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Establishing High Speed Securable Network with IP Telephony

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Abstract—**The world is interconnected with the advent of the inter-networking. Each organization have their own network topologies. There is a need for securing their own networks. In this project, a topology with high speed secured network is designed. In order to protect the intervention of third party in accessing the network, VLAN is created, authentication and ACL is provided. The speed of the packet transfer increased through VLAN and FRAME RELAY. The IP phones are configured in the secured network by representing a real time environment of an organization. TELNET remote access provision is also provided to allow the admin or other users to access the host devices from remote site. It also helps the admin to modify the network from offsite through data connection.**

Keywords—VLAN; FRAME RELAY;TELNET;IP phones.

I. INTRODUCTION

A computer network is a group of computer systems and other computing hardware devices that are linked together through communication channels to facilitate communication and resource-sharing among a wide range of users. Networks are commonly categorized based on their characteristic

Networks are used to:

- Facilitate communication via email, video conferencing, instant messaging, etc.
- Enable multiple users to share a single hardware device like a printer or scanner
- Enable file sharing across the network

There are many types of networks, including:

- Local Area Networks (LAN)
- Wide Area Networks (WAN)
- Metropolitan Area Networks (MAN)
- Campus Networks

Organization are interconnected to each other by a way of Local Area Network (LAN). Typically by means of a single dedicated computer known as the "server, "The networking IP telephony transmits voice and data over the networking using open standards-based Internet Protocol. It provides a way to extend consistent voice communication services in their workspace. Example main campus, branch offices, remote or mobile. Cisco IP telephony solution is an integrated part of Cisco unified communications, which combine voice, video, data and mobile application on fixed and mobile networks. By the Cisco IP telephone the organization can gain the inherent benefits by the converged network for transport and interconnection.

IP telephony (Internet Protocol telephony) is a technology that uses the Internet Protocols and packet switched connections to exchange voice, fax, and other forms of information that have traditionally been carried over the circuit-switched connections of the public switched telephone network. Using the internet calls the data and voice travel as packets of data on shared lines, avoiding the tolls of PSTN.

II. EXISTING SYSTEM

A. LAN

A LAN comprises the linking of two or more computers within a single site for the purpose of sharing data, software and ***peripherals*** such as printers.

B. Merits of Local Area Network

LAN network promotes collaborative work through the easy sharing of files. Almost any peripheral device (printers / scanners / modems / fax cards etc.) can be networked and shared by any workstation. This minimizes the number of peripheral devices required.

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C. Demerits of Local Area Network

- A failure in any part of cable can affect entire workstation.
- Location of failures can be difficult to trace.
- It is difficult to add or remove workstations while the network is in operation.
- It suffers with the major problem of data transmission speed and security.

A switch makes a decision based on ingress and a destination port. Christo Ananth et al. [4] discussed about a method, Wireless sensor networks utilize large numbers of wireless sensor nodes to collect information from their sensing terrain. Wireless sensor nodes are battery-powered devices. Energy saving is always crucial to the lifetime of a wireless sensor network. Recently, many algorithms are proposed to tackle the energy saving problem in wireless sensor networks. There are strong needs to develop wireless sensor networks algorithms with optimization priorities biased to aspects besides energy saving. In this project, a delay-aware data collection network structure for wireless sensor networks is proposed based on Multi hop Cluster Network. The objective of the proposed network structure is to determine delays in the data collection processes. The path with minimized delay through which the data can be transmitted from source to destination is also determined. AODV protocol is used to route the data packets from the source to destination.

III. PROPOSED SYSTEM

A. VLAN(Virtual LAN)

VLAN is a logical partition of a layer 2 network. Multiple partitions can be created allowing for multiple VLANs to co-exist. Each VLAN is a broadcast domain, usually with its own IP network .VLAN area mutually isolated and packets can only pass between them via a router. The partitioning of the layer 2 network takes place inside a layer 2 device, usually via a switch. The hosts grouped within a VLAN area unaware the VLAN's existence.

B. Port security

Port security limits the number of valid MAC addresses allowed on a port. The MAC addresses of legitimate devices are allowed access, while other MAC addresses are denied. Any additional attempts to connect by unknown MAC addresses generate a security violation.

C. Frame Relay

Frame relay is a telecommunication service designed for cost-efficient data transmission for intermittent traffic between local area networks (LANs) and between end-points in a wide area network (WAN). Frame relay puts data in a variable-size unit called a frame and leaves any necessary error correction (retransmission of data) up to the end-points, which speeds up overall data transmission.

D. Telnet

Telnet is an application layer protocol used on the Internet or localareanetworks to provide a bidirectional interactive text-oriented communication facility using a virtual terminal connection. It is an underlying TCP/IP protocol for accessing remote computers. Through Telnet, an administrator or another user can access someone else's computer remotely.

*E. ACL(*Access Control List*)*

ACLs are basically a set of commands, grouped together by a number or name that is used to filter traffic entering or leaving an interface. It is a table that tells a computer operating system which gives access rights for each user to particular system object. Access control lists can generally be configured to control both inbound and outbound traffic.

F. Authentication

Authentication is enabled to each and every users to access the network.so it will secure the network from unauthorized users.

G. VOIP

VOIP leverages the internet as an infrastructure for voice communications. Data packets carry voice in the same manner as general internet traffic. This configuration is more efficient than the PSTN network. VoIP can use one shared broadband circuit for many packet switched services; data, voice, and even video teleconferencing. Within an office environment, VoIP implementations often converge with the existing data network.

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- The call cost is lower, especially over long distances
- The infrastructure costs are lower: When it became available any IP network infrastructure is required.
- This save bandwidth used. Data packets, containing voice information are routed over the network, encoded in digital form.

Merits of Proposed system

- VLAN tighten network security with establishment of secure user groups, better management.
- VLAN control broadcast activity, micro segmentation of the network without sacrificing scalability, load distribution of traffic-intensive switches.
  - Ports security restricts unknown mac address to access the network.
  - Frame relay provide control for the error handling to the end points available. Thus entire transmission get faster.
  - VOIP technology in securable network is more efficient than PSTN network and reduces the communication cost.

IV. RESULT AND DISCUSSION

A. VLAN(Virtual LAN)

VLANs provide greater segmentation & organizational flexibility. It completely remove the physical constraints of workgroup Communications across the enterprise and also provide the ability for any organization to be physically dispersed throughout the company while maintaining its group identity.

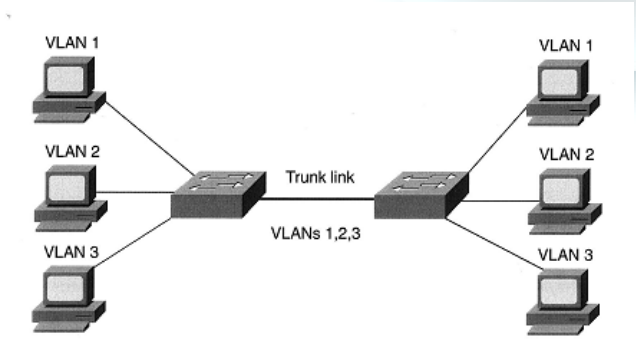

Fig.VLAN

B. Port security

Every switch in the network should be configured with port security from the network segment .when switch lacks port security, it is possible that an attacker or unauthorized person might take advantage to compromise the network by enabling and attaching a host to the port to gathering information

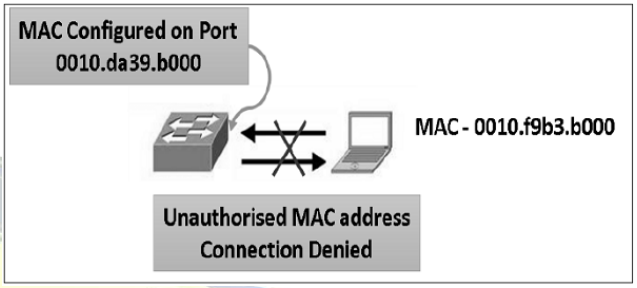

Fig.Port Security

C. Frame Relay

In this network data is divided into different size units which are called frames and necessary error correction is leaved for the endpoints. With this continues connection is provided without paying for the full-time leased line. This process increases the speed of transmission of data.

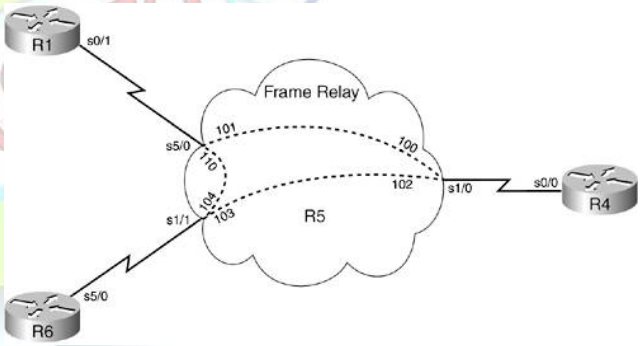

Fig. Frame Relay

D. Telnet

Telnet is a network protocol that allows a user to communicate with a remote device .It is a virtual terminal protocol used mostly by network administrators to remotely access and manage devices. Administrator can access the device by "telnetting" to IP address or hostname of a remote device .To use telnet, you must have a software (Telnet client) installed. On a remote device, a Telnet server must be installed and running. Telnet uses TCP port 23.

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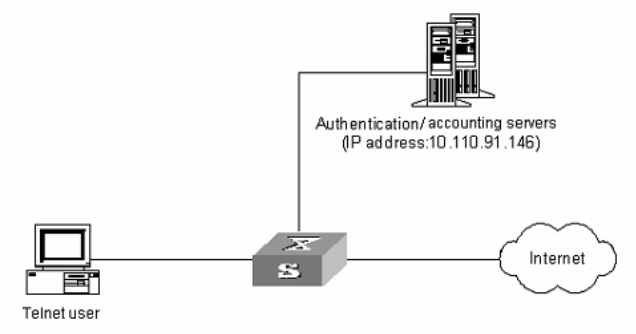

Fig. Telnet

E. ACL

- Access Control List permission systems restrict access based on verifying membership in static permission lists. An ACL should have at least one permit statement; otherwise, all traffic will be dropped because of the hidden implicit deny statement at the end of every ACL. No matter what type of ACL you use, though, you can have only one ACL per protocol, per interface, per direction

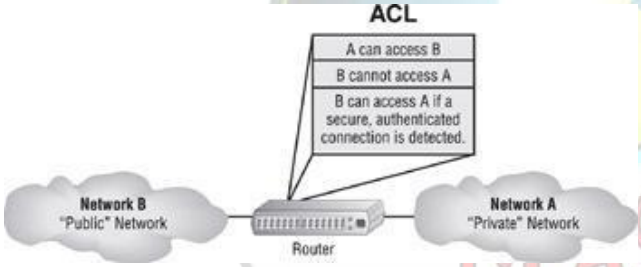

Fig. ACL

F. Authentication

Authentication is a process in which the credentials provided are compared to those on file in a database of authorized users' information on a local operating system or within an authentication server. If the credentials match, the process is completed and the user is granted authorization for access.

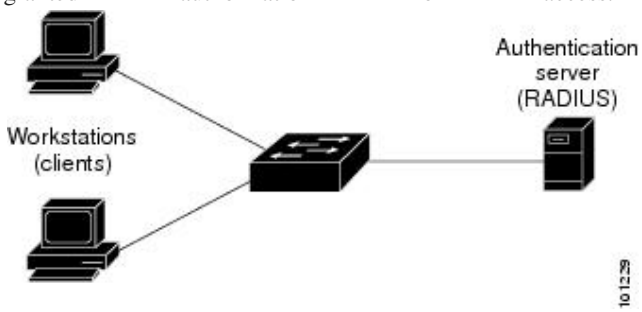

Fig.Authentication

G. VOIP

VOIP is an IP telephony term for set of facilities used to manage the delivery of voice information over the internet. VoIP involves sending voice information in digital form in

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