Study And Analysis Of Local Area Network By Using Packet Tracer

D. P. Tripathi, P. Saleem Akram, P. Ravi Teja, M. Siri Chandana

Abstract : In our new era PCs become our part of life for every personal and professional requirement. Majority of organizations depend on the finest possible working of their systems for correspondences, organization, mechanization, online business solutions, and so on. LAN is the best fundamental and significant PC system claimed by discrete organizations and might be utilized for interconnection of wide region systems. A LAN provides effective cost sharing of fast processing information handling gear, for example, mass stockpiling media, centralized server PCs or tiny computers and various types of printers. Asset sharing is generally similar as significant where a Local Area Network (LAN) serves as the entrance path for an Internet. In view of this, framework supervisor's requirement professional tools to help them with the motivation of improvement of QoS and maintenance of LANs. So in our present article, a LAN system is structured utilizing Cisco Packet Tracer. This article explains just how the apparatus can be used to build up a re-enactment model of the Local Area Network (LAN) for College of Engineering which contains different departments like Bio Technology (BT), Civil, Mechanical, ECE and EEE of our University. The examination gives a knowledge into different ideas such as IP address setup, topology plan and how to send data as packets in a solitary network and for the usage of Virtual Local Area Networks to isolate the heavy traffic produced by various departments by using a main Server.

Index Terms : Local Area Network, IP Address, Subnetting, Ping Test, Computer Networks, Cisco Packet Tracer

1. INTRODUCTION

The requirement for PC systems administration was an effect of the requirement to use PCs for exchanging information [1] in an association in form of messages or packets, exchanging documents and data bases, etc. Regardless of whether the organization is situated in one structure or spread over a huge grounds, the requirement for systems administration the computers cannot be over underscored. As the name assumes, a Local Area Network (LAN) connects PCs in a limited physical territory [2-4]. It gives high-data transfer capacity correspondence over cheap transmission media .The corporate LAN has developed from an easy basis business segment to a profoundly vibrant, noticeable core asset that activities depend on to help everyday tasks to their market accomplishment. E-Governance is a system of open segment order and is a significant advance in the adjustment of metropolitan organization, with E-Governance joins the utilization of ICT's [6] by government's association. The anticipated calculation utilizes insight of calculation for security of substance in e-governance executing a standard based methodology [7-10] from computationalKnowledge and client's present purpose of area data. On a work area PC, a recreation model had been actualized and assessment utilizing meandering client's continuous position-based data [11, 12] exhibits that proposed system can capably preserve wandering client position secrecy while giving better execution, ensured position privacy, and better nature of administration in e-Governance.

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2. RELATED WORK

2.1 Design and Analysis of a Network Topology in Cisco Packet Tracer tool

The present world is incomprehensible without messages, web based banking, talks and other significant administrations gave by the web. In this administrations PC system assume significant job to trade the data starting with one point then onto the next. So we can say correspondence arrange, alongside transportation systems, have turned out to be basic foundation in every general public that permits the progression of individuals data and merchandise. For interconnecting of several parts [13-16], organize topology depict physical as well coherent appearance and correlation between plan of PCs, links and other segment in an information correspondence system and how to be utilized for taking a parcel from one gadget and sending it through the system to another gadget on an alternate system [17]. So in this article, we are planning a system utilizing a system test system device for example Cisco parcel tracer, while keeping centre around transport, star, work topology to comprehend different ideas, for example, topology structure, IP address arrangement and how to drive data in type of bundle in a solitary system [18-21]. In this article, we actualized different topologies with best possible significant ideas similar to DHCP, DNS [22-24] in a solitary system exploiting Packet Tracer tool. We have utilized basic system with switch, switch arrangement and send parcel information starting with one gadget then onto the next.

2.2 Device Positioning Policies for Large-scale Wireless Sensor Networks

Arranging gadget sending is a principal issue in executing remote sensor organize Wireless Sensor Networks applications. This plan practice decides types, numbers and areas of gadgets so as to construct an amazing and powerful framework utilizing gadgets of restricted vitality supply and compelled limits. The arrangement plan chooses the points of confinement of numerous natural properties of a WSN, for example, inclusion, network, charge, and lifetime. In our proposal, we address the gadget sending arranging issues identified with enormous scale WSN frameworks. We

consider a run of the mill arrangement of arranging situation in a varied two-level WSN made out of sensor hubs and hand-off hubs. Sensor hubs structure the lower level of the system and are liable for giving palatable detecting inclusion to the application. We along these lines address the sensor hub arrangement regarding the detecting inclusion and hand-off hub sending as far as the correspondence network and framework lifetime. For sensor hub organization, we propose an inclusion ensured sensor hub organization structure procedure. Utilizing this method, the detecting inclusion is finished regardless of whether sensor hubs are arbitrarily scattered inside a limited range from its objective areas as indicated by a given network design. So as to check the expanded expense because of additional sensor hubs that are utilized in the inclusion ensured organization, while as yet keeping up a great detecting inclusion, we further investigation the probabilistic assets of the network based instrument hub sending within the sight of arrangement blunders. For transfer hub organization, we propose to broaden the framework lifetime by conveying hand-off hubs as per a thickness work, which is upgraded because of the vitality utilization rate, with the goal that the vitality is scattered at an around same rate over the system. We further art the organization thickness capacity to accommodate the necessities of adjusted vitality utilization and solid sensor hub network. The methods proposed in this proposition fill the clear of accessible writing and can fill in as rules for WSN planners, arrangement suppliers and framework integrators of WSN applications. Gadget arrangement is a significant designing issue in actualizing WSN applications. The sorts, numbers, and areas of gadgets must be reasonably arranged with the goal that presentation prerequisites, for example, detecting inclusion quality, organize network, lifetime, and unwavering quality are altogether met while keeping the cost moderate. This issue is especially significant for enormous scale WSN applications, in which countless gadgets will be utilized. Because of costly work cost, the detachment of the detecting field, and the qualities of territory, purposeful situation of gadgets by people or machines can be troublesome, or even totally infeasible. In these circumstances, arrangement mistakes are unavoidably acquired in the sending exercise. Accordingly, it is important to mull over these sending blunders when the gadget arrangement plan is led. In this proposition, we propose an enormous scale WSN arrangement system under which sending blunders are joined into the organization models and the issue definitions. We likewise propose a progression of strategies and instruments to address a lot of sending issues. Computation (GCA) and two progressive utility based covering counts rang base covering (BCA) and cross breed covering (HCA). A movement of preliminaries has been directed to evaluate these computations under various structure settings. Preliminary outcomes show that, GCA has the most surprising accomplishment rate, anyway encounters a long covering time especially when the security level is high; BCA has the best adequacy, yet its anonymization cost, covering accomplishment extent and postponed time are modestly progressively terrible; HCA achieves the best as a rule execution to the extent diverse execution estimations.

3. FRAME WORK

Cisco Packet Tracer designed to be used as multi-tasking, that's been wont to organize and examine varied network exercises like application of dissimilar topologies, development of apt servers, subnetting and study of different network setups, configuration and different troubleshooting defined commands. To initialise communication among two networking devices i.e., user networking devices and to organise a network, we intend to demand to pick applicable networking devices like routers hubs, switches or interconnecting devices and build physical change of integrity by connecting cables, quick local area network seaports from the module list of packet tracer[4]. Internetworking devices square measure costly and thus it's well to perform 1st on the packet tracer to recognise the conception, performance of the prescribed network.

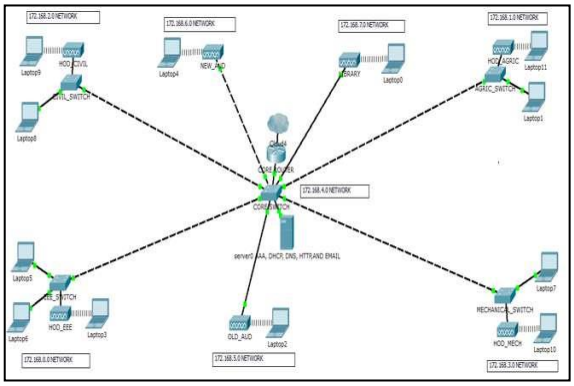


***Fig.1**: Framework*

The graph of Fig. 1 is the finished graph of the LAN and at the center it connected to switch, switch and the servers framing the Network Operating Center and every one of the different departments in College are only a simple expansion of the system at the center. The alloted IP address picked to the inside system is 192.168.0.0 and it has been sub netted to acquire IP address obstructs that are allocated to various divisions and segments of this prescribed LAN.

4. LAN SIMULATION MODEL

We require at least 252 hosts for every subnet the quantity of unmasked bits in the subnet mask is 8. Which infers that the amount of masked bits are 8.

4.1 Create and assign IP/subnet mask for VLANs:

In this VLAN, we are assigning the default gate ways to all the VLANs with ip address and subnet mask.
Which is configured in the main switch of VLAN.
#ena
#config t
#VLAN 2
#VLAN 3
#int VLAN 1
#ip address 192.168.1.1(Network ID) 255.255.255.0 (Host ID)
#int VLAN 2
#ip address 192.168.2.1(Network ID) 255.255.255.0 (Host ID)
#int VLAN 3
#ip address 192.168.3.1(Network ID) 255.255.255.0 (Host ID)
#int VLAN 4
#ip address 192.168.4.1(Network ID) 255.255.255.0 (Host ID)
#int VLAN 5
#ip address 192.168.5.1(Network ID) 255.255.255.0 (Host ID)
#int VLAN 6
#ip address 192.168.6.1(Network ID) 255.255.255.0 (Host ID)
#int VLAN 7
#ip address 192.168.7.1(Network ID) 255.255.255.0 (Host ID)
#int VLAN 8
#ip address 192.168.8.1(Network ID) 255.255.255.0 (Host ID)

4.2 Configure DHCP server

In this DHCP server, we must give the IP address , DNS server and subnet mask .After that we must go to the DHCP we assign the default gateway and DNS server address by give name to different address and add one by one to server.

4.3 Configure mode access/trunk in VLANs:

The configuration is done between the main switch and the primary switchs of VLANs by using the cable interface we can trunk all the switchs.
#int fa0/2
#switchport trunk encapsulation dot1q
#switchport mode trunk

In the primary switch, the interface cable are connect to the laptop and access point. Swhich is used to trunk to the PC and access point.
#int fa1/1
#switchport mode access
#switchport access VLAN 2

4.4 Tell PC in VLANs where to get IP:

In this VLANs, the switch of different VLAN are getting there IP address from server.
#int VLAN 1
#ip helper-address 192.168.10.2
#int VLAN 2
#ip helper-address 192.168.10.2

***Table: IP** Address Allocations*

Broadcast	First valid Host	Last valid host	Network Address
192.168.1.255	192.168.1.1	192.168.1.254	192.168.1.0
192.168.2.255	192.168.2.1	192.168.2.254	192.168.2.0
192.168.3.255	192.168.3.1	192.168.3.254	192.168.3.0
192.168.4.255	192.168.4.1	192.168.4.254	192.168.4.0
192.168.5.255	192.168.5.1	192.168.5.254	192.168.5.0
192.168.6.255	192.168.6.1	192.168.6.254	192.168.6.0
192.168.7.255	192.168.7.1	192.168.7.254	192.168.7.0
192.168.8.255	192.168.8.1	192.168.8.254	192.168.8.0

4. EXPERIMENTAL RESULTS

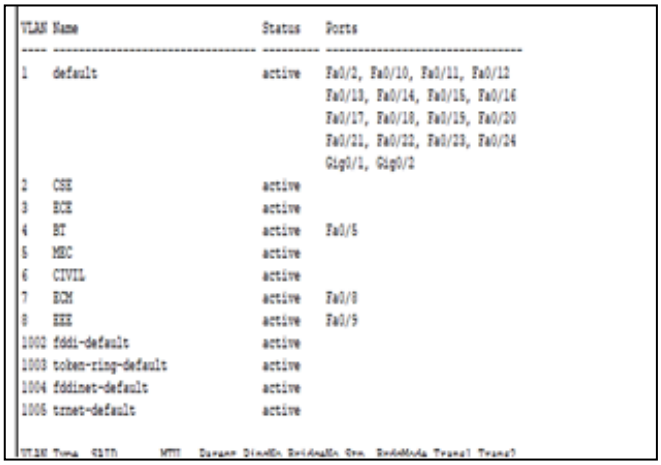


***Fig.2:** VLANs created on the switch*

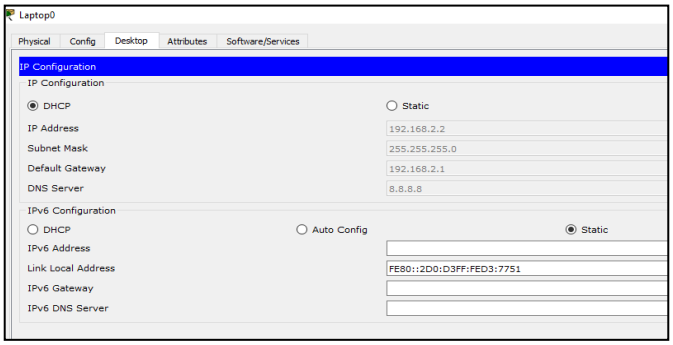
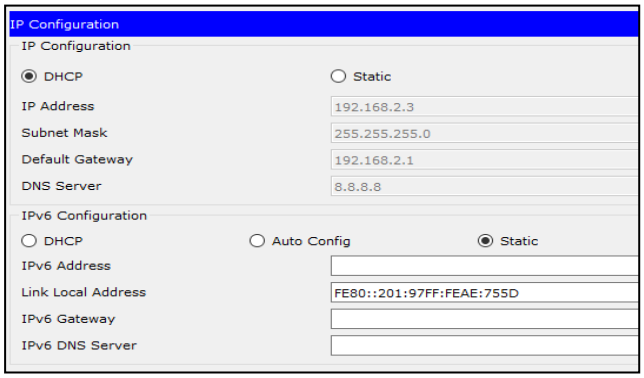


Fig.3: *Dynamic Host Configuration Protocol (DHCP) server pools*

Fig. 2 shows the created Virtual Local Area Networks working on the switch, corresponding ID and switch ports are connected to every VLAN. Fig. 3 displays the simulation results after the configuration of the DHCP server, viewing the address pools of every Virtual LAN created in the given Network. A dynamic IP address configuration was performed on the given network, i.e. when a client device trying to connect to the respective network; it is allotted an IP address that is fee and available in that network given address pool, to the pool that the client model is connected to. Fig. 5 displays client devices are successfully gaining an IP address that are proper to the Virtual LAN, to which the devices are associated to.



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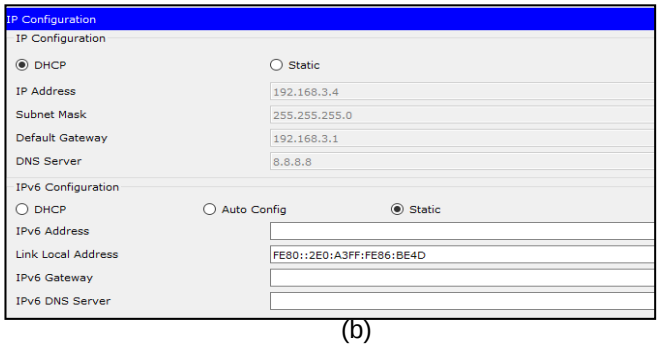

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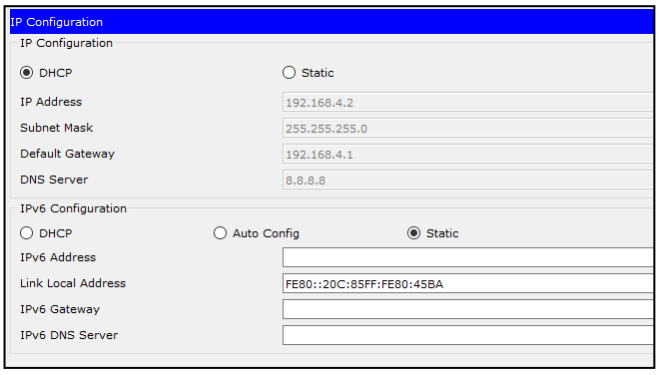

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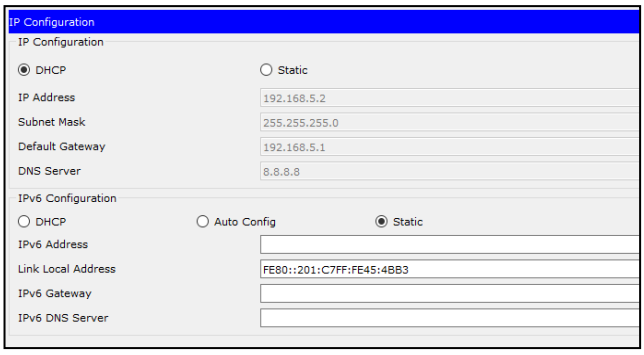

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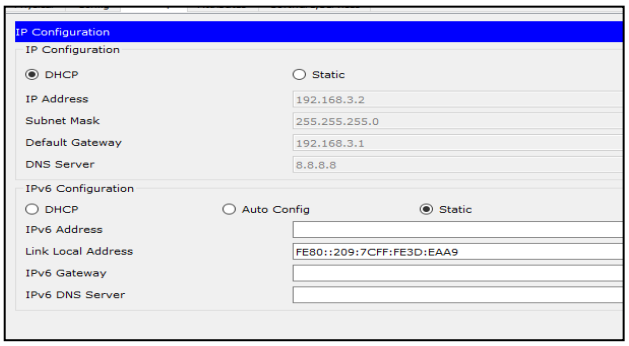

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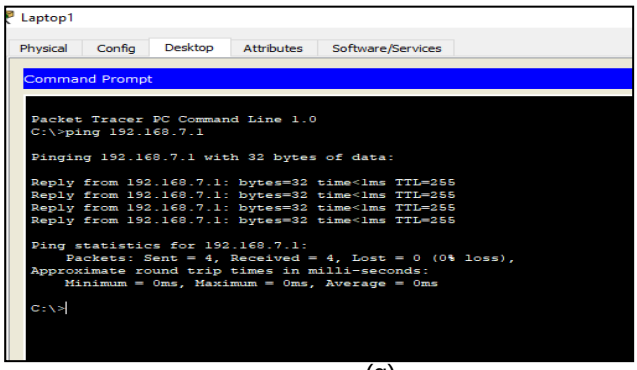
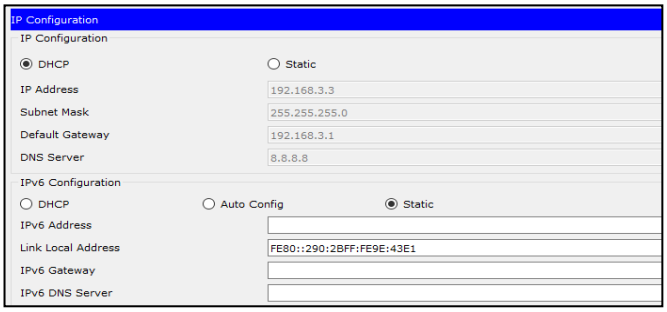


(g)



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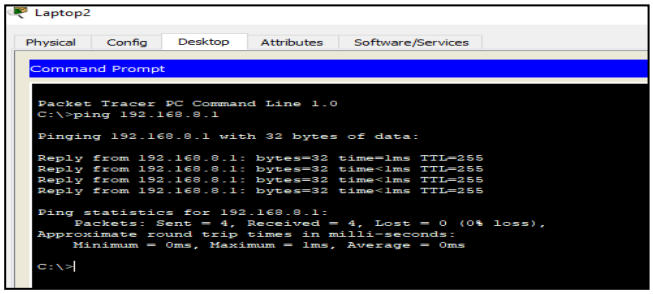
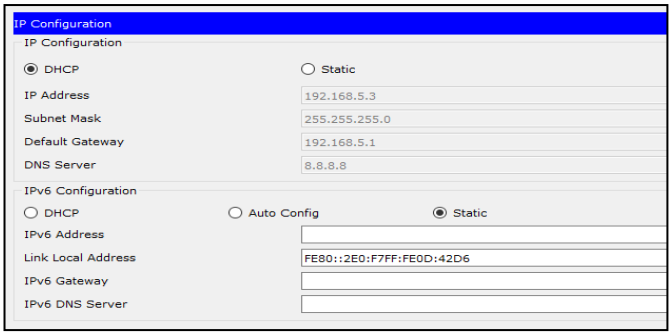




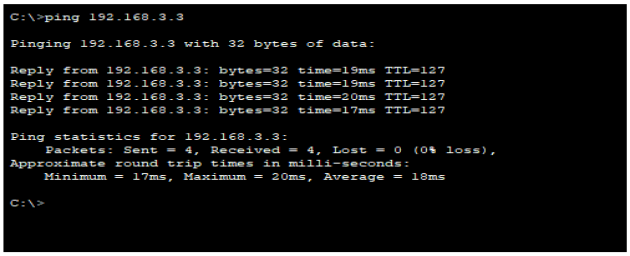
(h)

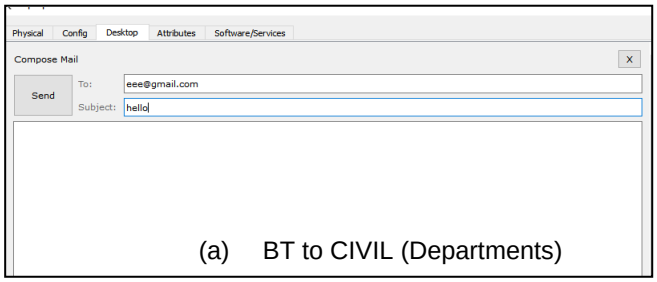
Fig.4: IP addresses data (a-g)

From Fig.4, it is clear that every client or device connected to network and is receiving IP address data lethargically, per the subnet the consumer is linked to.

5.1 Network Active checking Test (Ping)

Network communications and network connectivity will be verified with the help of ping commands, tracked by the domain significant name of the device one wishes to check connectivity with. Two proposed VLAN models, have been additional to the prescribed network and the ping test was accomplished to test if the devices are linked to those VLANs are incontact with the other devices in the network. The simulation results acquired in ping test are in Fig.5.



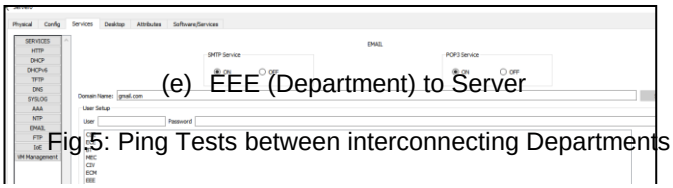


(a) BT to CIVIL (Departments)

(b) CSE to ECM (Departments)

(c) ECE to EEE (Departments)

(d) MECH to ECE (Departments)

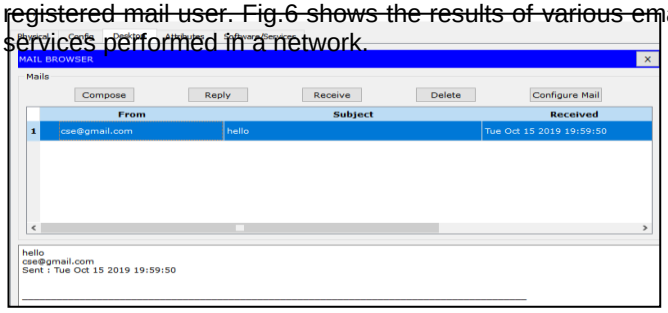


(e) EEE (Department) to Server

Fig.5: Ping Tests between interconnecting Departments

5.2. E-mail Services

E-mail services will be monitored by the simulation results will which show a memorandum from a registered e-mail user or a registered id on a network, referring a mail to other registered mail user. Fig.6 shows the results of various email services performed in a network.



(a)

(b)

(c)

Fig.6: Email Service Results between Departments (a –c)

6. CONCLUSIONS

In our article, a Local Area Network that utilizations both wired and remote topology have been executed with some significant ideas like Dynamic Host Configuration Protocol, Domain Name System, Email, and Virtual LANs in a solitary system in Cisco Packet Tracer. Virtual Local Area Networks have been utilized to intelligently amass customers on the system, and with the guide of a switch and switch setups, information bundles directed starting with one gadget then onto the next. It is likewise important that, the design and particulars are for the underlying model and can further be created and extra usefulness can be added to expand backing and inclusion.

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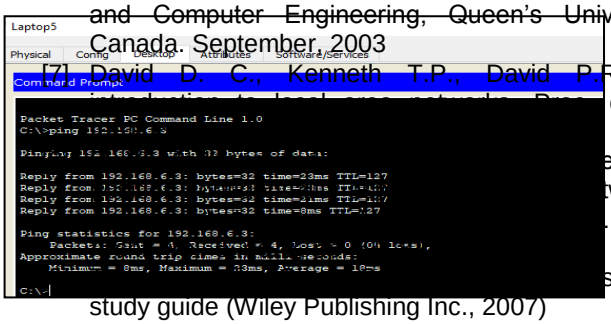

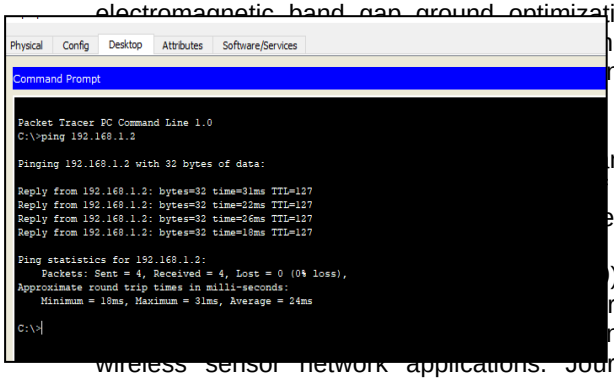

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