**3-2 Milestone One**

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IT 212: Intro to Computer Networks

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March 23, 2025

**Key Considerations:**

**Communications Media and Mode of Data Transport**

* The Fayetteville office must be able to support video teleconferencing, print jobs to other locations, and communicate with employees across other sites. This office will follow the structure of the Open Systems Interconnection (OSI) model to properly set up its network infrastructure. For the physical layer (layer 1) of the OSI model the new office should use fiber optic internet since it currently provides the fastest internet option. With fiber optic “the light signals are also not susceptible to interference or noise from other sources and less effected by attenuation” (CompTIA, n.d., section 2.1.6) will ensure a strong connection for the new office. The data link layer (layer 2) should allow the employees to connect to the network by wired connection or using Wi-Fi. For the transport (layer 4) of the OSI model, sending traffic to other host on a network, the new office should use a Virtual Private Network (VPN) to secure data being sent across networks to other locations such the print jobs sent to Albany. A VPN will also benefit employees working remotely trying to access the corporate network.

**Network Hardware Components**

* Router/Modem – Both works together as a combined unit. The modem will connect to the internet while the router connects multiple devices in the network and manages traffic.
* Switches – The office must use switches since “Gigabit Ethernet and faster can *only*be deployed using switches” (CompTIA, n.d., section 3.2.3).
* Access Points (AP) – The office should have Aps throughout the office at each workstation for employees to be able to connect to the network with wired connection.
* Fiber Optic Cable – The office should use multimode fiber (MMF) type of fiber optic cable because it uses less expensive optics and is less expensive to deploy than single mode fiber (SMF) with subscriber connectors (CompTIA, n.d., section 2.4.2).
* Power Management – The office must consider the power load and voltage to the circuits supplying power to a rack, server room, or network closet of the installed equipment and consider additional equipment for growth (CompTIA, n.d., section 2.5.3).

**LAN Topology – LAN Topologies**

* The topology “describes the physical or logical structure of the network in terms of nodes and links” (CompTIA, n.d., section 1.1.3). A star topology uses a central hub or switch as the central point, like the shape of a star. Another topology to use is a mesh topology. A mesh topology is often used with wide area networks (WAN) and connects only the more important devices. Another option is a ring topology, where each device is connected to multiple other devices in ring formation.

**LAN Topology – Strength and Weaknesses**

* The strength of having a star topology is that the central appliance makes it easier to manage or troubleshoot all traffic. Another strength, the star topology makes it easier to add or remove devices without affecting the whole network which is ideal for adding a new office. If a device fails it won’t affect the entire network unless the main central switch is at fault. However, a weakness is if the central switch does fail then the entire network is down. A mesh topology approach is considered “impractical” (CompTIA, n.d., section 1.1.5) and requires additional nodes. Using a ring topology, it can be difficult to locate an issue and troubleshoot which requires more complex management.

**LAN Topology – Optimal Support**

* The Fayetteville office LAN Topology should be star topology. In a star topology “each endpoint node is connected to a central forwarding appliance, such as a switch or router” (CompTIA, n.d., section 1.1.4). This will allow the central appliance to serve as the main point for communication and makes it easier to troubleshoot. For a company looking to grow and add new locations a star topology is the best choice.

**Reference**

CompTIA. (n.d.). *CertMaster Learn Network+: Exam N10-009*. CompTIA.