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Touchstone Task 1: Planning a Network

Review the [scenario and client expectations](https://app.sophia.org/tutorials/introduction-to-networking-scenario-and-client-expectations) about Greenfield Properties.

Based on the information provided by the client, answer the following questions in 2-4 sentences each. Be sure to explain your answers in detail.

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| **How many employees will the new company have, and how many total devices, including PCs, tablets, and smartphones?** |
| Looks like greenfield Properties has a total amount of 46 Employees. 17 being exclusively "On-Site" and the other 29 are a mix of Hybrid and Remote positions. All together they have 95 Devices. (26 Pc's - 30 Tablets - 39 Smartphones) |
| **What network architecture will be used: client/server or peer-to-peer? Why?** |
| We will be using a Client-Server network. This setup is popular in large businesses these days because it does a great job handling privacy and security concerns with its server-controlled systems. This will work seamlessly with everyone since some of the employees are remote and still need access to the companies resources remotely. Adding more layers of protection like integrating IPDS and Encrypting stored data with strong Authentication and Authorization methods will keep everything running smoothly but more importantly safely. |
| **When on-site employees access the network, will it be a PAN, LAN, or WAN? Why?** |
| VLANs offer flexible ways to separate a host's physical connection to a switch from the VLAN it’s logically part of. For instance, with VLANs, it doesn’t matter which switch or port a host connects to, and as the company grows, we’ll have the option to connect more hosts to specific subnets without worrying about running out of physical ports on certain switches. It’s a great way to stay scalable and organized. |
| **What type(s) of cable should be used to connect the in-house hosts to the switch or router?** |
| I recommend using Category 6 plenum cable. It has fire-resistant shielding that doesn’t release toxic fumes when burned, which is crucial for protecting employees from inhaling harmful gases in case of a fire. It’s a small step that makes a big difference in safety. |
| **Describe the types of servers that will be needed in order to meet the company’s networking goals.** |
| According to the rubric I identified the need for the following servers.  1 - Active Directory Server ADS (Provides a central point for user authentication, authorization, and accounting as well)  2 - File Server (For all employees to be able to share and access data files needed)  3 - Web Server (This is what will host the company website and any other nuances like management of apps that allow customers to use payment tools.  4 - Mail Server (This will let the company administrate their own mail server and provide speedy acess to critical info.  5 - Database Server (Used to store all the companies databases that are essential to inerface the web server)  6 - Printer Server (Allows all the employees that are printing in office to seamlessly use the same printer saving costs of everyone having an individual printer) |
| **Do you think the servers should be on-premises, cloud-based, or a hybrid? Why?** |
| I believe all can be on site except the Mail and Web. Those can be either completely cloud or hybrid depending on the exact budget the company has. Ideally saving alot of downtime if we go with a Cloud hosted web server like Azure which offers a 99.99% run time which comes down to only 10 minutes of downtime a week which can save alot of time and money as well. |
| **What operating system(s) should be used on the servers? Why?** |
| Ideally something simple since the company prioritizes easy use so most likely a Windows OS for all the servers. We could opt for something like Ubuntu or Red Hat Linux but since most of the IT people in the buidling are not that familliarized with Linux Windows will be adequate. |
| **Will multiple servers be virtualized on a single physical server? Why or why not?** |
| Each server is typically dedicated to one function, so you wouldn't run a database server and a web server on the same hardware. However, you can virtualize servers using platforms like VMware to run multiple server instances on a single machine. This works great when each server has low traffic, like your Active Directory and internal file servers. Virtualization can really help save on hardware costs, making it a smart financial move. |
| **If you chose Microsoft Server software, which edition will you select, and why?** |
| The version of Windows Server you choose depends on how many cores or virtual servers you’re running on each physical server. The Standard edition is more budget-friendly but only lets you host two virtual servers per license. On the other hand, the Enterprise version costs more, but it lets you run unlimited virtual servers, giving you more flexibility. |
| **If you choose Linux, which distro(s) will you select, and why?** |
| I chose not to go with linux. Due to not being as user friendly to entry level IT employees. |

1. Greenfield Properties: The Scenario

Two small property management companies, Bluegrass Rentals (BR) and Redstone Property Management (RPM), will soon be merging into a new company to be called Greenfield Properties (GP). Each company has been using peer-to-peer LANs up until now, but they now want to move up to client/server networking. Greenfield Properties will be operating out of a single, one-story building in a suburban office park.

You have been asked to create a proposal for the new company's IT network. The client has sent you the information in the table below about the employee job roles and duties planned for Greenfield Properties.

Employee Role Count Onsite/Remote PC Tablet Smartphone

Executives (4) Onsite Yes No Yes

Office Manager (1) Onsite Yes No Yes

Advertising Manager (1) 25/75 Yes Yes Yes

Public Relations and Social Media Manager (1) Remote Yes No Yes

Human Resources Manager (1) and Specialist (1) Onsite Yes No Yes

Receptionists (2) Onsite No Yes No

Leasing Manager (1) 90/10 Yes Yes Yes

Leasing Agents (10) 50/50 No Yes Yes

Leasing Assistants (2) Onsite Yes No No

Property Owner Liaisons (3) 50/50 Yes Yes Yes

Property Managers (4) 50/50 Yes Yes Yes

Maintenance Manager (1) 80/20 Yes Yes Yes

Maintenance Specialists (8) 10/90 No Yes Yes

Accountant (1) Onsite Yes No Yes

Accounting Specialists (3) Onsite Yes No No

IT Manager (1) and IT Support Specialist (1) Onsite Yes No Yes

A company representative has provided the information in the table below about some of the job roles.

Role Description

Leasing Agents They spend about half of their time showing properties to potential renters and use tablets to guide potential renters through the process of filling out an application, reviewing information about available properties, and recording property inspection data. They use cell phones to communicate with the leasing manager.

Maintenance Specialists They spend most of their time responding to maintenance requests. They use tablets to access the app used for scheduling and documenting requests, and cell phones to communicate with the maintenance manager.

Receptionists They sit at a desk in the lobby and greet visitors. They use tablets to access the company directory and a digital multiline phone system to route incoming voice calls. The tablet app they use also interfaces with the company’s digital telephone system.

2. Additional Information Related to the Client’s Expectations

When asked about their overall goals and priorities for the network, the representative from Greenfield Properties offered the expectations in the section below.

2a. All Touchstone Tasks

Use the following client expectations to help answer the questions in all the Touchstone Tasks.

While the budget is not unlimited, the top executives feel that it is more important to have good-quality, reliable, easy-to-use hardware and software than to keep costs as low as possible.

Ease of administration is important because the company’s IT staff has limited experience with network administration.

The following capabilities are required:

The network must authenticate users and authorize them for the privileges they need to do their work.

All employees must be able to access shared resources, including files and printers, from anywhere.

All employees must be able to access the company’s custom-built property management app from anywhere.

Certain employees need access to specific secure databases.

The network must be very secure. Top executives are especially concerned about ransomware and breaches of private information such as credit card data.

The company is open to either hosting servers on-site or on the cloud, or a combination of the two.

Some of these roles are already filled by existing workers from the two companies; other positions will be filled by new hires.

In addition to the client hosts, there are about a dozen network-capable multifunction printers that the merging companies are bringing with them. Each of them currently uses a static IPv4 address and is part of a workgroup. Given that you are replacing the workgroups with a client/server network, consider how you will deploy those printers.

2b. Planning Network Printer Connectivity Touchstone Task

Use the additional client expectations to help answer the questions in Touchstone Task 2.1: Planning Network Printer Connectivity.

There are two ways to connect printers to a network: using a print server or using direct IP printing. In preparation for this touchstone, research the pros and cons of each. Here are some articles you may find helpful:

Print Servers or Direct IP Printing: Which Is Right for My Business?

Direct IP Printing or Print Servers – Which one is better?

2c. Planning IP Address Assignments Touchstone Task

Use the additional client expectations to help answer the questions in Touchstone Task 2.2: Planning IP Address Assignments.

For this scenario, assume that you’ll be using the IP address range 10.1.1.0/24 for the internal network. The following are different ways to consider what subnets you want to create, depending on how you think you will be managing them.

Based on geographic factors: In a multi-office company, you might create a separate subnet for each location. Or in a multistory building, each floor might be a subnet.

By departments: You might create a separate subnet for each department, especially if certain departments have access to specific applications or databases that other departments don’t have.

By functions or permissions: It can be easier to assign resources and permissions to an entire subnet than to individual users or groups. You might have one subnet for all PCs that connect to the network via cables, another for user devices connected through Wi-Fi, a third one for network-connected equipment such as printers, and so on

Although it can be tempting to create subnets that are exactly the right size for the pool of users it will be supporting, that is short-sighted. As a general rule, when defining subnets, you should plan for a future expansion of at least 50%. For example, suppose a certain subnet must initially support 10 host IP addresses. Rather than using a subnet mask of 255.255.255.240, resulting in 14 available host IP addresses, you would be better served to go up one level, to a subnet mask of 255.255.255.224, which supports up to 30 host IP addresses.

2d. Planning a Wireless Infrastructure Touchstone Task

Use the additional client expectations to help answer the questions in Touchstone Task 3: Planning a Wireless Infrastructure.

Now, it’s time to start thinking about adding Wi-Fi access to the network. As you learned in the scenario, over half of the devices users employ are tablets and smartphones. These do not usually have ports for connecting to a wired network, so it is critical to provide Wi-Fi access.

You will need to recommend a strategy for blanketing the office with Wi-Fi coverage so a user can get a strong Wi-Fi signal anywhere in the building. You will also need to be concerned with choosing the appropriate channels and service set identifiers (SSIDs) to use on the Wireless Application Protocols (WAPs) and where to install them.

The following are some things to remember about Wi-Fi that may come in handy for this activity.

In general, 2.4 GHz Wi-Fi signals can extend for about 150 feet if there are no impediments, such as thick walls. 5 GHz Wi-Fi signals can extend for about 50 feet. Those are maximums, though; as a host gets further away from the WAP, performance decreases. Therefore, you should plan on placing WAPs about 30–70 ft apart. This is close enough to prevent dead spots.

Wi-Fi 5 (802.11ac) runs only on the 5 GHz band; Wi-Fi 6 (802.11ax) can use both the 5 GHz and 2.4 GHz bands.

Channels 1, 6, and 11 are typically used because they do not overlap with each other. You should try to alternate channel selections among adjacent WAPs.

WAPs can be installed in the ceiling. This is a good way to keep them out of users’ way, as well as to add an extra measure of physical security for them.

For WAPs that are not located near a power outlet, you can either run power cords through the ceiling or you can use Power over Ethernet (PoE), a technology that allows electricity to be supplied on the Ethernet data cable.