admin	Mac Address
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
100	150	10	40	30	100	point-to-point

Authentication

Mode: MD5

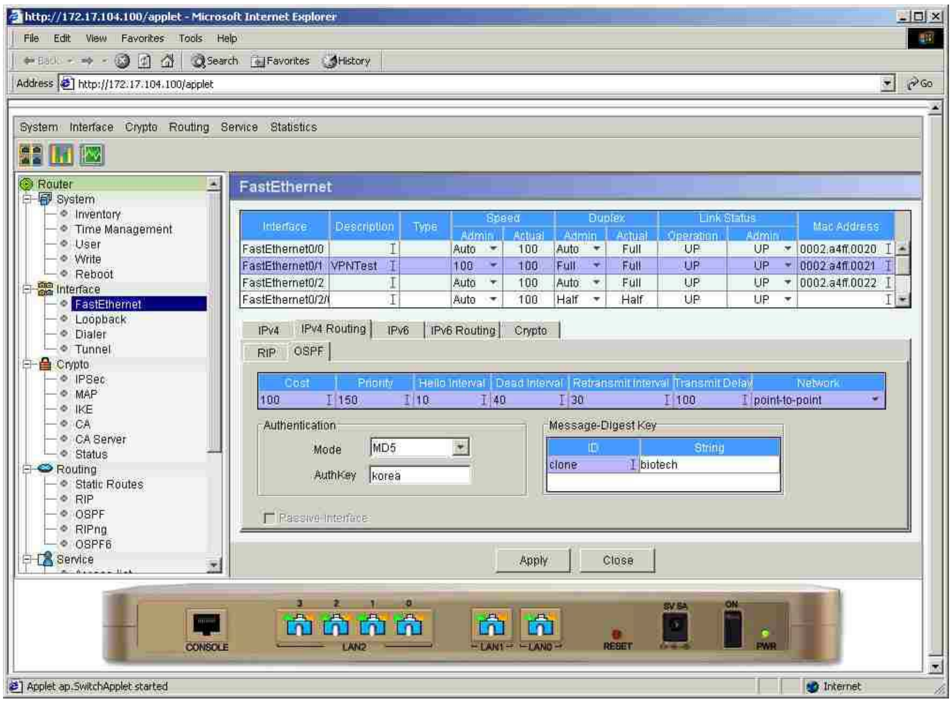
AuthKey: korea

Message-Digest Key

ID	String
clone	

(Figure3-76) Input Message Digest Key ID

Input the password for MD5 authentication in the String field.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
FastEthernet
IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto
RIP | OSPF
Apply
Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
100	150	10	40	30	100	point-to-point

Authentication

Mode: MD5

AuthKey: korea

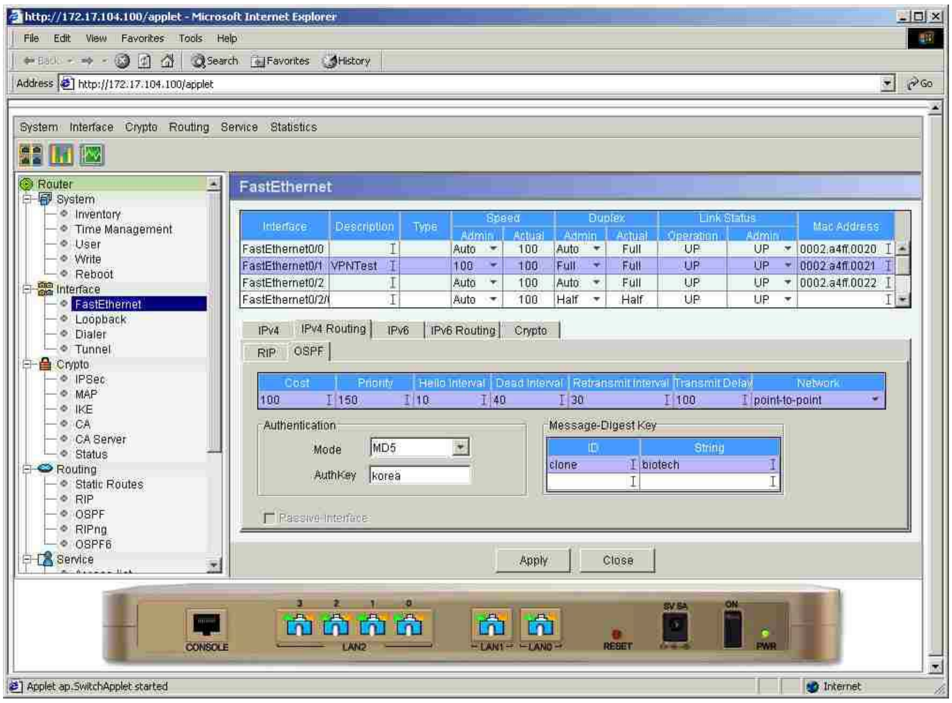
Message-Digest Key

ID	String
clone	biotech

☐ Passive-Interface

(Figure3-77) Input Message Digest Password

Click “Apply” to verify.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
FastEthernet
IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto
RIP | OSPF
Apply
Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interval	Transmit Delay	Network
100	150	10	40	30	100	point-to-point

Authentication

Mode: MD5

AuthKey: korea

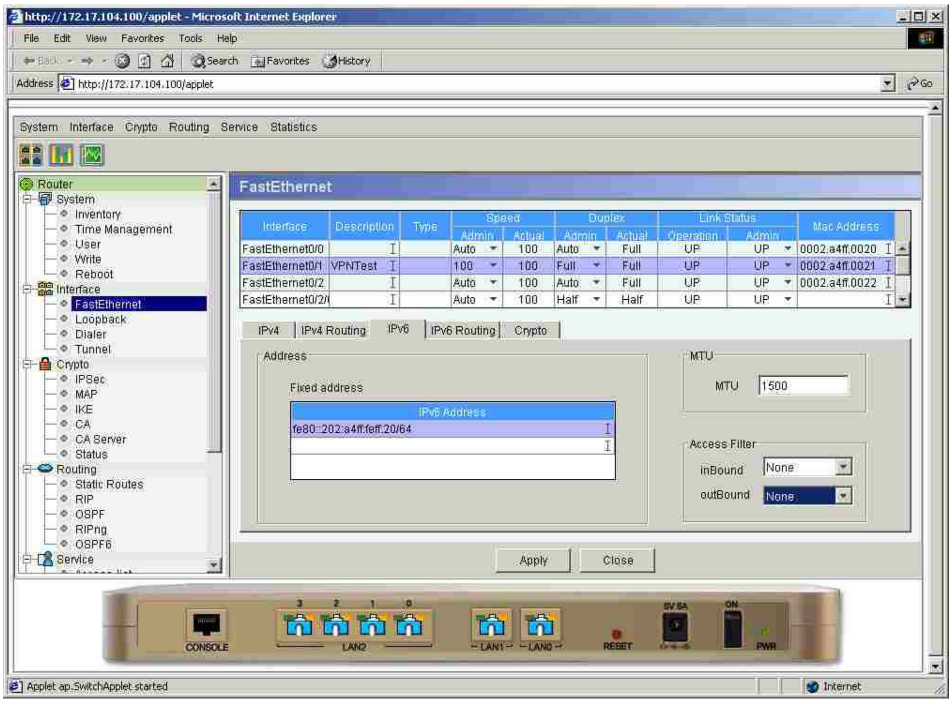
Message-Digest Key

ID	String
clone	biotech

☐ Passive-Interface

(Figure3-78) OSPF configuration setting verify

Figure 3-80 shows how to input IPv6 Address on Fast Ethernet 0/1.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

Fixed address

IPv6 Address
fe80::202:a4ff:feff:20/64

MTU: 1500

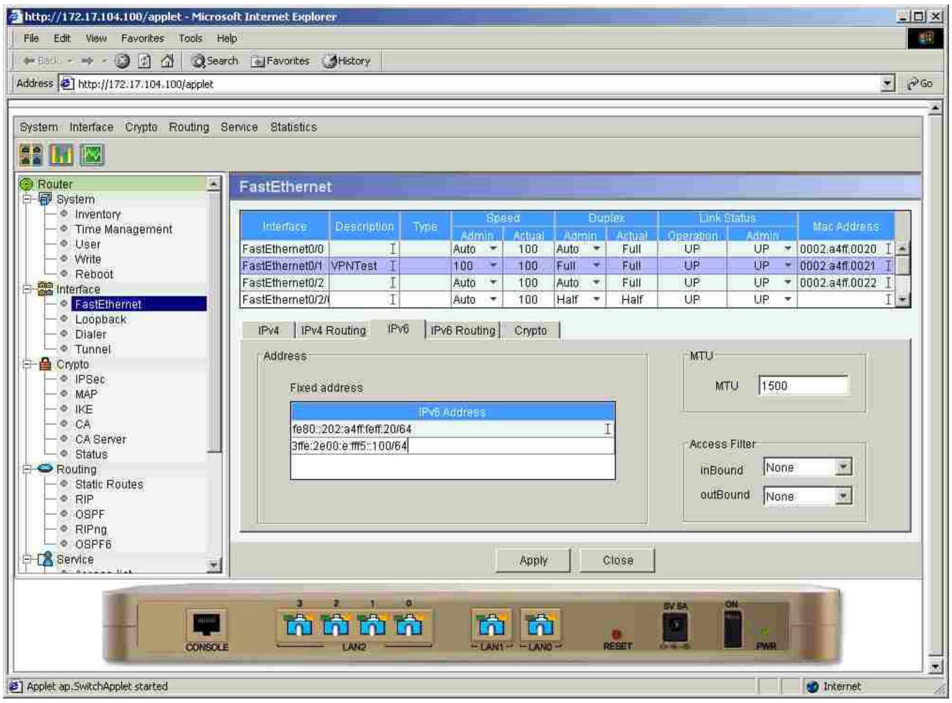
Access Filter

inBound: None

outBound: None

(Figure3-79) Select Fast Ethernet IPv6

Input the new IPv6 Address "3ffe:2e00:e:fff5::100/64".



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

Fixed address

IPv6 Address
fe80::202:a4ff:feff:20/64
3ffe:2e00:e:fff5::100/64

MTU: 1500

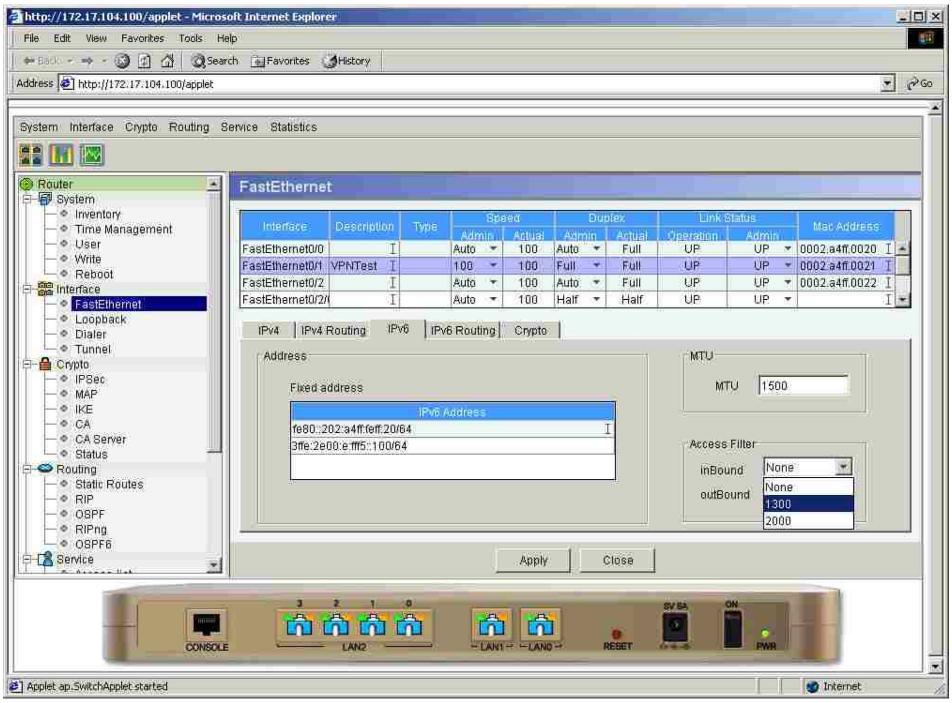
Access Filter

inBound: None

outBound: None

(Figure3-80) Input IPv6 Address

Select “Access-List 1300” in Access Filter Inbound.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

Fixed address

IPv6 Address
fe80::202:a4ff:feff:20/64
3ffe:2e00:e:fff5::100/64

MTU

MTU 1500

Access Filter

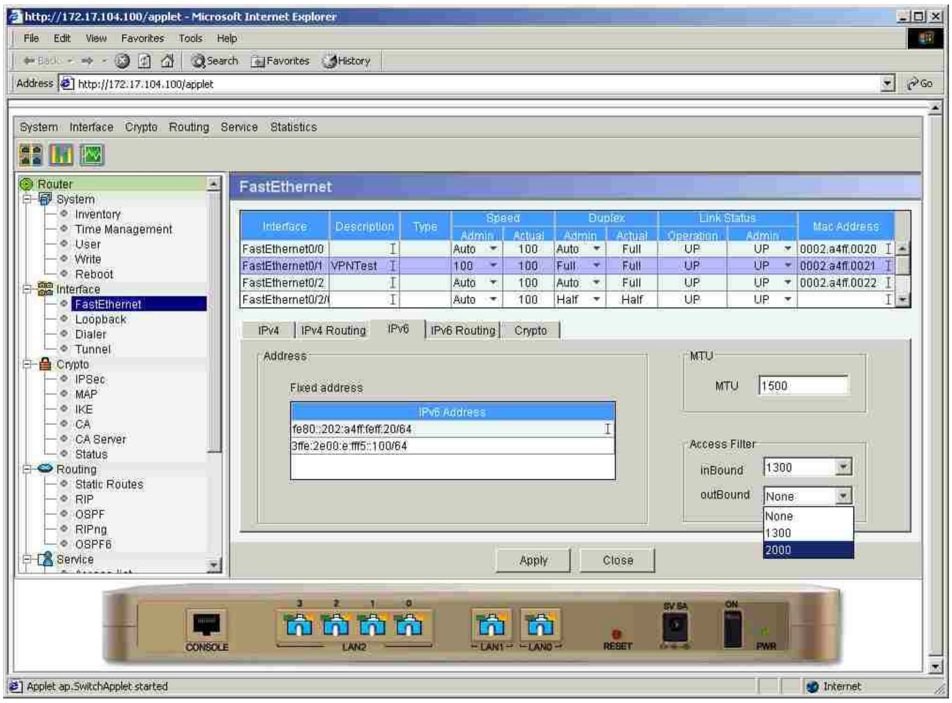
inBound None

outBound

None
1300
2000

(Figure3-81) Select IPv6 Access Filter Inbound

Select “Access-List 2000” in Access Filter outbound Access Filter.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

Fixed address

IPv6 Address
fe80::202:a4ff:feff:20/64
3ffe:2e00:e:fff5::100/64

MTU

MTU 1500

Access Filter

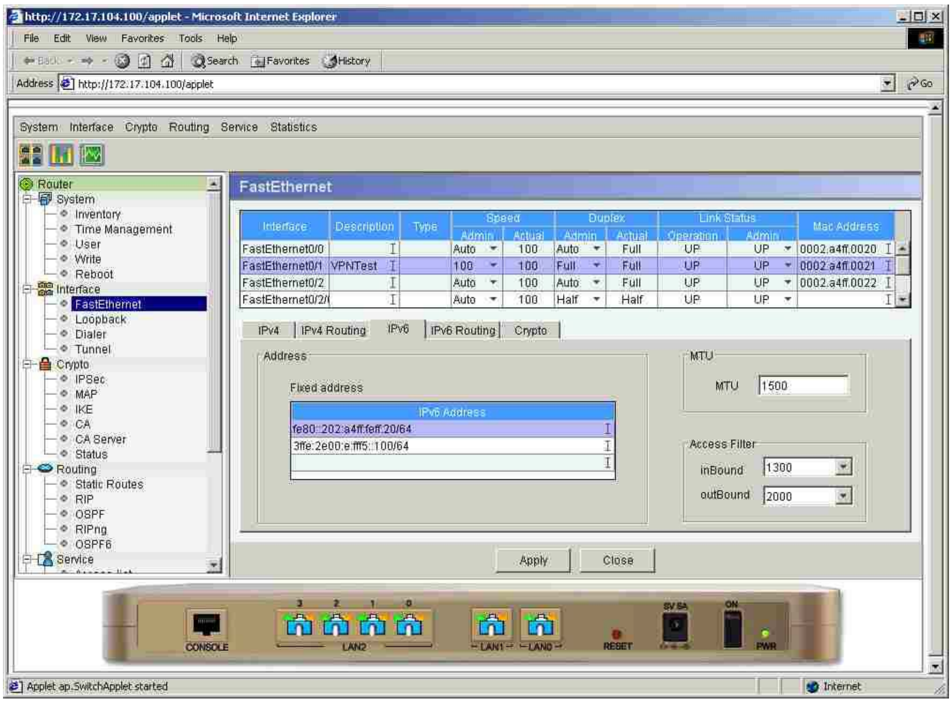
inBound 1300

outBound None

None
1300
2000

(Figure3-82) Select IPv6 Access Filter Outbound

Click "Apply" to verify



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

Fixed address

IPv6 Address
fe80::202:a4ff:feff:20/64
3ffe:2e00:e:fff5::100/64

MTU

MTU 1500

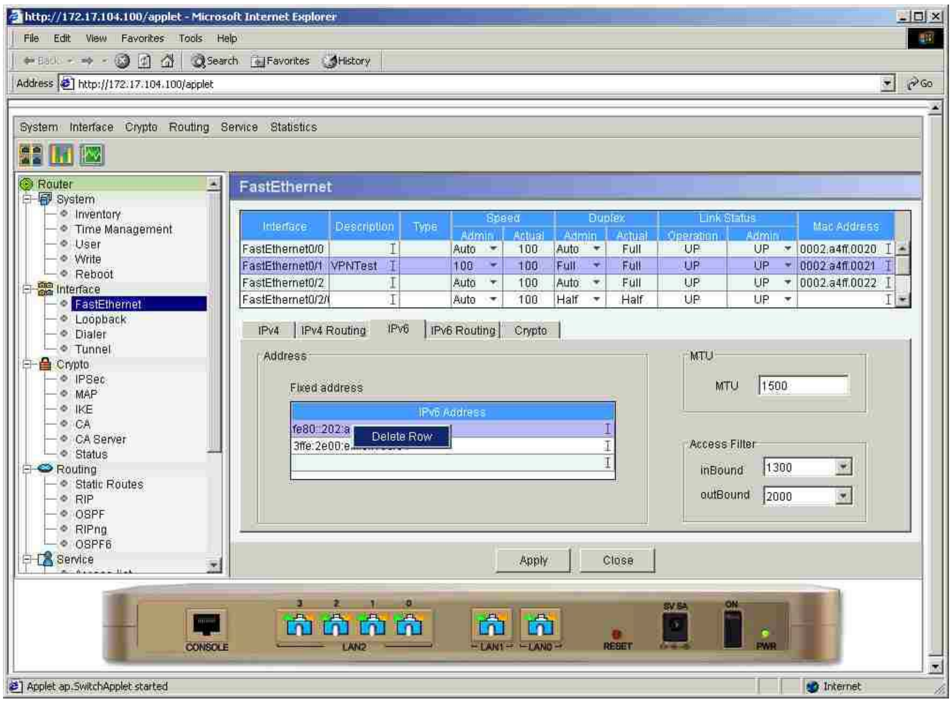
Access Filter

inBound 1300

outBound 2000

(Figure3-83) Adding IPv6 Address & Access Filter verify

To delete IPv6 Address, Select IPv6 Address-> Select "Delete Row" by clicking right side of mouse.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

Fixed address

IPv6 Address
fe80::202:a
3ffe:2e00:e

MTU

MTU 1500

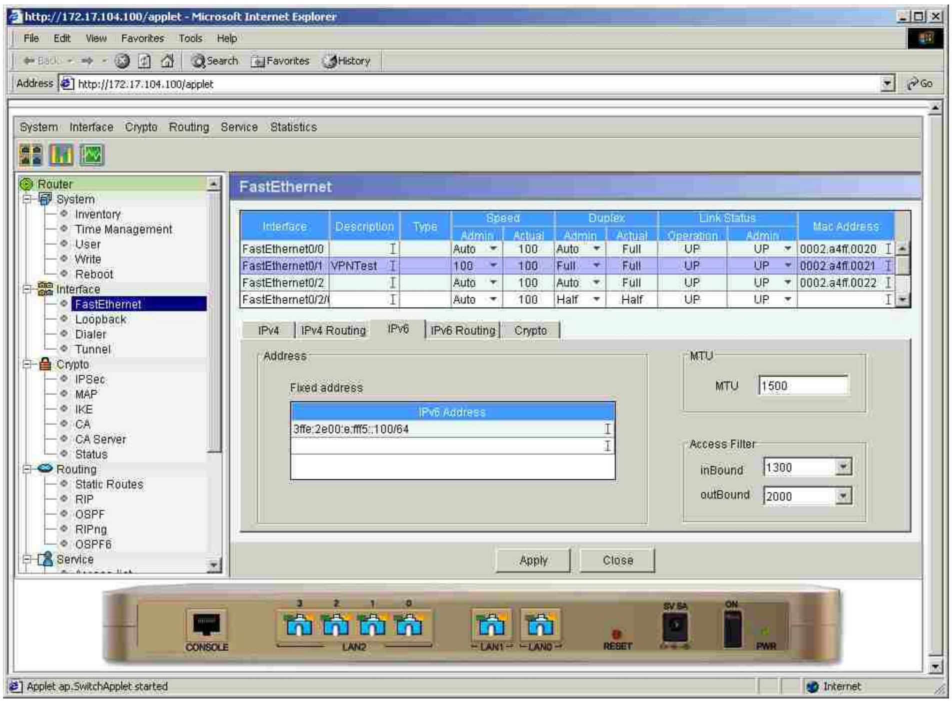
Access Filter

inBound 1300

outBound 2000

(Figure3-84) Delete IPv6 Address

Click “Apply” to verify



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Address

Fixed address

IPv6 Address
3ffe:2e00:e:fff5::100/64

MTU

MTU 1500

Access Filter

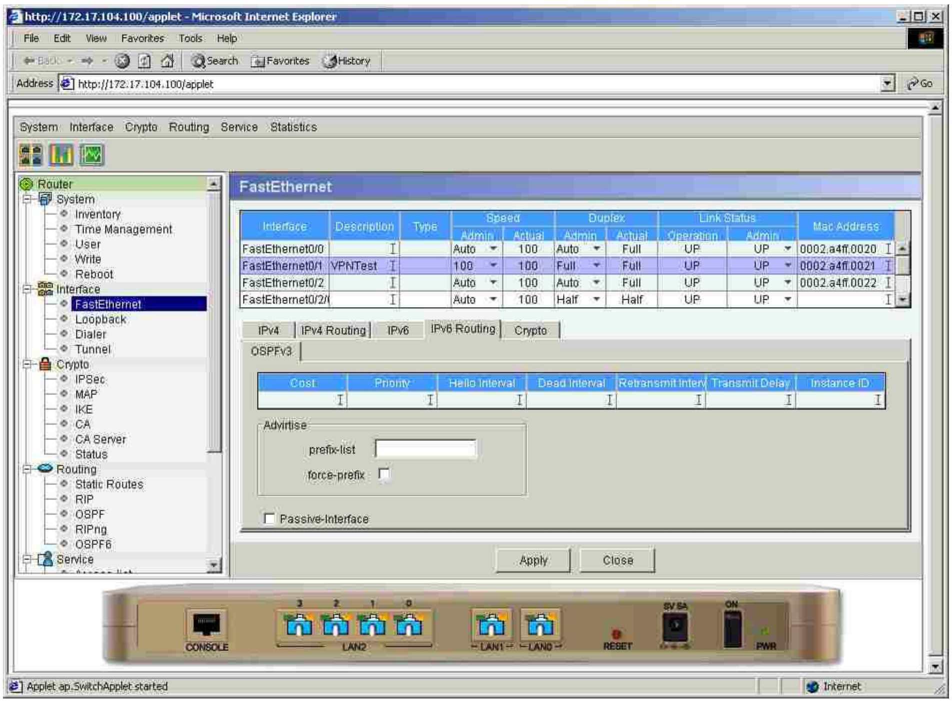
inBound 1300

outBound 2000

(Figure3-85) Verifying IPv6 Address delete

Figure 3-87 shows how to configure IPv6 Routing Protocol, OSPFv3.

Select "OSPFv3" of IPv6 Routing.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID

Advirtise

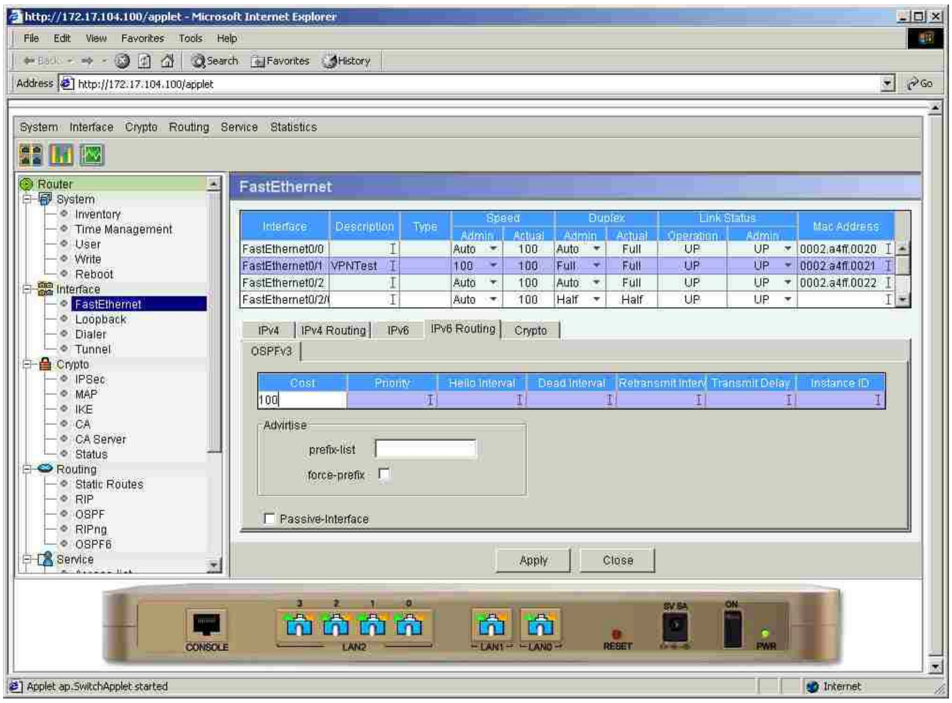
prefix-list

force-prefix □

□ Passive-Interface

(Figure3-86) Select IPv6 OSPFv3

Input "100" for OSPFv3 Cost



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID
100						

Advirtise

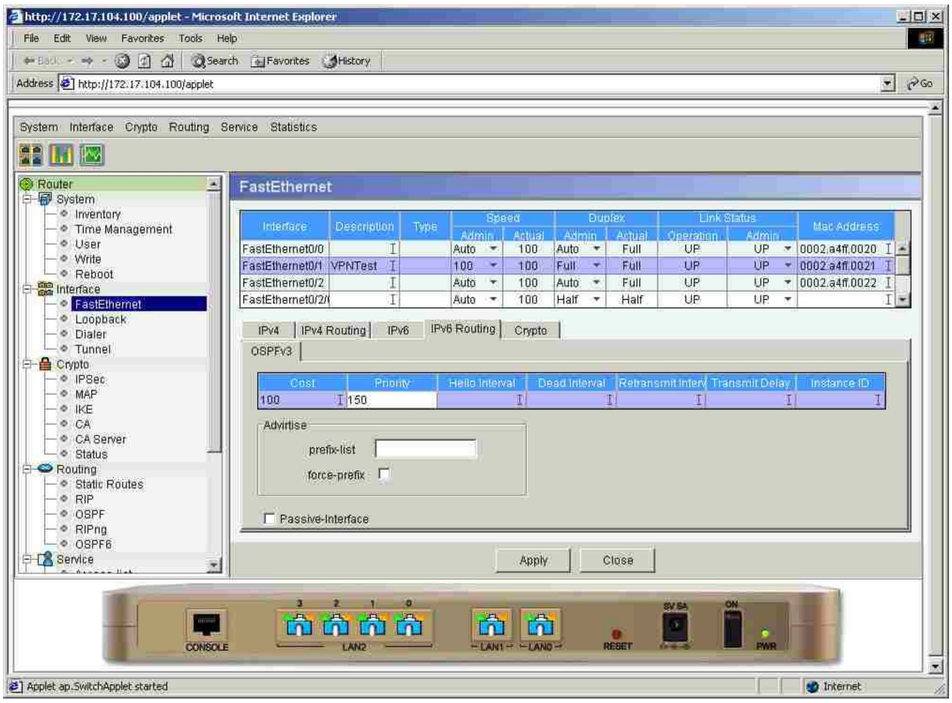
prefix-list

force-prefix □

□ Passive-Interface

(Figure3-87) Input OSPFv3 Cost

Input “150” for OSPFv3 Interface Priority



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID
100	150					

Advirtise

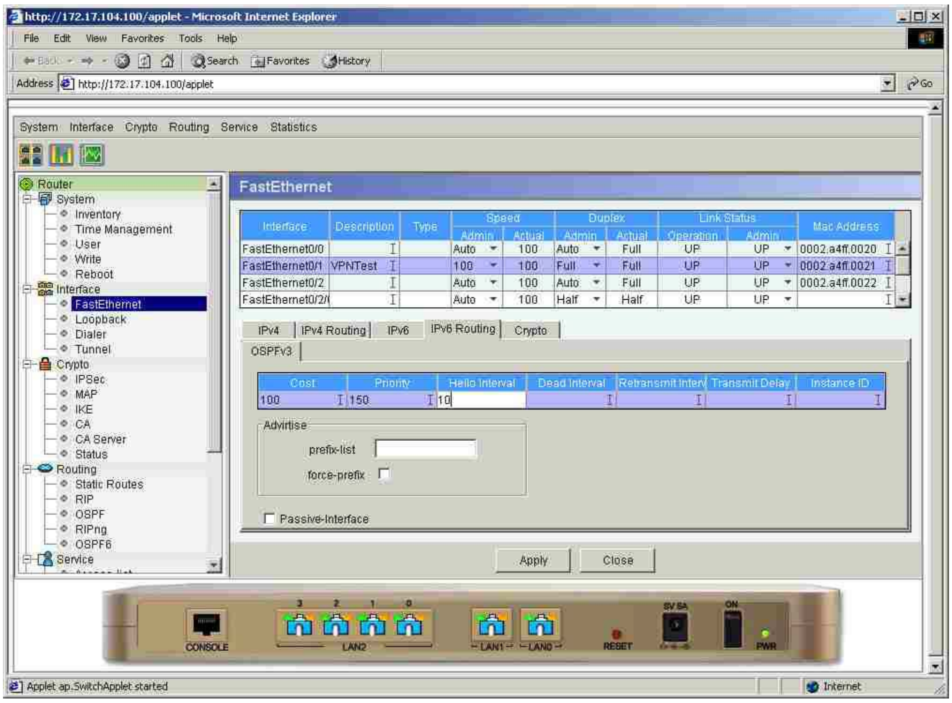
prefix-list

force-prefix □

□ Passive-Interface

(Figure3-88) Input OSPFv3 Interface Priority

Input “10” for OSPFv3 Hello Packet transmit interval.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID
100	150	10				

Advirtise

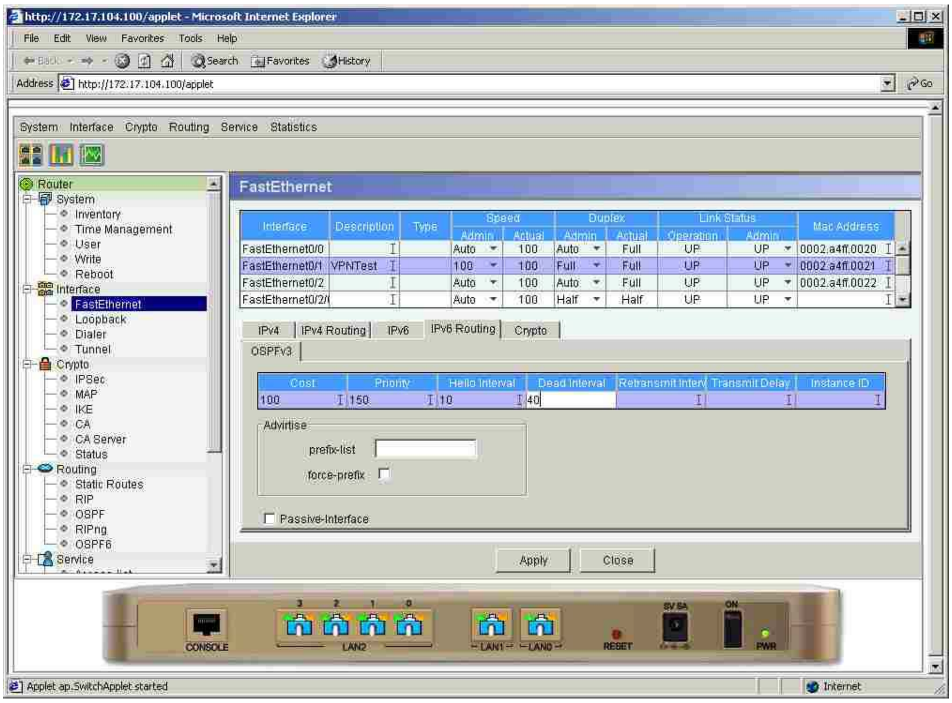
prefix-list

force-prefix □

□ Passive-Interface

(Figure3-89) Input OSPFv3 Hello Interval

Input “40” for OSPFv3 Dead Interval parameter.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID
100	150	10	40			

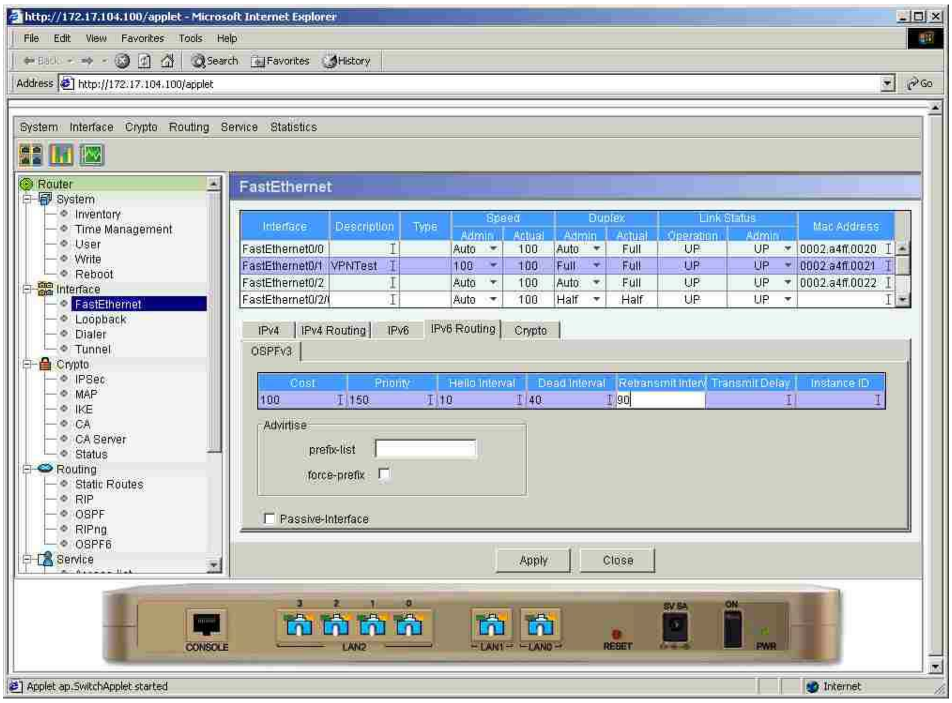
prefix-list:

□ force-prefix

□ Passive-Interface

(Figure3-90) Input OSPFv3 Dead Interval

Input “90” for Advertisement Packet Retransmit interval parameter.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID
100	150	10	40	90		

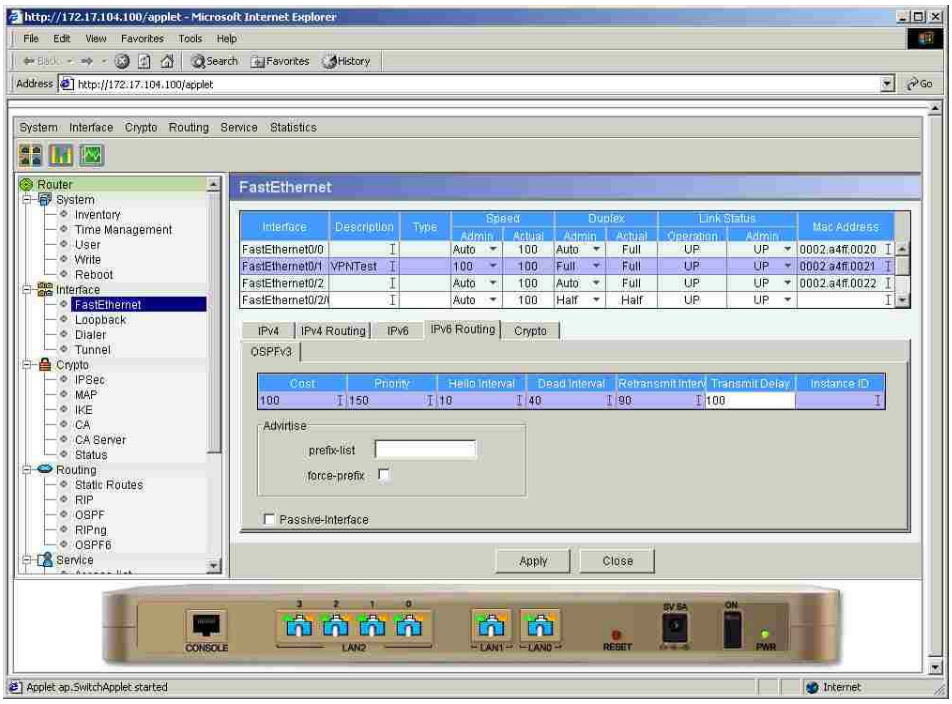
prefix-list:

□ force-prefix

□ Passive-Interface

(Figure3-91) Input OSPFv3 Retransmit Interval

Input “100” for Transmit Delay of Link State Packet.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID
100	150	10	40	90	100	

Advirtise

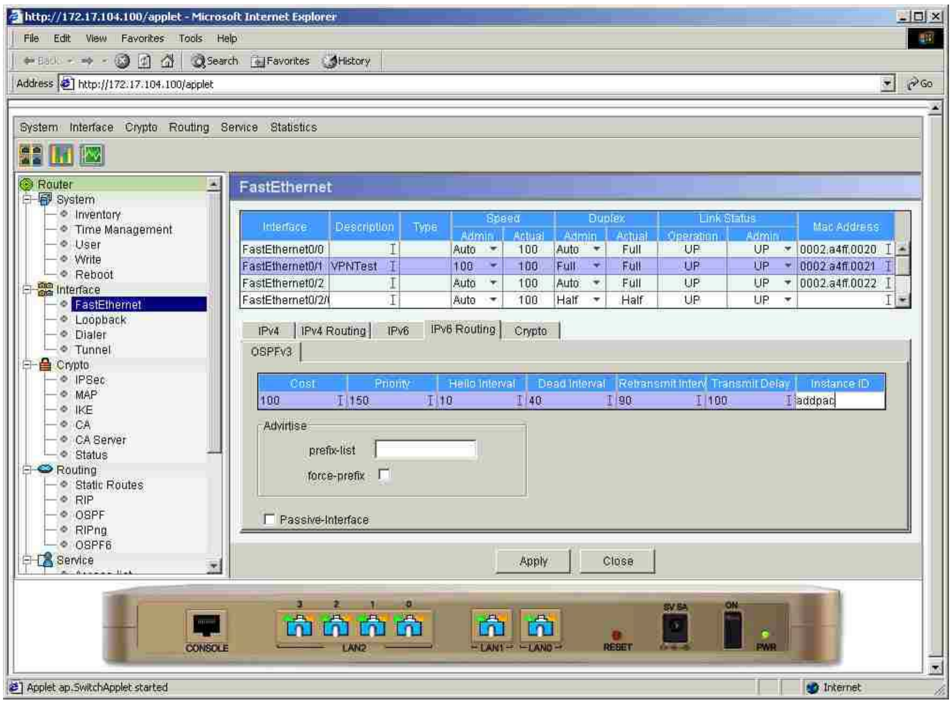
prefix-list

force-prefix □

□ Passive-Interface

(Figure3-92) Input OSPFv3 Transmit Delay

Input “addpac” for OSPFv3 Instance ID parameter.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID
100	150	10	40	90	100	addpac

Advirtise

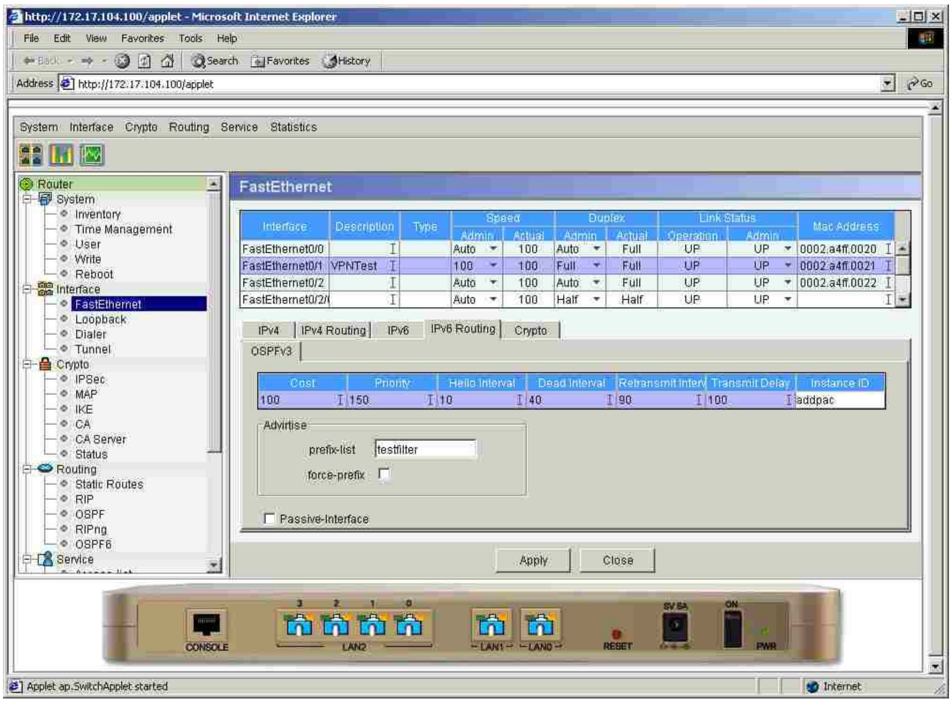
prefix-list

force-prefix □

□ Passive-Interface

(Figure3-93) Input OSPFv3 Instance ID

Input Prefix-List “testfilter” to filter information of specific network.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto

OSPFv3

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID
100	150	10	40	90	100	addpac

Advirtise

prefix-list testfilter

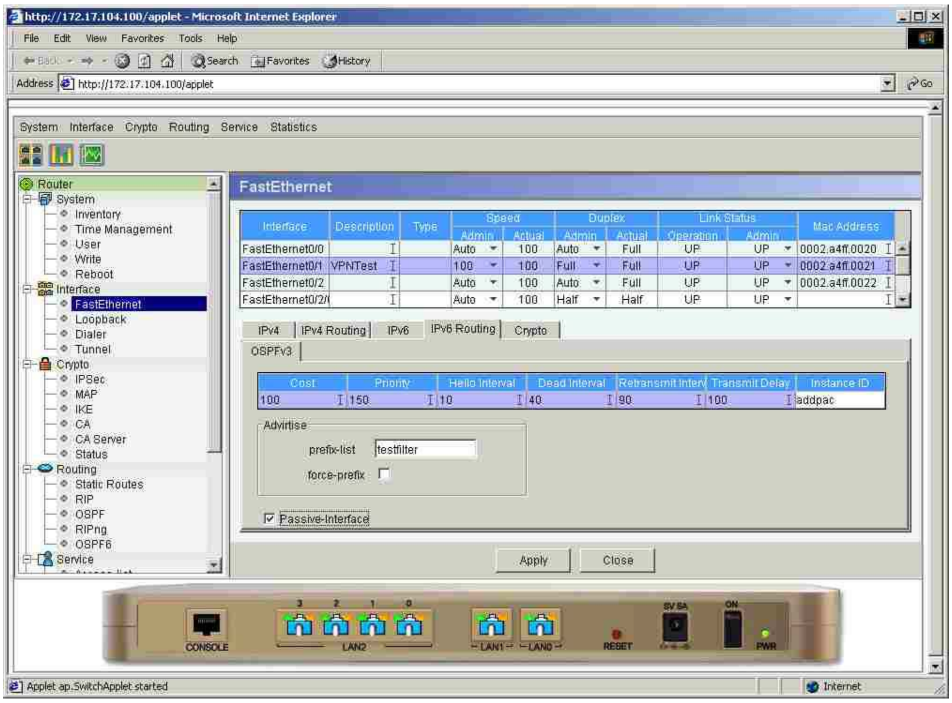
force-prefix □

□ Passive-Interface

Apply Close

(Figure3-94) Input OSPFv3 Prefix-List

Check Passive-Interface to only receive OSPFv3 Routing Table


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto

OSPFv3

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID
100	150	10	40	90	100	addpac

Advirtise

prefix-list testfilter

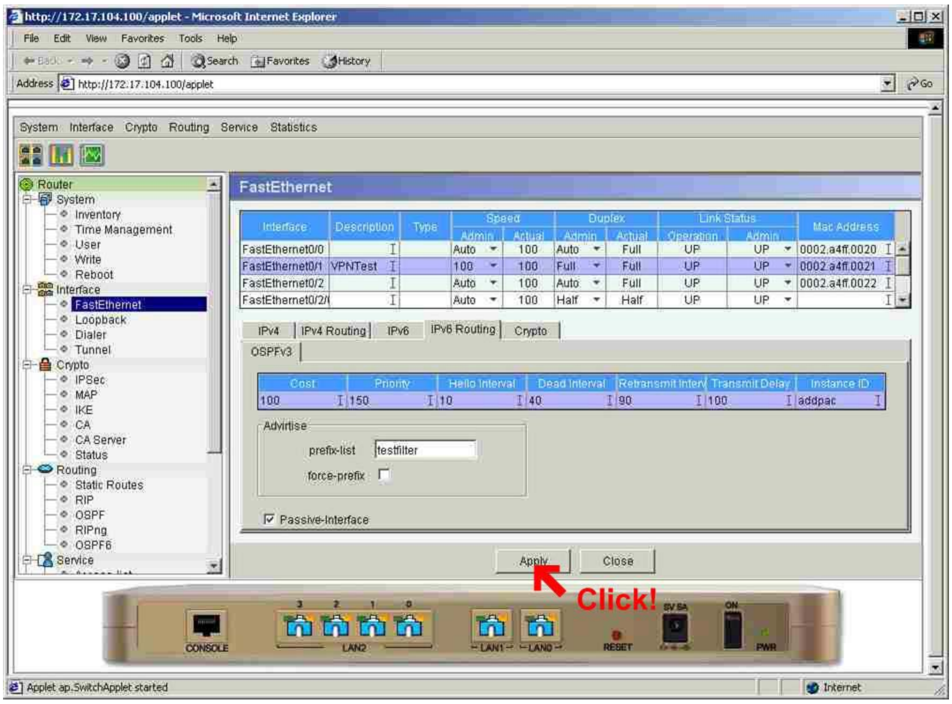
force-prefix □

☑ Passive-Interface

Apply Close

(Figure3-95) OSPFv3 Passive Interface check

Click "Apply" to verify



http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
CONSOLE
3
2
1
0
LAN2
LAN1
LAN0
RESET
5V 5A
ON
PWR
Click!
Applet ap.SwitchApplet started
Internet

FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

IPv4 | IPv4 Routing | IPv6 | IPv6 Routing | Crypto

OSPFv3

Cost	Priority	Hello Interval	Dead Interval	Retransmit Interv	Transmit Delay	Instance ID
100	150	10	40	90	100	addpac

Advirtise

prefix-list testfilter

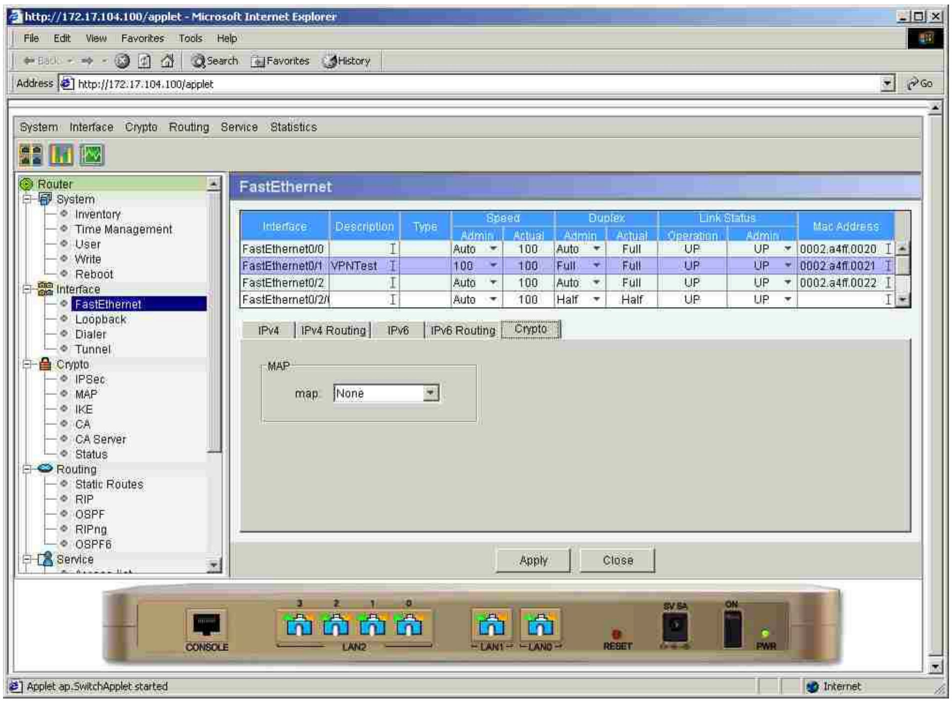
force-prefix □

☑ Passive-Interface

Apply Close

(Figure3-96) Verify OSPFv3 settings

Figure 3-98 shows the example of applying Crypto Map to Fast Ethernet 0/1. The user has to select pre-created Map from Crypto menu.



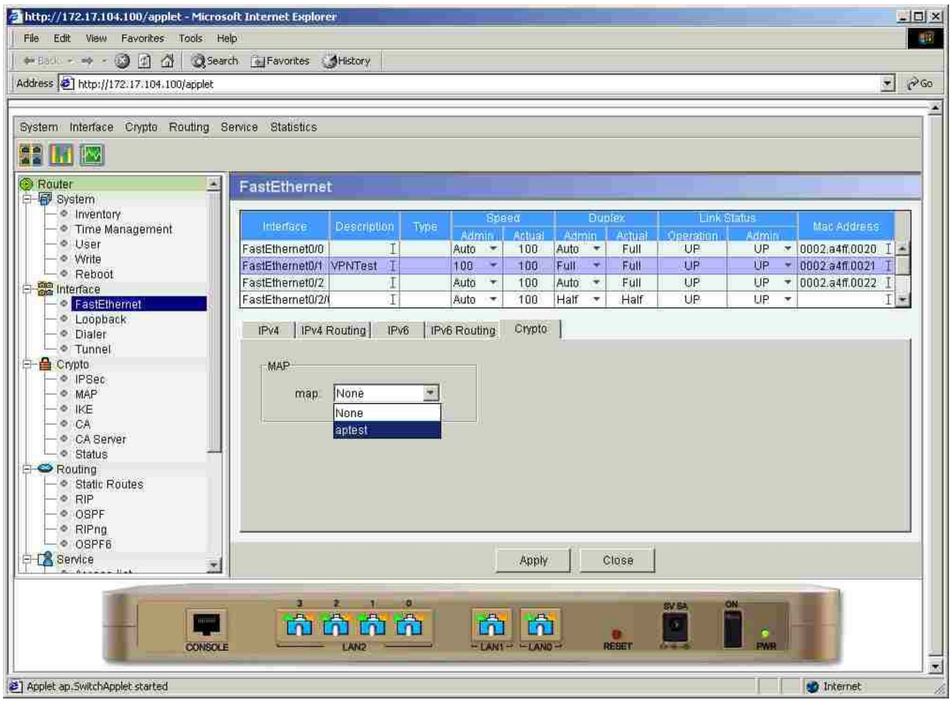
Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

MAP

map: None

(Figure3-97) Select Fast Ethernet Crypto

Select Map "aptest"



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

MAP

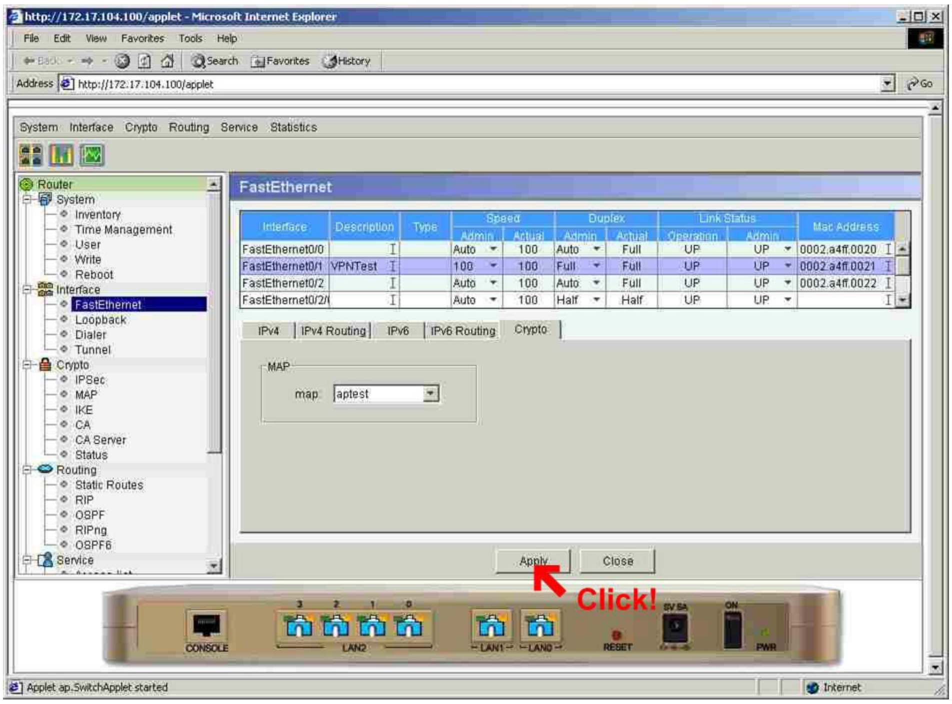
map: None

None

aptest

(Figure3-98) Select Fast Ethernet Crypto Map

Click “Apply” to verify.



FastEthernet

Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/(			Auto	100	Half	Half	UP	UP	

MAP

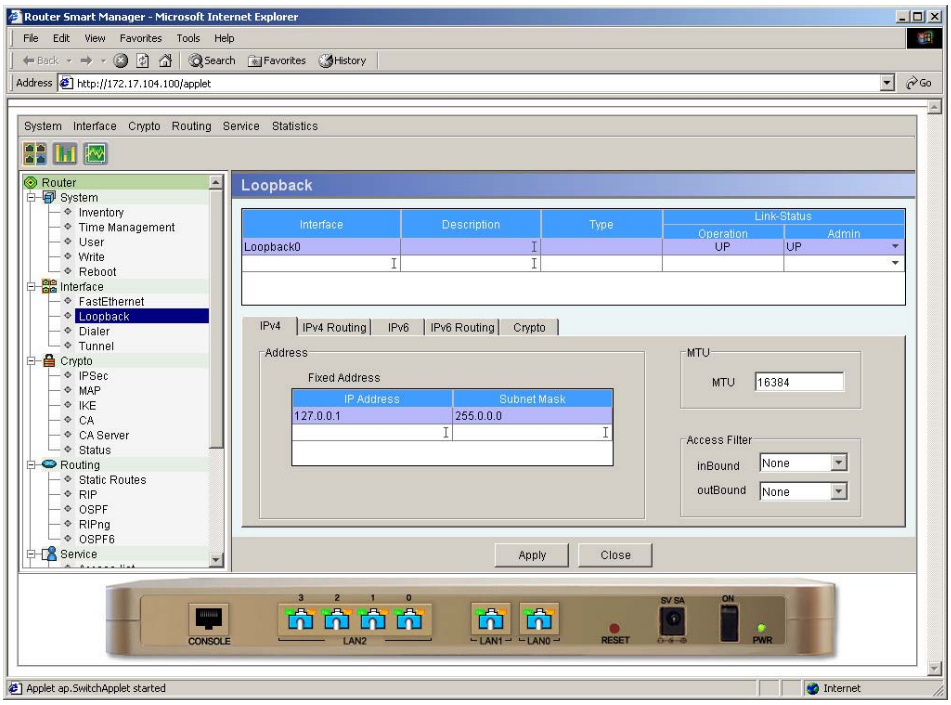
map: aptest

(Figure3-99) Verify Interface Crypto Map

Loopback

Loopback Interface is not physical Interface. It is logical interface placed inside of Gateway. Therefore, it is unable to have direct communication with other hosts using physical interface. To communicate with other hosts, Routing Protocols such as Static Routing, RIP are necessary for packets exchange. Generally, Loopback Interface is used for testing Routing Protocols.

Figure 3-101 shows the initial page of Loopback



Loopback

Interface	Description	Type	Link-Status	
			Operation	Admin
Loopback0			UP	UP

Address

Fixed Address

IP Address	Subnet Mask
127.0.0.1	255.0.0.0

MTU

MTU 16384

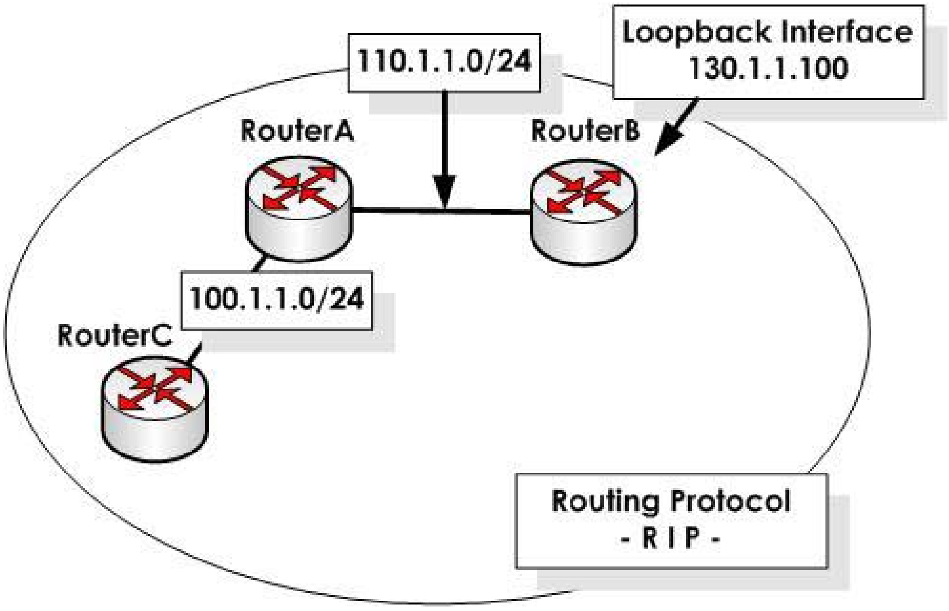
Access Filter

inBound None

outBound None

(Figure3-100) Loopback initial page

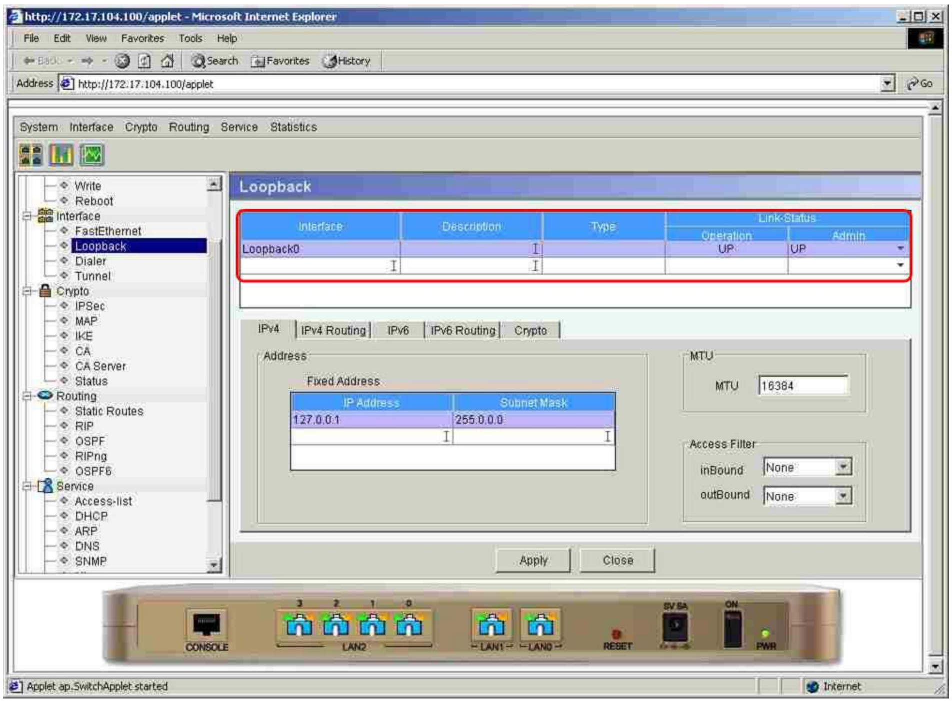
Figure 3-102 shows the network which includes Loopback Interface and uses RIP as Routing Protocol.



(Figure3-101) Network (including Loopback Interface) Example

RouterC has information on "100.1.1.0" Network, RouterA has info on "100.1.1.0", "110.1.1.0" Network, and RouterB has info on "110.1.1.0", "130.1.1.0" Network. Once RIP is started, Router A, B, C shares information on every network. Loopback Interface is not physically exists however, network can be configured using interfaces inside of the router. Also there is no physical Link Up/Down in Loopback Interface so it is easier to test Routing Protocol or Routing performance without configuring complicating network diagram.

Figure 3-103 shows Loopback Interface menu.



Interface	Description	Type	Link-Status	
			Operation	Admin
Loopback0			UP	UP

IP Address	Subnet Mask
127.0.0.1	255.0.0.0

MTU 16384

inBound None

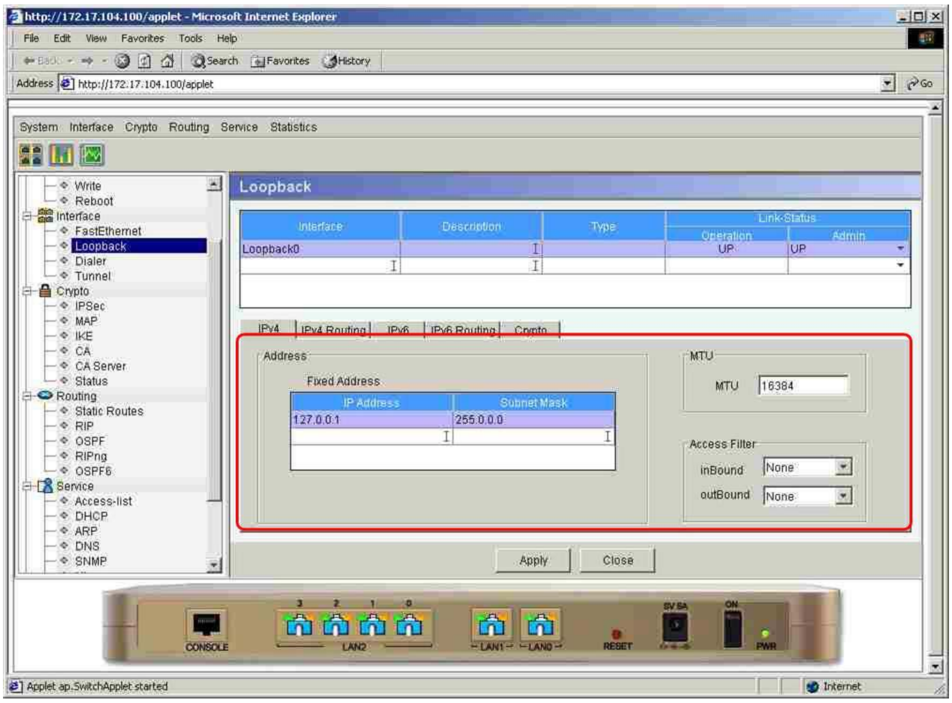
outBound None

(Figure3-102) Loopback Interface page

<Table 3-15> Loopback Interface Description

Elements	Description
Interface	It is a Loopback Interface. The user can create total 32 of Loopback Interface.
Description	Comments Field
Type	Interface Type
Link Status	Link Status of Loopback Interface & shutdown

Figure 3-104 shows Loopback Interface, IPv4 menu


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Loopback
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
Address
Fixed Address
MTU
Access Filter
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Link-Status	
			Operation	Admin
Loopback0			UP	UP

IP Address	Subnet Mask
127.0.0.1	255.0.0.0

MTU: 16384

inBound: None

outBound: None

(Figure3-103) Loopback IPv4 Main page

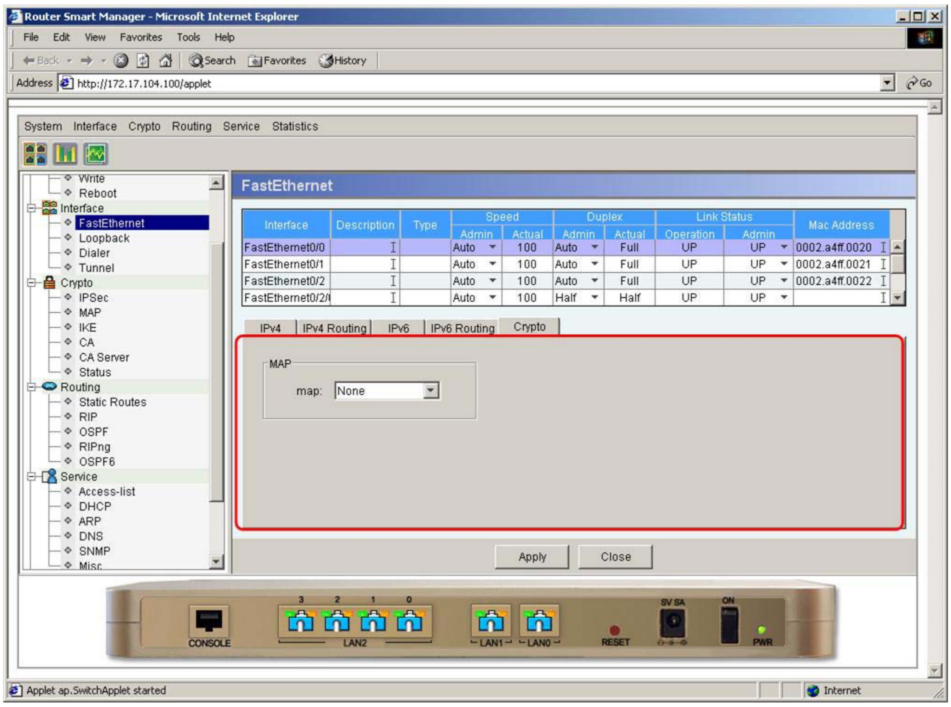
<Table 3-16> Loopback IPv4 Description

Elements	Description
IP Address	IP Address of Loopback Interface
Subnet Mask	Subnet Mask for appropriate IP Address of Loopback Interface
MTU	Maximum Transmission Unit. Default value is 16384 Bytes.
Access Filter InBound	To apply Access-List. Access Filter Inbound is used for filtering received packets.
Access Filter OutBound	To apply Access-List. Access Filter Outbound is used for filtering sending packets.

IPv4, IPv6, IPv4 and IPv6 Routing Protocol menu of Loopback Interface is the same as menu in FastEthernet. Please refer to FastEthernet menu description.

Figure 3-105 shows Crypto Info of Loopback Interface.

Crypto Map form Crypto Menu is applied to a specific Interface. Select a Map using scroll bar.

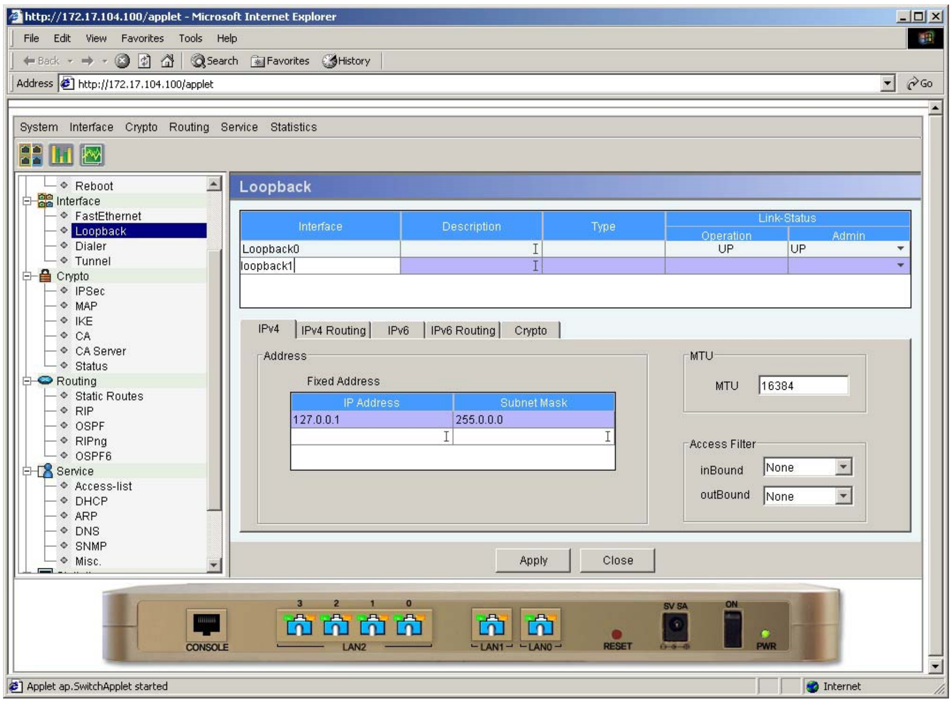


Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1			Auto	100	Auto	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/			Auto	100	Half	Half	UP	UP	

map: None

(Figure3-104) Loopback Interface Crypto Info

Figure 3-106 shows how to add Loopback1 Interface for IPv4 and IPv6 Address. Select Loopback Interface1 with a mouse.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
Apply Close
3 2 1 0
CONSOLE LAN2 LAN1 LAN0 RESET SV SA ON PWR
Applet ap.SwitchApplet started
Internet

Loopback

Interface	Description	Type	Link-Status	
			Operation	Admin
Loopback0			UP	UP
loopback1				

Address

Fixed Address

IP Address	Subnet Mask
127.0.0.1	255.0.0.0

MTU

MTU 16384

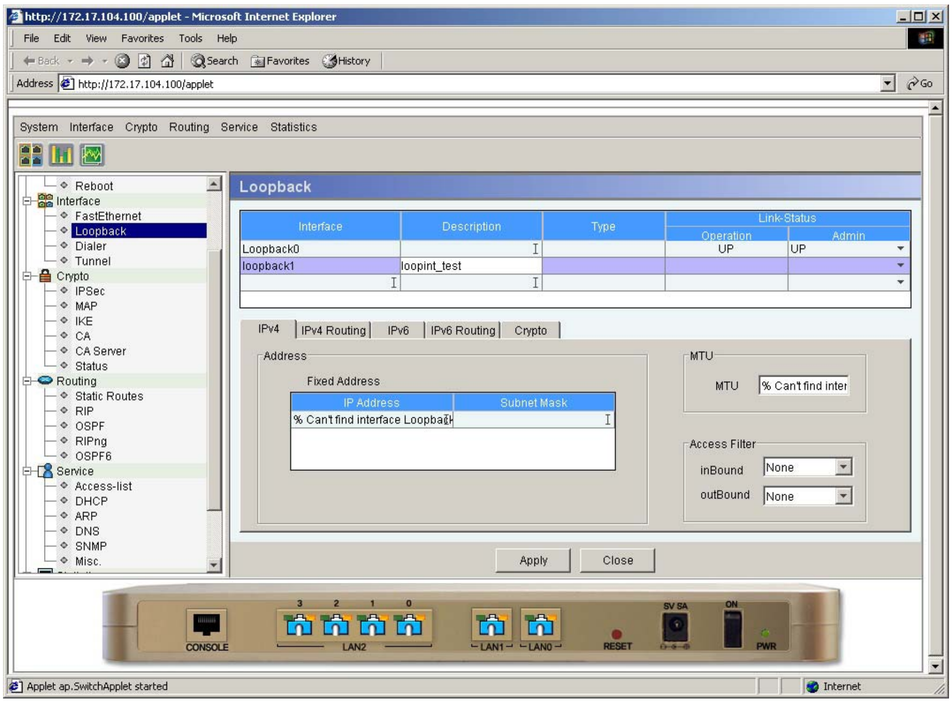
Access Filter

inBound None

outBound None

(Figure3-105) Add Loopback1 Interface

Brief comment on Loopback1 Interface.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
Apply Close
3 2 1 0
CONSOLE LAN2 LAN1 LAN0 RESET SV SA ON PWR
Applet ap.SwitchApplet started
Internet

Loopback

Interface	Description	Type	Link-Status	
			Operation	Admin
Loopback0			UP	UP
loopback1	loopint_test			

Address

Fixed Address

IP Address	Subnet Mask
% Can't find interface Loopbac	

MTU

MTU % Can't find inter

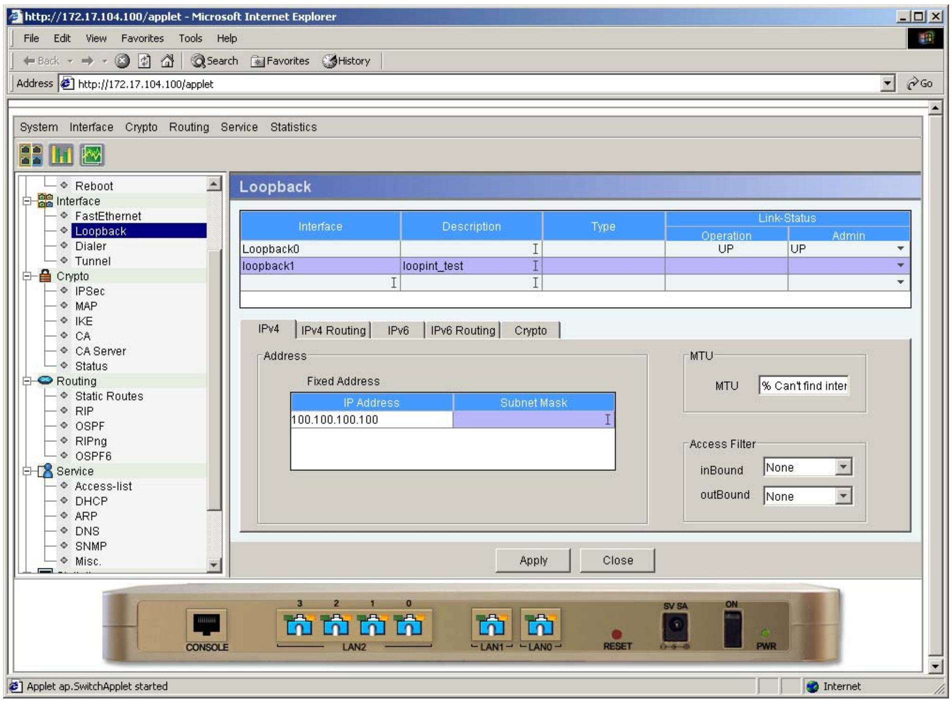
Access Filter

inBound None

outBound None

(Figure3-106) Input Loopback1 Interface Description

Input “100.100.100.100” IP Address for IPv4.



Interface	Description	Type	Link-Status Operation	Link-Status Admin
Loopback0			UP	UP
loopback1	loopint_test			

Address — Fixed Address

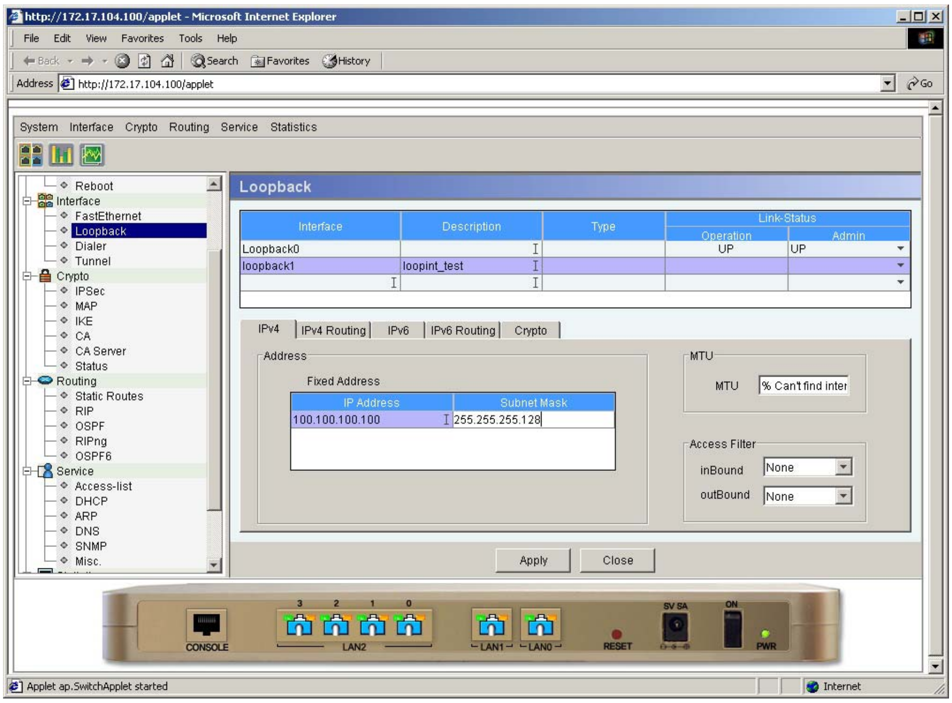
IP Address	Subnet Mask
100.100.100.100	

MTU: % Can't find inter

Access Filter: inBound None; outBound None

(Figure3-107) Input IPv4 Address

Input “255.255.255.128” Subnet Mask for the IP Address.



Interface	Description	Type	Link-Status Operation	Link-Status Admin
Loopback0			UP	UP
loopback1	loopint_test			

Address — Fixed Address

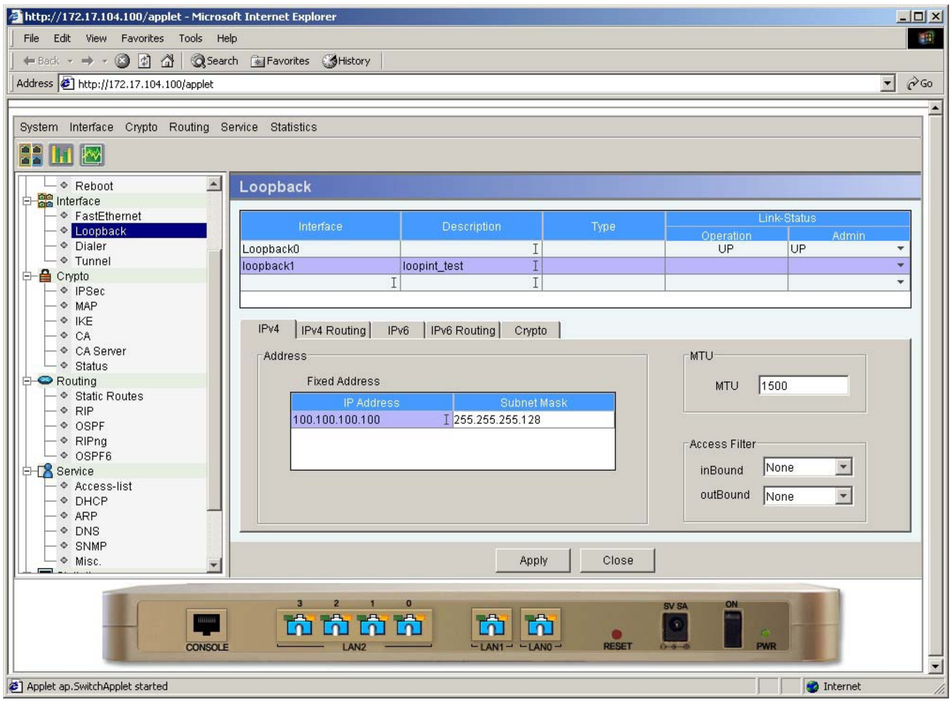
IP Address	Subnet Mask
100.100.100.100	255.255.255.128

MTU: % Can't find inter

Access Filter: inBound None; outBound None

(Figure3-108) Input Subnet Mask of IPv4 Address

Input “1500” for MTU value.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Loopback

Interface	Description	Type	Link-Status	
			Operation	Admin
Loopback0			UP	UP
loopback1	loopint_test			

Address

Fixed Address

IP Address	Subnet Mask
100.100.100.100	255.255.255.128

MTU

MTU 1500

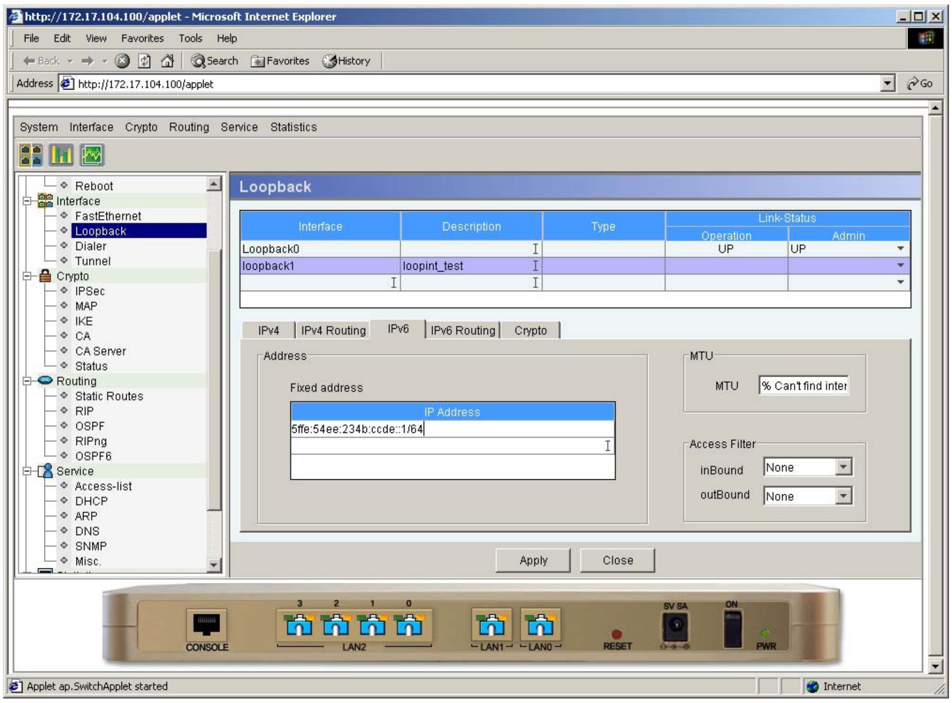
Access Filter

inBound None

outBound None

(Figure3-109) Input IPv4 MTU

Move to IPv6 then, input IPv6 Address.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Loopback

Interface	Description	Type	Link-Status	
			Operation	Admin
Loopback0			UP	UP
loopback1	loopint_test			

Address

Fixed address

IP Address
5ffe:54ee:234b:ccde::1/64

MTU

MTU % Can't find inter

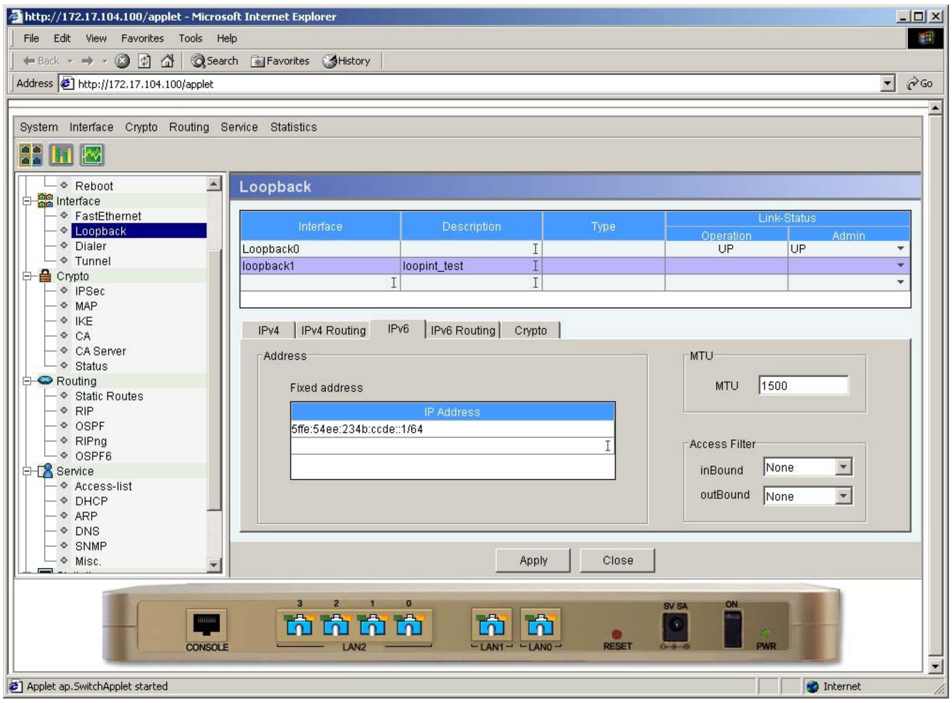
Access Filter

inBound None

outBound None

(Figure3-110) Input IPv6 Address

Input “1500” for MTU value.



Loopback

Interface	Description	Type	Link-Status Operation	 Admin
Loopback0			UP	UP
loopback1	loopint_test			

Address

Fixed address

IP Address
5ffe:54ee:234b:ccde::1/64

MTU

MTU 1500

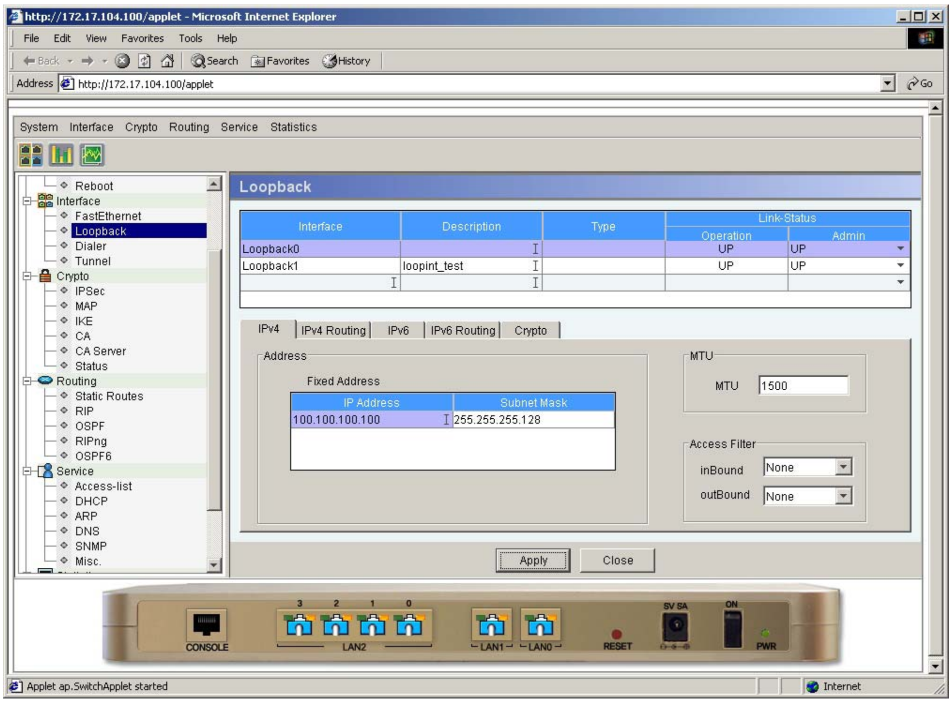
Access Filter

inBound None

outBound None

(Figure3-111) Input IPv6 MTU

Click “Apply” to verify.



Loopback

Interface	Description	Type	Link-Status Operation	 Admin
Loopback0			UP	UP
Loopback1	loopint_test		UP	UP

Address

Fixed Address

IP Address	Subnet Mask
100.100.100.100	255.255.255.128

MTU

MTU 1500

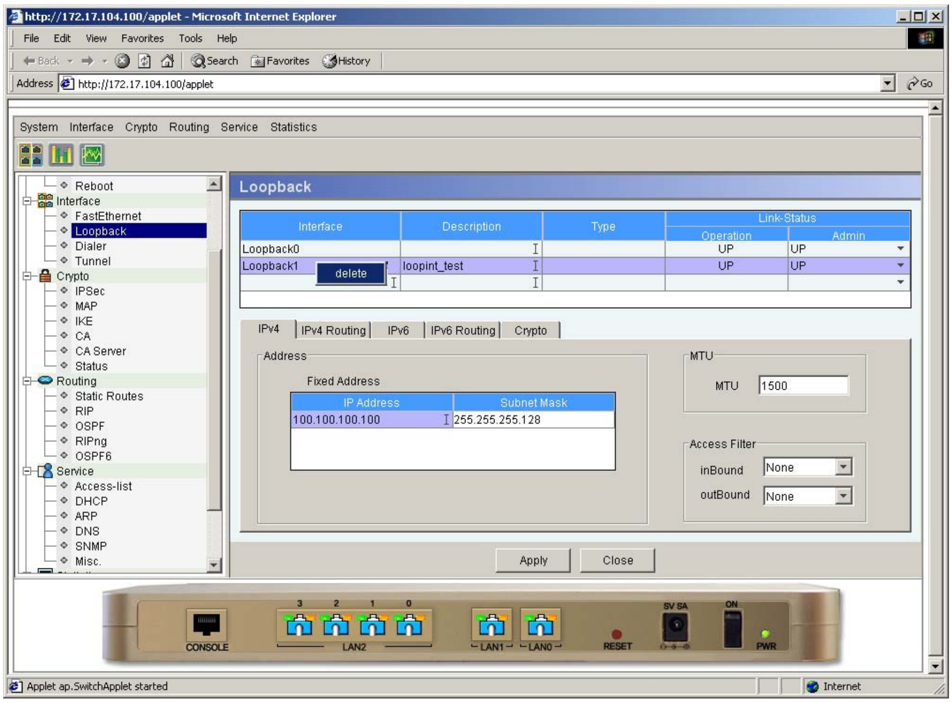
Access Filter

inBound None

outBound None

(Figure3-112) Loopback1 Interface verify page

To delete Loopback1 Interface, Select Interface then select “Delete” by clicking right side of mouse.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Loopback
delete
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
Apply
Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Link-Status Operation	 Admin
Loopback0			UP	UP
Loopback1	loopint_test		UP	UP

Address — Fixed Address

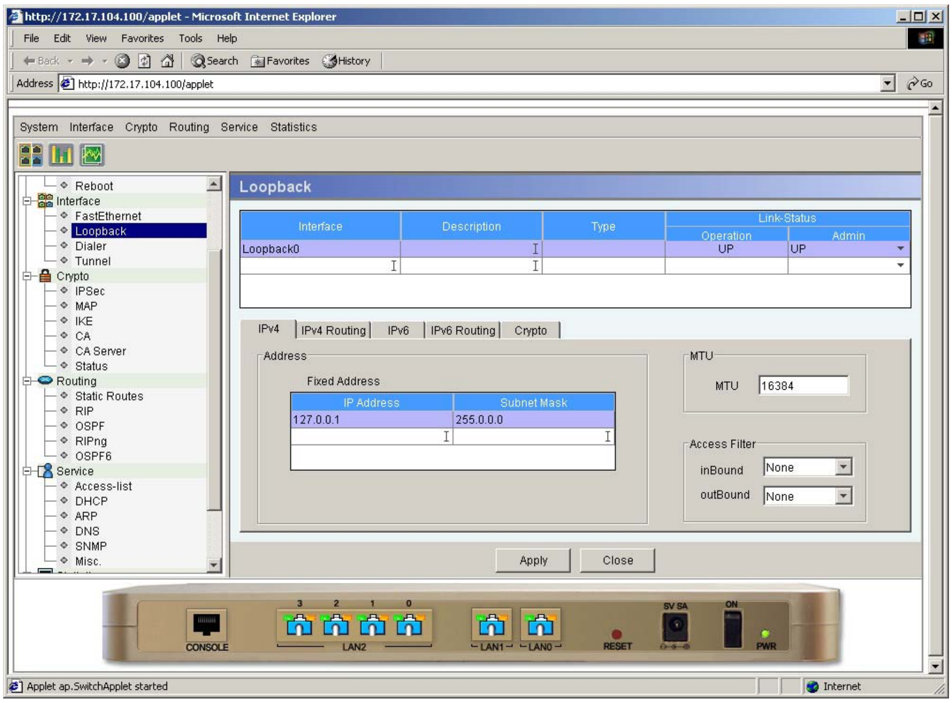
IP Address	Subnet Mask
100.100.100.100	255.255.255.128

MTU: 1500

Access Filter — inBound: None; outBound: None

(Figure3-113) Delete Loopback1 Interface

Click “Apply” to verify.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Loopback
IPv4 IPv4 Routing IPv6 IPv6 Routing Crypto
Apply
Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Link-Status Operation	 Admin
Loopback0			UP	UP

Address — Fixed Address

IP Address	Subnet Mask
127.0.0.1	255.0.0.0

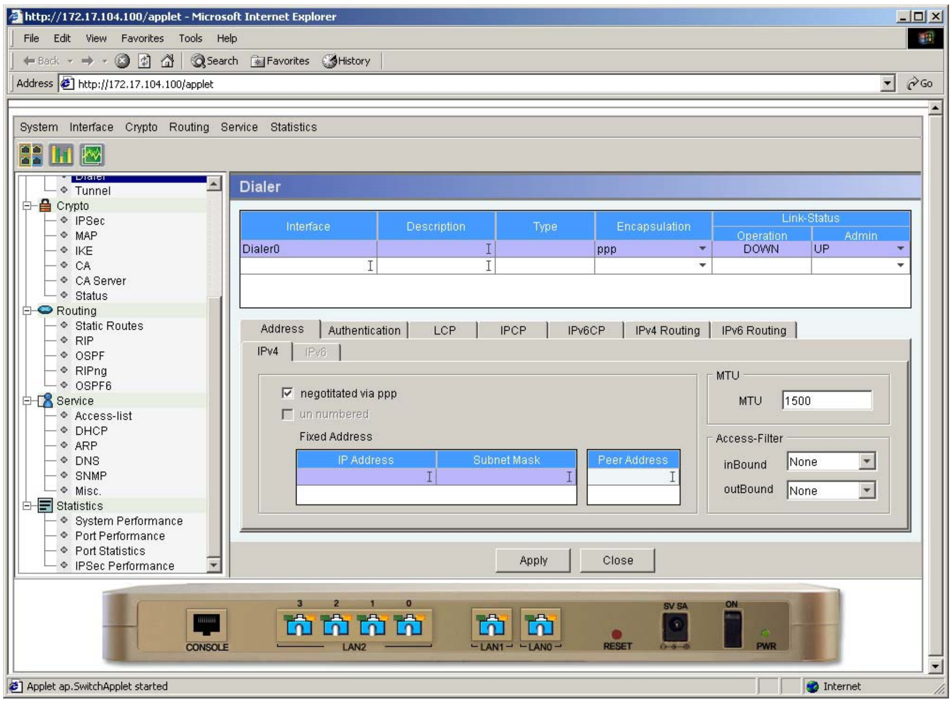
MTU: 16384

Access Filter — inBound: None; outBound: None

(Figure3-114) Loopback1 Interface delete verify.

Dialer

Dialer is a virtual interface which includes elements for PPP Session. The user has to define authentication for PPP Session, rules to access IP address and protocols for Link control. Also the virtual interface from Dialer has to be applied on Ethernet Interface to use.



Dialer

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP

☑ negotitated via ppp

☐ un numbered

Fixed Address

IP Address	Subnet Mask	Peer Address

MTU

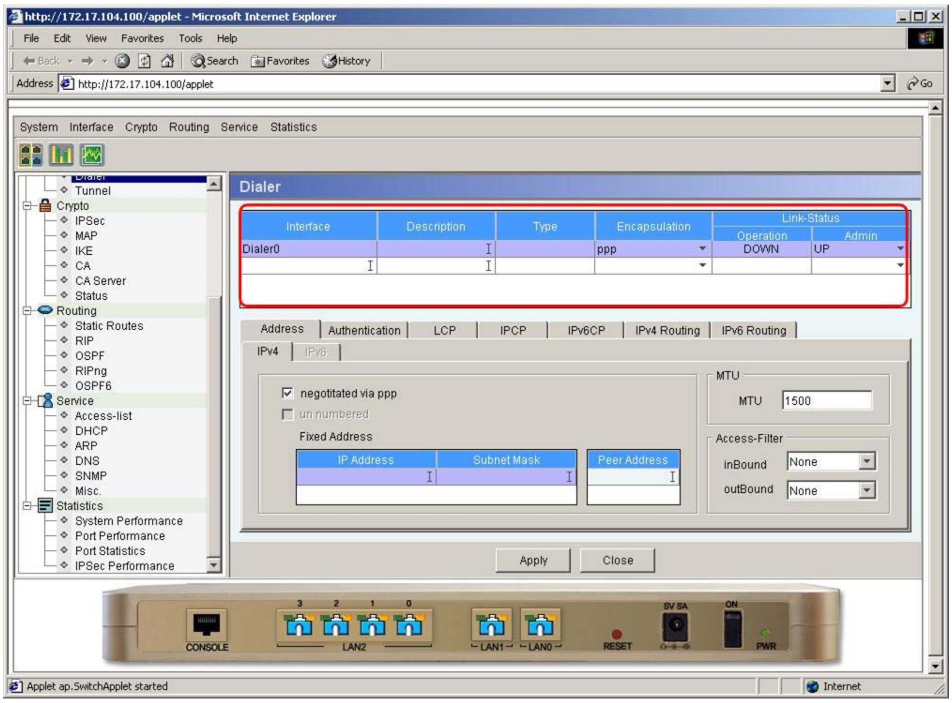
MTU 1500

Access-Filter

inBound None

outBound None

(Figure3-115) Dialer main page



Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP

☑ negotitated via ppp

□ un numbered

Fixed Address

IP Address	Subnet Mask	Peer Address

MTU

MTU 1500

Access-Filter

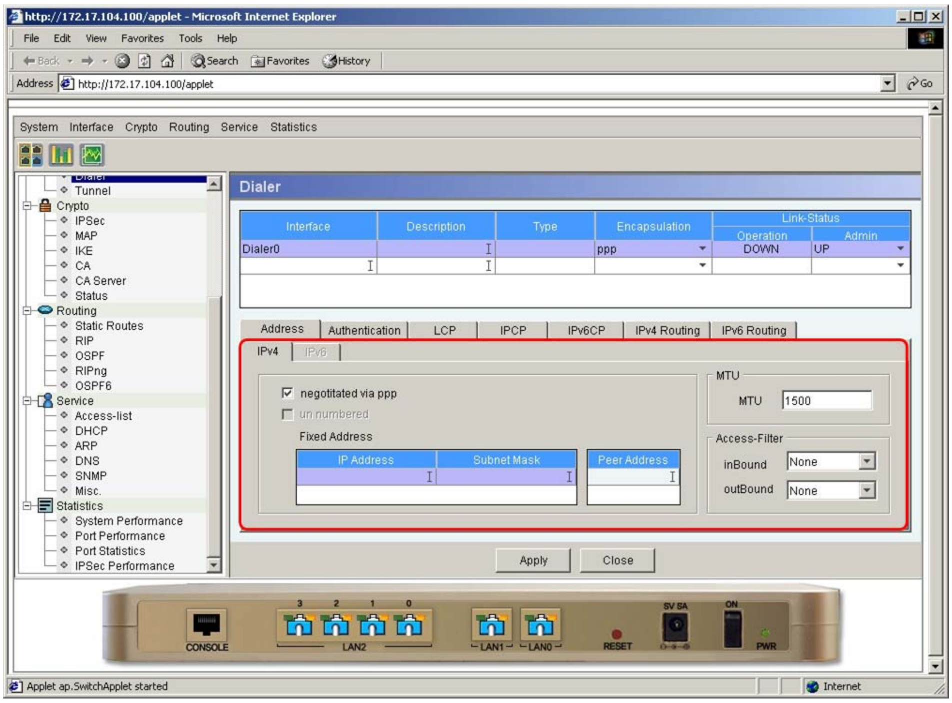
inBound None

outBound None

(Figure3-116) Dialer Interface elements

<Table 3-17> Dialer Interface Description

Elements	Description
Interface	This is Dialer Interface. You can create maximum 32 of Dialer Interfaces.
Description	Comments on Dialer Interface.
Type	Interface Type
Encapsulation	Encapsulation method of Link Protocol. PPP or Null can be used.
Link Status	Monitoring Link Status & controlling Shutdown



Dialer

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP

☑ negotitated via ppp

□ un numbered

Fixed Address

IP Address	Subnet Mask	Peer Address

MTU

MTU 1500

Access-Filter

inBound None

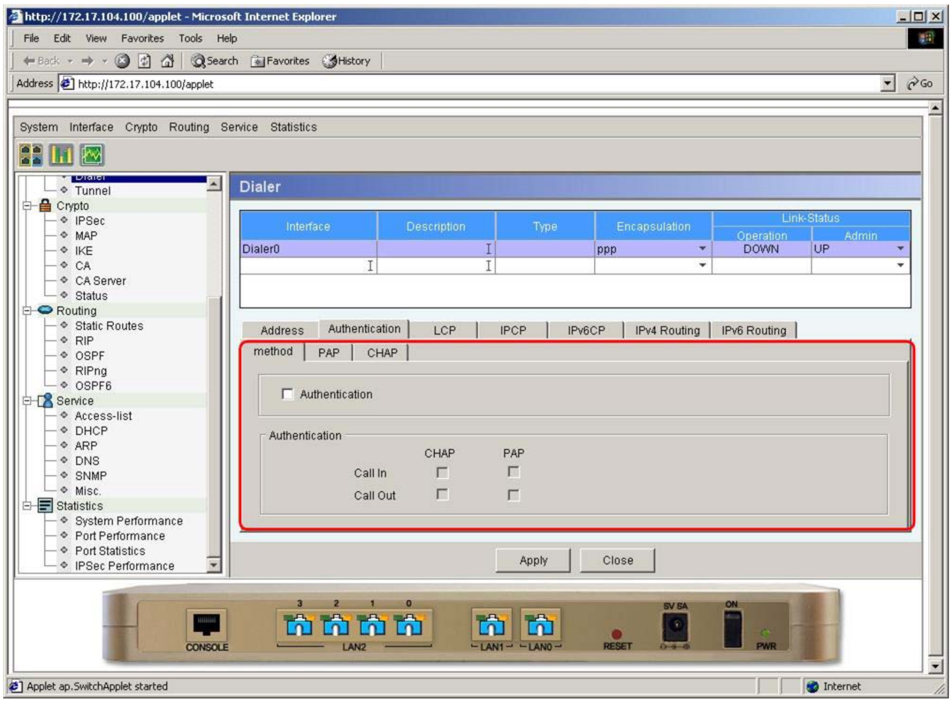
outBound None

Applet ap.SwitchApplet started

(Figure3-117) Dialer IPv4 Address elements

<Table 3-18> Dialer IPv4 Address Description

Elements	Description
Negotiated via PPP	To get IP Address from Peer via PPP Session
Unnumbered	This is not only for one specific IP Address, it is for using every IP Address.
Fixed Address	Input fixed IP Address. Not PPP Client.
Peer Address	It decides IP Address for peer when creating PPP Session.
MTU	Maximum Transmission Unit
Access Filter	To realize Packet Filter using Access-List.



Interface	Description	Type	Encapsulation	Link-Status Operation	Link-Status Admin
Dialer0			ppp	DOWN	UP

□ Authentication

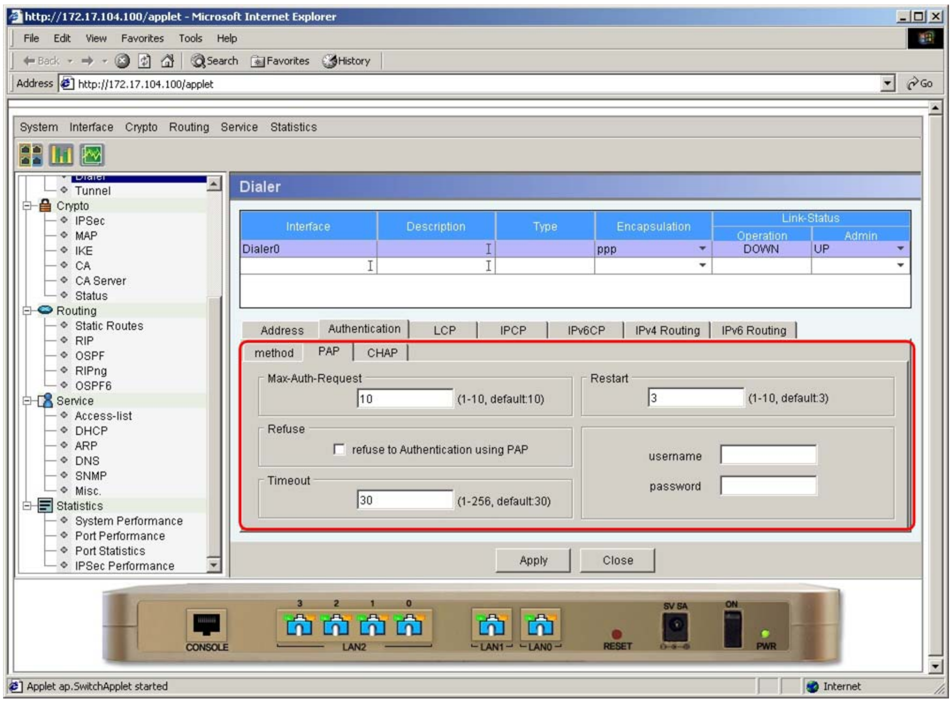
Authentication

	CHAP	PAP
Call In	□	□
Call Out	□	□

(Figure3-118) Authentication method for PPP Session creation

<Table 3-19> Dialer Authentication Method Description

Elements	Description
Authentication	It decides whether authentication is needed or not for PPP Session.
Unnumbered	This is not only for one specific IP Address; it is for using every IP Address.
Fixed Address	Input fixed IP Address. Not PPP Client.
Peer Address	It decides IP Address for peer when creating PPP Session.
Callin[Chap|Pap]	Set PPP to Callin, it choose PAP and CHAP.
Callout[Chap|Pap]	Set PPP to Callout, it choose PAP and CHAP.



Dialer

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP

Max-Auth-Request: 10 (1-10, default:10)

Restart: 3 (1-10, default:3)

Refuse: □ refuse to Authentication using PAP

Timeout: 30 (1-256, default:30)

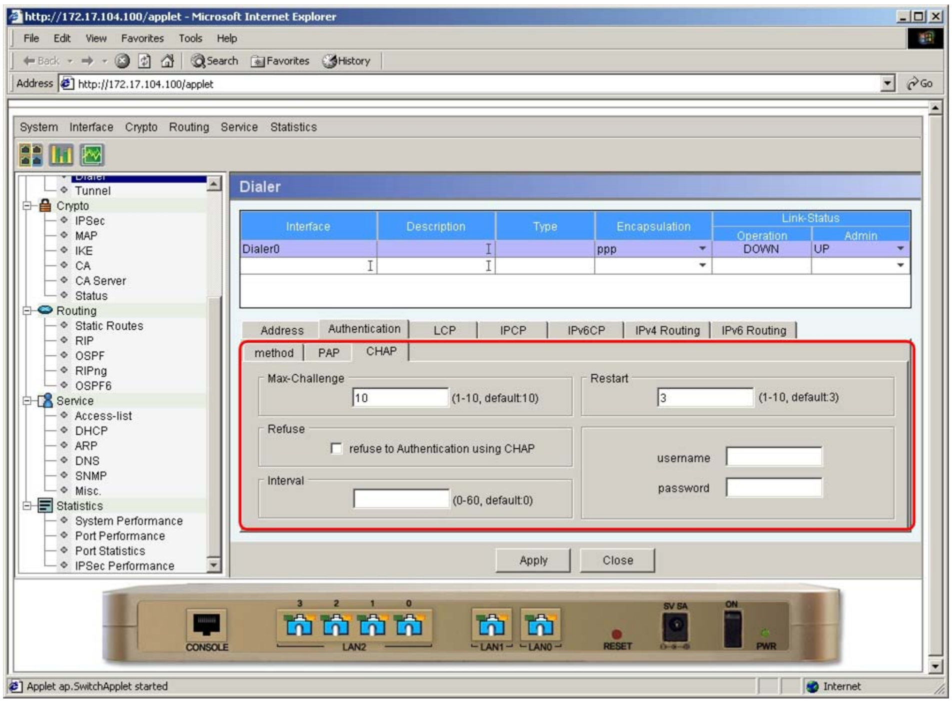
username:

password:

(Figure3-119) Dialer PAP Configuration

<Table 3-20> Dialer PAP Description

Elements	Description
Max-Auth-Request	It sets the maximum number of requesting time for authentication. PPP Session will be terminated after the requesting time is over. The default requesting number is “10”.
Restart	It sets the waiting time from peer after requesting PAP authentication. The default time is 3 sec.
Refuse	It is to refuse authentication when authentication is set to Callin.
Timeout	It restricts requesting time for PAP authentication. Default time is 30 sec.
Username	Input user name for PAP authentication.
Password	Input password for PAP authentication.



Dialer

Interface	Description	Type	Encapsulation	Link-Status Operation	Link-Status Admin
Dialer0			ppp	DOWN	UP

Max-Challenge: 10 (1-10, default:10)

Restart: 3 (1-10, default:3)

Refuse: □ refuse to Authentication using CHAP

Interval: (0-60, default:0)

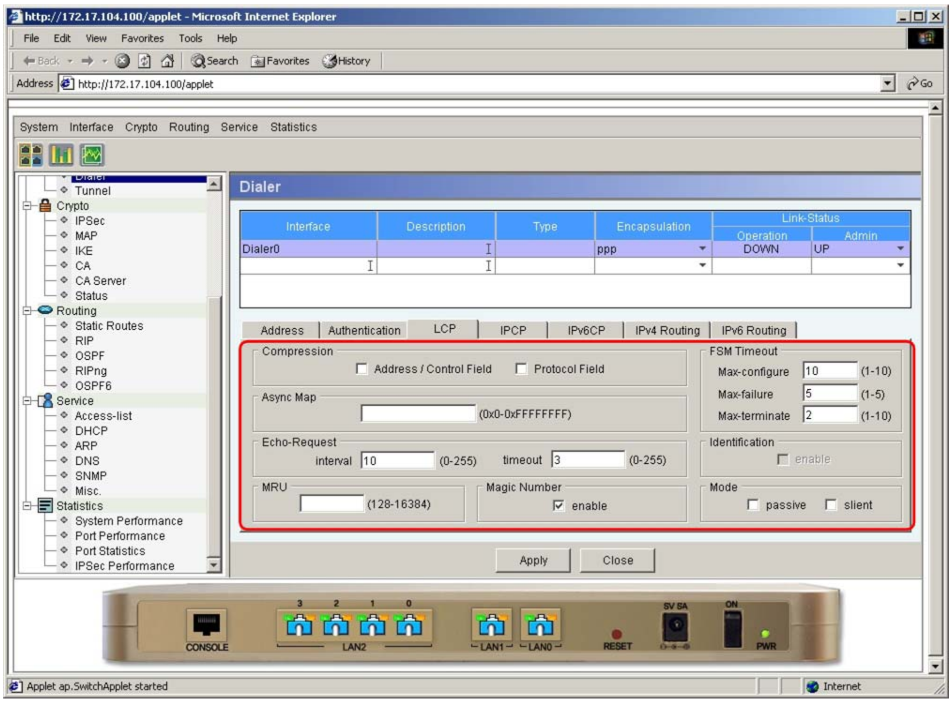
username:

password:

(Figure3-120) Dialer CHAP Configuratoin

<Table 3-21> Dialer CHAP Description

Elements	Description
Max-Auth-Request	It sets the maximum number of requesting time for authentication. PPP Session will be terminated after the requesting time. The default requesting number is "10".
Restart	It sets the waiting time from peer after requesting CHAP authentication. The default time is 3 sec.
Refuse	It is to refuse authentication when authentication is set to Callin.
Timeout	It restricts requesting time for CHAP authentication. Default time is 30 sec.
Username	Input user name for CHAP authentication.
Password	Input password for CHAP authentication.



Interface	Description	Type	Encapsulation	Link-Status Operation	Link-Status Admin
Dialer0			ppp	DOWN	UP

Compression: □ Address / Control Field □ Protocol Field

Async Map: (0x0-0xFFFFFFFF)

Echo-Request: interval 10 (0-255) timeout 3 (0-255)

MRU: (128-16384)

Magic Number: ☑ enable

FSM Timeout: Max-configure 10 (1-10) Max-failure 5 (1-5) Max-terminate 2 (1-10)

Identification: □ enable

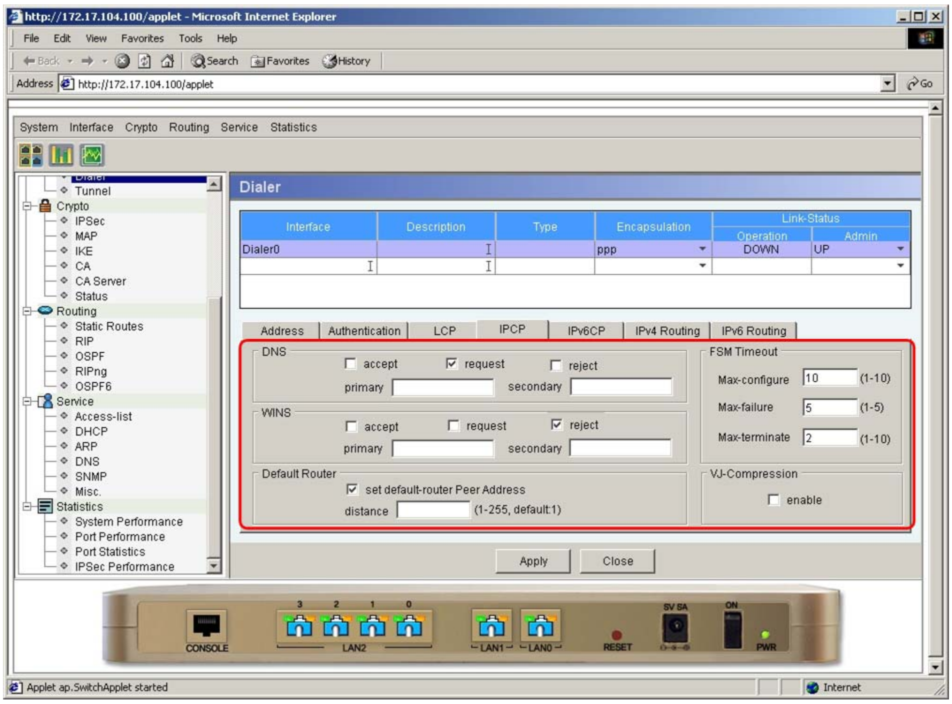
Mode: □ passive □ slient

(Figure3)-121 Dialer LCP Configuration

<Table 3-22> Dialer LCP Description

Elements	Description
Compression	It is a Compression on Address, Controls field of PPP Packet and Protocol field.
Async Map	Input Async Map in LCP level.
FSM Timeout [Max-ConFigure]	Maximum transmit number of Configuration Request. Default number is “10”.
FSM Timeout [Max-Failure]	Restrict the number of Configuration. Default number is “5”.
FSM Timeout [Max-Terminate]	Restrict the number of Terminate Request. Default number is “2”.
Echo-Request Interval	Set transmit interval of Echo Request to check peer via PPP Session. Default is “10” sec.
Echo-Request Timeout	It restricts waiting time for Echo-Repeat after sending Echo-Request. Default time is “3” sec.
Identification	LCP Identification options.
MRU	It restricts Maximum Received Packet Size for PPP Negotiation.

Magic Number	To use LCP Magic Number. Default is “Enable”.
Mode	To use Passive Silent mode. Default is “Disable”.



Dialer

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP

DNS
□ accept ☑ request □ reject
primary
secondary

WINS
□ accept □ request ☑ reject
primary
secondary

Default Router
☑ set default-router Peer Address
distance (1-255, default:1)

FSM Timeout
Max-configure 10 (1-10)
Max-failure 5 (1-5)
Max-terminate 2 (1-10)

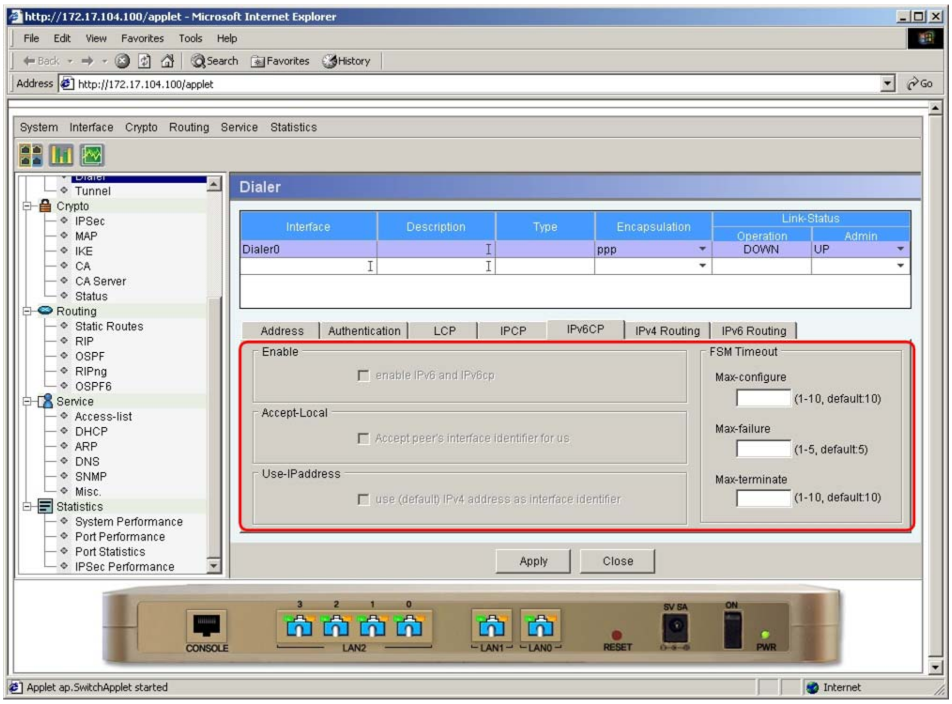
VJ-Compression
□ enable

(Figure3-122) Dialer IPCP Configuration

<Table 3-23> Dialer IPCP Description

Elements	Description
DNS	It is used to get DNS information from PPP Server. Accept is to receive DNS info. Request is to request DNS info. Reject is to ignore DNS info from PPP Server. The user can input DNS addresses in Primary/Secondary field. Default value is “Request”.
WINS	It is used to get WINS information from PPP Server. Accept is to receive WINS info. Request is to request WINS info. Reject is to ignore WINS info from PPP Server. The user can input WINS addresses in Primary/Secondary field. Default value is “Reject” .
Default-router	Set IP Address of peer to Default-router.
FSM Timeout [Max-Configure]	Restricts Maximum transmit number of Configuration Request. Default number is “10”.
FSM Timeout [Max-Failure]	Restricts the number of IPCP operation. Default number is “5”.

FSM Timeout [Max-Terminate]	Restricts maximum transmit number of Terminate Request. Default number is “2”.
VJ Compression	To use VJ Compression


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
System Performance
Port Performance
Port Statistics
IPSec Performance
Address Authentication LCP IPCP IPv6CP IPv4 Routing IPv6 Routing
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

Dialer

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP

Enable
□ enable IPv6 and IPv6cp

Accept-Local
□ Accept peer's interface identifier for us

Use-IPaddress
□ use (default) IPv4 address as interface identifier

FSM Timeout
Max-configure (1-10, default:10)
Max-failure (1-5, default:5)
Max-terminate (1-10, default:10)

(Figure3-123) Dialer IPv6CP configuration

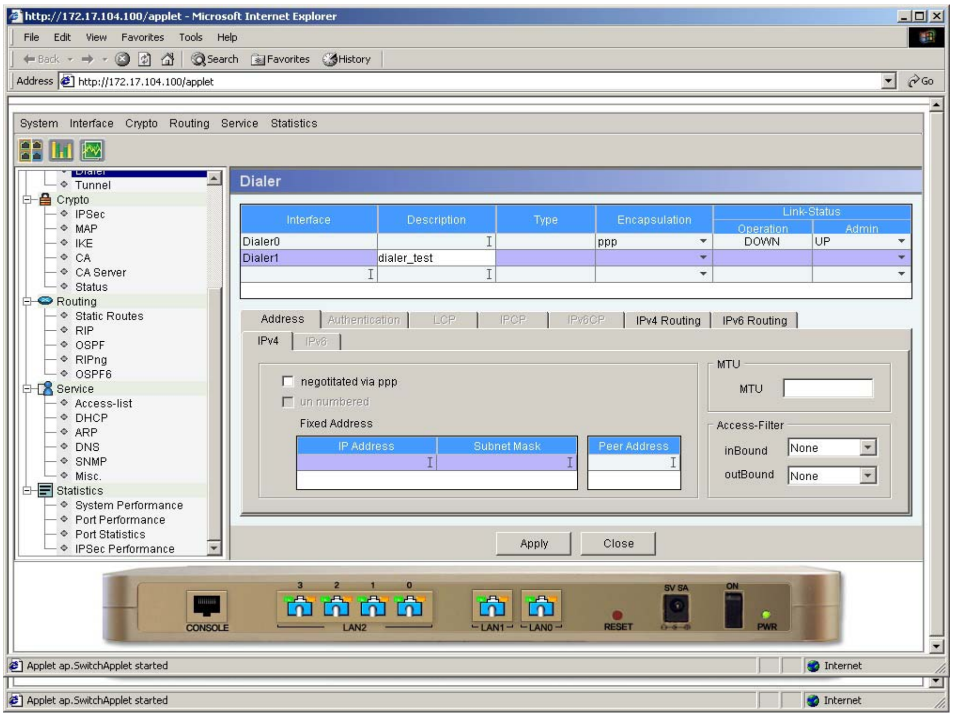
<Table 3-24> Dialer IPv6CP Description

Elements	Description
Enable IPv6 and IPv6CP	Enable of disable IPv6, IPv6CP on virtual Interface.
Accept-Local	It decides whether to recognize Interface Identifier of peer.
Use-IP Address	Config Identifier of interface as “Default-router”.
FSM Timeout [Max-ConFigure]	It sets the maximum transmit number of Configuration Request. Default number is “10”.
FSM Timeout [Max-Failure]	It sets the number of IPv6CP operation. Default number is “5”.
FSM Timeout [Max-Terminate]	It sets the maximum transmit number of Terminate Request. Default number is “2”.

Configuration setting for Dialer IPv4 Routing Protocol (RIP, OSPF), IPv6 Routing Protocol (RIPng, OSPFv3) is the same as Routing Protocol configuration setting of FastEthernet. Please refer to Routing Protocol configuration of FastEthernet.

Figure 3-125 shows how to create and delete Dialer Interface.

First, Input "Dialer1" in Interface field.



Dialer

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test				

☐ negotitated via ppp
☐ un numbered

Fixed Address

IP Address	Subnet Mask	Peer Address

MTU

MTU

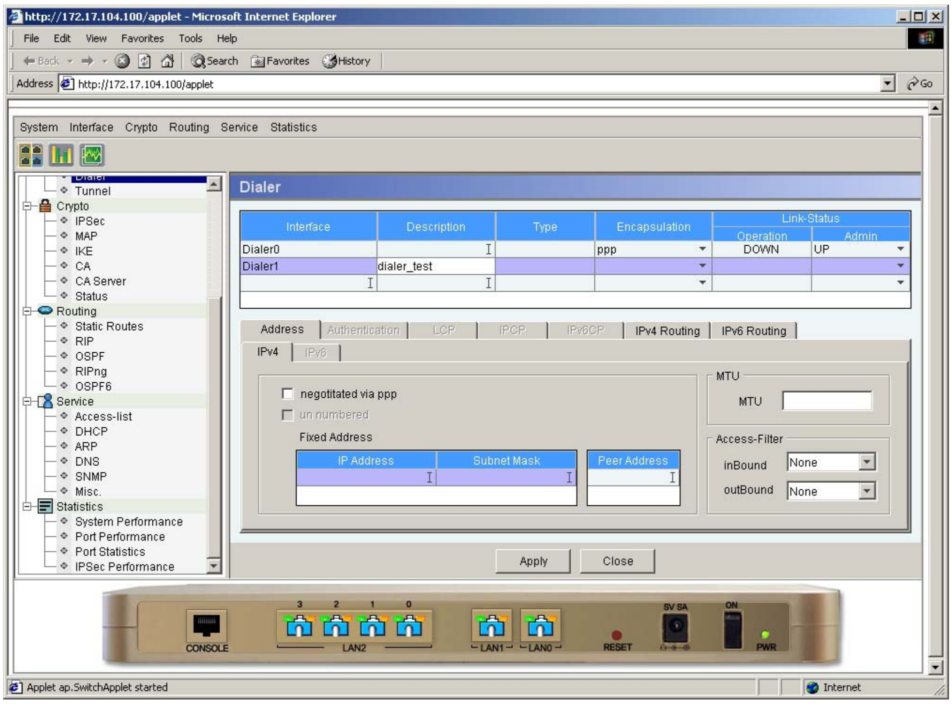
Access-Filter

inBound None

outBound None

(Figure3-124 Create Dialer1 Interface)

Input "dialer_test" in Description field for brief comment.



Dialer

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test				

□ negotitated via ppp

□ un numbered

Fixed Address

IP Address	Subnet Mask	Peer Address

MTU

MTU

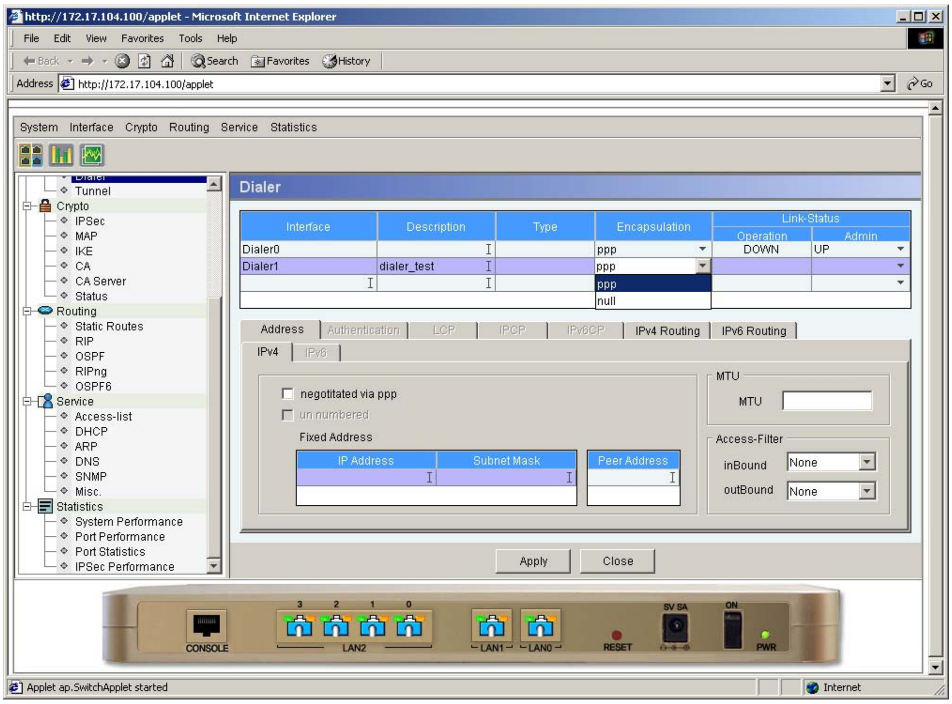
Access-Filter

inBound None

outBound None

(Figure3-125) Input Description

Set Encapsulation to PPP.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
System Performance
Port Performance
Port Statistics
IPSec Performance
Address Authentication LCP IPCP IPv6CP IPv4 Routing IPv6 Routing
IPv4 IPv6
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Dialer

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test		ppp ppp null		

□ negotiated via ppp
□ un numbered
Fixed Address

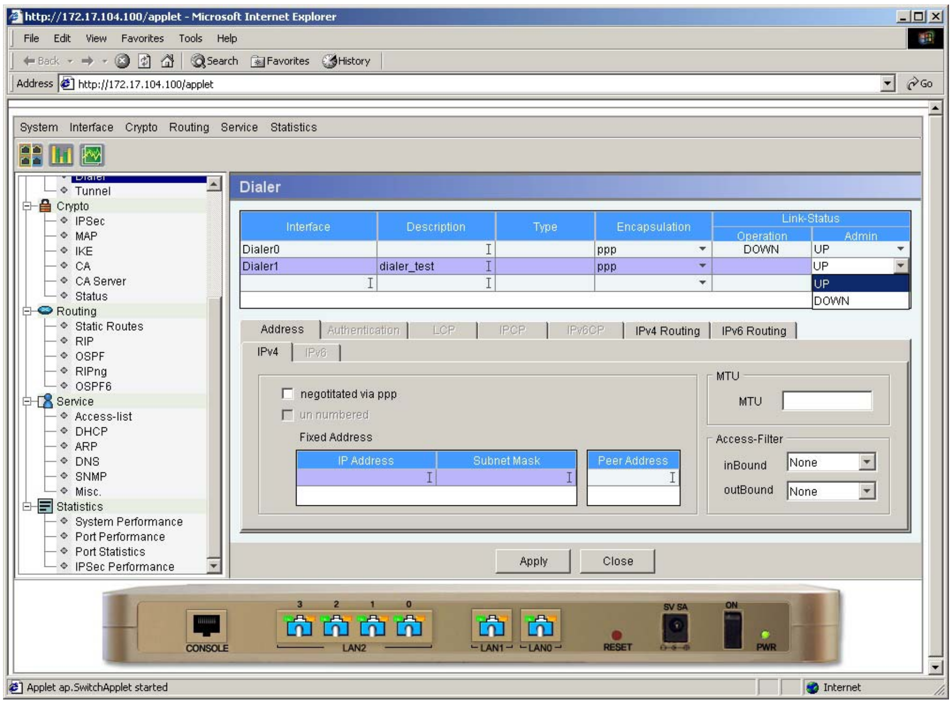
IP Address	Subnet Mask	Peer Address

MTU: MTU

Access-Filter: inBound None; outBound None

(Figure3-126) Select Encapsulation

Set Administrative Link State of Interface to “Up”.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
System Performance
Port Performance
Port Statistics
IPSec Performance
Address Authentication LCP IPCP IPv6CP IPv4 Routing IPv6 Routing
IPv4 IPv6
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Dialer

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test		ppp		UP UP DOWN

□ negotiated via ppp
□ un numbered
Fixed Address

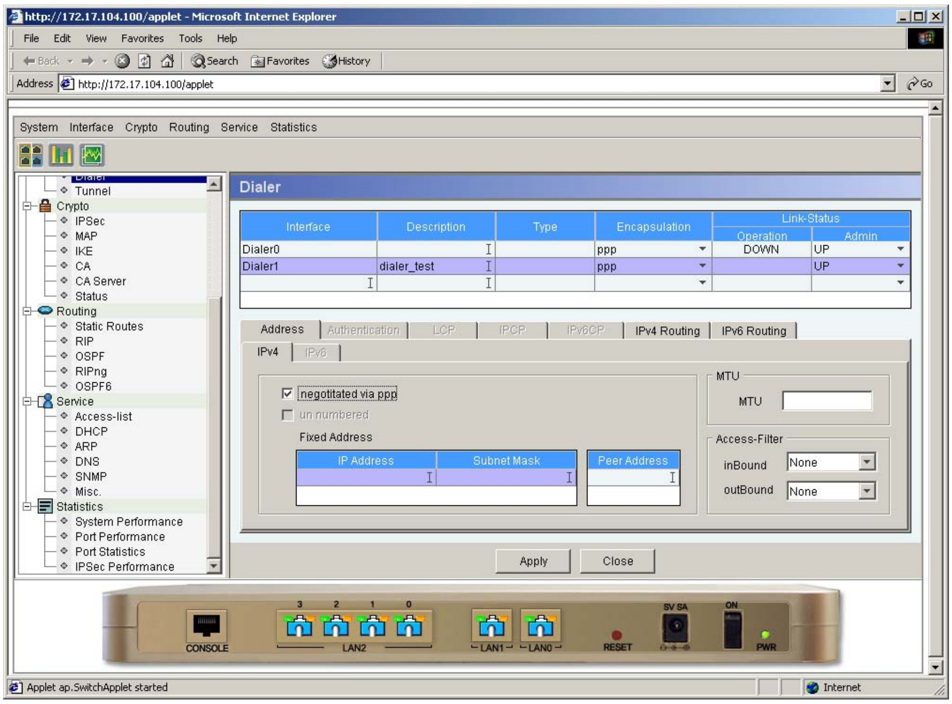
IP Address	Subnet Mask	Peer Address

MTU: MTU

Access-Filter: inBound None; outBound None

(Figure3-127) Alter Administrative Link State

Select Negotiated via ppp for PPP Session.



Dialer

Interface	Description	Type	Encapsulation	Link-Status Operation	Link-Status Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test		ppp		UP

☑ negotitated via ppp

☐ un numbered

Fixed Address

IP Address	Subnet Mask	Peer Address

MTU

MTU

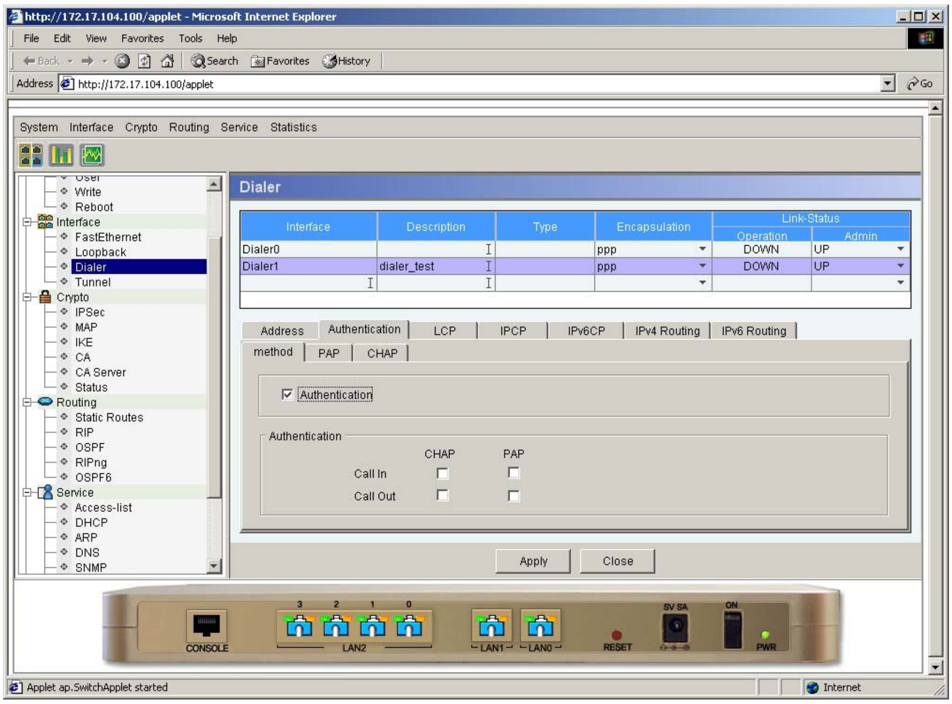
Access-Filter

inBound None

outBound None

(Figure3-128) Select Negotiated via PPP

Check “Authentication” for PPP Session Authentication.



Dialer

Interface	Description	Type	Encapsulation	Link-Status Operation	Link-Status Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test		ppp	DOWN	UP

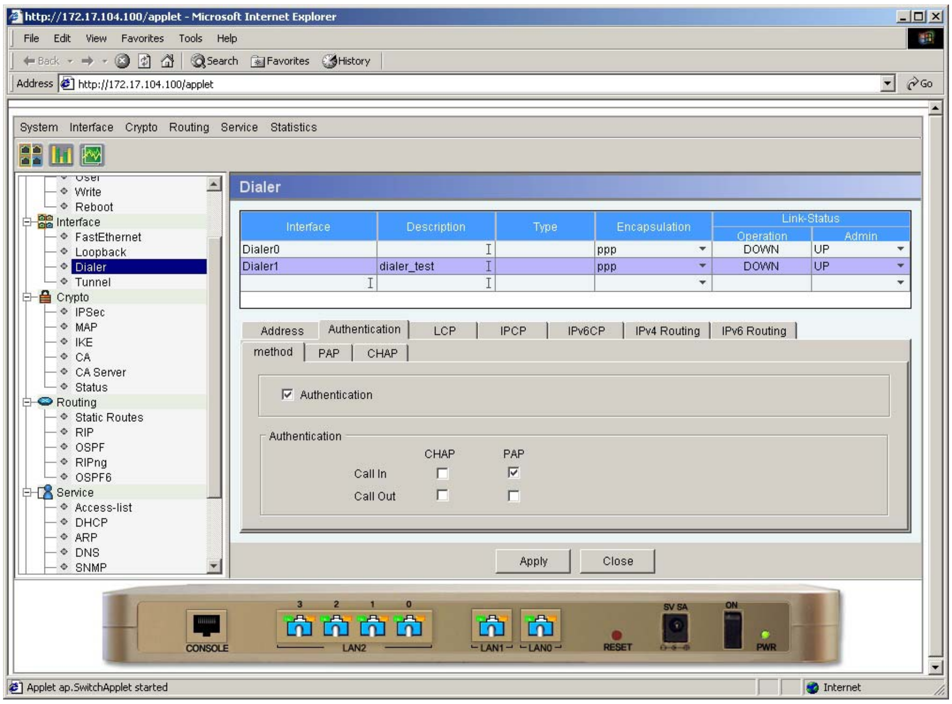
☑ Authentication

Authentication

	CHAP	PAP
Call In	☐	☐
Call Out	☐	☐

(Figure3-129) Check Authentication

Check general PPP Session authentication method, PAP Callin.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Address Authentication LCP IPCP IPv6CP IPv4 Routing IPv6 Routing
method PAP CHAP
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Dialer

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test		ppp	DOWN	UP

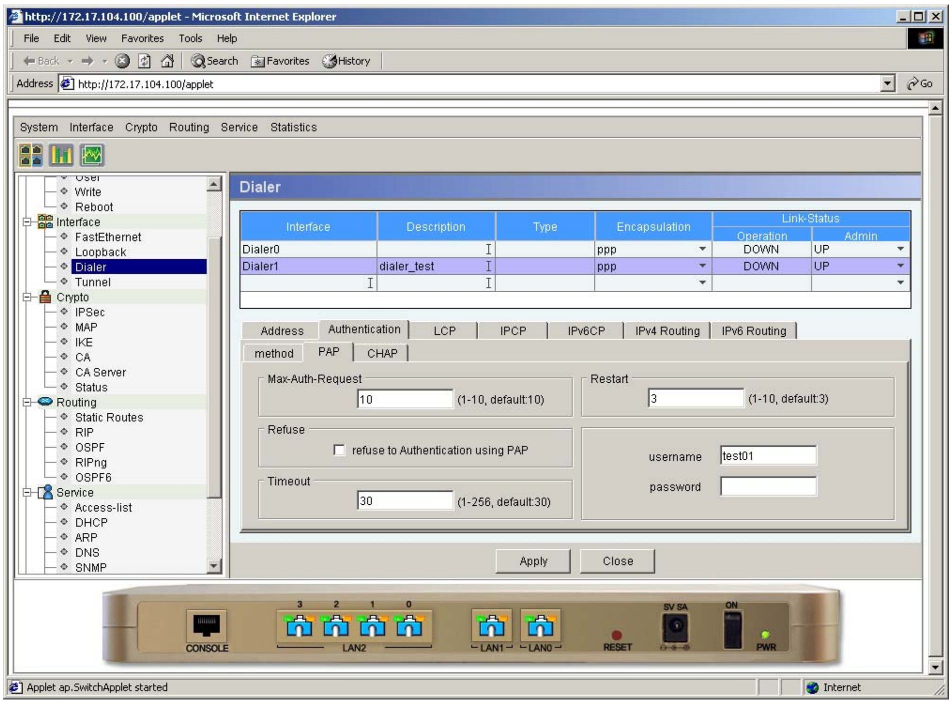
☑ Authentication

Authentication

	CHAP	PAP
Call In	□	☑
Call Out	□	□

(Figure3-130) Check PAP Callin

Input Username "test01" for PAP authentication.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Address Authentication LCP IPCP IPv6CP IPv4 Routing IPv6 Routing
method PAP CHAP
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Dialer

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test		ppp	DOWN	UP

Max-Auth-Request: 10 (1-10, default:10)

Restart: 3 (1-10, default:3)

Refuse: □ refuse to Authentication using PAP

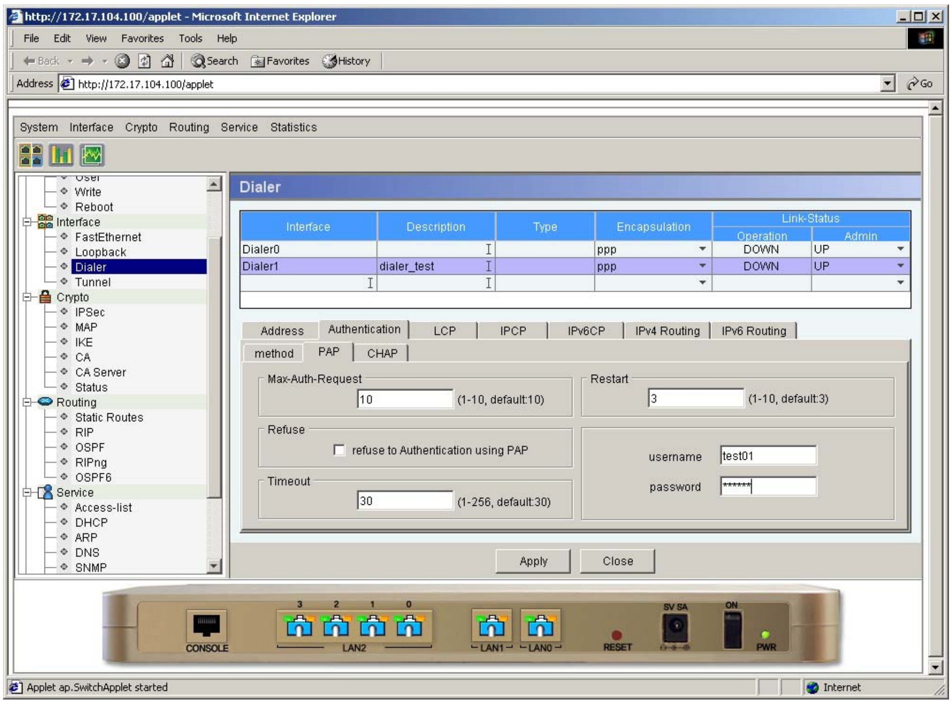
username: test01

password:

Timeout: 30 (1-256, default:30)

(Figure3-131) Input PAP Username

Input PAP Password “test01”. It will be shown as “*” on the screen for security.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Dialer
Address Authentication LCP IPCP IPv6CP IPv4 Routing IPv6 Routing
method PAP CHAP
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET SV SA ON PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test		ppp	DOWN	UP

Max-Auth-Request 10 (1-10, default:10)

Restart 3 (1-10, default:3)

Refuse
☐ refuse to Authentication using PAP

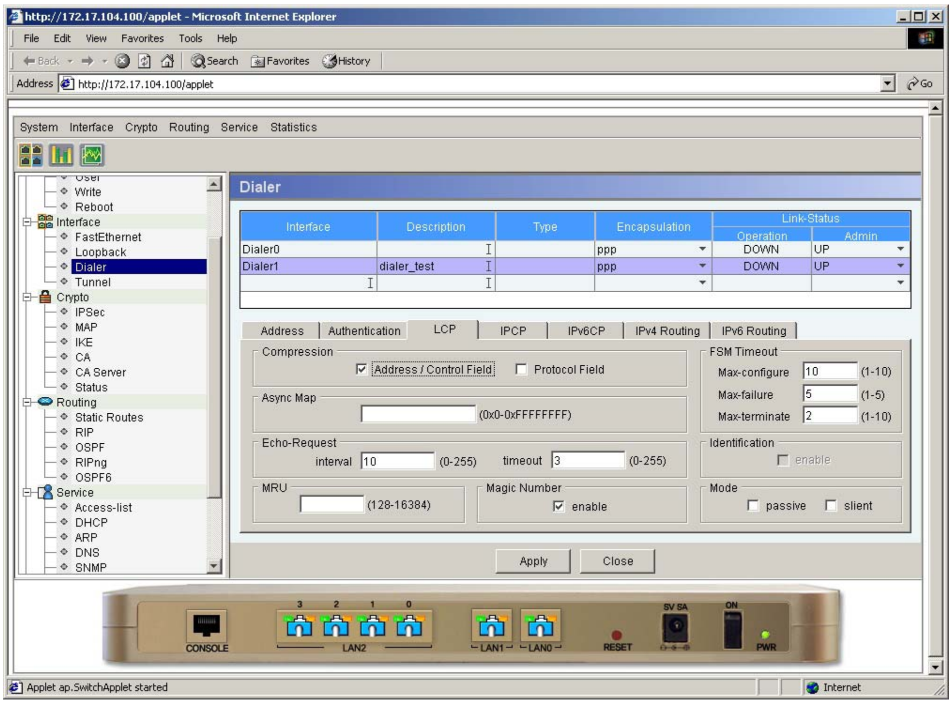
Timeout 30 (1-256, default:30)

username test01

password ******

(Figure3-132) Input PAP User Password

Check on LCP Address/Control Field Compression


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Dialer
Address Authentication LCP IPCP IPv6CP IPv4 Routing IPv6 Routing
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET SV SA ON PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test		ppp	DOWN	UP

Compression
☑ Address / Control Field ☐ Protocol Field

FSM Timeout
Max-configure 10 (1-10)
Max-failure 5 (1-5)
Max-terminate 2 (1-10)

Async Map (0x0-0xFFFFFFFF)

Echo-Request
interval 10 (0-255) timeout 3 (0-255)

Identification
☐ enable

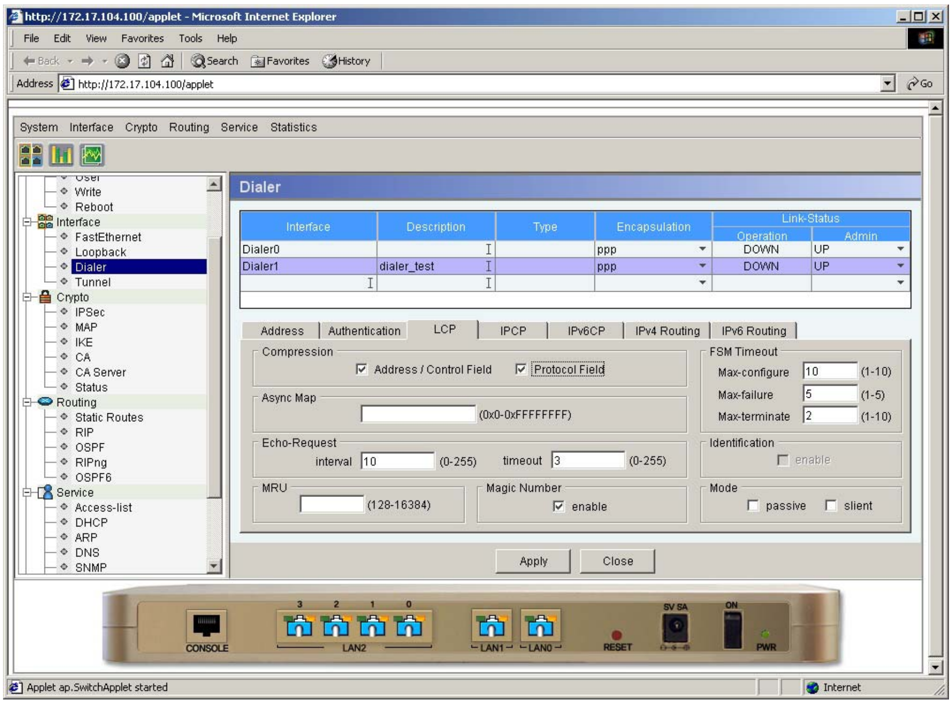
MRU (128-16384)

Magic Number
☑ enable

Mode
☐ passive ☐ slient

(Figure3-133) Check LCP ACFC

Check LCP Protocol Field Compression.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Dialer
Address Authentication LCP IPCP IPv6CP IPv4 Routing IPv6 Routing
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Encapsulation	Link-Status Operation	Link-Status Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test		ppp	DOWN	UP

Compression: ☑ Address / Control Field ☑ Protocol Field

Async Map: (0x0-0xFFFFFFFF)

Echo-Request: interval 10 (0-255) timeout 3 (0-255)

MRU: (128-16384)

Magic Number: ☑ enable

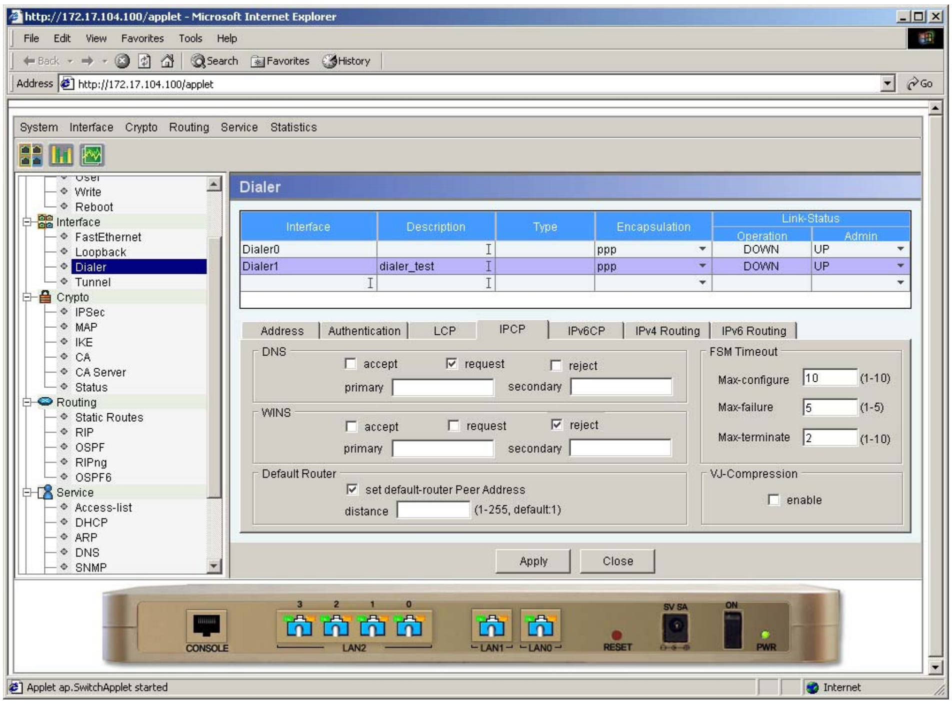
FSM Timeout: Max-configure 10 (1-10), Max-failure 5 (1-5), Max-terminate 2 (1-10)

Identification: □ enable

Mode: □ passive □ slient

(Figure3-134) Check LCP PFC

Check DNS Request and Default Router to be able to receive information from Peer.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Dialer
Address Authentication LCP IPCP IPv6CP IPv4 Routing IPv6 Routing
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Type	Encapsulation	Link-Status Operation	Link-Status Admin
Dialer0			ppp	DOWN	UP
Dialer1	dialer_test		ppp	DOWN	UP

DNS: □ accept ☑ request □ reject; primary secondary

WINS: □ accept □ request ☑ reject; primary secondary

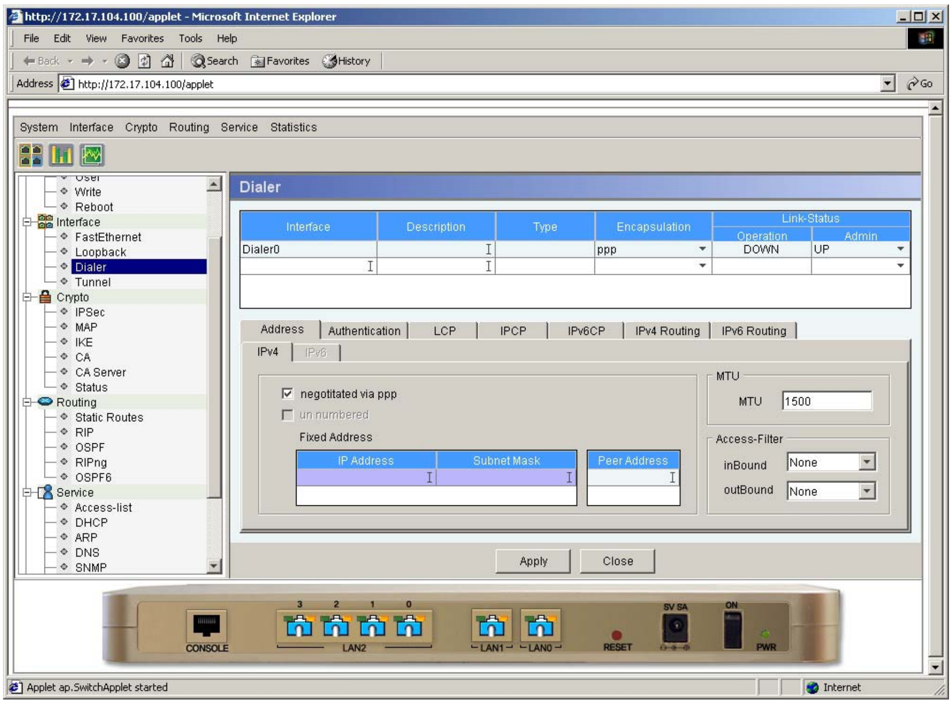
Default Router: ☑ set default-router Peer Address; distance (1-255, default:1)

FSM Timeout: Max-configure 10 (1-10), Max-failure 5 (1-5), Max-terminate 2 (1-10)

VJ-Compression: □ enable

(Figure3-135) Check IPCP DNS Request, Default Router

To delete a specific Dialer Interface, select the interface you want to delete, click on right side of the mouse to delete.



Interface	Description	Type	Encapsulation	Link-Status	
				Operation	Admin
Dialer0			ppp	DOWN	UP

☑ negotitated via ppp

☐ un numbered

Fixed Address

IP Address	Subnet Mask	Peer Address

MTU

MTU 1500

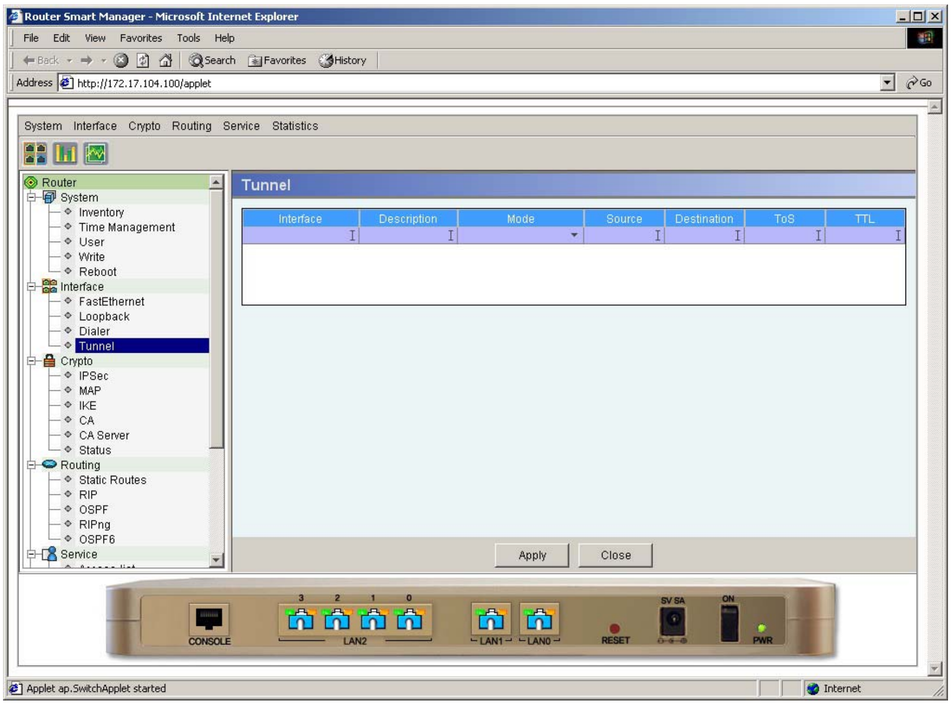
Access-Filter

inBound None

outBound None

Tunnel

Tunnel Interface is necessary for IPv4 and IPv6 communication. For example, there is LAN A and LAN B configured with IPv6. And they need to go through IPv4 area for end-to-end IPv6 Communication. Tunnel Interface enables to communicate between LAN A and LAN B.



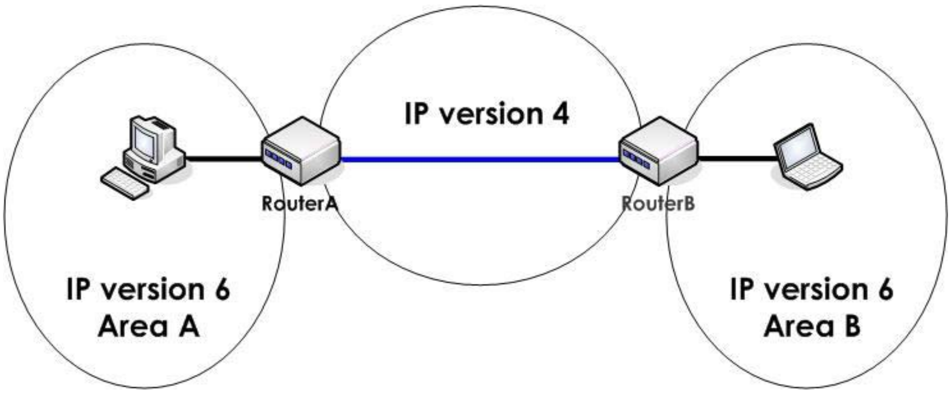
Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Tunnel
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Mode	Source	Destination	ToS	TTL

(Figure3-136) Tunnel main page

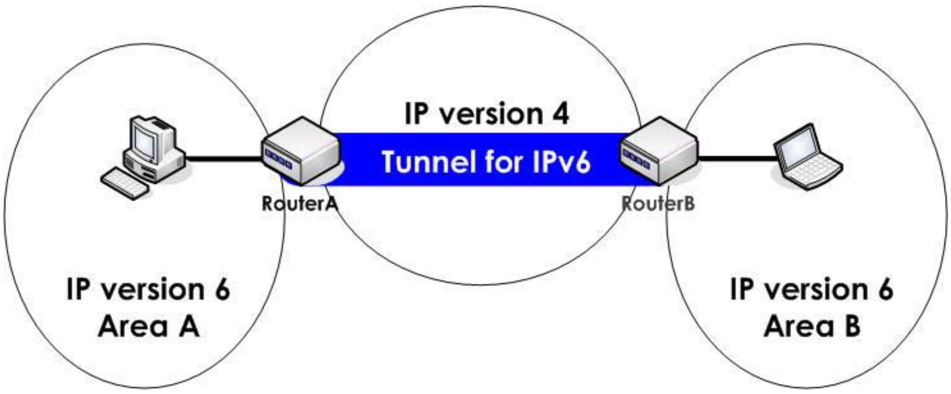
Figure 3-139 is an example of Tunnel Interface.

Router A and B is configured with IP version 4 network, so hosts from Area A and Area B are not able to communicate each other. It is because of Router A and Router B can not implement normal Routing.

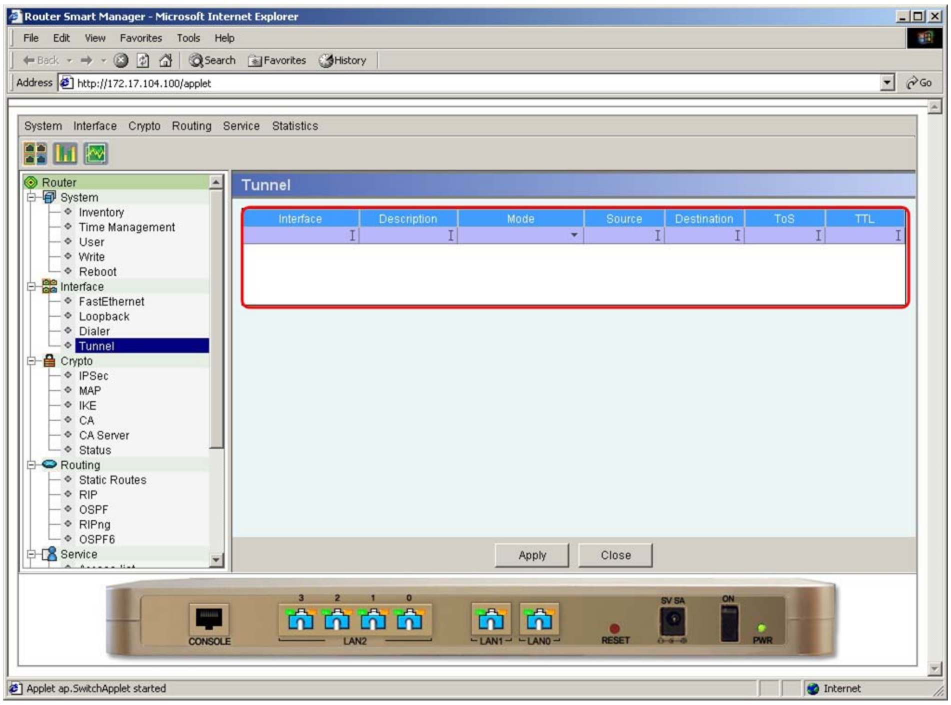


(Figure3-137) Tunnel Interface example Network Diagram 1

However, through Tunnel Interface, Router A and Router B create logical tunnel between Area A and Area B. So hosts from these two areas can send and receive IP version 6 datagram.



(Figure3-138) Tunnel Interface example Network Diagram 2



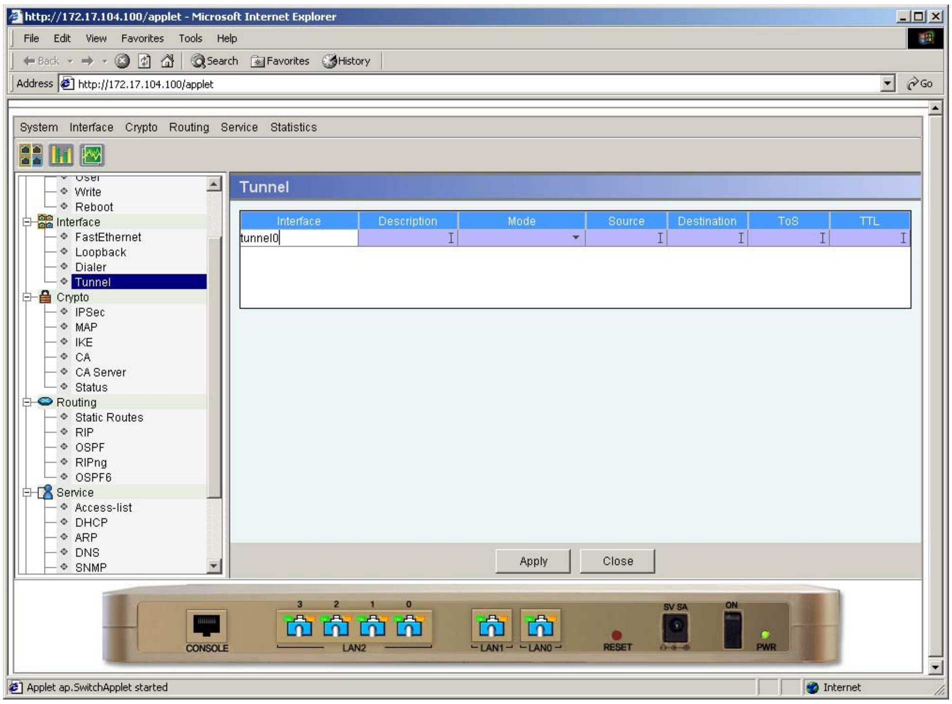
(Figure3-139) Tunnel main page

<Table 3-25> Tunnel Description

Elements	Description
Interface	The name of Tunnel Interface
Description	Brief comments
Mode	Select one from ipip, ipv6ip or none mode.
Source	Input IP Address of Local Interface.
Destination	Input Interface IP Address of Peer system.
ToS	Type of Service. It is used for changing ToS field value of sending Packet. Default value is “0”.
TTL	It decides TTL field value of Sending Packet. Default value is 30 Hop.

Figure 3-142 shows how to add Tunnel Interface.

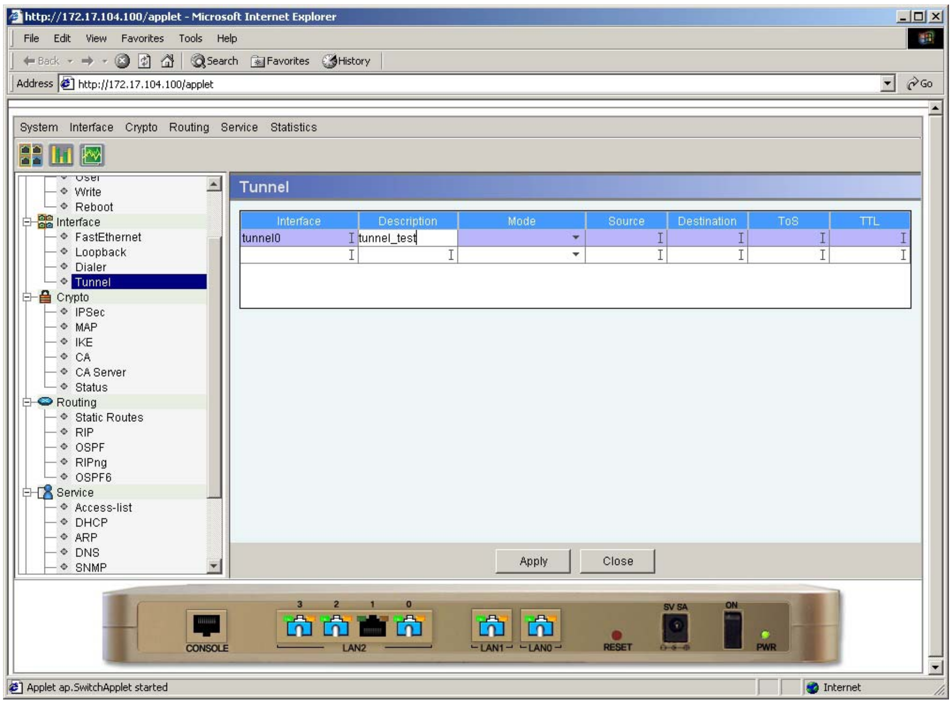
Input “tunnel0” by clicking Interface field.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Tunnel
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Mode	Source	Destination	ToS	TTL
tunnel0						

(Figure3-140) Input Tunnel Interface Name

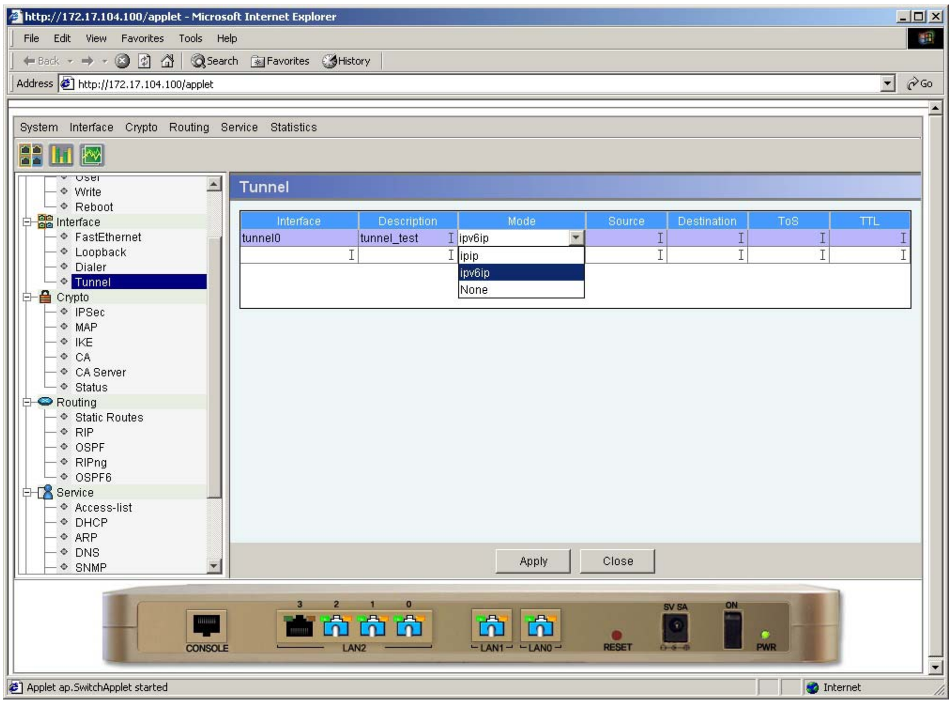
Input “tunnel_test” in Description field.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Tunnel
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Mode	Source	Destination	ToS	TTL
tunnel0	tunnel_test					

(Figure3-141) Input Tunnel Interface Description

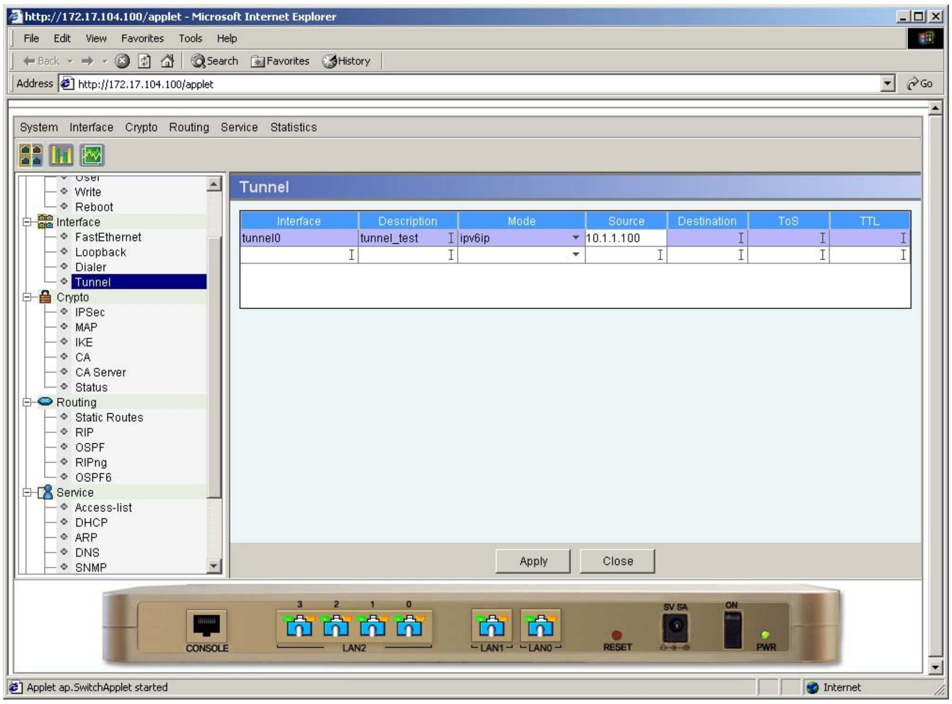
Select "ipv6ip" Mode to create IPv6 → IPv4 Tunnel Interface.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Tunnel
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Mode	Source	Destination	ToS	TTL
tunnel0	tunnel_test	ipv6ip				
		ipip ipv6ip None				

(Figure3-142) Select Tunnel Mode

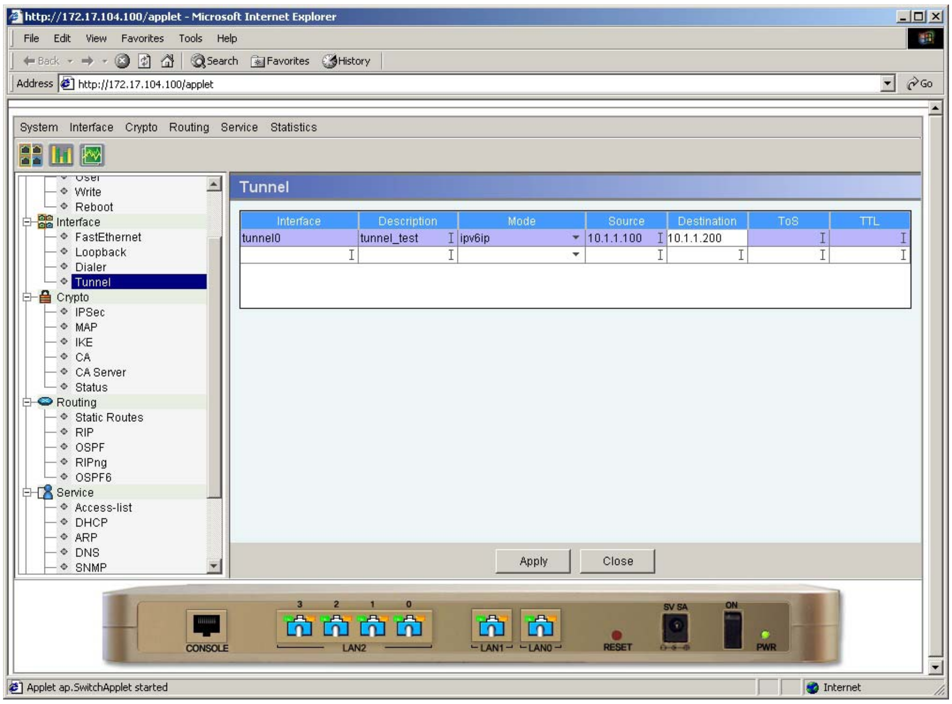
Input IP Address of Local Interface in Source field.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Tunnel
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Mode	Source	Destination	ToS	TTL
tunnel0	tunnel_test	ipv6ip	10.1.1.100			

(Figure3-143) Input Tunnel Interface IP Address

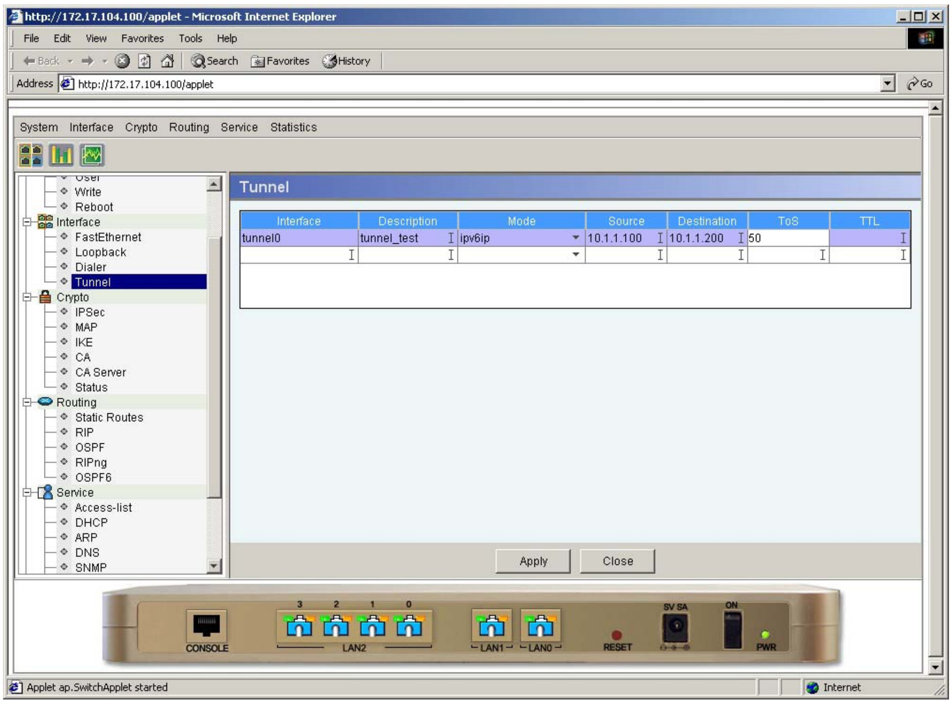
Input Peer IP Address in Destination field.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Tunnel
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Mode	Source	Destination	ToS	TTL
tunnel0	tunnel_test	ipv6ip	10.1.1.100	10.1.1.200		

(Figure3-144) Input Tunnel Interface Destination IP Address

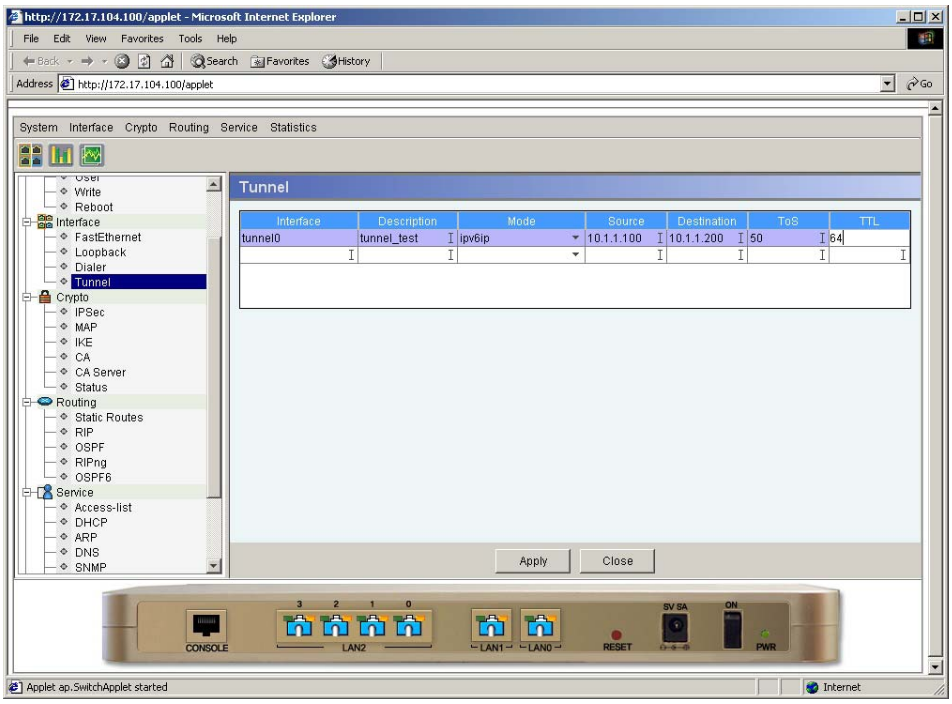
Input "50" for ToS field of sending packet via Tunnel Interface.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Tunnel
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Mode	Source	Destination	ToS	TTL
tunnel0	tunnel_test	ipv6ip	10.1.1.100	10.1.1.200	50	

(Figure3-145) Input Tx Packet ToS

Input "64" for TTL field of sending packet via Tunnel Interface.

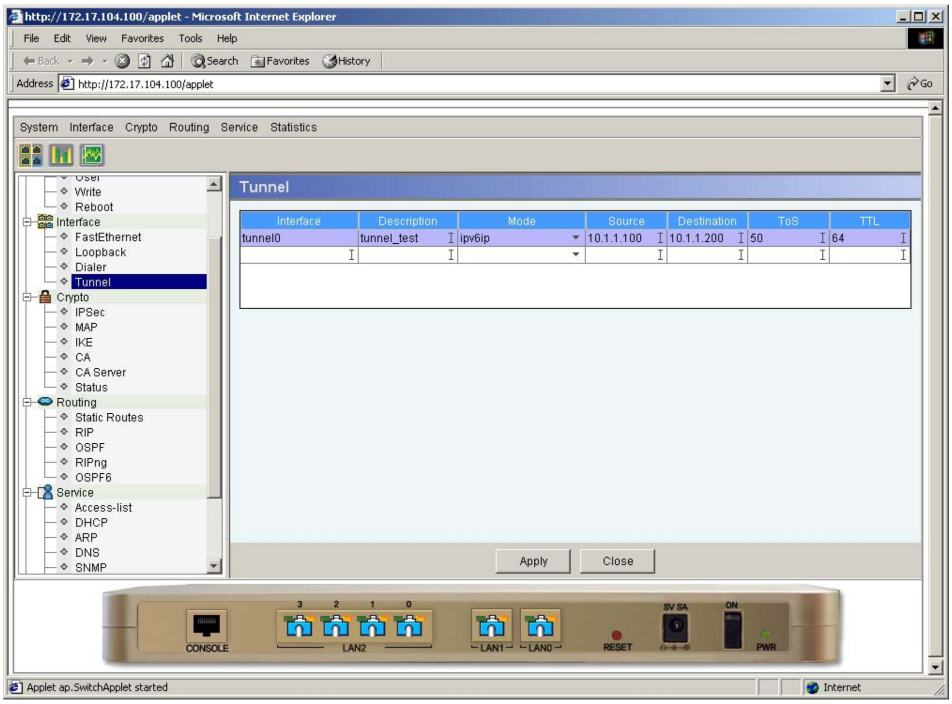

http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Tunnel
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Mode	Source	Destination	ToS	TTL
tunnel0	tunnel_test	ipv6ip	10.1.1.100	10.1.1.200	50	64

(Figure3-146) Input Tx Packet TTL

Click "Apply" to verify.

To delete Tunnel Interface, Select the interface you want to delete then click "Delete" on the right side of mouse.

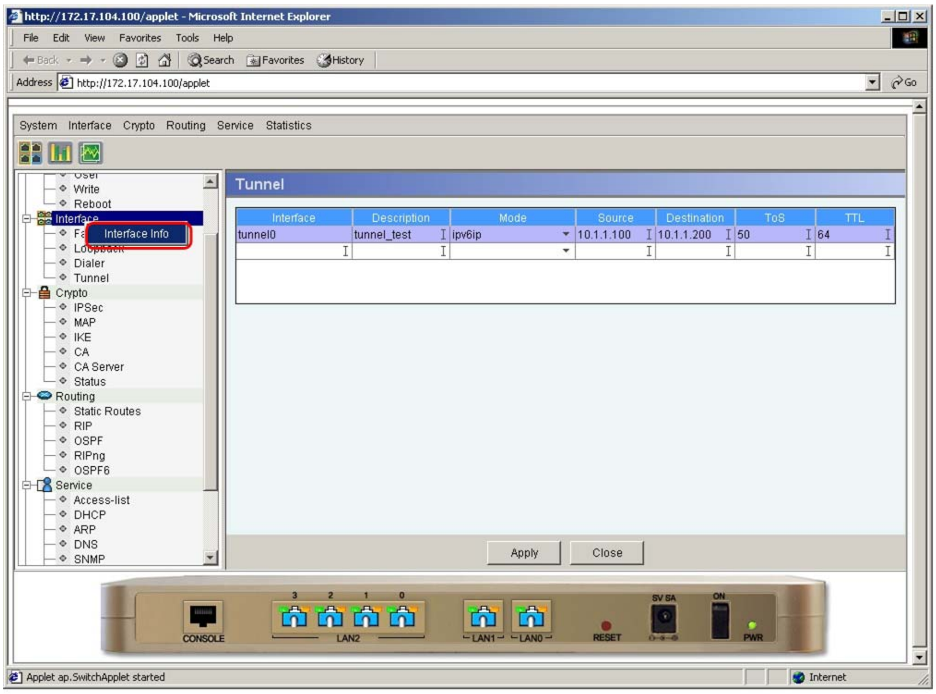

http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Tunnel
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

Interface	Description	Mode	Source	Destination	ToS	TTL
tunnel0	tunnel_test	ipv6ip	10.1.1.100	10.1.1.200	50	64

(Figure3-147) Tunnel Interface creation

Interface Popup Menu

Select Interface, then click right side of the mouse to use Popup Menu. Popup Menu of Interface is Interface Information. Use a mouse to see the detail info for each element.

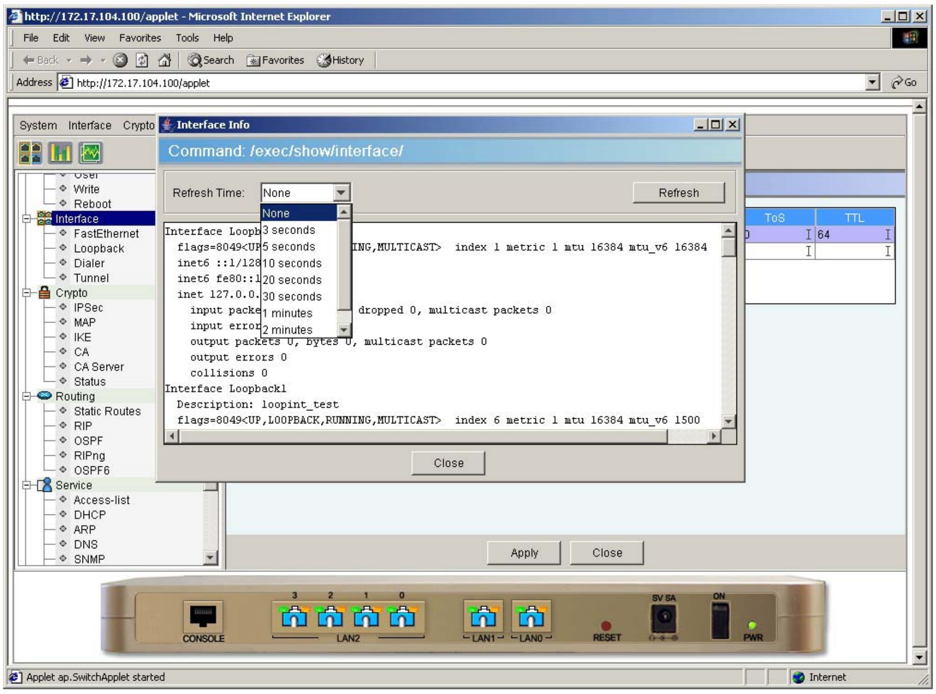

http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
User
Write
Reboot
Interface
Fa
Interface Info
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Apply
Close
CONSOLE
3 2 1 0
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

Tunnel

Interface	Description	Mode	Source	Destination	ToS	TTL
tunnel0	tunnel_test	ipv6ip	10.1.1.100	10.1.1.200	50	64

(Figure3-148) Interface Popup Menu Main page.

Refresh Time for Interface Info can take 3 sec to 5 sec. Click Refresh button run directly. Information for each Interface includes Interface Metric, MTU, IP Address, MAC Address, Tx/Rx Packet Count etc.



Command: /exec/show/interface/

Refresh Time: None

```
Interface Loopb
  flags=8049<UP                ING,MULTICAST>  index 1 metric 1 mtu 16384 mtu_v6 16384
  inet6 ::1/128
  inet6 fe80::1
  inet 127.0.0.
    input packe                dropped 0, multicast packets 0
    input error
    output packets 0, bytes 0, multicast packets 0
    output errors 0
    collisions 0
Interface Loopback1
  Description: loopint_test
  flags=8049<UP,LOOPBACK,RUNNING,MULTICAST>  index 6 metric 1 mtu 16384 mtu_v6 1500
```

(Figure3-149) Interface Info page

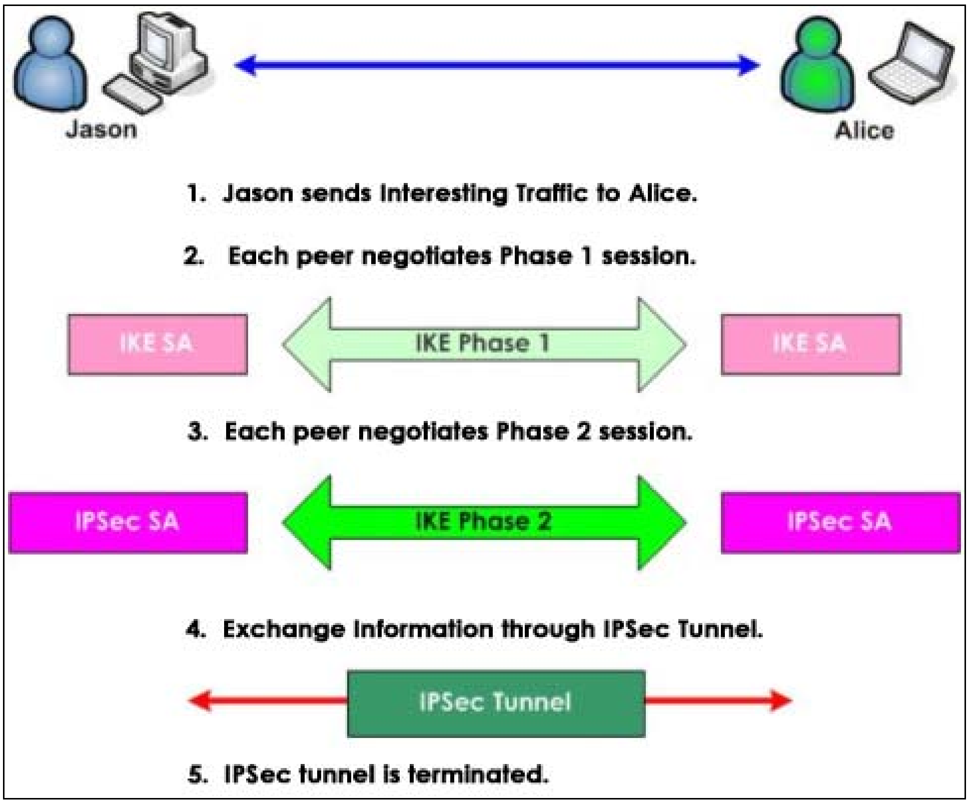
Crypto Menu

IPSec

IPSec supports secure communication between the end-to-end terminals.

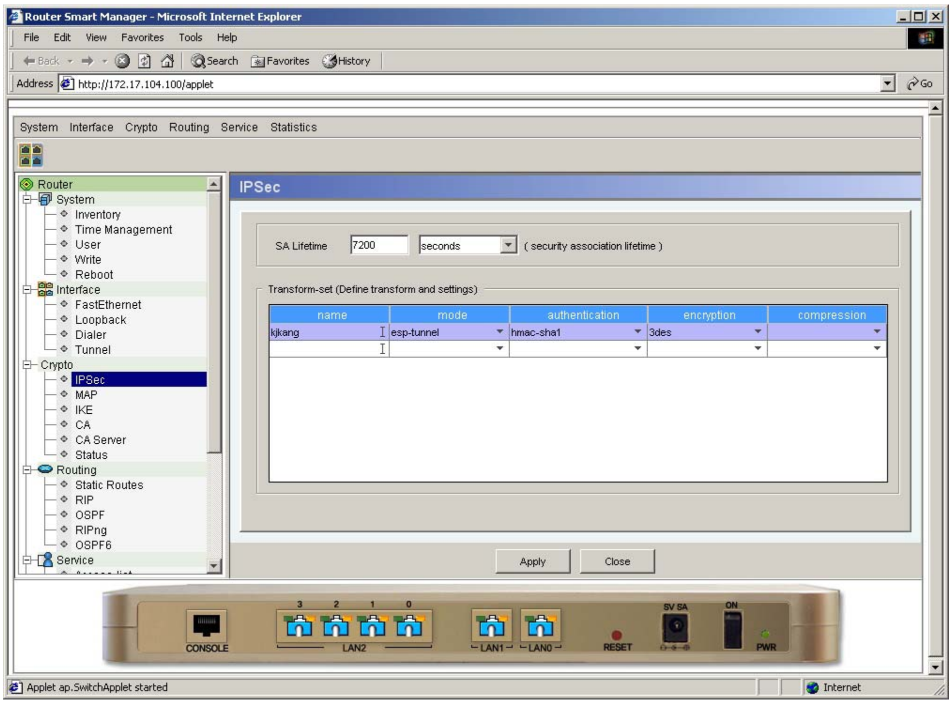
It provides security protocols based on IP layer.

Figure 3-152 shows stages of realizing IPSec.


Jason
Alice
1. Jason sends Interesting Traffic to Alice.
2. Each peer negotiates Phase 1 session.
IKE SA
IKE Phase 1
IKE SA
3. Each peer negotiates Phase 2 session.
IPSec SA
IKE Phase 2
IPSec SA
4. Exchange Information through IPSec Tunnel.
IPSec Tunnel
5. IPSec tunnel is terminated.

(Figure3-150) Stages of realizing IPSec

The user can define IPSec Mode, Authentication, Data Encryption, Data Compression etc on IPSec menu.



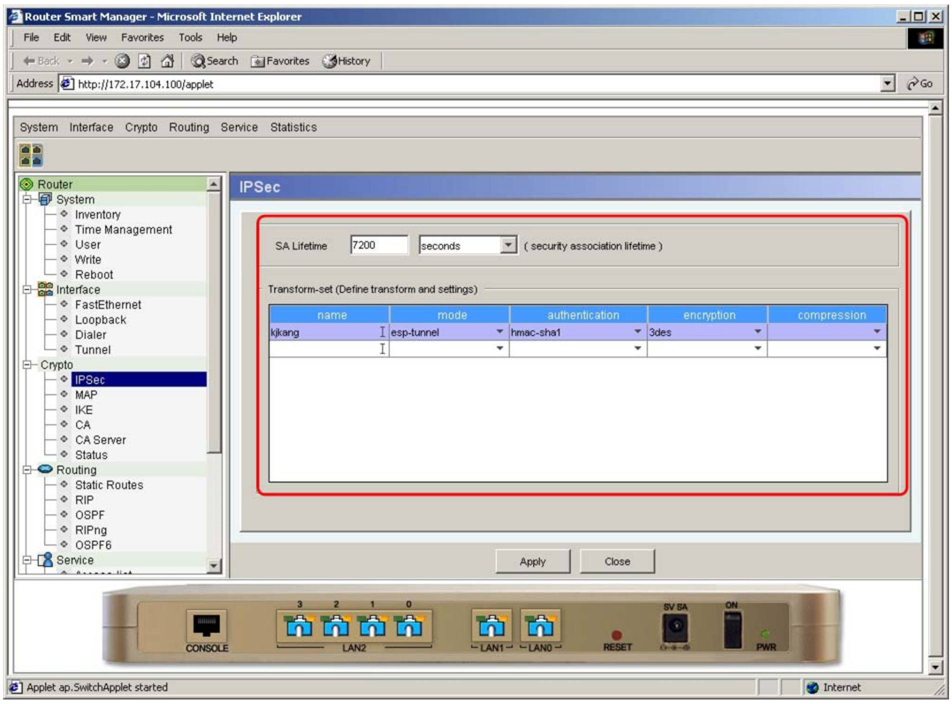
SA Lifetime 7200 seconds (security association lifetime)

Transform-set (Define transform and settings)

name	mode	authentication	encryption	compression
kjkang	esp-tunnel	hmac-sha1	3des	

(Figure3-151) Crypto IPSec Main page

<Table 3-26> shows each element of IPSec menu.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
IPSec
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

SA Lifetime 7200 seconds (security association lifetime)

Transform-set (Define transform and settings)

name	mode	authentication	encryption	compression
kjkang	esp-tunnel	hmac-sha1	3des	

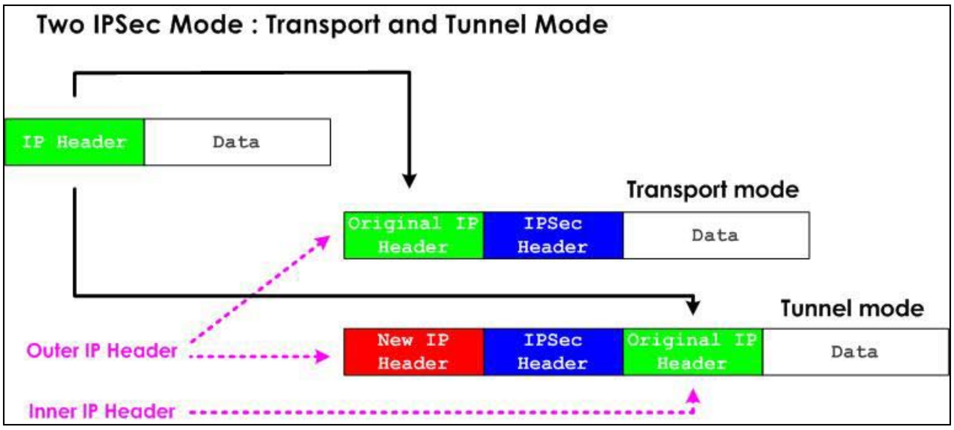
(Figure3-152) IPSec Menu

<Table 3-26> IPSec Description

Elements	Description
SA Lifetime	Lifetime of Security Association. Time or data traffic can be choosed.
Name	The name of Transform-set.
Mode	Select IPSec Mode. Choose one from esp-tunnel, esp-transport, ah-tunnel, ah-transport.
Authentication	Select authentication algorithm. Choose one from hmac-md5, hmac-sha1.
Encryption	Select Encryption algorithm. Choose one from 3des, blowfish, cast, des, null, rijndael.
Compression	Select data compression algorithm. Choose one from deflate, lzs.

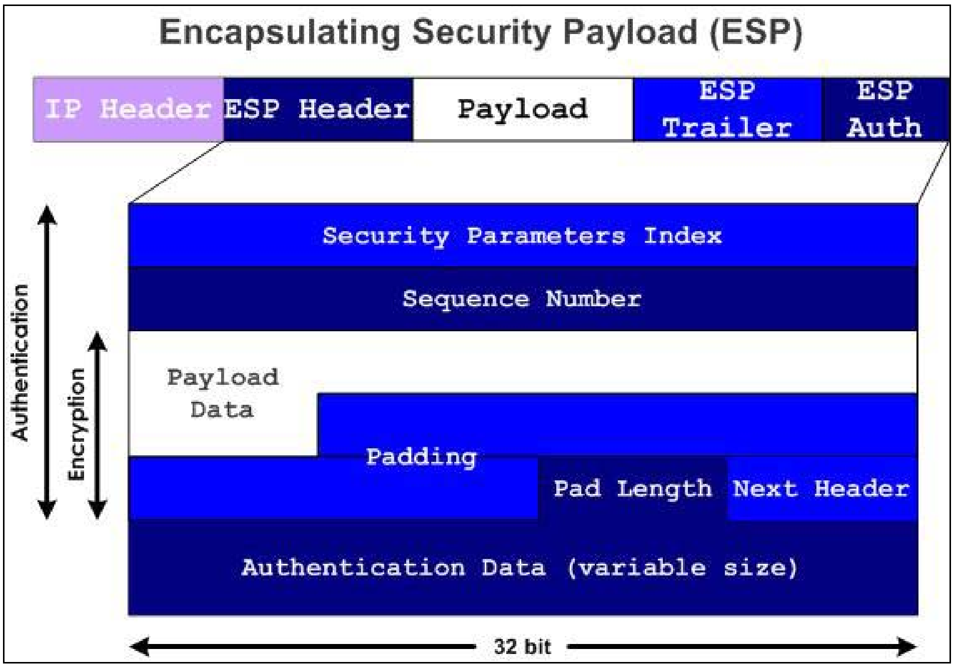
Figure 3-155 shows the difference between Transport Mode and Tunnel Mode.

Source IP Address and Destination IP Address are not changing on Transport Mode. IP Address for IPSec communication is added on Tunnel Mode.



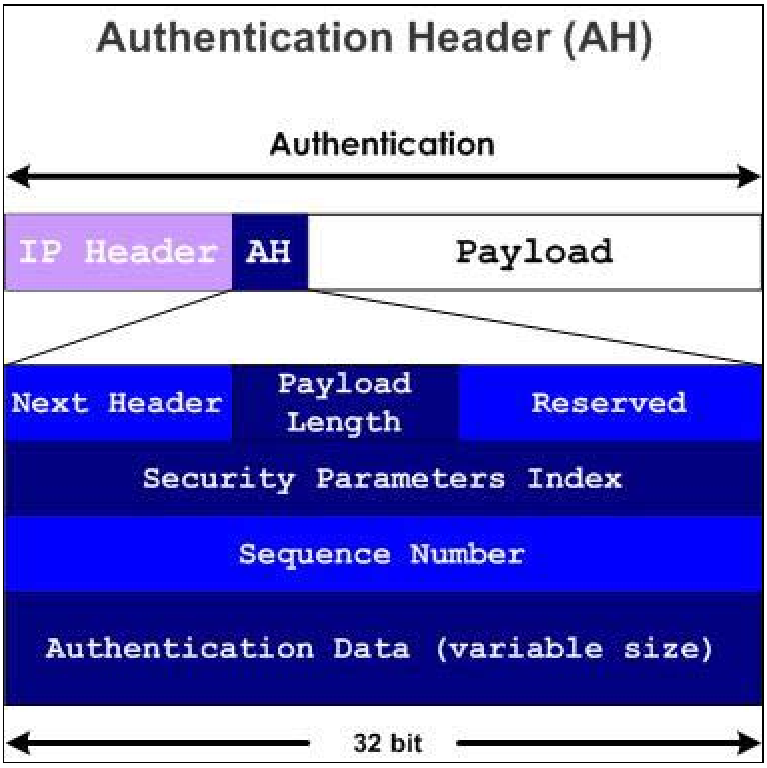
(Figure3-153) Transport Mode and Tunnel Mode

Figure 3-156 shows the structure of ESP Packet.



(Figure3-154) ESP Packet structure

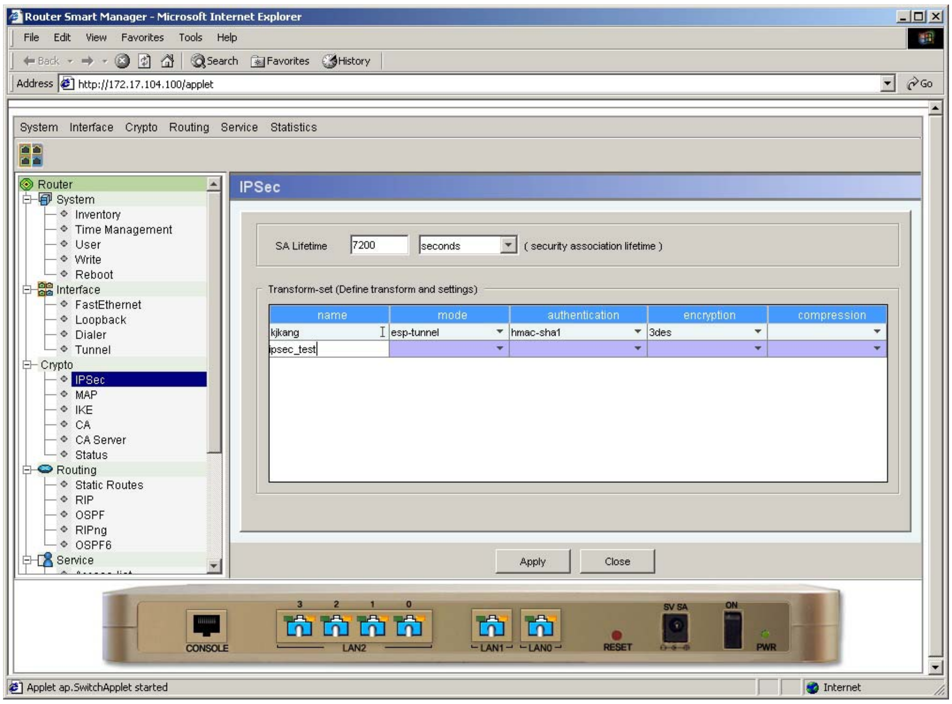
Figure 3-157 shows AH Packet structure.


Authentication Header (AH)
Authentication
IP Header
AH
Payload
Next Header
Payload Length
Reserved
Security Parameters Index
Sequence Number
Authentication Data (variable size)
32 bit

(Figure3-155) AH Packet Structure

Figure 3-158 shows how to make IPSec Transform-set.

First, Input “ipsec_test” in the name field. You can make your own name. However, any spaces are not allowed in the name field.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
IPSec
Apply
Close
CONSOLE LAN2 LAN1 LAN0 RESET SV SA ON PWR
Applet ap.SwitchApplet started
Internet

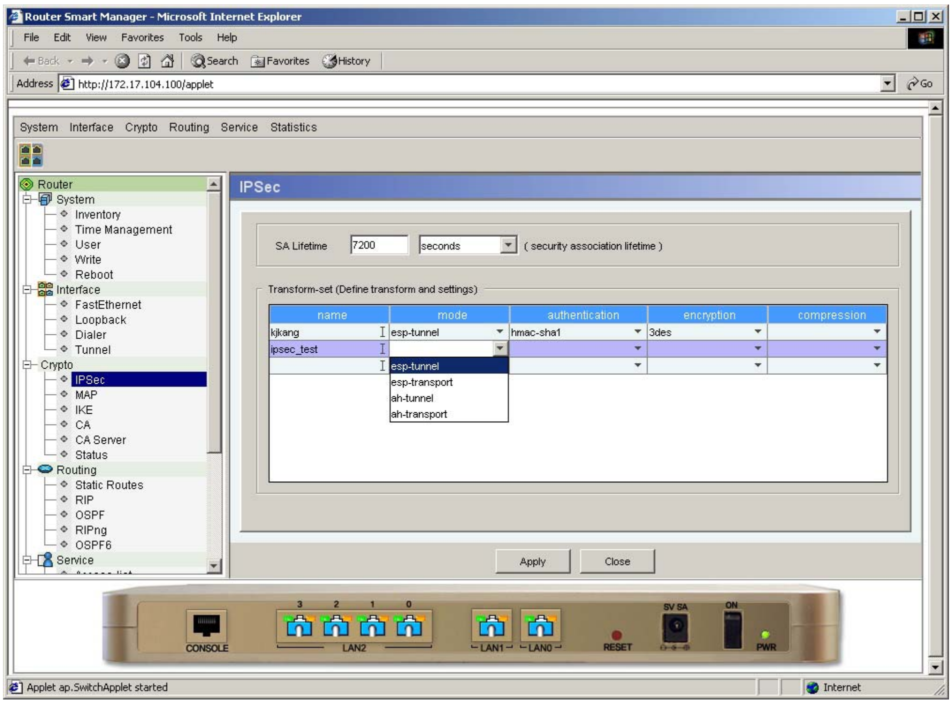
SA Lifetime 7200 seconds (security association lifetime)

Transform-set (Define transform and settings)

name	mode	authentication	encryption	compression
kjkang	esp-tunnel	hmac-sha1	3des	
ipsec_test				

(Figure3-156) Input IPSec Transform-set name

Select “esp-tunnel” for IPSec Mode.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
IPSec
esp-tunnel
esp-transport
ah-tunnel
ah-transport
Apply
Close
CONSOLE LAN2 LAN1 LAN0 RESET SV SA ON PWR
Applet ap.SwitchApplet started
Internet

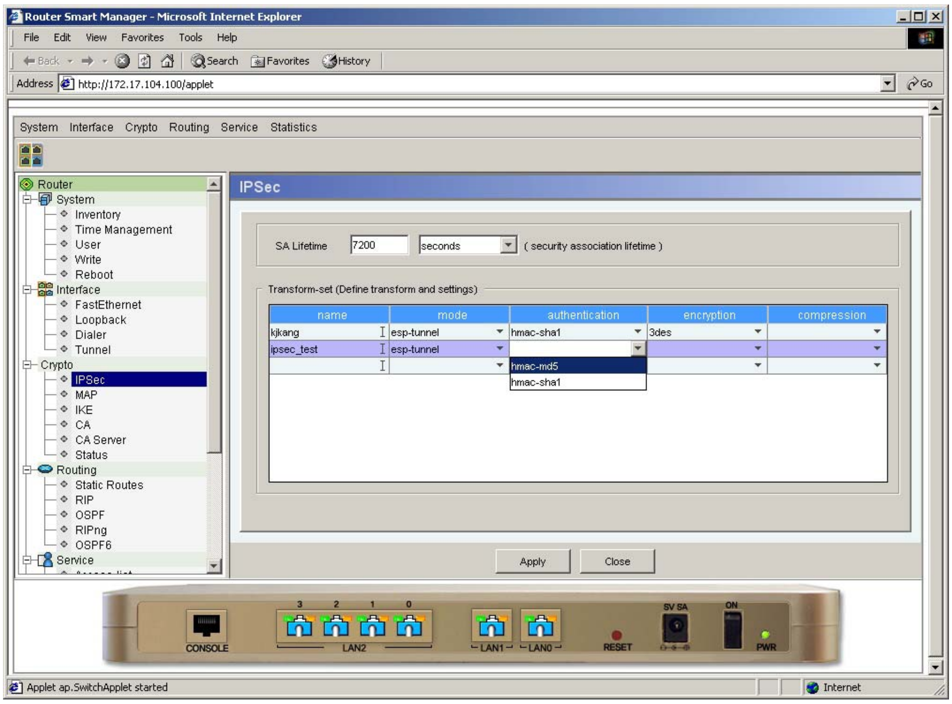
SA Lifetime 7200 seconds (security association lifetime)

Transform-set (Define transform and settings)

name	mode	authentication	encryption	compression
kjkang	esp-tunnel	hmac-sha1	3des	
ipsec_test				

(Figure3-157) Select IPSec Transform-set Mode

Select "hmac-md5" for Data authentication algorithm.



IPSec

SA Lifetime 7200 seconds (security association lifetime)

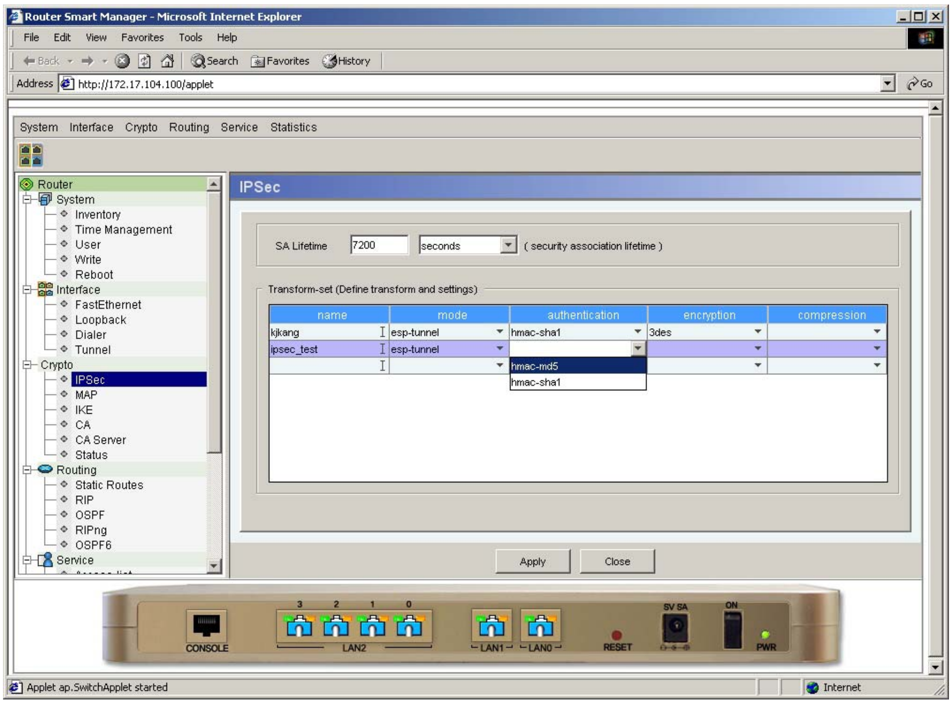
Transform-set (Define transform and settings)

name	mode	authentication	encryption	compression
kjkang	esp-tunnel	hmac-sha1	3des	
ipsec_test	esp-tunnel			

hmac-md5
hmac-sha1

(Figure3-158) IPSec Authentication main page

Select "3des" for data encryption.



IPSec

SA Lifetime 7200 seconds (security association lifetime)

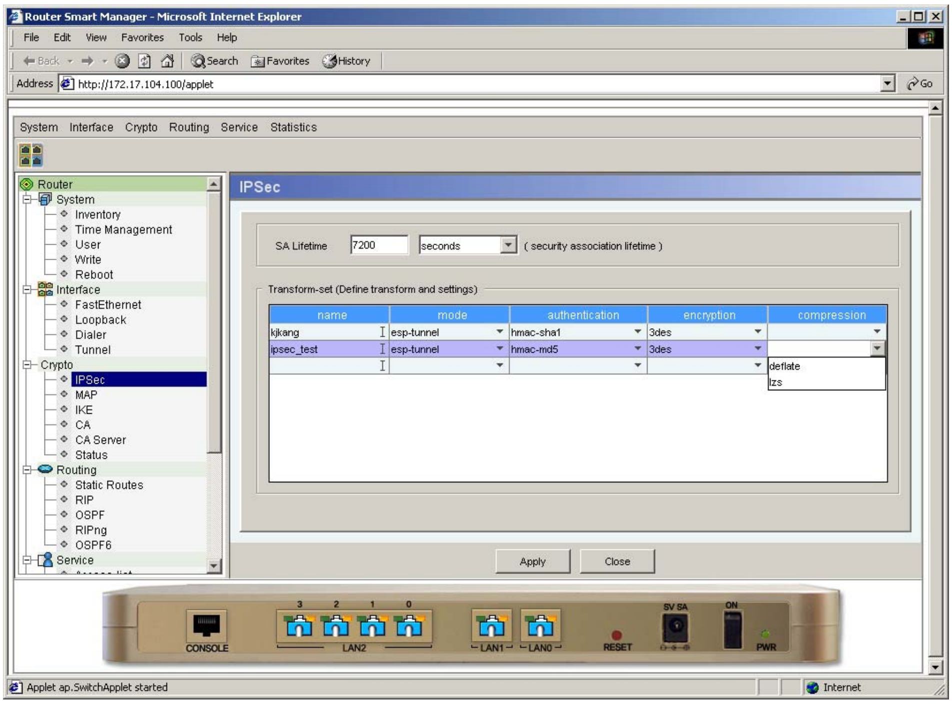
Transform-set (Define transform and settings)

name	mode	authentication	encryption	compression
kjkang	esp-tunnel	hmac-sha1	3des	
ipsec_test	esp-tunnel			

hmac-md5
hmac-sha1

(Figure3-159) Select IPSec Encryption

Select “lzs” for data compression algorithm.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
IPSec
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

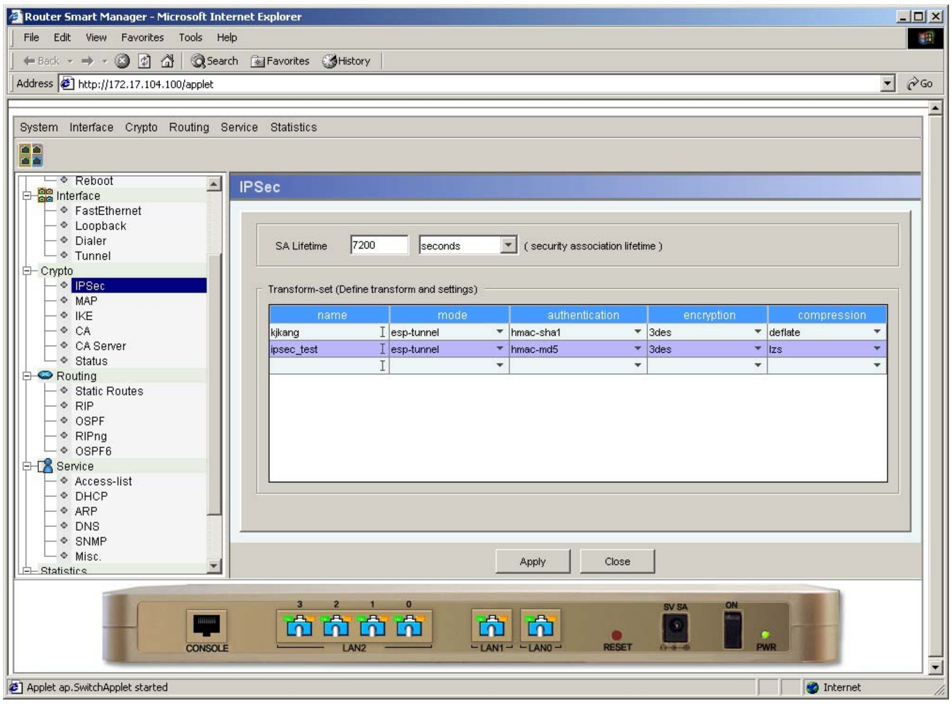
SA Lifetime 7200 seconds (security association lifetime)

Transform-set (Define transform and settings)

name	mode	authentication	encryption	compression
kjkang	esp-tunnel	hmac-sha1	3des	
ipsec_test	esp-tunnel	hmac-md5	3des	
				deflate lzs

(Figure3-160) Select IPSec Data Compression

Click “Apply” to verify. Figure 3-163 will be shown.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
IPSec
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

SA Lifetime 7200 seconds (security association lifetime)

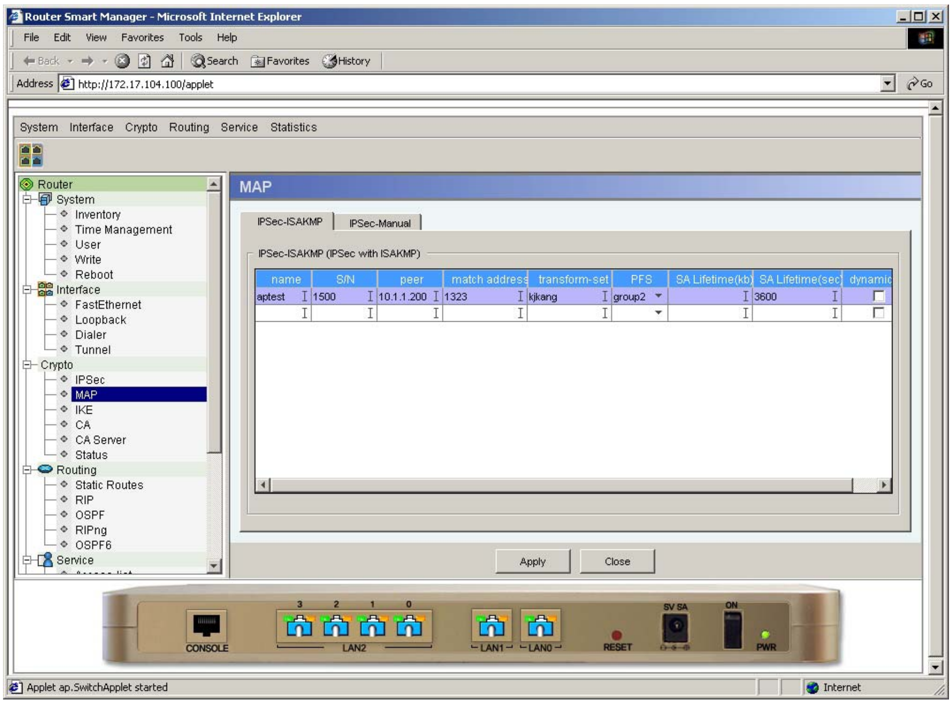
Transform-set (Define transform and settings)

name	mode	authentication	encryption	compression
kjkang	esp-tunnel	hmac-sha1	3des	deflate
ipsec_test	esp-tunnel	hmac-md5	3des	lzs

(Figure3-161) Root Parameters configuration page

MAP

Virtual network can not be configured only with Transform-set from IPSec menu. You need to create a Map using Transform-set. The user can define session options for configuring virtual network.



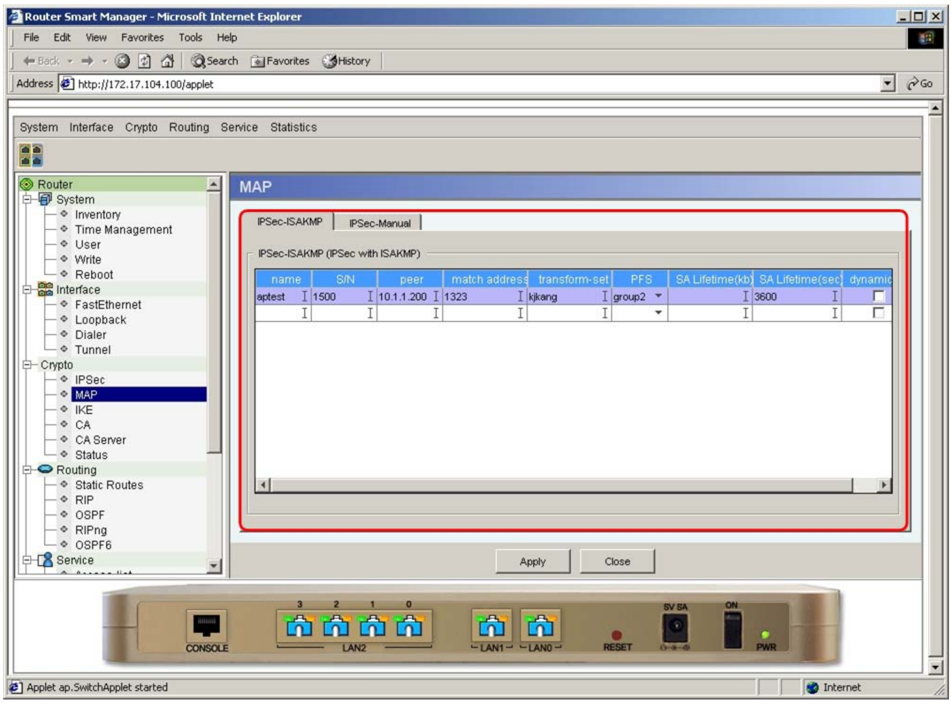
IPSec-ISAKMP (IPSec with ISAKMP)

name	S/N	peer	match address	transform-set	PFS	SA Lifetime(kb)	SA Lifetime(sec)	dynamic
aptest	1500	10.1.1.200	1323	kjkang	group2		3600	□
								□

(Figure3-162) Crypto MAP main page

There are two ways of creating Map. One is to use IKE Key creation algorithm and the other one is manually inputting the Key Values. The later one delivers high speed in data exchange than using IKE when configuring VPN. However, in the later one, if any one of the Key values is not matched with the other, problems can occur. So you need to be very careful on this.

<Table 3-27> shows IPSec-ISAKMP menu description.



IPSec-ISAKMP (IPSec with ISAKMP)

name	S/N	peer	match address	transform-set	PFS	SA Lifetime(kb)	SA Lifetime(sec)	dynamic
aptest	1500	10.1.1.200	1323	kjkang	group2		3600	□
								□

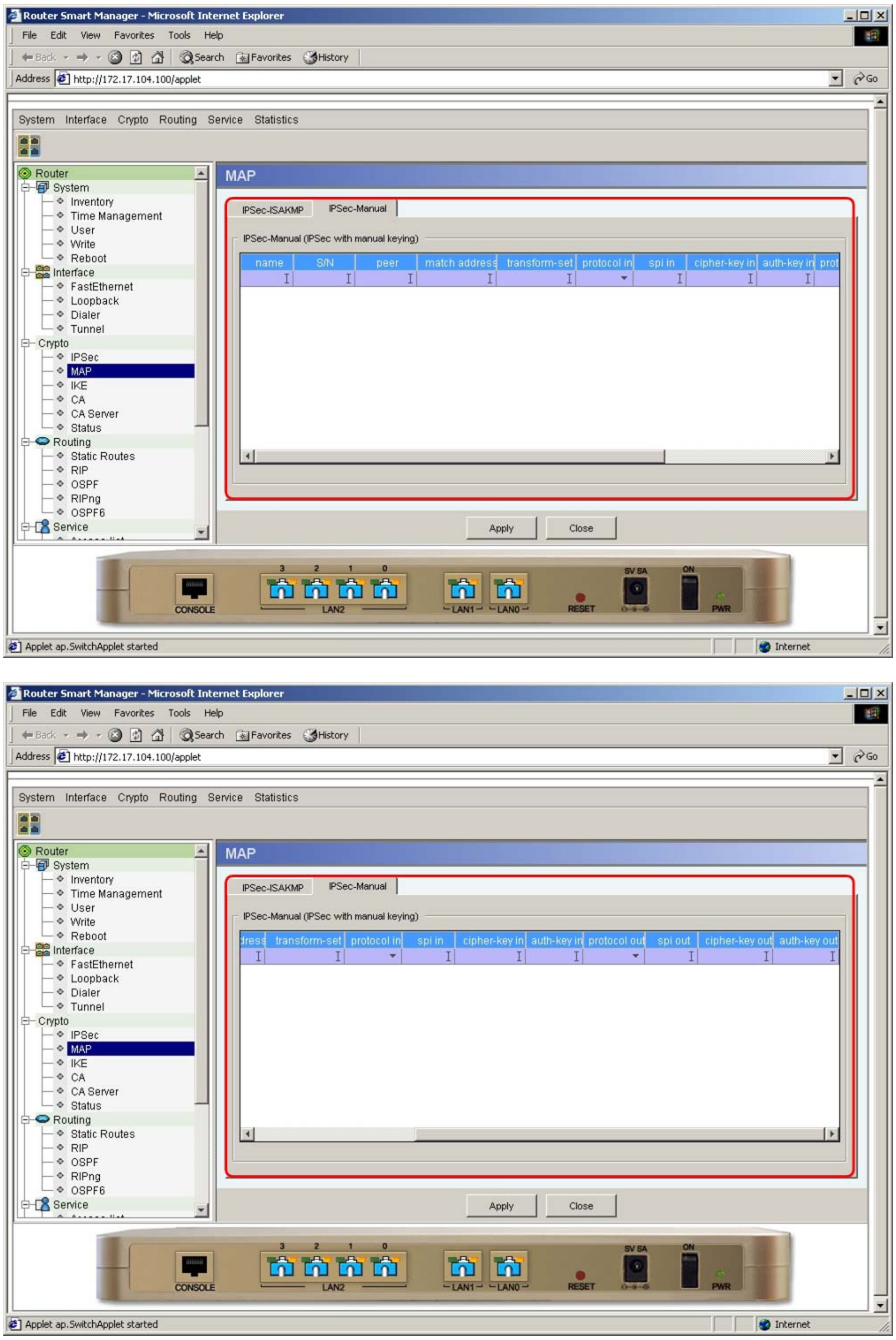
(Figure3-163) IPSec-ISAKMP Menu

<Table 3-27> IPSec-ISAKMP Menu Description

Elements	Description
Name	Define name of the Map
S/N	Sequence Number. It gives priority among many maps.
Peer	Input IP Address of Peer Interface.
Match Address	Input tag number of Access-List. When Map is applied to the Interface, only Packets in Access-List are secured by IPSec Transform-set.
Transform-set	Input Transform-set from IPSec menu.
PFS	Define Diffie-Hellman group. Diffie-Hellman group is an algorithm about creation of public key/private key.

	There are 3 groups (Group1, 2, 5). Group1 is the fastest but with less complexity of encryption and Group5 has excellent algorithm complexity but with slow speed. Therefore Gruop2 is recommended.
SA Lifetime (Kilobytes)	The unit is “Kilobytes”
SA Lifetime (Seconds)	Set Life time of Configured Map. The unit is “Seconds”
Dynamic	On Aggressive Mode, Peer which uses Fixed IP Address checks Dynamic Field.

<Table 3-28> shows IPSec-Manual menu.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
MAP
IPSec-ISAKMP
IPSec-Manual
IPSec-Manual (IPSec with manual keying)
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

name	S/N	peer	match address	transform-set	protocol in	spi in	cipher-key in	auth-key in	prot

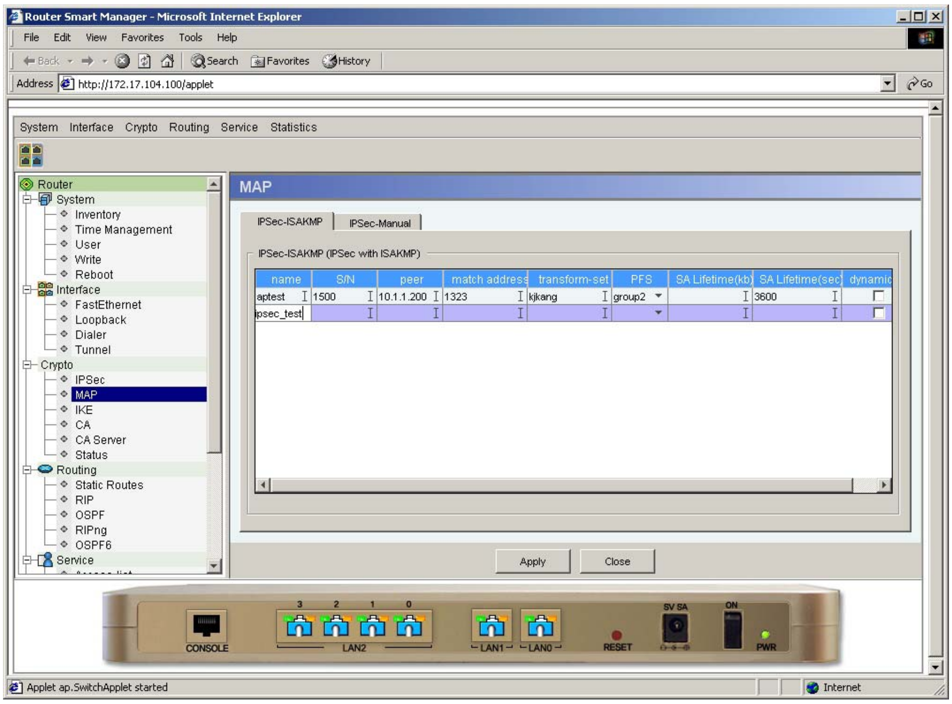
dress	transform-set	protocol in	spi in	cipher-key in	auth-key in	protocol out	spi out	cipher-key out	auth-key out

(Figure3-164) IPSec-Manual menu page

<Table 3-28> IPSec-Manual menu Description

Elements	Description
Name	Define name of the Map
S/N	Sequence Number. It gives priority when there are many maps.
Peer	Input IP Address of Peer Interface
Match Address	Input tag number of Access-List. When Map is applied to Interface, only Packets in Access-List are secured by IPSec Transform-set.
Transform-set	Input Transform-set from IPSec menu.
Protocol in	Define IPSec Protocol for receiving. Select "esp" for esp, "ah" for ah for defined protocols in Transform-set.
Spi in	Defines Security Parameter Index value when receiving. Spi sets the values for opposite Peer. If the Spi value of Peer A is 1000, then the Spi value of PeerB has to be 1000 as well. Also user can define its own value in between 256~4294967295.
Cipher-key in	Defines (16 decimal format) session key for receiving. Select key value from authentication on Transform-set, authentication algorithm. DES : 8 Bytes, 3DES : 24Bytes, AES : 16 Bytes
Auth-key in	When "esp" and "ah" is used together, Input the authentication key value for sending.
Protocol out	Define IPSec Protocol for sending. Select "esp" for esp, "ah" for ah for defined protocols in Transform-set.
Spi out	Security Parameter Index when sending. Spi sets the values for opposite Peer. If the Spi value of Peer A is 1000, then the Spi value of PeerB has to be 1000 as well. Also user can define its own value in between 256~4294967295.
Cipher-key out	Defines (16 decimal format) session key for sending. Select key value from authentication on Transform-set, authentication algorithm. DES : 8 Bytes, 3DES : 24Bytes, AES : 16 Bytes
Auth-key out	When "esp" and "ah" is used together, Input the authentication key value for receiving.

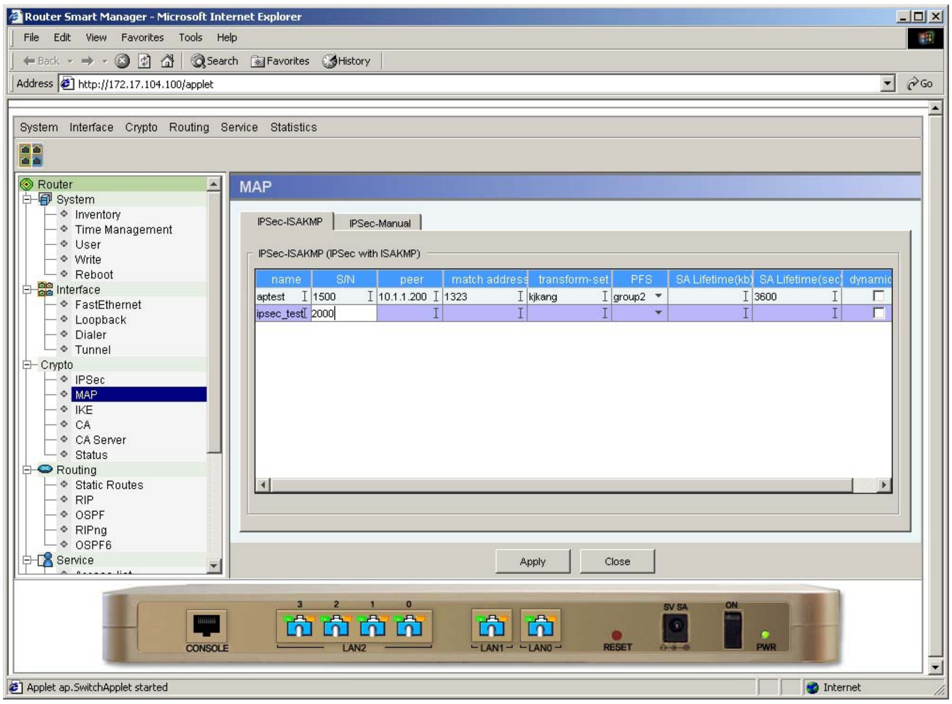
Figure 3-167 shows how to create the map with a name of “ipsec_test”. First, Input “ipsec_test” in the name field.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
MAP
IPSec-ISAKMP
IPSec-Manual
IPSec-ISAKMP (IPSec with ISAKMP)
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

name	S/N	peer	match address	transform-set	PFS	SA Lifetime(kb)	SA Lifetime(sec)	dynamic
aptest	1500	10.1.1.200	1323	kjkang	group2		3600	□
ipsec_test								□

(Figure3-165) Input IPSec-ISAKMP Name

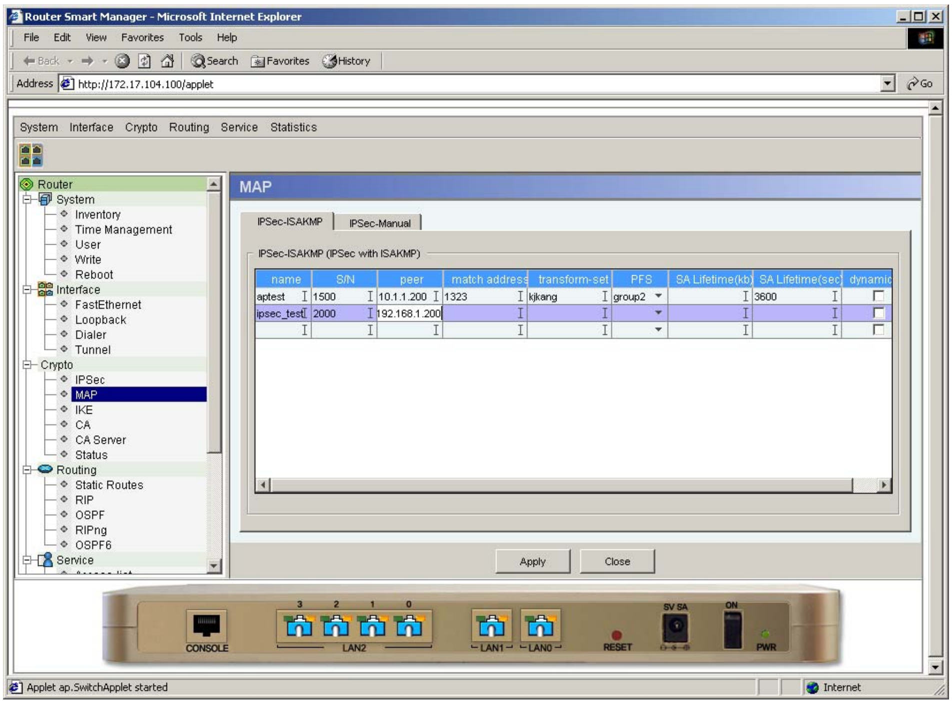
Input “2000” for Sequence Number.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
MAP
IPSec-ISAKMP
IPSec-Manual
IPSec-ISAKMP (IPSec with ISAKMP)
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

name	S/N	peer	match address	transform-set	PFS	SA Lifetime(kb)	SA Lifetime(sec)	dynamic
aptest	1500	10.1.1.200	1323	kjkang	group2		3600	□
ipsec_test	2000							□

(Figure3-166) Input IPSec-ISAKMP S/N

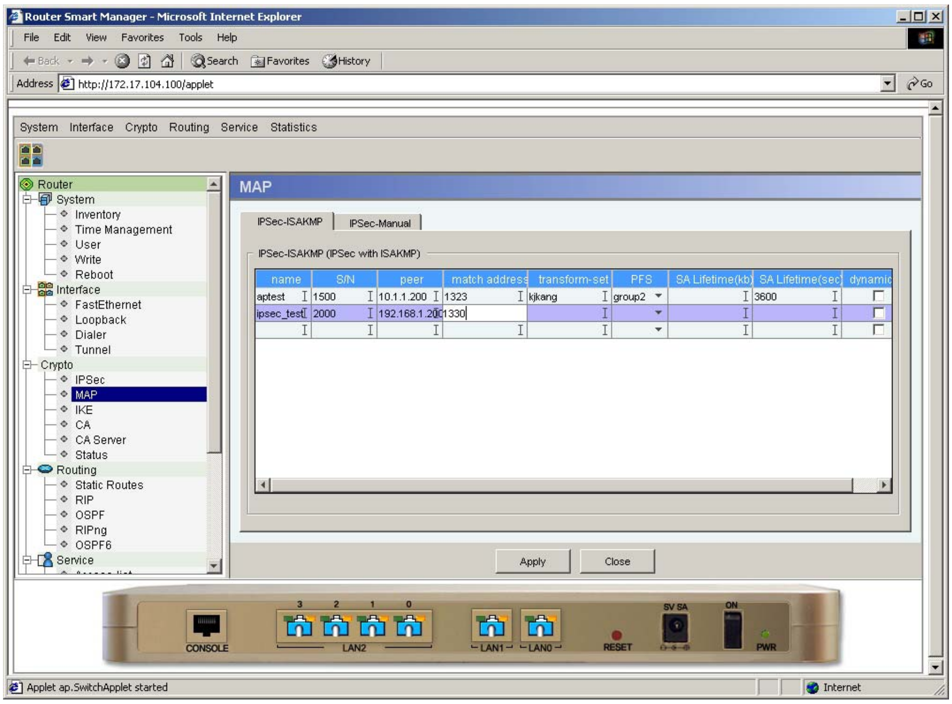
Input “192.168.1.200” for IP Address of Peer Interface.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
MAP
IPSec-ISAKMP
IPSec-Manual
IPSec-ISAKMP (IPSec with ISAKMP)
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

name	S/N	peer	match address	transform-set	PFS	SA Lifetime(kb)	SA Lifetime(sec)	dynamic
aptest	1500	10.1.1.200	1323	kjkang	group2		3600	□
ipsec_test	2000	192.168.1.200						□
								□

(Figure3-167) Input IPSec-ISAKMP Peer Address

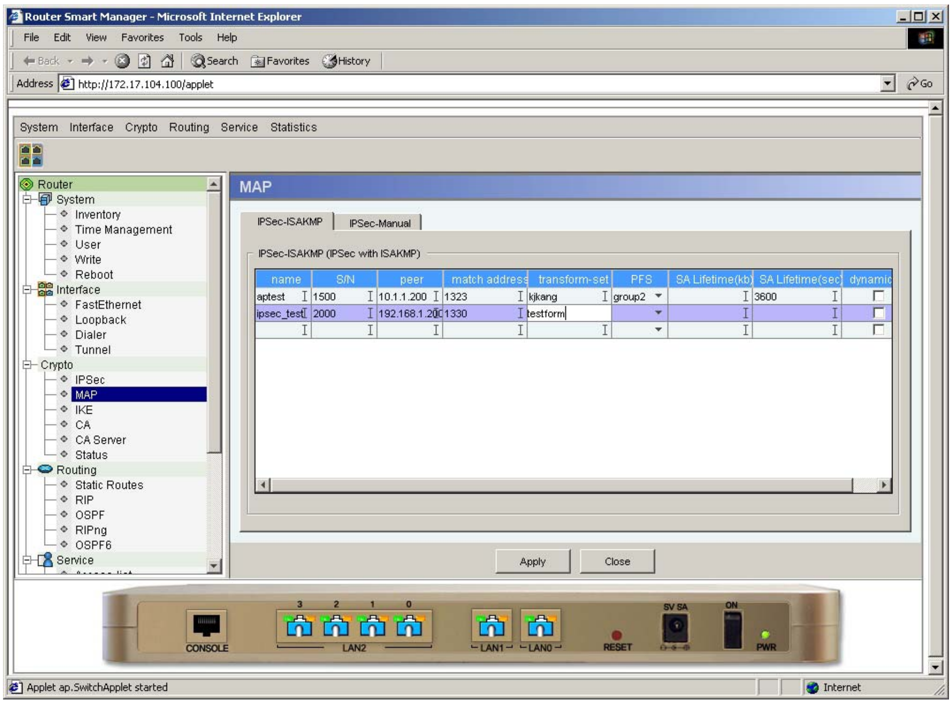
Input “1300” for tag number of Access-List which has secured packet information.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
MAP
IPSec-ISAKMP
IPSec-Manual
IPSec-ISAKMP (IPSec with ISAKMP)
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

name	S/N	peer	match address	transform-set	PFS	SA Lifetime(kb)	SA Lifetime(sec)	dynamic
aptest	1500	10.1.1.200	1323	kjkang	group2		3600	□
ipsec_test	2000	192.168.1.200	1330					□
								□

(Figure3-168) Input IPSec-ISAKMP Match Address

Input Transform-set "testform" which is created from IPSec.



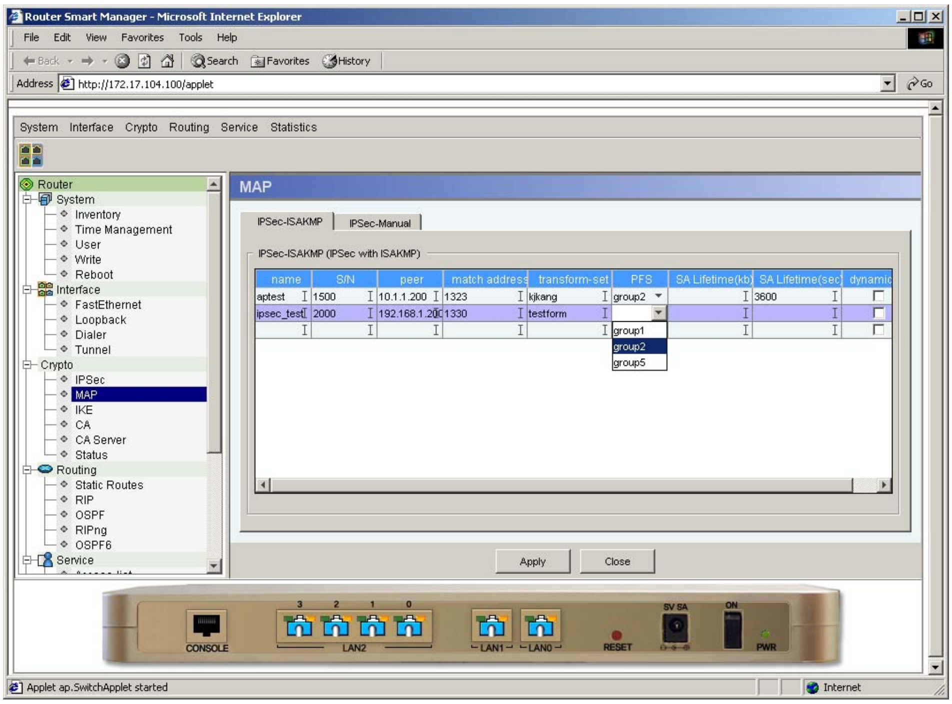
MAP

IPSec-ISAKMP (IPSec with ISAKMP)

name	S/N	peer	match address	transform-set	PFS	SA Lifetime(kb)	SA Lifetime(sec)	dynamic
aptest	1500	10.1.1.200	1323	kjkang	group2		3600	□
ipsec_test	2000	192.168.1.200	1330	testform				□
								□

(Figure3-169) Input IPSec-ISAKMP Transform-set

Select Diffie-Hellman Group "2"



MAP

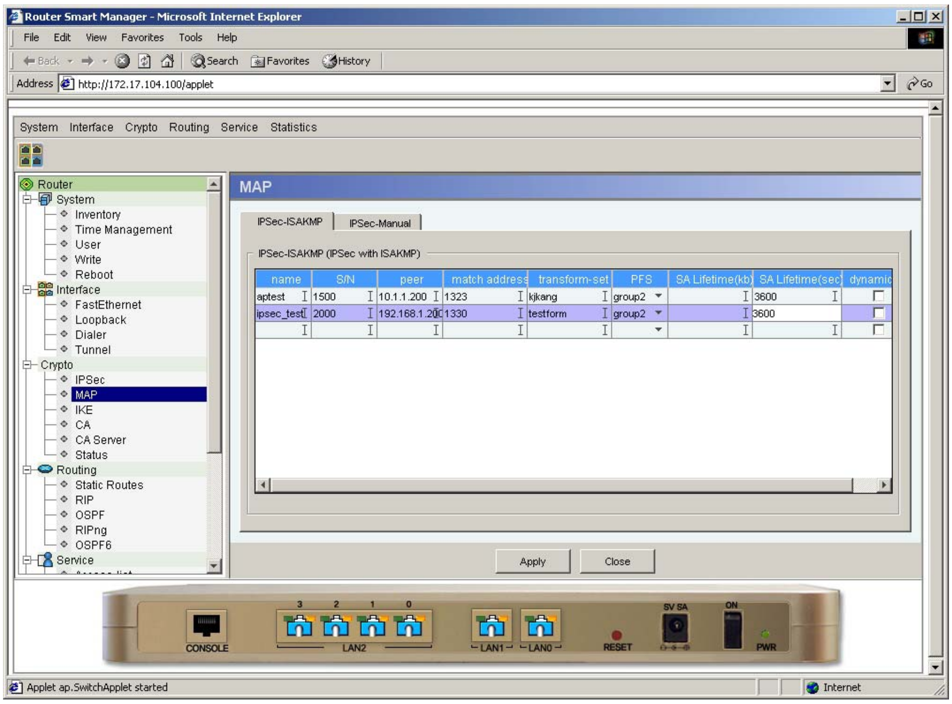
IPSec-ISAKMP (IPSec with ISAKMP)

name	S/N	peer	match address	transform-set	PFS	SA Lifetime(kb)	SA Lifetime(sec)	dynamic
aptest	1500	10.1.1.200	1323	kjkang	group2		3600	□
ipsec_test	2000	192.168.1.200	1330	testform				□
								□

(Figure3-170) Select IPSec-ISAKMP Diffie-Hellman Group

Set SA Lifetime to 3600 second.

Click "Apply" to create a Map named "ipsec_test".

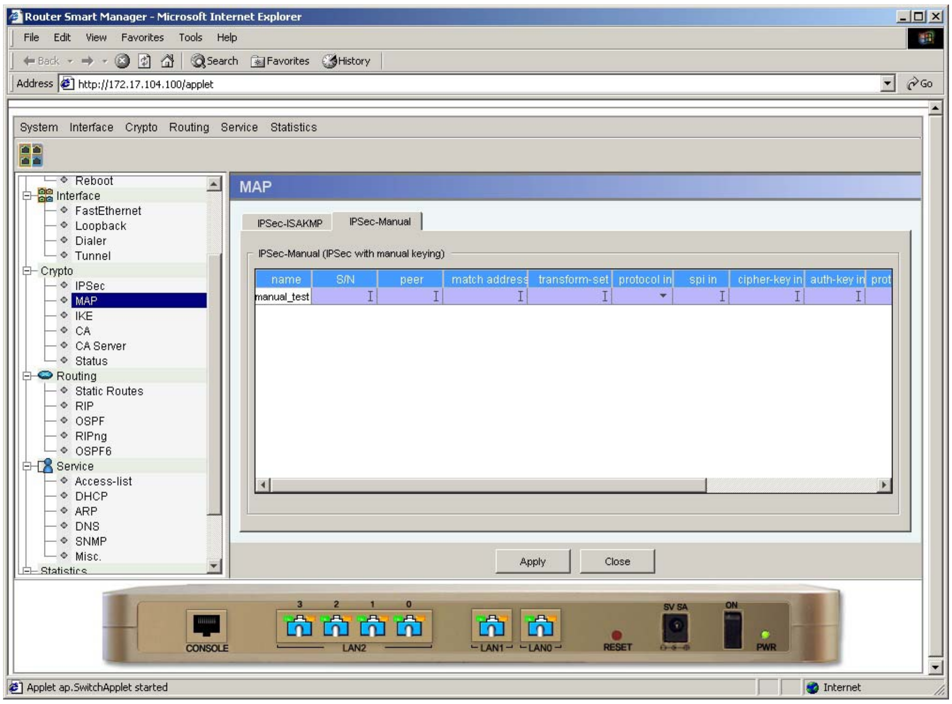


IPSec-ISAKMP (IPSec with ISAKMP)

name	S/N	peer	match address	transform-set	PFS	SA Lifetime(kb)	SA Lifetime(sec)	dynamic
aptest	1500	10.1.1.200	1323	kjkang	group2		3600	□
ipsec_test	2000	192.168.1.200	1330	testform	group2		3600	□
								□

(Figure3-171) Input IPSec-ISAKMP SA Lifetime

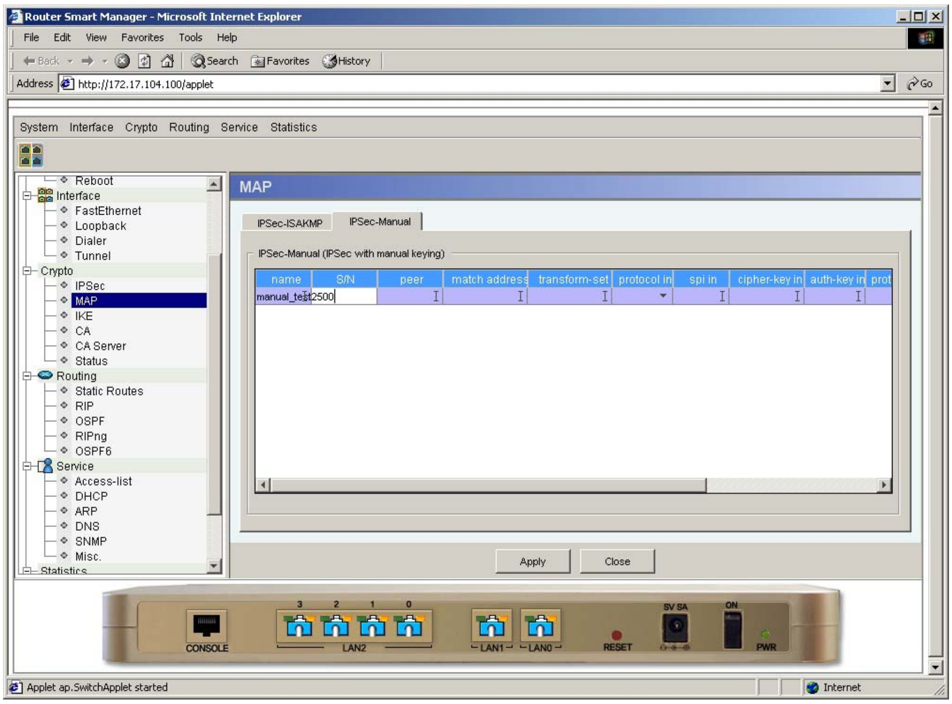
Figure 3-174 shows how to create a Map named “manual_test” using IPSec-Manual menu. Input “manual_test” in the name field..


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
MAP
IPSec-ISAKMP
IPSec-Manual
IPSec-Manual (IPSec with manual keying)
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

name	S/N	peer	match address	transform-set	protocol in	spi in	cipher-key in	auth-key in	prot
manual_test									

(Figure3-172) Input IPSec-Manual Name

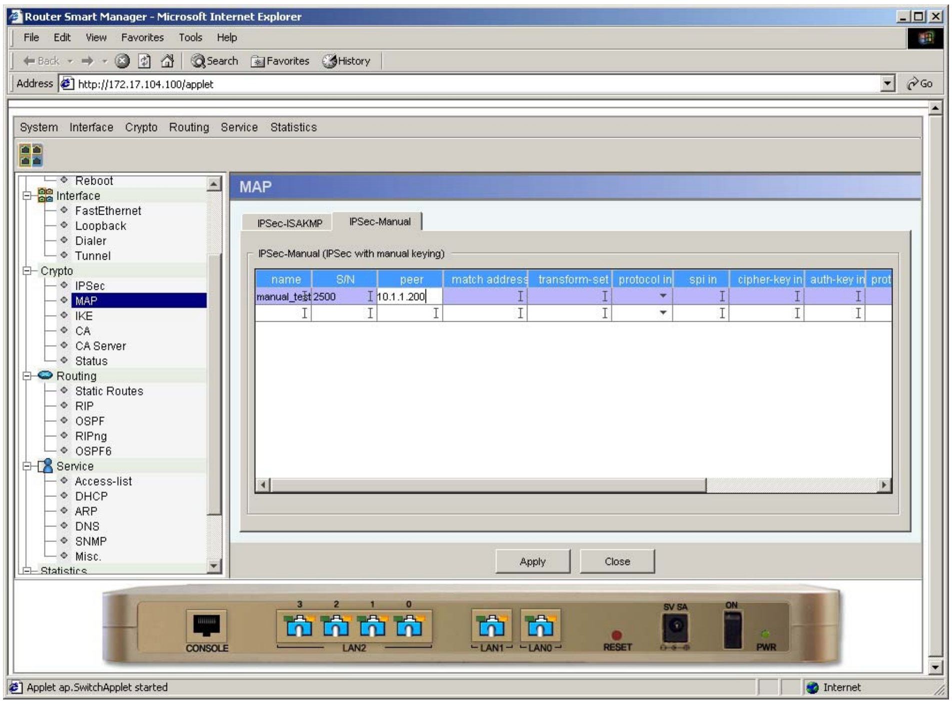
Input “2500” for Sequence Number.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
MAP
IPSec-ISAKMP
IPSec-Manual
IPSec-Manual (IPSec with manual keying)
Apply
Close
Applet ap.SwitchApplet started
Internet

name	S/N	peer	match address	transform-set	protocol in	spi in	cipher-key in	auth-key in	prot
manual_test	2500								

(Figure3-173) Input IPSec-Manual S/N

Input “10.1.1.200” for IP Address of Peer Interface.

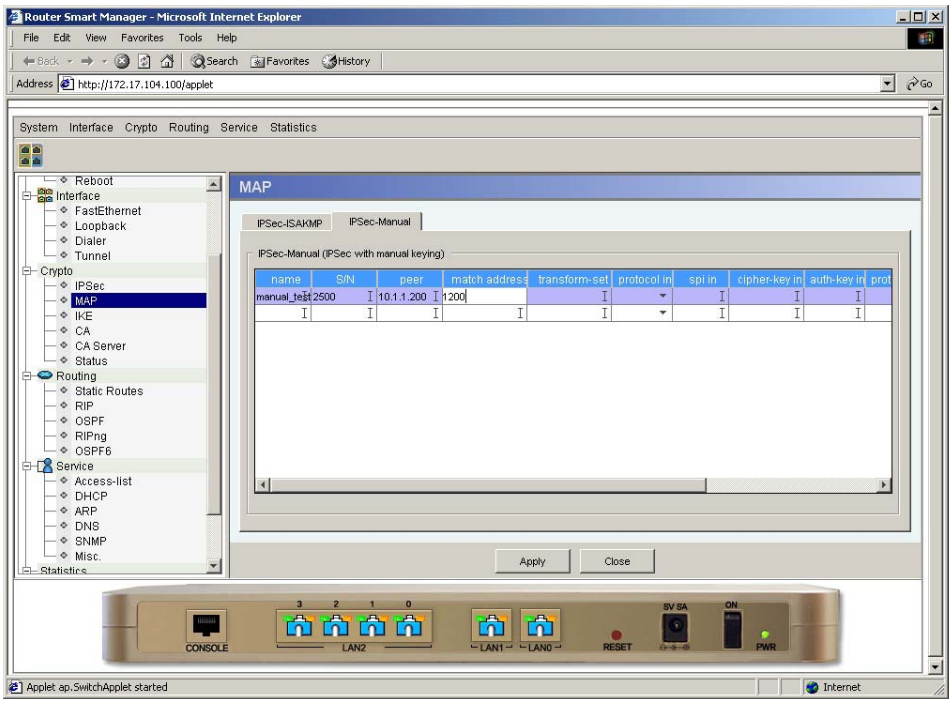


IPSec-Manual (IPSec with manual keying)

name	S/N	peer	match address	transform-set	protocol in	spi in	cipher-key in	auth-key in	prot
manual_test	2500	10.1.1.200							

(Figure3-174) Input IPSec-Manual Peer Address

Input “1200” for the tag number of Access-List which has secured Packet info.

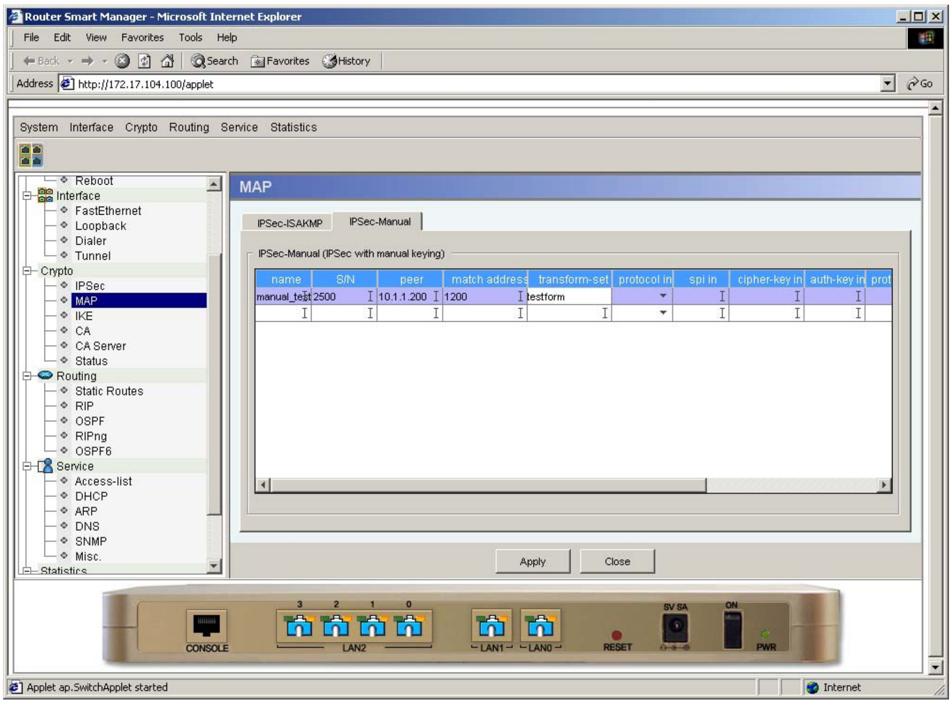


IPSec-Manual (IPSec with manual keying)

name	S/N	peer	match address	transform-set	protocol in	spi in	cipher-key in	auth-key in	prot
manual_test	2500	10.1.1.200	1200						

(Figure3-175) Input IPSec-Manual Match Address

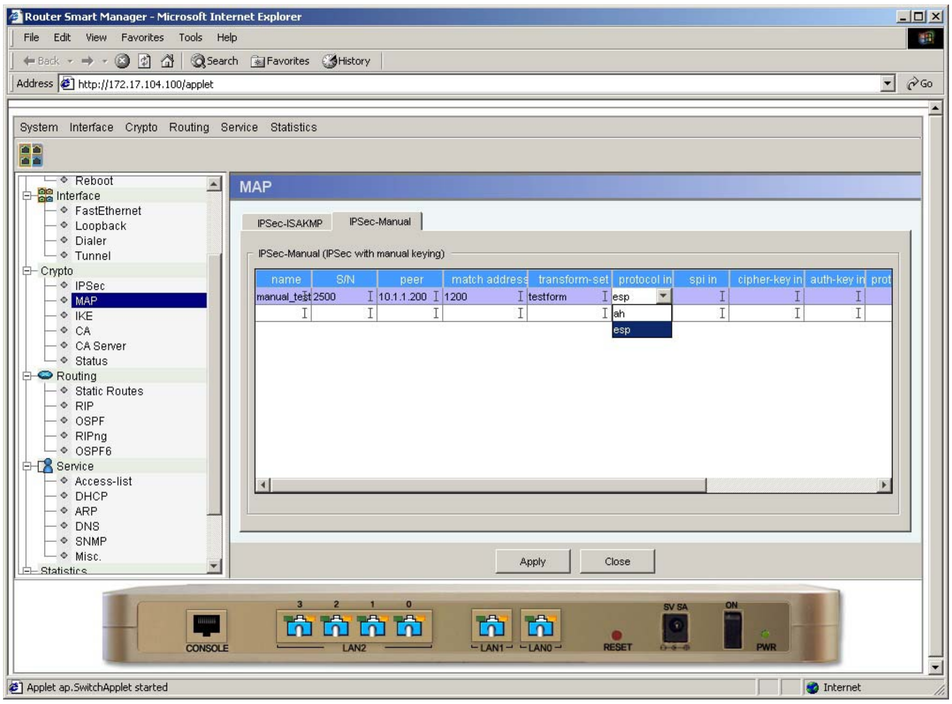
Input Transform-set “testform” which is created from IPSec menu.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
MAP
IPSec-ISAKMP
IPSec-Manual
IPSec-Manual (IPSec with manual keying)
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

name	S/N	peer	match address	transform-set	protocol in	spi in	cipher-key in	auth-key in	prot
manual_test	2500	10.1.1.200	1200	testform					

(Figure3-176) Input IPSec-Manual Transform-set

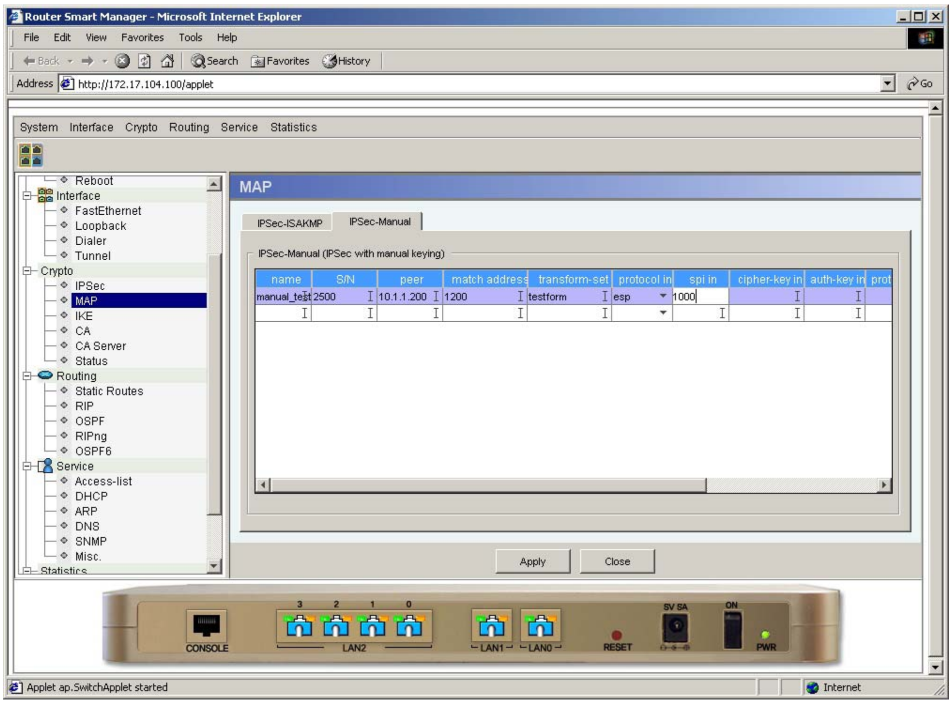
Select protocol “esp” to use for Inbound IPSec session.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
MAP
IPSec-ISAKMP
IPSec-Manual
IPSec-Manual (IPSec with manual keying)
ah
esp
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

name	S/N	peer	match address	transform-set	protocol in	spi in	cipher-key in	auth-key in	prot
manual_test	2500	10.1.1.200	1200	testform	esp				

(Figure3-177) Select IPSec-Manual Protocol in

Input SPI in “1000” for Inbound IPSec session. It has to be the same value as the value in SPI out of the Peer.

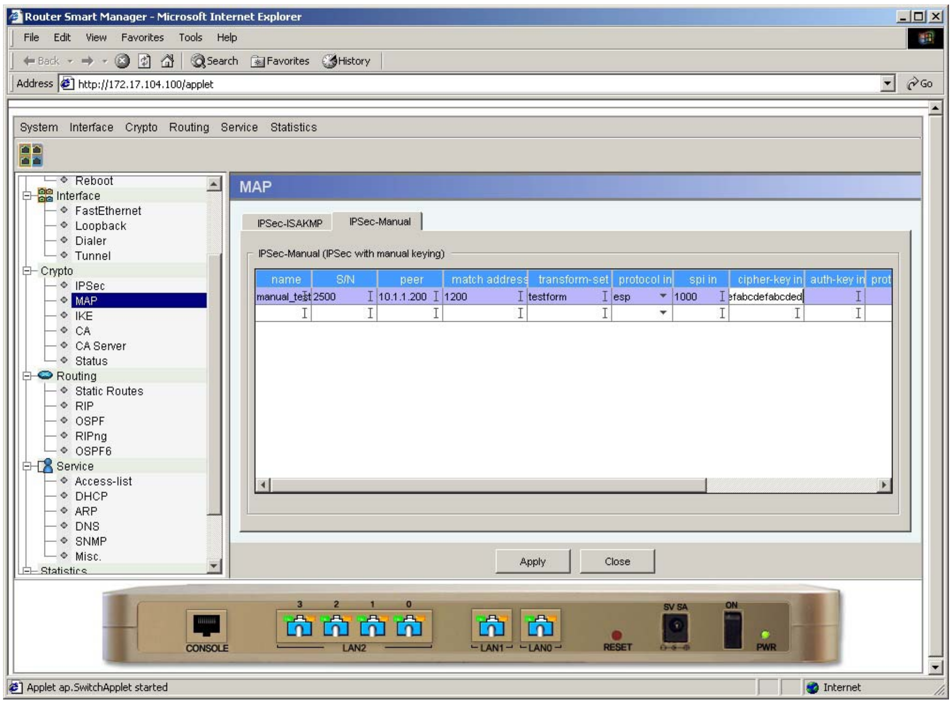


IPSec-Manual (IPSec with manual keying)

name	S/N	peer	match address	transform-set	protocol in	spi in	cipher-key in	auth-key in	prot
manual_test	2500	10.1.1.200	1200	testform	esp	1000			

(Figure3-178) Input IPSec-Manual Spi in

Input 24 byte Hex value for Cipher-key to use in Inbound IPSec session. This has to be the same value as the value in Cipher-key out of the Peer.

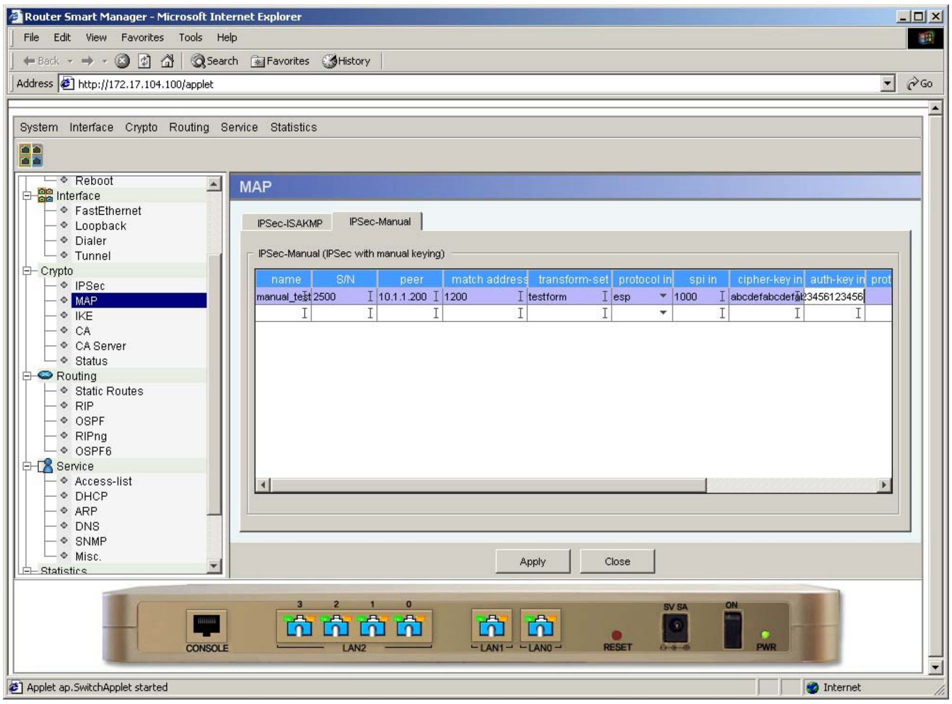


IPSec-Manual (IPSec with manual keying)

name	S/N	peer	match address	transform-set	protocol in	spi in	cipher-key in	auth-key in	prot
manual_test	2500	10.1.1.200	1200	testform	esp	1000	efabcdefabcded		

(Figure3-179) Input IPSec-Manual Cipher-key in

Input Inbound Authentication-key for IPSec session. This has to be the same value as the value in Authentication-key out of the Peer.

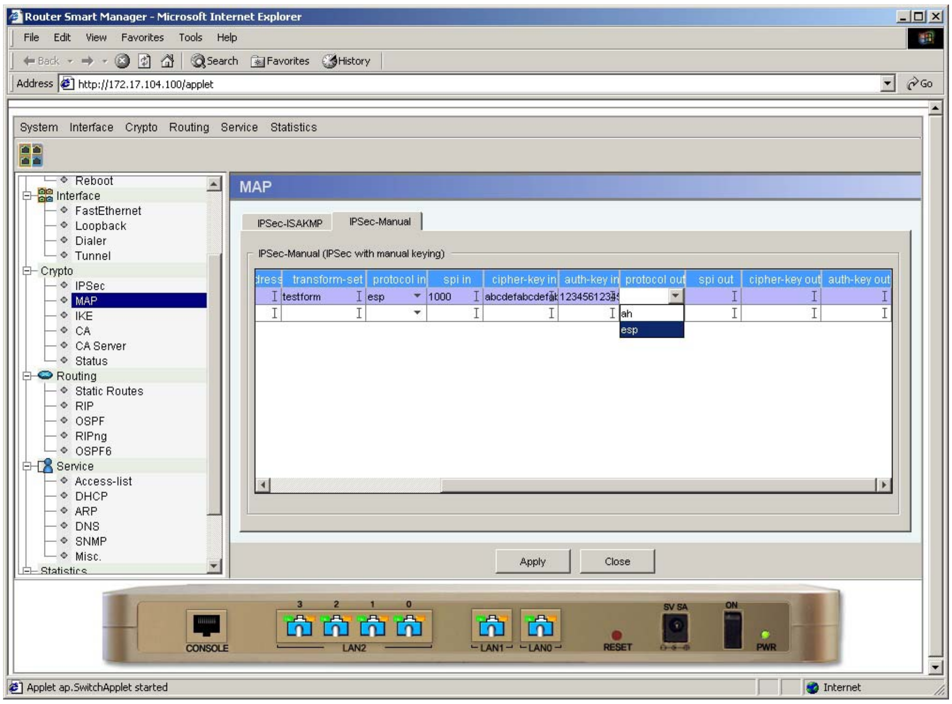


IPSec-Manual (IPSec with manual keying)

name	S/N	peer	match address	transform-set	protocol in	spi in	cipher-key in	auth-key in	prot
manual_test	2500	10.1.1.200	1200	testform	esp	1000	abcdefabcdefab	23456123456	

(Figure3-180) Input IPSec-Manual Auth-key in

Select protocol "esp" to use in Outbound IPSec session.

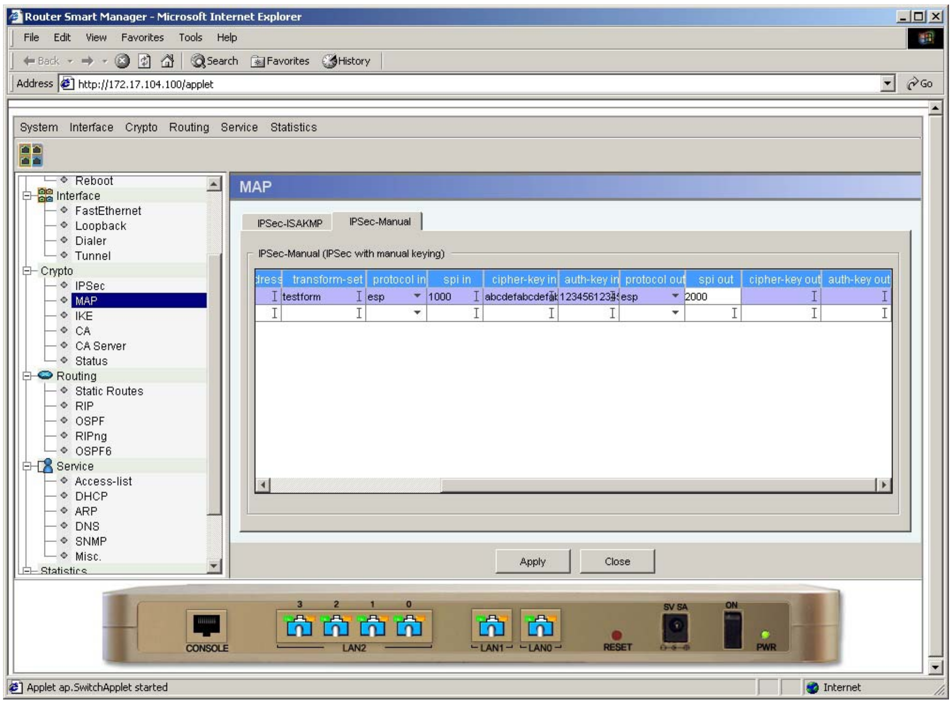


IPSec-Manual (IPSec with manual keying)

dress	transform-set	protocol in	spi in	cipher-key in	auth-key in	protocol out	spi out	cipher-key out	auth-key out
	testform	esp	1000	abcdefabcdefab	1234561234				
						ah esp			

(Figure3-181) Select IPSec-Manual Protocol out

Input SPI out “2000” for outbound IPSec session. It has to be the same value as the value in SPI in of the Peer.

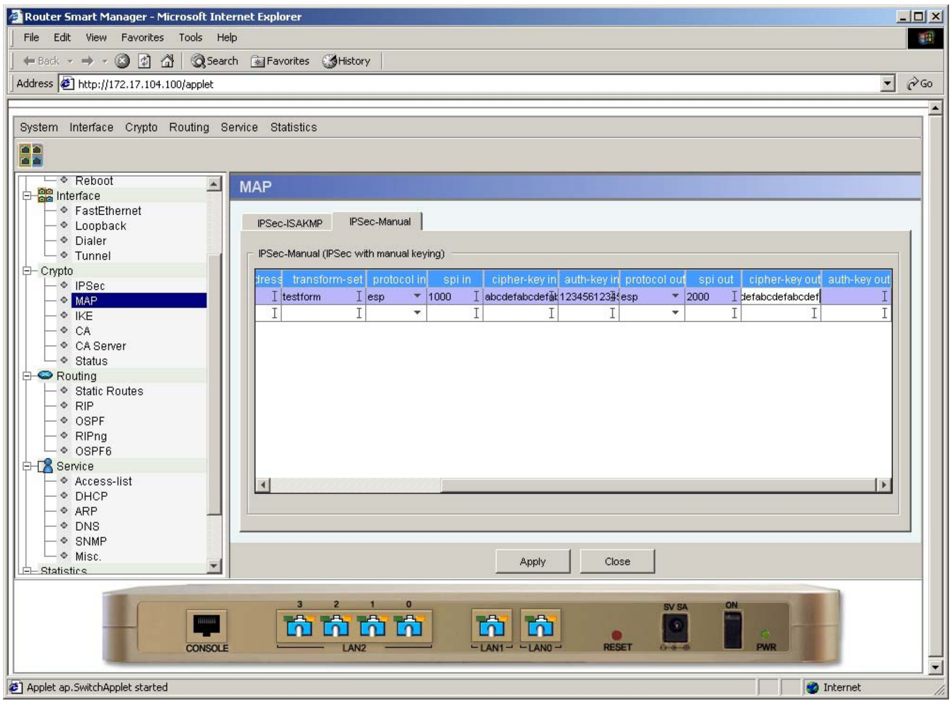


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
MAP
IPSec-ISAKMP
IPSec-Manual
IPSec-Manual (IPSec with manual keying)
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

dress	transform-set	protocol in	spi in	cipher-key in	auth-key in	protocol out	spi out	cipher-key out	auth-key out
	testform	esp	1000	abcdefabcdefak	123456123451	esp	2000		

(Figure3-182) Input IPSec-Manual Spi out

Input 24 byte Hex value for Cipher-key to use in outbound IPSec session. This has to be the same value as the value in Cipher-key in of the Peer

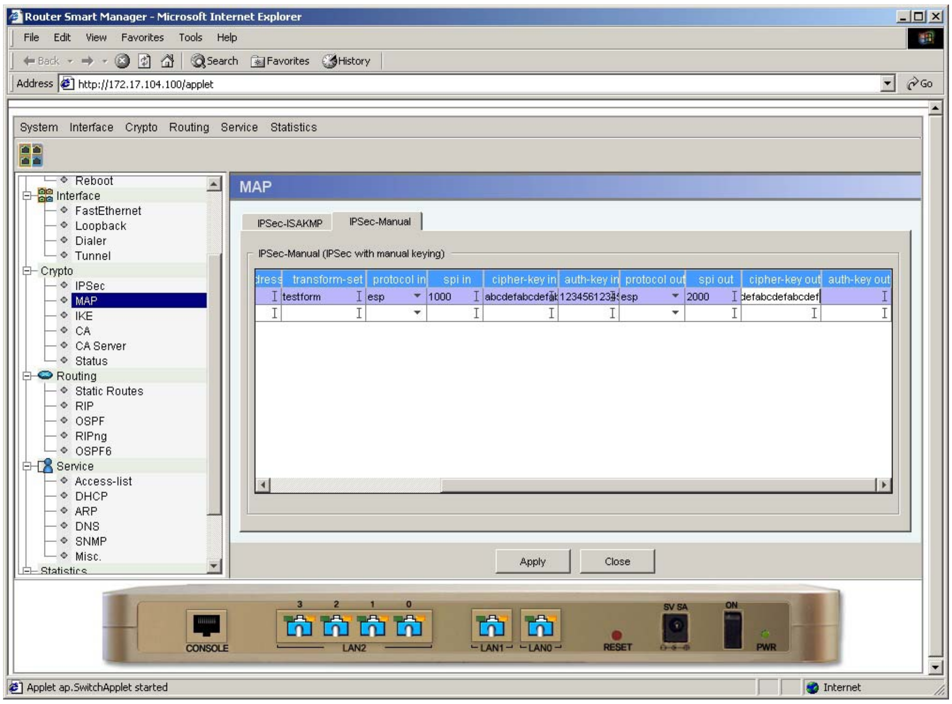


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
MAP
IPSec-ISAKMP
IPSec-Manual
IPSec-Manual (IPSec with manual keying)
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
SV SA
ON
PWR
Applet ap.SwitchApplet started
Internet

dress	transform-set	protocol in	spi in	cipher-key in	auth-key in	protocol out	spi out	cipher-key out	auth-key out
	testform	esp	1000	abcdefabcdefak	123456123451	esp	2000	defabcdefabcdef	

(Figure3-183) Input IPSec-Manual Cipher-key out

Input 24 byte Hex value for Cipher-key to use in outbound IPSec session. This has to be the same value as the value in Cipher-key of the Peer.

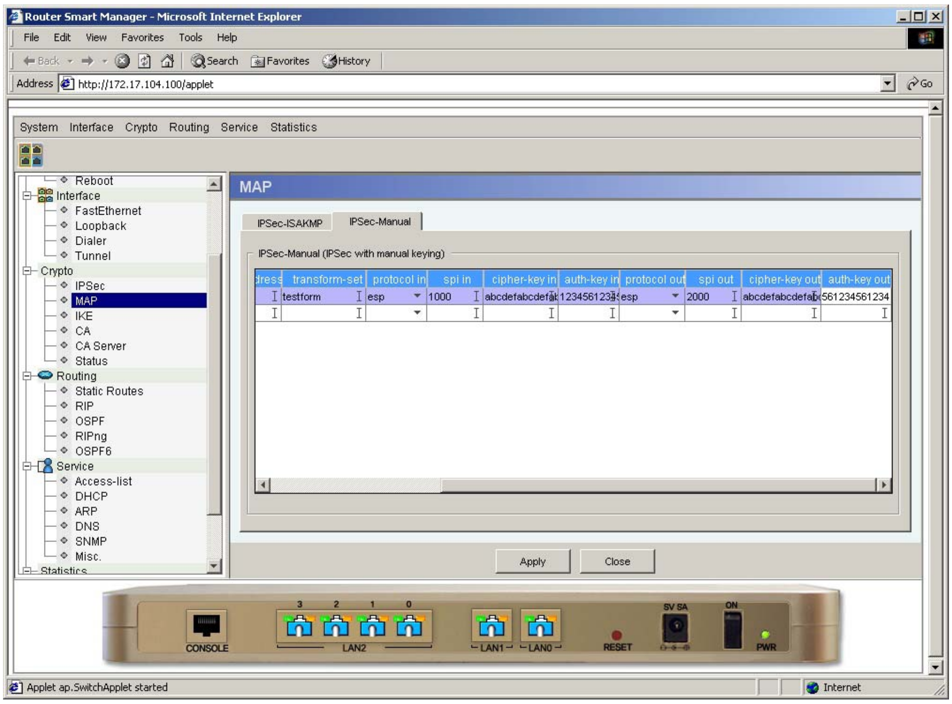


IPSec-Manual (IPSec with manual keying)

dress	transform-set	protocol in	spi in	cipher-key in	auth-key in	protocol out	spi out	cipher-key out	auth-key out
	testform	esp	1000	abcdefabcdefab	123456123456	esp	2000	defabcdefabcdef	

(Figure3-184) Input IPSec-Manual Cipher-key out

Input Authentication-key value to use in outbound IPSec session. This has to be the same value as the value in Authentication-key of the Peer.

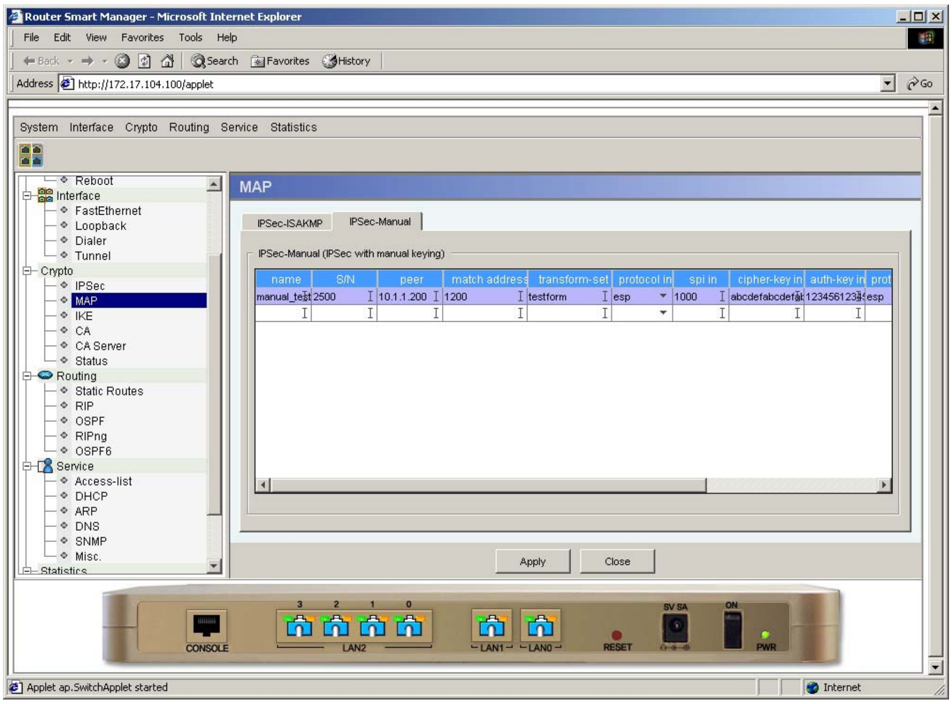


IPSec-Manual (IPSec with manual keying)

dress	transform-set	protocol in	spi in	cipher-key in	auth-key in	protocol out	spi out	cipher-key out	auth-key out
	testform	esp	1000	abcdefabcdefab	123456123456	esp	2000	abcdefabcdefab	561234561234

(Figure3-185) Input IPSec-Manual Auth-key out

Click "Apply" to verify.



IPSec-Manual (IPSec with manual keying)

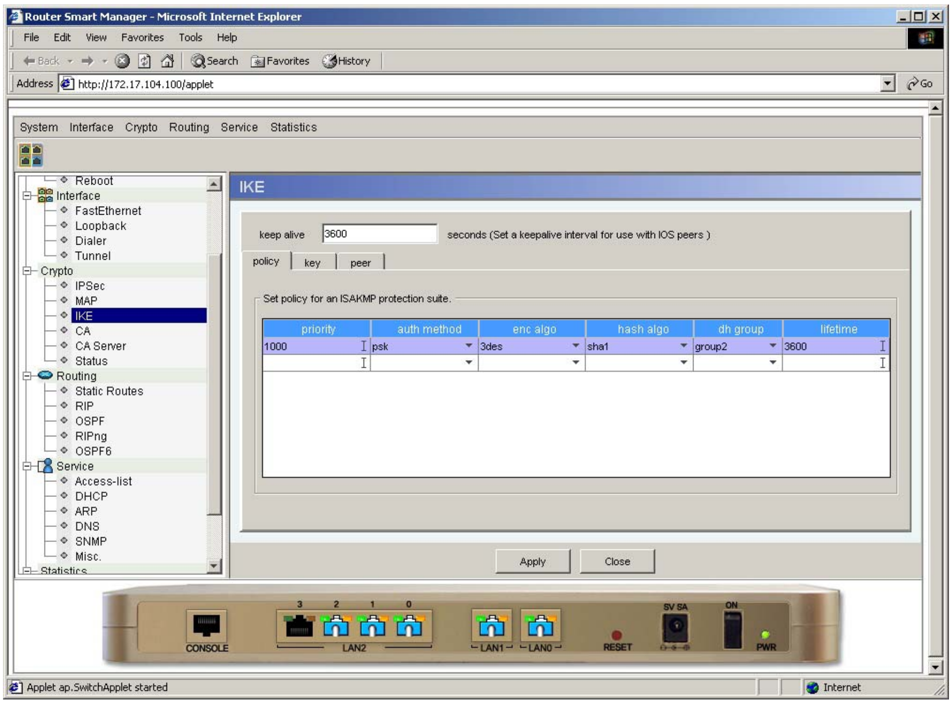
name	S/N	peer	match address	transform-set	protocol in	spi in	cipher-key in	auth-key in	prot
manual_test	2500	10.1.1.200	1200	testform	esp	1000	abcdefabcdefab	1234561234	esp

(Figure3-186) Verify IPSec-Manual settings

IKE

IKE (Internet Key Exchange) is a protocol which provides and negotiates securely authenticated key data in order to have Security Association. IKE is different from ISAKMP. ISAKMP only provides key exchange common frame work which can be used by any key exchange protocols while IKE defines actual key exchange. IKE provides key information so that other factors of IPSec can create encryption and authentication keys.

IKE menu consists of Policy, Key, and Peer.



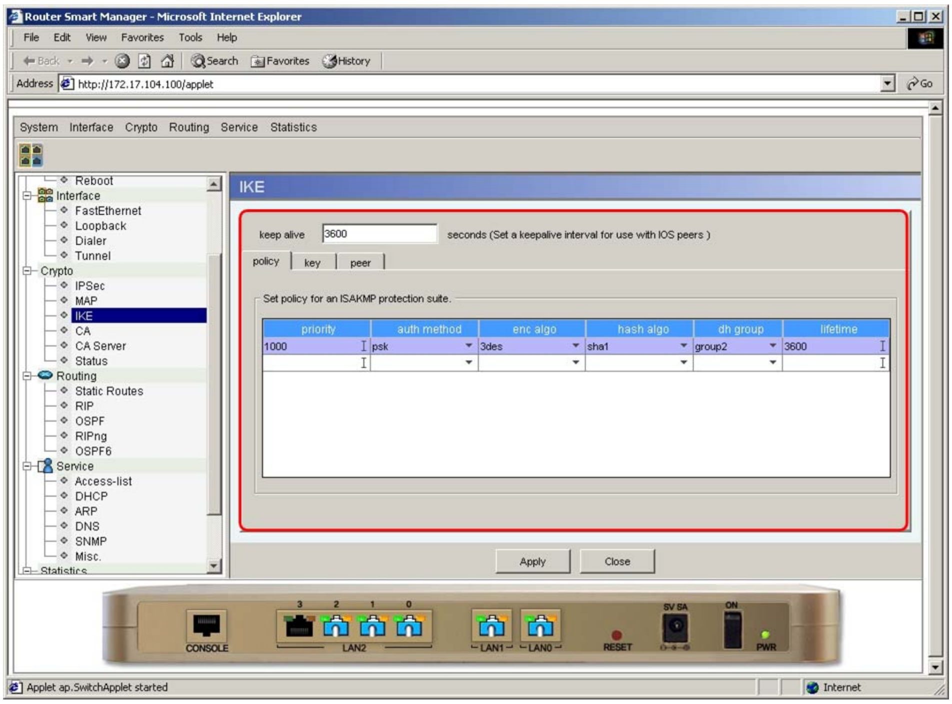
keep alive 3600 seconds (Set a keepalive interval for use with IOS peers)

Set policy for an ISAKMP protection suite.

priority	auth method	enc algo	hash algo	dh group	lifetime
1000	psk	3des	sha1	group2	3600

(Figure3-187) IKE Policy Main page

Table 3-29 describes each element of IKE Policy menu.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
IKE
policy
key
peer
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

keep alive 3600 seconds (Set a keepalive interval for use with IOS peers)

Set policy for an ISAKMP protection suite.

priority	auth method	enc algo	hash algo	dh group	lifetime
1000	psk	3des	sha1	group2	3600

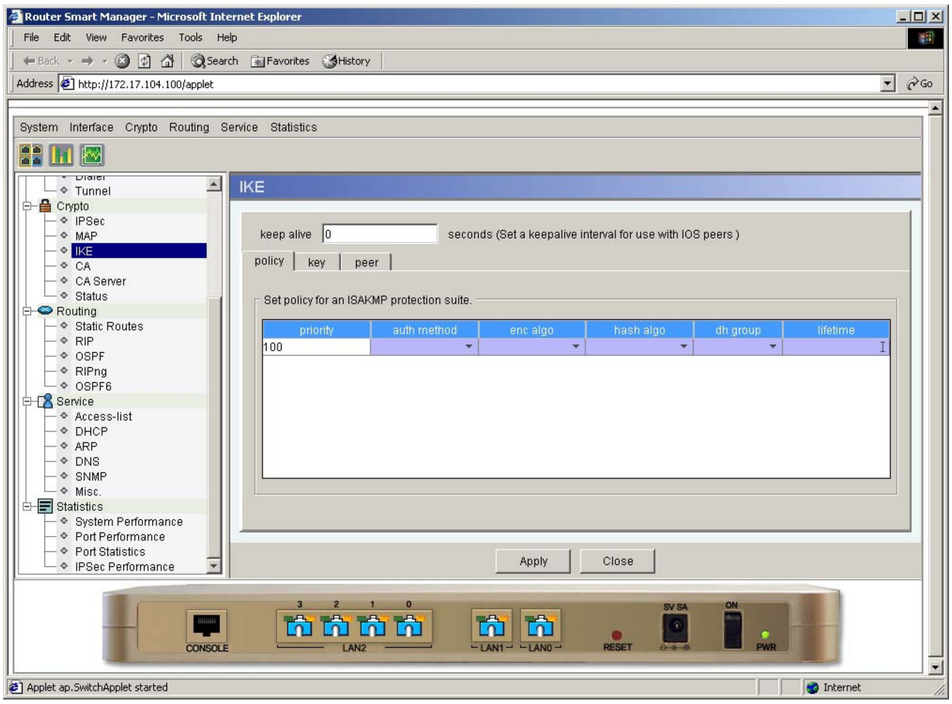
(Figure3-188) IKE Policy Menu

<Table 3-29> IKE Policy menu Discription

Elements	Description
Priority	It sets priority on IKE Policy. Choose from 1 to 10000. Lower number has high priority.
Auth Method	It decides Peer authentication method. There are Psk (Preshared Key) and rsasig (RSA Signature).
Enc Algo	It decides encryption algorithm for message. Select one from 3des, blowfish, aes, cast.
Hash Algo	It selects an algorithm authenticates data integrity. Choose one from md5, sha1.
Dh Group	It decides Diffie-Hellman Group. choose one from Group1, Group2 and Gruop5
Lifetime	It decides lifetime of IKE Policy.

Figure 3-191 shows how to create a Policy.

First, input “100” in Priority field.



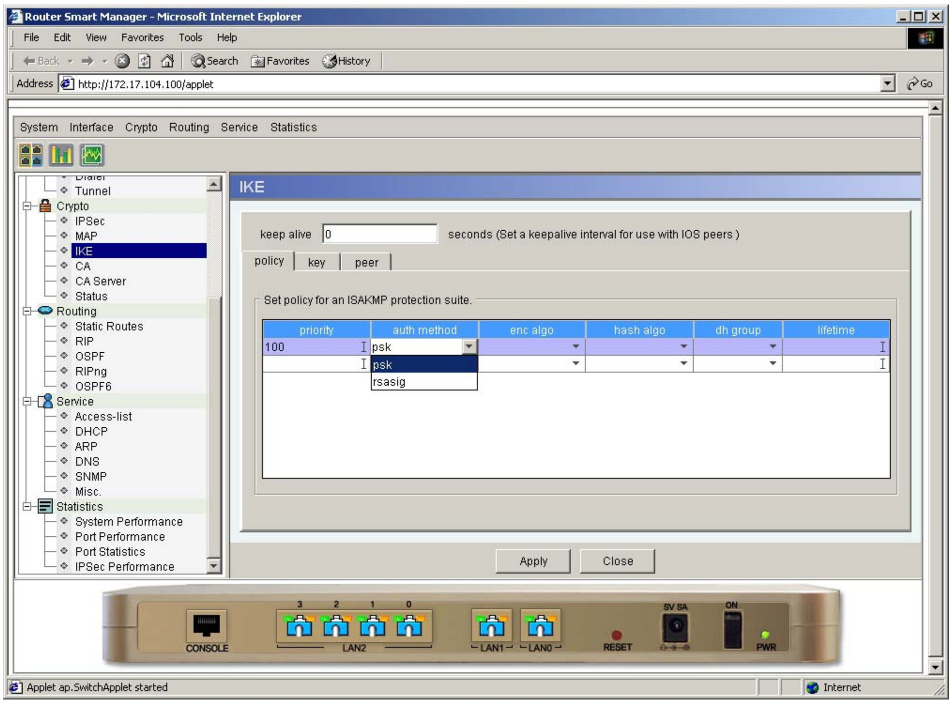
keep alive 0 seconds (Set a keepalive interval for use with IOS peers)

Set policy for an ISAKMP protection suite.

priority	auth method	enc algo	hash algo	dh group	lifetime
100					

(Figure3-189) Input IKE Policy Priority

Select psk (Preshared Key) for Authentication Method.



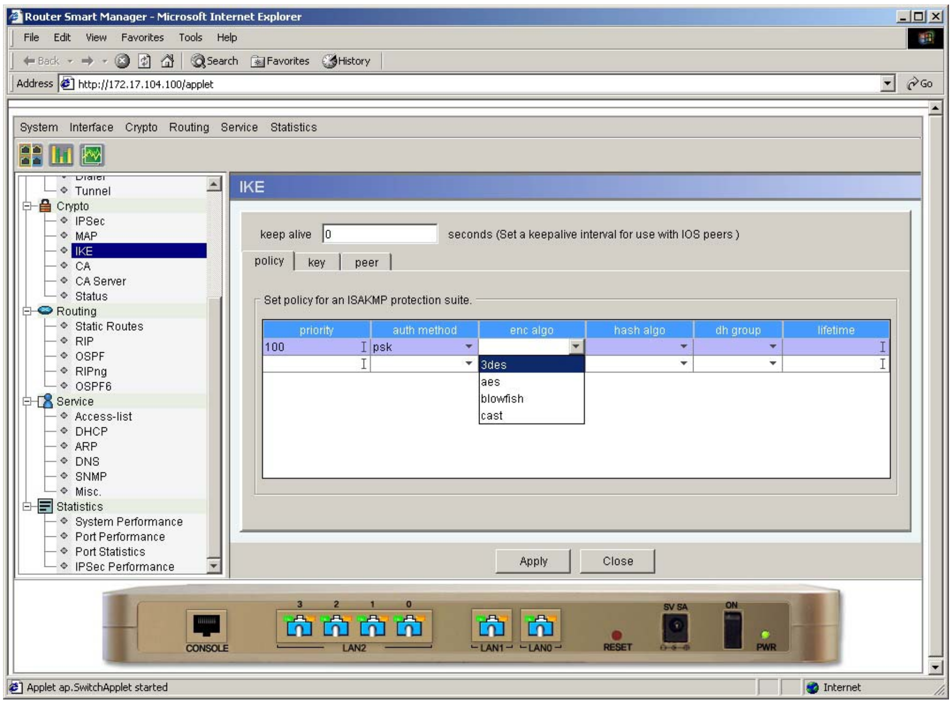
keep alive 0 seconds (Set a keepalive interval for use with IOS peers)

Set policy for an ISAKMP protection suite.

priority	auth method	enc algo	hash algo	dh group	lifetime
100	psk				

(Figure3-190) Select IKE Policy Authentication Method

Select 3des for Encryption Algorithm.



Router Smart Manager - Microsoft Internet Explorer

Address: http://172.17.104.100/applet

IKE

keep alive 0 seconds (Set a keepalive interval for use with IOS peers)

Set policy for an ISAKMP protection suite.

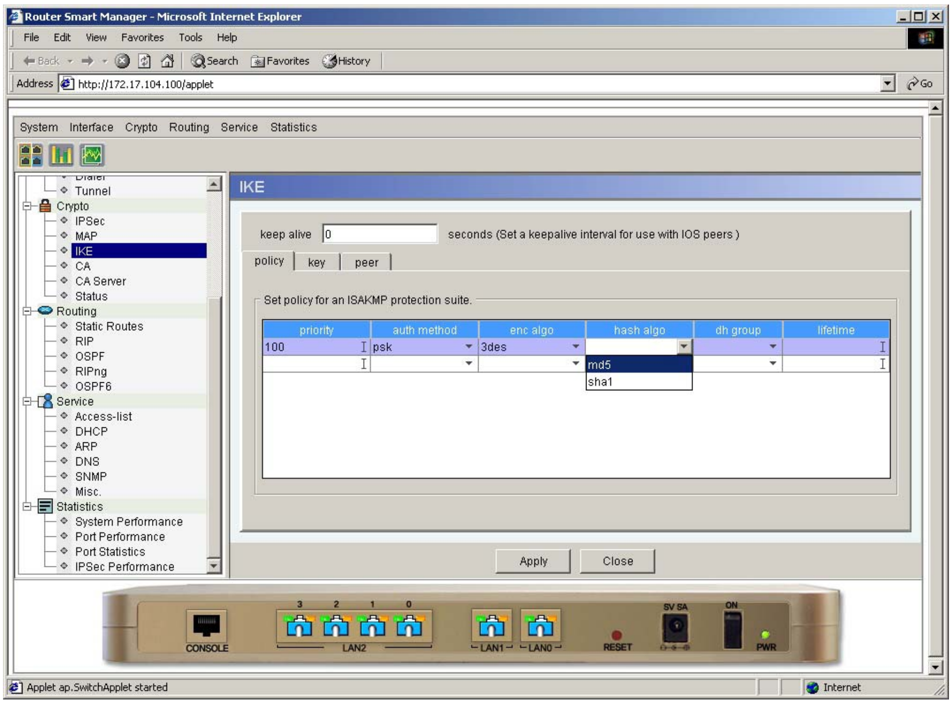
priority	auth method	enc algo	hash algo	dh group	lifetime
100	psk				

enc algo: 3des, aes, blowfish, cast

Applet ap.SwitchApplet started

(Figure3-191) Select IKE Policy Encryption Algorithm

Select md5 for Hash Algorithm.



Router Smart Manager - Microsoft Internet Explorer

Address: http://172.17.104.100/applet

IKE

keep alive 0 seconds (Set a keepalive interval for use with IOS peers)

Set policy for an ISAKMP protection suite.

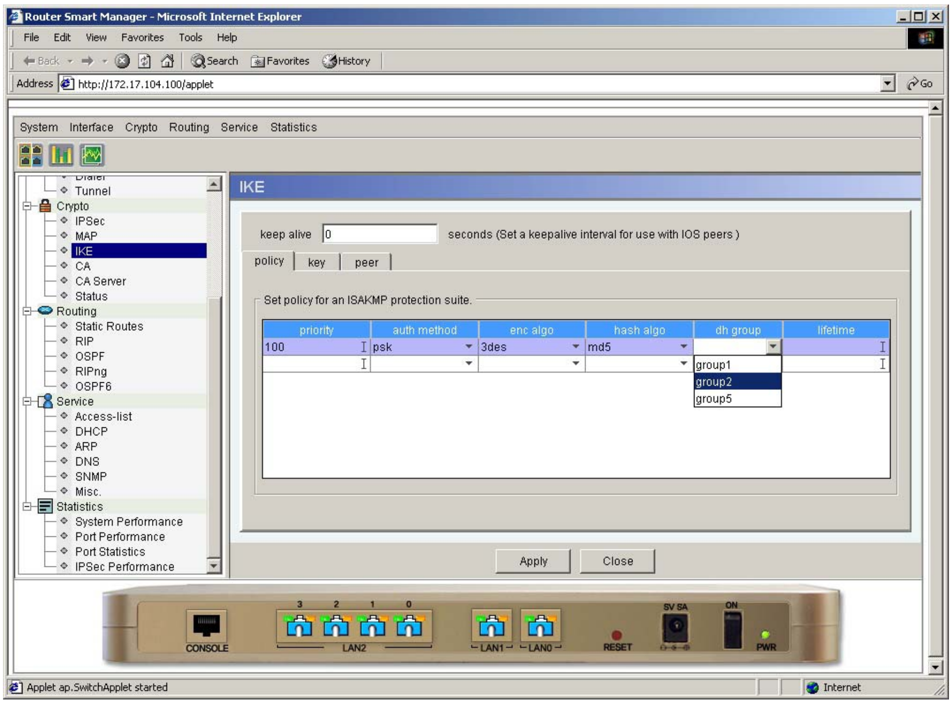
priority	auth method	enc algo	hash algo	dh group	lifetime
100	psk	3des			

hash algo: md5, sha1

Applet ap.SwitchApplet started

(Figure3-192) Select IKE Policy Hash Algorithm

Select Diffie-Hellman Group “2”.



IKE

keep alive 0 seconds (Set a keepalive interval for use with IOS peers)

policy | key | peer

Set policy for an ISAKMP protection suite.

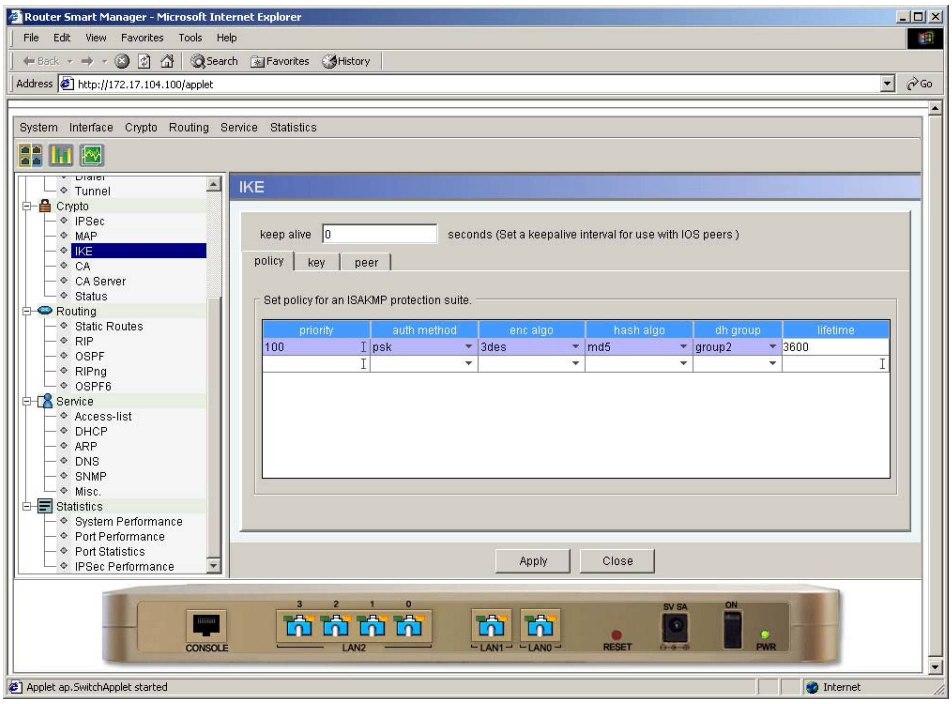
priority	auth method	enc algo	hash algo	dh group	lifetime
100	psk	3des	md5		

group1
group2
group5

(Figure3-193) Select IKE Policy Diffe-Hellman Group

Input “3600” for Policy Lifetime.

Click “Apply” to verify.



IKE

keep alive 0 seconds (Set a keepalive interval for use with IOS peers)

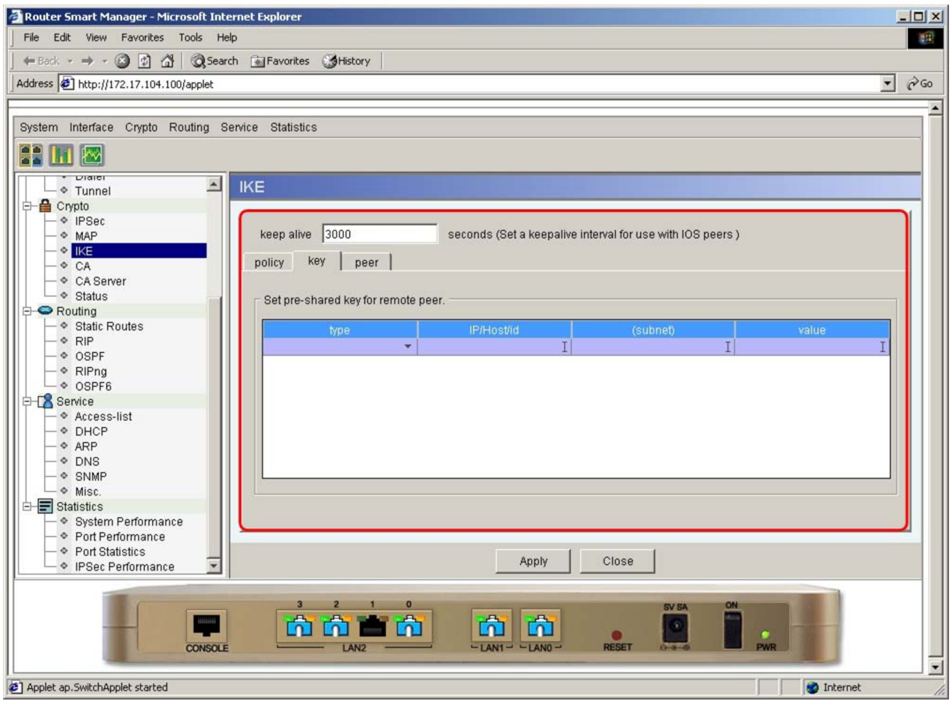
policy | key | peer

Set policy for an ISAKMP protection suite.

priority	auth method	enc algo	hash algo	dh group	lifetime
100	psk	3des	md5	group2	3600

(Figure3-194) Input IKE Policy Lifetime

Table 3-30 describes each element of IKE Key menu.



Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
System Performance
Port Performance
Port Statistics
IPSec Performance
IKE
keep alive 3000 seconds (Set a keepalive interval for use with IOS peers)
policy key peer
Set pre-shared key for remote peer.
type IP/Host/id (subnet) value
Apply Close
CONSOLE LAN2 LAN1 LAN0 RESET PWR
Applet ap.SwitchApplet started
Internet

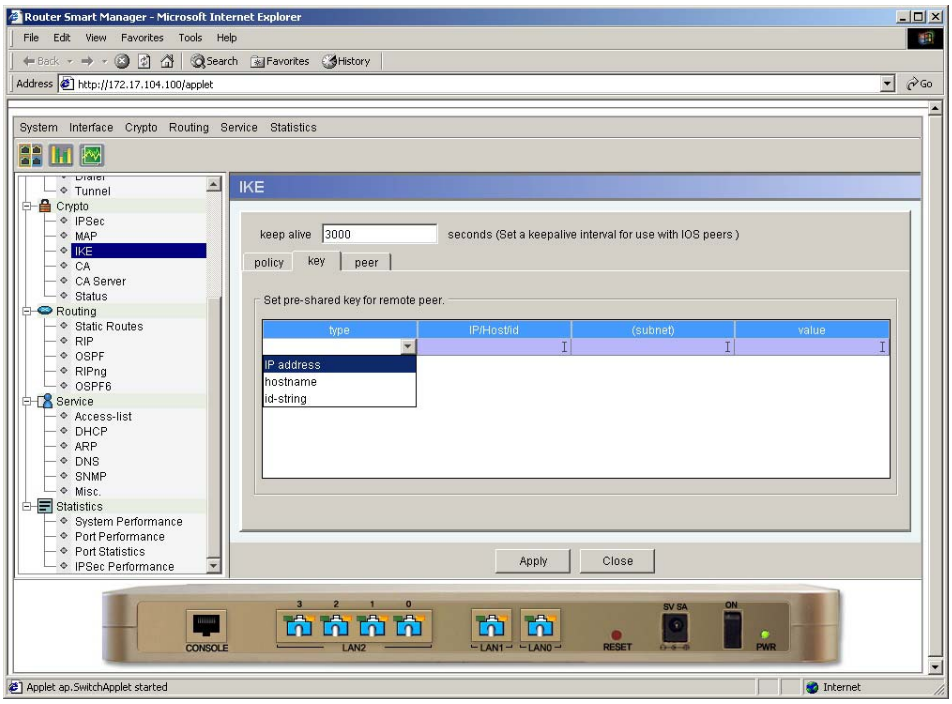
(Figure3-195) IKE Key Menu

<Table 3-30> IKE Key Menu Description

Elements	Description
Type	It decides the type to exchange Preshared Key. Select one from IP Address, Hostname, ID. Use DNS for Hostname, or Domain-List is needed.
IP/Host/id	Input IP Address, Hostname or Peer ID.
Subnet	Input subnet mask when IP Address is selected.
Value	Input Preshared Key value.

Figure 3-198 shows how to input Preshared Key “addpac_tech”.

First, select “IP Address” as Type.

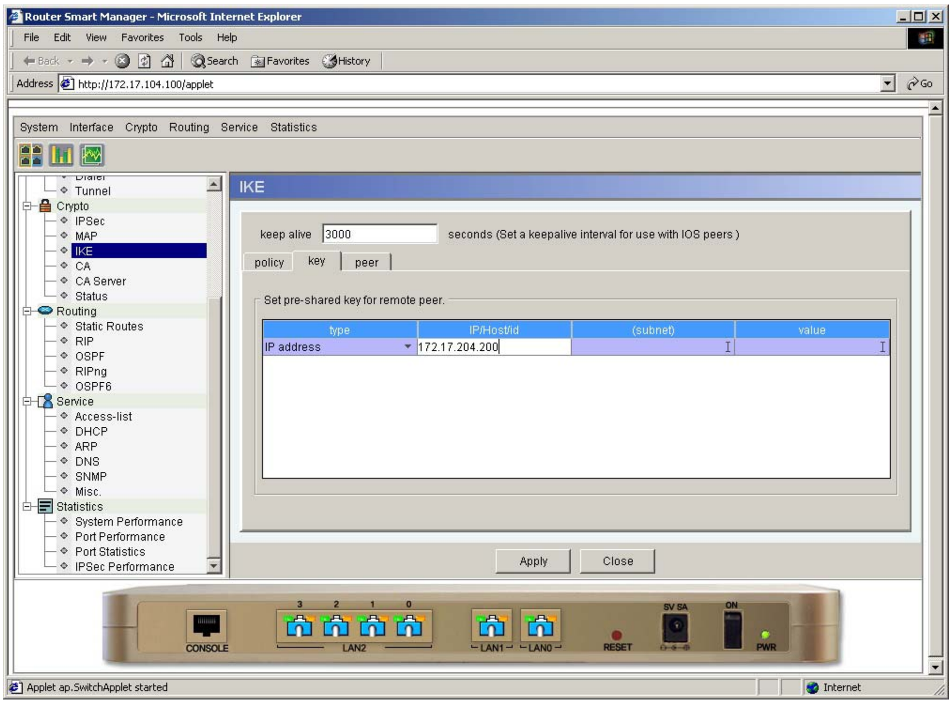


keep alive 3000 seconds (Set a keepalive interval for use with IOS peers)

Set pre-shared key for remote peer.

(Figure3-196) Select IKE Key Peer Type

Input IP Address “172.17.204.200” in IP/Host/id field.



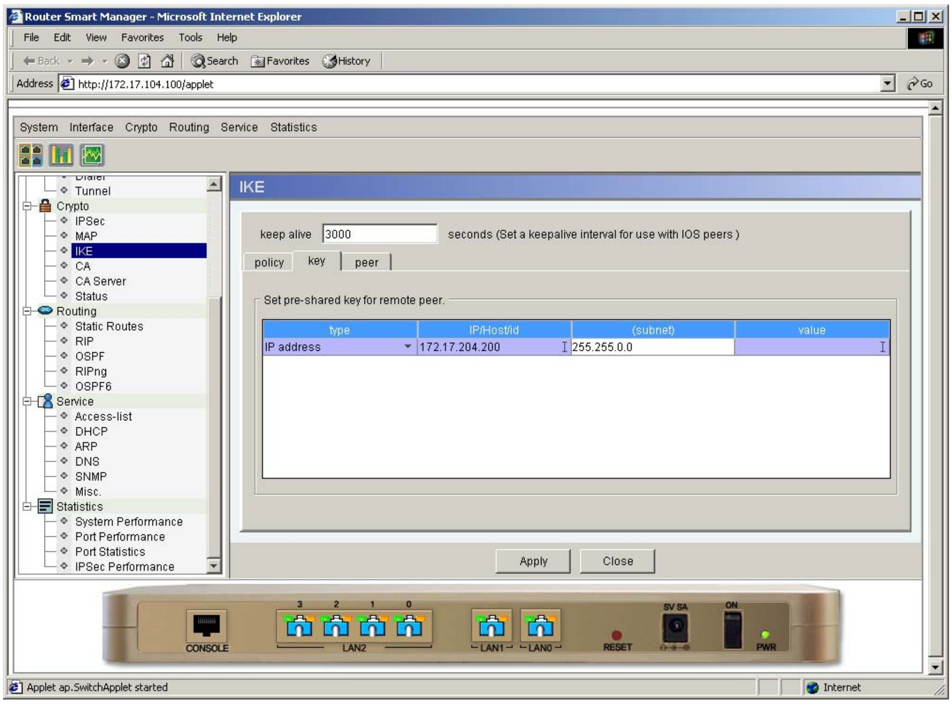
keep alive 3000 seconds (Set a keepalive interval for use with IOS peers)

Set pre-shared key for remote peer.

type	IP/Host/id	(subnet)	value
IP address	172.17.204.200		

(Figure3-197) Input IKE Key Peer IP Address

Input Subnet mask “255.255.0.0” for IP Address “172.17.204.200”.



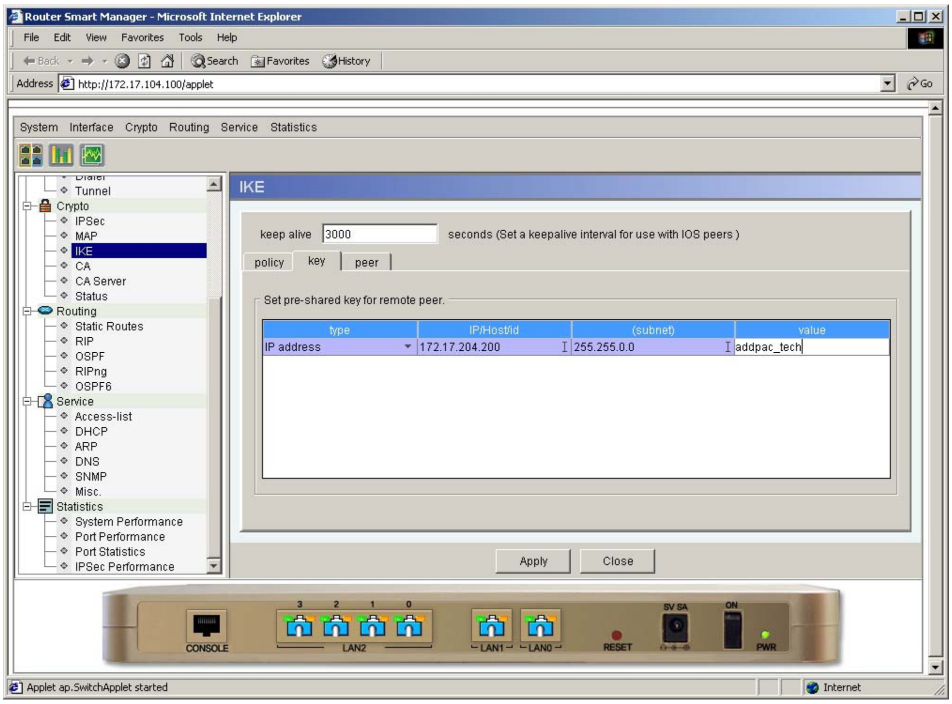
keep alive 3000 seconds (Set a keepalive interval for use with IOS peers)

Set pre-shared key for remote peer.

type	IP/Host/Id	(subnet)	value
IP address	172.17.204.200	255.255.0.0	

(Figure3-198) Input IKE Key Subnet mask

Input Preshared Key “addpac_tech” in Value field.



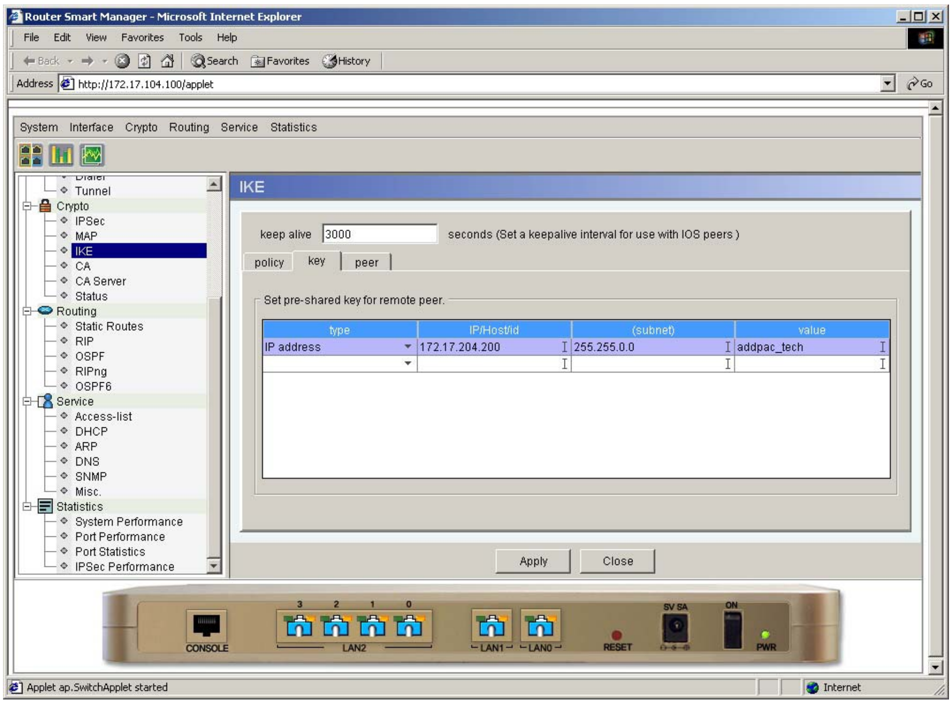
keep alive 3000 seconds (Set a keepalive interval for use with IOS peers)

Set pre-shared key for remote peer.

type	IP/Host/Id	(subnet)	value
IP address	172.17.204.200	255.255.0.0	addpac_tech

(Figure3-199) IKE Key Menu

Click “Apply” to verify.



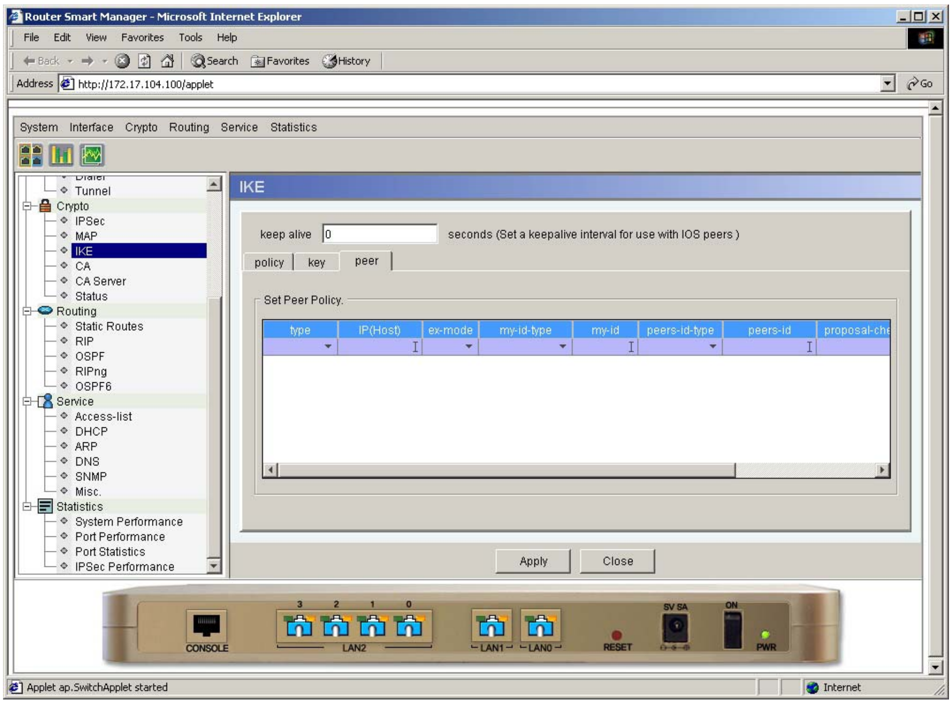
keep alive 3000 seconds (Set a keepalive interval for use with IOS peers)

Set pre-shared key for remote peer.

type	IP/Host/id	(subnet)	value
IP address	172.17.204.200	255.255.0.0	addpac_tech

(Figure3-200) IKE Key configuration verify

Figure 3-203, 204 shows IKE Key Peer Menu.

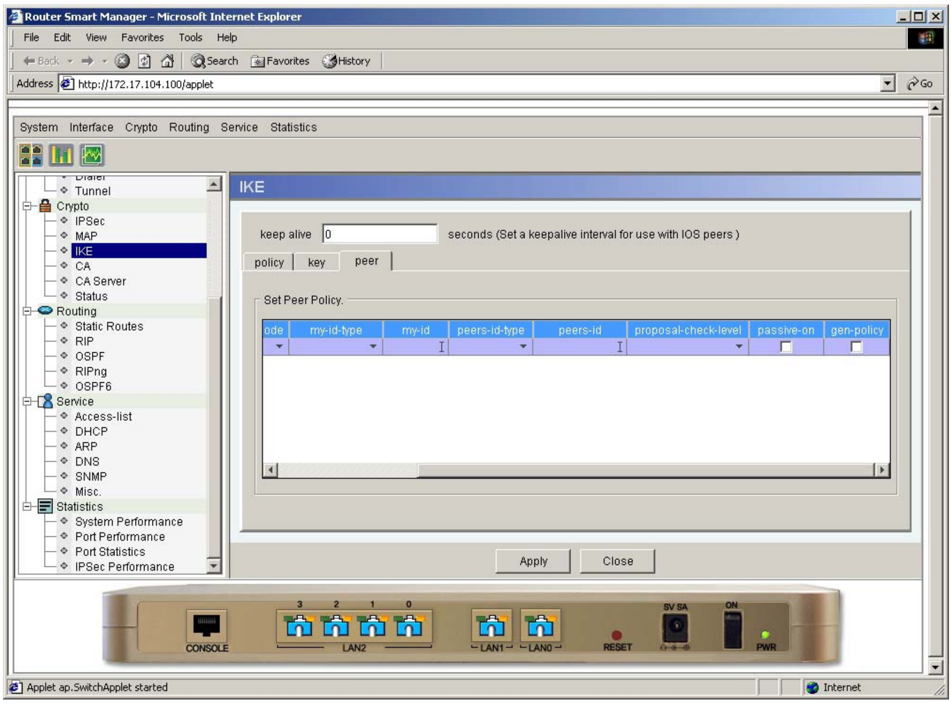


keep alive 0 seconds (Set a keepalive interval for use with IOS peers)

Set Peer Policy.

type	IP(Host)	ex-mode	my-id-type	my-id	peers-id-type	peers-id	proposal-che

(Figure3-201) IKE Key Peer Menu page I



keep alive 0 seconds (Set a keepalive interval for use with IOS peers)

Set Peer Policy.

ode	my-id-type	my-id	peers-id-type	peers-id	proposal-check-level	passive-on	gen-policy
						□	□

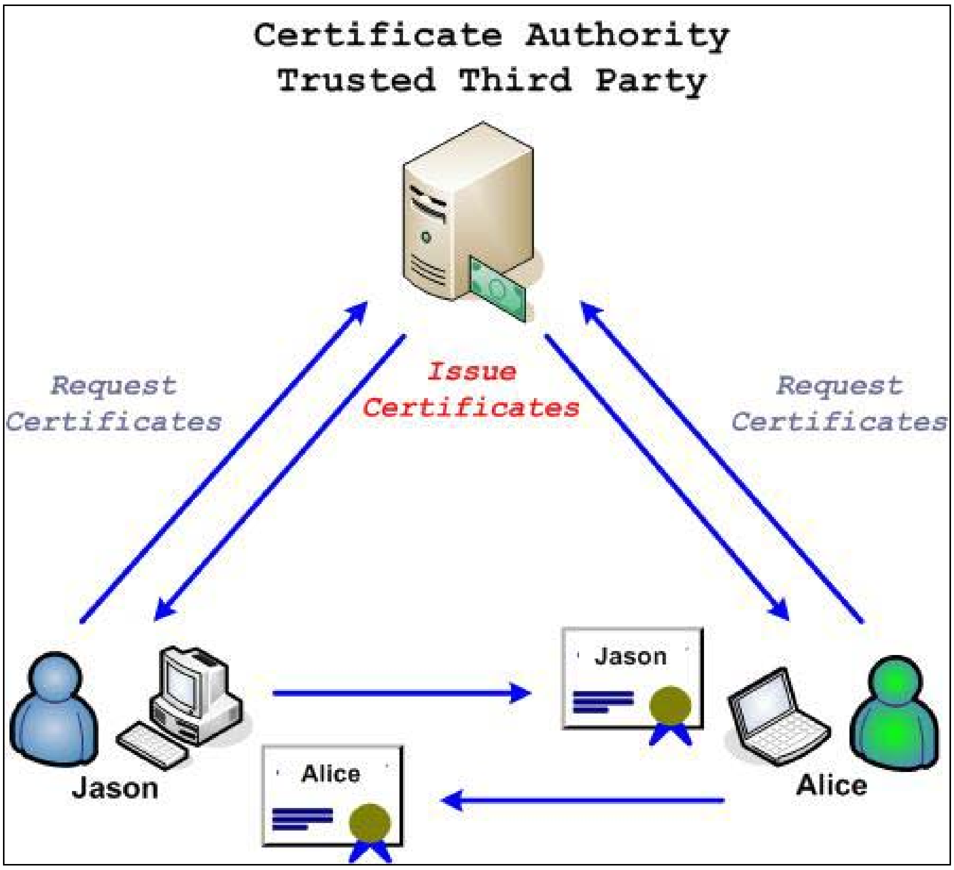
(Figure3-202) IKE Key Peer Menu page II

<Table 3-31> IKE Key Description

Elements	Description
Type	It decides type of Peer. Select one from IP Address, Hostname. Use DNS for Hostname, or Domain-List is needed.
IP(Host)	Input Peer IP Address or Hostname. Use DNS for Hostname or DNS List is needed.
Ex-mode	Choose Exchange-mode. Select one from Base/Aggressive/Main.
My-id-type	Choose My-id-type. Select one from asn1dn/fqdn/ipv4-address/key-id/user-fqdn.
My-id	Input Send Peer ID.
Peers-id-type	Choose Peers-id-type. Select one from asn1dn/fqdn/ipv4-address/key-id/user-fqdn. Select the same one as My-id-type.
Peers-id	Input Receive Peer ID.
Proposal-check-level	It decides acceptance level for SA Request from sender. It is applied on IPSec Lifetime and PFS. (This has to be predefined in Crypto Map of receiver Gateway) select one from exact/obey/strict. “Exact” only enables IPSec SA when the value of sender and receiver is the same, “obey” accepts the value from sender and “strict” enables IPSec SA when Lifetime of sender is the same or less than receiver’s. If Lifetime of sender is more than receiver’s, IPSec SA is disabled. (Based on Lifetime of sender.) In the case of PFS, IPSec SA is enabled in PFS-PFS, PFS-no PFS. If sender is “no PFS” and receiver is “PFS”, IPSec SA is disabled. (Based on sender’s PFS policy).
Passive-on	It starts Negotiation when getting SA Request from Peer. It does not send SA Request actively.
Gen-policy	Check if you want to enable sending SA Request.

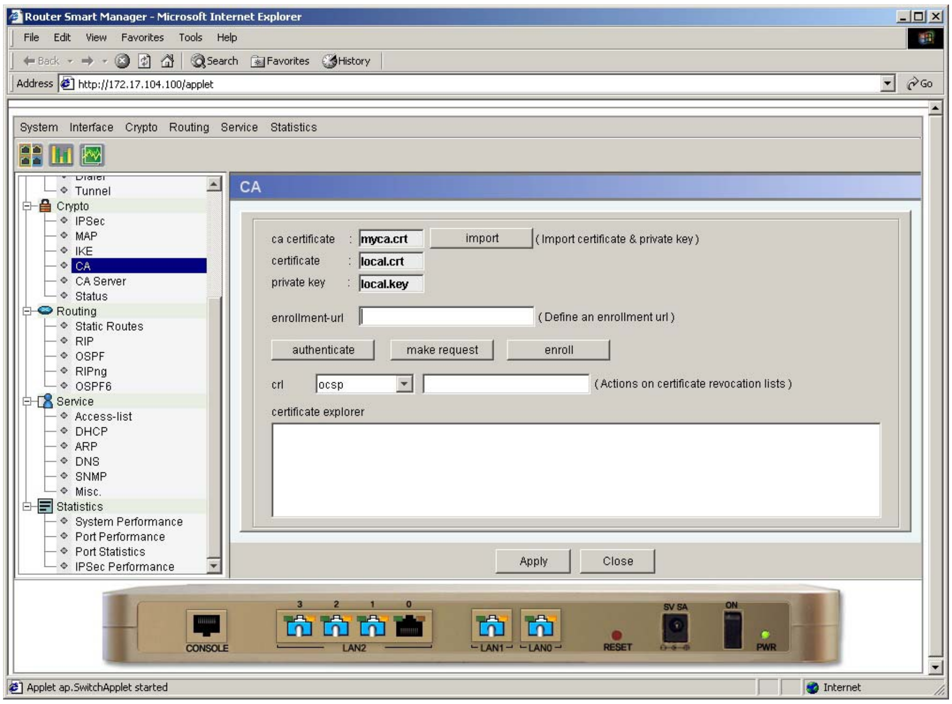
CA

CA (Certification Authority) is for using certification as for VPN gateway configuration. Using certification ensures security for gateways.



(Figure3-203) IPSec using certificate of CA Server

Figure 3-206 shows CA menu.



CA

ca certificate : myca.crt import (Import certificate & private key)

certificate : local.crt

private key : local.key

enrollment-url (Define an enrollment url)

authenticate make request enroll

crl ocsp (Actions on certificate revocation lists)

certificate explorer

Apply Close

(Figure3-204) Crypto CA menu

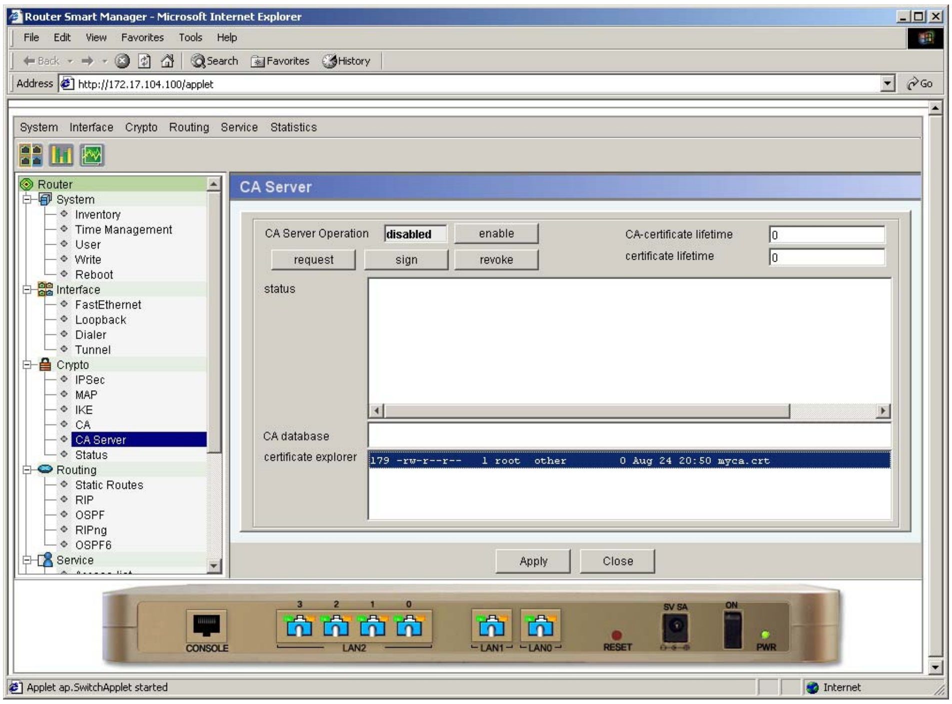
<Table 3-32> Crypto CA Description

Elements	Description
CA Certificate	CA certification file.
Certificate	Certificate file of Gateway.
Private key	Private key file.
Import [Button]	Imports contents of the certificate file.
Enrollment-url	Input URL of CA Server which requests certification.
Authenticate[Button]	Gateway authenticates CA Server.
Make Request [Button]	Create RSA key to check remote Peer.
Enroll[Button]	Request certification from CA Server.
Crl	Input the URL of ocsp/ldap Server to check expiration date of the certification.

CA Server

CA (Certification Authority) Server provides a function of issuing certification, IPSec communication by setting AP900S as a CA server.

AP900S enables Gateway to issue certification without a specific CA Server. AP900S does not only play as a CA Server but also plays as a gateway for IPS communication so it realizes easy use of certification.



CA Server Operation: disabled

CA-certificate lifetime: 0

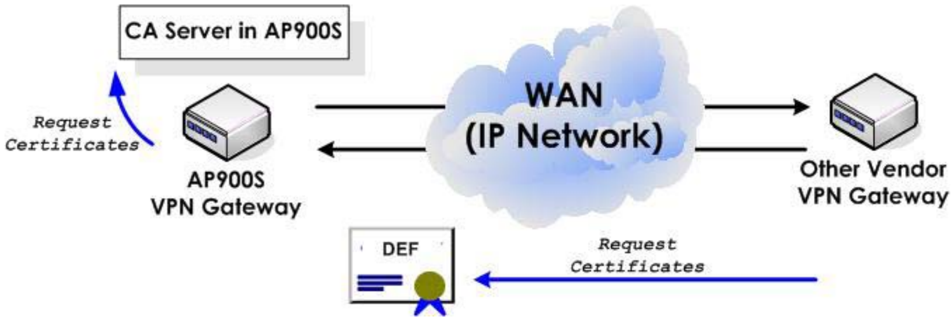
certificate lifetime: 0

certificate explorer:

```
179 -rw-r--r--    1 root   other        0 Aug 24 20:50 myca.crt
```

(Figure3-205) Crypto CA Server main page

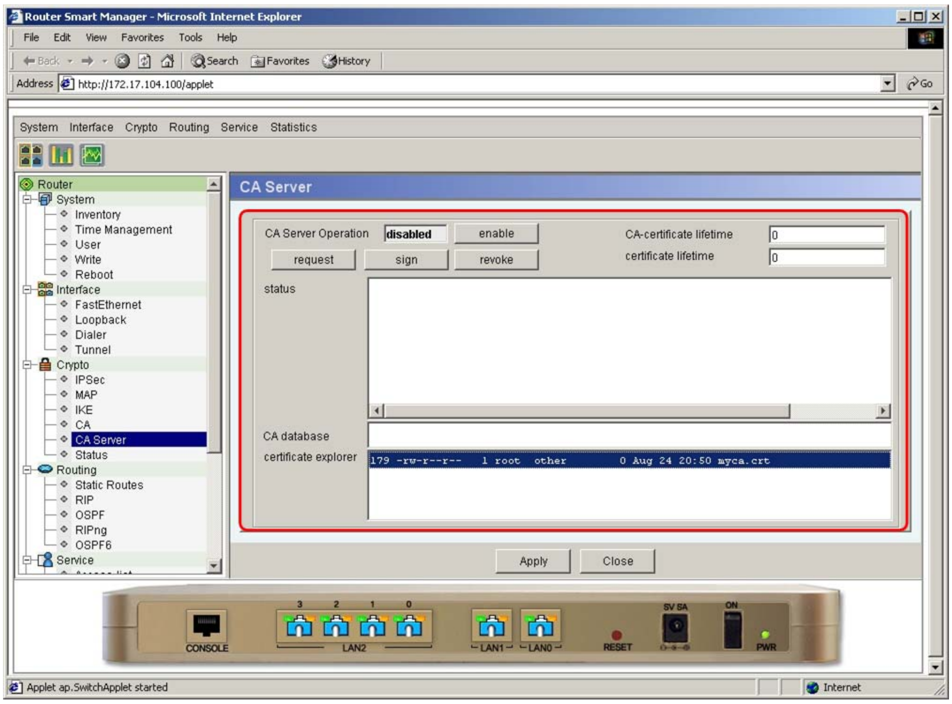
Figure 3-208 shows a network diagram of using AP900S as CA Server.



(Figure3-206) CA Server in AP900S Diagram

AP900S has its own CA Server inside which enables issuing its own certification and also certifications of other VPN Gateways. CA Server of AP900S provides functions of requesting and issuing AP900S certification even for SA Negotiation of AP900S. It also enables to issue certifications for remote VPN Gateways. This function is suitable for the environments which can not operate individual CA Server.

Table 3-33 shows CA Server menu.



CA Server Operation: disabled

CA-certificate lifetime: 0

certificate lifetime: 0

```
179 -rw-r--r--    1 root   other        0 Aug 24 20:50 myca.crt
```

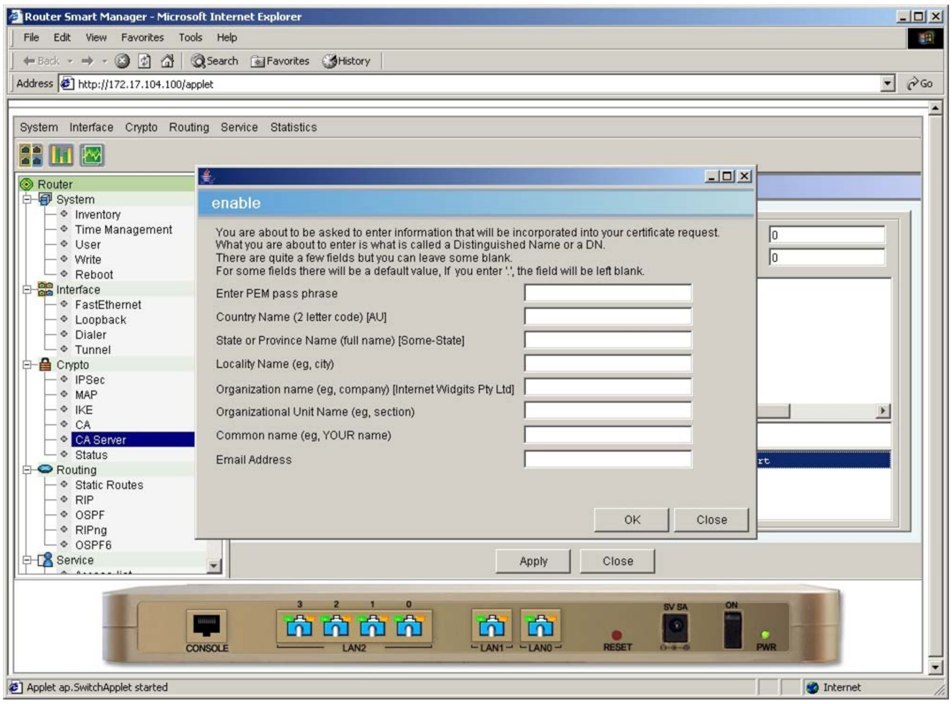
(Figure3-207) Crypto CA Server Menu

<Table 3-33> Crypto CA menu Description

Elements	Description
CA Server Operation	Set CA Server operation to Enable or Disable.
CA-Certificate Lifetime	Input Lifetime as CA Server.
Certificate Lifetime	Input certification Lifetime of CA Server.
Request [button]	Request authentication and 1024bit RSA Key for IPSec communication.
Sign [button]	Sign for requested certification from CA Server using RSA Key and authentication requesting form.
Revoke [button]	Revoke certification by requesting it to CA Server.

Figure 3-210 shows CA Server Enable menu page.

Must Input "." When there is nothing to input in each field.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
Router
System
Inventory
Time Management
User
Write
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

enable

You are about to be asked to enter information that will be incorporated into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank.
For some fields there will be a default value, If you enter '.', the field will be left blank.

Enter PEM pass phrase

Country Name (2 letter code) [AU]

State or Province Name (full name) [Some-State]

Locality Name (eg, city)

Organization name (eg, company) [Internet Widgits Pty Ltd]

Organizational Unit Name (eg, section)

Common name (eg, YOUR name)

Email Address

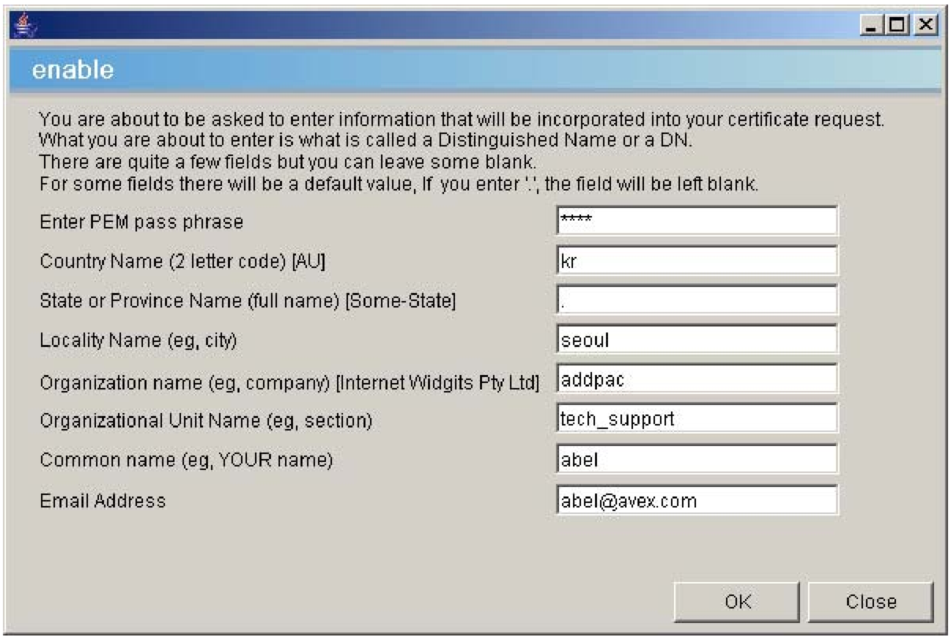
OK Close

(Figure3-208) Crypto CA Server Enable Menu page

<Table 3-34> Crypto CA Enable menu Description

Elements	Description
Enter PEM pass phase	Set Password for the use of creating CA authentication certificate. This password is also used for issuing certification from other gateways.
Country Name	Input country name.
State or Province Name	Input the name of state or province.
Locality Name	Input the name of city.
Organization name	Input the name of organization.
Organization Unit Name	Input the name of department.
Common Name	Input the name of user.
Email Address	Input E-Mail address.

Figure 3-211 shows the parameter setting input example of CA Server Enable.



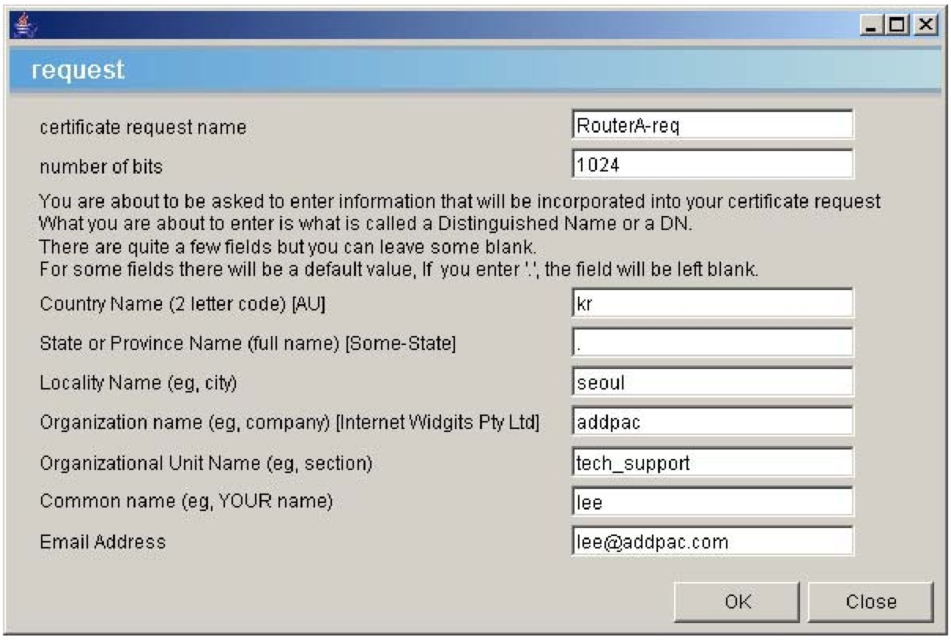
enable

You are about to be asked to enter information that will be incorporated into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank.
For some fields there will be a default value, If you enter '.', the field will be left blank.

Enter PEM pass phrase	****
Country Name (2 letter code) [AU]	kr
State or Province Name (full name) [Some-State]	.
Locality Name (eg, city)	seoul
Organization name (eg, company) [Internet Widgits Pty Ltd]	addpac
Organizational Unit Name (eg, section)	tech_support
Common name (eg, YOUR name)	abel
Email Address	abel@avex.com

(Figure3-209) Crypto CA Server Enable input example

Figure 3-212 shows the parameter setting input example of CA Server Request.



request

certificate request name	RouterA-req
number of bits	1024

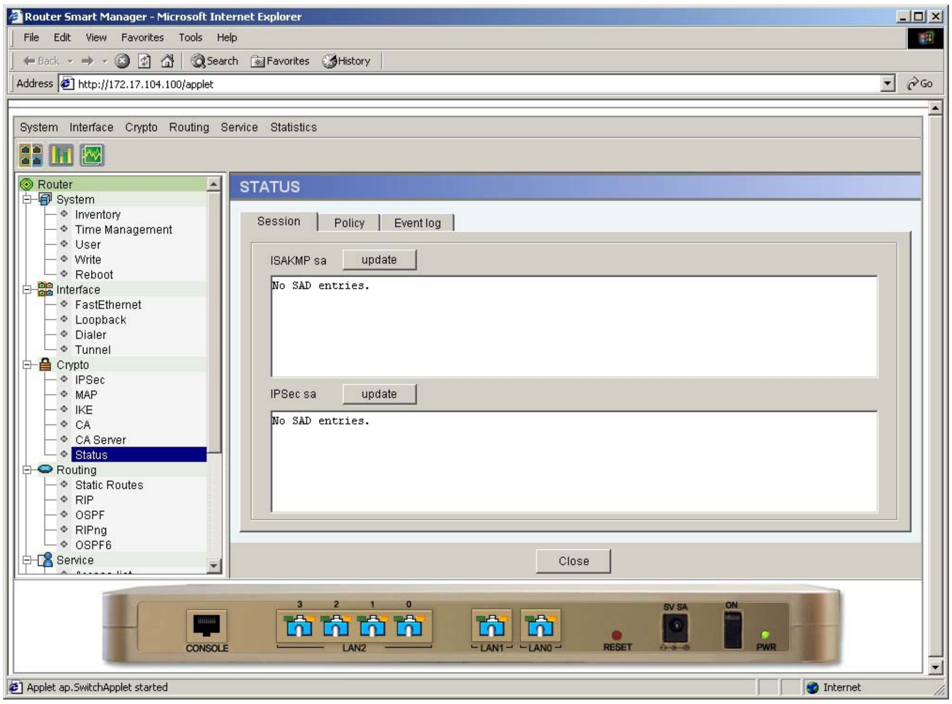
You are about to be asked to enter information that will be incorporated into your certificate request
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank.
For some fields there will be a default value, If you enter '.', the field will be left blank.

Country Name (2 letter code) [AU]	kr
State or Province Name (full name) [Some-State]	.
Locality Name (eg, city)	seoul
Organization name (eg, company) [Internet Widgits Pty Ltd]	addpac
Organizational Unit Name (eg, section)	tech_support
Common name (eg, YOUR name)	lee
Email Address	lee@addpac.com

(Figure3-210) Crypto CA Server Request input example

Status

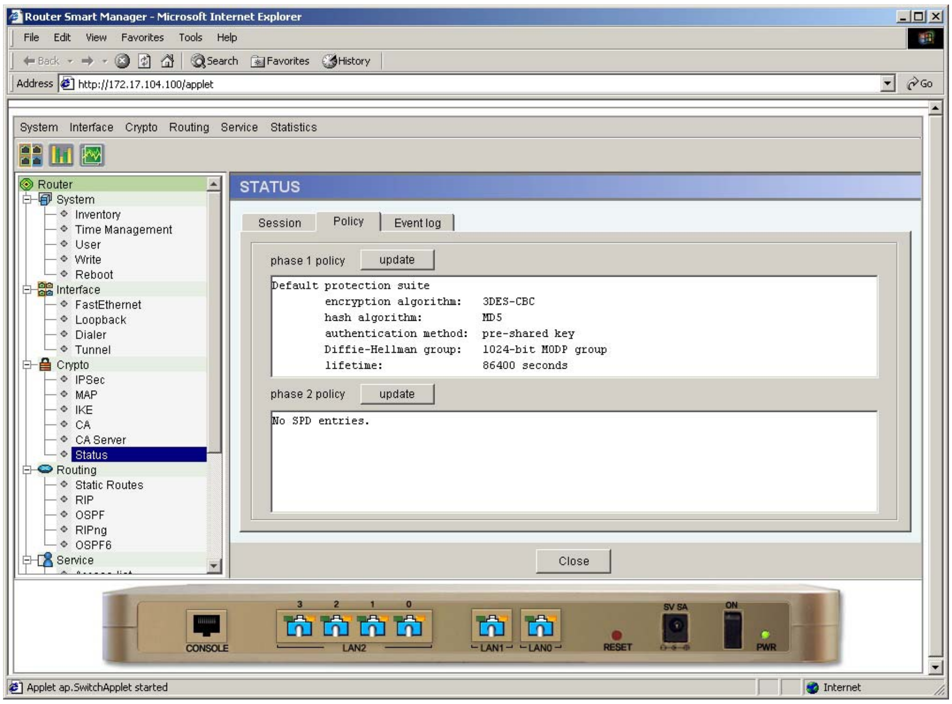
Status menu shows the information on ISAKMP SA Session, IPSec SA Session info, Phase1, Phase2 Policy and Event Log etc. Click "Update" to verify updated status.



```
No SAD entries.
```

```
No SAD entries.
```

(Figure3-211) Crypto Status Session page



```
Default protection suite
        encryption algorithm:   3DES-CBC
        hash algorithm:         MD5
        authentication method:  pre-shared key
        Diffie-Hellman group:   1024-bit MODP group
        lifetime:               86400 seconds
```

```
No SPD entries.
```

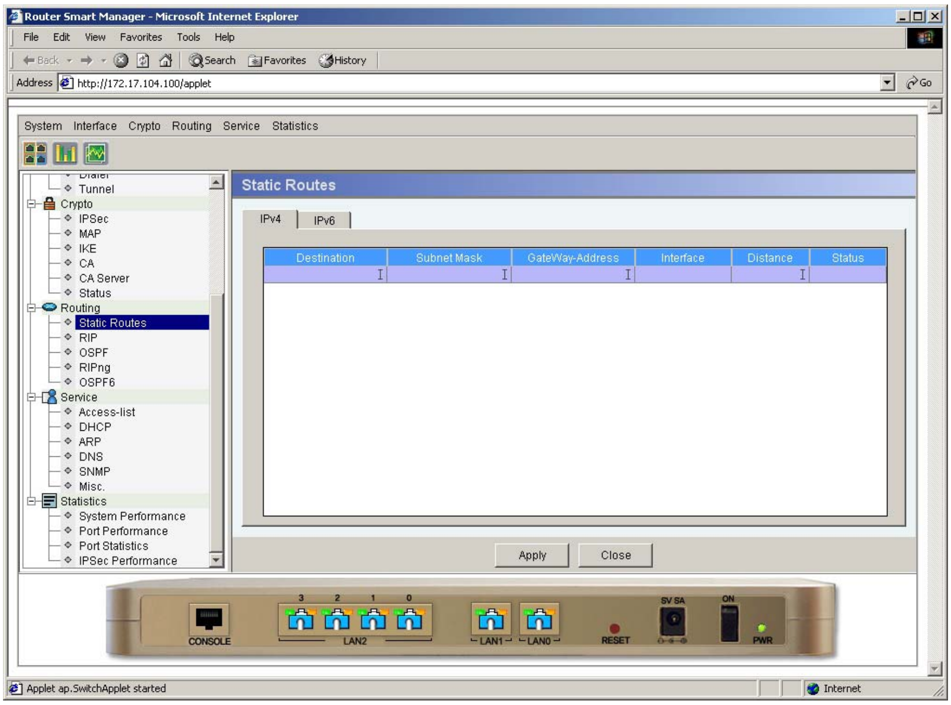
(Figure3-212) Crypto Status Policy page

Routing Menu

Static Routes

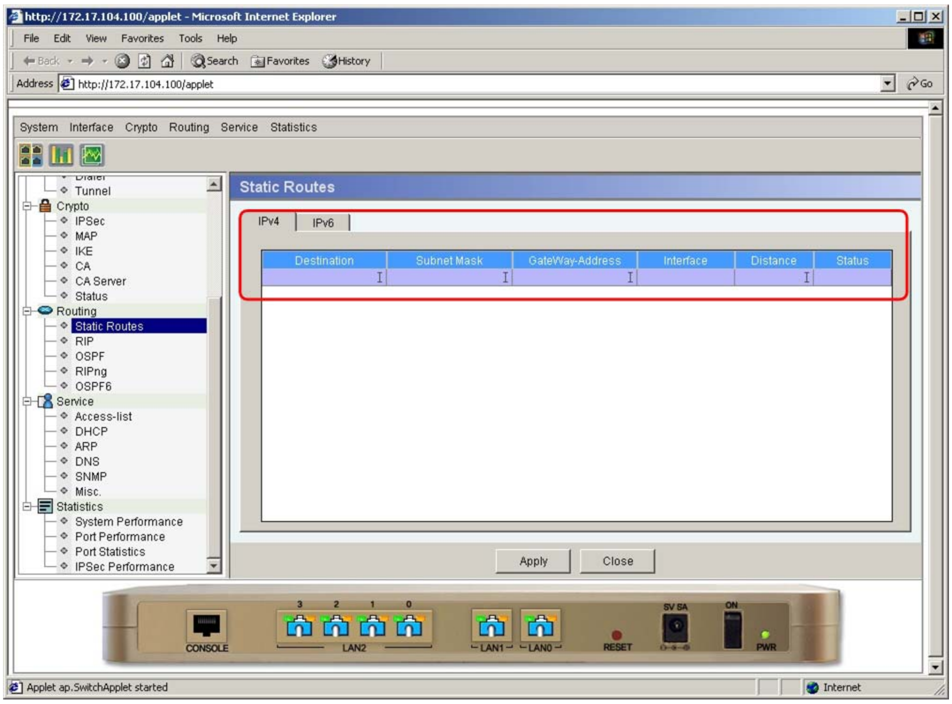
Static Routes enables manual input of Routing Table without using a specific Routing Protocol. Unlike Routing Protocols such as RIP and OSPF, Static Routes do not exchange Routing Table between Routers so it has a benefit of having bandwidth availability. However, it is not commonly used because of its complicated configuration and difficulties of solving network problems.

Static Routes is used when priority over Routing Table which uses Routing Protocols is needed or when Default-Router is needed because Interface uses IP Address.



(Figure3-213) Static Routes Main page

Table 3-35 is a description of IP version 4 Static Routes menu.

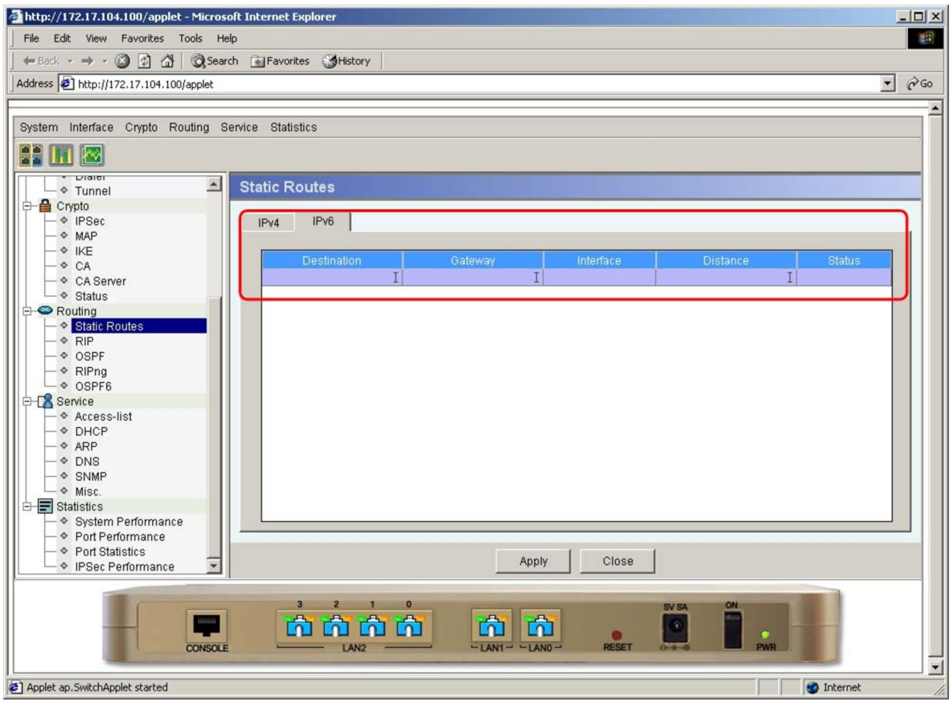


(Figure3-214) IP version 4 Static Routes page

<Table 3-35> IP version 4 Static Routes menu Description

Elements	Description
Destination	Input Destination IP Address. Input “0,0,0,0” for Default Route.
Subnet Mask	Input Destination Subnet mask. Input “0,0,0,0” for Default Route.
Gateway-Address	Input Gateway IP Address.
Interface	Input Local IP Address instead of Gateway IP Address.
Distance	Input priority for Static Route.
Status	Status of current Static Routes.

Table 3-36 is a description of IP version 6 Static Routes menu.



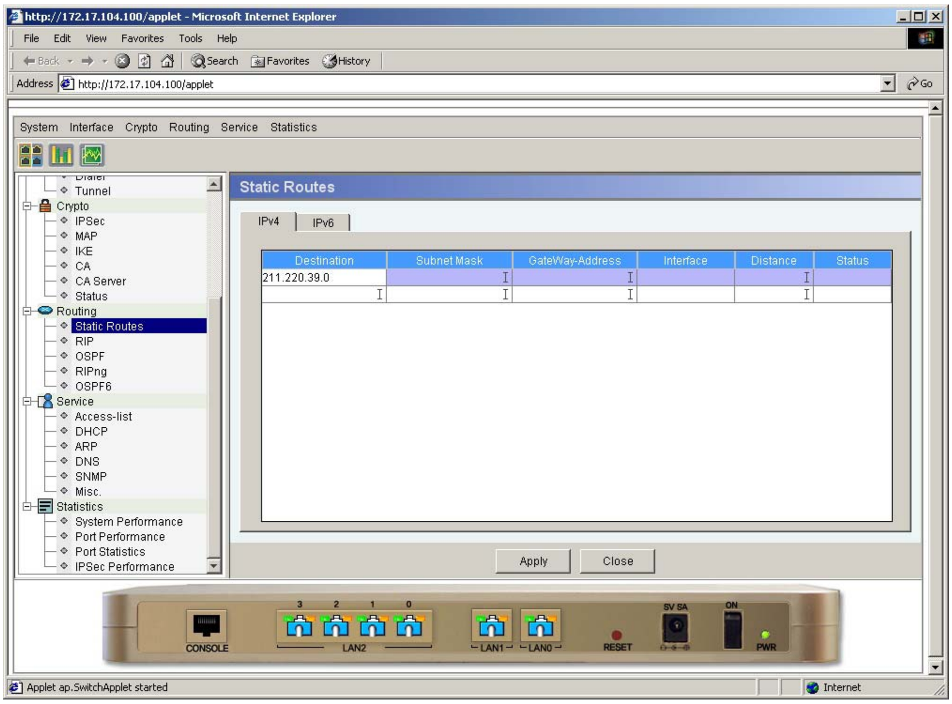
(Figure3-215) IP version 6 Static Routes page

<Table 3-36> IP version 6 Static Routes menu description

Elements	Description
Destination	Input Destination IP Address. Input IP Address and Subnet Mask in IPv6.
Gateway-Address	Input Gateway IP Address.
Interface	Input Local IP Address instead of Gateway IP Address.
Distance	Input priority for Static Route.
Status	Status of current Static Routes.

Figure 3-218 shows the example of IP version 4 Static Routes configuration.

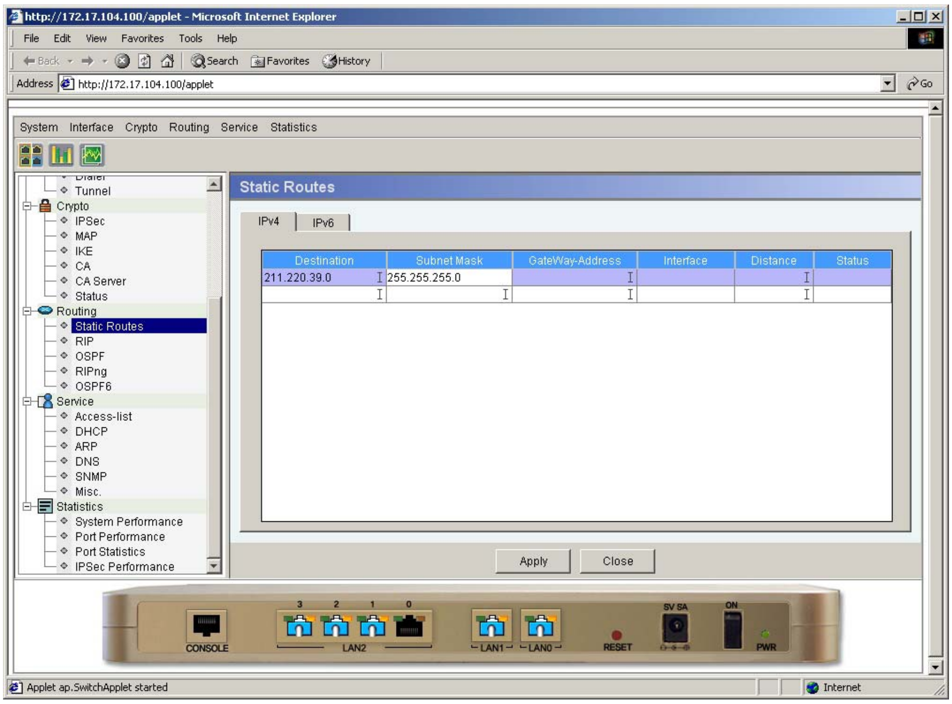
Input “211.220.39.0” for Destination IP Address



Destination	Subnet Mask	GateWay-Address	Interface	Distance	Status
211.220.39.0					

(Figure3-216) Input IP version 4 Static Routes Destination IP Address

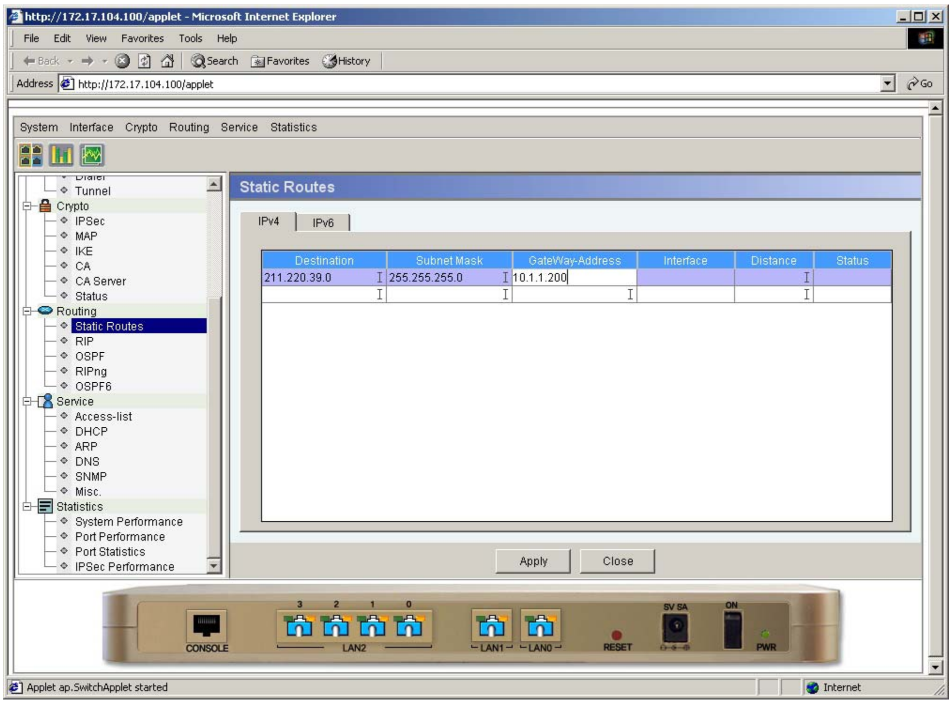
Input “255.255.255.0” for Subnet Mask



Destination	Subnet Mask	GateWay-Address	Interface	Distance	Status
211.220.39.0	255.255.255.0				

(Figure3-217) Input IP version 4 Static Routes Subnet Mask

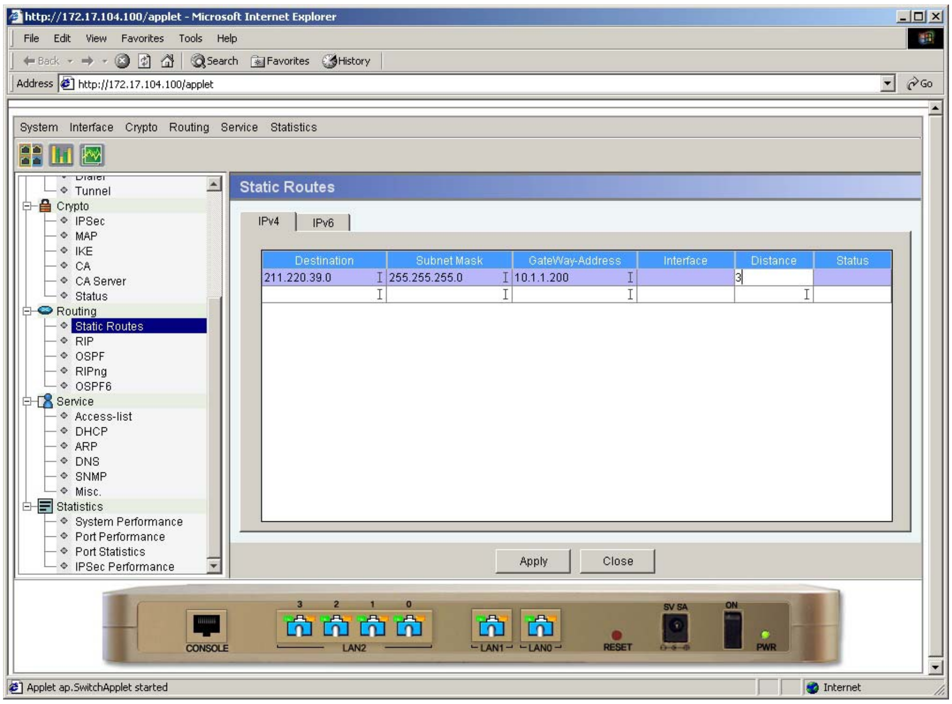
Input “10.1.1.200” for Gateway Address



Destination	Subnet Mask	GateWay-Address	Interface	Distance	Status
211.220.39.0	255.255.255.0	10.1.1.200			

(Figure3-218) Input IP version 4 Static Routes Gateway Address

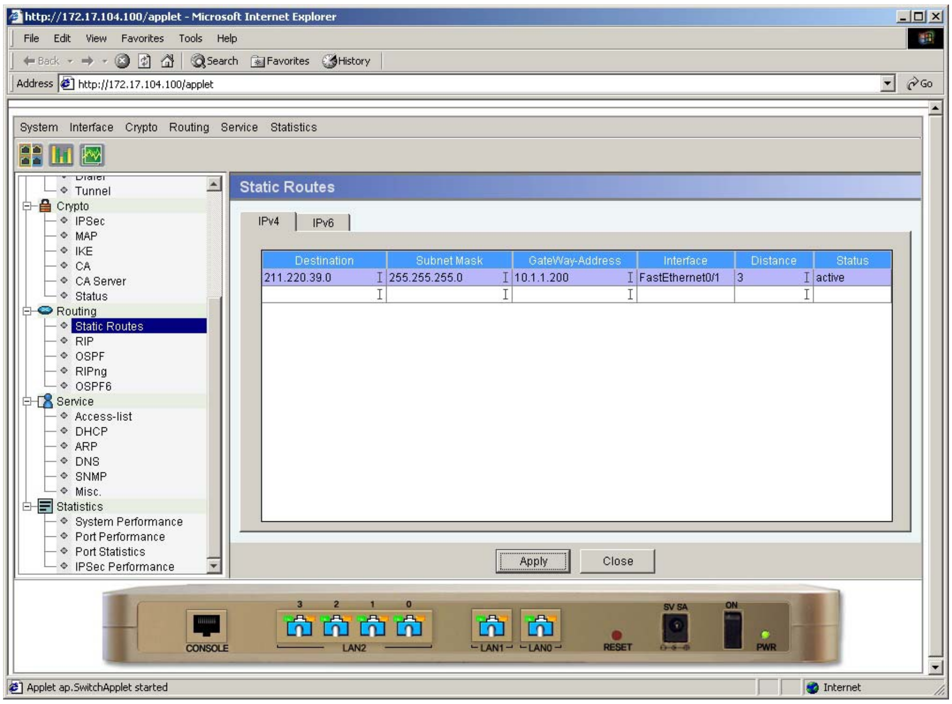
Input “3” for Distance



Destination	Subnet Mask	GateWay-Address	Interface	Distance	Status
211.220.39.0	255.255.255.0	10.1.1.200		3	

(Figure3-219) Input IP version 4 Static Routes Distance

Click “Apply” to verify. It will automatically change the interface value to FastEthernet 0/1 of the same network as Gateway Address and Status field changes to “Active”.

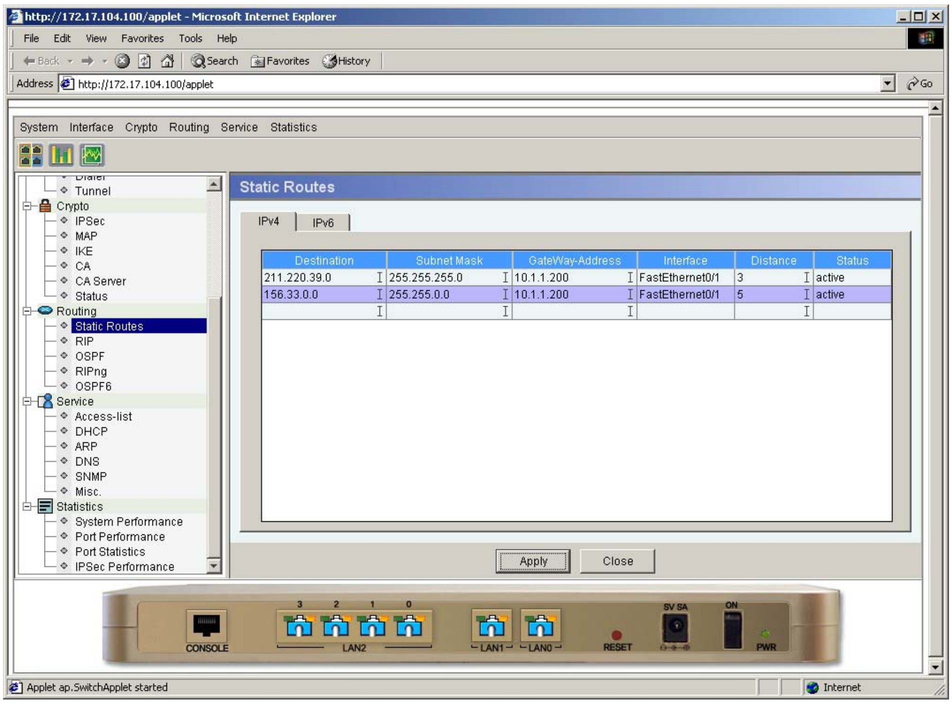


Destination	Subnet Mask	GateWay-Address	Interface	Distance	Status
211.220.39.0	255.255.255.0	10.1.1.200	FastEthernet0/1	3	active

(Figure3-220) Verify IP version 4 Static Routes settings.

Figure 3-223 shows the example of deleting Static Route of "156.33.0.0/16"

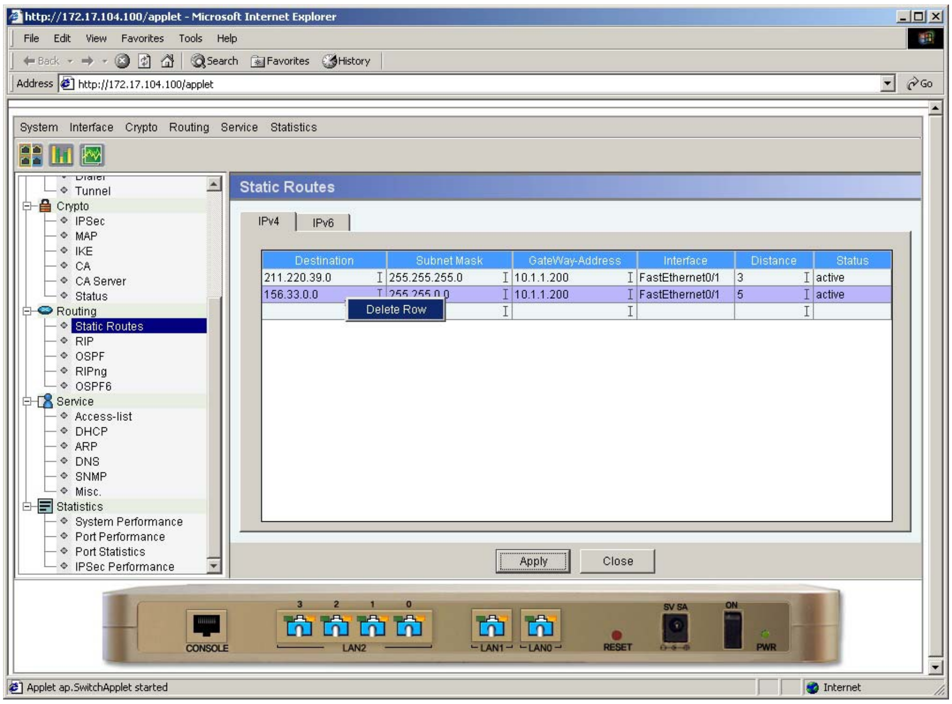
First, select Static Route you want to delete.



Destination	Subnet Mask	GateWay-Address	Interface	Distance	Status
211.220.39.0	255.255.255.0	10.1.1.200	FastEthernet0/1	3	active
156.33.0.0	255.255.0.0	10.1.1.200	FastEthernet0/1	5	active

(Figure3-221) Select IP version 4 Static Route you want to delete

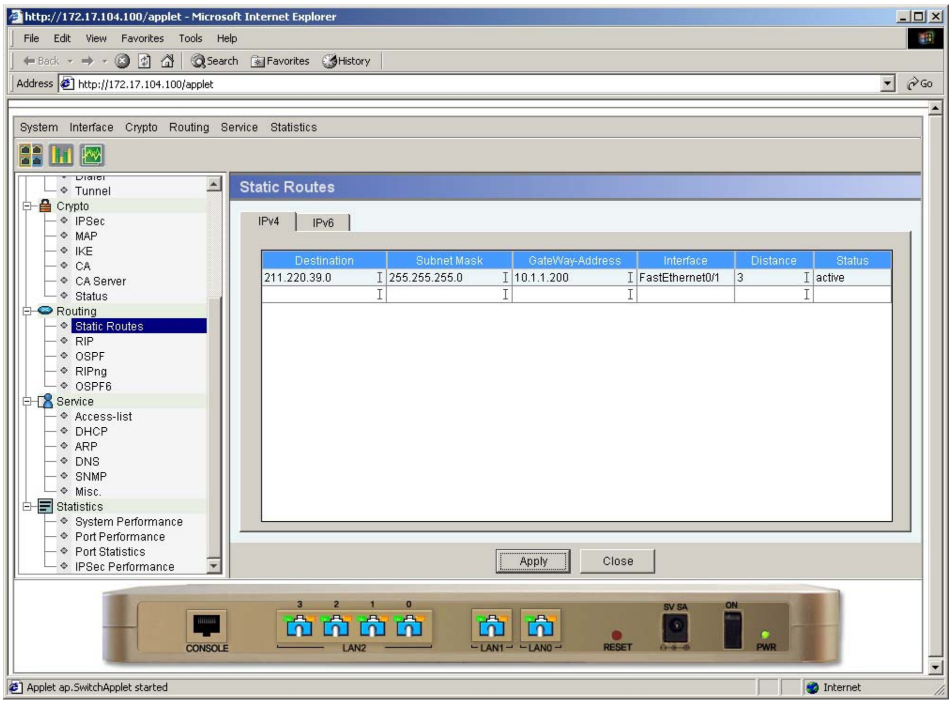
Select "Delete Row" by clicking right side of the mouse.



Destination	Subnet Mask	GateWay-Address	Interface	Distance	Status
211.220.39.0	255.255.255.0	10.1.1.200	FastEthernet0/1	3	active
156.33.0.0	255.255.0.0	10.1.1.200	FastEthernet0/1	5	active

(Figure3-222) Delete IP version 4 Static Route

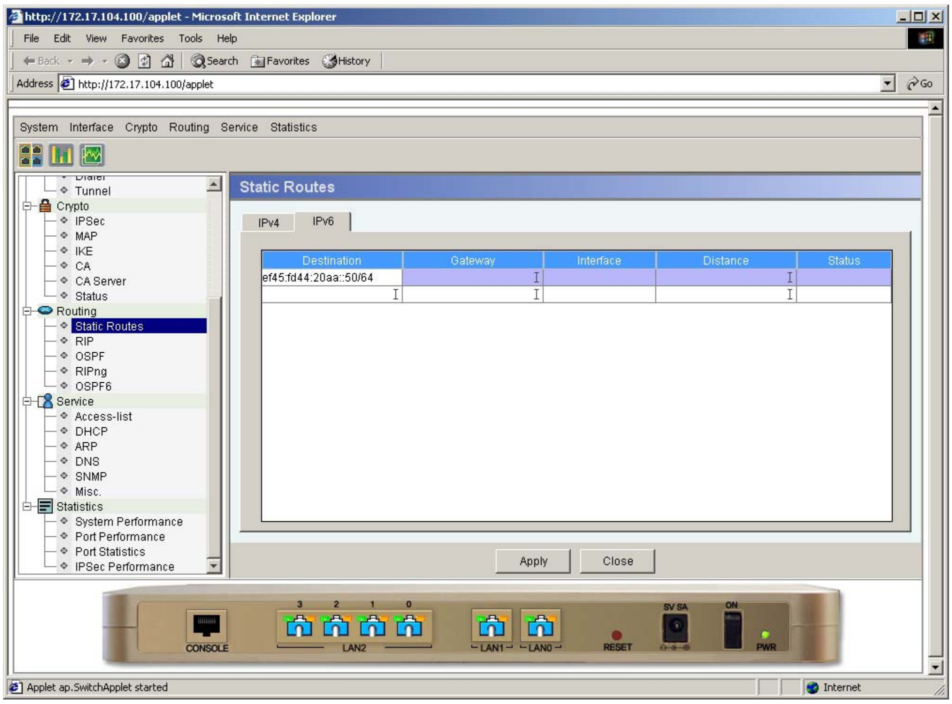
Click "Apply" to verify.



Destination	Subnet Mask	GateWay-Address	Interface	Distance	Status
211.220.39.0	255.255.255.0	10.1.1.200	FastEthernet0/1	3	active

(Figure3-223) Verify IP version 4 Static Routes delete.

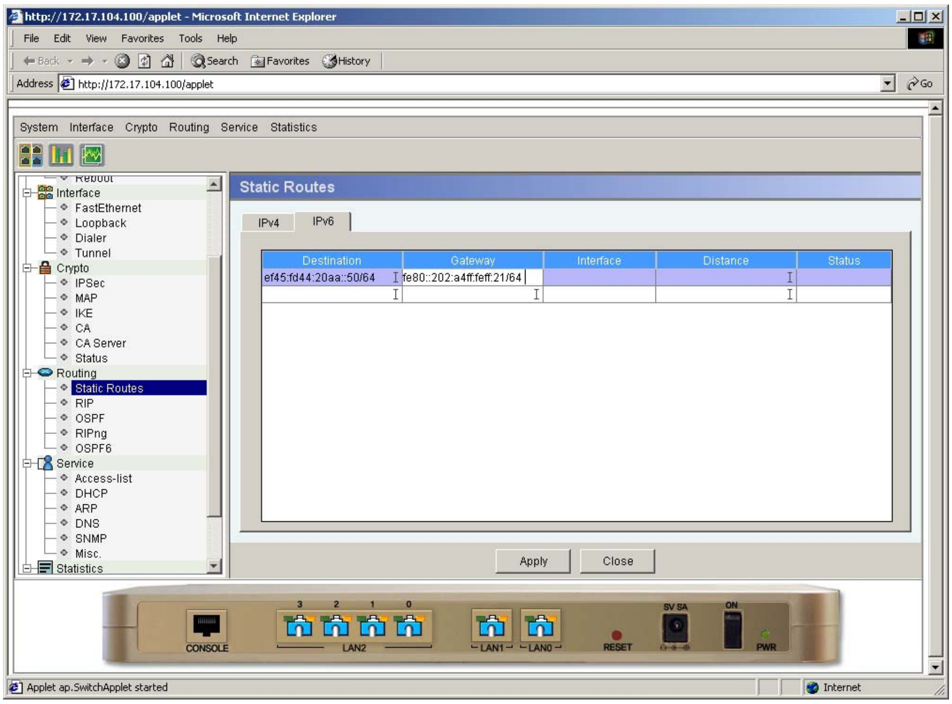
Figure 3-226 shows the example of configuring IP version 6 Static Routes. Input IPv6 Address and Subnet mask in Destination field.



Destination	Gateway	Interface	Distance	Status
ef45:fd44:20aa::50/64				

(Figure3-224) Input IP version 6 Static Routes Destination

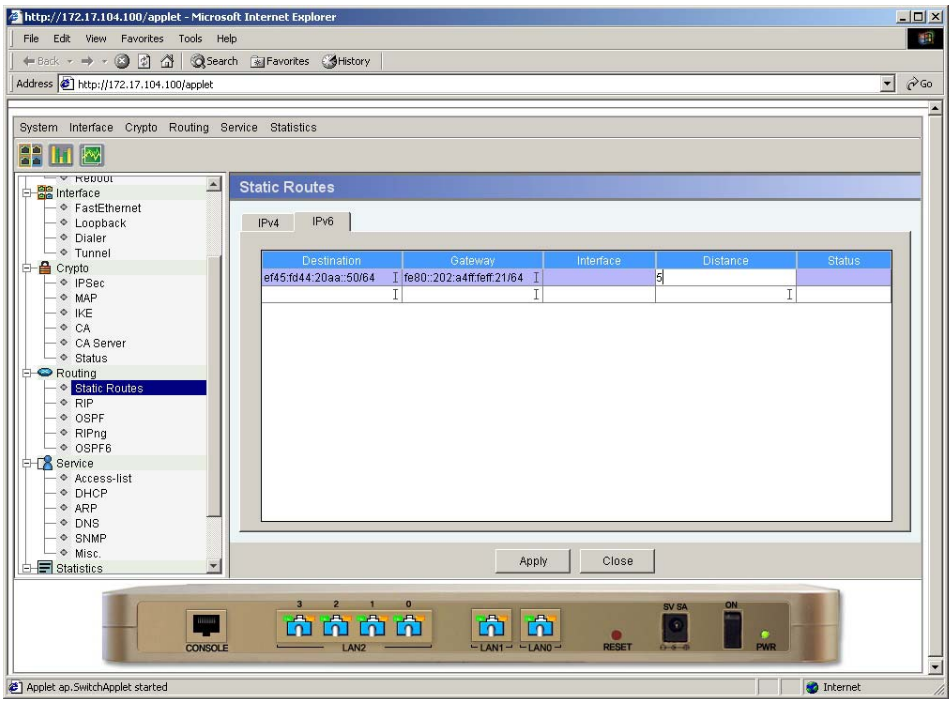
Input IP Address of the gateway.



Destination	Gateway	Interface	Distance	Status
ef45:fd44:20aa::50/64	fe80::202:a4ff:feff:21/64			

(Figure3-225) Input IP version 6 Static Routes Gateway Address

Input “5” for Distance



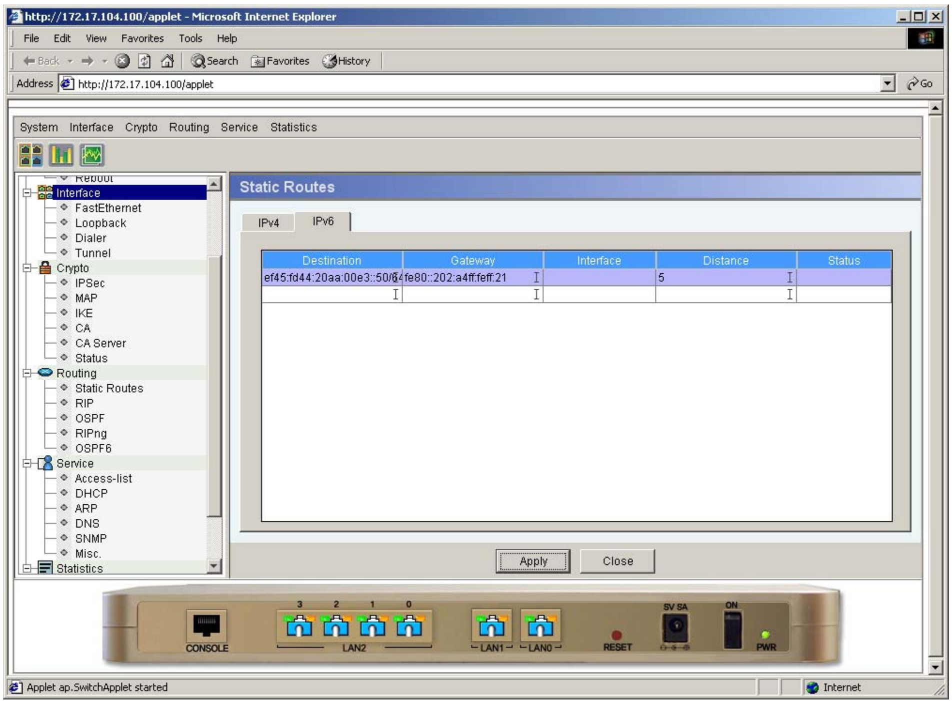
Static Routes

Destination	Gateway	Interface	Distance	Status
ef45:fd44:20aa::50/64	fe80::202:a4ff:feff:21/64		5	

http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
IPv4
IPv6
Apply
Close
Applet ap.SwitchApplet started

(Figure3-226) Input IP version 6 Static Routes Distance

Click “Apply” to verify.



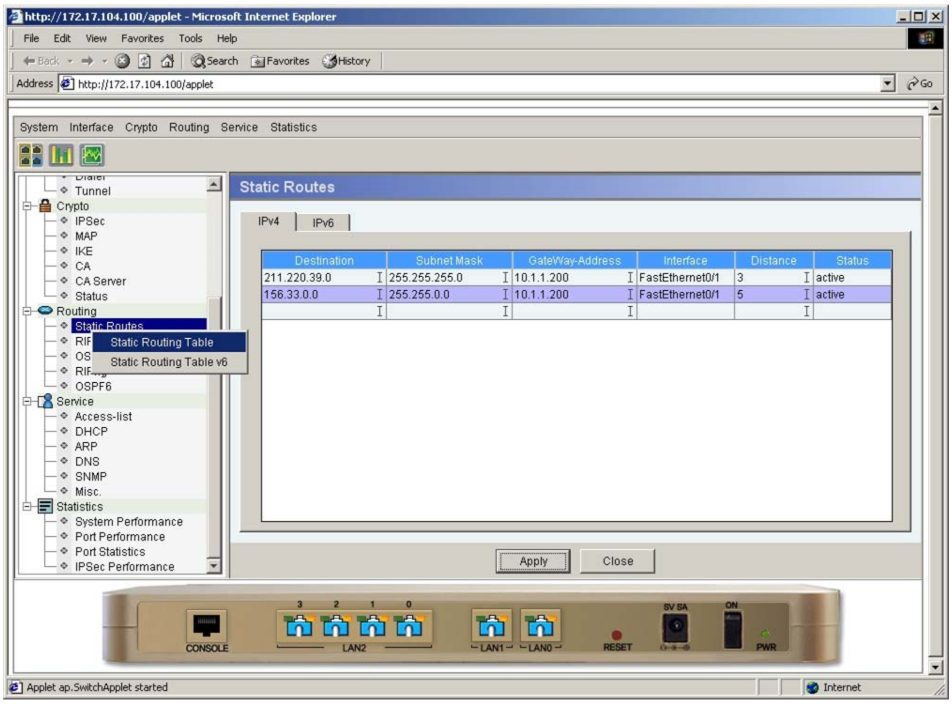
Static Routes

Destination	Gateway	Interface	Distance	Status
ef45:fd44:20aa:00e3::50/64	fe80::202:a4ff:feff:21		5	

http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
IPv4
IPv6
Apply
Close
Applet ap.SwitchApplet started

(Figure3-227) IP version 6 Static Routes configuration verify

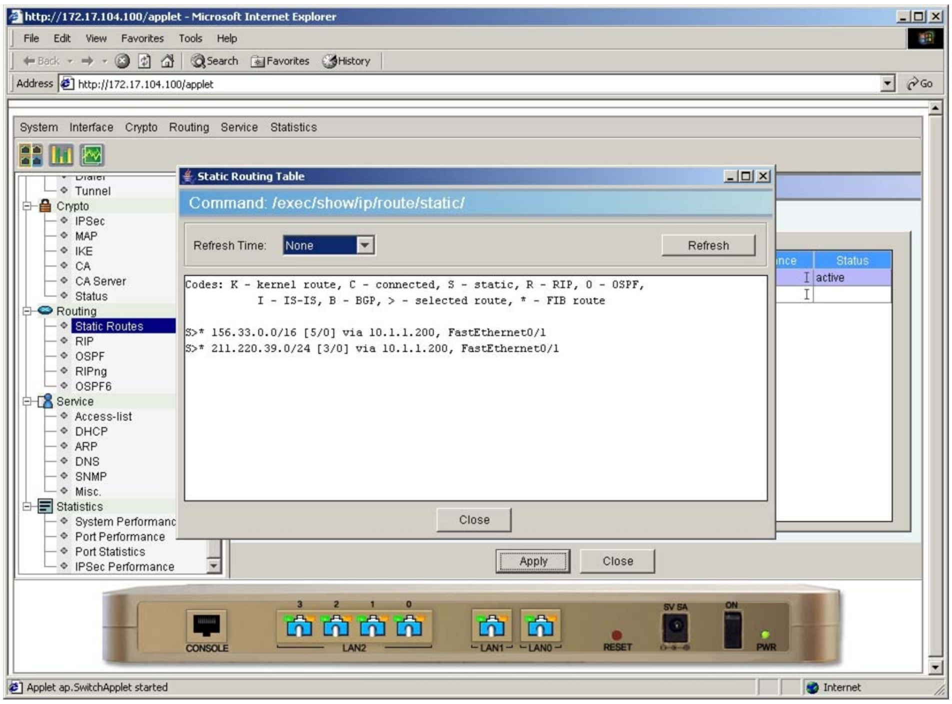
Click right side of the mouse on Static Routes menu to check created Static Routes. See the Figure 3-230.



Destination	Subnet Mask	GateWay-Address	Interface	Distance	Status
211.220.39.0	255.255.255.0	10.1.1.200	FastEthernet0/1	3	active
156.33.0.0	255.255.0.0	10.1.1.200	FastEthernet0/1	5	active

(Figure3-228) Select Static Routes Pop menu

Figure 3-231 shows how to check Routing Table by selecting Static Routes Table. Refresh Time can be set from 3~5 second. Click "Refresh" to check.



Command: /exec/show/ip/route/static/

Refresh Time: None

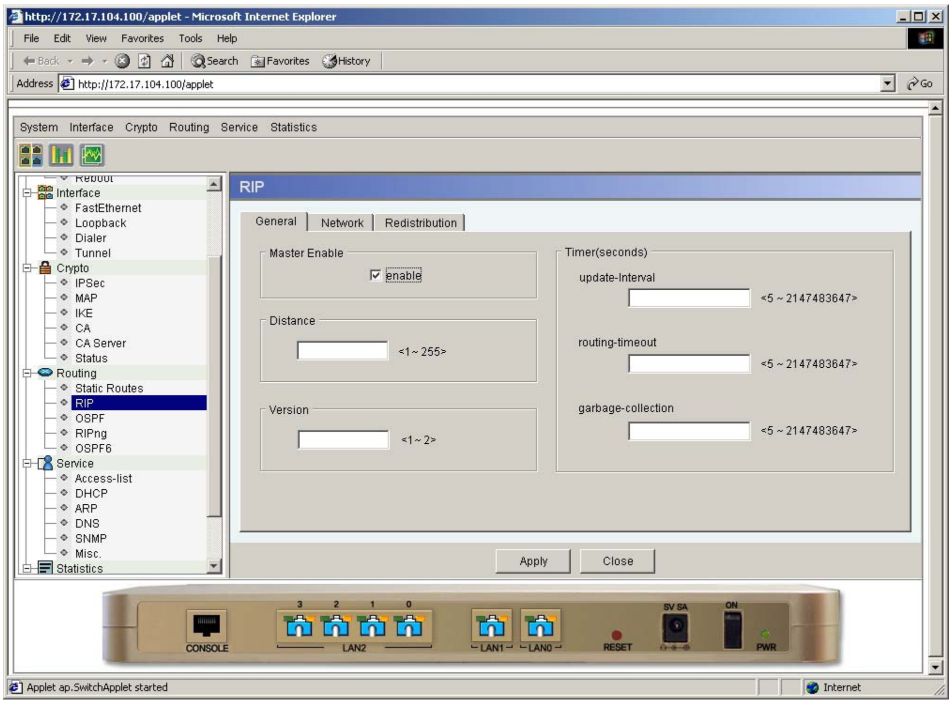
```
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
          I - IS-IS, B - BGP, > - selected route, * - FIB route

S>* 156.33.0.0/16 [5/0] via 10.1.1.200, FastEthernet0/1
S>* 211.220.39.0/24 [3/0] via 10.1.1.200, FastEthernet0/1
```

(Figure3-229) IP version 4 Static Routes Routing Table Verify

RIP

RIP (Routing Information Protocol) is a protocol which is widely used for managing routing information within LAN environments or LAN group networks.

Figure 3-232 shows the main page of selecting RIP.



Master Enable

☑ enable

Distance

<1 ~ 255>

Version

<1 ~ 2>

Timer(seconds)

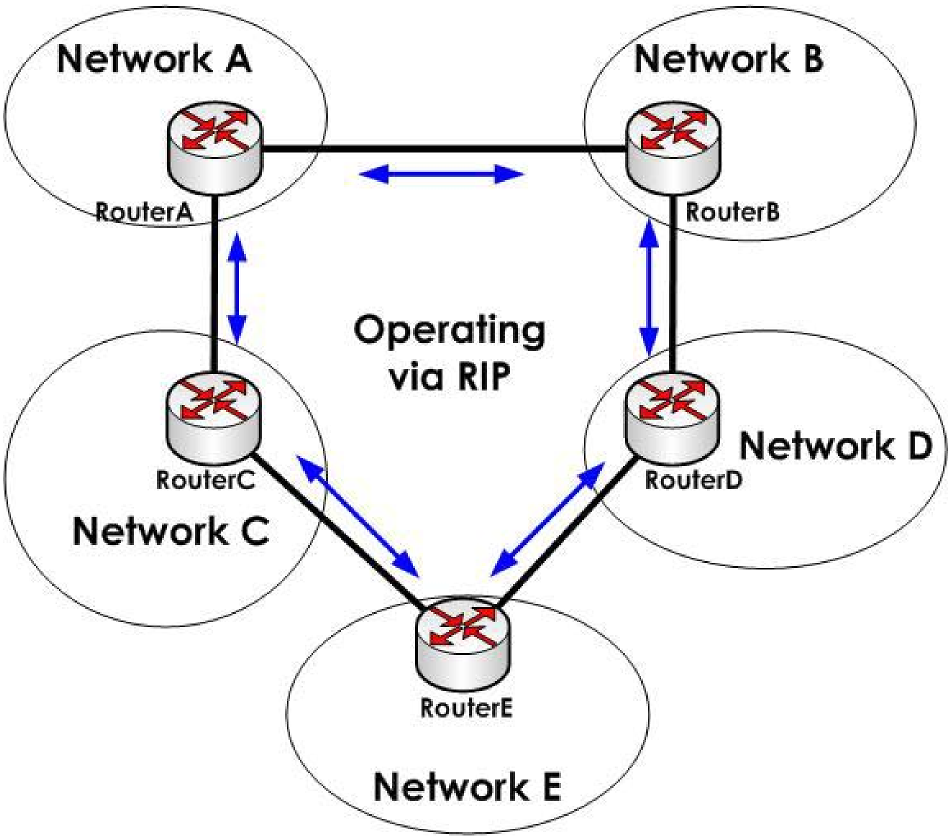
update-Interval <5 ~ 2147483647>

routing-timeout <5 ~ 2147483647>

garbage-collection <5 ~ 2147483647>

(Figure3-230) Routing RIP Main page

Figure 3-233 is a Network Diagram using RIP as a Routing Protocol.



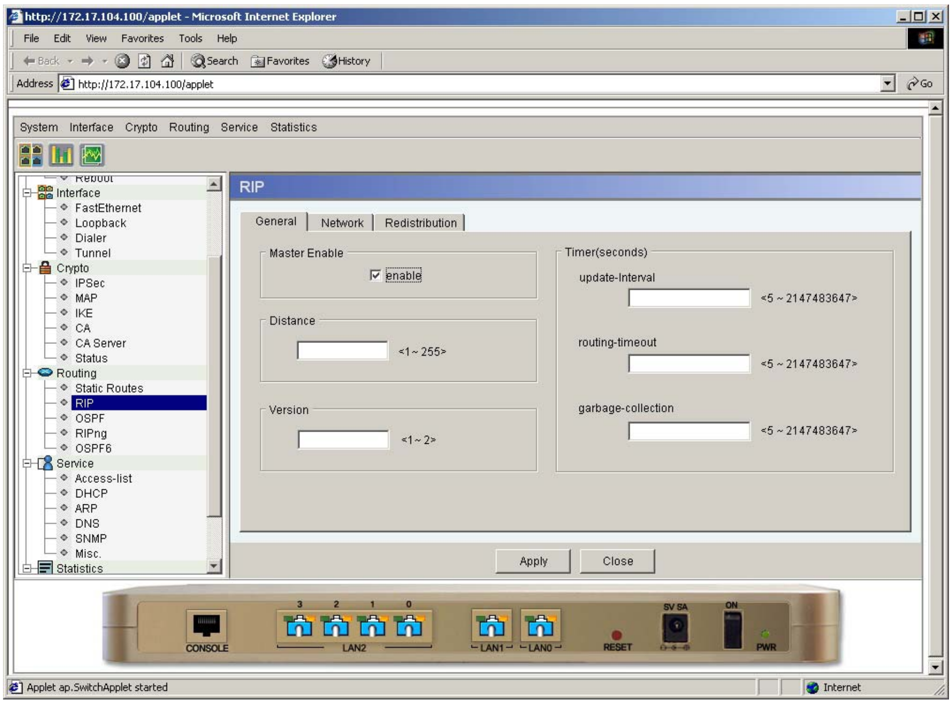
(Figure3-231) RIP Network Diagram

Basically Router A, B, C, D, E knows its own Network information but also each Router knows Network info of A~E through exchanging Routing Table. There are two paths for Network A to Network D. One is “RouterA → RouterC → RouterE” and the other one is “RouterA → RouterB → RouterD → RouterE”. RIP choose a path using number of Hops. Less number of Hop is choosed for an optimal path. So “RouterA → RouterC → RouterE” is choosed.

Alternately, RIP will choose the path of “RouterA → RouterB → RouterD → RouterE”, when the Link between RouterC and RouterE is down.

After the Link is back on again between RouterC and RouterE, Router A uses the original path for a packet transmits to exchange Routing Table.

Table 3-37 is a description of RIP General menu.



Master Enable
☑ enable

Distance
<1 ~ 255>

Version
<1 ~ 2>

Timer(seconds)

update-Interval <5 ~ 2147483647>

routing-timeout <5 ~ 2147483647>

garbage-collection <5 ~ 2147483647>

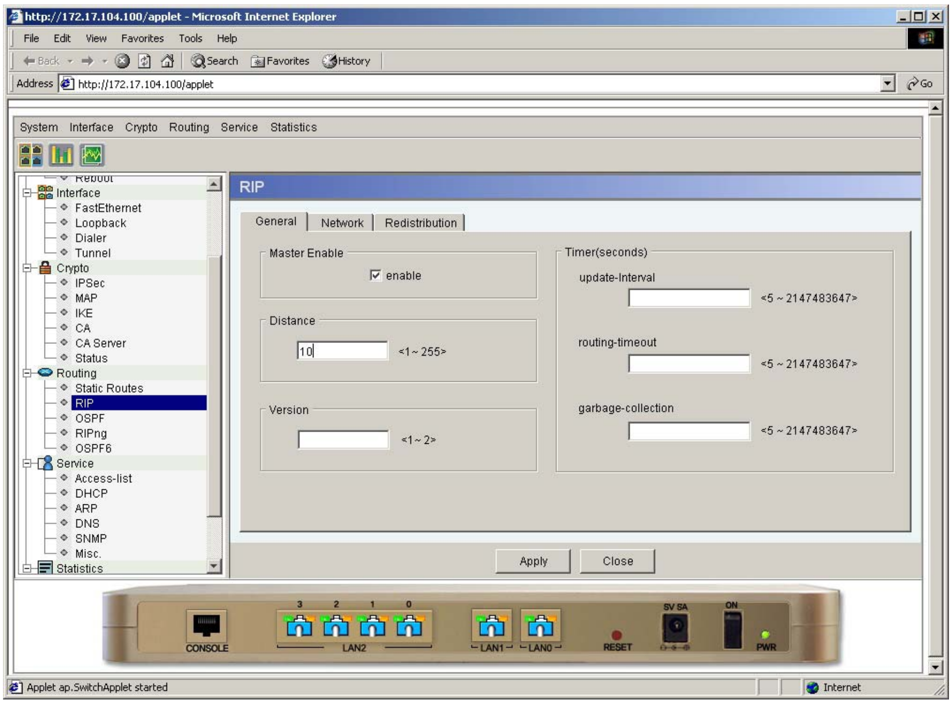
(Figure3-232) RIP General Main page

<Table 3-37> RIP General menu Description

Elements	Description
Master Enable	Select RIP enable or disable
Distance	Choose Distance Value for RIP. You can select from 1~255. Default value is “120”
Version	Choose Version of RIP. Select one from v1, v2. Default is “v2”
Update-Interval	Sets Routing Table update interval. Default value is “30”
Routing-Timeout	Sets waiting time for receiving Routing Table from a specific Interface. Default value is “180” sec.
Garbage-Collection	Sets the time for deleting a Routing Table after Routing-Timeout. Default value is “120” sec.

Figure 3-235 shows the example of altering RIP General menu.

Input "10" for Distance



Master Enable

☑ enable

Distance

10 <1 ~ 255>

Version

<1 ~ 2>

Timer(seconds)

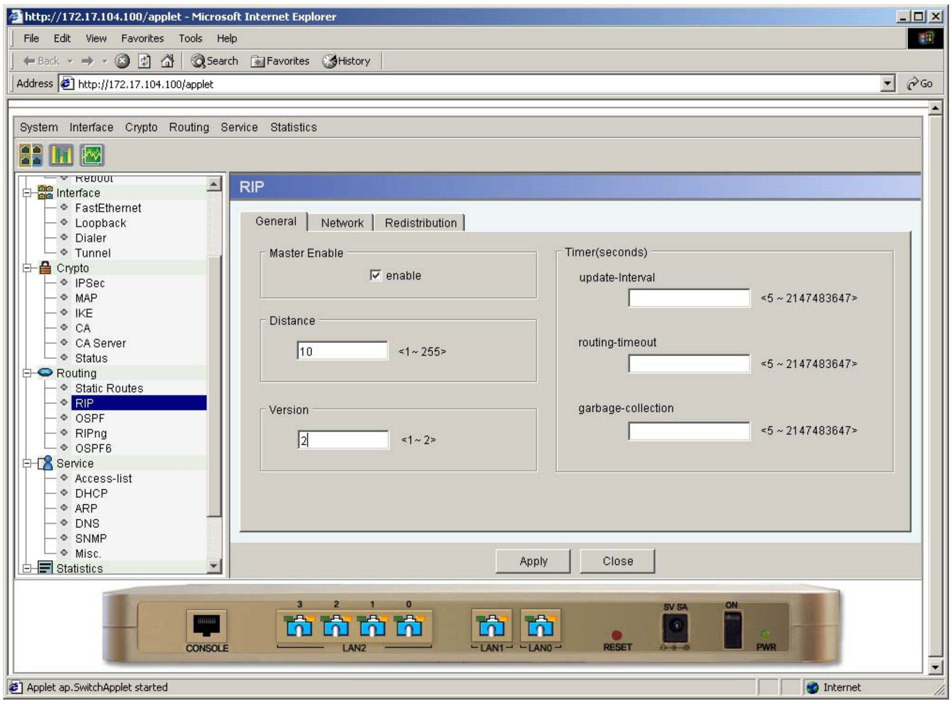
update-Interval <5 ~ 2147483647>

routing-timeout <5 ~ 2147483647>

garbage-collection <5 ~ 2147483647>

(Figure3-233) Input RIP Distance

Select "2" for Version.



Master Enable

☑ enable

Distance

10 <1 ~ 255>

Version

2 <1 ~ 2>

Timer(seconds)

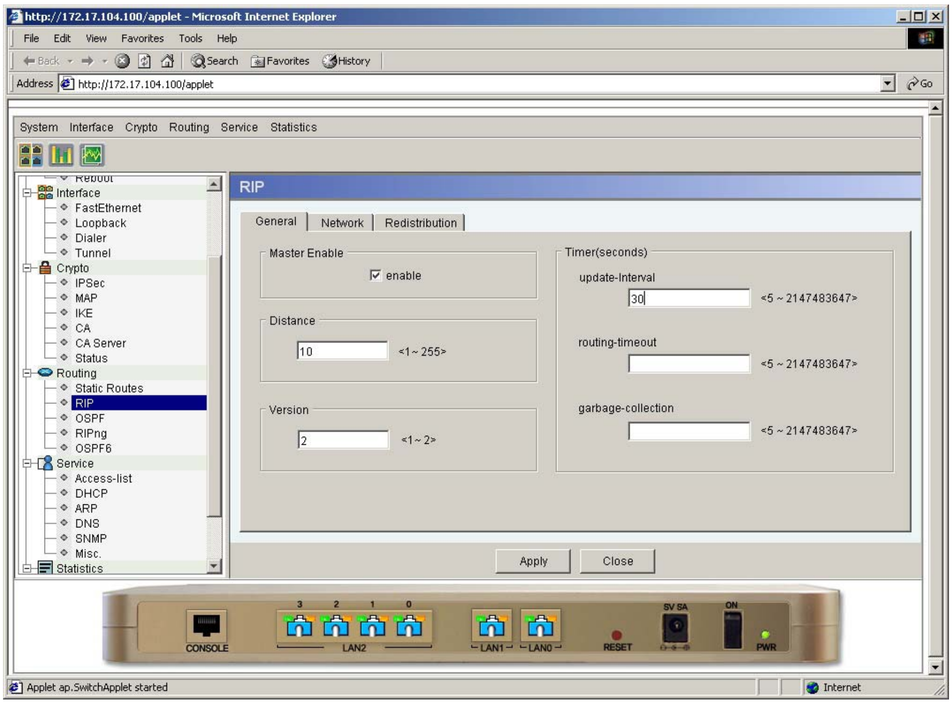
update-Interval <5 ~ 2147483647>

routing-timeout <5 ~ 2147483647>

garbage-collection <5 ~ 2147483647>

(Figure3-234) Input RIP Version

Input "30" for Update-Interval


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
General
Network
Redistribution
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

RIP

Master Enable ☑ enable

Distance: 10 <1 ~ 255>

Version: 2 <1 ~ 2>

Timer(seconds)

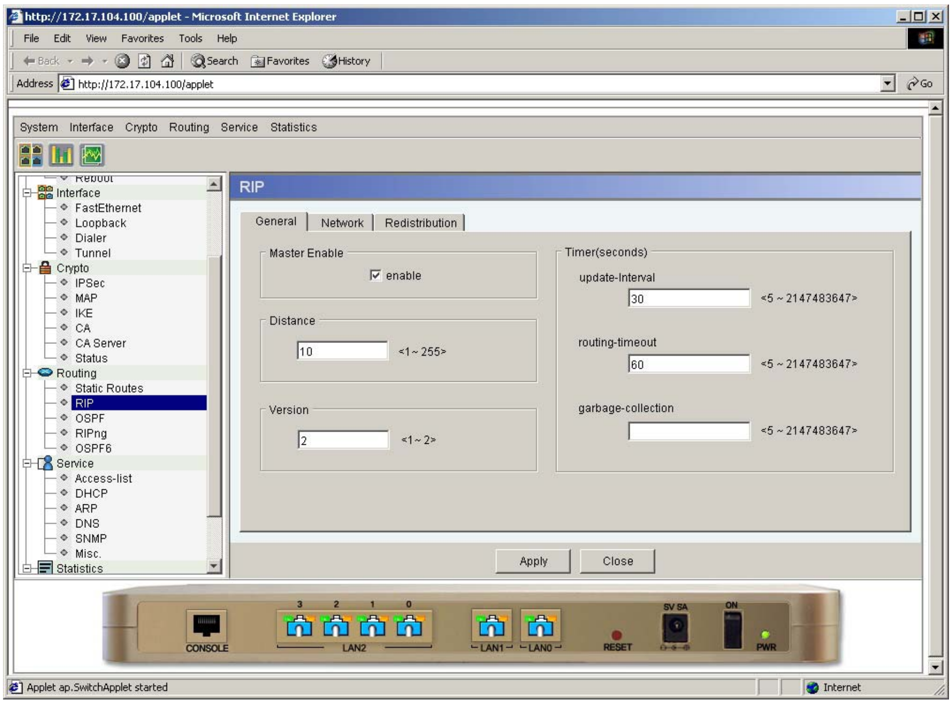
update-Interval: 30 <5 ~ 2147483647>

routing-timeout: <5 ~ 2147483647>

garbage-collection: <5 ~ 2147483647>

(Figure3-235) Input RIP Update-Interval

Input "60" for Routing-Timeout


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
General
Network
Redistribution
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

RIP

Master Enable ☑ enable

Distance: 10 <1 ~ 255>

Version: 2 <1 ~ 2>

Timer(seconds)

update-Interval: 30 <5 ~ 2147483647>

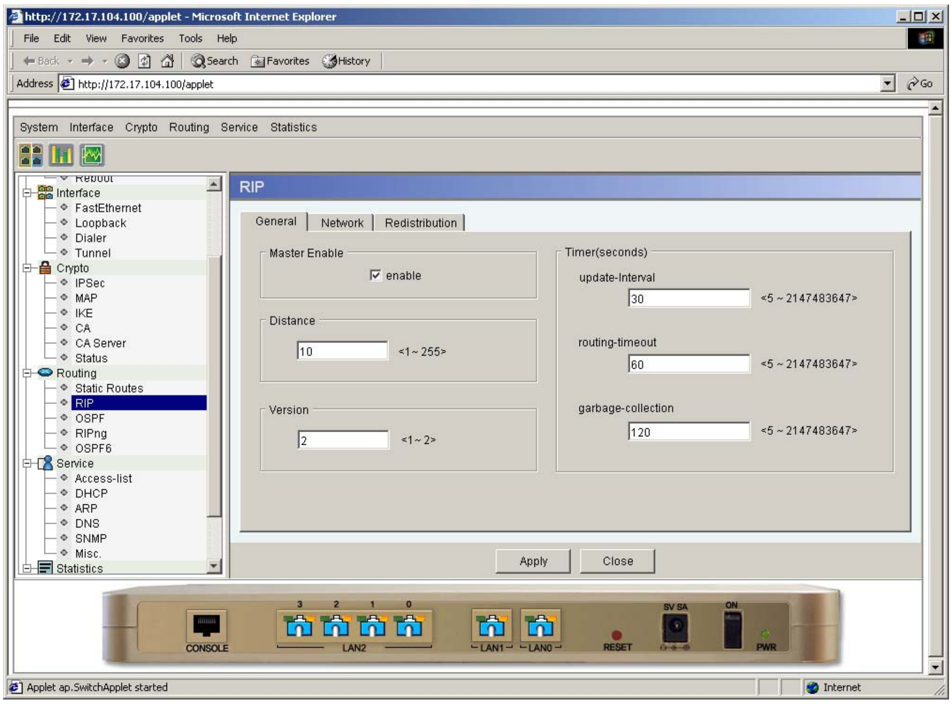
routing-timeout: 60 <5 ~ 2147483647>

garbage-collection: <5 ~ 2147483647>

(Figure3-236) Input RIP Routing-Timeout

Input “120” for Garbage-Collection

Click “Apply”.



http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet Go
System Interface Crypto Routing Service Statistics
Reboot
Interface
FastEthernet
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
RIP
General
Network
Redistribution
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

Master Enable: ☑ enable

Distance: 10 <1 ~ 255>

Version: 2 <1 ~ 2>

Timer(seconds)

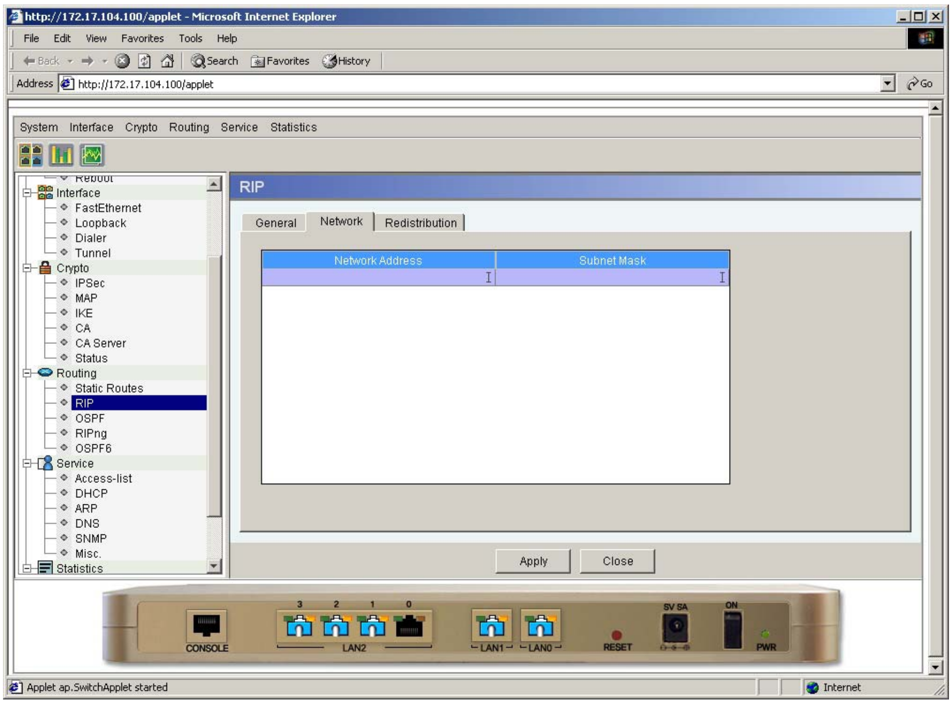
update-Interval: 30 <5 ~ 2147483647>

routing-timeout: 60 <5 ~ 2147483647>

garbage-collection: 120 <5 ~ 2147483647>

(Figure3-237) Input RIP Garbage-Collection

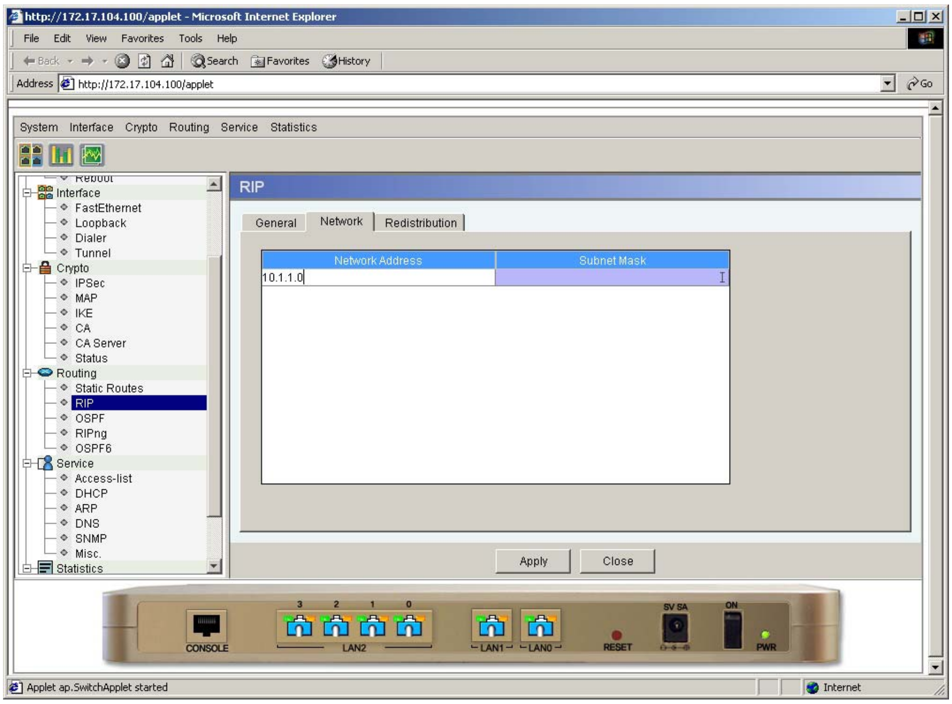
Figure 3-240 shows RIP Network page.



(Figure3-238) RIP Network Main page

Figure 3-241 shows the example of adding “10.1.1.0/24” to RIP Network.

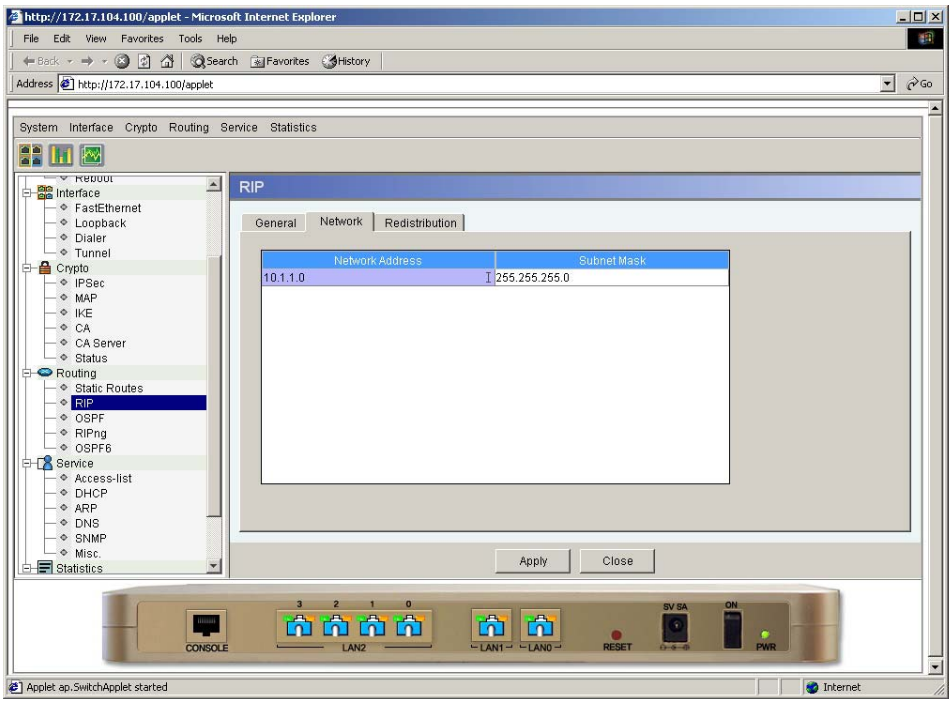
Input “10.1.1.0” for Network Address



Network Address	Subnet Mask
10.1.1.0	

(Figure3-239) Add RIP Network Address

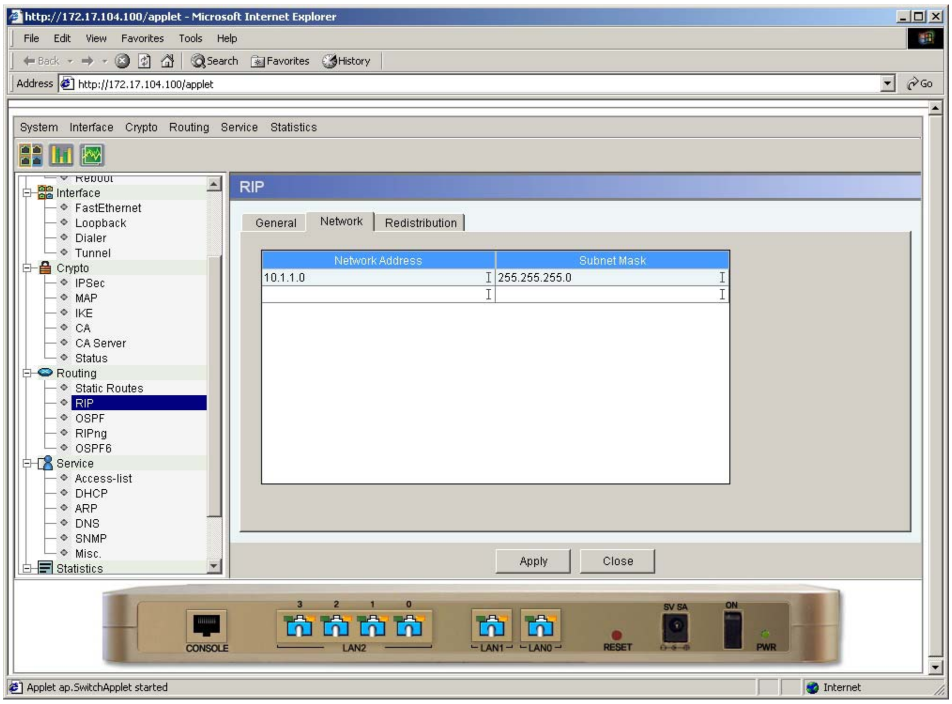
Input “255.255.255.0” for Subnet Mask



Network Address	Subnet Mask
10.1.1.0	255.255.255.0

(Figure3-240) Input RIP Network Subnet Mask

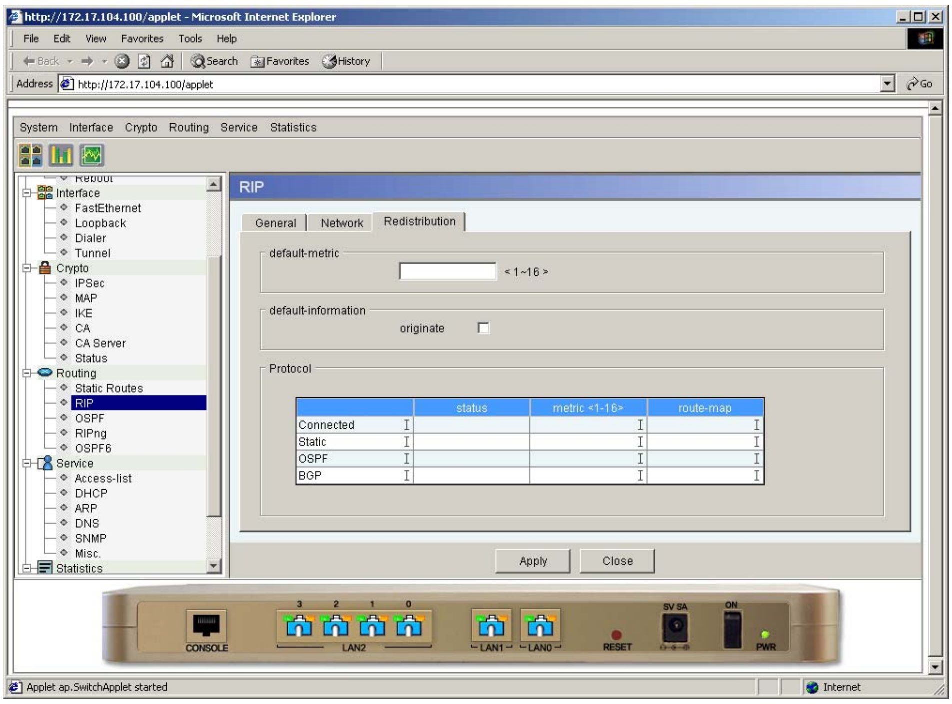
Click “Apply” to verify.



Network Address	Subnet Mask
10.1.1.0	255.255.255.0

(Figure3-241) New RIP Network verify

Figure 3-244 shows RIP Redistribution page.



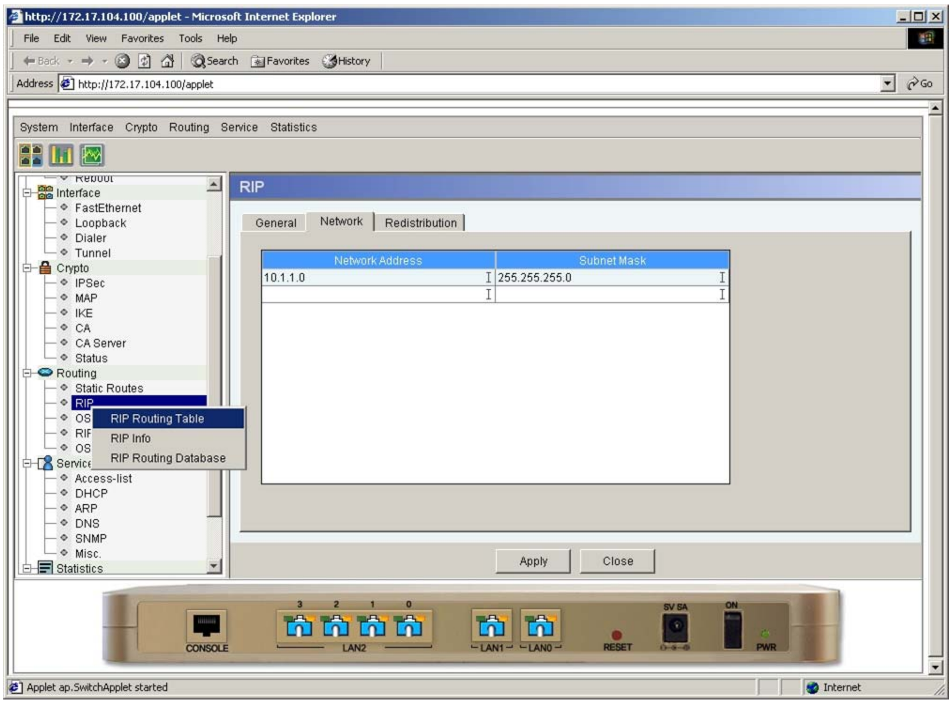
	status	metric <1-16>	route-map
Connected			
Static			
OSPF			
BGP			

(Figure3-242) RIP Redistribution Main page

<Table 3-38> RIP Redistribution Description

Elements	**Description**
Default-metric	Sets Offset value for sending RIP Packet. If it is over 16 Metric, RIP considers it as unreachable network. Default value is "1"
Default-Information	It informs Default information when sending RIP Packet.
Protocol Status	It checks protocols for exchanging Routing Protocol and Routing Table.
Protocol Metric	It defines default Metric for exchanging Routing Protocol and Routing Table.
Protocol route-map	It defines Route-map for exchanging Routing Protocol and Routing Table.

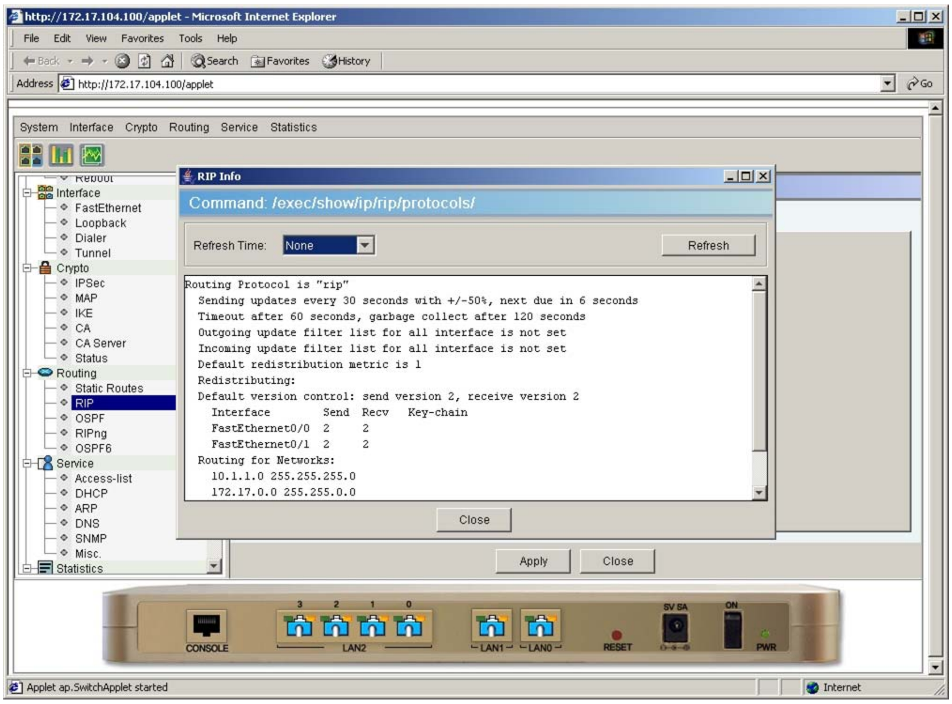
Click to see the information on current RIP. Click on right side of mouse. Figure 3-245 will be shown.


http://172.17.104.100/applet - Microsoft Internet Explorer
System Interface Crypto Routing Service Statistics
RIP
General Network Redistribution
RIP Routing Table
RIP Info
RIP Routing Database
Apply Close

Network Address	Subnet Mask
10.1.1.0	255.255.255.0

(Figure3-243) RIP Pop menu page

Figure 3-246 shows RIP Info page. Refresh Time can take from 3~5 second. Click “Refresh” to see the page right away.



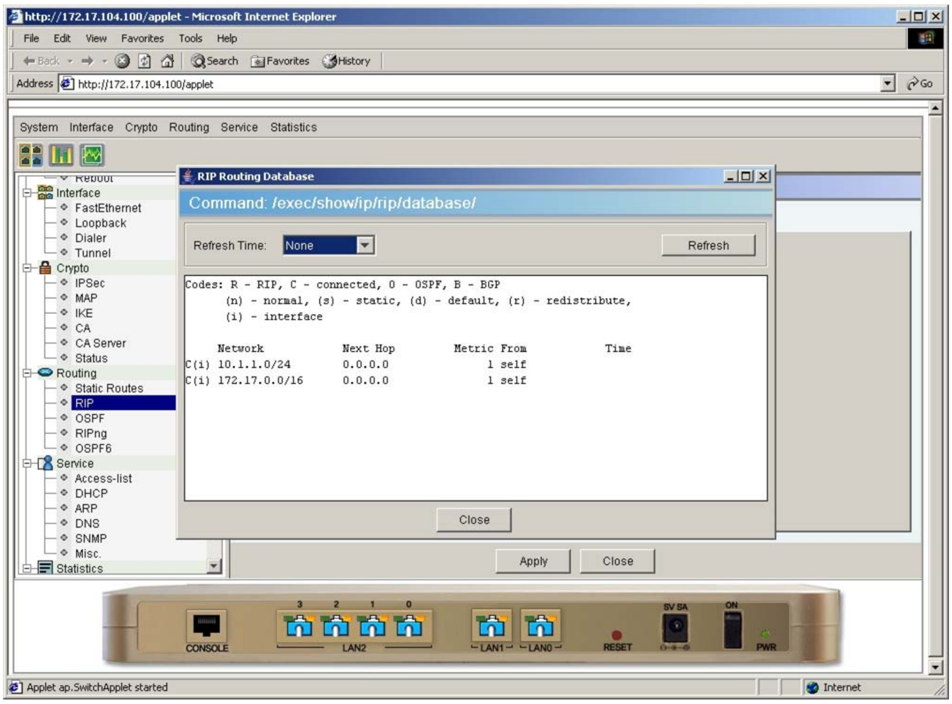
Command: /exec/show/ip/rip/protocols/

Refresh Time: None

```
Routing Protocol is "rip"
  Sending updates every 30 seconds with +/-50%, next due in 6 seconds
  Timeout after 60 seconds, garbage collect after 120 seconds
  Outgoing update filter list for all interface is not set
  Incoming update filter list for all interface is not set
  Default redistribution metric is 1
  Redistributing:
  Default version control: send version 2, receive version 2
    Interface        Send  Recv   Key-chain
    FastEthernet0/0  2     2
    FastEthernet0/1  2     2
  Routing for Networks:
    10.1.1.0 255.255.255.0
    172.17.0.0 255.255.0.0
```

(Figure3-244) RIP Info Page

Figure 3-246 shows RIP Database page. Refresh Time can take from 3~5 second. Click “Refresh” to see the page right away.



Command: /exec/show/ip/rip/database/

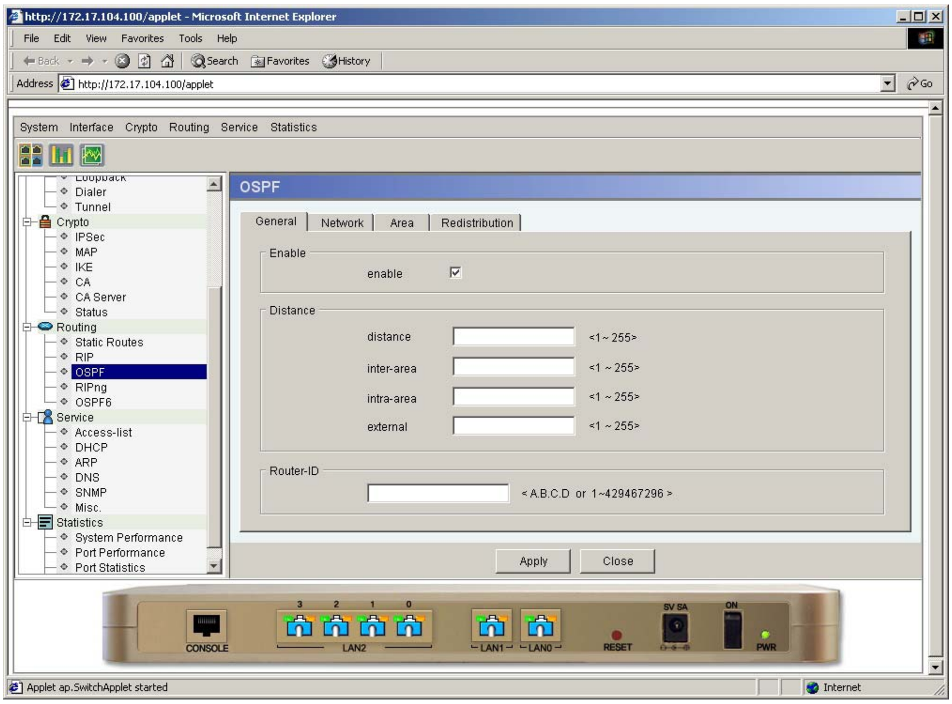
Refresh Time: None

```
Codes: R - RIP, C - connected, O - OSPF, B - BGP
      (n) - normal, (s) - static, (d) - default, (r) - redistribute,
      (i) - interface

     Network           Next Hop         Metric From           Time
C(i) 10.1.1.0/24       0.0.0.0               1 self
C(i) 172.17.0.0/16     0.0.0.0               1 self
```

(Figure3-245) RIP Database Page

OSPF

OSPF (Open Short Path First) is IGP (Interior Gateway Protocol) which is developed from OSPF Working Group of IETF (Internet Engineering Task Force). OSPF is a Link State Protocol based on Shortest Path First (SPF) algorithm of Dijsktra. OSPF using IP protocol number "89" is a typical routing protocol which runs on Autonomous System. Each OSPF Router sustains database through Autonomous System topology information and creates Routing table to find a shortest path from database.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
Go
System Interface Crypto Routing Service Statistics
Loopback
Dialer
Tunnel
Crypto
IPSec
MAP
IKE
CA
CA Server
Status
Routing
Static Routes
RIP
OSPF
RIPng
OSPF6
Service
Access-list
DHCP
ARP
DNS
SNMP
Misc.
Statistics
System Performance
Port Performance
Port Statistics
CONSOLE
3 2 1 0
LAN2
LAN1
LAN0
RESET
5V 5A
ON
PWR
Applet ap.SwitchApplet started
Internet

OSPF

General | Network | Area | Redistribution

Enable

enable ☑

Distance

distance <1 ~ 255>

inter-area <1 ~ 255>

intra-area <1 ~ 255>

external <1 ~ 255>

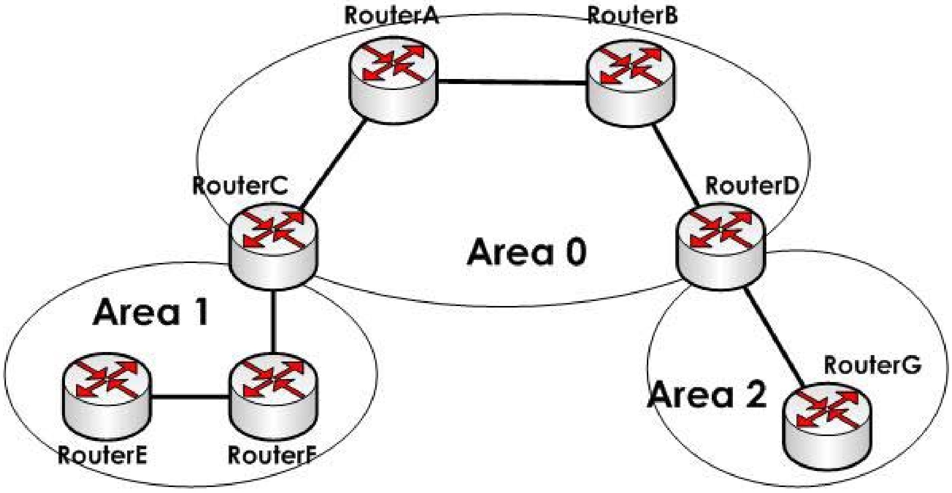
Router-ID

< A.B.C.D or 1~429467296 >

Apply Close

(Figure3-246) Routing OSPF Main page

Figure 3-249 is an example of OSPF Network Diagram.

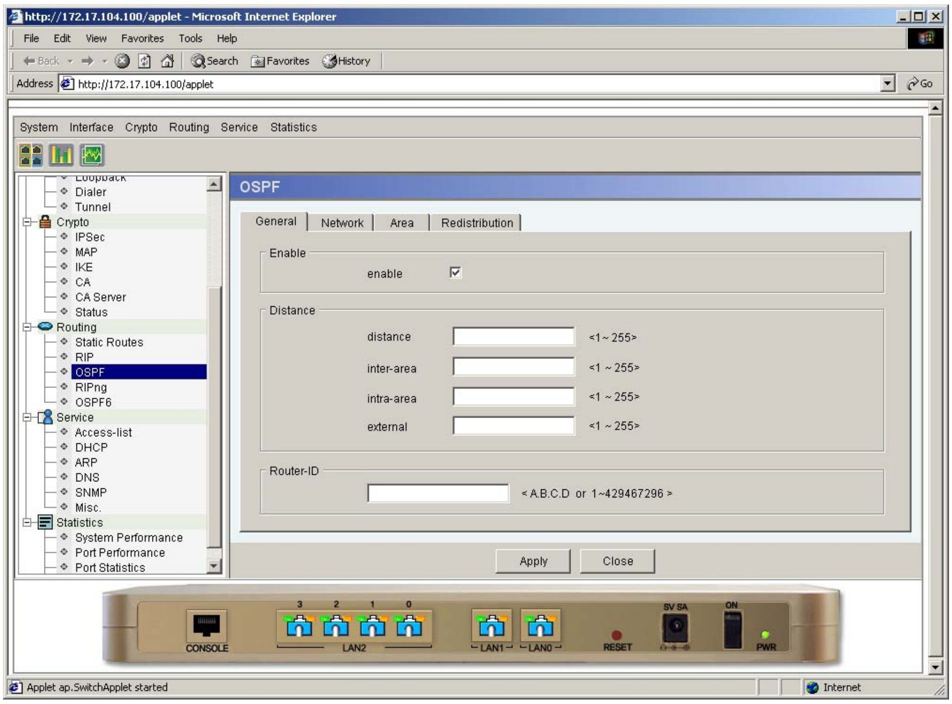


(Figure3-247) OSPF Network Diagram

In this example of Network Diagram, Area 0 is considered as a backbone network for connecting Area 1 and Area 2. RouterA and RouterB play as a backbone router and an inner router, RouterC, RouterD operate as ABR(Area Border Router) also as a backbone router for connecting Area 0, Area 1 and Area 2. Each RouterE, RouterF, RouterG is an inner router for Area 1 and Area 2.

Routing Table of OSPF is exchanged as a Link State Advertisement Packet. This Packet has complex information on Interface status, Bandwidth etc so OSPF is more efficient than RIP which counts number of Hops to find a path.

Figure 3-250 is OSPF General main page.



Enable

enable ☑

Distance

distance <1 ~ 255>

inter-area <1 ~ 255>

intra-area <1 ~ 255>

external <1 ~ 255>

Router-ID

< A.B.C.D or 1~429467296 >

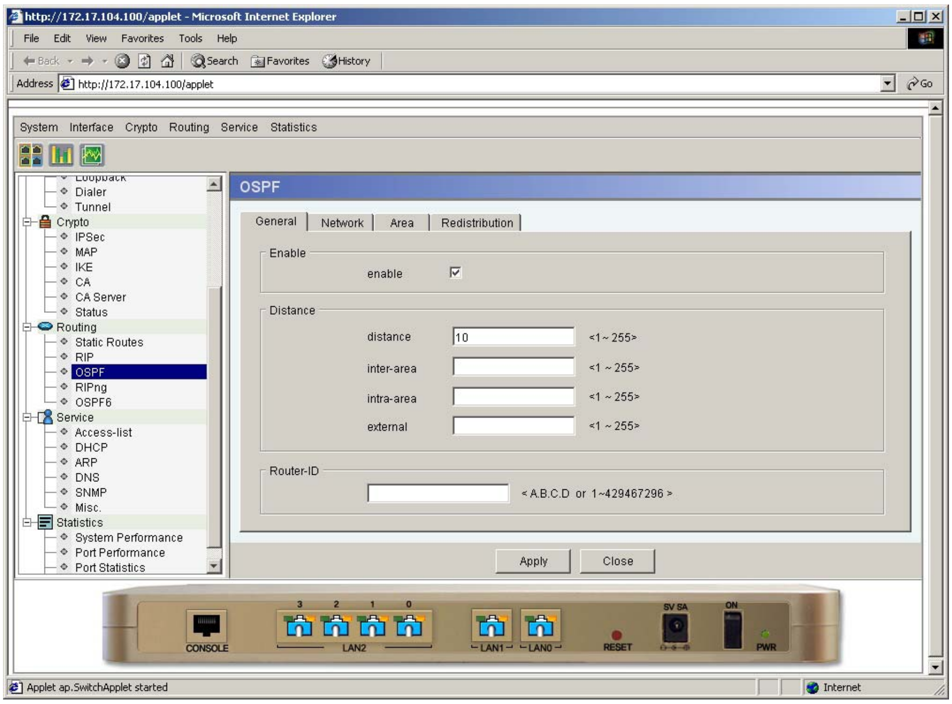
(Figure3-248) OSPF General main page

<Table 3-39> OSPF General Menu Description

Elements	Description
Enable	Enable or Disable of OSPF Protocol.
Distance	Input Distance Value of OSPF Protocol.
Inter-area	Input Distance Value of Inter-area route.
Intra-area	Input Distance Value of Intra-area route.
External	Input Distance Value of External route.
Router-ID	Input Router-ID to identify. Input IP Address or specific number.

Figure 3-251 shows an example of configuring OSPF General.

First, Check "Enable" box to activate then, input "10" for Distance.



Enable

enable ☑

Distance

distance 10 <1 ~ 255>

inter-area <1 ~ 255>

intra-area <1 ~ 255>

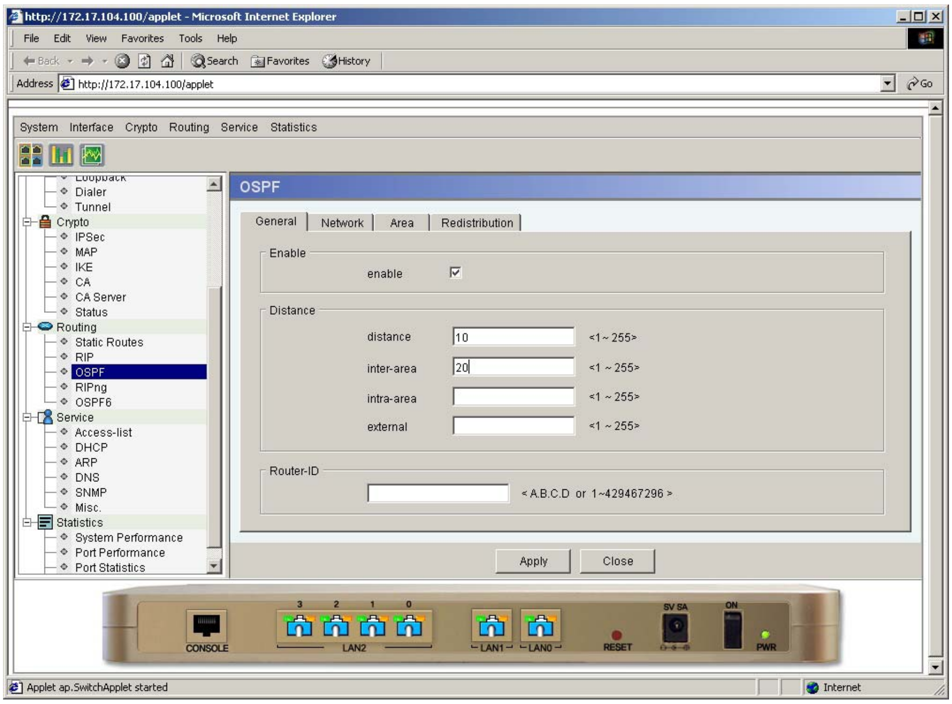
external <1 ~ 255>

Router-ID

< A.B.C.D or 1~429467296 >

(Figure3-249) Input OSPF General Distance

Input "20" for Inter-area distance.



Enable

enable ☑

Distance

distance 10 <1 ~ 255>

inter-area 20 <1 ~ 255>

intra-area <1 ~ 255>

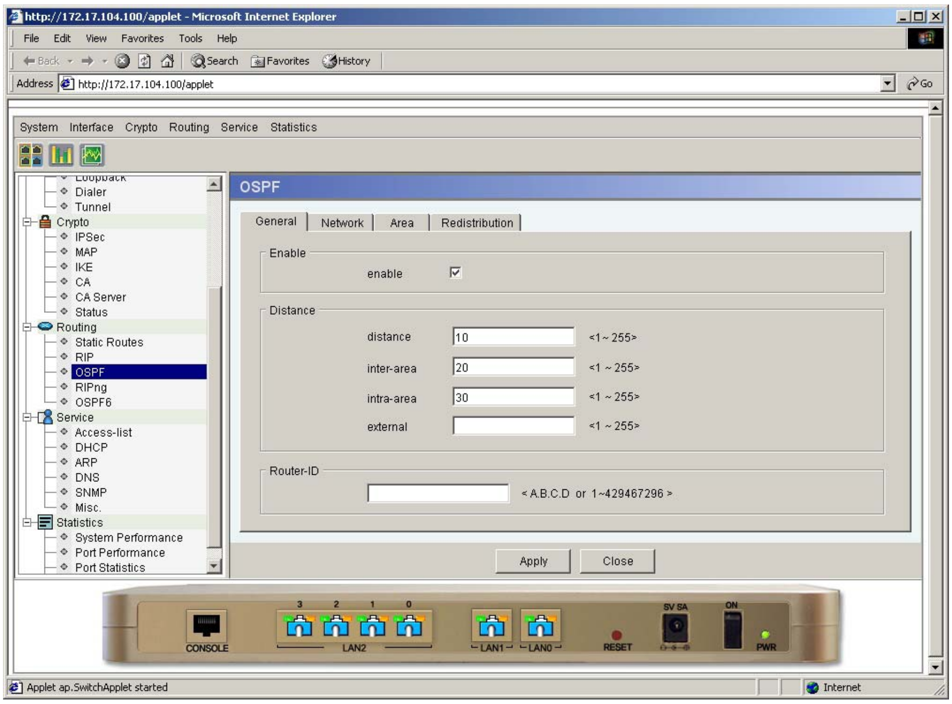
external <1 ~ 255>

Router-ID

< A.B.C.D or 1~429467296 >

(Figure3-250) Input OSPF General Inter-area Distance

Input “30” for Intra-area distance.



Enable

enable ☑

Distance

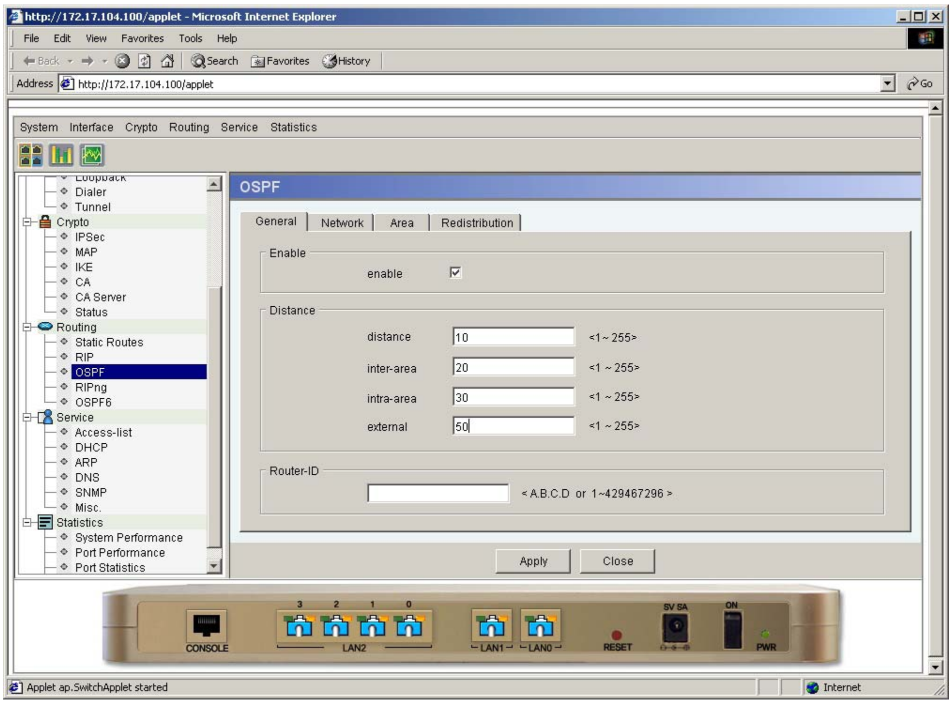
distance	10	<1 ~ 255>
inter-area	20	<1 ~ 255>
intra-area	30	<1 ~ 255>
external		<1 ~ 255>

Router-ID

< A.B.C.D or 1~429467296 >

(Figure3-251) Input OSPF General Intra-area Distance

Input “50” for External distance.



Enable

enable ☑

Distance

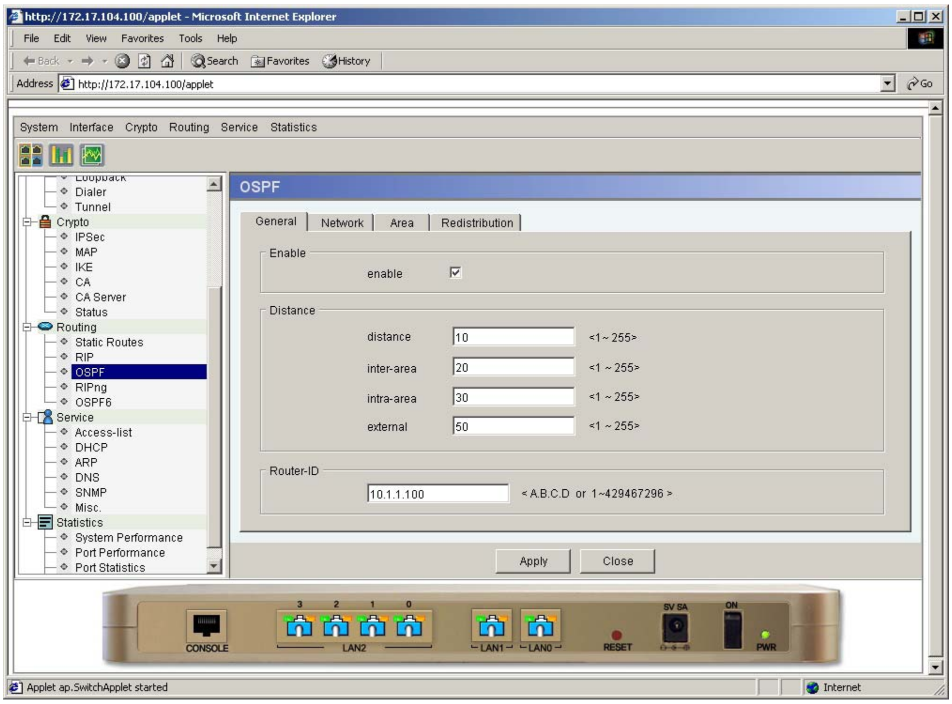
distance	10	<1 ~ 255>
inter-area	20	<1 ~ 255>
intra-area	30	<1 ~ 255>
external	50	<1 ~ 255>

Router-ID

< A.B.C.D or 1~429467296 >

(Figure3-252) Input OSPF General External Distance

Input “10.1.1.100” for Router-ID



http://172.17.104.100/applet - Microsoft Internet Explorer

OSPF

General | Network | Area | Redistribution

Enable

enable ☑

Distance

distance: 10 <1 ~ 255>

inter-area: 20 <1 ~ 255>

intra-area: 30 <1 ~ 255>

external: 50 <1 ~ 255>

Router-ID

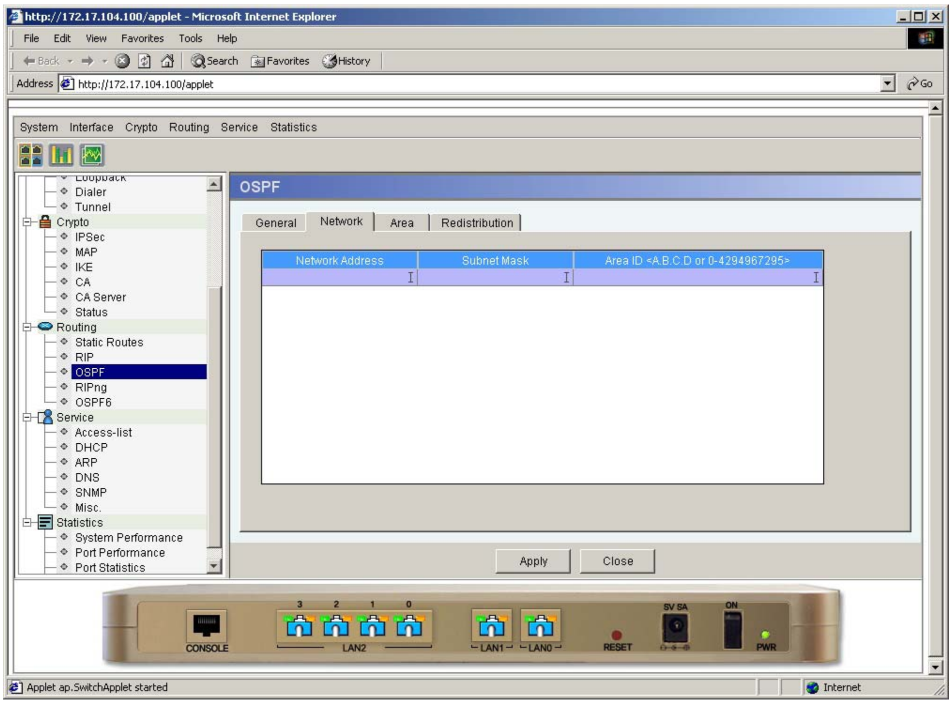
10.1.1.100 < A.B.C.D or 1~429467296 >

Apply | Close

Applet ap.SwitchApplet started

(Figure3-253) Input OSPF General Router-ID

Figure 3-256 shows how to select OSPF Network. User can add or delete OSPF Routing Table in OSPF Network.

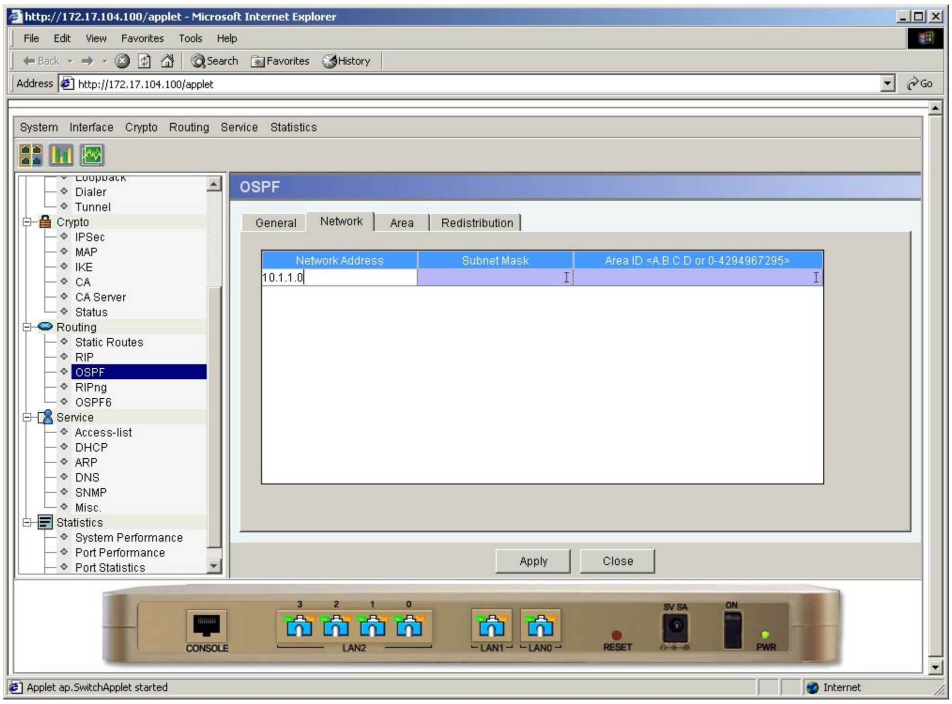


Network Address	Subnet Mask	Area ID <A.B.C.D or 0-4294967295>

(Figure3-254) OSPF Network Page

Figure 3-257 shows how to add a new Network "10.1.1.0/24".

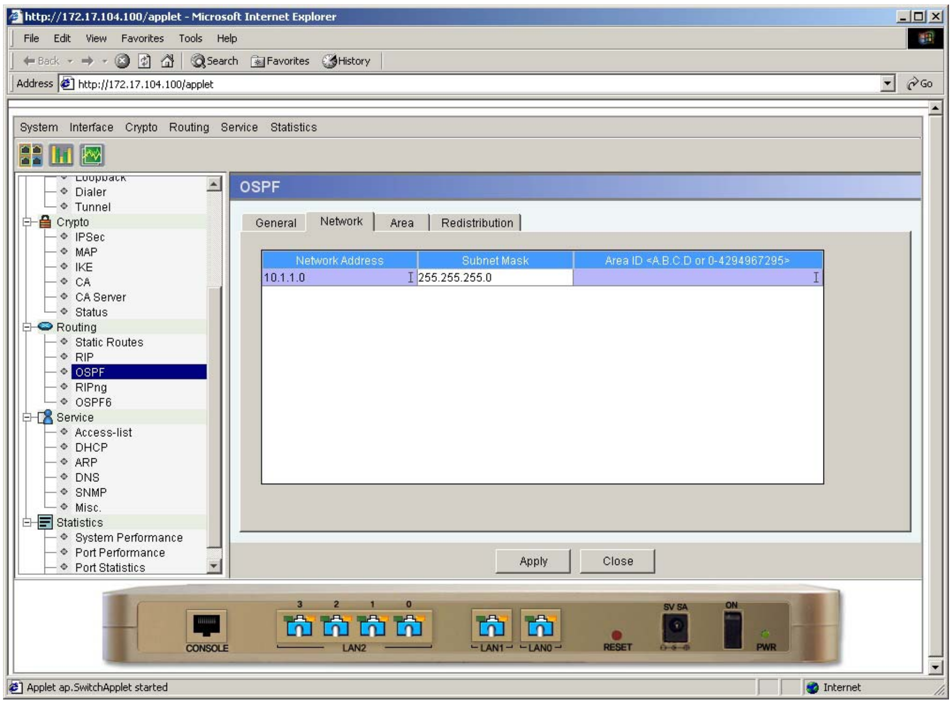
First input Network Address.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
Routing
OSPF
General
Network
Area
Redistribution
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

Network Address	Subnet Mask	Area ID <A.B.C.D or 0-4294967295>
10.1.1.0		

(Figure3-255) Add a new OSPF Network Address

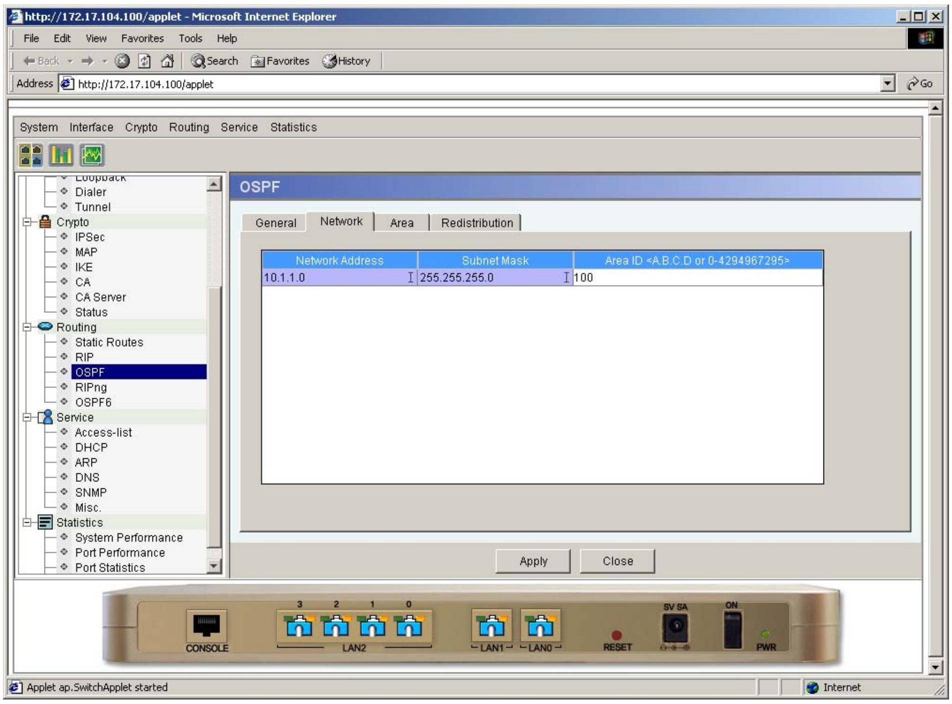
Input Subnet mask “255.255.255.0” for the Network Address.



Network Address	Subnet Mask	Area ID <A.B.C.D or 0-4294967295>
10.1.1.0	255.255.255.0	

(Figure3-256) Input OSPF Network Subnet mask

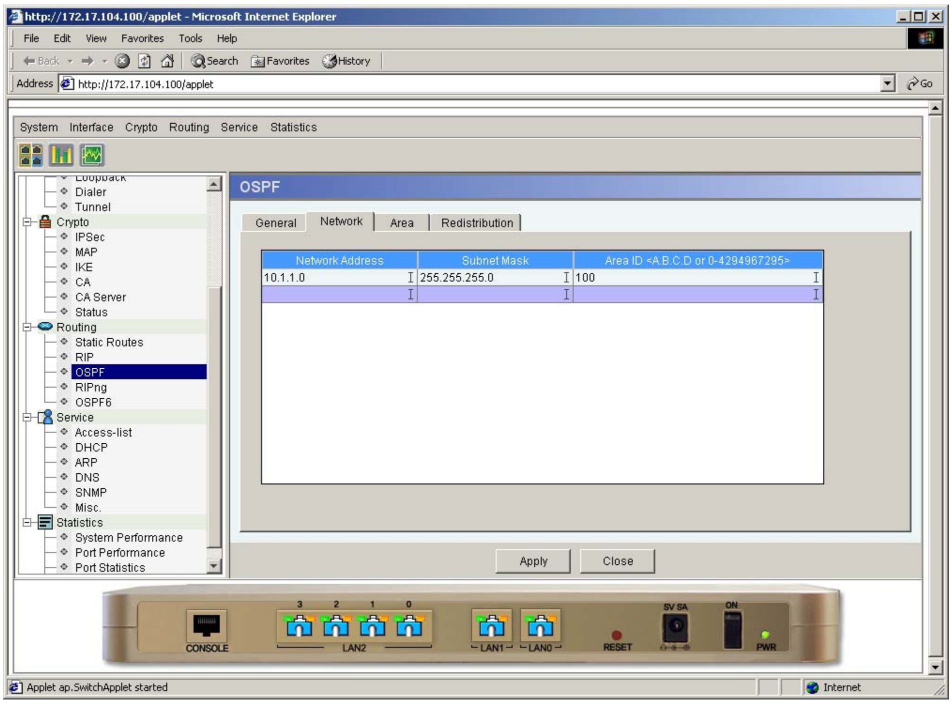
Input “100” for Area ID.



Network Address	Subnet Mask	Area ID <A.B.C.D or 0-4294967295>
10.1.1.0	255.255.255.0	100

(Figure3-257) Input OSPF Network Area-ID

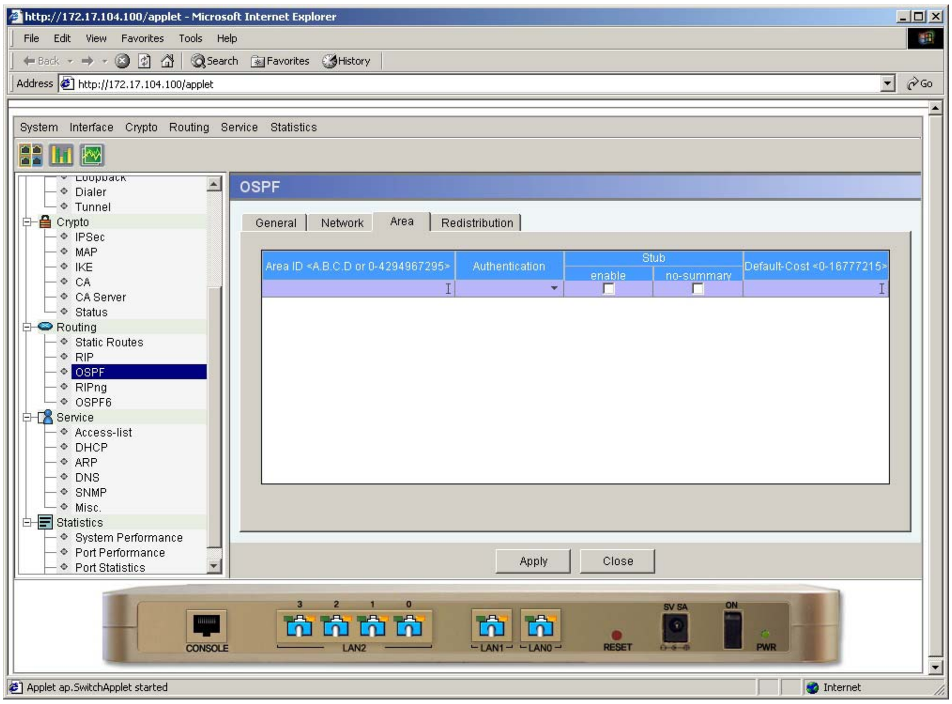
Click “Apply” to verify.



Network Address	Subnet Mask	Area ID <A.B.C.D or 0-4294967295>
10.1.1.0	255.255.255.0	100

(Figure3-258) OSPF Network verification page

Area Settings on OSPF Area menu


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
OSPF
General Network Area Redistribution
Area ID <A.B.C.D or 0-4294967295>
Authentication
Stub
enable
no-summary
Default-Cost <0-16777215>
Apply
Close
Applet ap.SwitchApplet started

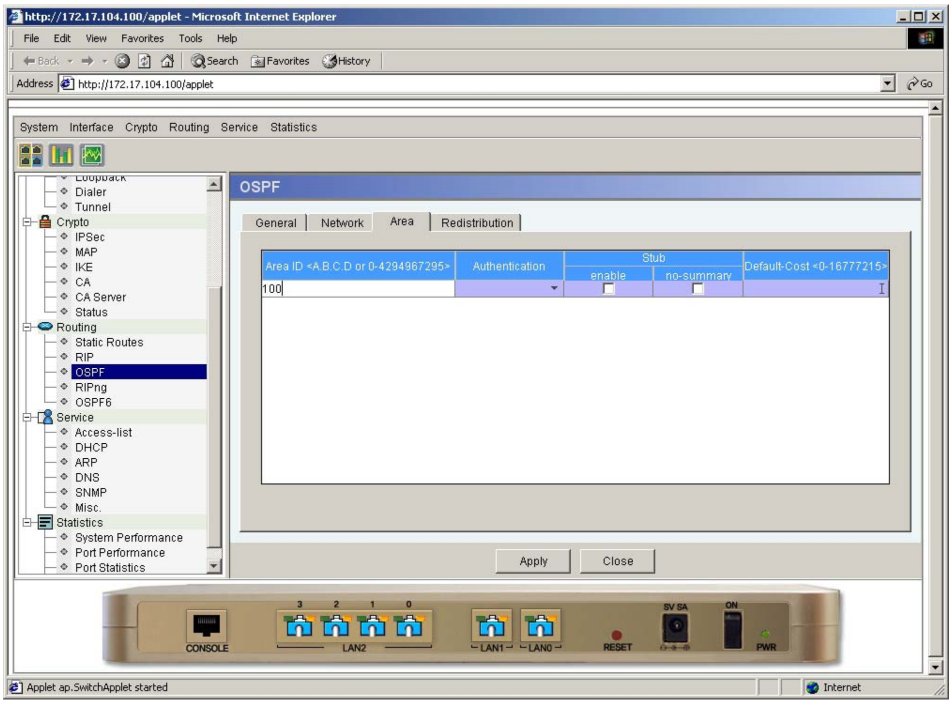
(Figure3-259) OSPF Area page

<Table 3-40> OSPF General Menu Description

Elements	Description
Area ID	Input Area ID.
Authentication	It decides whether to use authentication for exchanging Area info. Select one from None/SimpleText/Message-Digest.
Stub Enable	It decides whether to use Stub Area or not.
Stub no-summary	It is selected when Inter-Area is not included in Stub Area.
Default Cost	Default Cost Value for the Area.

Figure 3-262 shows the example of OSPF Area 100.

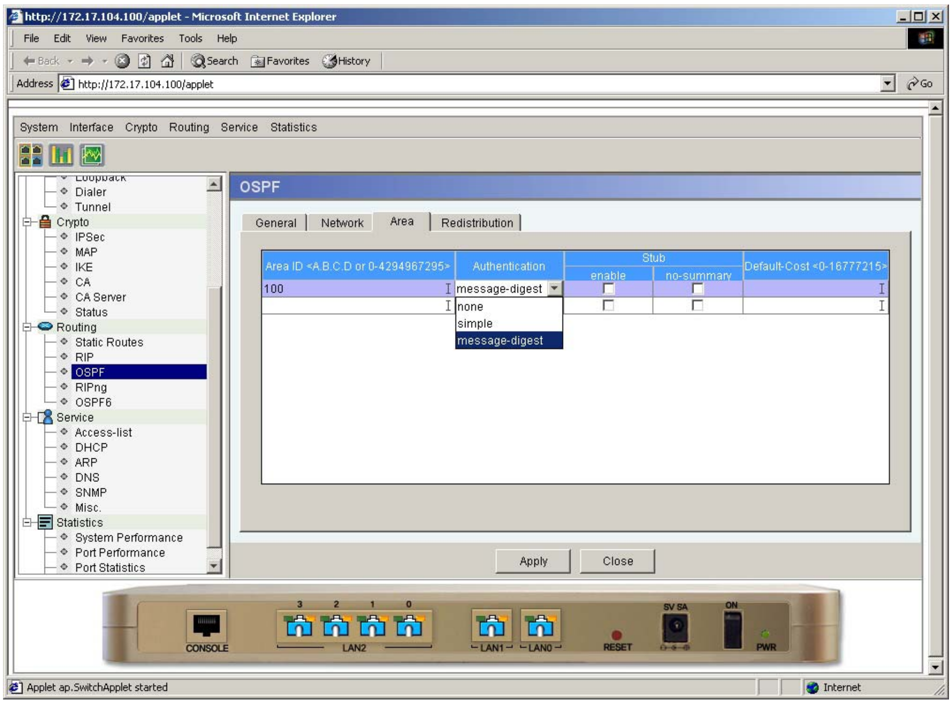
Input “100” for Area-ID



Area ID <A.B.C.D or 0-4294967295>	Authentication	Stub enable	Stub no-summary	Default-Cost <0-16777215>
100		□	□	

(Figure3-260) Input OSPF Area

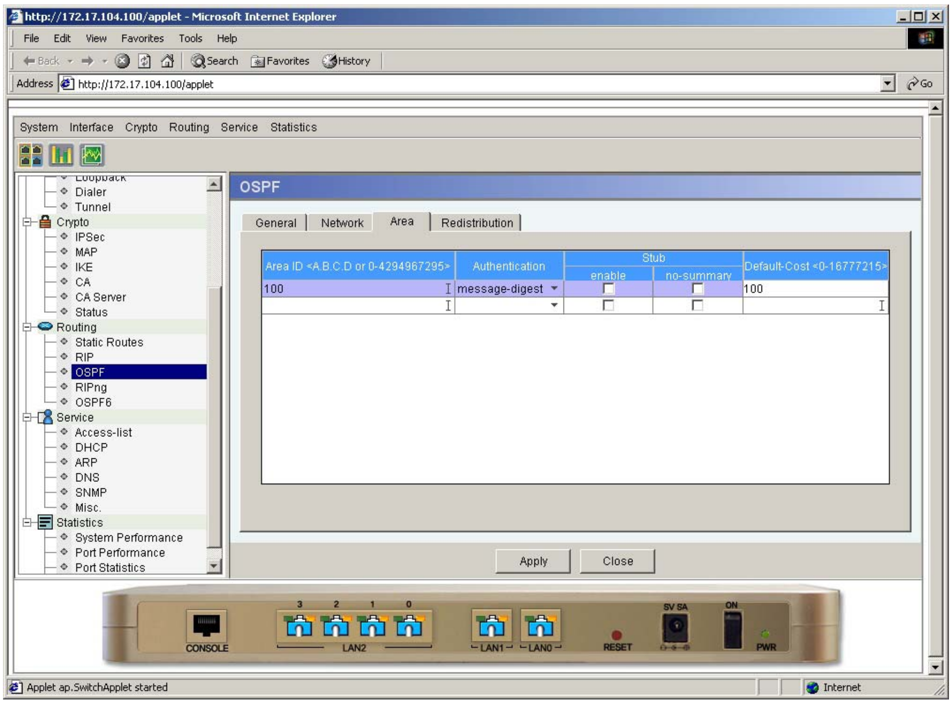
Select Message-Digest for Authentication algorithm.



Area ID <A.B.C.D or 0-4294967295>	Authentication	Stub enable	Stub no-summary	Default-Cost <0-16777215>
100	message-digest	□	□	
		□	□	

(Figure3-261) Select OSPF Area authentication method

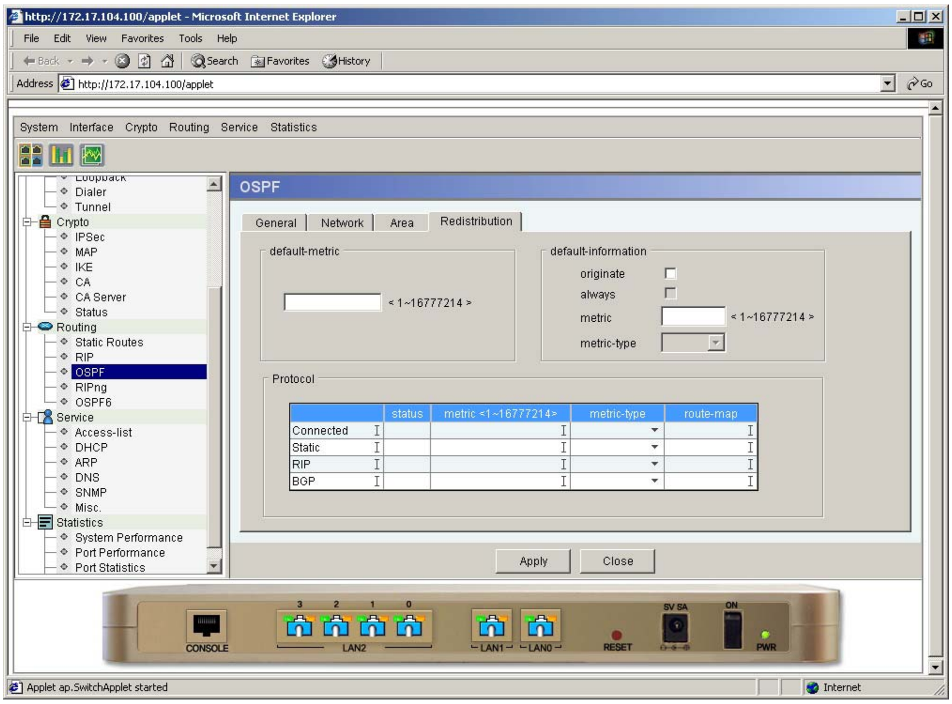
Input "100" for Default Cost Click "Apply" to verify.



Area ID <A.B.C.D or 0-4294967295>	Authentication	Stub		Default-Cost <0-16777215>
		enable	no-summary	
100	message-digest	□	□	100
		□	□	

(Figure3-262) Input OSPF Area Default Cost

Figure 3-265 shows OSPF Redistribution page.



default-metric

< 1~16777214 >

default-information

originate □

always □

metric < 1~16777214 >

metric-type

Protocol

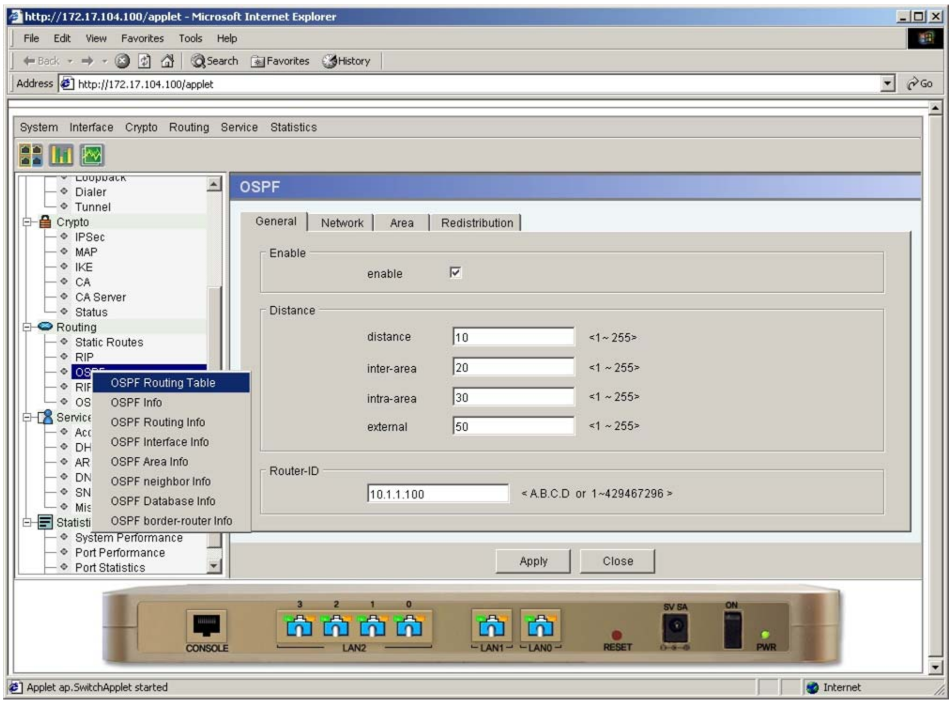
	status	metric <1~16777214>	metric-type	route-map
Connected				
Static				
RIP				
BGP				

(Figure3-263) OSPF Redistribution page

<Table 3-41> OSPF Redistribution menu Description

Elements	Description
Default-metric	Set Offset value for sending OSPF Packet.
Default-Information	It informs Default Router when sending OSPF Packet. Originate: Transfer Default-Information. Always: Always transfer Default-route. Metric: Defines metric for Default-route. Metric-type: Defines External Type 1/2 metric for Default-route.
Protocol Status	Check protocol when exchange Routing Protocol and Routing Table besides OSPF.
Protocol Metric	Defines default Metric when exchange Routing Protocol and Routing Table besides OSPF.
Protocol Metric-type	Defines OSPF External Type 1/2 Metric.
Protocol route-map	Defines Route-map for reference when exchange Routing Protocol and Routing Table besides OSPF.

Click right side of the mouse to see the current OSPF information. See the Figure 3-266.


http://172.17.104.100/applet - Microsoft Internet Explorer
System Interface Crypto Routing Service Statistics
OSPF Routing Table
OSPF Info
OSPF Routing Info
OSPF Interface Info
OSPF Area Info
OSPF neighbor Info
OSPF Database Info
OSPF border-router Info
General Network Area Redistribution
Apply Close
Applet ap.SwitchApplet started

OSPF

Enable

enable ☑

Distance

distance 10 <1~255>

inter-area 20 <1 ~ 255>

intra-area 30 <1 ~ 255>

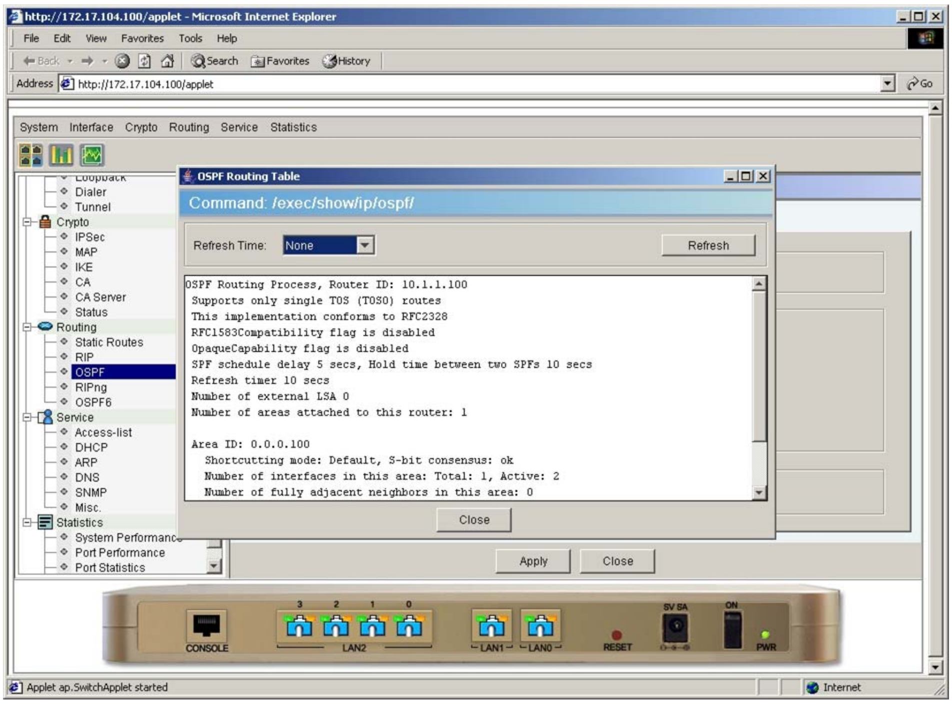
external 50 <1 ~ 255>

Router-ID

10.1.1.100 < A.B.C.D or 1~429467296 >

(Figure3-264) OSPF Pop Menu page

This shows OSPF Routing Table page.


http://172.17.104.100/applet - Microsoft Internet Explorer
System Interface Crypto Routing Service Statistics
OSPF Routing Table
Refresh
Close
Apply Close
Applet ap.SwitchApplet started

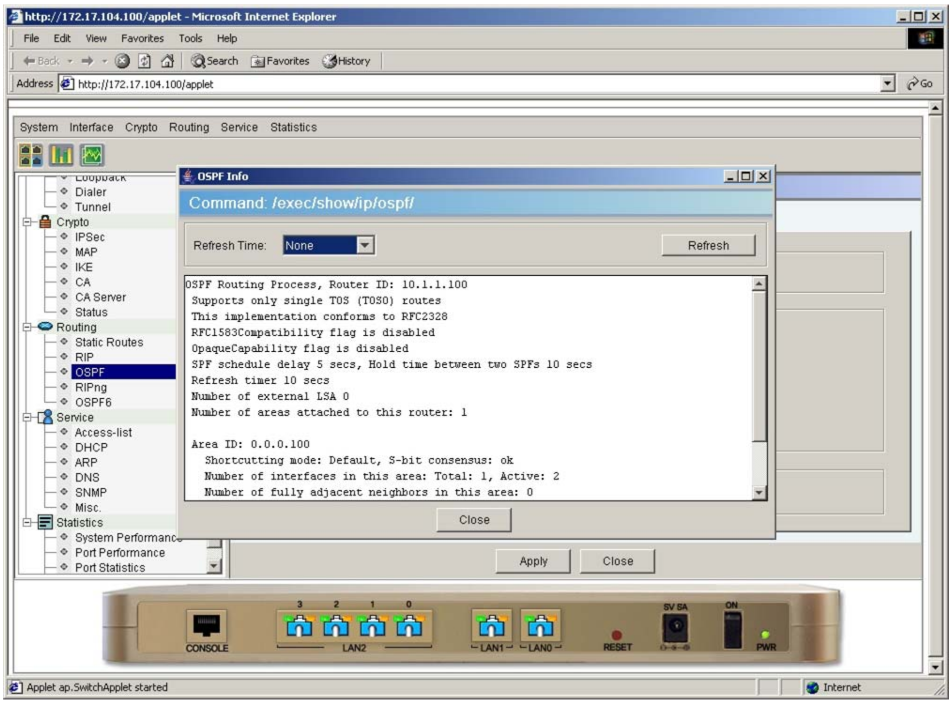
Command: /exec/show/ip/ospf/

Refresh Time: None

```
OSPF Routing Process, Router ID: 10.1.1.100
 Supports only single TOS (TOS0) routes
 This implementation conforms to RFC2328
 RFC1583Compatibility flag is disabled
 OpaqueCapability flag is disabled
 SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
 Refresh timer 10 secs
 Number of external LSA 0
 Number of areas attached to this router: 1

 Area ID: 0.0.0.100
   Shortcutting mode: Default, S-bit consensus: ok
   Number of interfaces in this area: Total: 1, Active: 2
   Number of fully adjacent neighbors in this area: 0
```

(Figure3-265) OSPF Routing Table page

This shows OSPF Info page.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
OSPF Info

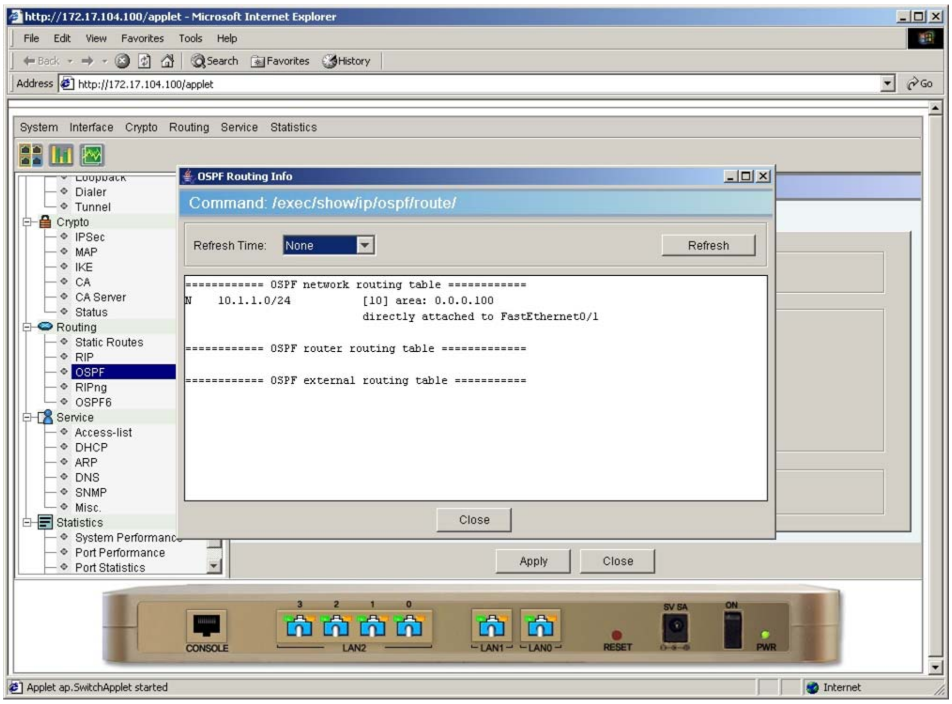
Command: /exec/show/ip/ospf/

Refresh Time: None

```
OSPF Routing Process, Router ID: 10.1.1.100
 Supports only single TOS (TOS0) routes
 This implementation conforms to RFC2328
 RFC1583Compatibility flag is disabled
 OpaqueCapability flag is disabled
 SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
 Refresh timer 10 secs
 Number of external LSA 0
 Number of areas attached to this router: 1

 Area ID: 0.0.0.100
   Shortcutting mode: Default, S-bit consensus: ok
   Number of interfaces in this area: Total: 1, Active: 2
   Number of fully adjacent neighbors in this area: 0
```

(Figure3-266) OSPF Info page

This shows OSPF Routing Info page.


http://172.17.104.100/applet - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
OSPF Routing Info

Command: /exec/show/ip/ospf/route/

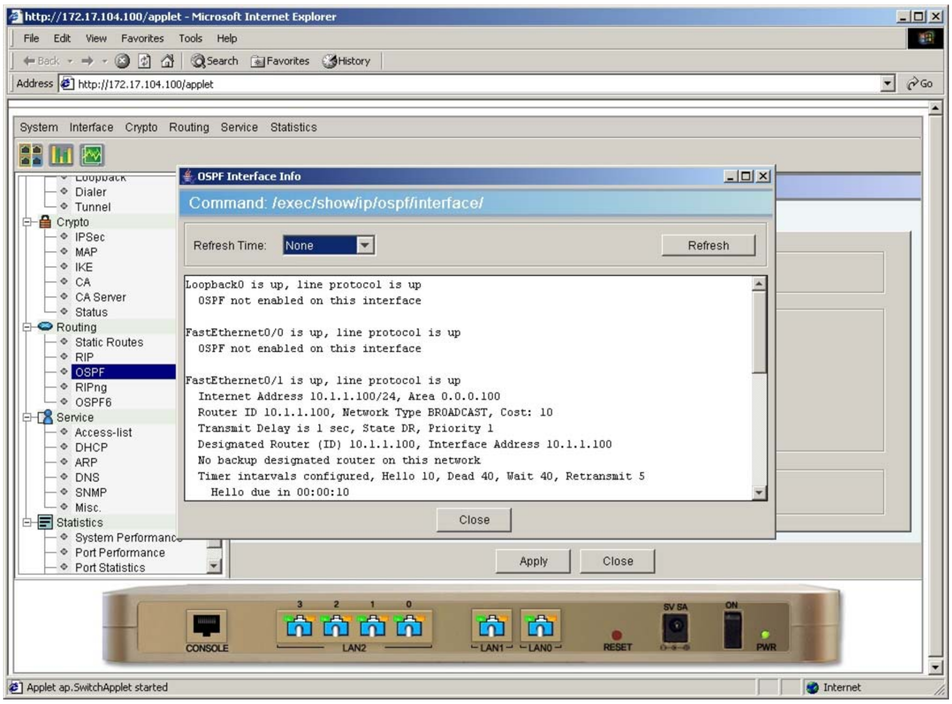
Refresh Time: None

```
============ OSPF network routing table ============
N    10.1.1.0/24           [10] area: 0.0.0.100
                           directly attached to FastEthernet0/1

============ OSPF router routing table =============

============ OSPF external routing table ===========
```

Refresh
Close
Apply
Close
Applet ap.SwitchApplet started
Internet

(Figure3-267) OSPF Routing Info page

This shows OSPF Interface Info.



Command: /exec/show/ip/ospf/interface/

Refresh Time: None

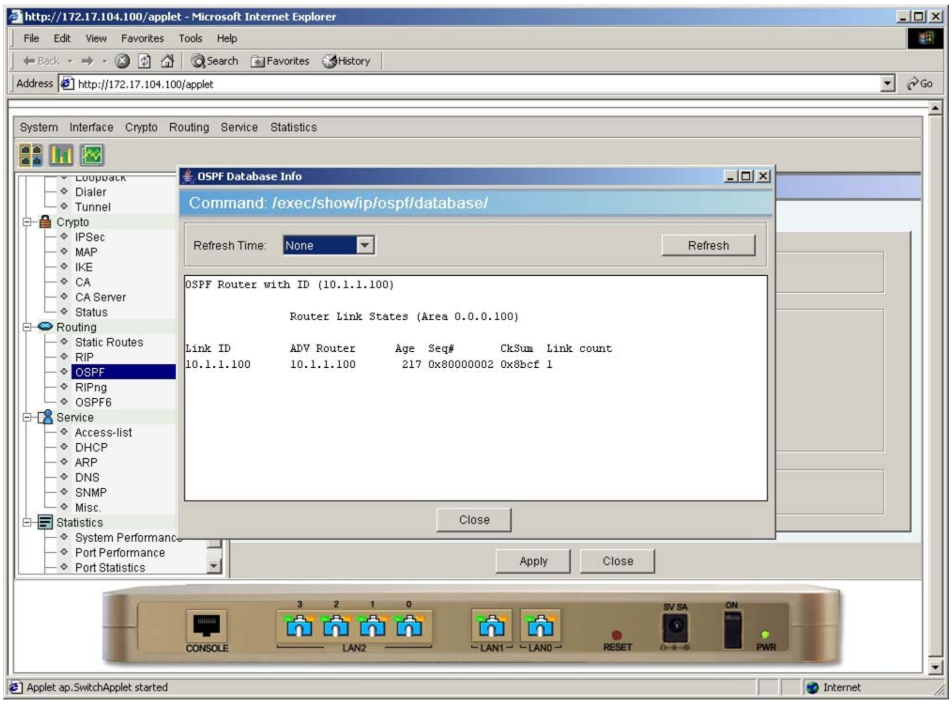
Refresh

```
Loopback0 is up, line protocol is up
  OSPF not enabled on this interface

FastEthernet0/0 is up, line protocol is up
  OSPF not enabled on this interface

FastEthernet0/1 is up, line protocol is up
  Internet Address 10.1.1.100/24, Area 0.0.0.100
  Router ID 10.1.1.100, Network Type BROADCAST, Cost: 10
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 10.1.1.100, Interface Address 10.1.1.100
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:10
```

Close

(Figure3-268) OSPF Interface Info page

This shows OSPF Database Info.



Command: /exec/show/ip/ospf/database/

Refresh Time: None

Refresh

```
OSPF Router with ID (10.1.1.100)

                Router Link States (Area 0.0.0.100)

Link ID         ADV Router      Age  Seq#       CkSum  Link count
10.1.1.100      10.1.1.100       217 0x80000002 0x8bcf 1
```

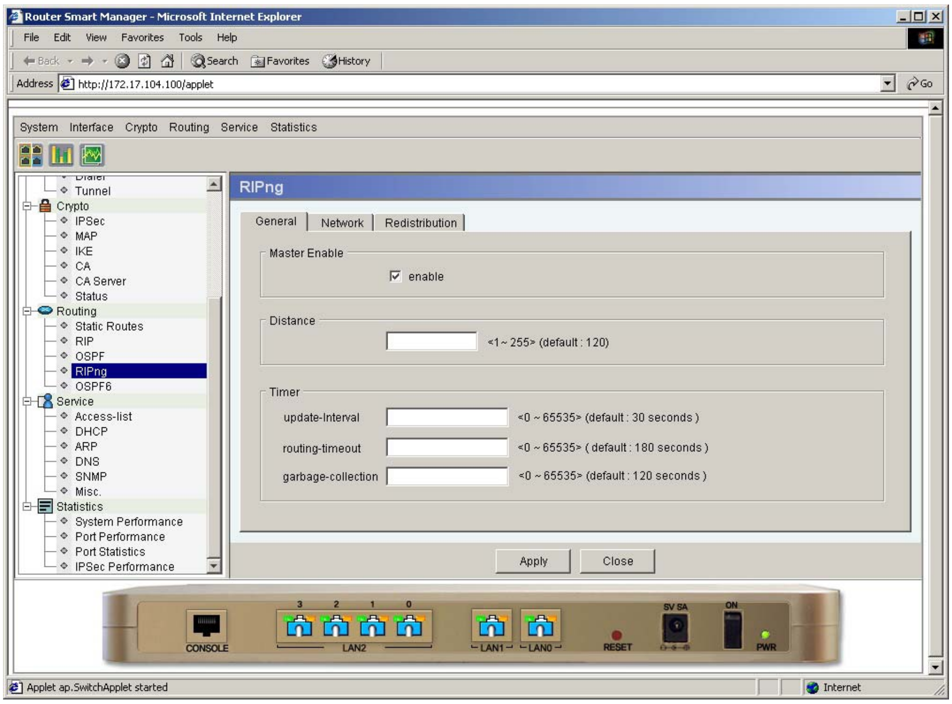
Close

(Figure3-269) OSPF Database Info page

RIPng

RIP (Routing Information Protocol) is widely used to manage Routing information in LAN or LAN group network environment.

RIPng (Routing Information Protocol next generation) is a IPv6 Routing protocol. It is based on IPv4 RIP.



Master Enable

☑ enable

Distance

<1 ~ 255> (default : 120)

Timer

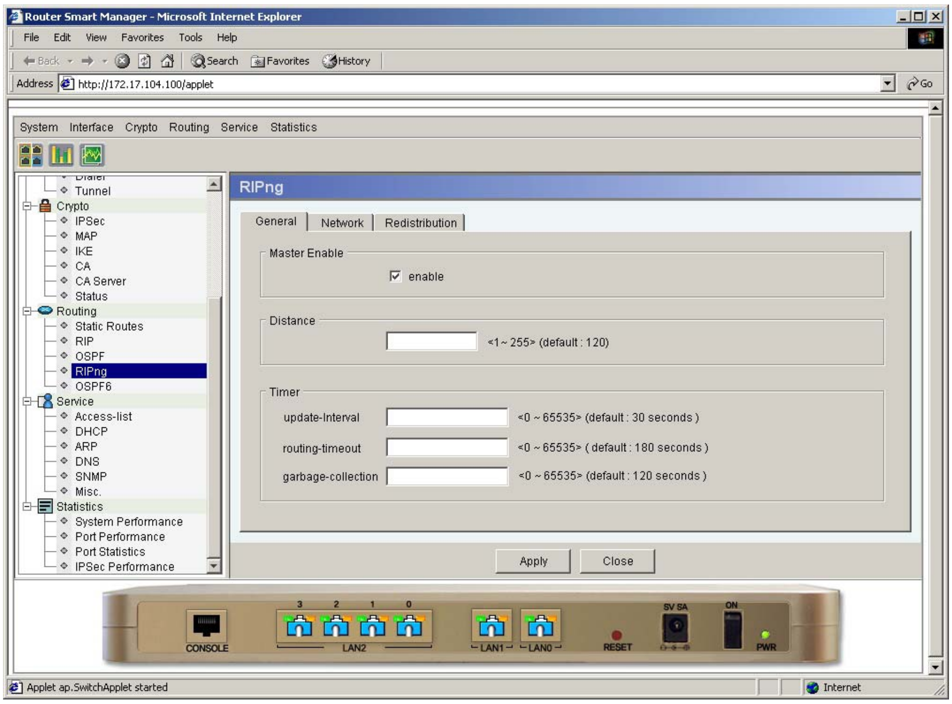
update-Interval <0 ~ 65535> (default : 30 seconds)

routing-timeout <0 ~ 65535> (default : 180 seconds)

garbage-collection <0 ~ 65535> (default : 120 seconds)

(Figure3-270) Routing RIPng Main page

Figure 3-273 shows RIPng General Menu.



RIPng

Master Enable

☑ enable

Distance <1 ~ 255> (default : 120)

Timer

update-Interval <0 ~ 65535> (default : 30 seconds)

routing-timeout <0 ~ 65535> (default : 180 seconds)

garbage-collection <0 ~ 65535> (default : 120 seconds)

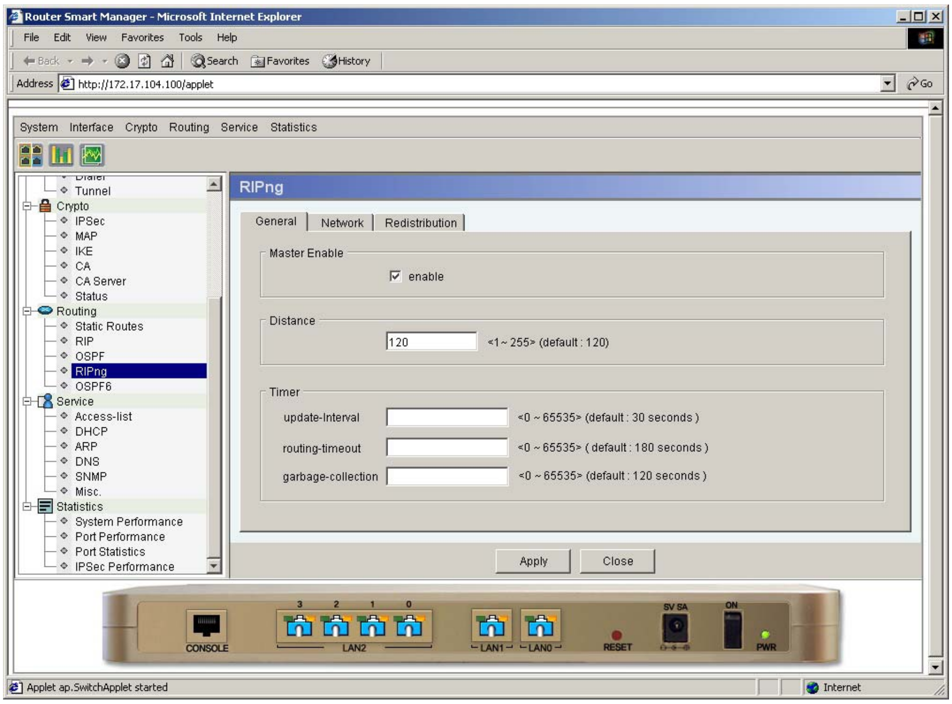
(Figure3-271) RIPng General Menu page

<Table 3-42> RIPng General Menu Description

Elements	Description
Master Enable	Select Enable or Disable for RIPng
Distance	Input Distance Value for RIPng. It can be selected from 1to 255. Default value is "120"
Update-Interval	Input update interval for Routing Table. Default value is "30" seconds.
Routing-Timeout	Sets waiting time for receiving Routing Table from a specific Interface. Default value is "180" sec.
Garbage-Collection	Sets the time for deleting a Routing Table after Routing-Timeout. Default value is "120" sec.

Figure 3-274 shows RIPng General Configuration page.

Input “120” for Distance



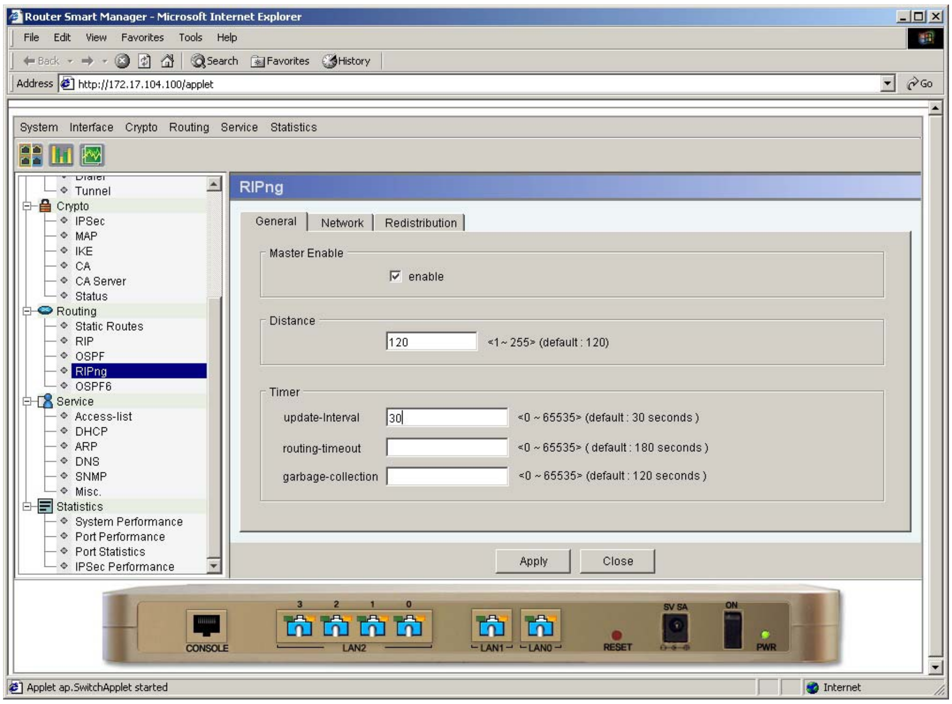
Master Enable
☑ enable

Distance
120 <1 ~ 255> (default : 120)

Timer
update-Interval <0 ~ 65535> (default : 30 seconds)
routing-timeout <0 ~ 65535> (default : 180 seconds)
garbage-collection <0 ~ 65535> (default : 120 seconds)

(Figure3-272) Input RIPng General Distance

Input “30” second for Update-Interval.



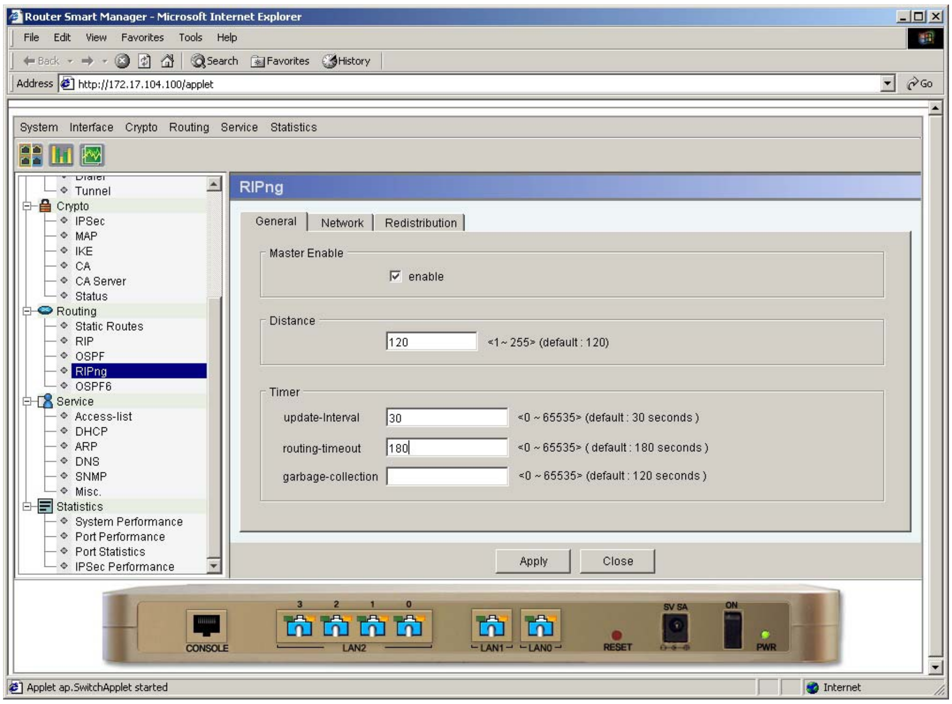
Master Enable
☑ enable

Distance
120 <1 ~ 255> (default : 120)

Timer
update-Interval 30 <0 ~ 65535> (default : 30 seconds)
routing-timeout <0 ~ 65535> (default : 180 seconds)
garbage-collection <0 ~ 65535> (default : 120 seconds)

(Figure3-273) Input RIPng General Update-Interval

Input “180” for Routing-Timeout



Master Enable

☑ enable

Distance

120 <1 ~ 255> (default : 120)

Timer

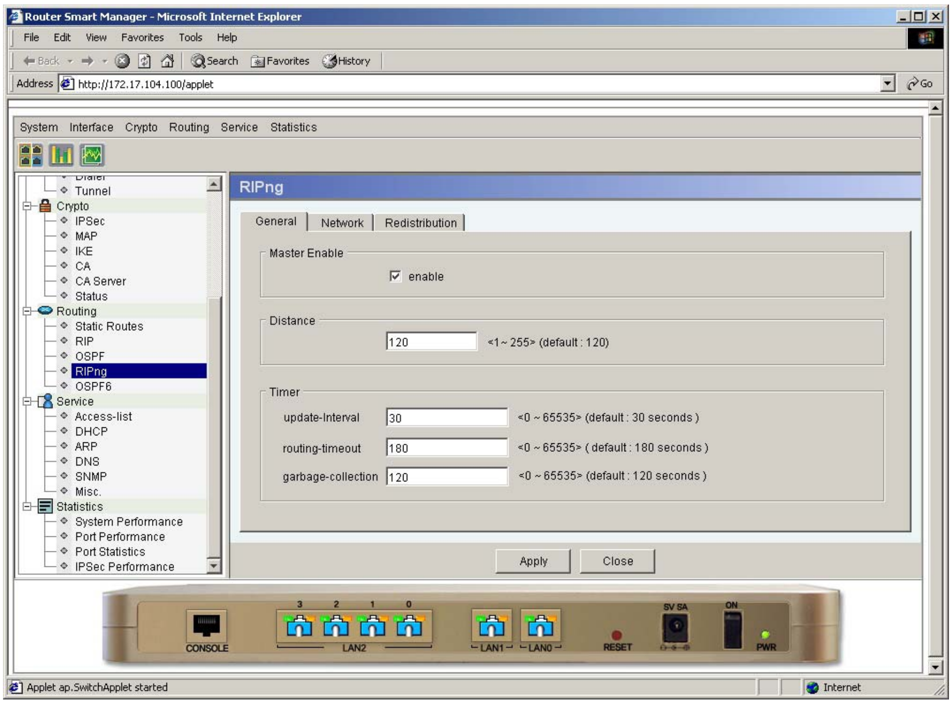
update-Interval 30 <0 ~ 65535> (default : 30 seconds)

routing-timeout 180 <0 ~ 65535> (default : 180 seconds)

garbage-collection <0 ~ 65535> (default : 120 seconds)

(Figure3-274) Input RIPng General Routing-Timeout

Input “120” for Garage-Collection



Master Enable

☑ enable

Distance

120 <1 ~ 255> (default : 120)

Timer

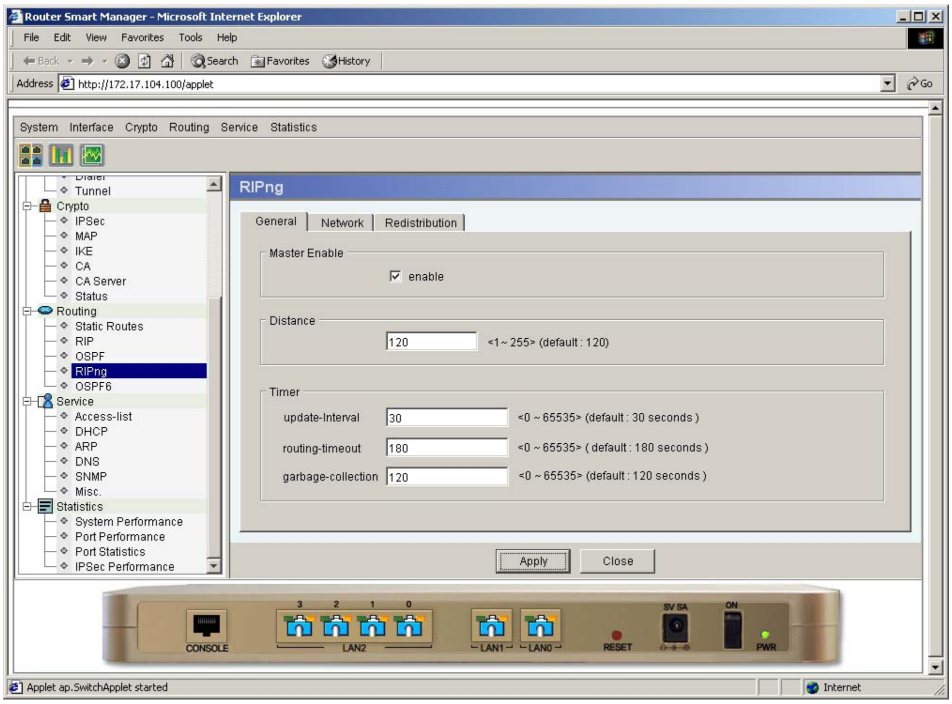
update-Interval 30 <0 ~ 65535> (default : 30 seconds)

routing-timeout 180 <0 ~ 65535> (default : 180 seconds)

garbage-collection 120 <0 ~ 65535> (default : 120 seconds)

(Figure3-275) Input RIPng General Garage-Collection

Click “Apply” to verify.



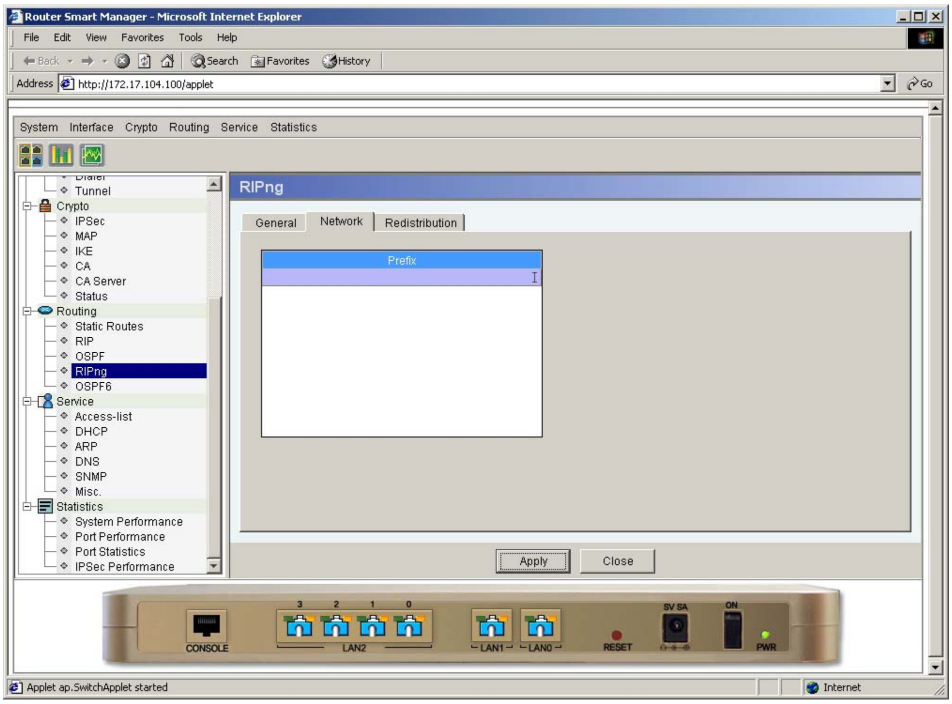
Master Enable
☑ enable

Distance
120 <1 ~ 255> (default : 120)

Timer
update-Interval 30 <0 ~ 65535> (default : 30 seconds)
routing-timeout 180 <0 ~ 65535> (default : 180 seconds)
garbage-collection 120 <0 ~ 65535> (default : 120 seconds)

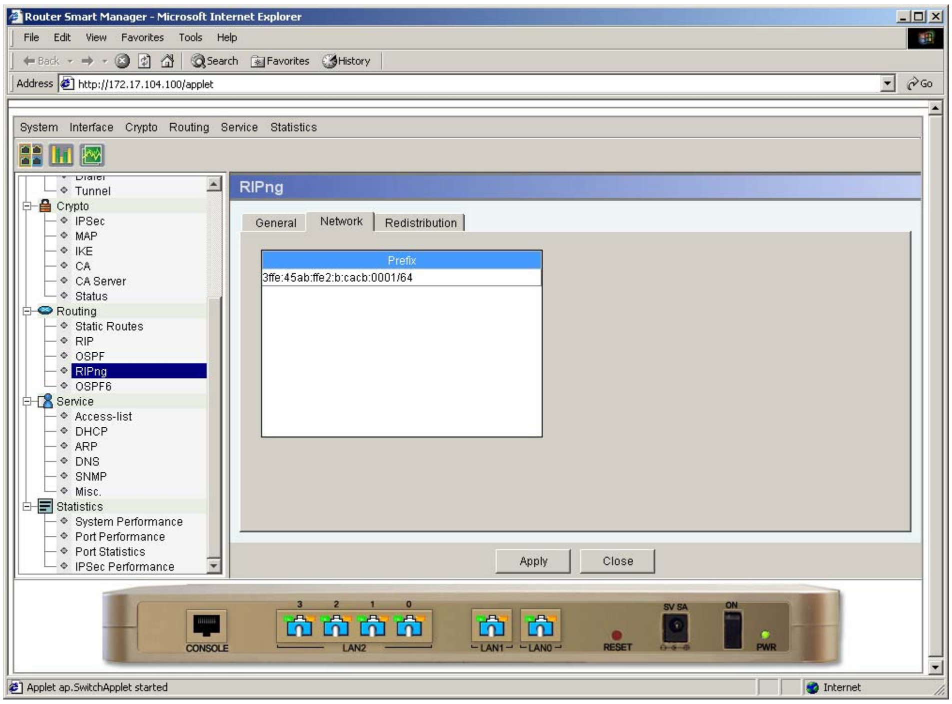
(Figure3-276) RIPng General Configuration verify

Figure 3-279 shows RIPng Prefix menu. Prefix menu plays the same role as RIP for IPv4 Network. So the user needs to input IPv6 network in Prefix field.



(Figure3-277) RIPng Prefix menu page

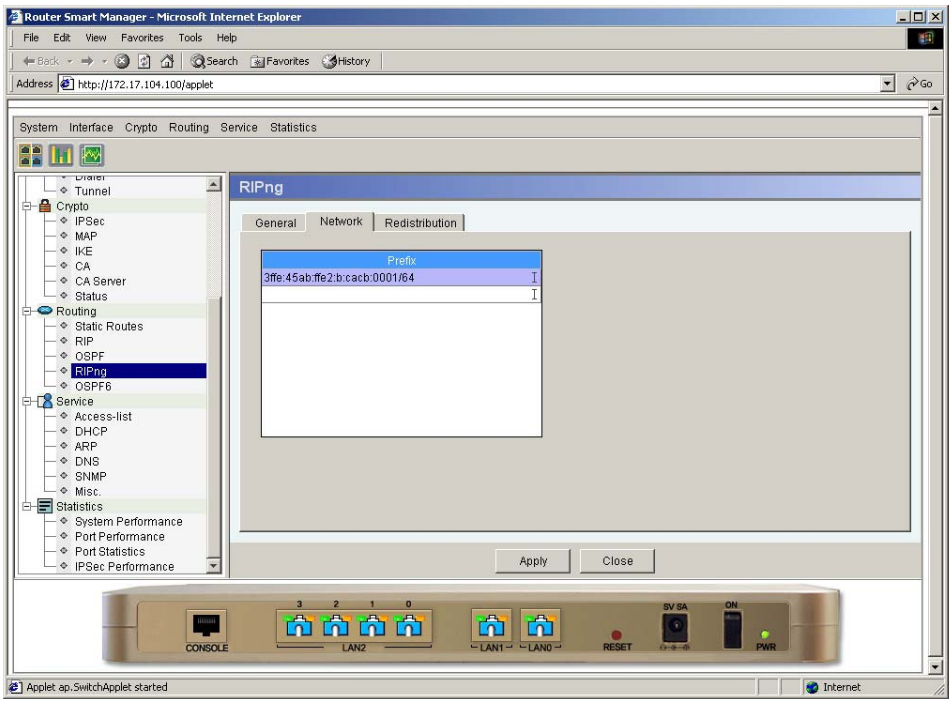
Figure 3-280 shows how to input Prefix. Input IPv6 network.



Prefix: 3ffe:45ab:ffe2:b:cacb:0001/64

(Figure3-278) Input RIPng Prefix IPv6

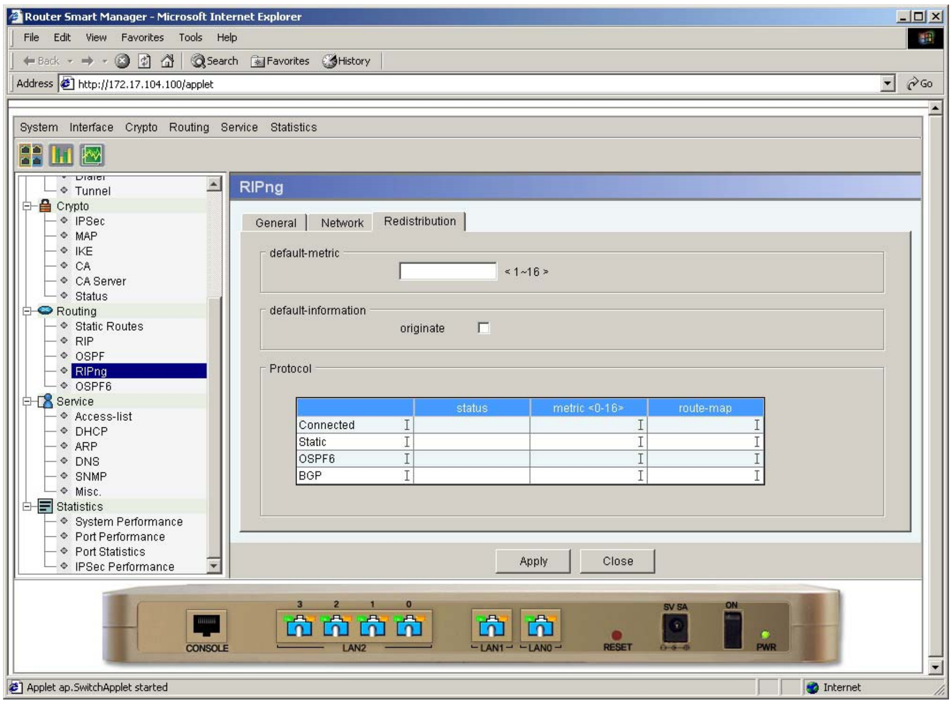
IPv6 “3ffe:45ab:ffe2:b:cacb:0001/64” is added.



Prefix
3ffe:45ab:ffe2:b:cacb:0001/64

(Figure3-279) Verify RIPng Prefix IPv6

Figure 3-282 is RIPng Redistribution menu.



	status	metric <0-16>	route-map
Connected			
Static			
OSPF6			
BGP			

(Figure3-280) RIPng Redistribution menu page

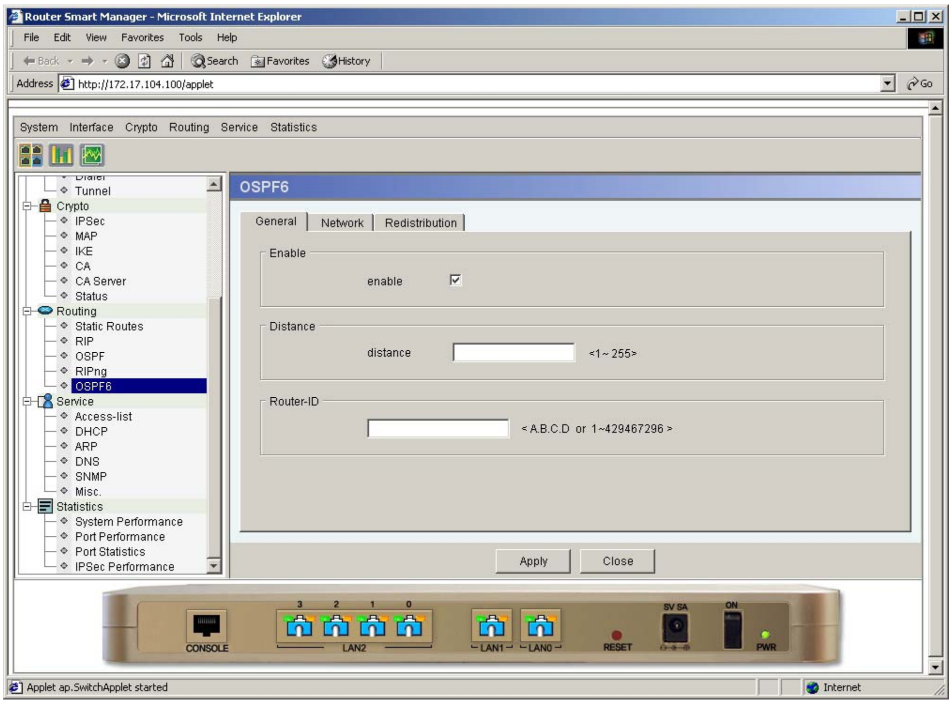
<Table 3-43> RIPng Redistribution menu Description

Elements	Description
Default-metric	Sets Offset value for sending RIPng Packet. If it is over 16 Metric, RIPng considers it as unreachable network. Default value is “1”
Default-Information	It informs Default information when sending RIPng Packet.
Protocol Status	It checks protocols for exchanging Routing Protocol and Routing Table.
Protocol Metric	It defines default Metric for exchanging Routing Protocol and Routing Table.
Protocol route-map	It defines Route-map for exchanging Routing Protocol and Routing Table.

OSPF6

OSPF (Open Short Path First) is IGP (Interior Gateway Protocol) which is developed from OSPF Working Group of IETF (Internet Engineering Task Force). It uses Link State algorithm. OSPF is designed to support IP network so it supports Tagging for Routing info which goes in and out with IP Subnet. Also OSPF supports Packet Authentication to neighboring switches and it uses IP Multicast when exchanging Packet info.

Like OSPF for IPv4, OSPF6 is designed to support IPv6. Therefore basic operation algorithm is the same as OSPF for IPv4.



OSPF6

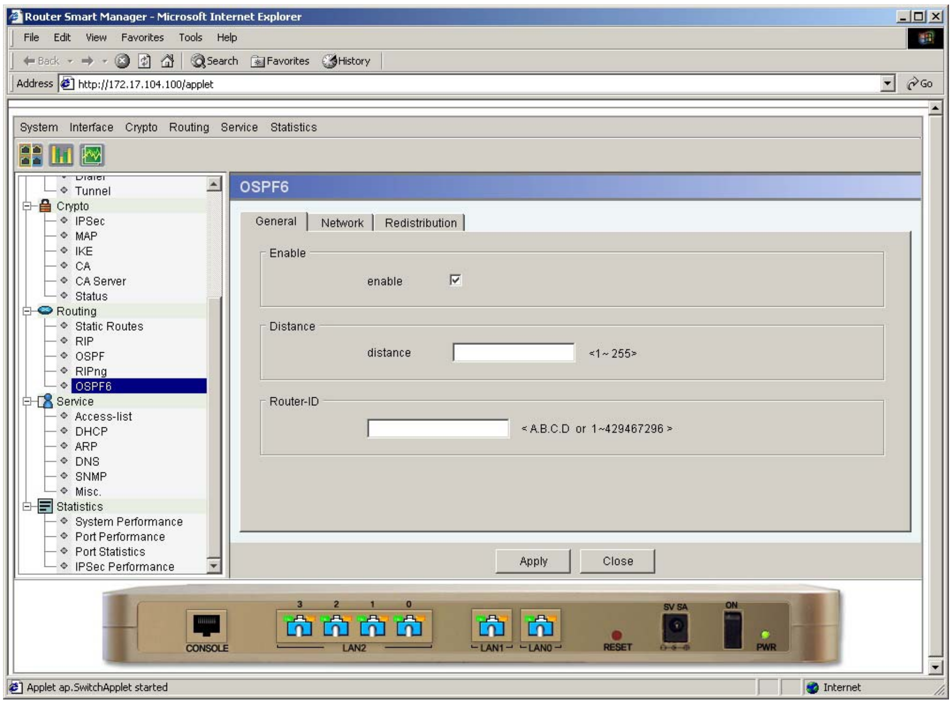
Enable
enable ☑

Distance
distance <1 ~ 255>

Router-ID
< A.B.C.D or 1~429467296 >

(Figure3-281) Routing OSPF6 Main page

Figure 3-284 shows OSPF General Menu.



OSPF6

General | Network | Redistribution

Enable

enable ☑

Distance

distance [ ] <1~255>

Router-ID

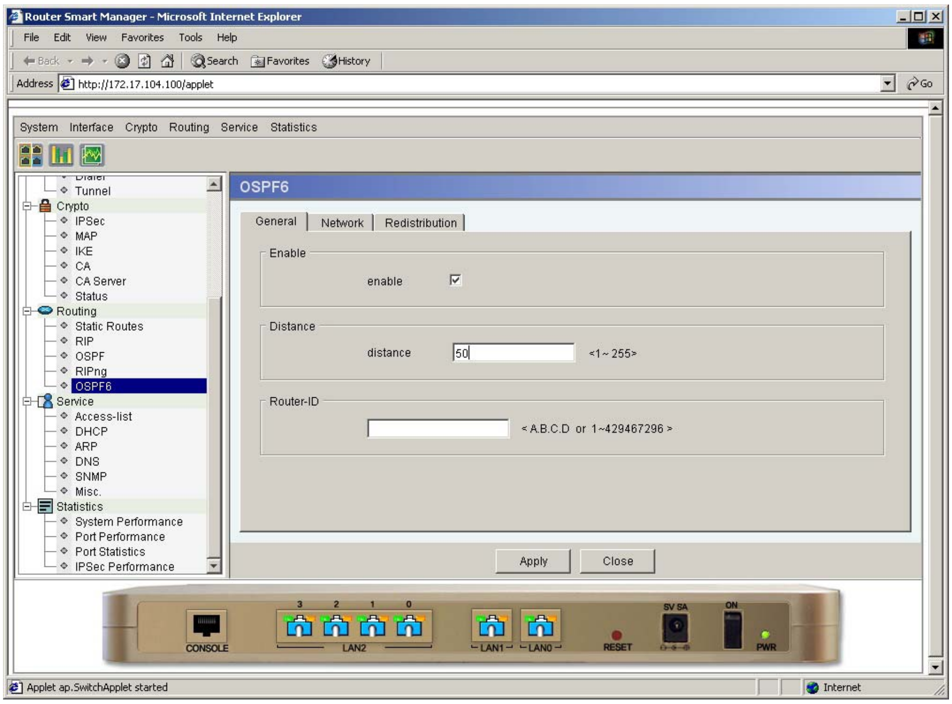
[ ] < A.B.C.D or 1~429467296 >

(Figure3-282) OSPF6 General Menu page

<Table 3-44> OSPF6 General Menu Description

Elements	Description
Enable	Sets Enable or Disable of OSPF Protocol.
Distance	Input Distance Value of OSPF Protocol.
Router-ID	Input Router-ID to identify when exchanging Routing Table. Input IP Address or a specific number.

Figure 3-285 shows the example of OSPF6 General Configuration. First, check "Enable" box to activate then input "50" for Distance.



OSPF6

Enable

enable ☑

Distance

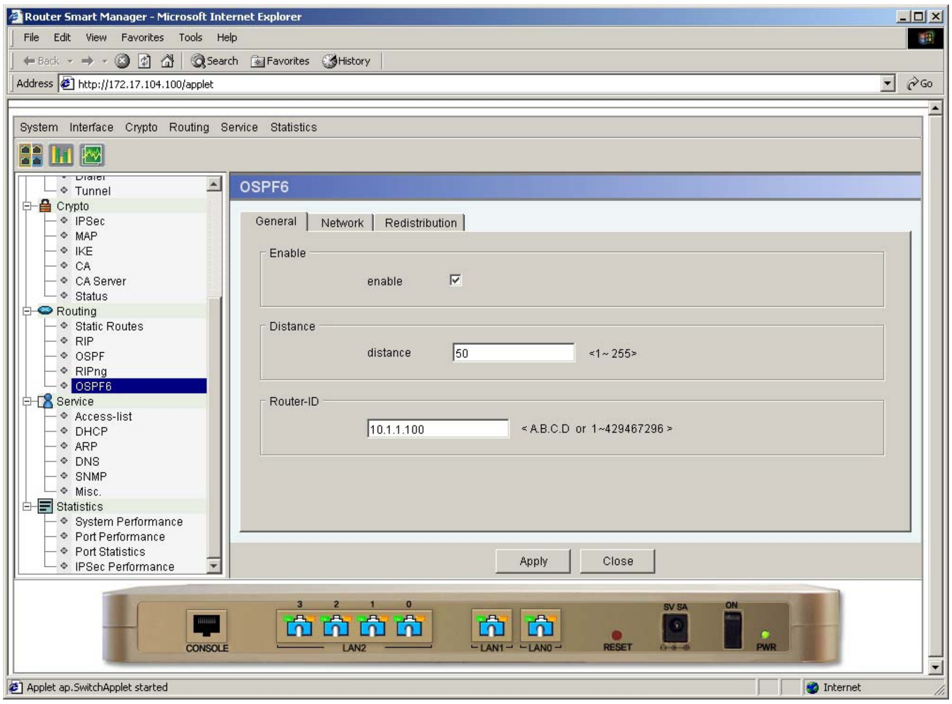
distance 50 <1~255>

Router-ID

<A.B.C.D or 1~429467296>

(Figure3-283) Input OSPF6 General Distance

Input "10.1.1.100" for Router-ID



OSPF6

Enable

enable ☑

Distance

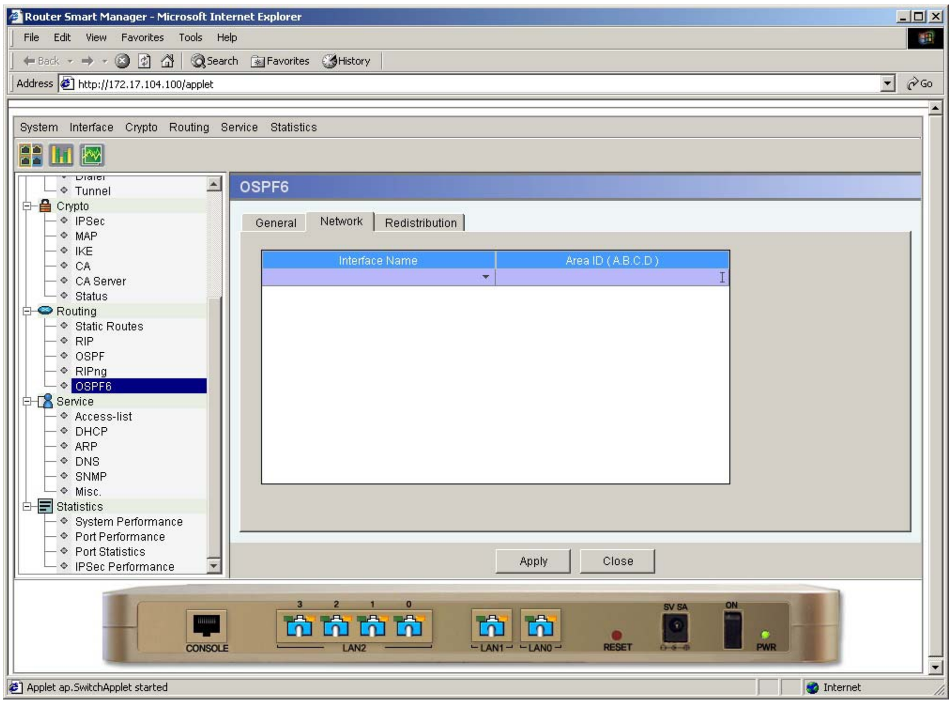
distance 50 <1~255>

Router-ID

10.1.1.100 <A.B.C.D or 1~429467296>

(Figure3-284) Input OSPF6 General Router-ID

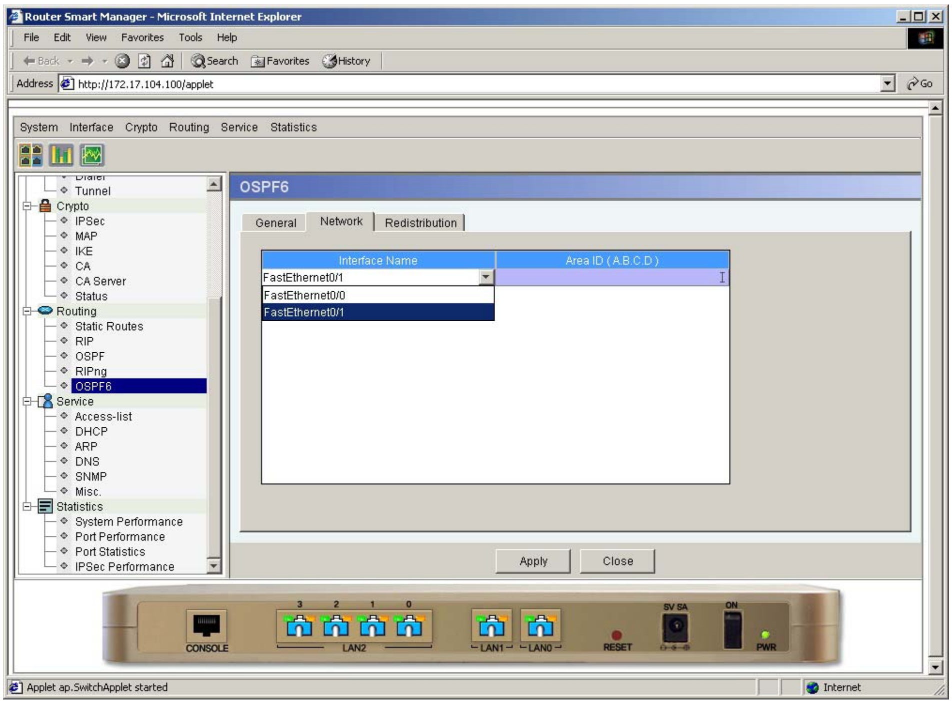
Figure 3-287 shows how to select OSPF6 Network. The user can add or delete OSPF6 Area in OSPF6 Network.



Interface Name	Area ID (A.B.C.D)

(Figure3-285) Select OSPF6 Network

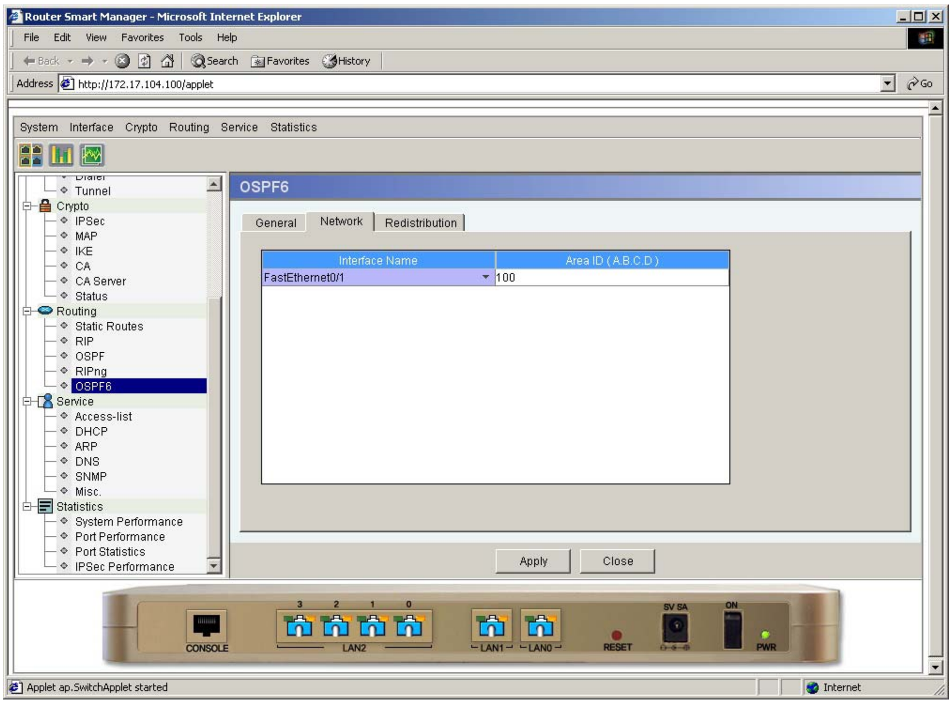
Figure 3-288 shows how to add a new Area.
First, select Interface Fast Ethernet 0/1.



Interface Name	Area ID (A.B.C.D)
FastEthernet0/1	

(Figure3-286) Input OSPF6 Network Interface

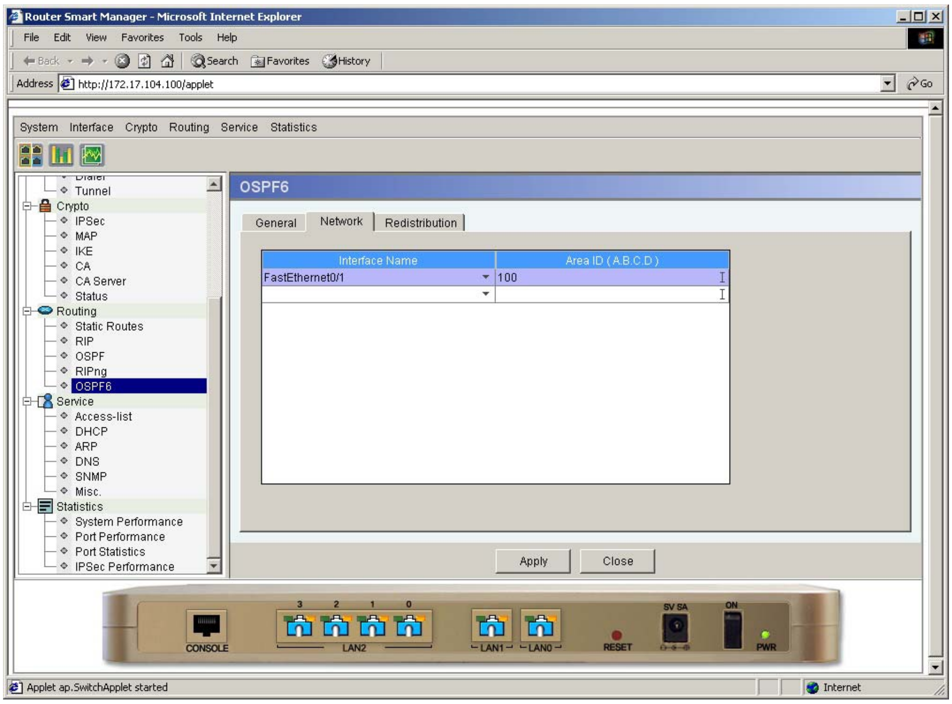
Input “100” for Area ID



Interface Name	Area ID (A.B.C.D)
FastEthernet0/1	100

(Figure3-287) Input OSPF6 Network Area ID

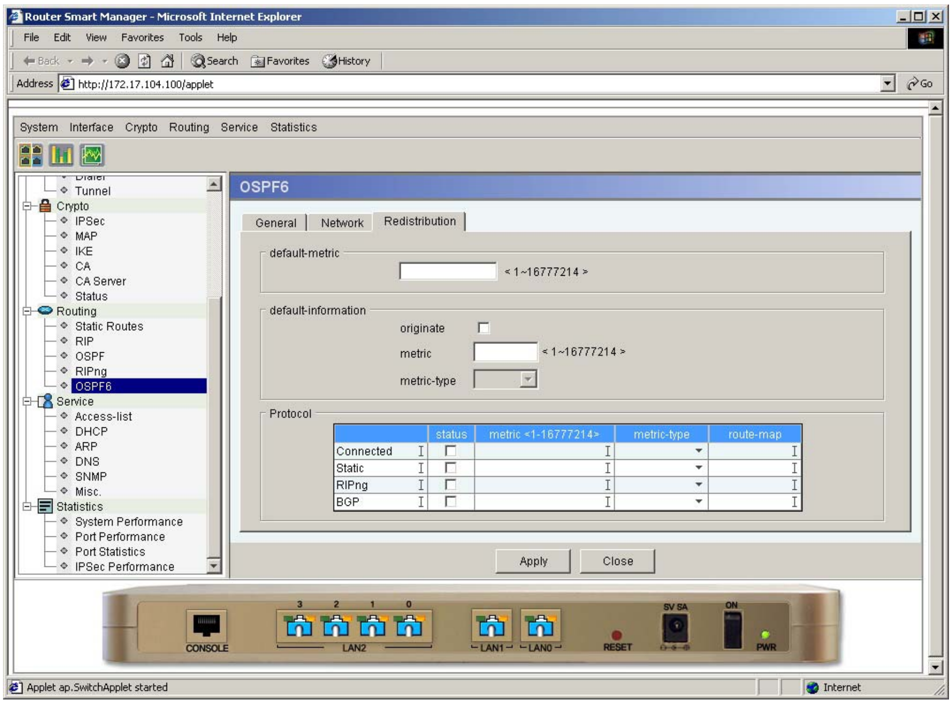
Click “Apply” to verify.



Interface Name	Area ID (A.B.C.D)
FastEthernet0/1	100

(Figure3-288) OSPF6 Network configuration verify

Figure 3-291 shows how to select OSPF6 Redistribution.



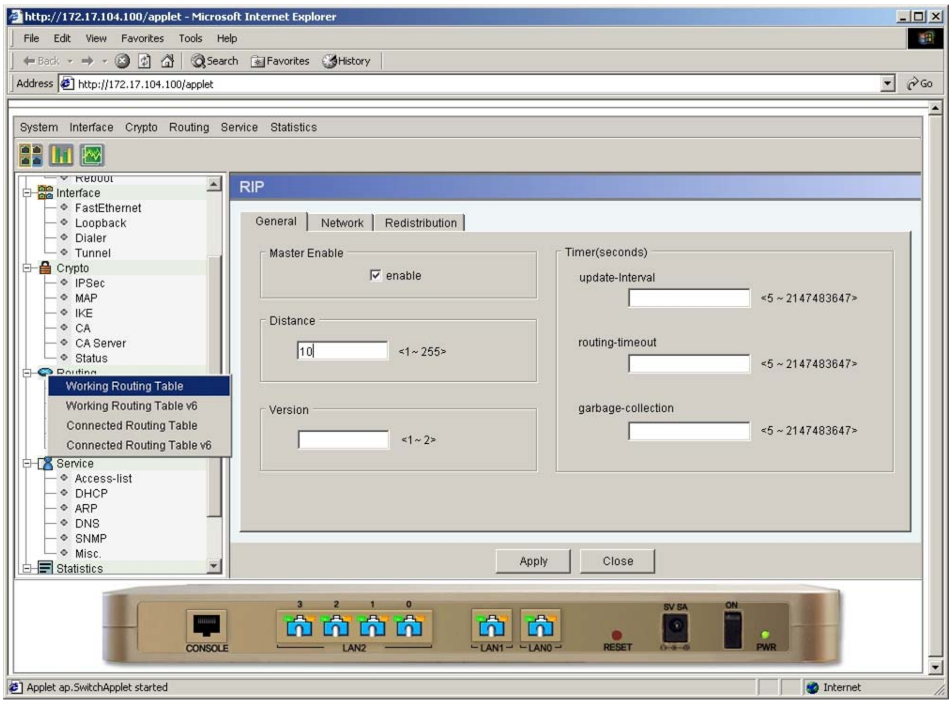
	status	metric <1-16777214>	metric-type	route-map
Connected	□			
Static	□			
RIPng	□			
BGP	□			

(Figure3-289) OSPF6 Redistribution page

<Table 3-45> OSPF6 Redistribution menu Description

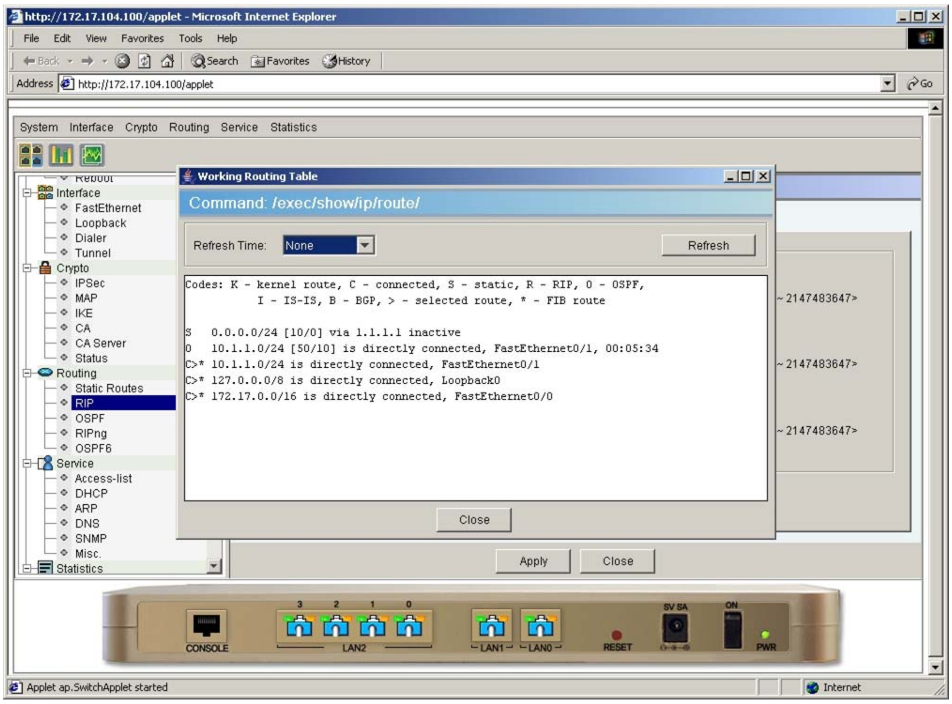
Elements	Description
Default-metric	Defines Offset value for sending OSPF Packet.
Default-Information	It informs Default Router when sending OSPF Packet Originate : Transfer Default-Information Metric: defines Metric for Default-route. Metric-type: defines External Type 1/2 metric for Default-route.
Protocol Status	Check protocol when exchanging Routing Protocol and Routing Table besides OSPF.
Protocol Metric	Defines default Metric when exchanging Routing Protocol and Routing Table besides OSPF.
Protocol Metric-type	Defines OSPF External Type 1/2 Metric.
Protocol route-map	Defines Route-map for reference when exchanging Routing Protocol and Routing Table besides OSPF.

Click right side of the mouse to see the information on current Routing Table. Click “Routing” menu.



(Figure3-290) Routing Pop menu page

Figure 3-293 shows Working Routing Table page.



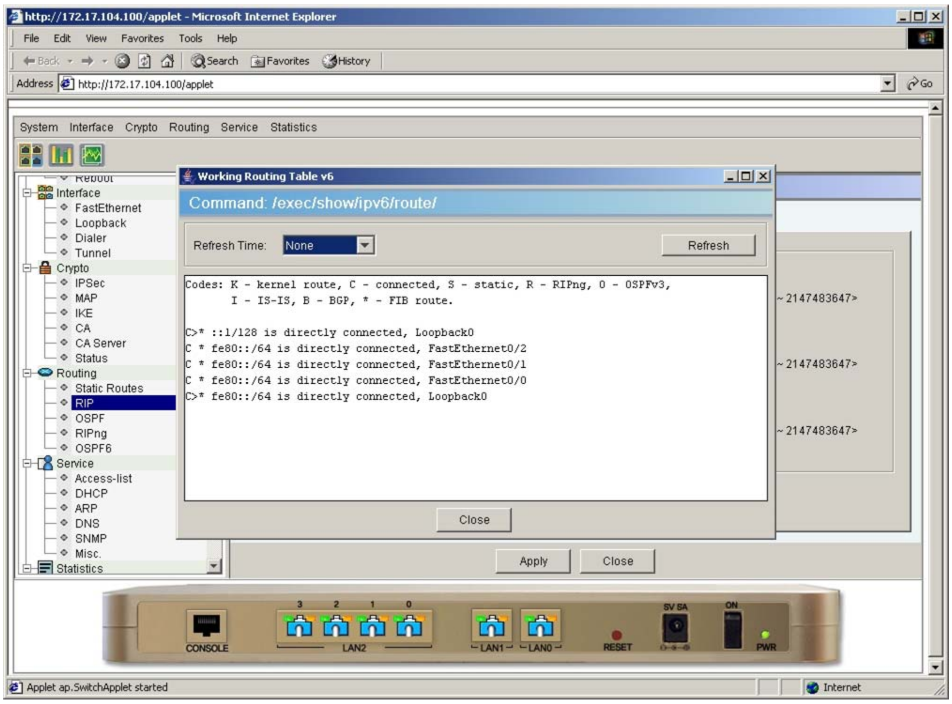
Command: /exec/show/ip/route/

Refresh Time: None

```
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
          I - IS-IS, B - BGP, > - selected route, * - FIB route

S   0.0.0.0/24 [10/0] via 1.1.1.1 inactive
O   10.1.1.0/24 [50/10] is directly connected, FastEthernet0/1, 00:05:34
C>* 10.1.1.0/24 is directly connected, FastEthernet0/1
C>* 127.0.0.0/8 is directly connected, Loopback0
C>* 172.17.0.0/16 is directly connected, FastEthernet0/0
```

(Figure3-291) Working Routing Table page

Figure 3-294 shows Working Routing Table for IPv6 page.



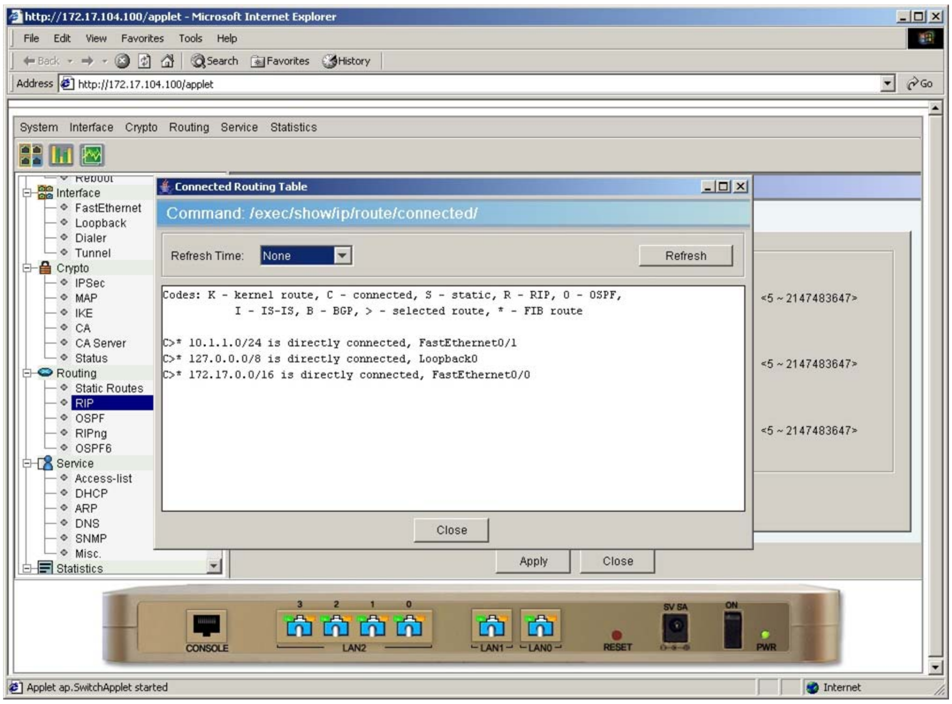
Command: /exec/show/ipv6/route/

Refresh Time: None

```
Codes: K - kernel route, C - connected, S - static, R - RIPng, O - OSPFv3,
       I - IS-IS, B - BGP, * - FIB route.

C>* ::1/128 is directly connected, Loopback0
C * fe80::/64 is directly connected, FastEthernet0/2
C * fe80::/64 is directly connected, FastEthernet0/1
C * fe80::/64 is directly connected, FastEthernet0/0
C>* fe80::/64 is directly connected, Loopback0
```

(Figure3-292) Working Routing Table for IPv6 page

Figure 3-295 shows Connected Routing Table page.



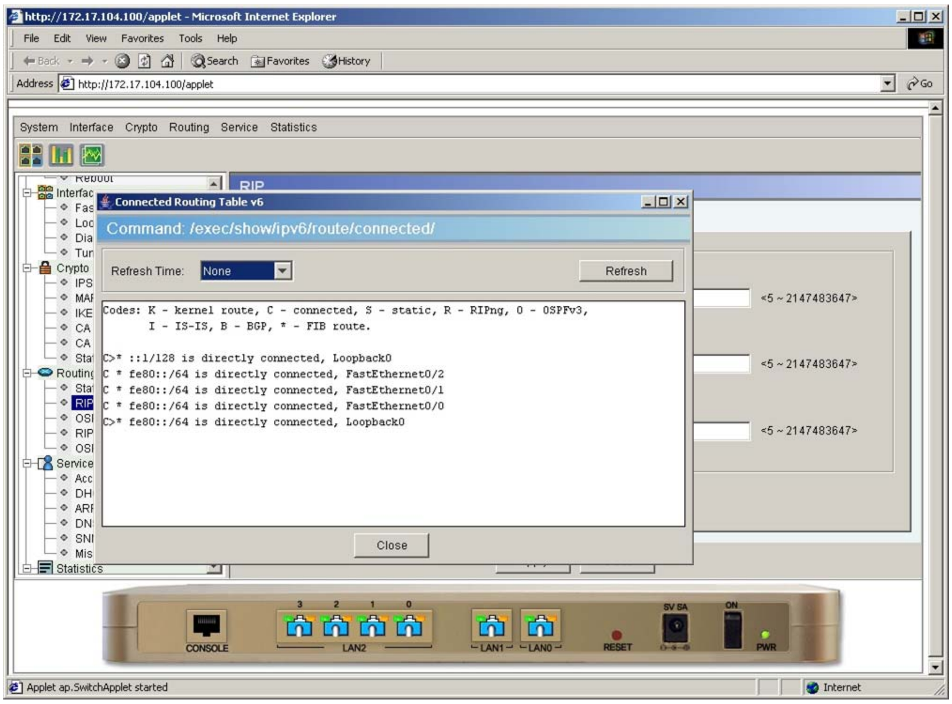
Command: /exec/show/ip/route/connected/

Refresh Time: None

```
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
          I - IS-IS, B - BGP, > - selected route, * - FIB route

C>* 10.1.1.0/24 is directly connected, FastEthernet0/1
C>* 127.0.0.0/8 is directly connected, Loopback0
C>* 172.17.0.0/16 is directly connected, FastEthernet0/0
```

(Figure3-293) Connected Routing Table page

Figure 3-296 shows Connected Routing Table for IPv6 page.



Connected Routing Table v6
Command: /exec/show/ipv6/route/connected/
Refresh Time: None
Refresh
Close

```
Codes: K - kernel route, C - connected, S - static, R - RIPng, O - OSPFv3,
       I - IS-IS, B - BGP, * - FIB route.

C>* ::1/128 is directly connected, Loopback0
C * fe80::/64 is directly connected, FastEthernet0/2
C * fe80::/64 is directly connected, FastEthernet0/1
C * fe80::/64 is directly connected, FastEthernet0/0
C>* fe80::/64 is directly connected, Loopback0
```

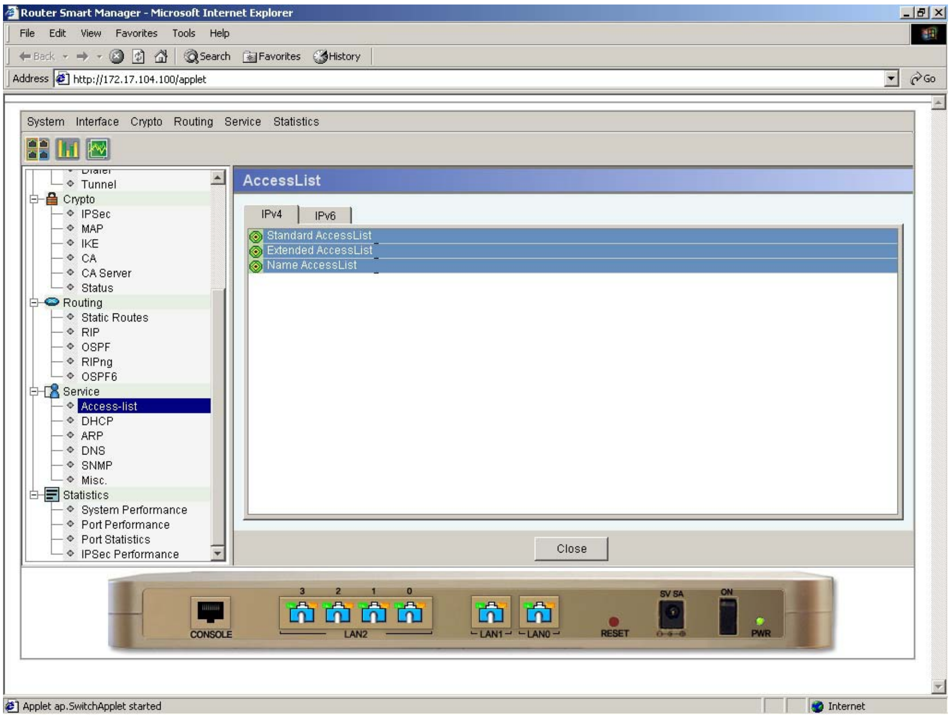
(Figure3-294) Connected Routing Table for IPv6 page

Service menu

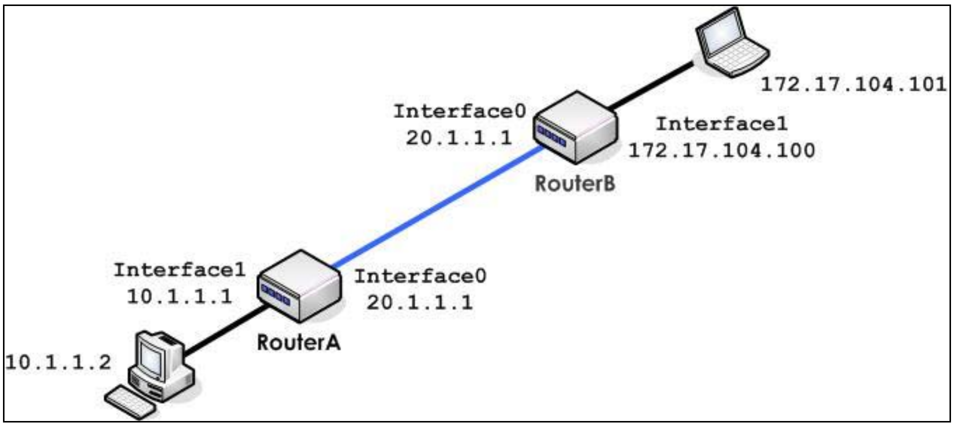
Access-List

Access-List of AP900S can create IPv6 with IPv4 Standard/Extended/Name. Also it has a Copy/Paste function which enables Access-List creation, edition, delete using Smart Manager.

(Caution!) Access-List must have at least one line of Permit sentence.



(Figure3-295) Access-List Main page



(Figure3-296) Access-List Network Diagram

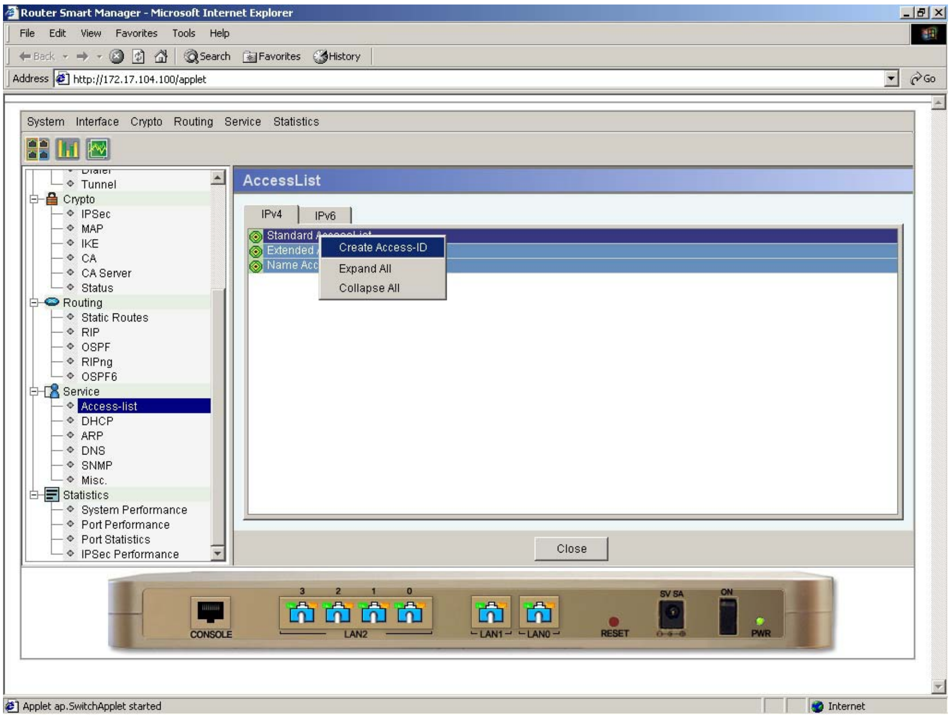
In this example of Network Diagram, host 10.1.1.2 and host 172.17.104.101 can send/receive Packet properly using Routing Protocol such as Static Routing or RIP etc. however, when Access-List which restricts ICMP packet (Source IP Address “10.1.1.2”, Destination IP Address “172.17.104.101”) is applied to Interface0 of RouterA then host 10.1.1.2 and host172.17.104.101 can not have ICMP communication.

Access-List is applied on interface. Access-List is not only restricts Packet transmit but also it can be applied on Crypto Map. In this Crypto Map, Data is protected by encapsulating Packets which is on Access-List.

Moreover, Access-List is used for filtering received Routing Table when exchanging Routing Table between Routers. And also Access-List is used to create IP-Policy for QoS.

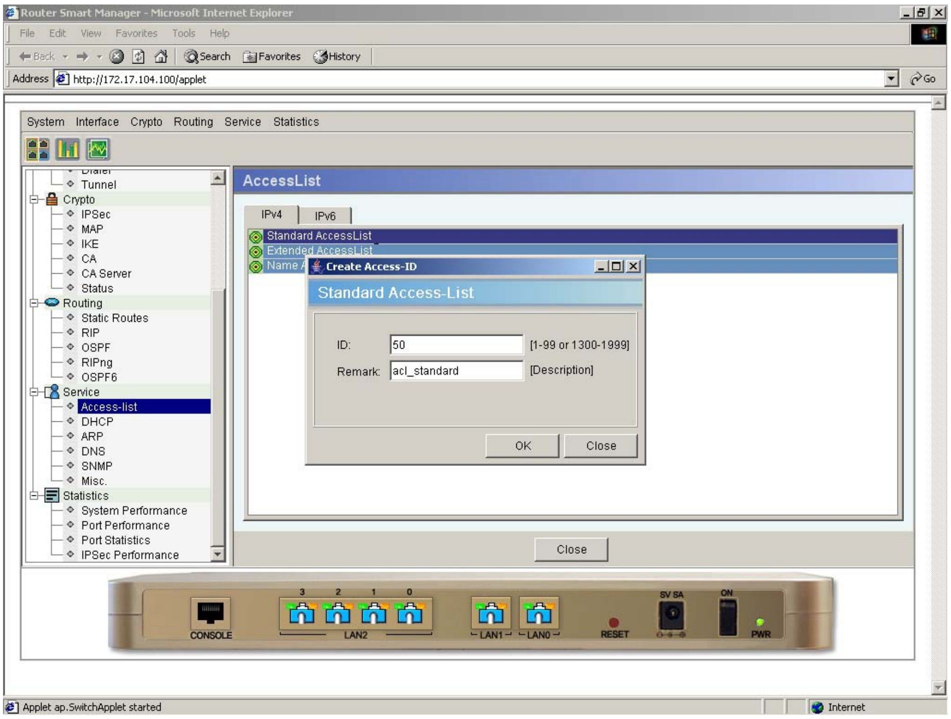
Figure 3-299 shows how to create IPv4 Standard Access-List.

Click "Create Access-ID" by clicking right side of the mouse on Standard Access-List.



(Figure3-297) Create Standard Access-List

Input "50" for Access-ID, "acl_standard" for Remark. Spaces are allowed for Remark.

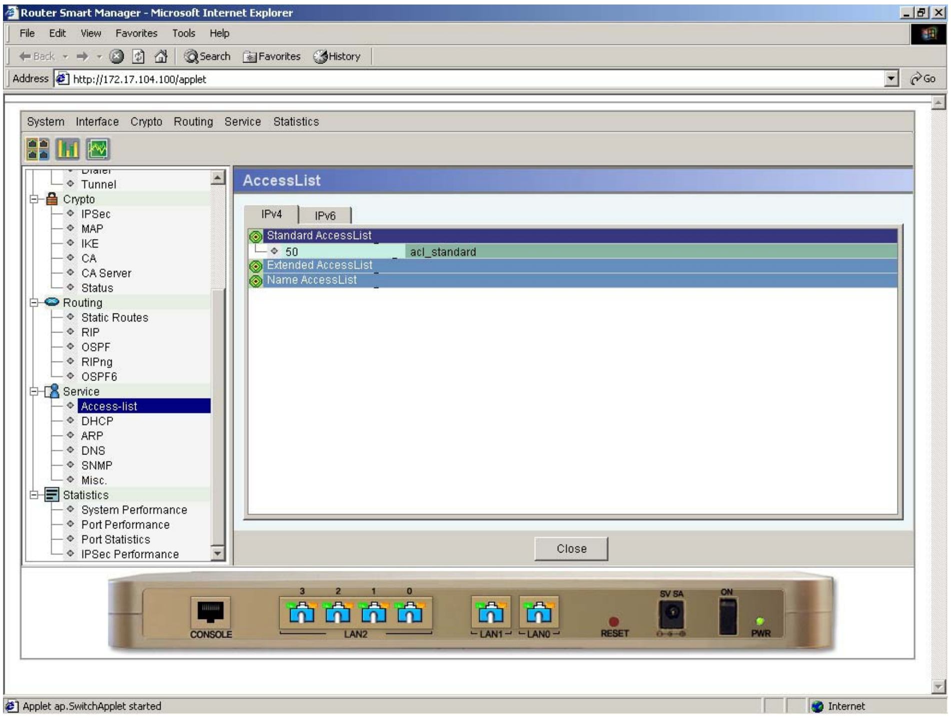

Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
AccessList
IPv4
IPv6
Standard AccessList
Extended AccessList
Create Access-ID
Standard Access-List
OK
Close
Close
Applet ap.SwitchApplet started
Internet

ID: 50 [1-99 or 1300-1999]

Remark: acl_standard [Description]

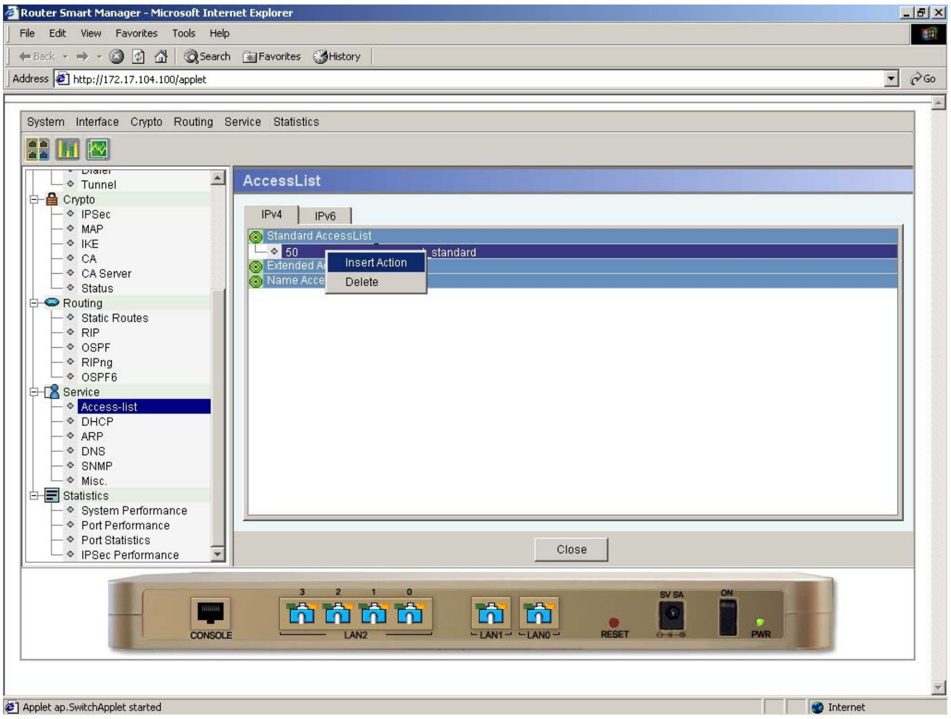
(Figure3-298) Input Access-ID, Remark

Click “OK” to verify. Figure3-301 shows the Access-ID.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
AccessList
IPv4 IPv6
Standard AccessList
50 acl_standard
Extended AccessList
Name AccessList
Close
Applet ap.SwitchApplet started

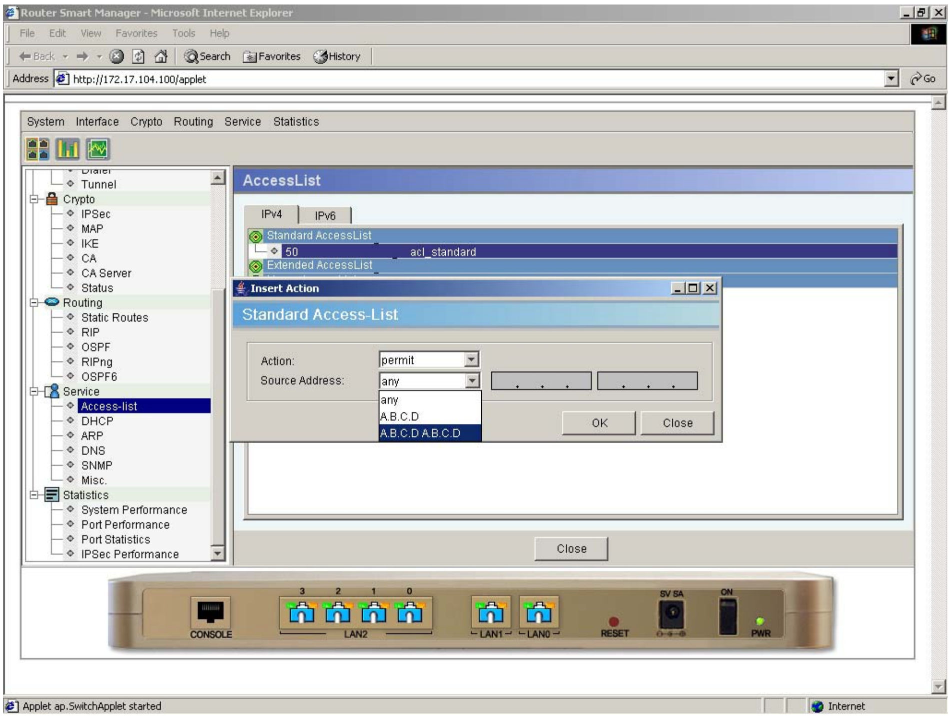
(Figure3-299) Access-ID creation verify.

Select “Insert Action” by clicking right side of mouse on created Access-ID.



(Figure3-300) Select Insert Action

Select "Permit" for Action, "A.B.C.D, A.B.C.D" for Source Address.



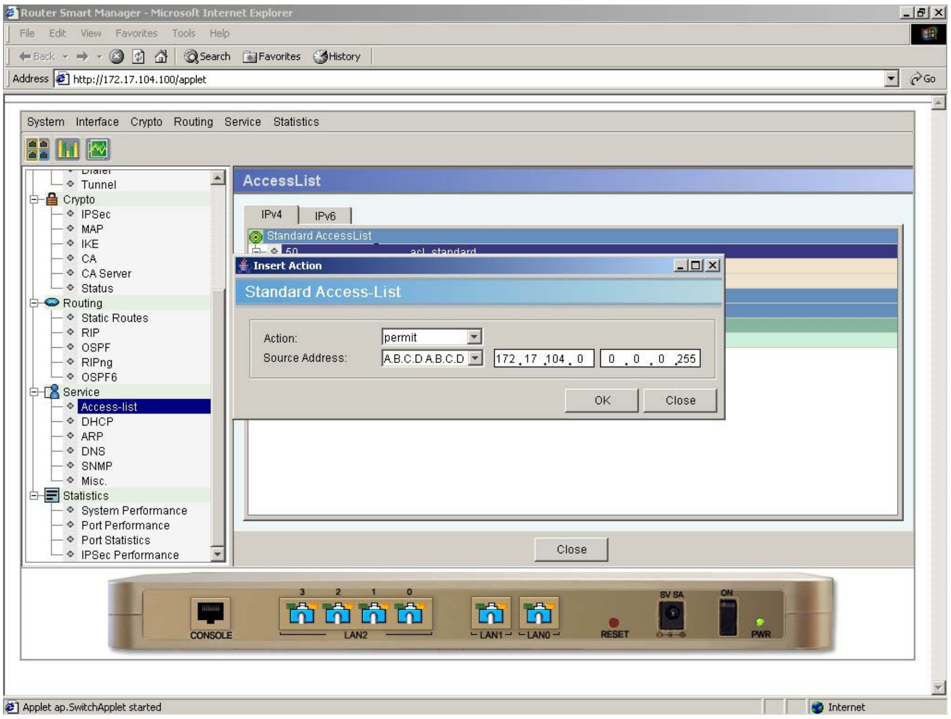
Action: permit

Source Address: any

- any
- A.B.C.D
- A.B.C.D A.B.C.D

(Figure3-301) Select Action, Source Address Type

Enter "172.17.104.0" for IP Address , "0.0.0.255" for Wildcard bits.

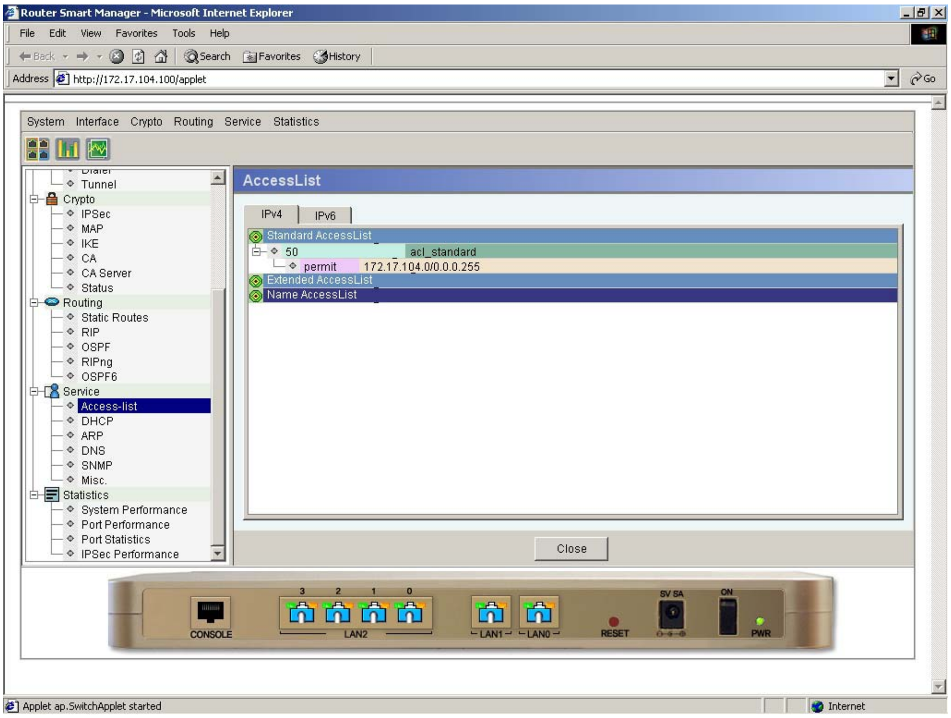


Action: permit

Source Address: A.B.C.D A.B.C.D 172 . 17 . 104 . 0 0 . 0 . 0 . 255

(Figure3-302) Input Source Address Range

Click "OK" to verify. Permit sentence is created.

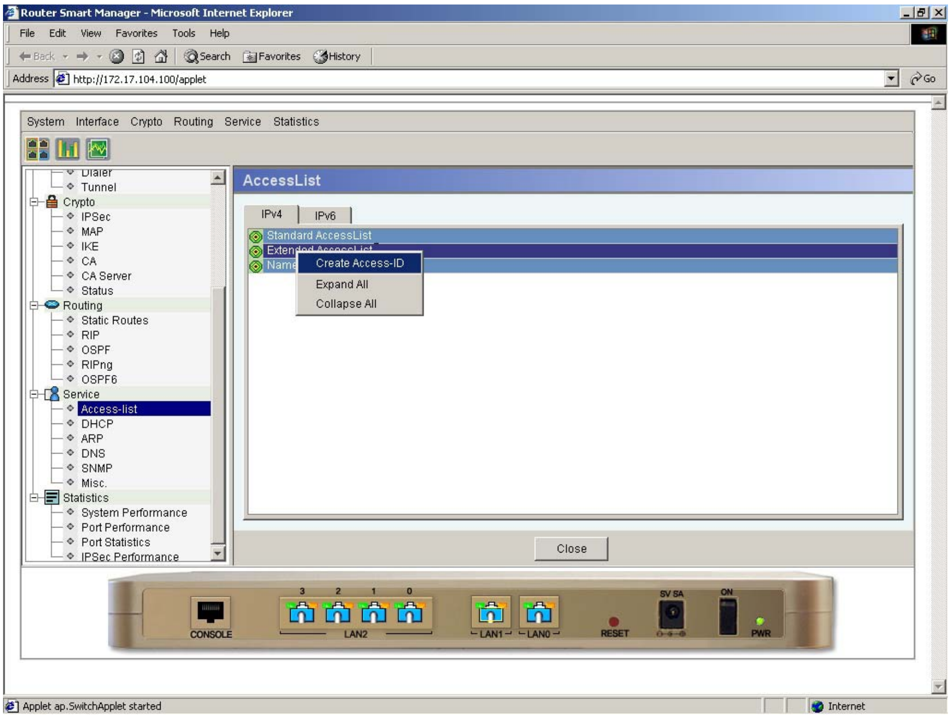


Standard AccessList
50 acl_standard
permit 172.17.104.0/0.0.0.255
Extended AccessList
Name AccessList

(Figure3-303) Access-List creation verify

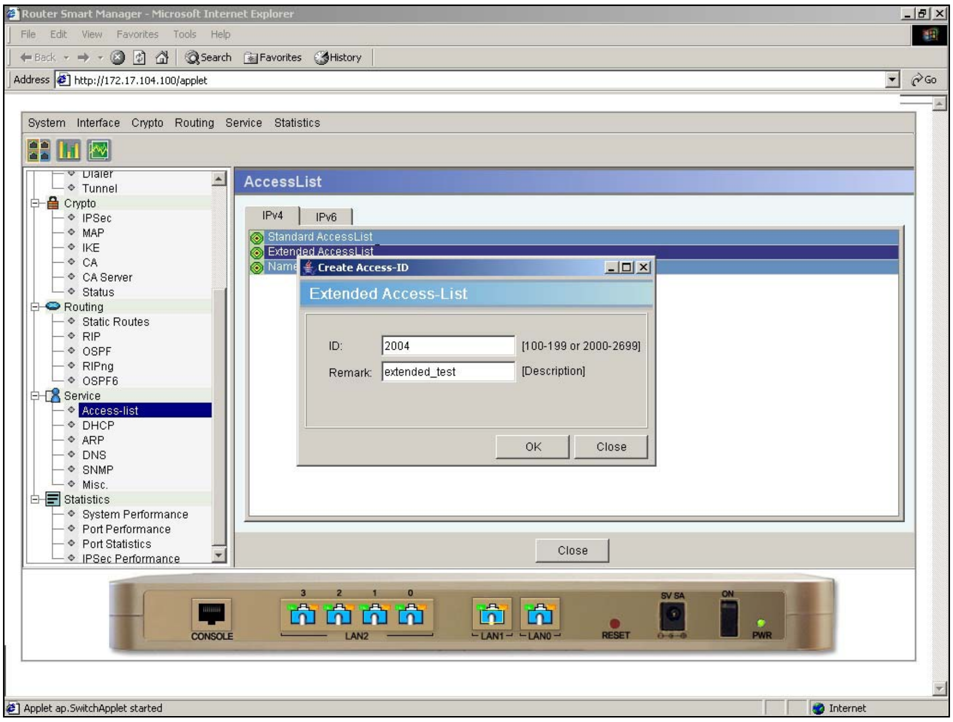
Figure 3-306 shows how to create Extended Access-List.

Select Create Access-ID by clicking right side of the mouse on Extended Access-List.



(Figure3-304) Select Extended Access-List Create Access-ID

Enter Access-ID ("2004"), Remark ("extended_test").

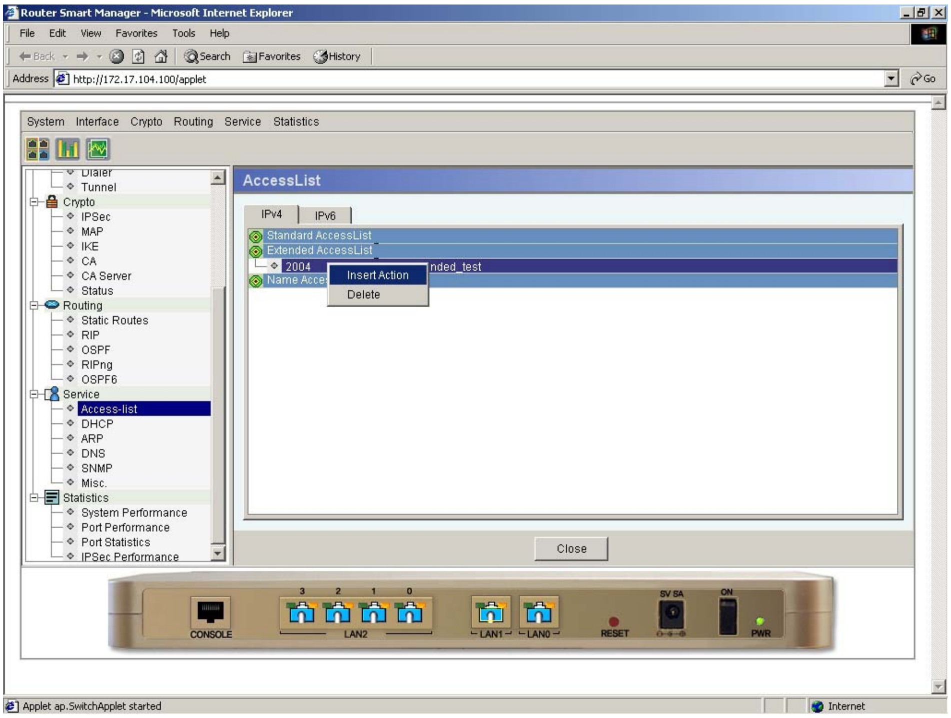


ID: 2004 [100-199 or 2000-2699]

Remark: extended_test [Description]

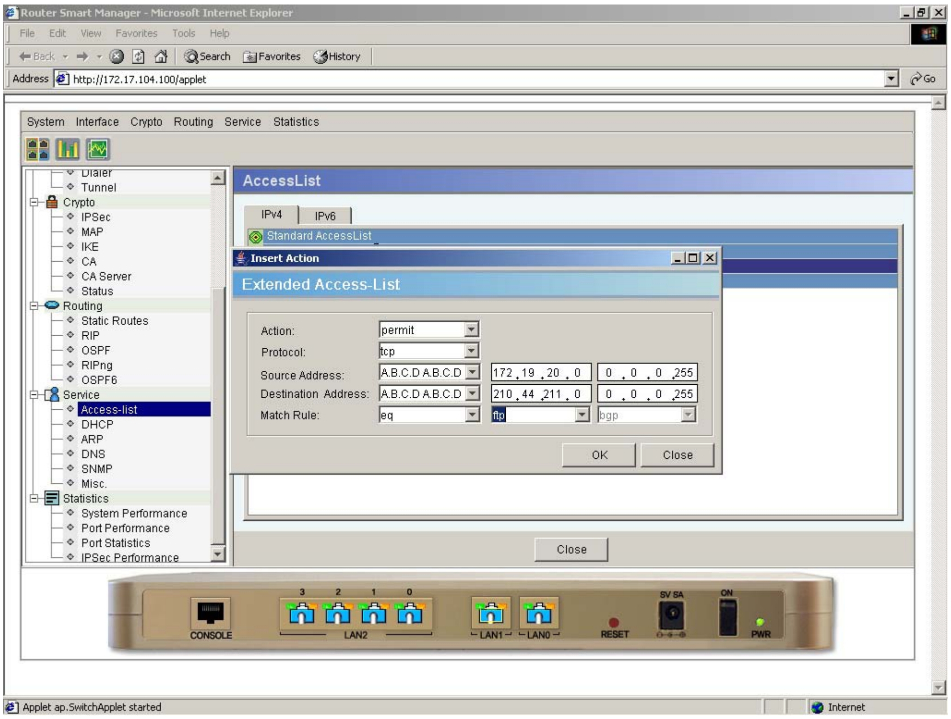
(Figure3-305) Input Extended Access-List Access-ID, Remark

Select Insert Action by clicking right side of the mouse on Access-ID.



(Figure3-306) Select Extended Access-List Insert Action

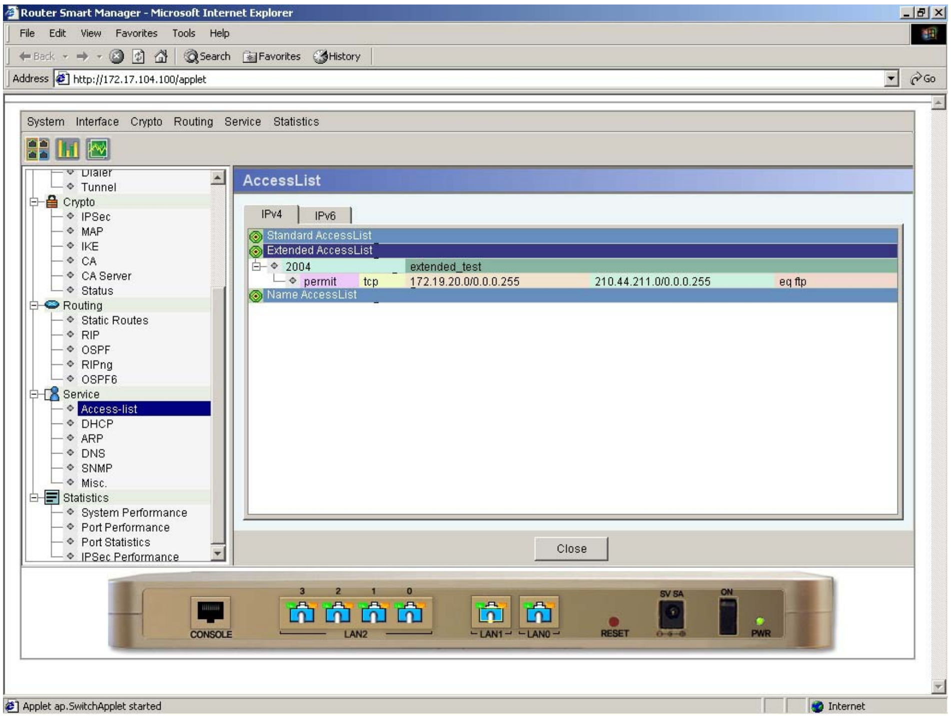
Enter the range of Source IP Address, Destination IP Address, input or select Protocol and Permit etc.


Router Smart Manager - Microsoft Internet Explorer
System Interface Crypto Routing Service Statistics
AccessList
IPv4
IPv6
Standard AccessList
Access-list
Insert Action
Extended Access-List
OK
Close
Close

Action: permit
Protocol: tcp
Source Address: A.B.C.D A.B.C.D 172.19.20.0 0.0.0.255
Destination Address: A.B.C.D A.B.C.D 210.44.211.0 0.0.0.255
Match Rule: eq ftp bgp

(Figure3-307) Extended Access-List

Click “OK” to verify.

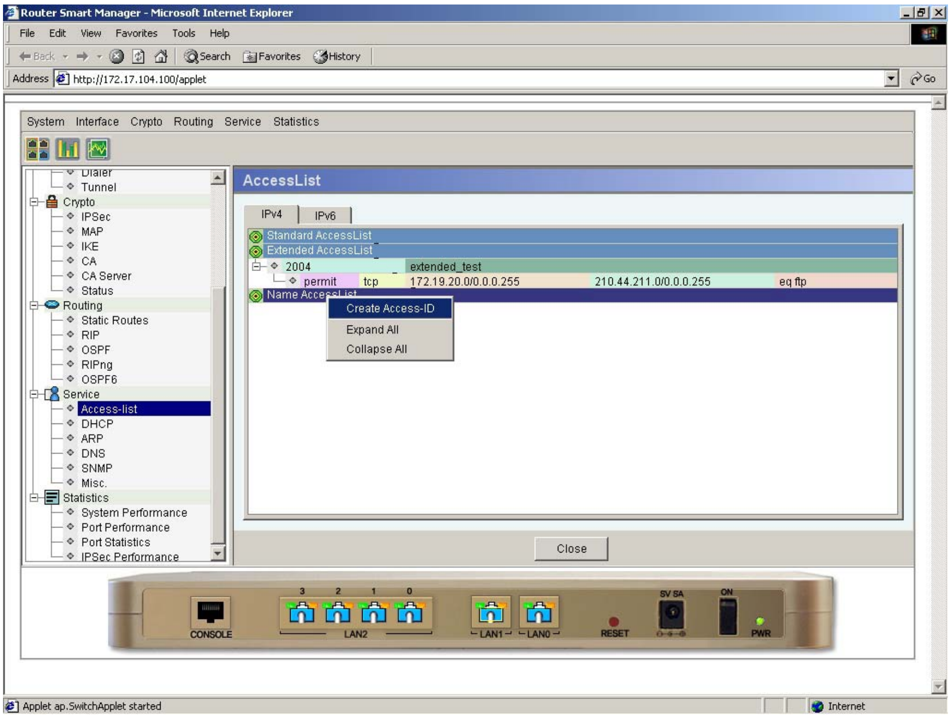


Standard AccessList
Extended AccessList
2004 extended_test
permit tcp 172.19.20.0/0.0.0.255 210.44.211.0/0.0.0.255 eq ftp
Name AccessList

(Figure3-308) Extended Access-List creation verify

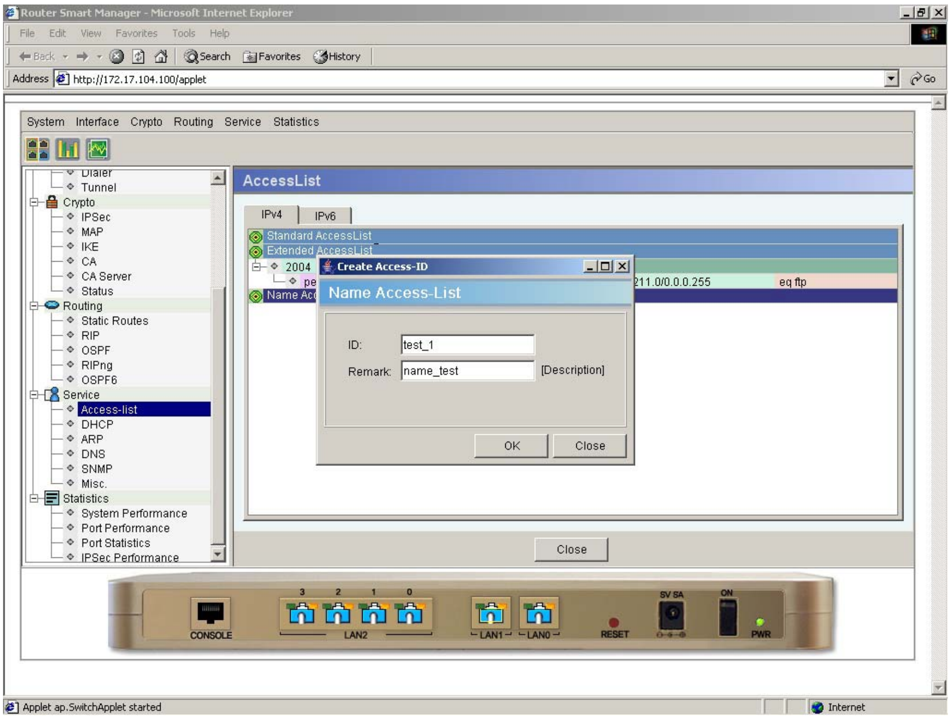
Figure 3-311 shows how to configure Name Access-List.

Select Create Access-ID by clicking right side of the mouse on Name Access-List.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
AccessList
IPv4 IPv6
Standard AccessList
Extended AccessList
2004 extended_test
permit tcp 172.19.20.0/0.0.0.255 210.44.211.0/0.0.0.255 eq ftp
Name AccessList
Create Access-ID
Expand All
Collapse All
Close
Applet ap.SwitchApplet started

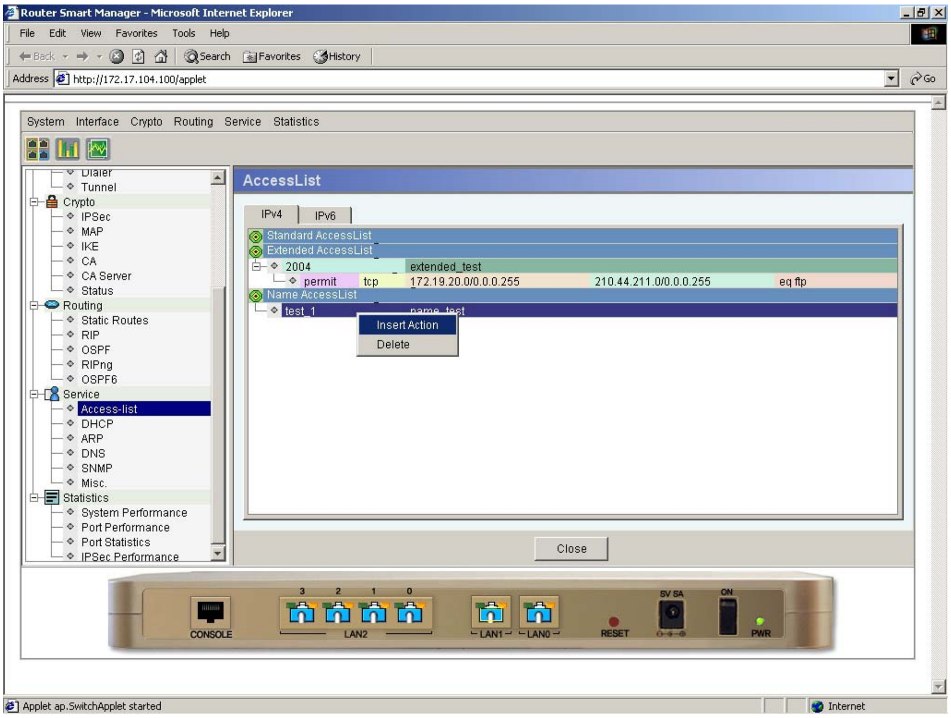
(Figure3-309) Select Name Access-List Create Access-ID

Enter "test_1" for Access-ID, "name_test" for Remark.


Router Smart Manager - Microsoft Internet Explorer
AccessList
Create Access-ID
Name Access-List
ID: test_1
Remark: name_test [Description]
OK Close
Close
Applet ap.SwitchApplet started

(Figure3-310) Input Name Access-List Access-ID, Remark

Select Insert Action by clicking right side of mouse on the new Access-ID.

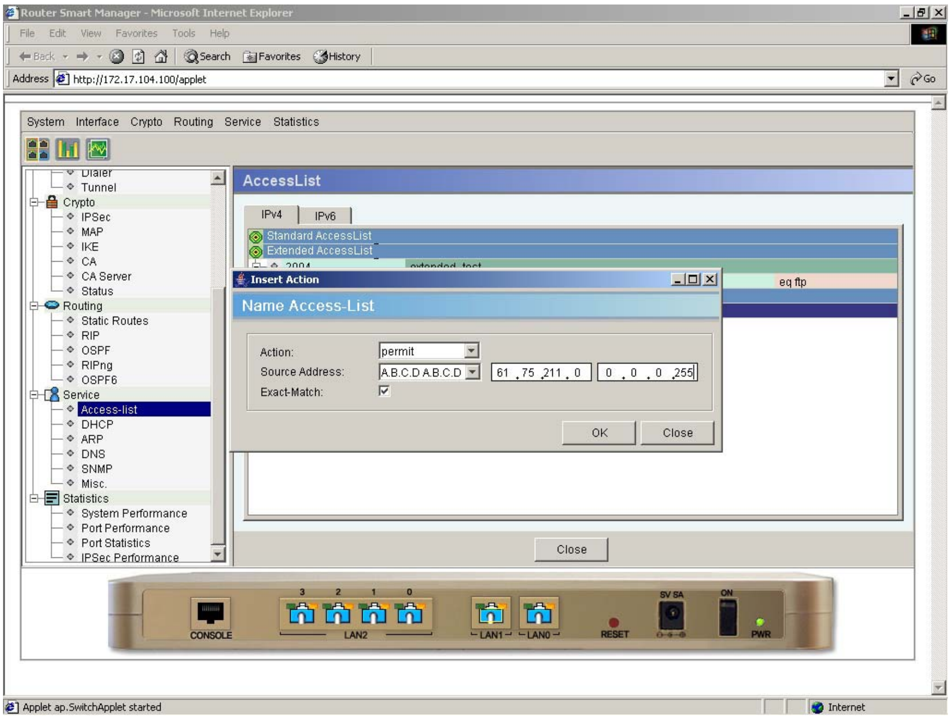


AccessList

- Standard AccessList
- Extended AccessList
  - 2004 extended_test
    - permit tcp 172.19.20.0/0.0.0.255 210.44.211.0/0.0.0.255 eq ftp
- Name AccessList
  - test_1 name_test

(Figure3-311) Select Name Access-List Insert Action

Input or Select the ranges of Source IP Address and Permit.



Insert Action

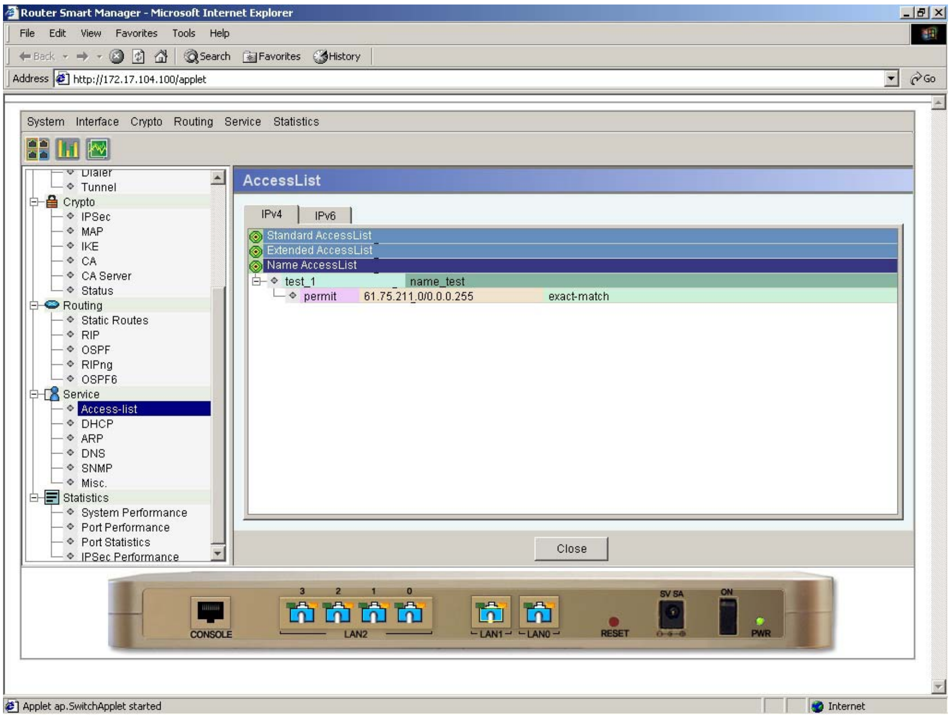
Name Access-List

Action: permit

Source Address: A.B.C.D A.B.C.D 61 . 75 . 211 . 0   0 . 0 . 0 . 255

Exact-Match: ☑

Verify the new Name Access-List.

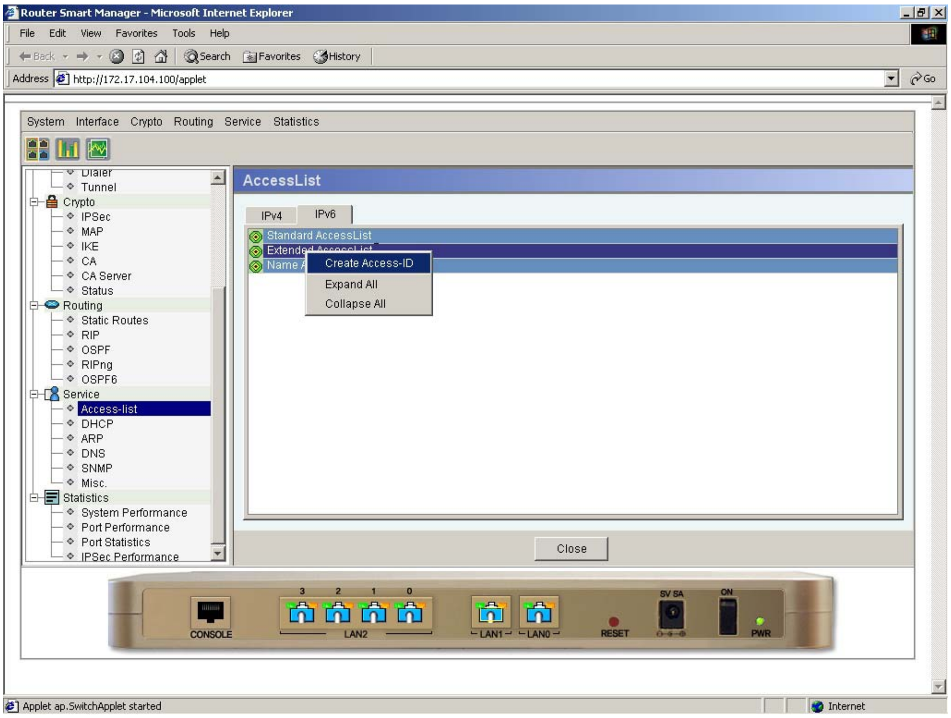


test_1 name_test
permit 61.75.211.0/0.0.0.255 exact-match

(Figure3-312) Name Access-List Verify

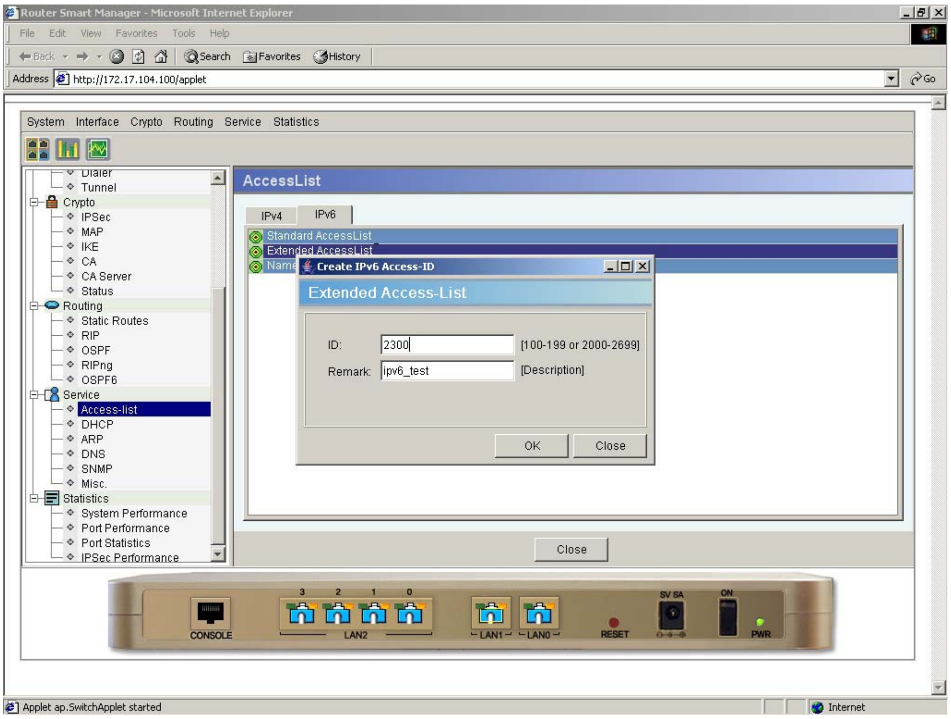
Figure 3-316 shows how to write IPv6 Extended Access-List.

Select Create Access-ID by clicking right side of the mouse on Extended Access-List.



(Figure3-313) Select IPv6 Extended Access-List Create Access-ID

Input “2300” for Access-ID, “ipv6_test” for Remark.

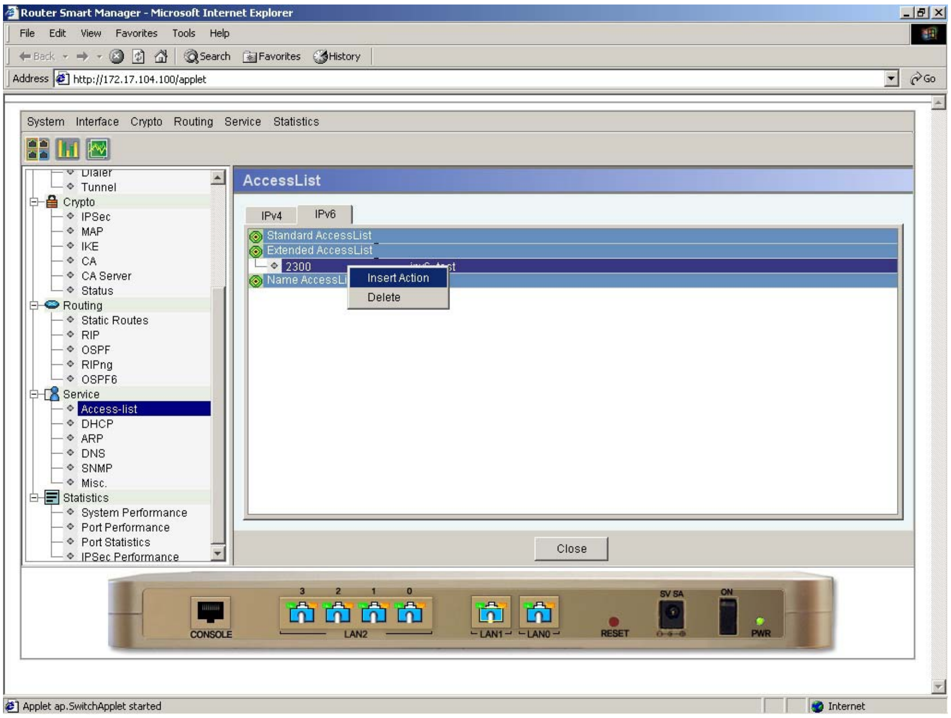


ID: 2300 [100-199 or 2000-2699]

Remark: ipv6_test [Description]

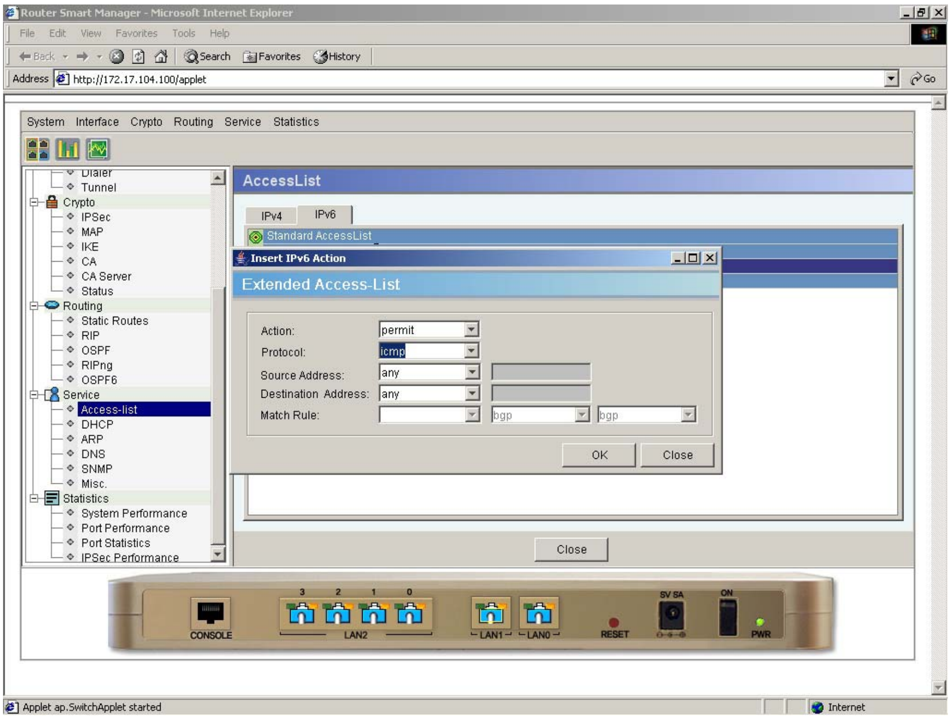
(Figure3-314) Input IPv6 Extended Access-List Access-ID, Remark

Select Insert Action by clicking right side of the mouse on created ID.



(Figure3-315) IPv6 Select Extended Access-List Insert Action

Select Source IP Address, Destination IP Address, Protocol etc.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
AccessList
IPv4
IPv6
Standard AccessList
Insert IPv6 Action
Extended Access-List
OK
Close
Close
Applet ap.SwitchApplet started
Internet

Action: permit

Protocol: icmp

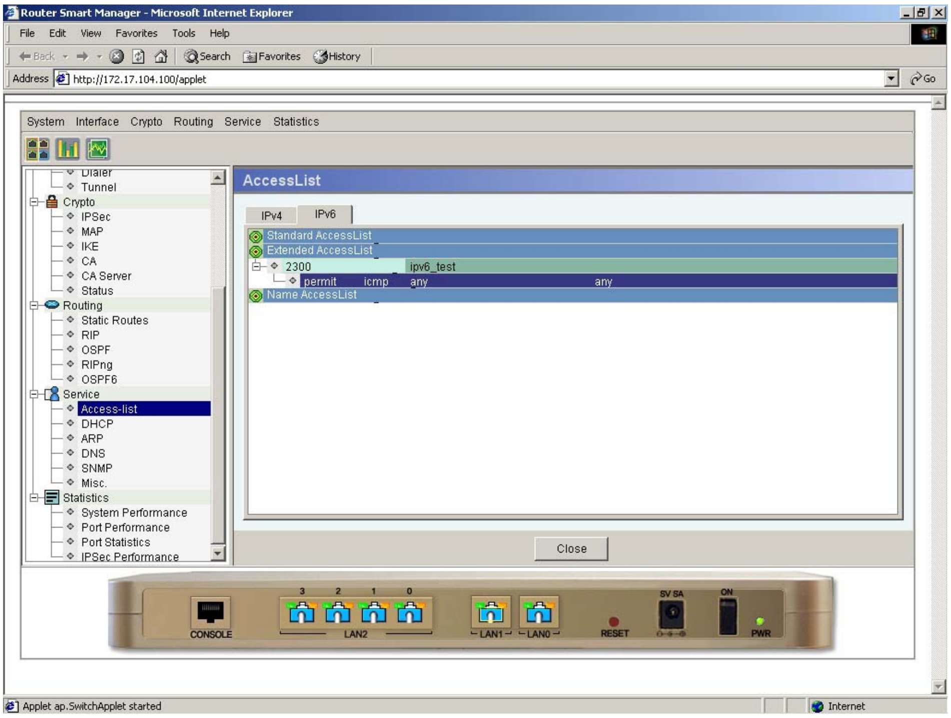
Source Address: any

Destination Address: any

Match Rule: bgp bgp

(Figure3-316) Writing IPv6 Extended Access-List

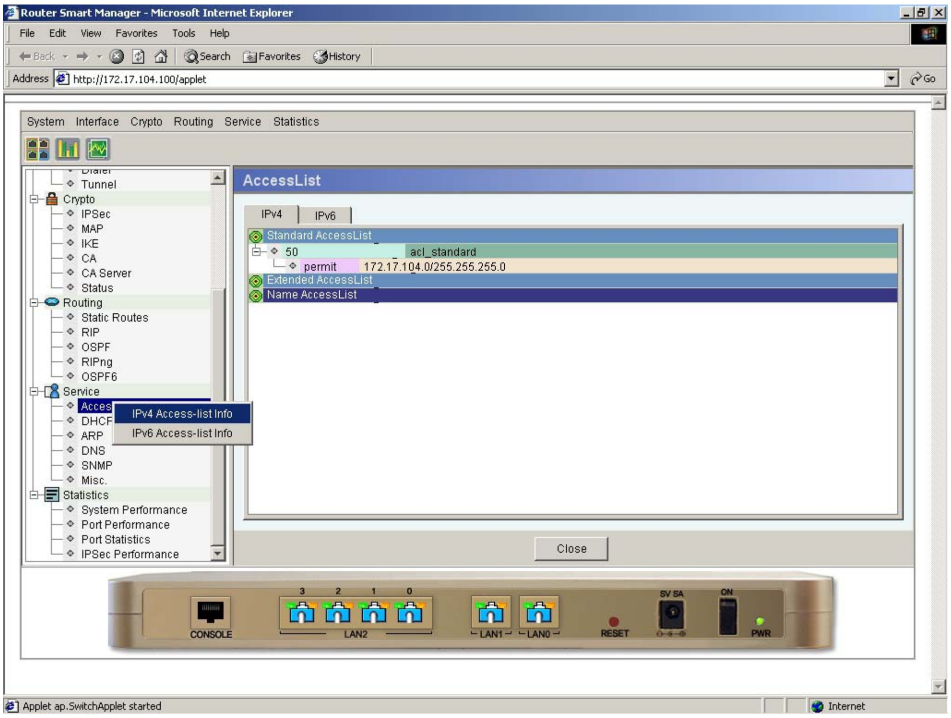
Click “OK” to verify.



```
2300            ipv6_test
  permit  icmp  any            any
```

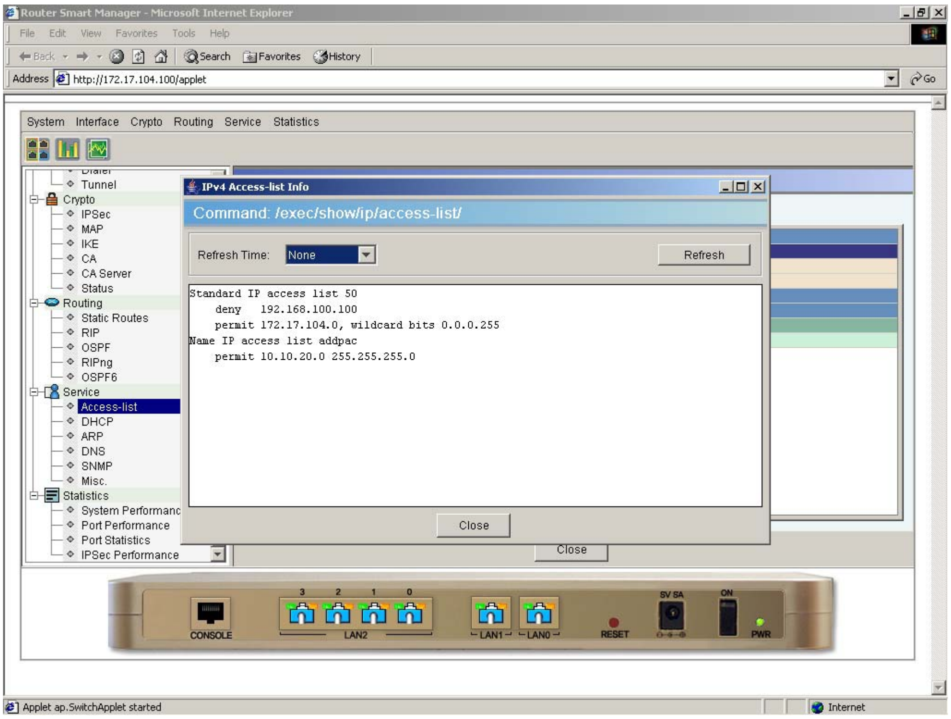
(Figure3-317) IPv6 Extended Access-List creation

Click on right side of the mouse on Access-List to check Access-List. See the Figure 3-321.


Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
AccessList
IPv4 IPv6
Standard AccessList
50 acl_standard
permit 172.17.104.0/255.255.255.0
Extended AccessList
Name AccessList
IPv4 Access-list Info
IPv6 Access-list Info
Close
Applet ap.SwitchApplet started

(Figure3-318) Access-List Pop Menu

Figure 3-322 shows IPv4 Access-List page.


Router Smart Manager - Microsoft Internet Explorer
Address http://172.17.104.100/applet
IPv4 Access-list Info
Refresh
Close

Command: /exec/show/ip/access-list/

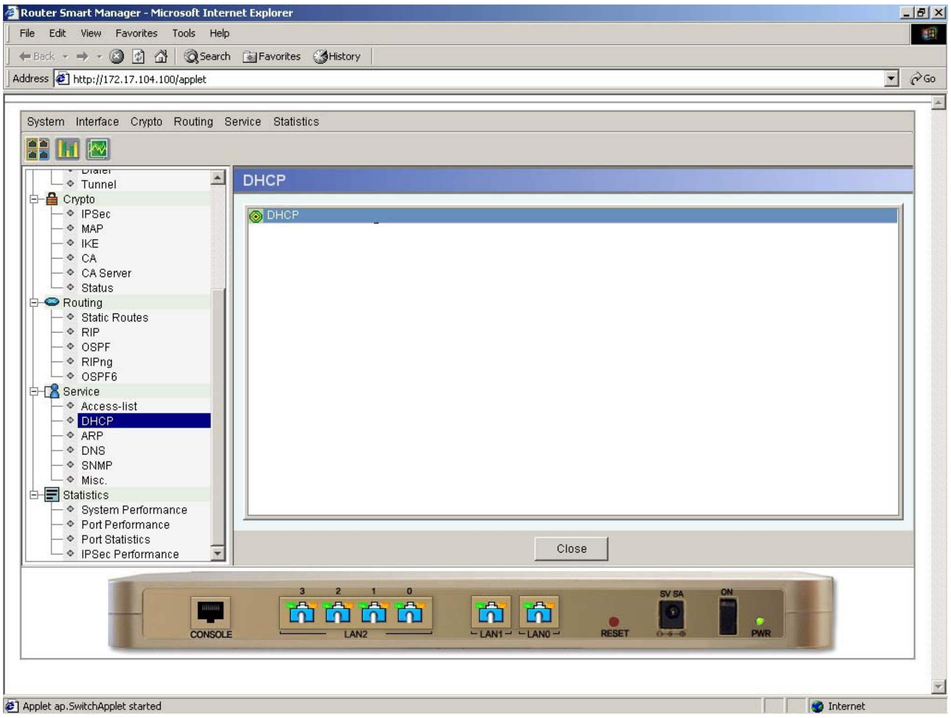
Refresh Time: None

```
Standard IP access list 50
    deny   192.168.100.100
    permit 172.17.104.0, wildcard bits 0.0.0.255
Name IP access list addpac
    permit 10.10.20.0 255.255.255.0
```

(Figure3-319) IPv4 Access-List page

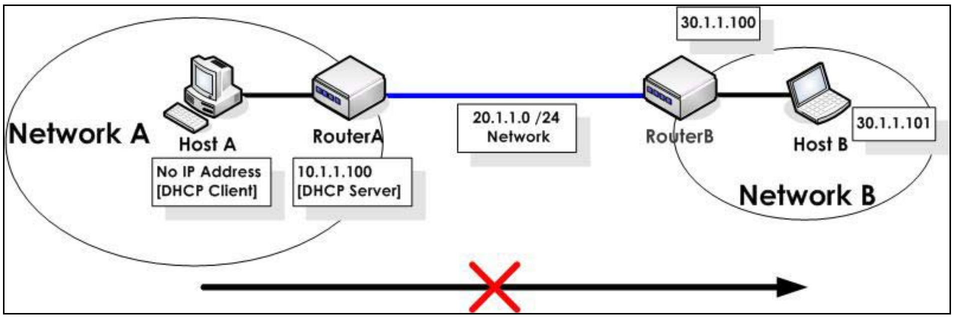
DHCP

DHCP Pool which is created from DHCP (Dynamic Host Configuration Protocol) menu must be applied on appropriate Interface to work properly. More than one of DHCP Pool can be written.



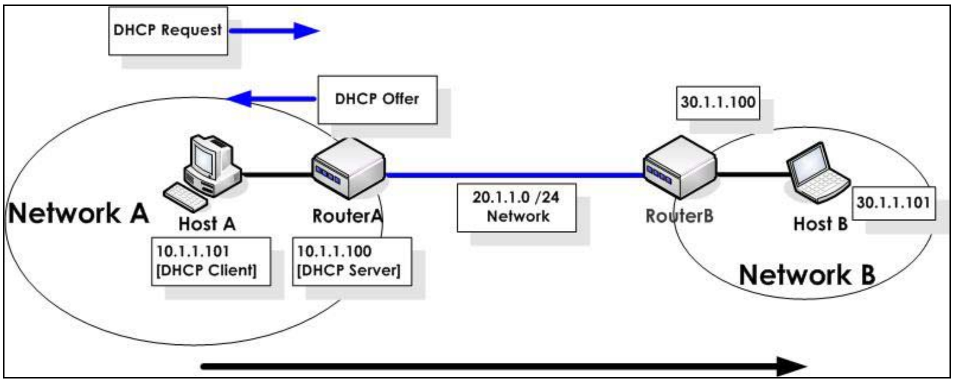
(Figure3-320) DHCP Main page

Figure 3-324 shows the example network diagram of DHCP.



(Figure3-321) DHCP Diagram 1

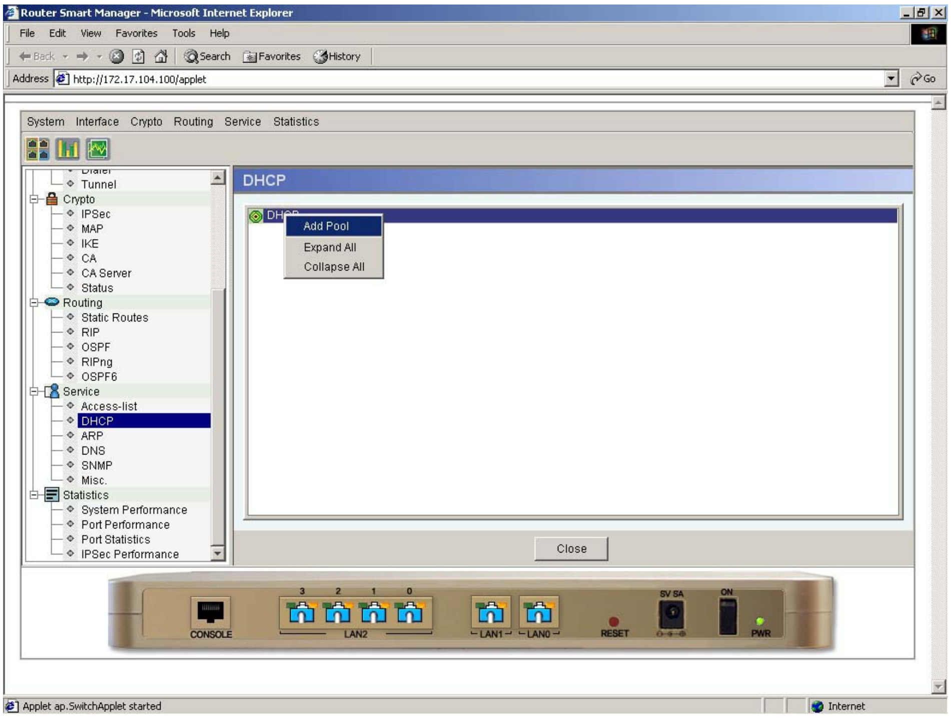
Currently Host A is not able to communicate with Host B because it does not have IP Address. However, DHCP Server is enabled on Router A so if Host A sends DHCP Request to Router A then Host A can assign IP Address from Router A.   See the Figure 3-325.



(Figure3-322) DHCP Diagram 2

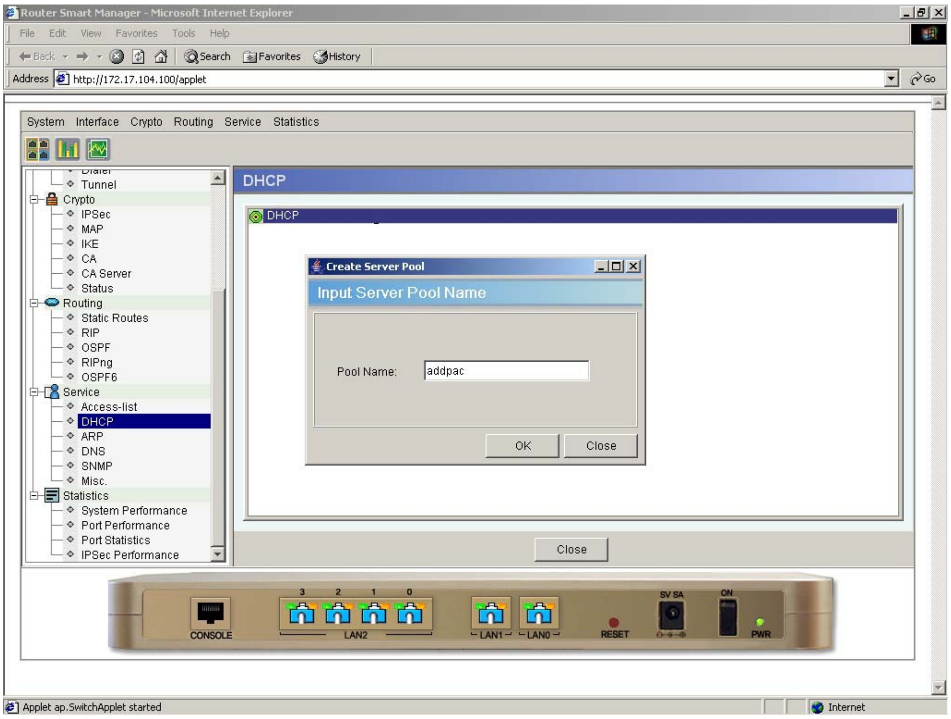
Figure 3-326 shows how to create DHCP Pool.

Select Add Pool by clicking right side of the mouse on DHCP.



(Figure3-323) Select DHCP Add Pool

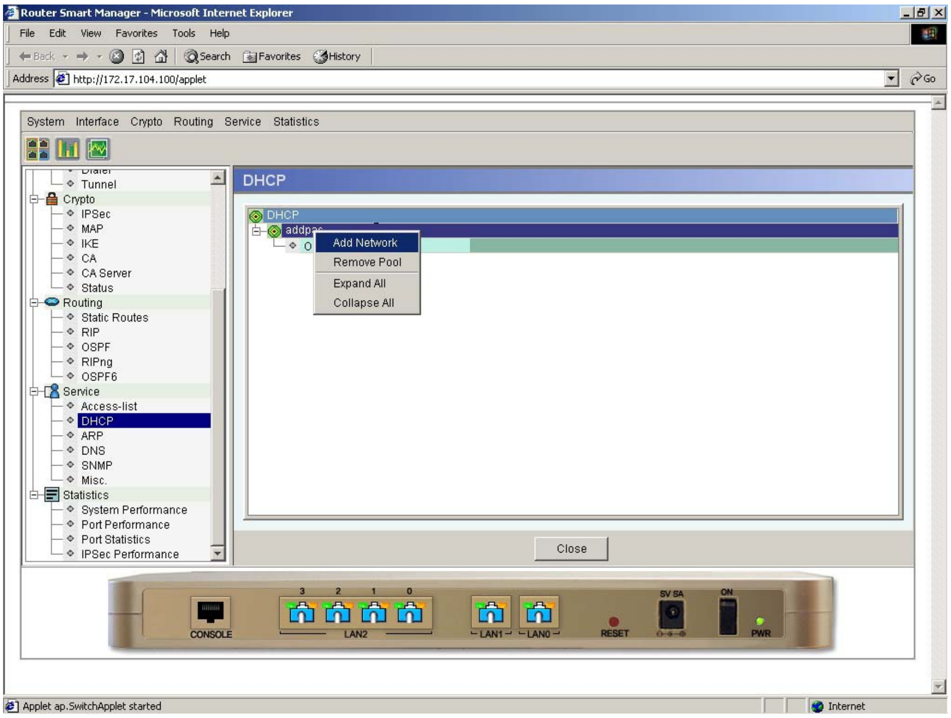
Input “addpac” for Pool Name.


Router Smart Manager - Microsoft Internet Explorer
System Interface Crypto Routing Service Statistics
DHCP
Create Server Pool
Input Server Pool Name
OK
Close
Applet ap.SwitchApplet started

Pool Name: addpac

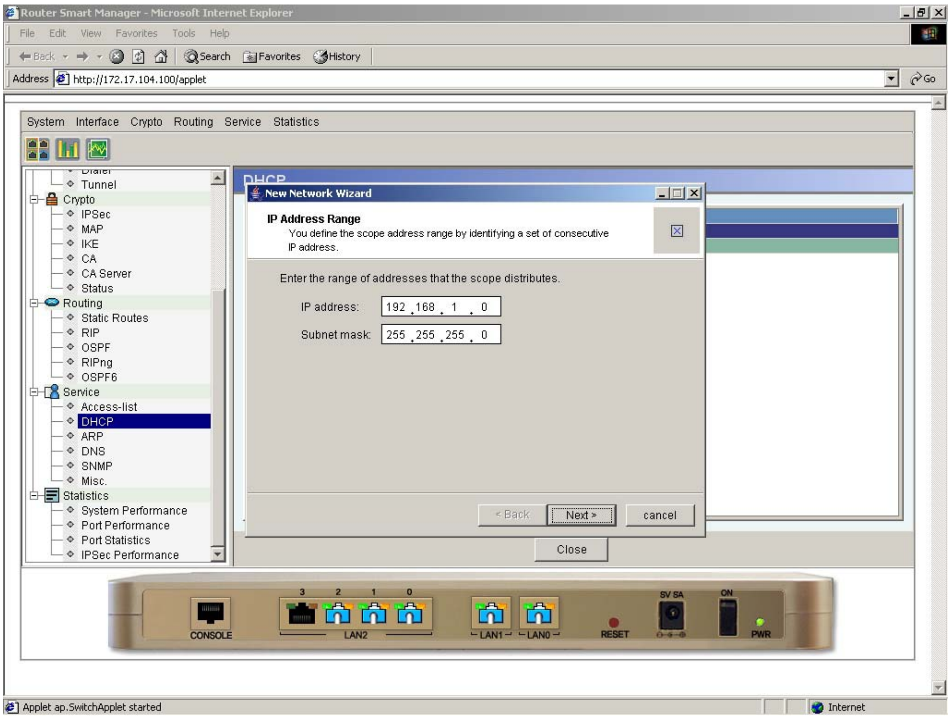
(Figure3-324) Input DHCP Pool Name

Select Add Network by clicking right side of the mouse on created DHCP Pool “addpac”.



(Figure3-325) Select DHCP Add Network

New Network Wizard is executed Input IP Address Range.



IP Address Range

You define the scope address range by identifying a set of consecutive IP address.

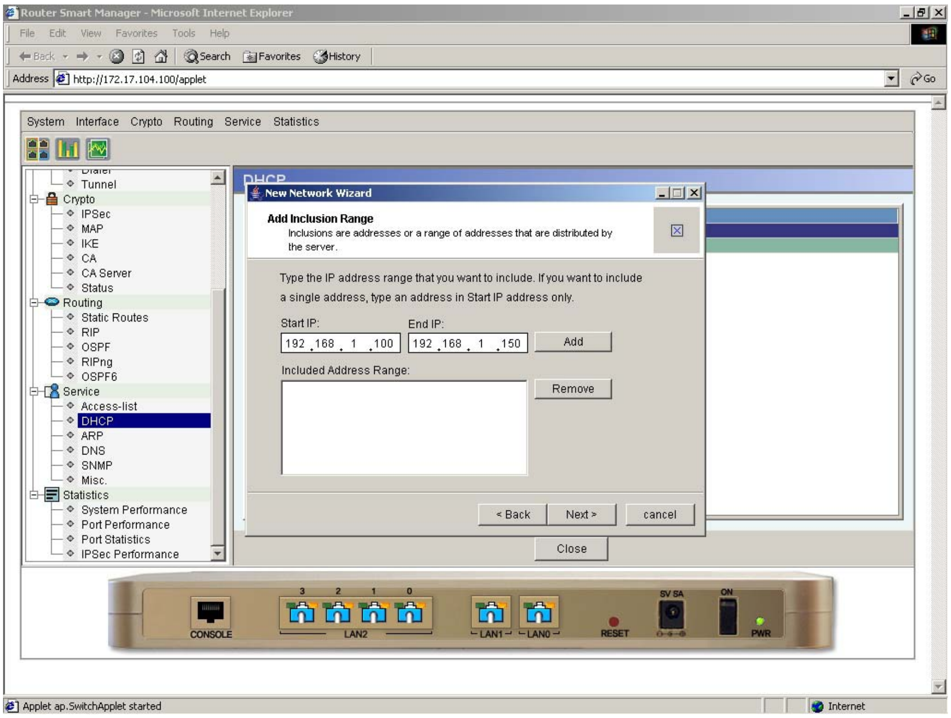
Enter the range of addresses that the scope distributes.

IP address: 192 . 168 . 1 . 0

Subnet mask: 255 . 255 . 255 . 0

(Figure3-326) Input DHCP IP Address Range

Input the ranges of IP Address which will be providing to DHCP Client.



Add Inclusion Range

Inclusions are addresses or a range of addresses that are distributed by the server.

Type the IP address range that you want to include. If you want to include a single address, type an address in Start IP address only.

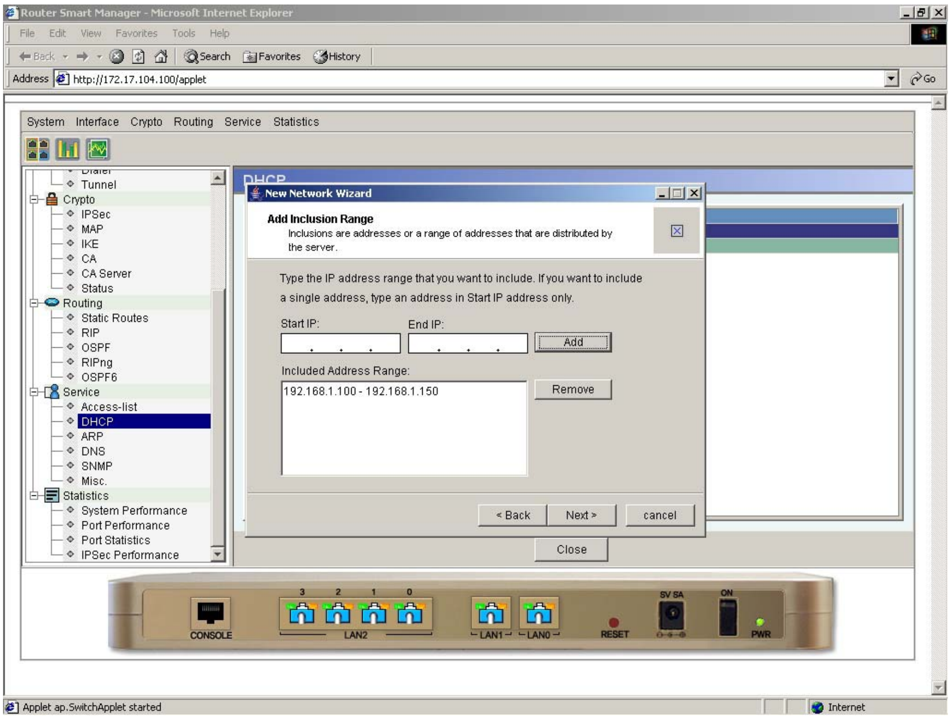
Start IP: 192.168.1.100

End IP: 192.168.1.150

Included Address Range:

(Figure3-327) Input IP Address Range for DHCP Client

Click “Add” to move to Address Range box.



Add Inclusion Range

Inclusions are addresses or a range of addresses that are distributed by the server.

Type the IP address range that you want to include. If you want to include a single address, type an address in Start IP address only.

Start IP: . . .

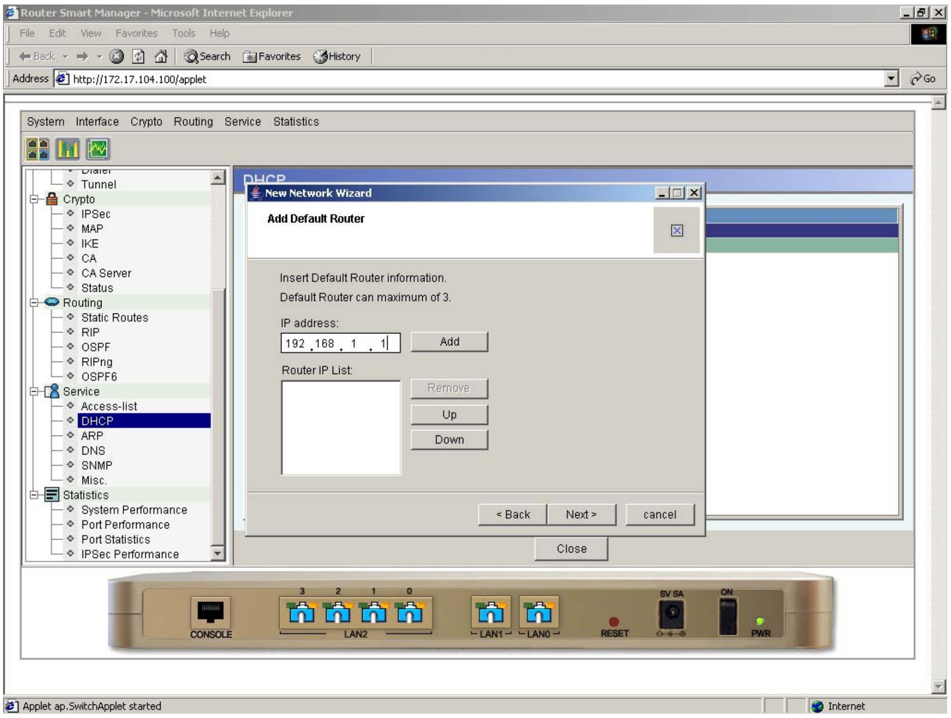
End IP: . . .

Included Address Range:

192.168.1.100 - 192.168.1.150

(Figure3-328) Move to DHCP Address Range box.

Input Default Router IP Address. Input Maximum 3 addresses.



Add Default Router

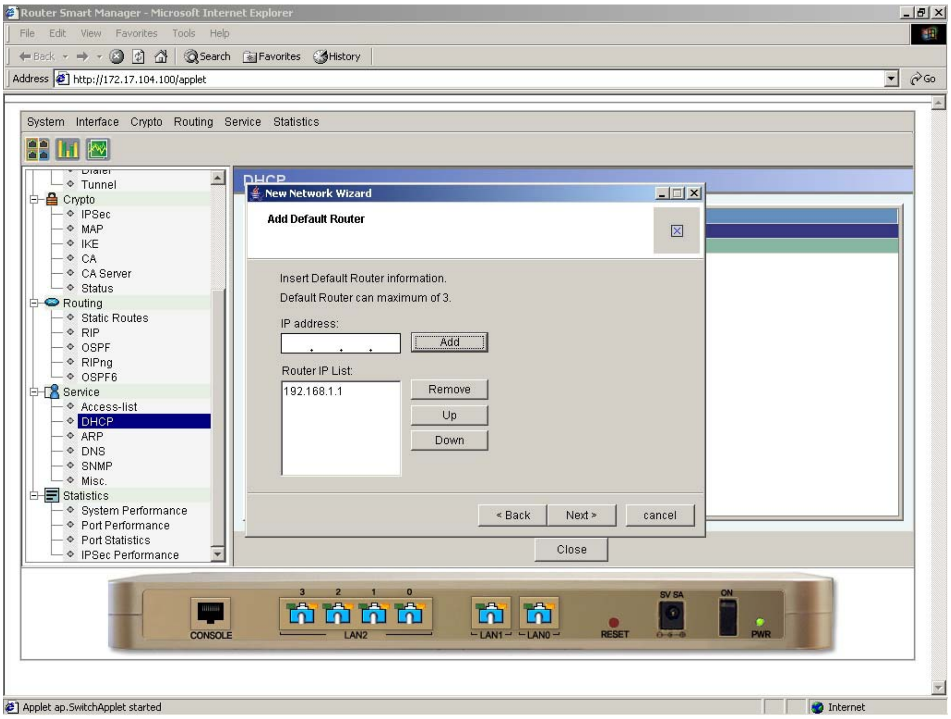
Insert Default Router information.
Default Router can maximum of 3.

IP address: 192 . 168 . 1 . 1

Router IP List:

(Figure3-329) Input DHCP Default Router IP Address

Click “Add” to move to Router IP List page.



Add Default Router

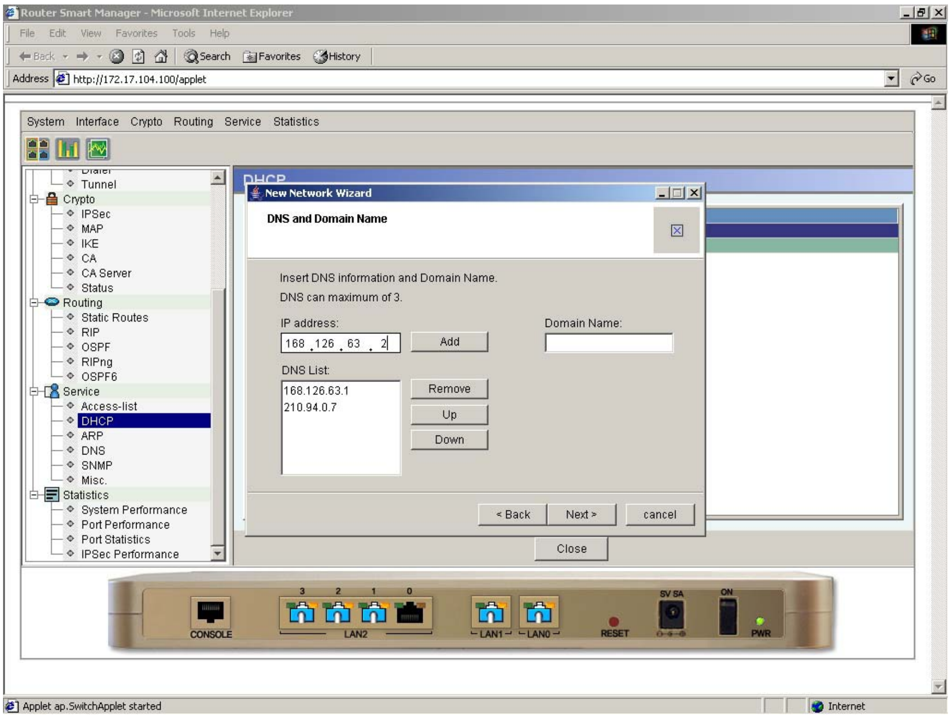
Insert Default Router information.
Default Router can maximum of 3.

IP address:

Router IP List:
192.168.1.1

(Figure3-330) DHCP Router IP List page

Input DNS IP Address. Input Maximum 3 addresses.



DNS and Domain Name

Insert DNS information and Domain Name.
DNS can maximum of 3.

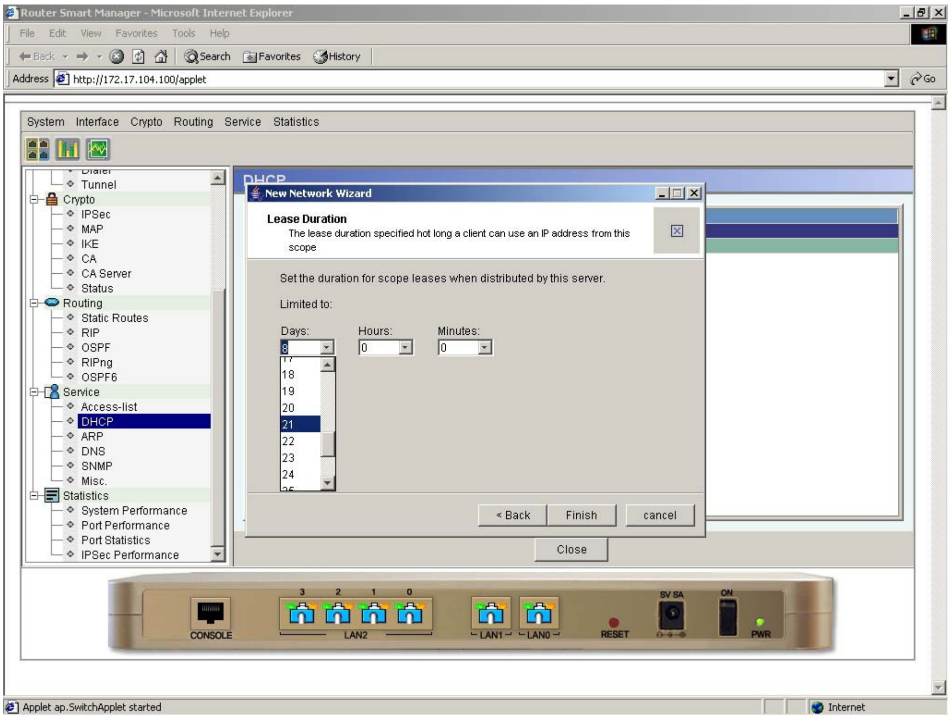
IP address: 168 . 126 . 63 . 2

Domain Name:

DNS List:
168.126.63.1
210.94.0.7

(Figure3-331) Input DHCP DNS IP Address

Select Lease Duration of assigned IP Address.



Lease Duration
The lease duration specified hot long a client can use an IP address from this scope

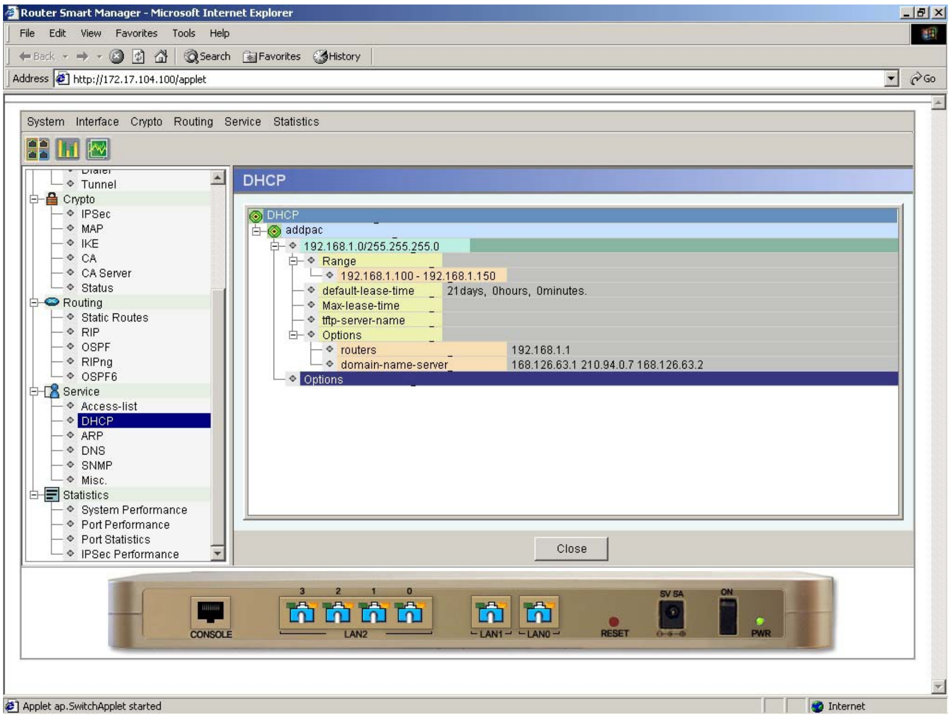
Set the duration for scope leases when distributed by this server.

Limited to:

Days: 8
Hours: 0
Minutes: 0

(Figure3-332) Select DHCP Lease Duration

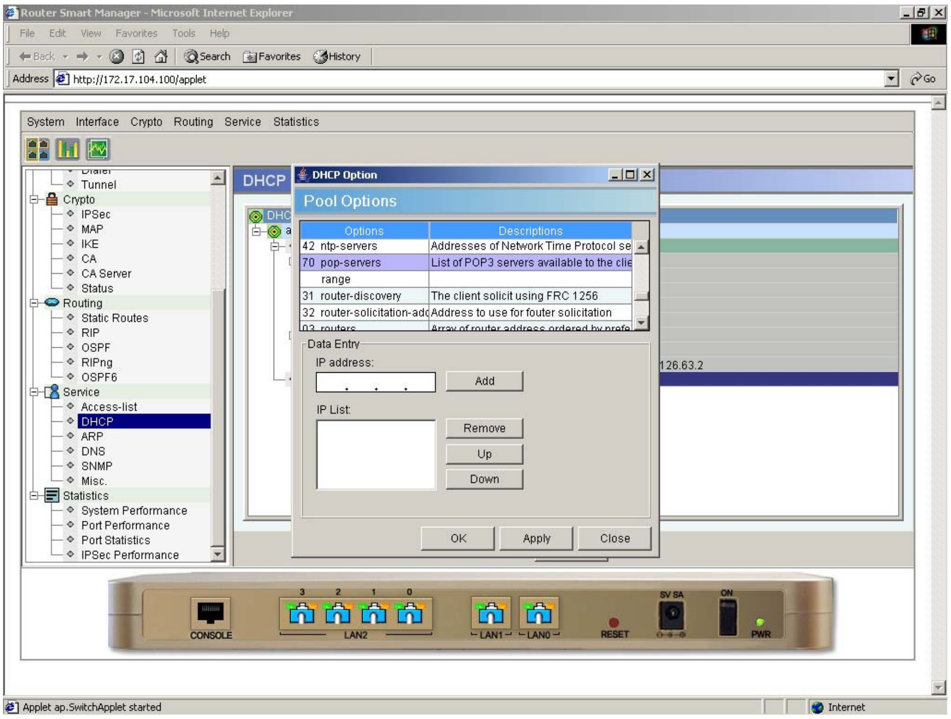
Click "OK" to verify.



```
DHCP
  addpac
    192.168.1.0/255.255.255.0
      Range
        192.168.1.100 - 192.168.1.150
      default-lease-time      21days, 0hours, 0minutes.
      Max-lease-time
      tftp-server-name
      Options
        routers               192.168.1.1
        domain-name-server    168.126.63.1 210.94.0.7 168.126.63.2
    Options
```

(Figure3-333) addpac DHCP Pool configuration

Select "Configuration" to input the value by clicking right side of the mouse on Option to use options such as POP-Server, NTP-Server.

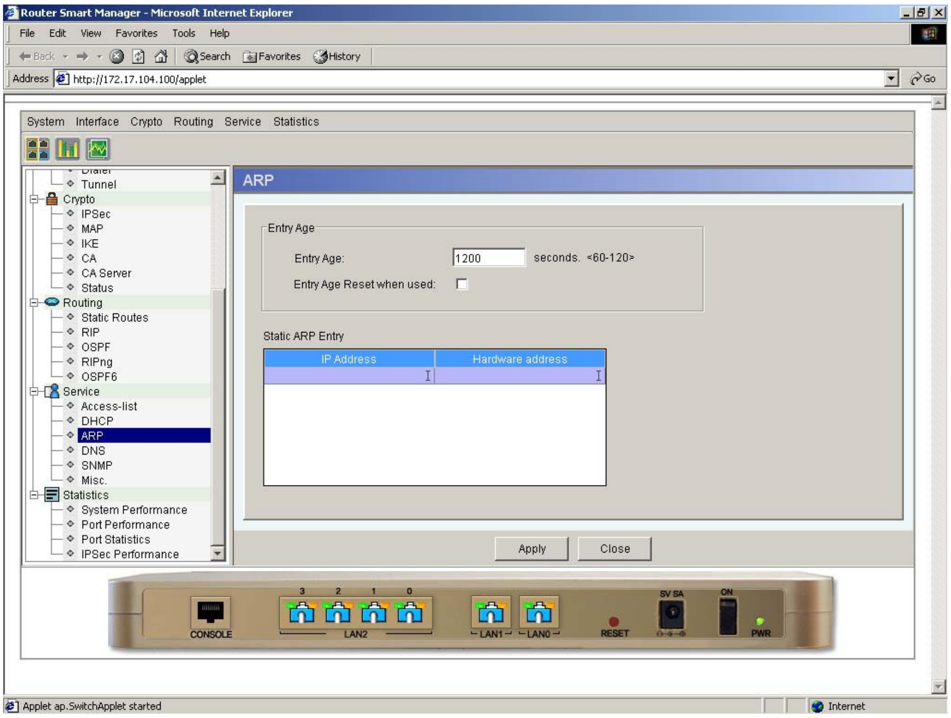

Router Smart Manager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
DHCP Option
Pool Options
Data Entry
IP address:
Add
IP List:
Remove
Up
Down
OK
Apply
Close
CONSOLE
LAN2
LAN1
LAN0
RESET
PWR
Applet ap.SwitchApplet started
Internet

Options	Descriptions
42 ntp-servers	Addresses of Network Time Protocol se
70 pop-servers	List of POP3 servers available to the clie
range	
31 router-discovery	The client solicit using FRC 1256
32 router-solicitation-add	Address to use for fouter solicitation
03 routers	Array of router address ordered by prefe

(Figure3-334) DHCP Pool Option page

ARP

ARP (Address Resolution Protocol) is used for matching IP Address on IP Network with Physical Network Address. Physical Network Address indicates Ethernet 48bits MAC Address.



ARP

Entry Age

Entry Age: 1200 seconds. <60-120>

Entry Age Reset when used: □

Static ARP Entry

IP Address	Hardware address

Apply Close

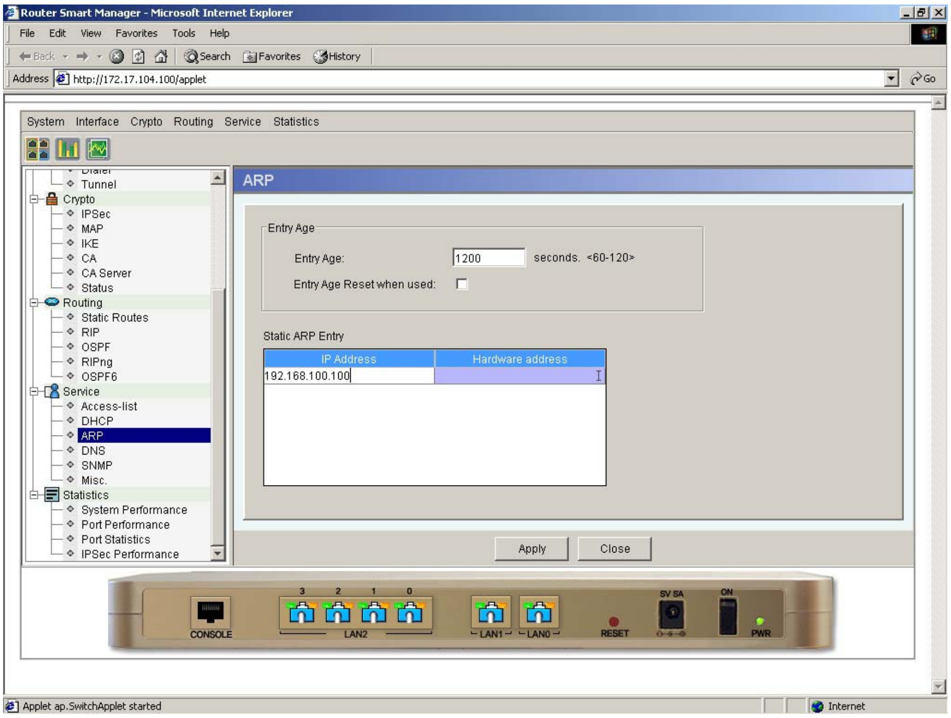
(Figure3-335) ARP Main page

<Table 3-46> ARP Menu Description

Elements	Description
Entry Age	Input the lifetime for MAC Address info on ARP Table. Default value is "1200" seconds.
Entry Age Reset when used	ARP Reset is executed even if the session is on.
Static ARP Entry	It is used when the user wants to register static IP Address and MAC Address of the Host on ARP Table.

Figure 3-339 shows the example of using Static ARP Entry.

Input "192.168.100.100" for IP address.



Entry Age: 1200 seconds. <60-120>

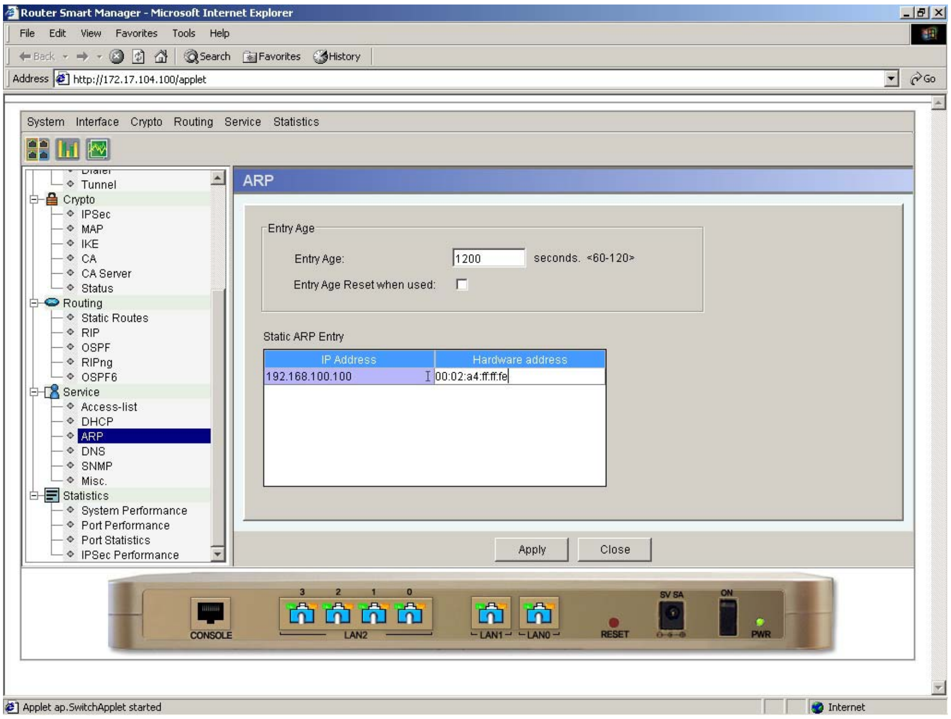
Entry Age Reset when used: □

Static ARP Entry

IP Address	Hardware address
192.168.100.100	

(Figure3-336) Input Static ARP Entry IP Address

Input "00:02:a4:ff:ff:fe" for MAC Address.



Entry Age: 1200 seconds. <60-120>

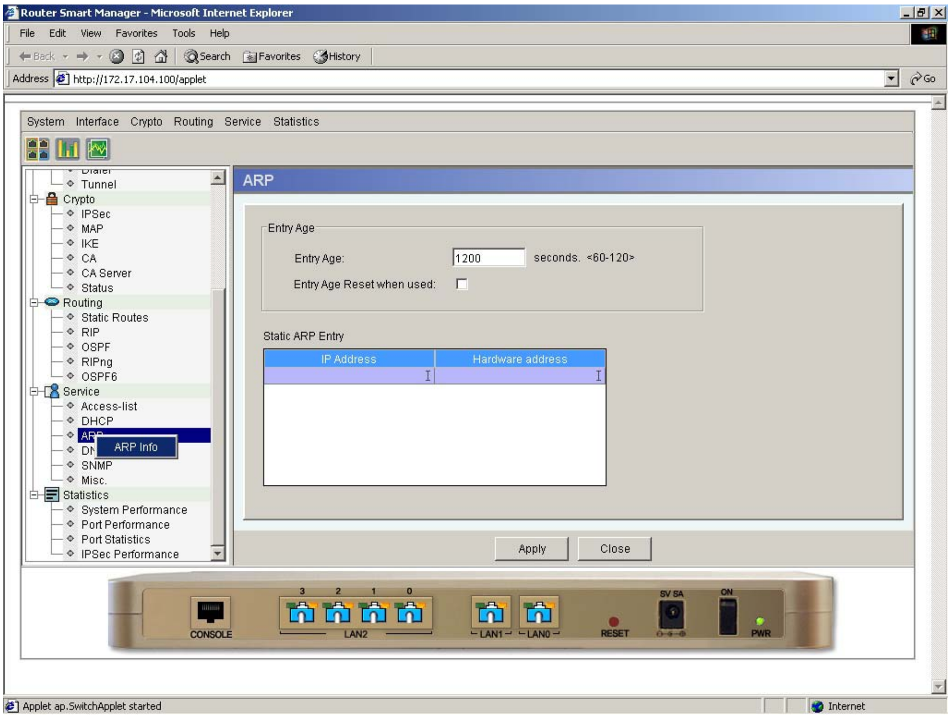
Entry Age Reset when used: □

Static ARP Entry

IP Address	Hardware address
192.168.100.100	00:02:a4:ff:ff:fe

(Figure3-337) Input Static ARP Entry MAC Address

Select "ARP Info" by clicking right side of the mouse on ARP to see the contents of ARP Table.



ARP

Entry Age

Entry Age: 1200 seconds. <60-120>

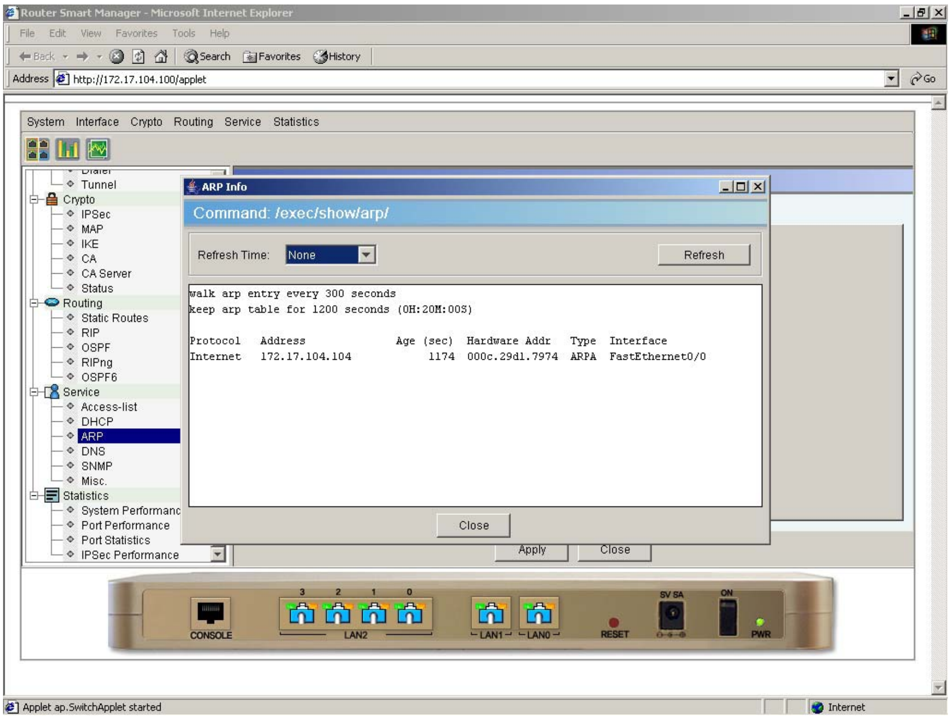
Entry Age Reset when used: □

Static ARP Entry

IP Address	Hardware address

(Figure3-338) Select ARP Pop Menu ARP Info

ARP Table content will be shown.



ARP Info

Command: /exec/show/arp/

Refresh Time: None

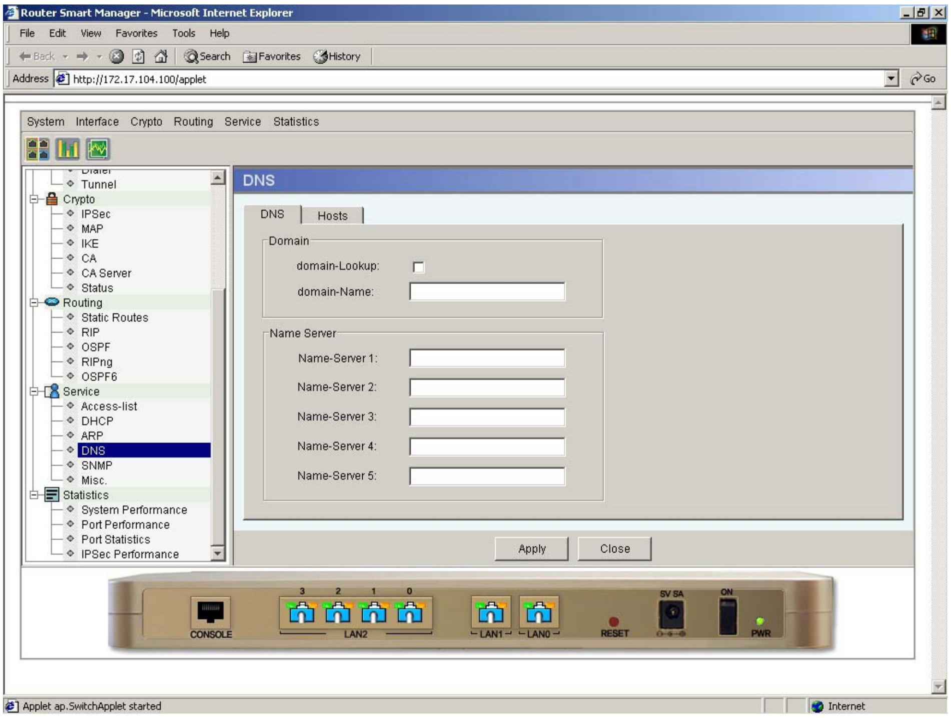
```
walk arp entry every 300 seconds
keep arp table for 1200 seconds (0H:20M:00S)

Protocol   Address            Age (sec)  Hardware Addr   Type  Interface
Internet   172.17.104.104          1174  000c.29d1.7974  ARPA  FastEthernet0/0
```

Router Smart Manager - Microsoft Internet Explorer
Address http://172.17.104.100/applet
System Interface Crypto Routing Service Statistics
Refresh
Close
Apply
Close
ARP
DNS
SNMP
Applet ap.SwitchApplet started
Internet

(Figure3-339) ARP Info page

DNS

DNS (Domain Name System) is used to look up the IP Address for internet domain name.

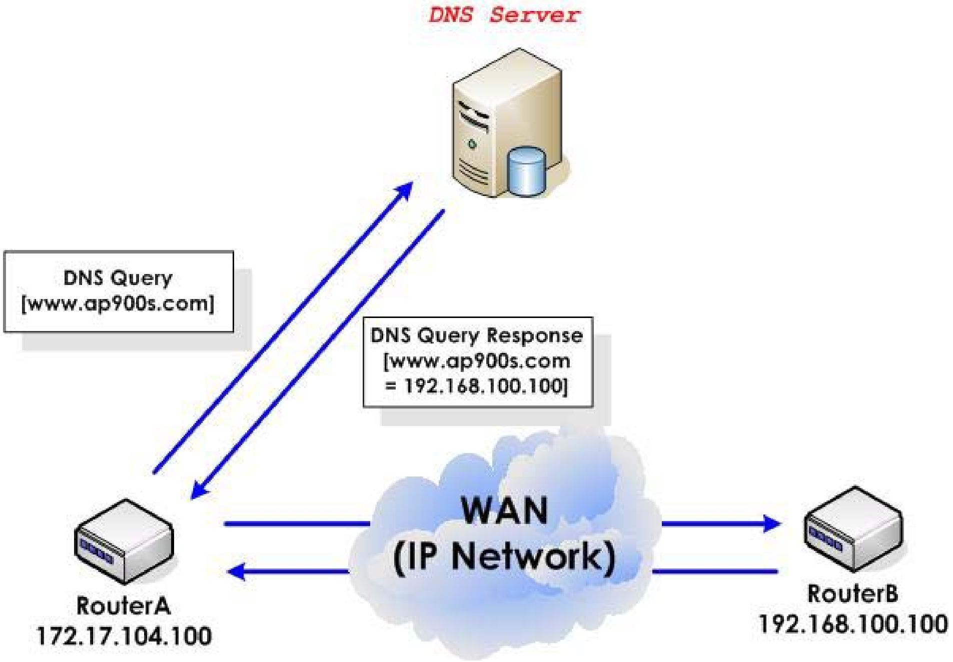


(Figure3-340) DNS Main page

<Table 3-47> DNS menu Description

Elements	Description
Domain-Lookup	It is for Domain-Lookup Service.
Domain-Name	Input Domain Name of AP900S.
Name Server1~5	Input Name Server IP Address. Maximum 5 addresses

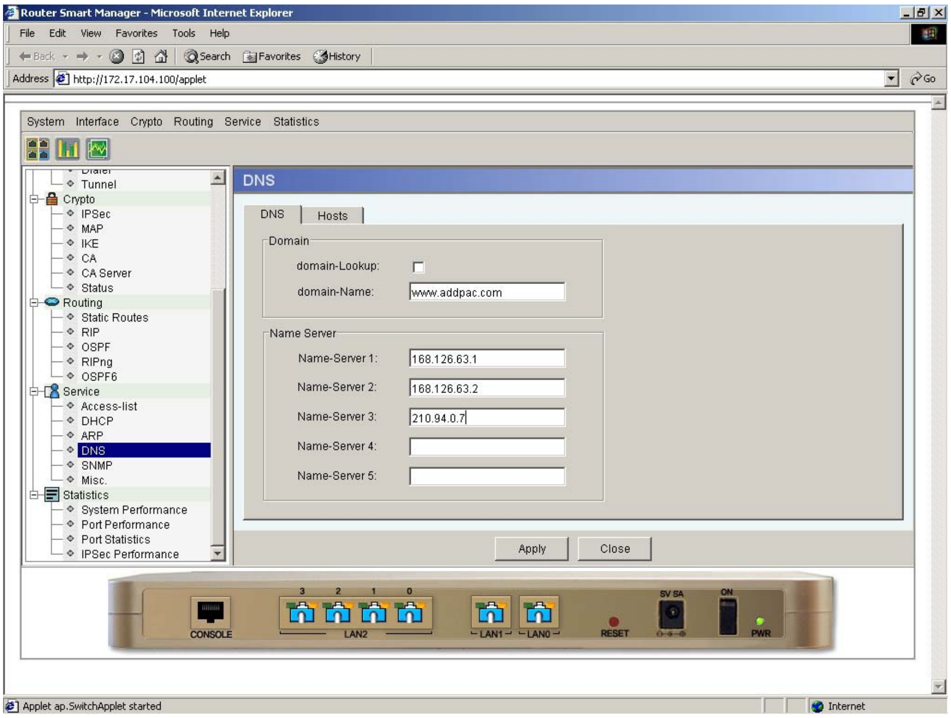
Figure 3-344 shows Diagram example of DNS Service



(Figure3-341) DNS Service Diagram example

RouterA only have a domain address of RouterB, "www.ap900s.com" but does not have IP Address of RouterB, then, RouterA can not access to RouterB without DNS Service. So RouterA sends DNS Query for "www.ap900s.com" to DNS Server, DNS Server notify IP Address, "192.168.100.100" as for "www.ap900s.com" to RouterA.
Then RouterA can access to RouterB using IP Address "192.168.100.100" received from DNS Query.

Figure 3-345 shows the example of inputting Domain-Name of AP900S and 3 of DNS Server IP Address.



Router Smart Manager - Microsoft Internet Explorer

Address http://172.17.104.100/applet

DNS

Domain

domain-Lookup: □

domain-Name: www.addpac.com

Name Server

Name-Server 1: 168.126.63.1

Name-Server 2: 168.126.63.2

Name-Server 3: 210.94.0.7

Name-Server 4:

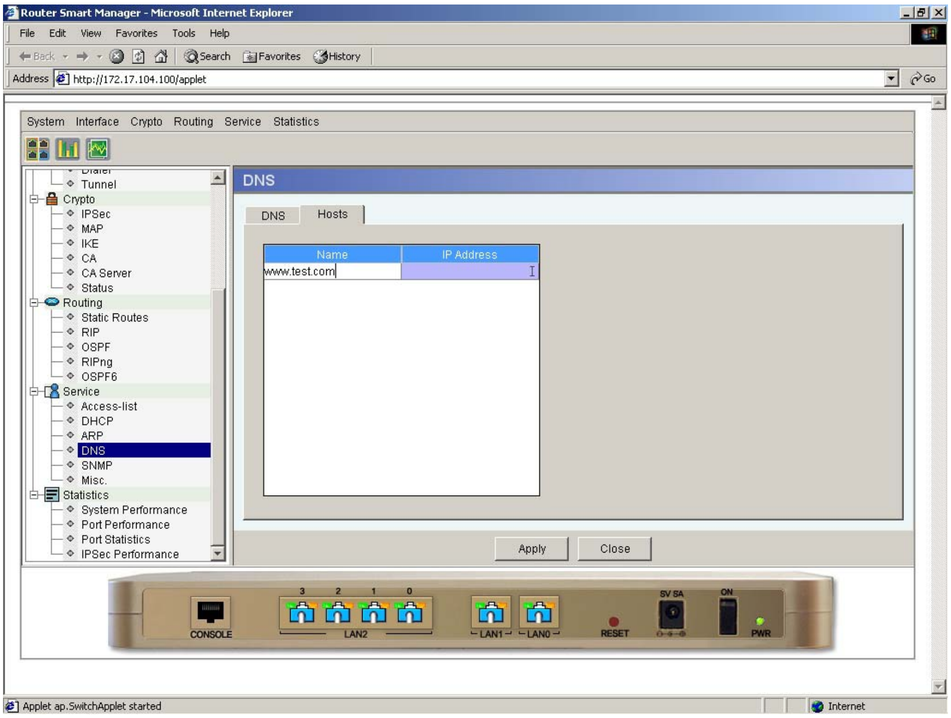
Name-Server 5:

Applet ap.SwitchApplet started

(Figure3-342) DNS input example

Hosts Menu is used to input Domain IP Address to AP900S without using DNS Server.

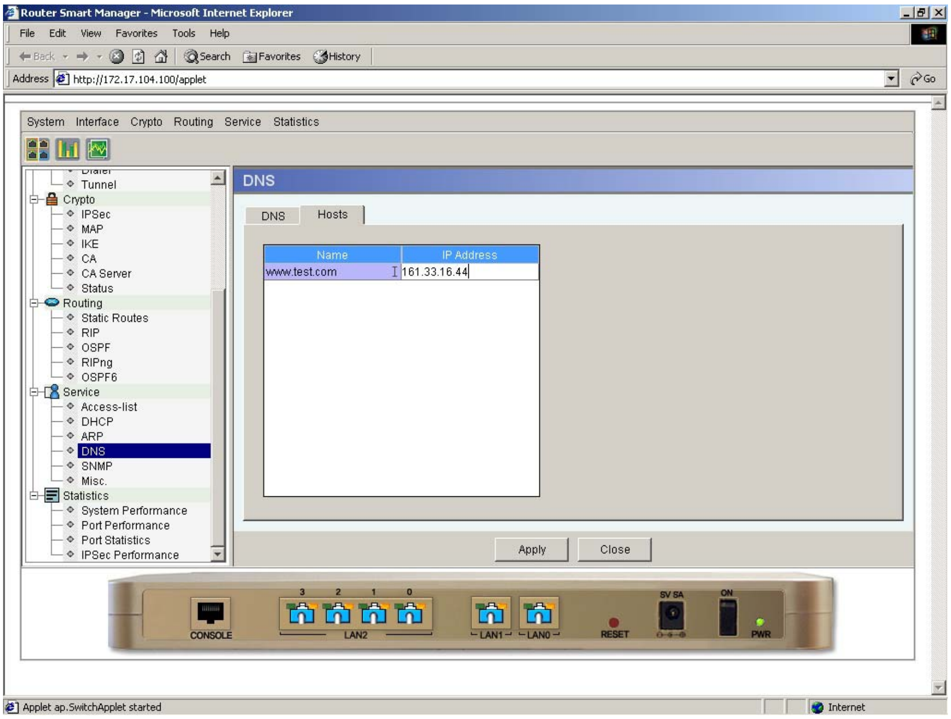
Figure 3-346 shows the example of inputting www.test.com in Name filed.



Name	IP Address
www.test.com	

(Figure3-343) Input Host Name

Input IP Address "161.33.16.44" for www.test.com.

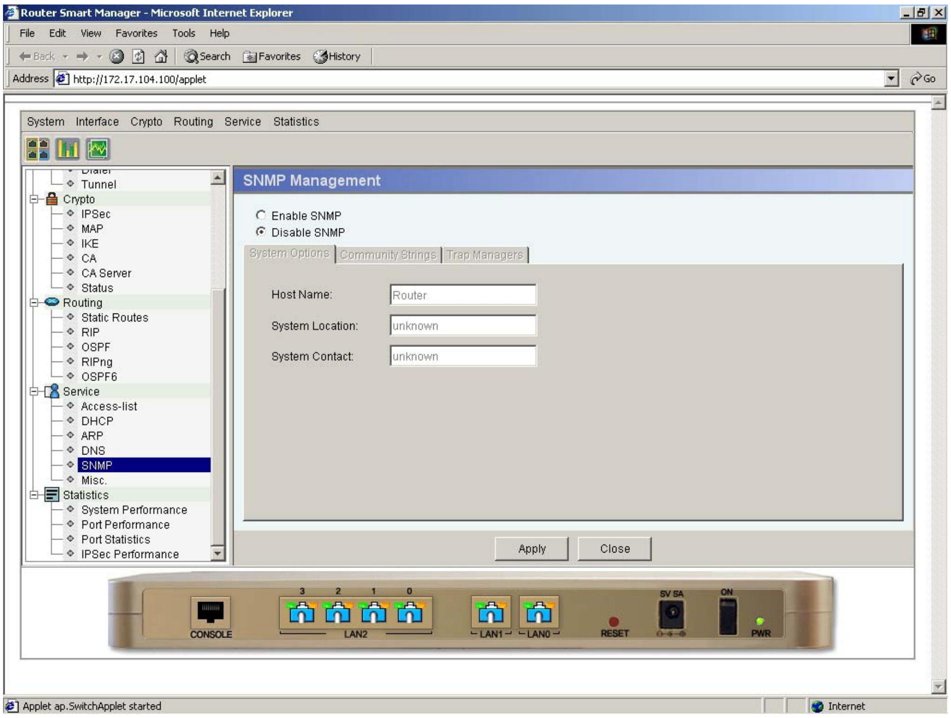


Name	IP Address
www.test.com	161.33.16.44

(Figure3-344) Input Host IP Address

SNMP

It sets SNMP Agent of AP900S so the user can manage AP900S remotely using SNMP Server. Enable SNMP to use. Default is Disable.



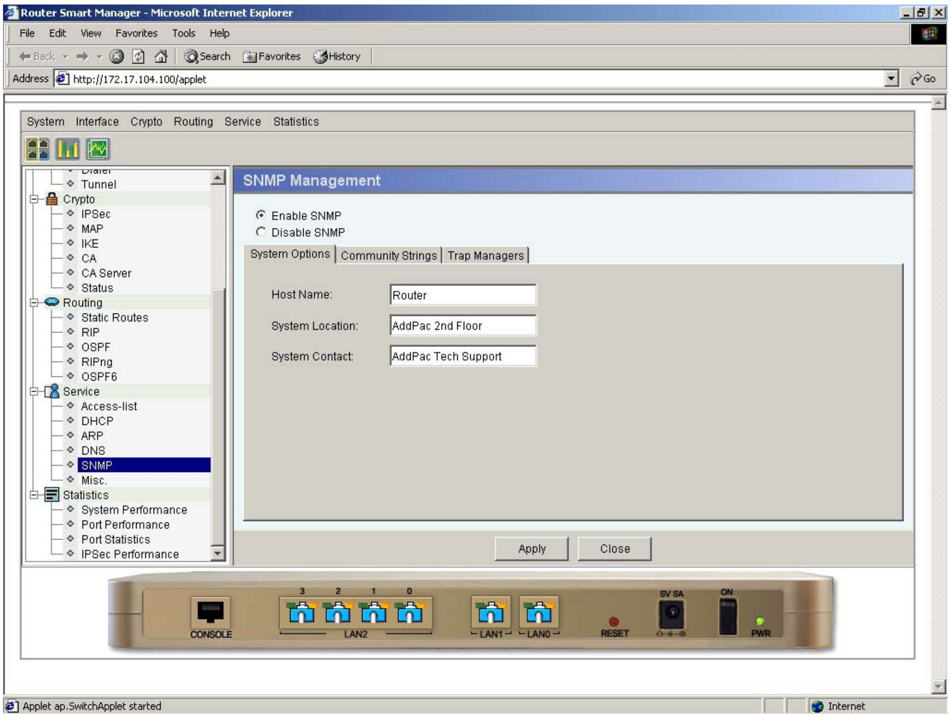
SNMP Management

○ Enable SNMP
● Disable SNMP

Host Name: Router
System Location: unknown
System Contact: unknown

(Figure3-345) SNMP Main page

Figure 3-348 shows input example of SNMP System Option.



● Enable SNMP

○ Disable SNMP

Host Name: Router

System Location: AddPac 2nd Floor

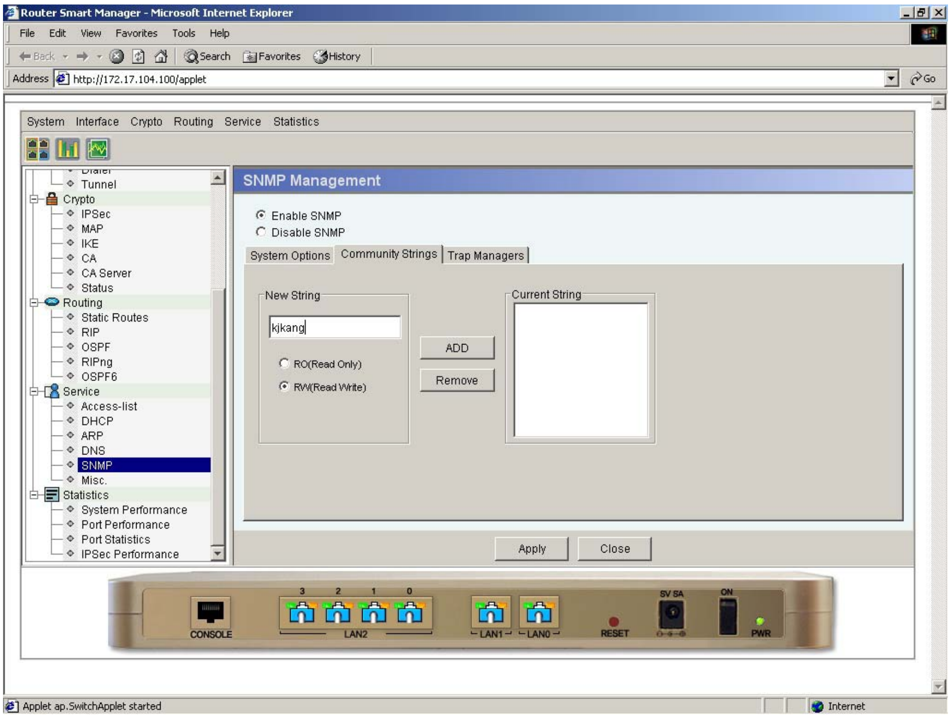
System Contact: AddPac Tech Support

(Figure3-346) SNMP System Option Input example

<Table 3-48> SNMP System Option Description

Elements	Description
Host Name	It sets Host Name of AP900S. You can check the value from "Inventory" Only English characters and numbers can be used for values.
System Location	Input the physical location of AP900S.
System Contact	Input Contact info for any problems on AP900S.

Figure 3-350 shows the example of SNMP Community String.



Address: http://172.17.104.100/applet

SNMP Management

● Enable SNMP
○ Disable SNMP

New String: kjkang

○ RO(Read Only)
● RW(Read Write)

Current String

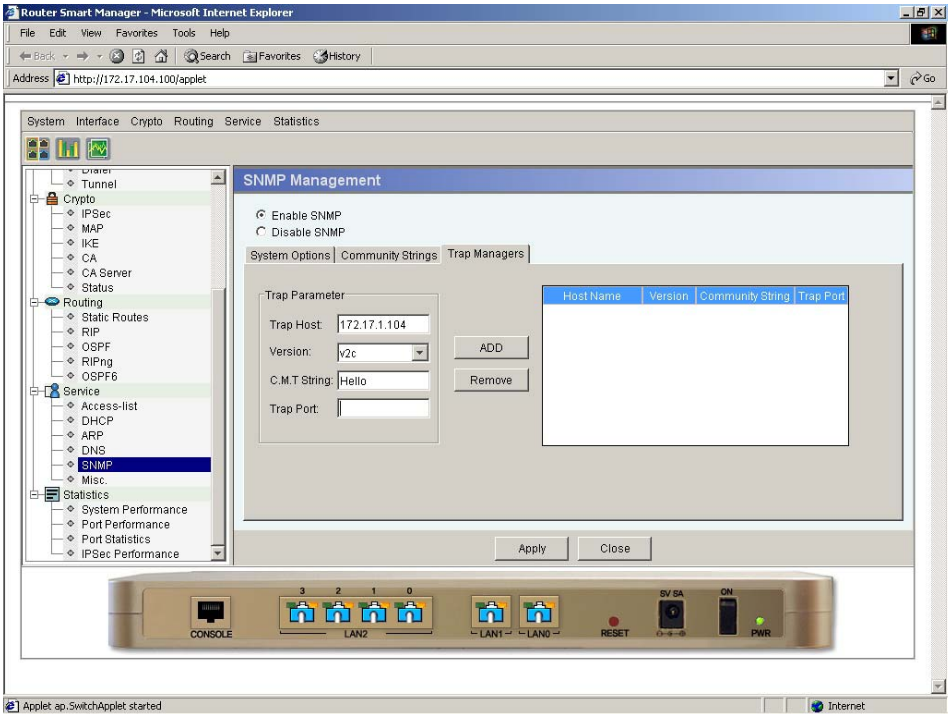
Applet ap.SwitchApplet started

(Figure3-347) SNMP Community String example

<Table 3-49> SNMP Community String Description

Elements	Description
New String	SNMP Community String. Input a new value then Click "ADD" after selecting RO (Read Only), RW (Read Write) to add.
Current String	It is current Community value. Select Community String value you want to delete then Click "Remove" to delete.

Figure 3-351 shows the example of SNMP Trap Manager.

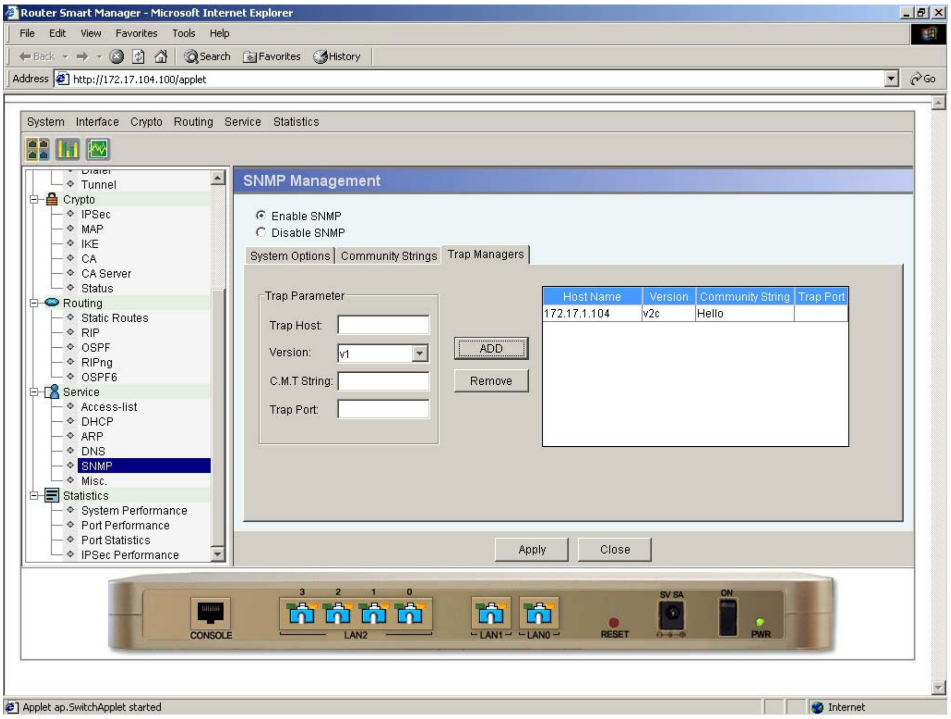


● Enable SNMP
○ Disable SNMP

Trap Host: 172.17.1.104
Version: v2c
C.M.T String: Hello
Trap Port:

(Figure3-348) SNMP Trap Managers example

Figure 3-352 shows the example of SNMP Trap Manager.



● Enable SNMP
○ Disable SNMP

Trap Host:
Version: v1
C.M.T String:
Trap Port:

Host Name	Version	Community String	Trap Port
172.17.1.104	v2c	Hello	

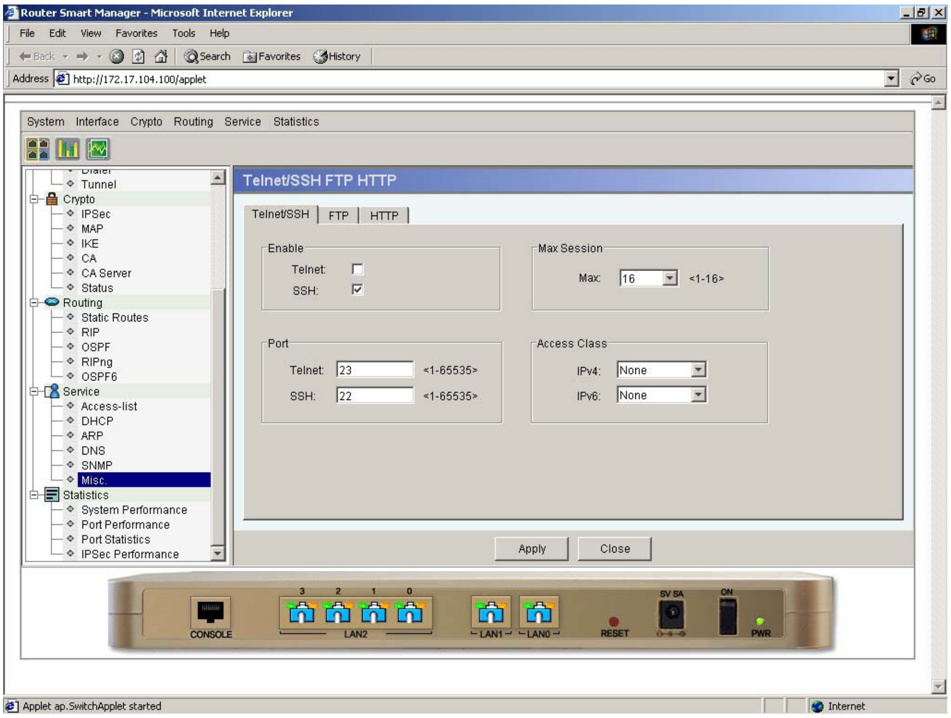
(Figure3-349) SNMP Trap Managers page

<Table 3-50> SNMP Trap Parameter Description

Elements	Description
Trap Host	Input Trap Message to IP Address of host which will be transferred.
Version	Select SNMP Trap Version. It has to be the same as the version of Trap Host.
C.M.T String	Input SNMP Trap Community String.
Trap Port	Input Trap port of SNMP Trap Message.

Misc.

Misc. menu controls Telnet/SSH, FTP, HTTP of AP900S.



Address http://172.17.104.100/applet

Telnet/SSH FTP HTTP

Enable
Telnet: □
SSH: ☑

Max Session
Max: 16 <1-16>

Port
Telnet: 23 <1-65535>
SSH: 22 <1-65535>

Access Class
IPv4: None
IPv6: None

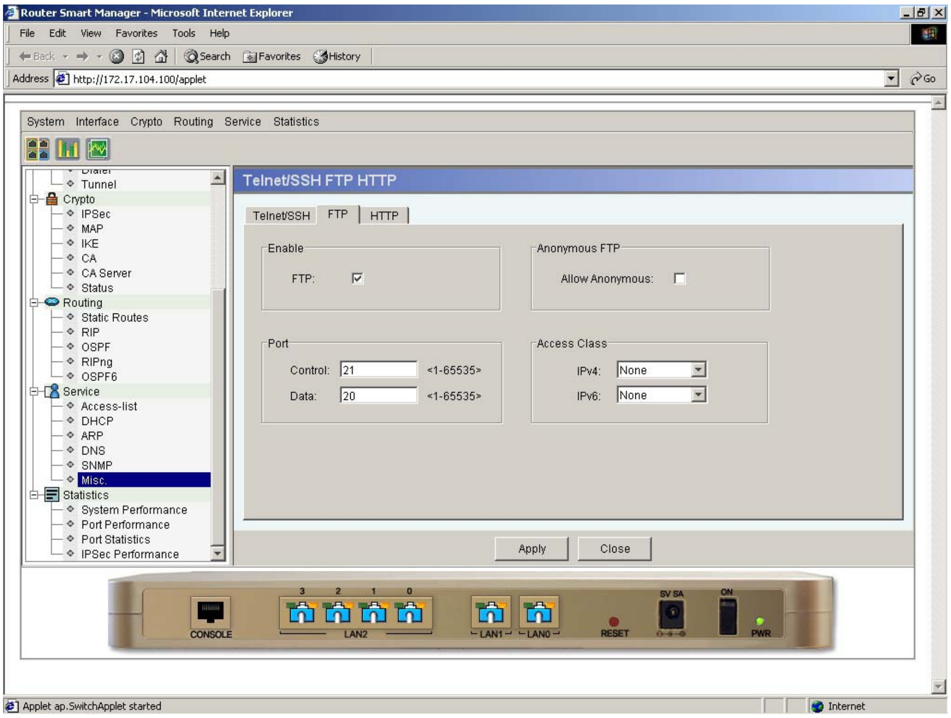
Apply Close

Applet ap.SwitchApplet started

(Figure3-350) Telnet/SSH Menu page

<Table 3-51> Telnet/SSH Description

Elements	Description
Enable **[Telnet, SSH]**	Enable or Disable services such as Telnet, SSH.
Max Session	Limits Remote Access (Telnet/SSH) users.
Port **[Telnet, SSH]**	Defines TCP Port for Telnet, SSH. Default is 23 for Telnet, default is 22 for SSH.
Access Class	Remote Access Filtering using Access-List of IPv4, IPv6.



FTP: ☑

Allow Anonymous: □

Control: 21 <1-65535>

Data: 20 <1-65535>

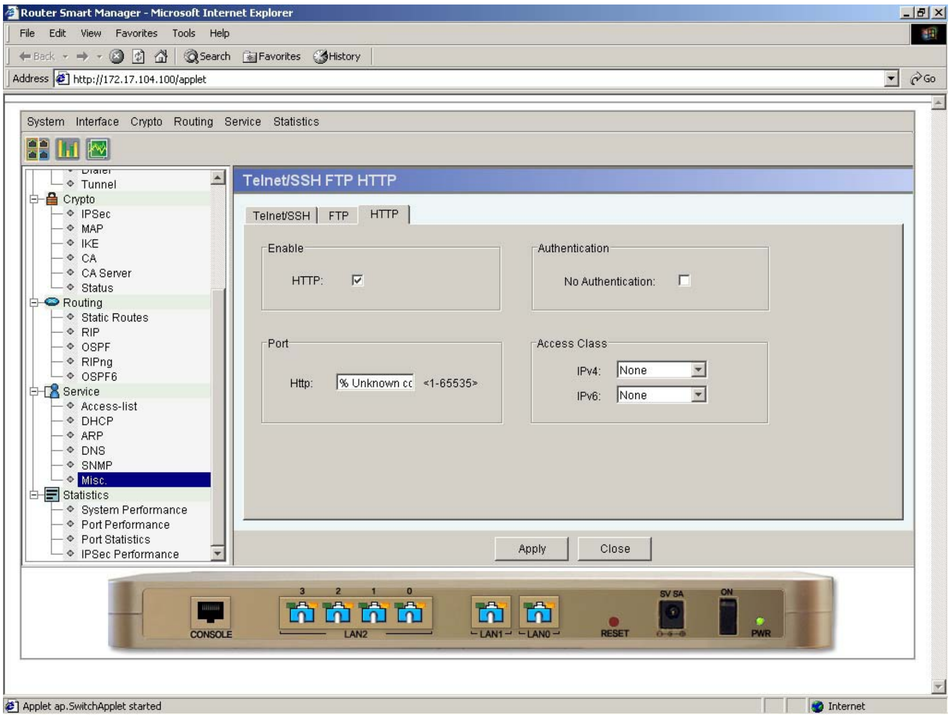
IPv4: None

IPv6: None

(Figure3-351) FTP menu page

<Table 3-52> FTP Description

Elements	Description
Enable **[FTP]**	Enable / Disable FTP Service.
Allow Anonymous	Allow anonymous FTP access.
Port [Control, Data]	It is used to alter FTP Control Port and Data Port. Default value is 21 for Control Port. Default value is 20 for Data Port.
Access Class	Filtering Remote Access using Access-List of IPv4, IPv6.



Telnet/SSH FTP HTTP

Enable

HTTP: ☑

Authentication

No Authentication: □

Port

Http: % Unknown cc <1-65535>

Access Class

IPv4: None

IPv6: None

Applet ap.SwitchApplet started

(Figure3-352) HTTP Menu page

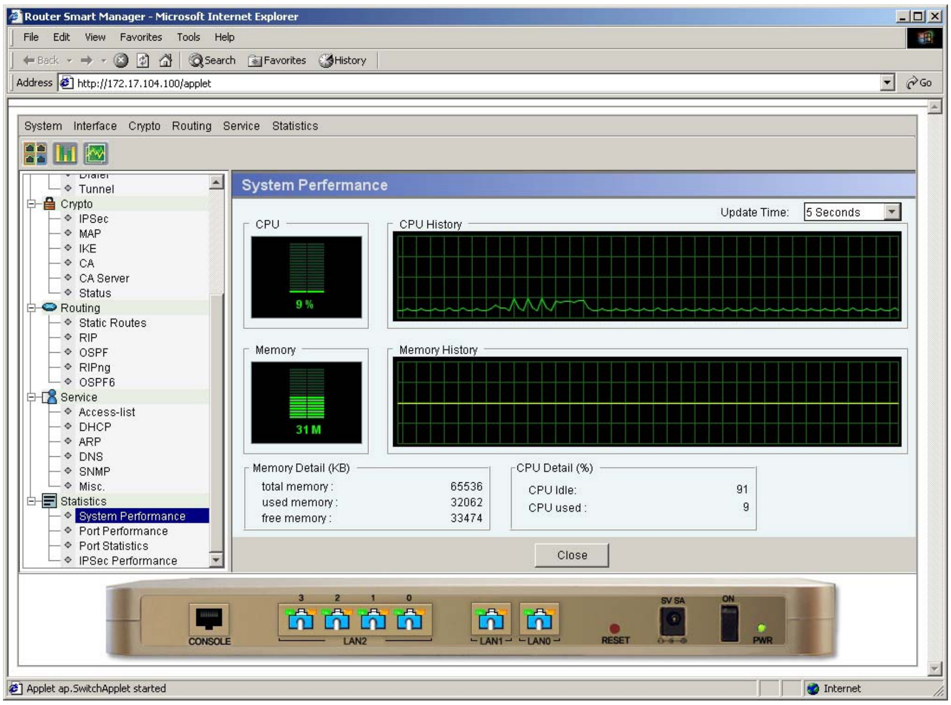
<Table 3-53> HTTP elements Description

Elements	Description
Enable **[HTTP]**	Enable or Disable HTTP Service.
No Authentication	No authentication for HTTP access.
Port **[HTTP]**	It is used to change HTTP access Port. Default value of HTTP Port is “80”
Access Class	Filtering Remote Access using Access-List of IPv4, IPv6.

Statistics Menu

System Performance

System Performance Menu monitors CPU and memory usage of AP900S using graphs. The user can change Update Interval.



Address: http://172.17.104.100/applet

System Performance

Update Time: 5 Seconds

Memory Detail (KB)

total memory : 65536
used memory : 32062
free memory : 33474

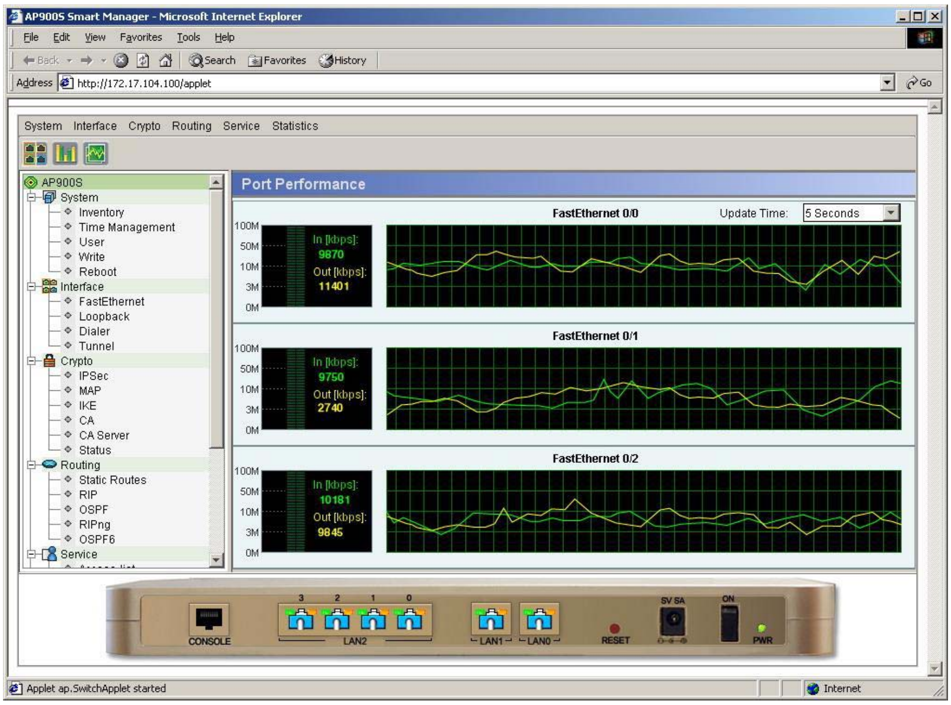
CPU Detail (%)

CPU Idle: 91
CPU used : 9

Applet ap.SwitchApplet started

Port Performance

Port Performance monitors every Ethernet Port of AP900S. It shows almost real-time data traffic rate about each LAN ports using analog style graphs and digital value. The user can change Update Interval.



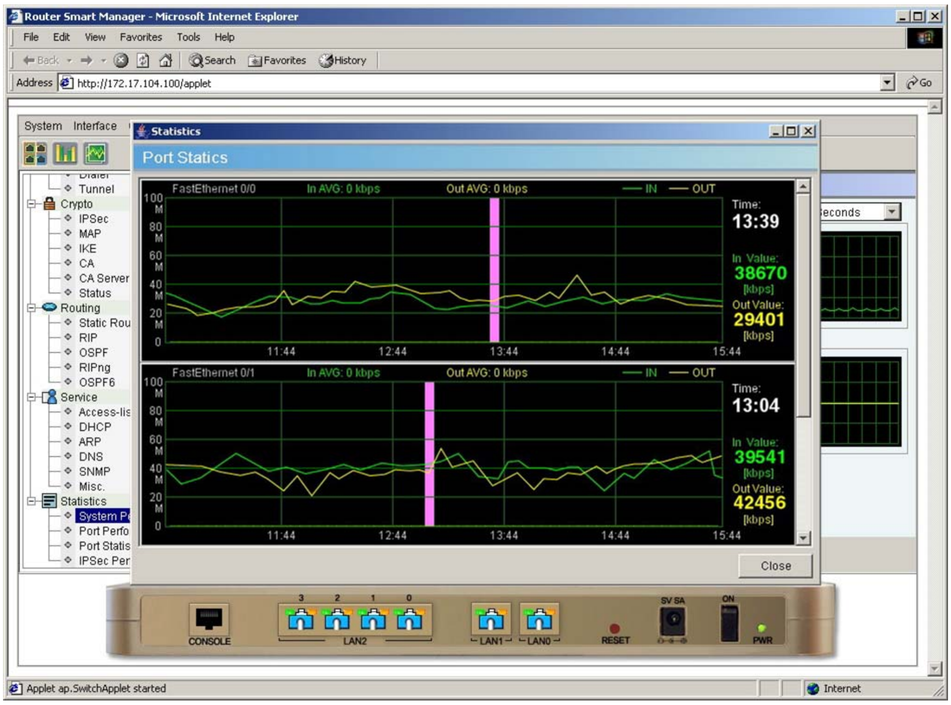
FastEthernet 0/0 — Update Time: 5 Seconds
In [kbps]: 9870
Out [kbps]: 11401

FastEthernet 0/1
In [kbps]: 9750
Out [kbps]: 2740

FastEthernet 0/2
In [kbps]: 10181
Out [kbps]: 9845

(Figure3-353) Port Performance page

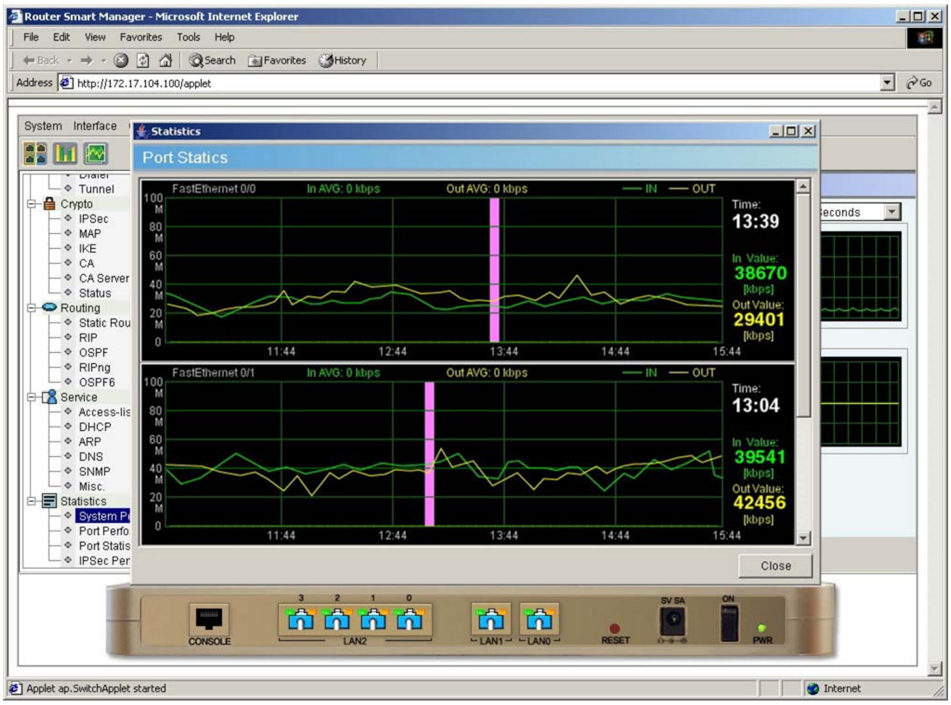
Select "show detail" to see a specific Port by clicking right side of the mouse on Port.



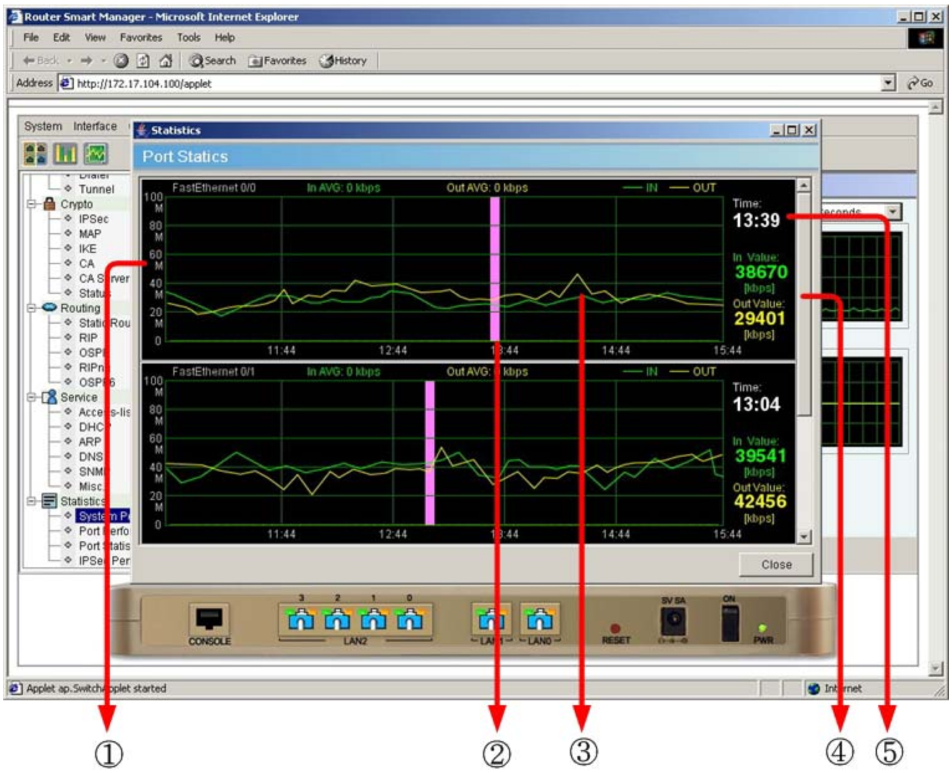
(Figure3-354) Port Statistics page

Port Statistics

Port Statistics Menu shows data traffic rate per time for Fast Ethernet 0/0, 0/1, 0/2 of AP900S. It uses analog style graphs and digital numbers. The user can check a specific port time and data traffic rate from the graph using a mouse.



(Figure3-355) System Performance page



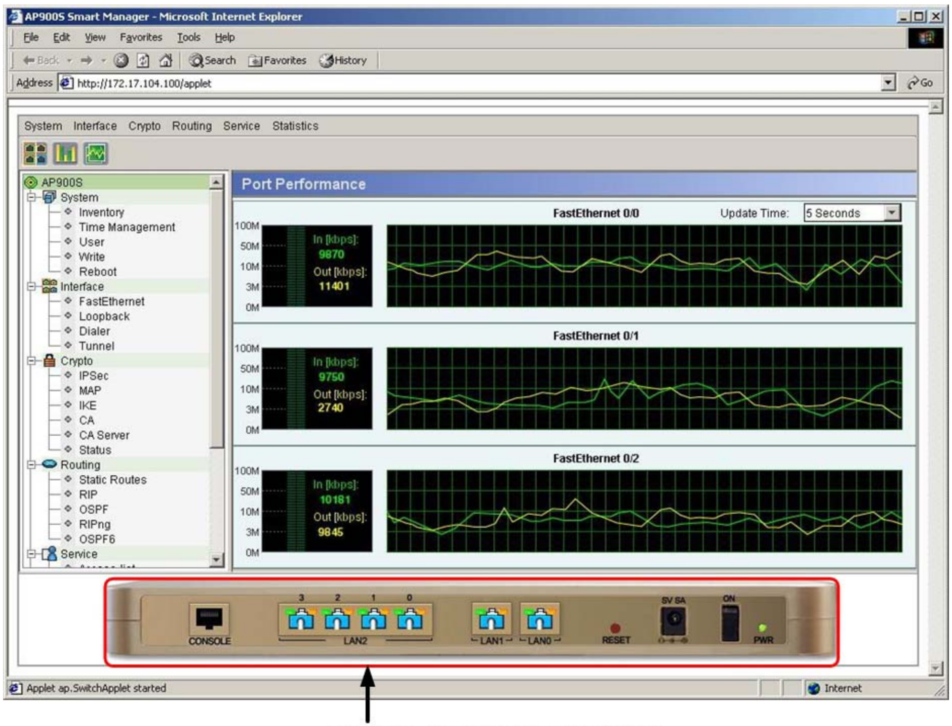
<Table 3-54> Port Statistics Description

Number	Description
①	It shows data traffic rate. The unit is Mbps.
②	It is a mouse Point. Data rate and time of that Point appears as numbers in number 4 and 5.
③	It shows Tx/Rx graph
④	It shows Tx/Rx data rate which the pink stick indicates.
⑤	It shows the time which the pink stick indicates.

AP900S control method on the front panel

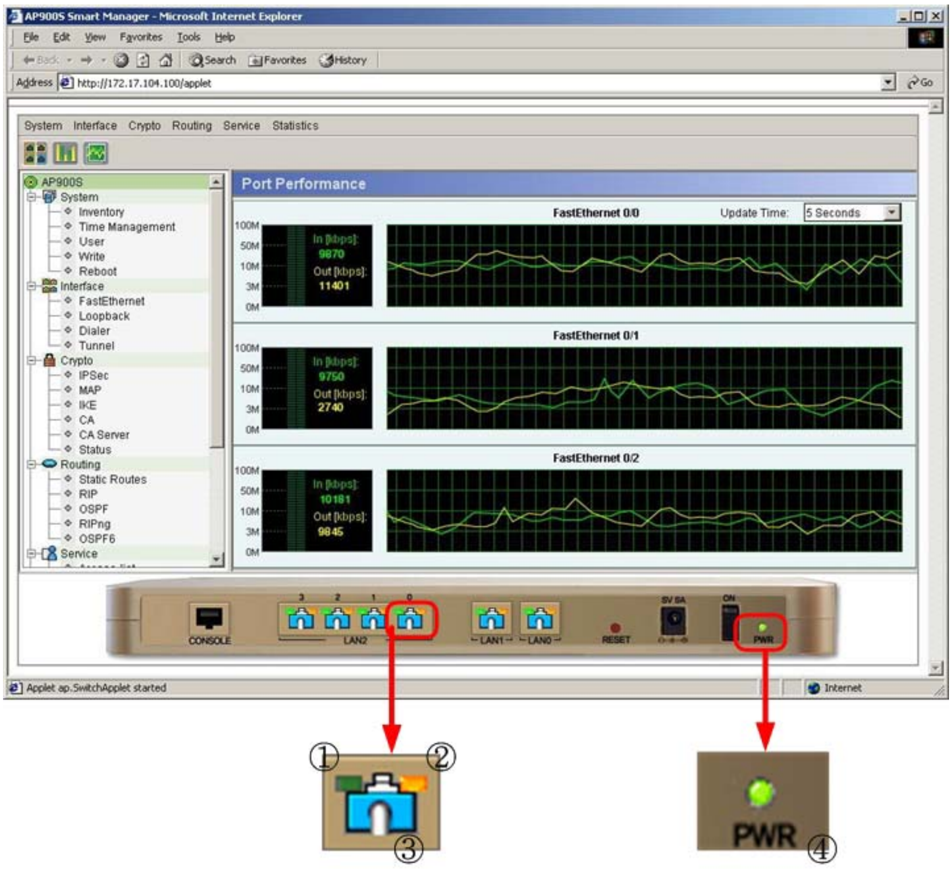
Introducing the front ports of AP900s

The front of AP900S Smart Manager shows real-time operation state of AP900S and Link State of each Port. Also the user can move to Port Configuration, Port Status menu by clicking right side of the mouse on Port.



Realtime Monitoring for Each Port

(Figure3-356) AP900S

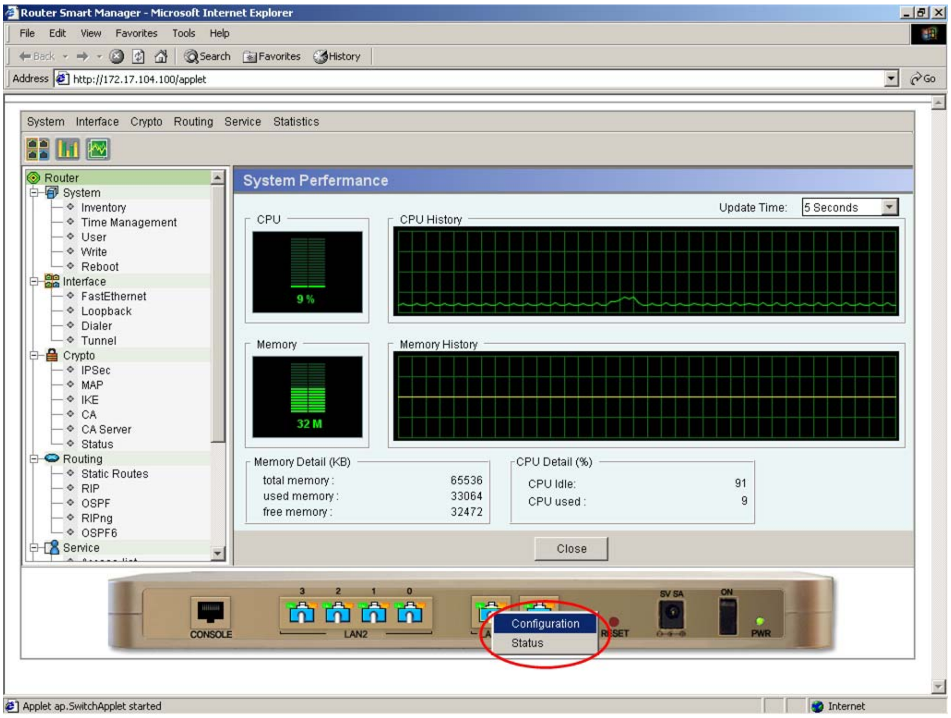


(Figure3-357) AP900S Front

<Table 3-55> AP900S front Description

Number	Description
① Link LED	The link state of the port. It is turned off when the link is down, and it blinks in green when the link is up.
② 100Mbps Link LED	It shows 100Mbps Link State of the port. When 100Mbps Link is on, the yellow light is turned on.
③ Connect	If the Port is “Link Up” state, it shows as if UTP cable is on. If the Port is “Link Down” state, it shows Blank.
④ Power LED	Power the AP900S on, the green light is turned on.

The user can execute Port Configuration, Port Status commends by clicking right side of the mouse on a specific Port using Smart Manager.



Update Time: 5 Seconds

CPU: 9 %

Memory: 32 M

Memory Detail (KB)

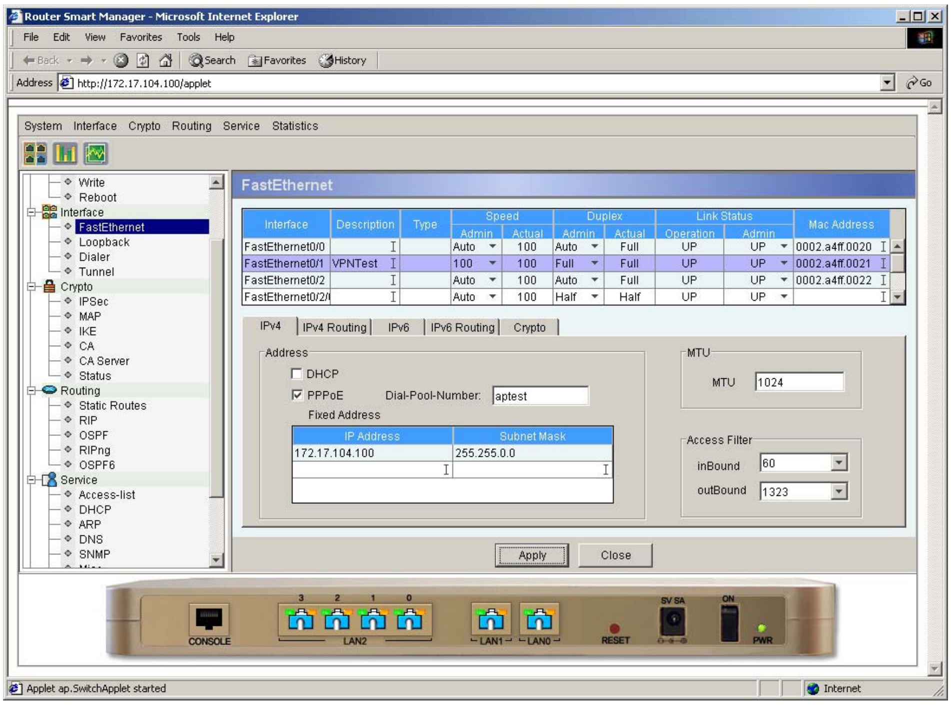
total memory :	65536
used memory :	33064
free memory :	32472

CPU Detail (%)

CPU Idle:	91
CPU used :	9

(Figure3-358) Execute AP900S Front Port Configuration

This below Figure 3-363 shows Port Configuration page.



Interface	Description	Type	Speed		Duplex		Link Status		Mac Address
			Admin	Actual	Admin	Actual	Operation	Admin	
FastEthernet0/0			Auto	100	Auto	Full	UP	UP	0002.a4ff.0020
FastEthernet0/1	VPNTest		100	100	Full	Full	UP	UP	0002.a4ff.0021
FastEthernet0/2			Auto	100	Auto	Full	UP	UP	0002.a4ff.0022
FastEthernet0/2/			Auto	100	Half	Half	UP	UP	

Address

☐ DHCP

☑ PPPoE Dial-Pool-Number: aptest

Fixed Address

IP Address	Subnet Mask
172.17.104.100	255.255.0.0

MTU

MTU 1024

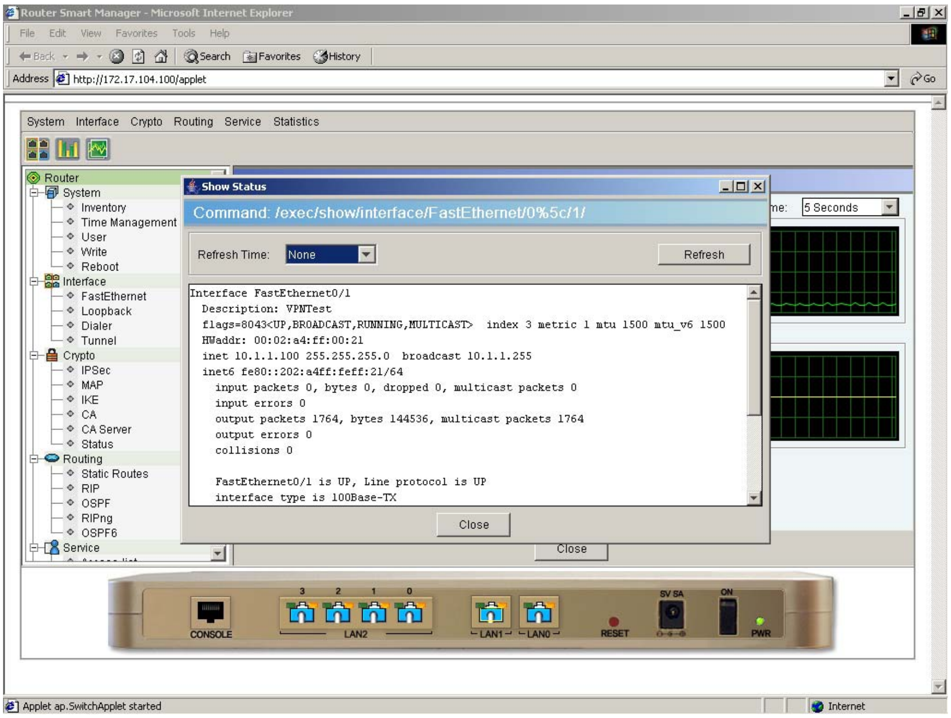
Access Filter

inBound 60

outBound 1323

(Figure3-359) Execute AP900S Front Port Configuration

This below shows Port Status page



Command: /exec/show/interface/FastEthernet/0%5c/1/

Refresh Time: None

```
Interface FastEthernet0/1
  Description: VPNTest
  flags=8043<UP,BROADCAST,RUNNING,MULTICAST>  index 3 metric 1 mtu 1500 mtu_v6 1500
  HWaddr: 00:02:a4:ff:00:21
  inet 10.1.1.100 255.255.255.0  broadcast 10.1.1.255
  inet6 fe80::202:a4ff:feff:21/64
    input packets 0, bytes 0, dropped 0, multicast packets 0
    input errors 0
    output packets 1764, bytes 144536, multicast packets 1764
    output errors 0
    collisions 0

    FastEthernet0/1 is UP, Line protocol is UP
    interface type is 100Base-TX
```

(Figure3-360) Execute AP900S Front Port Status

Checking list for Smart Manager connection failure

Smart Manager is Java Based Manager of TCP/IP Connection. So the user has to access Web Management System before accessing the Smart Manager. If the TCP/IP Connection is not working properly, check the points below.

1. Make sure if the IP Address of PC is the same as the IP Address of AP900S.
2. Try "Ping" Test to check if it receives Reply Packet properly.

3. Check if HTTP Server is enabled through the Console Terminal.

```
Router# show running-config
hostname Router
-------------------------skip--------------------------
http server
```

(Figure3-361) HTTP Server from CLI

4. If the HTTP Server is disabled, try to follow the procedure in Figure3-366. Default login ID is "root/router" in this example.

```
Router#
Router# config terminal
Router(config)# http server
Router(config)# end
Router#
```

(Figure3-362) Enable HTTP Server from CLI

IPSec related technical term

<Table 3-56> IPSec related technical terms

Term	Description
DES	DES is for Encryption and Decryption of Packet Data. It provides high performance Encryption using 56 bit key. Decryption algorithm is used from Remote and it recovers Cipher Text to Clear Text. Shared Secret Keys execute Encryption and Decryption.
3DES	This is a Triple DES algorithm which is transformed from 56 bit DES. 3DES provides much powerful and efficient encryption algorithm by applying 56 bit DES three times.
Diffie-Hellman (D-H)	Diffie-Hellman is Public-key Cryptography protocol. It creates Shared Secret Key for encryption Algorithm (DES or MD5) in unsecured network. Diffie-Hellman is used to create Session Key in IKE. AP900S supports 768, 1024, 153 bit Diffie-Hellman Group.
MD5	It is Message Digest 5. Message Digest 5 is Hash algorithm for Packet Data authentication. AP900S supports HMAC-MD5. Hash is one-way encryption algorithm which uses MD5 for IKE, AH, ESP authentication.
SHA-1	It is Secure Hash Algorithm-1. SHA-1 is a Hash algorithm for authentication of Packet Data. AP900S supports HMAC-SHA-1. IKE, AH, ESP use SHA-1 algorithm for authentication.
RSA Signature	Rivest, Shamir, Adelman Signature is a Public-key encryption system for authentication. IKE use D-H exchange in order to decide Secret Key of IPSec Peer D-H. RSA Signature or Preshared Key is used for authentication.
IKE	Internet Key Exchange. IKE is Hybrid protocol which provides Utility Services such as authentication of IPSec Peer, Negotiation of IKE, IPSec Security Association and key creation for authentication algorithm used by IPSec. IKE and ISAKMP (Internet Security Association Key Management Protocol) is used in the same way.

CA	Certificate Authority. When two IPSec Peer try to communicate, exchanging Digital Certificates is necessary to identify each other. This is CA.
Transport Mode	Transport Mode is used for terminal to terminal security. This mode provides security priority in Transport Layer for Transport Header through packet transforming.
Tunnel Mode	Tunnel Mode is usually used when the destination of packet and secure tunnel terminal is different. So you always have to use Tunnel Mode when tunnel terminal is secure gateway. However Tunnel Mode IPSec can be configured with two hosts. Tunnel Mode encapsulates entire IP datagram after adding a new IP head in order to recognize the start and end point of Tunnel. In this case, Inner header is configured on host, outer header is configured on tunnel terminal.
AH	Authentication Header. AH ensures data authentication, data integrity and security by including information to authenticate IP datagram. AH provides data integrity, data authentication and reply prevents etc.
ESP	Encapsulation Security Payload. It provides data integrity, reply prevents, security function etc. it also provides authentication function depends on types and modes of encryption algorithm.