Network Design Proposal Template

Network Design Proposal

Prepared for:
University of Maryland University College

Prepared by:
Student Name

I. Network Design

A. Network Topology

Technical Requirements

In this section, you will assess UMUC's technical requirements. Use the information provided in the scenario to analyze the need for network topology, cables and connectors, networking and internetworking devices, wide area networking design, and computer systems. If you need more information, **feel free to ask your instructor or make some assumptions**. If you make assumptions, be sure to list them. **This section should be used to describe the technical requirements of the task at hand.** That is, you will be making explicit the requirements as you understand them, which will lead to the next section (your proposed solution).
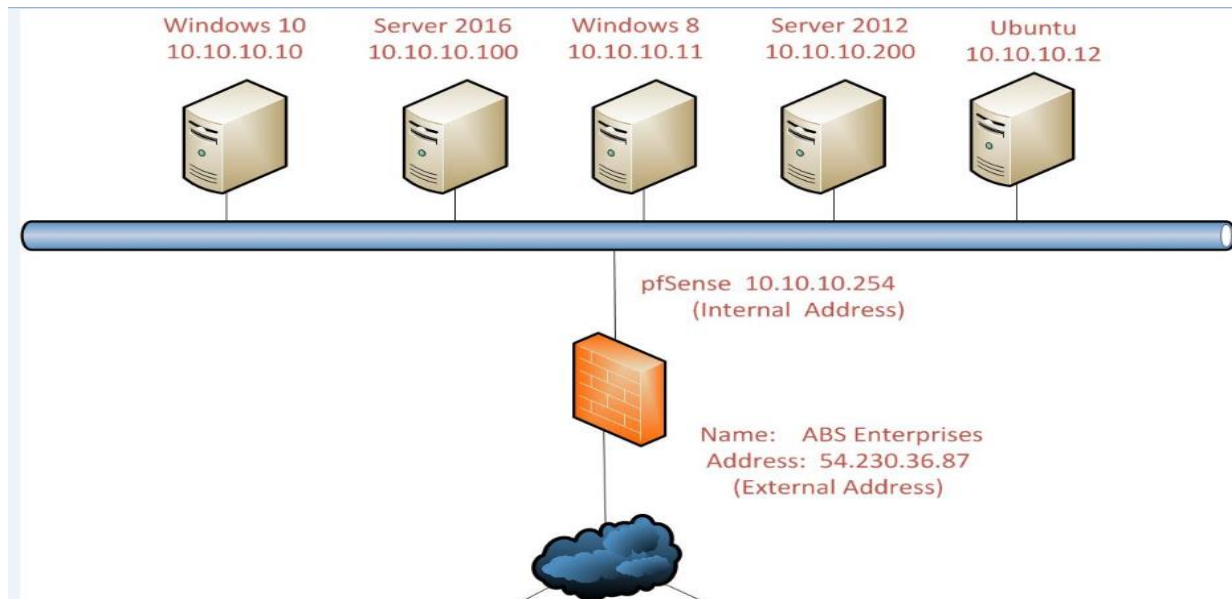
Example (Note: The paragraph that follows is an example. It is expected that students will use this as a reference only. Remember to include references and cite your work according to IEEE-style format.)
Secure Network Contractors believes that students and faculty health, well-being, and morale have a significant impact on the learning experience and productivity of the academic institution. Secure Network Contractors understands the following technical requirements. The university wants to invest in two new buildings that will bestow an academic ambience while providing students and faculty a world class research and learning environment. The university has hundreds of faculty that teach and perform research within the two new academic buildings. Faculty should be able to seamlessly transition between the two new academic buildings. Students will be required to have a similar experience as classes will take place in each building. Faculty and students will be required to print regardless of location, and therefore needs shared printing resources. All computers should be able to communicate, but the human resources department should operate on a separate network due to the sensitive and personally identifiable information they handle. We understand that the two buildings will need to wirelessly communicate with one another, and we will address this in the Wireless Area Network (WAN) section that follows. Etc…(students should continue to explain the technical requirements).

Proposed Topology

Select one or more topologies to use for this design (*i.e., star, bus, mesh, ring, and please note that the star topology is the most commonly used*). **This section should be used to provide the details of your proposed solution**. Be specific and include the model, manufacturer, features, and cost of devices where appropriate. Students should include a visual representation of the topology selected. Topologies can be created using Microsoft Visio, or you

can create a free account at gliffy.com and create diagrams.

Example (*Note: The paragraph that follows is an example. It is expected that students will use this as a reference only. Remember to include references and cite your work according to IEEE-style format.)***

Secure Network Contractors believes that a ring topology is the best solution based on the requirements described by the University of Maryland University College (UMUC). We believe a ring topology satisfies the requirements of forming a single, continuous pathway for data to be transmitted through each node. A ring network topology in where each node connects to exactly two other nodes. A node on a network can be considered a computer, laptop, printer, or mobile device. Each node has a unique network address, which is referred to as the Media Access Control (MAC) address. The MAC address provides… Etc…(students should continue to explain their proposal).

Justification

This section should be used to **justify your proposed solution based on the requirement(s).** That is, you are explaining why you proposed the solution in the aforementioned paragraph, based on the technical requirement you made explicit in aforementioned paragraph.

Example (*Note: The paragraph that follows is an example. It is expected that students will use this as a reference only. Remember to include references and cite your work according to IEEE-style format.)***

Secure Network Contractors believes that a ring topology is the best solution based on the requirements described by the University of Maryland University College (UMUC). Specifically, the requirement that data flows in one direction, reducing the chance of packet

collisions. The ring topology reduce the need for network servers because they are not needed to control network connectivity between each workstation. Etc…(students should continue to explain their proposal).

B.   Cables and Connectors

Note: (Students should consider the needs for both a wired and wireless implementation as your proposal should include both.**)**

Technical Requirements

In this section, you will <u>assess UMUC's **technical requirements**</u> related to cables and connectors. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Cables and Connectors

This section should be used to provide the details of <u>your **proposed** solution</u>, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **<u>justify</u>** <u>your proposed solution based on the technical requirements and assumptions.</u>

C.   Networking and Internetworking Hardware

Technical Requirements

In this section, you will <u>assess UMUC's **technical requirements**</u> related to networking and internetworking hardware. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Networking and Internetworking Devices

This section should be used to provide the details of <u>your **proposed** solution</u>, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **justify** your proposed solution based on the technical requirements and assumptions.

D.   Wide Area Network (WAN) Design

Technical Requirements

In this section, you will assess UMUC's **technical requirements** related to the Wide Area Network (WAN) design. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Wide Area Network (WAN) Design

This section should be used to provide the details of your **proposed** solution, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **justify** your proposed solution based on the technical requirements and assumptions.

E.   Computer Systems Hardware

Technical Requirements

In this section, you will assess UMUC's **technical requirements** related to the computer systems hardware. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Computer Systems Hardware

This section should be used to provide the details of your **proposed** solution, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **justify** your proposed solution based on the technical

requirements and assumptions.

II. Network Addressing and Security

A.   Subnetting

Overview

Subnetting is a process of breaking a large network into small networks known as subnets. Subnetting happens when we extend the default boundary of the subnet mask. Basically we borrow host bits to create networks (i.e., subnets).

We have been assigned the network address 199.1.2.0. Based on the chart below, we know this is a Class C address. This is determined by observing the first octet of the IP address, which is 199. This octet falls in between 192 and 223.

Class	Octet Decimal Range
A	1 - 126
B	128 - 191
C	192 - 223

Each class has a predefined default subnet mask that tells us the octets, which are already part of the network portion, as well as how many bits we have available to work with.

Class	Subnet Mask	Format
A	255.0.0.0	Network.Host.Host.Host
B	255.255.0.0	Network.Network.Host.Host
C	255.255.255.0	Network.Network.Network.Host

CIDR (Classless Inter Domain Routing)

CIDR is a slash notation of the subnet mask. CIDR tells us the number of on bits in a network address.

- Class A has default subnet mask 255.0.0.0. that means first octet of the subnet mask has all on bits. In slash notation it would be written as /8, means address has 8 bits on.

- Class B has default subnet mask 255.255.0.0. that means first two octets of the subnet mask have all on bits. In slash notation it would be written as /16, means address has 16

bits on.

- Class C has default subnet mask 255.255.255.0. that means first three octets of the subnet mask have all on bits. In slash notation it would be written as /24, means address has 24 bits on.

Technical Requirements

UMUC has not decided how they will use all of the physical space within the two new leased buildings. However, they have decided to use some of the space for a total of eight offices. Specifically, the initial setup will include *four classrooms*, *one computer lab*, *one administrative office*, *one library*, and *one shared printer office*.

Given the aforementioned scenario, we are going to use the 199.1.2.0 network and create a total of 8 subnets, with 25 hosts on each subnet. The chart below describes structures the scenario to include each subnet and required hosts.

Subnet Description	Required Hosts
Classroom 1	25 Computers
Classroom 2	25 Computers
Classroom 3	25 Computers
Classroom 4	25 Computers
Computer Lab	25 Computers
Administrative Office	25 Computers
Library	25 Computers
Shared Printers	14 Printers

Using the How to Subnet a Network Video provided in CMIT 265 LEO - Content - UMUC Network Design Proposal, **complete the following chart**.

Proposed Subnet

Subnet	Network Address	Host Address Range	Broadcast Address
Subnet Mask: 255.255.255._____			
Classroom 1	199.1.2.0	199.1.2.1 - 199.1.2.30	199.1.2.31
Classroom 2	199.1.2._	199.1.2._ - 199.1.2._	199.1.2._
Classroom 3	199.1.2._	199.1.2._ - 199.1.2._	199.1.2._
Classroom 4	199.1.2.96	199.1.2.97 - 199.1.2.126	199.1.2.127
Classroom 5	199.1.2.128	199.1.2.129 - 199.1.2.158	199.1.2.159
Classroom 6	199.1.2._	199.1.2._ - 199.1.2._	199.1.2._
Library Lab	199.1.2._	199.1.2._ - 199.1.2._	199.1.2._
Office Network	199.1.2._	199.1.2._ - 199.1.2._	199.1.2._

B. Firewall Implementation

Technical Requirements

In this section, you will assess UMUC's **technical requirements** related to the firewall implementation. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Network Security Hardware

This section should be used to provide the details of your **proposed** solution, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **justify** your proposed solution based on the technical requirements and assumptions.

C.   Intrusion Detection System / Intrusion Protection System

Technical Requirements

In this section, you will <u>assess UMUC's **technical requirements**</u> related to the intrusion detection system (IDS) and Intrusion Prevention System (IPS). You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Network Security Hardware

This section should be used to provide the details of <u>your **proposed** solution</u>, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **<u>justify</u>** <u>your proposed solution based on the technical requirements and assumptions.</u>

D.   DMZ Implementation

Technical Requirements

In this section, you will <u>assess UMUC's **technical requirements**</u> related to the DMZ implementation. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Network Security Hardware

This section should be used to provide the details of <u>your **proposed** solution</u>, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **<u>justify</u>** <u>your proposed solution based on the technical requirements and assumptions.</u>

E.   Physical Security Measures

Technical Requirements

In this section, you will assess UMUC's **technical requirements** related to the physical security measures. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Network Security Hardware

This section should be used to provide the details of your **proposed** solution, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **justify** your proposed solution based on the technical requirements and assumptions.

F.   Additional Network Security Measures

Technical Requirements

In this section, you will assess UMUC's **technical requirements** related to the additional security measures. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Network Security Hardware

This section should be used to provide the details of your **proposed** solution, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **justify** your proposed solution based on the technical requirements and assumptions.

III. Network Customization and Optimization

A.   Network and Cloud Base Storage

Technical Requirements

In this section, you will <u>assess UMUC's **technical requirements**</u> related to the network and cloud based storage. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Computer Systems Hardware

This section should be used to provide the details of <u>your **proposed** solution</u>, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **justify** <u>your proposed solution based on the technical requirements and assumptions.</u>

B.   Data Protection and Backup

Technical Requirements

In this section, you will <u>assess UMUC's **technical requirements**</u> related to the data protection and backup. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Computer Systems Hardware

This section should be used to provide the details of <u>your **proposed** solution</u>, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **justify** your proposed solution based on the technical requirements and assumptions.

C. Network Monitoring

Technical Requirements

In this section, you will assess UMUC's **technical requirements** related to network monitoring. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Computer Systems Hardware

This section should be used to provide the details of your **proposed** solution, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **justify** your proposed solution based on the technical requirements and assumptions.

D. Log Storage and Management

Technical Requirements

In this section, you will assess UMUC's **technical requirements** related to the log storage and management. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Computer Systems Hardware

This section should be used to provide the details of your **proposed** solution, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **justify** your proposed solution based on the technical requirements and assumptions.

E. Troubleshooting Methodology

Technical Requirements

In this section, you will <u>assess UMUC's **technical requirements**</u> related to the troubleshooting methodology. You will need to make assumptions where appropriate. When making assumptions, list each and make sure to justify the solution in the Justification section.

Proposed Computer Systems Hardware

This section should be used to provide the details of <u>your **proposed** solution</u>, based on the technical requirements and assumptions. Student should be specific when discussing the models, types, and costs.

Justification

This section should be used to **justify** <u>your proposed solution based on the technical requirements and assumptions.</u>