CAP276: Data Communiction and Networking-Laboratory

Lecture Zero

Dr. Manmohan Sharma

School of Computer Applications

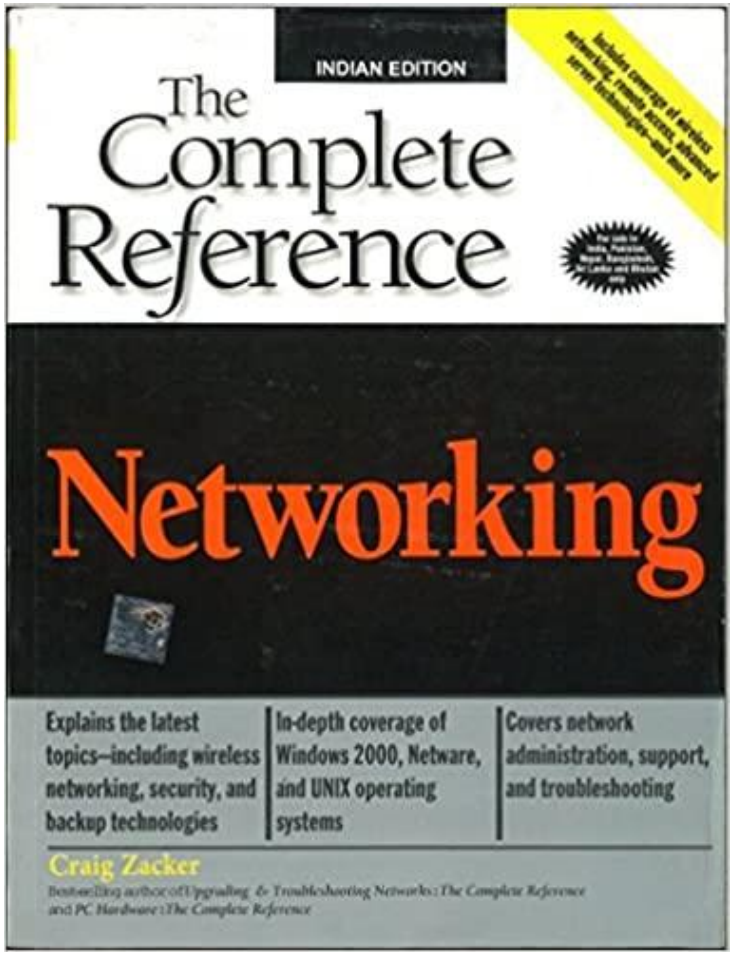
Lovely Professional University

About the Course

- This course provides students with hands on training regarding the design, troubleshooting, modelling and evaluation of computer networks.
- In this course, students are going to experiment in a real test-bed networking environment, and learn about network design and troubleshooting topics and tools such as: network addressing, Address Resolution Protocol (ARP), basic troubleshooting tools (e.g. ping, ICMP), IP routing (e,g, RIP), route discovery (e.g. traceroute), TCP and UDP, IP fragmentation and many others.
- Student will also be introduced to the network modelling and simulation, and they will have the opportunity to build some simple networking models using the tool and perform simulations that will help them evaluate their design approaches and expected network performance.

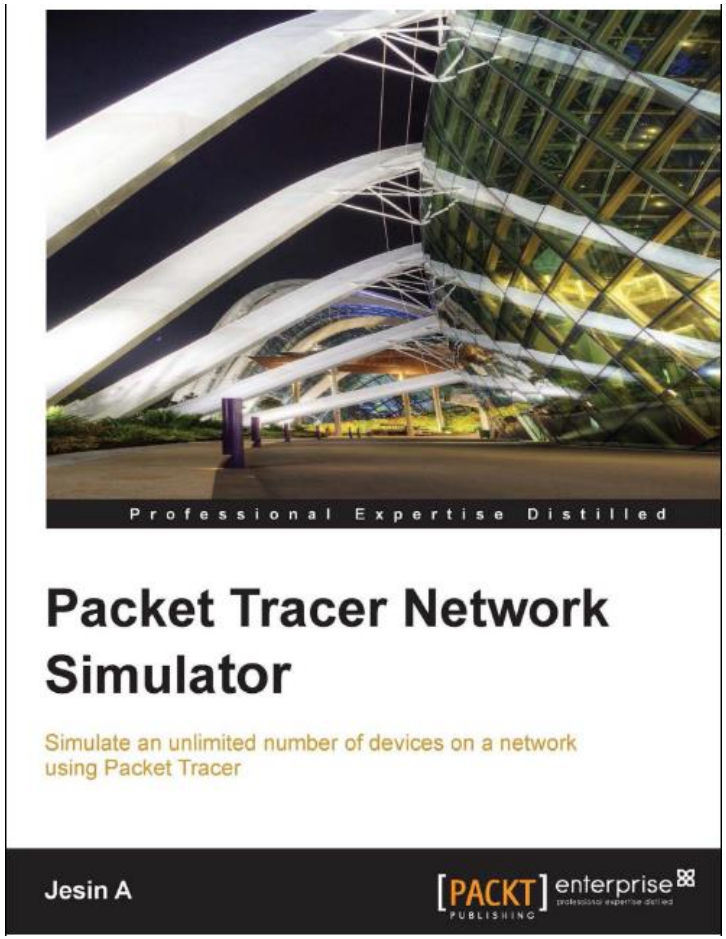
Text Book

- NETWORKING: THE COMPLETE REFERENCE by CRAIG ZACKER
- Mc Graw Hill Education



Reference Books

- PACKET TRACER NETWORK SIMULATOR by JESIN A
- PACKT PUBLISHING



Course Organization

- ✓ **L T P = 0 0 2 Credit =1 i.e. 2 hours of lecture per week for 14 weeks.**
- ✓ **Exam criteria**
  - ❑ **4 Academic Task (Best 3 counted) (50 marks each)**
  - ❑ **ETP (Refer academic Calendar)**

Course Assessment Model

Assessment Criteria	Weightage
Attendance	05%
Continuous Assessments	45%
End Term Practical (ETP)	50%
Total	**100%**

Course Outcomes

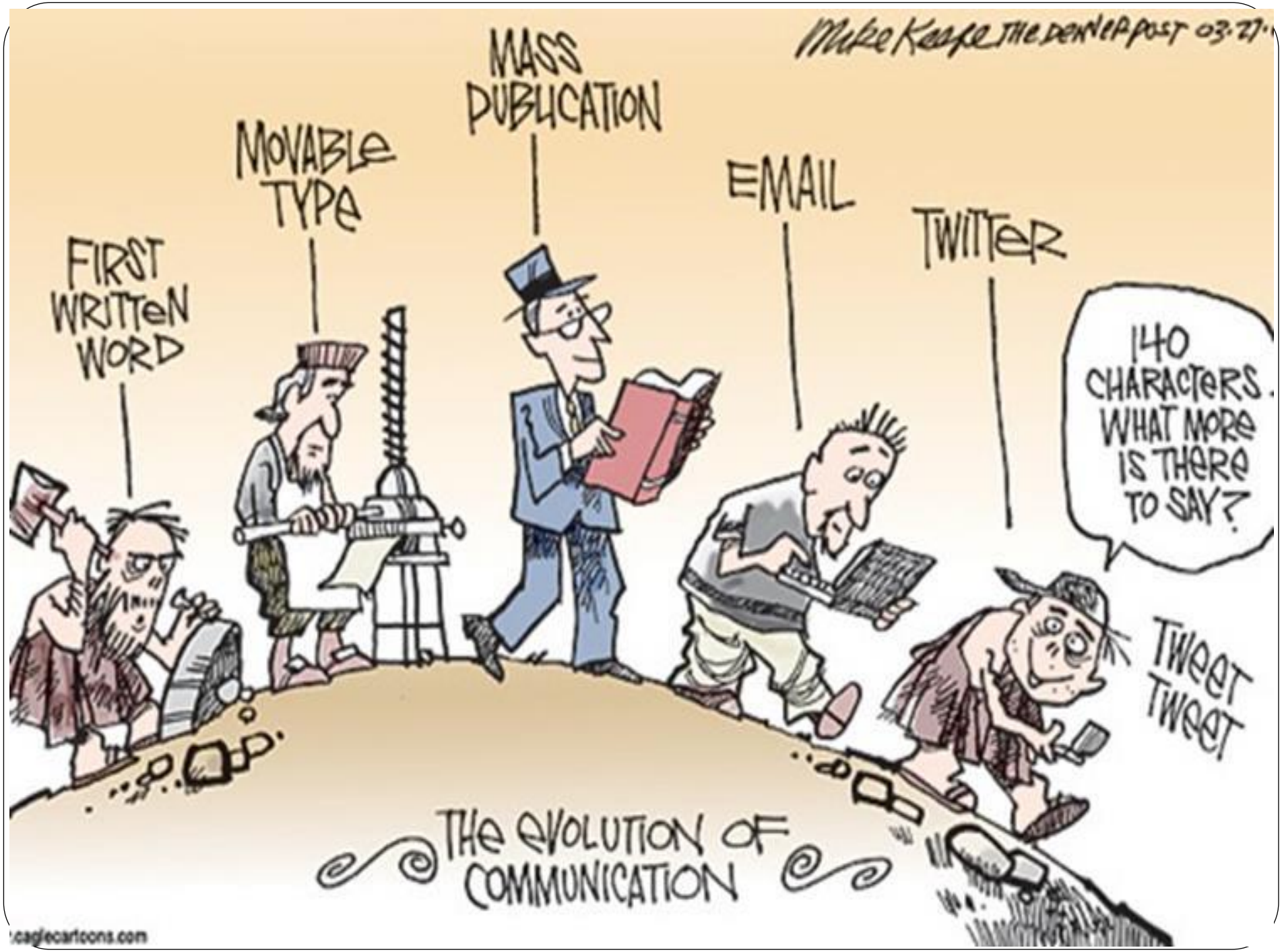
CO1 :: Understand the fundamental concepts of data flow and criteria for the selection of transmission media.

CO2 :: Demonstrate the techniques for IP allocation in the networks and creation of the subnets.

CO3 :: Analyze the difference between static and dynamic routing protocols

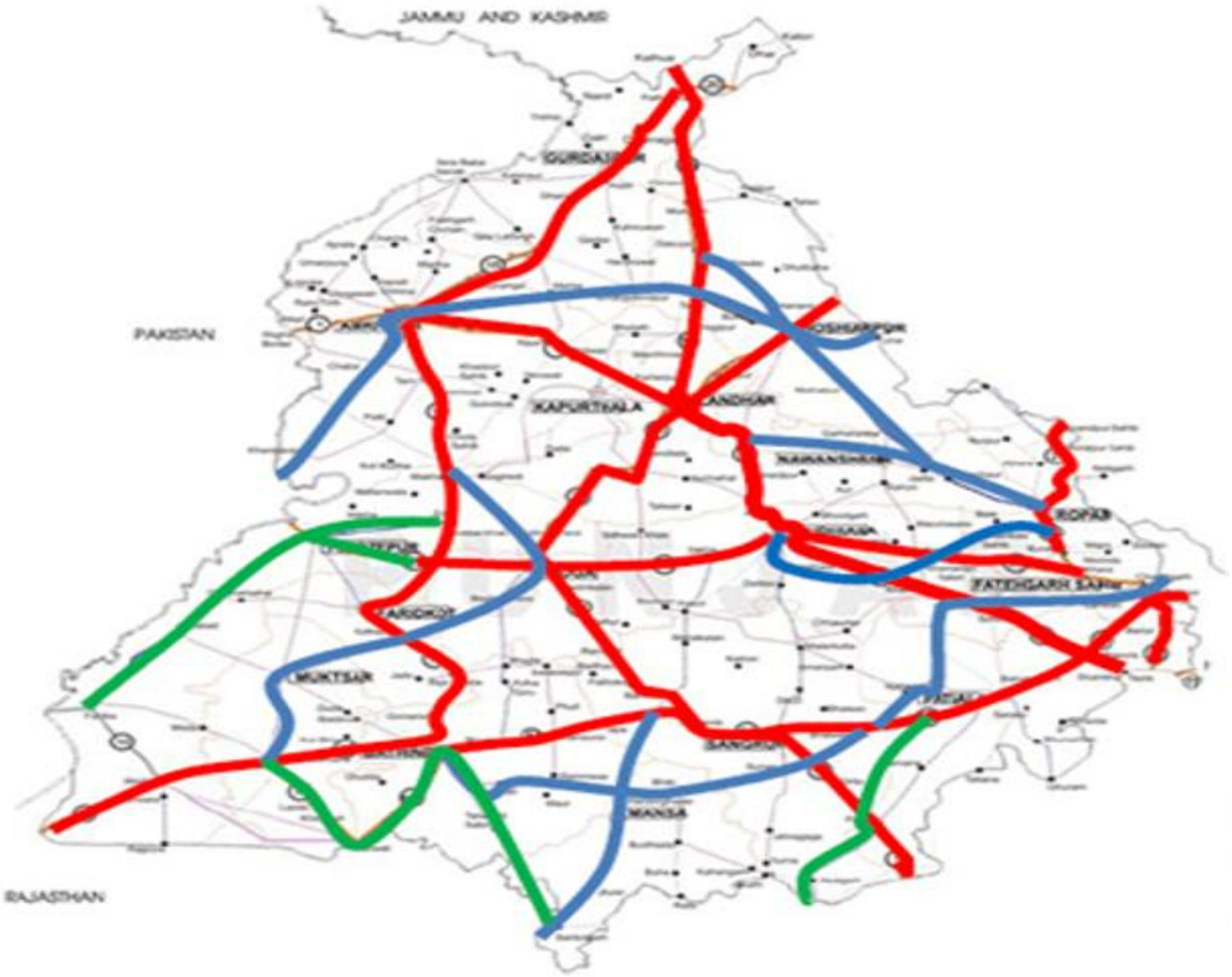
CO4 :: Summarize the working of various application layer services in the network.

Networks

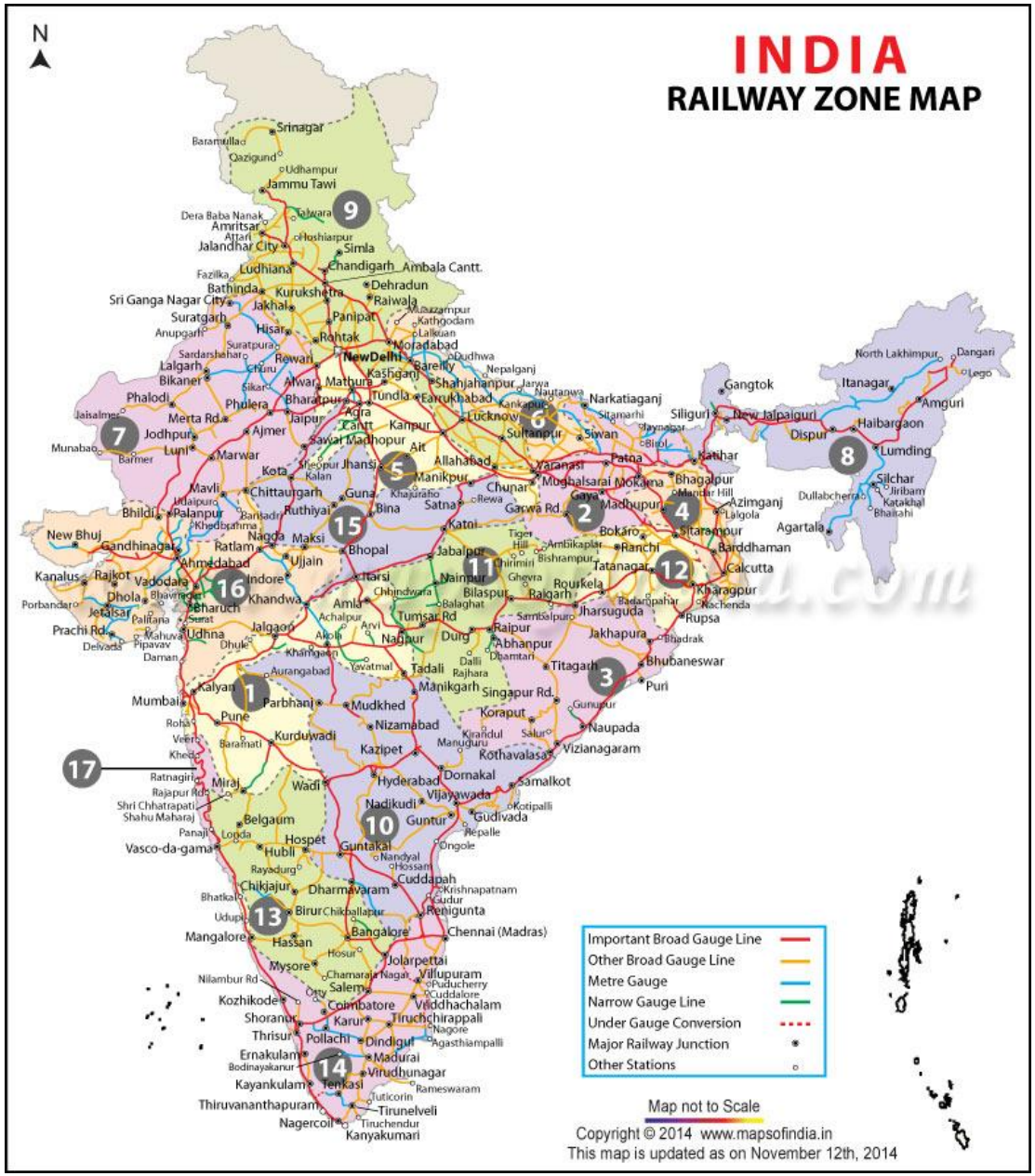

Mike Keefe The Denver Post 03.27
FIRST WRITTEN WORD
MOVABLE TYPE
MASS PUBLICATION
EMAIL
TWITTER
140 CHARACTERS. WHAT MORE IS THERE TO SAY?
TWEET TWEET
THE EVOLUTION OF COMMUNICATION
caglecartoons.com

Social Network

Road Networks

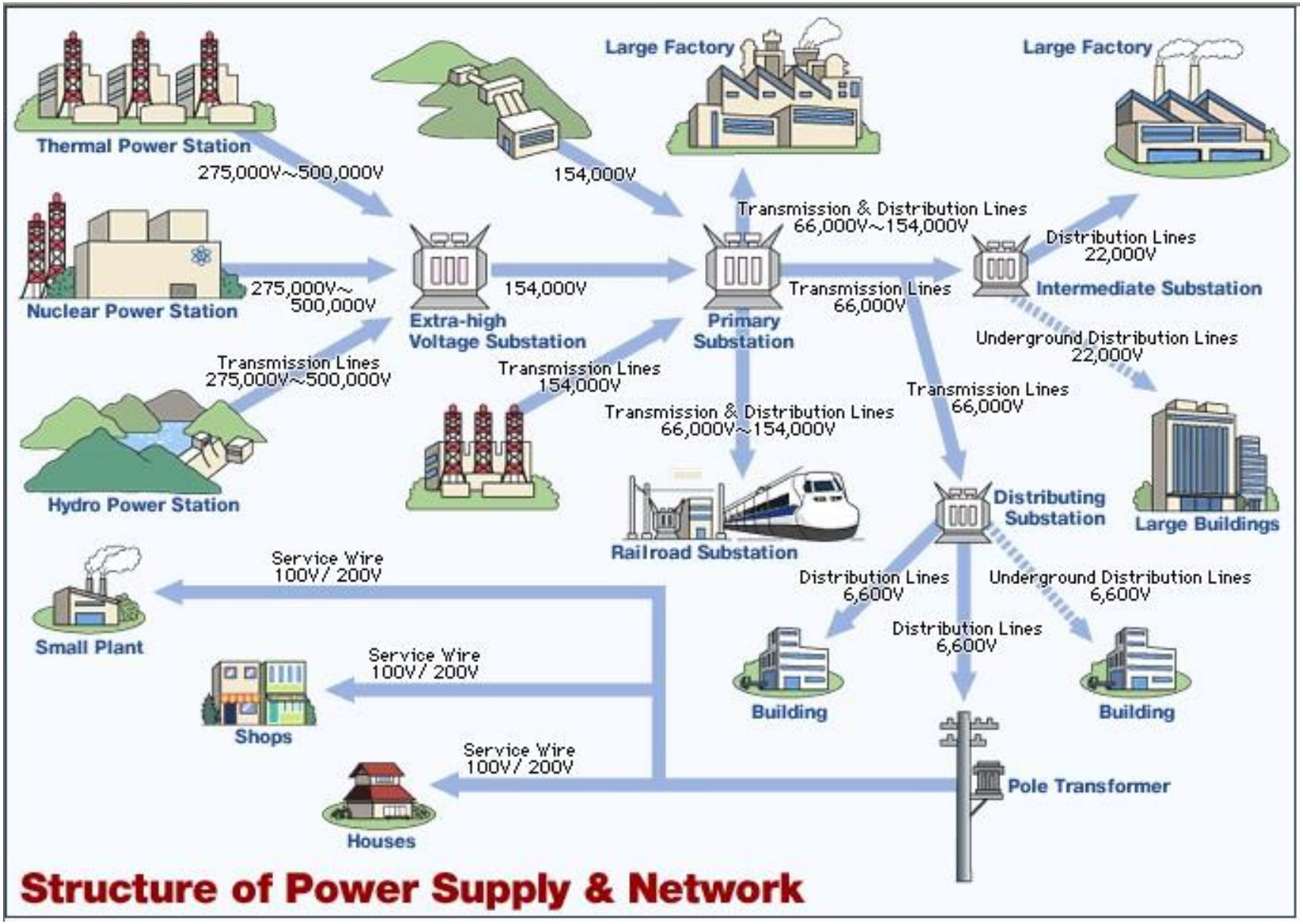


Railways Networks



Air Transport Networks

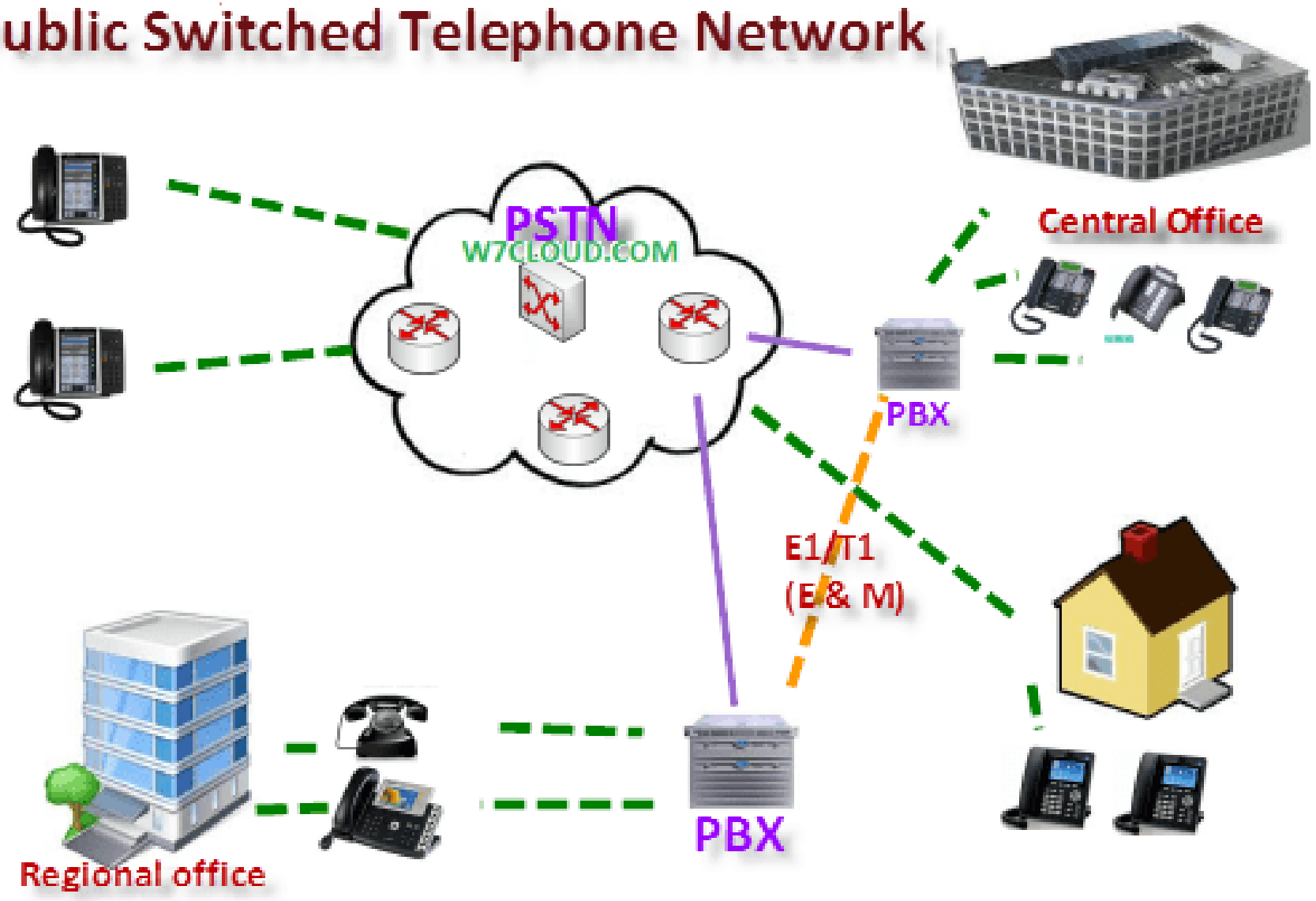
Power Distribution Network

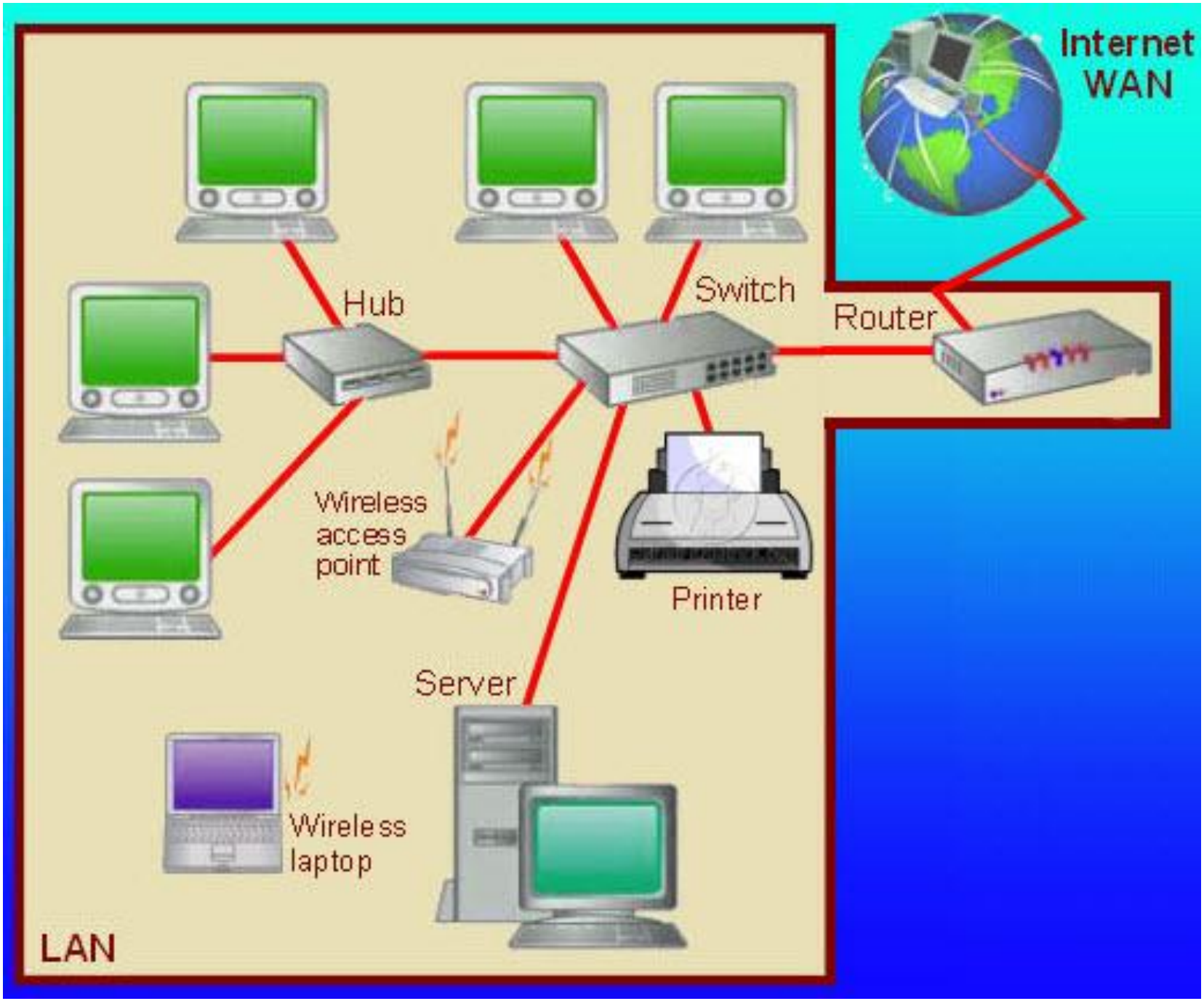


Features of Networks

- Nodes
- Connectivity (Link/Relationships)
- Transfer of data and knowledge (Sharing)
- Scalability
- Reliability
- Security
- Rules

Communication or Telephone Networks




Internet
WAN
Hub
Switch
Router
Wireless
access
point
Printer
Server
Wireless
laptop
LAN

List of Practicals / Experiments:

Networking basics

- demonstration of packet tracer installation and packet tracer interface
- design a peer-to-peer network using the packet tracer, check the connectivity using ping command, sending PDU in real time mode and simulation mode
- design two isolated networks in packet tracer to demonstrate the difference in working of hub and switch
- design a network with hybrid topology that includes a bus backbone and three star networks, check the connectivity using ping command, sending PDU in real time mode and simulation mode

Connectivity between networks and routing

- connect two networks using a single router and configure the router for communication between the two networks
- connect two or more networks with a router in each network and configure the routers for static routing
- connect two or more networks with a router in each network and configure the routers for dynamic routing using RIP
- use static routing to connect the subnets of a network assigned with the following network 197.34.21.0/24, use FLSM to divide the network into subnet where every subnet supports at least 56 hosts

Configuring network services

- configure HTTP server and demonstrate the process to access a website using IP address in real time and simulation mode
- configure DNS server for two domain names with two HTTP servers in the networks and demonstrate the process to access both the servers using name resolution in real time and simulation mode
- configure DHCP server and demonstrate how DHCP server assigns dynamic IP addresses to the nodes in local network
- configure DHCP server and demonstrate how DHCP server assigns dynamic IP addresses to the nodes in some other network
- configure the FTP server and demonstrate the working of FTP in real time and simulation mode
- configure two e-mail servers with different domain names and with at least four users in each domain, demonstrate the process of sending and receiving e-mail messages in real time and simulation mode

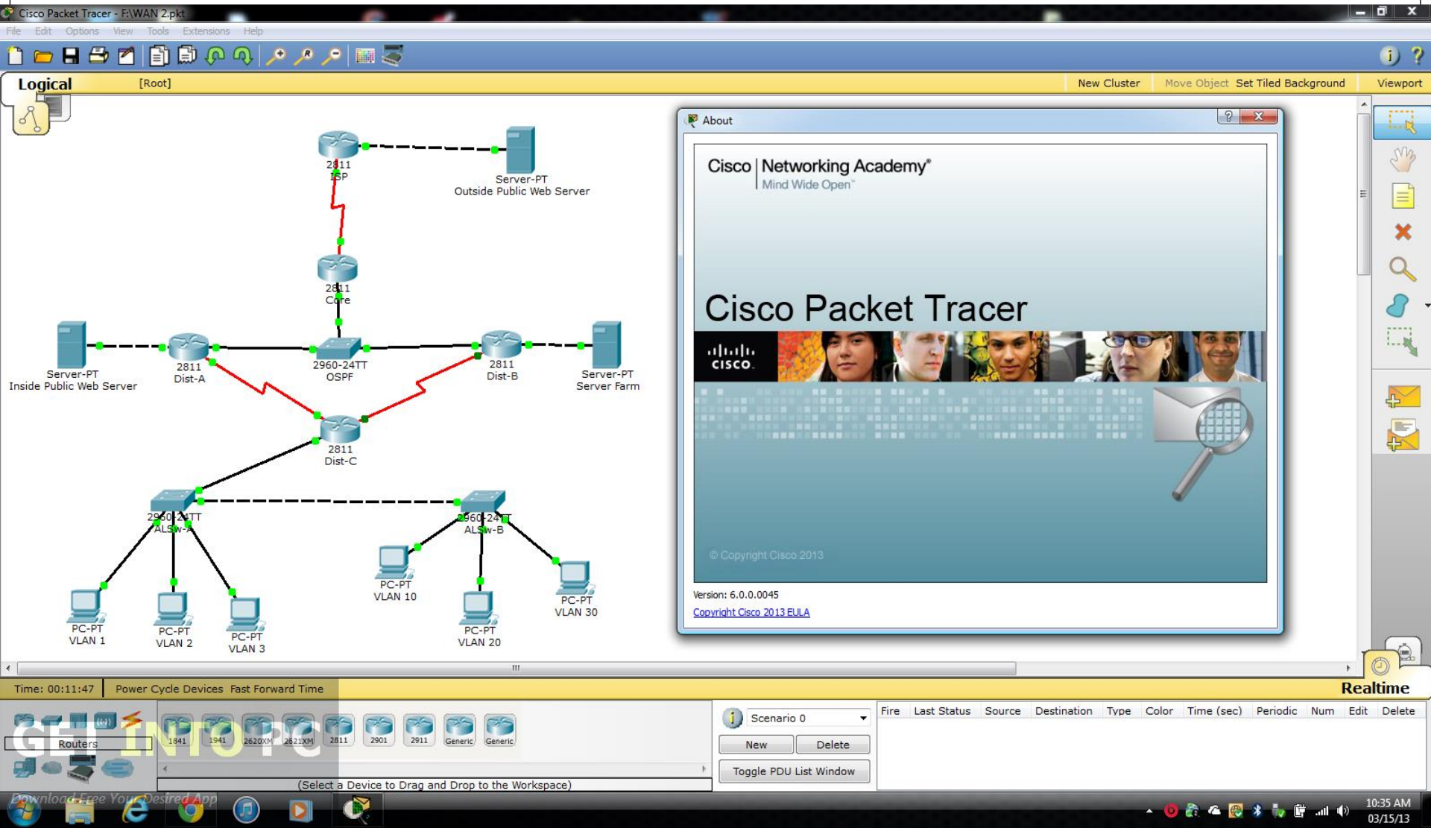
Services and Uses of Internet

- Surf website
- Information access
- e-mail
- e-commerce
- Social networks (WhatsApp, Facebook, etc.)
- Education
- Banking Services (Online banking, CBS, ATM)
- Entertainment (Netflix, Amazon Prime, Hotstar, Voot etc.)
- Healthcare (Health monitoring system)
- Research
- Online Gaming

Packet Tracer

A Network Simulator

CISCO PACKET TRACER



Introduction

- **Packet Tracer** is a powerful network simulator that can be utilized in training for CCNA and CCNP certification exam by allowing students to create networks with an almost unlimited number of devices and to experience troubleshooting without having to buy real **Cisco** routers or switches.

- **Cisco Packet Tracer** is a simulation software own by Cisco. It can be used to build the complex network topologies and simulate their working to learn about abstract networking concept.

Packet Tracer

Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks.

Software allow for???

- Allows users to simulate the configuration of ***Cisco routers*** using a simulated command line interface.
- Allows users to simulate the configuration of ***switches*** using a simulated command line interface

Type of user interface

- Packet Tracer makes use of a ***drag and drop*** user interface, allowing users to add and remove simulated network devices as they see fit.

On what platform we can run packet tracer?

- Packet Tracer can be run on IOS, Linux and Microsoft Windows.
- A similar Android and IOS apps are also available

What user can create using packet tracer?

- Packet Tracer allows users to create simulated network topologies by dragging and dropping routers, switches and various other types of network devices.
- A physical connection between devices is represented by a "cable" item.

Packet Tracer supports an array of simulated

- Application Layer protocols, as well as basic routing with RIP, OSPF, EIGRP, BDP.
- As of version 5.3, Packet Tracer also supports the Border Gateway Protocol.

Role in Education

- Packet Tracer allows students to design complex and large networks, which is often not feasible with physical hardware, due to costs.
- Packet Tracer is commonly used by CCNA Academy students, since it is available to them for free
- However, due to functional limitations, it is intended by CISCO to be used only as a learning aid, not a replacement for Cisco routers and switches.
- Packet Tracer is also useful in education by providing additional components, including an authoring system, network protocol simulation and improving knowledge an assessment system