Tshwane University of Technology

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FACULTY
OF
INFORMATION
AND
COMMUNICATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

PROJECT PROPOSAL

COURSE: [N DIP IT: COMMUNICATION NETWORKS]
SUBJECT CODE: IDC30BC
PROJECT NAME: Performance optimization for Gijima Technology people

SUBMISSION DATE: 28-SEPTEMBER-2023
PROJECT CO-ORDINATOR: MR. Z. Mapundu

STUDENT DETAILS :

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TABLE OF CONTENT

1. Project Name

Performance optimization for Gijima Techonology people

2. Team Members

- Am drafting rough work as we were busy with the planning t of project, proposal and also the old network diagram he also will check for anyerror before submission of proposal and project.
- In the final project i will be the one to implement all those new features of the new packet tracer.
- Designing the final proposal that will be submitted and alsodesign the new network diagram. responsible for researching more advanced required Project Components and Technologies.
- Checking program and also make sure time is managed so that can avoid pressure and finish on time.

- As for final stage we will be implementing and configuring together so we can share knowledge and information we have researched and also to identify problems that we both can't fix so we can research more and also ask for help in different sources.

- This simply means we are both responsible for everything in this project, this includes planning, analyzing, implementing and configurations on cisco packet tracer, testing and presenting.

3. Background & Current Practices/Problems

The problem is that when new device is added on the network it causesdegradation in the quality of the network. This is continuing problem and as a result, the network is mostly down and unable to support all the users at the same time. Packets were lost, and poor
network throughput. In addition, the users of the network are devastated about system's privacy dueto lack of adequate security measures. Lack of Hardware and links redundancy became a huge problem. Less network pointers and network cables, users are complaining about lack of WI-FI access. Bring your own device is growing trend which saves the equipment of the organization, however it affects the bandwidth drastically.

4. Project Description

The purpose of this project is to improving the network performance. I am going to configure IPsec and SSH on routers to improve network security and separate the LANS by implementing VLAN. Port Security, VPN for remote access, IDPS, email access, DNS, HTTPS and ACL to strengthen our security. Implementation of HSRP (load balance) to improve the network performance.
Implement link and hardware redundancy in order to have reliable network by eliminating single point of failure. Data recovery site implementation for backup of data in case of unforeseen data corruption on the Datacenter of the main site. Our remote sites we be connecting using frame relay WAN technology.

5. Project Components and Technologies

Router - 2811 cisco router, a router is a device that forwards data packets along networks and is located at gateways, the places where two or more networks connect, and are the critical devicethat keeps data flowing between networks and keeps the networks connected to the Internet.

Switch - Cisco Catalyst 2960 Series Switches layer 2, a switch is a device that is used at the Access or OSI Layer. A switch can be used to connect multiple hosts (PCs) to the network. A switch sends a message to another host on the same network or same switch, the switch receivesand decodes the frames to read the physical (MAC) address portion of the message.

Cables, Is used to connect one network device to other network devices or to connect two or more computers to share printer, PCs etc. category 6 cabling have fewer errors for current applications. This means fewer re-transmissions of lost or corrupted data packets under certain conditions, which translates into higher reliability for category 6 networks compared to category 5e networks. Fiber optic, cross over, straight through and RJ45

Dell server - is a computer in a LAN that is dedicated to database storage and retrieval of data.

Domain Name System (DNS) is a hierarchical and decentralized naming system for computers, services, or other resources connected to the Internet or a private network. It associates various information with domain names assigned to each of the participating entities. Most prominently, ittranslates more readily memorized domain names to the numerical IP addresses needed for locating and identifying computer services and devices with the underlying network protocols

Firewall – A sonic Firewall is a single choke point that keeps unauthorized users out of the protected network, prohibits potentially vulnerable services from entering or leaving the network,and provides protection from various kinds of IP spoofing and routing attacks.

VPN (virtual private network) – is a network that uses a public telecommunication infrastructure, such as the Internet, to provide remote offices or individual users with secure access to their organization's network.

Patch panel - Patch panels' offer the convenience of allowing technicians to quickly change the path of select signals, without the expense of dedicated switching equipment. Is a panel that contains multiple cable connections, the back of the panel has wiring or other connective cablingthat runs to disparate equipment. The front of the patch panel allows easy access to connect thedifferent equipment through the use of short patch cables.

IDPS - is used to detect and prevent who try to access our data on the network or any information that is not belonging to the network by telling the administrator with a notification.

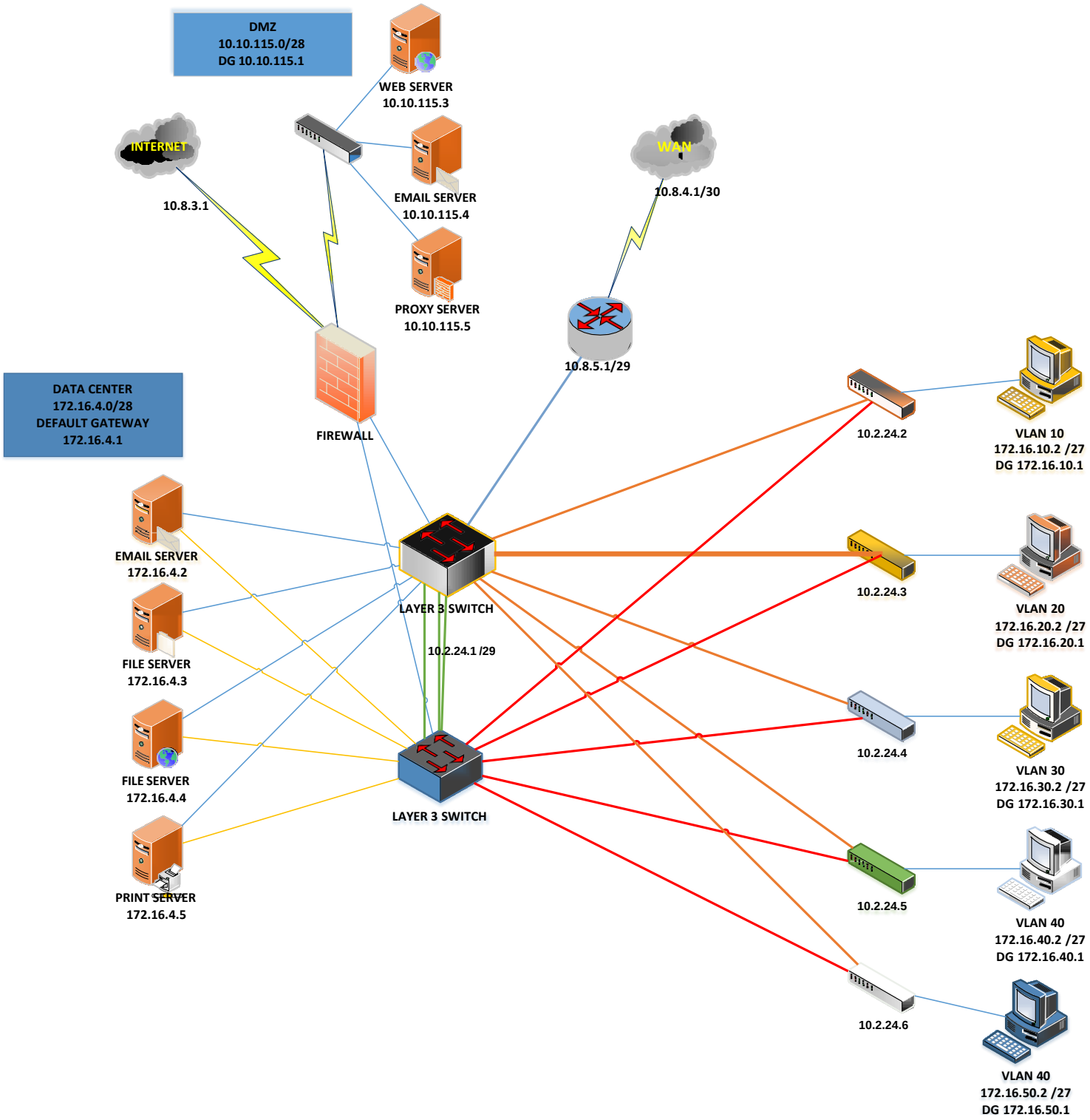
Dell PC - Consists of two or more computing devices connected by a medium allowing the exchange of electronic information.

A PBX (private branch exchange) is a telephone system within an enterprise that switches calls between enterprise users on local lines while allowing all users to share a certain number of external phone lines.

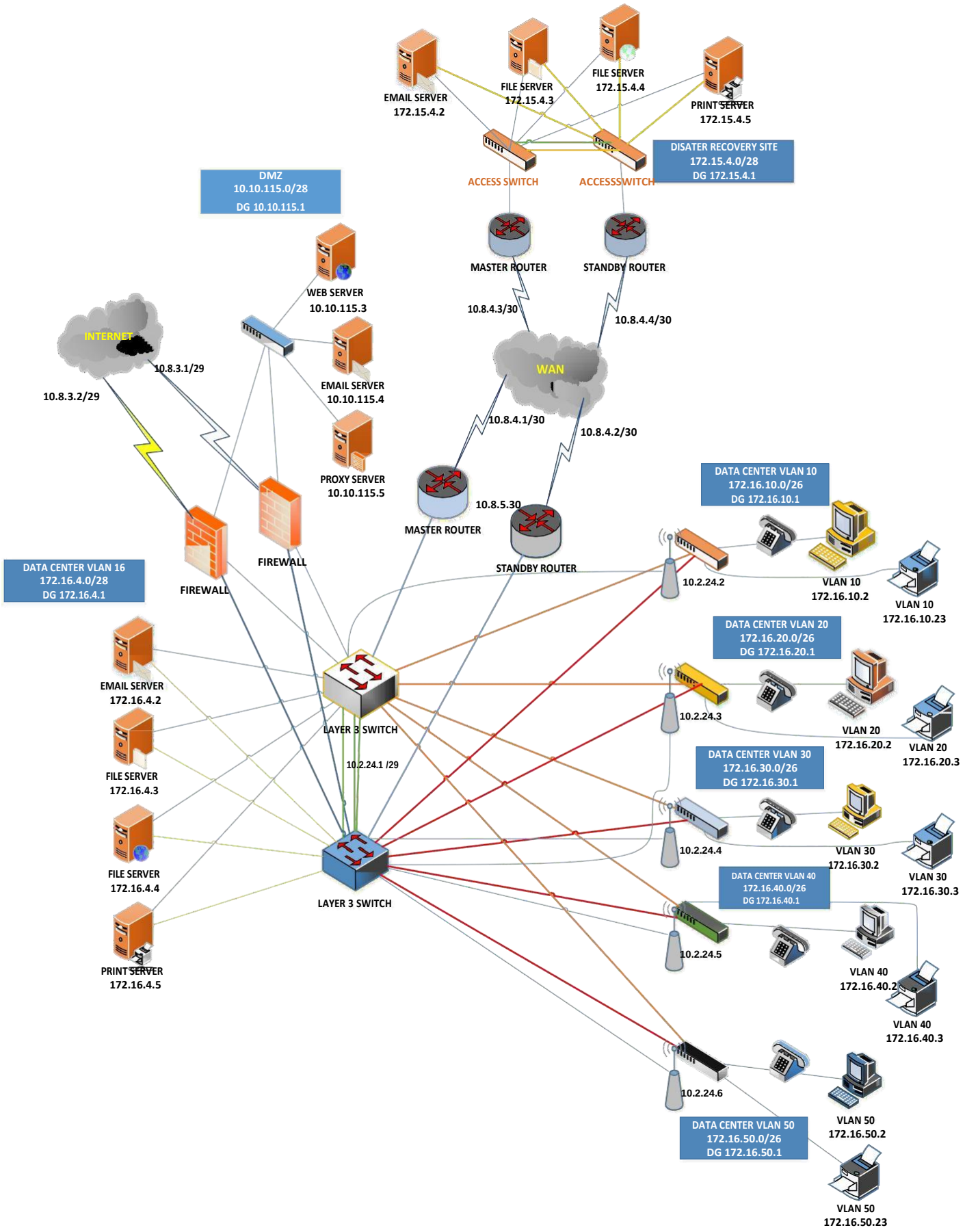
6. Project Plan & Network Diagram

Task Name	Start	Finish	Duration
PROPOSAL	18-SEPTEMBER-2023	13-OCTOBER-2023	4-WEEKS
NETWORK DESIGN	16-OCTOBER-2023	10-NOVEMBER-2023	4-WEEKS
CONFIGURATION	13-NOVEMBER-2023	8-DECEMBER-2023	4-WEEKS
NETWORK TESTING	11-DEEMBER-2023	05-JANUARY-2024	4-WEEKS
IMPLEMENTATION	08-JANUAR-2024	02-FEBRUARY-2024	4-WEEKS
PRE EVALUATION	05-FEBRUARY-2024	16-FEBRUARY-2024	2-WEEKS
FINAL PRESENTATION	19-FEBRUARY-2024	28-FEBRUARY-2024	2-WEEKS

OLD DIAGRAM



PROPOSED DIAGRAM



7. Budget Plan

Network Upgrade System Budget Plan

Items	Cost
11 Servers	**R150 744.00**
10 Switches	**R98 124.00**
20 computers	**R 150 250.00**
Network cables	**R15 461.00**
4 Routers	**R96 844.00**
Patch panel	**R 37818.78**
4 firewalls	**R 52 000**
IDPS software	**R800.00**
1 AP	**R 3 573.00**
4 Printers	**R20 000.00**
6 Telephone	**R 17 000.00**
IP Address blocking	**R 3400.00**
Total	**R 646 014.78**

8. Conclusion

I believe that after the implementation of new network diagram all problems identified will be resolved, network will be more secured, will be available, reliable and scalable all the times. I will be over the moon if my project gets approved.

9. References

Network-security-essentials-4th-edition-william-stallings
Network_Security_Essentials-byWilliam_Stallings_[DroidD]
Guide to Network Defense and Countermeasures Third Edition
www.cisco.com/security
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