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| Assignment No. 1 | |
| **Basic Network Configuration** | |
| Instructor's Name- Prof. B. P. Masram | Student's Name- Ayush Chanekar |
| Student's Roll no- 31311 | Date of Experiment- 19/08/24 |
| Objectives- To learn and understand configuring IP Addresses and related network devices as well as setting up a LAN. | |
| **Problem Statement-**  Setup a wired LAN using Layer 2 Switch.  It includes preparation of cable, testing of cable using line tester, configuration machine using IP addresses, testing using PING utility & demonstrating the PING packets captured traces using Wireshark Packet Analyzer Tool. | |
| Equipment and Software-   * Cat 3, Cat 5, Cat 5e Cat 6a Cables and RJ45 Connectors * Crimping Tool * Line Tester * One server Node with Open Source and Internet Support * HTTP Server (Apache) with Website pages of your Institute * Four Client Nodes with Wi-Fi Support * Wireshark Protocol Analyzer on all nodes * Layer-II Switch * IP Address Configuration Chart | |
| **Theory/Background**  **Computer Networks:** A computer network can be defined as a collection of computing devices (nodes) interconnected by wires or wireless means and governed by a set of standards(protocols) in order to share data and resources.  **Comparison between LAN, MAN, WAN:**   |  |  |  |  | | --- | --- | --- | --- | | Characteristic | LAN | MAN | WAN | | Definition | Local area network | Metropolitan area network | Wide area network | | Coverage | Building/Campus | City/Large campus | Multiple cities/countries | | Design and maintenance | Easy | Moderate | Difficult | | Speed | High (100 Mbps to 10 Gbps) | Moderate to High (10 Mbps to 1 Gbps) | Variable (1 Mbps to several hundred Mbps) | | Propagation delay | Short | Moderate | Long | | Technology | Ethernet, Wi-Fi | Ethernet, FDDI, ATM | MPLS, Frame Relay, ATM, VSAT | | Cost | Low | Moderate | High | | Use Cases | Offices, Schools | Government, Universities | Internet, Corporate Networks | | Security | Easier to secure | Moderately challenging | Most challenging |      |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Layer No.** | **OSI Model Layers** | **TCP/IP Model Stages** | **Devices** | **Protocols** | **Services** | | 1 | Physical | Network Access | Hubs, Repeaters, Cables | Ethernet, USB | Bit transmission | | 2 | Data Link | Network Access | Switches, Bridges | Ethernet, PPP, Frame Relay, MAC, ARP | Data framing, MAC addressing, Error detection | | 3 | Network | Internet | Routers | IP (IPv4, IPv6), ICMP, IPSec, ARP | Logical addressing, Routing | | 4 | Transport | Transport | - | TCP, UDP | End-to-end communication, Flow control, Error correction | | 5 | Session | Application | - | NetBIOS, PPTP, RPC | Session management, Authentication | | 6 | Presentation | Application | - | SSL/TLS, FTP, JPEG, MPEG, GIF | Data translation, Encryption/Decryption | | 7 | Application | Application | - | HTTP, HTTPS, FTP, SMTP, DNS, Telnet, POP3, IMAP, SNMP | Network services to end-users |   **Network Topology**   * Detailed diagram of the network setup. * Explanation of the topology used (e.g., star, ring, mesh). | |
| **Procedure**   * Step-by-step instructions on how the experiment was conducted. * Configuration settings (e.g., IP addresses, subnet masks). * Commands used (if applicable). | |
| **Observations and Results**   * Screenshots or outputs from the software/tools used. * Tables, charts, or graphs representing the data collected. * Description of what was observed during the experiment. | |
| **Analysis**   * Interpretation of the results. * Comparison with expected results. * Possible reasons for any discrepancies. | |
| **Conclusion**   * Summary of what was learned from the experiment. * Assessment of whether the objectives were met. * Suggestions for improvement or further study. | |
| **References**   * Citations of any sources used (books, research papers, online resources). | |
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