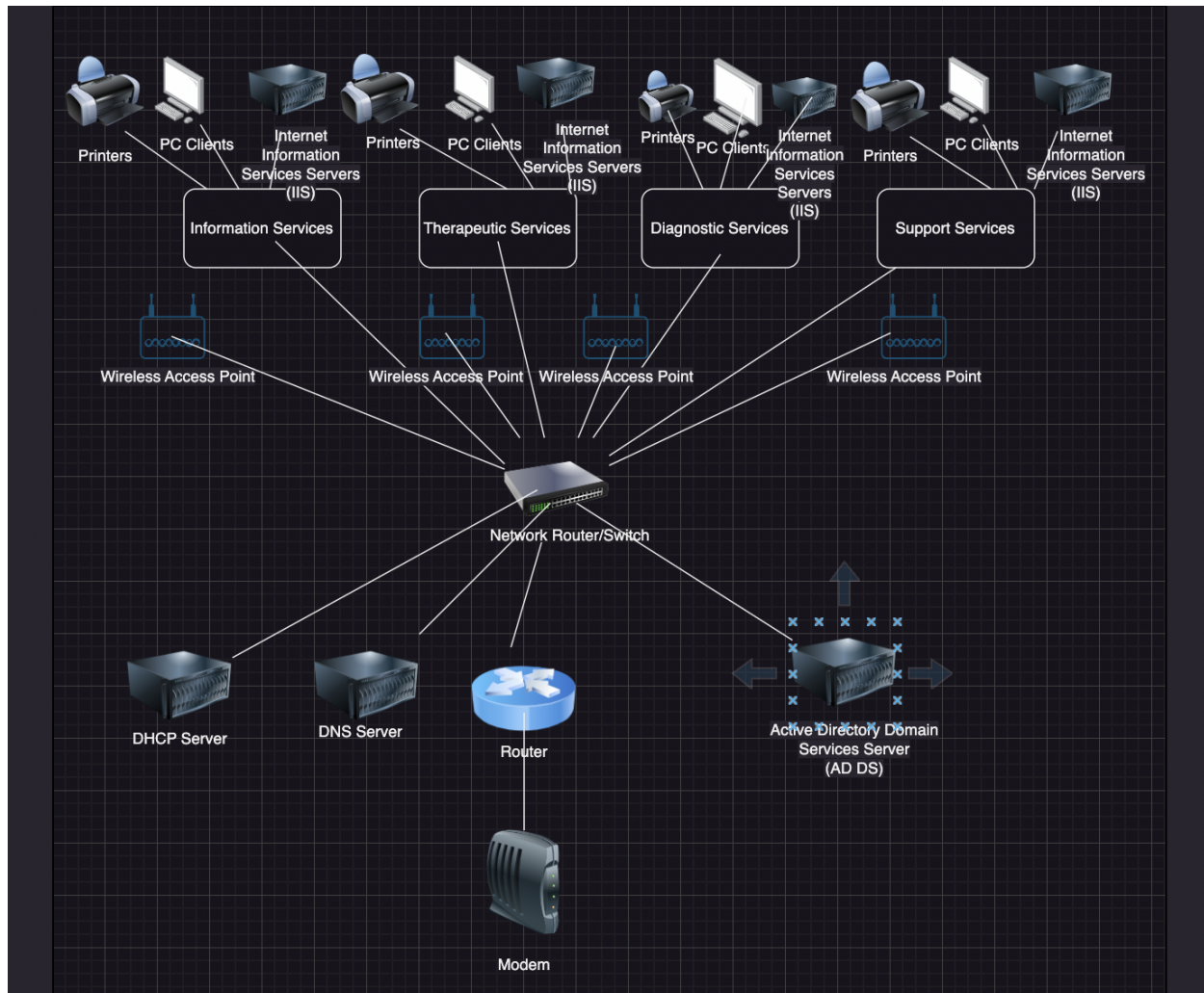


Task 1:



Task 2:

Hardware	# of Items	Explain why this item is or not needed
Server PCs for AD/DS and DNS	1 for AD/DS and 1 for DNS	AD/DS was requested by the medical center and a DNS server is essential for translating websites into IP addresses in order for PCs to be connected to desired servers.
Server PCs for DHCP	1	DHCP is needed for the

		medical center to provide IP addresses and essential networking features for all clients. DHCP may also be used to prevent unapproved clients from entering the network due to not meeting the security requirements of the medical center's network.
Server PCs for IIS	12	Requested by the medical center to establish a separate web server and act as a file server for each of the computer labs. Otherwise, this would not be needed.
Client PCs for labs	240	Each lab requires twenty computers and there are three labs for each unit. Thus, sixty computers are needed for each unit and there are four units total. Therefore, a total of 240 client PCs are required.
UTP cables	285	240 UTP cables are required for the client PCs to be connected to switches, twelve for the printers, twelve for the IIS servers and three for the remaining servers, four for the wireless access points, twelve for the 100-port switches, one for the router, and one for the modem.
100-port switches for labs with star topology	12	Needed to connect the twenty computers, the printer, and the IIS server for each of the twelve computer labs.
10-port switches for linking labs in tree topology	3	Needed to connect the three 100-port switches from each of the four units, the DHCP, DNS, and AD DS servers, the router, and the four wireless

		access points. Additionally, some 10-port switches will have to connect to other 10-port switches.
Routers	1	Necessary for an ethernet connection along with a modem.
Printers	12	Each lab requires one printer, so at least twelve printers are needed.
WiFi Access Points	4	WiFi access is needed in a location that is near the three computer labs for each unit, so at least four wireless access points should be used.
Any other equipment	1 - Modem	A modem is needed for an ethernet connection to the Internet.

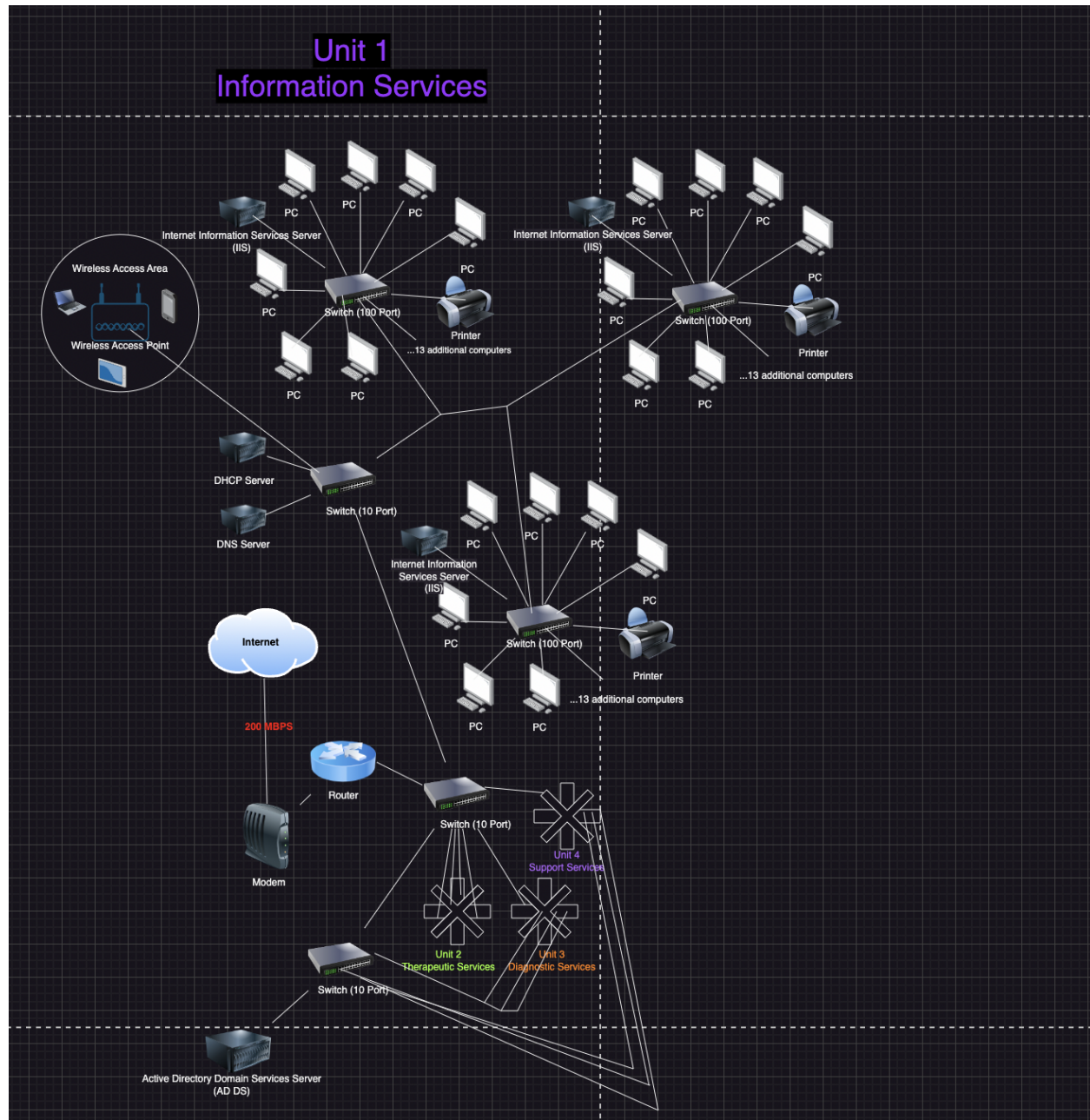
Task 3:

To satisfy the medical center's requirements, it is crucial for several services to be installed, including Active Directory Domain Services, Internet Information Services to allow for web application execution and data management for all PC clients, DHCP for ensuring no two clients in the network have the same IP address, and printing services for each of the computer labs to obtain and manage crucial medical documents.

Server Feature	Explain why this service is or is not needed
Active Directory Domain Services (AD DS)	AD DS was requested to be installed by the medical center. AD DS will assist admins with managing and storing data that comes from the network and web applications with the use of a provided database.
Domain Name System (DNS)	DNS is an essential networking tool to give PC clients certainty that they are accessing the correct network or server when requested.
Dynamic Host Configuration Protocol (DHCP)	DHCP is necessary to assign unique IP addresses for each PC client in the medical

	center's network.
Internet Information Server (IIS)	IIS is required to allow for web applications to be run on the medical center's network. On top of that, IIS also provides the features of a file server so PC clients in each computer lab have a reliable source of data management.
Remote Desktop (RD)	Having software or an operating system that allows users to connect remote devices to the medical center's network does not sound like an ideal plan since most work and data, especially involving patients, should not be outside of the medical center on someone's personal device.
File Server role	Requested by the medical center as a method of data storage for all PC clients. File servers are in each computer lab and are a part of the Internet Information Server.
Print and Document Services role	Printers were requested for each computer lab. The file servers from IIS will be a method for managing documents in the medical center.

Task 4:



Task 5:

To provide valuable security for the medical center's network, it would be beneficial to hook up several additional hardware devices to at least one of the four units. One of these hardware tools includes a firewall so that malicious traffic from outside sources are not received from any client in the network. Moreover, the network could also receive an upgrade to the DHCP server that includes a health registration authority server that is connected to an antivirus server and a patch management server, which helps evaluate all of the client PCs to see if they satisfy the medical

center's network, software, and hardware security requirements. Lastly, for devices that do not meet these conditions, a quarantine network could also be installed where PC clients may still have a connection, but are away from the network where the rest of the client PCs are on. With this measure, clients may become aware of the changes needed to the PCs in order to be given access to the official network, which will be a method to ensure that the technology being utilized is fully up-to-date, especially those involving security. All of these hardware implementations are likely to significantly lower the risk of malicious damage attacking the medical center's network.

Sources Used:

<https://www.educba.com/what-is-remote-desktop/>

<https://www.infoblox.com/glossary/dhcp-server/#:~:text=A%20DHCP%20Server%20is%20a,to%20broadcast%20queries%20by%20clients.>

<https://www.solarwinds.com/resources/it-glossary/iis-server/#:~:text=Internet%20Information%20Services%2C%20also%20known,as%20ASP.NET%20and%20PHP.>

https://www.techtarget.com/searchnetworking/definition/file-server?Offer=abMeterCharCount_v ar3

[https://www.techtarget.com/searchwindowsserver/definition/Microsoft-Active-Directory-Domain-Services-AD-DS#:~:text=Active%20Directory%20Domain%20Services%20\(AD%20DS\)%20is%20a%20server%20role,data%2C%20in%20a%20distributed%20database.](https://www.techtarget.com/searchwindowsserver/definition/Microsoft-Active-Directory-Domain-Services-AD-DS#:~:text=Active%20Directory%20Domain%20Services%20(AD%20DS)%20is%20a%20server%20role,data%2C%20in%20a%20distributed%20database.)