

Sandip Institute of Technology & Research Centre, Nashik
Department Of Electronics and Telecommunication
Report on “Computer Network”

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Main objective :- To Understand the Use Computer Networking in Industry.

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Course Topics:-

LAN Switching Technologies

Determine the technology and media access control method for Ethernet networks Identify basic switching concepts and the operation of Cisco switches. Configure and verify initial switch configuration including remote access management. Verify network status and switch operation using basic utilities such as ping, telnet and ssh. Identify enhanced switching technologies Describe how VLANs create logically separate networks and the need for routing between them. Configure and verify VLANs Configure and verify trunking on Cisco switches Configure and verify PVSTP operation

IP addressing (IPv4 /Pv6)



Describe the operation and necessity of using private and public IP addresses for IPv4 addressing. Identify the appropriate IPv6 addressing scheme to satisfy addressing requirements in a LAN/WAN environment. Identify the appropriate IPv4 addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment. Describe the technological requirements for running IPv6 in conjunction with IPv4 such as dual stack. Describe IPv6 addresses.

IP Routing Technologies

Describe basic routing concepts. Describe the boot process of Cisco IOS routers. Configure and verify utilizing the CLI to set basic Router configuration. Configure and verify operation status of a Device interface, both serial and Ethernet. Verify router configuration and network connectivity. Configure and verify routing configuration for a static or default route given specific routing requirements. Manage Cisco IOS Files. Differentiate methods of routing and routing protocols. Configure and verify OSPF (single area). Configure and verify EIGRP (single AS). Configure and verify interVLAN routing (Router on a stick). Configure SVI interfaces.

IP Services

Configure and verify DHCP (IOS Router). Describe the types, features, and applications of ACLs. Configure and verify ACLs in a network environment. Identify the basic operation of NAT. Configure and verify NAT for given network requirements. Configure and verify NTP as a client. Recognize High availability (FHRP). Configure and verify Syslog. Describe SNMP v2 & v3.

A **computer network** or **data network** is a telecommunications network which allows computers to exchange data. In computer networks, networked computing devices exchange data with each other along network links (data connections). The connections between nodes are established using either cable media or wireless media. The best-known computer network is the Internet.



Network computer devices that originate, route and terminate the data are called network nodes. Nodes can include hosts such as personal computers, phones, servers as well as networking hardware. Two such devices can be said to be networked together when one device is able to exchange information with the other device, whether or not they have a direct connection to each other.

Computer networks differ in the transmission media used to carry their signals, the communications protocols to organize network traffic, the network's size, topology and organizational intent. In most cases, communications protocols are layered on (i.e. work using) other more specific or more general communications protocols, except for the *physical layer* that directly deals with the transmission media. Computer networks support applications such as access to the World Wide Web, shared use of application and storage servers, printers, and fax machines, and use of email and instant messaging applications.

Repeaters and hubs

A repeater is an electronic device that receives a network signal, cleans it of unnecessary noise



and regenerates it. The signal is retransmitted at a higher power level, or to the other side of an obstruction, so that the signal can cover longer distances without degradation. In most twisted pair



A network switch is a device that forwards and filters OSI layer 2 datagrams (frames) between ports based on the MAC addresses in the frames.[9] A switch is distinct from a hub in that it only forwards the frames to the physical ports involved in the communication rather than all ports connected. It can be thought of as a multi-port bridge.[10] It learns to associate physical ports to MAC addresses by examining the source addresses of received frames. If an unknown destination is targeted, the switch broadcasts to all ports but the source. Switches normally have numerous ports, facilitating a star topology for devices, and cascading additional switches.

Multi-layer switches are capable of routing based on layer 3 addressing or additional logical levels. The term *switch* is often used loosely to include devices such as routers and bridges, as well as devices that may distribute traffic based on load or based on application content (e.g., a Web URL identifier).

Routers

A router is an internetworking device that forwards packets between networks by processing the routing information included in the packet or datagram (Internet protocol information from layer 3). The routing information is often processed in conjunction with the routing table (or forwarding table).

A router uses its routing table to determine where to forward packets. (A destination in a routing table can include a "null" interface, also known as the "black hole" interface because data can go into it, however, no further processing is done for said data.)

Cisco **Packet Tracer** is a network simulation program that allows students to experiment with network behavior and ask “what if” questions. As an integral part of the Networking Academy comprehensive learning experience, Packet Tracer provides simulation, visualization, authoring, assessment, and collaboration capabilities and facilitates the teaching and learning of complex technology concepts.

Use in Education

Packet Tracer is commonly used by Cisco Networking Academy students working towards Cisco Certified Network Associate (CCNA) certification. 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 can be used to understand various concepts of networking with simulation, It can be used to design a network by connecting various networking devices and running various troubleshooting tests to check the connectivity and communication between different networking devices. Packet Tracer can be used to understand the use of different networking devices appropriately and the difference in their working.

As it is costly to buy various networking equipment while learning networking, Packet Tracer can be used to understand computer networks.