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Multimedia Information Networking

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Abstract

The focus of this tutorial paper is on networks and their ability to carry multimedia information. In this presentation, the audience will learn about the ability of the various networking technologies to carry multimedia traffic. The inability of legacy networks to carry multimedia traffic will be discussed, followed by a description of multimedia networks. LAN technologies such as Switched Ethernet, Isochronous Ethernet, Fast Ethernet, 100GAnyLAN, FDDI-II, and Synchronous FDDI will be presented. Digital leased lines, ISDN and other WAN options for multimedia networking will also be described. Multimedia networking over the Internet will be discussed. Fundamentals of the ATM technology and its application to multimedia information networking will be presented.

Outline

1. Introduction to Networks and Multimedia Systems
2. Performance Parameters
   2.1 Synchronization Accuracy Specification (SAS) Factors
   2.2 Traffic Characterization Parameters
   2.3 Network Performance Parameters
3. Quality of Service
4. Multimedia Transmission Requirements
5. Multimedia Transmission Over WANs
   5.1 Circuit Switched Services
   5.2 Integrated Services Digital Network – ISDN
   5.3 Packet Switched and Residential Services
   5.4 The Internet
   5.5 IP Multicast, M-Bone, ST-II, RTP, and RSVP
   5.6 The Internet2 Initiative
6. Multimedia Transmission over LANs
   6.1 Ethernet LANs
   6.2 Ring Networks
7. Multimedia Transmission with ATM
   7.1 ATM: The Multimedia Networking Technology
   7.2 Features of the ATM Technology
   7.3 ATM Architecture
   7.4 Application of ATM in LANs
8. Conclusions

Overview

Presenting multimedia information (and not just plain text) is fast becoming the norm, rather than an exception. Also, multimedia information is increasingly being transmitted over communication links and various networking technologies. Users with varying backgrounds need to learn about networked multimedia and its applications. This presentation will cover important aspects of multimedia networks.
A network that is suitable for carrying multimedia information can be called a multimedia network. In general, it is not possible to give a simple Yes/No answer to the question if a network is a multimedia network or not. Many legacy networks are still in operation. It is important to understand the ability (or inability) of these networks to carry multimedia traffic. This ability is evaluated by comparing multimedia application’s characteristics and the network’s performance parameters. In this tutorial, the attendees will learn about the ability of the various networking technologies to carry multimedia traffic.

The main characteristics of real-time multimedia applications are high throughput, bursty traffic, low end-to-end delay, and very low delay variance. Networking technologies that can satisfy these requirements can be used for carrying multimedia traffic. Most of the legacy WAN and LAN technologies were not designed to carry multimedia traffic. Enhancements to these technologies have been developed in an effort to make them capable of carrying multimedia information. The inability of legacy networks to carry multimedia traffic will be discussed, followed by a description of multimedia networks.

LAN technologies such as Switched Ethernet, Isochronous Ethernet, Fast Ethernet, 100VGAnyLAN, FDDI-II, and Synchronous FDDI will be presented. Digital leased lines, ISDN, and other WAN options for multimedia networking will also be described.

To make it possible to carry real-time multimedia traffic over the Internet, new protocols such as M-Bone, ST-II, RTP, and RSVP have been developed. A new initiative called Internet2 aims to overcome the problems of throughput, delay and jitter encountered on the original Internet. Multimedia networking over the Internet will be discussed.

The Asynchronous Transfer Mode (ATM) technology has been developed with multimedia networking as one of its main applications. ATM technology can be used for multimedia networking in the WAN as well as LAN environments. Fundamentals of the ATM technology and its application to multimedia information networking will be presented.

Acknowledgements

This tutorial has been extracted from the following book: Multimedia Information Networking, Nalin Sharda, Prentice Hall, ISBN 0-13-258773-4.

References