Review the hypothetical scenario below which concerns local area networks (LANs), then answer the series of questions about the scenario. Make sure each answer is thoroughly explained and that your reasoning behind your answers is included. Explain any significant assumptions or interpretations you made for the scenario as well.

**Lollipopola Scenario**

Lollipopola, an organization that manufactures lollipops and other candies, uses many local area networks in its corporate office. Lollipopola naturally used earlier forms of Ethernet based on hubs when LANs were first becoming popular. The LAN speeds in the corporate office have been upgraded across the organization several times over the years, with most groups now using 100 Mbps (some groups are still using 10 Mbps). Those using 100 Mbps are using switches, while the rest are still using 10 Mbps hubs. The cables for the subnets run to utility closets, and each closet contains the subnet’s switch or hub. Lollipopola has wireless access only for the offices of the board of directors.

The CTO, recognizing the current trends, has asked Delaney, the network manager, to upgrade the speed of the network, to use more modern technology, and to add additional wireless capabilities. Delaney submitted the following proposal.

**Network Design**

The network staff will interview the high-level executives to determine what applications the organization uses. Using this information, the network staff will carefully calculate the speeds needed by each group.

The staff will then contact various vendors to review their prices through discount negotiations or bid requests and determine the cheapest devices available to support the speeds necessary for each group. The goals are twofold -- to minimize purchase cost, and to buy from as many different vendors as possible to avoid vendor lock-in (i.e. avoid being tied to only one vendor). This process will take about a year-and-a-half.

During the interview process, the staff will also ask the executives about who needs wireless access, to get a rough number of users that would use it.

**Network Implementation**

After the technologies and speeds have been designed, some groups will be given 100Mbps speed subnets connected to switches, which will be placed in the server room. Although 1Gbps speeds are available, using this slower speed allows re-use of existing 100Mbps switches to save cost. Groups with wired access will have no wireless access, to save cost. If several employees in a group need wireless access, the entire group will be given only wireless access via the 802.11i protocol; and their wired access will be removed to save cost. Each group will either have 100Mbps wired access, or 802.11i wireless access, but not both.

Wireless access points will only be placed next to groups that need wireless access. If no one needs wireless access in a certain part of the building, no access point will be added. Access points will also be placed around the edges of the building, so that employees can access the network with their laptop at the picnic tables and outdoor areas.

The upgrades will be rolled out one small area at a time, to avoid work disruptions. This process will take about 12 months.

**Part 1: LANs**

1. Delaney’s proposal eliminates hubs in favor of switches. Compare and contrast the characteristics of each type of device with regards to the following aspects:

* Throughput
* Frame Collisions
* Frame Loss
* Security
* Future Growth and Speed Upgrades

|  |  |
| --- | --- |
| Hub | Switch |
| Hubs are work at physical layer | Switch works at data link layer |
| Bandwidth is divided by the number of ports | Operates all ports at its maximum speed |
| Collision occur in steps using hubs | No collision occur in a full duplex switch |
| Capacity is limited by shared topology | Capacity is point-to-point |
| Hubs speed are 10 Mbps | Switch speed are 10/100 Mbps or 1Gbps |

**Part 2: Wireless LANs**

2. The CTO asked for wireless capabilities, and Delaney’s proposal includes access points to this end. What are two security vulnerabilities that would be easier to exploit on Lollipopola’s new WLAN when compared to its existing wired LANs?

1. The wireless network is just for those people who need now and no more backup devices. If there are some new staff come to this company in the future, they may not use the wireless network.
2. And the firewall is not design in the Wireless LAN, it may cause the security problem and the data loss.

3. What are three steps that could be taken to mitigate or eliminate these WLAN vulnerabilities?

1. About the security problem, each computer in this WLAN must have a private key or password to prevent other people use your computer.
2. And also in this WLAN we can set a record about who access the network, so that if the problem is happen, we can know who did this.
3. Also the wireless LAN must can be used by all people in the company, if the fund is enough.

4. What wireless protocol(s) (other than the one selected) would provide Lollipopola with fast and secure WLAN access, while being readily available in modern network devices?

1. IEEE 802.11
2. Wi-Fi Protected Access (WPA)

**Part 3: Network Design**

In this part, you review Delaney’s design, determine what parts work well and what parts are problematic, write an alternative proposal, and explain why your proposal is better than Delaney’s. *For all problems in this part, make sure to consider at least the following areas:*

* Speed
* Cost
* Network management
* Security
* Functionality

5. What elements of Delaney’s proposal are problematic? Identify them and explain what the issues are.

1. Cost, the proposal care more about the cost of the network, but doesn’t awareness that in modern day equipment is quite cheap, and network staff are expensive. And cheap device may cause problem, and it doesn’t calculate the cost of the training of using new hardware and installation.
2. Security, we have been talk about the firewall problem.
3. Cost, this proposal seems save a lot of money, but waste a lot of time, to ask each employee about their demand.
4. Network management, some group only have the wireless, may lead to the issue to work with those wired network group.

6. What elements of Delaney’s proposal work well? Identify them and explain why they work well.

1. Network management, in this proposal each employee have been asked about the speed they need. And it will make the network more effectively.
2. Functionality, switches are preferred to hubs because they offer dedicated bandwidth and superior performance.
3. Cost, it really save a lot of money.

7. Now that you have reviewed the characteristics, positives, and negatives of Delaney’s proposal, write an alternative proposal that does not exhibit the same issues. The proposal should contain both a network design and a network implementation section and should also correct all the issues you listed in #5.

**Network design**

The network staff will interview the team leads, directors, and executive leadership to gather the information of the demand of the network and make an informed decision.

The staff will then contact various vendors to review their prices through discount negotiations or bid requests and determine the best devices available to support the speeds necessary for each group. The goals are twofold – to buy the right devices which has the good quality, best review, also suit for the demand, and to buy from as many different vendors as possible to avoid vendor lock-in (i.e. avoid being tied to only one vendor). This process will take about a year-and-a-half.

Also, the staff need to calculate the cost of what inner the bid requests. Such as the licenses, training of employees on the hardware, installation, implementation, and deployment of new environment. To figure out the total cost.

During the interview process, the staff will also ask the executives leadership about who needs wireless access, to get a rough number of users that would use it.

**Network implement**

After the technologies and speeds have been designed, some groups will be given 100Mbps speed subnets connected to switches, which will be placed in the server room. Although 1Gbps speeds are available, using this slower speed allows re-use of existing 100Mbps switches to save cost. Groups with wired access will also have wireless access. If several employees in a group need wireless access, the entire group will be given wireless access via the 802.11i protocol. Each group will either have 100Mbps wired access, and 802.11i wireless access.

Wireless access points will only be placed next to groups that need wireless access. If no one needs wireless access in a certain part of the building, some point will be added prepare for the upcoming user. Access points will also be placed around the edges of the building, so that employees can access the network with their laptop at the picnic tables and outdoor areas. Also, firewall will be set up in the wireless network.

The upgrades will be rolled out one small area at a time, to avoid work disruptions. This process will take about 12 months.

8. Explain specifically why your proposal is better than Delaney’s proposal.

My proposal solves some problem in Delaney’s proposal. It is more security than the last one. Also, it not only keeps eyes on saving the money, but also make it more reliable and durable. And, it calculates the cost which Delaney didn’t think about. This proposal may cost more money than Delaney’s, but it makes the network can be use more years.

Your assignment will be evaluated according to the following rubric.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Grade** | **Qualities Demonstrated by the Assignment Submission** | **Grade Assigned** |
| **Content (70%)**  **Measures the quality of the content in the assignment** | A+ 🡺 100 | The content demonstrates exceptional understanding of all relevant subject matter and its inter-relationships. All major relevant issues are thoroughly covered, and all content is very focused and on-topic. There is no known way to improve the content, and there are absolutely no technical or coverage errors present. |  |
| A 🡺 96 | The content demonstrates exceptional understanding of all relevant subject matter and its inter-relationships. All major relevant issues are thoroughly covered, and all content is very focused and on-topic. At most one insignificant technical or coverage error may be present |
| A- 🡺 92 | The content demonstrates deep understanding of all relevant subject matter and its inter-relationships. All major relevant issues are covered, and all content is on-topic. |
| B+ 🡺 88 | The content demonstrates understanding of all relevant subject matter and its inter-relationships. Almost all major relevant issues are covered, and the content is at least reasonably on-topic. |
| B 🡺 85 | The content demonstrates understanding of most relevant subject matter and its inter-relationships. Almost all major relevant issues are covered, and all content is at least reasonably on-topic. |
| B- 🡺 82 | The content demonstrates moderate understanding of much relevant subject matter and its inter-relationships. There is reasonable coverage of major relevant issues, and the content is at least reasonably on-topic. |
| C+ 🡺 78 | The content demonstrates some understanding of relevant subject matter and its inter-relationships. Some major relevant issues are covered, and at least some content is on-topic. |
| C 🡺 75 | The content demonstrates understanding of a small portion of the relevant subject matter and its inter-relationships. Some major relevant issues are covered, and at least a small portion of the content is on-topic. |
| C- 🡺 72 | The content demonstrates little understanding of and insight into the relevant subject matter and its inter-relationships. A small portion of the major relevant issues are covered. The focus of the content may be off topic or on insubstantial or secondary topics |
| D 🡺 67 | The content demonstrates almost no understanding of or insight into the relevant subject matter and its inter-relationships. Almost none of the major relevant issues are covered, and the content may be almost entirely off-topic. |
| F 🡺 0 | The content demonstrates no understanding of or insight into the relevant subject matter and its inter-relationships. No major relevant issues are covered, and the content is entirely off-topic. |
| **Exposition (30%)**  **Measures how well the content is expressed** | A+ 🡺 100 | The presentation of all ideas and designs is exceptionally clear and persuasive; the entire submission is exceptionally organized. There is no known way to improve the clarity or organization of the submission. |  |
| A 🡺 96 | The presentation of all ideas and designs is exceptionally clear and persuasive; the entire submission is exceptionally organized. There may be at most one insignificant way to improve the clarity or organization of the submission. |
| A- 🡺 92 | The presentation of all ideas and designs is very clear and persuasive; the entire submission is very organized. |
| B+ 🡺 88 | The presentation of all ideas and designs is clear and persuasive; the entire submission is organized. |
| B 🡺 85 | The presentation of most ideas and designs is clear and persuasive; most of the submission is organized. |
| B- 🡺 82 | The presentation of most ideas and designs is generally clear; most of the submission is reasonably organized. |
| C+ 🡺 78 | Some parts of the submission are hard to understand; some parts are disorganized. |
| C 🡺 75 | About half of the submission is hard to understand; about half is disorganized. |
| C- 🡺 72 | Most parts of the submission are hard to understand; most parts are disorganized. |
| D 🡺 67 | Almost all of the submission is hard to understand and disorganized. |
| F 🡺 0 | The entire submission is hard to understand and disorganized. |
| **Overall Assignment Grade:** | | | |

Use the **Ask your Facilitator Discussion Board** if you have any questions regarding how to approach this assignment.

Save your assignment as ***lastnameFirstname\_assignment3.doc*** and submit it in the *Assignments* section of the course.

For help uploading files please refer to the *Technical Support* page in the syllabus.