



Performance Evaluation of Wide Area Network using Cisco Packet Tracer

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ABSTRACT

Computer networks have turn out to be most significant in the current society. The huge number of MNC'S hang on the good operative of their networks for communications, management, administration, online business solutions, etc. The WAN is the most necessary computer network used to join the different cities and states So in this paper, with the use of Cisco Packet Tracer we will design a WAN network. This paper defines how we can use the cisco packet simulation tool to improve a simulation model for the WAN network to the cities. The study provides understanding to the different concepts for example designing the topology for WAN networks, the assignment of ip addresses to devices, switches and routers , and the transmission of information using Virtual Wide Area Networks. (VWANs).

Key words: VWAN, Cisco packet tracer, IP Addressing, Topology design

1. INTRODUCTION

We can create a WAN by connecting large numbers of local area networks. Computer networks were used to share information between different systems. The WAN is an interconnecting network between cities and capitals.. The WAN is the interconnecting network of cities and capitals. At present day the network is accessible from everywhere at any time, so we have to provide the fast and secure connection irrespective of location to every user. The Cisco packet tracer provides the path to calculate the effect of a hardware upgrade, changing topology, and increase of network traffic, or using of latest applications on the network. A WAN network is developed with the use of Cisco Packet Tracer in this document. The paper describes how to use the Cisco packet method to build a WAN simulation system for a state's capital cities. This study delivers awareness into multiple concepts such as the configuration of IP addresses and how to transmit information to a single network in the form of a packet and the use of Virtual Wide Area Networks .CCNA: Cisco Certified Network Associate CCNA [1][3] is a networking certification made by Cisco Systems. It is used by Cisco to identify basic capabilities for the setting up and maintenance of medium-sized networks. This software allows us to

connect different computers like routers, switches and different users to establish communication between each other to exchange data. It is also scalable to construct a methodological and reliable .network. Portability is one of the features of the WAN function software.

Dynamic Host Configuration Protocol (DHCP):

Dynamic Host Configuration Protocol [2][4] is useful to model the host's specific IP address. It is used to provide different types. Subnet mask used to determine whether or not the host is on the network. The sub net mask is used in.

- 1) Router Address
- 2) DNS Address
- 3) Class Identifier

The IP address should be different when we find a network where we should use IP addresses for systems or PCs. Total system is useless if it does not offer unique Ip address. For example, if these two systems don't have different IP addresses, take two systems PC1, PC2, the data coming through it doesn't understand going to a specific system and the systems get corrupted. As we took two computers, we assign Ip addresses manually, according to our example. s we took two pc's, we assign Ip addresses manually. But in case where there are many pc's or devices it is difficult to assign, so DHCP is used.

2.USER INTERFACE

The monitor will be shown in the city's digital topology.

- The Cisco Packet Tracer [5][7] network emulator is easy to implement and provides a clear appeal to the graphical user interface.
- Five switches will be shown, separate VLANs and 1 router will be connected to the VWAN.
- The interface of the command line (CLI) will allow you to adjust it or customize it

Hardware interfaces

We need certain basic requirements for the usage of cisco packet simulator, which are:-

- 1.A system with minimum RAM of 512 MB
- 2.a system contain storage of 500MB minimum disk space

Software interfaces :

The requirements for the project are:

1. The system with operating system of windows 7 or above
2. The system with the installation of cisco network simulation tool.

Cisco Packet Tracer

Cisco Packet Tracer[1][2] has two modes namely Physical mode and Logical mode. This Packet Tracer is a developed by the Cisco for virtual design of network architectures and the topologies this tool allows all the users to create their own network designs and simulate according to present world computer networks. This software permits all users to use a graphical command line interface to run the setup of Cisco routers [3] and devices. It is a drag - drop interface which includes to configure IP address of routers, switches, PC and many more. In this we can configure switches in two different ways. Firstly ,by writing some commands in CLI which is Command Line Interface and the other way is by giving IP address to the external devices which are connected for the switch. As Packet Tracer is flexible it allows users to add or it allow user to remove virtual network devices.

3.IPv4 ADDRESSING

An IP address is an address given to every system to identify each system during communication and it is in numeric form., Every device is assigned by an its own individual IPp address for communication. An ipv4 address is in size of 32 bits of data, This IP address is derived into different classes based on the requirements, it is a logical address given to users to establish network communication and 2^{32} address can be given to users. It is in the form of 132.148.20.100 in which each number is of 8 bits. The ip address is of two various types one of it is network address and also called as service address and another is receiver address. The IP address is designed to establish communication between server and the host and to provide the address to the users to establish the secure communication

Classes of Addresses

There are classified into five various classes and are shown below

Table 1: Types of IPv4 addressing mode

Address class	Range
Class A Address	1 - 127
Class B Address	128 - 191
Class C Address	192 - 223
Class D Address	224 - 239
Class E Address	240 - 255

Subnet Mask

The subnet mask is used to identify the subnet allocated to the ip address. The ip address are divided as two parts one is reciever address and another is server address.The subnet perorms bitwise AND operations to identify the network address of ip address[21].

Table 2: Default subnet masks for all network classes

Class	Format	Default subnet mask
A	Network.host.host.host	255.0.0.0
B	Network.host.host.host	255.255.0.0
C	Network.host.host.host	255.255.255.0

4.BASIC WAN ARCHITECTURE

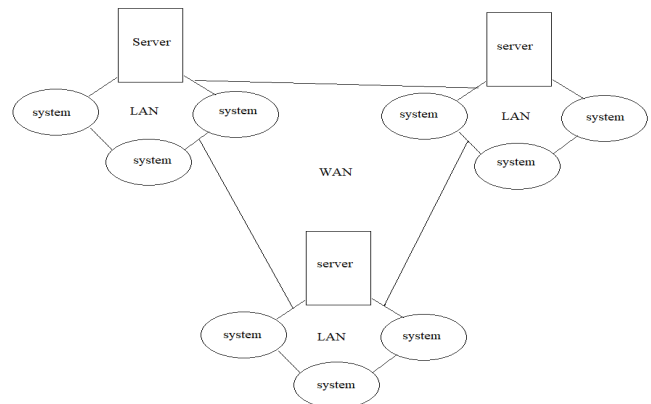


Figure 1: Basic WAN architecture

Wide area network connects multiple number of LANS from different places and forms into a single network. The switches and routers and all the devices combine together and establish the connection between themselves and forms the local area network and a various number of LANs connect each other and forms a single network called WAN network[22].while local network establish connection between colleges and institutes these WAN area networks connects different LANs and establish the communication between different cities.

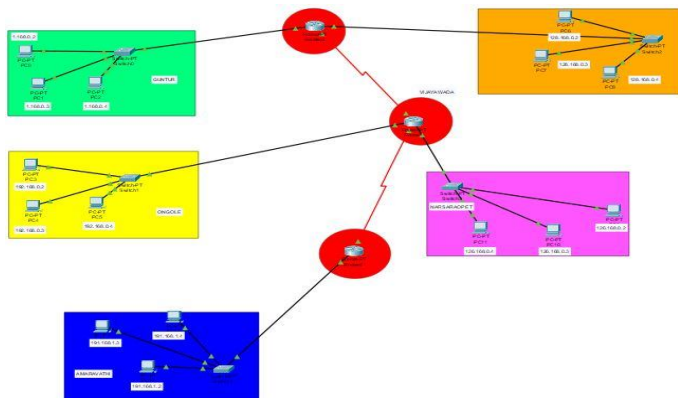


Figure 2: Implemented WAN architecture in Cisco Packet Tracer.

5.CONFIGURATION

Router Configuration

The IP address should be given to router in config option, as see in the diagram Those configurations should be considered according to the interface. Router to Router connection is another impactful thing which should be taken into consideration and in serial ports we can configure the connection to the routers as In the diagram

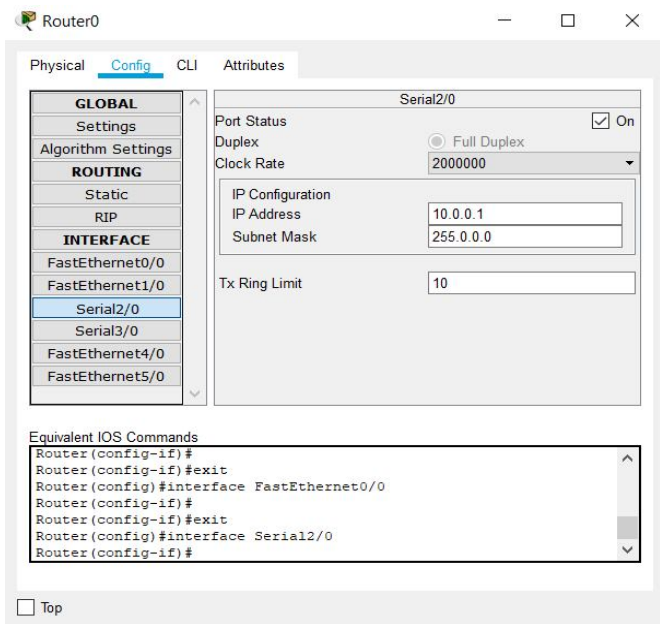


Figure 3: Router configuration

System Configuration

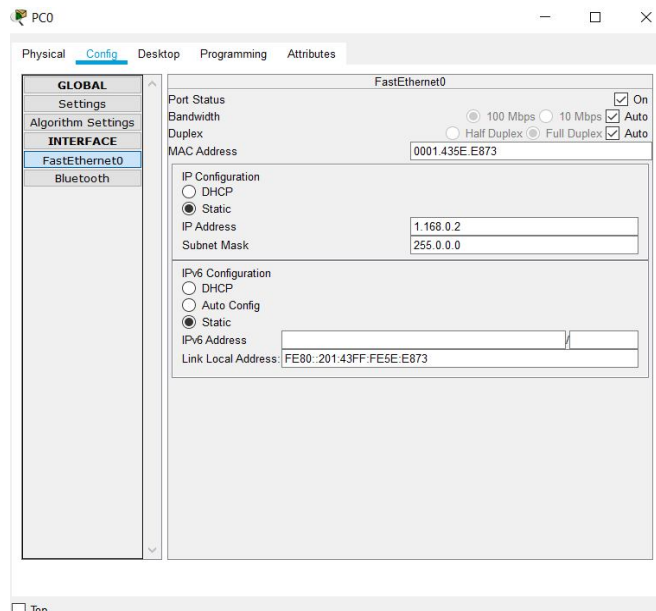
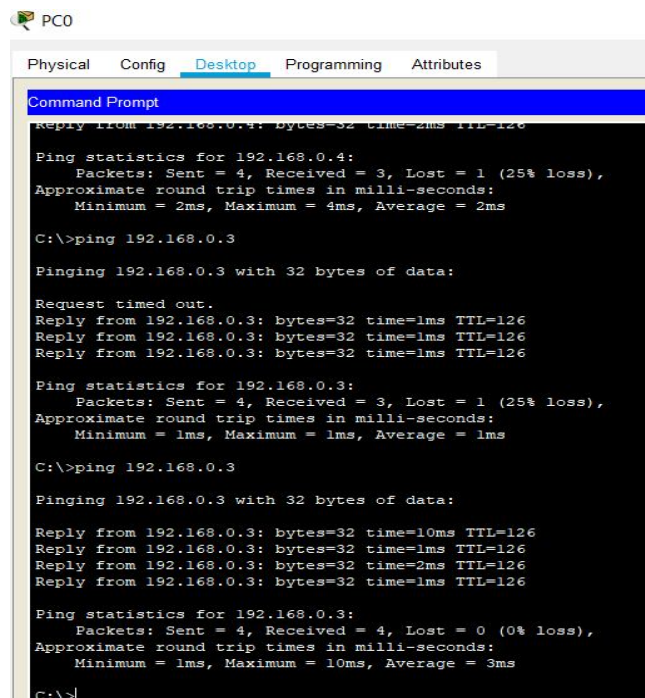


Figure 4: System configuration

In system configuration the ip address is assigned to the system and and the router address is filled in the gateway address to establish the connection between the router and the system.

6.RESULTS



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PCO
Physical Config Desktop Programming Attributes
Command Prompt
Reply from 192.168.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 10ms, Average = 3ms

C:\>ping 1.168.0.4

Pinging 1.168.0.4 with 32 bytes of data:

Reply from 1.168.0.4: bytes=32 time<1ms TTL=128
Reply from 1.168.0.4: bytes=32 time<1ms TTL=128
Reply from 1.168.0.4: bytes=32 time<1ms TTL=128
Reply from 1.168.0.4: bytes=32 time<1ms TTL=128

Ping statistics for 1.168.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 128.168.0.4

Pinging 128.168.0.4 with 32 bytes of data:

Request timed out.
Reply from 128.168.0.4: bytes=32 time<1ms TTL=127
Reply from 128.168.0.4: bytes=32 time<1ms TTL=127
Reply from 128.168.0.4: bytes=32 time<1ms TTL=127

Ping statistics for 128.168.0.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
    
```

7.CONCLUSION

Designing the Wide Area Network scenario provides the substructure for all other system exposures, such as network security and provides the basis for safety, organizational effectiveness, e-learning environments and secure transactions. This paper tells us the designing of network made by Cisco tool, as well as we can be able to implement these scenarios in a district's various locations. In the wide area network, we can also provide email security and further improve its security during message transmission.

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