Minor Project- Report

Aug-2021-2022

Course Faculty: Prof Ramya KM & Prof Sunanda Semester: 5

Course Name & code: Computer Networks, 19CS5DLCNL Date: 31st December, 2021

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TITLE OF THE PROJECT | BANKING NETWORK SYSTEM | | | |
|  |  | | | |
| STUDENT NAME | Arnav Dubey | Aryan Khandelwal | Ashwath S | Ayush Shah |
| USN | 1DS19CS030 | 1DS19CS031 | 1DS19CS032 | 1DS19CS033 |
| INDIVIDUAL  CONTRIBUTION | Multilayer Switching,  Inter VLAN routing | VPN tunneling,  IPsec routing | VPN tunneling  IPsec routing | Multilayer Switching,  Inter VLAN routing |
| GUIDE | Prof Ramya KM | | | |
|  |  | | | |
| PROJECT ABSTRACT : | The project focus on Banking Network System. The proposed network is designed for a general banking network system, where we are having 6 departments :   * Internal IT support * ATM services * Consumer Banking * Investment Banking * Loans * Insurance   Every department network is separated. A guest Wi-Fi is provided to customers through which Phone, Printer, Laptops can be connected. This is a network isolated with only web browsing capabilities. We will be using different networking concepts such as VLAN, Multilayer Switch(Layer 3 Switch) , Server, Routers .  We will be using Gateway ,Trunk and DHCP concepts | | | |
|  |  | | | |
| INTRODUCTION | Banking Network System is a model where two different branches of the departments can transfer the data between them as well as an inter department communication.  There are various departments involved in the proper functioning of a bank such as  Loan Department that sanctions loan to the Consumers, IT department handles all the network and technical issues, Consumer banking is related to deposition and withdrawal of money, Investment banking provides investment related support, Insurance department handles claims of the consumers. | | | |
|  |  | | | |
| DESIGN | C:\Users\Deepak\OneDrive\Desktop\New folder\ss\switch.jpgSwitches are networking devices operating at layer 2 or a data link layer of the OSI model. They connect devices in a network and use packet switching to send, receive or forward data packets or data frames over the network  C:\Users\Deepak\OneDrive\Desktop\New folder\ss\multilayer_switch.jpgA multilayer switch is a network device that has the ability to operate at higher layers of the OSI reference model, unlike the Data Link Layer (DLL) traditionally used by switches. A multilayer switch can perform the functions of a switch as well as that of a router at incredibly fast speeds.  A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet. Data sent through the internet, such as a web page or email, is in the form of data packets.C:\Users\Deepak\OneDrive\Desktop\New folder\ss\router.jpg  C:\Users\Deepak\OneDrive\Desktop\New folder\ss\wifi.jpgWiFi is a universal wireless networking technology that utilizes radio frequencies to transfer data. WiFi allows high-speed Internet connections without the use of cables. The term WiFi is a contraction of "wireless fidelity" and commonly used to refer to wireless networking technology.  These are the following devises that can be connected using WiFi  C:\Users\Deepak\OneDrive\Desktop\New folder\ss\laptop.jpgC:\Users\Deepak\OneDrive\Desktop\New folder\ss\printer.jpg  C:\Users\Deepak\OneDrive\Desktop\New folder\ss\smartdevice.jpg   * Switches are used for inter VLAN connections connecting various PC’s in a department. * We have used IPSEC VPN tunneling to make secure transfer of data from one bank branch to another * Tunneling provides us with confidentiality, integrity and authenticity so no third party can view and access the data or path * To connect all the departments in the branch we have used multilayer switching concept. * A guest Wi-Fi is provided to customers. This is an isolated network isolated with only web browsing capabilities. * DHCP protocols are used on layer 3 switch so that it could enable automatic assignment of IP configurations for nodes on the network. It   is efficient as we do not have to assign all the IP addresses manually.  **IT DEPARTMENT**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Device | Model | IP Address | Subnet Mask | Default gateway | | IT 1 | PC-PT | 192.168.60.100 | 255.255.255.0 | 192.168.60.1 | | IT 2 | PC-PT | 192.168.60.101 | 255.255.255.0 | 192.168.60.1 | | IT 3 | Server-PT | 192.168.1.10 | 255.255.255.0 | 192.168.1.1 | | SwitchIT | 2960-24TT | N/A | N/A | N/A |   **CONSUMER BANKING**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Device | Model | IP Address | Subnet Mask | Default gateway | | CB1 | PC-PT | 192.168.50.100 | 255.255.255.0 | 192.168.50.1 | | CB2 | PC-PT | 192.168.50.101 | 255.255.255.0 | 192.168.50.1 | | SwitchIT | 2960-24TT | N/A | N/A | N/A |   **INVESTMENT BANKING**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Device | Model | IP Address | Subnet Mask | Default gateway | | IB1 | PC-PT | 192.168.40.100 | 255.255.255.0 | 192.168.40.1 | | IB2 | PC-PT | 192.168.40.101 | 255.255.255.0 | 192.168.40.1 | | SwitchIT | 2960-24TT | N/A | N/A | N/A |   **LOAN**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Device | Model | IP Address | Subnet Mask | Default gateway | | LOANS1 | PC-PT | 192.168.30.100 | 255.255.255.0 | 192.168.30.1 | | LOANS2 | PC-PT | 192.168.30.101 | 255.255.255.0 | 192.168.30.1 | | SwitchIT | 2960-24TT | N/A | N/A | N/A |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Device | Model | Port | IP Address | Subnet Mask | Default gateway | | Multi-sw 1(MAIN) | 3650-24PS | Vlan10 | 192.168.10.1 | 255.255.255.0 | N/A | | Vlan20 | 192.168.20.1 | 255.255.255.0 | | Vlan30 | 192.168.30.1 | 255.255.255.0 | | Vlan40 | 192.168.40.1 | 255.255.255.0 | | Vlan50 | 192.168.50.1 | 255.255.255.0 | | Vlan60 | 192.168.60.1 | 255.255.255.0 | | Vlan70 | 192.168.70.1 | 255.255.255.0 |   **INSURANCE**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Device | Model | IP Address | Subnet Mask | Default gateway | | I1 | PC-PT | 192.168.20.100 | 255.255.255.0 | 192.168.20.1 | | I2 | PC-PT | 192.168.20.101 | 255.255.255.0 | 192.168.20.1 | | SwitchIT | 2960-24TT | N/A | N/A | N/A |   **AUDIT MANAGEMNET**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Device | Model | IP Address | Subnet Mask | Default gateway | | AM1 | PC-PT | 192.168.10.100 | 255.255.255.0 | 192.168.10.1 | | AM2 | PC-PT | 192.168.10.101 | 255.255.255.0 | 192.168.10.1 | | SwitchIT | 2960-24TT | N/A | N/A | N/A |     **MULTILAYER SWITCH**     |  |  |  |  |  | | --- | --- | --- | --- | --- | | Device | Model | IP Address | Subnet Mask | Default gateway | | Guest-Wifi Router | HomeRouter-PT-AC | N/A | N/A | N/A | | GuestDevice | SMARTPHONE-PT | 192.168.70.2 | 255.255.255.0 | 192.168.70.1 |   **WIRELESS ROUTER & PC CONNECTION**    **Guest WiFi**    **IPSEC CONFIGURATION FOR VPN TUNNELING**  hostname R1  interface g0/1  ip address 192.168.1.1 255.255.255.0  no shut  interface g0/0  ip address 209.165.100.1 255.255.255.0  no shut  exit  ip route 0.0.0.0 0.0.0.0 209.165.100.2  hostname ISP  interface g0/1  ip address 209.165.200.2 255.255.255.0  no shut  interface g0/0  ip address 209.165.100.2 255.255.255.0  no shut  exit  hostname R3  interface g0/1  ip address 192.168.3.1 255.255.255.0  no shut  interface g0/0  ip address 209.165.200.1 255.255.255.0  no shut  exit  ip route 0.0.0.0 0.0.0.0 209.165.200.2  2. Make sure routers have the security license enabled:  license boot module c1900 technology-package securityk9  3. Configure IPsec on the routers at each end of the tunnel (R1 and R3)  R1  crypto isakmp policy 10  encryption aes 256  authentication pre-share  group 5  crypto isakmp key secretkey address 209.165.200.1  crypto ipsec transform-set R1-R3 esp-aes 256 esp-sha-hmac  crypto map IPSEC-MAP 10 ipsec-isakmp  set peer 209.165.200.1  set pfs group5  set security-association lifetime seconds 86400  set transform-set R1-R3  match address 100  interface GigabitEthernet0/0  crypto map IPSEC-MAP  access-list 100 permit ip 192.168.1.0 0.0.0.255 192.168.3.0 0.0.0.255  R3  crypto isakmp policy 10  encryption aes 256  authentication pre-share  group 5  crypto isakmp key secretkey address 209.165.100.1  crypto ipsec transform-set R3-R1 esp-aes 256 esp-sha-hmac  crypto map IPSEC-MAP 10 ipsec-isakmp  set peer 209.165.100.1  set pfs group5  set security-association lifetime seconds 86400  set transform-set R3-R1  match address 100  interface GigabitEthernet0/0  crypto map IPSEC-MAP  access-list 100 permit ip 192.168.3.0 0.0.0.255 192.168.1.0 0.0.0.255 | | | |
| PLATFORM USED  (H/W & S/W TOOLS TO BE USED | CISCO PACKET TRACER | | | |
|  |  | | | |
| PROJECT SOURCE CODE LINK (GITHUB/ GOOGLE DRIVE) | Github->https://github.com/123aryankhandelwal/Banknetwork.git | | | |
|  |  | | | |
| CONCLUSION /FUTURE ENHANCEMENT | We are able to transfer data from one branch of the department to another securely.  We have also provided wireless connectivity for the consumers using wifi router.  We will try to improvise the efficiency of the Topology we have used by limiting the amount of data loss. | | | |
|  |  | | | |
| UI SCREENSHOTS |  | | | |