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CHINATAG

70-226

Designing Highly Available Web Solutions with
Microsoft Windows 2000 Server Technologies

Q&A

DEMO Version

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11 case studies are included. They are:

- Case Study #1, Northwind Traders
- Case Study #2, Coho Vineyard
- Case Study #3, Contoso, Ltd
- Case Study #4, Trey Research
- Case Study #5, Wide World Importers
- Case Study #6, A. Datum Corporation
- Case Study #7, Tailspin Toys
- Case Study #8, Adventure Works
- Case Study #9, Graphic Design Institute
- Case Study #10, Proseware
- Case Study #11, Consolidated Messenger

Affinity information

WLBS port rules for common applications:

HTTP Web servers typically listen on port 80. Affinity should be set to 'None', unless the Web server maintains client state in its memory, in which case set affinity to 'Single' or 'Class C'.

HTTPS HTTP over SSL (encrypted Web traffic) is usually handled on port 443. Affinity should be set to 'Single' or 'Class C' to ensure that the server that has SSL session established always handles client connections.

FTP FTP uses port 21 for control connection from the client and port 20 for return data connection from the server. Create two port rules that cover ports 20-21 and 1024-65,535 with affinity 'Single' or 'Class C' to ensure that both data and control connections are handled by the same server.

TFTP TFTP servers (BOOTP, etc.) use port 69 and can easily be load balanced with WLBS. Affinity should be set to 'None', when creating port rule covering port 69.

SMTP WLBS can be used effectively for scaling high-volume SMTP mailers. In this case you should use port 25 and set affinity to 'None'.

NBT NetBIOS over TCP/IP uses port 139 on the server. Affinity can be set to either 'None' or 'Single', but we recommend 'Single' for maximum compatibility with server applications.

WLBS is Windows NT Load Balancing, which became the NLB (Network Load Balancing) feature. In the questions below you will see references to affinity. Review and understand the affinity examples above.

Case Study 1, Northwind Traders

Background

Northwind Traders has been one of the top three Internet florist Web sites for the past three years. During an average day, the company processes 50,000 orders. However, during the week before Mother's Day (the second Sunday in May), the order volume goes up dramatically. Last year, the company processed 1 million orders during this week. However, the Web site did not perform well. Northwind Traders estimates that it lost as many as 1 million additional orders.

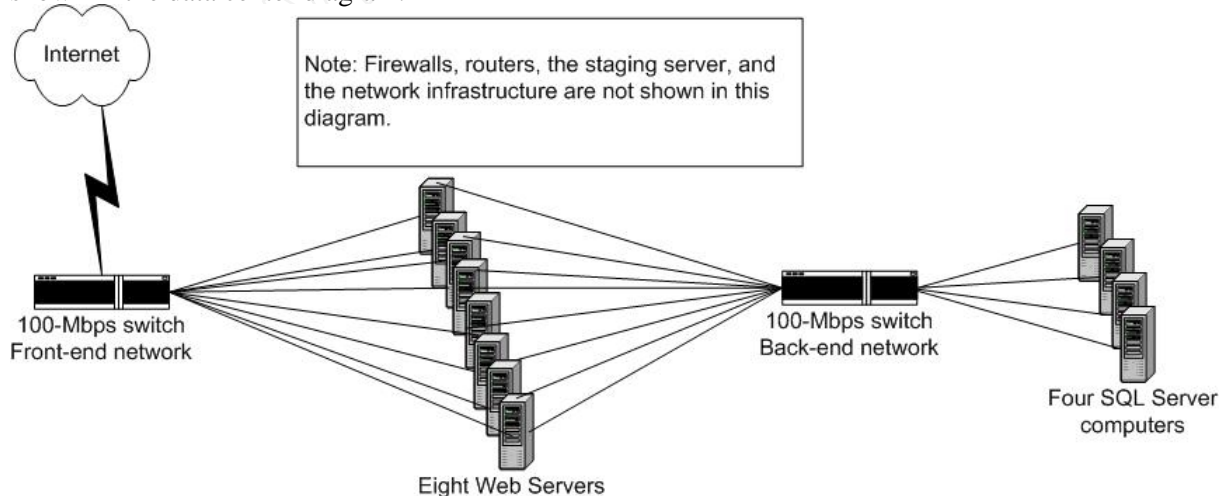
This year, the company expects traffic on the Web site to be double that of last year. Northwind Traders wants to make sure that the Web site infrastructure is prepared to handle as many as 4 million orders during the week proceeding this year's Mother's Day.

Performance data gathered during the Mother's Day period last year shows that the following areas were significant bottlenecks:

- Access to the product catalog database
- The network connection from the Internet data center to the Internet
- SSL Session initialization

Existing Environment

The company's Web site is currently located in one Internet data center in San Francisco, as shown in the data center diagram.



The Web site has the following characteristics:

Web servers

Eight Web servers each contain four CPUs and 2 GB of RAM. The Web servers are configured in an NLB cluster that has an affinity setting of None.

During peak periods on a typical day, the average CPU use for the Web servers is 40 percent.

During peak periods on a typical day, the average use of the network adapter on the back-end network for each Web server is 25 percent.

Database servers

Four Microsoft SQL Server computers each contain eight CPUs and 4GB of RAM.

During peak periods on a typical day, the average CPU use for the SQL Server computers is 20 percent.

During peak periods on a typical day, the average of the network adapter on the back-end network for each SQL Server computer is 50 percent.

Databases

Customer profile and login information is kept in one unpartitioned SQL Server database.

The product catalog is kept in one unpartitioned SQL Server database and is updated nightly.

Shopping cart state is managed in a SQL Server database.

General

All payment-processing traffic is encrypted by using SSL

There is no routing to the Internet from the back-end network.

Business Requirements

The following business requirements must be met for the Mother's Day traffic:

Temporary Internet data centers for the months of April and May

The Web site will be replicated to three new temporary Internet data centers.

Customers will be served by servers nearest their home locations.

The customer base will be divided into four regions of the country: northeast, southeast, Midwest, and west. One Internet data center will be located in each region.

The existing San Francisco data center will serve the west region.

In the event of a network outage at one data center, the Web sites will remain available and fully functional at other data center locations for customers in those regions.

Customers in the region experiencing an outage can reconnect to a Web site in another region to place an order. However, any shopping activity not completed at the of the outage will be lost.

General

Order response time must be almost the same as on a normal day.

All services of the Web sites must be highly available in the event of network or server hardware failure.

The company's server administrators must be able to fully administer all servers from remote locations.

Security of Web content and user profile information must be maintained at all times.

Technical Requirements

The following technical requirements must be considered

Additional servers

For the months of April and May, Northwind Traders will lease 24 servers to be used as front-end Web servers. These servers each have two CPUs and 512 MB of RAM. For the months of April and May, Northwind Traders will lease 12 servers to be used as back-end SQL Server computers. These servers each have eight CPUs and 4 GB of RAM.

General

Windows 2000 Advanced Server will be installed on all servers. Microsoft Application Center 2000 will be deployed on all Web Servers. Necessary network infrastructure services in the new Internet data centers will be provided by the leases Web or database servers. Only HTTP, HTTPS, and VPN traffic will be allowed through the firewall. All content staging will occur in the San Francisco data center. A common method will be used to replicate Web content from staging server to each regional Web site. The replication method must have restart support in the event of a dropped connection.

Questions Case Study 1, Northwind traders

QUESTION NO: 1

You need to design a rollback and recovery strategy for content changes to the Web servers. Which element or elements should you include in your design? (Choose all that apply.)

- A. Create an Application Center Web cluster that includes the two staging servers.
- B. Add a second staging server on one of the new Internet data centers.
- C. Create an Application Center COM+ cluster that includes the two staging servers.
- D. Take one of the staging servers offline until it is verified that the newly deployed content is error free.
- E. Add a second staging server in the west Internet data center
- F. Remove one of the staging servers from the synchronization loop until it is verified that the newly deployed content is error free.

Answer: A, E, F

QUESTION NO: 2

You want to optimize the SSL initialization for the Web site. Which two actions should you take? (Each correct answer presents part of the solution. Choose two.)

- A. Design NLB clusters to use the affinity setting of None for the Web servers.
- B. Replace SSL encryption with IPSec.
- C. Use HTTP for all Web site traffic
- D. Add SSL hardware accelerator cards to all the Web servers.
- E. Add SSL hardware accelerator cards to all of SQL Server computers.
- F. Add SSL hardware accelerator cards to two Web servers in each NLB cluster. Filter all SSL traffic to those two servers.
- G. Design NLB clusters to use the affinity setting of Single for the Web servers.

Answer: F, G

QUESTION NO: 3

You need to design the minimum network services necessary to support the new Internet data centers. Move the appropriate network service or services to each type of host server. (Use only network services that apply. Use each network service only once.)

Host Server Type	Network Service
<p><input type="button" value="Collapse"/></p> <ul style="list-style-type: none"><input checked="" type="checkbox"/> Web Server<input checked="" type="checkbox"/> SQL Server Computer	<ul style="list-style-type: none">Internet Connection SharingActive Directory Domain ControllerInternal DNSWINSVPN
	<p><input type="button" value=" <<Move"/></p> <p><input type="button" value=" Remove >>"/></p>

WWW.C

Answer:

You need to design the minimum network services necessary to support the new Internet data centers. Move the appropriate network service or services to each type of host server. (Use only network services that apply. Use each network service only once.)

Host Server Type	Network Service
<p>Collapse</p> <ul style="list-style-type: none">■ Web Server<ul style="list-style-type: none">Internal DNSActive Directory Domain Controller■ SQL Server Computer<ul style="list-style-type: none">VPNWINS	<p>Internet Connection Sharing</p> <p><<Move</p> <p>Remove>></p>

QUESTION NO: 4

You need to design a method for the company's server administrators to manage all their servers at the Internet data centers. Which method should you include in your design?

- A. Initiate a direct Telnet connection to each server over the Internet as needed.
- B. Initiate an HTTPS connection over the Internet to each server as needed.
- C. Initiate a VPN connection to a VPN server in each Internet data center over the Internet. Then make a Terminal Services connection to each server as needed.
- D. Initiate an encrypted Terminal Services connection over the Internet to each server as needed.
- E. Include a VPN connection to the Internet data center over the Internet. Then make a Telnet connection to each server as needed.

Answer: C

QUESTION NO: 5

You need to design a scalable architecture for the SQL Server clusters to support the expected increase in volume before Mother's Day. You need to design database integration to support the temporary Web sites at the new Internet data centers. Which three actions should you take? (Each correct action presents part of the solution. Choose three.)

- A. Design a partitioning strategy for the customer profile and login database based on geographic location.
- B. Design a partitioning strategy for the customer profile and login database based on alphabetical order.
- C. Design a partitioning strategy for the product catalog database based on alphabetical order.
- D. Design the Web sites to point back to the existing Web site for all database activity.
- E. Design a replication strategy for the customer profile and login database for all Web sites.
- F. Design a replication strategy for the shopping cart state database within each Web site.
- G. Design a replication strategy for the product catalog database for all Web sites.

Answer: A, E, G

QUESTION NO: 6

You need to design the server infrastructure for the Internet data centers. How should the leased SQL Server computers be deployed? (Choose all that apply.)

- A. Install the leased SQL Server computers in the existing Internet data center. Create four 4-node Cluster service clusters for all databases.
- B. Install the leased SQL Server computers in the existing Internet data center. Combine them with the existing SQL Server computers in a 16-node NLB cluster for all databases.
- C. In each new Internet data center, create a 2-node Cluster service cluster for Customer profile and shopping cart databases.
- D. In each new Internet data center, create a 2-node NLB cluster for the product catalog database.
- E. In each new Internet data center, create a 4-node Cluster service cluster for all databases.
- F. In each new Internet data center, create a 4-node NLB cluster for all databases.

Answer: C, D

QUESTION NO: 7

You want to reduce the risk of a network bottleneck between the Web servers and the SQL Server computers. Which two actions can you take? (Each correct answer presents a complete solution. Choose two.)

- A. Configure all NLB and Cluster service traffic to occur on a private network.
- B. Place each SQL Server cluster on a separate network segment.
- C. Upgrade the SQL Server computer network adapters and switches to Gigabit Ethernet.
- D. Place each SQL Server node on a separate network segment.
- E. Add an additional 100-Mbps network adapter to each SQL Server computer on the existing network segment.
- F. Configure the SQL Server computers to use a storage area network.

Answer: C, F

QUESTION NO: 8

Create a diagram that shows how to replicate Web server content within each Web site. Use the appropriate replication method to connect the appropriate sources and targets for replication. (Use only replication methods that apply).

Staging Server

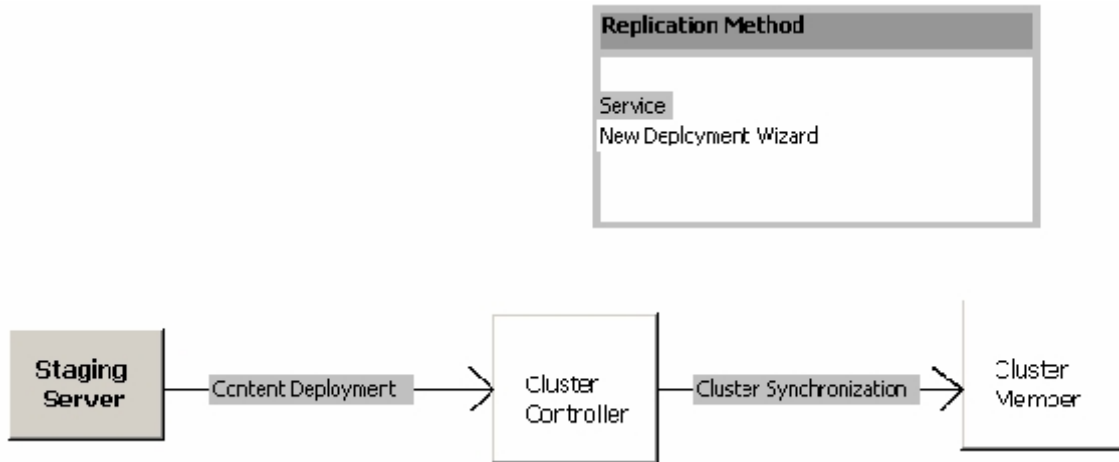
Cluster Controller

Cluster Member

Replication Method

- Content Deployment Service
- Cluster Synchronization
- New Deployment Wizard

Answer:



Explanation: The replication method must have restart support in the event of a dropped connection. We therefore use the **Content Deployment**, and not the **New Deployment Wizard**.

QUESTION NO: 9

You need to design clustering solutions for the different databases. Move the appropriate cluster method to each database. (Use both cluster mehtods. You will need to reuse cluster methods.)

Database	Cluster Method
<input type="button" value="Collapse"/>	
<ul style="list-style-type: none"><input type="checkbox"/> Customer Profile and Login<input type="checkbox"/> Product Catalog<input type="checkbox"/> Shopping Cart State	<ul style="list-style-type: none">Cluster Service ClusterNLB Cluster
	<input type="button" value=" <<Move"/>
	<input type="button" value=" Remove >>"/>

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Answer:

You need to design clustering solutions for the different databases. Move the appropriate cluster method to each database. (Use both cluster methods. You will need to reuse cluster methods.)

Database	Cluster Method
<p>Collapse</p>	
<ul style="list-style-type: none">■ Customer Profile and Login<ul style="list-style-type: none">Cluster Service Cluster■ Product Catalog<ul style="list-style-type: none">NLB Cluster■ Shopping Cart State<ul style="list-style-type: none">Cluster Service Cluster	<p>Cluster Service Cluster</p> <p>NLB Cluster</p> <p style="text-align: center;"><<Move</p> <p style="text-align: center;">Remove>></p>

WWW

QUESTION NO: 10

You need to design an Internet DNS naming strategy for customers in all the regions to connect to the appropriate Web site. Move the appropriate DNS name to each customer location. (Use only DNS names that apply. You might need to reuse DNS names.)

Customer Location	DNS Name
<p>Collapse</p> <ul style="list-style-type: none"><input checked="" type="checkbox"/> Northeast<input checked="" type="checkbox"/> Southeast<input checked="" type="checkbox"/> Midwest<input checked="" type="checkbox"/> West	<p>www.northwindtraders.com www.northeast.northwindtraders.com www.southeast.northwindtraders.com www.west.northwindtraders.com www.midwest.northwindtraders.com</p> <p><<Move</p> <p>Remove>></p>

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Answer:

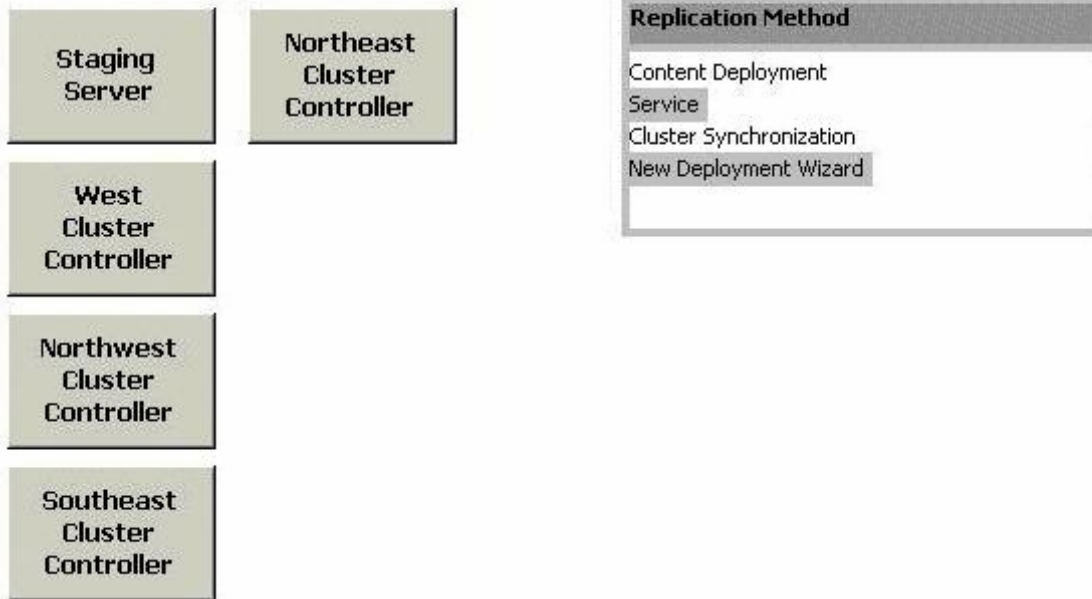
You need to design an Internet DNS naming strategy for customers in all the regions to connect to the appropriate Web site. Move the appropriate DNS name to each customer location. (Use only DNS names that apply. You might need to reuse DNS names.)

Customer Location	DNS Name
<p>Collapse</p> <ul style="list-style-type: none">■ Northeast www.northeast.northwindtraders.com■ Southeast www.southeast.northwindtraders.coms■ Midwest www.midwest.northwindtraders.com■ West www.west.northwindtraders.com www.northwindtraders.com	<p>www.northwindtraders.com www.northeast.northwindtraders.com www.southeast.northwindtraders.coms www.west.northwindtraders.com www.midwest.northwindtraders.com</p> <p><<Move</p> <p>Remove>></p>

Alert: We wonder if proper redundancy if ALL four regions should have one for the region AND the main domain name?

QUESTION NO: 11

Use the replication sources, targets, and methods provided to create a diagram that shows how to replicate Web server content to the Internet data centers. (Use only replication sources, targets, and methods that apply.)



Answer:

- Staging Server -> Content Deployment -> West Cluster Controller
- Staging Server -> Content Deployment -> Midwest Cluster Controller
- Staging Server -> Content Deployment -> Southeast Cluster Controller
- Staging Server -> Content Deployment -> Northeast Cluster Controller

Explanation: The replication method must have restart support in the event of a dropped connection. We therefore use the **Content Deployment**, and not the **New Deployment Wizard**.

QUESTION NO: 12

You need to design the server infrastructure for the Internet data centers. How should the leased Web servers be deployed?

- A. Install 8 of the leased Web servers in each new Internet data center.
 Create one 8-node NLB cluster in each new data center.
 Create round-robin DNS entries for each NLB cluster.
- B. Install 8 of the leased Web servers in each new Internet data center.
 Create round-robin DNS entries for all 32 Web Servers.
- C. Install all the leased Web servers in the existing Internet data center.
 Combine the leased Web servers with the existing Web servers in a 32-node NLB cluster.

- D. Install 8 of the leased Web servers in each new Internet data center.
 - Create two 4-node NLB cluster in each new data center.
 - Create round-robin DNS entries for each NLB cluster.

Answer: A

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Case Study No: 2

Coho Vineyard

The company has a testing lab that contains eight computers. When these computers were used to stress test the four-member NLB cluster, all connections went to one server.

Business Requirements

Coho Vineyard's strategy is to provide relationship services to four communities of interest. These communities are vineyards, retailers, restaurants, and individual consumers. The following Web features will be included:

Chat and discussion forums must allow people in the same community to meet and interact.

Efficient navigation must allow users to find items and accomplish tasks quickly.

Profiles that can be customized will allow users to focus on what interests them.

Security of transactions that include purchasing external products and services must be provided.

Safeguards will protect the privacy of individuals. Users must be able to control which information can be passed to others.

The initial membership within the four communities must support 20,000 members and 5,000 concurrent users.

All servers must be highly available.

The Web site cluster can be managed from a single console.

When a purchase request is made Coho Vineyard will route the request to the appropriate destination for fulfillment. A small fee will be assessed to the seller. All steps of the purchase transactions will be recorded.

Users will be able to find and compare wine and vineyard suppliers ranging from grapes and crates to a specific wine in the store closest to them.

Technical Requirements

The following internal systems will be included.

Collaboration: Coho Vineyard plans to use Microsoft Outlook Web Access and Microsoft Exchange 2000 Server as its collaboration infrastructure. Load testing shows that a four-processor server that has 5,000 concurrent users runs at 60 percent utilization.

Accounting: All transaction details will be recorded on the company's mainframe computer at headquarters.

Wine Market: User requests will be queried against production, inventory, and scheduled services. Provisions need to be made to support transaction requests even when all services are not available online.

Partners: A Microsoft BizTalk Server computer will be installed at each trading partner's location.

Microsoft Application Center 2000 will be used to manage the NLB cluster.

All servers will run Windows 2000 Advanced Server.

The following additional design requirements must be met:

Only the firewall will have publicly accessible IP addresses.

It must be possible to ping the front-end adapters of all NLB servers.

Overhead traffic on the production network must be minimized

Changes to external firewall configuration of the IPP must be minimized.

The problem with NLB testing must be resolved.

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