Chapter 12
Business Continuity and Disaster Recovery

CERTIFICATION OBJECTIVES

12.01   Business Continuity Methods

12.02   Disaster Recovery Methods

12.03   Backup and Recovery

QUESTIONS

Planning for failure may sound counterintuitive, but it is the key to business survival in the event of a disaster. Policies are created to provide structure in the efficient recovery of failed systems.

Fault tolerance removes single points of failure while maintaining an acceptable level of performance. Alternate sites provide a way of continuing business operations across geographic distances. Data is protected with backups, snapshots, cloning, and so on.

1.   A company has concluded based on past website downtime events that two hours is as long as its website can be down before the company suffers irreparably. What does this timeframe apply to?

A.   SLA

B.   RPO

C. RTO

D. MOF

2. Incremental cloud database backups occur three times daily. What is the RPO?

A. One hour

B. Three hours

C. Five days

D. Eight hours

3. Your on-premises virtual machine mail server is in the process of being migrated to the cloud, but some users are still using it. You need to restore the virtual machine to a previous state and then restore messages. What should you do prior to the restoration?

A. Take a virtual machine snapshot.

B. Notify affected users prior to the restoration.

C. Clone the virtual machine.

D. Notify affected users during the restoration.

4. Which statement regarding the RPO is correct?

A. The RPO is the maximum tolerable downtime of a business process.

B. A single RPO applies to all data.

C. The RPO is the minimum tolerable downtime of a business process.

D. Different types of data could require different RPOs.

5. Which of the following puts the business continuity plan guidelines into motion?

A. Business impact analysis

B. Business continuity management

C. Disaster recovery plan

D. Incident response plan

6. Which of the following are related to fault tolerance? Choose two.

A. NIC teaming

B. NIC TCP offload

C. RAID 0

D. RAID 1

7. Which type of document states how service providers will compensate service consumers if specific conditions are not met?

A. BCP

B. DRP

C. BIA

D. SLA

8. Which monitoring technique uses hard disk metrics to predict hard disk imminent failure?

A. SMART

B. MTTR

C. MTBF

D. KPI

9. Your cloud-based website is hosted in a cloud provider data center in California. Website visitors in Europe are experiencing delays when loading web pages and downloading files. You need to reduce network latency for European users. What should you configure?

A. Load balancing

B. Failover zone

C. Data deduplication

D. A content delivery network

10. What type of replication notifies an application that data has been written before replica servers verify data has been committed to disk?

A. Asynchronous

B. Master-slave

C. Synchronous

D. Peer-to-peer

11. You are the IT director for a law enforcement agency. The agency IT system must remain running at all times. An alternate location to house mission-critical servers, data, and personnel has been acquired. What else is needed for this hot site?

A. Load balancing

B. Replication

C. Failover clustering

D. Virtualization

12. Which type of alternative business site is the cheapest?

A. Warm

B. Hot

C. Cold

D. Lukewarm

13. Which type of alternative business site is the most expensive?
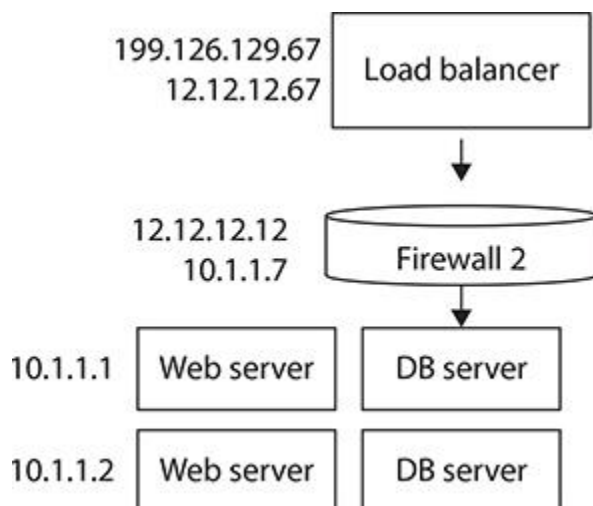
A. Warm

B. Hot

C. Cold

D. Lukewarm

14. Which recovery factor has the largest influence on the selection of the type of alternate site?

A. RPO

B. RTO

C. SLA

D. DRP

15. Refer to Figure 12-1. Users in a different location complain that both web servers are not responding. After verifying that the servers are running and then testing connectivity from client stations, you determine that users are configured with a default gateway of 192.168.0.1 and are connecting to www.app1.com, which resolves to 10.1.1.1. Why are users unable to connect to the website?

A. The default gateway is incorrect.

B. The FQDN is invalid.

C. www.app1.com should resolve to 10.1.1.2.

D. www.app1.com should resolve to 199.126.129.67.

FIGURE 12-1 Network diagram

16. Refer to Figure 12-1. You are configuring Firewall 2. The web servers use standard HTTP ports. What traffic must Firewall 2 allow?

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A. Inbound from 12.12.12.67 destined for 10.1.1.1, 10.1.1.2 TCP port 80

B. Inbound from 199.126.129.67 destined for 10.1.1.1, 10.1.1.2 TCP port 80

C. Inbound from 12.12.12.67 destined for 10.1.1.1, 10.1.1.2 TCP port 3389

D. Inbound from 199.126.129.67 destined for 10.1.1.1, 10.1.1.2 TCP port 3389

17. Refer to Figure 12-1. Which statement regarding the network diagram is correct?

A. The internal interface for Firewall 2 is configured on an incorrect subnet.

B. The load balancer external interface IP address is a private IP address.

C. The web server IP addresses must be private IP addresses.

D. Firewall 2 must allow outbound HTTP traffic using ports above 1024.

18. Refer to Figure 12-1. Which statement regarding the load balancer is correct?

A. The load balancer must have connectivity to the web servers.

B. The load balancer does not need connectivity to the web servers.

C. The load balancer listening port must match the internal web server listening port.

D. The load balancer will not detect if a web server is down.

19. Your company is migrating on-premises services to the public cloud. In the interim, you need a way to use existing backup solutions while backing up data to the public cloud. Which on-premises backup functionality is required?

A. Write verify

B. Tape encryption

C. VTL emulation

D. Tunneling

20. The archive bit for files modified since the last backup will be set to which value?

A. b

B. m

C. 0

D. 1

21. The archive bit for unmodified files that have been backed up will be set to which value?

A. b

B. m

C. 0

D. 1

22. A virtual machine file server's virtual hard disks are corrupt and cannot be repaired. Which type of tape backup will take the least amount of time to restore?

A. Snapshot

B. Incremental

C. Differential

D. Full

23. A virtual machine file server's virtual hard disks are corrupt and cannot be repaired. Which type of tape backup takes the most amount of time to restore?

A. Snapshot

B. Incremental

C. Differential

D. Full

24. Which type of backup contains only those files modified since the last full backup?

A. Snapshot

B. Incremental

C. Differential

D. Full

25. Which type of backup does not modify the archive bit?

A. Snapshot

B. Incremental

C. Differential

D. Full

26. While creating a DRP, you are concerned with how long the restoration of data files will take. You conclude the restoration cannot exceed three hours. What is another way of stating this?

A. RPO = 3 hours

B. Backup = 3 hours

C. RTO = 3 hours

D. Restore = 3 hours

27. What is the purpose of a backup catalog?

A. It is an index of the data on backup media.

B. It contains decryption keys.

C. It contains software licenses.

D. It lists backup sources available on the network.

28. Which term is best associated with data backups?

A. Performance

B. Integrity

C. Availability

D. Confidentiality

29. Your network link to the public cloud is 80 percent utilized by other services. On-premises files must be replicated to the public cloud while minimizing bandwidth usage. What type of replication method should you use?

A. Asynchronous

B. Synchronous

C. Block-level backup

D. Content delivery network

30. Which type of snapshot technology has the least computational requirements?

A. Copy-on-write

B. Deduplication

C. Compression

D. Redirect-on-write

31. What is another name for a cloud backup?

A. Snapshot

B. Clone

C. Online backup

D. Offline backup

32. You need to ensure that critical on-premises virtual machines are immediately available in the event of a regional disaster. What should you configure?

A. Cloud failover

B. Failover cluster

C. Hourly backups

D. Virtual machine clones

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33. Due to a short RTO of five minutes, you need to ensure a mission-critical website is available in the event of a regional disaster. What should you configure?

A. Mirrored site

B. Staged site

C. Container site

D. Zone site

34. A custom application draws insights from big data analytics. Due to the large volume of data transmitted between application components, you need to minimize computational and network latency. Which pair of options should you consider?

A. Distributed processing, jumbo frames

B. Jumbo frames, NIC teaming

C. Clustering, edge sites

D. Scaling in, edge sites

35. You need to ensure that server backups have a minimal impact on user productivity. When should you schedule backups to occur?

A. During maintenance windows

B. 12 A.M.–5 A.M.

C. During failback windows

D. 6 P.M.–12 A.M.

36. Which action could have resulted in the state of the file depicted in Figure 12-2?

A. A change was made to the file.

B. Block-level snapshots were enabled.

C. A full backup was just performed.

D. An incremental backup was just performed.

FIGURE 12-2 Windows file properties
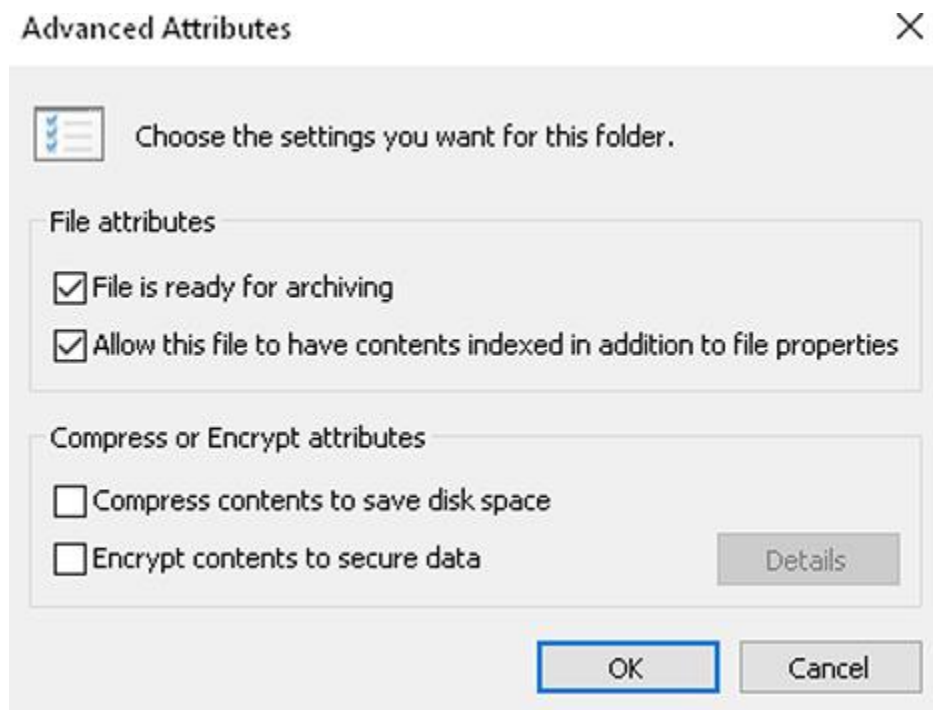
37. Which benefits are realized by using a content delivery network? Choose two.

A. Enhanced security

B. Dynamic website content

C. Increased performance

D. Data availability

38. What can be done to adhere to the RPO?

A. Enable deduplication.

B. Increase backup storage capacity.

C. Increase backup frequency.

D. Use SSD storage.

39. How is the DRP different from the BCP?

A. The DRP is specific to a system.

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B. The BCP is specific to a system.

C. The DRP is related to business continuity.

D. The BCP is related business continuity.

40. Which of the following items can reduce the RTO? Choose two.

A. Runbooks

B. Increased network bandwidth

C. Decreased network bandwidth

D. Content delivery networks

41. Which communication method is used for inter-node cluster communication?

A. Shared storage

B. LUN

C. iSCSI

D. Heartbeat

42. What do cluster nodes use to conclude that a member is no longer available?

A. Heartbeat

B. Ping

C. Tracert

D. DNS TTL

43. Which type of alternative disaster recovery site contains equipment but lacks up-to-date data?

A. Cold site

B. Warm site

C. Hot site

D. Lukewarm site

44. Which type of redundancy allows nodes to reside on different sides of a WAN?

A. WAN clustering

B. Geo-clustering

C. Disparate clustering

D. Long-haul clustering

45. Which of the following is a common SAN redundancy configuration?

A. Failover clustering

B. Regional replication

C. Multipathing

D. RAID 0

46. You are about to apply a new batch of updates to a Linux virtual machine. What should you do before performing this task?

A. Take a snapshot.

B. Create a clone.

C. Enable RAID 0.

D. Enable RAID 1.

QUICK ANSWER KEY

1. C

2. D

3. B

4. D

5. B

13

6. A, D

7. D

8. A

9. D

10. A

11. B

12. C

13. B

14. B

15. D

16. A

17. D

18. A

19. C

20. D

21. C

22. D

23. B

24. C

25. C

26. C

27. A

14

28. C

29. C

30. D

31. C

32. A

33. A

34. A

35. A

36. A

37. C, D

38. C

39. A

40. A, B

41. D

42. A

43. B

44. B

45. C

46. A

IN-DEPTH ANSWERS

1. A company has concluded based on past website downtime events that two hours is as long as its website can be down before the company suffers irreparably. What does this timeframe apply to?

A. SLA

B. RPO

C. RTO

D. MOF

☑ **C.** The recovery time objective (RTO) is the maximum amount of tolerable downtime.

☒ **A, B,** and **D** are incorrect. Service level agreements (SLAs) are contracts between service providers and consumers concerning expected levels of service. The recovery point objective (RPO) is the maximum tolerable amount of data loss. The Microsoft Operations Framework (MOF) is a service delivery framework.

2. Incremental cloud database backups occur three times daily. What is the RPO?

A. One hour

B. Three hours

C. Five days

D. Eight hours

☑ **D.** The recovery point objective (RPO) in this case is eight hours; three times daily.

☒ **A, B,** and **C** are incorrect. The listed values are incorrect.

3. Your on-premises virtual machine mail server is in the process of being migrated to the cloud, but some users are still using it. You need to restore the virtual machine to a previous state and then restore messages. What should you do prior to the restoration?

A. Take a virtual machine snapshot.

B. Notify affected users prior to the restoration.

C. Clone the virtual machine.

D. Notify affected users during the restoration.

☑ **B.** Affected stakeholders must always be notified before changes are made.

☒ **A, C,** and **D** are incorrect. A snapshot is not required before taking a snapshot. Cloning a virtual machine does not make sense before taking a snapshot. Users must be notified prior to the change, not during the change.

4. Which statement regarding the RPO is correct?

A. The RPO is the maximum tolerable downtime of a business process.

B. A single RPO applies to all data.

C. The RPO is the minimum tolerable downtime of a business process.

D. Different types of data could require different RPOs.

☑ **D.** The recovery point objective (RPO) is the maximum amount of tolerable data loss, such as four hours' worth. Mission-critical data that changes often would have a smaller RPO than less critical static data.

☒ **A, B,** and **C** are incorrect. The recovery point objective (RPO) is not related to the amount of downtime; it is related to the amount of data loss.

5. Which of the following puts the business continuity plan guidelines into motion?

A. Business impact analysis

B. Business continuity management

C. Disaster recovery plan

D. Incident response plan

☑ **B.** Business continuity management (BCM) puts business continuity plan guidelines into action.

☒ **A, C,** and **D** are incorrect. A business impact analysis (BIA) analyzes the impact of threats against assets. Disaster recovery plans (DRPs) are specific to the restoration of a system. Incident response plans outline reactionary details for negative events.

6. Which of the following are related to fault tolerance? Choose two.

A. NIC teaming

B. NIC TCP offload

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C. RAID 0

D. RAID 1

☑ **A** and **D.** NIC teaming groups two or more network interface cards (NICs) together for the purpose of redundancy or aggregated bandwidth. RAID 1 (disk mirroring) commits each data write to two disks for redundancy.

☒ **B** and **C** are incorrect. TCP offload transfers CPU processing for TCP/IP to the NIC. RAID 0 (disk striping) uses a group of disks to handle reads and writes, which increases performance.

7. Which type of document states how service providers will compensate service consumers if specific conditions are not met?

A. BCP

B. DRP

C. BIA

D. SLA

☑ **D.** Service level agreements (SLAs) are contracts between service providers and consumers concerning expected levels of service.

☒ **A, B,** and **C** are incorrect. The business continuity plan (BCP) prioritizes assets and business processes that must remain running. Disaster recovery plans (DRPs) are specific to the restoration of a system. A business impact analysis (BIA) analyzes the impact of threats against assets.

8. Which monitoring technique uses hard disk metrics to predict hard disk imminent failure?

A. SMART

B. MTTR

C. MTBF

D. KPI

☑ **A.** Self-monitoring, analysis, and reporting technology (SMART) uses disk metrics to predict disk failures.

☒ **B, C,** and **D** are incorrect. Mean time to repair (MTTR) is the average time that it takes to repair a failed hardware component. Mean time between failures (MTBF) is the average time a device will function before it fails. Key performance indicators (KPI) are metrics that are monitored to determine progress.

9. Your cloud-based website is hosted in a cloud provider data center in California. Website visitors in Europe are experiencing delays when loading web pages and downloading files. You need to reduce network latency for European users. What should you configure?

A. Load balancing

B. Failover zone

C. Data deduplication

D. A content delivery network

☑ **D.** A content delivery network (CDN) replicates data from a central location to geographical endpoints in order to reduce network latency for end users.

☒ **A, B,** and **C** are incorrect. Load balancing distributes application processing across multiple backend servers. Failover zones isolate clustered applications from other clustered applications. Data deduplication conserves disk space by avoiding the storage of duplicate disk blocks.

10. What type of replication notifies an application that data has been written before replica servers verify data has been committed to disk?

A. Asynchronous

B. Master-slave

C. Synchronous

D. Peer-to-peer

☑ **A.** Asynchronous replication does not wait for data to be committed to replicas before returning a completed message.

☒ **B, C,** and **D** are incorrect. Master-slave and peer-to-peer are general terms that apply to high-performance cluster node types, replication topologies, and so on. Synchronous replication reports to applications that data is written only after it has been committed to all replicas.

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11. You are the IT director for a law enforcement agency. The agency IT system must remain running at all times. An alternate location to house mission-critical servers, data, and personnel has been acquired. What else is needed for this hot site?

A. Load balancing

B. Replication

C. Failover clustering

D. Virtualization

☑   **B.** Hot alternate sites require an up-to-date copy of current data, which is possible only through replication.

☒   **A, C,** and **D** are incorrect. Load balancing distributes application processing across multiple backend servers. Failover clustering uses multiple cluster nodes to serve an application for redundancy. Virtualization allows multiple virtual machine operating systems to run concurrently on shared hardware managed by a hypervisor.

12. Which type of alternative business site is the cheapest?

A. Warm

B. Hot

C. Cold

D. Lukewarm

☑   **C.** Cold alternative sites are cheapest since they are not fully equipped and contain no data.

☒   **A, B,** and **D** are incorrect. Warm sites are equipped but do not contain up-to-date data. Hot sites are fully equipped and contain up-to-date data. Lukewarm is not an alternate site type.

13. Which type of alternative business site is the most expensive?

A. Warm

B. Hot

C. Cold

D. Lukewarm

20

☑ **B.** Hot sites are fully equipped and contain up-to-date data and therefore are the most expensive type of alternative site.

☒ **A, C,** and **D** are incorrect. Warm sites are equipped but do not contain up-to-date data. Cold alternative sites are cheapest since they are not fully equipped and contain no data. Lukewarm is not an alternate site type.

14. Which recovery factor has the largest influence on the selection of the type of alternate site?

A. RPO

B. RTO

C. SLA

D. DRP

☑ **B.** The recovery time objective (RTO) is the maximum amount of tolerable downtime.

☒ **A, C,** and **D** are incorrect. The recovery point objective (RPO) is the maximum tolerable amount of data loss. Service level agreements (SLAs) are contracts between service providers and consumers concerning expected levels of service. Disaster recovery plans (DRPs) are specific to the restoration of a system.

15. Refer to Figure 12-1. Users in a different location complain that both web servers are not responding. After verifying that the servers are running and then testing connectivity from client stations, you determine that users are configured with a default gateway of 192.168.0.1 and are connecting to www.app1.com, which resolves to 10.1.1.1. Why are users unable to connect to the website?
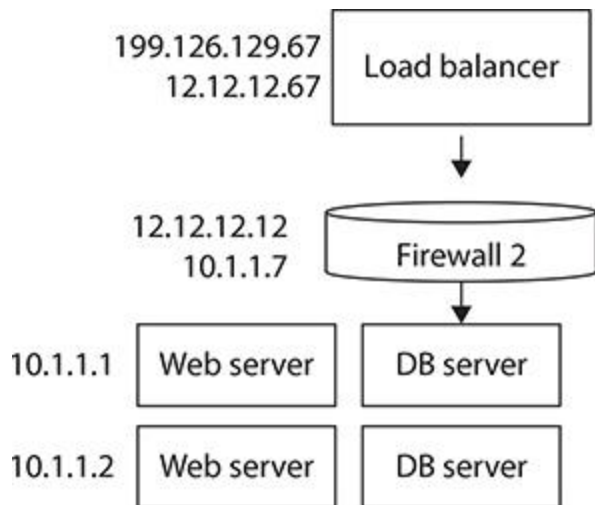
A. The default gateway is incorrect.

B. The FQDN is invalid.

C. www.app1.com should resolve to 10.1.1.2.

D. www.app1.com should resolve to 199.126.129.67.

FIGURE 12-1 Network diagram

☑ **D.** www.app1.com currently resolves to 10.1.1.1, which is behind the load balancer. www.app1.com needs to resolve the load balancer external IP address of 199.126.129.67.

☒ **A, B,** and **C** are incorrect. There is no concrete way of verifying whether the default gateway is correct or not. The FQDN www.app1.com is valid.

16. Refer to Figure 12-1. You are configuring Firewall 2. The web servers use standard HTTP ports. What traffic must Firewall 2 allow?

A. Inbound from 12.12.12.67 destined for 10.1.1.1, 10.1.1.2 TCP port 80

B. Inbound from 199.126.129.67 destined for 10.1.1.1, 10.1.1.2 TCP port 80

C. Inbound from 12.12.12.67 destined for 10.1.1.1, 10.1.1.2 TCP port 3389

D. Inbound from 199.126.129.67 destined for 10.1.1.1, 10.1.1.2 TCP port 3389

☑ **A.** The load balancer internal IP address of 12.12.12.67 needs connectivity to port 80 on both backend web servers.

☒ **B, C,** and **D** are incorrect. The internal, and not external, load balancer IP address must have access to backend servers. Port 3389 is used for the Remote Desktop Protocol (RDP), not web servers.

17. Refer to Figure 12-1. Which statement regarding the network diagram is correct?

A. The internal interface for Firewall 2 is configured on an incorrect subnet.

B. The load balancer external interface IP address is a private IP address.

C. The web server IP addresses must be private IP addresses.

D. Firewall 2 must allow outbound HTTP traffic using ports above 1024.

☑ **D.** Clients connect to web servers on port 80 or 443 (HTTP or HTTPS) and the servers talk back to clients on higher-numbered ports above 1024.

☒ **A, B,** and **C** are incorrect. Without a subnet mask, it is impossible to determine valid IP addresses on subnets. The load balancer external IP address is already a public IP address, and the web servers already have private IP addresses.

18. Refer to Figure 12-1. Which statement regarding the load balancer is correct?

A. The load balancer must have connectivity to the web servers.

B. The load balancer does not need connectivity to the web servers.

C. The load balancer listening port must match the internal web server listening port.

D. The load balancer will not detect if a web server is down.

☑ **A.** Load balancers must have connectivity to backend web servers for load balancing to work.

☒ **B, C,** and **D** are incorrect. Load balancers must talk to backend servers and can detect unresponsive servers, but the ports do not have to match.

19. Your company is migrating on-premises services to the public cloud. In the interim, you need a way to use existing backup solutions while backing up data to the public cloud. Which on-premises backup functionality is required?

A. Write verify

B. Tape encryption

C. VTL emulation

D. Tunneling

☑ **C.** Virtual tape library (VTL) emulation exposes storage in a format understood by backup software.

☒ **A, B,** and **D** are incorrect. Write verify ensures that backed-up data is not corrupt. Tape encryption provides data confidentiality. Tunneling is not related to data backup.

20. The archive bit for files modified since the last backup will be set to which value?

A. b

B. m

C. 0

D. 1

☑ **D.** When a file is modified, it needs to be archived (backed up), so the archive bit is turned on to a value of 1.

☒ **A, B,** and **C** are incorrect. b and m are not valid file attributes. 0 normally means the file has been backed up and has not since been modified.

21. The archive bit for unmodified files that have been backed up will be set to which value?

A. b

B. m

C. 0

D. 1

☑ **C.** 0 normally means the file has been backed up and has not since been modified.

☒ **A, B,** and **D** are incorrect. b and m are not valid file attributes. When a file is modified, it needs to be archived (backed up), so the archive bit is turned on to a value of 1.

22. A virtual machine file server's virtual hard disks are corrupt and cannot be repaired. Which type of tape backup will take the least amount of time to restore?

A. Snapshot

B. Incremental

C. Differential

D. Full

D. Full backups require a single backup set, or volume, to restore instead of switching out multiple backup tapes.

24

☒ **A, B,** and **C** are incorrect. Snapshots provide a point-in-time picture of the state of a virtual machine or disk volume. Incremental backups include files modified since the last full or incremental backup. Differential backups include files modified since the last full backup.

23. A virtual machine file server's virtual hard disks are corrupt and cannot be repaired. Which type of tape backup takes the most amount of time to restore?

A. Snapshot

B. Incremental

C. Differential

D. Full

☑ **B.** Incremental backups are the longest to restore since multiple backup tapes must be switched out to complete the restore.

☒ **A, C,** and **D** are incorrect. Snapshots provide a point-in-time picture of the state of a virtual machine or disk volume. Differential backups include files modified since the last full backup. Full backups include all files, modified or not, since the last backup.

24. Which type of backup contains only those files modified since the last full backup?

A. Snapshot

B. Incremental

C. Differential

D. Full

☑ **C.** Differential backups include only files modified since the last full backup.

☒ **A, B,** and **D** are incorrect. Snapshots provide a point-in-time picture of the state of a virtual machine or disk volume. Incremental backups include files modified since the last full or incremental backup. Full backups include all files, modified or not, since the last backup.

25. Which type of backup does not modify the archive bit?

A. Snapshot

B. Incremental

C. Differential

D. Full

☑ **C.** Differential backups include files created or modified since the last full backup. The archive bit is not cleared with this type of backup so that the next differential backup will still include all files since the last full backup.

☒ **A, B,** and **D** are incorrect. Snapshots provide a point-in-time picture of the state of a virtual machine or disk volume. New and modified files have the archive bit enabled, or set to 1, or "on", which means it needs to be backed up. This is a flag used by backup software to determine what should be included in the backup. Incremental backups include files modified since the last full or incremental backup. Full backups include all files, modified or not, since the last backup.

26. While creating a DRP, you are concerned with how long the restoration of data files will take. You conclude the restoration cannot exceed three hours. What is another way of stating this?

A. RPO = 3 hours

B. Backup = 3 hours

C. RTO = 3 hours

D. Restore = 3 hours

☑ **C.** The recovery time objective (RTO) is the maximum amount of tolerable downtime.

☒ **A, B,** and **D** are incorrect. The recovery point objective (RPO) is the maximum tolerable amount of data loss. RTO and RPO are terms used in business continuity parlance, not backup and restore.

27. What is the purpose of a backup catalog?

A. It is an index of the data on backup media.

B. It contains decryption keys.

C. It contains software licenses.

D. It lists backup sources available on the network.

☑ **A.** Backup catalogs are an index of the contents of backup media.

26

☒ **B, C,** and **D** are incorrect. The listed items are not stored in a backup catalog.

28. Which term is best associated with data backups?

A. Performance

B. Integrity

C. Availability

D. Confidentiality

☑ **C.** Data is more available if there are backups of it.

☒ **A, B,** and **D** are incorrect. The listed items are not as related to data backups as availability is.

29. Your network link to the public cloud is 80 percent utilized by other services. On-premises files must be replicated to the public cloud while minimizing bandwidth usage. What type of replication method should you use?

A. Asynchronous

B. Synchronous

C. Block-level backup

D. Content delivery network

☑ **C.** Block-level backup detects file block changes and replicates only those items.

☒ **A, B,** and **D** are incorrect. Asynchronous and synchronous replication are related to acknowledgments of disk writes. Content delivery networks (CDNs) place content so that it is geographically near end users.

30. Which type of snapshot technology has the least computational requirements?

A. Copy-on-write

B. Deduplication

C. Compression

D. Redirect-on-write

☑ **D.** Redirect-on-write snapshots redirect write requests to alternate locations so that the original data continues to be available.

☒ **A, B,** and **C** are incorrect. Copy-on-write makes a copy of blocks before changes overwrite them; this is more computationally expensive than redirection when writing. Deduplication and compression are not snapshot technologies.

31. What is another name for a cloud backup?

A. Snapshot

B. Clone

C. Online backup

D. Offline backup

☑ **C.** Online backups are always readily available as is the case with cloud backups.

☒ **A, B,** and **D** are incorrect. The listed terms are not synonymous with cloud backup.

32. You need to ensure that critical on-premises virtual machines are immediately available in the event of a regional disaster. What should you configure?

A. Cloud failover

B. Failover cluster

C. Hourly backups

D. Virtual machine clones

☑ **A.** Cloud failover allows on-premises services to be failed over to a cloud provider.

☒ **B, C,** and **D** are incorrect. A regular failover cluster will not solve the issue of a regional disaster. Backups and virtual machine clones are not designed for immediate access when an outage occurs.

33. Due to a short RTO of five minutes, you need to ensure a mission-critical website is available in the event of a regional disaster. What should you configure?

A. Mirrored site

B. Staged site

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C. Container site

D. Zone site

☑ **A.** A mirrored site is a copy of a website (in this case) that provides high availability.

☒ **B, C,** and **D** are incorrect. The listed site types are invalid.

34. A custom application draws insights from big data analytics. Due to the large volume of data transmitted between application components, you need to minimize computational and network latency. Which pair of options should you consider?

A. Distributed processing, jumbo frames

B. Jumbo frames, NIC teaming

C. Clustering, edge sites

D. Scaling in, edge sites

☑ **A.** Distributed processing uses multiple computers working together to solve large, complex problems. Jumbo frames are larger than normal network frames that can contain more data while reducing the number of frames that need to be processed. Network devices such as routers must be configured with an appropriate maximum transmission unit (MTU) size to properly support jumbo frames.

☒ **B, C** and **D** are incorrect. Jumbo frames are oversized network packets that allow more data to be sent in a single transmission, while NIC teaming groups two or more network interface cards (NICs) together for the purpose of redundancy or aggregated bandwidth, but these do not address computational latency. Clustering is used to make applications highly available but does not reduce computational or network latency. Edge sites can reduce network latency by keeping application components close together. Scaling in reduces the number of virtual machine nodes that support an application.

35. You need to ensure that server backups have a minimal impact on user productivity. When should you schedule backups to occur?

A. During maintenance windows

B. 12 A.M.–5 A.M.

C. During failback windows

D. 6 P.M.–12 A.M.

☑ **A.** Maintenance windows are built around times of minimal computing requirements.

☒ **B, C,** and **D** are incorrect. Not every company has the same productivity schedules. Failback windows is an invalid term.

36. Which action could have resulted in the state of the file depicted in ?

A.   A change was made to the file.

B.   Block-level snapshots were enabled.

C.   A full backup was just performed.

D.   An incremental backup was just performed.

FIGURE 12-2 Windows file properties
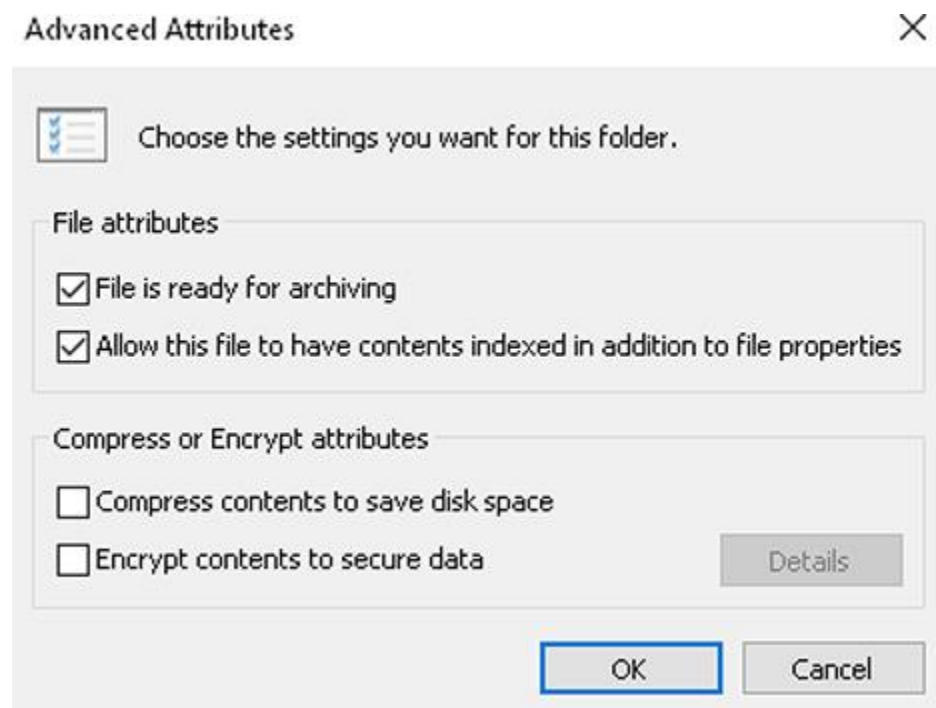
☑ **A.** You know the file was changed because it is flagged as being ready for archiving.

☒ **B, C,** and **D** are incorrect. The archive bit is not related to snapshots. You know a backup has not occurred since the archive bit is enabled.

37. Which benefits are realized by using a content delivery network? Choose two.

A.   Enhanced security

B. Dynamic website content

C. Increased performance

D. Data availability

☑ **C** and **D.** Content delivery networks (CDNs) place content so that it is geographically near end users, which increases performance and data availability.

☒ **A** and **B** are incorrect. Accounts do not need delegated cloud administrative privileges of any kind. CDNs do not increase security nor do they enable dynamic website content.

38. What can be done to adhere to the RPO?

A. Enable deduplication.

B. Increase backup storage capacity.

C. Increase backup frequency.

D. Use SSD storage.

☑ **C.** The recovery point objective (RPO) is the maximum tolerable amount of data loss, and it is related to the backup frequency.

☒ **A, B,** and **D** are incorrect. Deduplication reduces disk space consumption. Additional backup space and fast SSD storage do not have a direct impact on the RPO.

39. How is the DRP different from the BCP?

A. The DRP is specific to a system.

B. The BCP is specific to a system.

C. The DRP is related to business continuity.

D. The BCP is related business continuity.

☑ **A.** Whereas business continuity plans (BCPs) ensure the overall continued meeting of business objectives, disaster recovery plans (DRPs) apply to restoration procedures of specific systems.

☒ **B, C,** and **D** are incorrect. Both DRPs and BCPs are related to business continuity.

40. Which of the following items can reduce the RTO? Choose two.

A. Runbooks

B. Increased network bandwidth

C. Decreased network bandwidth

D. Content delivery networks

☑ **A** and **B.** Runbooks are used to automate workflows; this along with more network bandwidth can reduce the time to restore a failed service.

☒ **C** and **D** are incorrect. The listed items will not reduce the recovery time objective (RTO).

41. Which communication method is used for inter-node cluster communication?

A. Shared storage

B. LUN

C. iSCSI

D. Heartbeat

☑ **D.** The cluster heartbeat is constant cluster node intercommunication.

☒ **A, B,** and **C** are incorrect. The listed items are not specifically designated as cluster heartbeat mechanisms.

42. What do cluster nodes use to conclude that a member is no longer available?

A. Heartbeat

B. Ping

C. Tracert

D. DNS TTL

☑ **A.** When a cluster node does not send a heartbeat within a configured timeframe, other nodes discard the silent node and take over its services.

☒ **B, C,** and **D** are incorrect. Ping and tracert are TCP/IP connectivity tools. The DNS time-to-live (TTL) determines how long DNS entries remain cached.

43. Which type of alternative disaster recovery site contains equipment but lacks up-to-date data?

A. Cold site

B. Warm site

C. Hot site

D. Lukewarm site

☑ **B.** Warm sites lack only up-to-date data.

☒ **A, C,** and **D** are incorrect. Cold site are empty facilities. Hot sites are fully equipped and contain up-to-date data. Lukewarm sites do not exist.

44. Which type of redundancy allows nodes to reside on different sides of a WAN?

A. WAN clustering

B. Geo-clustering

C. Disparate clustering

D. Long-haul clustering

☑ **B.** Geo-clustering provides high availability across long distances.

☒ **A, C,** and **D** are incorrect. The listed items are not valid clustering terms.

45. Which of the following is a common SAN redundancy configuration?

A. Failover clustering

B. Regional replication

C. Multipathing

D. RAID 0

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☑ **C.** Multipathing uses redundancy (HBAs, Fibre Channel switches) to remove single points of failure in a storage area network (SAN).

☒ **A, B,** and **D** are incorrect. The listed solutions are not directly related to SANs.

46. You are about to apply a new batch of updates to a Linux virtual machine. What should you do before performing this task?

A. Take a snapshot.

B. Create a clone.

C. Enable RAID 0.

D. Enable RAID 1.

☑ **A.** Virtual machine snapshots are useful for quick point-in-time copies of a virtual machine's state that will be kept for a short time.

☒ **B, C,** and **D** are incorrect. Creating a clone or enabling RAID takes much longer and does not provide additional benefits.

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