



FINAL LABORATORY- CISCO IV

INTRODUCTION TO NETWORK INFRASTRUCTURE ADMINISTRATION

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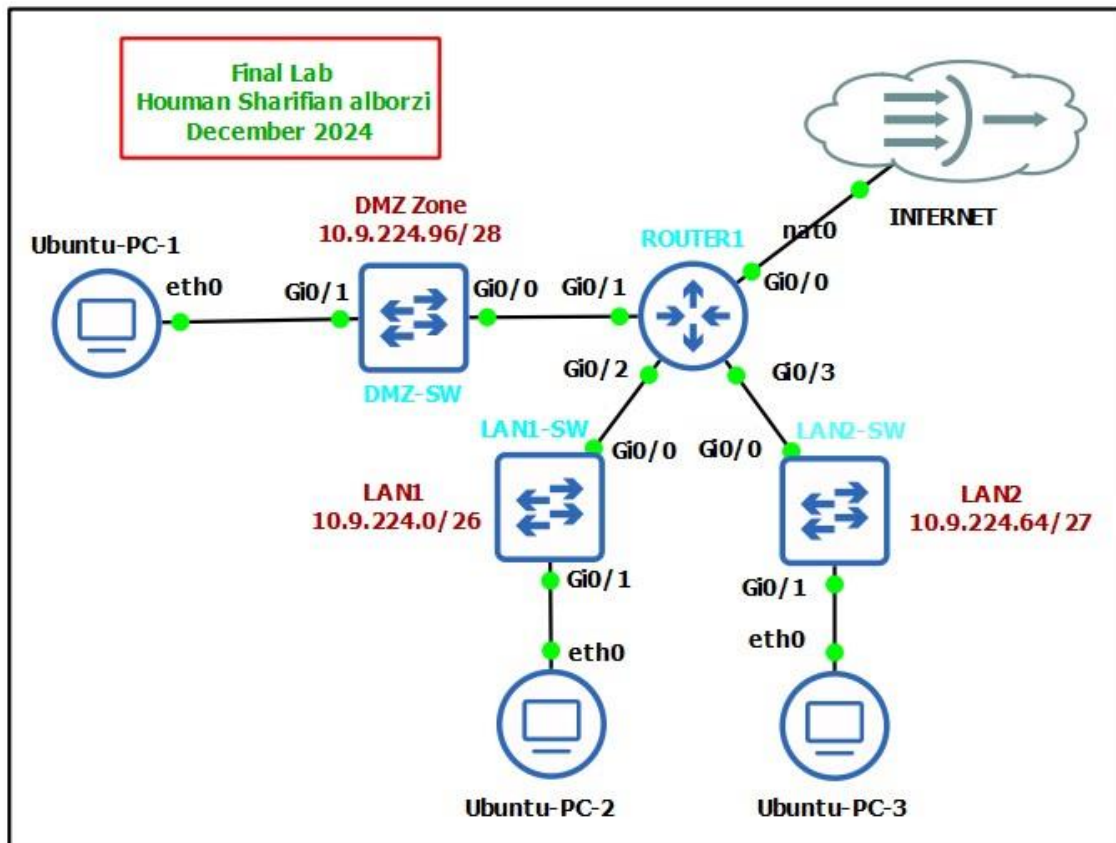
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Objective:

The goal of this laboratory test is creation, configuration, setting and testing a special topology. In this practice, GNS3 that is a famous platform for simulation of computer Network infrastructure, is used.

In the image below, in question Network topology, that is implemented in GNS3, is shown.



Picture 1) Network topology

Comprehensive IP Address Table:

In Table1 IP Address Table has been shown.

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
ROUTER1	G0/0	DHCP (192.168.232.229)	255.255.255.0	N/A
	G0/1	10.9.224.97	255.255.255.240	N/A
	G0/2	10.9.224.1	255.255.255.192	N/A
	G0/3	10.9.224.65	255.255.255.224	N/A
LAN1-SW	VLAN 1	10.9.224.2	255.255.255.192	10.9.224.1
LAN2-SW	VLAN 1	10.9.224.66	255.255.255.224	10.9.224.65
DMZ-SW	VLAN 1	10.9.224.98	255.255.255.240	10.9.224.97
Ubuntu-PC-1	NIC	10.9.224.99	255.255.255.240	10.9.224.97
Ubuntu-PC-2	NIC	10.9.224.3	255.255.255.192	10.9.224.1
Ubuntu-PC-3	NIC	10.9.224.67	255.255.255.224	10.9.224.65

In continues question of each part and pictures that is result of answering to that question will come include more explanations.

Network Device Configuration

- Set the hostname on all routers and switches.
- Configure secure passwords for accessing EXEC modes and the console.
- Add a banner and meaningful descriptions to all configured interfaces.
- Enable and secure SSH access on all devices.

Picture 2) Router Configuration

```
Press RETURN to get started.

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*****

Router#en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname ROUTER1
ROUTER1(config)#enable secret cisco
ROUTER1(config)#line con 0
ROUTER1(config-line)#password cisco
ROUTER1(config-line)#lo
*Dec 5 20:22:18.429: %PNP-6-PNP_DISCOVERY_STOPPED: PnP Discovery stopped (Config Wizard)
ROUTER1(config-line)#login
ROUTER1(config-line)#line vty 0 15
ROUTER1(config-line)#password cisco
ROUTER1(config-line)#login
ROUTER1(config-line)#transport input ssh
ROUTER1(config-line)#exit
ROUTER1(config)#service password-encryption
ROUTER1(config)#banner motd #This ROUTER supporter is Houman#
ROUTER1(config)#end
ROUTER1#
*Dec 5 20:25:54.693: %SYS-5-CONFIG_I: Configured from console by console
ROUTER1#wr
Building configuration...
[OK]
ROUTER1#
*Dec 5 20:26:07.924: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec 5 20:26:08.708: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
ROUTER1#
```

Picture 3) SSH Configuration on Router

```
ROUTER1#en
ROUTER1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ROUTER1(config)#ip domain-name itmt.ca
ROUTER1(config)#crypto key generate rsa general-keys modulus 1024
% You already have RSA keys defined named ROUTER1.itmt.ca.
% They will be replaced.

% The key modulus size is 1024 bits
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 1 seconds)

ROUTER1(config)#
*Dec 6 01:01:34.522: %SSH-5-DISABLED: SSH 1.99 has been disabled
*Dec 6 01:01:35.526: %SSH-5-ENABLED: SSH 1.99 has been enabled
ROUTER1(config)#username Houman secret cisco
ROUTER1(config)#line vty 0 15
ROUTER1(config-line)#password cisco
ROUTER1(config-line)#login
ROUTER1(config-line)#transport input ssh
ROUTER1(config-line)#login local
```

Picture 4) Switch DMZ-SW configuration

```
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*****

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname DMZ-SW
DMZ-SW(config)#enable secret cisco
DMZ-SW(config)#
*Dec 5 21:16:38.766: %PNP-6-PNP_DISCOVERY_STOPPED: PnP Discovery stopped (Config Wizard)
DMZ-SW(config)#line con 0
DMZ-SW(config-line)#password cisco
DMZ-SW(config-line)#login
DMZ-SW(config-line)#line vty 0 15
DMZ-SW(config-line)#password cisco
DMZ-SW(config-line)#login
DMZ-SW(config-line)#transport input ssh
DMZ-SW(config-line)#
% Invalid input detected at '^' marker.

DMZ-SW(config-line)#transport input ssh
DMZ-SW(config-line)#exit
DMZ-SW(config)#service password-encryption
DMZ-SW(config)#banner motd #This SW supporter is Houman#
DMZ-SW(config)#end
DMZ-SW#
*Dec 5 21:21:05.054: %SYS-5-CONFIG_I: Configured from console by console
DMZ-SW#wr
Building configuration...
Compressed configuration from 3557 bytes to 1699 bytes[OK]
*Dec 5 21:21:19.185: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec 5 21:21:19.917: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
DMZ-SW#
```


Picture 5) SSH configuration on DMZ-SW Switch

```
User Access Verification

Password:
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*****

DMZ-SW>en
Password:
DMZ-SW#config t
Enter configuration commands, one per line. End with CNTL/Z.
DMZ-SW(config)#ip domain-name itmt.ca
DMZ-SW(config)#crypto key generate rsa general-keys modulus 1024
The name for the keys will be: DMZ-SW.itmt.ca

% The key modulus size is 1024 bits
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 0 seconds)

DMZ-SW(config)#username Houman secret cisco
DMZ-SW(config)#line vty 0 15
DMZ-SW(config-line)#password cisco
DMZ-SW(config-line)#login
DMZ-SW(config-line)#transport input ssh
DMZ-SW(config-line)#login local
DMZ-SW(config-line)#
```


Picture 6) LAN1-SW switch configuration

```
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*****
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname LAN1-SW
LAN1-SW(config)#enable secret cisco
LAN1-SW(config)#line con 0
LAN1-SW(config-line)#password cisco
LAN1-SW(config-line)#login
LAN1-SW(config-line)#line vty 0 15
LAN1-SW(config-line)#password cisco
LAN1-SW(config-line)#login
LAN1-SW(config-line)#transport input ssh
LAN1-SW(config-line)#exit
LAN1-SW(config)#service password-encryption
LAN1-SW(config)#banner motd #This SW supporter is Houman#
LAN1-SW(config)#end
*Dec  5 21:31:50.403: %SYS-5-CONFIG_I: Configured from console by console
*Dec  5 21:31:55.543: %PNP-6-PNP_DISCOVERY_STOPPED: PnP Discovery stopped (Config Wizard)
LAN1-SW#wr
Building configuration...
Compressed configuration from 3558 bytes to 1690 bytes[OK]
*Dec  5 21:32:04.522: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec  5 21:32:05.255: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
LAN1-SW#
```

Picture7) SSH configuration on LAN1-SW

```
User Access Verification

Password:
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*****

LAN1-SW>en
Password:
LAN1-SW#conf t
Enter configuration commands, one per line. End with CNTL/Z.
LAN1-SW(config)#ip domain-name itmt.ca
LAN1-SW(config)#crypto key generate rsa general-keys modulus 1024
The name for the keys will be: LAN1-SW.itmt.ca

% The key modulus size is 1024 bits
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 0 seconds)

LAN1-SW(config)#username Houman secret cisco
LAN1-SW(config)#line vty 0 15
LAN1-SW(config-line)#password cisco
LAN1-SW(config-line)#login
LAN1-SW(config-line)#transport input ssh
LAN1-SW(config-line)#login local
LAN1-SW(config-line)#
```

Picture 8) LAN2-SW switch configuration

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname LAN2-SW
LAN2-SW(config)#enable secret cisco
LAN2-SW(config)#line con 0
LAN2-SW(config-line)#password cisco
LAN2-SW(config-line)#login
LAN2-SW(config-line)#line vty 0 15
LAN2-SW(config-line)#password cisco
LAN2-SW(config-line)#login
LAN2-SW(config-line)#transport input ssh
LAN2-SW(config-line)#exit
LAN2-SW(config)#service password-encryption
LAN2-SW(config)#banner motd #This SW supporter is Houman#
LAN2-SW(config)#end
LAN2-SW#
*Dec 5 21:52:53.999: %SYS-5-CONFIG_I: Configured from console by console
LAN2-SW#wr
Building configuration...
Compressed configuration from 3558 bytes to 1685 bytes[OK]
LAN2-SW#
*Dec 5 21:53:07.669: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec 5 21:53:08.412: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
LAN2-SW#
```

Picture 9) SSH configuration on LAN2-SW switch

```
User Access Verification

Password:
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* purposes is expressly prohibited except as otherwise authorized by *
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*****
LAN2-SW>en
Password:
LAN2-SW#conf t
Enter configuration commands, one per line. End with CNTL/Z.
LAN2-SW(config)#ip domain-name itmt.ca
LAN2-SW(config)#crypto key generate rsa general-keys modulus 1024
The name for the keys will be: LAN2-SW.itmt.ca

% The key modulus size is 1024 bits
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 0 seconds)

LAN2-SW(config)#username Houman secret cisco
LAN2-SW(config)#line vty 0 15
LAN2-SW(config-line)#password cisco
LAN2-SW(config-line)#login
LAN2-SW(config-line)#transport input ssh
LAN2-SW(config-line)#login local
LAN2-SW(config-line)#
```

Network Settings

- Create an IP address table for all devices and PCs interfaces.
- Configure all the routers interfaces.
Note: G0/0 should be configured to receive an IP address from the DHCP of the Internet.
- Configure the SVI of each switch.
- Assign static IP addresses to PCs.

Picture 10) Set DHCP on Gi0/0 interface of Router

```
User Access Verification
Password:
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ROUTER1#en
ROUTER1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ROUTER1(config)#int g0/0
ROUTER1(config-if)#ip address dhcp
ROUTER1(config-if)#no shutdown
ROUTER1(config-if)#
*Dec 5 20:49:06.124: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed state to up
*Dec 5 20:49:07.124: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
ROUTER1(config-if)#end
ROUTER1#
*Dec 5 20:49:16.036: %SYS-5-CONFIG_I: Configured from console by console
ROUTER1#wr
Building configuration...

*Dec 5 20:49:19.931: %DHCP-6-ADDRESS_ASSIGN: Interface GigabitEthernet0/0 assigned DHCP address 192.168.232.129, mask 255.255.0, hostname ROUTER1
[OK]
ROUTER1#
*Dec 5 20:49:22.786: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec 5 20:49:23.602: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
ROUTER1#
```


Picture 11) Set IP on Gi0/1 interface of Router

```
User Access Verification

Password:
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ROUTER1#en
ROUTER1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ROUTER1(config)#int g0/1
ROUTER1(config-if)#ip address 10.9.224.97 255.255.255.240
ROUTER1(config-if)#no shutdown
ROUTER1(config-if)#
*Dec 5 20:58:56.092: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed state
to up
*Dec 5 20:58:57.092: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEther
net0/1, changed state to up
ROUTER1(config-if)#end
ROUTER1#
*Dec 5 20:59:00.187: %SYS-5-CONFIG_I: Configured from console by console
ROUTER1#wr
Building configuration...
[OK]
ROUTER1#
*Dec 5 20:59:10.168: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated
on disk. Please wait...
*Dec 5 20:59:10.945: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to di
sk successfully.
ROUTER1#
```

Picture 12) Set IP on Gi0/2 interface of Router

```
User Access Verification

Password:
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ROUTER1#en
ROUTER1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ROUTER1(config)#int g0/2
ROUTER1(config-if)#ip address 10.9.224.1 255.255.255.192
ROUTER1(config-if)#no shutdown
ROUTER1(config-if)#end
*Dec 5 21:02:10.581: %LINK-3-UPDOWN: Interface GigabitEthernet0/2, changed state to up
*Dec 5 21:02:11.582: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up
ROUTER1(config-if)#end
ROUTER1#
*Dec 5 21:02:11.964: %SYS-5-CONFIG_I: Configured from console by console
ROUTER1#wr
Building configuration...
[OK]
ROUTER1#
*Dec 5 21:02:20.693: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec 5 21:02:21.477: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
ROUTER1#
```

Picture 13) Set IP on Gi0/3 interface of Router

```
User Access Verification

Password:
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ROUTER1#en
ROUTER1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ROUTER1(config)#int g0/3
ROUTER1(config-if)#ip address 10.9.224.65 255.255.255.224
ROUTER1(config-if)#no shutdown
ROUTER1(config-if)#
*Dec 5 21:05:16.373: %LINK-3-UPDOWN: Interface GigabitEthernet0/3, changed state to up
*Dec 5 21:05:17.373: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/3, changed state to up
ROUTER1(config-if)#end
ROUTER1#
*Dec 5 21:05:19.959: %SYS-5-CONFIG_I: Configured from console by console
ROUTER1#wr
Building configuration...
[OK]
ROUTER1#
*Dec 5 21:05:26.008: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec 5 21:05:26.787: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
ROUTER1#
```

Picture 14) Set IP on DMZ-SW Switch

```
User Access Verification

Password:
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DMZ-SW>en
Password:
DMZ-SW#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DMZ-SW(config)#int Vlan1
DMZ-SW(config-if)#
*Dec 5 21:23:19.817: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to down
DMZ-SW(config-if)#ip address 10.9.224.98 255.255.255.240
DMZ-SW(config-if)#no shut down
^
% Invalid input detected at '^' marker.

DMZ-SW(config-if)#no shutdown
DMZ-SW(config-if)#end
*Dec 5 21:25:11.551: %LINK-3-UPDOWN: Interface Vlan1, changed state to up
*Dec 5 21:25:12.551: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
DMZ-SW#
*Dec 5 21:25:14.577: %SYS-5-CONFIG_I: Configured from console by console
DMZ-SW#wr
Building configuration...
Compressed configuration from 3615 bytes to 1734 bytes[OK]
DMZ-SW#
*Dec 5 21:25:26.849: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec 5 21:25:27.581: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
DMZ-SW#
```

Picture 15) Set IP on LAN1-SW Switch

```
User Access Verification

Password:
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*****

LAN1-SW>en
Password:
LAN1-SW#conf t
Enter configuration commands, one per line. End with CNTL/Z.
LAN1-SW(config)#int Vlan1
LAN1-SW(config-if)#
*Dec 5 21:34:02.323: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to down
LAN1-SW(config-if)#ip address 10.9.224.2 255.255.255.192
LAN1-SW(config-if)#no shutdown
LAN1-SW(config-if)#en
*Dec 5 21:36:13.582: %LINK-3-UPDOWN: Interface Vlan1, changed state to up
LAN1-SW#
*Dec 5 21:36:14.581: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
*Dec 5 21:36:15.938: %SYS-5-CONFIG_I: Configured from console by console
LAN1-SW#wr
Building configuration...
Compressed configuration from 3615 bytes to 1726 bytes[OK]
LAN1-SW#
*Dec 5 21:36:30.203: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec 5 21:36:30.939: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
LAN1-SW#
```


Picture 16) Set IP on LAN2-SW Switch

```
User Access Verification

Password:
*****
* IOSv is strictly limited to use for evaluation, demonstration and IOS *
* education. IOSv is provided as-is and is not supported by Cisco's *
* Technical Advisory Center. Any use or disclosure, in whole or in part, *
* of the IOSv Software or Documentation to any third party for any *
* purposes is expressly prohibited except as otherwise authorized by *
* Cisco in writing. *
*****

LAN2-SW>en
Password:
LAN2-SW#conf t
Enter configuration commands, one per line. End with CNTL/Z.
LAN2-SW(config)#int Vlan1
LAN2-SW(config-if)#
*Dec 5 21:55:18.225: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to down
LAN2-SW(config-if)#ip address 10.9.224.66 255.255.255.224
LAN2-SW(config-if)#no shutdown
LAN2-SW(config-if)#e
*Dec 5 21:56:59.438: %LINK-3-UPDOWN: Interface Vlan1, changed state to up
*Dec 5 21:57:00.439: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to upnd
LAN2-SW#
*Dec 5 21:57:02.043: %SYS-5-CONFIG_I: Configured from console by console
LAN2-SW#end
Translating "end"...domain server (255.255.255.255)
(255.255.255.255)
Translating "end"...domain server (255.255.255.255)
% Unknown command or computer name, or unable to find computer address
LAN2-SW#
LAN2-SW#wr
Building configuration...
Compressed configuration from 3616 bytes to 1722 bytes[OK]
LAN2-SW#
*Dec 5 21:57:53.022: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Dec 5 21:57:53.751: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
LAN2-SW#
```

Picture 17) Set IP on Ubuntu-PC-1 PC

```
Ubuntu-PC-1 interfaces

#
# This is a sample network config, please uncomment lines to configure the network
#

# Uncomment this line to load custom interface files
# source /etc/network/interfaces.d/*

# Static config for eth0
auto eth0
iface eth0 inet static
address 10.9.224.99
netmask 255.255.255.240
gateway 10.9.224.97
# up echo nameserver 192.168.0.1 > /etc/resolv.conf

# DHCP config for eth0
#auto eth0
#iface eth0 inet dhcp
# hostname Ubuntu-PC-1
|
```

Picture 18) Set IP on Ubuntu-PC-2 PC

```
Ubuntu-PC-2 interfaces

#
# This is a sample network config, please uncomment lines to configure the network
#

# Uncomment this line to load custom interface files
# source /etc/network/interfaces.d/*

# Static config for eth0
auto eth0
iface eth0 inet static
address 10.9.224.3
netmask 255.255.255.192
gateway 10.9.224.1
#           up echo nameserver 192.168.0.1 > /etc/resolv.conf

# DHCP config for eth0
#auto eth0
#iface eth0 inet dhcp
#           hostname Ubuntu-PC-2
```

Picture 19) Set IP on Ubuntu-PC-3 PC

```
Ubuntu-PC-3 interfaces

#
# This is a sample network config, please uncomment lines to configure the network
#

# Uncomment this line to load custom interface files
# source /etc/network/interfaces.d/*

# Static config for eth0
auto eth0
iface eth0 inet static
address 10.9.224.67
netmask 255.255.255.224
gateway 10.9.224.65
#           up echo nameserver 192.168.0.1 > /etc/resolv.conf

# DHCP config for eth0
#auto eth0
#iface eth0 inet dhcp
#           hostname Ubuntu-PC-3
```

Testing

- Test connectivity between PCs using ping commands.
- Test SSH connectivity to all network devices from Ubuntu-PC-1.
- Using GNS3 Wireshark, to capture ICMPv4 traffic between Ubuntu-PC-1 and its Default Gateway (router interface), and another capture of a SSH connection between Ubuntu-PC-1 and its Default Gateway

Picture 20) RUN Show Run Command On Router

```
!
interface GigabitEthernet0/0
 ip address dhcp
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 ip address 10.9.224.97 255.255.255.240
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/2
 ip address 10.9.224.1 255.255.255.192
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/3
 ip address 10.9.224.65 255.255.255.224
 duplex auto
 speed auto
 media-type rj45
!
ip forward-protocol nd
!
!
no ip http server
no ip http secure-server
!
ipv6 ioam timestamp
!
!
!
control-plane
!
```

Picture 21) RUN Show Interface Brief Command on Router

```
ROUTER1#sh ip int br
Interface                IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0       192.168.232.129 YES DHCP    up          up
GigabitEthernet0/1       10.9.224.97     YES manual  up          up
GigabitEthernet0/2       10.9.224.1      YES manual  up          up
GigabitEthernet0/3       10.9.224.65     YES manual  up          up
ROUTER1#
```

Picture 22) RUN Show Run Command On DMZ-SW -1

```
interface GigabitEthernet2/0
 negotiation auto
!
interface GigabitEthernet2/1
 negotiation auto
!
interface GigabitEthernet2/2
 negotiation auto
!
interface GigabitEthernet2/3
 negotiation auto
!
interface GigabitEthernet3/0
 negotiation auto
!
interface GigabitEthernet3/1
 negotiation auto
!
interface GigabitEthernet3/2
 negotiation auto
!
interface GigabitEthernet3/3
 negotiation auto
!
interface Vlan1
 ip address 10.9.224.98 255.255.255.240
!
ip default-gateway 10.9.224.97
ip forward-protocol nd
!
ip http server
ip http secure-server
!
ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
!
```


Picture 23) RUN Show Run Command On DMZ-SW -2

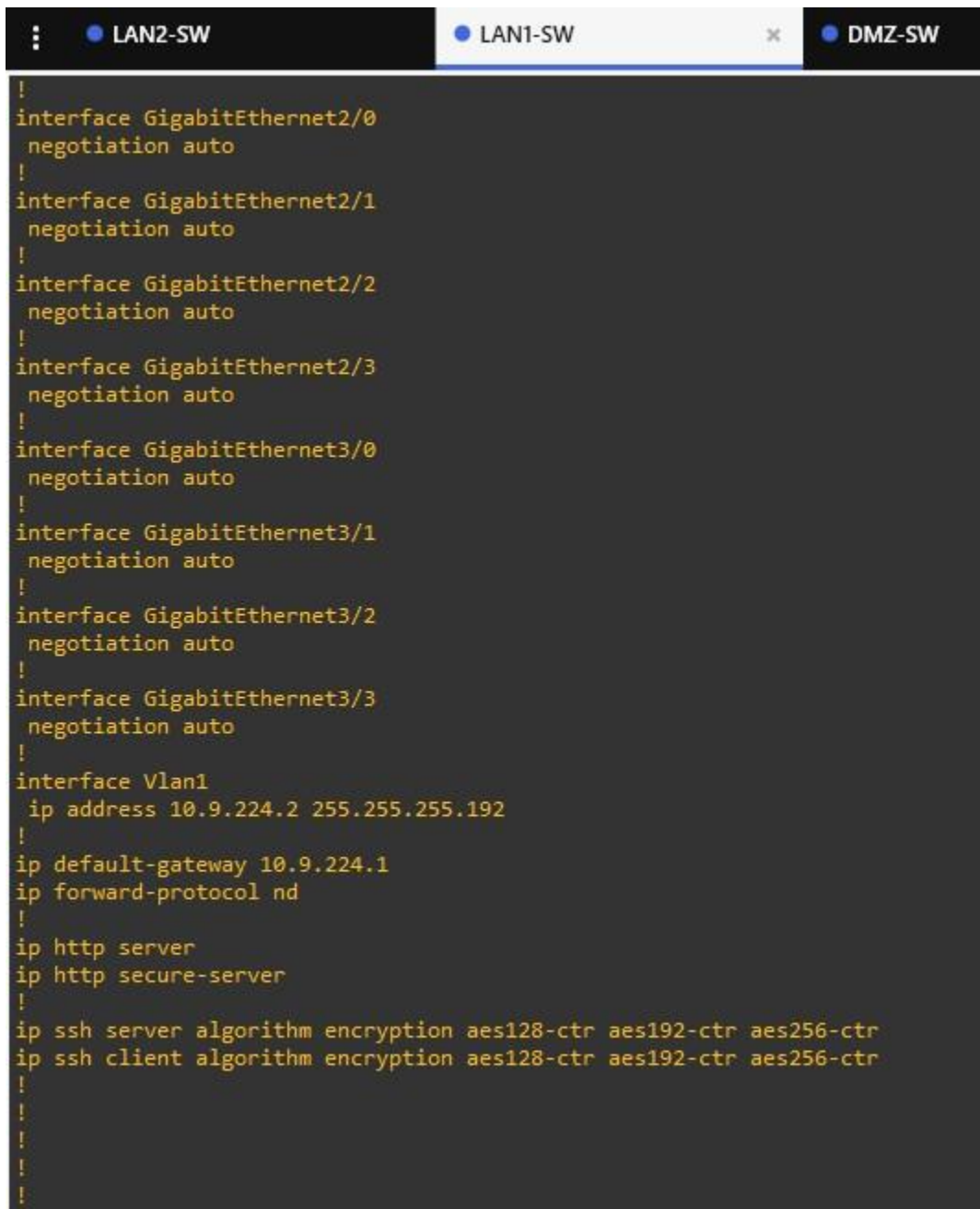
```
*****
banner motd ^CThis SW supporter is Houman^C
!
line con 0
  password 7 1511021F0725
  login
line aux 0
line vty 0 4
  password 7 070C285F4D06
  login
  transport input ssh
line vty 5 15
  password 7 070C285F4D06
  login
  transport input ssh
!
!
```

Picture 24) RUN Show Interface Brief Command on DMZ-SW

```
banner motd ^CThis SW supporter is Houman^C
!
line con 0
  password 7 1511021F0725
  login
line aux 0
line vty 0 4
  password 7 070C285F4D06
  login
  transport input ssh
line vty 5 15
  password 7 070C285F4D06
  login
  transport input ssh
!
!
end

DMZ-SW# sh ip int br
Interface      IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0  unassigned      YES unset    up          up
GigabitEthernet0/1  unassigned      YES unset    up          up
GigabitEthernet0/2  unassigned      YES unset    down        down
GigabitEthernet0/3  unassigned      YES unset    down        down
GigabitEthernet1/0  unassigned      YES unset    down        down
GigabitEthernet1/1  unassigned      YES unset    down        down
GigabitEthernet1/2  unassigned      YES unset    down        down
GigabitEthernet1/3  unassigned      YES unset    down        down
GigabitEthernet2/0  unassigned      YES unset    down        down
GigabitEthernet2/1  unassigned      YES unset    down        down
GigabitEthernet2/2  unassigned      YES unset    down        down
GigabitEthernet2/3  unassigned      YES unset    down        down
GigabitEthernet3/0  unassigned      YES unset    down        down
GigabitEthernet3/1  unassigned      YES unset    down        down
GigabitEthernet3/2  unassigned      YES unset    down        down
GigabitEthernet3/3  unassigned      YES unset    down        down
Vlan1          10.9.224.98     YES manual  up          up
DMZ-SW#
```

Picture 25) RUN Show Run Command On LAN1-SW -1



```
!
interface GigabitEthernet2/0
 negotiation auto
!
interface GigabitEthernet2/1
 negotiation auto
!
interface GigabitEthernet2/2
 negotiation auto
!
interface GigabitEthernet2/3
 negotiation auto
!
interface GigabitEthernet3/0
 negotiation auto
!
interface GigabitEthernet3/1
 negotiation auto
!
interface GigabitEthernet3/2
 negotiation auto
!
interface GigabitEthernet3/3
 negotiation auto
!
interface Vlan1
 ip address 10.9.224.2 255.255.255.192
!
ip default-gateway 10.9.224.1
ip forward-protocol nd
!
ip http server
ip http secure-server
!
ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
!
!
!
!
```

Picture 26) RUN Show Run Command On LAN1-SW -2

```
banner motd ^CThis SW supporter is Houman^C
!
line con 0
  password 7 094F471A1A0A
  login
line aux 0
line vty 0 4
  password 7 110A1016141D
  login
  transport input ssh
line vty 5 15
  password 7 110A1016141D
  login
  transport input ssh
!
!
end
LAN1-SW#
```

Picture 27) RUN Show Interface Brief Command on LAN1-SW

```
LAN1-SW#sh ip int br
Interface                               IP-Address    OK? Method Status          Protocol
GigabitEthernet0/0                     unassigned    YES unset  up              up
GigabitEthernet0/1                     unassigned    YES unset  up              up
GigabitEthernet0/2                     unassigned    YES unset  down            down
GigabitEthernet0/3                     unassigned    YES unset  down            down
GigabitEthernet1/0                     unassigned    YES unset  down            down
GigabitEthernet1/1                     unassigned    YES unset  down            down
GigabitEthernet1/2                     unassigned    YES unset  down            down
GigabitEthernet1/3                     unassigned    YES unset  down            down
GigabitEthernet2/0                     unassigned    YES unset  down            down
GigabitEthernet2/1                     unassigned    YES unset  down            down
GigabitEthernet2/2                     unassigned    YES unset  down            down
GigabitEthernet2/3                     unassigned    YES unset  down            down
GigabitEthernet3/0                     unassigned    YES unset  down            down
GigabitEthernet3/1                     unassigned    YES unset  down            down
GigabitEthernet3/2                     unassigned    YES unset  down            down
GigabitEthernet3/3                     unassigned    YES unset  down            down
Vlan1                                  10.9.224.2    YES manual up              up
LAN1-SW#
```


Picture 28) RUN Show Run Command On LAN2-SW -1

```
negotiation auto
!
interface GigabitEthernet2/1
negotiation auto
!
interface GigabitEthernet2/2
negotiation auto
!
interface GigabitEthernet2/3
negotiation auto
!
interface GigabitEthernet3/0
negotiation auto
!
interface GigabitEthernet3/1
negotiation auto
!
interface GigabitEthernet3/2
negotiation auto
!
interface GigabitEthernet3/3
negotiation auto
!
interface Vlan1
ip address 10.9.224.66 255.255.255.224
!
ip default-gateway 10.9.224.65
ip forward-protocol nd
!
ip http server
ip http secure-server
!
ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
!
!
!
!
!
!
!
control-plane
!
```

Picture 29) RUN Show Run Command On LAN2-SW -2

```
*****
banner motd ^CThis SW supporter is Houman^C
!
line con 0
  password 7 02050D480809
  login
line aux 0
line vty 0 4
  password 7 060506324F41
  login
  transport input ssh
line vty 5 15
  password 7 060506324F41
  login
  transport input ssh
!
!
end
LAN2-SW#
```

Picture 30) RUN Show Interface Brief Command on LAN2-SW

```
LAN2-SW#sh ip int br
Interface                               IP-Address    OK? Method Status        Protocol
GigabitEthernet0/0                     unassigned    YES unset  up            up
GigabitEthernet0/1                     unassigned    YES unset  up            up
GigabitEthernet0/2                     unassigned    YES unset  down          down
GigabitEthernet0/3                     unassigned    YES unset  down          down
GigabitEthernet1/0                     unassigned    YES unset  down          down
GigabitEthernet1/1                     unassigned    YES unset  down          down
GigabitEthernet1/2                     unassigned    YES unset  down          down
GigabitEthernet1/3                     unassigned    YES unset  down          down
GigabitEthernet2/0                     unassigned    YES unset  down          down
GigabitEthernet2/1                     unassigned    YES unset  down          down
GigabitEthernet2/2                     unassigned    YES unset  down          down
GigabitEthernet2/3                     unassigned    YES unset  down          down
GigabitEthernet3/0                     unassigned    YES unset  down          down
GigabitEthernet3/1                     unassigned    YES unset  down          down
GigabitEthernet3/2                     unassigned    YES unset  down          down
GigabitEthernet3/3                     unassigned    YES unset  down          down
Vlan1                                  10.9.224.66   YES manual up            up
LAN2-SW#
```

Picture 31) RUN Show Interface VLAN1 LAN1-SW

```
LAN1-SW>en
Password:
LAN1-SW#sh int Vlan1
Vlan1 is up, line protocol is up
  Hardware is Ethernet SVI, address is 0c73.1c07.8001 (bia 0c73.1c07.8001)
  Internet address is 10.9.224.2/26
  MTU 1500 bytes, BW 1000000 Kbit/sec, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:03:08, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    21 packets input, 1615 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicasts)
    0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
    2 packets output, 120 bytes, 0 underruns
    0 output errors, 0 interface resets
    0 unknown protocol drops
    0 output buffer failures, 0 output buffers swapped out
LAN1-SW#
```

Picture 32) RUN Show Interface VLAN1 LAN2-SW

```
LAN2-SW#sh int Vlan1
Vlan1 is up, line protocol is up
  Hardware is Ethernet SVI, address is 0c9b.55f1.8001 (bia 0c9b.55f1.8001)
  Internet address is 10.9.224.66/27
  MTU 1500 bytes, BW 1000000 Kbit/sec, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:01:51, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    5 packets input, 385 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicasts)
    0 runs, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
    14 packets output, 876 bytes, 0 underruns
    0 output errors, 0 interface resets
    0 unknown protocol drops
    0 output buffer failures, 0 output buffers swapped out
LAN2-SW#
```


Picture 33) RUN Show Interface VLAN1 DMZ-SW

```
DMZ-SW>sh int Vlan1
Vlan1 is up, line protocol is up
  Hardware is Ethernet SVI, address is 0c30.1fed.8001 (bia 0c30.1fed.8001)
  Internet address is 10.9.224.98/28
  MTU 1500 bytes, BW 1000000 Kbit/sec, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:05:36, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    24 packets input, 1832 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicasts)
    0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
    14 packets output, 900 bytes, 0 underruns
    0 output errors, 0 interface resets
    0 unknown protocol drops
    0 output buffer failures, 0 output buffers swapped out
DMZ-SW>
```

Picture 34) IfConfig Ubuntu-PC-1

```
Ubuntu-PC-1 console is now available... Press RETURN to get started.
ifup: can't open '/var/run/ifstate.new': No such file or directory
root@Ubuntu-PC-1:~# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.9.224.99 netmask 255.255.255.240 broadcast 0.0.0.0
    inet6 fe80::42:c0ff:fe8f:b200 prefixlen 64 scopeid 0x20<link>
    ether 02:42:c0:8f:b2:00 txqueuelen 1000 (Ethernet)
    RX packets 100 bytes 7760 (7.7 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 11 bytes 866 (866.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Picture 35) IfConfig Ubuntu-PC-2

```
root@Ubuntu-PC-2:~# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.9.224.3 netmask 255.255.255.192 broadcast 0.0.0.0
    inet6 fe80::42:3fff:fe90:cb00 prefixlen 64 scopeid 0x20<link>
    ether 02:42:3f:90:cb:00 txqueuelen 1000 (Ethernet)
    RX packets 370 bytes 27713 (27.7 KB)
    RX errors 0 dropped 1 overruns 0 frame 0
    TX packets 18 bytes 1384 (1.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@Ubuntu-PC-2:~#
```

Picture 36) IfConfig Ubuntu-PC-3

```
Ubuntu-PC-3 console is now available... Press RETURN to get started.
ifup: can't open '/var/run/ifstate.new': No such file or directory
root@Ubuntu-PC-3:~# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.9.224.67 netmask 255.255.255.224 broadcast 0.0.0.0
    inet6 fe80::42:2fff:fe90:cd00 prefixlen 64 scopeid 0x20<link>
    ether 02:42:2f:cd:21:00 txqueuelen 1000 (Ethernet)
    RX packets 546 bytes 40798 (40.7 KB)
    RX errors 0 dropped 3 overruns 0 frame 0
    TX packets 25 bytes 2014 (2.0 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@Ubuntu-PC-3:~#
```

Picture 37) Ping PC2 (Destination) From PC1(Source)

```
root@Ubuntu-PC-1:~# ping -c 3 10.9.224.3
PING 10.9.224.3 (10.9.224.3) 56(84) bytes of data.
64 bytes from 10.9.224.3: icmp_seq=1 ttl=63 time=25.1 ms
64 bytes from 10.9.224.3: icmp_seq=2 ttl=63 time=5.86 ms
64 bytes from 10.9.224.3: icmp_seq=3 ttl=63 time=8.52 ms

--- 10.9.224.3 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 5.856/13.163/25.118/8.522 ms
root@Ubuntu-PC-1:~#
```

Picture 38) Ping PC3 (Destination) From PC1(Source)

```
root@Ubuntu-PC-1:~# ping -c 3 10.9.224.67
PING 10.9.224.67 (10.9.224.67) 56(84) bytes of data.
64 bytes from 10.9.224.67: icmp_seq=1 ttl=63 time=10.5 ms
64 bytes from 10.9.224.67: icmp_seq=2 ttl=63 time=9.09 ms
64 bytes from 10.9.224.67: icmp_seq=3 ttl=63 time=6.82 ms

--- 10.9.224.67 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 6.820/8.794/10.468/1.504 ms
root@Ubuntu-PC-1:~#
```

Picture 39) Ping Default Gateway (Destination) From PC1(Source)

```
root@Ubuntu-PC-1:~# ping -c 3 10.9.224.97
PING 10.9.224.97 (10.9.224.97) 56(84) bytes of data.
64 bytes from 10.9.224.97: icmp_seq=1 ttl=255 time=4.89 ms
64 bytes from 10.9.224.97: icmp_seq=2 ttl=255 time=4.54 ms
64 bytes from 10.9.224.97: icmp_seq=3 ttl=255 time=4.42 ms

--- 10.9.224.97 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 4.418/4.615/4.889/0.199 ms
root@Ubuntu-PC-1:~#
```


Picture 40) Ping PC1(Destination) From PC2(Source)

```
root@Ubuntu-PC-2:~# ping -c 3 10.9.224.99
PING 10.9.224.99 (10.9.224.99) 56(84) bytes of data.
64 bytes from 10.9.224.99: icmp_seq=1 ttl=63 time=10.5 ms
64 bytes from 10.9.224.99: icmp_seq=2 ttl=63 time=7.81 ms
64 bytes from 10.9.224.99: icmp_seq=3 ttl=63 time=8.09 ms

--- 10.9.224.99 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 7.808/8.813/10.547/1.230 ms
root@Ubuntu-PC-2:~#
```

Picture 41) Ping PC3(Destination) From PC2(Source)

```
root@Ubuntu-PC-2:~# ping -c 3 10.9.224.67
PING 10.9.224.67 (10.9.224.67) 56(84) bytes of data.
64 bytes from 10.9.224.67: icmp_seq=1 ttl=63 time=8.96 ms
64 bytes from 10.9.224.67: icmp_seq=2 ttl=63 time=8.76 ms
64 bytes from 10.9.224.67: icmp_seq=3 ttl=63 time=10.2 ms

--- 10.9.224.67 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 8.757/9.310/10.212/0.643 ms
root@Ubuntu-PC-2:~#
```

Picture 42) Ping Default Gateway (Destination) From PC2(Source)

```
root@Ubuntu-PC-2:~# ping -c 3 10.9.224.1
PING 10.9.224.1 (10.9.224.1) 56(84) bytes of data.
64 bytes from 10.9.224.1: icmp_seq=1 ttl=255 time=7.88 ms
64 bytes from 10.9.224.1: icmp_seq=2 ttl=255 time=4.86 ms
64 bytes from 10.9.224.1: icmp_seq=3 ttl=255 time=5.24 ms

--- 10.9.224.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 4.860/5.995/7.882/1.343 ms
root@Ubuntu-PC-2:~#
```

Picture 43) Ping PC1(Destination) From PC3(Source)

```
root@Ubuntu-PC-3:~# ping -c 4 10.9.224.99
PING 10.9.224.99 (10.9.224.99) 56(84) bytes of data.
64 bytes from 10.9.224.99: icmp_seq=1 ttl=63 time=9.31 ms
64 bytes from 10.9.224.99: icmp_seq=2 ttl=63 time=11.1 ms
64 bytes from 10.9.224.99: icmp_seq=3 ttl=63 time=8.56 ms
64 bytes from 10.9.224.99: icmp_seq=4 ttl=63 time=10.2 ms

--- 10.9.224.99 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 8.555/9.784/11.106/0.953 ms
root@Ubuntu-PC-3:~#
```

Picture 44) Ping PC2(Destination) From PC3(Source)

```
root@Ubuntu-PC-3:~# ping 10.9.224.3
PING 10.9.224.3 (10.9.224.3) 56(84) bytes of data.
64 bytes from 10.9.224.3: icmp_seq=1 ttl=63 time=14.4 ms
64 bytes from 10.9.224.3: icmp_seq=2 ttl=63 time=8.76 ms
64 bytes from 10.9.224.3: icmp_seq=3 ttl=63 time=7.75 ms
64 bytes from 10.9.224.3: icmp_seq=4 ttl=63 time=7.41 ms
64 bytes from 10.9.224.3: icmp_seq=5 ttl=63 time=7.31 ms
^C
--- 10.9.224.3 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4007ms
rtt min/avg/max/mdev = 7.306/9.123/14.390/2.682 ms
root@Ubuntu-PC-3:~#
```

Picture 45) SSH from PC1(source) to DMZ-SW(Destination)

```
root@Ubuntu-PC-1:~# ssh -o HostKeyAlgorithms=+ssh-rsa -o KexAlgorithms=+diffie-hellman-group14-sha1 Houman@10.9.224.98
The authenticity of host '10.9.224.98 (10.9.224.98)' can't be established.
RSA key fingerprint is SHA256:TLlGcXRwDQCMVpNlWIPfFo/FyBhb+19adB0QnD5dMg.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.9.224.98' (RSA) to the list of known hosts.
*****
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* Technical Advisory Center. Any use or disclosure, in whole or in part, *
* of the IOSv Software or Documentation to any third party for any *
* purposes is expressly prohibited except as otherwise authorized by *
* Cisco in writing. *
(Houman@10.9.224.98) Password: *****
This SW supporter is Houman
*****
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*****
DMZ-SW>
```

Picture 46) SSH from PC1(source) to Router(Destination)

```
root@Ubuntu-PC-1:~# ssh -o HostKeyAlgorithms=+ssh-rsa -o KexAlgorithms=+diffie-hellman-group14-sha1 Houman@10.9.224.97
The authenticity of host '10.9.224.97 (10.9.224.97)' can't be established.
RSA key fingerprint is SHA256:iEg8E0MV/1ha9sNLAniE19nLxIYZd9RXIuyFah4oAJ4.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.9.224.97' (RSA) to the list of known hosts.

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* of the IOSv Software or Documentation to any third party for any *
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* Cisco in writing. *
(Houman@10.9.224.97) Password: *****
This ROUTER supporter is Houman
*****
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* purposes is expressly prohibited except as otherwise authorized by *
* Cisco in writing. *
*****
ROUTER1>
```

Picture 47) Using GNS3 Wireshark, to capture ICMPv4 traffic between Ubuntu-PC-1 and its Default Gateway (router interface)

Standard input [Ubuntu-PC-1 eth0 to DMZ-SW Gi0/1]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

icmp && ip.version == 4

No.	Time	Source	Destination	Protocol	Length	Info
9	9.981850	10.9.224.99	10.9.224.97	ICMP	98	Echo (ping) request id=0x000d, seq=1/256, ttl=64 (reply in 10)
10	9.988356	10.9.224.97	10.9.224.99	ICMP	98	Echo (ping) reply id=0x000d, seq=1/256, ttl=255 (request in 9)
12	10.983839	10.9.224.99	10.9.224.97	ICMP	98	Echo (ping) request id=0x000d, seq=2/512, ttl=64 (reply in 13)
13	10.989590	10.9.224.97	10.9.224.99	ICMP	98	Echo (ping) reply id=0x000d, seq=2/512, ttl=255 (request in 12)
14	11.985916	10.9.224.99	10.9.224.97	ICMP	98	Echo (ping) request id=0x000d, seq=3/768, ttl=64 (reply in 15)
15	11.989538	10.9.224.97	10.9.224.99	ICMP	98	Echo (ping) reply id=0x000d, seq=3/768, ttl=255 (request in 14)
17	12.987274	10.9.224.99	10.9.224.97	ICMP	98	Echo (ping) request id=0x000d, seq=4/1024, ttl=64 (reply in 18)
18	12.992839	10.9.224.97	10.9.224.99	ICMP	98	Echo (ping) reply id=0x000d, seq=4/1024, ttl=255 (request in ...)

> Frame 9: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on
 > Ethernet II, Src: 02:42:c0:8f:b2:00 (02:42:c0:8f:b2:00), Dst: 0c:83:2
 > Internet Protocol Version 4, Src: 10.9.224.99, Dst: 10.9.224.97
 > Internet Control Message Protocol

0000 0c 83 21 d3 00 01 02 42 c0 8f b2 00 08 00 45 00 ...!...B...
 0010 00 54 7d 94 40 00 40 01 e8 3d 0a 09 e0 63 0a 09 ...T}:@@...
 0020 e0 61 08 00 de 12 00 0d 00 01 90 51 53 67 00 00 ...a.....QS
 0030 00 00 69 53 0e 00 00 00 00 00 10 11 12 13 14 15 ...iS.....
 0040 16 17 18 19 1a 1b 1c 1d 1e 1f 20 21 22 23 24 25
 0050 26 27 28 29 2a 2b 2c 2d 2e 2f 30 31 32 33 34 35 ...&()*+,-./01:
 0060 36 37 38 39 3a 3b 3c 3d 3e 3f 40 41 42 43 44 45 ...6789:;<=>@A

Picture 48) capture of a SSH connection between Ubuntu-PC-1 and its Default Gateway

*Standard input [Ubuntu-PC-1 eth0 to DMZ-SW Gi0/1]

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ssh

No.	Time	Source	Destination	Protocol	Length	Info
10	10.112373	10.9.224.99	10.9.224.97	SSHv2	96	Client: Protocol (SSH-2.0-OpenSSH_9.6p1 Ubuntu-3ubuntu13...
12	10.128702	10.9.224.97	10.9.224.99	SSHv2	74	Server: Protocol (SSH-1.99-Cisco-1.25)
15	10.129249	10.9.224.99	10.9.224.97	SSHv2	170	Client: Key Exchange Init
18	10.143687	10.9.224.97	10.9.224.99	SSHv2	366	Server: Key Exchange Init
19	10.144906	10.9.224.99	10.9.224.97	SSHv2	326	Client: Diffie-Hellman Key Exchange Init
21	10.199674	10.9.224.97	10.9.224.99	SSHv2	70	Server: Diffie-Hellman Key Exchange Reply
23	10.201074	10.9.224.99	10.9.224.97	SSHv2	70	Client: New Keys
24	10.201097	10.9.224.97	10.9.224.99	SSHv2	70	Server: New Keys
27	10.412923	10.9.224.99	10.9.224.97	SSHv2	118	Client: Encrypted packet (len=64)
28	10.417741	10.9.224.97	10.9.224.99	SSHv2	118	Server: Encrypted packet (len=64)
30	10.417912	10.9.224.99	10.9.224.97	SSHv2	134	Client: Encrypted packet (len=80)
31	10.419993	10.9.224.97	10.9.224.99	SSHv2	614	Server: Encrypted packet (len=560)
32	10.420440	10.9.224.97	10.9.224.99	SSHv2	166	Server: Encrypted packet (len=112)
34	10.426089	10.9.224.97	10.9.224.99	SSHv2	150	Server: Encrypted packet (len=96)
35	10.426233	10.9.224.99	10.9.224.97	SSHv2	166	Client: Encrypted packet (len=112)
36	10.439106	10.9.224.97	10.9.224.99	SSHv2	134	Server: Encrypted packet (len=80)
40	15.041531	10.9.224.99	10.9.224.97	SSHv2	150	Client: Encrypted packet (len=96)
41	15.053681	10.9.224.97	10.9.224.99	SSHv2	102	Server: Encrypted packet (len=48)
43	15.053937	10.9.224.99	10.9.224.97	SSHv2	134	Client: Encrypted packet (len=80)
44	15.064376	10.9.224.97	10.9.224.99	SSHv2	118	Server: Encrypted packet (len=64)
45	15.064801	10.9.224.99	10.9.224.97	SSHv2	470	Client: Encrypted packet (len=416)
46	15.072841	10.9.224.97	10.9.224.99	SSHv2	102	Server: Encrypted packet (len=48)
47	15.075541	10.9.224.97	10.9.224.99	SSHv2	102	Server: Encrypted packet (len=48)
49	15.076012	10.9.224.97	10.9.224.99	SSHv2	150	Server: Encrypted packet (len=96)
50	15.079139	10.9.224.97	10.9.224.99	SSHv2	614	Server: Encrypted packet (len=560)
52	15.083130	10.9.224.97	10.9.224.99	SSHv2	166	Server: Encrypted packet (len=112)

> Frame 10: 96 bytes on wire (768 bits), 96 bytes captured (768 bits) on
 > Ethernet II, Src: 02:42:c0:8f:b2:00 (02:42:c0:8f:b2:00), Dst: 0c:83:2
 > Internet Protocol Version 4, Src: 10.9.224.99, Dst: 10.9.224.97
 > Transmission Control Protocol, Src Port: 42418, Dst Port: 22, Seq: 1,
 > SSH Protocol

0000 0c 83 21 d3 00 01 02 42 c0 8f b2 00 08 00 45 10 ...B
 0010 00 52 7e f4 40 00 40 06 e6 ca 0a 09 e0 63 0a 09 R~@:~
 0020 e0 61 a5 b2 00 16 c3 be 01 8b 32 02 c7 df 50 18 a~...2~
 0030 fa f0 53 88 00 00 53 53 48 2d 32 2e 30 2d 4f 70 SSSH H-2.0
 0040 65 6e 53 53 48 5f 39 2e 36 70 31 20 55 62 75 6e enSSH_9. 6p1 U
 0050 74 75 2d 33 75 62 75 6e 74 75 31 33 2e 35 0d 0a tu-3ubun tu13.

wireshark_Standard inputR1TDV2.pcapng | Packets: 110 - Displayed: 53 (48.2%) - Dropped: 0 (0.0%) | Profile: Default

Picture 49) Internet on PC1

```
root@Ubuntu-PC-1:~# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=127 time=46.7 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=127 time=53.1 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=127 time=52.9 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=127 time=40.4 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=127 time=48.8 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=127 time=38.5 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=127 time=38.5 ms
^C
--- 8.8.8.8 ping statistics ---
8 packets transmitted, 7 received, 12.5% packet loss, time 7010ms
rtt min/avg/max/mdev = 38.497/45.559/53.108/5.962 ms
root@Ubuntu-PC-1:~#
```

Picture 50) Internet on PC2

```
root@Ubuntu-PC-2:~# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=127 time=15.2 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=127 time=9.57 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=127 time=14.5 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=127 time=10.6 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=127 time=13.6 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=127 time=7.88 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=127 time=8.67 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=127 time=9.36 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=127 time=9.21 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=127 time=8.57 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=127 time=8.49 ms
64 bytes from 8.8.8.8: icmp_seq=12 ttl=127 time=6.32 ms
^C
--- 8.8.8.8 ping statistics ---
12 packets transmitted, 12 received, 0% packet loss, time 11017ms
rtt min/avg/max/mdev = 6.319/10.164/15.155/2.674 ms
root@Ubuntu-PC-2:~#
```

Picture 51) Internet on PC3

```
Ubuntu-PC-3 console is now available... Press RETURN to get started.  
ifup: can't open '/var/run/ifstate.new': No such file or directory  
root@Ubuntu-PC-3:~# ping 8.8.8.8  
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.  
64 bytes from 8.8.8.8: icmp_seq=1 ttl=127 time=12.4 ms  
64 bytes from 8.8.8.8: icmp_seq=2 ttl=127 time=14.9 ms  
64 bytes from 8.8.8.8: icmp_seq=3 ttl=127 time=10.1 ms  
64 bytes from 8.8.8.8: icmp_seq=4 ttl=127 time=16.4 ms  
64 bytes from 8.8.8.8: icmp_seq=5 ttl=127 time=8.55 ms  
64 bytes from 8.8.8.8: icmp_seq=6 ttl=127 time=26.1 ms  
^C  
--- 8.8.8.8 ping statistics ---  
6 packets transmitted, 6 received, 0% packet loss, time 5009ms  
rtt min/avg/max/mdev = 8.550/14.744/26.108/5.744 ms  
root@Ubuntu-PC-3:~#
```