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**CHINATAG**

70-221

Designing a Microsoft Windows 2000  
Network Infrastructure

Q&A

DEMO Version

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**Case Study No: 1****HANSON BROTHERS****Background**

Hanson Brothers is an international consulting firm that is based in Portland, Oregon. Hanson Brothers specializes in consulting services for US companies that want to establish business operations in foreign countries.

Hanson Brothers assists companies by analyzing the factors that influence their expansion into new geographical regions. Hanson Brothers also arranges for these companies to meet the government agencies that control the establishment of manufacturing facilities in their countries. In recent years, Hanson Brothers has expanded its business by offering its customers additional services such as housing procurement, recruiting and legal.

**Organization**

Hanson Brothers has 2500 employees in 20 countries. The Hanson Brothers Corporate headquarters is located in Portland, Oregon. Five regional headquarters oversee district offices.

The Portland office operates as the Hanson Brothers Corporate headquarters and as the North America regional headquarters. The North American region includes eight district offices.

- Atlanta, Georgia
- Chicago, Illinois
- Cincinnati, Ohio
- Denver, Colorado
- Los Angeles, California
- Montreal, Canada
- New York City, New York
- Washington, D.C

The Asian regional headquarters is located in Victoria, Hong Kong. The Asia region includes four district offices.

- Bangkok, Thailand
- Calcutta, India
- Hanoi, Vietnam
- Shanghai, China

The south Pacific regional headquarters is located in Sydney Australia. The south Pacific region includes three distinct offices.

- Auckland, New Zealand

- Manila, Philippines
- Singapore city, Singapore

The Europe regional headquarters is located in London, England. The Europe region includes three distinct offices.

- Brussels, Belgium
- Geneva, Switzerland
- Madrid, Spain

The Latin America headquarters is located in Buenos Aires, Argentina. The Latin America region includes four district offices.

- Bogota, Colombia
- Caracas Venezuela
- Mexico City, Mexico
- Sao Paulo, Brazil

### **Existing Environment**

Each North America office is connected to a frame relay network by means of a 56 Kbps circuit. A permanent virtual circuit (PVC) exists from each North America district office to the Portland Office. A 128 Kbps leased line connects the Portland Office to each regional headquarters. Each regional headquarters outside the United States connects to its district offices by means of a 256 kbps leased line. The Portland office is connected to the Internet by means of a T1 line to an Internet Service Provider (ISP)

Routers and DSU/CSU are installed at all company locations. Routers contain hardware from a variety of manufacturers. All routers are BOOTP enabled.

Hanson Brothers has the following client computers evenly distributed throughout its organization:

- 1000 Pentium III computers that are running Windows NT 4.0
- 1500 Pentium I computers that are running Microsoft Windows 95

One primary domain controller, one backup domain controller, and five file and print servers are located in the Portland office. The Portland office also contains two proxy servers, configured as an array, that provide Web cache services and Internet access control. A few locations throughout the company contain servers that provide Windows NT4 DHCP services.

A single Windows NT domain exists for email authentication and for Internet access control on the proxy array. Client computers throughout the company log on to the domain only when they need to access these services.

### **Interviews:**

**CEO:**

In the past four years, we have undergone rapid growth. For example, we have opened many new offices in through locations, and the number of employees in your company has tripled

**CIO:**

Our Corporate philosophy favors the centralized control of most business process. However, this philosophy is being shared by the company's rapid growth and expansion. We want to decentralize the administration of the network by creating three categories of administrators teams Enterprise, Regional and Site.

The Portland office will contain an enterprise, a regional and site administrator team. Each regional headquarters office will contain a regional and a site administrator team. Each district office will contain only site administrator.

Although Hanson Brothers has limited Internet presence, Internet resources play an important Role for the research company performs to its customers. Although our foreign offices have been reporting slow Internet performance, employees at the Portland Office report that Internet performance is more than acceptable.

In our company, we want to deploy several important web based applications. This deployment requires the creation of internal Web sites. All intranet Web servers will be located in Portland Office. One of these Web based applications concern all human resources files in a single location that users can view through their browser. These files are created and updated regularly by the human resources directors in each regional headquarters. These directors will need local access to their files, and the Internet server will need local access to the human resources files created and updated in these locations.

Because the links to the regional headquarters outside the United States are very expensive, the bandwidth must be used wisely. We want to minimize increase in costs for WAN connectivity wherever possible.

We want to immediately upgrade all Windows NT4 client computers to Windows 2000 professional. We will not upgrade the existing Microsoft Windows 95 client computers. We will replace them over the next two years with new computers running Windows 2000 Professional

**Security Manager:**

Currently the Portland Office has an Internet connection that is secured with a firewall. The firewall is running network address translation (NAT). My security team is located in the Portland office, and all extranet connections will be located in this office.

**Active Directory Design Team Leader:**

For our Active Directory design, we will use a model containing a single forest with a single tree that has multiple domains. Each domain will contain one regional headquarters and all of its district offices. The domain will use the following names:

- Asia
- Europe

- LAmerica
- NAmerica
- SPacific

A new parent domain named Corp will also be created to hold the enterprise administrator team accounts and the forest level accounts

We will use Active Directory namespaces that are contiguous with the existing registered domain name. All DHCP servers will reside on member servers, and the DNS zones should be configured to run in a multi-master mode. The security team will configure the firewall so that no Active directory DNS server will have access to the internet. Each regional headquarters will contain a domain controller that is configured as a replication bridgehead server. Each regional administrator team will manage all DHCP servers in its region regardless of the servers physical location.

### **Network Administrator**

Currently, all routers are configured by using static routes. However, as our company expands, static routing is becoming increasingly inefficient.

We have a lot of downtime with the old system, and redundancy is extremely important to us. We have several applications that all offices within a region use. We want to give the regional administrators the ability to manage these installation packages. An administrator also needs the ability to publish these applications so that they can be installed the first time they are used. Although some of the installation packages are large, we want the quickest installation possible.

Almost all users will require access to the Internet so that they can browse the web. However, only a few users will need access to FTP. The users in a region visit many of the same company and government web sites as other users in their region.

Hanson Brothers has a registered DNS namespace of hansbrothers.com. This namespace is held by a Unix server in the Corporate office that is running BIND version 4.8.3. This server will not be upgraded.

All client computers in the company must register with DNS. Client computers will access other client computers in share printers. All administrator client computers will run Windows 2000. All servers will run Windows 2000

# Questions Hanson Brothers

## Q. 1

**You need to provide Hanson Brothers with a highly available DNS design. What should you do?**

- A. Create primary DNS zones for the Asia, Europe, LAmerica and SPacific zones on the DNS servers in the Corp domain
- B. Create a primary DNS zone in each domain. Configure the DNS servers in the Asia, Europe, LAmerica, NAmerica, and SPacific domains as forwarded to each other.
- C. Create a primary DNS zone in each domain as forwarders to the Asia, Europe, LAmerica, North America and SPacific domains.
- D. Create a primary DNS zone in each domain. Create secondary DNS zones for the Corp zone on the DNS servers in the Asia, Europe, LAmerica, NAmerica and SPacific domains.

**Answer: D.**

**Explanation:** In this scenario a primary DNS zone for Corp is created at the DNS server in the Corp domain, and a secondary DNS zone is created for the Corp zone at DNS servers in each of the Asia, Europe, LAmerica, NAmerica and SPacific domains. This will allow all clients in the domains to resolve names in the Corp zone. Name resolution will be localized within the regional domains. As the primary DNS zone has been created in every regional domain, name resolution within a domain will be localized within that domain. The WAN links would therefore not be used for name resolution since all DNS queries will be resolved within each domain.

**Incorrect answers:**

- A:** If all primary DNS zones for all domains were created on the DNS server at the central Corp domain, then all name resolution would have to cross WAN links as each regional domain would need to access the central DNS server for name resolution. This would require a lot of bandwidth.
- B:** All domains must be able to use resources in the central Corp domain. A secondary zone for the Corp domain must be created on the DNS servers at Asia, Europe, LAmerica, NAmerica, and SPacific domains. If not they would not be able to resolve names of Corp domain.
- C:** There must be a DNS zone for the central Corp domain.

## Q. 2

**You need to create the DNS namespace design. Move the appropriate DNS namespaces to the appropriate company domains.**

**(Use only namespaces that apply. Use namespaces only once)**

You need to create the DNS namespace design. Move the appropriate DNS namespaces to the appropriate company domains.  
 (Use only namespaces that apply. Use namespaces only once.)

Domains	Namespace
<p><b>Collapse</b></p> <ul style="list-style-type: none"> <li>■ Corp</li> <li>■ NAmerica</li> <li>■ LAmerica</li> </ul>	<ul style="list-style-type: none"> <li>corp.hansonbrothers.com</li> <li>hansonbrothers.com</li> <li>lamerica.corp.hansonbrothers.com</li> <li>lamerica.hansonbrothers.com</li> <li>lamerica.namerica.hansonbrothers.com</li> <li>lamerica.namerica.corp.hansonbrothers.com</li> <li>namerica.corp.hansonbrothers.com</li> <li>namerica.hansonbrothers.com</li> </ul>
<p>&lt;&lt;Move</p> <p>Remove&gt;&gt;</p>	

You need to create the DNS namespace design. Move the appropriate DNS namespaces to the appropriate company domains.  
 (Use only namespaces that apply. Use namespaces only once.)

Domains	Namespace
<p><b>Collapse</b></p> <ul style="list-style-type: none"> <li>■ Corp                             <ul style="list-style-type: none"> <li>● corp.hansonbrothers.com</li> </ul> </li> <li>■ NAmerica                             <ul style="list-style-type: none"> <li>● namerica.corp.hansonbrothers.com</li> </ul> </li> <li>■ LAmerica                             <ul style="list-style-type: none"> <li>● lamerica.corp.hansonbrothers.com</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>corp.hansonbrothers.com</li> <li>hansonbrothers.com</li> <li>lamerica.corp.hansonbrothers.com</li> <li>lamerica.hansonbrothers.com</li> <li>lamerica.namerica.hansonbrothers.com</li> <li>lamerica.namerica.corp.hansonbrothers.com</li> <li>namerica.corp.hansonbrothers.com</li> <li>namerica.hansonbrothers.com</li> </ul>
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**Explanation:**

From the scenario we know:

- Hanson Brothers has a registered DNS namespace of hansonbrothers.com. This namespace is held by a Unix server in the corporate office that is running BIND version 4.8.3. This server will not be upgraded.
- A new parent domain named Corp will be created.
- Hanson brother will use Active Directory namespaces that are contiguous with the existing registered domain name.

These restrictions force us to use the corp.hansonbrothers.com DNS namespace at the Corp domain.

The DNS name space is contiguous so the domain names of the child domains of Corp domain must be added the corp.hansonbrothers.com domain name.

The namerica.corp.hansonbrothers.com namespace must be used in the NAmerica domain.

The lamerica.corp.hansonbrothers.com namespace must be used in the LAmerica domain.

**Incorrect answers:****hansonbrother.com:**

It cannot be used since the new parent Corp domain has been created.

Use Corp.hansonbrothers.com domain at the Corp domain.

**lamerica.hansonbrothers.com, namerica.hansonbrothers.com:**

These cannot be used since the root domain Corp must use the domain name space corp.hansonbrothers.com and LAmerica and Namerica are child domains of this domain in a contiguous DNS name space.

**Q. 3**

**What should you do to improve Internet connectivity for Hanson Brothers?**

- Configure all client computers to use existing proxy server in the Portland Office.
- Configure an Internet connection in each regional headquarters.
- Place a proxy server in each regional headquarter outside the United States.
- Increase the bandwidth between the Portland office and each regional headquarters. Increase the bandwidth to the Internet service provider (ISP)

**Answer: C.**

**Explanation:** Bandwidth must be used wisely to save money. That is why a centralized Internet connection is preferred at Hanson Brothers. By placing proxy servers locally in the regional headquarters outside the United States, bandwidth would be saved through caching. It would also provide Internet access, security, and monitoring capabilities.

**Incorrect answers:**

- A:** A centralized proxy server solution would create too much WAN traffic.
- B:** Hanson Brothers wants a centralized Internet connection solution because the links to the regional headquarters outside the United States are very expensive.
- D:** Hanson Brothers wants to minimize increase in costs for WAN connectivity wherever possible, therefore increasing bandwidth is not a preferred solution.

**Q. 4**

**How should you design the name registration strategy for Hanson brothers?**

**(Choose all that apply)**

- A. Configure all servers to register with WINS and DNS.
- B. Configure all client computers to register directly with DNS.
- C. Configure DHCP servers to register the A (host) records for Windows 2000 client computers with DNS.
- D. Configure all servers to register only with DNS.
- E. Configure DHCP servers to register the A (host) records for non Windows 2000 client computers with DNS.
- F. Configure all client computers to register with WINS.
- G. Configure only non Windows 2000 client computers to register with WINS.

**Answer: A, E, F.**

**Explanation:**

- A:** The down-level clients, Windows 95 and Windows NT 4.0 computers, require a WINS server for name resolution while the Windows 2000 computers require DNS for name resolution. All servers should register themselves with both the WINS server and DNS server so that the clients are able to access them by name.
- E:** The DHCP servers must be configured to register the A (host) records for non Windows 2000 client computers with DNS, since they are unable to do it themselves, contrary to the Windows 2000 clients.

**Incorrect answers:**

- B:** The down-level Windows 95 and Windows NT 4.0 computers are not able to register themselves directly in DNS. The DHCP servers must be configured to register the A (host) records for them with DNS.
- C:** It is not necessary for the DHCP server to register A (host) records for the Windows 2000 clients as they are able to do it themselves
- D:** We need to register the servers in WINS as well as we have down-level clients (Windows 95/Windows NT 4.0), cannot use DNS for name to IP resolution and therefore require a WINS server for this purpose.
- G:** If only non-Windows 2000 client computers register with WINS, the downlevel clients would only be able to access other downlevel clients, not any Windows 2000 computers, since downlevel clients use WINS for name resolution.

**Q. 5**

**Which change should you make to the existing WAN for the North America region before implementing the new network?**

- A. Install fully meshed site-to-site leased lines between all North America offices.
- B. Increase the circuit bandwidth at the Los Angeles, Montreal, New York city and Washington DC, district offices.
- C. Create a permanent virtual circuit (PVC) from each office to all other offices.
- D. Increase the circuit bandwidth at the Portland Office.

**Answer: D.**

**Explanation:** Hanson Brothers have to increase the bandwidth, since they are going to implement a new domain structure and Active Directory. Active Directory in particular would increase network bandwidth usage.

It would be less expensive to increase the bandwidth on only one location, and the logical choice would be the central Office in Portland.

**Incorrect answers:**

- A:** A fully meshed site-to-site leased line between all North American offices would provide excellent network bandwidth, but the cost would be tremendous. One requirement is that the increased cost for WAN connectivity would be minimized whenever possible.
- B:** Increasing the circuit bandwidth at the Los Angeles, Montreal, New York city and Washington DC, district offices would not be the most cost effective solution. It is better to increase the bandwidth only at the central Portland Office.
- C:** A permanent virtual circuit (PVC) exists from each North America district office to the Portland Office already exists. Adding PVCs between all offices would be a small improvement with a high cost.

**Q. 6**

**How should you implement DHCP for the district offices in the Europe region?**

- A. In each district office, deploy a DHCP server that has one scope for the local subnet with 20 percent of addresses excluded.  
In the regional headquarters, deploy a DHCP server that has one scope for each district office with 80 percent of the address excluded.
- B. In the regional headquarters, deploy a DHCP server that has one scope for each district office
- C. In each office in the region, deploy a DHCP server that has one scope for the local subnet.
- D. In each district office, deploy a DHCP server that has one scope for the local subnet with 20 percent of the address excluded.  
In the Corporate headquarters, deploy a DHCP server that has one scope for each district office with 80 percent of the addresses excluded.

**Answer: A.**

**Explanation:** The 80/20 rule is used to split the scope to provide redundancy. The DHCP servers placed locally at the district offices should have a local scope with 20 percent of the addresses excluded. The DHCP servers placed more centrally at the regional headquarters have one scope for each district office, and 80 percent of the addresses excluded.

Redundancy refers to ensuring that the network still operates properly even if a server becomes unavailable.

Most of the clients would receive IP configuration from the local DHCP server and thus saving network bandwidth.

**Incorrect answers:**

- B:** A single DHCP server at the regional office configured with scopes for each district office, would neither provide redundancy in case of failure, nor would it minimize network bandwidth; IP configuration traffic would cross the WAN links between the district and regional offices.
- C:** By deploying a DHCP server locally in each region, DHCP traffic would be minimized but there would not be any redundancy in case of failure of a DHCP server.
- D:** This solution is opposite. Most clients would get their IP configuration from the central DHCP server at the regional office. It is better exclude few (20%) IP addresses from the scopes of the local DHCP servers, and to exclude many (80%) from the scopes of the central DHCP server at the regional office.

**Q. 7**

**You need to create the DNS deployment strategy for the SPacific domain. Move the appropriate deployment tasks to the location or locations where the tasks will be performed. (Use only deployment tasks that apply. You might need to reuse deployment tasks)**

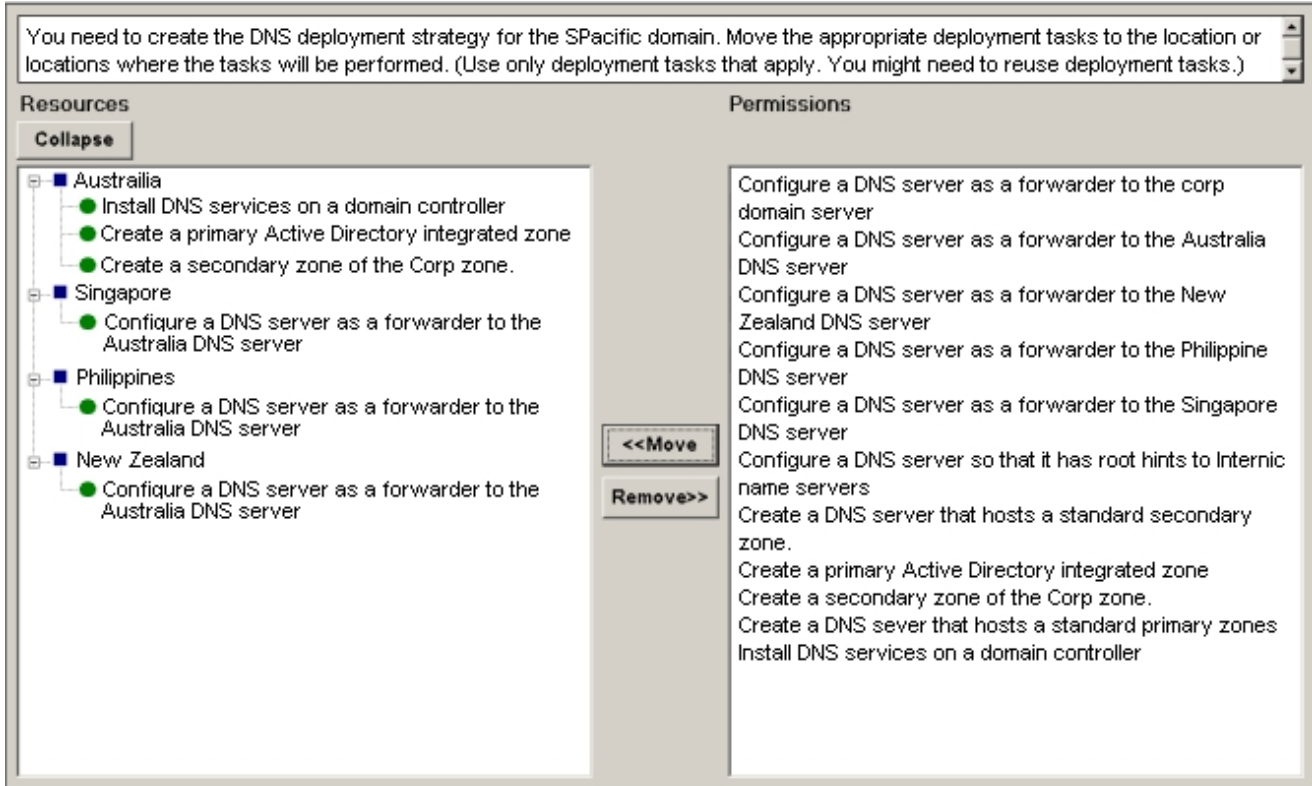
You need to create the DNS deployment strategy for the SPacific domain. Move the appropriate deployment tasks to the location or locations where the tasks will be performed. (Use only deployment tasks that apply. You might need to reuse deployment tasks.)

Locations	Tasks
<p><b>Collapse</b></p> <ul style="list-style-type: none"><li>■ Australia</li><li>■ Singapore</li><li>■ Philippines</li><li>■ New Zealand</li></ul>	<ul style="list-style-type: none"><li>Configure a DNS server as a forwarder to the corp domain server</li><li>Configure a DNS server as a forwarder to the Australia DNS server</li><li>Configure a DNS server as a forwarder to the New Zealand DNS server</li><li>Configure a DNS server as a forwarder to the Philippine DNS server</li><li>Configure a DNS server as a forwarder to the Singapore DNS server</li><li>Configure a DNS server so that it has root hints to Internic name servers</li><li>Create a DNS server that hosts a standard secondary zone.</li><li>Create a primary Active Directory integrated zone</li><li>Create a secondary zone of the Corp zone.</li><li>Create a DNS sever that hosts a standard primary zones</li><li>Install DNS services on a domain controller</li></ul>

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**Answer:**



**Explanation:**

Australia

*Create a primary Active Directory integrated zone:*

Hanson brothers has a requirement that DNS zones should be configured to run in a multi-master mode. Multi-master mode requires an Active Directory integrated zone.

*Create a secondary zone of the Corp zone:*

A secondary zone of the Corp zone would provide redundancy and it would also improve performance by decreasing name resolution traffic on the WAN links.

*Install DNS services on a domain controller:*

Since an Active Directory integrated zone should be used, DNS has to be installed on a Domain controller.

*Singapore, Philippines, New Zealand:*

Configure a DNS server as a forwarder to the Australia DNS server

No DNS server is installed at the local office. Instead the regional Australia DNS server is used for name resolutions. The Australia DNS server is authoritative for the zone.

**Q. 8**

**You need to provide a secure DHCP design that will minimize the risk of unauthorized DHCP servers appearing on the network. What should you do? (Choose all that apply)**

- A. Place all members of the Regional Administrator team into the DHCP Administrators group.
- B. Move the DHCP service from member servers to domain controllers.
- C. Place a DHCP relay agent on each DHCP server to propagate DHCPINFORM messages.
- D. Replace all Windows NT4 DHCP servers with Windows 2000 DHCP servers.
- E. Place all users into the DHCP Users group.

**Answer: A, D.**

**Explanation:** A: It is a requirement from the Active Directory Design Team leader that each regional administrator team will manage all DHCP servers in its region regardless of the server's physical location. By placing all members of the Regional Administrator team into the DHCP Administrators group this will be achieved.

**Note:** The DHCP Administrators group provides a way to grant limited administrative access to the DHCP server only, while not providing full access to the server computer. Other users or groups added as members of this group are granted the right to fully administer the applicable server in the DHCP console, but are not able to perform other administrative actions on the server computer.

**D:** Windows 2000 DHCP servers are safer than Windows NT 4.0 DHCP servers. Windows 2000 provides unauthorized DHCP server detection. This prevents unauthorized DHCP servers from joining an existing DHCP network in which Windows 2000 Server and Active Directory are deployed.

**Incorrect answers:**

- B:** This would decrease security. It is more secure to run the DHCP server on a member server compared to running it on a Windows 2000 Domain Controller. It is also a requirement from Hanson Brothers that all DHCP servers should reside on member servers.
- C:** All routers are already BOOTP enabled. That is they will allow all DHCP traffic to pass. DHCP Relay agents are therefore unnecessary
- E:** Placing all users in DHCP users group would provide all users with read access of the DHCP database. This would neither be good for security nor would it provide the regional administrator team ability to administer the DHCP servers.

**Note:** DHCP Setup automatically adds a special-purpose local users group, called the DHCP Users group, when DHCP is installed. Users belonging to this local group have read-only access to the local DHCP database and information via the DHCP console.

**Q.9**

You need to assign management and monitoring tasks to the administrator teams. Move each task to the administrator team that should perform it?  
(Use all tasks, use tasks only once)

Teams	Tasks
<p><b>Collapse</b></p>	
<ul style="list-style-type: none"><li><input checked="" type="checkbox"/> Enterprise administrator team</li><li><input checked="" type="checkbox"/> Regional administrator team</li><li><input checked="" type="checkbox"/> Site administrator team</li></ul>	<ul style="list-style-type: none"><li>Authorize DHCP servers</li><li>Change user passwords</li><li>Configure DNS server settings</li><li>Configure password policy</li><li>Manage Active Directory replication schedule</li><li>Manage WINS replication</li><li>Modify schema</li><li>Monitor event logs on individual servers</li><li>Provide end-user support</li></ul>
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**Answer:**

You need to assign management and monitoring tasks to the administrator teams. Move each task to the administrator team that should perform it?  
 (Use all tasks, use tasks only once)

Teams	Tasks
<input type="button" value="Collapse"/>	
<ul style="list-style-type: none"> <li>■ Enterprise administrator team                             <ul style="list-style-type: none"> <li>Authorize DHCP servers</li> <li>Configure password policy</li> <li>Modify schema</li> </ul> </li> <li>■ Regional administrator team                             <ul style="list-style-type: none"> <li>Manage WINS replication</li> <li>Manage Active Directory replication schedule</li> <li>Configure DNS server settings</li> </ul> </li> <li>■ Site administrator team                             <ul style="list-style-type: none"> <li>Monitor event logs on individual servers</li> <li>Change user passwords</li> <li>Provide end-user support</li> </ul> </li> </ul>	<div style="text-align: center;"> <input type="button" value=" &lt;&lt;Move"/>   <input type="button" value=" Remove &gt;&gt;"/> </div>

**Enterprise:**

*Authorize DHCP servers:*

Only Enterprise Administrators would be able to Authorize the DHCP servers in the domain.

*Configure password policy:*

Password policies should be configured at the Domain level so a consistent policy would be applied throughout the domain..

*Modify schema:*

Modify schema should be done at the most central point.

**Regional administrator teams:**

*Manage WINS replication, Manage Active Directory replication scheduling*

WINS and Active Directory replication is distributed throughout the network and should be delegated to reduce the work load on the Enterprise administrator team.

*Configure DNS server settings:*

Will have primary DNS servers for each domain at regional level so DNS must be managed regionally.

**Site:**

Monitor event logs on individual servers

Monitoring of individual servers is done locally at the site level.

Change user password:

Password changes should be done by personal close to user at the site level.

Provide end user support

End user support is provided at the site level.

#### Q. 10

**Hanson Brothers needs to accommodate the Human Resources intranet application in the new network. What should you do?**

- A. In the Portland Office, deploy a distributed file system (Dfs) root server that has a child node for each region, In each regional headquarters, deploy a Dfs replica server that corresponds to the child node for that region
- B. In each regional headquarters, deploy a distributed file system (Dfs) root server that has a human Resources child node. In the Portland Office, deploy a Dfs replica server.
- C. In the Portland Office, deploy a distributed file system (Dfs) root server. In each regional headquarters, deploy a child node.
- D. In each regional headquarters, deploy a distributed file system (Dfs) root server. In the Portland office, deploy a child node.

**Answer: A.**

**Explanation:** The DFS root server should be deployed centrally at the Portland Office. Deploy the child nodes for each region centrally as well. In each region a DFS replica server, corresponding to the child node for that region, is deployed.

This DFS hierarchy will be consistent across the entire company, and the web servers located at Portland will be able to access the local Human Resource files from each region.

**Incorrect answers:**

- B:** The structure must be top-down, not bottom up. There is consistent DFS hierarchy.
- C:** The child nodes must be set up on the root server, not only in the regions. DFS replica servers are needed as well.
- D:** There should be only one DFS root server, not one in each regional headquarters, to provide for a consistent hierarchy across the company.

## Case Study 2

# BLUE SKY AIRLINES

### **Background**

Blue Sky Airlines serves destinations to four airports: Boston, Massachusetts, Chicago, Illinois, New York City, New York and Philadelphia, Pennsylvania. The company headquarters is located in Boston three miles from the airport.

Blue Sky Airlines has announced an expansion of its services to four more airports: Atlanta, Georgia, Cincinnati, Ohio, Dallas, Texas and Washington, DC.

### **Organization**

Blue Sky Airlines employs more than 400 personnel. Approximately 220 of these employees work at Boston headquarters

Employees in the Boston headquarters are using 486 or Pentium class client computers that are connected to a single Windows NT 4 domain; Company headquarters are using 486 or Pentium class client computers that are connected to a single Windows NT 4.0 domain. Company headquarters contains a data center and an IT department

Blue Sky Airlines currently serves four airports and has approximately 20 employees who work on site at each airport. At each airport, one of these employees functions as a liaison to the IT department and can perform minor tasks at the direction of the Corporate IT personnel. Blue Sky Airlines also employs more than 100 flight personnel

### **Existing IT environment**

#### **Airports:**

All airports will have a ticket counter and five gates. The following equipment will be dynamically assigned a TCP/IP address and will be located in each airport.

- 10 ticket counter machines
- 10 gate counter machines
- 10 ticket printers

At any given time, no more than five users at each airport will be using the ticketing and reservation application

The airport in Atlanta, Boston, Chicago and Washington DC will contain a passenger lounge. A maximum of 10 ticketed passengers can connect their portable computers to the passenger lounge LAN and gain access

to the Internet through the Boston Headquarters. All passenger lounges will be part of a single, bridged VLAN named Red

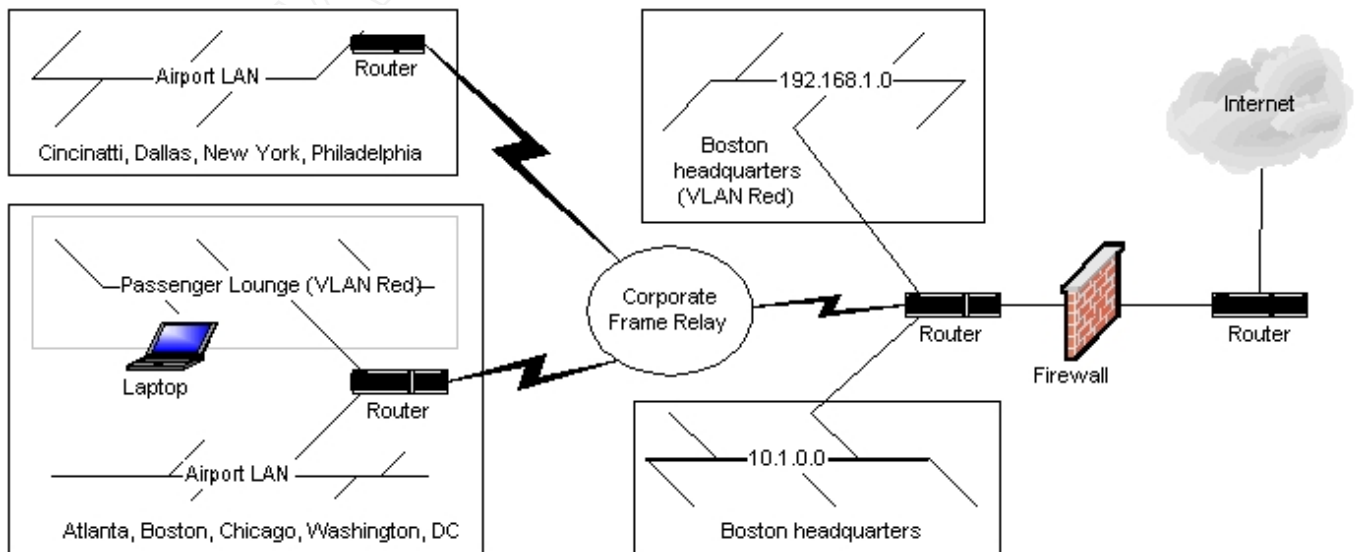
Passengers will be able to use all TCP/IP protocols without having to make any changes to their portable computers as long as the computers are using DHCP. Additionally, each passenger lounge will contain one kiosk computer so that passengers without portable computers can access the same Web based flight information and reservation application that Internet users can access.

**WAN Connectivity:**

Blue Sky Airlines want to migrate from the existing 56 Kbps point to point SNA circuits to a frame relay network that will connect all airports to the Boston headquarters.

At each airport containing a passenger lounge, Blue Sky Airlines will install a BOOTP capable router that is configured with four interfaces: two Ethernet interfaces, one ISDN interface, and one interface that connects to the frame relay network. Company employees will connect to the corporate WAN by means of Ethernet interface 1. Customers in the passenger lounges will connect to the Internet by means of Ethernet interface 2. All devices on the network that are connected to Ethernet interface 2 will be assigned to VLAN red.

Blue Sky Airlines will install a BOOTP capable router that is configured with five interfaces in the Boston headquarters. This router will have three Ethernet interfaces, one Primary Rate Interface (PRI) and one interface that connects to the frame relay network. Ethernet interface 1 will connect to the corporate LAN and have a network address of 10.1.0.0/16. Ethernet interface 2 will connect to a hub and all devices on this LAN will be assigned to VLAN Red. This network will have a network address of 192.168.1.0 /24. Ethernet interface 3 will be connected to a firewall for access to the Internet. All private corporate resources will be assigned addresses in the 10.0.0.0 address space. Routers will not allow any traffic to pass between the two LANs at corporate headquarters.



**Applications and Services:**

Blue Sky Airlines wants to migrate from the existing mainframe ticketing and reservation application to a new two-tier application. The user interface will only run on Windows 2000 and will connect to a SQL database. This SQL database must provide high availability and performance. The company also wants to develop two Web applications that will use the information in this SQL database. The first Web application will enable the public to make reservations, purchase tickets, and confirm flight information. The second Web application will enable only flight personnel to check and exchange their scheduled flights.

To support these new applications, two servers running Microsoft SQL Server, two servers running Terminal Services, and two servers running Internet Information Services (IIS) will be deployed in Boston. All pilots will be issued portable computers running Windows 2000 and configured with smart cards readers. Pilots will need access to a confidential section of the intranet Web server. Only the pilots will need strong encryption to access this section of the Web Server.

**Bandwidth Requirements:**

Blue Sky Airlines has done some testing of the new ticketing and reservation application and estimates the following bandwidth requirements

Blue Sky Airlines has done some testing of the new ticketing and reservation application and estimates the following bandwidth requirements:

- Client application to Microsoft SQL Server: 30 Kbps
- Terminal session running the client application: 10 Kbps
- Client application to a ticket printer: 15 Kbps

Blue Sky airlines wants to provide enough bandwidth in the passenger lounges so that while one user is using 128 Kbps streaming video, all other users still have 56 Kbps of shared bandwidth to browse the internet. The connection from the Boston headquarters to the frame relay network should be 75 percent of the total minimum required bandwidth for all other company locations.

**Interviews:****Chief Information Officer (CIO)**

The existing mainframe based ticketing and reservation application makes the IT environment in the airports simple and easy to maintain. The complexity of the airport environments must remain as low as possible.

I want to keep our existing centralized IT model in place. For this reason, as many services as possible should be located in the Boston headquarters. If possible, we need to standardize the equipment in each airport so that even an untrained IT liaison will be able to replace the client devices with minimal configuration.

We also need to give our flight personnel the ability to view and modify their flight schedules from their homes or from portable computers in their hotel rooms.

**Network Administrator:**

Users at the Boston headquarters have multiple drives mapped to several shared folders. Because drives are mapped inconsistently, it is extremely difficult for users to find and browse information. We want to restructure how users find information and prevent them from being able to view the existing shared folders in Network Neighborhood. We want all users to be able to connect to a single shared folder by means of the path \\domain\public.

**Project Manager:**

I have created the following project plan for the testing of and migration to the new ticketing and reservation application

*Phase I: Complete proof of concept for reservation application migration.*

1. Deploy Windows 2000 on client computers in the Boston headquarters.
2. Deploy Terminal Services.
3. Install the emulator application.
4. Make a copy of the existing mainframe database and import the copy into the new SQL database.
5. Test applications.

*Acceptance criteria:* From a terminal session, users will be able to use the existing mainframe application and will be able to run the new two-tier application client and access the SQL database.

*Phase II: Implement Windows 2000 infrastructure for the Boston headquarters.*

- Upgrade the servers in the existing Windows NT 4.0 domain to Windows 2000.

*Acceptance criteria:* Existing and enhanced functionality will be demonstrated by using Windows 2000 on the client computers and servers in the Boston headquarters.

*Phase III: Implement a test deployment in the Washington DC airport.*

1. Provide WAN connectivity to Washington, DC.
2. Test the old reservation application and the new reservation application.
3. Test the new Windows 2000 infrastructure from the Washington DC location.
4. Collect benchmark data.
5. Install and test passenger lounge functionality.
6. Test the kiosk computer.

*Acceptance criteria:* All aspects of the new reservation application and the new airport infrastructure will be installed and tested in the company's new Washington DC location.

*Phase IV: Deploy new equipment to all airports.*

1. Provide WAN connectivity to all airports.
2. Install LAN infrastructure.

3. Train users.
4. Replace existing equipment in all airports.

*Acceptance criteria:* All airports will be running the old mainframe reservation application on the new equipment.

*Phase V: Migrate to the new reservation application.*

1. Migrate data from the mainframe to Microsoft SQL Server.
2. Convert all airports.
3. Open new airports.

*Acceptance criteria:* Reservation data will be migrated from the mainframe and put into production with the new reservation application.

## QUESTIONS BLUE SKY AIRLINES

### Q. 1

Which client hardware should you use for the gate machines in the airports?

- A. Windows Terminal.
- B. New Pentium III client computers.
- C. Existing 486 client computers from corporate headquarters.
- D. Existing 3270 terminals.

**Answer: A.**

**Explanation:** The gate machines at the airports will be used as a front end to the SQL Server database. Windows Terminal computers which are computers running Windows Terminal Emulation software will be used for this purpose since their hardware requirement and cost is kept low.

**Incorrect answers:**

- B:** It is not necessary to use new and expensive Pentium III computers.
- C:** The scenario states that the 486 client computers will be upgraded.
- D:** 3270 terminals cannot be used to connect the SQL Server. They are used to connect to IBM main frames.

### Q. 2

Which component or components must you place locally on the passenger lounge network? (Choose all that apply)

- A. Kiosk computer
- B. Hub
- C. Domain controller
- D. DNS server
- E. Routing and Remote access
- F. Microsoft Proxy Server
- G. DHCP Server

**Answer: A, B.**

**Explanation:** The passenger lounge will provide internet access to passengers. The passenger will either use their own laptops or the kiosk computer.

- A:** A kiosk computer in each passenger lounge to provide Internet access to customers without laptops. The kiosk computer is a requirement of this scenario.