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VIRTUAL LOCAL AREA NETWORK FOR CONTROL NETWORK TRAFFIC

CHEAH CHOON WAH

This report is submitted in partial fulfillment of the requirements for the Bachelor of Information and Communication Technology (Computer Network)

FACULTY OF TECHNOLOGY AND COMMUNICATION TECHNOLOGY
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STUDENT : _____ Date : _____

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DEDICATION

To my beloved parents CHEAH KIM CHUAR and TIOW SWAN CHOO ,
thanks for blessing their son and give him the best ever have....

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ABSTRACT

Virtual Local Area Network (VLAN) is a technology to logical grouping of network resource and user connected to a administrative network on a switch. The project is to create network design and build a simulation VLANs base on National Semiconductor Sdn. Bhd(NSEM). Current NSEM network design can define as flat network, it is one large broadcast domain. By creating VLANs on NSEM network, their will separate broadcast domain into smaller broadcast domain within a switch, by assigning different ports in the switch to different subnetworks. This will reduce unnecessary broadcast traffic on network. VLANs can potentially reduce the cost associated with moves, adds and changes, in addition to reducing the cost for unused ports on non-VLAN hub and switches. Therefore by grouping certain user or server can be accomplishing, without physical boundary, it enhance network security and also easy management for network administrator. The project help to research proof of concept VLAN technology can reduce broadcast traffic, virtual grouping resource or user, network security, network enhancement. Methodology use to development of project is Model-Driven Development (MDD), the strategy and approach to achieving some goal presented as a framework in which related processes made up of activities or steps are grouped. Each phase have own guideline rather than as a strict set of instructions. Create a simulation VLAN environment and testing under windos98/XP/2000 operating system. The project brings advantage and may recover new method or strategy to creating a VLAN.

ABSTRAK

Virtual Local Area Network (VLAN) merupakan cara untuk mengumpul peralatan rangkaian and pengguna rangkaian dengan menggunakan *switch* yang boleh menguruskan rangkaian. Projek ini adalah merancangkan rangkaian dan juga membuat satu simulasi dengan merujuk kepada rangkaian semasa di National Semiconductor Sdn. Bhd(NSEM). Pada masa ini rangkaian di NSEM merupaka *flat network*, dan satu *broadcast domain* yang besar. Dengan adanya VLANs ia dapat memecahkan *broadcast domain* yang besar kepada kumpulan rangkaian yang lebih kecil. Ini dapat mengurangkan pembelanjaan untuk segala penyelengaraan seperti memindah, menambah dan mengubah *unused ports on non-VLAN hub and switches.* Dengan itu pengumpulan kepada pengguna dan juga *server* dapat dilaksanakan tanpa halangan fizikal, dan itu juga dapat mengetatkan keselamatan rangkaian serta pengawalan kepada rangkaian itu sendiri. Projek dapat membantu ketepatan teknologi VLAN iaitu mengurangkan *broadcast traffic,* virtual mengumpulkan peralatan dan pengguna, keselamatan rangkaian dan menambah kelancaran rangkain. Projek menggunakan metodologi Model-Driven Development (MDD), strategi ini dapat menujukkan pencapaian rangka, iaitu mengambarkan proses-proses dan aktiviti-aktiviti. Setiap langkah mempunyai penunjuk lebih baik daripada syarat-syarat yang dihalang. Simulasi VLANs adalah dalam keadaan pengoperasian windos98 /XP /2000. Projek VLAN dapat membawah kebaikan, iaitu menjumpai cara-cara atau strategi baru untuk membuat VLAN.

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LIST OF ACRONYM

ACROYMN	DESCRIPTION
[A]	
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CSI	Computer Security Institute's
[D]	
DDOS	Distributed Denial Of Service
DCOM	Distributed Component Object Model
DTEs	Data-Terminal Equipment
DCE	Data-Communication Equipment
[E]	
[F]	
FTMK	Fakulti Teknologi Maklumat dan Komunikasi
FTP	File Transfer Protocol
[G]	
GUI	Graphic User Interface
[H]	
HTTP	HyperText Transfer Protocol
[I]	

IC	Integrated Circuit
IEEE	Institute of Electrical and Electronics Engineers.
IP	Internet Protocol
IPX	Internetwork Packet eXchange
ICMP	Internet Control Message Protocol
IDF	Intermediate Distribution Frame
[K]	
KUTKM	Kolej Universiti Teknikal Kebangsaan Malaysia
[L]	
LAN	Local Area Network
[M]	
MAC	Medium Access Control
ME	Millenniums
MDD	Model – Driven development
MSFC	MultiLayer Switch Feature Card
MDF	Main Distribution Frame
[N]	
NSEM	National Semiconductor (Melacca)
NETBIOS	Network Basic Input/Output System
[P]	
PC	Personal Computer
PSM I	Projek Sarjana Muda Satu
PSM II	Projek Sarjana Muda Dua
POP	Post Office Protocol
[R]	
RPC	Remote Procedure Call
RAD	Rapid Application Development Model
RADIUS	Remote Authentication Dial-In user Service.
RIP	Routing Information Protocol

[S]

SDLC	System Development Life Cycle
SMTP	Simple Main Transfer Protocol
SSH	Secure Shell

[T]

TACACS	Terminal Access Controller Access Control System
TCP	Transmission Control Protocol
TTL	Time To Live

[U]

UTP	Unshielded Twisted-Pair
UDP	User Datagram Protocol

[V]

VLAN	Virtual Local Arae Network
VTP	Virtual Trunking Protocol

[W]

WBS	Work Breakdown Structure

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CHAPTER I

INTRODUCTION

1.1 Preamble/Overview

Project Virtual Local Area Network (VLAN) is to design a efficient network design that enhancement on current National Semiconductor, Malacca (NSEM) network business need, and setup practical a simulation environment.

National Semiconductor Sdn Bhd is located at Batu Berendam Free Trade Zone in Malacca. See Appendix 1.1: for NSEM building. It builds on 7.8 acres land, its manufacturing area covers 26,000 square feet, Assembly Facilities covers 14,500 square feet and lastly Testing Facilities covers 11,500 square feet. When NSEM was established, it only has a few hundred employees compare to 2500 by the time now. As the company name mentioned, National Semiconductor Electronics Malacca, NSEM produce the most advanced state of the art technology and manufacturing process among the industries of semiconductor.

The organization of research, choose is National Semiconductor Sdn Bhd (NSEM) network. This is because the current NSEM network environment is use range IP class B. The main problem is extraneous traffic issue, this is because broadcast activity occurrence by every communication on NSEM network. Therefore Virtual Local Are Network is the solution and enhancement for NSEM current network.

The project develop under Fast Methodology (Model Driven Development Route), it choose because suitable to the project VLAN, and it is one of the oldest or most use approaches to analyzing and designing information system is based on modeling.

1.2 Problem Statements

The problems on current NSEM LANs, are network device include computer workstation, network printer, server and machinery adapter to network that connected to each other by means of a switch and router. These network devices are primarily used to transmit incoming data throughout the network. In most cases, if two individuals were to send data simultaneously, a collision would occur and all the data transmitted would be lost. This collision would continue to propagate throughout the network by the switches, making it necessary for the original data to be sent again. LAN segments are formed with workstations, by switch. These are commonly known as collision domains because collisions remain within that segment.

A broadcast domain or LAN is the area in which broadcasts and multicasts are confined. Therefore, one or more LAN segments can be incorporated in a single LAN. The physical connection between the, workstations, switches, and routers determines broadcast and collision domains, meaning that everyone participating in the LAN must to in the same location. As the result, busy traffic often be the problems of NSEM network.

NSEM network administrators are forced to spend much of their time dealing with moving users and workstations. Although there are tools that facilitate network management, costs for network management represent a considerable financial load for an average company. The costs for network management rise with each additional network user and with the demand for higher flexibility of the network.

Due to leak management, it increase of cost to maintain and waste all kind of resource such as human recourses, time relocate and more.

The disadvantage of flat network, are broadcast message will send to all network device in the network. It is dangerous if a computer / workstation / machinery is infected by W32.Blaster. W32.Blaster is worm that exploits the DCOM RPC vulnerability. All infected workstation/machinery are aggressive to perform distributed denial of services DDOS to Microsoft update server. This cause whole network traffic be came very busy then slow down the network or bring down workstation/machinery. Beside above disadvantage, under a flat network every network device receive broadcast message, this highly expose to everyone confidential information such as plain text password include, telnet password, email password, ftp password. Other such as email content, credit card number, account number and more.

VLAN is a technology to logical grouping of network resource and user connected to a administrative network on a switch. It provides easier administration, giving way to the constraints of physically connected networks. Just as individuals belong to multiple workgroups, individual workstations and servers can participate in multiple VLANs. Broadcast domain can be defined without the use of router, but are used if there is a need to communicate between two VLANs.

Every single information change is document like, switch name, where it locate, switch port label to which VLAN group are document for future reference, this ensure when the information need, it can be search immediately. Therefore it enhance network management With VLAN can solve all the problem above.

1.3 Objective

i. To shrink broadcast domain, VLANs reduce size of broadcast domain. Therefore reducing extraneous traffic and improving the efficiency of the whole network by segment current NSEM network.

ii. To simplify network administrative, adding, moving, removing network device can be dealt with quickly and conveniently from the management console rather than the wiring closet. This enable the management run smoothly without any doubt making any decision relate change on NSEM network.

iii. To enhanced network security, VLANs create virtual boundaries that can only be crossed through a router. The standard, router-based security measures can be used to restrict access to each VLAN as required.

1.4 Scopes

i. Design a new network design, the design a new network diagram base on current NSEM intranet, and with VLAN technology enhancement.

ii. Build a simulation according a part of design, Build a VLANs simulation environment in KUTKM Cisco Lab that similar to the network design. Cisco Router and Cisco Catalyst Switch are equipping, and client of the simulation network is few computers with windows XP as operating system platform.

iii. VLAN configuration, port-based VLAN with 802.1Q VLAN encapsulation. A VLAN Trunking Protocol (VTP) domain is create to multicast messages to inform all other switches in the VTP domain.

1.5 Contributions

The new network design solve major networking difficulty that often occurrence in NSEM network.

1.6 Expected Output

The result expected is few VLANs are create. Each VLANs have own VLAN id. Each VLAN's node (computer, network printer etc.) belong to a single broadcast domain. Broadcast traffic from one node in a VLAN reaches ever other node in the same VLAN and broadcast traffic does not travel from one VLAN to other VLANs.