

# 70-221

## Microsoft

### *Designing a Microsoft Windows 2000 Network Infrastructure*

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## Case Study No. 1 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

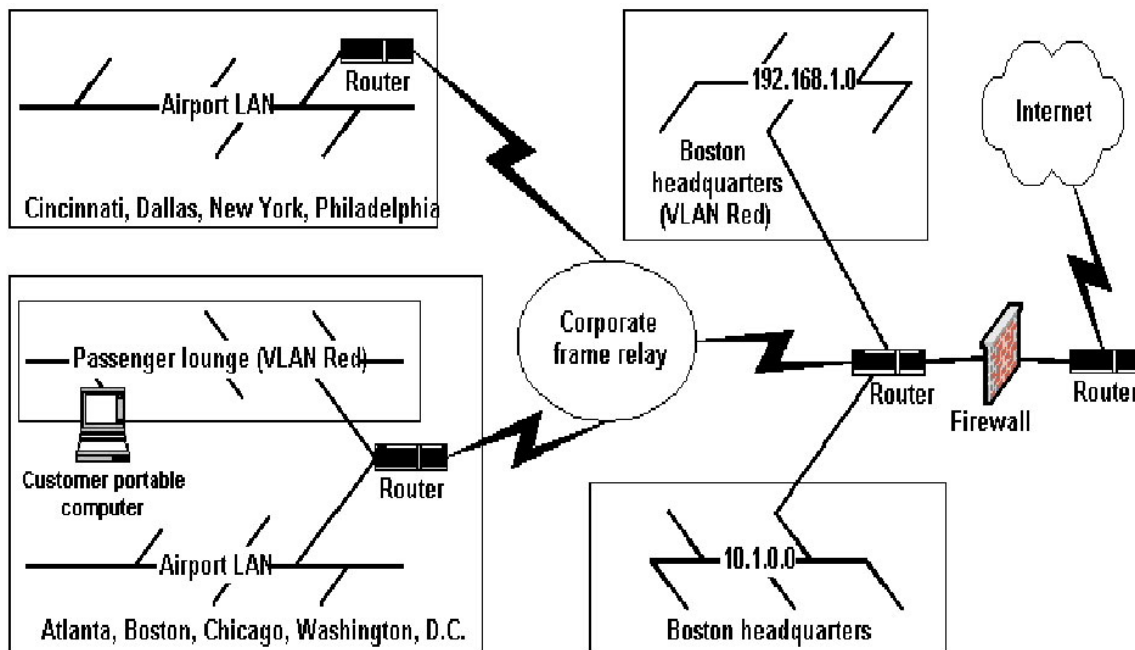
Passengers will be able to use all TCP/IP protocols without having to make any changes to their portable computers as long as the computers are using DHCP. Additionally, each passenger lounge will contain one kiosk computer so that passengers without portable computers can access the same Web based flight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



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 1: 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.

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