

Network Engineering Capstone Project Approval Form

Introduction

The purpose of this document is to help you clearly define your capstone project scope and to ensure the project will support the task requirements. Your final network project will be evaluated based on its ability to satisfy ten test case scenarios. There are seven predefined test case scenarios, with the remaining three test cases to be defined by you.

A clearly defined scope is essential for your capstone instructor to accurately assess the validity of your proposed network project and the expected timeline for completion. Work with your instructor before submitting this form if you are unclear on the organizational need or what an appropriately sized network will include. If applicable, scale your network project to no more than that of a 10-user network. A network that is too small will not have all of the connections or devices that are required to validate each of the seven required test cases. A network that is too large will take unnecessary time and effort for you to build, test, and deploy.

Complete this project approval form by identifying the organizational overview, network scope, and network diagram for your proposed network project. Additionally, review the seven predefined test case scenarios and define three custom test cases to be validated against your network project. Your project will be built inside of a virtual lab environment using GNS3. It is recommended to explore the virtual lab environment and included GNS3 tools during the planning process to ensure alignment between the proposed network project and the available virtual networking tools.

Email this completed form directly to your capstone instructor for approval. Once approved, you will receive a signed document in PDF format that you will upload as part of Task 1.



Organizational Overview

Provide one to two paragraphs that describe the organizational need or opportunity that your network will support. If needed, a fictional organization may be used to provide context to the need or opportunity.

██████████ Cloud Consulting Group is a fictional organization with 10 employees. The company's network has three main uses: Office desktops for general office work, desktops for visitors, and an admin server to administer network devices. The office desktops utilize a SaaS application daily to conduct the majority of their work. Loss of service to the application would result in lost revenue.



Network Scope

Provide one to two paragraphs that describe the main purpose and function of the network that you will build. Additionally, identify a tentative timeline of the anticipated future project start date, end date, and any major milestones to be completed during development.

The network will be designed with a router on the edge connecting to the example ISP. The ISP will advertise its networks with the company through OSPF with MD5 authentication. This allows the company to easily monitor the link state to the critical SaaS application and detect changes. The SaaS will be a single host on a non-RFC 1918 address.

The internal network will utilize the 10.0.0.0/26 network, and a VLAN for each client on a /29 network. Two layer three switches will be configured to connect to the edge router which provides redundancy if either of those links fail. Inter-VLAN communication will not be allowed.

As a small business, infrastructure is initially kept to a minimum, but the two switches allow for additional expansion for more desktops in the future.

Timeline:

Start: 2/9/2023

End: 2/17/2023

Major Milestones:

Physical infrastructure setup

Login banners configured

STP configured

Layer three addresses assigned

Source NAT configured

Internal routing configured

Connection to ISP

Dynamic routing configured

VLANs configured

IP services (NTP, DHCP) configured

ACLs with logging configured

Guest network configured

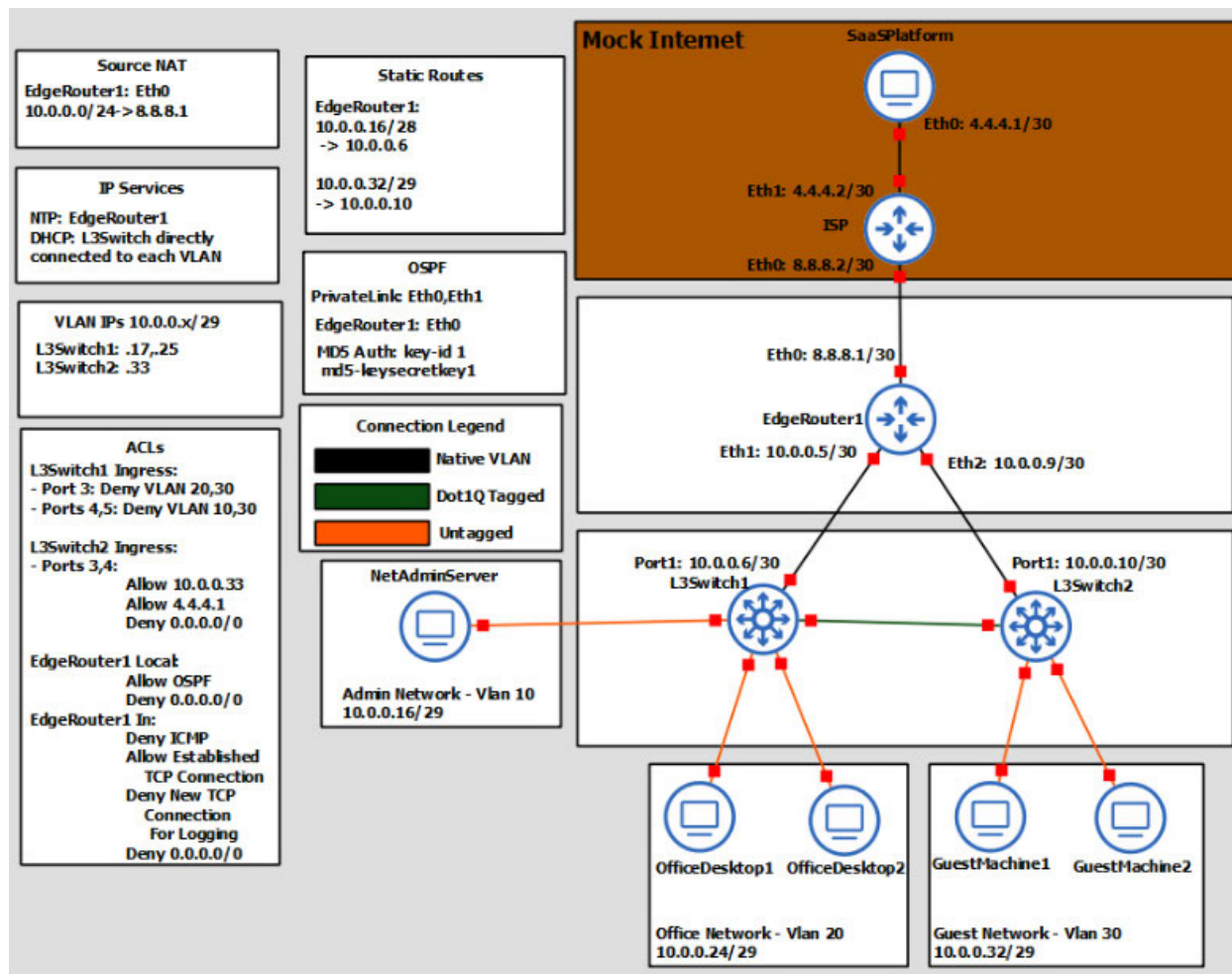
Network automation configured (Config backups, Banner updates)



Network Diagram

Provide a complete graphic diagram of all physical devices and connections for your proposed network.

You may use any graphic tool to create this diagram (Visio, PowerPoint, GNS3, etc.), but you must provide a clean and readable image pasted into this approval form (or attached as a PDF) when you submit the form to your instructor.



Test Case Scenarios

Predefined Test Cases

Review the seven predefined test case scenarios to ensure alignment with your proposed network project. Your project will be required to satisfy all seven requirements, adapted to your networking use case.

TEST CASE	REQUIREMENT
Test Case #1 Device Discovery and Reachability	Your network solution must include multiple network segments with access controls that allow traffic from a device on one network to access the resources of a device on another network. Similarly, there must be devices on one network that cannot access resources on a different network.
Test Case #2 Administering an Access Control List for Guest Access	Your network must utilize an Access Control List that allows guest access. Guest access should be limited to internet traffic only.
Test Case #3 Security Compliance—Log-in Banners and Automation	Display a log-in banner when accessing each device on the network. The log-in banner should notify users of an acceptable use policy (AUP) or other security-based policies when attempting to log into the network. Additionally, establish an automated process to update the log-in banner for multiple devices. Clearly identify the devices that will be updated, and provide a step-by-step guide for initiating the automated updates.
Test Case #4 Accessing External Resources—Routing and Traffic Security	User devices on your network should have dynamic addresses that are assigned through DHCP unless they provide a service that requires a static address. You must also have at least one network resource that requires a static address.
Test Case #5 Layer 2 Link Redundancy and Spanning-Tree Protocol (802.1w)	Enable and manage the Spanning-Tree Protocol to establish redundant Layer 2 paths while avoiding possible loops and broadcast storms. Identify the Layer 2 devices that will become the Root Bridge.
Test Case #6 Edge Device Syslog and NTP	Configure perimeter devices to generate system logs that capture unwanted traffic. Additionally, those perimeter devices should utilize Network Time Protocol (NTP) for clock synchronization.
Test Case #7 Basic Network Segmentation at Layer 2 via VLANs and 802.1q	Your network traffic should be segmented per department or service function at Layer 2 to enhance security and reduce network congestion at the switching layer while allowing segmented traffic to traverse between switches (VLAN trunking).



Custom Test Cases

Define three additional test case scenarios to be evaluated against your network project. These custom test cases should be equivalent in scope and requirements to the predefined test cases. Additionally, each test case should align to the broad networking domain indicated below.

TEST CASE	REQUIREMENT
Test Case #8 Basic or Advanced Networking	Your solution should have OSPF configured to get link state metrics to ensure that your connection to the critical service is fast and stable. You should also enable logging for link state adjacency changes on the edge router.
Test Case #9 Network Automation	To save backups of network device configurations, a script should be configured on a server to retrieve the full network device configuration for each network device and store it on the server executing the script.
Test Case #10 Network Security	Configure MD5 OSPF authentication to ensure that only authorized users will receive routes to the SaaS and company network.



Network Project Approval

Student

Student Name	
WGU Student ID	

Instructor

Instructor Name	Dr. William Dean
Instructor Signature	<i>William L. Dean Jr., Ph.D.</i>
Approval Date mm/dd/yyyy	
Instructor Notes (optional)	Considering your question on test case 6 – I don't see a problem with your edge router offering the NTP service. Logic: the L3 switches in your design can be considered "perimeter" devices for the discreet networks you've sub netted out and I do not see any restrictions preventing the router serving as its own clock source.

