SUPERIOR UNIVERSITY LAHORE

Faculty of Computer Science & IT

Final Year Project
PROJECT REPORT

University Network Management System

Project ID: MCS 001

Project Team

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Project Report

University Network Management System

Change Record

Author(s)	Version	Date	Notes	Supervisor's Signature
Waheed Abbas	1.0	04-04-2018	Diagrams	
Waheed Abbas	2.0	24-05-2018	Font size, alignment, headings	
Waheed Abbas	3.0	17-07-2018	Revise all diagrams and users use case	

APPROVAL

PROJECT SUPERVISOR

Comments: _____

_____

Name: Mr. Umair Zafar Khan

Date:_____ Signature:_____

PROJECT MANAGER

Comments: _____

_____

Date:_____ Signature:_____

HEAD OF THE DEPARTMENT

Comments: _____

_____

Date:_____ Signature:_____

Dedication

Dedicated to our respected parents and family whose utmost love, care and struggle against all odds brought us to this height of knowledge, encouraged me to complete this Degree, and were major driving force behind our all efforts with the blessings of ALMIGHTY ALLAH.

Acknowledgements

First, I would like to express my special thanks of gratitude to my teacher **"Umair Zafar Khan"** who gave me the excellent opportunity to do this wonderful project of the topic **"University Network Management System"** which also helped me in doing a lot of research and I came to know about so many things. I am thankful to him.

I am making this project not only for marks but to also increase my knowledge and skills.

Thanks again to all who helped me a lot during this journey.

Executive Summary

We are designing UNMS with different access on network. We control with our administrator account. We are using incremental method for this implementation. We are using Server2012R2 for user creation and assigning rights them through AD. Everything control by administrator account. With this system user, communicate easily with different department. Every system having its own IP, which is assigned through DHCP server.

Table of Contents

Chapter 1

Introduction

Chapter 1: Introduction

The purpose of gathering and analyzing info was to get a detailed idea of the requirements for the "University Network Management System". It illustrated the purpose and complete declaration for the development of solution. It also explained the system constraints and interactions with other external solutions.

1.1. Background

Gathering and analyzing info related to the project helps the student or employee to get the job done in time without loss of time and resources. Pros and cons of the info and much more things related to the project are gathered and a true picture of the possibility factor of the project comes in front of the members. It helps the designer or developer to decide that he should work on the project or leave it in the meantime.

1.2. Motivations and Challenges

Successful companies know that network management is crucial for the proper support and maintenance of network infrastructure. When it comes to managing a large-scale or highly complex network, you will need a power full Network Management system. After all, a powerful and comprehensive Network Monitoring System is the heart of any network management solution.

1.3. Goals and Objectives

Gathering and analyzing info related to the project helps the student or employee to get the job done in time without loss of time and resources. Pros and cons of the info and much more things related to the project are gathered and a true picture of the possibility factor of the project comes in front of the members. It helps the designer or developer to decide that he should work on the project or leave it in the meantime.

1.4. Literature Review/Existing Solutions

In existing system, we don't have different network access for all department of the University so we designed UNMS with different access for all departments.

1.5. Proposed Solution

The scope of this solution “University Network Management System” in which Multiple / Different departments can communicate / Ping with each other with multiple VLANS. Every department would have his own VLAN in which multiple users will work. We will use the inter VLAN routing concept. By using the Inter VLAN, routing concept different department can We are designing UNMS with different access on network. We control with our administrator account. We are using incremental method for this implementation. We are using Server2008R2 for user creation and assigning rights them through AD. Everything control by administrator account. With this system user, communicate easily with different department. Every system having its own IP, which is assigned through DHCP server.

communicate with their respective VLANs. Every department will receive the dynamically IP addresses. For Dynamic IP address allocation, we will create the Dynamic Host Configuration Protocol (DHCP). All departments are able to make interactive sessions like voice and video calls. We will make two servers one is FTP server for file sharing services and second one is web server. In which social network application, will be accessible by entering the appropriate user name and password on web browser. Servers and all department / members will be interconnected via Cisco routers and switches. Our virtual network design will be applicable in any university rather than organization

1.6. Project Plan

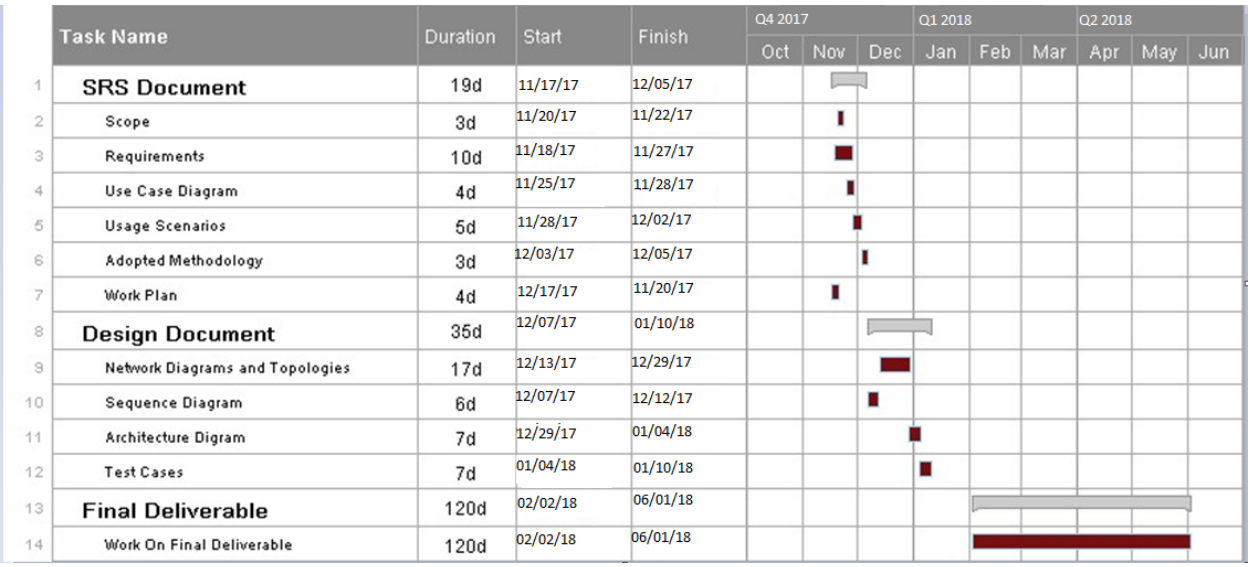
1.6.1. Work Breakdown Structure

The purpose of gathering and analyzing info was to get a detailed idea of the requirements for the “University Network Management System”. It illustrated the purpose and complete declaration for the development of solution. It also explained the system constraints and interactions with other external solutions.

1.6.2. Roles & Responsibility Matrix

In computer networking, a reliable protocol provides reliability properties with respect to the delivery of data to the intended recipient(s). Reliability is concerned with the ability of a network to carry out a desired operation such as "communication"

1.6.3. Gantt Chart



	Task Name	Duration	Start	Finish
1	**SRS Document**	19d	11/17/17	12/05/17
2	Scope	3d	11/20/17	11/22/17
3	Requirements	10d	11/18/17	11/27/17
4	Use Case Diagram	4d	11/25/17	11/28/17
5	Usage Scenarios	5d	11/28/17	12/02/17
6	Adopted Methodology	3d	12/03/17	12/05/17
7	Work Plan	4d	12/17/17	11/20/17
8	**Design Document**	35d	12/07/17	01/10/18
9	Network Diagrams and Topologies	17d	12/13/17	12/29/17
10	Sequence Diagram	6d	12/07/17	12/12/17
11	Architecture Digram	7d	12/29/17	01/04/18
12	Test Cases	7d	01/04/18	01/10/18
13	**Final Deliverable**	120d	02/02/18	06/01/18
14	Work On Final Deliverable	120d	02/02/18	06/01/18

1.7. Report Outline

The purpose of gathering and analyzing info was to get a detailed idea of the requirements for the “University Network Management System”. It illustrated the purpose and complete declaration for the development of solution. It also explained the system constraints and interactions with other external solutions.

Chapter 2

Software Requirement Specifications

Chapter 2: Software Requirement Specifications

The purpose of gathering and analyzing info was to get a detailed idea of the requirements for the “University Network Management System”. It illustrated the purpose and complete declaration for the development of solution. It also explained the system constraints and interactions with other external solutions.

2.1. Purpose

The purpose of gathering and analyzing info was to get a detailed idea of the requirements for the “University Network Management System”. It illustrated the purpose and complete declaration for the development of solution. It also explained the system constraints and interactions with other external solutions.

2.2. Document Conventions

Successful companies know that network management is crucial for the proper support and maintenance of network infrastructure. When it comes to managing a large-scale or highly complex network, you will need a power full Network Management system. After all, a powerful and comprehensive Network Monitoring System is the heart of any network management solution.

The scope of this solution “University Network Management System” in which Multiple / Different departments can communicate / Ping with each other with multiple VLANS. Every department would have his own VLAN in which multiple users will work. We will use the inter VLAN routing concept. By using the Inter VLAN, routing concept different department can communicate with their respective VLANs. Every department will receive the dynamically IP addresses. For Dynamic IP address allocation, we will create the Dynamic Host Configuration Protocol (DHCP). All departments are able to make interactive sessions like voice and video calls. We will make two servers one is FTP server for file sharing services and second one is web server. In which social network application, will be accessible by entering the appropriate user name and password on web browser. Servers and all department / members will be interconnected via Cisco routers and switches. Our virtual network design will be applicable in any university rather than organization.

2.3. Product Scope

Successful companies know that network management is crucial for the proper support and maintenance of network infrastructure. When it comes to managing a large-scale or highly complex network, you will need a power full Network Management system. After all, a powerful and comprehensive Network Monitoring System is the heart of any network management solution.

2.4. Overall Description

The purpose of gathering and analyzing info was to get a detailed idea of the requirements for the "University Network Management System". It illustrated the purpose and complete declaration for the development of solution. It also explained the system constraints and interactions with other external solutions.

2.5. Product Perspective

The scope of this solution "University Network Management System" in which Multiple Different departments can communicate ping with each other with multiple VLANS. Every department would have his own VLAN in which multiple users will work. We will use the inter VLAN routing concept. By using the Inter VLAN, routing concept different department can communicate with their respective VLANs. Every department will receive the dynamically IP addresses. For Dynamic IP address allocation, we will create the Dynamic Host Configuration Protocol (DHCP). All departments are able to make interactive sessions like voice and video calls. We will make two servers one is FTP server for file sharing services and second one is web server. In which social network application, will be accessible by entering the appropriate user name and password on web browser. Servers and all department / members will be interconnected via Cisco routers and switches. Our virtual network design will be applicable in any university rather than organization.

2.6. Product Functions

We are designing UNMS with different access on network. We control with our administrator account. We are using spiral method for this implementation. We are using Server2012R2 for user creation and assigning rights them through AD. Everything control by administrator account.

With this system user, communicate easily with different department. Every system having its own IP, which is assigned through DHCP server.

2.7. Operating Environment

Packet Tracer or GNS3 and Window Server 2008R2 and Windows 7 client machines are using for this UNMS and implementation we are using Cisco Router and Switches in GNS3.

2.8. Design and Implementation Constraints

Purpose of the design document is just to show the graphical view of the project means how the project will look like. Graphical design will help us to understand the infrastructure of Network design and topology. Networking has become an essential part of every Organization. Networking plays an important role in different organizations infrastructure. It is impossible to run organization smoothly without communication. Our network project will be covering two servers; 1st one is for social connectivity or internet connectivity and 2nd one is for intranet or FTP. All departments will be interconnected with each other throughout the different cisco equipment. Connectivity will be based on inter VLAN routing. Every department will be based on unique IP addresses with mapping of network as well. Our simulated network design will be applicable in any university rather any organization. Because of acquired results, QOS will be improved.

2.9. External Interface Requirements

2.9.1. Hardware Interfaces

Packet Tracer or GNS3 and Window Server 2008R2 and Windows 7 client machines are using for this UNMS and implementation we are using Cisco Router and Switches in GNS3.

2.10. System Features

We are designing UNMS with different VLAN and handling users with AD policy.

For this implementation we are using below tools.

- GNS 3 Simulator
- Router 7200 series

- Ethernet Switch
- VM Machine (Server 2012R2, Social server, FTP server)
- Virtual PCs
- NMS (Network management system) tool
- VMware for Server installation and Virtual PCs.

2.10.1. System Feature 1

2.10.1.1. Functional Requirements:

- **Functional requirement 1**

ID: FR1

TITLE: VLAN Creation

DESC: We will create the Multiple VLANs for each department.

DEP: Cisco Routers & Switches

- **Functional requirement 2**

ID: FR1

TITLE: Inter-VLAN Routing

DESC: After creation of Multiple VLAN for each department we will implement the Inter VLAN Routing Concept. So that every department will easily be communicate with each other.

DEP: Cisco Routers & Switches

- **Functional requirement 3**

ID: FR1

TITLE: Classification of IP addresses with their respective VLAN.

DESC: Every department/ member will receive IP address according to their respective VLAN.

DEP: Cisco Routers, Switches and configurations.

- **Functional requirement 4**

ID: FR1

TITLE: Mapping of Network with their respective VLAN.

DESC: Map the Network addresses with their respective VLANs. So that every user will be able to receive appropriate IP addresses.

DEP: Cisco Routers, Switches and FE cable.

- **Functional requirement 5**

ID: FR1

TITLE: Formation of Intra Net (DHCP / FTP) Server

DESC: We will configure intranet server in which DHCP Services FTP client services will run for dynamic IP addresses allocation to users with their respective VLANs and File sharing respectively.

DEP: Intranet Server, Software (VW Ware) and configurations.

- **Functional requirement 6**

ID: FR1

TITLE: Establishment of Web Server

DESC: We will configure intranet server in which DHCP Services FTP client services will run for dynamic IP addresses allocation to users with their respective VLANs and File sharing respectively.

DEP: Intranet Server, Software (VW Ware) and configurations.

2.11. Nonfunctional Requirements

2.11.1. Performance Requirements

A Network design is a tremendously fundamental piece of a system topology. A suitable system design upgrades the capacity of a system. Better Network design influences the entire system. In the given situation, we are utilizing a solitary router (in distribution layer) that deals with whole network; access switches, the inside and outer activity amongst servers. Our system project involves two servers in core layer as per the project requirement; first, one is for social

connectivity or Web server and 2nd one is for local file sharing or FTP (file transfer protocol). In our Network diagram, we have deployed four access switches with their elected departments. Nodes consisting of images, laptops, scanners and printers are further attached to the access switches in access layer. Distinctive IP addresses range has been assigned to each access switch for isolation of the department and as per the requirements of the project.

2.11.2. Safety Requirements

We used different VLAN for safety purpose.

2.11.3. Security Requirements

We having different VLAN with different access data on these VLAN and also user based security in our UNMS.

2.11.4. Software Quality Attributes

2.11.4.1. Usability

The Network Management system shall allow the users to access their file or data. Users will be facilitated by facilitated by FTP and Intranet services. Network Management system is usable for any other schools, college and university. Just to change the terminology and sections it will be work there also. The Network design system is user friendly and self-explanatory.

2.11.4.2. Reliability

In computer networking, a reliable protocol provides reliability properties with respect to the delivery of data to the intended recipient(s). Reliability is concerned with the ability of a network to carry out a desired operation such as "communication"

2.11.4.3. Supportability

Network Management system can be implemented on any type of operating system .i.e. Windows, MAC, Linux etc.

2.11.4.4. System Requirements

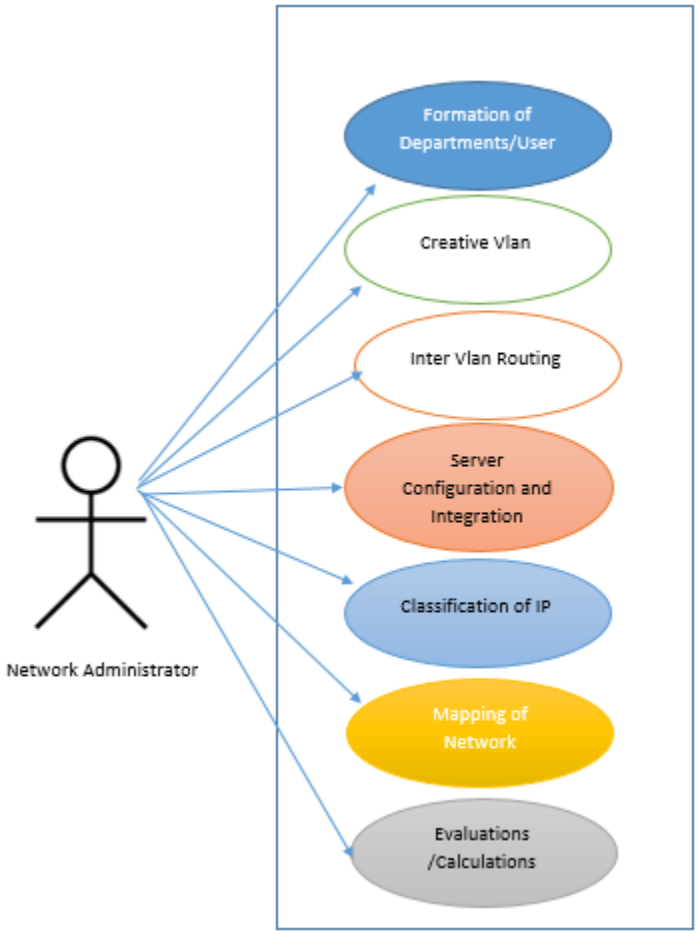
There are no special requirements, means any pc with LAN/Network card can be connected to the network but should be authorized by the network admin, as to save the network from malware or any other bugs & viruses etc.

Chapter 3

Use Case Analysis

Chapter 3: Use Case Analysis

3.1. Use Case Model



3.2. Use Case Descriptions

1.

UCS-01 Formation of Departments / Users	
Use Case Title	
Use Case ID	UCS-01
Actors	Administrator / Users
Description	1. This title describes that several departments will be in a network and multiple users will work under each department. 2. All departments will be interlocked and connected to the internet. 3. All departments will be connected via distinct VLANs. 4. For internet or social connectivity each node will be secured by the help of user name and password.
Alternative Paths	VLANs will be configured as per requirements and routers, Layer 3 switches and hubs will define alternative paths.
Pre-Conditions	Sub – Departments will be arranged in a network topology.
Task Sequence	All users in every department will be configured and implement network design apply policies for communication.
Post Conditions	Policies will implement according to network requirements.
Exceptions	Exceptions will be handled as per applying policies over the entire network.
Author	**Waheed Abbas**

2.

UCS-02 Creative VLANs	
Use Case Title	Creative VLANs
Use Case ID	UCS-02
Actors	Administrator
Description	1. After that the usage of layer 3 switches and hubs, VLANs are the basis of administration, reduced broadcast traffic and extended security etc. 2. By using the concept of VLAN, separated VLANs will be created for each department. 3. Through this IP subnet based VLANs will be assigned to each and every department.
Alternative Paths	VLANs will be configured as per requirements and routers, switches and hubs will define alternative paths.
Pre-Conditions	Admin will create Different VLANs for distinct departments. So that every User / Host will communicate with each other under respective Vlan.
Task Sequence	1. Admin will create VLANs on Cisco Devices. E.g. Switches and routers etc. 2. Same as it is, different VLAN will create for different department like wise.
Post Conditions	Communication among different will be started among distinct Vlan Hosts.
Exceptions	As an Alternative path, we will switch exceptions via VLANs.
Author	**Waheed Abbas**

3.

UCS-03 Inter VLAN Routing	
Use Case Title	Inter VLAN Routing
Use Case ID	UCS-03
Actors	Administrator
Description	1. Interconnectivity of VLANs is made by the help of Cisco switches, hubs and routers. 2. A host can communicate with only those hosts that are the members of same Vlan. If he wants to ping with different Vlan member then we will use the inter Vlan routing concept 3. For inter Vlan routing, Router and layer 3 switched will be required.
Alternative Paths	VLANs will be configured as per requirements and routers, switches and hubs will define alternative paths.
Pre-Conditions	Admin will implement the Inter Vlan routing concept for each department on Cisco Routers and Switches. So that every User / Host can ping to respective Vlan user and different Vlan user.
Task Sequence	1. Admin will implement inter Vlan routing concept on Cisco Devices. E.g. Switches and routers etc.
Post Conditions	When Communication among different will be successfully done then every user can communicate to different vlan member.
Exceptions	If admin does not implement the Inter Vlan routing concept on Cisco devices properly then it would also be handled by VLANs.
Author	**Waheed Abbas**

4.

UCS-04 Server Configuration and Integration	
Use Case Title	Server configurations and integration
Use Case ID	UCS-04
Actors	Administrator
Description	1. There will be two servers; one for FTP or intranet and other for social connectivity on internet. 2. Both will be configured as per Network Project requirement. 3. Department members will receive appropriate dynamic IP addresses from DHCP or intranet server. 4. For social connectivity, security and traffic will be maintained by the help of user name and password.
Alternative Paths	According to Project requirements, there is no alternative path of both servers.
Pre-Conditions	After mapping over the network, servers will be configured.
Task Sequence	FTP Server will be configured and then Web server for social network application.
Post Conditions	After configuration of both servers IPs will be assigned dynamically with their respective Vlan to all department Hosts.
Exception	Exceptions will also be handled via configured Vlan.
Author	**Waheed Abbas**

5.

UCS-05 Classification of IP Addresses	
Use Case Title	Classification of IP Addresses
Use Case ID	UCS-05
Actors	Administrator
Description	1. IP addresses will be classified by the use of VLANs. 2. Unique subnet will be assigned to separate section. 3. All nodes in the department will receive appropriate dynamic IP address to maintain traffic.
Alternative Paths	IP addresses will be assigned automatically. So without server entire network will catch IPs defined by VLANs.
Pre-Conditions	Server will assign dynamic IP address to every user on same / respective Vlan.
Task Sequence	Unique Subnet will be assigned to each department throughout the server.
Post Conditions	After Classify the IP address with their respective Vlan via Server to user Mapping of the network will start.
Exception	If dynamic IP does not assign to every user, then exceptions can be dome throughout the respective Vlan.
Author	**Waheed Abbas**

6.

UCS-06 Mapping of Network	
Use Case Title	Mapping of Network
Use Case ID	UCS-06
Actors	Administrator
Description	1. Monitoring and traffic control of the network can be complete by the help of VLANs. 2. Moreover the Monitoring of the network can also be complete by the help of servers.
Alternative Paths	VLANs and servers will be alternate to each other in this regard.
Pre-Conditions	After configuration of Server by Admin. Mapping over the network will be start with their respective Vlan.
Task Sequence	1. Unique Subnet will be assigned to each department for data transmission.
Post Conditions	After Classify the IP address with their Vlan via Server to user. Users would be able to easily communicate on same and different Vlan.
Exceptions	Exceptions will also be handled via configured distinct VLANs.
Author	**Waheed Abbas**

7.

UCS-07 Evaluation of Network	
Use Case Title	Evaluation of Network
Use Case ID	UCS-07
Actors	Administrator
Description	Connectivity of each department can be evaluated by the different tools but here we can use **"Ping"** to evaluate the network.
Alternative Paths	If we found any circuit over the network then Vlan can be changed to other.
Pre-Conditions	Complete infrastructure has been done and mapping has also been completed.
Task Sequence	Connectivity will be checked by sending packets from one sender to many receivers.
Post Conditions	After evaluation of the Whole network will be carried out.
Exception	Exceptions will also be handled via configured Vlan.
Author	**Waheed Abbas**

3.3. Use Case Diagram

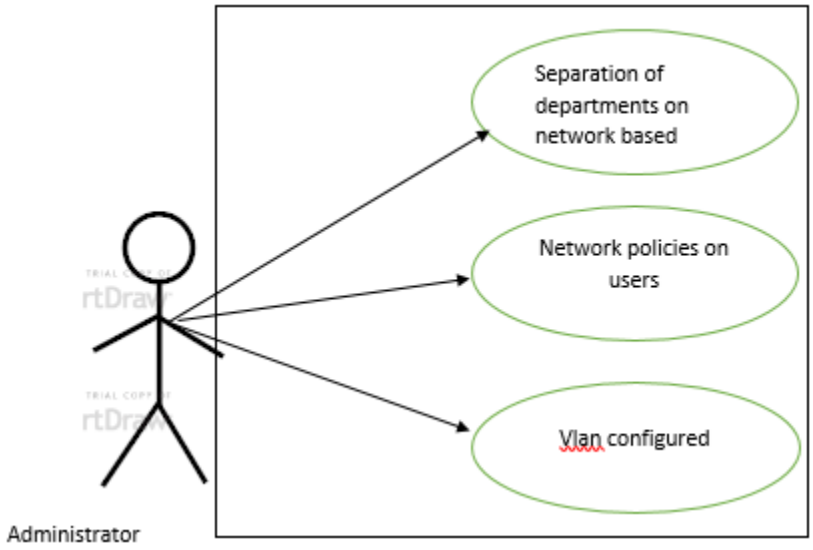


Figure: 01 Formation of Departments/Users

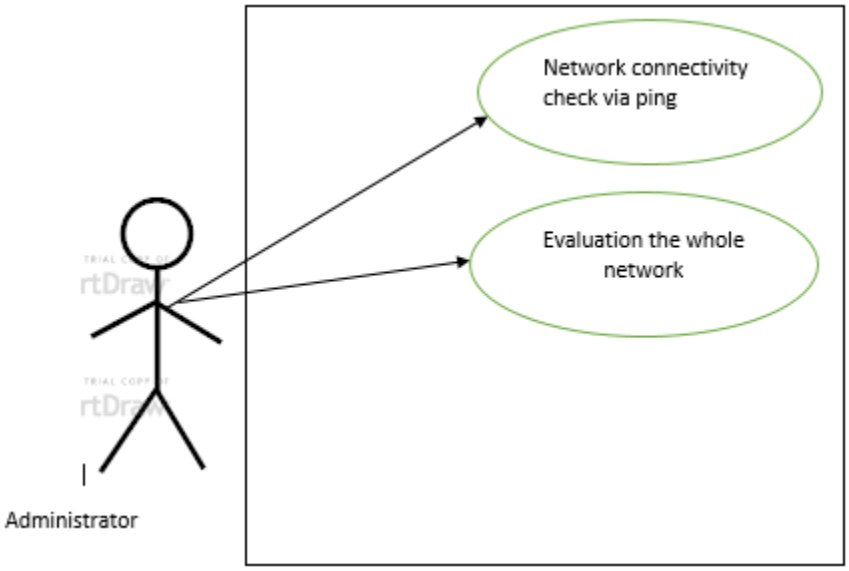


Figure: 02 Creating VLANs

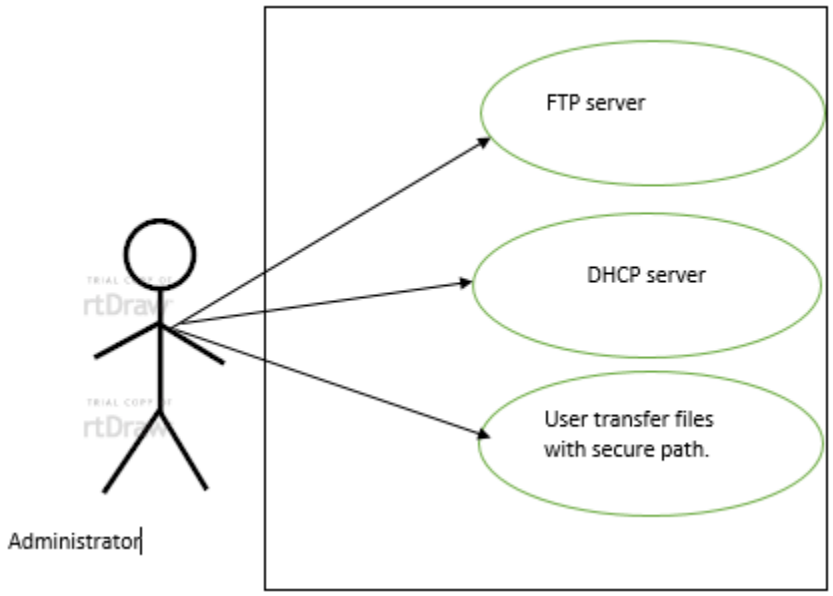


Figure: 03 Server Configuration and Integration

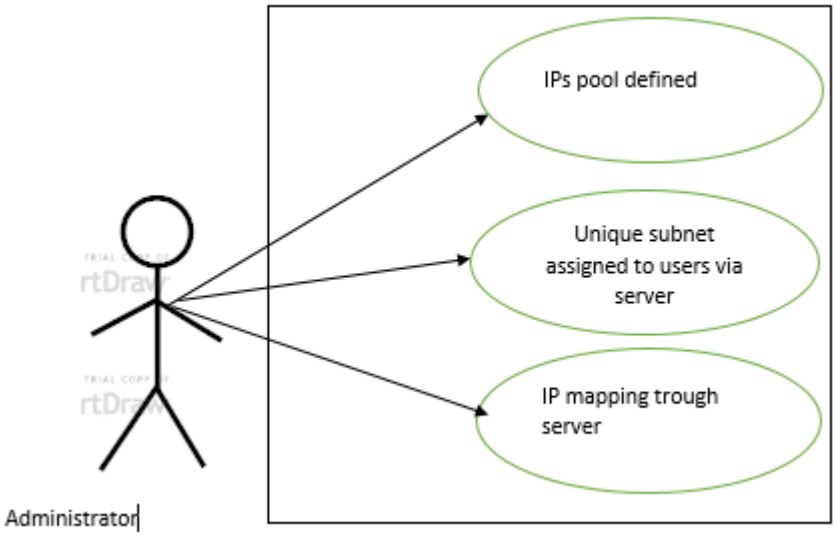


Figure: 04 Classification of IP Addresses

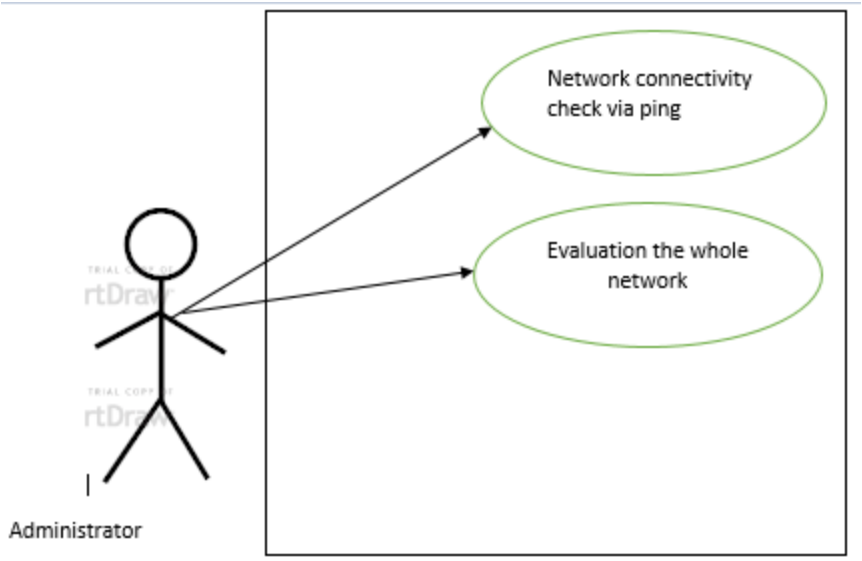


Figure: 07 Evaluation of Network

Chapter 4

System Design

Chapter 4: System Design

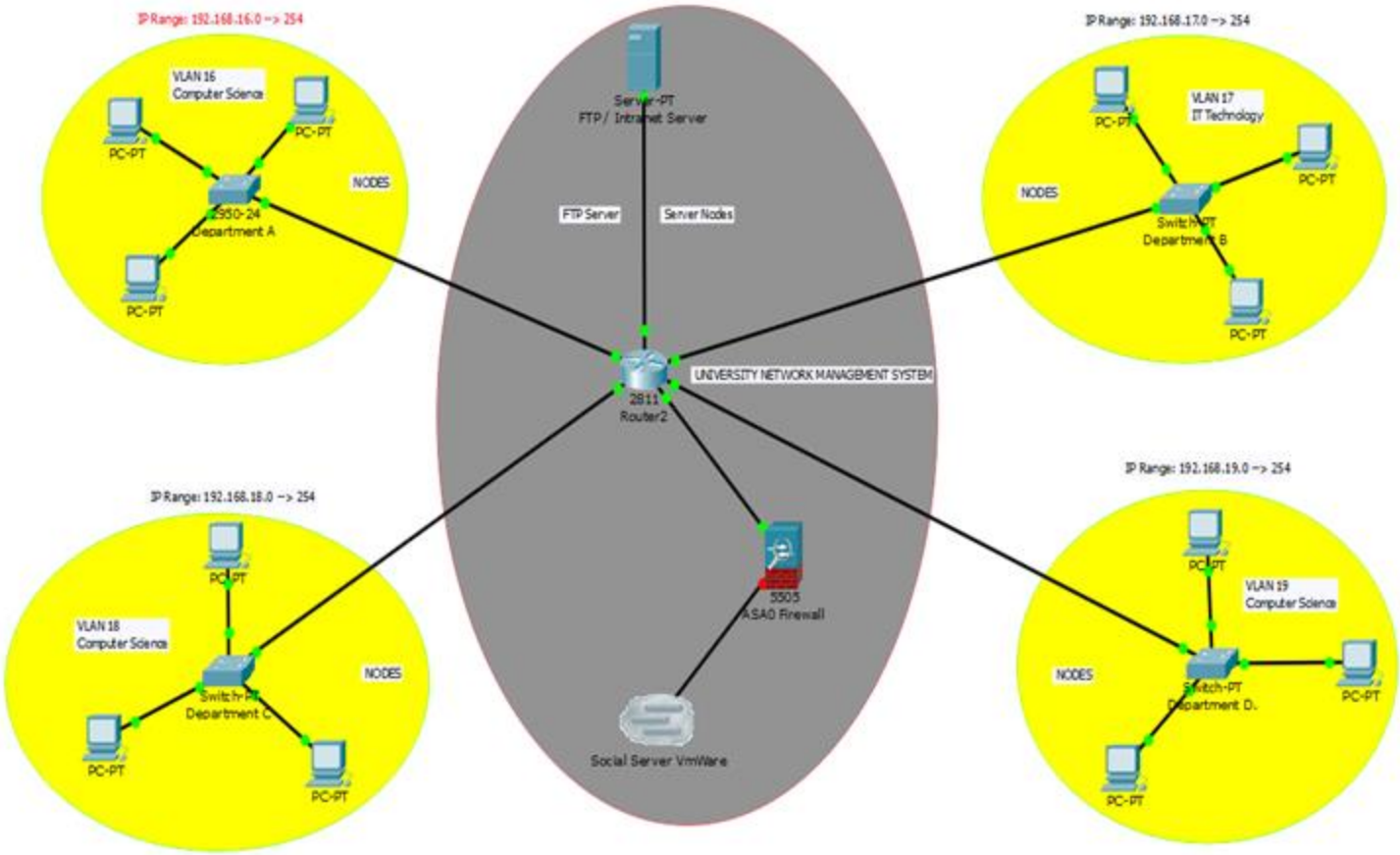


Figure: 01 System design

4.1. Architecture Diagram

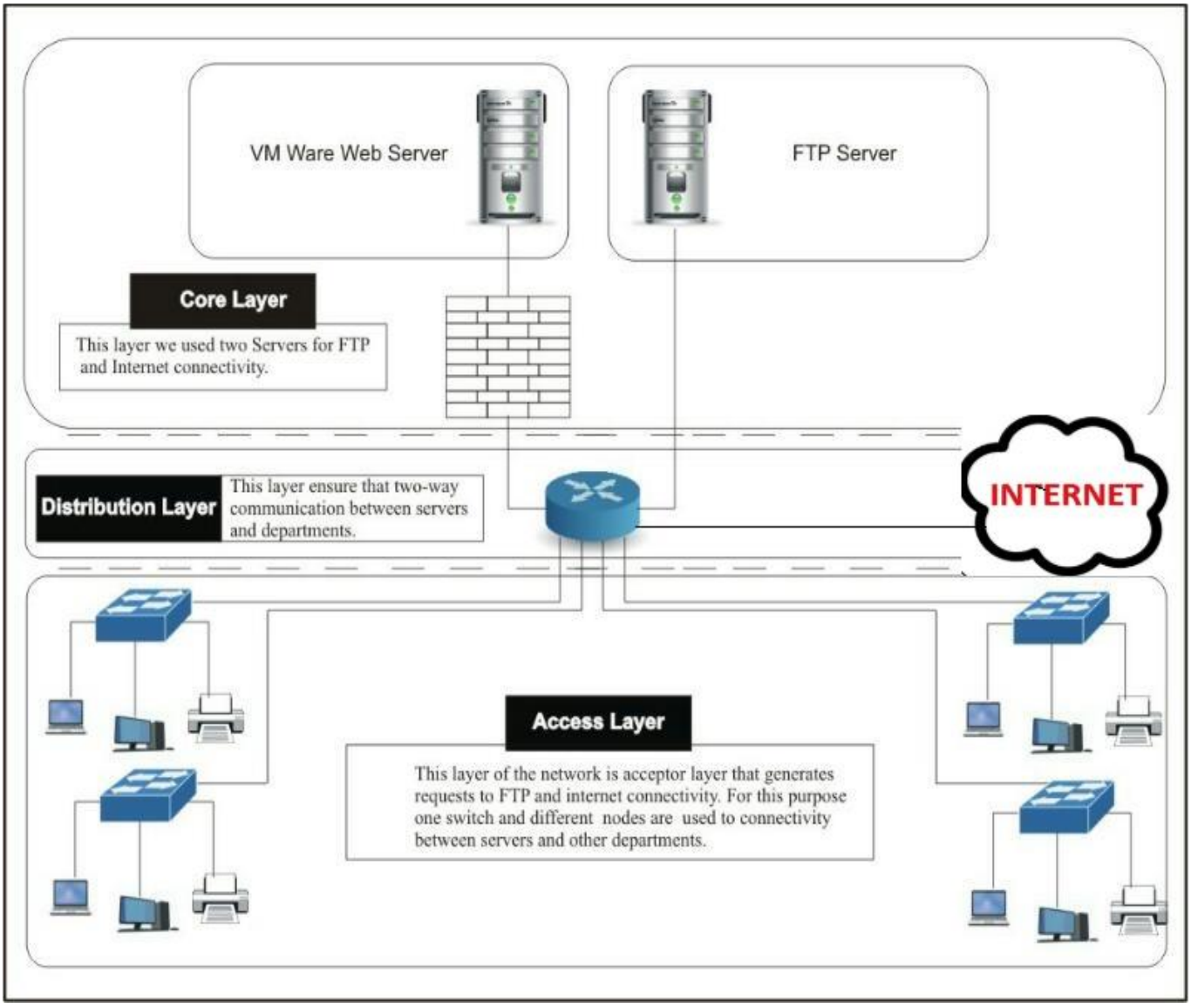


Figure: 02 Architecture Diagram

4.2. Sequence / Collaboration Diagram

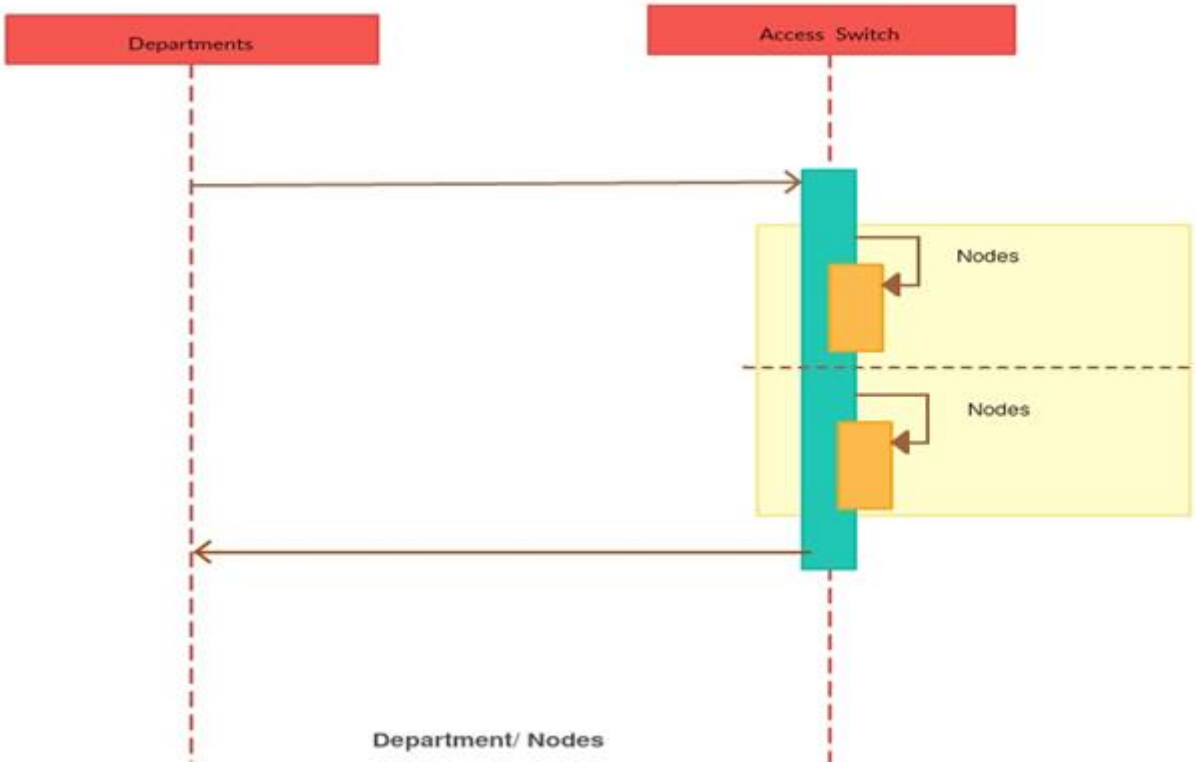


Figure: 04 Sequence Diagram 01

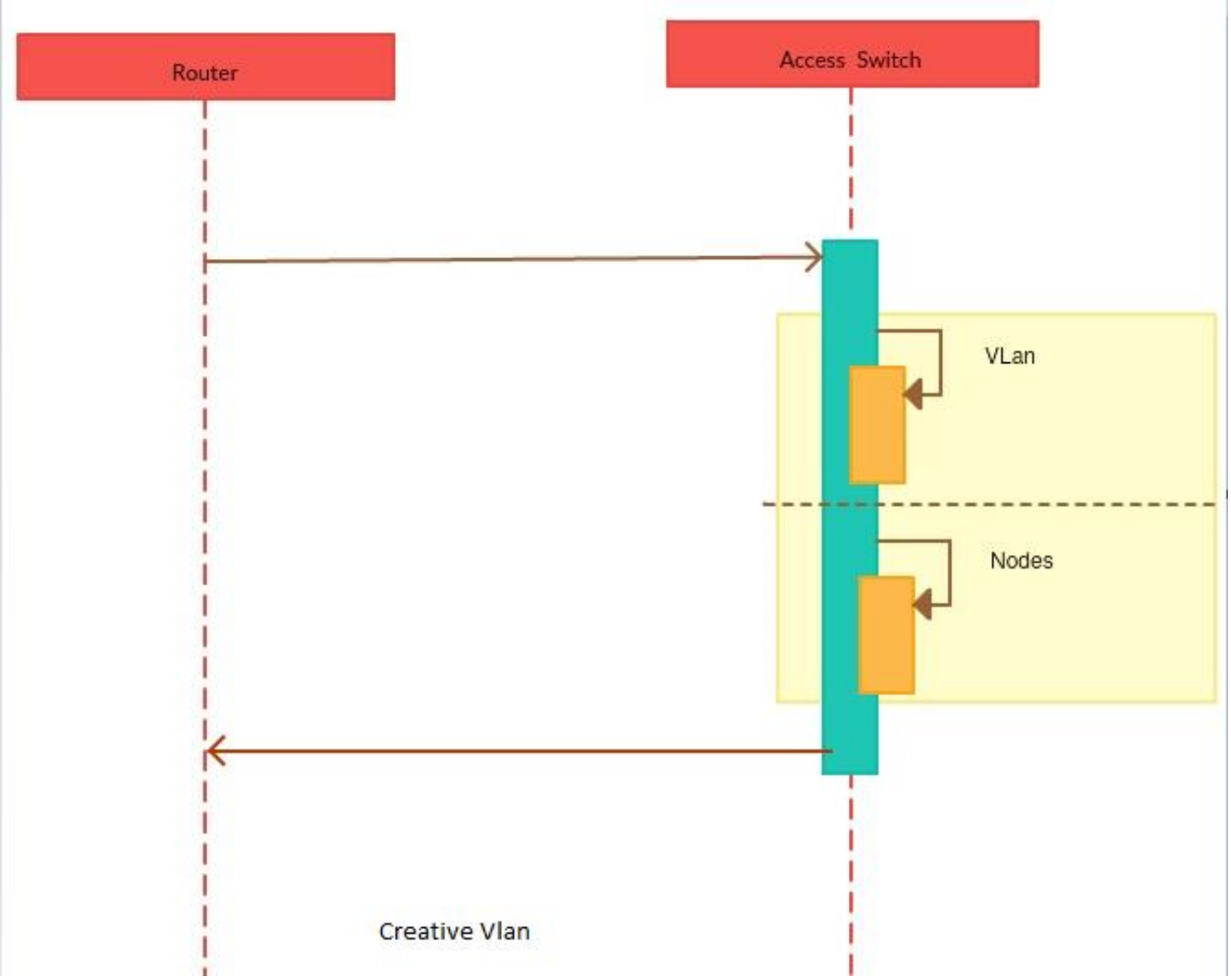


Figure: 05 Sequence Diagram 2

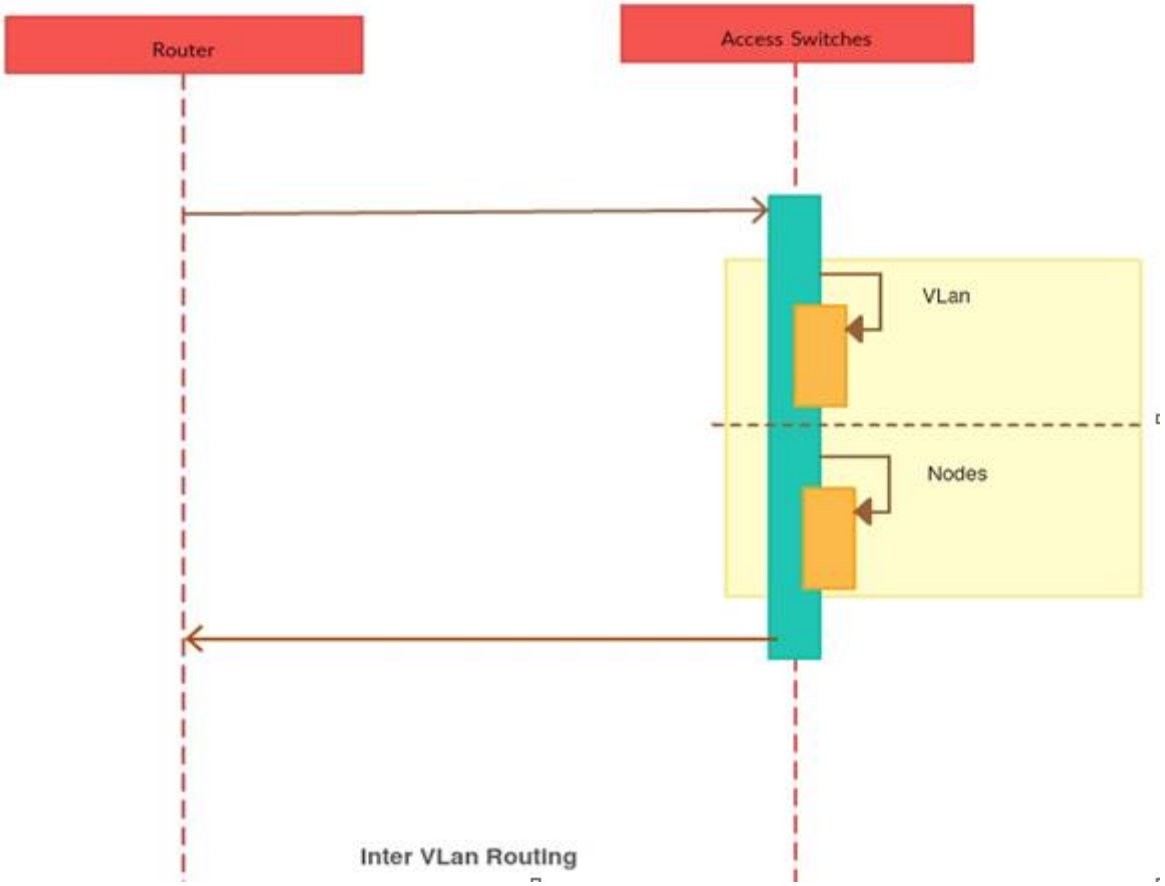


Figure: 06 Sequence Diagram 3

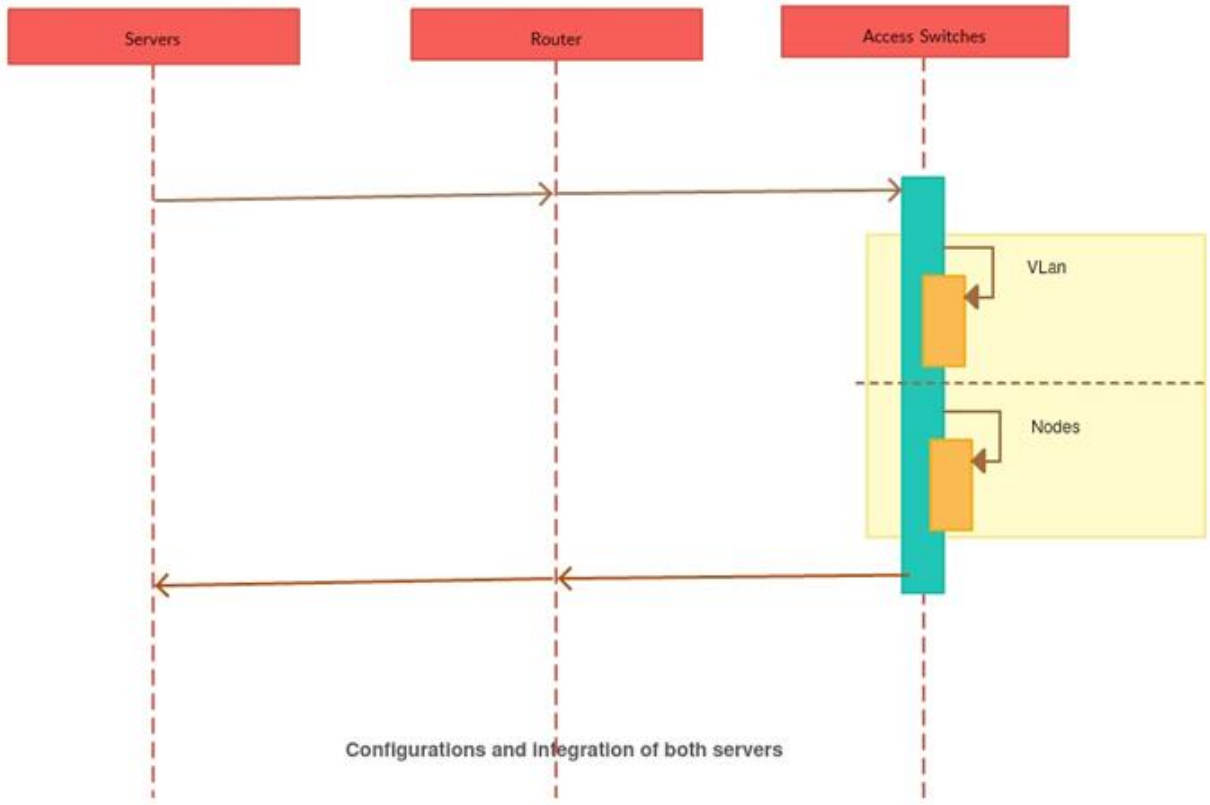


Figure: 07 Sequence Diagram 4

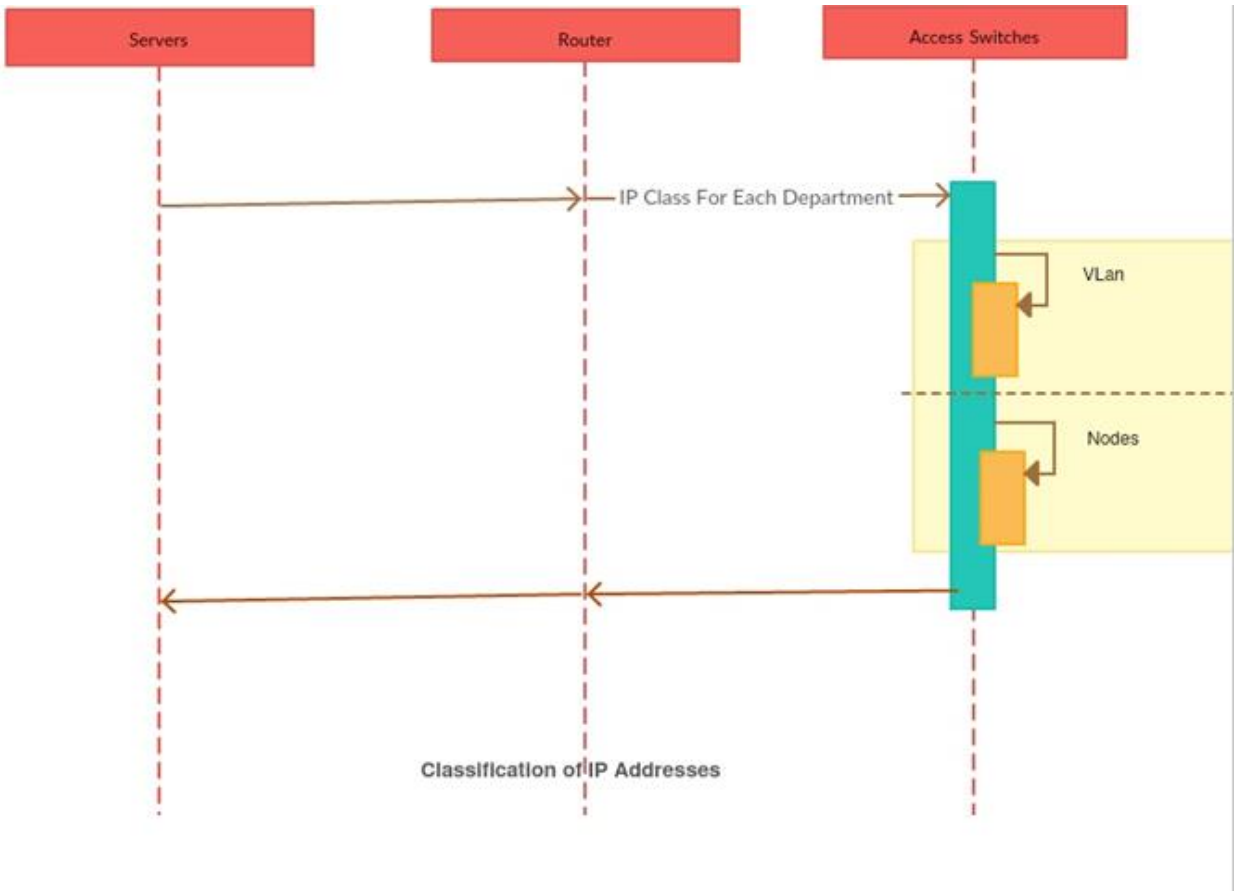


Figure: 08 Sequence Diagram 5

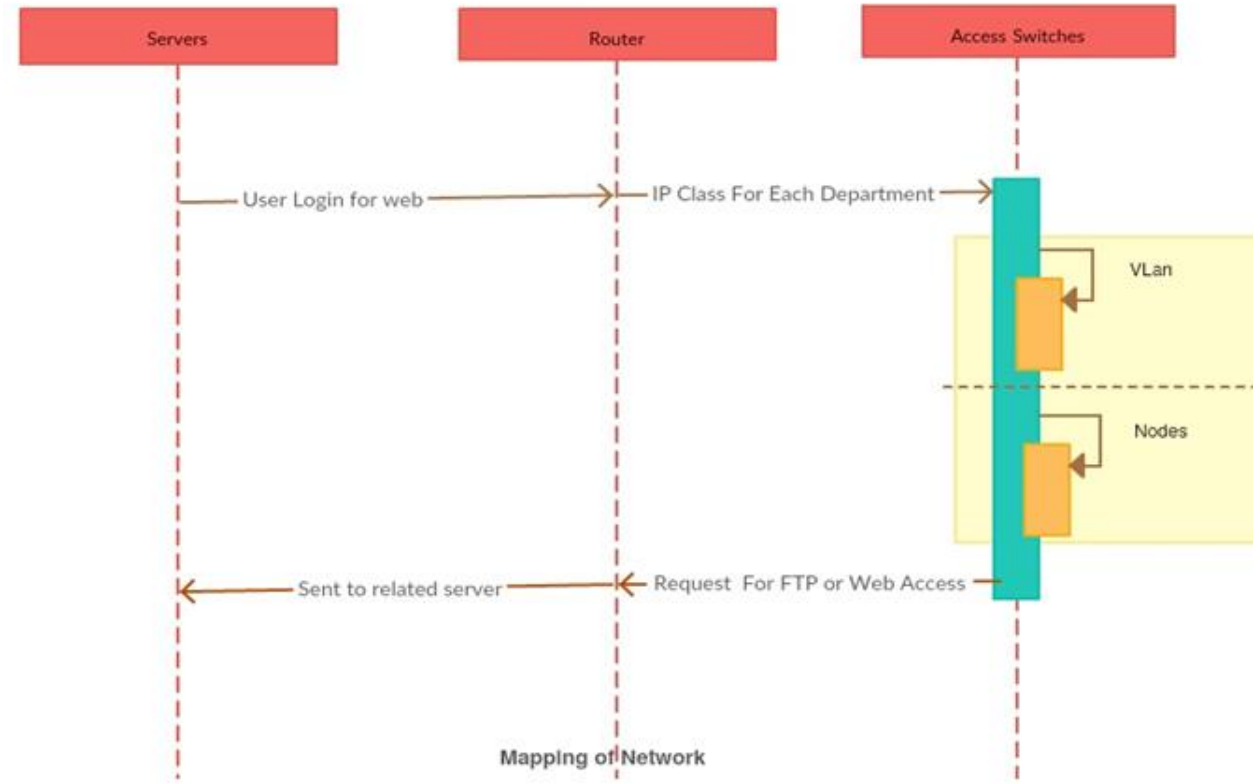


Figure: 09 Sequence Diagram 6

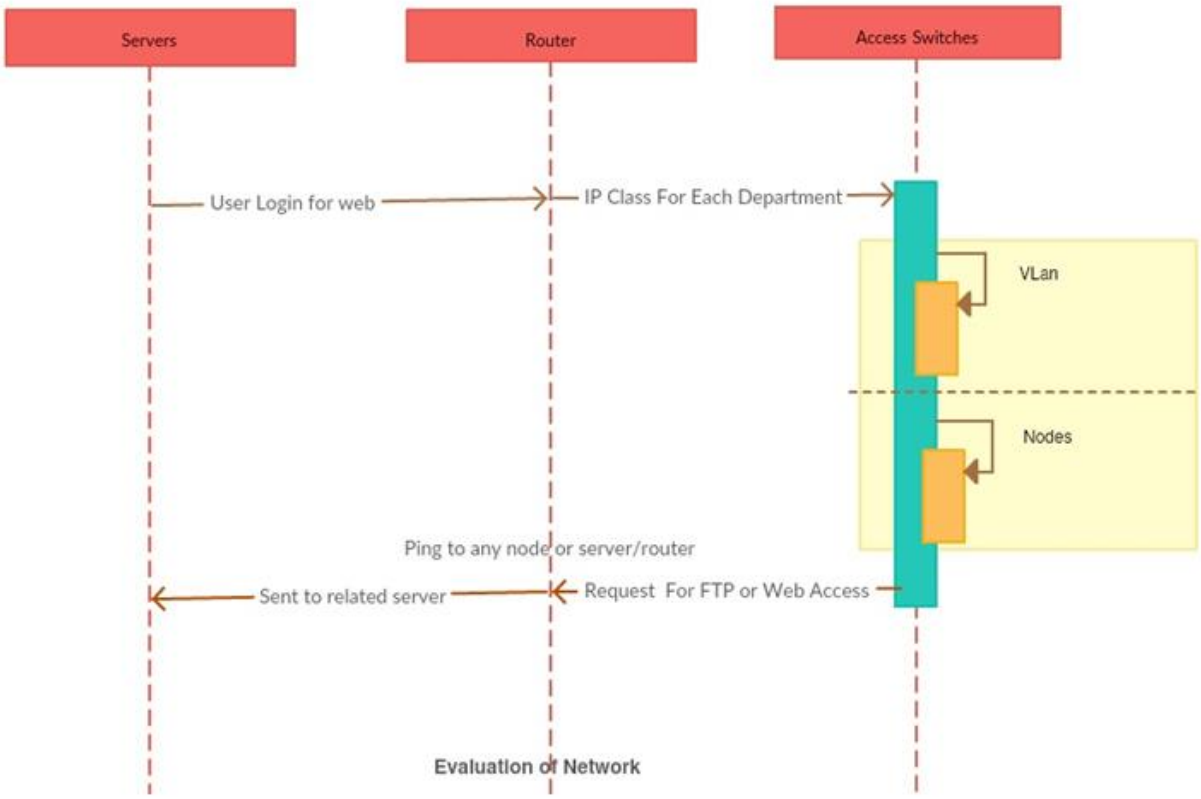


Figure: 10 Sequence Diagram 7

Chapter 5

Implementation

Chapter 5: Implementation Tools and Techniques

The purpose of gathering and analyzing info was to get a detailed idea of the requirements for the "University Network Management System". It illustrated the purpose and complete declaration for the development of solution. It also explained the system constraints and interactions with other external solutions.

5.1. Methodology

A software development methodology is a framework that is used to structure, plan, and control the process of developing an information system. A wide variety of such frameworks have evolved over the decades each having its own strength and weaknesses. One development methodology may not necessarily suitable for use by all projects. Each available methodology is best suited to specific kind of projects, based on various technical, organizational, project and team considerations. These frameworks are often bound to some kind of organization, which further develops, supports the use, and promotes the methodology. The methodology is often documented in some kind of formal documentation. According to Elliott, the Systems development life cycle (SDLC) can be considered to be the oldest formalized methodology for building information systems. The main idea of the SDLC has been "to pursue the development of information system in a very deliberate, structured and methodical way, requiring each phase of the life cycle from inception of the idea to delivery of the final system, to be carried out in rigidly and sequentially".

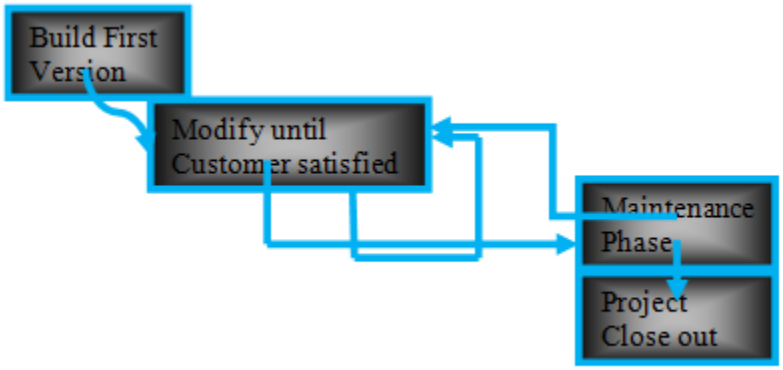
5.2. Available Methodologies

Different process models are used to model a project. Some well-known standard process models are:

- Build-and-fix model
- Incremental model
- Prototyping model
- Spiral model
- Water fall mode

5.3. Build and fix model

This model is depicted in the following diagram:

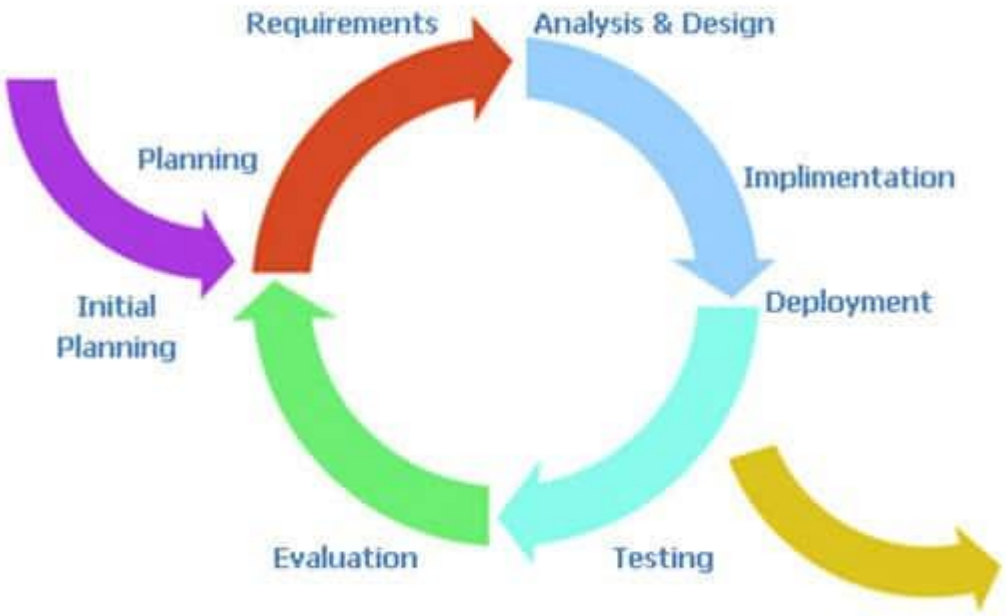


In this model the product is built without specifications or design. The developers build the product and present it to the customer and then adaptation is started to congregate the customer need. The cost of build and fix is much greater than the cost of properly designed and specified product. Maintenance of the product is totally without any documentation and if the problem persist after final delivery then the maintenance becomes very critical. This model work for small projects but for complex projects it is totally unpredictable.

5.4. Incremental model

The incremental build model is a method of software development where the product is designed, implemented and tested incrementally (a little more is added each time) until the product is finished. It involves both development and maintenance. The incremental model is an example of an evolutionary life cycle model. It combines the linear nature of the waterfall model and the iterative nature of the prototyping model. It is a method of software development where the model is designed, implemented and tested incrementally until the product close out. It involves both development and maintenance. The product is defined as finished when it fulfills all of its requirements. The incremental model divided the development life cycle into multiple linear sequences, each of which produces an increment of the final software product. The product is decomposed into a number of components, each of which are designed and built separately (termed as builds).

Following diagram shows the incremental model:



5.5. Project Plan

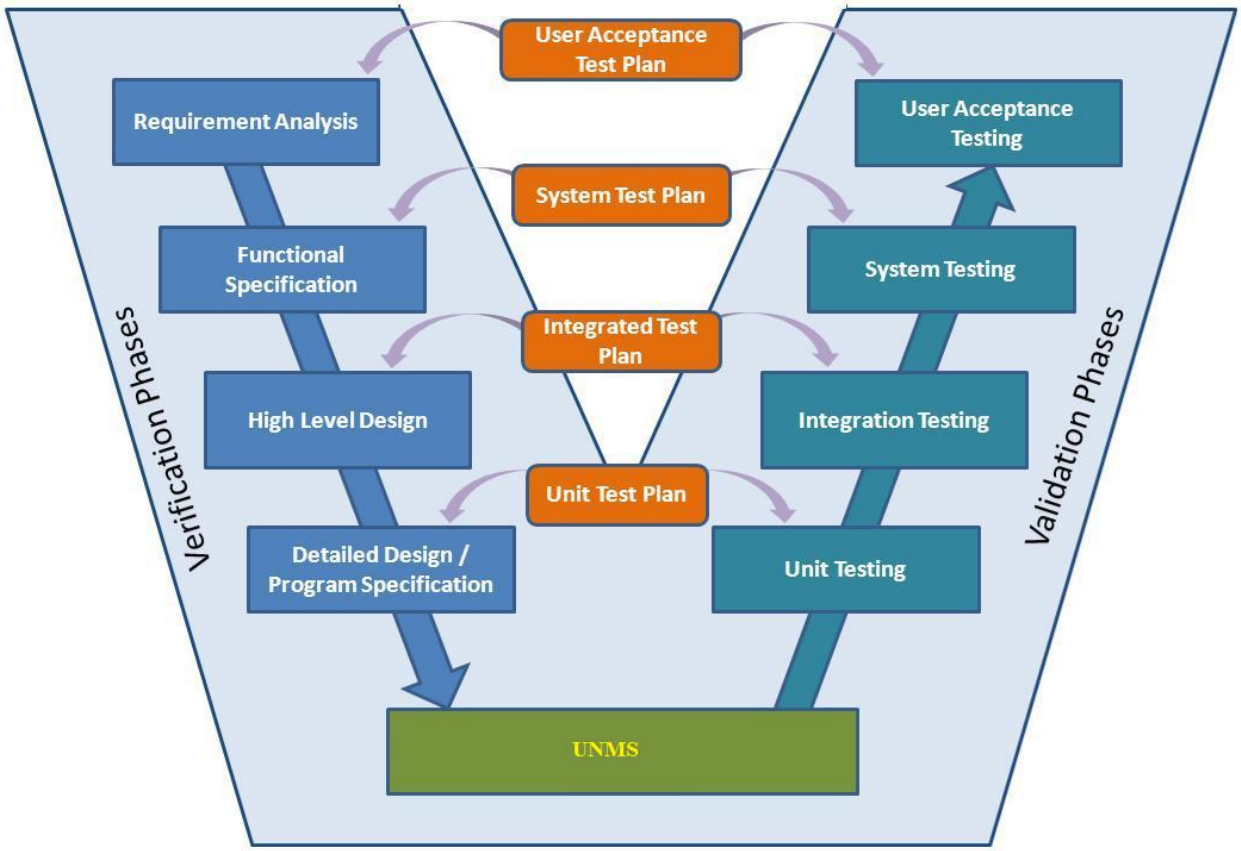
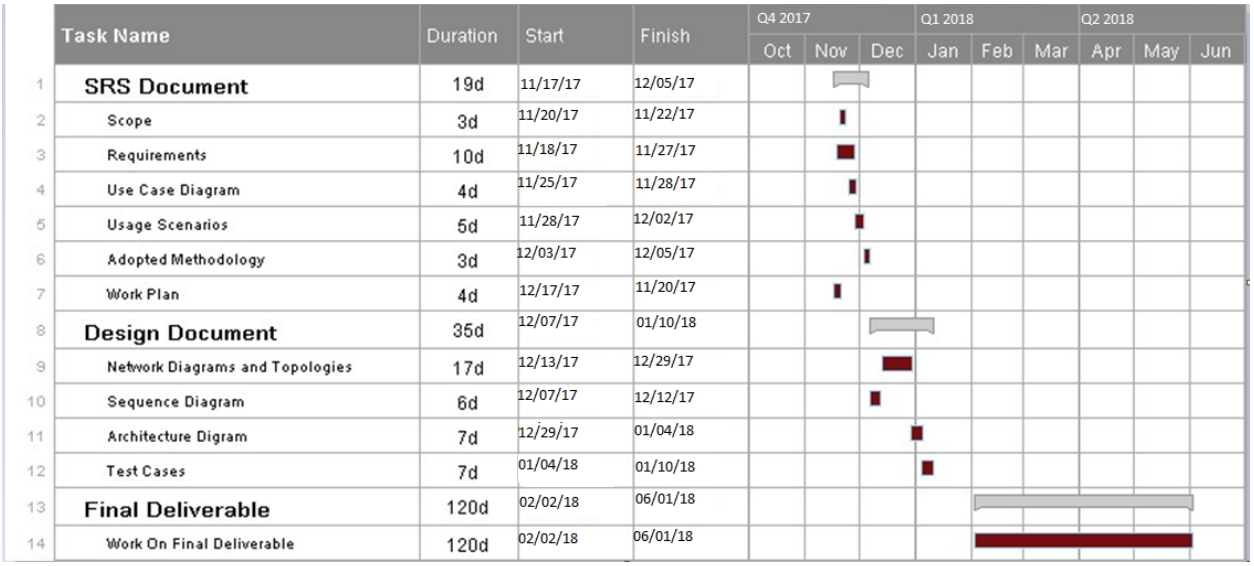


Diagram of UNMS Process Model



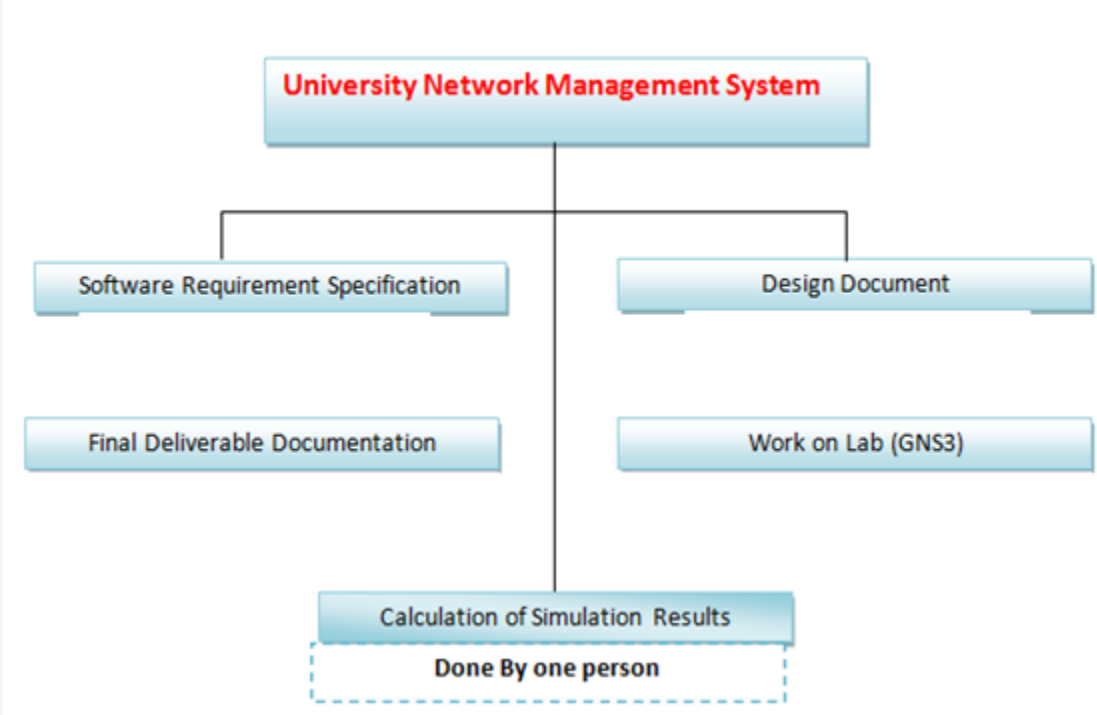
	Task Name	Duration	Start	Finish
1	SRS Document	19d	11/17/17	12/05/17
2	Scope	3d	11/20/17	11/22/17
3	Requirements	10d	11/18/17	11/27/17
4	Use Case Diagram	4d	11/25/17	11/28/17
5	Usage Scenarios	5d	11/28/17	12/02/17
6	Adopted Methodology	3d	12/03/17	12/05/17
7	Work Plan	4d	12/17/17	11/20/17
8	Design Document	35d	12/07/17	01/10/18
9	Network Diagrams and Topologies	17d	12/13/17	12/29/17
10	Sequence Diagram	6d	12/07/17	12/12/17
11	Architecture Digram	7d	12/29/17	01/04/18
12	Test Cases	7d	01/04/18	01/10/18
13	Final Deliverable	120d	02/02/18	06/01/18
14	Work On Final Deliverable	120d	02/02/18	06/01/18

5.6. Reasons to choose Methodology

- Spiral process model is heavily dependent on risk analysis and evaluation in each phase. This approach of system development maximizes the quality of system and minimizes the disadvantages and risk.
- The main idea to choose is to get the benefits of both these models **(Waterfall model & incremental Model)**.
- It is a chronological model with backward repetition.
- We want to achieve the linear nature of waterfall and iterative plus risk reduction nature of spiral model.
- If we are using **Spiral process model** then we will be work in phases to complete the given project.

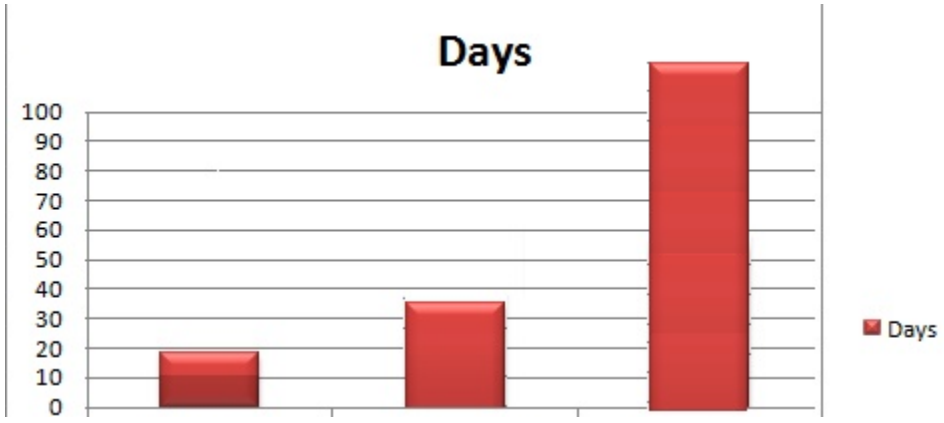
All the activities are performed in a sequence in Spiral Process Model.

5.7. Project Structure:



5.8. Project Schedule (Submission Calendar)

Task	Start	End	Days
SRS	17/12/2017	5/1/2018	19
Design	7/1/2018	17/02/2018	30
Final	19/02/2018	29/03/2018	41



SRS	Design	Final
17/12/2017	7/1/2018	19/02/2018
5/1/2018	17/02/2018	20/03/2018

5.9. Work Breakdown Structure

We are designing UNMS with different VLAN and also handling users with AD policy.

For this implementation we are using below tools

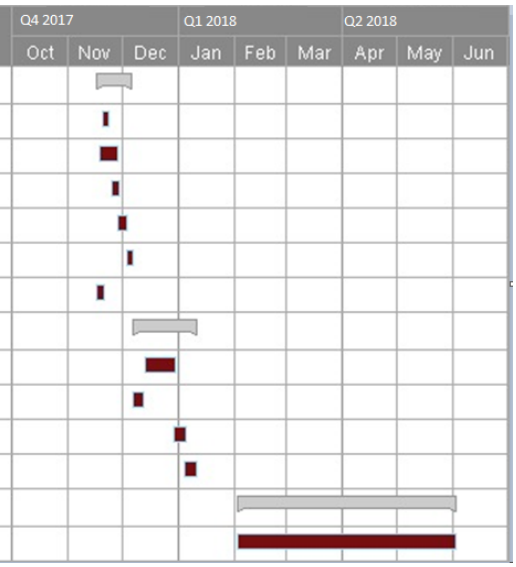
- GNS 3 Simulator
- Router 7200 series
- Ethernet Switch
- VM Machine (Server 2012R2, Social server, FTP server)
- Virtual PCs
- NMS (Network management system) tool
- VMware for Server installation and Virtual PCs.

5.10. Roles & Responsibility Matrix:

The purpose of roles & responsibility matrix is to identify who will do what.

WBS #	WBS Deliverable	Activity #	Activity to Complete the Deliverable	Duration (# of Days)	Responsible Team Member(s) & Role(s)
	Waheed Abbas	UNMS		120	Waheed Abbas

	Task Name	Duration	Start	Finish
1	**SRS Document**	19d	11/17/17	12/05/17
2	Scope	3d	11/20/17	11/22/17
3	Requirements	10d	11/18/17	11/27/17
4	Use Case Diagram	4d	11/25/17	11/28/17
5	Usage Scenarios	5d	11/28/17	12/02/17
6	Adopted Methodology	3d	12/03/17	12/05/17
7	Work Plan	4d	12/17/17	11/20/17
8	**Design Document**	35d	12/07/17	01/10/18
9	Network Diagrams and Topologies	17d	12/13/17	12/29/17
10	Sequence Diagram	6d	12/07/17	12/12/17
11	Architecture Digram	7d	12/29/17	01/04/18
12	Test Cases	7d	01/04/18	01/10/18
13	**Final Deliverable**	120d	02/02/18	06/01/18
14	Work On Final Deliverable	120d	02/02/18	06/01/18



Chapter 6

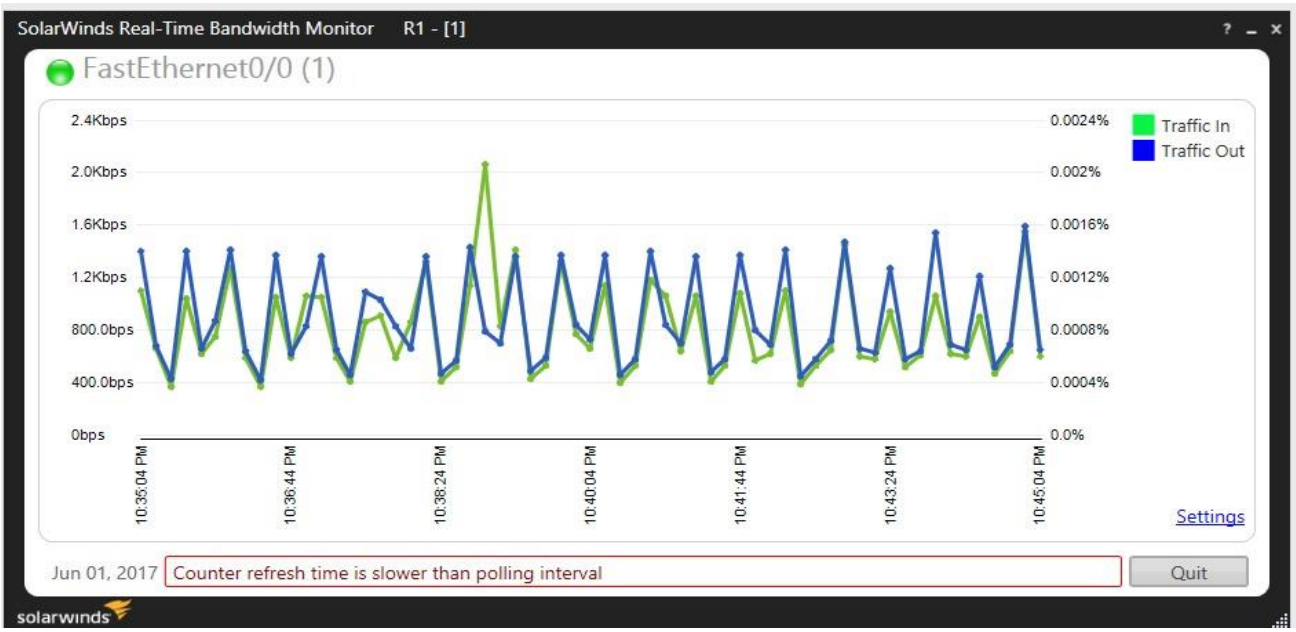
Testing and Evaluation

Chapter 6: Testing and Evaluation

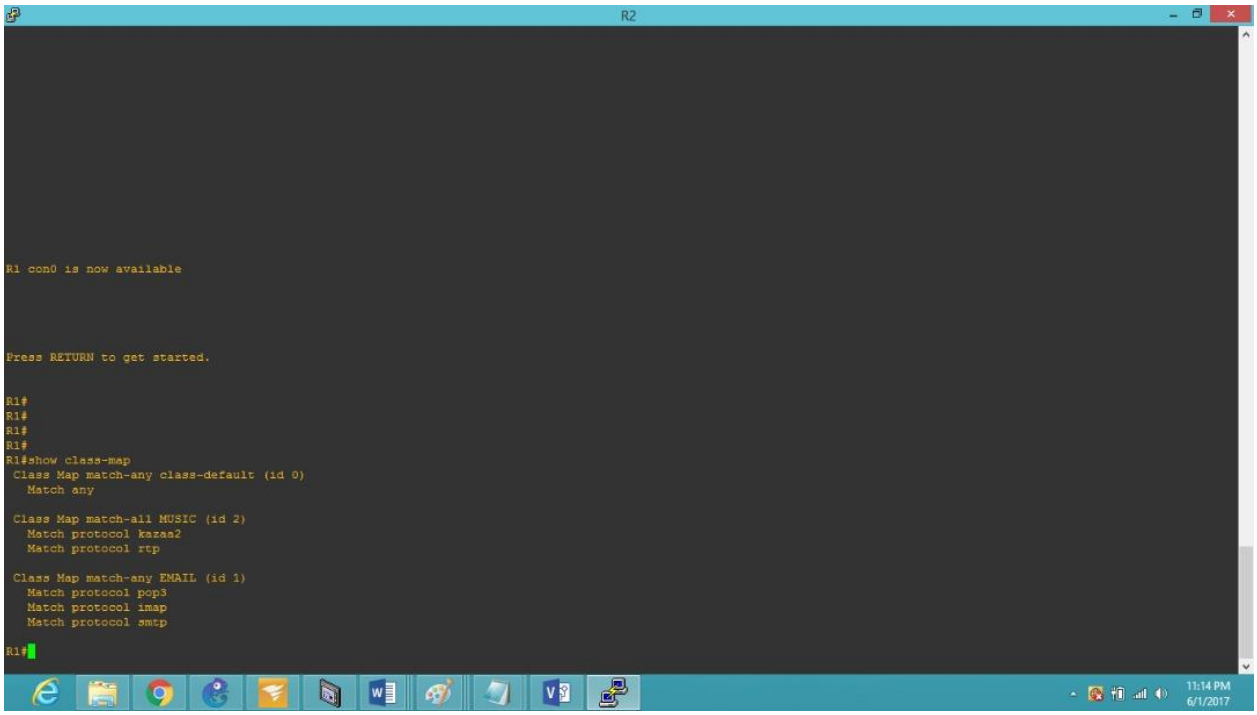
6.1. Use Case Testing

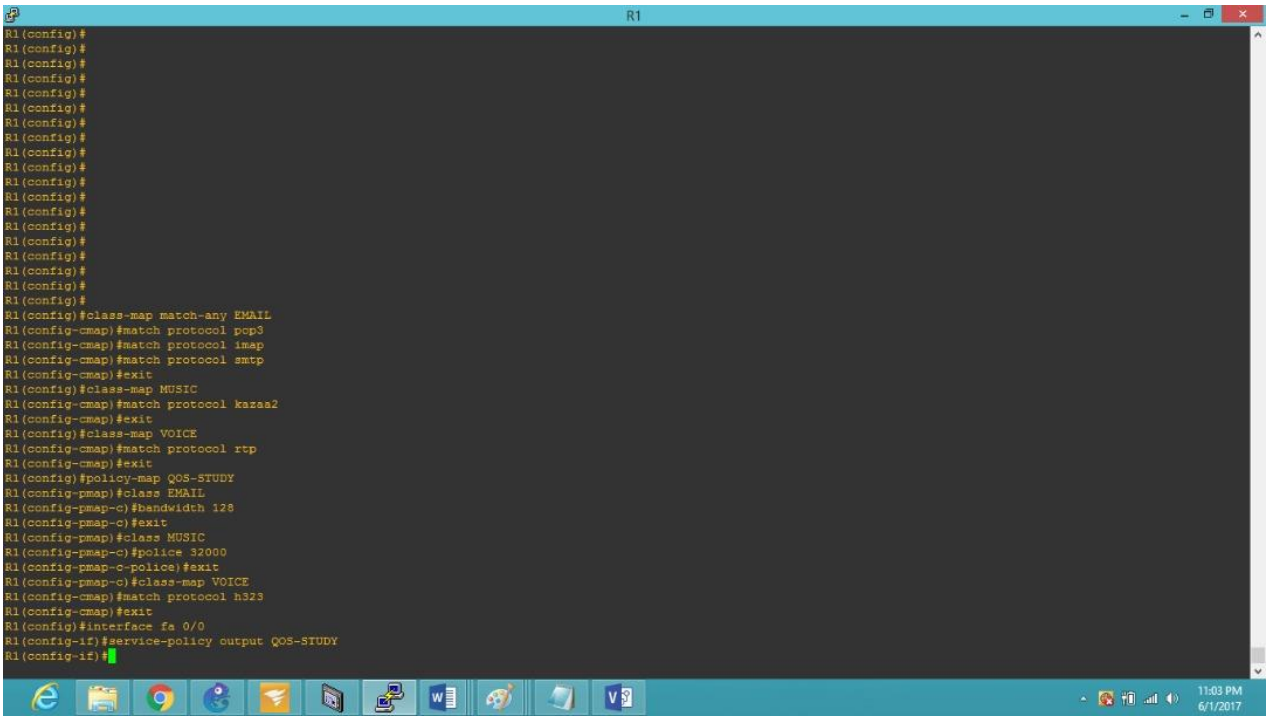
Sr. #s	Test Case	Pre-Condition checking	Post-Condition checking	Results
1	Departments / Nodes	Insertion of images with their related departments	Installation of each node in different departments	Success
2	Formation of VLANS	Deployment of Access switches with their respective department	Every Node to access switch cabling	Success
3	Vlan and Inter Vlan Routing	Network Communication of department nodes	Routing of each node to access every switch / User	Success
4	Server Configurations	Servers for FTP and Web Access	DHCP and Server installation in VMware	Success
5	Classify IP Addresses	Exclusive IP for each node	Authorized class for each Vlan	Success
6	Mapping of Network	Limited internet access for every node and access for FTP	Web surfing authorized by web server and FTP by FTP server	Success
7	Evaluate and Observe the Network	Every condition is tested	Ping to other nodes/router/servers	Success

6.2. Data flow testing



6.3. Integration testing





Chapter 7

Summary, Conclusion and Future Enhancements

Chapter 7: Summary, Conclusion & Future Enhancements

7.1. Project Summary

We are designing UNMS with different access on network. We control with our administrator account. We are using spiral method for this implementation. We are using Server 2012 R2 for user creation and assigning rights them through AD. Everything control by administrator account. With this system user communicate easily with different department. Every system having its own IP which is assigned through DHCP server.

7.2. Achievements and Improvements

Purpose of the design document is just to show the graphical view of the project means how the project will look like. Graphical design will help us to understand the infrastructure of Network design and topology. Networking has become an essential part of every Organization. Networking plays an important role in different organizations infrastructure. It is impossible to run organization smoothly without communication. Our network project will be covering two servers; 1st one is for social connectivity or internet connectivity and 2nd one is for intranet or FTP. All departments will be interconnected with each other throughout the different cisco equipment. Connectivity will be based on inter VLAN routing. Every department will be based on unique IP addresses with mapping of network as well. Our simulated network design will be applicable in any university rather any organization. On the basis of acquired results QOS will be improved.

7.3. Lessons Learnt

- **UNMS** → University Network Management System
- **QOS** → Quality of Service
- **FTP** → file transfer protocol
- **DHCP** → Dynamic Host configuration protocol
- **SRS** → Software Requirement Specification
- **DD** → Design documentation
- **PP** → Project Plan
- **FR** → Functional Requirements
- **NFR** → Non-Functional Requirements
- **IP** → Internet Protocol
- **IT** → Information Technology
- **LAN** → Local Area Network
- **VLAN** → Virtual Local Area Network
- **ACK** → Acknowledgment

Reference and Bibliography

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- www.youtube.com
- https://www.irisns.com/how-an-effective-network-management-system-benefits-your-business/
- https://wiki.mef.net/pages/viewpage.action?pageId=41223472

Books

- Handouts CS601 Data Communication
- Handouts CS610 Computer Networks
- Handouts CS716 Advanced Computer Networks
- CCNA Book by Todd Laemmle
- TCP/IP Protocol Suite by Behrouz A. Forouzan

- Data and Computer Communications by William Stallings