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Mind Wide Open™

Lab 5.1.2 Designing and Creating a Redundant Network

Straight-through cable	▬▬▬▬▬▬▬▬
Serial cable	⟋
Console (Rollover)	••••••••••••••••••••
Crossover cable	▬ ▬ ▬ ▬ ▬ ▬ ▬ ▬ ▬
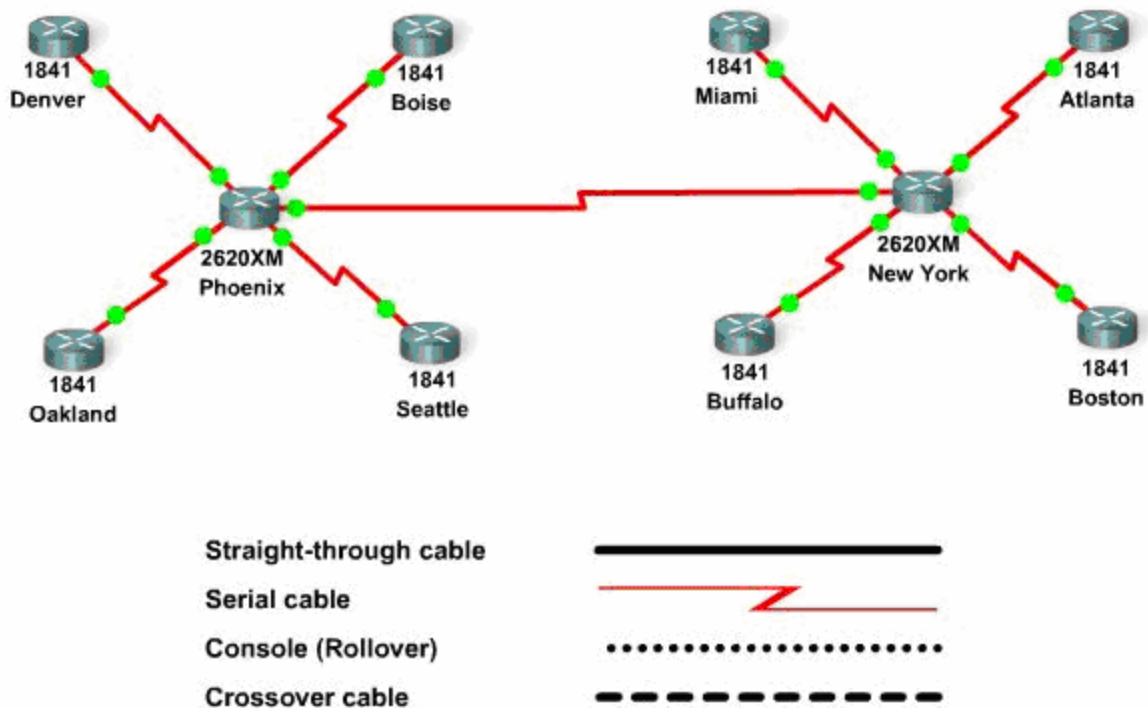
Objective

- Create an efficient and reliable network design with redundancy

Background / Preparation

Recently the New York router failed and the entire east coast operations lost 16 hours of production. The estimated cost of the outage was $600,000. The network engineering office has been provided additional money to create a more redundant network in an attempt to minimize future outages.

The head of design office has tasked you as the lead designer. With a budget of $5400 for monthly fees, you must meet the following design requirements.

- A minimum of three T-1 links must connect the east and west coast operations.
- Each router must have at least one 64 Kbps redundant link.
- Each router must also have at least two paths between the east and west coast operations.
- The failure of one device should not affect the connectivity of another site.

The east coast consist of the New York, Miami, Atlanta, Boston, and Buffalo routers, while the west coast consist of the Phoenix, Denver, Boise, Seattle, and Oakland routers.

Cost for new circuits:
$400 month – 64 Kbps circuit
$1900 month - 1.544 Mbps (T-1) circuit

Step 1: Determine the minimum number of links to meet the requirements

a. Identify the two links to meet requirement 1.

b. Determine the cost of those two links.

c. Identify the required links to meet requirement 2, 3, and 4.

d. Determine if the design is within budget.

Step 2: Implement the design

a. Using Packet Tracer, create the network including the redundant links specified in Step 1.

Step 3: Verify the design

a. Do three paths between the east and west coast operations exist?

b. Does each site have at least two links?

c. Does each site on the east coast have two paths to the west coast?

d. Does each site on the west coast have two paths to the east coast?

e. Will one device failure affect multiple sites?

Reflection

a. What network topology was implemented before adding redundancy?

b. What network topology is now implemented after adding redundancy?

c. What is an advantage to using the topology implemented after adding redundancy?

d. What is a disadvantage to using the topology implemented after redundancy was added?

e. Why would a company, such as the one in this case, suddenly decide to implement the type of topology used in step b?