The network applications that are part of the current network are IP phones, corporate computers, server farm, and video conferencing. The reason IP phones, and video conferencing are network applications is because it provides a way to communicate in the network. The corporate computers allow a way for security, software applications, and sharing and saving resources (Invision, 2022) that benefit the Memphis and Dallas offices.

The main component for the physical layer though is connecting the key components through cabling like fiber optic or twisted pair cabling. The components of the network at the data link layer are Network Interface Cards for the computers and switches (Skillset, 2016) as these handle MAC addresses by sending frames. Next layer 3 network layer are the routers in the organizational network diagram, as these will send packets by IP addressing. Also, the firewall in the network layer could help by filtering packets. The transport layer is using TCP and UDP, but in this case it would be TCP because this is a business, and they want to make sure their data is not lost, damaged, or out of order. This transport layer fits with the servers as TCP needs a server to operate controlling data flow between applications (Infoblox, 2024). The servers would also operate in the session layer by helping with hosting the session, managing, and finally shutting down the session for applications, so that the employees of the business can use the applications. The server also helps with the application and presentation layers as the presentation layer the server helps by converting data from EBCDIC-coded text file to an ASCII-coded file according to (Singla, 2021). The application layer the server helps by web browsing, email, and file transfer to function properly according to (Imperva, 2021).

A basic description of the key components to a nontechnical audience of layer one, is how your data is connected to your network devices usually by fiber optic cabling or twisted pair cabling. The cabling converts digital data to electronic data, or in plain terms it describes the way devices (computers) are connected to one another (another computer). Next, the data link layer 2 of the OSI model is responsible for transferring data between devices in the same network (Staff, 2024). The switch in the network diagram is the component that completes this task, as it has a MAC address table of the local network that is connected to the ports on the device. Layer 3 of the OSI model helps find how to move data from your network to the destination network by finding the best path to do that. The router would be the device needed to complete this task in the network diagram. The firewall also functions at this layer because it can filter these packets based on rules of IP addresses. The servers in the network diagram provide hosting capabilities so that applications can be used, and information can be secured safely in a database. The servers help set up and connect with clients or end users on their devices by making the applications public on the internet. The servers then have to make data usable for the application layer by converting EBCDIC-coded text file to an ASCII-coded file. This makes the format and graphics for the application layer that end users can understand. The servers also give encryption so that data on the servers is safe from hackers. In the last layer the servers help by web hosting the applications so that the end user can see the data. Load balancing is also another function at this layer that helps with making the application run faster and have better efficiency so that it doesn't take as long for servers to process the data in a timely manner (What is Application layer? - Definition from WhatIs.com, 2024).

The applications that would not be accessible if the router of Dallas office went down would be the HR, email, accounting, and payroll. These would not be available to the Memphis office if the router were to go down. For the Memphis office if the router were to go down it would be the billing and operations applications that would be inaccessible to the Dallas office.

The risk of having one switch or router within the Memphis office is a single point of failure. There is no backup to mitigate the situation until it is fixed. This means the business is losing money every second it is down. The applications for the Memphis employees and users would be inaccessible to Dallas employees and end users as well.

For firewalls in the current network, it should be router than firewall. This is so then the router can connect its computers to the outside world and access other networks (Sophos, 2024). The router is also there to provide an external connection point, to connect to other networks (Hossain, 2024). The firewall should have a router between it and the internet in the network diagram and in the Memphis network as well. As soon as the router connects to the other network the firewall will apply rules to the traffic such as protocols and IP addresses to see if it allows or denies the traffic.

To summarize the project requirements the 1st layer of the OSI model is how your devices are connected which is usually fiber optic or twisted pair cabling for sending and receiving bits. The next layer, the data link layer, is the switch that uses a MAC address table to send data to the specific devices in the local area network. The third layer is the network layer that uses a router to send packets to networks outside of the local area network for Memphis and Dallas offices. The fourth layer uses TCP for complete data transfers between host and end systems using servers. The fifth layer also uses servers to set up, manage, and tear down a session between computers. The sixth layer encrypts, and decrypts data done by the servers and helps data translation so that the application layer can format and graphic data correctly for the user to understand. The final layer is the application layer that the user can interact with through the application.

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