DP-203.examcollection.premium.exam.61q

Number: DP-203
Passing Score: 800
Time Limit: 120 min
File Version: 1.0

DP-203

Data Engineering on Microsoft Azure (beta)

Version 1.0

Design and implement data storage

Testlet 1

Case study

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study
To display the first question in this case study, click the **Next** button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an **All Information** tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the **Question** button to return to the question.

Overview

Contoso, Ltd. is a clothing retailer based in Seattle. The company has 2,000 retail stores across the United States and an emerging online presence.

The network contains an Active Directory forest named contoso.com. The forest it integrated with an Azure Active Directory (Azure AD) tenant named contoso.com. Contoso has an Azure subscription associated to the contoso.com Azure AD tenant.

Existing Environment

Transactional Data

Contoso has three years of customer, transactional, operational, sourcing, and supplier data comprised of 10 billion records stored across multiple on-premises Microsoft SQL Server servers. The SQL Server instances contain data from various operational systems. The data is loaded into the instances by using SQL Server Integration Services (SSIS) packages.

You estimate that combining all product sales transactions into a company-wide sales transactions dataset will result in a single table that contains 5 billion rows, with one row per transaction.

Most queries targeting the sales transactions data will be used to identify which products were sold in retail stores and which products were sold online during different time periods. Sales transaction data that is older than three years will be removed monthly.

You plan to create a retail store table that will contain the address of each retail store. The table will be approximately 2 MB. Queries for retail store sales will include the retail store addresses.

You plan to create a promotional table that will contain a promotion ID. The promotion ID will be associated to a specific product. The product will be identified by a product ID. The table will be approximately 5 GB.

Streaming Twitter Data

The ecommerce department at Contoso develops an Azure logic app that captures trending Twitter feeds referencing the company's products and pushes the products to Azure Event Hubs.

Planned Changes and Requirements

Planned Changes

Contoso plans to implement the following changes:

- Load the sales transaction dataset to Azure Synapse Analytics.
- Integrate on-premises data stores with Azure Synapse Analytics by using SSIS packages.
- Use Azure Synapse Analytics to analyze Twitter feeds to assess customer sentiments about products.

Sales Transaction Dataset Requirements

Contoso identifies the following requirements for the sales transaction dataset:

- Partition data that contains sales transaction records. Partitions must be designed to provide efficient loads by month. Boundary values must belong to the partition on the right.
- Ensure that queries joining and filtering sales transaction records based on product ID complete as quickly as possible.
- Implement a surrogate key to account for changes to the retail store addresses.
- Ensure that data storage costs and performance are predictable.
- Minimize how long it takes to remove old records.

Customer Sentiment Analytics Requirements

Contoso identifies the following requirements for customer sentiment analytics:

- Allow Contoso users to use PolyBase in an Azure Synapse Analytics dedicated SQL pool to query the content of the data records that host the Twitter feeds. Data must be protected by using row-level security (RLS). The users must be authenticated by using their own Azure AD credentials.
- Maximize the throughput of ingesting Twitter feeds from Event Hubs to Azure Storage without purchasing additional throughput or capacity units.
- Store Twitter feeds in Azure Storage by using Event Hubs Capture. The feeds will be converted into Parquet files.
- Ensure that the data store supports Azure AD-based access control down to the object level.
- Minimize administrative effort to maintain the Twitter feed data records.
- Purge Twitter feed data records that are older than two years.

Data Integration Requirements

Contoso identifies the following requirements for data integration:

- Use an Azure service that leverages the existing SSIS packages to ingest on-premises data into datasets stored in a dedicated SQL pool of Azure Synapse Analytics and transform the data.
- Identify a process to ensure that changes to the ingestion and transformation activities can be version-controlled and developed independently by multiple data engineers.

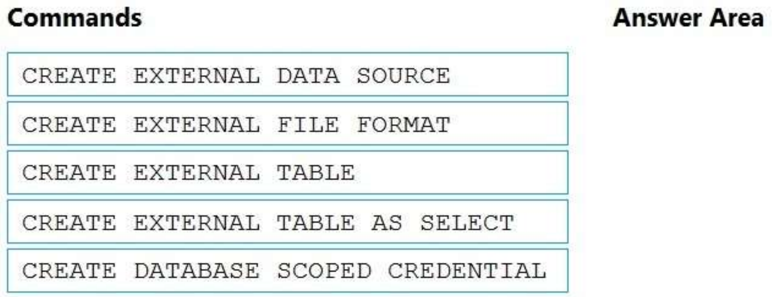
QUESTION 1
DRAG DROP

You need to ensure that the Twitter feed data can be analyzed in the dedicated SQL pool. The solution must meet the customer sentiment analytic requirements.

Which three Transact-SQL DDL commands should you run in sequence? To answer, move the appropriate commands from the list of commands to the answer area and arrange them in the correct order.

NOTE: More than one order of answer choices is correct. You will receive credit for any of the correct orders you select.

Select and Place:



Commands

CREATE EXTERNAL DATA SOURCE

CREATE EXTERNAL FILE FORMAT

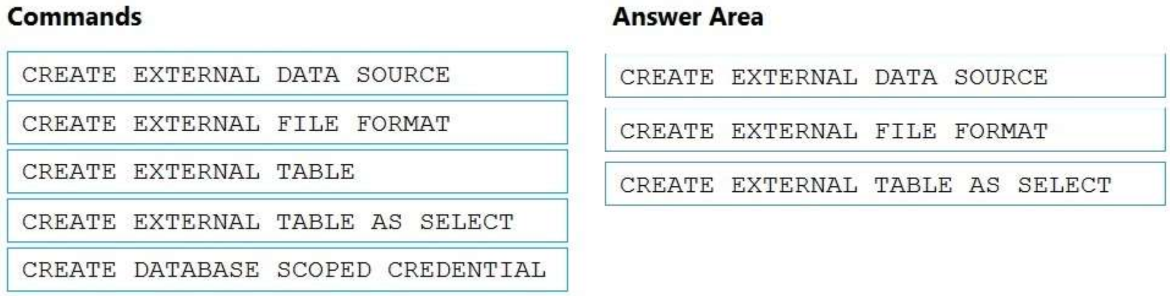
CREATE EXTERNAL TABLE

CREATE EXTERNAL TABLE AS SELECT

CREATE DATABASE SCOPED CREDENTIAL

Answer Area

Correct Answer:



Commands

CREATE EXTERNAL DATA SOURCE

CREATE EXTERNAL FILE FORMAT

CREATE EXTERNAL TABLE

CREATE EXTERNAL TABLE AS SELECT

CREATE DATABASE SCOPED CREDENTIAL

Answer Area

CREATE EXTERNAL DATA SOURCE

CREATE EXTERNAL FILE FORMAT

CREATE EXTERNAL TABLE AS SELECT

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Scenario: Allow Contoso users to use PolyBase in an Azure Synapse Analytics dedicated SQL pool to query the content of the data records that host the Twitter feeds. Data must be protected by using row-level security (RLS). The users must be authenticated by using their own Azure AD credentials.

Box 1: CREATE EXTERNAL DATA SOURCE
External data sources are used to connect to storage accounts.

Box 2: CREATE EXTERNAL FILE FORMAT
CREATE EXTERNAL FILE FORMAT creates an external file format object that defines external data stored in Azure Blob Storage or Azure Data Lake Storage. Creating an external file format is a prerequisite for creating an external table.

Box 3: CREATE EXTERNAL TABLE AS SELECT

When used in conjunction with the CREATE TABLE AS SELECT statement, selecting from an external table imports data into a table within the SQL pool. In addition to the COPY statement, external tables are useful for loading data.

Incorrect Answers:
CREATE EXTERNAL TABLE
The CREATE EXTERNAL TABLE command creates an external table for Synapse SQL to access data stored in Azure Blob Storage or Azure Data Lake Storage.

Reference:
https://docs.microsoft.com/en-us/azure/synapse-analytics/sql/develop-tables-external-tables

QUESTION 2

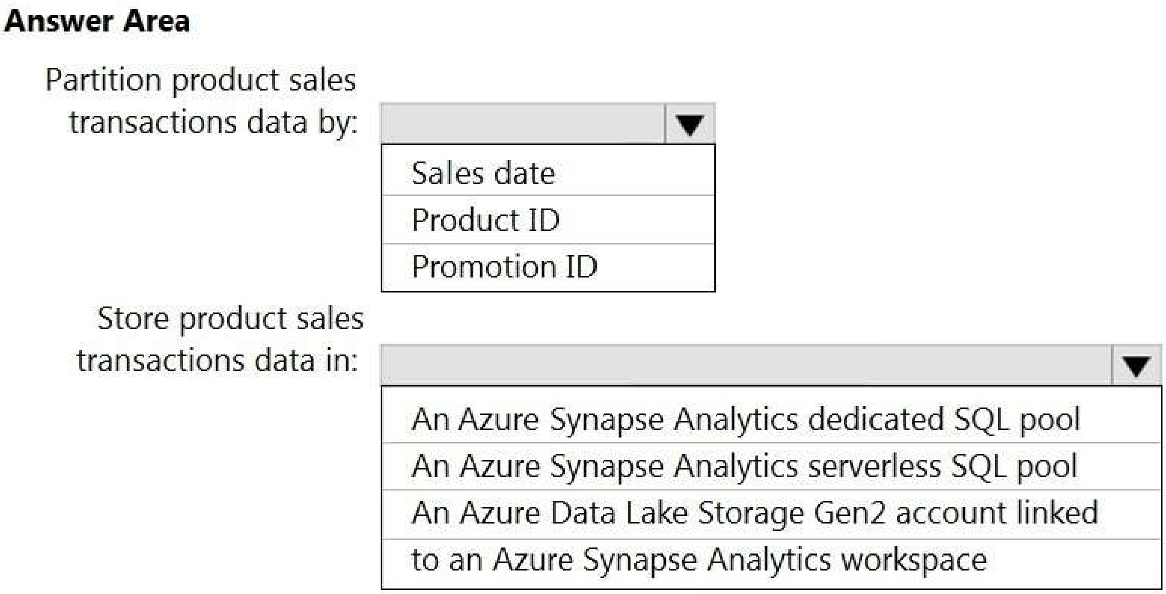
HOTSPOT

You need to design the partitions for the product sales transactions. The solution must meet the sales transaction dataset requirements.

What should you include in the solution? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:



Answer Area

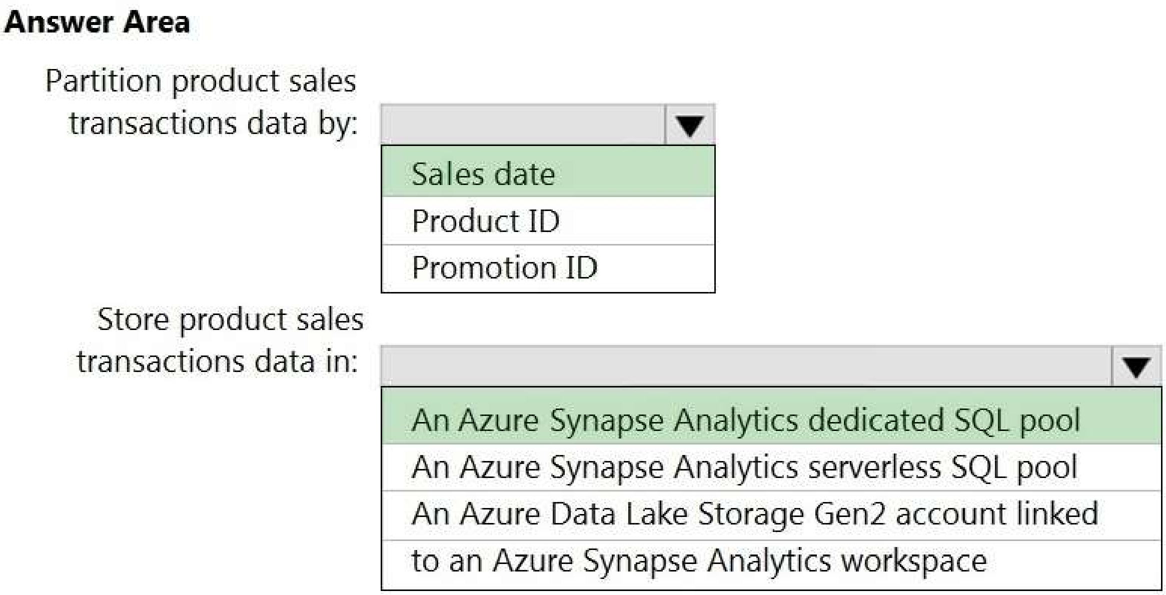
Partition product sales transactions data by:

- Sales date
- Product ID
- Promotion ID

Store product sales transactions data in:

- An Azure Synapse Analytics dedicated SQL pool
- An Azure Synapse Analytics serverless SQL pool
- An Azure Data Lake Storage Gen2 account linked to an Azure Synapse Analytics workspace

Correct Answer:



Answer Area

Partition product sales transactions data by:

- [✓ Sales date]
- Product ID
- Promotion ID

Store product sales transactions data in:

- [✓ An Azure Synapse Analytics dedicated SQL pool]
- An Azure Synapse Analytics serverless SQL pool
- An Azure Data Lake Storage Gen2 account linked to an Azure Synapse Analytics workspace

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: Sales date
Scenario: Contoso requirements for data integration include:

- Partition data that contains sales transaction records. Partitions must be designed to provide efficient loads by month. Boundary values must belong to the partition on the right.

Box 2: An Azure Synapse Analytics Dedicated SQL pool
Scenario: Contoso requirements for data integration include:

- Ensure that data storage costs and performance are predictable.

The size of a dedicated SQL pool (formerly SQL DW) is determined by Data Warehousing Units (DWU).
Dedicated SQL pool (formerly SQL DW) stores data in relational tables with columnar storage. This format significantly reduces the data storage costs, and improves query performance.
Synapse analytics dedicated sql pool

Reference:
https://docs.microsoft.com/en-us/azure/synapse-analytics/sql-data-warehouse/sql-data-warehouse-overview-what-is

QUESTION 3
You need to implement the surrogate key for the retail store table. The solution must meet the sales transaction dataset requirements.

What should you create?

A. a table that has an `IDENTITY` property
B. a system-versioned temporal table
C. a user-defined `SEQUENCE` object
D. a table that has a `FOREIGN KEY` constraint

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Scenario: Implement a surrogate key to account for changes to the retail store addresses.

A surrogate key on a table is a column with a unique identifier for each row. The key is not generated from the table data. Data modelers like to create surrogate keys on their tables when they design data warehouse models. You can use the IDENTITY property to achieve this goal simply and effectively without affecting load performance.

Reference:
https://docs.microsoft.com/en-us/azure/synapse-analytics/sql-data-warehouse/sql-data-warehouse-tables-identity

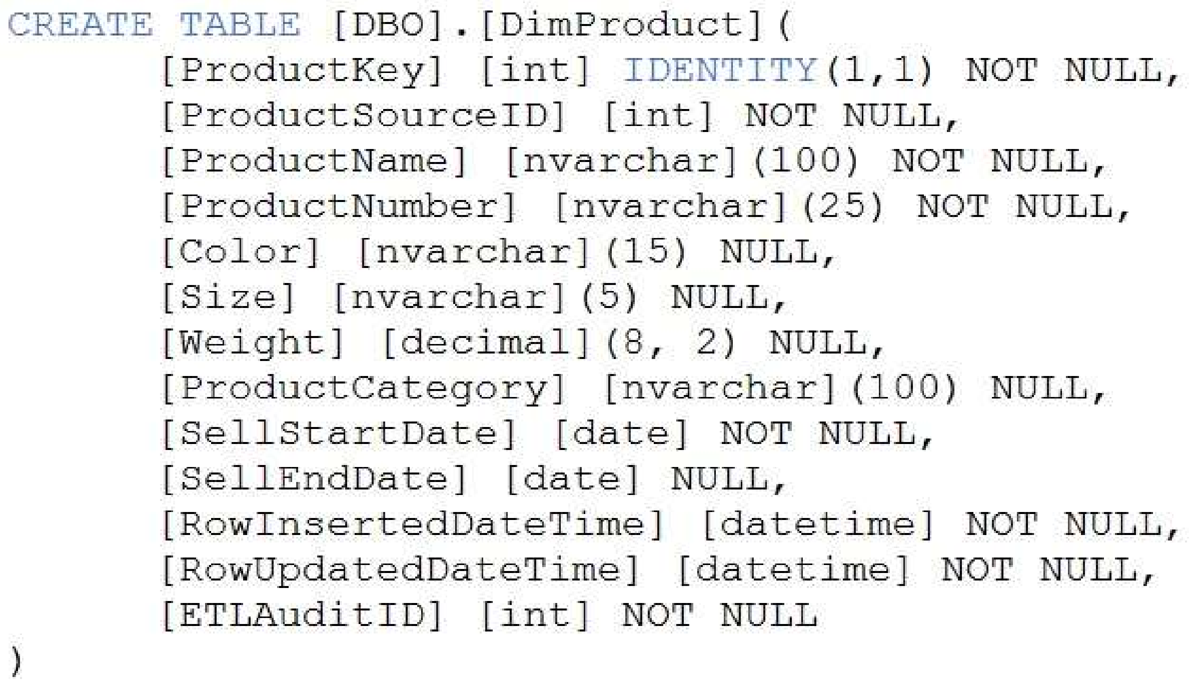
Design and implement data storage

Question Set 2

QUESTION 1
HOTSPOT

You are creating dimensions for a data warehouse in an Azure Synapse Analytics dedicated SQL pool.

You create a table by using the Transact-SQL statement shown in the following exhibit.

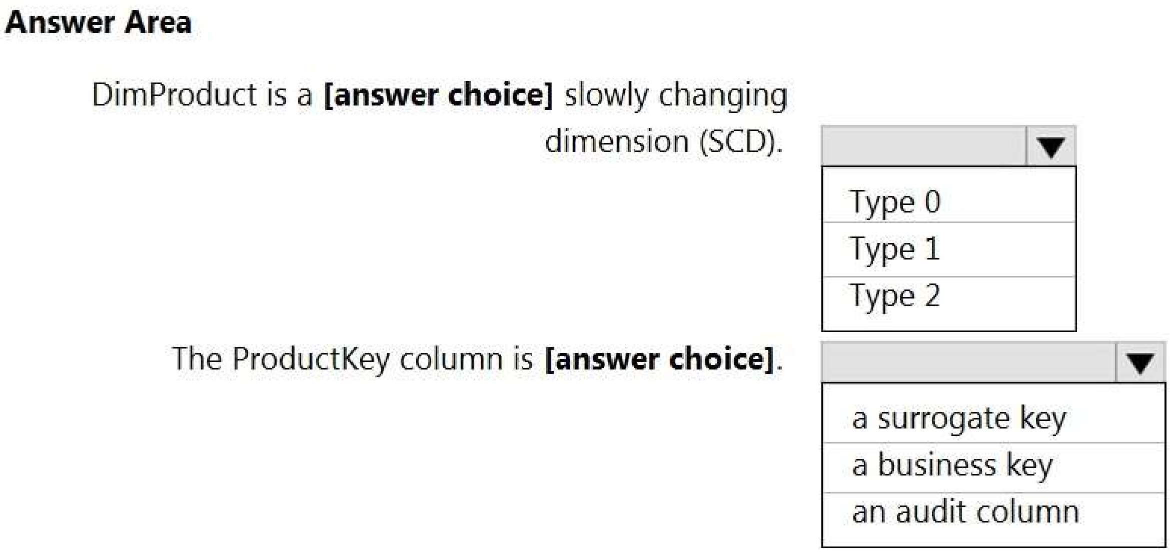


```
CREATE TABLE [DBO].[DimProduct](
        [ProductKey] [int] IDENTITY(1,1) NOT NULL,
        [ProductSourceID] [int] NOT NULL,
        [ProductName] [nvarchar](100) NOT NULL,
        [ProductNumber] [nvarchar](25) NOT NULL,
        [Color] [nvarchar](15) NULL,
        [Size] [nvarchar](5) NULL,
        [Weight] [decimal](8, 2) NULL,
        [ProductCategory] [nvarchar](100) NULL,
        [SellStartDate] [date] NOT NULL,
        [SellEndDate] [date] NULL,
        [RowInsertedDateTime] [datetime] NOT NULL,
        [RowUpdatedDateTime] [datetime] NOT NULL,
        [ETLAuditID] [int] NOT NULL
)
```

Use the drop-down menus to select the answer choice that completes each statement based on the information presented in the graphic.

NOTE: Each correct selection is worth one point.

Hot Area:



Answer Area

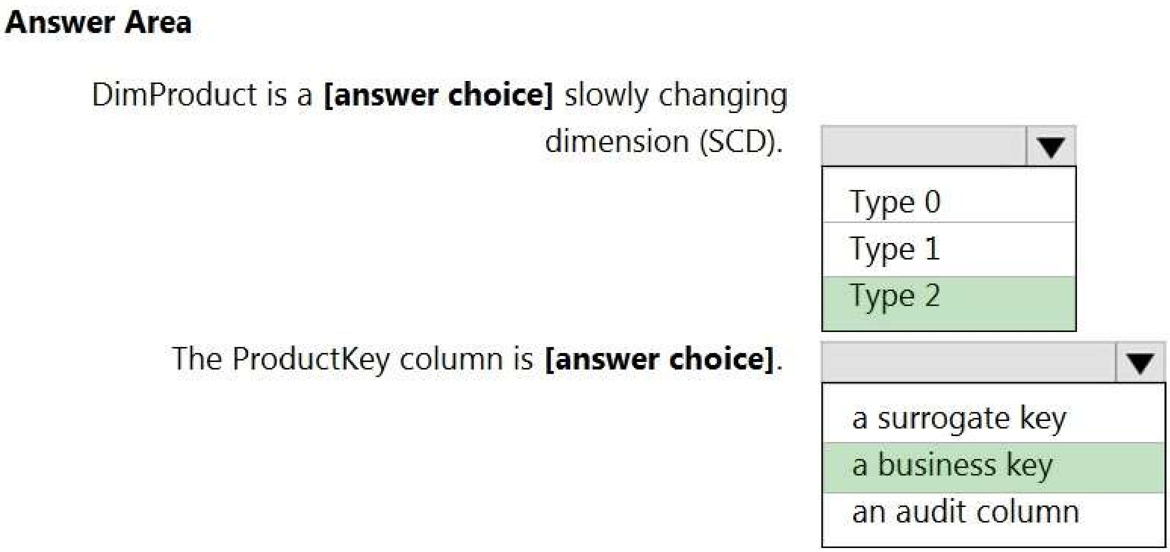
DimProduct is a **[answer choice]** slowly changing dimension (SCD).

- Type 0
- Type 1
- Type 2

The ProductKey column is **[answer choice]**.

- a surrogate key
- a business key
- an audit column

Correct Answer:



Answer Area

DimProduct is a **[answer choice]** slowly changing dimension (SCD).

- Type 0
- Type 1
- [✓ Type 2]

The ProductKey column is **[answer choice]**.

- a surrogate key
- [✓ a business key]
- an audit column

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: Type 2
A Type 2 SCD supports versioning of dimension members. Often the source system doesn't store versions, so the data warehouse load process detects and manages changes in a dimension table. In this case, the dimension table must use a surrogate key to provide a unique reference to a version of the dimension member. It also includes columns that define the date range validity of the version (for example, StartDate and EndDate) and possibly a flag column (for example, IsCurrent) to easily filter by current dimension members.

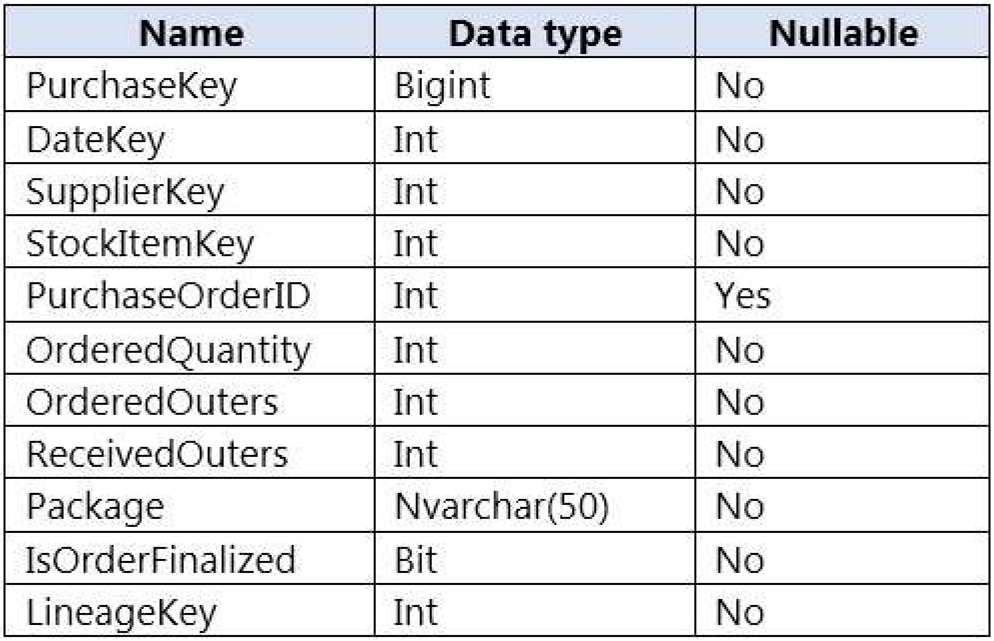
Incorrect Answers:
A Type 1 SCD always reflects the latest values, and when changes in source data are detected, the dimension table data is overwritten.

Box 2: a business key
A business key or natural key is an index which identifies uniqueness of a row based on columns that exist

naturally in a table according to business rules. For example business keys are customer code in a customer table, composite of sales order header number and sales order item line number within a sales order details table.

Reference:
https://docs.microsoft.com/en-us/learn/modules/populate-slowly-changing-dimensions-azure-synapse-analytics-pipelines/3-choose-between-dimension-types

QUESTION 2
You are designing a fact table named FactPurchase in an Azure Synapse Analytics dedicated SQL pool. The table contains purchases from suppliers for a retail store. FactPurchase will contain the following columns.



Name	Data type	Nullable
PurchaseKey	Bigint	No
DateKey	Int	No
SupplierKey	Int	No
StockItemKey	Int	No
PurchaseOrderID	Int	Yes
OrderedQuantity	Int	No
OrderedOuters	Int	No
ReceivedOuters	Int	No
Package	Nvarchar(50)	No
IsOrderFinalized	Bit	No
LineageKey	Int	No

FactPurchase will have 1 million rows of data added daily and will contain three years of data.

Transact-SQL queries similar to the following query will be executed daily.

```
SELECT
  SupplierKey, StockItemKey, COUNT(*)
FROM FactPurchase
WHERE DateKey >= 20210101
  AND DateKey <= 20210131
GROUP By SupplierKey, StockItemKey
```

Which table distribution will minimize query times?

A. replicated
B. hash-distributed on PurchaseKey
C. round-robin
D. hash-distributed on DateKey

Correct Answer: B
Section: (none)
Explanation

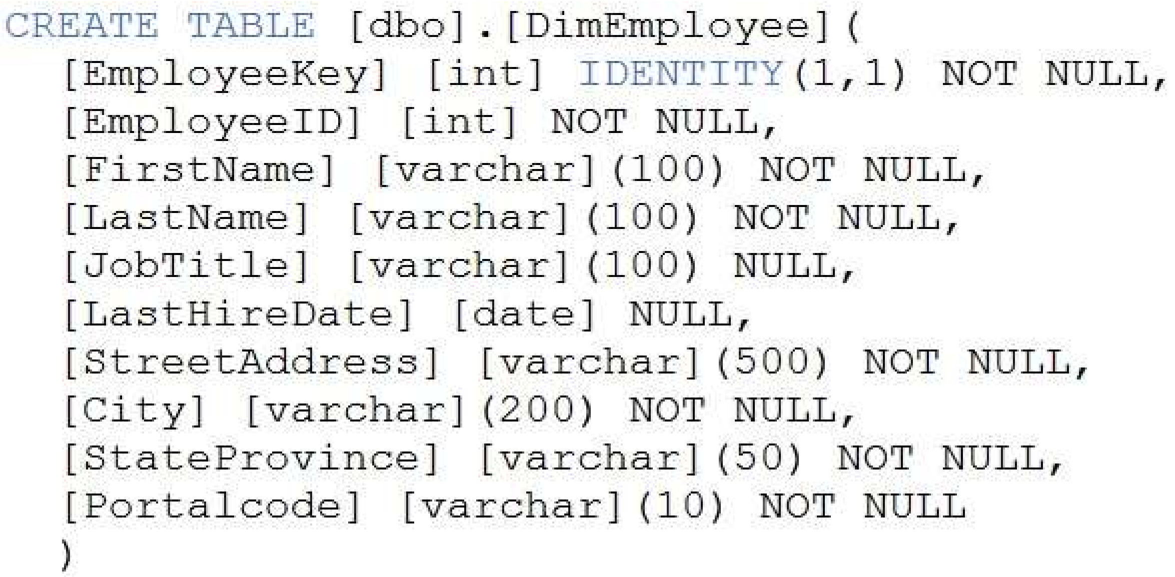
Explanation/Reference:
Explanation:

Hash-distributed tables improve query performance on large fact tables, and are the focus of this article. Round-robin tables are useful for improving loading speed.

Incorrect:
Not D: Do not use a date column. . All data for the same date lands in the same distribution. If several users are all filtering on the same date, then only 1 of the 60 distributions do all the processing work.

Reference:
https://docs.microsoft.com/en-us/azure/synapse-analytics/sql-data-warehouse/sql-data-warehouse-tables-distribute

QUESTION 3
You have a table in an Azure Synapse Analytics dedicated SQL pool. The table was created by using the following Transact-SQL statement.



```
CREATE TABLE [dbo].[DimEmployee](
   [EmployeeKey] [int] IDENTITY(1,1) NOT NULL,
   [EmployeeID] [int] NOT NULL,
   [FirstName] [varchar](100) NOT NULL,
   [LastName] [varchar](100) NOT NULL,
   [JobTitle] [varchar](100) NULL,
   [LastHireDate] [date] NULL,
   [StreetAddress] [varchar](500) NOT NULL,
   [City] [varchar](200) NOT NULL,
   [StateProvince] [varchar](50) NOT NULL,
   [Portalcode] [varchar](10) NOT NULL
   )
```

You need to alter the table to meet the following requirements:

- Ensure that users can identify the current manager of employees.
- Support creating an employee reporting hierarchy for your entire company.
- Provide fast lookup of the managers' attributes such as name and job title.

Which column should you add to the table?

A. [ManagerEmployeeID] [int] NULL
B. [ManagerEmployeeID] [smallint] NULL
C. [ManagerEmployeeKey] [int] NULL
D. [ManagerName] [varchar](200) NULL

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Use the same definition as the EmployeeID column.

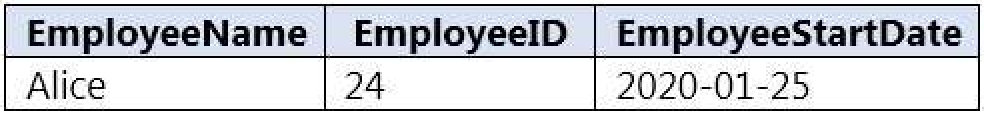
Reference:
https://docs.microsoft.com/en-us/analysis-services/tabular-models/hierarchies-ssas-tabular

QUESTION 4
You have an Azure Synapse workspace named MyWorkspace that contains an Apache Spark database named mytestdb.

You run the following command in an Azure Synapse Analytics Spark pool in MyWorkspace.

```
CREATE TABLE mytestdb.myParquetTable(
  EmployeeID int,
  EmployeeName string,
  EmployeeStartDate date)
USING Parquet
```

You then use Spark to insert a row into mytestdb.myParquetTable. The row contains the following data.



EmployeeName	EmployeeID	EmployeeStartDate
Alice	24	2020-01-25

One minute later, you execute the following query from a serverless SQL pool in MyWorkspace.

```
SELECT EmployeeID
FROM mytestdb.dbo.myParquetTable
WHERE name = 'Alice';
```

What will be returned by the query?

A. 24
B. an error
C. a null value

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Once a database has been created by a Spark job, you can create tables in it with Spark that use Parquet as the storage format. Table names will be converted to lower case and need to be queried using the lower case name. These tables will immediately become available for querying by any of the Azure Synapse workspace Spark pools. They can also be used from any of the Spark jobs subject to permissions.

Note: For external tables, since they are synchronized to serverless SQL pool asynchronously, there will be a delay until they appear.

Reference:
https://docs.microsoft.com/en-us/azure/synapse-analytics/metadata/table

QUESTION 5
DRAG DROP

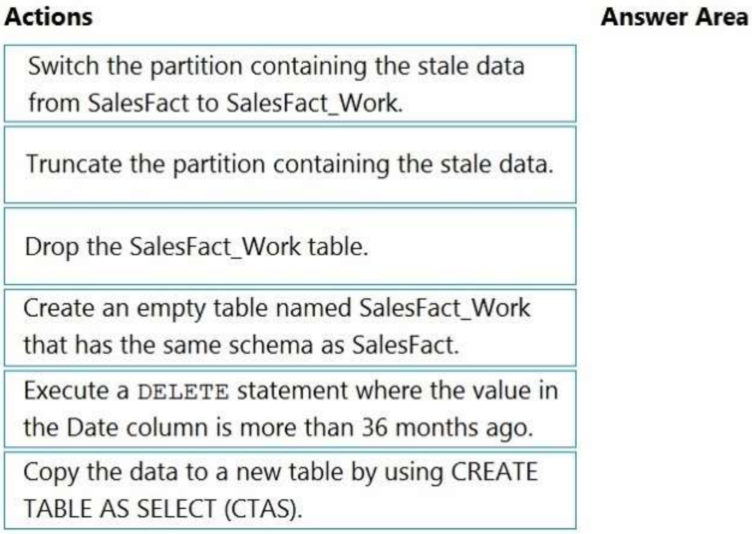
You have a table named SalesFact in an enterprise data warehouse in Azure Synapse Analytics. SalesFact contains sales data from the past 36 months and has the following characteristics:

- Is partitioned by month
- Contains one billion rows
- Has clustered columnstore indexes

At the beginning of each month, you need to remove data from SalesFact that is older than 36 months as quickly as possible.

Which three actions should you perform in sequence in a stored procedure? To answer, move the appropriate actions from the list of actions to the answer area and arrange them in the correct order.

Select and Place:

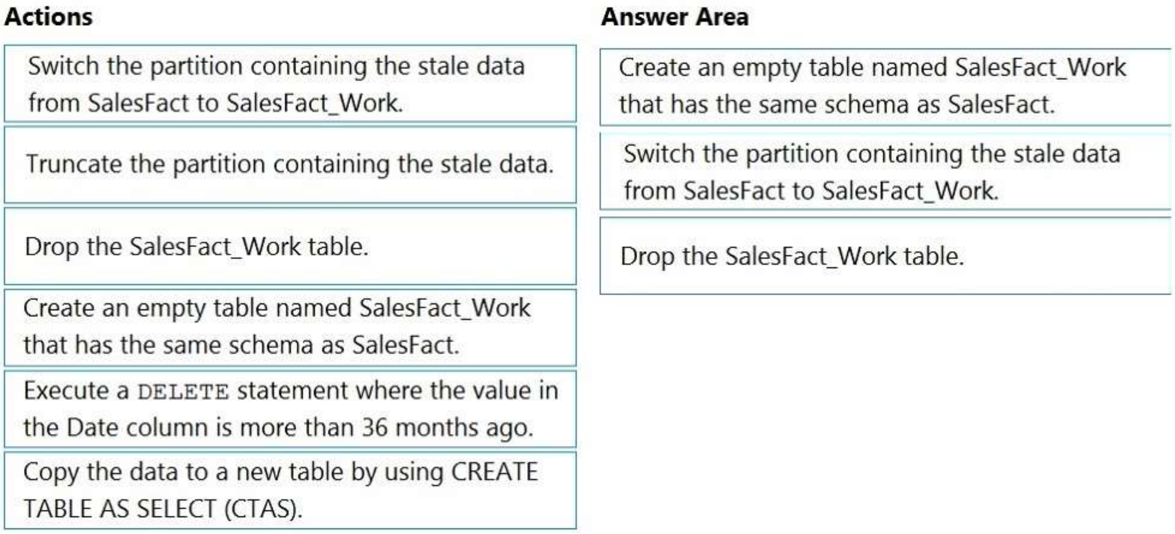


Actions

- Switch the partition containing the stale data from SalesFact to SalesFact_Work.
- Truncate the partition containing the stale data.
- Drop the SalesFact_Work table.
- Create an empty table named SalesFact_Work that has the same schema as SalesFact.
- Execute a DELETE statement where the value in the Date column is more than 36 months ago.
- Copy the data to a new table by using CREATE TABLE AS SELECT (CTAS).

Answer Area

Correct Answer:



Actions

- Switch the partition containing the stale data from SalesFact to SalesFact_Work.
- Truncate the partition containing the stale data.
- Drop the SalesFact_Work table.
- Create an empty table named SalesFact_Work that has the same schema as SalesFact.
- Execute a DELETE statement where the value in the Date column is more than 36 months ago.
- Copy the data to a new table by using CREATE TABLE AS SELECT (CTAS).

Answer Area

- Create an empty table named SalesFact_Work that has the same schema as SalesFact.
- Switch the partition containing the stale data from SalesFact to SalesFact_Work.
- Drop the SalesFact_Work table.

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Step 1: Create an empty table named SalesFact_work that has the same schema as SalesFact.

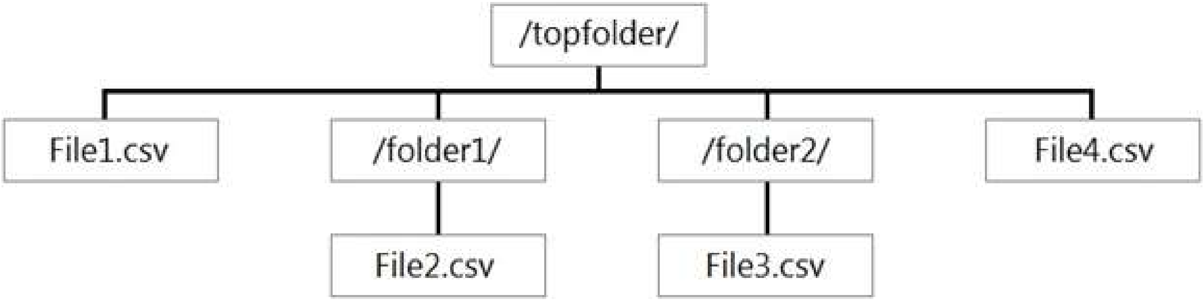
Step 2: Switch the partition containing the stale data from SalesFact to SalesFact_Work.
SQL Data Warehouse supports partition splitting, merging, and switching. To switch partitions between two tables, you must ensure that the partitions align on their respective boundaries and that the table definitions match.

Loading data into partitions with partition switching is a convenient way stage new data in a table that is not visible to users the switch in the new data.

Step 3: Drop the SalesFact_Work table.

Reference:
https://docs.microsoft.com/en-us/azure/sql-data-warehouse/sql-data-warehouse-tables-partition

QUESTION 6
You have files and folders in Azure Data Lake Storage Gen2 for an Azure Synapse workspace as shown in the following exhibit.



You create an external table named ExtTable that has `LOCATION='/topfolder/'`.

When you query ExtTable by using an Azure Synapse Analytics serverless SQL pool, which files are returned?

A. File2.csv and File3.csv only
B. File1.csv and File4.csv only
C. File1.csv, File2.csv, File3.csv, and File4.csv
D. File1.csv only

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
To run a T-SQL query over a set of files within a folder or set of folders while treating them as a single entity or rowset, provide a path to a folder or a pattern (using wildcards) over a set of files or folders.

Reference:
https://docs.microsoft.com/en-us/azure/synapse-analytics/sql/query-data-storage#query-multiple-files-or-folders

QUESTION 7
HOTSPOT

You are planning the deployment of Azure Data Lake Storage Gen2.

You have the following two reports that will access the data lake:

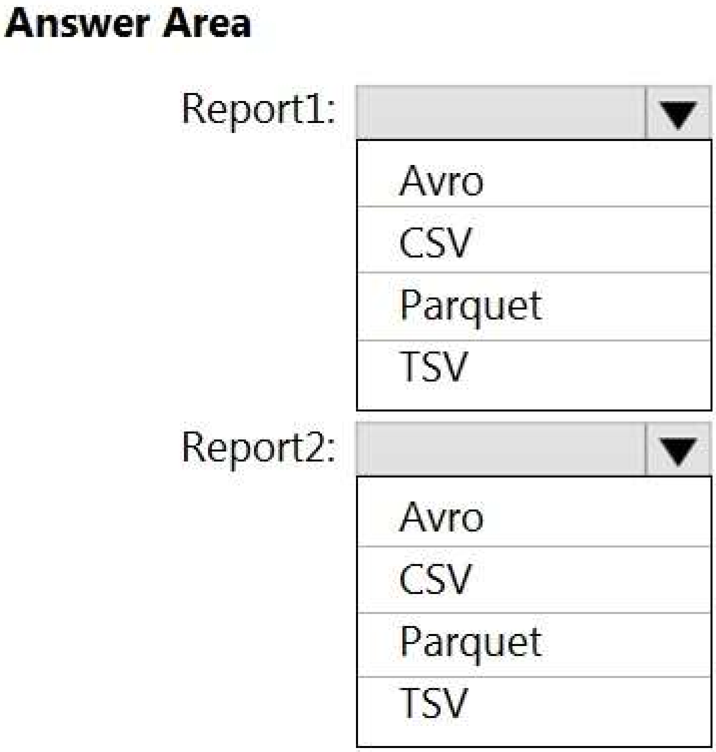
- Report1: Reads three columns from a file that contains 50 columns.
- Report2: Queries a single record based on a timestamp.

You need to recommend in which format to store the data in the data lake to support the reports. The solution must minimize read times.

What should you recommend for each report? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:



Answer Area

Report1: ▼

Avro

CSV

Parquet

TSV

Report2: ▼

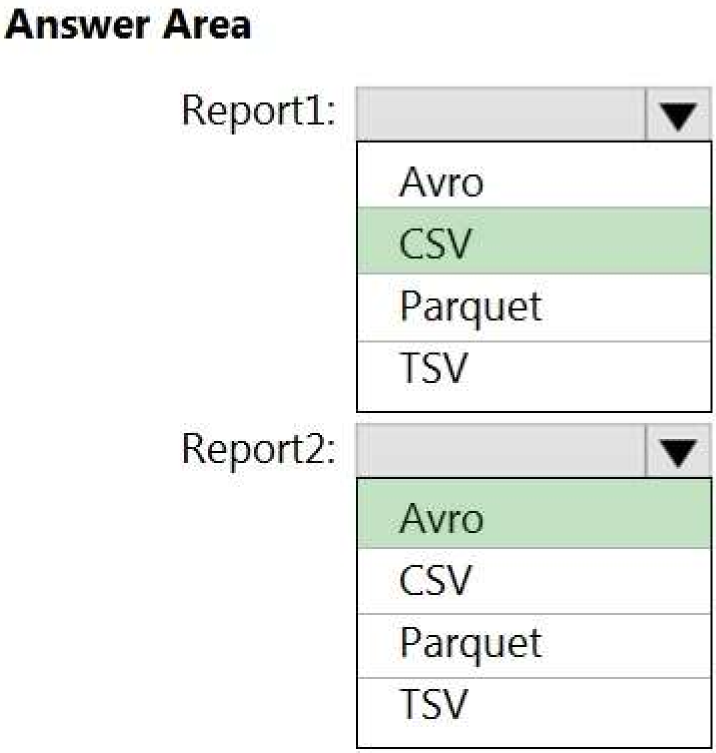
Avro

CSV

Parquet

TSV

Correct Answer:



Answer Area

Report1: ▼

Avro

[✓ CSV]

Parquet

TSV

Report2: ▼

[✓ Avro]

CSV

Parquet

TSV

Section: (none)

Explanation

Explanation/Reference:
Explanation:

Report1: CSV
CSV: The destination writes records as delimited data.

Report2: AVRO
AVRO supports timestamps.
Not Parquet, TSV: Not options for Azure Data Lake Storage Gen2.

Reference:
https://streamsets.com/documentation/datacollector/latest/help/datacollector/UserGuide/Destinations/ADLS-G2-D.html

QUESTION 8
You are designing the folder structure for an Azure Data Lake Storage Gen2 container.

Users will query data by using a variety of services including Azure Databricks and Azure Synapse Analytics serverless SQL pools. The data will be secured by subject area. Most queries will include data from the current year or current month.

Which folder structure should you recommend to support fast queries and simplified folder security?

A. `/{SubjectArea}/{DataSource}/{DD}/{MM}/{YYYY}/{FileData}_{YYYY}_{MM}_{DD}.csv`
B. `/{DD}/{MM}/{YYYY}/{SubjectArea}/{DataSource}/{FileData}_{YYYY}_{MM}_{DD}.csv`
C. `/{YYYY}/{MM}/{DD}/{SubjectArea}/{DataSource}/{FileData}_{YYYY}_{MM}_{DD}.csv`
D. `/{SubjectArea}/{DataSource}/{YYYY}/{MM}/{DD}/{FileData}_{YYYY}_{MM}_{DD}.csv`

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
There's an important reason to put the date at the end of the directory structure. If you want to lock down certain regions or subject matters to users/groups, then you can easily do so with the POSIX permissions. Otherwise, if there was a need to restrict a certain security group to viewing just the UK data or certain planes, with the date structure in front a separate permission would be required for numerous directories under every hour directory. Additionally, having the date structure in front would exponentially increase the number of directories as time went on.

Note: In IoT workloads, there can be a great deal of data being landed in the data store that spans across numerous products, devices, organizations, and customers. It’s important to pre-plan the directory layout for organization, security, and efficient processing of the data for down-stream consumers. A general template to consider might be the following layout:

{Region}/{SubjectMatter(s)}/{yyyy}/{mm}/{dd}/{hh}/

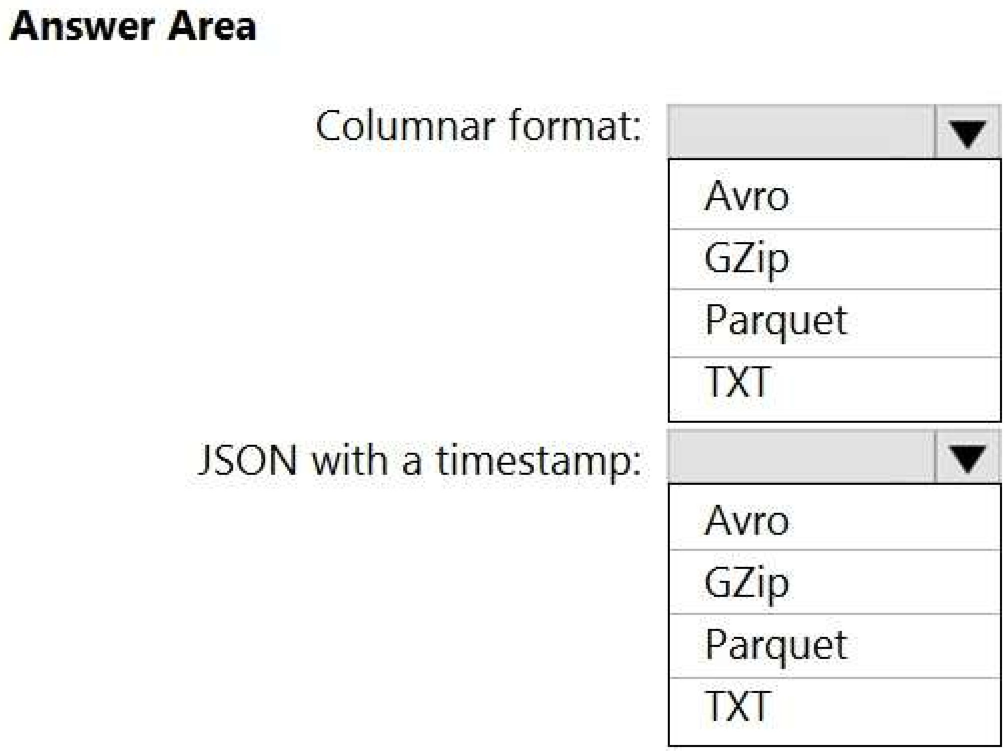
QUESTION 9
HOTSPOT

You need to output files from Azure Data Factory.

Which file format should you use for each type of output? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:



Answer Area

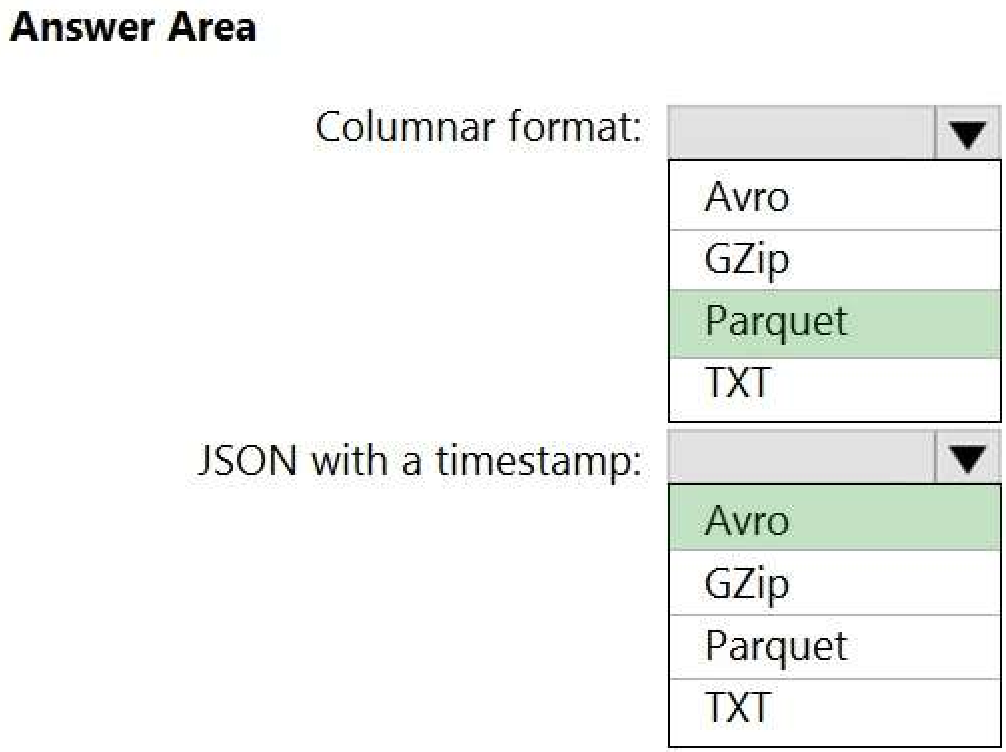
Columnar format:

- Avro
- GZip
- Parquet
- TXT

JSON with a timestamp:

- Avro
- GZip
- Parquet
- TXT

Correct Answer:



Answer Area

Columnar format:

- Avro
- GZip
- [✓ Parquet]
- TXT

JSON with a timestamp:

- [✓ Avro]
- GZip
- Parquet
- TXT

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: Parquet
Parquet stores data in columns, while Avro stores data in a row-based format. By their very nature, column-oriented data stores are optimized for read-heavy analytical workloads, while row-based databases are best for write-heavy transactional workloads.

Box 2: Avro
An Avro schema is created using JSON format.
AVRO supports timestamps.

Note: Azure Data Factory supports the following file formats (not GZip or TXT).

- Avro format
- Binary format
- Delimited text format
- Excel format
- JSON format
- ORC format
- Parquet format
- XML format

Reference:
https://www.datanami.com/2018/05/16/big-data-file-formats-demystified

QUESTION 10
HOTSPOT

You use Azure Data Factory to prepare data to be queried by Azure Synapse Analytics serverless SQL pools.

Files are initially ingested into an Azure Data Lake Storage Gen2 account as 10 small JSON files. Each file contains the same data attributes and data from a subsidiary of your company.

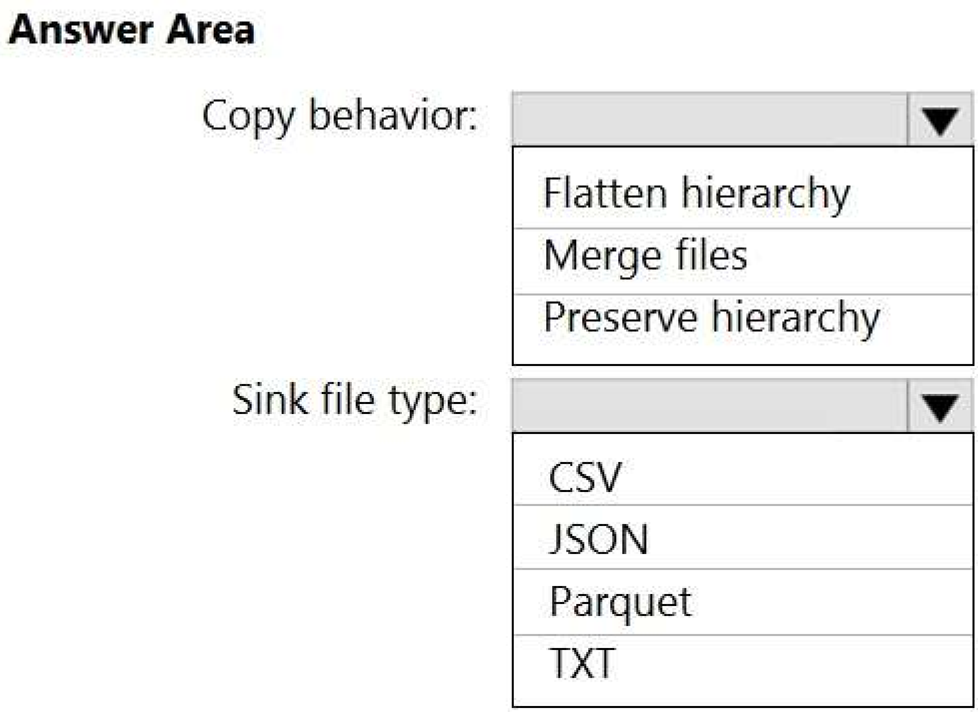
You need to move the files to a different folder and transform the data to meet the following requirements:

- Provide the fastest possible query times.
- Automatically infer the schema from the underlying files.

How should you configure the Data Factory copy activity? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:



Answer Area

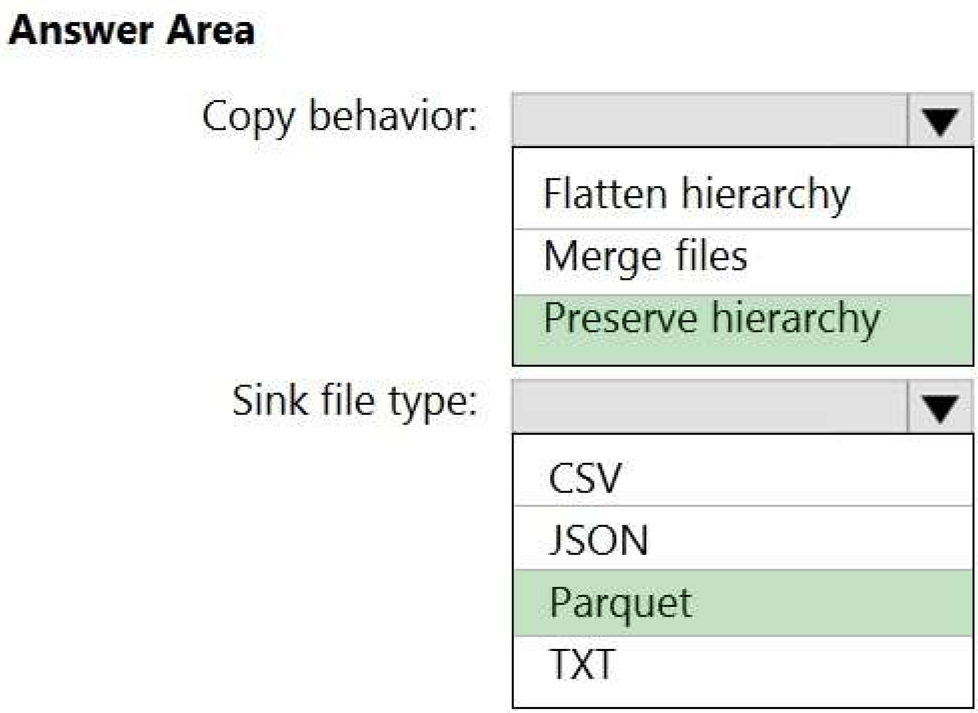
Copy behavior: ▼

- Flatten hierarchy
- Merge files
- Preserve hierarchy

Sink file type: ▼

- CSV
- JSON
- Parquet
- TXT

Correct Answer:



Answer Area

Copy behavior: ▼

- Flatten hierarchy
- Merge files
- [✓ Preserve hierarchy]

Sink file type: ▼

- CSV
- JSON
- [✓ Parquet]
- TXT

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: Preserver herarchy
Compared to the flat namespace on Blob storage, the hierarchical namespace greatly improves the

performance of directory management operations, which improves overall job performance.

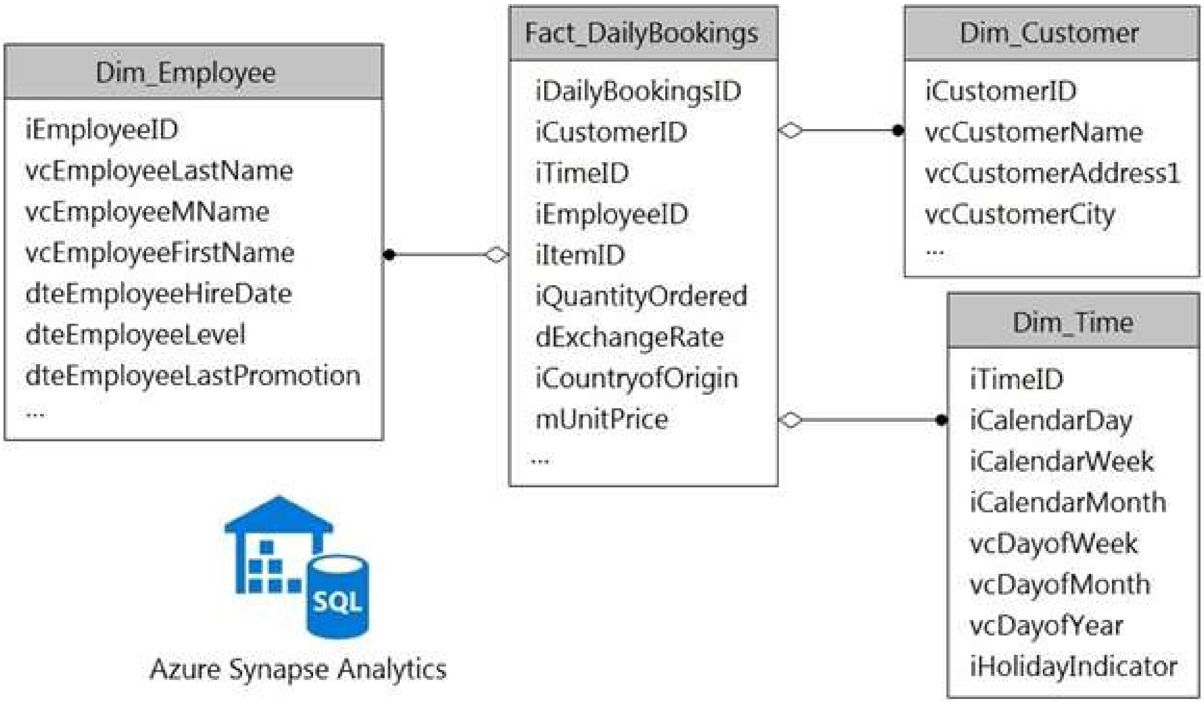
Box 2: Parquet
Azure Data Factory parquet format is supported for Azure Data Lake Storage Gen2.
Parquet supports the schema property.

Reference:
https://docs.microsoft.com/en-us/azure/storage/blobs/data-lake-storage-introduction

https://docs.microsoft.com/en-us/azure/data-factory/format-parquet

QUESTION 11
HOTSPOT

You have a data model that you plan to implement in a data warehouse in Azure Synapse Analytics as shown in the following exhibit.

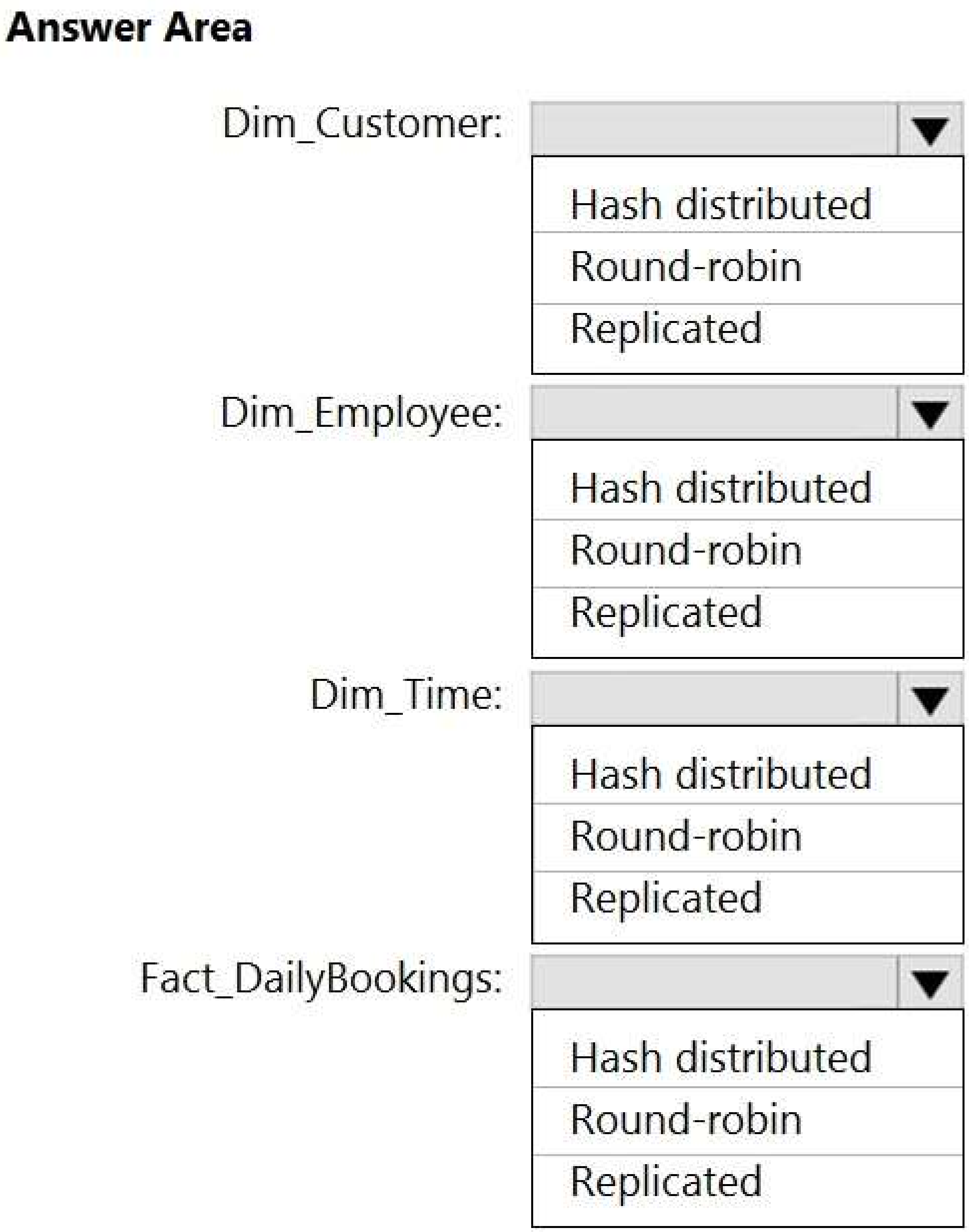


All the dimension tables will be less than 2 GB after compression, and the fact table will be approximately 6 TB.

Which type of table should you use for each table? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:



Answer Area

Dim_Customer: ▼

- Hash distributed
- Round-robin
- Replicated

Dim_Employee: ▼

- Hash distributed
- Round-robin
- Replicated

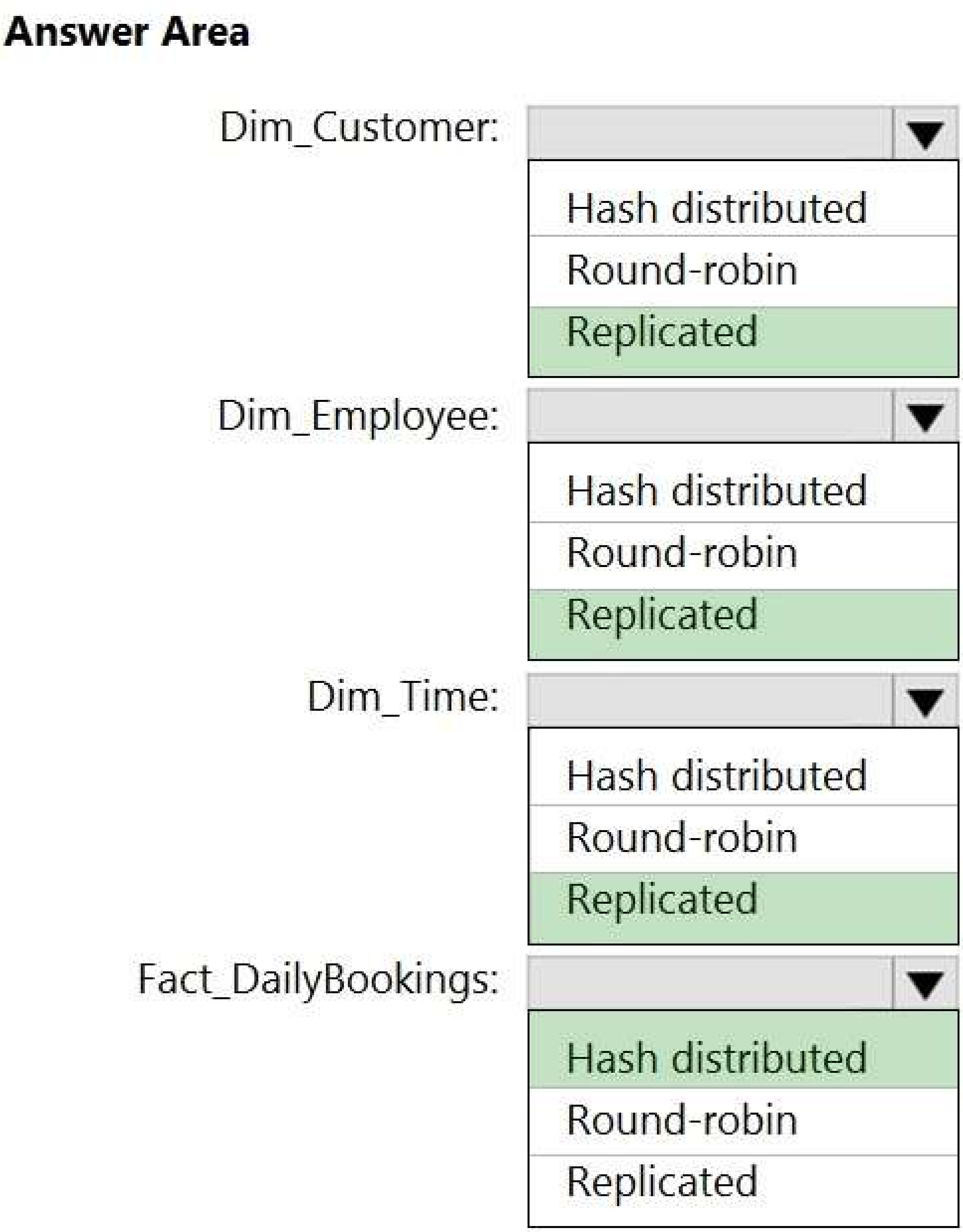
Dim_Time: ▼

- Hash distributed
- Round-robin
- Replicated

Fact_DailyBookings: ▼

- Hash distributed
- Round-robin
- Replicated

Correct Answer:



Answer Area

Dim_Customer: ▼

Hash distributed
Round-robin
[✓ Replicated]

Dim_Employee: ▼

Hash distributed
Round-robin
[✓ Replicated]

Dim_Time: ▼

Hash distributed
Round-robin
[✓ Replicated]

Fact_DailyBookings: ▼

[✓ Hash distributed]
Round-robin
Replicated

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: Replicated
Replicated tables are ideal for small star-schema dimension tables, because the fact table is often distributed on a column that is not compatible with the connected dimension tables. If this case applies to your schema, consider changing small dimension tables currently implemented as round-robin to replicated.

Box 2: Replicated

Box 3: Replicated

Box 4: Hash-distributed
For Fact tables use hash-distribution with clustered columnstore index. Performance improves when two hash

tables are joined on the same distribution column.

Reference:
https://azure.microsoft.com/en-us/updates/reduce-data-movement-and-make-your-queries-more-efficient-with-the-general-availability-of-replicated-tables/

https://azure.microsoft.com/en-us/blog/replicated-tables-now-generally-available-in-azure-sql-data-warehouse/

QUESTION 12
HOTSPOT

You have an Azure Data Lake Storage Gen2 container.

Data is ingested into the container, and then transformed by a data integration application. The data is **NOT** modified after that. Users can read files in the container but cannot modify the files.

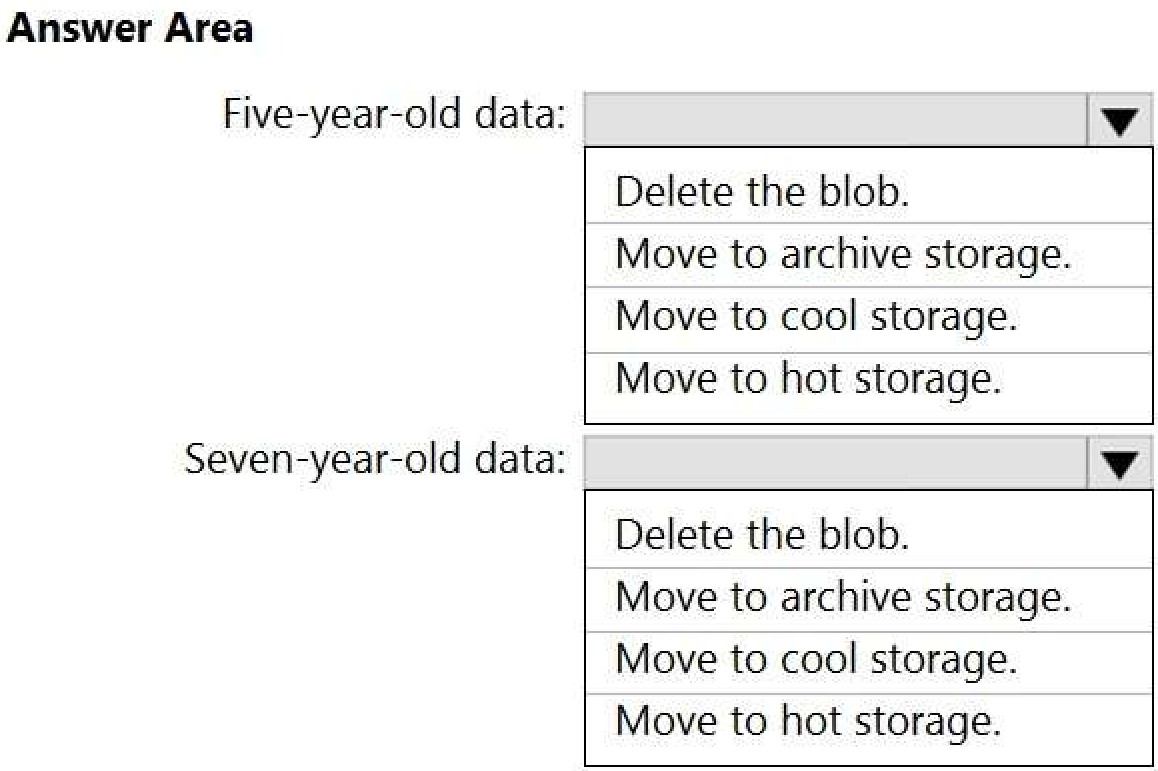
You need to design a data archiving solution that meets the following requirements:

- New data is accessed frequently and must be available as quickly as possible.
- Data that is older than five years is accessed infrequently but must be available within one second when requested.
- Data that is older than seven years is **NOT** accessed. After seven years, the data must be persisted at the lowest cost possible.
- Costs must be minimized while maintaining the required availability.

How should you manage the data? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point

Hot Area:



Answer Area

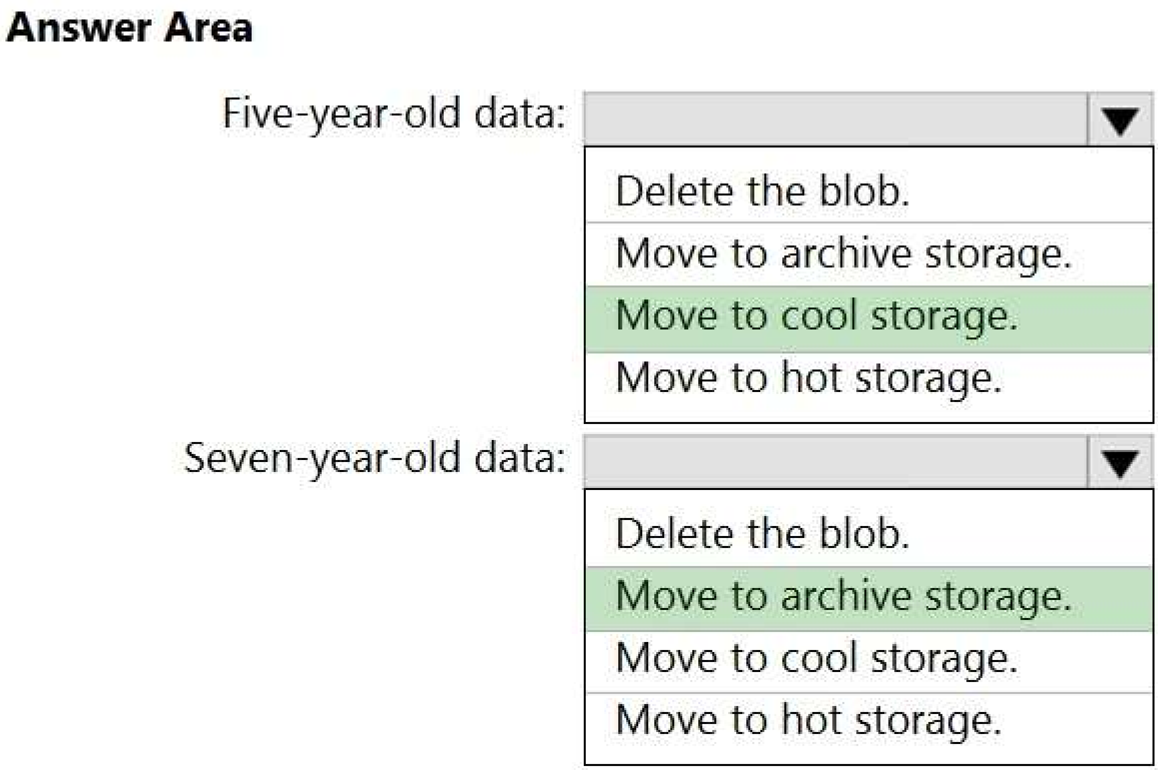
Five-year-old data: ▼

Delete the blob.
Move to archive storage.
Move to cool storage.
Move to hot storage.

Seven-year-old data: ▼

Delete the blob.
Move to archive storage.
Move to cool storage.
Move to hot storage.

Correct Answer:



Answer Area

Five-year-old data: ▼

- Delete the blob.
- Move to archive storage.
- [✓ Move to cool storage.]
- Move to hot storage.

Seven-year-old data: ▼

- Delete the blob.
- [✓ Move to archive storage.]
- Move to cool storage.
- Move to hot storage.

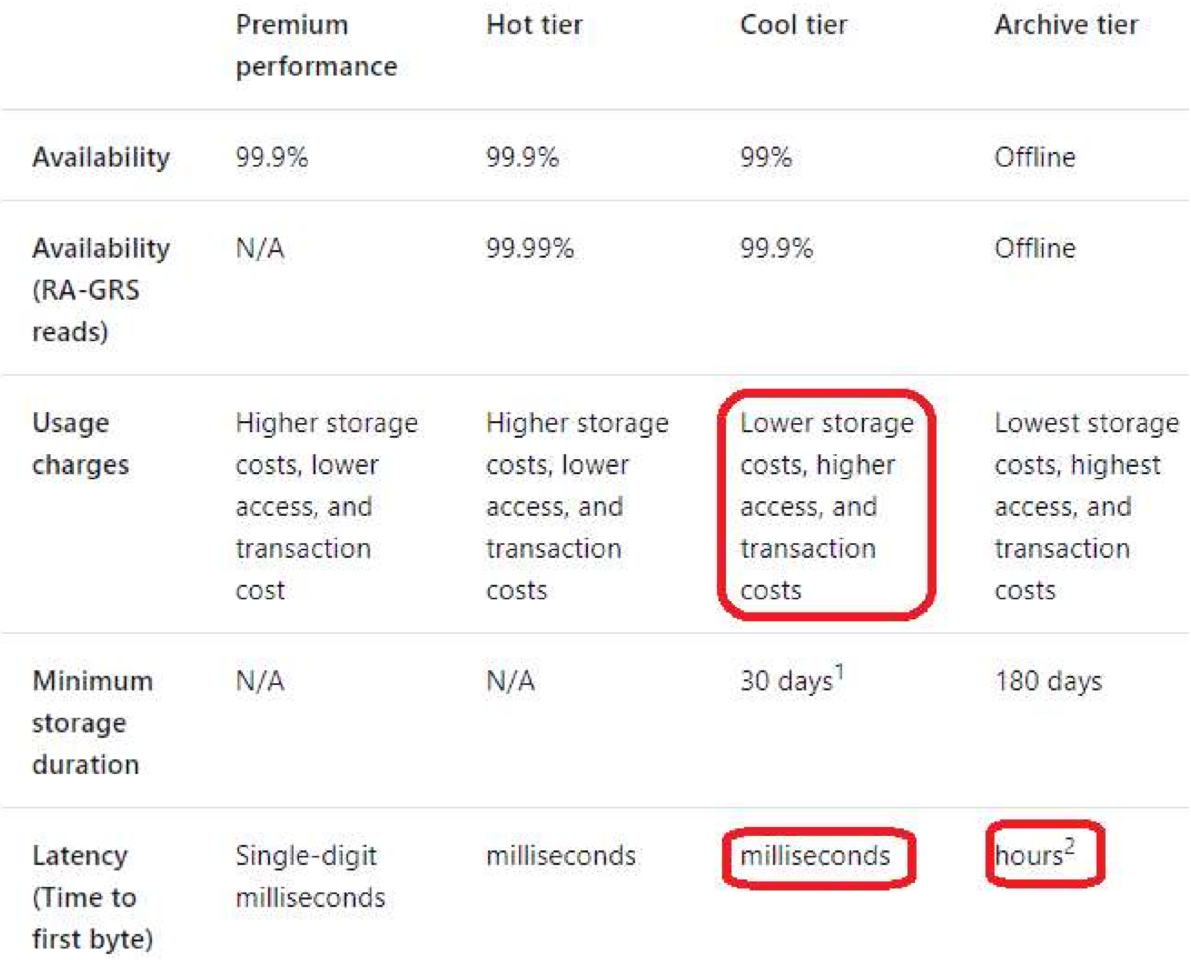
Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: Move to cool storage

Box 2: Move to archive storage
Archive - Optimized for storing data that is rarely accessed and stored for at least 180 days with flexible latency requirements, on the order of hours.

The following table shows a comparison of premium performance block blob storage, and the hot, cool, and archive access tiers.



	Premium performance	Hot tier	Cool tier	Archive tier
Availability	99.9%	99.9%	99%	Offline
Availability (RA-GRS reads)	N/A	99.99%	99.9%	Offline
Usage charges	Higher storage costs, lower access, and transaction cost	Higher storage costs, lower access, and transaction costs	Lower storage costs, higher access, and transaction costs	Lowest storage costs, highest access, and transaction costs
Minimum storage duration	N/A	N/A	30 days[1]	180 days
Latency (Time to first byte)	Single-digit milliseconds	milliseconds	milliseconds	hours[2]

Reference:
https://docs.microsoft.com/en-us/azure/storage/blobs/storage-blob-storage-tiers

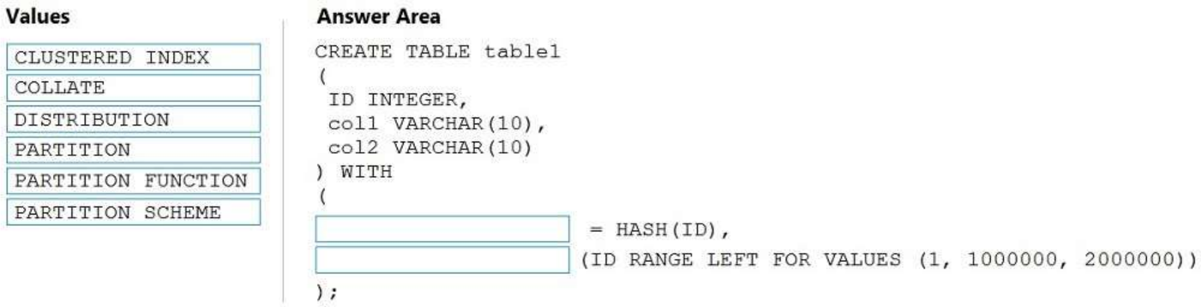
QUESTION 13
DRAG DROP

You need to create a partitioned table in an Azure Synapse Analytics dedicated SQL pool.

How should you complete the Transact-SQL statement? To answer, drag the appropriate values to the correct targets. Each value may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

NOTE: Each correct selection is worth one point.

Select and Place:



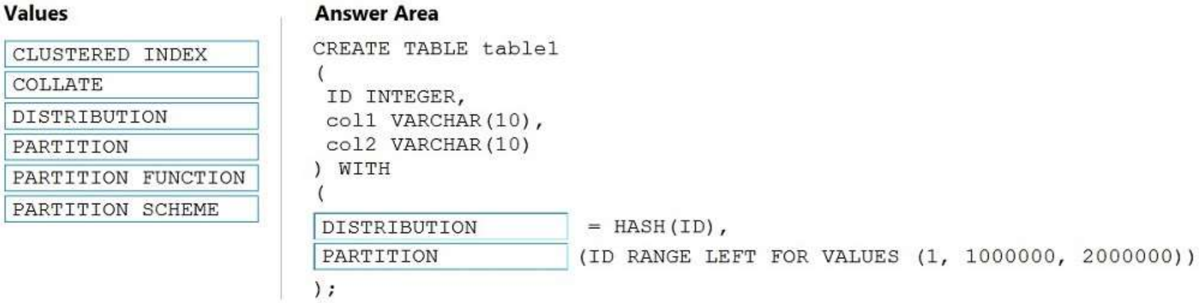
Values

- CLUSTERED INDEX
- COLLATE
- DISTRIBUTION
- PARTITION
- PARTITION FUNCTION
- PARTITION SCHEME

Answer Area

```
CREATE TABLE table1
(
 ID INTEGER,
 col1 VARCHAR(10),
 col2 VARCHAR(10)
) WITH
(
[                    ]  = HASH(ID),
[                    ] (ID RANGE LEFT FOR VALUES (1, 1000000, 2000000))
);
```

Correct Answer:



Values

- CLUSTERED INDEX
- COLLATE
- DISTRIBUTION
- PARTITION
- PARTITION FUNCTION
- PARTITION SCHEME

Answer Area

```
CREATE TABLE table1
(
 ID INTEGER,
 col1 VARCHAR(10),
 col2 VARCHAR(10)
) WITH
(
[DISTRIBUTION]  = HASH(ID),
[PARTITION]     (ID RANGE LEFT FOR VALUES (1, 1000000, 2000000))
);
```

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: DISTRIBUTION
Table distribution options include DISTRIBUTION = HASH (distribution_column_name), assigns each row to one distribution by hashing the value stored in distribution_column_name.

Box 2: PARTITION
Table partition options. Syntax:
PARTITION (partition_column_name RANGE [LEFT | RIGHT] FOR VALUES ([boundary_value [,...n]]))

Reference:
https://docs.microsoft.com/en-us/sql/t-sql/statements/create-table-azure-sql-data-warehouse?

QUESTION 14
You need to design an Azure Synapse Analytics dedicated SQL pool that meets the following requirements:

- Can return an employee record from a given point in time.
- Maintains the latest employee information.
- Minimizes query complexity.

How should you model the employee data?

A. as a temporal table
B. as a SQL graph table
C. as a degenerate dimension table
D. as a Type 2 slowly changing dimension (SCD) table

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
A Type 2 SCD supports versioning of dimension members. Often the source system doesn't store versions, so the data warehouse load process detects and manages changes in a dimension table. In this case, the dimension table must use a surrogate key to provide a unique reference to a version of the dimension member. It also includes columns that define the date range validity of the version (for example, StartDate and EndDate) and possibly a flag column (for example, IsCurrent) to easily filter by current dimension members.

Reference:
https://docs.microsoft.com/en-us/learn/modules/populate-slowly-changing-dimensions-azure-synapse-

analytics-pipelines/3-choose-between-dimension-types

QUESTION 15
You have an enterprise-wide Azure Data Lake Storage Gen2 account. The data lake is accessible only through an Azure virtual network named VNET1.

You are building a SQL pool in Azure Synapse that will use data from the data lake.

Your company has a sales team. All the members of the sales team are in an Azure Active Directory group named Sales. POSIX controls are used to assign the Sales group access to the files in the data lake.

You plan to load data to the SQL pool every hour.

You need to ensure that the SQL pool can load the sales data from the data lake.

Which three actions should you perform? Each correct answer presents part of the solution.

NOTE: Each area selection is worth one point.

A. Add the managed identity to the Sales group.
B. Use the managed identity as the credentials for the data load process.
C. Create a shared access signature (SAS).
D. Add your Azure Active Directory (Azure AD) account to the Sales group.
E. Use the snared access signature (SAS) as the credentials for the data load process.
F. Create a managed identity.

Correct Answer: ADF
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The managed identity grants permissions to the dedicated SQL pools in the workspace.

Note: Managed identity for Azure resources is a feature of Azure Active Directory. The feature provides Azure services with an automatically managed identity in Azure AD

Reference:
https://docs.microsoft.com/en-us/azure/synapse-analytics/security/synapse-workspace-managed-identity

Design and develop data processing

Testlet 1

Case study

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study
To display the first question in this case study, click the **Next** button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an **All Information** tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the **Question** button to return to the question.

Overview

Litware, Inc. owns and operates 300 convenience stores across the US. The company sells a variety of packaged foods and drinks, as well as a variety of prepared foods, such as sandwiches and pizzas.

Litware has a loyalty club whereby members can get daily discounts on specific items by providing their membership number at checkout.

Litware employs business analysts who prefer to analyze data by using Microsoft Power BI, and data scientists who prefer analyzing data in Azure Databricks notebooks.

Requirements

Business Goals

Litware wants to create a new analytics environment in Azure to meet the following requirements:

- See inventory levels across the stores. Data must be updated as close to real time as possible.
- Execute ad hoc analytical queries on historical data to identify whether the loyalty club discounts increase sales of the discounted products.
- Every four hours, notify store employees about how many prepared food items to produce based on historical demand from the sales data.

Technical Requirements

Litware identifies the following technical requirements:

- Minimize the number of different Azure services needed to achieve the business goals.
- Use platform as a service (PaaS) offerings whenever possible and avoid having to provision virtual machines that must be managed by Litware.
- Ensure that the analytical data store is accessible only to the company's on-premises network and Azure services.
- Use Azure Active Directory (Azure AD) authentication whenever possible.

- Use the principle of least privilege when designing security.
- Stage Inventory data in Azure Data Lake Storage Gen2 before loading the data into the analytical data store. Litware wants to remove transient data from Data Lake Storage once the data is no longer in use. Files that have a modified date that is older than 14 days must be removed.
- Limit the business analysts' access to customer contact information, such as phone numbers, because this type of data is not analytically relevant.
- Ensure that you can quickly restore a copy of the analytical data store within one hour in the event of corruption or accidental deletion.

Planned Environment

Litware plans to implement the following environment:

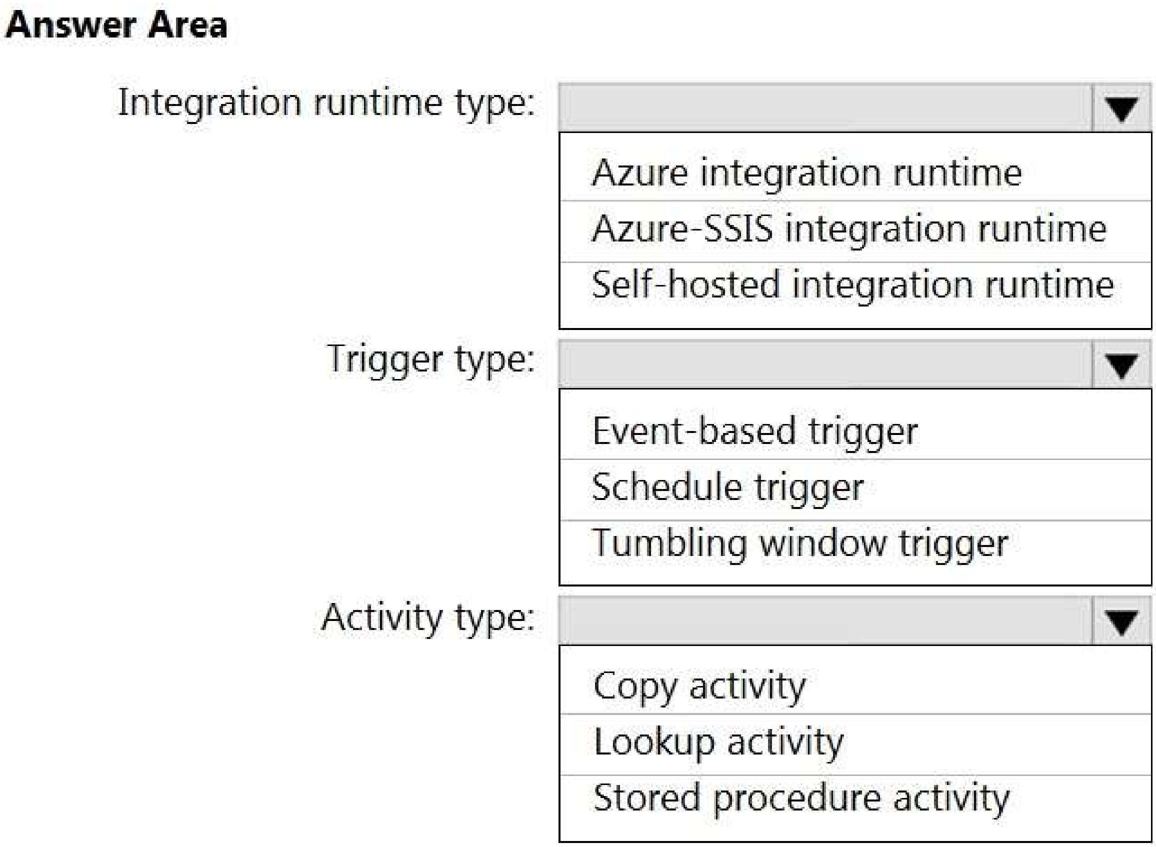
- The application development team will create an Azure event hub to receive real-time sales data, including store number, date, time, product ID, customer loyalty number, price, and discount amount, from the point of sale (POS) system and output the data to data storage in Azure.
- Customer data, including name, contact information, and loyalty number, comes from Salesforce, a SaaS application, and can be imported into Azure once every eight hours. Row modified dates are not trusted in the source table.
- Product data, including product ID, name, and category, comes from Salesforce and can be imported into Azure once every eight hours. Row modified dates are not trusted in the source table.
- Daily inventory data comes from a Microsoft SQL server located on a private network.
- Litware currently has 5 TB of historical sales data and 100 GB of customer data. The company expects approximately 100 GB of new data per month for the next year.
- Litware will build a custom application named FoodPrep to provide store employees with the calculation results of how many prepared food items to produce every four hours.
- Litware does not plan to implement Azure ExpressRoute or a VPN between the on-premises network and Azure.

QUESTION 1
HOTSPOT

Which Azure Data Factory components should you recommend using together to import the daily inventory data from the SQL server to Azure Data Lake Storage? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:



Answer Area

Integration runtime type:

- Azure integration runtime
- Azure-SSIS integration runtime
- Self-hosted integration runtime

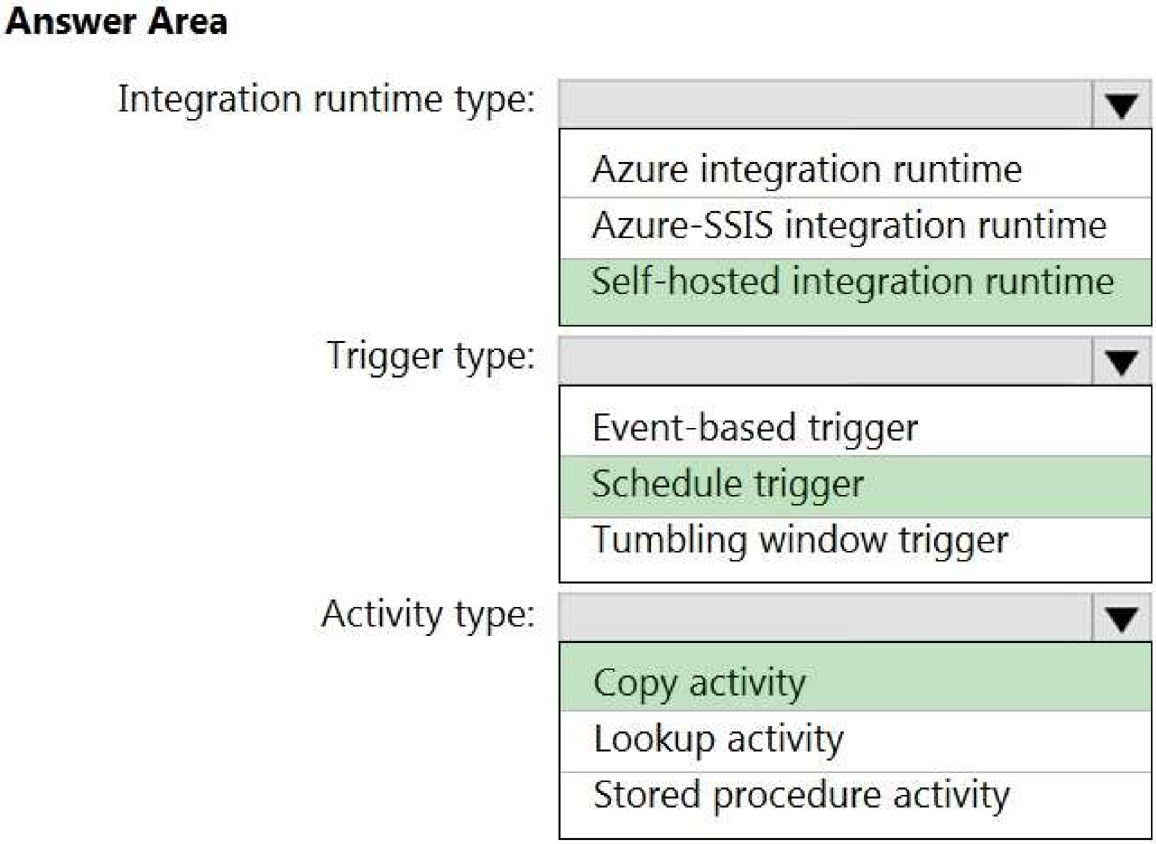
Trigger type:

- Event-based trigger
- Schedule trigger
- Tumbling window trigger

Activity type:

- Copy activity
- Lookup activity
- Stored procedure activity

Correct Answer:



Answer Area

Integration runtime type:

- Azure integration runtime
- Azure-SSIS integration runtime
- [✓ Self-hosted integration runtime]

Trigger type:

- Event-based trigger
- [✓ Schedule trigger]
- Tumbling window trigger

Activity type:

- [✓ Copy activity]
- Lookup activity
- Stored procedure activity

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: Self-hosted integration runtime
A self-hosted IR is capable of running copy activity between a cloud data stores and a data store in private network.

Box 2: Schedule trigger
Schedule every 8 hours

Box 3: Copy activity

Scenario:

- Customer data, including name, contact information, and loyalty number, comes from Salesforce and can be imported into Azure once every eight hours. Row modified dates are not trusted in the source table.
- Product data, including product ID, name, and category, comes from Salesforce and can be imported into Azure once every eight hours. Row modified dates are not trusted in the source table.

Design and develop data processing

Question Set 2

QUESTION 1
HOTSPOT

You are building an Azure Stream Analytics job to identify how much time a user spends interacting with a feature on a webpage.

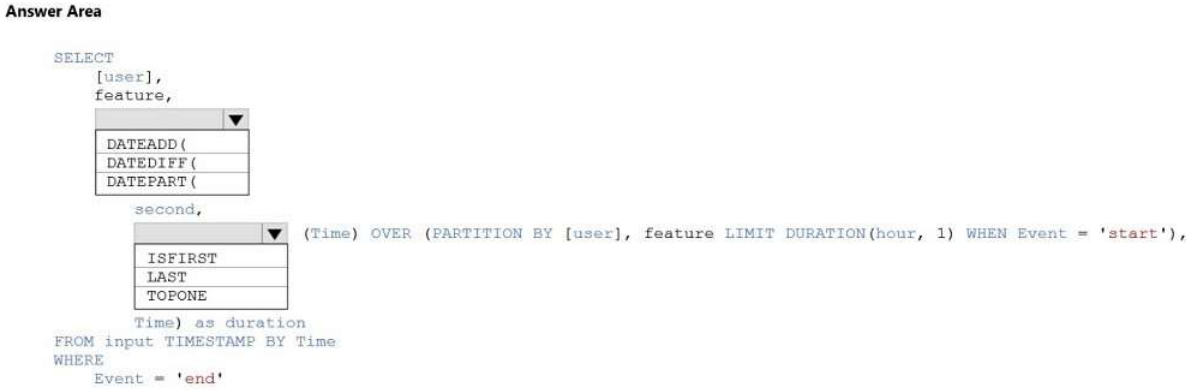
The job receives events based on user actions on the webpage. Each row of data represents an event. Each event has a type of either `'start'` or `'end'`.

You need to calculate the duration between start and end events.

How should you complete the query? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

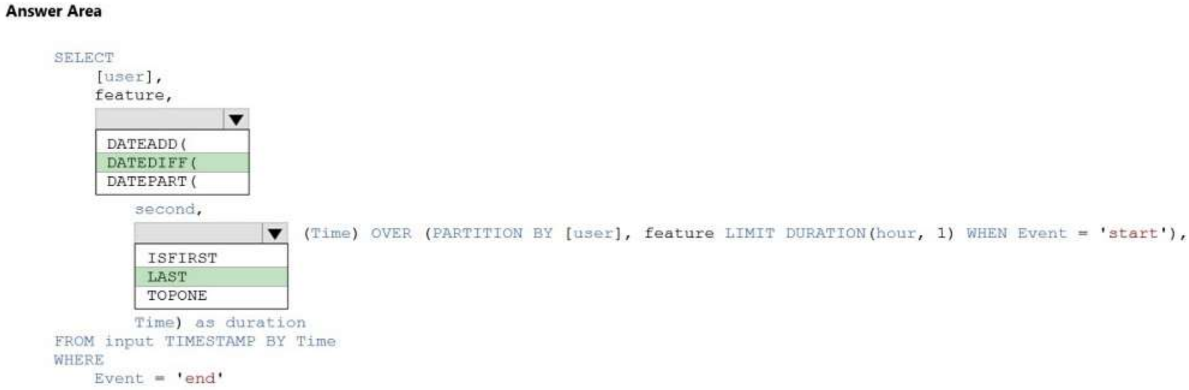
Hot Area:



Answer Area

```
SELECT
    [user],
    feature,
    ▼
    DATEADD(
    DATEDIFF(
    DATEPART(
        second,
        ▼  (Time) OVER (PARTITION BY [user], feature LIMIT DURATION(hour, 1) WHEN Event = 'start'),
        ISFIRST
        LAST
        TOPONE
        Time) as duration
FROM input TIMESTAMP BY Time
WHERE
    Event = 'end'
```

Correct Answer:



Answer Area

```
SELECT
    [user],
    feature,
    ▼
    DATEADD(
    [✓ DATEDIFF(]
    DATEPART(
        second,
        ▼  (Time) OVER (PARTITION BY [user], feature LIMIT DURATION(hour, 1) WHEN Event = 'start'),
        ISFIRST
        [✓ LAST]
        TOPONE
        Time) as duration
FROM input TIMESTAMP BY Time
WHERE
    Event = 'end'
```

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: DATEDIFF
DATEDIFF function returns the count (as a signed integer value) of the specified datepart boundaries crossed between the specified startdate and enddate.

Syntax: DATEDIFF (datepart , startdate, enddate)

Box 2: LAST
The LAST function can be used to retrieve the last event within a specific condition. In this example, the condition is an event of type Start, partitioning the search by PARTITION BY user and feature. This way, every user and feature is treated independently when searching for the Start event. LIMIT DURATION limits the search back in time to 1 hour between the End and Start events.

Example:

```
SELECT
   [user],
   feature,
   DATEDIFF(
      second,
      LAST(Time) OVER (PARTITION BY [user], feature LIMIT DURATION(hour,
         1) WHEN Event = 'start'),
      Time) as duration
FROM input TIMESTAMP BY Time
WHERE
   Event = 'end'
```

Reference:
https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-stream-analytics-query-patterns

QUESTION 2
You are creating an Azure Data Factory data flow that will ingest data from a CSV file, cast columns to specified types of data, and insert the data into a table in an Azure Synapse Analytic dedicated SQL pool. The CSV file contains three columns named username, comment, and date.

The data flow already contains the following:

- A source transformation.
- A Derived Column transformation to set the appropriate types of data.
- A sink transformation to land the data in the pool.

You need to ensure that the data flow meets the following requirements:

- All valid rows must be written to the destination table.
- Truncation errors in the comment column must be avoided proactively.
- Any rows containing comment values that will cause truncation errors upon insert must be written to a file in blob storage.

Which two actions should you perform? Each correct answer presents part of the solution.

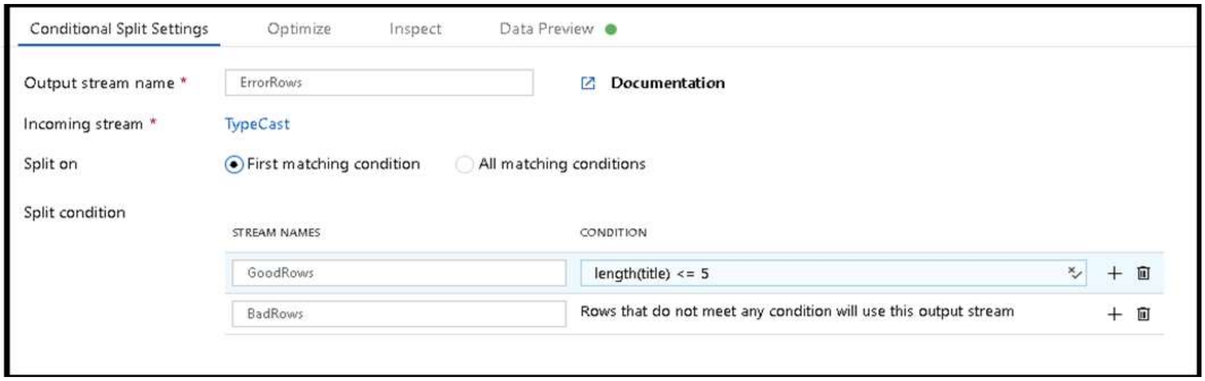
NOTE: Each correct selection is worth one point.

A. To the data flow, add a sink transformation to write the rows to a file in blob storage.
B. To the data flow, add a Conditional Split transformation to separate the rows that will cause truncation errors.
C. To the data flow, add a filter transformation to filter out rows that will cause truncation errors.
D. Add a select transformation to select only the rows that will cause truncation errors.

Correct Answer: AB
Section: (none)
Explanation

Explanation/Reference:
Explanation:
B: Example:

1. This conditional split transformation defines the maximum length of "title" to be five. Any row that is less than or equal to five will go into the GoodRows stream. Any row that is larger than five will go into the BadRows stream.



Conditional Split Settings | Optimize | Inspect | Data Preview ●

Output stream name * ErrorRows

Documentation

Incoming stream * TypeCast

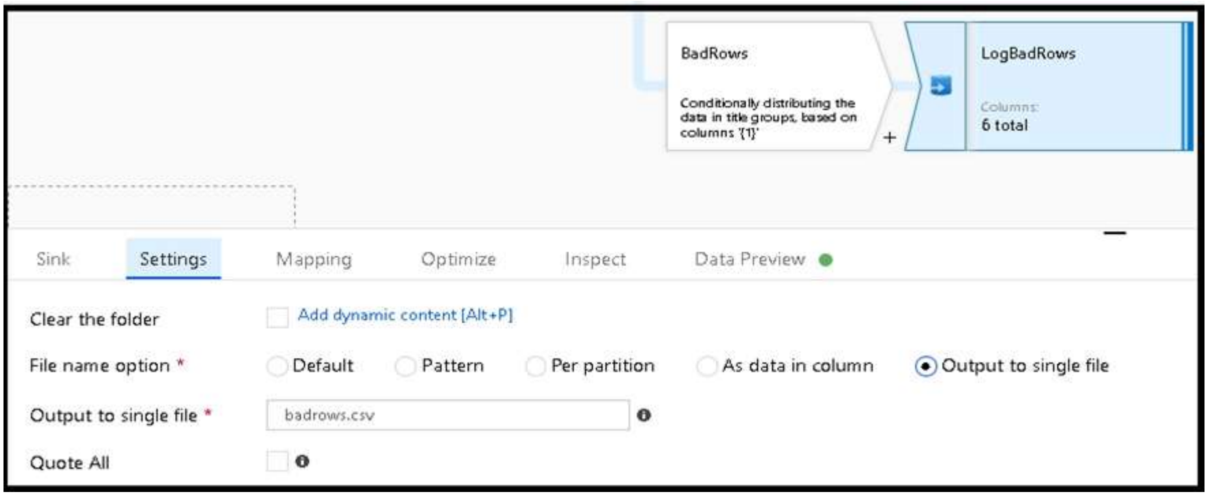
Split on ● First matching condition ○ All matching conditions

Split condition

STREAM NAMES	CONDITION
GoodRows	length(title) <= 5
BadRows	Rows that do not meet any condition will use this output stream

2. This conditional split transformation defines the maximum length of "title" to be five. Any row that is less than or equal to five will go into the GoodRows stream. Any row that is larger than five will go into the BadRows stream.

A:
3. Now we need to log the rows that failed. Add a sink transformation to the BadRows stream for logging. Here, we'll "auto-map" all of the fields so that we have logging of the complete transaction record. This is a text-delimited CSV file output to a single file in Blob Storage. We'll call the log file "badrows.csv".



BadRows
Conditionally distributing the data in title groups, based on columns '{1}'
LogBadRows
Columns:
6 total

Sink | Settings | Mapping | Optimize | Inspect | Data Preview ●

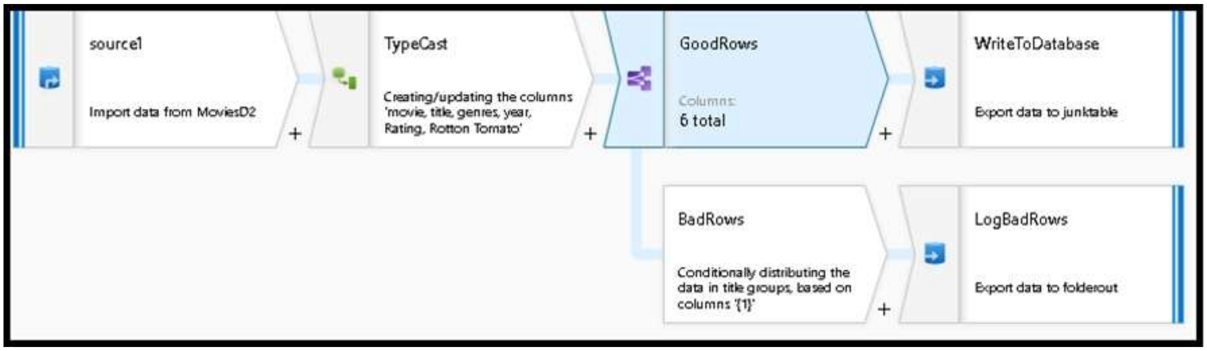
Clear the folder □ Add dynamic content [Alt+P]

File name option * ○ Default ○ Pattern ○ Per partition ○ As data in column ● Output to single file

Output to single file * badrows.csv

Quote All □

4. The completed data flow is shown below. We are now able to split off error rows to avoid the SQL truncation errors and put those entries into a log file. Meanwhile, successful rows can continue to write to our target database.



source1
Import data from MoviesD2
TypeCast
Creating/updating the columns 'movie, title, genres, year, Rating, Rotton Tomato'
GoodRows
Columns:
6 total
WriteToDatabase
Export data to junktable
BadRows
Conditionally distributing the data in title groups, based on columns '{1}'
LogBadRows
Export data to folderout

Reference:
https://docs.microsoft.com/en-us/azure/data-factory/how-to-data-flow-error-rows

QUESTION 3

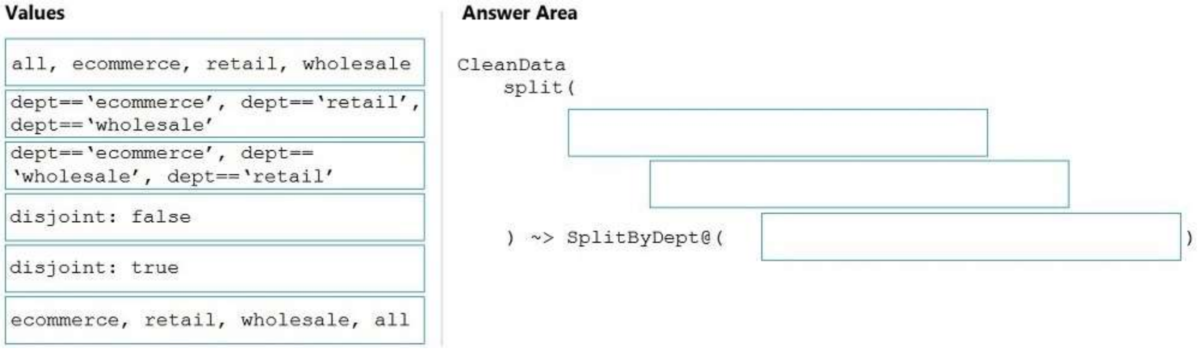
DRAG DROP

You need to create an Azure Data Factory pipeline to process data for the following three departments at your company: Ecommerce, retail, and wholesale. The solution must ensure that data can also be processed for the entire company.

How should you complete the Data Factory data flow script? To answer, drag the appropriate values to the correct targets. Each value may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

NOTE: Each correct selection is worth one point.

Select and Place:



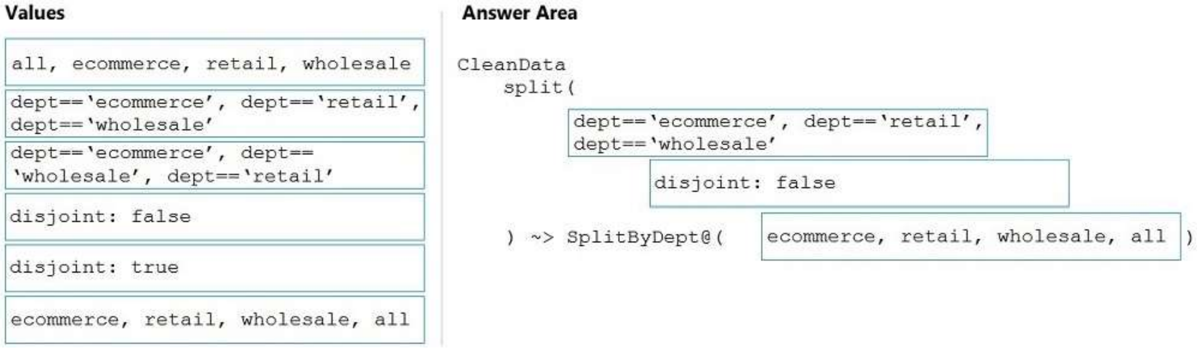
Values

- all, ecommerce, retail, wholesale
- dept==‘ecommerce’, dept==‘retail’, dept==‘wholesale’
- dept==‘ecommerce’, dept== ‘wholesale’, dept==‘retail’
- disjoint: false
- disjoint: true
- ecommerce, retail, wholesale, all

Answer Area

```
CleanData
    split(
          
          
    ) ~> SplitByDept@(                    )
```

Correct Answer:



Values

- all, ecommerce, retail, wholesale
- dept==‘ecommerce’, dept==‘retail’, dept==‘wholesale’
- dept==‘ecommerce’, dept== ‘wholesale’, dept==‘retail’
- disjoint: false
- disjoint: true
- ecommerce, retail, wholesale, all

Answer Area

```
CleanData
    split(
          dept==‘ecommerce’, dept==‘retail’,
          dept==‘wholesale’
                 disjoint: false
    ) ~> SplitByDept@( ecommerce, retail, wholesale, all )
```

Section: (none)
Explanation

Explanation/Reference:
Explanation:

The conditional split transformation routes data rows to different streams based on matching conditions. The conditional split transformation is similar to a CASE decision structure in a programming language. The transformation evaluates expressions, and based on the results, directs the data row to the specified stream.

Box 1: dept=='ecommerce', dept=='retail', dept=='wholesale'
First we put the condition. The order must match the stream labeling we define in Box 3.

Syntax:

```
<incomingStream>
  split(
    <conditionalExpression1>
    <conditionalExpression2>
    ...
    disjoint: {true | false}
```

) ~> <splitTx>@(stream1, stream2, ..., <defaultStream>)

Box 2: discount : false
disjoint is false because the data goes to the first matching condition. All remaining rows matching the third condition go to output stream all.

Box 3: ecommerce, retail, wholesale, all
Label the streams

Reference:
https://docs.microsoft.com/en-us/azure/data-factory/data-flow-conditional-split

QUESTION 4
DRAG DROP

You have an Azure Data Lake Storage Gen2 account that contains a JSON file for customers. The file contains two attributes named `FirstName` and `LastName`.

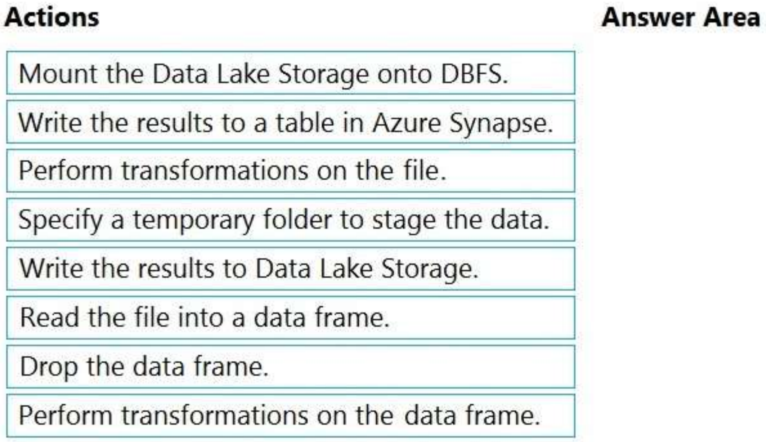
You need to copy the data from the JSON file to an Azure Synapse Analytics table by using Azure Databricks. A new column must be created that concatenates the `FirstName` and `LastName` values.

You create the following components:

- A destination table in Azure Synapse
- An Azure Blob storage container
- A service principal

Which five actions should you perform in sequence next in is Databricks notebook? To answer, move the appropriate actions from the list of actions to the answer area and arrange them in the correct order.

Select and Place:

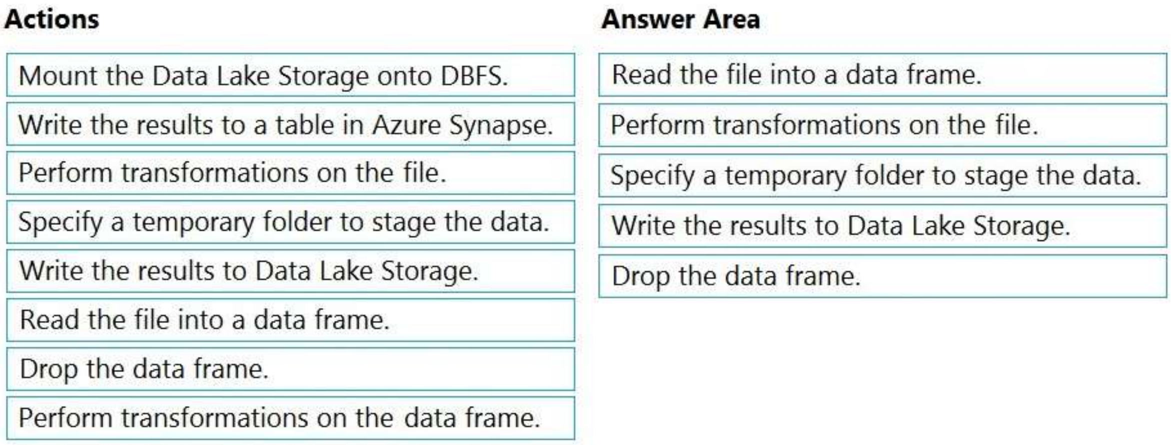


Actions

- Mount the Data Lake Storage onto DBFS.
- Write the results to a table in Azure Synapse.
- Perform transformations on the file.
- Specify a temporary folder to stage the data.
- Write the results to Data Lake Storage.
- Read the file into a data frame.
- Drop the data frame.
- Perform transformations on the data frame.

Answer Area

Correct Answer:



Actions

- Mount the Data Lake Storage onto DBFS.
- Write the results to a table in Azure Synapse.
- Perform transformations on the file.
- Specify a temporary folder to stage the data.
- Write the results to Data Lake Storage.
- Read the file into a data frame.
- Drop the data frame.
- Perform transformations on the data frame.

Answer Area

- Read the file into a data frame.
- Perform transformations on the file.
- Specify a temporary folder to stage the data.
- Write the results to Data Lake Storage.
- Drop the data frame.

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Step 1: Read the file into a data frame.
You can load the json files as a data frame in Azure Databricks.

Step 2: Perform transformations on the data frame.

Step 3:Specify a temporary folder to stage the data
Specify a temporary folder to use while moving data between Azure Databricks and Azure Synapse.

Step 4: Write the results to a table in Azure Synapse.
You upload the transformed data frame into Azure Synapse. You use the Azure Synapse connector for Azure Databricks to directly upload a dataframe as a table in a Azure Synapse.

Step 5: Drop the data frame
Clean up resources. You can terminate the cluster. From the Azure Databricks workspace, select Clusters on the left. For the cluster to terminate, under Actions, point to the ellipsis (...) and select the Terminate icon.

Reference:
https://docs.microsoft.com/en-us/azure/azure-databricks/databricks-extract-load-sql-data-warehouse

QUESTION 5
HOTSPOT

You build an Azure Data Factory pipeline to move data from an Azure Data Lake Storage Gen2 container to a database in an Azure Synapse Analytics dedicated SQL pool.

Data in the container is stored in the following folder structure.

`/in/{YYYY}/{MM}/{DD}/{HH}/{mm}`

The earliest folder is `/in/2021/01/01/00/00`. The latest folder is `/in/2021/01/15/01/45`.

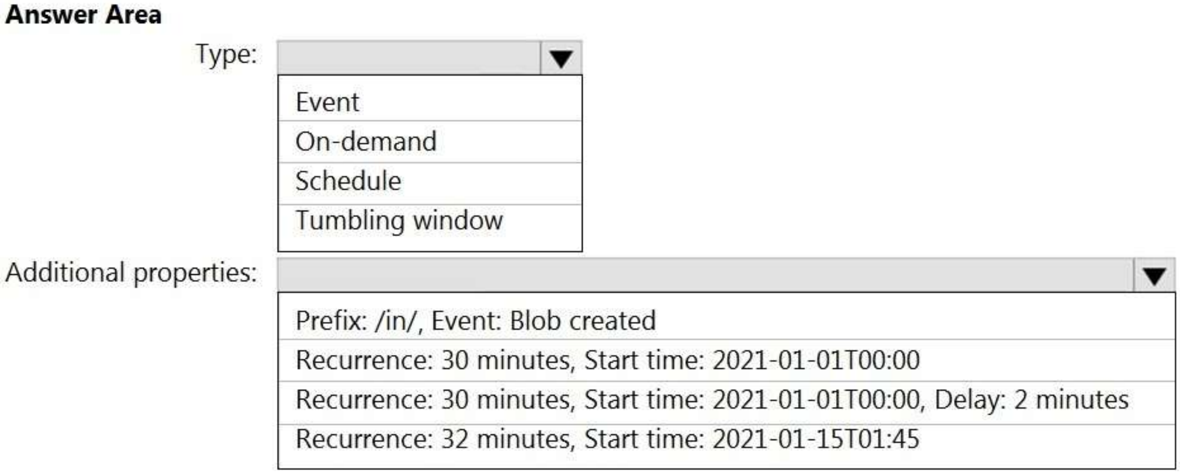
You need to configure a pipeline trigger to meet the following requirements:

- Existing data must be loaded.
- Data must be loaded every 30 minutes.
- Late-arriving data of up to two minutes must he included in the load for the time at which the data should have arrived.

How should you configure the pipeline trigger? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:



Answer Area

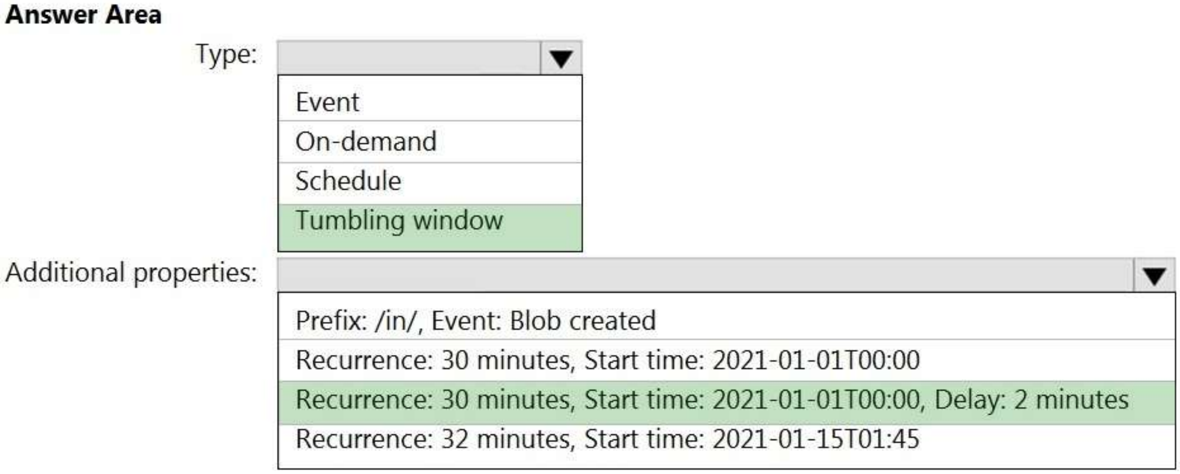
Type:

- Event
- On-demand
- Schedule
- Tumbling window

Additional properties:

- Prefix: /in/, Event: Blob created
- Recurrence: 30 minutes, Start time: 2021-01-01T00:00
- Recurrence: 30 minutes, Start time: 2021-01-01T00:00, Delay: 2 minutes
- Recurrence: 32 minutes, Start time: 2021-01-15T01:45

Correct Answer:



Answer Area

Type:

- Event
- On-demand
- Schedule
- [✓ Tumbling window]

Additional properties:

- Prefix: /in/, Event: Blob created
- Recurrence: 30 minutes, Start time: 2021-01-01T00:00
- [✓ Recurrence: 30 minutes, Start time: 2021-01-01T00:00, Delay: 2 minutes]
- Recurrence: 32 minutes, Start time: 2021-01-15T01:45

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: Tumbling window

To be able to use the Delay parameter we select Tumbling window.

Box 2:
Recurrence: 30 minutes, not 32 minutes
Delay: 2 minutes.
The amount of time to delay the start of data processing for the window. The pipeline run is started after the expected execution time plus the amount of delay. The delay defines how long the trigger waits past the due time before triggering a new run. The delay doesn’t alter the window startTime.

Reference:
https://docs.microsoft.com/en-us/azure/data-factory/how-to-create-tumbling-window-trigger

QUESTION 6
HOTSPOT

You are designing a real-time dashboard solution that will visualize streaming data from remote sensors that connect to the internet. The streaming data must be aggregated to show the average value of each 10-second interval. The data will be discarded after being displayed in the dashboard.

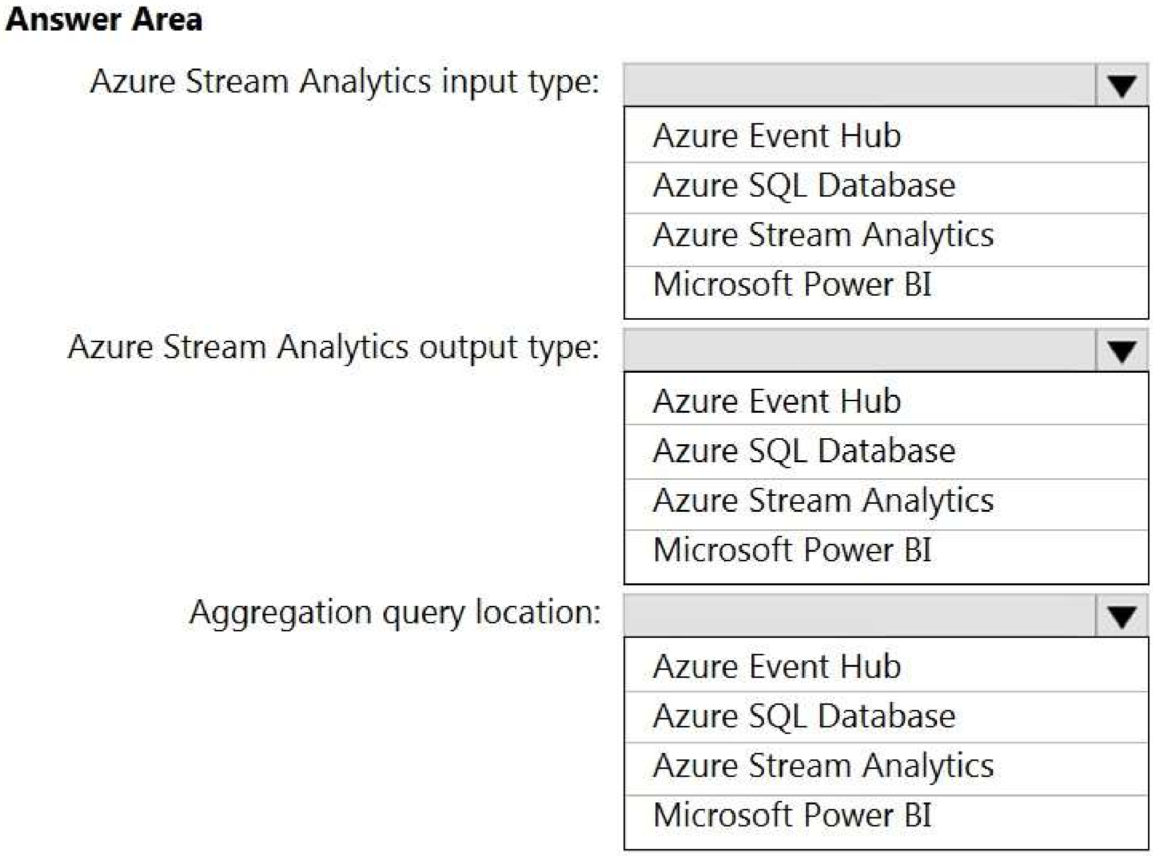
The solution will use Azure Stream Analytics and must meet the following requirements:

- Minimize latency from an Azure Event hub to the dashboard.
- Minimize the required storage.
- Minimize development effort.

What should you include in the solution? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point

Hot Area:



Answer Area

Azure Stream Analytics input type:

- Azure Event Hub
- Azure SQL Database
- Azure Stream Analytics
- Microsoft Power BI

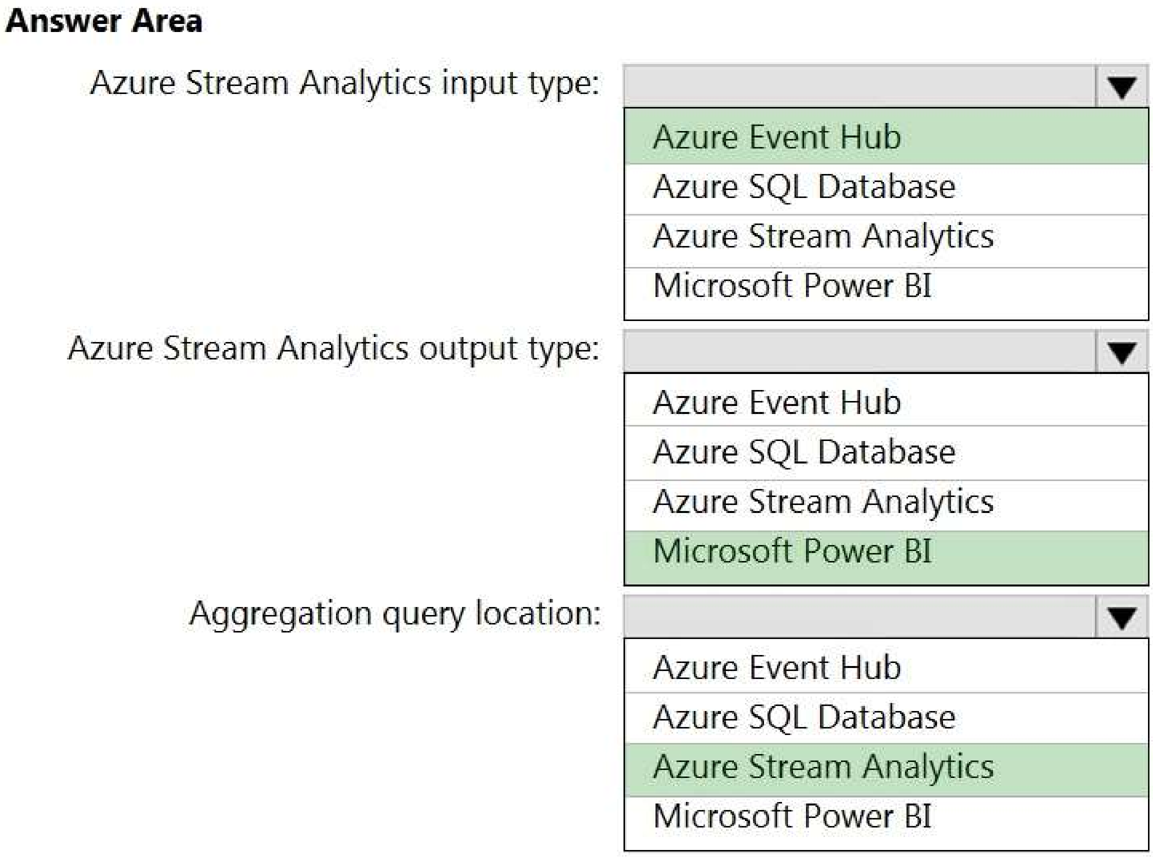
Azure Stream Analytics output type:

- Azure Event Hub
- Azure SQL Database
- Azure Stream Analytics
- Microsoft Power BI

Aggregation query location:

- Azure Event Hub
- Azure SQL Database
- Azure Stream Analytics
- Microsoft Power BI

Correct Answer:



Answer Area

Azure Stream Analytics input type:

- [✓ Azure Event Hub]
- Azure SQL Database
- Azure Stream Analytics
- Microsoft Power BI

Azure Stream Analytics output type:

- Azure Event Hub
- Azure SQL Database
- Azure Stream Analytics
- [✓ Microsoft Power BI]

Aggregation query location:

- Azure Event Hub
- Azure SQL Database
- [✓ Azure Stream Analytics]
- Microsoft Power BI

Section: (none)
Explanation

Explanation/Reference:
Reference:
https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-power-bi-dashboard

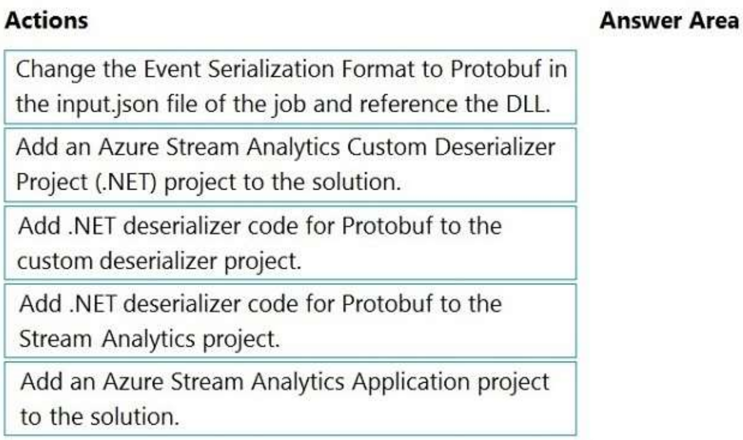
QUESTION 7
DRAG DROP

You have an Azure Stream Analytics job that is a Stream Analytics project solution in Microsoft Visual Studio. The job accepts data generated by IoT devices in the JSON format.

You need to modify the job to accept data generated by the IoT devices in the Protobuf format.

Which three actions should you perform from Visual Studio on sequence? To answer, move the appropriate actions from the list of actions to the answer area and arrange them in the correct order.

Select and Place:

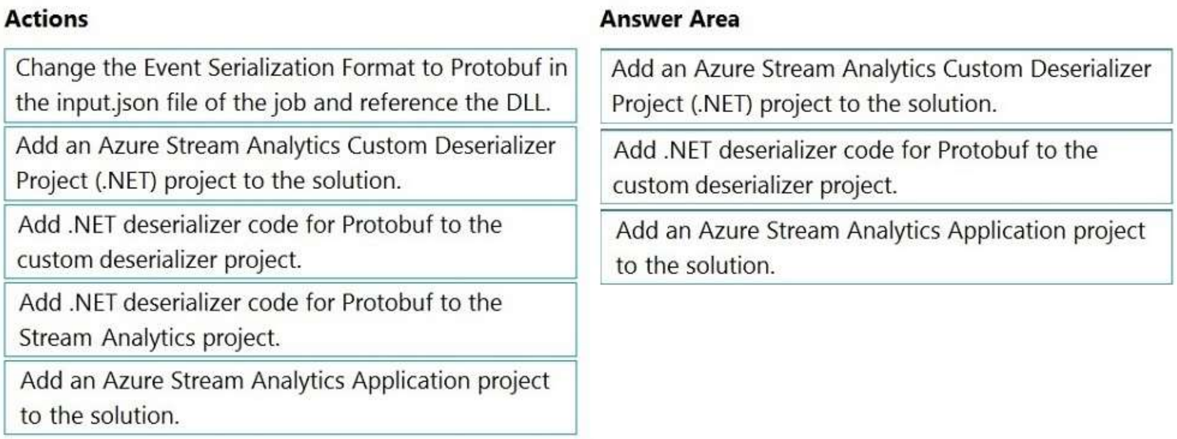


Actions

- Change the Event Serialization Format to Protobuf in the input.json file of the job and reference the DLL.
- Add an Azure Stream Analytics Custom Deserializer Project (.NET) project to the solution.
- Add .NET deserializer code for Protobuf to the custom deserializer project.
- Add .NET deserializer code for Protobuf to the Stream Analytics project.
- Add an Azure Stream Analytics Application project to the solution.

Answer Area

Correct Answer:



Actions

- Change the Event Serialization Format to Protobuf in the input.json file of the job and reference the DLL.
- Add an Azure Stream Analytics Custom Deserializer Project (.NET) project to the solution.
- Add .NET deserializer code for Protobuf to the custom deserializer project.
- Add .NET deserializer code for Protobuf to the Stream Analytics project.
- Add an Azure Stream Analytics Application project to the solution.

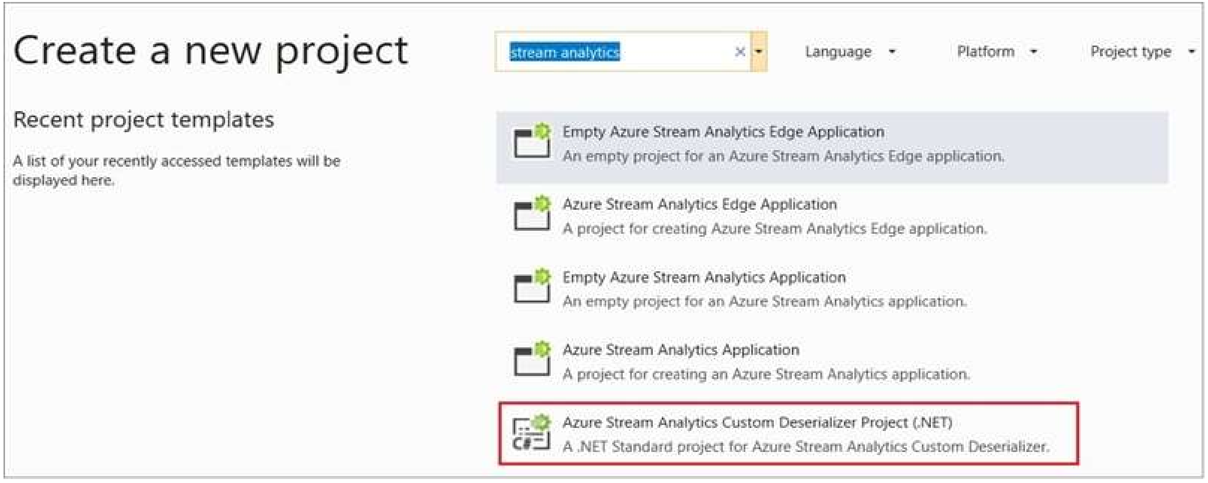
Answer Area

- Add an Azure Stream Analytics Custom Deserializer Project (.NET) project to the solution.
- Add .NET deserializer code for Protobuf to the custom deserializer project.
- Add an Azure Stream Analytics Application project to the solution.

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Step 1: Add an Azure Stream Analytics Custom Deserializer Project (.NET) project to the solution.
Create a custom deserializer
1. Open Visual Studio and select File > New > Project. Search for Stream Analytics and select Azure Stream Analytics Custom Deserializer Project (.NET). Give the project a name, like Protobuf Deserializer.



Create a new project

stream analytics

Recent project templates

A list of your recently accessed templates will be displayed here.

Empty Azure Stream Analytics Edge Application
An empty project for an Azure Stream Analytics Edge application.

Azure Stream Analytics Edge Application
A project for creating Azure Stream Analytics Edge application.

Empty Azure Stream Analytics Application
An empty project for an Azure Stream Analytics application.

Azure Stream Analytics Application
A project for creating an Azure Stream Analytics application.

Azure Stream Analytics Custom Deserializer Project (.NET)
A .NET Standard project for Azure Stream Analytics Custom Deserializer.

2. In Solution Explorer, right-click your Protobuf Deserializer project and select Manage NuGet Packages from the menu. Then install the Microsoft.Azure.StreamAnalytics and Google.Protobuf NuGet packages.
3. Add the MessageBodyProto class and the MessageBodyDeserializer class to your project.
4. Build the Protobuf Deserializer project.

Step 2: Add .NET deserializer code for Protobuf to the custom deserializer project
Azure Stream Analytics has built-in support for three data formats: JSON, CSV, and Avro. With custom .NET deserializers, you can read data from other formats such as Protocol Buffer, Bond and other user defined formats for both cloud and edge jobs.

Step 3: Add an Azure Stream Analytics Application project to the solution
Add an Azure Stream Analytics project

1. In Solution Explorer, right-click the Protobuf Deserializer solution and select Add > New Project. Under Azure Stream Analytics > Stream Analytics, choose Azure Stream Analytics Application. Name it ProtobufCloudDeserializer and select OK.
2. Right-click References under the ProtobufCloudDeserializer Azure Stream Analytics project. Under Projects, add Protobuf Deserializer. It should be automatically populated for you.

Reference:
https://docs.microsoft.com/en-us/azure/stream-analytics/custom-deserializer

QUESTION 8
You have an Azure Storage account and a data warehouse in Azure Synapse Analytics in the UK South region.

You need to copy blob data from the storage account to the data warehouse by using Azure Data Factory. The solution must meet the following requirements:

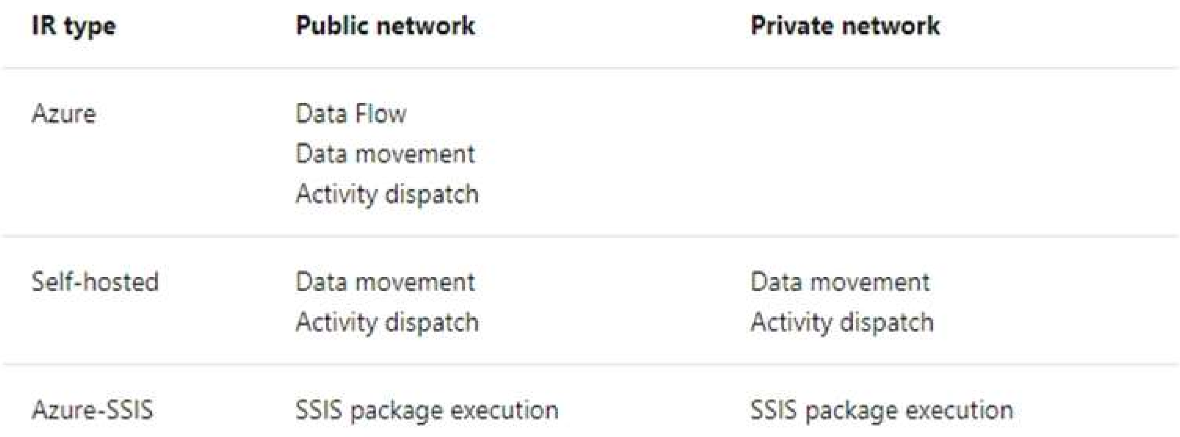
- Ensure that the data remains in the UK South region at all times.
- Minimize administrative effort.

Which type of integration runtime should you use?

A. Azure integration runtime
B. Azure-SSIS integration runtime
C. Self-hosted integration runtime

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:



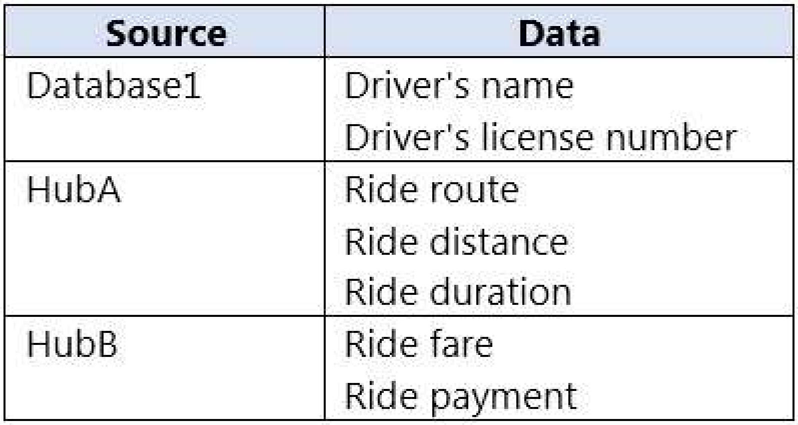
IR type	Public network	Private network
Azure	Data Flow Data movement Activity dispatch	
Self-hosted	Data movement Activity dispatch	Data movement Activity dispatch
Azure-SSIS	SSIS package execution	SSIS package execution

Incorrect Answers:
C: Self-hosted integration runtime is to be used On-premises.

Reference:
https://docs.microsoft.com/en-us/azure/data-factory/concepts-integration-runtime

QUESTION 9
HOTSPOT

You have an Azure SQL database named Database1 and two Azure event hubs named HubA and HubB. The data consumed from each source is shown in the following table.



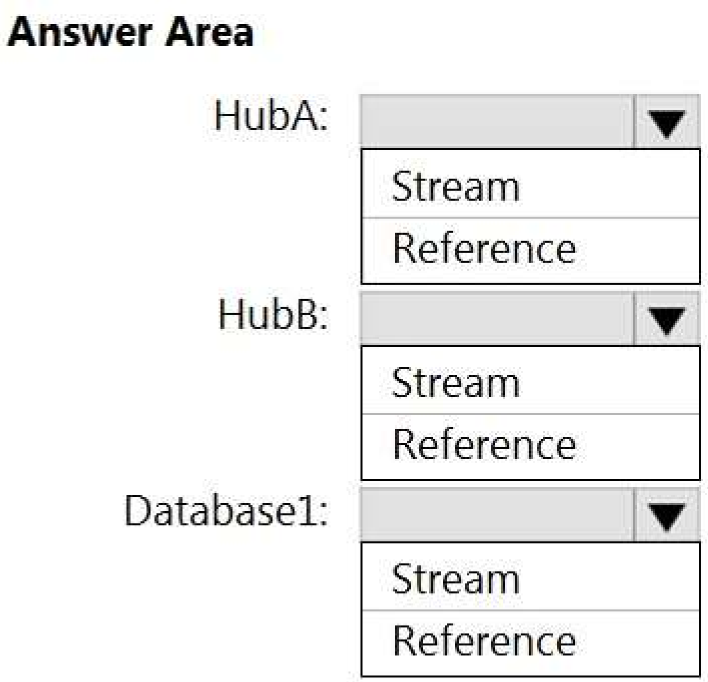
Source	Data
Database1	Driver's name Driver's license number
HubA	Ride route Ride distance Ride duration
HubB	Ride fare Ride payment

You need to implement Azure Stream Analytics to calculate the average fare per mile by driver.

How should you configure the Stream Analytics input for each source? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:



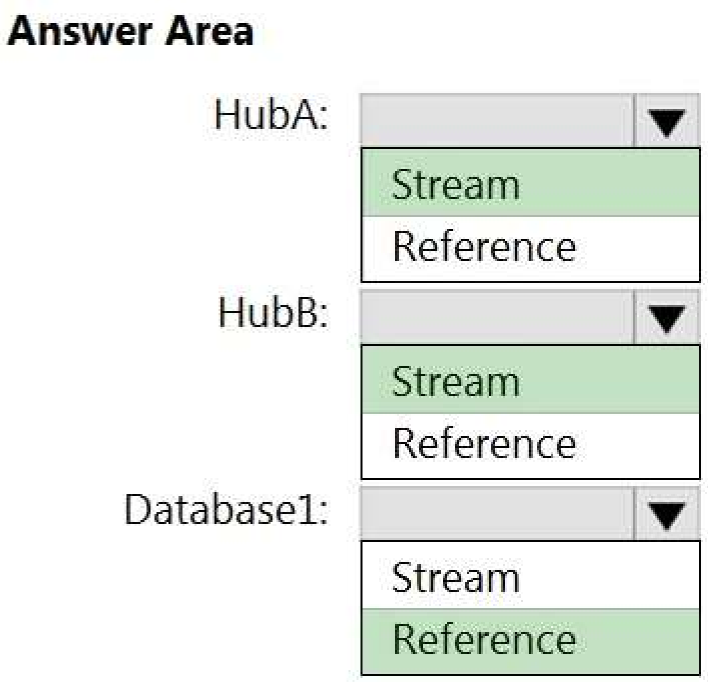
Answer Area

HubA:
- Stream
- Reference

HubB:
- Stream
- Reference

Database1:
- Stream
- Reference

Correct Answer:



Answer Area

HubA:
- [✓ Stream]
- Reference

HubB:
- [✓ Stream]
- Reference

Database1:
- Stream
- [✓ Reference]

Section: (none)
Explanation

Explanation/Reference:
Explanation:

HubA: Stream

HubB: Stream

Database1: Reference
Reference data (also known as a lookup table) is a finite data set that is static or slowly changing in nature, used to perform a lookup or to augment your data streams. For example, in an IoT scenario, you could store metadata about sensors (which don't change often) in reference data and join it with real time IoT data streams. Azure Stream Analytics loads reference data in memory to achieve low latency stream processing

Reference:
https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-use-reference-data

QUESTION 10
You have an Azure Stream Analytics job that receives clickstream data from an Azure event hub.

You need to define a query in the Stream Analytics job. The query must meet the following requirements:

- Count the number of clicks within each 10-second window based on the country of a visitor.
- Ensure that each click is **NOT** counted more than once.

How should you define the Query?

A.
```
SELECT Country, Avg(*) AS Average
FROM ClickStream TIMESTAMP BY CreatedAt
GROUP BY Country, SlidingWindow(second, 10)
```

B.
```
SELECT Country, Count(*) AS Count
FROM ClickStream TIMESTAMP BY CreatedAt
GROUP BY Country, TumblingWindow(second, 10)
```

C.
```
SELECT Country, Avg(*) AS Average
FROM ClickStream TIMESTAMP BY CreatedAt
GROUP BY Country, HoppingWindow(second, 10, 2)
```

D.
```
SELECT Country, Count(*) AS Count
FROM ClickStream TIMESTAMP BY CreatedAt
GROUP BY Country, SessionWindow(second, 5, 10)
```

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Tumbling window functions are used to segment a data stream into distinct time segments and perform a function against them, such as the example below. The key differentiators of a Tumbling window are that they repeat, do not overlap, and an event cannot belong to more than one tumbling window.
Example:

Incorrect Answers:
A: Sliding windows, unlike Tumbling or Hopping windows, output events only for points in time when the content of the window actually changes. In other words, when an event enters or exits the window. Every window has at least one event, like in the case of Hopping windows, events can belong to more than one sliding window.

C: Hopping window functions hop forward in time by a fixed period. It may be easy to think of them as Tumbling windows that can overlap, so events can belong to more than one Hopping window result set. To make a Hopping window the same as a Tumbling window, specify the hop size to be the same as the window size.

D: Session windows group events that arrive at similar times, filtering out periods of time where there is no data.

Reference:
https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-window-functions

QUESTION 11
HOTSPOT

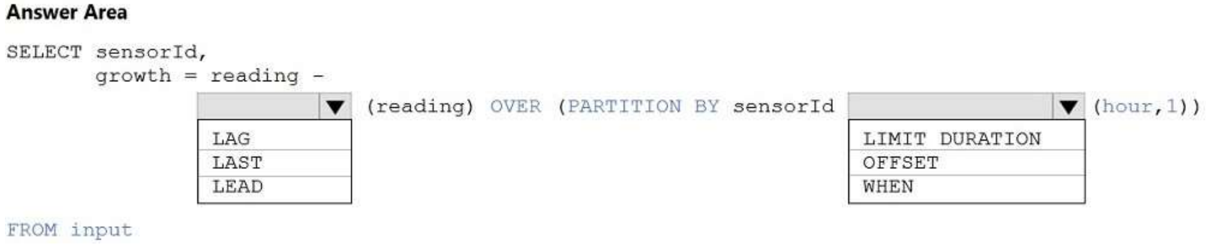
You are building an Azure Analytics query that will receive input data from Azure IoT Hub and write the results to Azure Blob storage.

You need to calculate the difference in readings per sensor per hour.

How should you complete the query? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

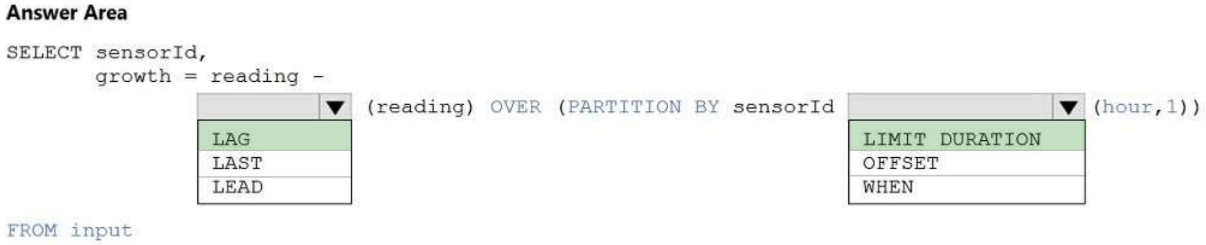
Hot Area:



Answer Area

```
SELECT sensorId,
       growth = reading -
              [          ▼] (reading) OVER (PARTITION BY sensorId [              ▼] (hour,1))
              LAG                                                 LIMIT DURATION
              LAST                                                OFFSET
              LEAD                                                WHEN
FROM input
```

Correct Answer:



Answer Area

```
SELECT sensorId,
       growth = reading -
              [          ▼] (reading) OVER (PARTITION BY sensorId [              ▼] (hour,1))
              [✓ LAG]                                             [✓ LIMIT DURATION]
              LAST                                                OFFSET
              LEAD                                                WHEN
FROM input
```

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: LAG
The LAG analytic operator allows one to look up a “previous” event in an event stream, within certain constraints. It is very useful for computing the rate of growth of a variable, detecting when a variable crosses a threshold, or when a condition starts or stops being true.

Box 2: LIMIT DURATION
Example: Compute the rate of growth, per sensor:

```
SELECT sensorId,
    growth = reading -
                LAG(reading) OVER (PARTITION BY sensorId LIMIT DURATION(hour, 1))
FROM input
```

Reference:
https://docs.microsoft.com/en-us/stream-analytics-query/lag-azure-stream-analytics

QUESTION 12
You need to schedule an Azure Data Factory pipeline to execute when a new file arrives in an Azure Data Lake Storage Gen2 container.

Which type of trigger should you use?

A. on-demand
B. tumbling window
C. schedule
D. event

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Event-driven architecture (EDA) is a common data integration pattern that involves production, detection, consumption, and reaction to events. Data integration scenarios often require Data Factory customers to trigger pipelines based on events happening in storage account, such as the arrival or deletion of a file in Azure Blob Storage account.

Reference:
https://docs.microsoft.com/en-us/azure/data-factory/how-to-create-event-trigger

QUESTION 13
You have two Azure Data Factory instances named ADFdev and ADFprod. ADFdev connects to an Azure DevOps Git repository.

You publish changes from the main branch of the Git repository to ADFdev.

You need to deploy the artifacts from ADFdev to ADFprod.

What should you do first?

A. From ADFdev, modify the Git configuration.
B. From ADFdev, create a linked service.
C. From Azure DevOps, create a release pipeline.
D. From Azure DevOps, update the main branch.

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
In Azure Data Factory, continuous integration and delivery (CI/CD) means moving Data Factory pipelines from one environment (development, test, production) to another.

Note:
The following is a guide for setting up an Azure Pipelines release that automates the deployment of a data factory to multiple environments.
1. In Azure DevOps, open the project that's configured with your data factory.
2. On the left side of the page, select Pipelines, and then select Releases.
3. Select New pipeline, or, if you have existing pipelines, select New and then New release pipeline.
4. In the Stage name box, enter the name of your environment.
5. Select Add artifact, and then select the git repository configured with your development data factory. Select the publish branch of the repository for the Default branch. By default, this publish branch is adf_publish.
6. Select the Empty job template.

Reference:
https://docs.microsoft.com/en-us/azure/data-factory/continuous-integration-deployment

QUESTION 14
You are developing a solution that will stream to Azure Stream Analytics. The solution will have both streaming data and reference data.

Which input type should you use for the reference data?

A. Azure Cosmos DB
B. Azure Blob storage
C. Azure IoT Hub
D. Azure Event Hubs

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Stream Analytics supports Azure Blob storage and Azure SQL Database as the storage layer for Reference Data.

Reference:
https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-use-reference-data

QUESTION 15
You are designing an Azure Stream Analytics job to process incoming events from sensors in retail environments.

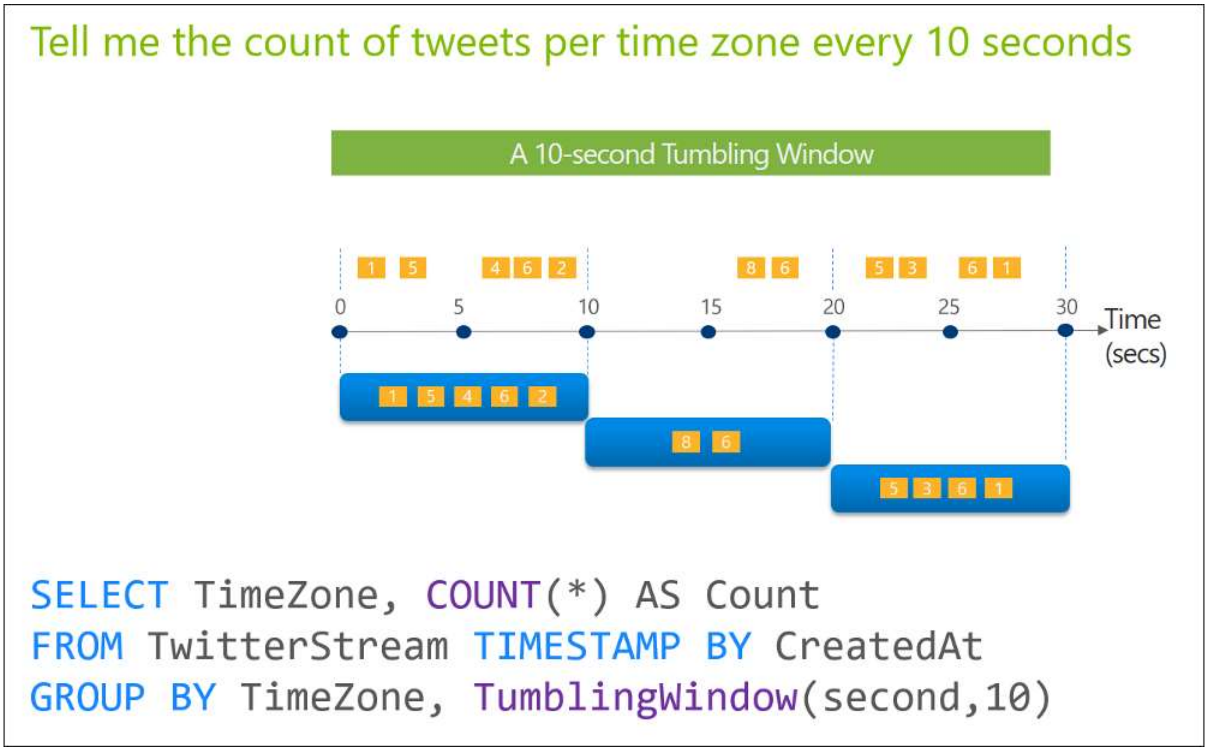
You need to process the events to produce a running average of shopper counts during the previous 15 minutes, calculated at five-minute intervals.

Which type of window should you use?

A. snapshot
B. tumbling
C. hopping
D. sliding

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Tumbling windows are a series of fixed-sized, non-overlapping and contiguous time intervals. The following diagram illustrates a stream with a series of events and how they are mapped into 10-second tumbling windows.



Tell me the count of tweets per time zone every 10 seconds

```
SELECT TimeZone, COUNT(*) AS Count
FROM TwitterStream TIMESTAMP BY CreatedAt
GROUP BY TimeZone, TumblingWindow(second,10)
```

Reference:
https://docs.microsoft.com/en-us/stream-analytics-query/tumbling-window-azure-stream-analytics

QUESTION 16
HOTSPOT

You are designing a monitoring solution for a fleet of 500 vehicles. Each vehicle has a GPS tracking device that sends data to an Azure event hub once per minute.

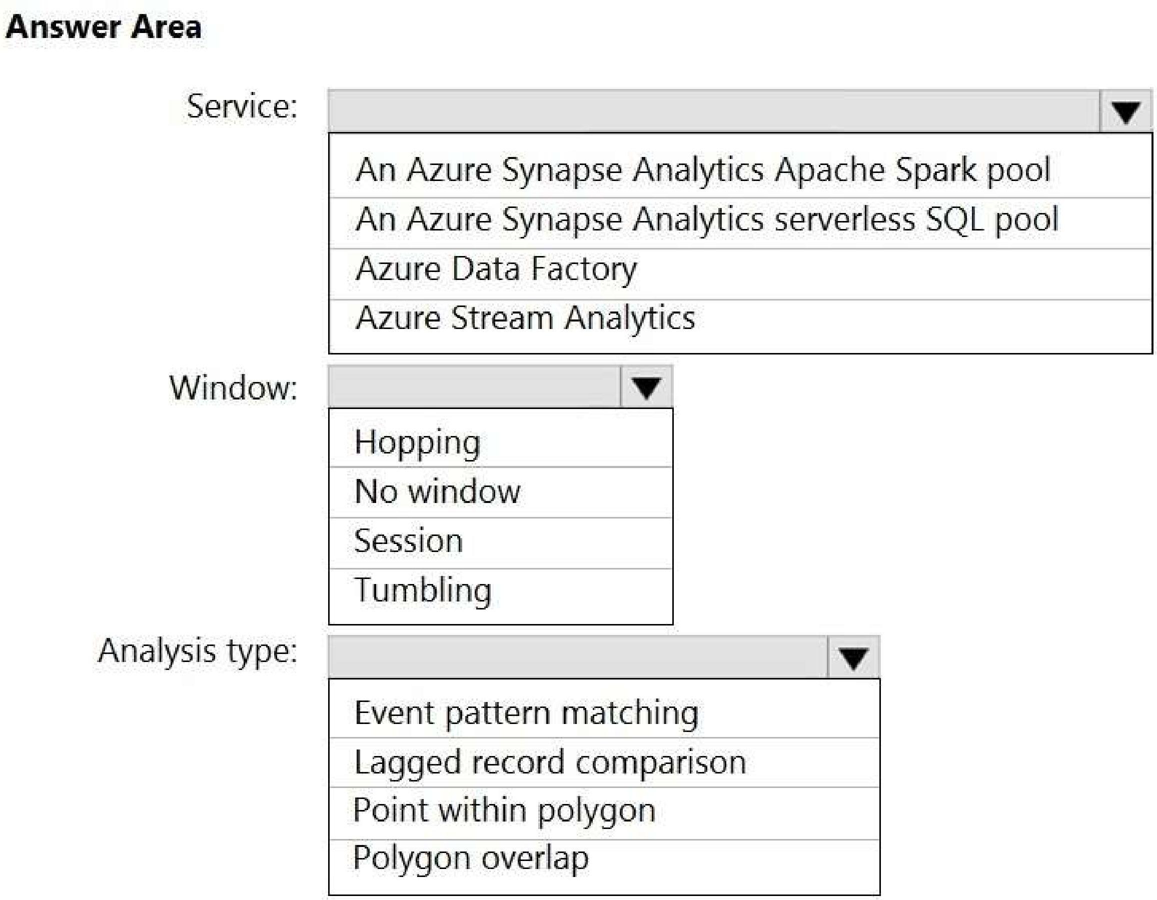
You have a CSV file in an Azure Data Lake Storage Gen2 container. The file maintains the expected geographical area in which each vehicle should be.

You need to ensure that when a GPS position is outside the expected area, a message is added to another event hub for processing within 30 seconds. The solution must minimize cost.

What should you include in the solution? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:



Answer Area

Service:

- An Azure Synapse Analytics Apache Spark pool
- An Azure Synapse Analytics serverless SQL pool
- Azure Data Factory
- Azure Stream Analytics

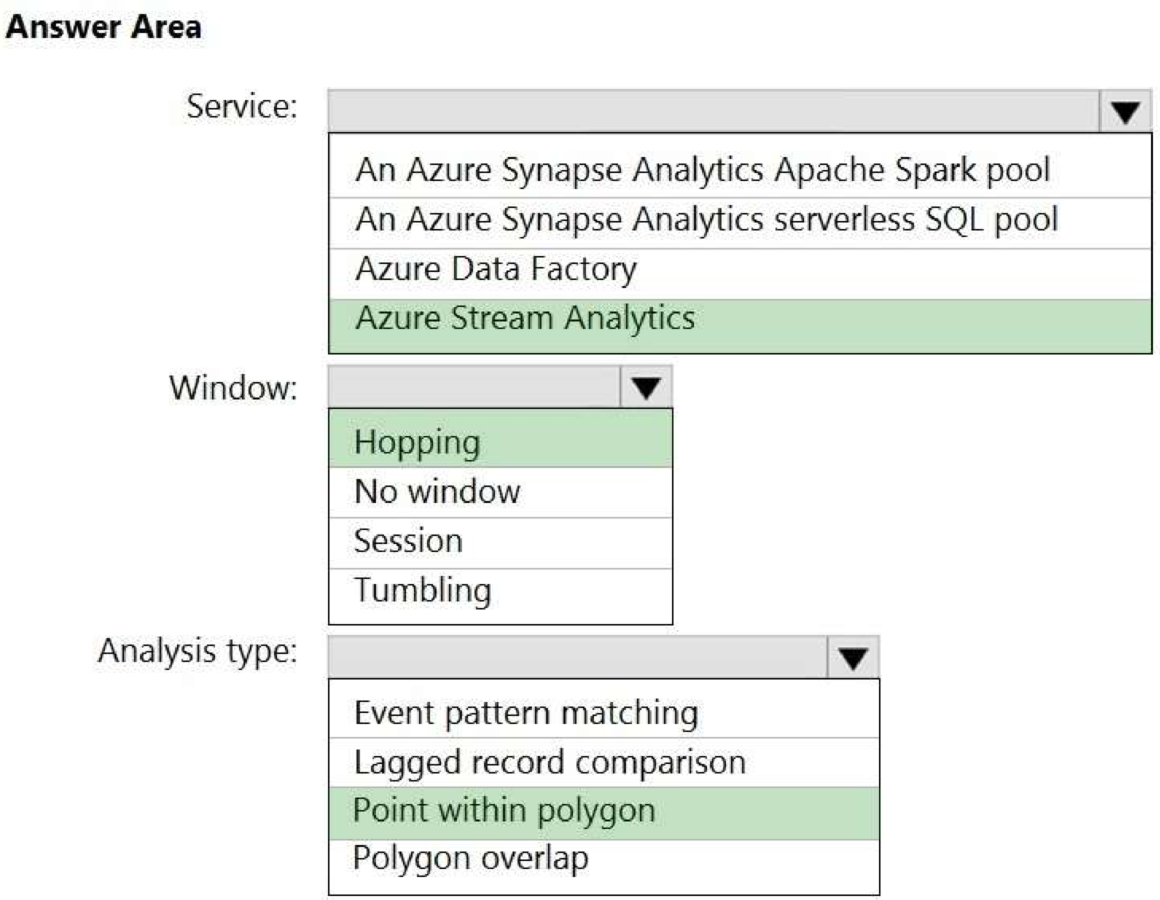
Window:

- Hopping
- No window
- Session
- Tumbling

Analysis type:

- Event pattern matching
- Lagged record comparison
- Point within polygon
- Polygon overlap

Correct Answer:



Answer Area

Service:

- An Azure Synapse Analytics Apache Spark pool
- An Azure Synapse Analytics serverless SQL pool
- Azure Data Factory
- [✓ Azure Stream Analytics]

Window:

- [✓ Hopping]
- No window
- Session
- Tumbling

Analysis type:

- Event pattern matching
- Lagged record comparison
- [✓ Point within polygon]
- Polygon overlap

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: Azure Stream Analytics

Box 2: Hopping
Hopping window functions hop forward in time by a fixed period. It may be easy to think of them as Tumbling windows that can overlap and be emitted more often than the window size. Events can belong to more than one Hopping window result set. To make a Hopping window the same as a Tumbling window, specify the hop size to be the same as the window size.

Box 3: Point within polygon

Reference:
https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-window-functions

QUESTION 17
You are designing an Azure Databricks table. The table will ingest an average of 20 million streaming events per day.

You need to persist the events in the table for use in incremental load pipeline jobs in Azure Databricks. The solution must minimize storage costs and incremental load times.

What should you include in the solution?

A. Partition by DateTime fields.
B. Sink to Azure Queue storage.
C. Include a watermark column.
D. Use a JSON format for physical data storage.

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The Databricks ABS-AQS connector uses Azure Queue Storage (AQS) to provide an optimized file source that lets you find new files written to an Azure Blob storage (ABS) container without repeatedly listing all of the files. This provides two major advantages:

- Lower latency: no need to list nested directory structures on ABS, which is slow and resource intensive.
- Lower costs: no more costly LIST API requests made to ABS.

Reference:
https://docs.microsoft.com/en-us/azure/databricks/spark/latest/structured-streaming/aqs

QUESTION 18
HOTSPOT

You have a self-hosted integration runtime in Azure Data Factory.

The current status of the integration runtime has the following configurations:

- Status: Running
- Type: Self-Hosted
- Version: 4.4.7292.1
- Running / Registered Node(s): 1/1
- High Availability Enabled: False
- Linked Count: 0
- Queue Length: 0
- Average Queue Duration. 0.00s

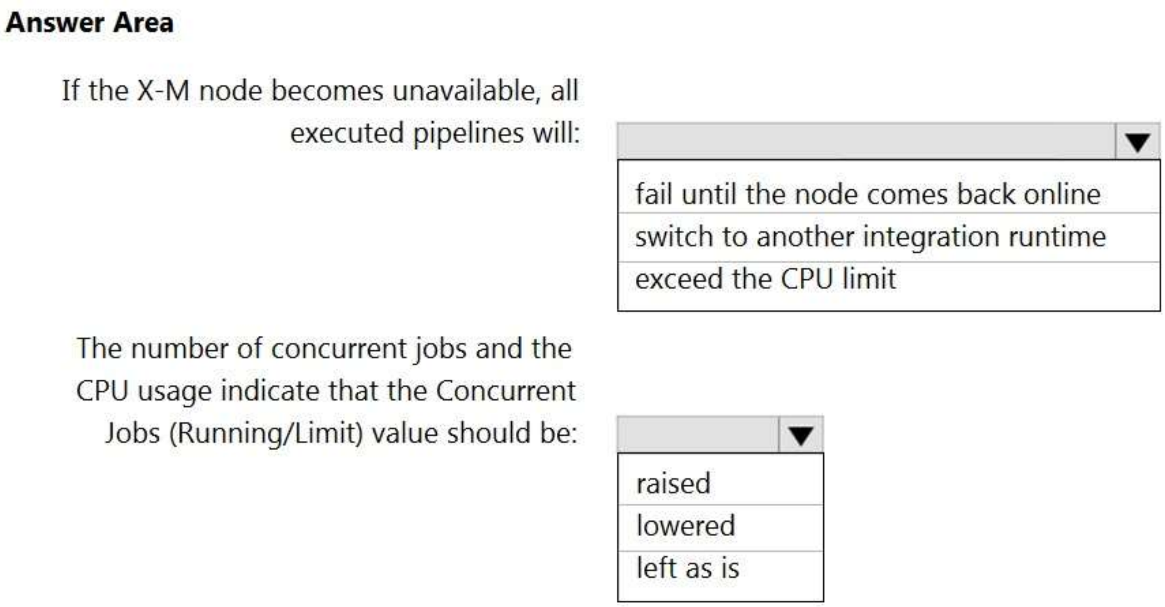
The integration runtime has the following node details:

- Name: X-M
- Status: Running
- Version: 4.4.7292.1
- Available Memory: 7697MB
- CPU Utilization: 6%
- Network (In/Out): 1.21KBps/0.83KBps
- Concurrent Jobs (Running/Limit): 2/14
- Role: Dispatcher/Worker
- Credential Status: In Sync

Use the drop-down menus to select the answer choice that completes each statement based on the information presented.

NOTE: Each correct selection is worth one point.

Hot Area:



Answer Area

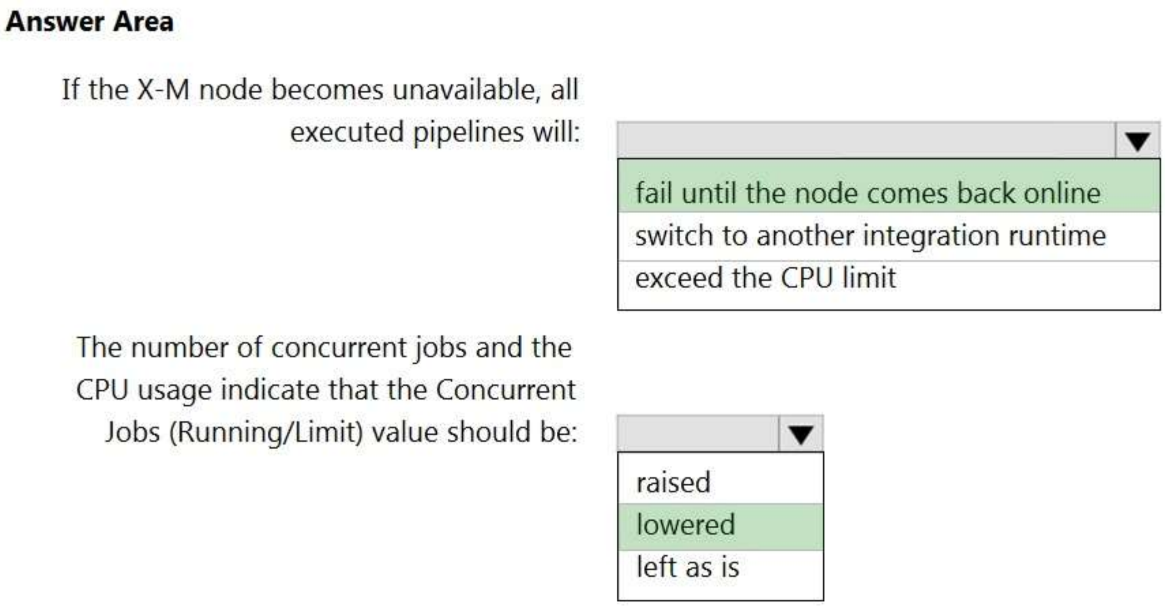
If the X-M node becomes unavailable, all executed pipelines will:

- fail until the node comes back online
- switch to another integration runtime
- exceed the CPU limit

The number of concurrent jobs and the CPU usage indicate that the Concurrent Jobs (Running/Limit) value should be:

- raised
- lowered
- left as is

Correct Answer:



Answer Area

If the X-M node becomes unavailable, all executed pipelines will:

- [✓ fail until the node comes back online]
- switch to another integration runtime
- exceed the CPU limit

The number of concurrent jobs and the CPU usage indicate that the Concurrent Jobs (Running/Limit) value should be:

- raised
- [✓ lowered]
- left as is

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: fail until the node comes back online
We see: High Availability Enabled: False

Note: Higher availability of the self-hosted integration runtime so that it's no longer the single point of failure in your big data solution or cloud data integration with Data Factory.

Box 2: lowered
We see:
Concurrent Jobs (Running/Limit): 2/14
CPU Utilization: 6%

Note: When the processor and available RAM aren't well utilized, but the execution of concurrent jobs reaches a node's limits, scale up by increasing the number of concurrent jobs that a node can run

Reference:
https://docs.microsoft.com/en-us/azure/data-factory/create-self-hosted-integration-runtime

QUESTION 19
You have an Azure Databricks workspace named workspace1 in the Standard pricing tier.

You need to configure workspace1 to support autoscaling all-purpose clusters. The solution must meet the following requirements:

- Automatically scale down workers when the cluster is underutilized for three minutes.
- Minimize the time it takes to scale to the maximum number of workers.
- Minimize costs.

What should you do first?

A. Enable container services for workspace1.
B. Upgrade workspace1 to the Premium pricing tier.
C. Set Cluster Mode to High Concurrency.
D. Create a cluster policy in workspace1.

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
For clusters running Databricks Runtime 6.4 and above, optimized autoscaling is used by all-purpose clusters in the Premium plan
Optimized autoscaling:
Scales up from min to max in 2 steps.
Can scale down even if the cluster is not idle by looking at shuffle file state.
Scales down based on a percentage of current nodes.
On job clusters, scales down if the cluster is underutilized over the last 40 seconds.
On all-purpose clusters, scales down if the cluster is underutilized over the last 150 seconds.
The spark.databricks.aggressiveWindowDownS Spark configuration property specifies in seconds how often a cluster makes down-scaling decisions. Increasing the value causes a cluster to scale down more slowly. The maximum value is 600.

Note: Standard autoscaling
Starts with adding 8 nodes. Thereafter, scales up exponentially, but can take many steps to reach the max. You can customize the first step by setting the spark.databricks.autoscaling.standardFirstStepUp Spark configuration property.
Scales down only when the cluster is completely idle and it has been underutilized for the last 10 minutes.
Scales down exponentially, starting with 1 node.

Reference:
https://docs.databricks.com/clusters/configure.html

QUESTION 20
Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.

After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing an Azure Stream Analytics solution that will analyze Twitter data.

You need to count the tweets in each 10-second window. The solution must ensure that each tweet is counted only once.

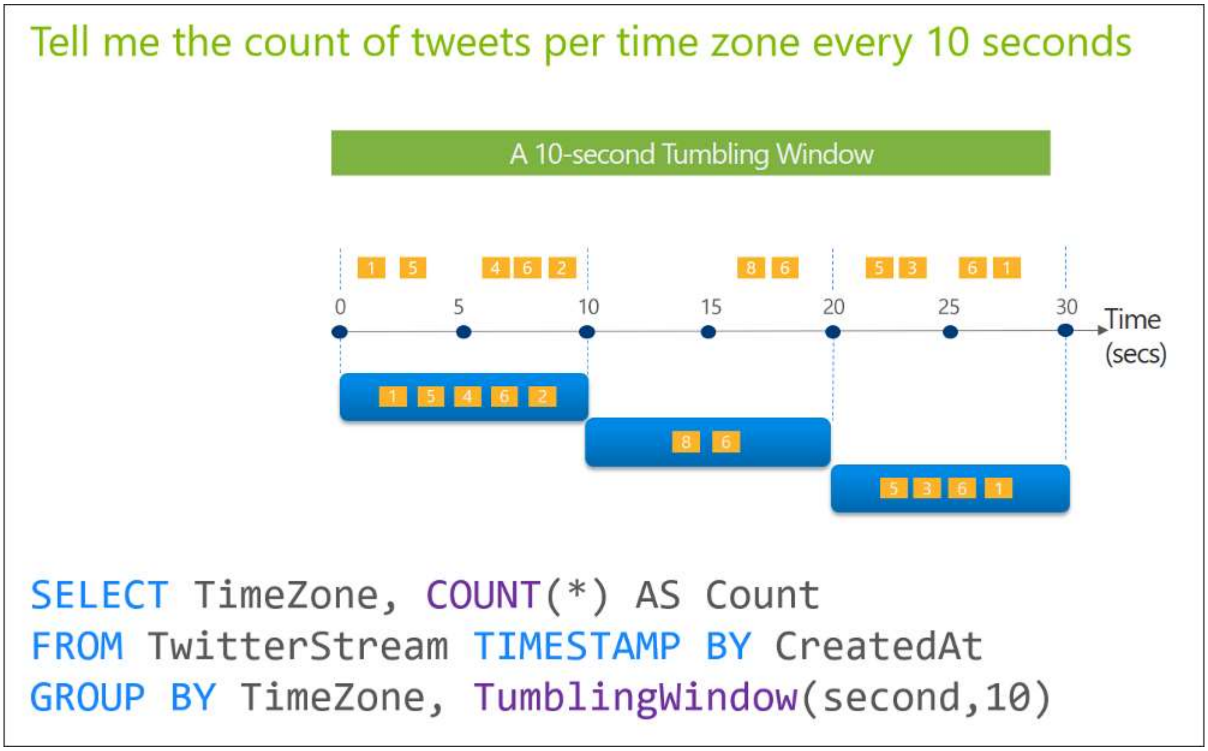
Solution: You use a tumbling window, and you set the window size to 10 seconds.

Does this meet the goal?

A. Yes
B. No

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Tumbling windows are a series of fixed-sized, non-overlapping and contiguous time intervals. The following diagram illustrates a stream with a series of events and how they are mapped into 10-second tumbling windows.



Tell me the count of tweets per time zone every 10 seconds

```
SELECT TimeZone, COUNT(*) AS Count
FROM TwitterStream TIMESTAMP BY CreatedAt
GROUP BY TimeZone, TumblingWindow(second,10)
```

Reference:
https://docs.microsoft.com/en-us/stream-analytics-query/tumbling-window-azure-stream-analytics

QUESTION 21
Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.

After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing an Azure Stream Analytics solution that will analyze Twitter data.

You need to count the tweets in each 10-second window. The solution must ensure that each tweet is counted only once.

Solution: You use a session window that uses a timeout size of 10 seconds.

Does this meet the goal?

A. Yes
B. No

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Instead use a tumbling window. Tumbling windows are a series of fixed-sized, non-overlapping and contiguous time intervals.

Reference:
https://docs.microsoft.com/en-us/stream-analytics-query/tumbling-window-azure-stream-analytics

QUESTION 22
Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.

After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing an Azure Stream Analytics solution that will analyze Twitter data.

You need to count the tweets in each 10-second window. The solution must ensure that each tweet is counted only once.

Solution: You use a hopping window that uses a hop size of 5 seconds and a window size 10 seconds.

Does this meet the goal?

A. Yes
B. No

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Instead use a tumbling window. Tumbling windows are a series of fixed-sized, non-overlapping and contiguous time intervals.

Reference:
https://docs.microsoft.com/en-us/stream-analytics-query/tumbling-window-azure-stream-analytics

QUESTION 23
Note: This question is part of a series of questions that present the same scenario. Each question in

the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.

After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You plan to create an Azure Databricks workspace that has a tiered structure. The workspace will contain the following three workloads:

- A workload for data engineers who will use Python and SQL.
- A workload for jobs that will run notebooks that use Python, Scala, and SOL.
- A workload that data scientists will use to perform ad hoc analysis in Scala and R.

The enterprise architecture team at your company identifies the following standards for Databricks environments:

- The data engineers must share a cluster.
- The job cluster will be managed by using a request process whereby data scientists and data engineers provide packaged notebooks for deployment to the cluster.
- All the data scientists must be assigned their own cluster that terminates automatically after 120 minutes of inactivity. Currently, there are three data scientists.

You need to create the Databricks clusters for the workloads.

Solution: You create a High Concurrency cluster for each data scientist, a High Concurrency cluster for the data engineers, and a Standard cluster for the jobs.

Does this meet the goal?

A. Yes

B. No

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Need a High Concurrency cluster for the jobs.

Standard clusters are recommended for a single user. Standard can run workloads developed in any language: Python, R, Scala, and SQL.

A high concurrency cluster is a managed cloud resource. The key benefits of high concurrency clusters are that they provide Apache Spark-native fine-grained sharing for maximum resource utilization and minimum query latencies.

Reference:
https://docs.azuredatabricks.net/clusters/configure.html

QUESTION 24
Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.

After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You plan to create an Azure Databricks workspace that has a tiered structure. The workspace will contain the following three workloads:

- A workload for data engineers who will use Python and SQL.
- A workload for jobs that will run notebooks that use Python, Scala, and SOL.
- A workload that data scientists will use to perform ad hoc analysis in Scala and R.

The enterprise architecture team at your company identifies the following standards for Databricks environments:

- The data engineers must share a cluster.
- The job cluster will be managed by using a request process whereby data scientists and data engineers provide packaged notebooks for deployment to the cluster.
- All the data scientists must be assigned their own cluster that terminates automatically after 120 minutes of inactivity. Currently, there are three data scientists.

You need to create the Databricks clusters for the workloads.

Solution: You create a Standard cluster for each data scientist, a High Concurrency cluster for the data engineers, and a Standard cluster for the jobs.

Does this meet the goal?

A. Yes

B. No

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
We would need a High Concurrency cluster for the jobs.

Note:
Standard clusters are recommended for a single user. Standard can run workloads developed in any language: Python, R, Scala, and SQL.

A high concurrency cluster is a managed cloud resource. The key benefits of high concurrency clusters are that they provide Apache Spark-native fine-grained sharing for maximum resource utilization and minimum query latencies.

Reference:
https://docs.azuredatabricks.net/clusters/configure.html

QUESTION 25
Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.

After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You plan to create an Azure Databricks workspace that has a tiered structure. The workspace will contain the following three workloads:

- A workload for data engineers who will use Python and SQL.
- A workload for jobs that will run notebooks that use Python, Scala, and SOL.
- A workload that data scientists will use to perform ad hoc analysis in Scala and R.

The enterprise architecture team at your company identifies the following standards for Databricks environments:

- The data engineers must share a cluster.
- The job cluster will be managed by using a request process whereby data scientists and data engineers provide packaged notebooks for deployment to the cluster.
- All the data scientists must be assigned their own cluster that terminates automatically after 120 minutes of inactivity. Currently, there are three data scientists.

You need to create the Databricks clusters for the workloads.

Solution: You create a Standard cluster for each data scientist, a High Concurrency cluster for the data engineers, and a High Concurrency cluster for the jobs.

Does this meet the goal?

A. Yes

B. No

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
We need a High Concurrency cluster for the data engineers and the jobs.

Note:
Standard clusters are recommended for a single user. Standard can run workloads developed in any language: Python, R, Scala, and SQL.

A high concurrency cluster is a managed cloud resource. The key benefits of high concurrency clusters are that they provide Apache Spark-native fine-grained sharing for maximum resource utilization and minimum query latencies.

Reference:
https://docs.azuredatabricks.net/clusters/configure.html

Design and implement data security

Testlet 1

Case study

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study
To display the first question in this case study, click the **Next** button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an **All Information** tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the **Question** button to return to the question.

Overview

Litware, Inc. owns and operates 300 convenience stores across the US. The company sells a variety of packaged foods and drinks, as well as a variety of prepared foods, such as sandwiches and pizzas.

Litware has a loyalty club whereby members can get daily discounts on specific items by providing their membership number at checkout.

Litware employs business analysts who prefer to analyze data by using Microsoft Power BI, and data scientists who prefer analyzing data in Azure Databricks notebooks.

Requirements

Business Goals

Litware wants to create a new analytics environment in Azure to meet the following requirements:

- See inventory levels across the stores. Data must be updated as close to real time as possible.
- Execute ad hoc analytical queries on historical data to identify whether the loyalty club discounts increase sales of the discounted products.
- Every four hours, notify store employees about how many prepared food items to produce based on historical demand from the sales data.

Technical Requirements

Litware identifies the following technical requirements:

- Minimize the number of different Azure services needed to achieve the business goals.
- Use platform as a service (PaaS) offerings whenever possible and avoid having to provision virtual machines that must be managed by Litware.
- Ensure that the analytical data store is accessible only to the company's on-premises network and Azure services.
- Use Azure Active Directory (Azure AD) authentication whenever possible.

- Use the principle of least privilege when designing security.
- Stage Inventory data in Azure Data Lake Storage Gen2 before loading the data into the analytical data store. Litware wants to remove transient data from Data Lake Storage once the data is no longer in use. Files that have a modified date that is older than 14 days must be removed.
- Limit the business analysts' access to customer contact information, such as phone numbers, because this type of data is not analytically relevant.
- Ensure that you can quickly restore a copy of the analytical data store within one hour in the event of corruption or accidental deletion.

Planned Environment

Litware plans to implement the following environment:

- The application development team will create an Azure event hub to receive real-time sales data, including store number, date, time, product ID, customer loyalty number, price, and discount amount, from the point of sale (POS) system and output the data to data storage in Azure.
- Customer data, including name, contact information, and loyalty number, comes from Salesforce, a SaaS application, and can be imported into Azure once every eight hours. Row modified dates are not trusted in the source table.
- Product data, including product ID, name, and category, comes from Salesforce and can be imported into Azure once every eight hours. Row modified dates are not trusted in the source table.
- Daily inventory data comes from a Microsoft SQL server located on a private network.
- Litware currently has 5 TB of historical sales data and 100 GB of customer data. The company expects approximately 100 GB of new data per month for the next year.
- Litware will build a custom application named FoodPrep to provide store employees with the calculation results of how many prepared food items to produce every four hours.
- Litware does not plan to implement Azure ExpressRoute or a VPN between the on-premises network and Azure.

QUESTION 1
What should you recommend to prevent users outside the Litware on-premises network from accessing the analytical data store?

A. a server-level virtual network rule

B. a database-level virtual network rule

C. a server-level firewall IP rule

D. a database-level firewall IP rule

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Scenario: Ensure that the analytical data store is accessible only to the company's on-premises network and Azure services.

Virtual network rules are one firewall security feature that controls whether the database server for your single databases and elastic pool in Azure SQL Database or for your databases in SQL Data Warehouse accepts communications that are sent from particular subnets in virtual networks.

Server-level, not database-level: Each virtual network rule applies to your whole Azure SQL Database server, not just to one particular database on the server. In other words, virtual network rule applies at the server-level, not at the database-level.

Reference:
https://docs.microsoft.com/en-us/azure/sql-database/sql-database-vnet-service-endpoint-rule-overview

QUESTION 2
What should you recommend using to secure sensitive customer contact information?

A. Transparent Data Encryption (TDE)
B. row-level security
C. column-level security
D. data sensitivity labels

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Scenario: Limit the business analysts' access to customer contact information, such as phone numbers, because this type of data is not analytically relevant.

Labeling: You can apply sensitivity-classification labels persistently to columns by using new metadata attributes that have been added to the SQL Server database engine. This metadata can then be used for advanced, sensitivity-based auditing and protection scenarios.

Incorrect Answers:
A: Transparent Data Encryption (TDE) encrypts SQL Server, Azure SQL Database, and Azure Synapse Analytics data files, known as encrypting data at rest. TDE does not provide encryption across communication channels.

Reference:
https://docs.microsoft.com/en-us/azure/azure-sql/database/data-discovery-and-classification-overview

https://docs.microsoft.com/en-us/azure/sql-database/sql-database-security-overview

Design and implement data security

Question Set 2

QUESTION 1
DRAG DROP

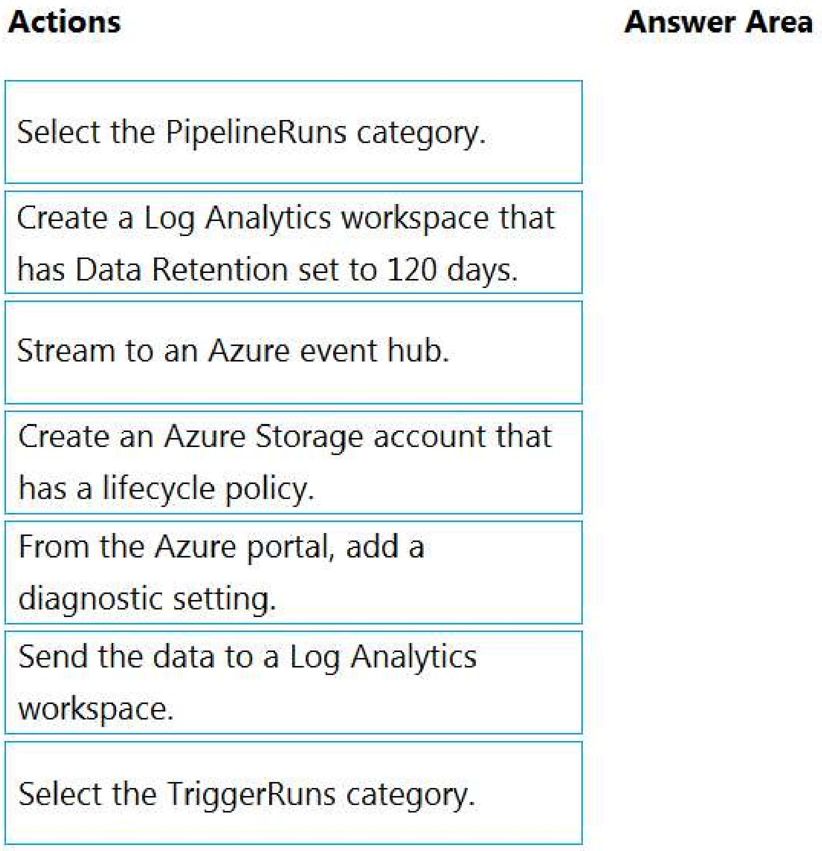
You have an Azure data factory.

You need to ensure that pipeline-run data is retained for 120 days. The solution must ensure that you can query the data by using the Kusto query language.

Which four actions should you perform in sequence? To answer, move the appropriate actions from the list of actions to the answer area and arrange them in the correct order.

NOTE: More than one order of answer choices is correct. You will receive credit for any of the correct orders you select.

Select and Place:

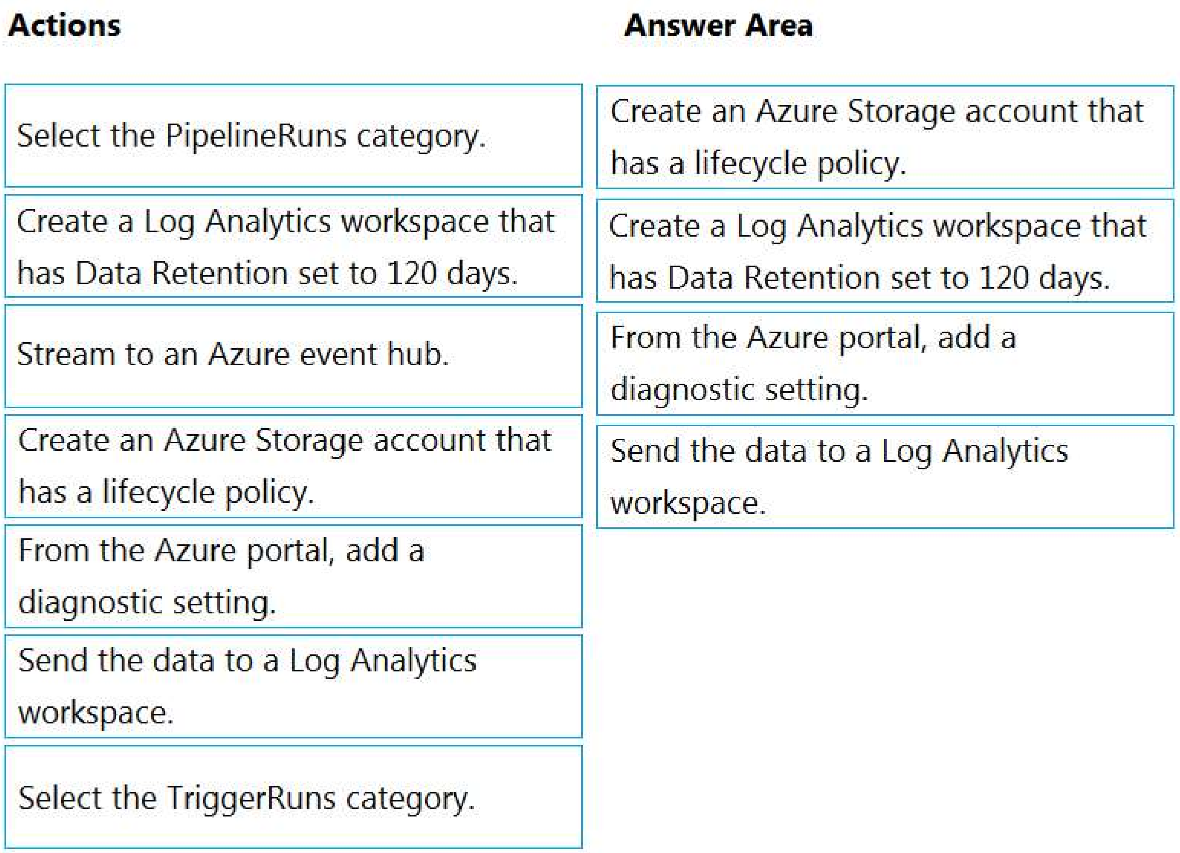


Actions

- Select the PipelineRuns category.
- Create a Log Analytics workspace that has Data Retention set to 120 days.
- Stream to an Azure event hub.
- Create an Azure Storage account that has a lifecycle policy.
- From the Azure portal, add a diagnostic setting.
- Send the data to a Log Analytics workspace.
- Select the TriggerRuns category.

Answer Area

Correct Answer:



Actions

- Select the PipelineRuns category.
- Create a Log Analytics workspace that has Data Retention set to 120 days.
- Stream to an Azure event hub.
- Create an Azure Storage account that has a lifecycle policy.
- From the Azure portal, add a diagnostic setting.
- Send the data to a Log Analytics workspace.
- Select the TriggerRuns category.

Answer Area

- Create an Azure Storage account that has a lifecycle policy.
- Create a Log Analytics workspace that has Data Retention set to 120 days.
- From the Azure portal, add a diagnostic setting.
- Send the data to a Log Analytics workspace.

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Step 1: Create an Azure Storage account that has a lifecycle policy
To automate common data management tasks, Microsoft created a solution based on Azure Data Factory. The service, Data Lifecycle Management, makes frequently accessed data available and archives or purges other data according to retention policies. Teams across the company use the service to reduce storage costs, improve app performance, and comply with data retention policies.

Step 2: Create a Log Analytics workspace that has Data Retention set to 120 days.
Data Factory stores pipeline-run data for only 45 days. Use Azure Monitor if you want to keep that data for a longer time. With Monitor, you can route diagnostic logs for analysis to multiple different targets, such as a Storage Account: Save your diagnostic logs to a storage account for auditing or manual inspection. You can use the diagnostic settings to specify the retention time in days.

Step 3: From Azure Portal, add a diagnostic setting.

Step 4: Send the data to a log Analytics workspace,
Event Hub: A pipeline that transfers events from services to Azure Data Explorer.

Keeping Azure Data Factory metrics and pipeline-run data.

Configure diagnostic settings and workspace.
Create or add diagnostic settings for your data factory.

1. In the portal, go to Monitor. Select Settings > Diagnostic settings.
2. Select the data factory for which you want to set a diagnostic setting.
3. If no settings exist on the selected data factory, you're prompted to create a setting. Select Turn on

diagnostics.
4. Give your setting a name, select Send to Log Analytics, and then select a workspace from Log Analytics Workspace.
5. Select Save.

Reference:
https://docs.microsoft.com/en-us/azure/data-factory/monitor-using-azure-monitor

QUESTION 2
You have an Azure Synapse Analytics dedicated SQL pool.

You need to ensure that data in the pool is encrypted at rest. The solution must **NOT** require modifying applications that query the data.

What should you do?

A. Enable encryption at rest for the Azure Data Lake Storage Gen2 account.
B. Enable Transparent Data Encryption (TDE) for the pool.
C. Use a customer-managed key to enable double encryption for the Azure Synapse workspace.
D. Create an Azure key vault in the Azure subscription grant access to the pool.

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Transparent Data Encryption (TDE) helps protect against the threat of malicious activity by encrypting and decrypting your data at rest. When you encrypt your database, associated backups and transaction log files are encrypted without requiring any changes to your applications. TDE encrypts the storage of an entire database by using a symmetric key called the database encryption key.

Reference:
https://docs.microsoft.com/en-us/azure/synapse-analytics/sql-data-warehouse/sql-data-warehouse-overview-manage-security

QUESTION 3
DRAG DROP

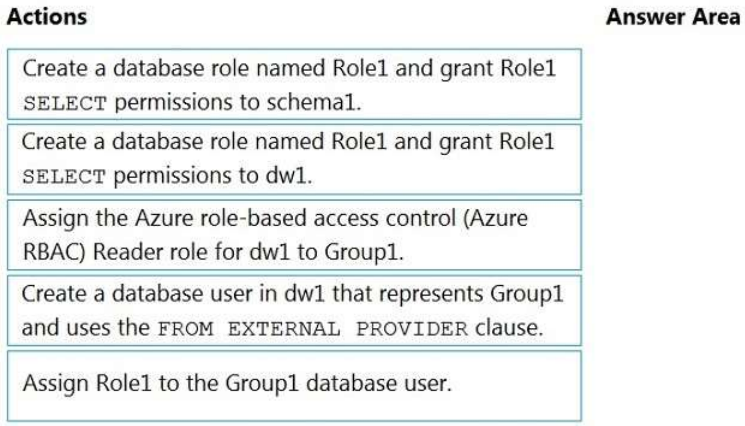
You have an Azure Active Directory (Azure AD) tenant that contains a security group named Group1. You have an Azure Synapse Analytics dedicated SQL pool named dw1 that contains a schema named schema1.

You need to grant Group1 read-only permissions to all the tables and views in schema1. The solution must use the principle of least privilege.

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

NOTE: More than one order of answer choices is correct. You will receive credit for any of the correct orders you select.

Select and Place:



Actions

Answer Area

Create a database role named Role1 and grant Role1 `SELECT` permissions to schema1.

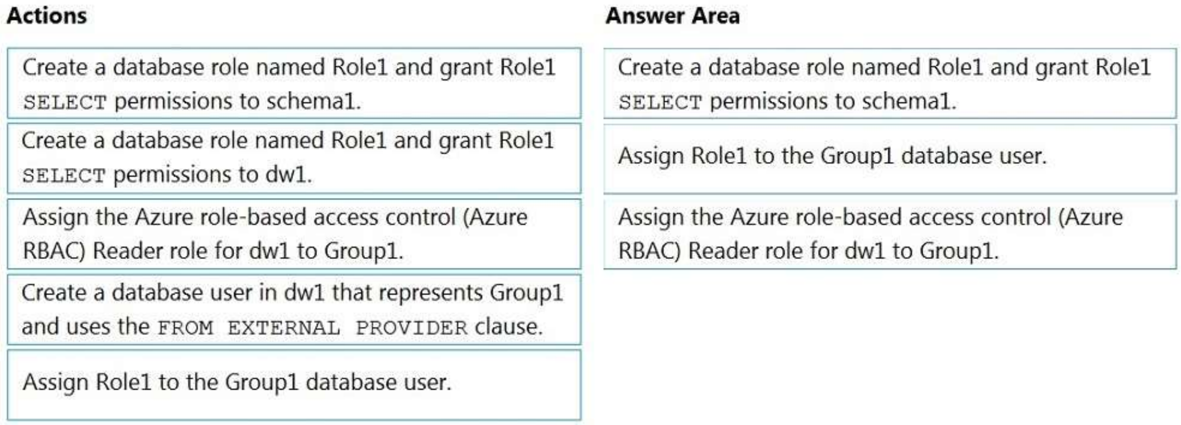
Create a database role named Role1 and grant Role1 `SELECT` permissions to dw1.

Assign the Azure role-based access control (Azure RBAC) Reader role for dw1 to Group1.

Create a database user in dw1 that represents Group1 and uses the `FROM EXTERNAL PROVIDER` clause.

Assign Role1 to the Group1 database user.

Correct Answer:



Actions

Create a database role named Role1 and grant Role1 `SELECT` permissions to schema1.

Create a database role named Role1 and grant Role1 `SELECT` permissions to dw1.

Assign the Azure role-based access control (Azure RBAC) Reader role for dw1 to Group1.

Create a database user in dw1 that represents Group1 and uses the `FROM EXTERNAL PROVIDER` clause.

Assign Role1 to the Group1 database user.

Answer Area

Create a database role named Role1 and grant Role1 `SELECT` permissions to schema1.

Assign Role1 to the Group1 database user.

Assign the Azure role-based access control (Azure RBAC) Reader role for dw1 to Group1.

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Step 1: Create a database role named Role1 and grant Role1 SELECT permissions to schema
You need to grant Group1 read-only permissions to all the tables and views in schema1.
Place one or more database users into a database role and then assign permissions to the database role.

Step 2: Assign Rol1 to the Group database user

Step 3: Assign the Azure role-based access control (Azure RBAC) Reader role for dw1 to Group1

Reference:
https://docs.microsoft.com/en-us/azure/data-share/how-to-share-from-sql

QUESTION 4
HOTSPOT

You have an Azure subscription that contains a logical Microsoft SQL server named Server1. Server1 hosts an Azure Synapse Analytics SQL dedicated pool named Pool1.

You need to recommend a Transparent Data Encryption (TDE) solution for Server1. The solution must meet the following requirements:

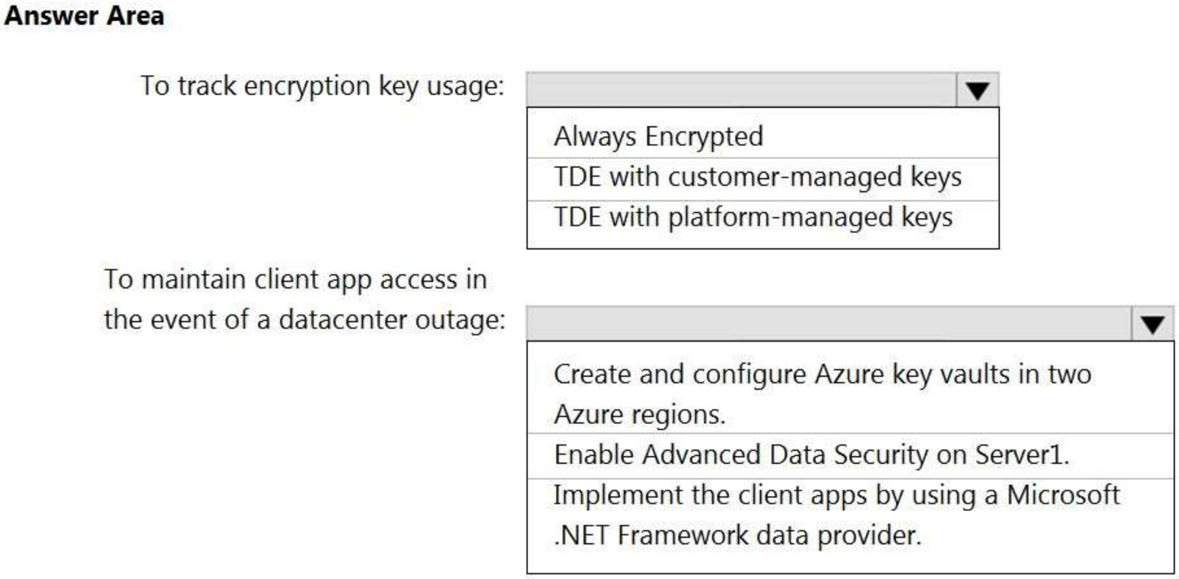
- Track the usage of encryption keys.
- Maintain the access of client apps to Pool1 in the event of an Azure datacenter outage that affects the

availability of the encryption keys.

What should you include in the recommendation? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:



Answer Area

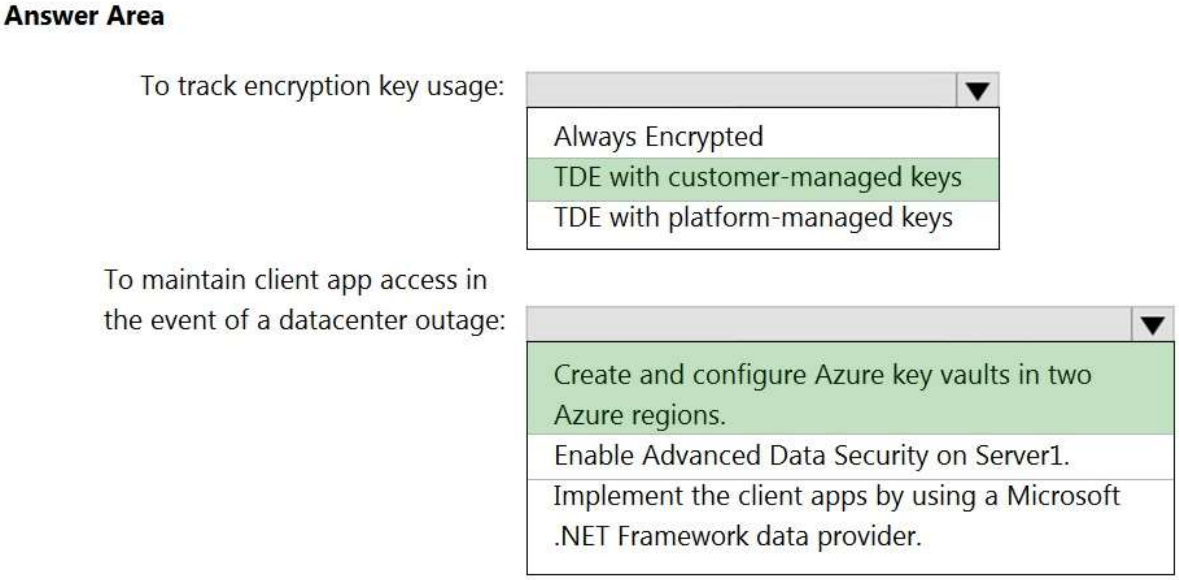
To track encryption key usage: ▼

- Always Encrypted
- TDE with customer-managed keys
- TDE with platform-managed keys

To maintain client app access in the event of a datacenter outage: ▼

- Create and configure Azure key vaults in two Azure regions.
- Enable Advanced Data Security on Server1.
- Implement the client apps by using a Microsoft .NET Framework data provider.

Correct Answer:



Answer Area

To track encryption key usage: ▼

- Always Encrypted
- [✓ TDE with customer-managed keys]
- TDE with platform-managed keys

To maintain client app access in the event of a datacenter outage: ▼

- [✓ Create and configure Azure key vaults in two Azure regions.]
- Enable Advanced Data Security on Server1.
- Implement the client apps by using a Microsoft .NET Framework data provider.

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: TDE with customer-managed keys
Customer-managed keys are stored in the Azure Key Vault. You can monitor how and when your key vaults are accessed, and by whom. You can do this by enabling logging for Azure Key Vault, which saves information

in an Azure storage account that you provide.

Box 2: Create and configure Azure key vaults in two Azure regions
The contents of your key vault are replicated within the region and to a secondary region at least 150 miles away, but within the same geography to maintain high durability of your keys and secrets.

Reference:
https://docs.microsoft.com/en-us/azure/synapse-analytics/security/workspaces-encryption

https://docs.microsoft.com/en-us/azure/key-vault/general/logging

QUESTION 5
You plan to create an Azure Synapse Analytics dedicated SQL pool.

You need to minimize the time it takes to identify queries that return confidential information as defined by the company's data privacy regulations and the users who executed the queues.

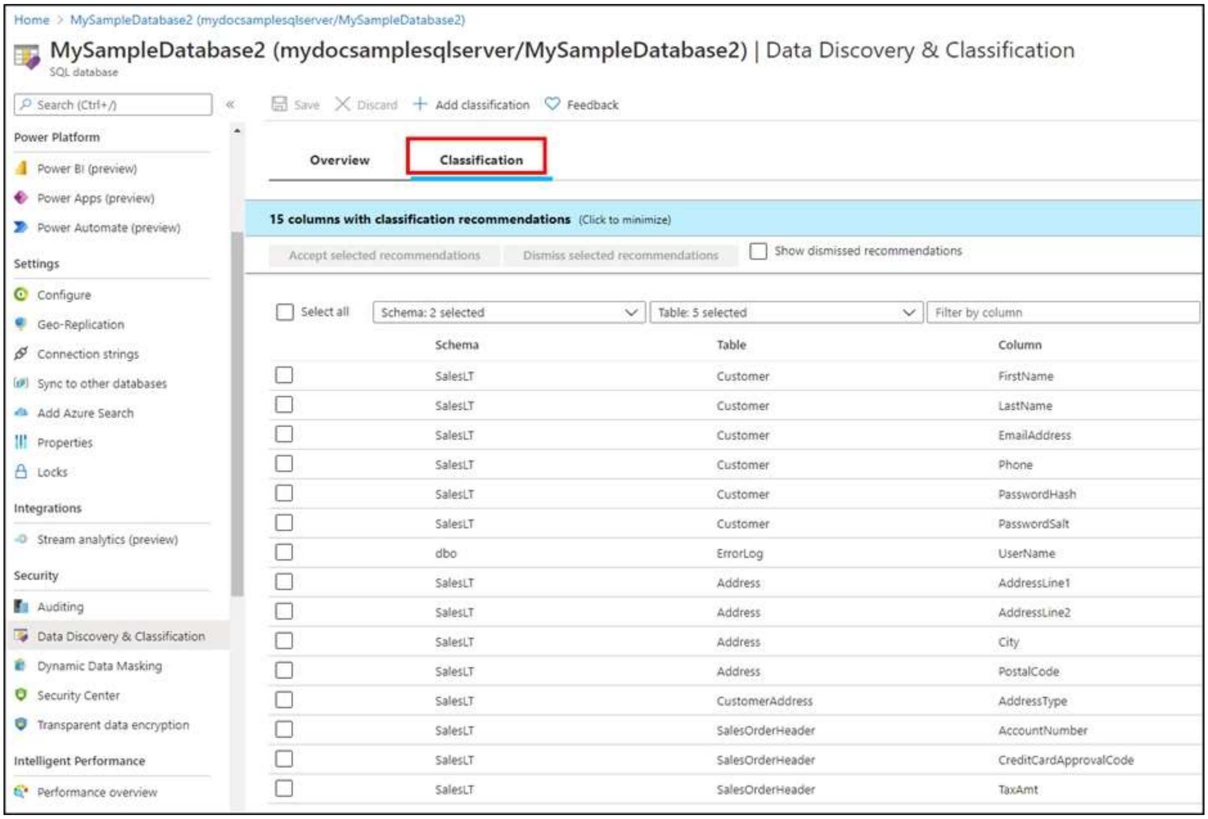
Which two components should you include in the solution? Each correct answer presents part of the solution.

NOTE: Each correct selection is worth one point.

A. sensitivity-classification labels applied to columns that contain confidential information
B. resource tags for databases that contain confidential information
C. audit logs sent to a Log Analytics workspace
D. dynamic data masking for columns that contain confidential information

Correct Answer: AC
Section: (none)
Explanation

Explanation/Reference:
Explanation:
A: You can classify columns manually, as an alternative or in addition to the recommendation-based classification:



15 columns with classification recommendations (Click to minimize)

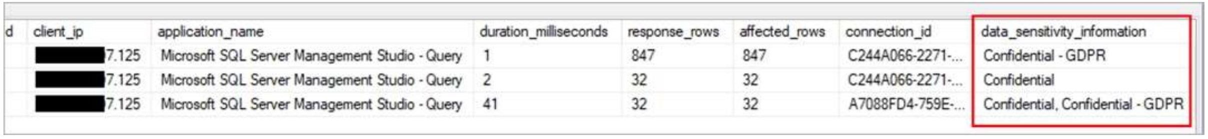
Accept selected recommendations | Dismiss selected recommendations | □ Show dismissed recommendations

□ Select all | Schema: 2 selected | Table: 5 selected | Filter by column

	Schema	Table	Column
□	SalesLT	Customer	FirstName
□	SalesLT	Customer	LastName
□	SalesLT	Customer	EmailAddress
□	SalesLT	Customer	Phone
□	SalesLT	Customer	PasswordHash
□	SalesLT	Customer	PasswordSalt
□	dbo	ErrorLog	UserName
□	SalesLT	Address	AddressLine1
□	SalesLT	Address	AddressLine2
□	SalesLT	Address	City
□	SalesLT	Address	PostalCode
□	SalesLT	CustomerAddress	AddressType
□	SalesLT	SalesOrderHeader	AccountNumber
□	SalesLT	SalesOrderHeader	CreditCardApprovalCode
□	SalesLT	SalesOrderHeader	TaxAmt

1. Select Add classification in the top menu of the pane.
2. In the context window that opens, select the schema, table, and column that you want to classify, and the information type and sensitivity label.
3. Select Add classification at the bottom of the context window.

C: An important aspect of the information-protection paradigm is the ability to monitor access to sensitive data. Azure SQL Auditing has been enhanced to include a new field in the audit log called data_sensitivity_information. This field logs the sensitivity classifications (labels) of the data that was returned by a query. Here's an example:



d	client_ip	application_name	duration_milliseconds	response_rows	affected_rows	connection_id	data_sensitivity_information
	[redacted]7.125	Microsoft SQL Server Management Studio - Query	1	847	847	C244A066-2271-...	Confidential - GDPR
	[redacted]7.125	Microsoft SQL Server Management Studio - Query	2	32	32	C244A066-2271-...	Confidential
	[redacted]7.125	Microsoft SQL Server Management Studio - Query	41	32	32	A7088FD4-759E-...	Confidential, Confidential - GDPR

Reference:
https://docs.microsoft.com/en-us/azure/azure-sql/database/data-discovery-and-classification-overview

QUESTION 6

You are designing an enterprise data warehouse in Azure Synapse Analytics that will contain a table named Customers. Customers will contain credit card information.

You need to recommend a solution to provide salespeople with the ability to view all the entries in Customers. The solution must prevent all the salespeople from viewing or inferring the credit card information.

What should you include in the recommendation?

A. data masking
B. Always Encrypted
C. column-level security
D. row-level security

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
SQL Database dynamic data masking limits sensitive data exposure by masking it to non-privileged users.

The Credit card masking method exposes the last four digits of the designated fields and adds a constant string as a prefix in the form of a credit card.

Example: XXXX-XXXX-XXXX-1234

Reference:
https://docs.microsoft.com/en-us/azure/sql-database/sql-database-dynamic-data-masking-get-started

Monitor and optimize data storage and data processing

Testlet 1

Case study

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study
To display the first question in this case study, click the **Next** button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an **All Information** tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the **Question** button to return to the question.

Overview

Litware, Inc. owns and operates 300 convenience stores across the US. The company sells a variety of packaged foods and drinks, as well as a variety of prepared foods, such as sandwiches and pizzas.

Litware has a loyalty club whereby members can get daily discounts on specific items by providing their membership number at checkout.

Litware employs business analysts who prefer to analyze data by using Microsoft Power BI, and data scientists who prefer analyzing data in Azure Databricks notebooks.

Requirements

Business Goals

Litware wants to create a new analytics environment in Azure to meet the following requirements:

- See inventory levels across the stores. Data must be updated as close to real time as possible.
- Execute ad hoc analytical queries on historical data to identify whether the loyalty club discounts increase sales of the discounted products.
- Every four hours, notify store employees about how many prepared food items to produce based on historical demand from the sales data.

Technical Requirements

Litware identifies the following technical requirements:

- Minimize the number of different Azure services needed to achieve the business goals.
- Use platform as a service (PaaS) offerings whenever possible and avoid having to provision virtual machines that must be managed by Litware.
- Ensure that the analytical data store is accessible only to the company's on-premises network and Azure services.
- Use Azure Active Directory (Azure AD) authentication whenever possible.

- Use the principle of least privilege when designing security.
- Stage Inventory data in Azure Data Lake Storage Gen2 before loading the data into the analytical data store. Litware wants to remove transient data from Data Lake Storage once the data is no longer in use. Files that have a modified date that is older than 14 days must be removed.
- Limit the business analysts' access to customer contact information, such as phone numbers, because this type of data is not analytically relevant.
- Ensure that you can quickly restore a copy of the analytical data store within one hour in the event of corruption or accidental deletion.

Planned Environment

Litware plans to implement the following environment:

- The application development team will create an Azure event hub to receive real-time sales data, including store number, date, time, product ID, customer loyalty number, price, and discount amount, from the point of sale (POS) system and output the data to data storage in Azure.
- Customer data, including name, contact information, and loyalty number, comes from Salesforce, a SaaS application, and can be imported into Azure once every eight hours. Row modified dates are not trusted in the source table.
- Product data, including product ID, name, and category, comes from Salesforce and can be imported into Azure once every eight hours. Row modified dates are not trusted in the source table.
- Daily inventory data comes from a Microsoft SQL server located on a private network.
- Litware currently has 5 TB of historical sales data and 100 GB of customer data. The company expects approximately 100 GB of new data per month for the next year.
- Litware will build a custom application named FoodPrep to provide store employees with the calculation results of how many prepared food items to produce every four hours.
- Litware does not plan to implement Azure ExpressRoute or a VPN between the on-premises network and Azure.

QUESTION 1
What should you do to improve high availability of the real-time data processing solution?

A. Deploy a High Concurrency Databricks cluster.

B. Deploy an Azure Stream Analytics job and use an Azure Automation runbook to check the status of the job and to start the job if it stops.

C. Set Data Lake Storage to use geo-redundant storage (GRS).

D. Deploy identical Azure Stream Analytics jobs to paired regions in Azure.

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Guarantee Stream Analytics job reliability during service updates
Part of being a fully managed service is the capability to introduce new service functionality and improvements at a rapid pace. As a result, Stream Analytics can have a service update deploy on a weekly (or more frequent) basis. No matter how much testing is done there is still a risk that an existing, running job may break due to the introduction of a bug. If you are running mission critical jobs, these risks need to be avoided. You can reduce this risk by following Azure's paired region model.

Scenario: The application development team will create an Azure event hub to receive real-time sales data, including store number, date, time, product ID, customer loyalty number, price, and discount amount, from the point of sale (POS) system and output the data to data storage in Azure

Reference:
https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-job-reliability

Monitor and optimize data storage and data processing

Question Set 2

QUESTION 1
HOTSPOT

You have an Azure event hub named retailhub that has 16 partitions. Transactions are posted to retailhub. Each transaction includes the transaction ID, the individual line items, and the payment details. The transaction ID is used as the partition key.

You are designing an Azure Stream Analytics job to identify potentially fraudulent transactions at a retail store. The job will use retailhub as the input. The job will output the transaction ID, the individual line items, the payment details, a fraud score, and a fraud indicator.

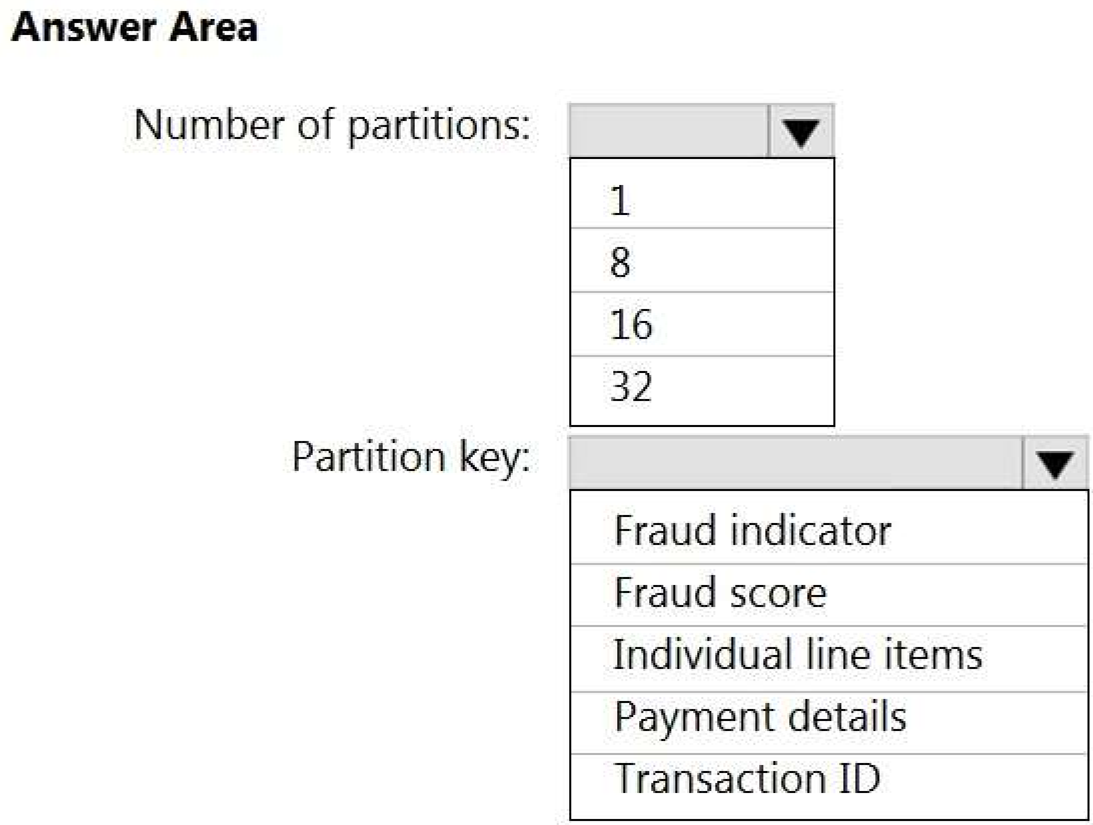
You plan to send the output to an Azure event hub named fraudhub.

You need to ensure that the fraud detection solution is highly scalable and processes transactions as quickly as possible.

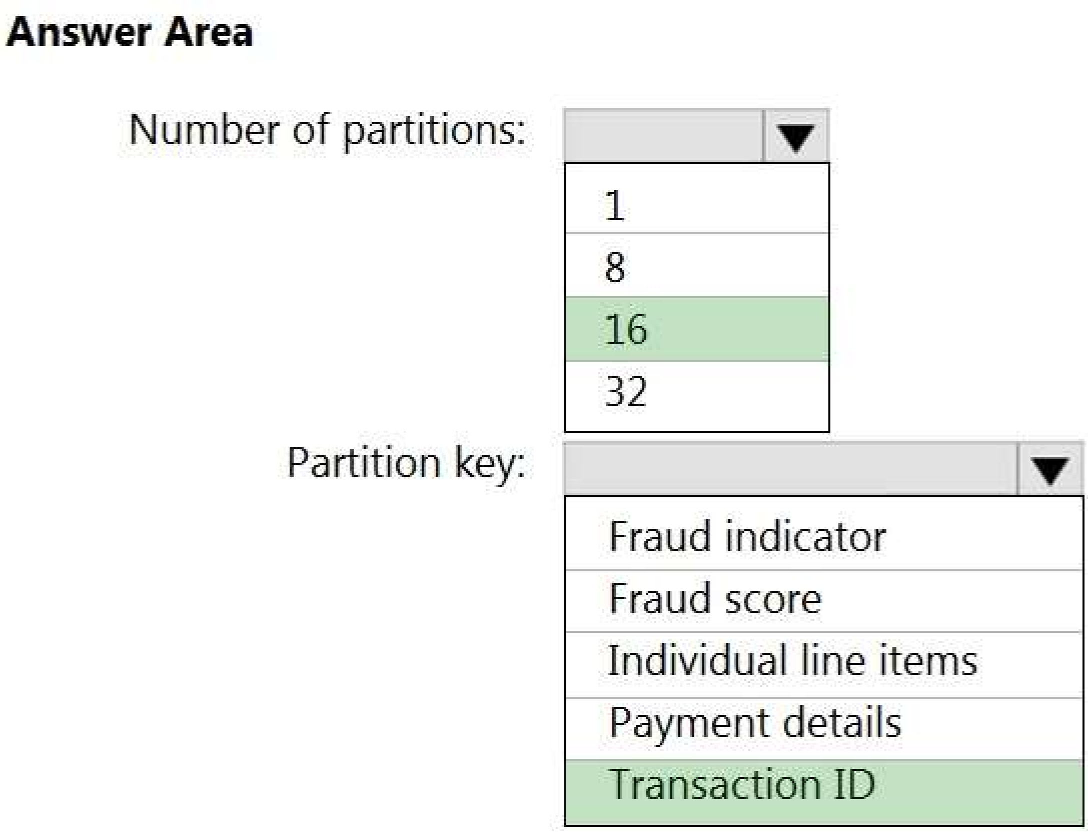
How should you structure the output of the Stream Analytics job? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:



Correct Answer:



Answer Area

Number of partitions:

1
8
[✓ 16]
32

Partition key:

Fraud indicator
Fraud score
Individual line items
Payment details
[✓ Transaction ID]

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: 16
For Event Hubs you need to set the partition key explicitly.

An embarrassingly parallel job is the most scalable scenario in Azure Stream Analytics. It connects one partition of the input to one instance of the query to one partition of the output.

Box 2: Transaction ID

Reference:
https://docs.microsoft.com/en-us/azure/event-hubs/event-hubs-features#partitions

QUESTION 2
HOTSPOT

You have an on-premises data warehouse that includes the following fact tables. Both tables have the following columns: DateKey, ProductKey, RegionKey. There are 120 unique product keys and 65 unique region keys.

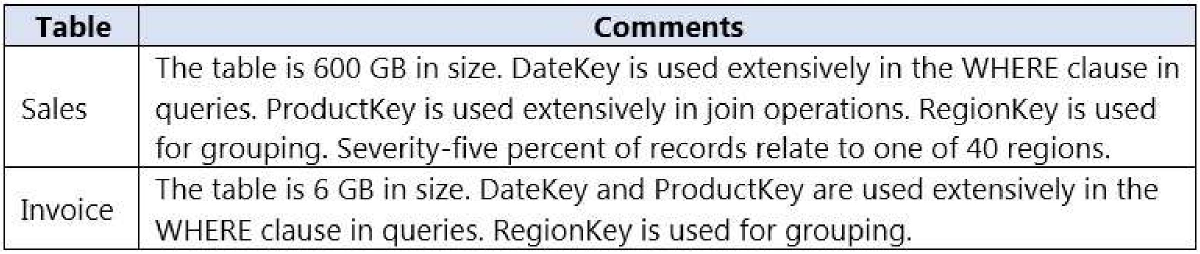


Table	Comments
Sales	The table is 600 GB in size. DateKey is used extensively in the WHERE clause in queries. ProductKey is used extensively in join operations. RegionKey is used for grouping. Severity-five percent of records relate to one of 40 regions.
Invoice	The table is 6 GB in size. DateKey and ProductKey are used extensively in the WHERE clause in queries. RegionKey is used for grouping.

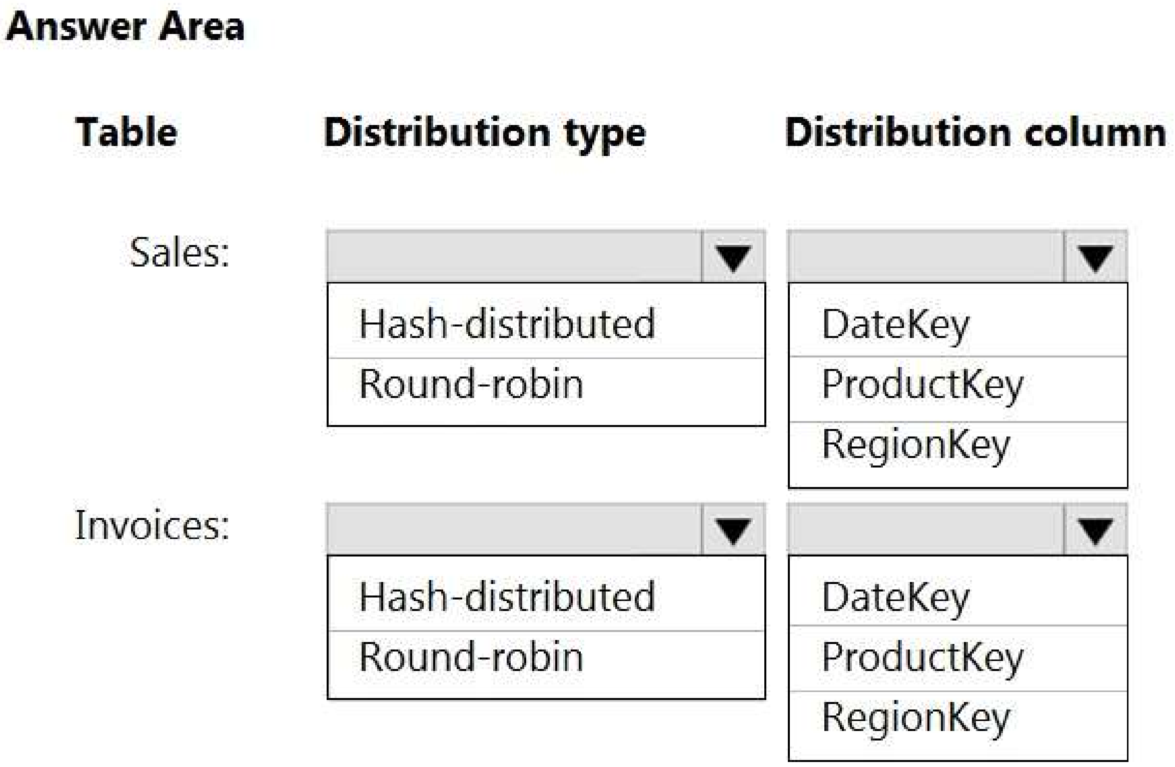
Queries that use the data warehouse take a long time to complete.

You plan to migrate the solution to use Azure Synapse Analytics. You need to ensure that the Azure-based solution optimizes query performance and minimizes processing skew.

What should you recommend? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point

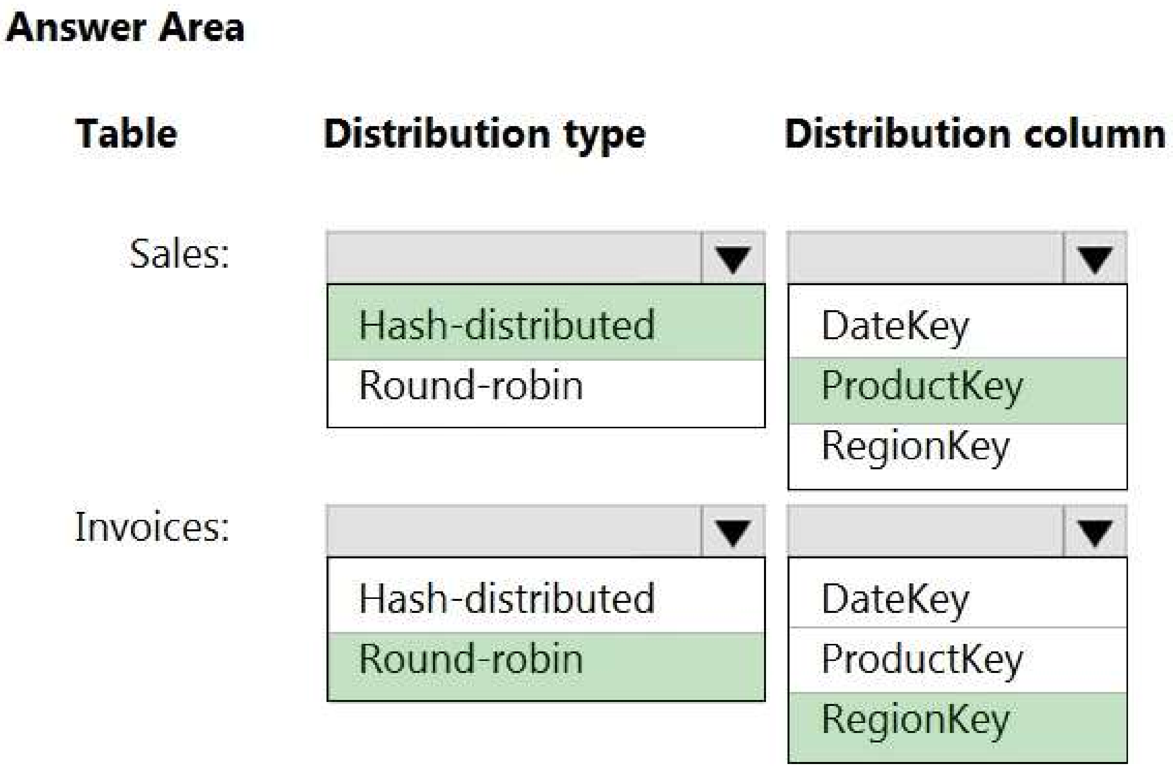
Hot Area:



Answer Area

Table	Distribution type	Distribution column
Sales:	Hash-distributed Round-robin	DateKey ProductKey RegionKey
Invoices:	Hash-distributed Round-robin	DateKey ProductKey RegionKey

Correct Answer:



Answer Area

Table	Distribution type	Distribution column
Sales:	[✓ Hash-distributed] Round-robin	DateKey [✓ ProductKey] RegionKey
Invoices:	Hash-distributed [✓ Round-robin]	DateKey ProductKey [✓ RegionKey]

Section: (none)
Explanation

Explanation/Reference:
Explanation:

Box 1: Hash-distributed

Box 2: ProductKey
ProductKey is used extensively in joins.
Hash-distributed tables improve query performance on large fact tables.

Box 3: Round-robin

Box 4: RegionKey
Round-robin tables are useful for improving loading speed.

Consider using the round-robin distribution for your table in the following scenarios:

- When getting started as a simple starting point since it is the default
- If there is no obvious joining key
- If there is not good candidate column for hash distributing the table
- If the table does not share a common join key with other tables
- If the join is less significant than other joins in the query
- When the table is a temporary staging table

Note: A distributed table appears as a single table, but the rows are actually stored across 60 distributions. The rows are distributed with a hash or round-robin algorithm.

Reference:
https://docs.microsoft.com/en-us/azure/sql-data-warehouse/sql-data-warehouse-tables-distribute

QUESTION 3

You have a partitioned table in an Azure Synapse Analytics dedicated SQL pool.

You need to design queries to maximize the benefits of partition elimination.

What should you include in the Transact-SQL queries?

A. `JOIN`
B. `WHERE`
C. `DISTINCT`
D. `GROUP BY`

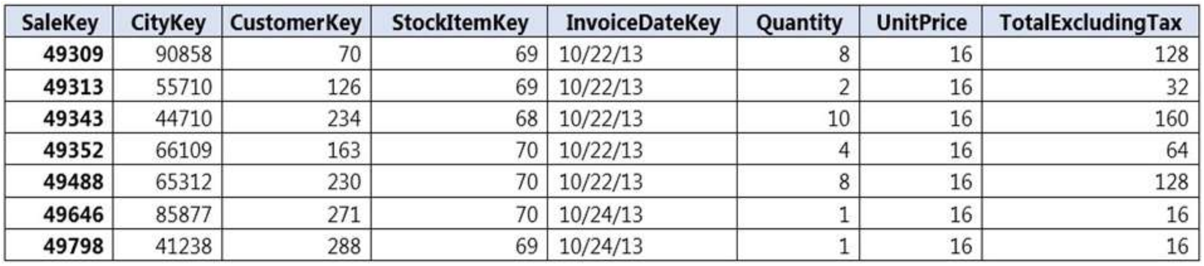
Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:

QUESTION 4
You implement an enterprise data warehouse in Azure Synapse Analytics.

You have a large fact table that is 10 terabytes (TB) in size.

Incoming queries use the primary key SaleKey column to retrieve data as displayed in the following table:



SaleKey	CityKey	CustomerKey	StockItemKey	InvoiceDateKey	Quantity	UnitPrice	TotalExcludingTax
49309	90858	70	69	10/22/13	8	16	128
49313	55710	126	69	10/22/13	2	16	32
49343	44710	234	68	10/22/13	10	16	160
49352	66109	163	70	10/22/13	4	16	64
49488	65312	230	70	10/22/13	8	16	128
49646	85877	271	70	10/24/13	1	16	16
49798	41238	288	69	10/24/13	1	16	16

You need to distribute the large fact table across multiple nodes to optimize performance of the table.

Which technology should you use?

A. hash distributed table with clustered index
B. hash distributed table with clustered Columnstore index
C. round robin distributed table with clustered index
D. round robin distributed table with clustered Columnstore index
E. heap table with distribution replicate

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Hash-distributed tables improve query performance on large fact tables.

Columnstore indexes can achieve up to 100x better performance on analytics and data warehousing workloads and up to 10x better data compression than traditional rowstore indexes.

Incorrect Answers:

C, D: Round-robin tables are useful for improving loading speed.

Reference:
https://docs.microsoft.com/en-us/azure/sql-data-warehouse/sql-data-warehouse-tables-distribute

https://docs.microsoft.com/en-us/sql/relational-databases/indexes/columnstore-indexes-query-performance

QUESTION 5
You have an Azure Synapse Analytics dedicated SQL pool that contains a large fact table. The table contains 50 columns and 5 billion rows and is a heap.

Most queries against the table aggregate values from approximately 100 million rows and return only two columns.

You discover that the queries against the fact table are very slow.

Which type of index should you add to provide the fastest query times?

A. nonclustered columnstore
B. clustered columnstore
C. nonclustered
D. clustered

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Clustered columnstore indexes are one of the most efficient ways you can store your data in dedicated SQL pool.
Columnstore tables won't benefit a query unless the table has more than 60 million rows.

Reference:
https://docs.microsoft.com/en-us/azure/synapse-analytics/sql/best-practices-dedicated-sql-pool

QUESTION 6
You create an Azure Databricks cluster and specify an additional library to install.

When you attempt to load the library to a notebook, the library in not found.

You need to identify the cause of the issue.

What should you review?

A. notebook logs
B. cluster event logs
C. global init scripts logs
D. workspace logs

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Cluster-scoped Init Scripts: Init scripts are shell scripts that run during the startup of each cluster node before the Spark driver or worker JVM starts. Databricks customers use init scripts for various purposes such as

installing custom libraries, launching background processes, or applying enterprise security policies.

Logs for Cluster-scoped init scripts are now more consistent with Cluster Log Delivery and can be found in the same root folder as driver and executor logs for the cluster.

Reference:
https://databricks.com/blog/2018/08/30/introducing-cluster-scoped-init-scripts.html

QUESTION 7
You have an Azure data factory.

You need to examine the pipeline failures from the last 60 days.

What should you use?

A. the Activity log blade for the Data Factory resource
B. the Monitor & Manage app in Data Factory
C. the Resource health blade for the Data Factory resource
D. Azure Monitor

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Data Factory stores pipeline-run data for only 45 days. Use Azure Monitor if you want to keep that data for a longer time.

Reference:
https://docs.microsoft.com/en-us/azure/data-factory/monitor-using-azure-monitor

QUESTION 8
You are monitoring an Azure Stream Analytics job.

The Backlogged Input Events count has been 20 for the last hour.

You need to reduce the Backlogged Input Events count.

What should you do?

A. Drop late arriving events from the job.
B. Add an Azure Storage account to the job.
C. Increase the streaming units for the job.
D. Stop the job.

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
General symptoms of the job hitting system resource limits include:

- If the backlog event metric keeps increasing, it’s an indicator that the system resource is constrained (either because of output sink throttling, or high CPU).

Note: Backlogged Input Events: Number of input events that are backlogged. A non-zero value for this metric implies that your job isn't able to keep up with the number of incoming events. If this value is slowly increasing or consistently non-zero, you should scale out your job: adjust Streaming Units.

Reference:
https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-scale-jobs

https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-monitoring