UNIVERSITY of HOUSTON

COLLEGE of TECHNOLOGY

DEPARTMENT OF INFORMATION AND LOGISTICS TECHNOLOGY

CIS 3347 Individual Final Project Assignment

Introduction

The objective of this individual project is to get an overall understanding of various networking technologies used to support businesses need. Students should be able to design a network for Apollo Residence Luxury Apartments according to hands-on activities of the course book 8B page 242-244 and 7D page 220-221. Please find the minimum design requirements in the following sections.

Helpful Links:

https://ron.viseh.com/index.php?curr_folder=%2FCIS3347%2FEXAMPLES

https://viseh.com/

https://www.calculator.net/ip-subnet-calculator.html

Required format:

- The design part (Convert Visio maps to one PDF only) MUST contain the type of cables, name devices, Wi-Fi channels, IPs, subnet, connections, and other related information for the physical topologies. The writing part in Microsoft Word including introduction, tables, conclusion, and references.

Recommendations:

You will design a network for a luxury building for honor students.

- Three floors including lobby and offices at first floor, meeting rooms, offices at second floor, and the apartments from third.
- 27 two-bedrooms only on third floor (total of 54 students)
    - Recommendation(s): 4 network drops for each room (27 * 4 = 108) including Voice/IP.
- The measurement of first and second floor is 100 by 70 feet.
    - Recommendation(s): Server room is located at first floor, and second floor can be wired from the first floor.
- The measurement of third is 240 by 150 feet.
    - Recommendation(s): The wiring closet is located at the middle of third floor.
- Other Recommendation(s):
    - Consider a printer server and an All-In-One Printer | Scanner | Fax for each floor.
    - Wireless Access Points including 5 GHZ for residents and building employees.
    - Use class B privet IP for internal along with network address translation (NAT) with subnet of 255.255.255.0/24.
    - What kind of Wi-Fi security you would consider?
    - What are your best practice recommendations?
- Patch panel for network room and third floor wiring closet.
- 1 GHZ network including two drops for offices including Voice/IP.
- Wi-Fi for employees and residents 5 GHZ (Page 195-197) with proper securities.
- Consider 60 feet diameter coverage area for 5 GHZ Wi-Fi.
- Consider the following equipment's for residents and building employees.
    - Two Active Directory servers for authenticating and DHCP for residents and employees.
    - Voice over IP phone system.
    - A file server.
    - All-in-one Printer (printer, copier, scanner, and fax) for lobby for each floor.
- Consider securities for the network.
- Consider a backup system and disaster recovery.
- And any other necessary network components for this luxury apartments.

Deliverables

Required maps:

1. Physical topology includes:
    - MDF room details for 1 Gbps network including a patch panel.
    - 1 Gbps wired network physical topology with IP addresses and proper icons for 3 floors.
    - 5 GHZ employees and residents' wireless physical topology with IP addresses, active channel numbers, and proper icons for 3 floors.
    - A high-level physical topology map for all floors (Page 218.)
    - The physical topology map must include IP addresses and a related icons for the type of connections and WiFi access points must include IP addresses and the active channel numbers next to each connection.

Required tables:

Table 1

IPv4 Subnet Result for 172.16.0.0

Network Address	172.16.0.0
Usable Host IP Range	172.16.0.0 - 172.16.63.254
Broadcast Address	172.16.63.255
Total Number of Hosts	16,834
Number of Usable Hosts	16,832
Subnet Mask	255.255.192.0
Binary Subnet Mask	11111111.11111111.11000000.00000000

IP Class	B
CIDR Notation	/18
IP Type	Private

Table 2

All Possible Networks for 172.16.x.x

Network Address	Useable Host Range	Broadcast Address
172.16.0.0	172.16.0.1 - 172.16.63.254	172.16.63.255
172.16.64.0	172.16.64.1 - 172.16.127.254	172.16.127.255
172.16.128.0	172.16.128.1 - 172.16.191.254	172.16.191.255
172.16.192.0	172.16.192.1 - 172.16.255.254	172.16.255.255

Table 3

Hardware Recommendations

Hardware	IP	Subnet	Type	Location
Router(s)	172.16.0.2 172.16.0.10	172.16.1.x	Network	MDF
Core Switch 1	172.16.0.20	…	Network	MDF
Core Switch 2	172.16.0.31	…	Network	MDF

Switche1	172.16.0.100	…	Network	MDF
Firewall	172.16.0.2	…	Network	MDF
AP 5GHZ	172.16.0.120	…	Network	1st floor
AP 5GHZ	172.16.0.121	172.16.0.x	Network	2nd floor
Active Directory 1	172.16.0.150	…	Server	MDF
Active Directory 2	172.16.0.151	…	Server	MDF
Printer server	172.16.0.152	…	Server	MDF
…	…	…	…	…
…	…	…	…	…

Grading Scale	Description
50	Physical Topologies PDF 3 floors
20	WiFi design
20	A high-level physical topology map
10	Tables & Descriptions (APA)
100	**Total**