



Republic of the Philippines
BATANGAS STATE UNIVERSITY
The National Engineering University
Alangilan Campus

Golden Country Homes, Alangilan Batangas City, Batangas, Philippines 4200
Tel Nos.: (+63 43) 425-0139 local 2222 / 2223
E-mail Address: cics.alangilan@g.batstate-u.edu.ph | Website Address:
<http://www.batstate-u.edu.ph>

College of Informatics and Computing Sciences

Name: Lipata, Riazal A. **Score:** /
Year and Section: 4107 **Date:** September 12, 2024

Laboratory Activity 1
Use of Diagnostic Commands in Packet Tracer

Objective:
Students will learn to use diagnostic commands to gather information about end-user devices, network devices, and diagnose connectivity issues within a network using Cisco Packet Tracer.

Part 1: Gather End User Device Settings
Learn how to gather IP configuration details of end-user devices.

- Process:**
1. Open Cisco Packet Tracer and create a simple network with at least two PCs connected to a switch.



2. Assign IP addresses to the PCs:

PC1: IP Address: 192.168.1.2, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.1.1

IP Configuration

Interface

FastEthernet0

IP Configuration

DHCP

Static

IPv4 Address

192.168.1.2

Subnet Mask

255.255.255.0

Default Gateway

192.168.1.1

DNS Server

0.0.0.0

PC2: IP Address: 192.168.1.3, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.1.1

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.1.3

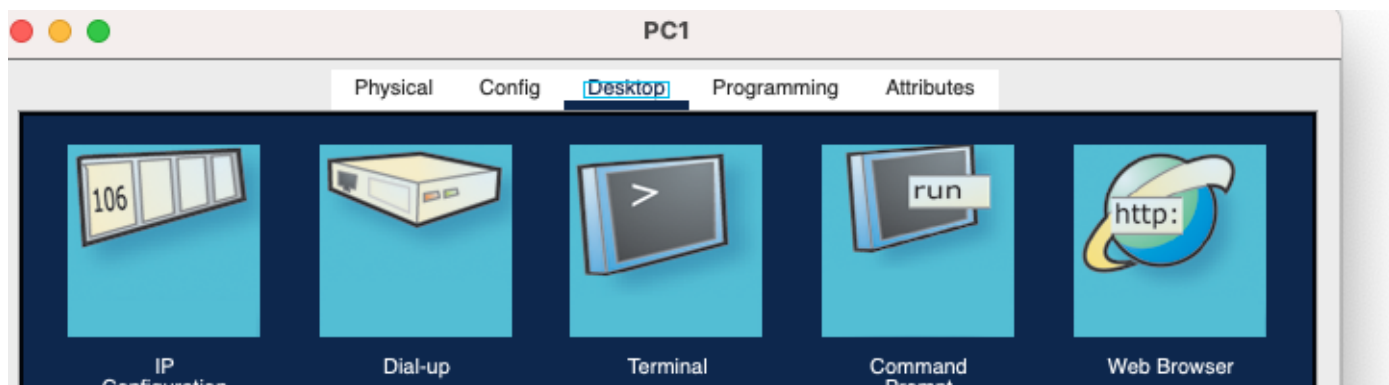
Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.1

DNS Server: 0.0.0.0

3. Gather IP Configuration Details:

- Click on PC1. Go to **Desktop > Command Prompt**.



- Type the command `ipconfig` and press Enter.

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address...: FE80::230:A3FF:FE12:5276
    IPv6 Address...: ::
    IPv4 Address...: 192.168.1.2
    Subnet Mask...: 255.255.255.0
    Default Gateway...: ::
                        192.168.1.1
```

- Record the following information:

IP Address: 192.168.1.2
 Subnet Mask: 255.255.255.0
 Default Gateway: 192.168.1.1

Assessment Questions:

What is the significance of the Subnet Mask in the IP configuration of a device?

- The significance of the subnet mask in the IP configuration of a device is that the subnet mask helps to identify which parts of the IP address is for the network and which is for the device. It also helps to know if other devices are on the same network.



Leading Innovations, Transforming Lives, Building the Nation

Republic of the Philippines

BATANGAS STATE UNIVERSITY

The National Engineering University

Alangilan Campus

Golden Country Homes, Alangilan Batangas City, Batangas, Philippines 4200

Tel Nos.: (+63 43) 425-0139 local 2222 / 2223

E-mail Address: cics.alangilan@g.batstate-u.edu.ph | Website Address:

<http://www.batstate-u.edu.ph> **College of Informatics and Computing Sciences**

If PC1's IP address is set to 192.168.1.2 but the Subnet Mask is mistakenly set to 255.255.0.0, what potential issues could arise?

- If PC1's IP address is set to 192.168.1.2 but the Subnet Mask is mistakenly set to 255.255.0.0, the potential issues that could arise are network issues, and problems with the connections and communication between other devices.

If PC1 and PC2 are on the same network but have different Default Gateway addresses, what connectivity issues might occur?

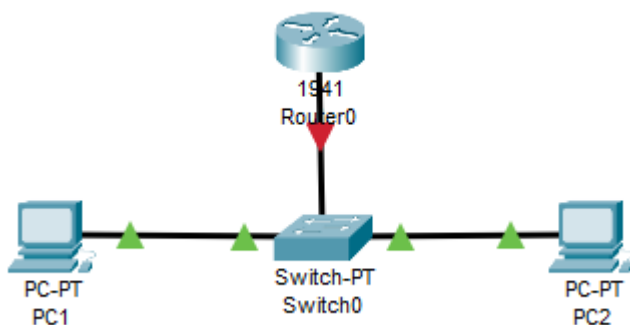
- If PC1 and PC2 are on the same network but have different Default Gateway addresses, they might have problems connecting to other devices outside their network that may lead to slower connections and communication issues.

Part 2: Gather Information about Network Devices

Learn how to gather information about network devices, such as switches and routers.

Process:

1. Add a Router to the existing network and connect it to the switch using a straight-through cable.



2. Configure the Router:

- Assign the IP address **192.168.1.1/24** to the interface connected to the switch. •

Use the following commands on the router's CLI:

```
Router> enable
Router# configure terminal
Router(config)# interface gigabitEthernet 0/0
Router(config-if)# ip address 192.168.1.1 255.255.255.0
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# exit
```

```

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface gigabitEthernet 0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
|

```

3. Verify Router Configuration:

- From the router CLI, use the `show ip interface brief` command.
- Record the IP address and status of the router's interfaces.

```

Router#show ip interface
GigabitEthernet0/0 is up, line protocol is up (connected)
Internet address is 192.168.1.1/24
Broadcast address is 255.255.255.255
Address determined by setup command

```

4. Gather Device Information:

- Use the `show version` command on the router to gather information about the device model, IOS version, and system uptime.

```

Router#show version
Cisco IOS Software, C1900 Software (C1900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE
SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 23-Feb-11 14:19 by pt_team

```

```

ROM: System Bootstrap, Version 15.1(4)M4, RELEASE SOFTWARE (fc1)
cisco1941 uptime is 4 minutes, 20 seconds
System returned to ROM by power-on
System image file is "flash0:c1900-universalk9-mz.SPA.151-1.M4.bin"
Last reload type: Normal Reload

```

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at: <http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

```

Cisco CISC01941/K9 (revision 1.0) with 491520K/32768K bytes of memory.
Processor board ID FTX152400KS
2 Gigabit Ethernet interfaces
DRAM configuration is 64 bits wide with parity disabled.
256K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

```

```
License Info:

License UDI:

-----
Device#      PID                      SN
-----
*0           CISCO1941/K9                  FTX15243I0Q-

Technology Package License Information for Module:'c1900'

-----
Technology    Technology-package      Technology-package
Current      Type                    Next reboot
-----
ipbase        ipbasek9                ipbasek9
security      None                    None
data          None                    None

Configuration register is 0x2102
```

Assessment Questions:

Why is the show ip interface brief command useful for network administrators?

- The show ip interface brief command is useful for network administrators because it allows them to see the IP addresses and the status of the interface that helps them to check the connections and easily identify the issues.

What information can you obtain from the show version command that is critical when planning an upgrade for the router?

- The information that I can obtain from the show version command that is critical when planning an upgrade for the router are the IOS version of the software, and model.

Part 3: Diagnose Connectivity Issues

Learn how to diagnose and troubleshoot connectivity issues using ping and traceroute commands.

Process:

- 1. Test Connectivity:
 - o From **PC1**, open the **Command Prompt** and type `ping 192.168.1.3` (PC2's IP address).
 - o Record the results. If the ping is successful, note the response times. If it fails, document the error message.



Republic of the Philippines
BATANGAS STATE UNIVERSITY
The National Engineering University
Alangilan Campus

Golden Country Homes, Alangilan Batangas City, Batangas, Philippines 4200

Tel Nos.: (+63 43) 425-0139 local 2222 / 2223

E-mail Address: cics.alangilan@g.batstate-u.edu.ph | Website Address:

<http://www.batstate-u.edu.ph> **College of Informatics and Computing Sciences**

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time=21ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 21ms, Average = 5ms
```

2. Simulate a Connectivity Issue:

- On the router, go to the interface connected to the switch and shut it down using the command shutdown.

```
Switch>enable
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface FastEthernet 1/1
Switch(config-if)#shutdown

Switch(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/1, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/1, changed state to down
```

Note: You may configure other devices on the network to simulate a connectivity issue.

- Try pinging from PC1 to PC2 again.

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

3. Diagnose the Issue:

- Use the `tracert` command from PC1 to trace the route to PC2.
- Observe where the connection fails.


```
C:\>tracert 192.168.1.3

Tracing route to 192.168.1.3 over a maximum of 30 hops:

  1  *      *      *      Request timed out.
  2  *      *      *      Request timed out.
  3  *      *      *      Request timed out.
  4  *      *      *      Request timed out.
  5  *      *      *      Request timed out.
  6  *      *      *      Request timed out.
  7  *      *      *      Request timed out.
  8  *      *      *      Request timed out.
  9  *      *      *      Request timed out.
 10 *      *      *      Request timed out.
 11 *      *      *      Request timed out.
 12 *      *      *      Request timed out.
 13 *      *      *      Request timed out.
 14 *      *      *      Request timed out.
 15 *      *      *      Request timed out.
 16 *      *      *      Request timed out.
 17 *      *      *      Request timed out.
 18 *      *      *      Request timed out.
 19 *      *      *      Request timed out.
 20 *      *      *      Request timed out.
 21 *      *      *      Request timed out.
 22 *      *      *      Request timed out.
 23 *      *      *      Request timed out.
 24 *      *      *      Request timed out.
 25 *      *      *      Request timed out.
 26 *      *      *      Request timed out.
 27 *      *      *      Request timed out.
 28 *      *      *      Request timed out.
 29 *      *      *      Request timed out.
 30 *      *      *      Request timed out.

Trace complete.
```

4. Resolve the Issue:
- Reactivate the router interface using the `no shutdown` command.

```
Switch>enable
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface FastEthernet 1/1
Switch(config-if)#no shutdown

Switch(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/1, changed state to up
|
```

- Re-test the connectivity by pinging from PC1 to PC2.

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Assessment Questions:

What is the significance of the `tracert` command in diagnosing network issues?

- ' The `tracert` command is important in diagnosing network issues because it helps identify which interfaces have an issue.

After shutting down the router’s interface, at what point does the `tracert` command fail?

-

How did you resolve the connectivity issue, and why was this method effective?

- I resolved the connectivity issue by entering the `no shutdown` command to reactivate the switch interface.