

Performance Study of Wired, Wireless and Combined Approach LAN & WAN

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It is important to identify and characterize network traffic flows to analyze network performance. Network traffic has the common attributes, such as source/destination address, type of information, directionality, or other end-to-end information. Modeling and Simulation are useful throughout the analysis process for characterizing user, application, and existing network behaviors. They are also useful during the architecture and design processes for understanding the temporal and spatial behaviors of traffic flows, as well as understanding equipment type, placement, configuration, and behavior under stress or failure. The enormous volume and diversity of Internet usage brings new problems and challenges to network design. To handle the ever increasing volume and diversity of Internet traffic, a campus LAN, campus Wireless LAN (WLAN), a combination of LAN and WLAN and also WAN has been implemented using simulation to study the performance of different type of networks. In case of LAN ethernet, ethernet coaxial, fddi and token ring networks are configured to observe the application behavior under different scenarios. In these scenarios the workstations are configured to generate different types of application traffic, such as FTP, Email and Database application. Servers are configured with different selection weights, overheads and processing speeds. In the scenarios LANs are interconnected via switches and routers to carry traffic to and from devices and LANs in other parts of the network. Several statistics have been collected throughout the simulation process. Bus Utilization (% of link bandwidth) has been collected for coaxial Ethernet scenario which determines the utilization of the network coaxial Ethernet bus. Other statistics which have been observed are delays (sec), server utilization(% of time when the server was busy), Link Throughput (packets/sec), Email Sent (packets/sec) and Traffic Forwarded by Bridge (packets/sec) collected for scenario switched Ethernet, and switched_ethernet_LANs. In case of wireless LAN, effects of Ad hoc network configuration, Infrastructure network configuration, Access Point Functionality, Effect of various data rates has been observed. The Since, traditional Poisson or Markovian traffic models have been proven, by several studies, inappropriate for predicting the performance of networks with long-range dependent traffic. In this paper, we have taken traffic load from existing real network and fed to the simulator. In the combined approach, different WLANs are connected via wireline distribution systems using coaxial cable and fibre backbone. Both routed and switched network has been implemented. The provision of communication among the nodes using access point has also been introduced. The local statistics which have been observed are back off Slots, channel reservation, data traffic received, data traffic sent, dropped data packet, higher layer queue size, media access delay, throughput, retransmission attempts and load.