Network Design Lab

Case Study

On

Structured Network Design for a Departmental Shop

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CERTIFICATE

This is to certify that the case study report titled **Structured Network Design for a Departmental Shop** is a bonafied work of

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Chapter 1

Prepare Phase

1.1. Organizational Goals

- To design and simulate a shop network system which is secure.
- To simulate a shop network system that will easily manage any customer's task.
- To manage the shop network by a central system.
- Identify the hardware components required to setup the network for the Shop.
- High availability should be available to the application server, which is accessible using https protocol.
- The application server should be setup in a secure manner with network and host level protection.
- All traffic into the application server should be scanned for security attacks.
- IP network design for the shop.
- IP addressing range for users and hardware components.
- The users at different locations should be able to access each other, including the application server.
- Identify the features and methodology which would be followed to achieve the solution.
- Network Topology diagram.

1.2. Network Design Strategies

During the strategic planning process an organization attempts to configure a supply chain, which will enable this organization to maximize its economic performance over an extended period of time. Devices and cabling were then selected based on the requirements outlined. Multiple designs were also created to be able to view the LAN from a documentation perspective. This design is based on the **OSI reference model**, which is actually a seven layered protocol. The system is designed in a top-down approach. Also, during this phase, prototypes were created and tested. A successful prototype is a good indicator of how the network will operate. A simulator program such as **Cisco Packet Tracer 5.3 and GNS3 Design and Configure is** a good tool to test the network.

After the design is approved by the customer, implementation of the new network can begin. If the design exceeds the budget of the customer, adjustment of the Design or project Budget can be discussed between the customer and developer.

1.2.1. Cisco Express Forwarding (CEF)

Routing of packets in software with the route processor is much slower and processor (CPU) intensive than hardware forwarding. Cisco Express Forwarding does the Layer 2 and Layer 3 switching packets in hardware. This feature is supported on most Cisco routers and multilayer switches for optimizing performance. The MSFC (route processor) builds the routing table in software (control plane) and derives an optimized routing table called a FIB from that. The FIB is comprised of a destination prefix and next hop address. The FIB is pushed to the PFC forwarding engine (data plane) and any DFC for switching of packets in hardware. The MSFC builds a Layer 2 adjacency table as well comprised of the next hop address and MAC address from the FIB table and ARP table. The adjacency table is pushed to the PFC and any DFC modules as well. There is a pointer from the FIB table entry to a Layer 2 adjacency table entry for all necessary packet forwarding information. The rewriting of Layer 2 frame and Layer 3 packet information occurs before forwarding the packet to the switch port queue. The MSFC updates the routing table when any routing changes occur. The MSFC then updates the FIB and adjacency table and pushes those changes to PFC and DFC modules. There are some

network services that cannot be hardware switched and as a result must be software switched with the route processor.

1.2.2. Server Load Balancing

The primary vendors that have server load balancing solutions for the enterprise include F5 and Cisco. The F5 load balancer appliance is called BIG IP Local Traffic Manager (LTM). LTM is an application proxy load balancer with distributed performance optimization and high availability Server load balancers are used to optimize the available capacity across all servers. In addition, latency is decreased by selecting servers based on performance metrics. Various models include 1600, 2000, 3600 and 3900 series appliances. The 4000, 6900, 8900, 10000 and 11000 appliances have an add-on module option. The Virtual Edition is available for VMware and Microsoft hypervisor software. The following is a summary of F5 BIG IP LTM features. Some routing protocols allow for load balancing of traffic across equal and unequal cost links as well.

1.2.3. Quality of Service (QoS)

The purpose of implementing quality of service (QoS) is to allocate the available network bandwidth to various traffic classes for the purpose of managing performance and optimizing bandwidth usage. The default network queuing is First-in-First Out (FIFO) queuing. The ingress and egress packets are queued to FIFO queues as they arrive. They are then forwarded to the interface hardware ring. There is no prioritization of packets or assignment of traffic classes with FIFO. Deploying QoS won't necessarily prevent packet loss on a network that requires additional bandwidth. QoS does not increase the amount of aggregate bandwidth available to network traffic. What it does is manage the available bandwidth by assigning it to various traffic types. It merely decides what packets are prioritized and how packets are dropped during times of network congestion. This is important for delay sensitive voice and video traffic. It is possible as well to prioritize (classify) data according to specific business requirements and mark down bulk traffic and Internet traffic as well. Cisco QoS is available with various techniques for managing network traffic. The use of QoS applies only in the context of minimizing the effects of network congestion. It is implemented as part of a performance management strategy. Some of the most popular QoS tools include packet classification and marking, low latency queuing, traffic shaping, rate limiting and policing. The correct techniques for packet classification, marking, queuing and traffic shaping must be selected to improve network performance. The performance requirements should determine the strategies employed for prioritizing and managing traffic. Cisco QoS best practices are recommended for deployment to your network infrastructure. Consider doing a network assessment that analyzes network design, device platforms, current performance issues and required SLAs before deploying QoS. It is important as well to deploy QoS only where it is needed and not to over manage traffic. Start at the access layer and only deploy necessary QoS as you move toward the network core. Maintain markings through all transit devices and focus your QoS on WAN links where bottlenecks often occur. In addition, consider other performance strategies for improving performance in addition to QoS tools. QoS can help alleviate performance problems where there are link mismatches such as WAN links. Policing and traffic shaping can manage oversubscription problems however it is preferable to fix the oversubscription issues with upgrades and network design changes.

1.2.4. Cisco WAAS Optimizer

The WAAS appliances are deployed on WAN links for optimizing bandwidth and accelerating application traffic. There are a variety of WAAS platforms with features and performance ratings designed for each office and traffic profile. The newer models are called Wide Area Virtualization Engines (WAVE) that use Cisco WAAS software. Cisco WAVE 294 and WAVE 594 are appliances for the branch office. The Cisco WAVE 694 and WAVE 7471 appliance are deployed at distribution and core office WAN links. The Cisco WAVE 7571 and WAVE 8541 are data center appliances. The maximum recommended WAN link speed is based on the appliance maximum optimized throughput.

1.2.5. Jumbo Frames

Jumbo frames are supported on some Cisco switch and router platforms. The 9000 bytes jumbo frame substantially decreases network device utilization (processing). In addition, performance is optimized with increased packet efficiency and fewer ACKs required per session. The Unix NFS protocol used for file sharing uses 8192 byte read/write data blocks. This is a specific advantage for Unix servers however all equipment between source and destination must support jumbo frames. Fragmentation occurs at network devices that don't support jumbo frames. Deploying TCP Offload at the server network interface card is recommended to process the larger frame size more effectively. Jumbo frames are standard with Cisco Gigabit and 10 Gigabit interfaces.

1.2.6. Performance Routing (PfR)

The purpose of performance routing (PfR) is to optimize available bandwidth and best path selection for packet forwarding across the company WAN. Most companies today have deployed backup links and sometimes multiple links for WAN connectivity. Performance routing provides for effective load balancing to maximize available bandwidth. In addition, there is dynamic best path selection based on granular real time monitoring of performance metrics.

1.2.7. Network Redundancy

This refers to the aggregate fault tolerance of a network at all layers of the OSI model. That starts at the physical layer with link redundancy up to the application layer with server clustering and load balancing. Most companies today specify what amount of uptime they require for effective business operations. This is expressed as an annual percentage SLA. Most enterprises will target somewhere between 97 to 99.99% uptime not including planned outages. There are change management windows defined for various planned outages. There is link, module, default gateway, router, firewall, circuit, ISP, telco, data, server and power redundancy.

1.3. Technology Used and Budget

1.3.1. Wi-Fi Routers:

There is a need of installing multiple routers in the shop which will be act as access point. There will be one router directly connected to main system where as other routers will be act as bridge.

1.3.2. LAN Cables:

LAN cables are required to connect multiple routers with the main system as well as with each other.

1.3.3. Hybrid Topology:

Hybrid topology will be used a backbone cable will be there where two hubs are connected. To each hubs multiple Wi-Fi are connected.

Budget of this system is approximately the 50,000 But if any problems occurs or any expansion may be done so it can be increase maximum up to the more 10,000.

1.4. Architecture

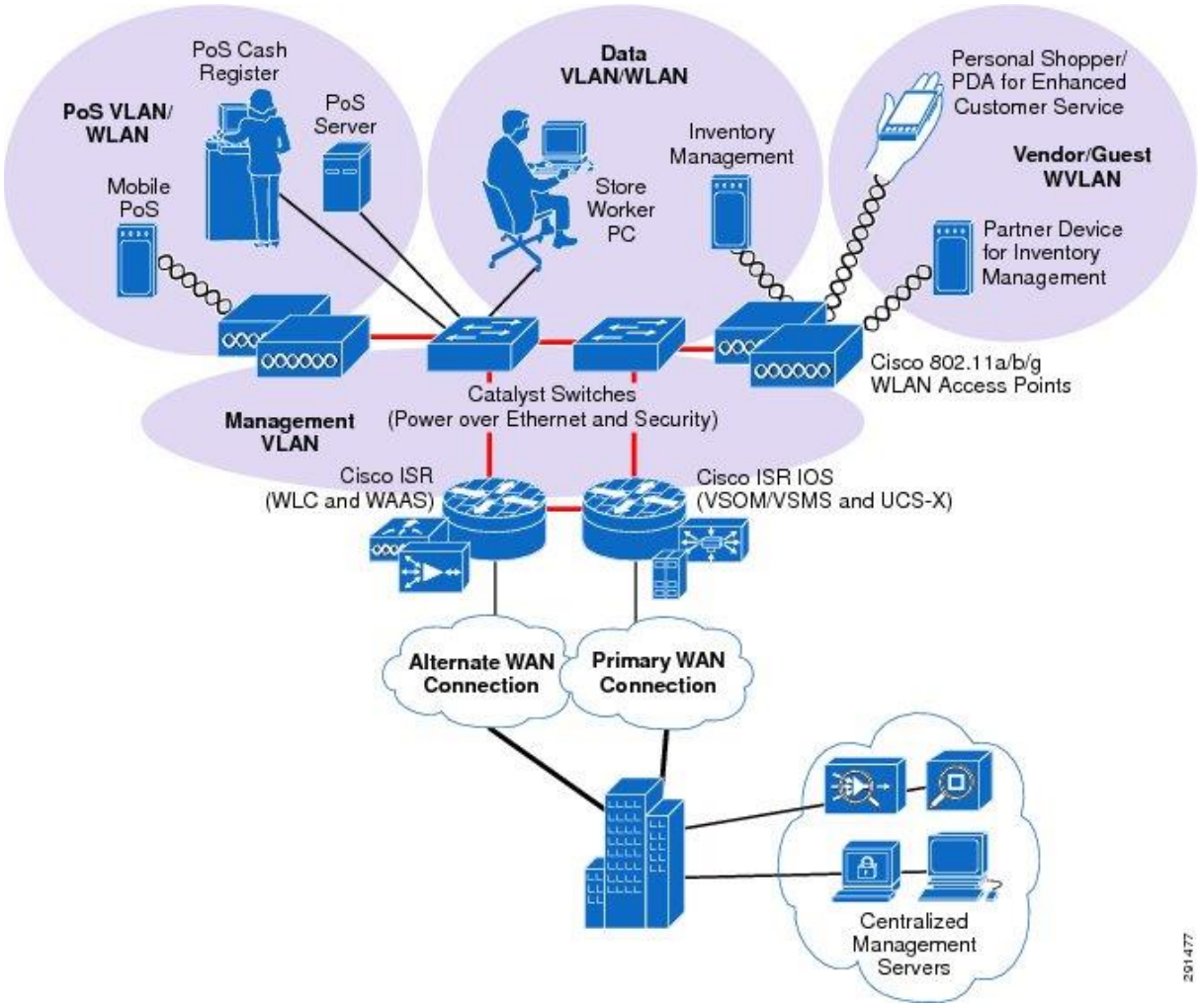

Fig. 1.1 Proposed Architecture

Chapter 2

Plan Phase

2.1. Network Service used in store

A local area network, or LAN, is a data communications network, covering a limited geographical area, like a departmental shop. LANs can connect a large number of electronic devices, including computers, dumb terminals, tape drives, modems, file servers, and various printers. For many departments of shop, wireless technology is an important addition to the network. First, shop owner add wireless to the LAN to give users greater mobility and flexibility in various departments of shop. Secondly, wireless provides LAN access in buildings that are difficult to rewire for high-speed access.

2.2. Gap Analysis

Gap analysis is technique of asset liability management that can be used to assess credit transaction risk or liquidity risk. Gap analysis was widely adopted by financial institutions during the 1980's when used to manage credit transaction risk, it was used in duration analysis. Both techniques have their own strengths and weaknesses.

To support next-generation applications, shop will need to upgrade their LANs. At the most basic level, we will need to migrate from shared hub technology to a switched infrastructure to use faster, more intelligent technologies, such as Fast Ethernet or Gigabit Ethernet. In addition, we can integrate wireless technology into their environments for greater user mobility and LAN accessibility. Below, are the steps that shop owner and shop systems can take today to build a robust, high-performance LAN.

2.2.1. Migrating from Hubs to Switches

It is critical to replace 10 (Mbps) shared-bandwidth hubs in the wiring closet with Ethernet/Fast Ethernet (10/100 Mbps) switches. Migration from 10-Mbps shared Ethernet hubs to 100-Mbps Ethernet switches is now within reach of most departmental shop owner's budgets and in most cases will deliver exponential performance boosts. Additionally, migration causes minimal disruption because the new switches are based on traditional Ethernet protocol and require no specialized expertise to deploy. Migrating from hubs to switches may simply require deploying the new switches over the existing wiring to handle the higher speeds provided by Fast Ethernet, or updating the physical cables.

2.2.2. Migrating to Multilayer Advanced Switches

For many departmental shops with hubs or Ethernet/Fast Ethernet switches, a migration to advanced, higher performance multilayer switches will also be necessary. Before deciding to implement Gigabit Ethernet, shop owner should consider the following issues

- Is my network optimized to handle an array of broadband services?
- Can my network adequately scale as users are added?
- As broadband services are introduced, will my network continue to be able to deliver top performance for all applications?

Which network topology is the best for departmental shop's network?
HYBRID TOPOLOGY: A departmental shop would have a large network enterprise. A lot of customers and workers would be trying to use the network from all over the shop. A database would be recommended to be in the center of the enterprise for easier access for users.

Chapter 3

Design Phase

3.1. Requirement Gathering Technique

3.1.1. Functional Requirements

Departmental store systems in almost all markets have an IT department. IT department solution all type of IT problem and serve the core network. IT creates a core network diagram. This diagram involves all type of useable network mechanism (Switch, Router, Firewall, Server) etc. Simulation is the most important of any system. An accurate system design, accurate performance and accurate Simulation give best performance of a system.

3.1.2. Analysis of Requirements

The description of the services and constraints are the requirements for the system and the process of finding out, analyzing, documenting and checking these services and constraints is called requirements engineering. The hardware and software requirement which we need in our project is given below.

3.1.3. Hardware Requirement

- IBM compatible
- Intel Pentium 4 or more
- Intel core-i3 based PC or more
- A monitor, keyboard and mouse
- System must have 1 GB Ram
- Hard disk 80 GB or of available memo.
- Switch.
- Router.
- Firewall
- Server

3.1.4. Software Requirement

This following software we have used to implement our project

- Windows XP or Windows 7 or Windows 8 platform.
- Packet Tracer 5.3.3

3.1.5. Packet Tracer 5.3

Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface. Packet Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit. The software is mainly focused towards Certified Cisco Network Associate Academy students as an educational tool for helping them learn fundamental CCNA concepts. Previously students enrolled in a CCNA Academy program could freely download and use the tool free of charge for educational use.

3.2. Router Configuration

3.2.1. Setting Hostname

A router should be given a unique name as one of the first configuration tasks. This task is accomplished in global configuration mode with the following command.

3.2.2. Password Encryption

The service password-encryption command applies a weak encryption to all unencrypted passwords. The enable secret <password> command uses a strong MD5 algorithm for encryption.
Router (config) #service password-encryption

3.2.3. Backup Configuration File

A current copy of the configuration can be stored on a TFTP server. The copy running-configuration TFTP command can be used to store the current configuration on a network. TFTP server.
Router# copy running-config tftp

3.2.4. Interface Configuration

Serial Interface each connected serial interface must have an IP address and subnet mask to router IP packet. Configuration the IP address with the following commands
Router(config)#interface serial 0/0/0
Router(config)#ip address<ip address> <subnet mask>

3.2.5. Routing Protocol

A routing protocol is used by routers to dynamically find all the networks in the intra network and to ensure that all routers have the routing table. Basically, a routing protocol determines the path of a packet through an intra network. Examples of routing protocols are Static, RIP, EIGRP, and OSPF.

3.2.6. Project Structure

Now we discuss and simulate the OSPF protocol. Open Shortest Path First (OSPF) is a routing protocol developed for Internet Protocol (IP) networks by the interior gateway protocol (IGP) working group of the Internet Engineering Task Force.

3.2.7. Security

Security is most important part for any departmental store. We use the different method for provide strong departmental store. Ensuring comprehensive network security visibility is no easy task. Uncover expert tips on how to improve network security visibility with network flow analysis tools, cloud security monitoring solutions, and anomaly-based monitoring technology.

3.3. Authentication Mechanism

Authentication is the process of establishing whether a client is who or what it claims to be in a particular context. A client can be an end user, a machine, or an application. The authentication mechanism is responsible for creating a credential, which is an internal product representation of a successfully authenticated client user. The abilities of the credential are determined by the configured authentication mechanism.

3.4. Design Principles

The following design principles were applied to develop the Departmental Shop network architecture

3.4.1. Hierarchy:

- Clarifies the role of each device in each tier.
- Simpler to deploy, operate, and manage the network.
- Reduces fault domains at every tier.

3.4.2. Modularity

- Enables growing the network on demand basis.

3.4.3. Resiliency

- Network must be available to meet customers and workers expectations.

3.4.4. Flexibility

- Allows intelligent traffic load-sharing by using all network resources.

3.4.5. The network design includes the following key features

- Hierarchical design with collapsed Core.
- Quality-of-service (QoS) to ensure real-time data (telephony, video) are given higher priority.
- Application of resilient design principles.
- Multi cast.
- Routed access.
- Redundancy.

3.4.6. Deploying QoS in Departmental Shop's Network

IP networks forward traffic on a best-effort basis by default. The routing protocol forwards packets over the best path, but offers no guarantee of delivery. This model works well for TCP-based data applications that adapt gracefully to variations in latency, jitter, and loss. The Departmental Shop Service Ready Architecture is a multi-service network design which supports voice and video as well as data traffic on a single network. Real time applications (such as voice, video) require packets delivered with in specified loss, delay and jitter parameters. Quality-of-Service (QoS) is a collection of features which allows the network to dedicate network resources for higher priority real time applications, while reserving sufficient network resources to service lower priority traffic. QoS accomplishes this by providing differentiated services, depending on the traffic type.

3.4.7. Building a Resilient Network

The Departmental Shop Ready Architecture is a high performance, resilient and scalable network design. A network outage may be caused by the system, human error, or natural disaster. The Departmental Shop Ready Architecture is designed to minimize the impact of a failure regardless of the cause. Network outages may be either planned or unplanned.

- **Planned Outage**

Planned network outage occurs when a portion of the network is taken out of service as part of a scheduled event (e.g., a software upgrade).

- **Unplanned Outage**

Any unscheduled network outage is considered an unplanned outage. Such outages may be caused by internal faults in the network, or devices due to hardware or software malfunctions.

The network is designed to recover from most un planned outages in less than a second (milliseconds). In many situations, the user will not even notice the outage occurred. If the outage lasts longer (several seconds), then the user will notice the lack of application responsiveness. The network is designed to minimize the overall impact of an unplanned network outage, and gracefully adjust and recover from many outage conditions.

Several techniques are used to make the network design more resilient. Deploying redundant devices and redundant connections between devices, enables the network to recover from fault conditions. Identifying critical versus non critical applications, and network resources optimizes cost performance, by focusing on the most important elements of the network design.

The resiliency of a system design is often categorized as follows

- **Network Resiliency**

Provides redundancy during physical link outages (e.g., fiber cut, bad transceivers, incorrect cabling, etc.).

- **Device Resiliency**

Protects network during device outage triggered by hardware or software (e.g. software crash, non-responsive supervisor, etc.).

- **Operational Resiliency**

Capabilities which provide network availability even during planned network outage conditions - (e.g., ISSU features which enable software upgrades while device is operating).

3.4.8. WAN Design

In the Departmental Shop Ready Architecture, the various branches of the shop are connected to the head office over Wide Area Network (WAN) links. The primary components of WAN architecture are as follows

- WAN technology
- Bandwidth capacity planning
- WAN IP addressing structure
- Routing
- QoS

Chapter 4

Implement Phase

Every financial company has its individual strengths and its own grown structures. These must be identified and transferred to the digital world. The biggest challenge lies in the smooth integration of legacy systems, some of which are still based on older technologies and will have to be integrated into the new processes, at least in the medium term. A complete conversion of all business areas in a big bang is often not practical and goal oriented. The planning time would be too long and the performance of the financial institution too limited during the implementation phase. This division is therefore also predestined for the first step towards digital stores.

In the project outlined below, the corporate lending division was chosen as the starting point for the modernization. With a knowledge-based combination of technologies, a cross divisional credit platform was established which is located above the core economic systems and whose implementation did not require any intervention in the existing systems.

4.1. Involve the right people and build a powerful team

The team entrusted with the implementation is fundamental for a successful project. Around the core-team it was therefore important to involve the company's stakeholders into the modelling of the processes, both from the and technological point of view. Whether they are credit experts, IT department heads, digitalization officers or workers - all these people know your processes and legacy systems in detail. And perhaps even more important: They also know the weak points of the existing processes. This will temporarily bind more employees to the project, but the effort for coordination and inquiries will be significantly reduced. The fact that people who later work with the system are involved in the planning also increases acceptance and understanding of the system.

4.2. Define professional goals and develop the solution configuration

In a first step, a clear target picture for the credit platform was defined together with the department and the possible use cases were analyzed and documented. These use cases were based upon the customer's strategy and the individual performance requirements.

Some examples for the customer’s strategic performance requirements regarding this project-

- Minimize processing and waiting times significantly.
- Complete audit security and prevention fraud.
- Immediate ability to provide information to customers and colleagues.
- Replacement of MS Office programs within the loan decision processes
- Simultaneous working on loan templates of several persons.
- Comprehensive process transparency.
- Preservation of space for expert knowledge.

The overall goal of this project was to automatically move process control into the background, without forcing the user to perform any defined process steps. Nevertheless, full process transparency and control should always be ensured for all parties involved. The actual technical logic is implemented and guaranteed by an intelligent information link on the new credit platform. The user is then provided at any time with all the information that he needs in the specific task context.

All relevant cases and business processes were continuously extracted from these specifications, translated into technological requirements and finally a solution configuration was developed.

Basically important

Technological specifications should never be the focus of attention when designing professionally driven solution ideas. Of course, the requirements of the credit management departments must be harmonized with the functional and process-related capabilities of the IT solution, but the software should always adapt to the processes and not vice versa. Therefore, standard software in the economic sector quickly reaches its limits, since it cannot map the diverse professional requirements in the corporate credit sector out-of-the-box.

Mainly due to the platform technology, the implementation time for the solution configuration could be kept to a minimum, despite the comprehensive requirements of the customer. In short iterations, the professional requirements were implemented directly on the solution platform and approved by the respective departments.

It took only four months to develop a technical solution, including the creation of a functioning application.

4.3. Integration and testing

The application was integrated into the store's existing infrastructure via interfaces/web services to the established core economic systems. All systems that provided relevant information for the business processing were considered. The information was linked on the credit platform using so-called ontology-based domain models. Due to the iterative development, the basic functional tests of the individual software processes already took place within the corresponding development cycles, whereby the final test effort could be considerably reduced. Complete sub-areas could already be optimized and approved parallel to the integration phase, which also had a positive effect on the duration of the entire project process.

4.4. Training, Pilot Stage and Go-Live

Often neglected, the topic of training is one of the central factors in creating acceptance for a new system. Store employees were professionally familiarized with the new system through a digitalization partner. In some cases, employees in key positions were also specifically trained, who subsequently instructed other colleagues and thus acted as multipliers.

However, the aim was to develop an intuitively manageable system through modern web applications that was easy to learn and self-explanatory. Where possible, existing work styles were retained. The focus of the training courses was on the new functions. After the successfully completed pilot phase, the planned go-live of the first business application was achieved after 12 months.

4.5. Implementation

4.5.1. Installation of routers

Routers used are of good quality and having improved performance to make the system available every time. Routers are installed in each department of the store. These routers are connected with the main server room of the store using LAN connection. Each router is allotted with the static IP address of private class. We give utmost importance to CIA as

- **Confidentiality**

Confidentiality of the user is the crucial part of any enterprise network designing. The user has to be secure from various kind of attacks. Only authorized users are allowed to access the system. Any malicious activity should be reported to network admin. The network admin should take care the security of the system.

- **Integrity**

All authorized users have to be able to use the system effectively. The user's identity, authorization and authentication have to be done for the security of the system.

- **Availability**

All authorized users need to be able to access internet services as per the store's working hours. There should not be any down time which might cause ambiguity among users.

4.5.2. Installation of camera surveillance

Security cameras are installed in each department of the store. Also, at the entry and exit point of the store. Some cameras are also installed at areas such as godown(s), parking lot(s), stairs, etc. to monitor any malicious activity. All these cameras are connected in the LAN to the main server. There is a system which continuously monitors all the action taking place in the store.

4.5.2.1. Rules

To maintain the security of the store, some rules are specified as follows

- No any worker is allowed to enter the server room.
- No any worker is allowed to enter the head office where all the business-related work is done.
- No any cutomer is allowed to enter in the godown(s) where all the goods are kept.
- No any customer is allowed to enter the room where business-related decisions are taken place.
- No any customer is allowed to carry bags inside the store. If there any, submit it at the entry point and get a token from there.
- All customers are requested to keep the goods at the same place after reviewing it.
- All workers are ordered to update good's track as soon as it gets empty.
- All customers are requested to declare all the goods at the billing counter which they have taken in the store.
- All customers need to verify the good receipt before leaving the store.

4.5.2.2. Implementing security at the entry and exit point

Security is the crucial part of any organization. Maintaining the security is one of the biggest roles that an owner has to play. We have implemented some guards at the entry and exit points to make sure that no any suspicious user enters the store. The customer's proper checking has to be done to avoid any theft. All customers needed to be verified before leaving the store.

4.5.3. Maintaining the data security

Data security is the crucial part of any enterprise network design. The data must be kept secure. For maintaining the data security following actions are taken

- Only authenticated owners are allowed to see the business transactions.
- Only accountants are allowed to make new entry to the organization's database.
- The database is stored within the store as well as partially shared other branches of the company using WAN for the purpose of statistical growth.
- All prices of the goods need to be updated regularly.
- All customer's data need to be protected and securely stored in the system.
- Customer's purchase history needs to be maintained for understanding the interest of the customer which will help to attract the cutomer by offering them discounts on the product of their interest.
- Worker's personal records, including their salary payment, insurance, personal information, etc. need to be securely stored in the system.
- All the information related to business strategies need not to be disclosed to unauthorized user of the system.

Chapter 5

Operate Phase

5.1. Router fault detection

Router fault monitoring and management is one of the most critical services a retail banking support organization needs to get right. Device outages can be costly to the financial institution, highlighting the support team's need for an efficient and effective way to respond and resolve these issues quickly. Any unplanned interruption may cause quality of service to decline, and therefore potentially impact customer happiness and loyalty. Successful incident management processes facilitate rapid and sometimes automated fault diagnosis and implements state of the art technology to restore normal operation as fast as possible, minimizing the impact on volumes of the customer.

5.1.1. Bringing value to your operation

NCR Vision is a comprehensive incident management solution that includes robust workflow automation, tracking and a full audit train of the incident life cycle. It provides unrivaled visibility into what is happening in your self-service network and helps you make significant advances in availability, customer experience, and business performance.

5.1.2. Manage operations your way with essential features

- **Combined Business and Operational Data Analysis**

Vision provides a centralized point of access to all user-based functions and visibility into both operational data (availability, transaction counts) and business data you need to identify hidden relationships between different performance-influencing factors.

- **Multivendor Capability**

Vision's scope of support extends beyond the management of a diverse range of device types, vendors and network structures. Vision uses software agents to gather data from multiple vendors as well as branch devices and kiosks. Manage your multi-channel store network with a robust, future-proofed management solution that will simplify your network operations management and provide actionable end-to-end reporting.

- **Customized, Automated workflow process**

Vision has an extensive automation capability that interrogates incoming device and transaction data per your specified performance objectives, that can create and manage incidents with minimal, manual help desk input. Incident dispatching, escalation, tracking and problem resolution—Vision provides the capabilities for end-to- end automation for solving network incidents.

- **Business intelligence and analytics**

The ability to correlate and analyze data enables the discovery of hidden relationships between different performance influencing factors, and helps expose the outlying cases that affect the consumer experience that normally would be lost in a conventional management system. Vision incorporates additional database analytics information that goes beyond the traditional network status information. It can correlate and compare traditional network information with other business information for a more precise performance picture.

When a problem occurs on the LAN network, it is automatically detected by Vision Incident Management, and a new service ticket is created. Vision makes an intelligent decision on how

to respond to the network problem based on customized workflow rules, such as automatically creating and dispatching the ticket to the relevant service provider. If at any time the repair is not going as it should—for example, if the service team misses their scheduled time of arrival then Vision will automatically escalate the ticket through the customer defined business escalation rules. Vision will log when the service team arrives on-site and is working to fix the problem. Once the router is back in service, the ticket is closed. Each step of the process is logged in detail and the audit trail allows the Support Organization to produce the reporting necessary to make more intelligent decisions around future deployments and services.
Vision Management Solution allows you to run new devices and offer more services to enhance your consumers' self-service marketing experiences. It's not just about incident management it's about improving and transforming the way you serve your consumers.

5.2. Performance Monitoring

5.2.1. Marketing Challenges

Today follows the rapid changing economic environment, which leads into narrowed margins, the need for new marketing products, increased competition among departmental stores and increased risks. Departmental stores need to improve their strategic decision-making process in order to satisfy the ever-increasing customer requirements and loyalty decrease, the new regulatory environment and the implementation of Risk-adjusted capital requirement rules.

5.2.2. Business Intelligence tools

It can be used by departmental stores for historical analysis, performance-based budgeting, business performance analytics, employee performance measurement, executive dashboards, marketing and sales automation, product innovation, customer profitability, regulatory compliance and risk management.

5.2.3. Features

- The routers are giving good bandwidth.
- The cameras are well directed to proper entries.
- The system's access is mainly to authorized users only.
- We make sure that any unauthorized or illegal connection should not be made to organization.
- The router should not have down time as it may affect the store's reputation.
- The system is protected with high security to avoid any malicious attack
- Business strategies are well planned and discussed with authorized users of the system only.
- The errors regarding login to network are resolved.
- The errors in the database of the store are resolved and proper rights are grant to various level users.
- Data of each branch is centrally available to central store with the help of WAN.
- The user's interests are properly determined and offered with attractive discounts.
- The godown(s) are well secured and restricted for the unauthorized access.

Chapter 6

Optimize Phase

6.1. Not making enough money

Despite all of the headlines about commercial stores' profitability, departmental stores and market institutions still are not making enough return on investment, or the return on equity, that shareholders require.

6.2. Consumer expectations

These days it's all about the customer experience, and many stores are feeling pressure because they are not delivering the level of service that consumers are demanding, especially in regards to technology.

6.3. Increasing competition from financial technology companies

Financial technology (FinTech) companies are usually start-up companies based on using software to provide financial services. The increasing popularity of FinTech companies is disrupting the way traditional marketing has been done. This creates a big challenge for traditional markets because they are not able to adjust quickly to the changes not just in technology, but also in operations, culture, and other facets of the industry.

6.4. Regulatory pressure

Regulatory requirements continue to increase, and stores need to spend a large part of their discretionary budget on being compliant, and on building systems and processes to keep up with the escalating requirements.

6.5. Evolving competition in the retail store marketplace

A shop used to be a shop, but not any longer. There are digital only shops, malls and high street only shops, and that's not counting the peer-to-peer financial services which are due to add another dimension to the market over the next few years. The advantage these newer shops have is that their telecoms networks are being designed for the market now. Rather than being adapted to fit the current market. Their core marketing systems and branch networks are likely to be much more flexible, built with stringent compliance requirements in mind and their online, mobile and social channels are often more 'in-touch' with consumers.

6.6. Customer-driven transformation of retail marketing services

Social media has also transformed retail marketing. Not only is it a source of information, it is now also a method to resolve problems. In the future, it could even provide the opportunity for a store to cross-sell services. Indeed, big data analytics could provide insight on emerging consumer trends to inform strategy and enable traditional retail stores to retain their dominance in the market. Other markets such as fashion and hospitality have already recognized the opportunity of this approach, so it's perhaps only a matter of time before banks do the same.

6.7. Virtualization of IT infrastructure

There are also changes happening within the IT department itself as efficiency gains afforded by technology continue to carve out a competitive advantage for stores. While virtualization and cloud technologies are used in the front and middle offices of many organizations and their data centers, its orchestration technologies can be the most disruptive to the underlying network infrastructure.

6.8. The continuous yet ever-changing challenge of regulatory compliance

It's not just market position that retail stores have to consider. With such stringent regulatory restrictions in the financial industry, compliance has to be considered with every change in process or technology implementation.

6.9. A network built for change

All in all, retail markets have changed. An 'anytime, anywhere' service is now expected and it's critical that retail market infrastructures are adaptable to these changes. The network plays a role in almost all transformations of the retail market and it is therefore absolutely critical that it is considered every step of the way. Failing to do so could not only impinge the growth of the retail store but it could, in fact, spell its demise.

Chapter 7

CONCLUSION

In this project we have implemented an enterprise network system for Departmental Store, by following guidelines specified by CISCO for Enterprise Network Design. We have gathered all the required information from the client, we have done feasibility study on that and then as and when required we have contacted them for recommendation. On their requirements we have done feasibility study again. Later we informed them with our project design. On their approval we started our work.

We are waiting for client's response to proceed further.

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