**Chapter 6 Problems and Exercises Tips**

**Problems & Exercises:**

**1) Using the following description, create a network diagram using Visio or another network diagramming tool (such as EdrawMax, SmartDraw, Lucidchart, or Creately). If you have never used Visio or a Visio alternative, consider viewing one or more online videos about how to use the diagramming tool to create a network diagram.**

**Create a diagram that includes the following elements. If using Visio, use Network and Peripherals shapes and the shapes search box to search for other needed shapes. The diagram should include the following:**

* **Five switches**
* **One access point**
* **One laptop**
* **Two tablets**
* **One smartphone**
* **One router**
* **Two servers**
* **One storage device**
* **One network printer**
* **Eight desktop PCs**
* **One scanner**
* **Four VoIP phones**
* **One Internet cloud**

**Specific Guidance:**

* **One of the switches should be labeled Backbone Switch, and each of the other four switches should have a single circuit that connects it directly to the Backbone Switch. The router should have a circuit that connects it to the Backbone; it should also have a link to the Internet cloud.**
* **The Wi-Fi access point (labeled Access Point) should have a circuit that connects it to one of the other four switches; this switch should be labeled PoE Switch. The smart phone, tablets, and laptop should be grouped near the labeled Access Point to depict this network segment as a Wi-Fi LAN.**
* **A labeled Email Server, Database Server, Network Printer, and Storage Device should be the only devices connected to a second switch that connects to the Backbone Switch. Each of these devices should have its own circuit to connect to this switch, which should be labeled Server Switch.**
* **Four PCs should connect to a third switch, labeled Employee LAN Switch, that connects to the Backbone Switch. Each PC should have its own circuit that connects it to the Employee LAN Switch. (Four total circuits should be shown.)**
* **Four PCs and four VoIP phones should connect to the fourth switch, labeled Administrative LAN Switch, which connects to the Backbone Server. Each PC should have a circuit that connects it to the switch. Each VoIP phone should also have a circuit that connects it to the switch.**
* **The labeled Scanner should directly connect to one of the desktop PCs. It *should not* directly connect to a switch.**

**Deliverable: The deliverable for this exercise is a network diagram that conforms to the specified requirements.**

**Tips for Success**: This exercise enables you to apply what you have learned about the physical deployment of wired LANs and backbone networks in Chapter 6. Section 6.5 and Figures 6-28, 6-29, and 6-32 are especially relevant. You are encouraged to place the Backbone Switch. In the middle upper third of the diagram and to place the router above the Backbone Switch; the Internet cloud can be placed above the router. Consider placing the PoE switch to the left of the Backbone Switch and placing the Access Point and the mobile devices connect to it to the left of the PoE switch. The Server Switch might be placed to the right of the Backbone Switch. The Employee LAN switch might be placed below the PoE Switch and the Administrative LAN switch might be placed below the Server Switch in your diagram. Be sure to include all specified wired connections (circuits) and to include labels for all devices. Your instructor is likely to deduct points for late submissions, missing components, missing labels, and missing wired connections.

**2) AgSouth is renovating a warehouse in downtown Statesboro, GA, to expand the campus of its southeastern headquarters. A telecommunications closet will be included in the new space, which will house an equipment rack for the building’s backbone network. The equipment rack will include four 24-port 10/100/1000 Ethernet switches, a building distribution switch, and a router. The building distribution switch will connect to a core layer switch located in another building on the campus via an underground fiber optic cable.**

**A) Use Visio or another network diagramming tool to develop a logical diagram for the backbone network. (Your diagram may resemble Figure 6-28a but with fewer switches.)**

* 1. **Include a title on your diagram: e.g., “Building Backbone Network for AgSouth.”**
  2. **Label each access-layer switch “24-port 10/100/100BASE-T Ethernet Switch.”**
  3. **Label the building distribution switch “Gigabit Ethernet Backbone Switch.”**

**Part A Tips for Success**: This exercise enables you to apply what you have learned about switched backbone networks in Chapter 6. Figures 6-28, 6-29, and 6-30 are especially relevant. Your diagram can be relatively simple and uncluttered because it only illustrates the deployment of one distribution layer switch and four access layer (wired LAN) switches. Be sure to include the specified title on your diagram, appropriately label each switch, include the router, and illustrate the fiber optic connection to the core layer switch. Your instructor is likely to deduct points for late submissions, missing components, and missing labels.

**B) Use cdw.com or another data communications equipment vendor to identify a switch to use as the building distribution switch. On your diagram or in a separate Word file, identify the make, model, and price of the switch you are recommending as the backbone switch.**

1. **The backbone switch must be a *managed* switch.**
2. **The backbone switch *must be* rack mountable. It should not be a chassis switch or a chassis blade.**
3. **The backbone switch should have a limited number of ports, ideally no less than 12 ports and no more than 16.**
4. **The backbone switch you recommend should have at least two 10 Gbps uplinks; at least one of them should be a 1000Base-X SFP interface for a fiber connection.**
5. **The backbone switch you recommend should support Layer 3 routing and VLANs.**
6. **You should provide a clickable link to the switch vendor’s web page that identifies the switch’s specifications.**

**Part B Tips for Success**: This part of the exercise provides insights into the marketplace for network switches. You need to identify a switch from an online vendor that meets the specified requirements that could be used as the backbone switch at AgSouth. You will see that switches are commodities with specifications that include multiple references to networking standards. The clickable link to the to the switch’s product page will be used by your instructor to ensure that the switch you are recommending is managed, rack mountable, supports VLANs, has fiber uplinks, and a limited number of ports. Your instructor is likely to deduct points for any of the specified requirements that are not met by your recommended switch.

**C) Use cdw.com or another data communications equipment vendor to identify a 24-port 10/100/1000BASE-T switch to use as a LAN switch. On your diagram or in a separate Word file, identify the make, model, and price of the 24-port Ethernet switch.**

1. **The access layer switch must be a 10/100/1000 *managed* switch.**
2. **The access layer switch must be *rack-mountable*; it should not be a chassis switch or a chassis blade.**
3. **The access layer switch must have 24 ports and at least one 1G uplink, ideally with a 1000Base-X SFP interface to support a fiber connection.**
4. **The access layer switch should support VLANs.**
5. **You should provide a clickable link to the switch vendor’s web page that identifies the switch’s specifications.**

**Part C Tips for Success**: Like Part B, the part of the exercise requires you to identify a switch from an online vendor that meets the specified requirements, and you need to provide a clickable link to the switch’s product page. Your instructor is likely to deduct points if the recommended switch lacks any of the required specifications.

**Deliverables: The deliverables for this exercise include a diagram of the building backbone network and clickable links to your recommended backbone switch and LAN switch.**