Physical Network Design

Network Topology

Business Needs

In this section, you will assess the business needs of the company. Use the information provided in the scenario to analyze the need for infrastructure or equipment. If you need more information, feel free to ask your instructor or make some assumptions. If you make some assumptions, be sure to list them. This section is not about the actual infrastructure or equipment, but it should discuss the business needs of the company.

Example

ABS Enterprises believes that employees’ health, well-being, and morale have a significant impact on the productivity of the employees and thus the overall results or output of the company. They want to invest in a facility that will provide the most return on investment while still providing a facility that employees will use.

Proposed Topology

Select one or more topologies to use for this design. This section should be used to provide details of the selected infrastructure or equipment. Include the model, manufacturer, features, and cost.

Example

We are proposing the construction of a basketball court at our campus. This can be constructed behind our main building where the current overflow parking lot is located. The court will be a full regulation-size basketball court [1]. The typical measurements of a regulation-size basketball court are as follows:

|  |  |
| --- | --- |
| Area | Measurements |
| Court length | 94 ft |
| Court width | 50 ft |
| Rim height | 10 ft |
| Restricted arc radius | 4 ft |
| Center circle diameter | 12 ft |
| 3-point line distance from the basket | 23.75 ft |
| Key (shaded lane or restricted area) width | 16 ft |
| Free-throw line distance from point on the floor directly below the backboard | 15 ft |

The court will cost approximately $20,000 and will include such features as the company logo, a state-of-the-art lighting system, and a net structure around the court.

Justification

Justify your determination that the selected topologies will meet the business needs. Use the information provided in the scenario to make the appropriate assumptions (make sure to list those assumptions). Be sure to also provide an analysis of the justification for the infrastructure or equipment.

Example

Last month, the Human Resources department conducted a survey asking all current employees which facility they would be more likely to use: basketball court, volleyball court, or tennis court. Based on the survey, 70% of our employees selected basketball, 40% selected a tennis court, and 20% percent chose volleyball court.

Network Media

Business Needs

Assess the business needs.

Proposed Network Media (include network wiring diagrams)

Select one or more network media to use for this design.

Justification

Justify your determination that the selected media will meet the business needs.

Network Devices

Business Needs

Assess the business needs.

Proposed Network Devices

Select network devices to use to implement the design. Include setup and location information for the devices. Provide a comprehensive list of devices including the quantity of each device needed.

Justification

Justify your determination that the selected network devices will meet the business needs.

Network Security Devices

Business Needs

Assess the business needs.

Proposed Network Security Devices

Select network security devices to use to secure the network. Include setup and location information for the devices. Provide comprehensive list of devices including the quantity of each device needed.

Justification

Justify your determination that the selected network security devices will meet the business needs.

Computer Systems

Business Needs

Assess the business needs.

Proposed Computer Systems

Select computer systems (servers) to use to implement the network design. Include setup and location information for the devices. Provide comprehensive list of devices including the quantity of each system needed.

Justification

Justify your determination that the selected systems will meet the business needs.

II. Network Addresses Design

Subnetting

Business Needs

Assess the business needs.

Proposed Subnetting (include the calculations)

List the quantity of subnets needed. For each subnet, provide the IP addressing info (network address, broadcast address, range of available IP addresses) and the systems, devices, or equipment that will be on that network. Also provide the calculations on how those IP addressing information are determined.

Justification

Justify your determination that the network address design will meet the business needs(why the design needs to have x number of subnets? What are the implications if they have more or less subnets?)

III. Network Services Design

Network Services

Business Needs

Assess the business needs

Proposed Network Services

Determine and list the network services needed to implement the design. Provide setup and licensing information (as necessary).

Justification

Justify your determination that the network services are needed and will meet the business needs

Network Security Measures

Business Needs

Assess the business needs

Proposed Network Security Measures

Outline network security measures needed in the design. This includes training, monitoring, and maintenance procedures. Provide implementation details of these measures.

Justification

Justify your determination that the network security measures are needed and will meet the business needs.

* Define the topology that will be used.
* Select the appropriate network media.
* Select the appropriate network connecting devices, including network security devices.
* Select the appropriate computer systems to use to support the network design.
* Determine a physical layout of the computers on the floor plan, along with the network wires (network wiring diagram).
* Provide justifications for each element of your network design (numbers 1–4 above).

In this section, address each of the following.

* Define the subnets (based on rooms, floor, department, or other criteria).
* For each subnet, explain which devices/‌groups/‌users/‌rooms will be on this subnet, define the network address, subnet mask, and available IP addresses to be used by computers or devices.

In this section, address each of the following.

* Identify network services needed.
* List additional servers or network devices needed to implement the network.
* List network security measures to be implemented.
* Justify the need for the network services, security measures, and devices you’ve selected.

Building dimensions: Length: 240 Feet, Width: 95 Feet, Height: 30 Feet

The building will house six computer labs that will be used for instruction. In the building diagrams above, the labs are labeled Classroom #1, Classroom #2, and Classroom #4 on the first floor and Classroom #1, Classroom #2, and Classroom #5 on the second floor; each computer lab will have a closet.  Each lab will have 32 computers: 30 student computers, 1 instructor computer, and 1 server in the closet for instructional use.

In addition, there will be a Student Computer Lab that will provide computer access to students to do their homework. There will be 50 computers in this lab and a server in the closet. To allow students access to library resources, the library will also have 10 computers for students and 5 computers for library staff.

Finally, there are various offices in the building. Each of these offices will have one computer for staff use, with the exception of the admissions office, which will have five computers. There will be two server rooms, one on the first floor and one on the second floor.