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* **Chapter 8: pg 229 - Question # 8 (was page#238 in 12th edition): In Figure 8.5, would the network still work if we removed the routers in each building and just had one core router? What would be the advantages and disadvantages of doing this?**

If we removed the routers in each building and just had one core router, it will become a switched backbones architecture.

The primary advantage of the routed backbone is that it clearly segments each part of the

network connected to the backbone. Each segment (usually a set of LANs or switched backbone) has its own subnet addresses that can be managed by a different network manager. Broadcast messages stay within each subnet and do not move to other parts of the network.

There are two primary disadvantages to routed backbones. First, the routers in the network

impose time delays. Routing takes more time than switching, so routed networks can sometimes be slower. Second, routers are more expensive and require more management than switches.

* **Chapter 8: pg 229 - Question # 10 (was page#238 in 12th edition): What are the key advantages and disadvantages among routed and switched backbones?**

**Routed backbones**

**Advantages**

* Clear segmentation of parts of the network connected to the backbone as each network has a subnet address and can be managed separately.

**Disadvantages**

* Slower performance as routing takes more time than bridging or switching.
* Management and/or software overhead costs due to need to establish subnet addressing and provide reconfiguration when computers are moved (or support dynamic addressing).

**Switched backbones**

**Advantages**

* Performance is improved. With the traditional backbone network, the backbone circuit was shared among many LANs; each had to take turns sending messages. With the collapsed backbone, each connection into the switch is a separate point-to-point circuit. The switch enables simultaneous access, so that several LANs can send messages to other LANs at the same time. Throughput is increased significantly, often by 200% to 600%, depending upon the number of attached LANs and the traffic pattern.
* Since there are far fewer networking devices in the network, this reduces costs and greatly simplifies network management. All the key backbone devices are in the same physical location, and all traffic must flow through the switch. If something goes wrong or if new cabling is needed, it can all be done in one place.
* Software reconfiguration replaces hardware reconfiguration.

**Disadvantages**

* Because data link layer addresses are used to move packets, there is more broadcast traffic flowing through the network and it is harder to isolate and separately manage the individually attached LANs. Layer 3 switches can use the network layer address, so future collapsed backbones built with layer 3 will not suffer from this problem.
* Collapsed backbones use more cable, and the cable must be run longer distances, which often means that fiber optic cables must be used.
* If the switch fails, so does the entire backbone network. If the reliability of the switch has the same reliability as the reliability of the routers, then there is less chance of an failure (because there are fewer devices to fail).
* **Chapter 9: pg 255 - Question # 6 (was page#266 in 12th edition): Compare and contrast ring architecture, star architecture, and mesh architecture.**

**Ring Topology:** This connects all of the computers on the LAN in one closed loop circuit, with each computer linked to the next one. Messages are passed around the ring in ONLY one direction, to each computer, in turn. Each device is connected directly to two other devices, one on either side of it.

**Star Topology:** This is where all devices are connected to a central hub. Star networks are relatively easy to install and manage, but bottlenecks can occur because all data must pass through the hub. central station routes messages to their proper destination. If the central station, or node, fails, the entire network fails.

**Mesh Topology:** In this example, any network node can communicate with any other network node. There are direct point-to-point connections among all computers.A mesh is one possible topology for a network backbone. For redundancy in the case of a circuit outage, a backbone is usually connected in a circular fashion so that if data can’t get to the next node because of an interruption, it can get there by flowing in the opposite direction.

* **Chapter 9: pg 255 - Question # 18 (was page#266 in 12th edition): How can you improve WAN performance?**

Improving the performance of WANs is handled in the same way as improving LAN performance. You begin by checking the devices in the network, by upgrading the circuits between the computers, and by changing the demand placed on the network. Below is the performance checklist for improving WANs.

* Increase Computer and Device Performance
* Upgrade devices
* Change to a more appropriate routing protocol (either static or dynamic)
* Increase Circuit Capacity
* Analyze message traffic and upgrade to faster circuits where needed
* Check error rates
* Reduce Network Demand
* Change user behavior
* Analyze network needs of all new systems
* Move data closer to users.
* **REFERENCES:**
* **ASSIGNMENT GRADING RUBRIC:**

**\*\*\* DO NOT REMOVE BELOW GRADING RUBRIC FROM YOUR SUBMISSION \*\*\***

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|  | **Grade** | **Qualities Demonstrated by the Assignment Submission** | **Grade Assigned** |
| **Content (70%)**  **Measures the quality of the content in the assignment** | A+ 🡺 100 | The content demonstrates exceptional understanding of all relevant subject matter and its inter-relationships. All major relevant issues are thoroughly covered, and all content is very focused and on-topic. There is no known way to improve the content, and there are absolutely no technical or coverage errors present. |  |
| A 🡺 96 | The content demonstrates exceptional understanding of all relevant subject matter and its inter-relationships. All major relevant issues are thoroughly covered, and all content is very focused and on-topic. At most one insignificant technical or coverage error may be present |
| A- 🡺 92 | The content demonstrates deep understanding of all relevant subject matter and its inter-relationships. All major relevant issues are covered, and all content is on-topic. |
| B+ 🡺 88 | The content demonstrates understanding of all relevant subject matter and its inter-relationships. Almost all major relevant issues are covered, and the content is at least reasonably on-topic. |
| B 🡺 85 | The content demonstrates understanding of most relevant subject matter and its inter-relationships. Almost all major relevant issues are covered, and all content is at least reasonably on-topic. |
| B- 🡺 82 | The content demonstrates moderate understanding of much relevant subject matter and its inter-relationships. There is reasonable coverage of major relevant issues, and the content is at least reasonably on-topic. |
| C+ 🡺 78 | The content demonstrates some understanding of relevant subject matter and its inter-relationships. Some major relevant issues are covered, and at least some content is on-topic. |
| C 🡺 75 | The content demonstrates understanding of a small portion of the relevant subject matter and its inter-relationships. Some major relevant issues are covered, and at least a small portion of the content is on-topic. |
| C- 🡺 72 | The content demonstrates little understanding of and insight into the relevant subject matter and its inter-relationships. A small portion of the major relevant issues are covered. The focus of the content may be off topic or on insubstantial or secondary topics |
| D 🡺 67 | The content demonstrates almost no understanding of or insight into the relevant subject matter and its inter-relationships. Almost none of the major relevant issues are covered, and the content may be almost entirely off-topic. |
| F 🡺 0 | The content demonstrates no understanding of or insight into the relevant subject matter and its inter-relationships. No major relevant issues are covered, and the content is entirely off-topic. |
| **Exposition (30%)**  **Measures how well the content is expressed** | A+ 🡺 100 | The presentation of all ideas and designs is exceptionally clear and persuasive; the entire submission is exceptionally organized. There is no known way to improve the clarity or organization of the submission. |  |
| A 🡺 96 | The presentation of all ideas and designs is exceptionally clear and persuasive; the entire submission is exceptionally organized. There may be at most one insignificant way to improve the clarity or organization of the submission. |
| A- 🡺 92 | The presentation of all ideas and designs is very clear and persuasive; the entire submission is very organized. |
| B+ 🡺 88 | The presentation of all ideas and designs is clear and persuasive; the entire submission is organized. |
| B 🡺 85 | The presentation of most ideas and designs is clear and persuasive; most of the submission is organized. |
| B- 🡺 82 | The presentation of most ideas and designs is generally clear; most of the submission is reasonably organized. |
| C+ 🡺 78 | Some parts of the submission are hard to understand; some parts are disorganized. |
| C 🡺 75 | About half of the submission is hard to understand; about half is disorganized. |
| C- 🡺 72 | Most parts of the submission are hard to understand; most parts are disorganized. |
| D 🡺 67 | Almost all of the submission is hard to understand and disorganized. |
| F 🡺 0 | The entire submission is hard to understand and disorganized. |
| **OVERALL GRADE:** | | |  |