**Network Engineering Capstone  
Functionality Report**

# Introduction

*Provide a functionality report detailing the 10 test-case scenarios used to verify the utility of your network project. Seven of the test-case scenarios must be from the provided predefined list, with the remaining three test cases created by you. The functionality report should be written so that a networking peer could replicate the steps for a successful test of your networking solution.*

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# 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.*

## Functionality

*Describe the* ***functionality*** *of the test case in relation to your network project. Identify the relevant tools (devices, subnets, etc.) used in this test case and their specific interactions.*

 Config subnets ONLY. Point them to test case #2 for ACL configuration. Don’t configure DHCP, just configure static IP’s on the routers/L3 switches. DHCP is for Test Case #4.

## Network Diagram or Segment

*Provide a* ***network diagram or segment*** *visualizing the topology and devices used in this test case.*

## Testing Method

*Summarize the* ***testing method*** *used to verify functionality of the network project within the virtual lab environment, including any metrics of success.*

## Process List

*Provide a comprehensive* ***process list*** *of the steps taken within the network project to run the testing method. Include screenshots to illustrate the process and ensure clarity for others attempting to replicate the test.*

# 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.*

## Functionality

*Describe the* ***functionality*** *of the test case in relation to your network project. Identify the relevant tools (devices, subnets, etc.) used in this test case and their specific interactions.*

## Network Diagram or Segment

*Provide a* ***network diagram or segment*** *visualizing the topology and devices used in this test case.*

## Testing Method

*Summarize the* ***testing method*** *used to verify functionality of the network project within the virtual lab environment, including any metrics of success.*

## Process List

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# Test Case #3: Security Compliance—Log-in Banners

*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.*

## Functionality

*Describe the* ***functionality*** *of the test case in relation to your network project. Identify the relevant tools (devices, subnets, etc.) used in this test case and their specific interactions.*

## Network Diagram or Segment

*Provide a* ***network diagram or segment*** *visualizing the topology and devices used in this test case.*

## Testing Method

*Summarize the* ***testing method*** *used to verify functionality of the network project within the virtual lab environment, including any metrics of success.*

## Process List

*Provide a comprehensive* ***process list*** *of the steps taken within the network project to run the testing method. Include screenshots to illustrate the process and ensure clarity for others attempting to replicate the test.*

# 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.*

## Functionality

*Describe the* ***functionality*** *of the test case in relation to your network project. Identify the relevant tools (devices, subnets, etc.) used in this test case and their specific interactions.*

## Network Diagram or Segment

*Provide a* ***network diagram or segment*** *visualizing the topology and devices used in this test case.*

## Testing Method

*Summarize the* ***testing method*** *used to verify functionality of the network project within the virtual lab environment, including any metrics of success.*

## Process List

*Provide a comprehensive* ***process list*** *of the steps taken within the network project to run the testing method. Include screenshots to illustrate the process and ensure clarity for others attempting to replicate the test.*

# 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.*

## Functionality

*Describe the* ***functionality*** *of the test case in relation to your network project. Identify the relevant tools (devices, subnets, etc.) used in this test case and their specific interactions.*

## Network Diagram or Segment

*Provide a* ***network diagram or segment*** *visualizing the topology and devices used in this test case.*

## Testing Method

*Summarize the* ***testing method*** *used to verify functionality of the network project within the virtual lab environment, including any metrics of success.*

## Process List

*Provide a comprehensive* ***process list*** *of the steps taken within the network project to run the testing method. Include screenshots to illustrate the process and ensure clarity for others attempting to replicate the test.*

# 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.*

## Functionality

*Describe the* ***functionality*** *of the test case in relation to your network project. Identify the relevant tools (devices, subnets, etc.) used in this test case and their specific interactions.*

## Network Diagram or Segment

*Provide a* ***network diagram or segment*** *visualizing the topology and devices used in this test case.*

## Testing Method

*Summarize the* ***testing method*** *used to verify functionality of the network project within the virtual lab environment, including any metrics of success.*

## Process List

*Provide a comprehensive* ***process list*** *of the steps taken within the network project to run the testing method. Include screenshots to illustrate the process and ensure clarity for others attempting to replicate the test.*

# 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).*

## Functionality

*Describe the* ***functionality*** *of the test case in relation to your network project. Identify the relevant tools (devices, subnets, etc.) used in this test case and their specific interactions.*

## Network Diagram or Segment

*Provide a* ***network diagram or segment*** *visualizing the topology and devices used in this test case.*

## Testing Method

*Summarize the* ***testing method*** *used to verify functionality of the network project within the virtual lab environment, including any metrics of success.*

## Process List

*Provide a comprehensive* ***process list*** *of the steps taken within the network project to run the testing method. Include screenshots to illustrate the process and ensure clarity for others attempting to replicate the test.*

# Test Case #8: Basic or Advanced Networking

## Custom Test Case

*Define a* ***custom test case*** *to be run within your network project aligned to your specific organizational need or opportunity identified in Task 1. The custom test case should be equivalent in scope and requirements to the predefined test cases and pertain to basic or advanced networking.*

## Functionality

*Describe the* ***functionality*** *of the test case in relation to your network project. Identify the relevant tools (devices, subnets, etc.) used in this test case and their specific interactions.*

## Network Diagram or Segment

*Provide a* ***network diagram or segment*** *visualizing the topology and devices used in this test case.*

## Testing Method

*Summarize the* ***testing method*** *used to verify functionality of the network project within the virtual lab environment, including any metrics of success.*

## Process List

*Provide a comprehensive* ***process list*** *of the steps taken within the network project to run the testing method. Include screenshots to illustrate the process and ensure clarity for others attempting to replicate the test.*

# Test Case #9: IPSec

## Custom Test Case

*Define a* ***custom test case*** *to be run within your network project aligned to your specific organizational need or opportunity identified in Task 1. The custom test case should be equivalent in scope and requirements to the predefined test cases and pertain to IPSec.*

## Functionality

*Describe the* ***functionality*** *of the test case in relation to your network project. Identify the relevant tools (devices, subnets, etc.) used in this test case and their specific interactions.*

## Network Diagram or Segment

*Provide a* ***network diagram or segment*** *visualizing the topology and devices used in this test case.*

## Testing Method

*Summarize the* ***testing method*** *used to verify functionality of the network project within the virtual lab environment, including any metrics of success.*

## Process List

*Provide a comprehensive* ***process list*** *of the steps taken within the network project to run the testing method. Include screenshots to illustrate the process and ensure clarity for others attempting to replicate the test.*

# Test Case #10: Network Security

## Custom Test Case

*Define a* ***custom test case*** *to be run within your network project aligned to your specific organizational need or opportunity identified in Task 1. The custom test case should be equivalent in scope and requirements to the predefined test cases and pertain to network security.*

## Functionality

*Describe the* ***functionality*** *of the test case in relation to your network project. Identify the relevant tools (devices, subnets, etc.) used in this test case and their specific interactions.*

## Network Diagram or Segment

*Provide a* ***network diagram or segment*** *visualizing the topology and devices used in this test case.*

## Testing Method

*Summarize the* ***testing method*** *used to verify functionality of the network project within the virtual lab environment, including any metrics of success.*

## Process List

*Provide a comprehensive* ***process list*** *of the steps taken within the network project to run the testing method. Include screenshots to illustrate the process and ensure clarity for others attempting to replicate the test.*

# Network Troubleshooting

*Discuss how you analyzed the network to identify, troubleshoot, and resolve issues during development or when ensuring functionality of the test cases.*