

**© University of Stavanger, 2024. All Rights Reserved.**

*Title of your network design*

Summary

A summary of your designed network in under 250 words

Table of Contents

[Submission Instructions 2](#_Toc177732770)

[Group Details 2](#_Toc177732771)

[Implemented Modules 2](#_Toc177732772)

[Network Topology Screenshot 3](#_Toc177732773)

[Addressing Table 3](#_Toc177732774)

[Introduction 4](#_Toc177732775)

[Requirements Analysis 4](#_Toc177732776)

[Network Design Overview 4](#_Toc177732777)

[Network Topology Description 4](#_Toc177732778)

[Chosen Modules 4](#_Toc177732779)

[Switch 4](#_Toc177732780)

[WLAN 5](#_Toc177732781)

[OSPF 5](#_Toc177732782)

[ACLs 5](#_Toc177732783)

[Design Rationale 5](#_Toc177732784)

[Network Cost 5](#_Toc177732785)

[Design Challenges and Solutions 6](#_Toc177732786)

[Appendix 6](#_Toc177732787)

[Device Configurations (Optional) 6](#_Toc177732788)

[Router Configuration(s) 6](#_Toc177732789)

[Switch Configuration(s) 9](#_Toc177732790)

List of Tables

[Table 1. Group number, student name, number, and email 2](#_Toc176954036)

[Table 2. Modules and learned concepts implemented 2](#_Toc176954037)

[Table 3. Screenshot of Network Topology 3](#_Toc176954038)

[Table 4. Network Devices and their Interface Configuration(s) 3](#_Toc176954039)

# Submission Instructions

* Following these instructions is mandatory for the lab assignment approval.
* Zip this report together with the project packet tracer file and upload the compressed file to Canvas.

## Group Details

1. Insert your group number, name, and student number in Table 1.

|  |  |  |  |
| --- | --- | --- | --- |
| Group number | Student Name | UiS Student ID | UiS Email |
| 00 | first name, last name | 00000 | name@std.uis.no |
| first name, last name | 00000 | name@std.uis.no |
| Table 1. Group number, student name, number, and email | | | |

## Implemented Modules

1. List implemented modules and their associated concepts in Table 3.

|  |  |  |
| --- | --- | --- |
| Modules | Concepts | Concepts Implemented? |
| Switch | Configuring basic switch settings. |  |
| Configuring an EtherChannel with Cisco PAgP or IEEE 802.3ad LACP. |  |
| Configuring a Redundant EtherChannel Link. |  |
| Securing trunks, unused switchports, and implementing port security. |  |
| Enabling DHCP Snooping. |  |
| Enabling PortFast and BPDU Guard. |  |
| WLAN | Connecting and configuring the wireless router. |  |
| Connecting a wired and wireless device to the wireless router and extending the wireless coverage. |  |
| Connecting to a wireless LAN controller GUI and configuring a WLAN on a wireless LAN controller. |  |
| Configuring a new WLAN on a WLC. |  |
| Securing a WLAN with WPA2-Enterprise. |  |
| Single Area OSPF | Configuring OSPF router ID and networks for OSPF routing with or without passive interfaces and verifying OSPF configuration. |  |
| Verifying the connectivity by modifying OSPF default settings and by propagating a default route. |  |
| Identifying and verifying the status of OSPF neighbors. |  |
| Adding a new LAN into an existing OSPF network and verifying connectivity. |  |
| ACLs | Verifying and testing local connectivity with and without ACL. |  |
| Configuring, applying, verifying, and modifying a named and numbered standard ACL. |  |
| Configuring, applying, and verifying an extended named and numbered ACL. |  |
| Configuring IPv4 and IPv6 static and floating static routes, host routes, and routes to the internal LANs. |  |
| Configure IPv4 and IPv6 default routes. |  |
| Table 2. Modules and learned concepts implemented | | |

## Network Topology Screenshot

1. Provide a screenshot of network topology (including IP addresses)

|  |
| --- |
|  |
| Table 3. Screenshot of Network Topology |

## Addressing Table

1. Describes the types of devices, their interfaces, and associated network configurations.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Device | Interface | IPv4 Address | Subnet Mask | Default Gateway | IPv6 Address |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Table 4. Network Devices and their Interface Configuration(s) | | | | | |

# Introduction

* Provide a brief introduction (1-2 paragraphs) explaining the purpose of your network design and its objectives.

# Requirements Analysis

* What is the requirement of the network you will design.
* Summarize the answers and how they influenced your design decisions.

# Network Design Overview

## Network Topology Description

* Describe the physical and logical topology of your network design.
* Explain why you chose a particular topology.

## Chosen Modules

* List and describe the three modules from Table 2 that you chose to implement.

### Switch

|  |
| --- |
| * Configuring basic switch settings   + We have configured … * Configuring an EtherChannel with Cisco PAgP or IEEE 802.3ad LACP   + An EtherChannel has been configured … |

### WLAN

|  |
| --- |
|  |

### OSPF

|  |
| --- |
|  |

### ACLs

|  |
| --- |
|  |

## **Design Rationale**

* Explain why you chose these modules and what problems or scenarios do they address?

# Network Cost

* What is the approximate cost of your designed network?

|  |  |  |  |
| --- | --- | --- | --- |
| Device Category | Device | Cost (in NOK) | Cost Reference (per-device) |
| Core Network Components | Cisco 4331 (routers) | 2 x 36.141,00 Kr | <https://www.atea.no/eshop/product/cisco-integrated-services-router-4331-ruter-rackmonterbar/?prodid=3104396> |
| Cisco 2960 (switches) | 3 x 59.498,00 Kr | <https://www.atea.no/eshop/product/cisco-catalyst-2960x-24pd-l-switch-24-porter-styrt-rackmonterbar/?prodid=2508602> |
| End Devices | PCs | 3 x 8.000,00 Kr | - |
|  | Total | 274.776,00 Kr | |
|  | Table 5. Network Devices and their Interface Configuration(s) | | |

# Design Challenges and Solutions

* Describe any potential issues faced during the network design.

# Appendix

## **Device Configurations (Optional)**

### Router Configuration(s)

* Provide the full text of the exported configurations for all routers used in your design. Include all relevant settings, such as interfaces, routing protocols, and security settings.
* An example has been done for you in the table below:

|  |
| --- |
| **R1** |
| no service timestamps log datetime msec  no service timestamps debug datetime msec  no service password-encryption  !  hostname Router  !  !  !  !  !  !  !  !  ip cef  no ipv6 cef  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  interface FastEthernet0/0  no ip address  duplex auto  speed auto  shutdown  !  interface FastEthernet1/0  ip address 10.0.0.1 255.0.0.0  duplex auto  speed auto  !  interface Serial2/0  ip address 192.168.0.1 255.255.255.252  !  interface Serial3/0  ip address 192.168.0.5 255.255.255.252  clock rate 2000000  !  interface FastEthernet4/0  no ip address  shutdown  !  interface FastEthernet5/0  no ip address  shutdown  !  router ospf 10  router-id 1.1.1.1  log-adjacency-changes  network 10.0.0.0 0.255.255.255 area 0  network 192.168.0.4 0.0.0.3 area 0  default-information originate  !  ip classless  ip route 0.0.0.0 0.0.0.0 192.168.0.2  !  ip flow-export version 9  !  !  access-list 100 deny tcp any any eq www  !  !  !  !  !  !  line con 0  !  line aux 0  !  line vty 0 4  login  !  !  !  end |

|  |
| --- |
| R2 |
| no service timestamps log datetime msec  no service timestamps debug datetime msec  no service password-encryption  !  hostname Router  !  !  !  !  !  !  !  !  ip cef  no ipv6 cef  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  interface FastEthernet0/0  ip address 172.16.0.1 255.255.255.0  duplex auto  speed auto  !  interface FastEthernet1/0  no ip address  duplex auto  speed auto  shutdown  !  interface Serial2/0  no ip address  shutdown  !  interface Serial3/0  ip address 192.168.0.6 255.255.255.252  !  interface FastEthernet4/0  no ip address  shutdown  !  interface FastEthernet5/0  no ip address  shutdown  !  router ospf 10  router-id 2.2.2.2  log-adjacency-changes  network 192.168.0.4 0.0.0.3 area 0  !  ip classless  !  ip flow-export version 9  !  !  access-list 1 deny 10.0.0.0 0.255.255.255  !  !  !  !  !  !  line con 0  !  line aux 0  !  line vty 0 4  login  !  !  !  end |

### Switch Configuration(s)

* Provide the full text of the exported configurations for all switches used in your design. Include all relevant settings, such as VLANs, port security, and EtherChannel configurations.
* An example has been done for you in the table below:

|  |
| --- |
| S1 |
| no service timestamps log datetime msec  no service timestamps debug datetime msec  no service password-encryption  !  hostname Router  !  !  !  !  !  !  !  !  ip cef  no ipv6 cef  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  !  interface FastEthernet0/0  ip address 172.16.0.1 255.255.255.0  duplex auto  speed auto  !  interface FastEthernet1/0  no ip address  duplex auto  speed auto  shutdown  !  interface Serial2/0  no ip address  shutdown  !  interface Serial3/0  ip address 192.168.0.6 255.255.255.252  !  interface FastEthernet4/0  no ip address  shutdown  !  interface FastEthernet5/0  no ip address  shutdown  !  router ospf 10  router-id 2.2.2.2  log-adjacency-changes  network 192.168.0.4 0.0.0.3 area 0  !  ip classless  !  ip flow-export version 9  !  !  access-list 1 deny 10.0.0.0 0.255.255.255  !  !  !  !  !  !  line con 0  !  line aux 0  !  line vty 0 4  login  !  !  !  end |

|  |
| --- |
| S2 |
| no service timestamps log datetime msec  no service timestamps debug datetime msec  no service password-encryption  !  hostname S2  !  !  !  !  !  !  spanning-tree mode pvst  spanning-tree extend system-id  !  interface Port-channel1  !  interface FastEthernet0/1  !  interface FastEthernet1/1  shutdown  !  interface FastEthernet2/1  channel-group 1 mode active  !  interface FastEthernet3/1  channel-group 1 mode active  !  interface FastEthernet4/1  shutdown  !  interface FastEthernet5/1  shutdown  !  interface Vlan1  no ip address  shutdown  !  !  !  !  line con 0  !  line vty 0 4  login  line vty 5 15  login  !  !  !  !  end |

|  |
| --- |
| S3 |
| no service timestamps log datetime msec  no service timestamps debug datetime msec  no service password-encryption  !  hostname S3  !  !  !  !  !  !  spanning-tree mode pvst  spanning-tree extend system-id  !  interface FastEthernet0/1  !  interface FastEthernet1/1  switchport mode access  switchport port-security  switchport port-security mac-address sticky  switchport port-security mac-address sticky 00E0.F7DD.315D  !  interface FastEthernet2/1  !  interface FastEthernet3/1  !  interface FastEthernet4/1  !  interface FastEthernet5/1  !  interface Vlan1  no ip address  shutdown  !  !  !  !  line con 0  !  line vty 0 4  login  line vty 5 15  login  !  !  !  !  end |