# 70-764 Q&As

Administering a SQL Database Infrastructure

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**QUESTION 1**

You manage a Microsoft SQL Server instance that has a database named DB1. The instance has a server audit named Audit1. DB1 uses the following schemas:

| Schema | Comments |
|---|---|
| Schema1 | This schema is owned by User1. The schema contains the following tables: Table1, Table2 |
| Schema2 | This schema contains 10 tables |

You need to implement a database audit specification for database DB1 that meets the following requirements:

Audit only delete statements performed by users in the db_datawriter role.

Audit insert statements for all tables in Schema1 for all users.

How should you complete the Transact-SQL statement? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

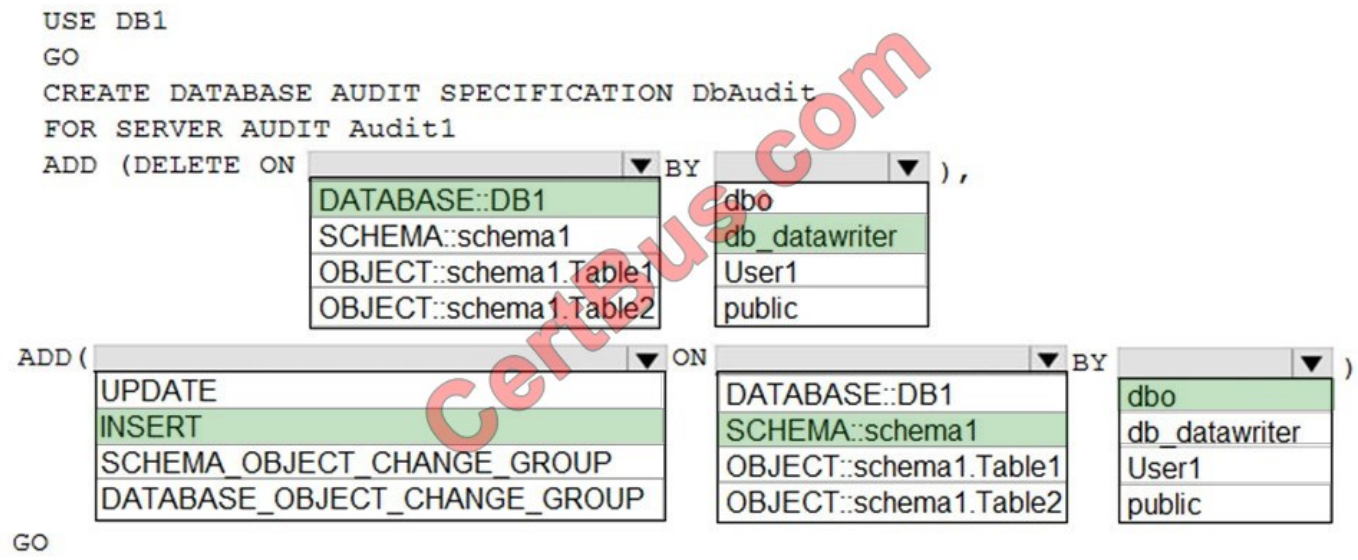
Hot Area:

**Answer Area**

```
USE DB1
GO
CREATE DATABASE AUDIT SPECIFICATION DbAudit
FOR SERVER AUDIT Audit1
ADD (DELETE ON [ DATABASE::DB1 | SCHEMA::schema1 | OBJECT::schema1.Table1 | OBJECT::schema1.Table2 ]
     BY [ dbo | db_datawriter | User1 | public ]),
ADD ( [ UPDATE | INSERT | SCHEMA_OBJECT_CHANGE_GROUP | DATABASE_OBJECT_CHANGE_GROUP ]
      ON [ DATABASE::DB1 | SCHEMA::schema1 | OBJECT::schema1.Table1 | OBJECT::schema1.Table2 ]
      BY [ dbo | db_datawriter | User1 | public ] )
GO
```

Correct Answer:

## Answer Area






**QUESTION 2**

Overview

General Overview

ADatum Corporation has offices in Miami and Montreal.

The network contains a single Active Directory forest named adatum.com. The offices connect to each other by using a WAN link that has 5-ms latency. A. Datum standardizes its database platform by using SQL Server 2014 Enterprise

edition.

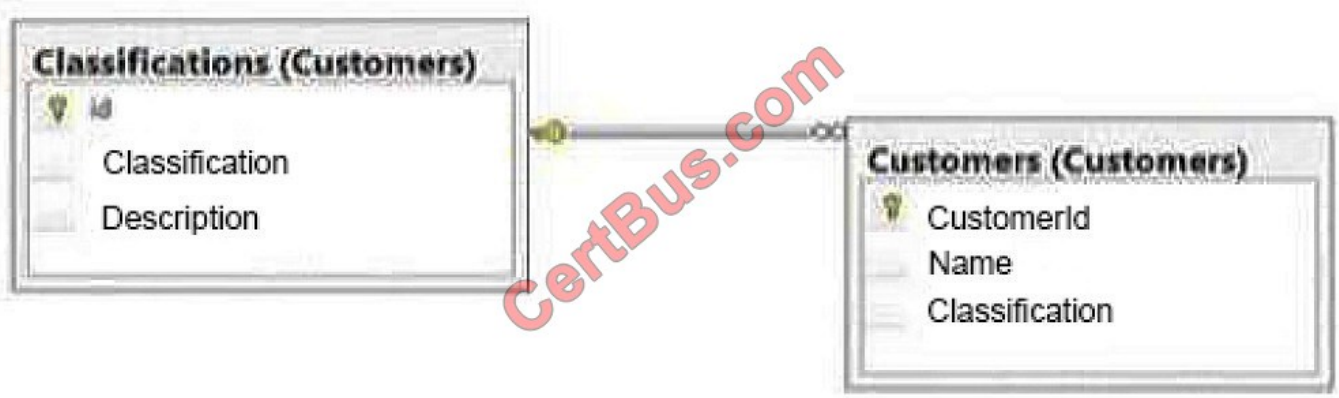
Databases

Each office contains databases named Sales, Inventory, Customers, Products, Personnel, and Dev.

Servers and databases are managed by a team of database administrators. Currently, all of the database administrators have the same level of permissions on all of the servers and all of the databases.

The Customers database contains two tables named Customers and Classifications.

The following graphic shows the relevant portions of the tables:




The following table shows the current data in the Classifications table:

| ID | Classification | Description |
|---|---|---|
| 1 | Platinum | Yearly sales over 1,000,000 |
| 2 | Gold | Yearly sales over 500,000 |
| 3 | Silver | Yearly sales over 100,000 |

The Inventory database is updated frequently.

The database is often used for reporting.

A full backup of the database currently takes three hours to complete.

Stored Procedures

A stored procedure named USP_1 generates millions of rows of data for multiple reports. USP_1 combines data from five different tables from the Sales and Customers databases in a table named Table1. After Table1 is created, the

reporting process reads data from Table1 sequentially several times. After the process is complete, Table1 is deleted. A stored procedure named USP_2 is used to generate a product list. The product list contains the names of products

grouped by category.

USP_2 takes several minutes to run due to locks on the tables the procedure accesses. The locks are caused by USP_1 and USP_3.

A stored procedure named USP_3 is used to update prices. USP_3 is composed of several UPDATE statements called in sequence from within a transaction. Currently, if one of the UPDATE statements fails, the stored procedure fails. A

stored procedure named USP_4 calls stored procedures in the Sales, Customers, and Inventory databases.

The nested stored procedures read tables from the Sales, Customers, and Inventory databases. USP_4 uses an EXECUTE AS clause.

All nested stored procedures handle errors by using structured exception handling. A stored procedure named USP_5 calls several stored procedures in the same database. Security checks are performed each time USP_5 calls a stored

procedure.

You suspect that the security checks are slowing down the performance of USP_5. All stored procedures accessed by user applications call nested stored procedures.

The nested stored procedures are never called directly.

Design Requirements

Data Recovery

You must be able to recover data from the Inventory database if a storage failure occurs. You have a Recovery Time Objective (RTO) of 5 minutes.

You must be able to recover data from the Dev database if data is lost accidentally. You have a Recovery Point Objective (RPO) of one day.

Classification Changes

You plan to change the way customers are classified. The new classifications will have four levels based on the number of orders. Classifications may be removed or added in the future. Management requests that historical data be

maintained for the previous classifications. Security A group of junior database administrators must be able to manage security for the Sales database. The junior database administrators will not have any other administrative rights. A. Datum

wants to track which users run each stored procedure.

Storage

ADatum has limited storage. Whenever possible, all storage space should be minimized for all databases and all backups.

Error Handling

There is currently no error handling code in any stored procedure.

You plan to log errors in called stored procedures and nested stored procedures. Nested stored procedures are never called directly.

You need to recommend a solution for the planned changes to the customer classifications. What should you recommend? (Each correct answer presents part of the solution. Choose all that apply.)

A. Add a row to the Customers table each time a classification changes.

B. Add columns for each classification to the Customers table.

C. Add a table to track any changes made to the classification of each customer.

D. Add a column to the Classifications table to track the status of each classification.

E. Implement change data capture.

Correct Answer: CD

Scenario:

You plan to change the way customers are classified.

The new classifications will have four levels based on the number of orders. Classifications may be removed or added in the future.

Incorrect Answers:

E: Change data capture provides information about DML changes on a table and a database. By using change data capture, you eliminate expensive techniques such as user triggers, timestamp columns, and join queries.

**QUESTION 3**

Note: This question is part of a series of questions that use the same or similar answer choices. An answer choice may be correct for more than one question in the series. Each question is independent of the other questions in this series.

Information and details provided in a question apply only to that question.

A company has an on-premises Microsoft SQL Server environment.

SQL Server backups should be stored as Microsoft Azure blob pages. The connection process from the SQL Server instances to Azure should be encrypted.

You need to store backups as Azure blob pages. Which option should you use?

A. backup compression

B. backup encryption

C. file snapshot backup

D. mirrored backup media sets

E. SQL Server backup to URL

F. SQL Server Managed Backup to Azure

G. tail-log backup

H. back up and truncate the transaction log

Correct Answer: F

SQL Server Managed Backup to Microsoft Azure manages and automates SQL Server backups to Microsoft Azure Blob storage. You can choose to allow SQL Server to determine the backup schedule based on the transaction workload of your database. Or you can use advanced options to define a schedule. The retention settings determine how long the backups are stored in Azure Blob storage.

References: https://docs.microsoft.com/en-us/sql/relational-databases/backup-restore/sql-server-managed-backup-to-microsoft-azure?view=sql-server-2017

**QUESTION 4**

You administer a Microsoft SQL Server 2016 database.

Users report that a billing application becomes unresponsive during busy times of the day.

While investigating, you notice large number of processes taking or waiting for table locks.

You suspect that SQL Server is assigning stronger locks to queries.

You start a SQL Profiler trace.

Which event should you select?

A. Deadlock graph

B. Lock: Escalation

C. Lock: Timeout

D. Lock: Deadlock

Correct Answer: B

**QUESTION 5**

You have a customer who has several SQL Server 2012 database servers. You are designing a data warehouse for the customer. The data warehouse will use columnstore indexes.

The customer identifies that the following must be supported for the column store indexes. Data manipulation language (DML) statements Nonclustered columnstore indexes Clustered columnstore indexes - Partitioning

You need to identify which technology requires the customer to implement an SQL Server 2014 database. What should you identify?

A. clustered columnstore indexes

B. nonclustered columnstore indexes

C. data manipulation language (DML) statements

D. partitioning

Correct Answer: A

SQL Server 2014 has the features of SQL Server 2012 plus updateable clustered columnstore indexes. This feature is required here as DML statements must be supported in the warehouse. References: https://msdn.microsoft.com/en-us/library/gg492088(v=sql.120).aspx

**QUESTION 6**

You administer a Microsoft SQL Server 2016 database that has multiple tables in the Sales schema.

Some users must be prevented from deleting records in any of the tables in the Sales schema. You need to manage users who are prevented from deleting records in the Sales schema.

You need to achieve this goal by using the minimum amount of administrative effort.

What should you do?

A. Create a custom database role that includes the users. Deny Delete permissions on the Sales schema for the custom database role.

B. Include the Sales schema as an owned schema for the db_denydatawriter role. Add the users to the db_denydatawriter role.

C. Deny Delete permissions on each table in the Sales schema for each user.

D. Create a custom database role that includes the users. Deny Delete permissions on each table in the Sales schema for the custom database role.

Correct Answer: A

**QUESTION 7**

You have a SQL Server 2012 database named DB1.

You plan to import a large number of records from a SQL Azure database to DB1.

You need to recommend a solution to minimize the amount of space used in the transaction log during the import operation.

What should you include in the recommendation?

A. a new log file

B. a new filegroup

C. the full recovery model

D. a new partitioned table

E. the bulk-logged recovery model

Correct Answer: E

Compared to the full recovery model, which fully logs all transactions, the bulk-logged recovery model minimally logs bulk operations, although fully logging other transactions. The bulk-logged recovery model protects against media failure

and, for bulk operations, provides the best performance and least log space usage.

Note:

The bulk-logged recovery model is a special-purpose recovery model that should be used only intermittently to improve the performance of certain large-scale bulk operations, such as bulk imports of large amounts of data. Recovery Models

(SQL Server)

**QUESTION 8**

You are building a stored procedure for a SQL Azure database. The procedure will add multiple rows to a table. You

need to design the stored procedure to meet the following requirements:

If any of the new rows violates a table constraint, then no further additions must be attempted and all changes made by the stored procedure must be discarded.

If any errors occur, a row must be added to an audit table, and the original error must be returned to the caller of the stored procedure.

What should you include in the design?

A. An implicit transaction that has XACT_ABORT enabled

B. An explicit transaction that has XACT_ABORT disabled

C. An implicit transaction that has error handling enabled

D. An explicit transaction that has error handling enabled

Correct Answer: D

References: http://technet.microsoft.com/en-us/library/ms175127(v=SQL.105).aspx

**QUESTION 9**

You plan to deploy SQL Server 2014.

You identify the following security requirements for the deployment:

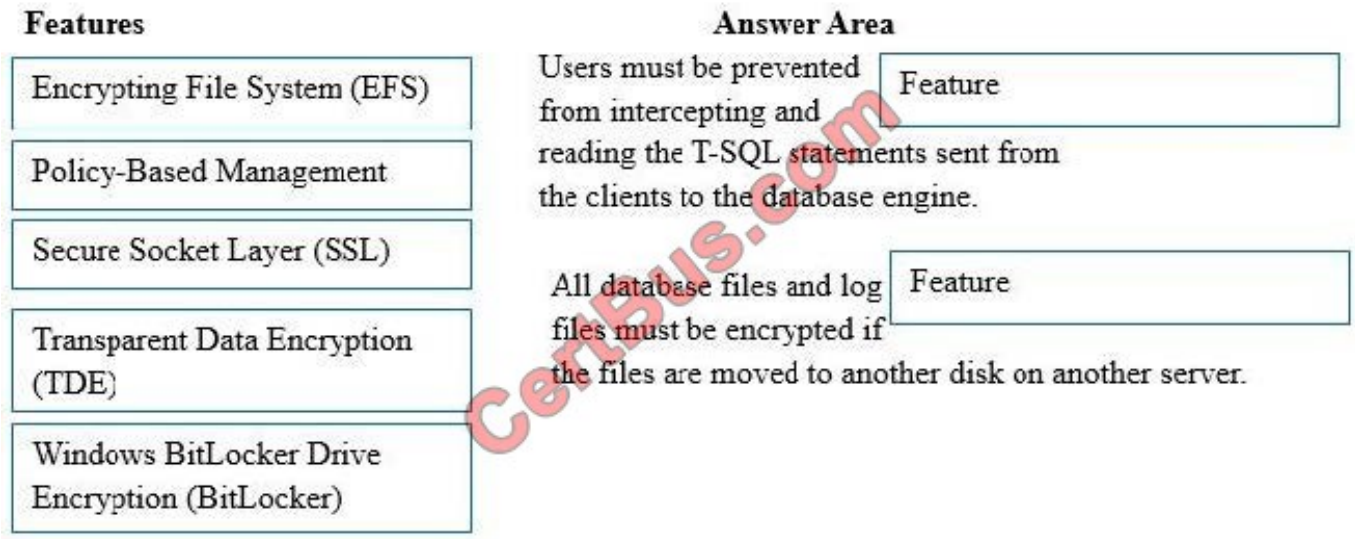
Users must be prevented from intercepting and reading the T-SQL statements sent from the clients to the database engine.

All database files and log files must be encrypted if the files are moved to another disk on another server.

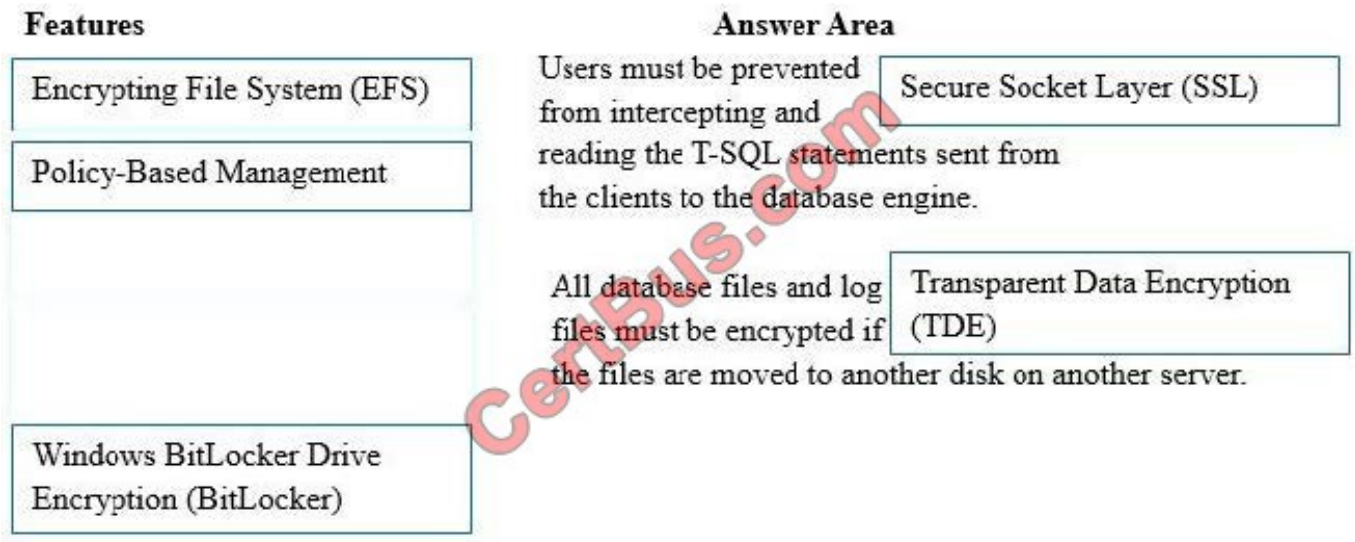
You need to identify which feature meets each security requirement. The solution must minimize processor overhead.

Which features should you identify? To answer, drag the appropriate feature to the correct requirement in the answer area.

Select and Place:




Correct Answer:




- Secure Sockets Layer (SSL) encryption enables transmitting encrypted data across the network between an instance of SQL Server and a client application.

-Transparent data encryption (TDE) performs real-time I/O encryption and decryption of the data and log files.

**QUESTION 10**

You administer a Microsoft SQL Server 2016 instance that contains a financial database hosted on a storage area network (SAN). The financial database has the following characteristics:

A data file of 2 terabytes is located on a dedicated LUN (drive D).

A transaction log of 10 GB is located on a dedicated LUN (drive E).

Drive D has 1 terabyte of free disk space.

Drive E has 5 GB of free disk space.

The database is continually modified by users during business hours from Monday through Friday between 09:00 hours and 17:00 hours.

Five percent of the existing data is modified each day.

The Finance department loads large CSV files into a number of tables each business day at 11:15 hours and 15:15 hours by using the BCP or BULK INSERT commands.

Each data load adds 3 GB of data to the database.

These data load operations must occur in the minimum amount of time. A full database backup is performed every Sunday at 10:00 hours.

Backup operations will be performed every two hours (11:00, 13:00, 15:00, and 17:00) during business hours.

You implement log shipping of the financial database to another SQL Server 2016 instance. You decide to failover to this secondary database.

You need to ensure that all transactions will be replicated to the secondary database.

Which backup option should you use?

A. Differential

B. Transaction Log

C. FULL

D. SIMPLE

E. SKIP

F. RESTART

G. STANDBY

H. CHECKSUM

I. DBO_ONLY

J. COPY_ONLY

K. NORECOVERY

L. NO_CHECKSUM

M. CONTINUE_AFTER_ERROR

N. BULK_LOGGED

Correct Answer: K

Roll back is controlled by the RESTORE statement through the [ RECOVERY | NORECOVERY ] options:

NORECOVERY specifies that roll back not occur. This allows roll forward to continue with the next statement in the

sequence.

References: https://docs.microsoft.com/en-us/sql/t-sql/statements/restore-statements-transact-sql

**QUESTION 11**

You have a database. The existing backups for the database and their corresponding files are listed in the following table.

| Backup type | Backup date/time | File name |
|---|---|---|
| Full | 05/02/2016 21:00 | Full_20160502_2100.bak |
| Transaction log | 05/03/2016 6:00 | Log_20160503_0600.trn |
| Transaction log | 05/03/2016 9:00 | Log_20160503_0900.trn |
| Differential | 05/03/2016 12:00 | Diff_20160503_1200.bak |
| Transaction log | 05/03/2016 15:00 | Log_20160503_1500.trn |
| Differential | 05/03/2016 17:00 | Diff_20160503_1700.bak |
| Transaction log | 05/03/2016 19:00 | Log_20160503_1900.trn |

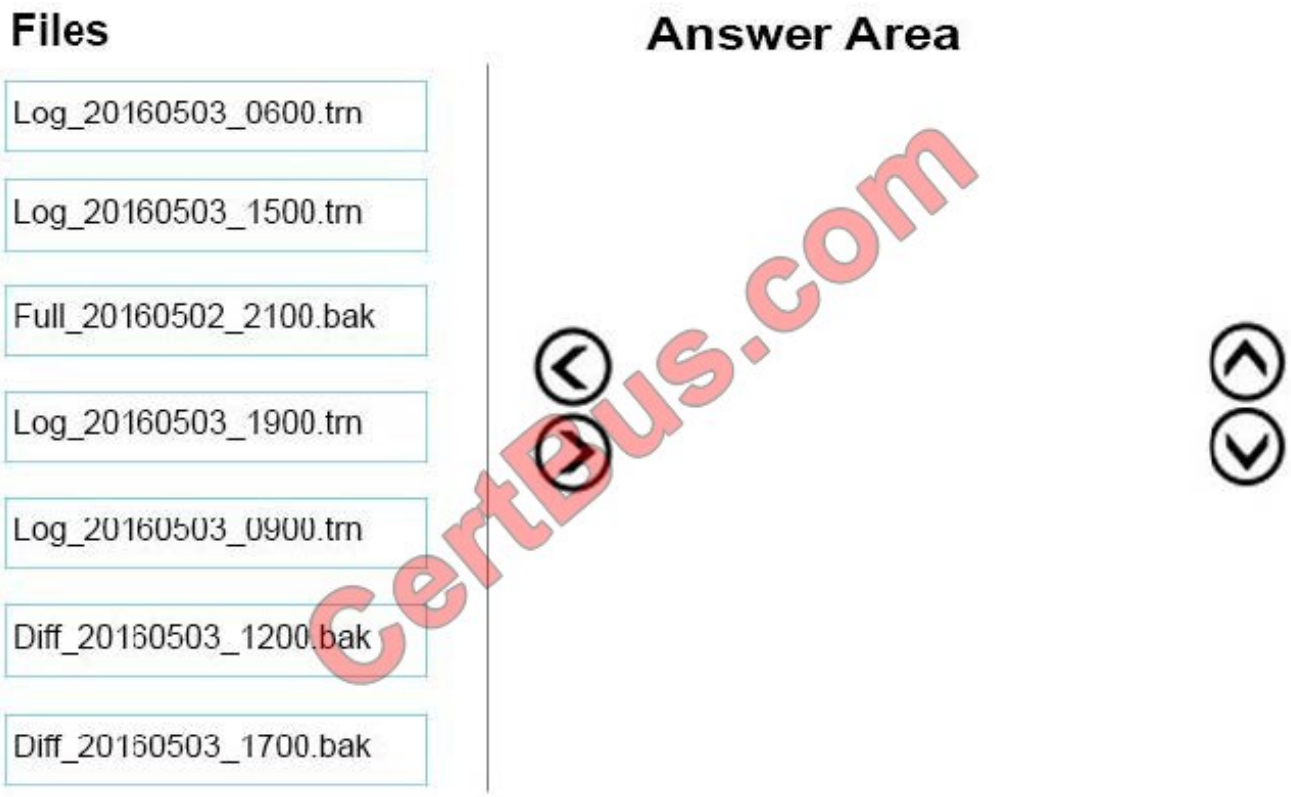


You purchase a new server. You must restore the database to the new server.

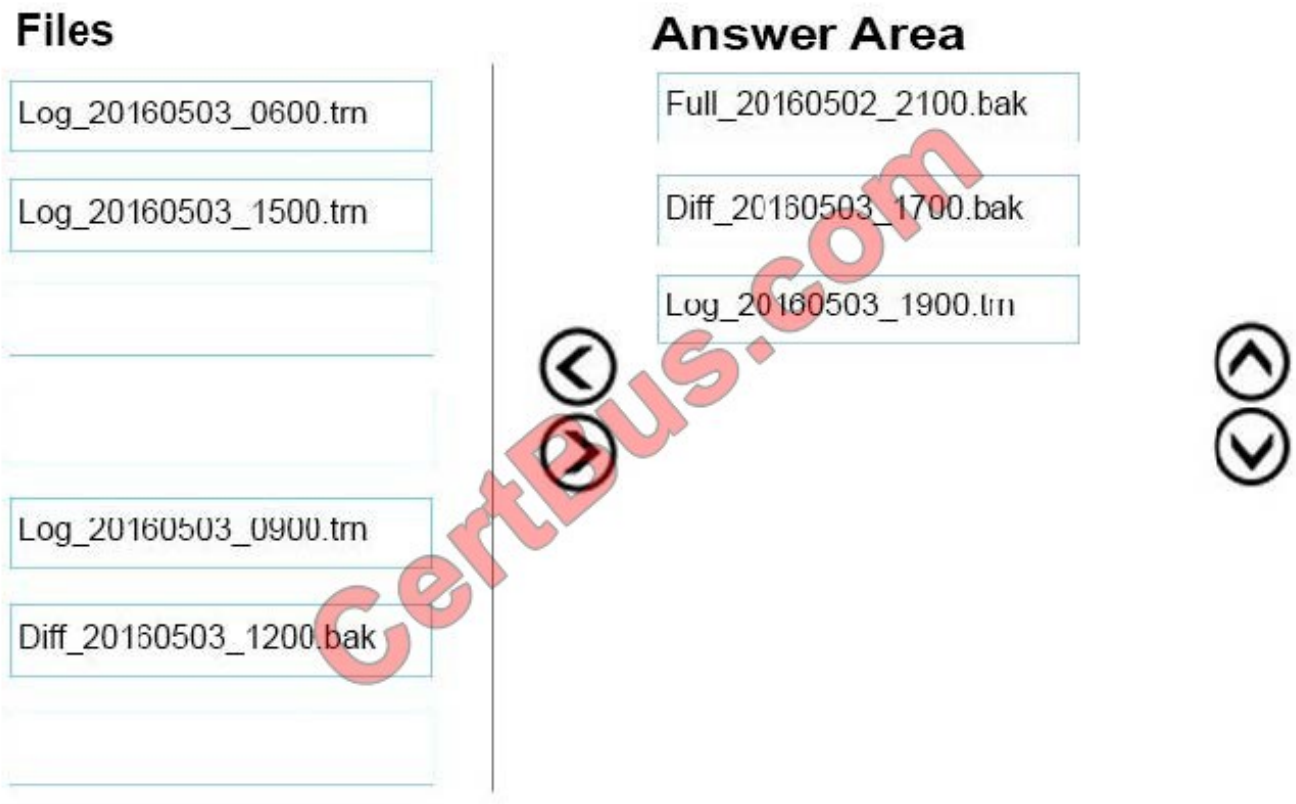
You need to restore the data to the most recent time possible.

Which three files should you restore in sequence? To answer, move the appropriate files from the list of files to the answer area and arrange them in the correct order.

Select and Place:




Correct Answer:




Step 1: Full.

Start with the full backup.

Step 2: Diff_20160503_1700.bak

Followed by the most recent differential backup.

Step 3: Log_20160503_1900.bak

And finally the most recent log backup (the only log backup done after the most recent differential backup).

References: https://docs.microsoft.com/en-us/sql/relational-databases/backuprestore/differential-backups-sql-server

**QUESTION 12**

Your company has offices in Seattle and Montreal.

The network contains two servers named Server1 and Server2 that have SQL Server 2012 installed. The servers are located in separate building within your campus.

The latency of the WAN link between the buildings is less than 10 ms.

You plan to implement an AlwaysOn availability group on both servers.

You need to recommend a failover type for the availability group.

What should you recommend?

A. Asynchronous automatic failover

B. Synchronous manual failover

C. Asynchronous manual failover

D. Synchronous automatic failover

Correct Answer: D

**QUESTION 13**

You administer a Microsoft SQL Server 2016 database named Contoso on a server named Server01.

You need to prevent users from disabling server audits in Server01.

What should you create?

A. an Alert

B. a Resource Pool

C. an Extended Event session

D. a Policy

E. a Database Audit Specification

F. a SQL Profiler Trace

G. a Server Audit Specification

Correct Answer: D

**QUESTION 14**

Background

Corporate Information

Fabrikam, Inc. is a retailer that sells electronics products on the Internet. The company has a headquarters site and one satellite sales office. You have been hired as the database administrator, and the company wants you to change the

architecture of the Fabrikam ecommerce site to optimize performance and reduce downtime while keeping capital expenditures to a minimum. To help with the solution, Fabrikam has decided to use cloud resources as well as on-premise

servers.

Physical Locations

All of the corporate executives, product managers, and support staff are stationed at the headquarters office. Half of the sales force works at this location. There is also a satellite sales office. The other half of the sales force works at the

satellite office in order to have sales people closer to clients in that area. Only sales people work at the satellite location.

Problem Statement

To be successful, Fabrikam needs a website that is fast and has a high degree of system uptime. The current system operates on a single server and the company is not happy with the single point of failure this presents. The current nightly

backups have been failing due to insufficient space on the available drives and manual drive cleanup often needing to happen to get past the errors. Additional space will not be made available for backups on the HQ or satellite servers.

During your investigation, you discover that the sales force reports are causing significant contention.

Configuration

Windows Logins

The network administrators have set up Windows groups to make it easier to manage security. Users may belong to more than one group depending on their role. The groups have been set up as shown in the following table:

| Group | Members |
|---|---|
| OurDomain\Management | All corporate executives |
| OurDomain\SalesStaff | All sales people |
| OurDomain\ProductionStaff | All product managers and support staff |
| OurDomain\AllUsers | Everyone |
| OurDomain\CustomerSupport | Customer support representatives |

Server Configuration The IT department has configured two physical servers with Microsoft Windows Server 2012 R2 and SQL Server 2014 Enterprise Edition and one Windows Azure Server. There are two tiers of storage available for use by database files only a fast tier and a slower tier. Currently the data and log files are stored on the fast tier of storage only. If a possible use case exists, management would like to utilize the slower tier storage for data files. The servers are configured as shown in the following table:

| Location | Server |
|---|---|
| Company headquarters | HQ_Server |
| Satellite sales office | Satellite_Server |
| Microsoft Windows Azure (cloud) | Cloud_File Server |

Database

Currently all information is stored in a single database called ProdDB, created with the following script:

```
CREATE DATABASE ProdDB
GO
ALTER DATABASE ProdDB SET RECOVERY SIMPLE
GO
```

The Product table is in the Production schema owned by the ProductionStaff Windows group. It is the main table in the system so access to information in the Product table should be as fast as possible. The columns in the Product table are defined as shown in the following table:

| Column | Data type |
|---|---|
| ProductID | INT |
| ProductName | VARCHAR(100) |
| ProductDescription | VARCHAR(MAX) |
| ProductPrice | SMALLMONEY |
| QuantityOnHand | INT |
| ProductCost | SMALLMONEY |
| ProductSupplierID | INT |

The SalesOrderDetail table holds the details about each sale. It is in the Sales schema owned by the SalesStaff Windows group. This table is constantly being updated, inserted into, and read. The columns in the SalesOrderDetail table are defined as shown in the following table:

| Column | Data type |
|---|---|
| SalesOrderDetailID | INT |
| ProductID | INT |
| SalePrice | SMALLMONEY |
| SaleQuantity | INT |

Database Issues

The current database does not perform well. Additionally, a recent disk problem caused the system to go down, resulting in lost sales revenue. In reviewing the current system, you found that there are no automated maintenance procedures.

The database is severely fragmented, and everyone has read and write access.

Requirements

Database

The database should be configured to maximize uptime and to ensure that very little data is lost in the event of a server failure. To help with performance, the database needs to be modified so that it can support in-memory data, specifically

for the Product table, which the CIO has indicated should be a memoryoptimized table. The auto-update statistics option is set off on this database. Only product managers are allowed to add products or to make changes to the name,

description, price, cost, and supplier. The changes are made in an internal database and pushed to the Product table in ProdDB during system maintenance time. Product managers and others working at the headquarters location also

should

be able to generate reports that include supplier and cost information.

Customer data access

Customers access the company\\'s website to order products, so they must be able to read product information such asname, description, and price from the Product table. When customers place orders, stored procedures calledby the website

update product quantityon-hand values. This means the product table is constantly updated at randomtimes.

Customer support data access

Customer support representatives need to be able to view and not update or change product information. Management does not want the customer support representatives to be able to see the product cost or any supplier information.

Sales force data access

Sales people at both the headquarters office and the satellite office must generate reports that read from the Product and SalesOrderDetail tables. No updates or inserts are ever made by sales people. These reports are run at random times

and there can be no reporting downtime to refresh the data set except during the monthly maintenance window. The reports that run from the satellite office are process intensive queries with large data sets. Regardless of which office runs a

sales force report, the SalesOrderDetail table should only return valid, committed order data; any orders not yet committed should be ignored.

Historical Data

The system should keep historical information about customers who access the site so that sales people can see how frequently customers log in and how long they stay on the site.

The information should be stored in a table called Customer Access. Supporting this requirement should have minimal impact on production website performance.

Backups

The recovery strategy for Fabrikam needs to include the ability to do point in time restores and minimize the risk of data loss by performing transaction log backups every 15 minutes.

Database Maintenance

The company has defined a maintenance window every month when the server can be unavailable. Any maintenance functions that require exclusive access should be accomplished during that window.

Project milestones completed

Revoked all existing read and write access to the database, leaving the schema ownership in place.

Configured an Azure storage container secured with the storage account name MyStorageAccount with the primary access key StorageAccountKey on the cloud file server.

SQL Server 2014 has been configured on the satellite server and is ready for use.

On each database server, the fast storage has been assigned to drive letter F:, and the slow storage has been assigned to drive letter D:.

You need to change the ProdDB database.

Which two database options should you change to meet the requirements? Each correct answer presents part of the solution. (Choose two.)

A. CONTAINS FILESTREAM

B. Change recovery model to FULL

C. CONTAINMENT = PARTIAL

D. Change recovery model to BULK_LOGGED

E. COLLATE IN.MEMORY

F. CONTAINS MEMORY OPTIMIZED DATA

Correct Answer: EF

Scenario: To help with performance, the database needs to be modified so that it can support in-memory data, specifically for the Product table, which the CIO has indicated should be a memory-optimized table. Collations and Code Pages FileGroupDefinition.ContainsMemoryOptimizedData Property (Microsoft.SqlServer.TransactSql.ScriptDom)

**QUESTION 15**

You administer a Microsoft SQL Server 2016 database.

You have a SQL Server Agent job instance that runs using the service account.

You have a job step within the job that requires elevated privileges.

You need to ensure that the job step can run using a different user account.

What should you use?

A. a schedule

B. an alert

C. an operator

D. a proxy

Correct Answer: D

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