Dr. Vishwanath Karad
MIT WORLD PEACE UNIVERSITY | PUNE
TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS

Semester: V (2023-24) **Subject:** Communication Networks

Name: Shreerang Mhatre **Class: TY**

Roll No: 52 **Batch: A3**

Experiment No: 04

Name of the Experiment: Study of advanced network with router and switches by using GNS3 simulator.

Performed on: 12/09/2023

Submitted on: 30/10/2023

Aim: To study advanced networks with router and switches by using GNS3 simulator.

Pre Requisite: Basic knowledge of network components and its working principle.

Objective:

- To study GNS3 network simulator.
- To simulate switches and routers to the network using GNS3.

Components and equipment required/studied:

- Computer with GNS3 software installed on the system (preferably Windows).

Theory:

The Graphical Network Simulator-3 is an open source, free network software emulator that is used by over one million network engineers, students, and architects all over the world to simulate, configure, test, and troubleshoot virtual and real networks.

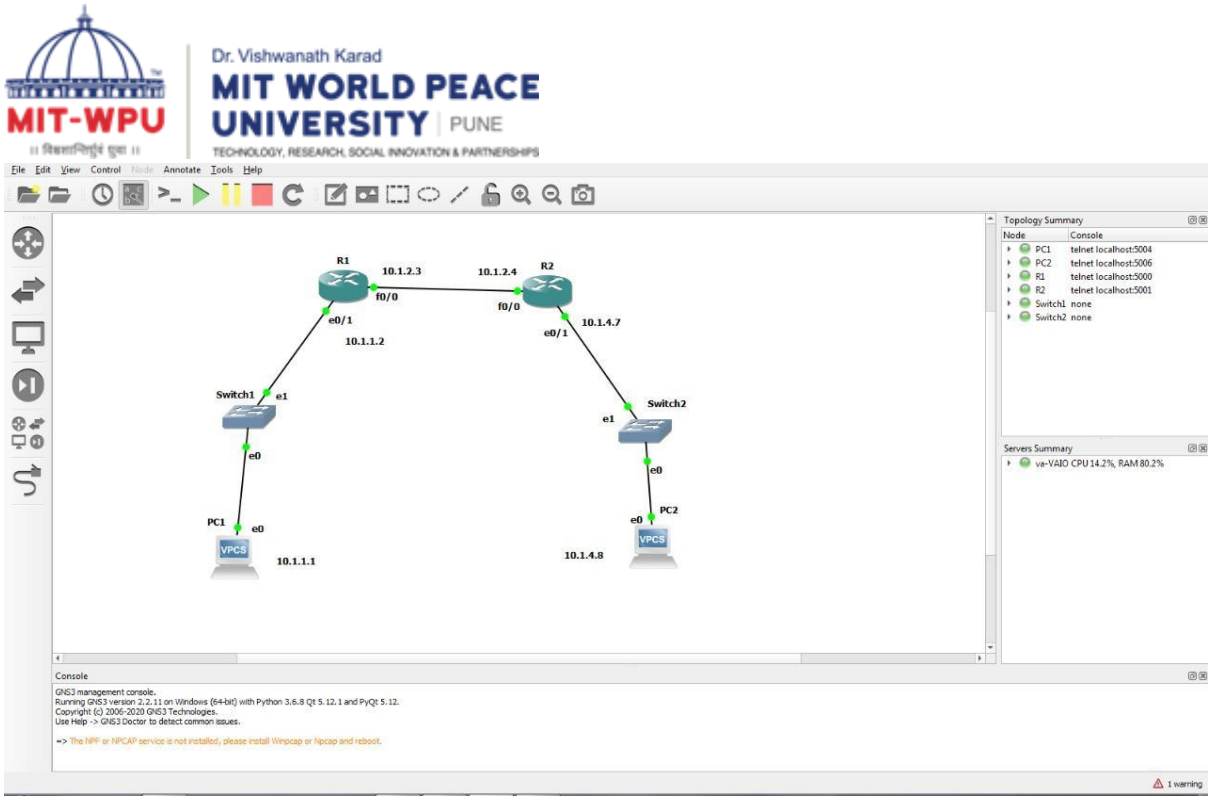
- When building a new enterprise network, it can be useful to simulate the network before going live. A simulation allows for better testing and troubleshooting, as well as creating different models to find the one that is most effective for the desired need.
- GNS3 that allows simulation of complex networks. You may be familiar with VMware or Virtual PC that are used to emulate various operating systems in a virtual environment.
- During this process, you need to create network devices and host them on the server process. In principle, the server component can be executed as a local virtual machine (VM) and as a remote VM
- The software allows users to simulate a wide range of networks, from running a small topology that consists of only a few devices on your laptop, to those that consist of many devices hosted on multiple servers or in the cloud.

GNS3 supports many devices from various network vendors including Cisco virtual switches, Cumulus Linux switches, Cisco ASAs, Brocade vRouters, HPE VSRs, Docker instances, multiple Linux appliances and many others.

Procedure:

1) Open GNS3 and enter name of new project
2) On the left-hand side of the screen browse to Router option and select a router IOS image (preferably c1700). Drag two routers on the screen.
3) For switch selection, browse to the switch section and choose two switches.
4) Browse to End devices to select VPCS.
5) To make connections, click on Add a link option on left-hand side and execute the following steps:
    1. Click on PC1, select Ethernet0/0 then drag to Switch 1.
    2. Make connection from Switch 1 to Router 1 and select Ethernet 0/0 option.
    3. Repeat the steps 1 and 2 for PC2, Switch 2 and Router 2.
    4. Make a connection between Router 1 and Router 2, and select FastEthernet 0/0 option.
6) Open Console from Menu bar.
7) Assign IP address to the PC1 and PC2.
8) Assign IP address to Router 1 and Router 2.

9) Similarly, we need to configure all the devices. Once it is done, we can check whether the network is correctly configured or not by using the ping command at different interfaces or by pinging from one PC to another PC.



Add min 4 – 5 screen shots

Add commands and related process

Conclusion:

Post Lab Questions:

1. Why the switch is not assigned with an IP Address?
2. Why is 255.255.255.0 written while assigning IP Address to Router?
3. How do you check whether the configuration is correct or not?
4. How can we use Wireshark for capturing the packet on GNS3?

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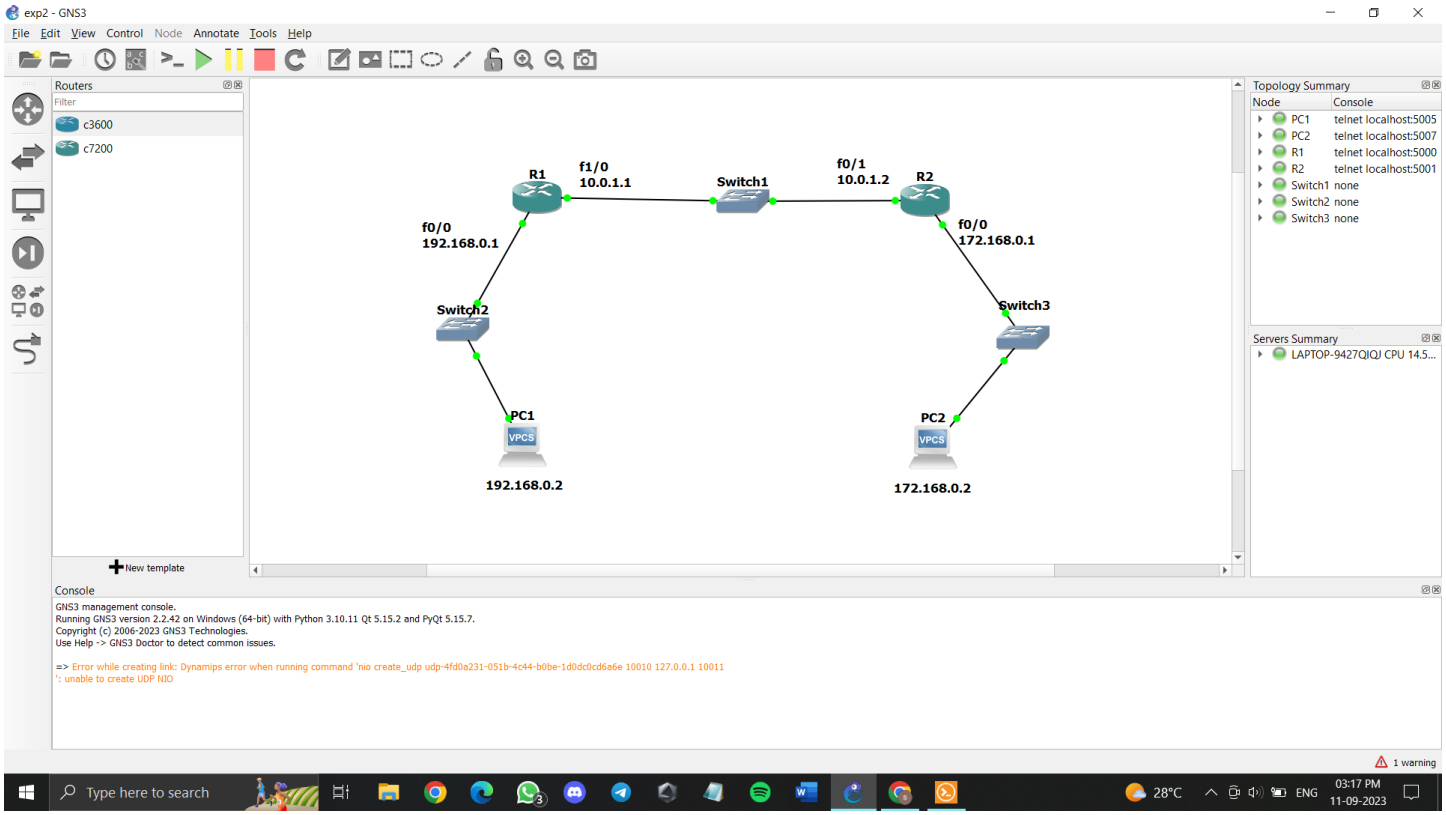

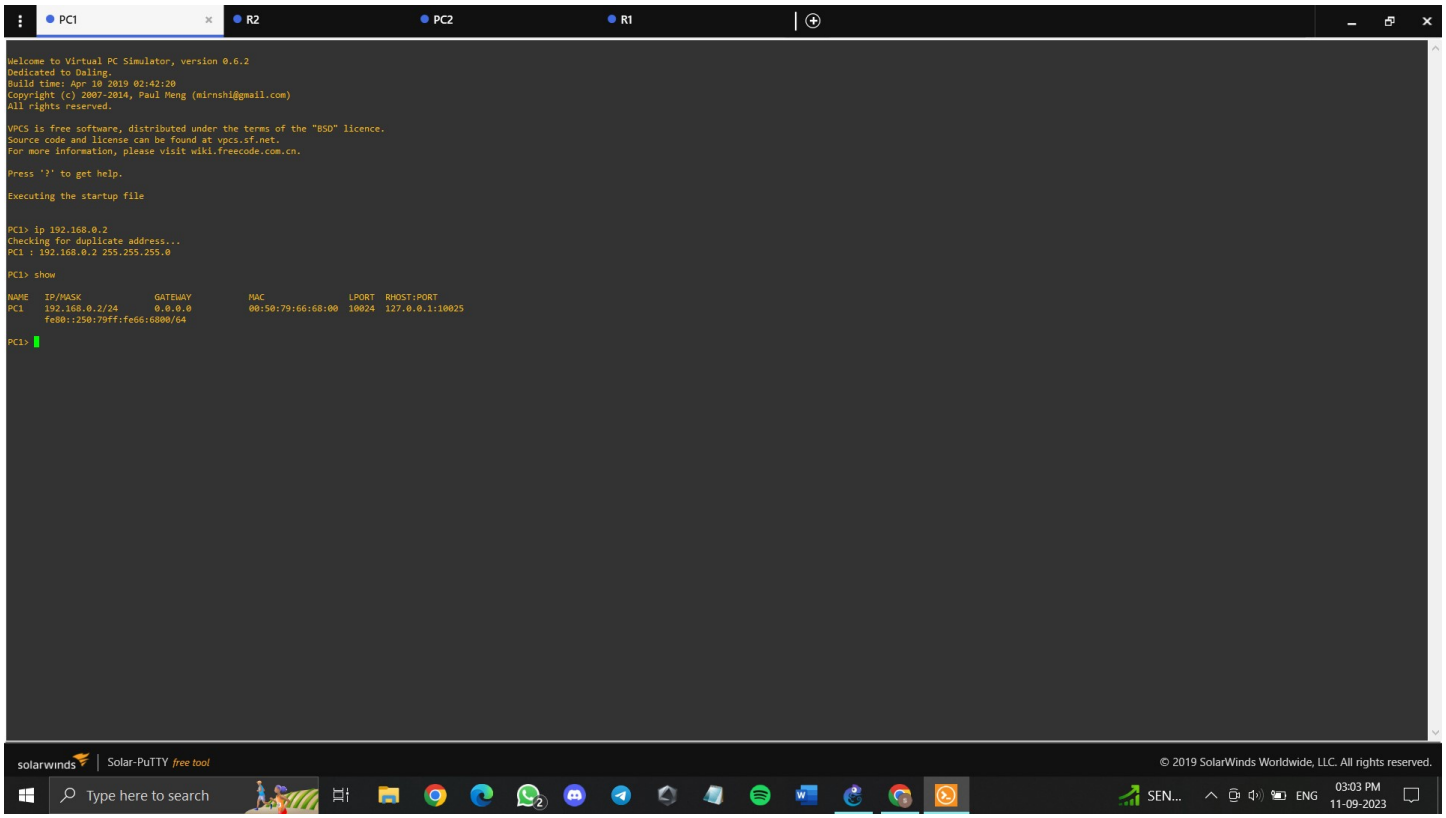

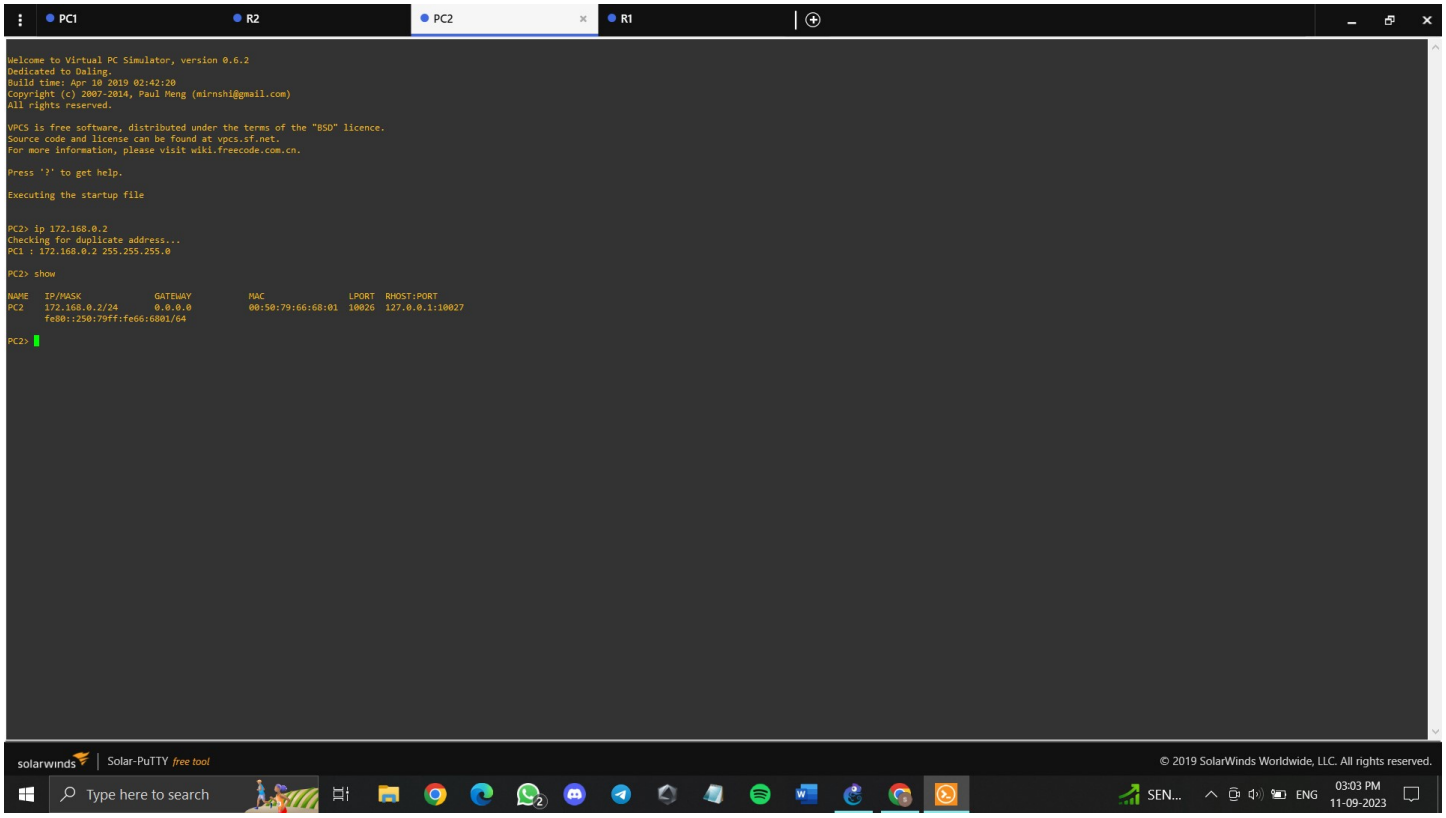
PC1
R2
PC2
R1
Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to Daling.
Build time: Apr 10 2019 02:42:20
Copyright (c) 2007-2014, Paul Meng (mirnshi@gmail.com)
All rights reserved.
VPCS is free software, distributed under the terms of the "BSD" licence.
Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.
Press '?' to get help.
Executing the startup file
PC2> ip 172.168.0.2
Checking for duplicate address...
PC1 : 172.168.0.2 255.255.255.0
PC2> show
NAME IP/MASK GATEWAY MAC LPORT RHOST:PORT
PC2 172.168.0.2/24 0.0.0.0 00:50:79:66:68:01 10026 127.0.0.1:10027
fe80::250:79ff:fe66:6801/64
PC2>
solarwinds | Solar-PuTTY free tool
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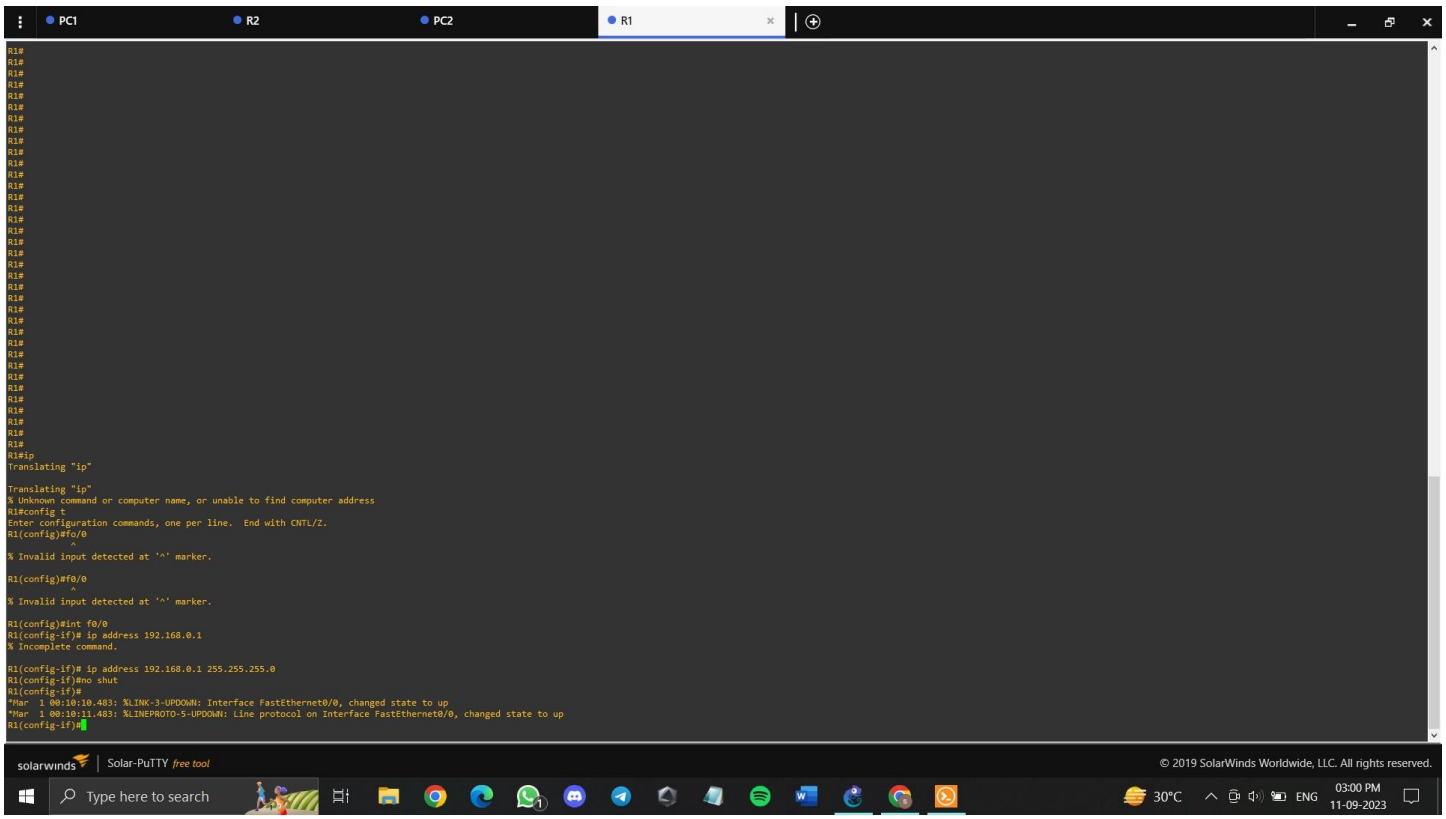
Type here to search
SEN...
ENG
03:03 PM
11-09-2023


PC1
R2
PC2
R1
R1#ip
Translating "ip"
Translating "ip"
% Unknown command or computer name, or unable to find computer address
R1#config t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#fo/0
^
% Invalid input detected at '^' marker.
R1(config)#f0/0
^
% Invalid input detected at '^' marker.
R1(config)#int f0/0
R1(config-if)# ip address 192.168.0.1
% Incomplete command.
R1(config-if)# ip address 192.168.0.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#
*Mar 1 00:10:10.483: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:10:11.483: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config-if)#
solarwinds | Solar-PuTTY free tool
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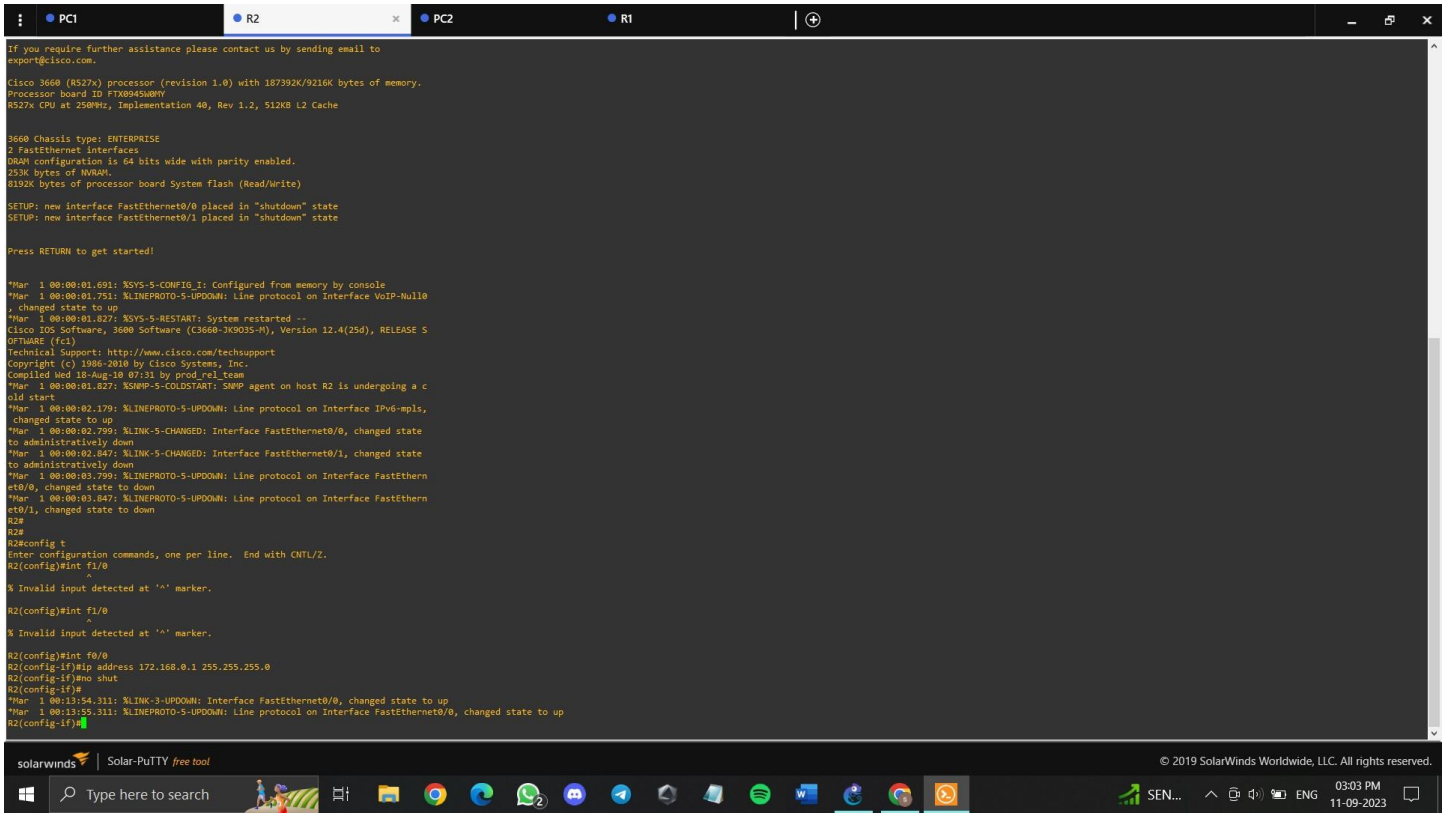
Type here to search
30°C
ENG
03:00 PM
11-09-2023


PC1
R2
PC2
R1
If you require further assistance please contact us by sending email to
export@cisco.com.
Cisco 3660 (R527x) processor (revision 1.0) with 187392K/9216K bytes of memory.
Processor board ID FTX0945W0MY
R527x CPU at 250MHz, Implementation 40, Rev 1.2, 512KB L2 Cache
3660 Chassis type: ENTERPRISE
2 FastEthernet interfaces
DRAM configuration is 64 bits wide with parity enabled.
253K bytes of NVRAM.
8192K bytes of processor board System flash (Read/Write)
SETUP: new interface FastEthernet0/0 placed in "shutdown" state
SETUP: new interface FastEthernet0/1 placed in "shutdown" state
Press RETURN to get started!
*Mar 1 00:00:01.691: %SYS-5-CONFIG_I: Configured from memory by console
*Mar 1 00:00:01.751: %LINEPROTO-5-UPDOWN: Line protocol on Interface VoIP-Null0
, changed state to up
*Mar 1 00:00:01.827: %SYS-5-RESTART: System restarted --
Cisco IOS Software, 3600 Software (C3660-JK9O3S-M), Version 12.4(25d), RELEASE S
OFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Wed 18-Aug-10 07:31 by prod_rel_team
*Mar 1 00:00:01.827: %SNMP-5-COLDSTART: SNMP agent on host R2 is undergoing a c
old start
*Mar 1 00:00:02.179: %LINEPROTO-5-UPDOWN: Line protocol on Interface IPv6-mpls,
changed state to up
*Mar 1 00:00:02.799: %LINK-5-CHANGED: Interface FastEthernet0/0, changed state
to administratively down
*Mar 1 00:00:02.847: %LINK-5-CHANGED: Interface FastEthernet0/1, changed state
to administratively down
*Mar 1 00:00:03.799: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to down
*Mar 1 00:00:03.847: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to down
R2#
R2#
R2#config t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int f1/0
^
% Invalid input detected at '^' marker.
R2(config)#int f1/0
^
% Invalid input detected at '^' marker.
R2(config)#int f0/0
R2(config-if)#ip address 172.168.0.1 255.255.255.0
R2(config-if)#no shut
R2(config-if)#
*Mar 1 00:13:54.311: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:13:55.311: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R2(config-if)#
solarwinds | Solar-PuTTY free tool
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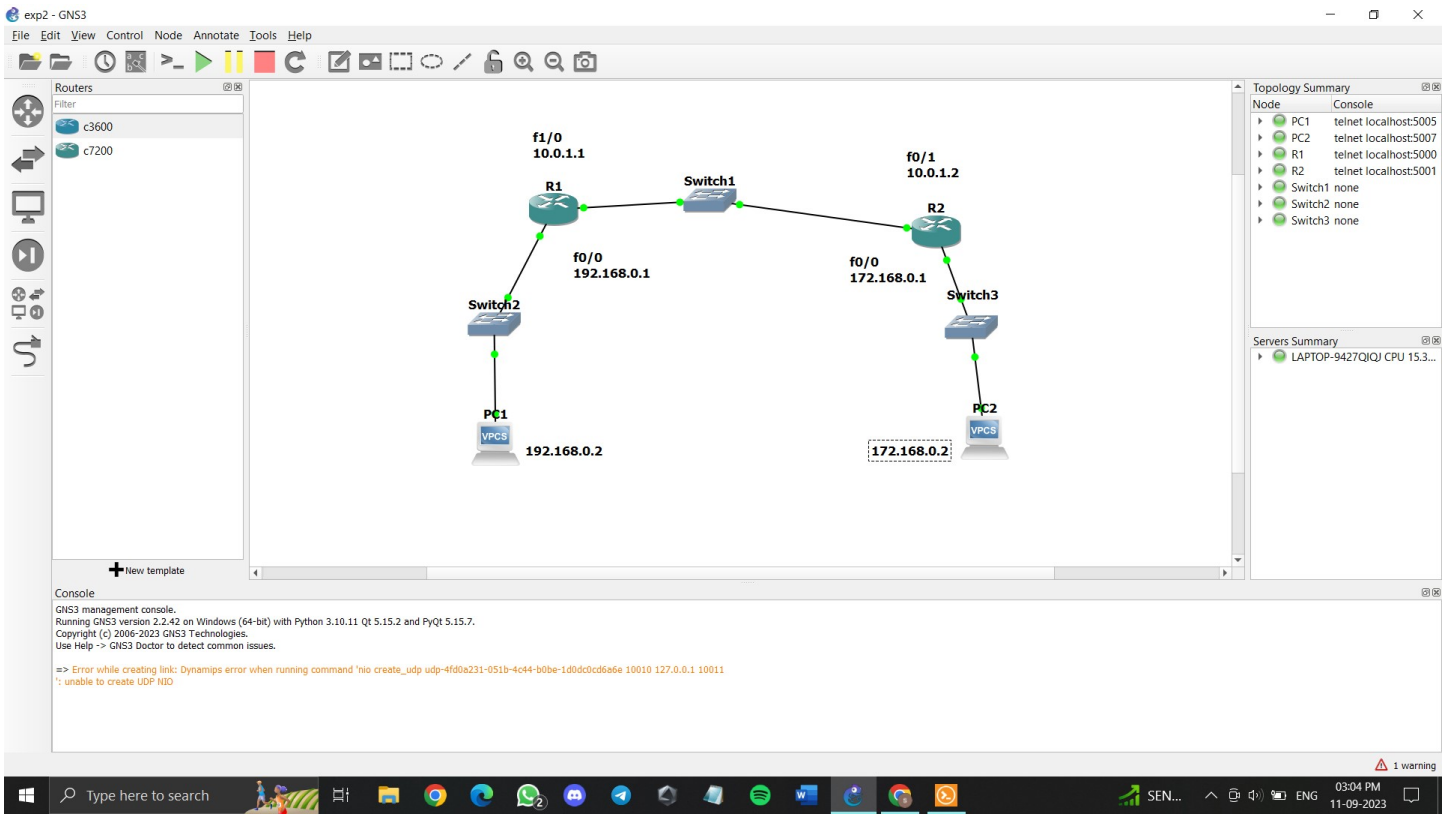
Type here to search
SEN...
ENG
03:03 PM
11-09-2023


exp2 - GNS3
File Edit View Control Node Annotate Tools Help
Routers
Filter
c3600
c7200
New template
f1/0
10.0.1.1
R1
Switch1
f0/1
10.0.1.2
R2
f0/0
192.168.0.1
f0/0
172.168.0.1
Switch2
Switch3
PC1
VPCS
192.168.0.2
PC2
VPCS
172.168.0.2
Topology Summary
Node
Console
PC1 telnet localhost:5005
PC2 telnet localhost:5007
R1 telnet localhost:5000
R2 telnet localhost:5001
Switch1 none
Switch2 none
Switch3 none
Servers Summary
LAPTOP-9427QJQJ CPU 15.3...
Console
GNS3 management console.
Running GNS3 version 2.2.42 on Windows (64-bit) with Python 3.10.11 Qt 5.15.2 and PyQt 5.15.7.
Copyright (c) 2006-2023 GNS3 Technologies.
Use Help -> GNS3 Doctor to detect common issues.
=> Error while creating link: Dynamips error when running command 'nio create_udp udp-4fd0a231-051b-4c44-b0be-1d0dc0cd6a6e 10010 127.0.0.1 10011
': unable to create UDP NIO
1 warning
Type here to search
SEN...
ENG
03:04 PM
11-09-2023

Exp 4

Name: Shreerang Mhalve
Roll no: 52
Batch: A3
Class: TY
Date: 09/10/2023

* Post-Lab Question

Q1) Why the switch is not assigned with an IP Address?

-> Switch doesn't need IP of its own, to be able to move ethernet frames & contain data packets} become incoming & outbound physical ports and its doesn't have a management system that a user can access so it doesn't have an IP address for itself

Q2) Why is 255.255.255.0 written while assigning IP Address to Router?

-> The notation "255.255.255.0" is used when assigning an IP address to a rater, or any network device, to specify the subnet mask. The subnet mask

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defines the network portion & the host portion of an IP address, helping devices understand which part of the IP address represents the network and represents the specific device.

Q3) How do you check whether the configuration is correct or not?

→ By ping our device through router, we can check wether the configuration is correct
Syntax of ping is "ping "router IP_address".

Q4) How can we use wireshark for capturing the packet on GNS3?

→ ① Install wireshark
② Configure GNS3 for Packet Capture
③ Configure wireshark
④ Start Packet Capture
⑤ Simulate Network Activity in GNS3
⑥ Analyze Captured Packets
⑦ Stop Packet Capture
⑧ Save Captured Packets
⑨ Additional Configuration
⑩ Disconnect & Remove the Cloud Device