DESIGN OF IP BASED MULTIMEDIA NETWORK FOR NATION WIDE CONCERTED

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Received on: 15.10.2016

Accepted on: 22.11.2016

Abstract

Internet Protocol (IP) Based Multimedia Network is the transmission of voice, video, data, video conferencing, web casting etc. across IP Network. Design of IP Based Multimedia Network is the complete guide to a success network design strategy. Build and design an end-to-end multimedia network with help of definitive guide. This paper will cover all current key processes, technologies & services and also helps to (i) Learn about current voice and data network infrastructures and transmission technologies. Understand technology (ii) Requirements from both a user’s and designer’s perspective (iii) Learn tried-and-tested design tips for each technology and service. Tune, secure and remotely manage your network.

Case study of big complex corporate wide multimedia network is also described.

- Understand basic and advanced protocol layering concepts.
- Learn about fiber & copper cable technologies.
- Gain a solid background on Multiplexing, switching & routing technologies and methods. Learn about network bandwidth requirement and traffic engineering.

1. Introduction

In the corporate environment, bandwidth-hungry and processor-hungry client-server applications have reached most corporate desktops. Enterprise resource planning (ERP) tools used to improve and productivity, voice-data-video (multimedia) integration at the desktop, increased file sizes for databases and medical images files, huge cross-country and international file transfer and Desktop video conferencing are just a few corporate applications driving the need for more bandwidth.
In a new age of distributing computing, we see that as data-transfer and storage bandwidth requirements for text, video, voice and imaging traffic increase exponentially, the network transport requirements required to transport that traffic increase proportionately, and no proportionately.

**Fig. 1: IP Based Multimedia Network with user-to-network interfaces.**

IP Based Multimedia Network with user-to-network interfaces is shown in figure 1 below.

**Fig. 2: IP Based Multimedia Network design steps.**

The various steps of IP Based Multimedia Network design is shown in figure 2 above.

2. **Problem definition**

Any corporate company has minimum three networks now-a-days.
Telephone network for voice transmission.

CCTV network for video transmission.

Data network for data transmission.

Every client should have three devices for accessing voice, video & data. Telephone for voice, TV for video & Computer for data.

A major problem of Lack of Synchronization between the applications crops up. It is also expensive to maintain and manage heterogeneous components and networks.

3. Solution

Devices are available to convert video and voice to network. A video camera output can be converted to Digital video and further to network packets. Similarly devices such as IP phones enable us to implement Internet Telephony. So,
Design of a suitable network architecture to integrate the devices with the existing IP network would provide optimal solution and required synchronization for the corporate applications. would provide the solution needed.

![Sample Multimedia network](image)

**Fig. 3 Sample Multimedia network.**

5. Design considerations

Network architecture shall be based on open standards.

All the devices related to multimedia interface to the network shall be COTS (Commercial-Off-The-Shelf) devices.

6. Protocol selection

IP – For core network

TCP – For any client / server application
UDP – For High speed data transfer applications.

VOIP – For Internet telephony

HTTP – For web applications

SNMP– For Network management, etc.

7. Hardware selection

ROUTER for WAN link

L2 OPTICAL/COPPER GIGA ETHERNET SWITCH for access network

L3 OPTICAL/COPPER GIGA ETHERNET SWITCH for access network

10G OPTICAL ETHERNET SWITCH for backbone network

10G COPPER ETHERNET SWITCH for backbone network

802.11n Access point for wireless network etc..

8. Address design

Class C IP address for all the network elements and nodes.

Network address ranges from 192.168.10.X TO 192.168.250.X

Internet connectivity through a firewall having class C & class A (ISP) address.

9. Network architecture

The network architecture is shown in figure 5. It consists of 3 level architecture. Level 1 is a optical network of 10 Gbps speed. A 1 Gbps, optical / copper access network forms Level 2. Final and 3rd level network is a 802.11n WiFi network.
10. Capacity Planning

Backbone Bandwidth – 10 Gbps speed

Access bandwidth – 1 Gbps speed

Wifi bandwidth – 100 Mbps speed

WAN link – 8 Mbps (4 * E1)

No. of ports – 250 / network, etc.

References

1. Multimedia networking communication protocols- Thomas C.Schmidt.

2. Data network design Darren. L. Spohn, TMH publications.


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