



ติวเข้ม

Data Fundamentals

เตรียมความพร้อมเพื่อการสอบ DP-900

วันที่ 9 มีนาคม 2564

9:00 – 16:30 น.

เรียนแบบออนไลน์พร้อมแขชทดสอบความกับวิทยากร



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ช่วงเช้า

เตรียมความพร้อม Data Fundamentals

เวลา 9:00 – 12:00 น.

เรียนรู้หลักการพื้นฐานของข้อมูล (Data) ทำความรู้จักกับชนิดข้อมูลทั้งแบบเชิงสัมพันธ์ (Relational), NoSQL และคลังข้อมูลยุคใหม่ (Modern Datawarehouse) พร้อมทั้งแนะนำ Azure Data Service ที่ใช้บริหารจัดการข้อมูลทั้ง 3 ชนิดได้อย่างมีประสิทธิภาพ

- Explore core data concepts
- Explore relational data in Azure
- Explore non-relational data in Azure
- Explore modern data warehouse analytics in Azure

ช่วงบ่าย

ติวเข้ม DP-900

เวลา 13:30 – 16:30 น.

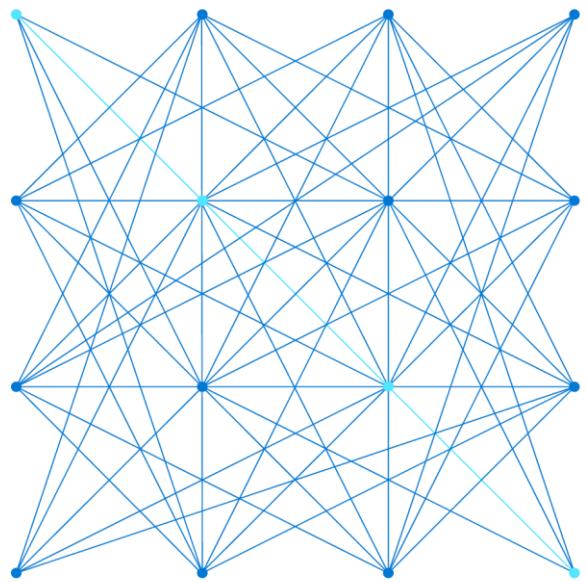
แนะนำการท่าข้อสอบ ฝึกฝนจากแบบฝึกหัด และตัวอย่างโจทย์ที่นำเสนอด้วย แนะนำวิธีการเตรียมตัว และแหล่งการเรียนรู้เพิ่มเติม

- แนะนำวิธีการลงคะแนนสอบ DP-900 ผ่าน และการเตรียมตัวก่อนสอบ
- แบบฝึกหัดทบทวนบทเรียน #1
- แนะนำศูนย์สอบชั้นนำ
- แบบฝึกหัดทบทวนบทเรียน #2

2



Microsoft Azure Data Fundamentals [DP-900]



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Microsoft Certified Azure Fundamentals

Microsoft Certified Azure Data Fundamentals

Microsoft Certified Azure AI Fundamentals

Microsoft Certified Solutions Associate (MCSA) - Web Application Development

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About this course



Course format:

One-day instructor-led with hands-on exercises

Supplemented by online training at <https://docs.microsoft.com/learn/>



Course objectives:

Describe core data concepts in Azure

Explain concepts of relational data in Azure

Explain concepts of non-relational data in Azure

Identify components of a modern data warehouse in Azure

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Course agenda

Module	Lessons
Module 1: Explore core data concepts	<ul style="list-style-type: none"> Explore core data concepts Explore roles and responsibilities in the world of data Describe concepts of relational data Explore concepts of non-relational data Explore concepts of data analytics
Module 2: Explore relational data in Azure	<ul style="list-style-type: none"> Explore relational data offerings in Azure Explore provisioning and deploying relational database offerings in Azure Query relational data in Azure
Module 3: Explore non-relational data in Azure	<ul style="list-style-type: none"> Explore non-relational data offerings in Azure Explore provisioning and deploying non-relational data services in Azure Manage non-relational data stores in Azure
Module 4: Explore modern data warehouse analytics	<ul style="list-style-type: none"> Examine components of a modern data warehouse Explore data ingestion in Azure Explore data storage and processing in Azure Get started building with Power BI

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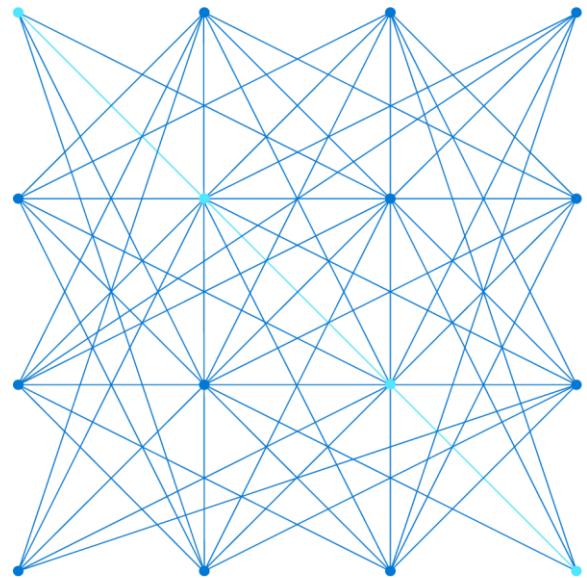


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Module 1: Explore core data concepts



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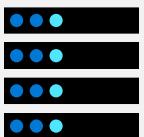
Agenda

-  Explore core data concepts
-  Explore roles and responsibilities in the world of data
-  Describe concepts of relational data
-  Explore concepts of non-relational data
-  Explore concepts of data analytics

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Lesson 1: Explore core data concepts



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Lesson 1 objectives



Identify how data is defined and stored



Identify characteristics of relational and non-relational data



Describe and differentiate data workloads



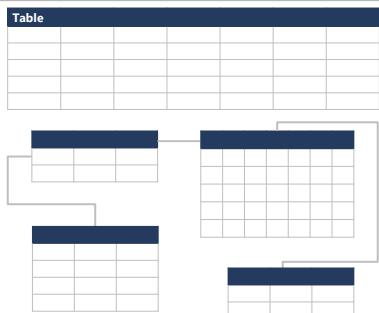
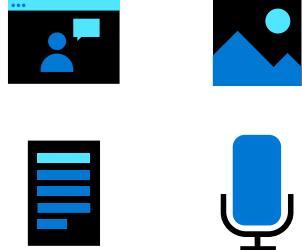
Describe and differentiate batch and streaming data

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What is data?

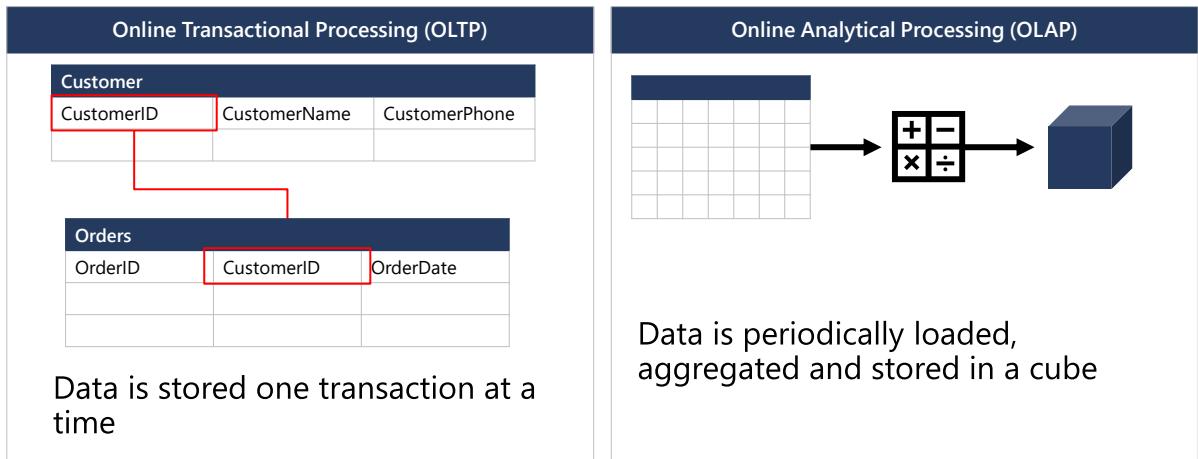
Collection of facts, numbers, descriptions, objects , stored in a structured, semi-structured, unstructured way

Structured	Semi-structured	Unstructured
Table 	Semi-structured <pre>## Document 1 ## { "customerID": "103248", "name": { "first": "AAA", "last": "BBB" }, "address": { "street": "Main Street", "number": "101", "city": "Acity", "state": "NY" }, "ccOnFile": "yes", "firstOrder": "02/28/2003" } ## Document 2 ## { "customerID": "103249", "name": { "title": "Mr", "forename": "AAA", "lastname": "BBB" }, "address": { "street": "Another Street", "number": "202", "city": "Bcity", "county": "Gloucestershire", "country-region": "UK" }, "ccOnFile": "yes" }</pre>	Unstructured 

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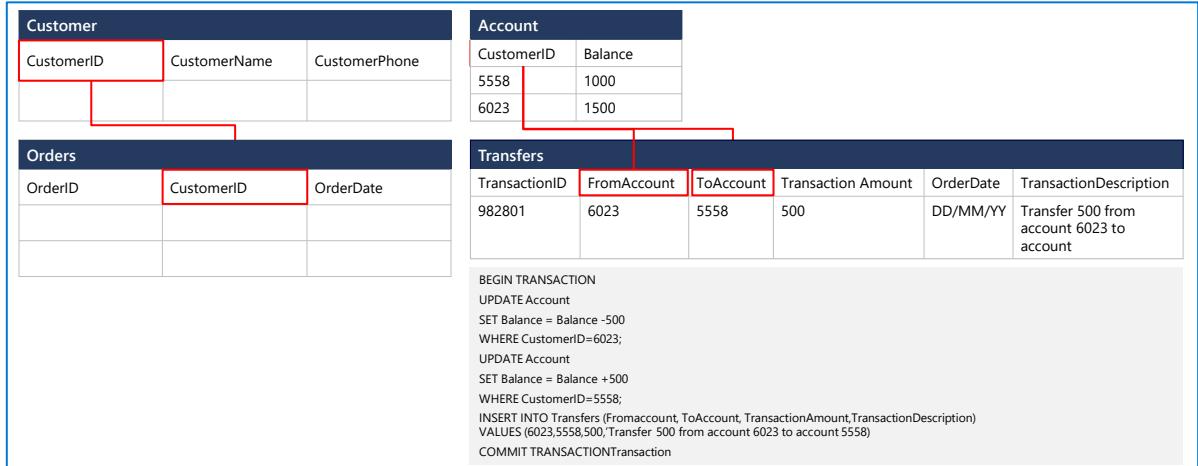
Transactional vs analytical data stores



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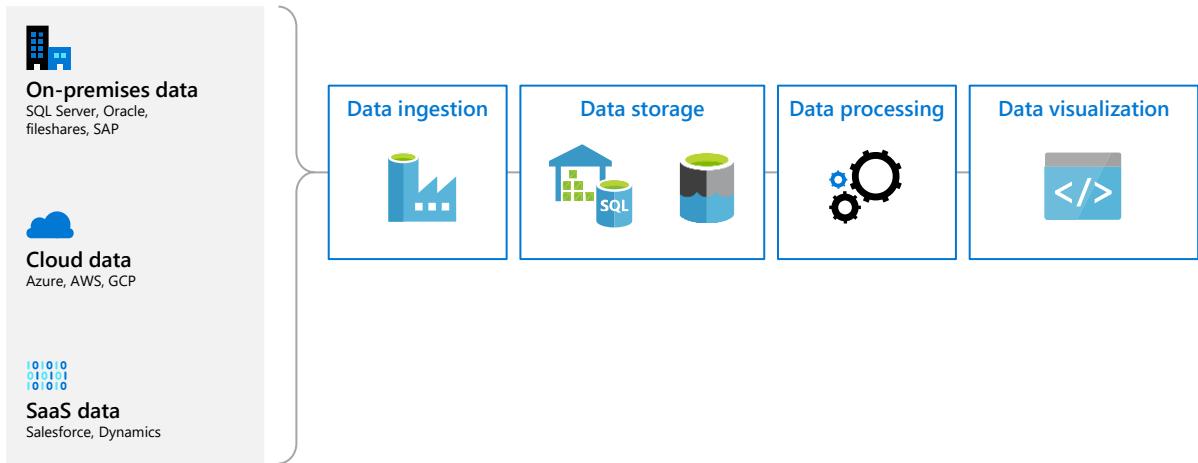
Transactional workloads



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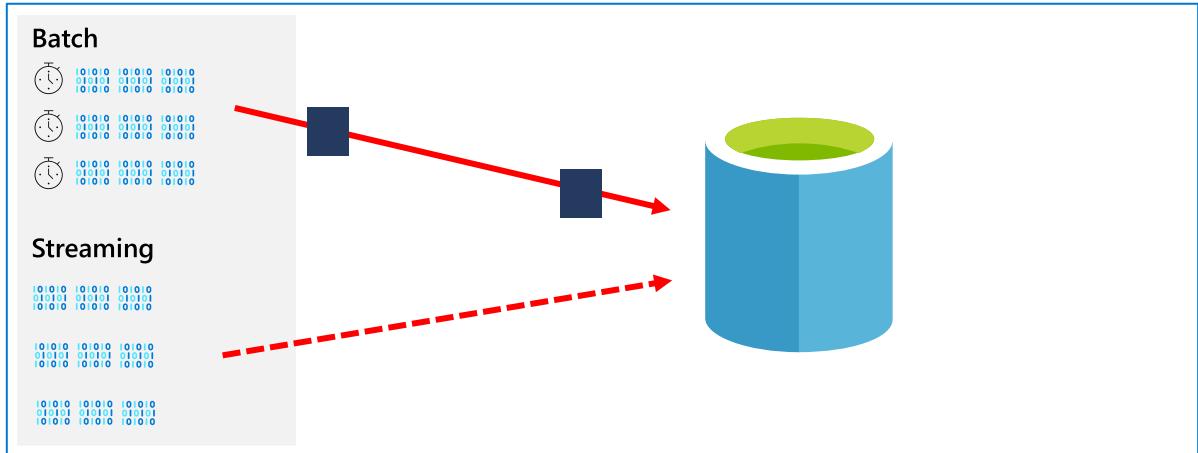
Analytical system



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Batch data/streaming data



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Lesson 1: Knowledge check



How is data in a relational table organized?

- Rows and Columns
- Header and Footer
- Pages and Paragraphs



Which of the following is an example of unstructured data?

- An Employee table with columns Employee ID, Employee Name, and Employee Designation
- Audio and Video files
- A table within SQL Server database



What of the following is an example of a streaming dataset?

- Data from sensor feeds
- Sales data for the past month
- List of employees working for a company

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Lesson 2: Explore roles and responsibilities in the world of data



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Lesson 2 objectives



Explore data job roles



Explore common tasks and tools for data job roles

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Roles in data

Database Administrator

Database Management
Implements Data Security
Backups
User Access
Monitors performance



Data Engineer

Data Pipelines and processes
Data Ingestion storage
Prepare data for Analytics
Prepare data for analytical processing



Data Analyst

Provides insights into the data
Visual Reporting
Modeling Data for Analysis
Combines data for visualization and analysis



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Common tools – Database administrator

Azure Data Studio	SQL Server Management Studio	Azure Portal/CLI
<p>Graphical interface for managing on-premises and cloud-based data services</p> <p>Runs on Windows, macOS, Linux</p>	<p>Graphical interface for managing on-premises and cloud-based data services</p> <p>Runs on Windows</p> <p>Comprehensive Database Administration tool</p>	<p>Tools for management and provisioning of Azure Data Services</p> <p>Manual and automation of scripts using Azure Resource Manager or Command Line Interface scripting</p>

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Common tools – Data engineering

Azure Synapse Studio	SQL Server Management Studio	Azure Portal/CLI
<p>Azure Portal integrated to manage Azure Synapse</p> <p>Data Ingestion (Azure Data Factory)</p> <p>Management of Azure Synapse assets (SQL Pools/Spark Pool)</p>	<p>Graphical interface for managing on-premises and cloud-based data services</p> <p>Runs on Windows</p> <p>Comprehensive Database Administration tool</p>	<p>Tools for management and provisioning of Azure resources</p> <p>Manual and automation of scripts using Azure Resource Manager or Command Line Interface scripting</p>

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Common tools – Data analyst

Power BI Desktop	Power BI Portal/ Power BI Service	Power BI Report Builder
Data Visualization tool	Authoring and management of Power BI reports	Data Visualization tool for paginated reports
Model and Visualize Data	Authoring of Power BI dashboards	Model and Visualize paginated reports
Management of Azure Synapse assets (SQL Pools/Spark Pool)	Share Reports/Datasets	

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Lesson 2: Knowledge check



Which one of the following tasks is a role of a database administrator?

- Backing up and restoring databases
- Creating dashboards and reports
- Identifying data quality issues



Which of the following tools is a visualization and reporting tool?

- SQL Server Management Studio
- Power BI
- SQL



Which one of the following roles is not a data job role?

- Systems Administrator
- Data Analyst
- Database Administrator

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Lesson 3: Describe concepts of relational data



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Lesson 3 objectives



Explore the characteristics of relational data



Define tables, indexes, and views



Explore relational data workload services in Azure

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Identify relational database use cases



IoT:

Although typically considered for non-relational, the data from IoT devices could be structured and consistent



Online transaction processing:

For example order systems that perform many small transactional updates



Data warehousing:

Large amounts of data can be imported from multiple sources and structured to enable high-performance queries

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Tables

Customers		
CustomerID	CustomerName	CustomerPhone
100	Muisto Linna	XXX-XXX-XXXX
101	Noam Maoz	XXX-XXX-XXXX
102	Vanja Matkovic	XXX-XXX-XXXX
103	Qamar Mounir	XXX-XXX-XXXX
104	Zhenis Omar	XXX-XXX-XXXX
105	Claude Paulet	XXX-XXX-XXXX
106	Alex Pettersen	XXX-XXX-XXXX
107	Francis Ribeiro	XXX-XXX-XXXX

Data is stored in a table

Table consists of rows and columns

All rows have same # of columns

Each column is defined by a datatype

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Entities

Customers		
CustomerID	CustomerName	CustomerPhone
100	Muisto Linna	XXX-XXX-XXXX
101	Noam Maoz	XXX-XXX-XXXX
102	Vanja Matkovic	XXX-XXX-XXXX
103	Qamar Mounir	XXX-XXX-XXXX
104	Zhenis Omar	XXX-XXX-XXXX
105	Claude Paulet	XXX-XXX-XXXX
106	Alex Pettersen	XXX-XXX-XXXX

An entity is a representation of an item which can be physical (such as a customer or a product), or virtual (such as an order).

Entities are connected by relations enabling interaction. For example, a customer can place an order for a product

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Normalization

Customers		
CustomerID	CustomerName	CustomerPhone
100	Muisto Linna	XXX-XXX-XXXX
101	Noam Maoz	XXX-XXX-XXXX
102	Vanja Matkovic	XXX-XXX-XXXX
103	Qamar Mounir	XXX-XXX-XXXX
104	Zhenis Omar	XXX-XXX-XXXX
105	Claude Paulet	XXX-XXX-XXXX
106	Alex Pettersen	XXX-XXX-XXXX

Orders		
OrderID	CustomerName	CustomerPhone
AD100	Noam Maoz	XXX-XXX-XXXX
AD101	Noam Maoz	XXX-XXX-XXXX
AD102	Noam Maoz	XXX-XXX-XXXX
AX103	Qamar Mounir	XXX-XXX-XXXX
AS104	Qamar Mounir	XXX-XXX-XXXX
AR105	Claude Paulet	XXX-XXX-XXXX
MK106	Muisto Linna	XXX-XXX-XXXX

Data is normalized to:

Reduce storage

Avoid data duplication

Improve data quality

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Relations

Customers			Orders		
CustomerID	CustomerName	CustomerPhone	OrderID	CustomerID	SalesPersonID
100	Muisto Linna	XXX-XXX-XXXX	AD100	101	200
101	Noam Maoz	XXX-XXX-XXXX	AD101	101	200
102	Vanja Matkovic	XXX-XXX-XXXX	AD102	101	200
103	Qamar Mounir	XXX-XXX-XXXX	AX103	103	201
104	Zhenis Omar	XXX-XXX-XXXX	AS104	103	201
105	Claude Paulet	XXX-XXX-XXXX	AR105	105	200
106	Alex Pettersen	XXX-XXX-XXXX	MK106	105	201

In a normalized database schema:

Primary Keys and Foreign keys are used to define relationships

No data duplication exists (other than key values in 3rd Normal Form (3NF))

Data is retrieved by joining tables together in a query

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Indexes

Customers			IDX-CustomerRegion	
CustomerID	CustomerName	CustomerPhone	CustomerID	Region
100	Muisto Linna	XXX-XXX-XXXX	100	France
101	Noam Maoz	XXX-XXX-XXXX	101	Brazil
102	Vanja Matkovic	XXX-XXX-XXXX	102	Croatia
103	Qamar Mounir	XXX-XXX-XXXX	103	Jordan
104	Zhenis Omar	XXX-XXX-XXXX	104	Spain
105	Claude Paulet	XXX-XXX-XXXX	105	France
106	Alex Pettersen	XXX-XXX-XXXX	106	USA

An index:

Optimizes search queries for faster data retrieval

Reduces the amount of data pages that need to be read to retrieve the data in a SQL Statement

Data is retrieved by joining tables together in a query

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View

Customers			Orders		
CustomerID	CustomerName	CustomerPhone	OrderID	CustomerID	SalesPersonID
100	Muisto Linna	XXX-XXX-XXXX	AD100	101	200
101	Noam Maoz	XXX-XXX-XXXX	AD101	101	200
102	Vanja Matkovic	XXX-XXX-XXXX	AD102	101	200
103	Qamar Mounir	XXX-XXX-XXXX	AX103	103	201
104	Zhenis Omar	XXX-XXX-XXXX	AS104	103	201
105	Claude Paulet	XXX-XXX-XXXX	AR105	105	200
106	Alex Pettersen	XXX-XXX-XXXX	MK106	105	201
			DB205	100	205

Create the definition of a view:

```
CREATE VIEW
vw_customerorders AS
SELECT Customers.CustomerID,
Customers.CustomerName,
Orders.OrderID FROM
Customers JOIN Orders on
Customers.CustomerID =
Orders.CustomerID
```

Retrieve the orders placed by customer 102 using the view:

```
SELECT CustomerName, OrderID
from vw_customerorders WHERE
CustomerID=102
```

A view is a virtual table based on the result set of query:

Views are created to simplify the query

Combine relational data into a single pane view

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Lesson 3: Knowledge check

Which one of the following statements is a characteristic of a relational database?

- All data must be stored as character strings
- A row in a table represents a single entity
- Different rows in the same table can contain different columns

What is an index?

- A structure that enables you to locate rows in a table quickly, using an indexed value
- A virtual-table based on the result-set of a query
- A structure comprising rows and columns that you use for storing data

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Lesson 4: Explore concepts of non-relational data



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Lesson 4 objectives



Explore the characteristics of non-relational data



Define types of non-relational data



Describe NoSQL, and the types of non-relational databases

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Explore characteristics of non-relational data

Entities

```
## Customer 1 ID: 1
Name: Mark Hanson
Telephone: [ Home: 1-999-9999999, Business: 1-888-8888888, Cell: 1-777- 7777777 ]
Address: [ Home: 121 Main Street, Some City, NY, 10110,
           Business: 87 Big Building, Some City, NY, 10111 ]
## Customer 2 ID: 2
Title: Mr
Name: Jeff Hay
Telephone: [ Home: 0044-1999-333333, Mobile: 0044-17545-444444 ]
Address: [ UK: 86 High Street, Some Town, A County, GL8888, UK,
           US: 777 7th Street, Another City, CA, 90111 ]
```

Non-relational collections can have:

Multiple entities in the same collection or container with different fields

Have a different, non-tabular schema

Are often defined by labeling each field with the name it represents

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Identify non-relational database use cases



IoT and Telematics:

Often require to ingest large amounts of data in frequent burst of activity, data is either semi structured or structured, often requires real time processing



Retail and Marketing:

Common scenarios for globally distributed data, document storage



Gaming:

In-game stats, social media integration, leaderboards, low-latency applications



Web and Mobile:

Commonly used with web click analytics, modern applications including bots

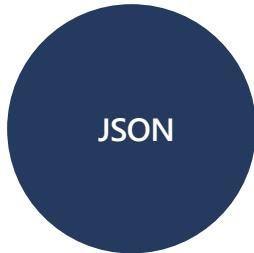
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Types of non-relational data

What is semi-structured data?

Data structure is defined within the actual data by fields. Format/file types include:



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What is unstructured data?



Does not naturally contain fields:

Examples: video, audio, media streams, documents



Often used to extract data organization and categorize or identify “structures”



Frequently used in combination with Machine Learning or Cognitive Services capabilities to “extract data” by using:

Text Analytics

Sentiment Analysis with Cognitive APIs

Vision API

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What is NoSQL?

Loose term, to describe non-relational



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Key-Value Stores

Key	Value
AAAAA	110100111010100110101111...
AABAB	1001100001011001101011110...
DFA766	0000000000101010110101010...
FABCC4	1110110110101010100101101...

Opaque to
data store

A key-value store is the simplest (and often quickest) type of NoSQL database for inserting and querying data.

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Document Databases

Key	Document
1001	{ "CustomerID": 99, "OrderItems": [{ "ProductID": 2010, "Quantity": 2, "Cost": 520 }, { "ProductID": 4365, "Quantity": 1, "Cost": 18 }], "OrderDate": "04/01/2017" }
1002	{ "CustomerID": 220, "OrderItems": [{ "ProductID": 1285, "Quantity": 1, "Cost": 120 }], "OrderDate": "05/08/2017" }

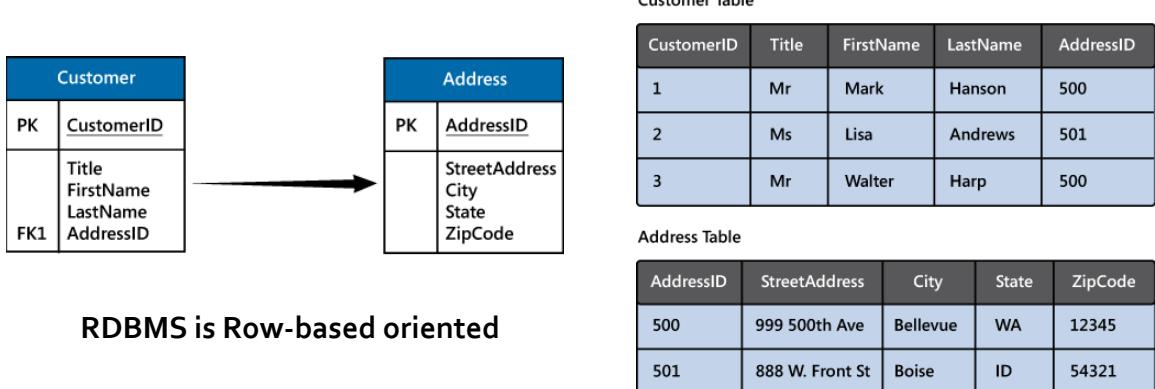
A document database represents the opposite end of the NoSQL spectrum from a key-value store. In a document database, each document has a unique ID, but the fields in the documents are transparent to the database management system. Document databases typically store data in JSON format,

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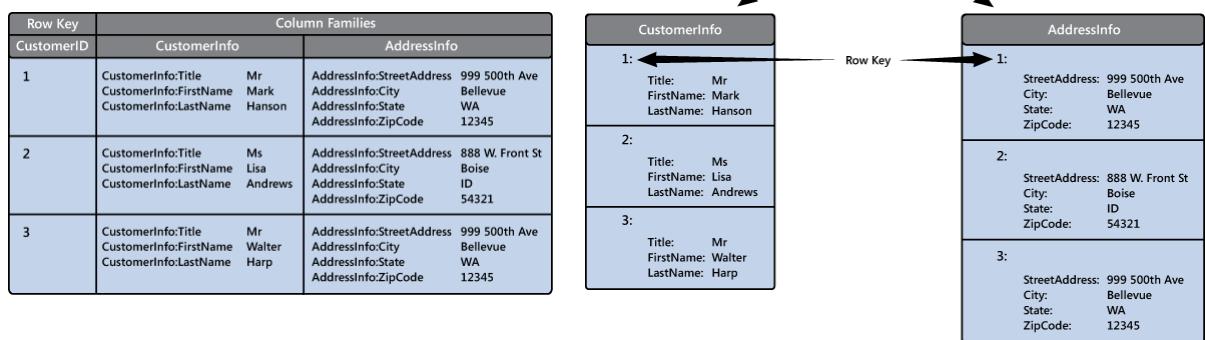
RDBMS	MongoDB
Database	Database
Table	Collection
Tuple/Row	Document
column	Field
Table Join	Embedded Documents
Primary Key	Primary Key (Default key <code>_id</code> provided by mongoDB itself)

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Column Family Databases



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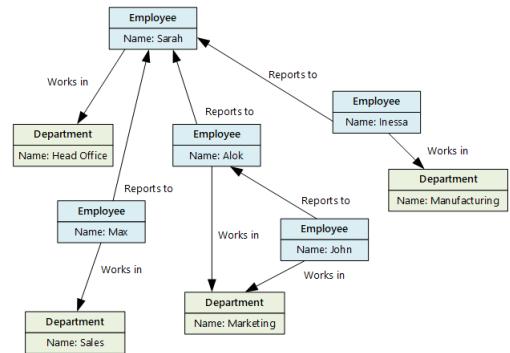
What is a graph database?



Stores entities centric around relationships



Enables applications to perform queries traversing a network of nodes and edges



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Lesson 4: Knowledge check



Which of the following services should you use to implement a non-relational database?

- Azure Cosmos DB
- Azure SQL Database
- The Gremlin API



Which of the following is a characteristic of non-relational databases?

- Non-relational databases contain tables with flat fixed-column records
- Non-relational databases require you to use data normalization techniques to reduce data duplication
- Non-relational databases are either schema free or have relaxed schemas

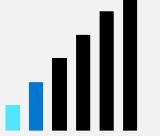


You are building a system that monitors the temperature throughout a set of office blocks, and sets the air conditioning in each room in each block to maintain a pleasant ambient temperature. Your system has to manage the air conditioning in several thousand buildings spread across the country or region, and each building typically contains at least 100 air-conditioned rooms. What type of NoSQL data store is most appropriate for capturing the temperature data to enable it to be processed quickly?

- A key-value store
- A column family database
- Write the temperatures to a blob in Azure Blob storage

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Lesson 5: Explore concepts of data analytics



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Lesson 5 objectives



Learn about data ingestion and processing



Explore data visualization

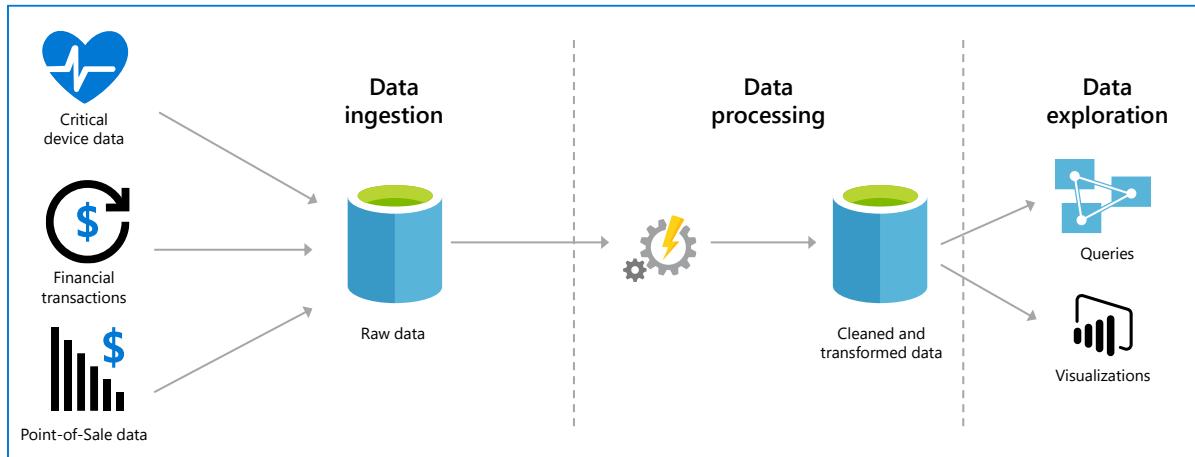


Explore data analytics

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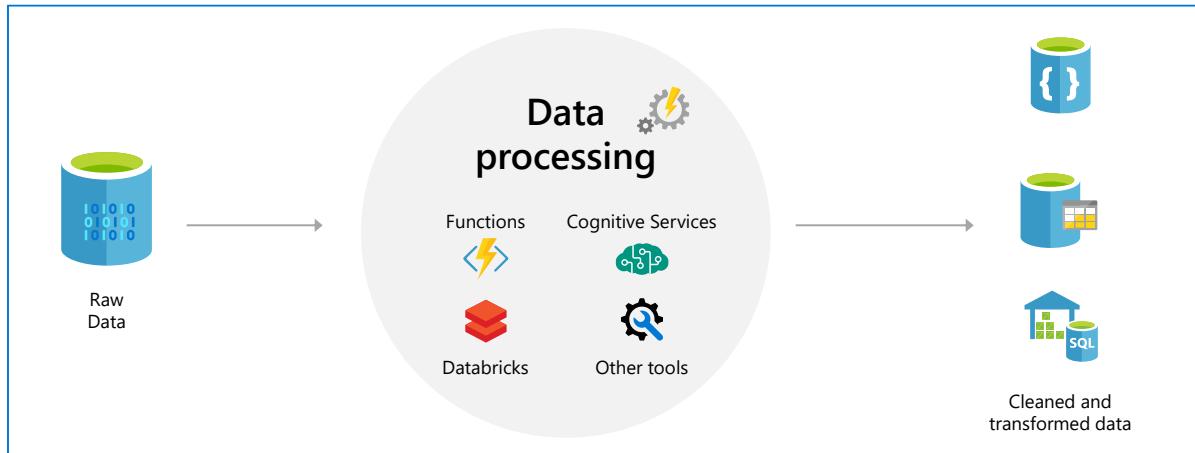
What is data ingestion?



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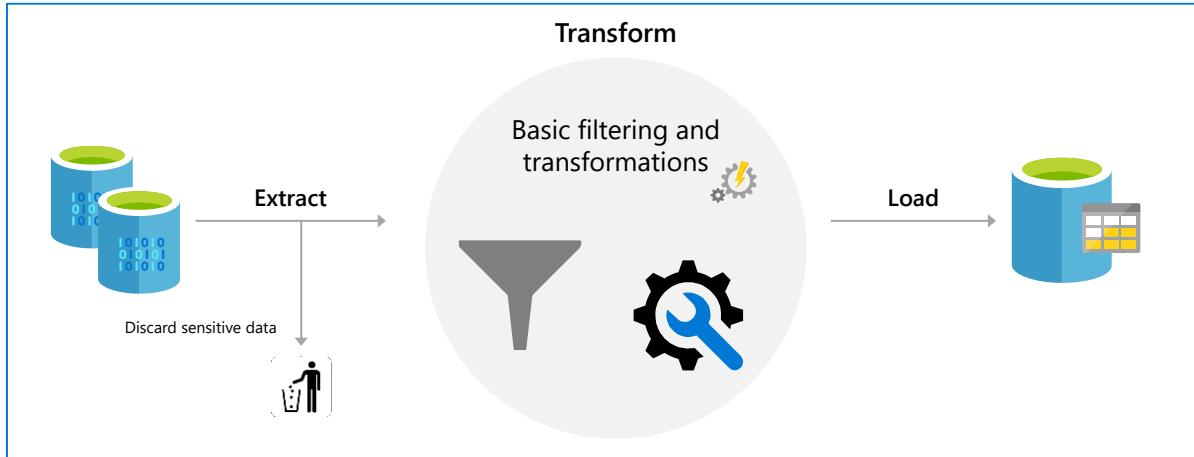
What is data processing?



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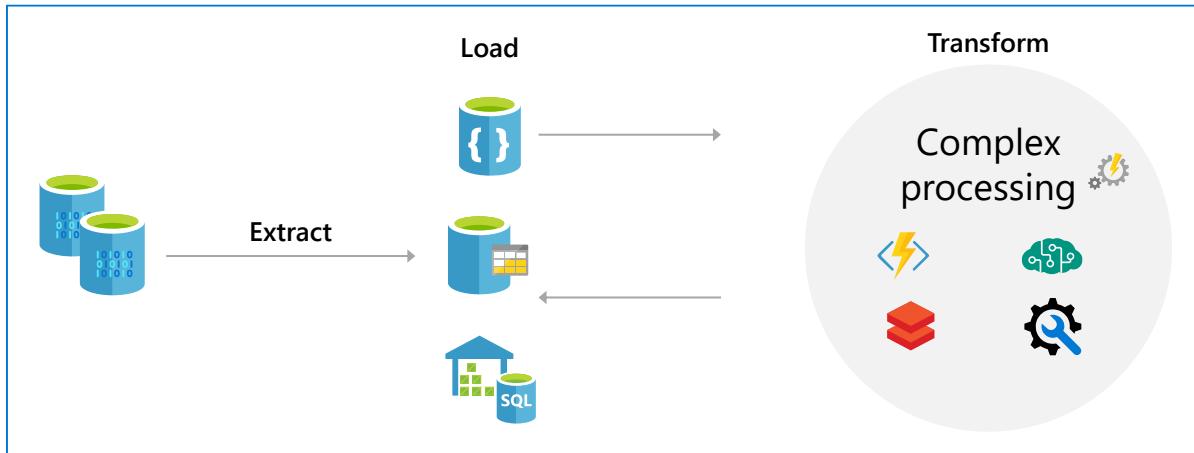
What is ETL?



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What is ELT?

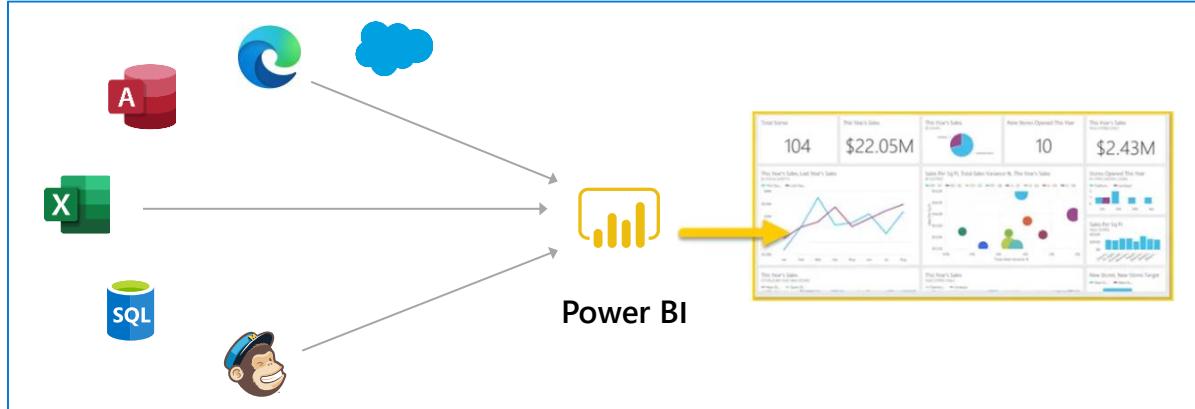


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Explore data visualization

Power BI: A collection of software, services, apps, and connectors



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Power BI

Visualizations



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Explore data analytics



Descriptive



Diagnostic



Predictive



Prescriptive



Cognitive

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Lesson 5: Knowledge check



What is data ingestion?

- The process of transforming raw data into models containing meaningful information
- Analyzing data for anomalies
- Capturing raw data streaming from various sources and storing it



Which one of the following visuals displays the major contributors to a selected result or value?

- Key influencers
- Column and bar chart
- Matrix chart



Which type of analytics helps answer questions about what has happened in the past?

- Descriptive analytics
- Prescriptive analytics
- Predictive analytics

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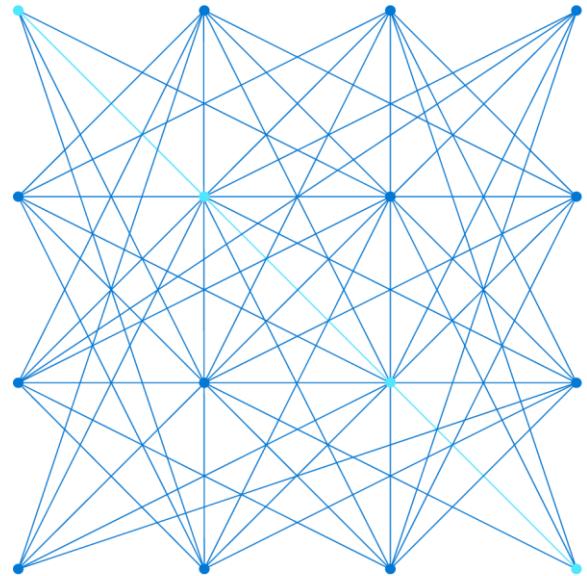


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Module 2: Explore relational data in Azure



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Agenda



Explore relational data services in Azure



Explore provisioning and deploying relational database services in Azure

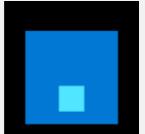


Query relational data in Azure

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Lesson 1: Explore relational data services in Azure



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Lesson 1 objectives



What are Azure Data Services?



IaaS vs PaaS



SQL Server on Azure virtual machines



Azure SQL DB



PostgreSQL, MySQL, MariaDB

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What are Azure Data Services?



SQL Server on Azure Virtual Machines

Best for re-hosting and apps requiring OS-level access and control
Automated manageability features and OS-level access



Azure SQL Managed Instance

Best for modernizing existing apps
Offers high compatibility with SQL Server and native VNET support



Azure SQL Database

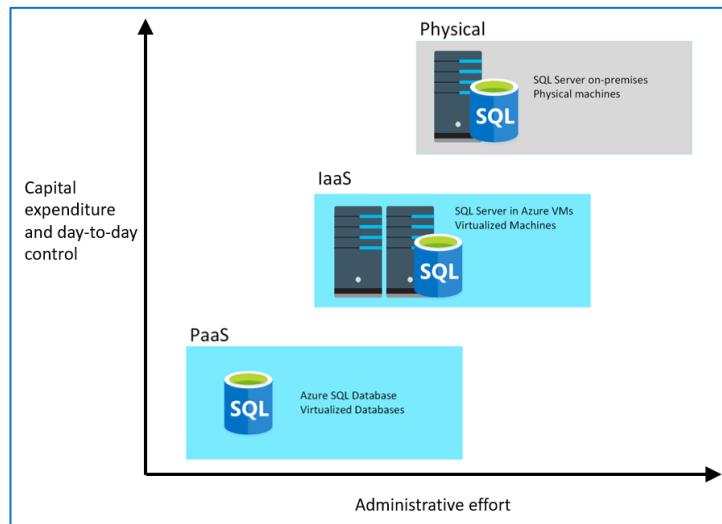
Best for building new apps in the cloud
Pre-provisioned or serverless compute and Hyperscale storage to meet demanding workload requirements

— Infrastructure as a Service — Platform as a Service —

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IaaS vs PaaS



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Azure SQL DB

<p>Customer challenge: I want to build modern apps, potentially multi-tenanted, with the highest uptime and predictable performance</p>	<p>Key features: Single database or elastic pool Hyperscale storage (100TB+) Serverless compute Fully managed service Private link support High availability with AZ isolation</p>	<p>Azure differentiators: Industry highest availability SLA of 99.995% Industry only business continuity SLA with 5 second RPO and 30 second RTO Price-performance leader for mission-critical workloads while costing up to 86 percent less than AWS RDS (GigaOm)</p>
<p>Solution: Azure SQL Database is a highly scalable cloud database service with built-in high availability and machine learning</p>		

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Create an Azure SQL database

Home > New > SQL Database > Create SQL Database

Create SQL Database

Basics Networking Additional settings Tags Review + create

Create a SQL database with your preferred configurations. Complete the Basics tab then go to Review + Create to provision with smart defaults, or visit each tab to customize. [Learn more](#)

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ctestao

Resource group * Select existing... Create new

Database details

Enter required settings for this database, including picking a logical server and configuring the compute and storage resources

Database name *

Server * Select a server Create new

The value must not be empty.

Want to use SQL elastic pool? * Yes No

Compute + storage * Please select a server first. Configure database

Dashboard > New > Create SQL Database

Create SQL Database

Basics **Additional settings** Tags Review + create

Customize additional configuration parameters including collation & sample data.

Data source

Start with a blank database, restore from a backup or select sample data to populate your new database.

* Use existing data None Backup Sample

* Backup

You can also restore a database to a server blade. [Learn more](#)

Database Collection

Database collation defines the rules that sort and compare data, and cannot be changed after database creation. The default database collation is SQL_Latin1_General_CI_AS. [Learn more](#)

myserver (West Europe)

database1 (2019-09-16 12:05:30 UTC)
database2 (2019-09-16 12:06:45 UTC)
database3 (2019-09-16 12:07:51 UTC)
database4 (2019-09-16 12:08:38 UTC)
database5 (2019-09-16 12:09:23 UTC)
database6 (2019-09-16 12:10:41 UTC)
database7 (2019-09-16 12:11:38 UTC)

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PostgreSQL, MySQL, MariaDB



PostgreSQL is the most popular and wanted database for modern apps



MySQL is a leading open source relational database for LAMP stack apps



MariaDB is a community-developed fork of MySQL with strong focus on the user community

Benefits of Azure Database for PostgreSQL, MySQL, MariaDB



Fully managed community database:

Take advantage of a fully managed service while still using the tools and languages you're familiar with



Built-in high availability for lowest TCO:

Ensure your data is always available without the need for additional costs



Intelligent performance and scale:

Improve performance with built-in intelligence and up to 16TB storage and 20K IOPs



Industry-leading security and compliance:

Protect your data with enhanced security features including Advanced Threat Protection



Integration with the Azure ecosystem:

Build apps faster with Azure services and safeguard your innovation with Azure IP Advantage

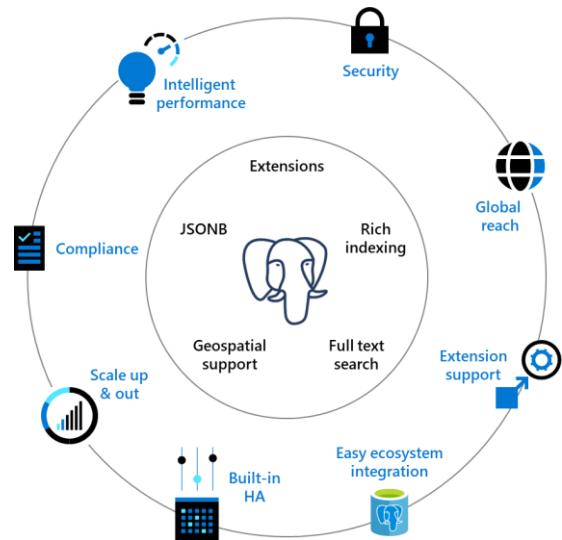
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Azure Database for PostgreSQL

Azure builds upon the core benefits of PostgreSQL and Open Source

Azure Database for PostgreSQL is fully-managed, community PostgreSQL

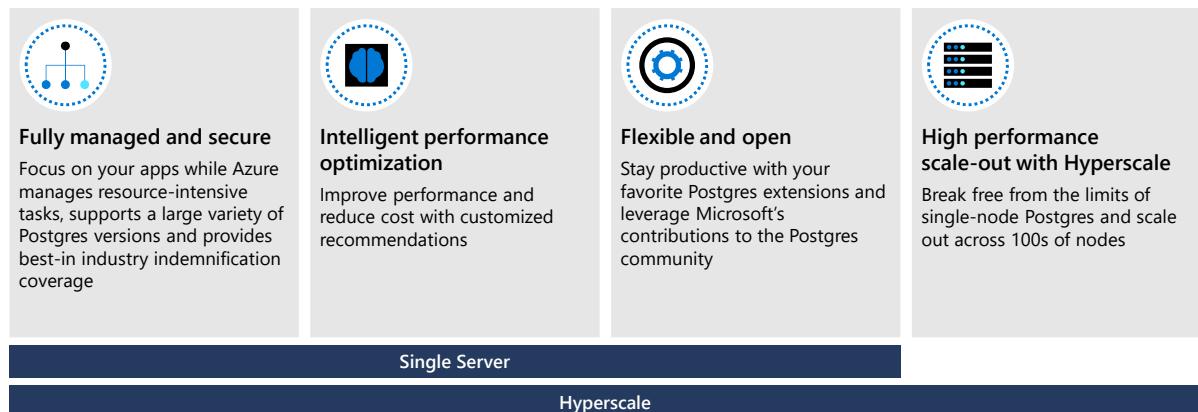


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The benefits of Azure Database for PostgreSQL

Build or migrate your workloads with confidence and optimized for value



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Lesson 1: Knowledge check (continued on next slide)



Which deployment requires the fewest changes when migrating an existing SQL Server on-premises solution?

- Azure SQL Database Managed Instance
- SQL Server running on a virtual machine
- Azure SQL Database Single Database



Which of the following statements is true about SQL Server running on a virtual machine?

- You must install and maintain the software for the database management system yourself, but backups are automated
- Software installation and maintenance are automated, but you must do your own backups
- You're responsible for all software installation and maintenance, and performing back ups



Which of the following statement is true about Azure SQL Database?

- Scaling up doesn't take effect until you restart the database
- Scaling out doesn't take effect until you restart the database
- Scaling up or out will take effect without restarting the SQL database

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Lesson 1: Knowledge check (continued)



When using an Azure SQL Database managed instance, what is the simplest way to implement backups?

- Manual Configuration of the SQL server
- Create a scheduled task to back up
- Backups are automatically handled



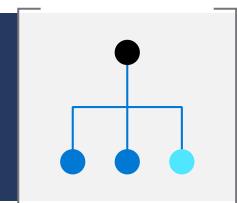
What is the best way to transfer the data in a PostgreSQL database running on-premises into a database running Azure Database for PostgreSQL service?

- Export the data from the on-premises database and import it manually into the database running in Azure
- Upload a PostgreSQL database backup file to the database running in Azure
- Use the Azure Database Migration Services

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Lesson 2: Explore provisioning and deploying relational database services in Azure



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Lesson 2 objectives



Provision relational data services



Configure relational data services



Explore basic connectivity issues



Explore data security

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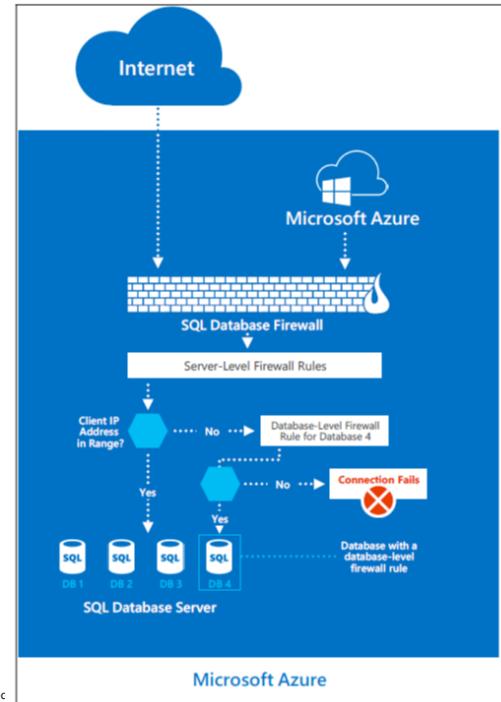
Configure relational data services

Basics	Network connectivity	Additional settings	Tags (DB)	Review & create
Subscription Resource group Managed Instance/ Server name Database Name (DB) Admin Login Password Region Opt-in for pools (DB) Compute + storage	Public vs Private access VNet/Firewall rules Connection type (MI)	Data source (DB) Server Collation (MI) Database Collation (DB) Time zone (MI) Opt-in for Advanced data security (DB)		Terms and Privacy

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Server-Level Firewall Rules



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Authentication and Access Control



"Mixed Mode" authentication forced

SQL Auth for deployment: **server admin**:

Server-level principal for logical server for DB

Member of sysadmin server role for MI



Need Windows Auth? Use Azure AD Authentication Azure Managed Instance:

Azure AD Server Admin

SQL or Azure AD Logins

Database Users

SQL Server Contained Database supported



Azure SQL Database:

Azure AD Server Admin

SQL logins

loginmanager and dbmanager roles for limited server admins

Database Users

Contained Database Users including Azure AD (recommended)

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Lesson 3 objectives



Query relational data



Describe query techniques for data using the SQL language

Start : 10.50

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Introduction to SQL



SQL is a standard language for use with relational databases



SQL standards are maintained by ANSI and ISO



Proprietary RDBMS systems have their own extensions of SQL such as T-SQL, PL/SQL, pgSQL

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SQL Statement types

DML	DDL	DCL
<p>Data Manipulation Language Used to query and manipulate data SELECT, INSERT, UPDATE, DELETE</p>	<p>Data Definition Language Used to define database objects CREATE, ALTER, DROP, RENAME</p>	<p>Data Control Language Used to manage security permissions GRANT, REVOKE, DENY</p>

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Use DML statements

Statement	Description
SELECT	Select/read from a table
INSERT	Insert new rows in a table
UPDATE	Edit/Update existing rows in a table
DELETE	Delete existing rows in a table

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Elements of the SELECT Statement

Clause	Expression
SELECT	<select list>
FROM	<table or view>
WHERE	<search condition>
GROUP BY	<group by list>
ORDER BY	<order by list>

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Example of SELECT statement

```
SELECT EmployeeId, YEAR(OrderDate) AS OrderYear
FROM Sales.Orders
WHERE CustomerId = 71
GROUP BY EmployeeId, YEAR(OrderDate)
HAVING COUNT(*) > 1
ORDER BY EmployeeId, OrderYear;
```

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Example of INSERT statement

The INSERT ... VALUES statement inserts a new row

```
INSERT INTO Sales.OrderDetails
    (orderid, productid, unitprice, qty, discount)
VALUES (10255,39,18,2,0.05);
```

Table and row constructors add multirow capability to INSERT ... VALUES

```
INSERT INTO Sales.OrderDetails
    (orderid, productid, unitprice, qty, discount)

VALUES
    (10256,39,18,2,0.05),
    (10258,39,18,5,0.10);
```

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Use DDL statements

Statement	Description
CREATE	Create a new object in the database, such as a table or a view
ALTER	Modify the structure of an object. For instance, altering a table to add a new column.
DROP	Remove an object from the database.
RENAME	Rename an existing object.

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Example of CREATE statement

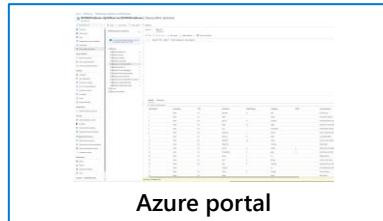
```
CREATE TABLE Mytable
```

```
(Mycolumn1 int NOT NULL PRIMARY KEY, Mycolumn2 VARCHAR(50) NOT
NULL , Mycolumn2 VARCHAR(10) NOT NULL
```

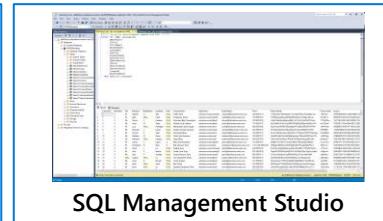
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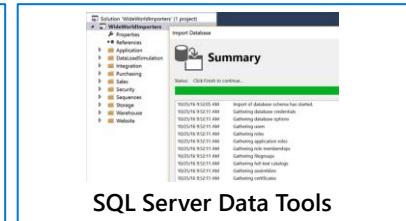
Query tools



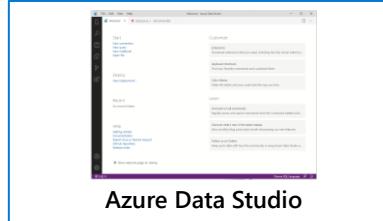
Azure portal



SQL Management Studio



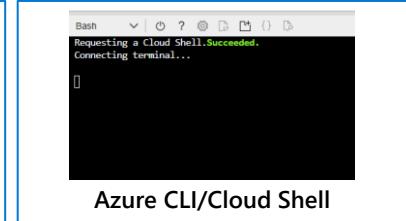
SQL Server Data Tools



Azure Data Studio



SQLCMD



Azure CLI/Cloud Shell

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Query relational data in Azure SQL Database for PostgreSQL

[Use PSQL to query a database](#)

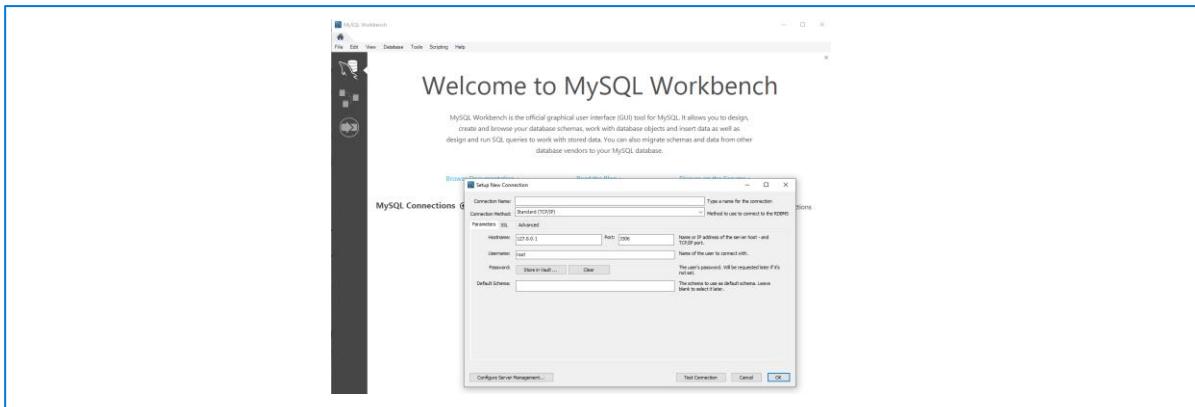
```
psql --host=<server-name>.postgres.database.azure.com --
username=<admin-user>@<server-name> --dbname=postgres
```

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Query relational data in Azure SQL Database for MySQL

[Use MySQL Workbench to query a database](#)



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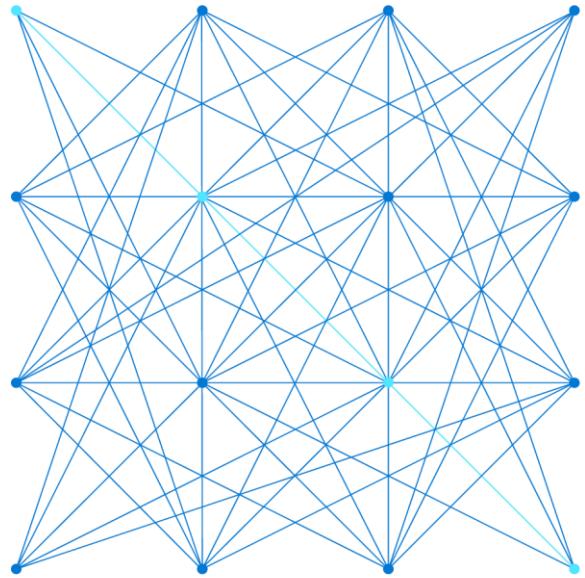


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Module 3: Explore non-relational data in Azure



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Agenda



Explore non-relational data services in Azure



Explore provisioning and deploying non-relational data services in Azure



Manage non-relational data stores in Azure

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Lesson 1: Explore non-relational data services in Azure



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Lesson 1 objectives



Explore use-cases and management benefits of using Azure Table storage



Explore use-cases and management benefits of using Azure Blob storage



Explore use-cases and management benefits of using Azure File storage



Explore use-cases and management benefits of using Azure Cosmos DB

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Explore Azure Table storage

Key (Customer ID)	Value (Customer Data)					
C1	AAAAA	BBB	101 Block Street	YY	999	888
C2	MM	NN	21 A Street	5 B Avenue		
C3	DDD	EEE	FFF	111	222	66 C Road

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Explore Azure Blob storage

Block blobs	Page blobs	Append blobs
<p>Has a maximum size of 4.7TB</p> <p>Best for storing large, discrete, binary objects that changes infrequently</p> <p>Each individual block can store up to 100MB of data</p> <p>A block blob can contain up to 50000 blocks</p>	<p>Can hold up to 8TB of data</p> <p>Is organized as a collection of fixed sized-512 byte pages</p> <p>Used to implement virtual disk storage for virtual machines</p>	<p>The maximum size is just over 195GB</p> <p>Is a block blob that is used to optimize append operations</p> <p>Each individual block can store up to 4MB of data</p>

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Create a storage account



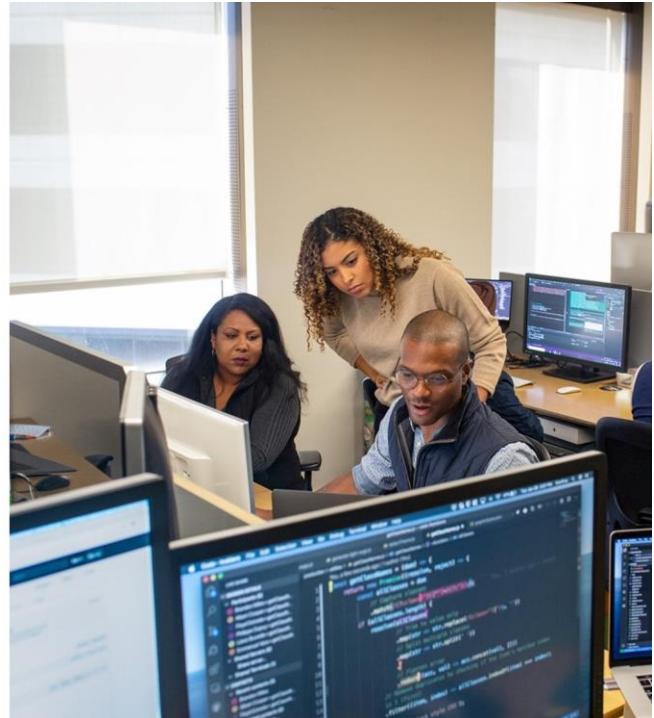
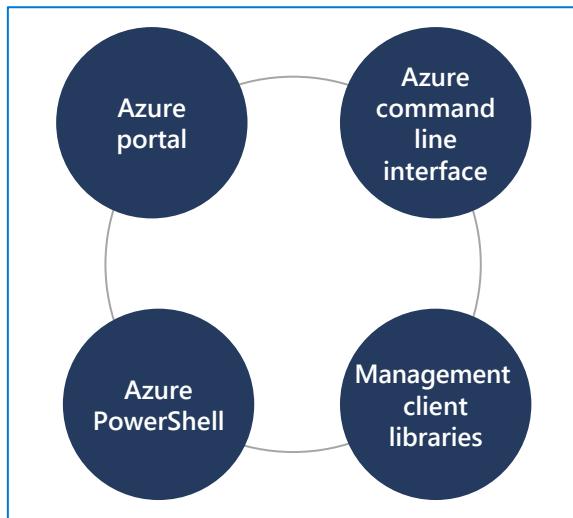
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Storage account settings

The screenshot shows the 'Create storage account' wizard in the Azure portal. The 'Basics' tab is selected. The page includes a brief description of Azure Storage, project details (subscription and resource group), instance details (storage account name, location, performance tier, account kind, replication, and access tier), and deployment model options.

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Storage account creation tool



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Explore Azure Cosmos DB



Scalability



Performance



Availability



Programming model

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Lesson 1: Knowledge check (continued on next slide)



What are the elements of an Azure Table storage key?

- Table name and column name
- Partition key and row key
- Row number



When should you use a block blob, and when should you use a page blob?

- Use a block blob for unstructured data that requires random access to perform reads and writes. Use a page blob for discrete objects that rarely change.
- Use a block blob for active data stored using the Hot data access tier, and a page blob for data stored using the Cool or Archive data access tiers
- Use a page block for blobs that require random read and write access. Use a block blob for discrete objects that change infrequently



Why might you use Azure File storage?

- To share files that are stored on-premises with users located at other sites
- To enable users at different sites to share files
- To store large binary data files containing images or other unstructured data

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Lesson 1: Knowledge check (continued)



You are building a system that monitors the temperature throughout a set of office blocks, and sets the air conditioning in each room in each block to maintain a pleasant ambient temperature. Your system has to manage the air conditioning in several thousand buildings spread across the country/region, and each building typically contains at least 100 air-conditioned rooms. What type of NoSQL data store is most appropriate for capturing the temperature data to enable it to be processed quickly?

- Send the data to an Azure Cosmos DB database and use Azure Functions to process the data
- Store the data in a file stored in a share created using Azure File Storage
- Write the temperatures to a blob in Azure Blob storage

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Lesson 2: Explore provisioning and deploying non-relational data services in Azure



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Lesson 2 objectives



Provision non-relational data services



Configure non-relational data services



Explore basic connectivity issues

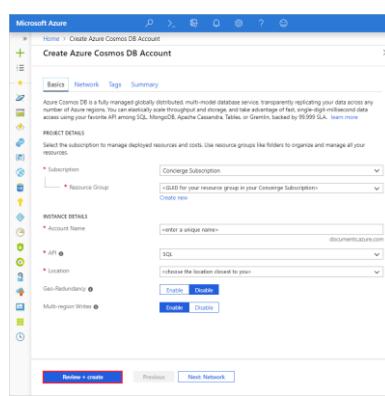


Explore data security components

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Provisioning Cosmos DB



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Provisioning Data Lake storage

Create storage account

Basics Advanced Tags Review + create

PROJECT DETAILS

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription: Visual Studio Enterprise
Resource group: Select existing... Create new

INSTANCE DETAILS

The default deployment model is Resource Manager, which supports the latest Azure features. You may choose to deploy using the classic deployment model instead. [Choose classic deployment model](#)

Storage account name:
Location: East US
Performance: Standard (selected)
Account kind: StorageV2 (general purpose v2)
Replication: Read-access geo-redundant storage (RA-GRS)
Access tier (default): Cool (selected)

SECURITY

Secure transfer required: Enabled

VIRTUAL NETWORKS

Allow access from: All networks Selected network
All networks will be able to access this storage account. [Learn more](#)

DATA LAKE STORAGE GEN2 (PREVIEW)

Hierarchical namespace: Enabled Disabled

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Configure storage accounts

Create storage account

Basics Advanced Tags Review + create

PROJECT DETAILS

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription: Visual Studio Enterprise
Resource group: Select existing... Create new

INSTANCE DETAILS

The default deployment model is Resource Manager, which supports the latest Azure features. You may choose to deploy using the classic deployment model instead. [Choose classic deployment model](#)

Storage account name:
Location: East US
Performance: Standard (selected)
Account kind: StorageV2 (general purpose v2)
Replication: Read-access geo-redundant storage (RA-GRS)
Access tier (default): Cool (selected)

SECURITY

Secure transfer required: Enabled

VIRTUAL NETWORKS

Allow access from: All networks Selected network
All networks will be able to access this storage account. [Learn more](#)

DATA LAKE STORAGE GEN2 (PREVIEW)

Hierarchical namespace: Enabled Disabled

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Lesson 2: Knowledge check



What is provisioning?

- The act of running series of tasks that a service provider performs to create and configure a service
 - Providing other users access to an existing service
 - Tuning a service to improve performance
-



What is a security principal?

- A named collection of permissions that can be granted to a service, such as the ability to use the service to read, write, and delete data. In Azure, examples include [Owner](#) and [Contributor](#).
 - A set of resources managed by a service to which you can grant access
 - An object that represents a user, group, service, or managed identity that is requesting access to Azure resources
-



Which of the following is an advantage of using multi-region replication with Cosmos DB?

- Data will always be consistent in every region
- Availability is increased
- Increased security for your data

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Lesson 3: Manage non-relational data stores in Azure

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Create an Azure Cosmos DB account

The screenshot shows the 'Create Azure Cosmos DB Account' wizard. The top navigation bar includes 'Home > New > Create Azure Cosmos DB Account'. The main page title is 'Create Azure Cosmos DB Account'. Below the title, there are tabs for 'Basics', 'Networking', 'Tags', and 'Review + create'. A note states: 'Azure Cosmos DB is a globally distributed, multi-model, fully managed database service. Try it for free, for 30 days with unlimited renewals. Go to production starting at \$24/month per database, multiple containers included. Learn more.' The 'Project Details' section contains fields for 'Subscription' (set to 'dhtesao') and 'Resource Group' (with options 'Select existing...' or 'Create new'). The 'Instance Details' section includes fields for 'Account Name' (placeholder 'Enter account name'), 'API' (set to 'Core (SQL)'), 'Apache Spark' (with options 'Notebooks', 'Notebooks with Apache Spark', and 'None'), 'Location' (set to '(US) West US'), 'Geo-Redundancy' (radio buttons for 'Enable' or 'Disable'), and 'Multi-region Writes' (radio buttons for 'Enable' or 'Disable'). At the bottom, a small note mentions a discount offer: 'Up to 33% off multi-region writes is available to qualifying new accounts only. Accounts must be created between December 1, 2019 and February 29, 2020. Offer limited to accounts with both account locations and geo-redundancy, and applies only to multi-region writes in those same regions. Both Geo-Redundancy and Multi-region Writes must be enabled in account settings. Actual discount will vary based on number of qualifying regions selected.'

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Creating a Database and a Container in Cosmos DB

Add Container

Start at \$24/mo per database, multiple containers included [More details](#)

* Database id Create new Use existing [Type a new database id](#)

Provision database throughput [\(400 - 100,000 RU/s\)](#)

* Throughput (400 - 100,000 RU/s) Autopilot (preview) Manual [400](#)

Estimated spend (USD): **\$0.032 hourly / \$0.77 daily** (1 region, 400RU/s, \$0.00008/RU)

* Container id [e.g., Container1](#)

* Partition key [e.g., /address/zipCode](#)

My partition key is larger than 100 bytes

Unique keys [\(1\)](#)

+ Add unique key

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What are Request Units

Throughput is important to ensure you can handle the volume of transactions you need

Database throughput	Database throughput is the number of reads and writes that your database can perform in a single second
What is a Request Unit	Azure Cosmos DB measures throughput using something called a request unit (RU). Request unit usage is measured per second, so the unit of measure is request units per second (RU/s). You must reserve the number of RU/s you want Azure Cosmos DB to provision in advance
Exceeding throughput limits	If you don't reserve enough request units, and you attempt to read or write more data than your provisioned throughput allows, your request will be rate-limited

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Item size	Reads/second	Writes/second	Request units
1 KB	500	100	$(500 * 1) + (100 * 5) = 1,000 \text{ RU/s}$
1 KB	500	500	$(500 * 1) + (500 * 5) = 3,000 \text{ RU/s}$
4 KB	500	100	$(500 * 1.3) + (100 * 7) = 1,350 \text{ RU/s}$
4 KB	500	500	$(500 * 1.3) + (500 * 7) = 4,150 \text{ RU/s}$
64 KB	500	100	$(500 * 10) + (100 * 48) = 9,800 \text{ RU/s}$
64 KB	500	500	$(500 * 10) + (500 * 48) = 29,000 \text{ RU/s}$

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Cosmos DB APIs

SQL API	Table API	MongoDB API	Cassandra API	Gremlin API
<ul style="list-style-type: none"> Supports SQL-like query language 	<ul style="list-style-type: none"> Compatible with Azure Table Storage 	<ul style="list-style-type: none"> Compatible with MongoDB 	<ul style="list-style-type: none"> Compatible with Cassandra 	<ul style="list-style-type: none"> A graph database

Query Azure Cosmos DB

<h3>Aggregation Function Basics</h3> <pre>COUNT(<fields_to_count>) SUM(<numeric_fields>) AVG(<numeric_fields>) MAX(<numeric_fields>) MIN(<numeric_fields>)</pre>	<h3>SQL API examples</h3> <pre>SELECT COUNT(*) FROM Products p SELECT SUM(p.quantity) FROM Products p WHERE p.expired = 0 SELECT AVG(p.price) AS 'Average Price' FROM Products p SELECT p1.ID, p.Name, p1.Description, p1.Price FROM Products p1 WHERE p1.Price = (SELECT MIN(p2.Price) FROM Product p2)</pre>
--	--

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Manage Azure Blob storage

The screenshot shows the Azure Storage account overview page. On the left, there's a sidebar with navigation links: Overview, Activity log, Tags, Diagnose and solve problems, Access Control (IAM), Data transfer, Events, Storage Explorer (preview), Settings, Access keys, Geo-replication, CORS, and Configuration. The main area displays the account details under the 'Essentials' section. It includes fields for Resource group (DataFundamentals), Status (Primary Available, Secondary Available), Location (East US 2, Central US), Subscription (CM Azure Subscription), Subscription ID (09c9876d-233f-4906-b0ac-d31970596a44), and Tags (Click here to add tags). To the right, there are four cards: 'Containers' (Scalable, cost-effective storage for unstructured data), 'File shares' (Serverless SMB and NFS file shares), 'Tables' (Tabular data storage), and 'Queues' (Effectively scale apps according to traffic). The 'Containers' card is highlighted with a red box.

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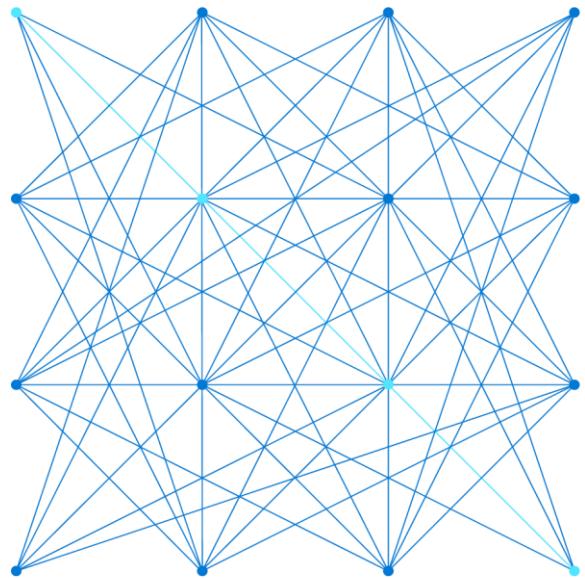


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Module 4: Explore modern data warehouse analytics



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Agenda

-  Examine components of a modern data warehouse
-  Explore data ingestion in Azure
-  Explore data storage and processing in Azure
-  Get started building with Power BI

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Lesson 1: Examine components of a modern data warehouse



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Lesson 1 objectives

-  Explore data warehousing concepts
-  Explore Azure data services for modern data warehousing
-  Explore modern data warehousing architecture and workload
-  Explore Azure data services in the Azure portal

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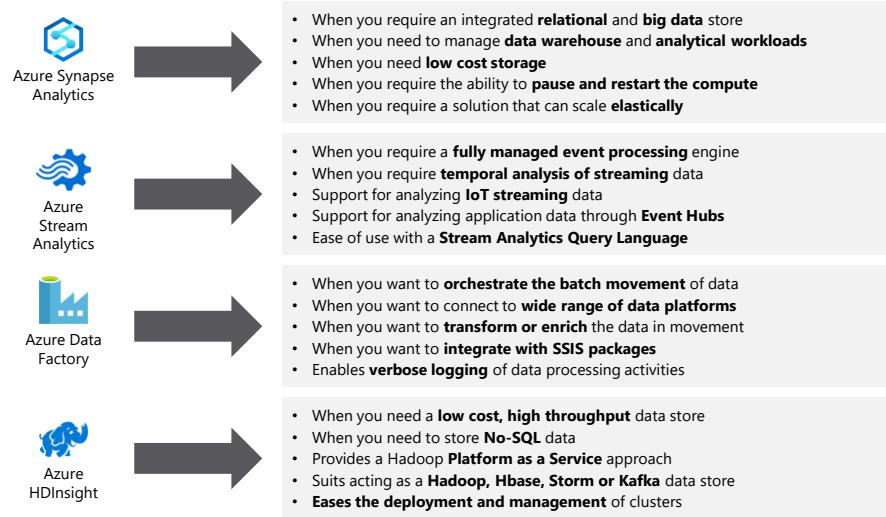
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What to use for Data

- | | |
|---|--|
| 
Storage Account |  <ul style="list-style-type: none"> • When you need a low cost, high throughput data store • When you need to store No-SQL data • When you do not need to query the data directly. No ad hoc query support • Suits the storage of archive or relatively static data • Suits acting as a HDInsight Hadoop data store |
| 
Data Lake Store |  <ul style="list-style-type: none"> • When you need a low cost, high throughput data store • Unlimited storage for No-SQL data • When you do not need to query the data directly. No ad hoc query support • Suits the storage of archive or relatively static data • Suits acting as a Databricks, HDInsight and IoT data store |
| 
Azure Databricks |  <ul style="list-style-type: none"> • Eases the deployment of a Spark based cluster • Enables the fastest processing of Machine Learning solutions • Enables collaboration between data engineers and data scientists • Provides tight enterprise security integration with Azure Active Directory • Integration with other Azure Services and Power BI |
| 
Azure CosmosDB |  <ul style="list-style-type: none"> • Provides global distribution for both structured and unstructured data stores • Millisecond query response time • 99.999% availability of data • Worldwide elastic scale of both the storage and throughput • Multiple consistency levels to control data integrity with concurrency |
| 
Azure SQL Database |  <ul style="list-style-type: none"> • When you require a relational data store • When you need to manage transactional workloads • When you need to manage a high volume on inserts and reads • When you need a service that requires high concurrency • When you require a solution that can scale elastically |

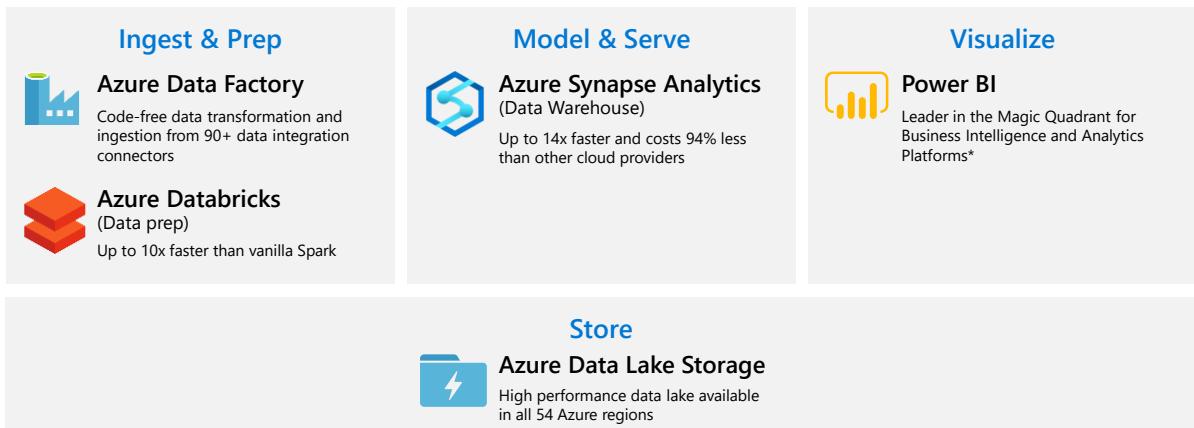
124

What to use for Data



125

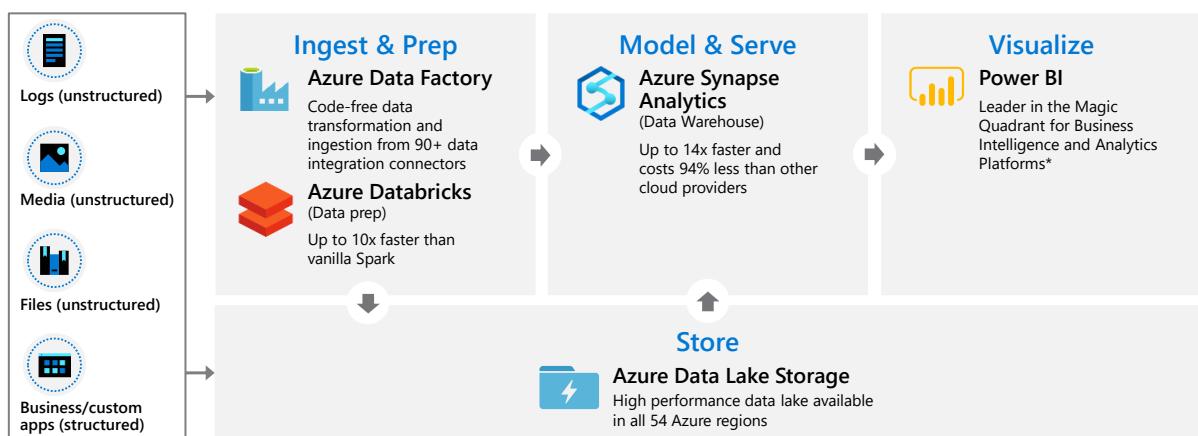
What is modern data warehousing?



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Combine batch and stream processing



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Explore Azure data services for modern data warehousing

What is Azure Data Factory



A cloud-based data integration service that allows you to orchestrate and automate data movement and data transformation

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What is Azure Data Lake storage?

A repository of data for your Modern Data Warehouse

Organises data into directories for improved file access

Supports POSIX and RBAC permissions

It is compatible with Hadoop Distributed File System

Store



Azure Data Lake Storage
High performance data lake available in all 54 Azure regions

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129

What is Azure Databricks?



Apache Spark-based platform:

Simplifies the provisioning and collaboration of Apache Spark-based analytical solutions



Enterprise Security:

Utilizes the security capabilities of Azure



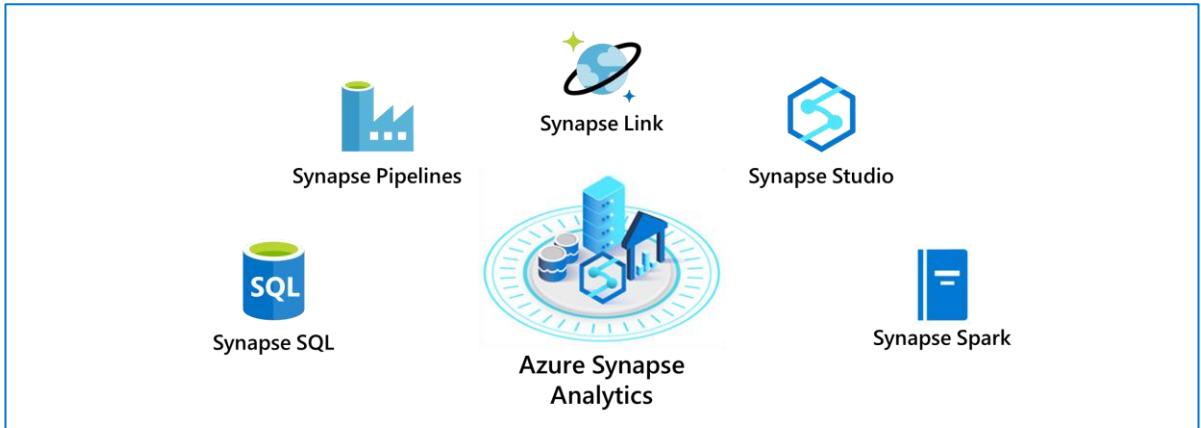
Integration with Azure services:

Can integrate with a variety of Azure data platform services and Power BI

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130

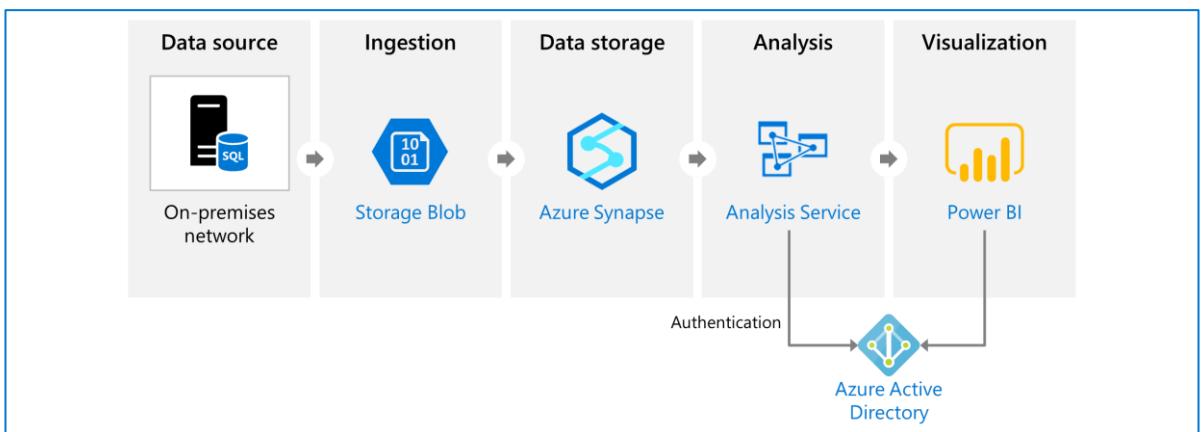
What is Azure Synapse Analytics?



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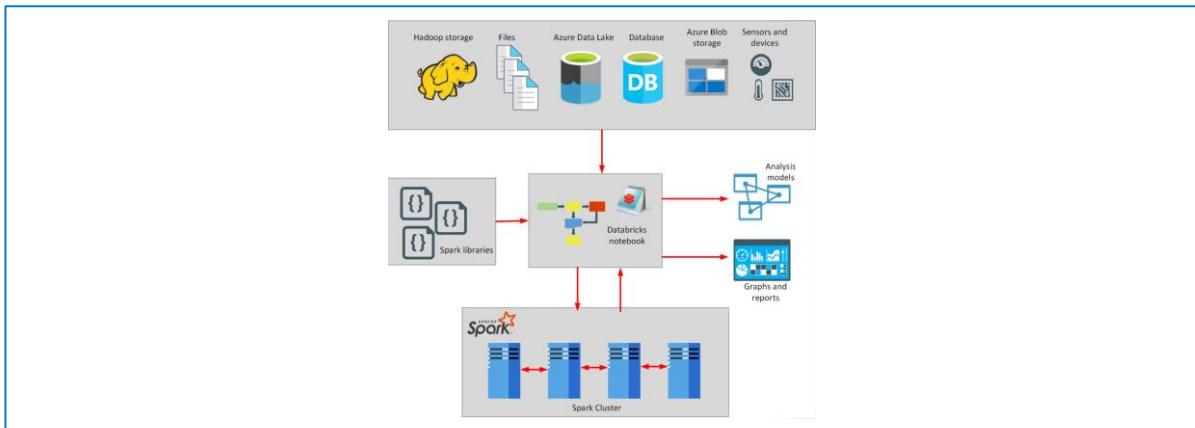
What is Azure Analysis Services?



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What is Azure HDInsight?



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Lesson 1: Knowledge check



When should you use Azure Synapse Analytics?

- To perform very complex queries and aggregations
- To create dashboards from tabular data
- To enable large number of users to query analytics data



What is the purpose of data ingestion?

- To perform complex data transformations over data received from external sources
- To capture data flowing into a data warehouse system as quickly as possible
- To visualize the results of data analysis



What is the primary difference between a data lake and a data warehouse?

- A data lake contains **structured information**, but a data warehouse holds **raw business data**
- A data lake holds **raw data**, but a data warehouse holds **structured information**
- Data stored in a data lake is dynamic, but information stored in a data warehouse is static

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Lesson 2: Explore data ingestion in Azure



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Lesson 2 objectives



Describe data ingestion in Azure



Describe components of Azure Data Factory

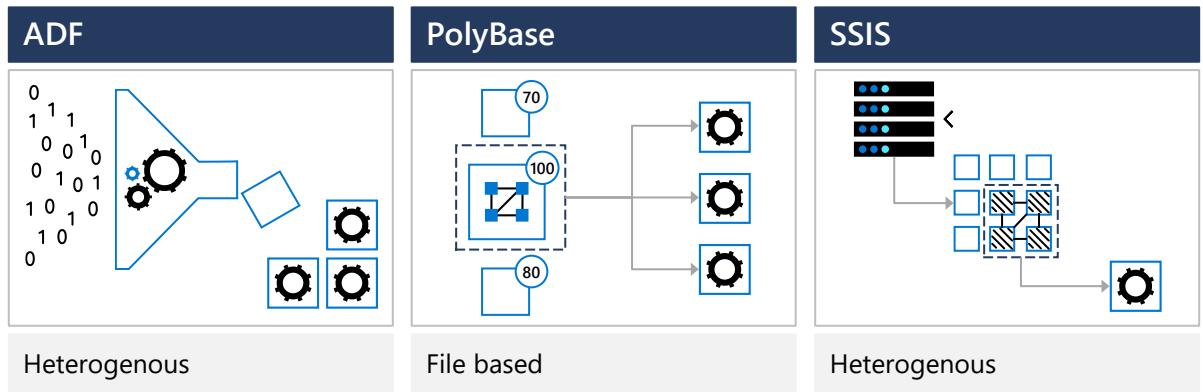


See how to use Azure Data Factory to load data into a data warehouse

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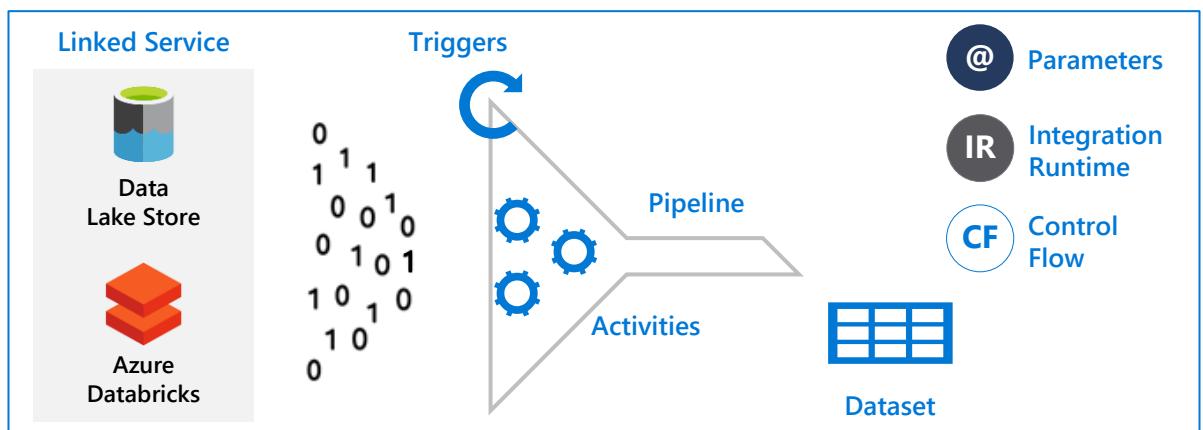
Describe data ingestion in Azure



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Describe components of Azure Data Factory



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Lesson 2: Knowledge check



Which component of an Azure Data Factory can be triggered to run data ingestion tasks?

- CSV File
- Pipeline
- Linked service



When might you use PolyBase?

- To query data from external data sources from Azure SQL Database
- To ingest streaming data using Azure Databricks
- To orchestrate activities in Azure Data Factory



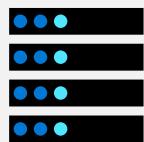
Which of these services can be used to ingest data into Azure Synapse Analytics?

- Azure Data Factory
- Power BI
- Azure Active Directory

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Lesson 3: Explore data storage and processing in Azure



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Lesson 3 objectives



Describe data processing options for performing analytics in Azure



Explore Azure Synapse Analytics

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Data processing options for performing analytics in Azure



Azure Synapse Analytics



Azure Databricks



Azure HDInsight



Azure Data Factory

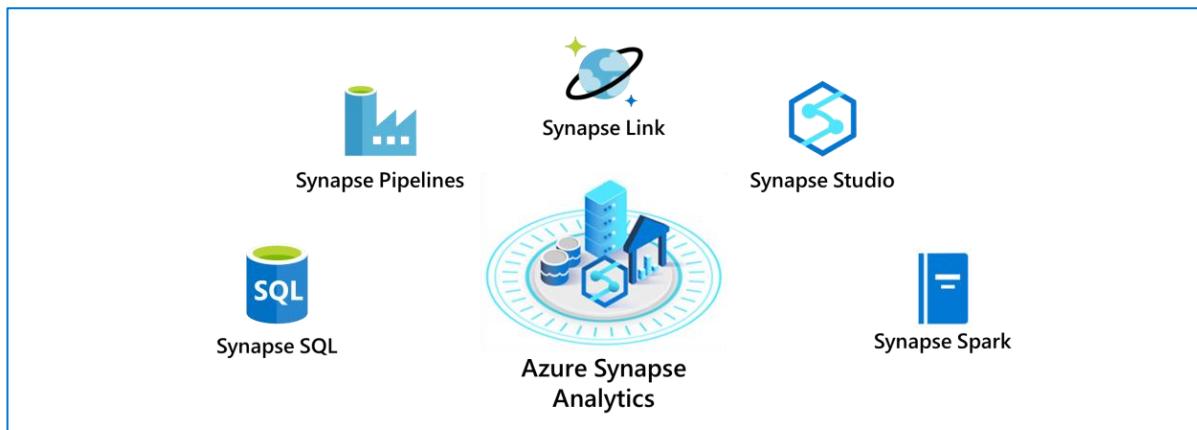


Data Lake Store

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Explore Azure Synapse Analytics



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Lesson 3: Knowledge check



You have a large amount of data held in files in Azure Data Lake storage. You want to retrieve the data in these files and use it to populate tables held in Azure Synapse Analytics. Which processing option is most appropriate?

- Use Azure Synapse Link to connect to Azure Data Lake storage and download the data
- Synapse SQL pool
- Synapse Spark pool



Which of the components of Azure Synapse Analytics allows you to train AI models using AzureML?

- Synapse Studio
- Synapse Pipelines
- Synapse Spark



In Azure Databricks how do you change the language a cell uses?

- The first line in the cell is %language. For example, %scala
- Change the notebook language before writing the commands
- Wrap the command in the cell with ##language##

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Lesson 4: Get started building with Power BI



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Lesson 4 objectives



Learn how Power BI services and applications work together



Explore how Power BI can make your business more efficient

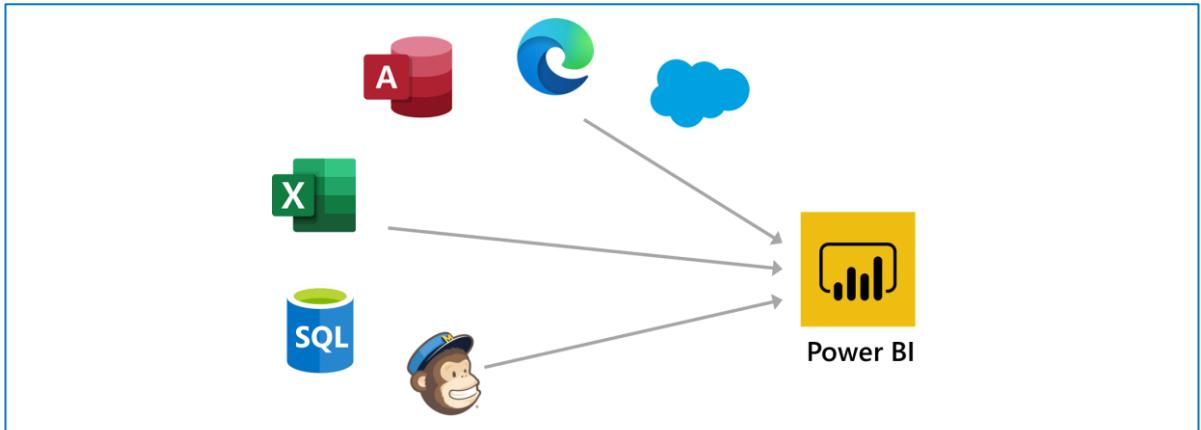


Learn how to create compelling visuals and reports

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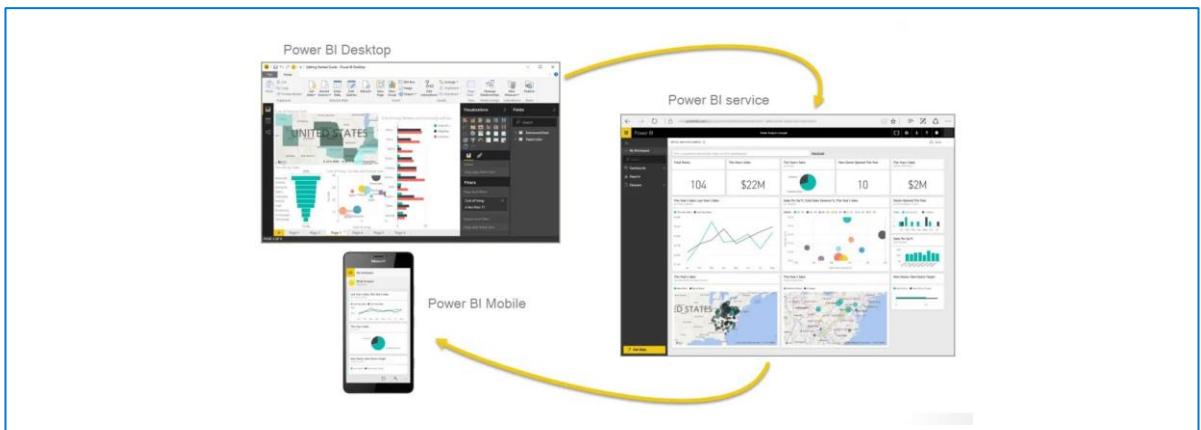
Learn how Power BI services and applications work together



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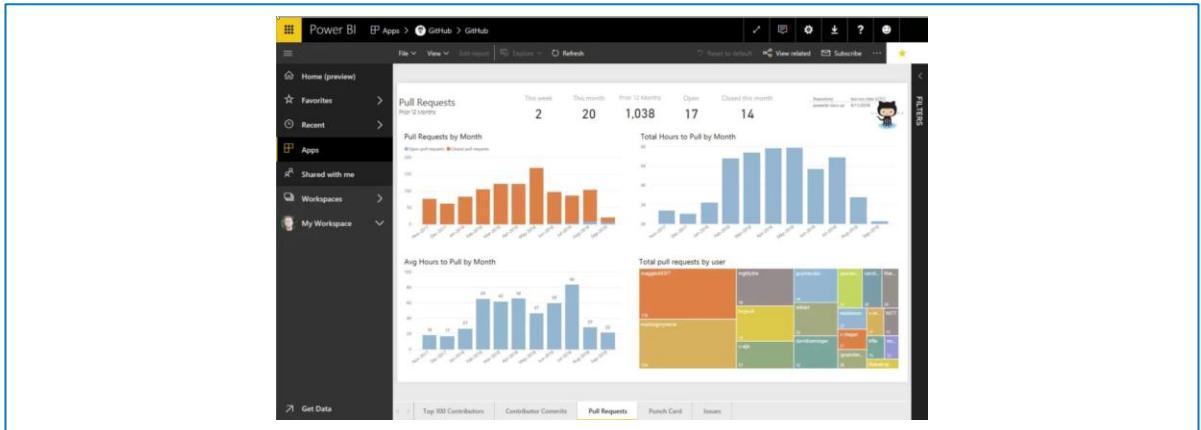
Explore how Power BI can make your business more efficient



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Learn how to create compelling visuals and reports



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Lesson 4: Knowledge check



What is the common flow of activity in Power BI?

- Create a report in Power BI mobile, share it to the Power BI Desktop, view and interact in the Power BI service
- Create a report in the Power BI service, share it to Power BI mobile, interact with it in Power BI Desktop
- Bring data into Power BI Desktop and create a report, share it to the Power BI service, view and interact with reports and dashboards in the service and Power BI mobile
- Bring data into Power BI mobile, create a report, then share it to Power BI Desktop



Which of the following are building blocks of Power BI?

- Tiles, dashboards, databases, mobile devices
- Visualizations, datasets, reports, dashboards, tiles
- Visual Studio, C#, and JSON files



A collection of ready-made visuals, pre-arranged in dashboards and reports is called what in Power BI?

- The canvas
- Scheduled refresh
- An app

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151

Question

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

Answer Area

Descriptive analytics tells you

▼
what is most likely to occur in the future.
what occurred in the past.
which actions you can perform to affect outcomes.
why something occurred in the past.

152

Answer

Descriptive analytics tells you

what is most likely to occur in the future.
what occurred in the past.
which actions you can perform to affect outcomes.
why something occurred in the past.

153

Question

Answer Area

Statements

Yes

No

Normalization involves eliminating relationships between database tables.

Normalizing a database reduces data redundancy.

Normalization improves data integrity.

154

Answer

Statements	Yes	No
Normalization involves eliminating relationships between database tables.	<input type="radio"/>	<input checked="" type="radio"/>
Normalizing a database reduces data redundancy.	<input checked="" type="radio"/>	<input type="radio"/>
Normalization improves data integrity.	<input type="radio"/>	<input checked="" type="radio"/>

155

Question

An extract, transform, and load (ETL) process requires

- a matching schema in the data source and the data target.
- a target data store powerful enough to transform data.
- data that is fully processed before being loaded to the target data store.
- that the data target be a relational database.

156

Answer

An extract, transform, and load (ETL) process requires

- a matching schema in the data source and the data target.
- a target data store powerful enough to transform data.
- data that is fully processed before being loaded to the target data store.
- that the data target be a relational database.

157

Question

Answer Area

In batch processing,

- data is always inserted one row at a time.
- data is processed in real-time.
- latency is expected.
- processing can only execute serially.

158

Answer

In batch processing,

▼
data is always inserted one row at a time.
data is processed in real-time.
latency is expected.
processing can only execute serially.

159

Question

Answer Area

Transcribing audio files is an example of

▼
cognitive
descriptive
predictive
prescriptive

analytics.

160

Answer

Transcribing audio files is an example of  analytics.

cognitive
descriptive
predictive
prescriptive

161

```

"customer" : {
    "first name" : "Ben",
    "last name" : "Smith",
    "address" : {
        "line 1" : "161 Azure Ln",
        "line 2" : "Palo Alto",
        "ZIP code" : "54762"
    },
    "social media": [
        {
            "service" : "twitter",
            "handle" : "@bensmith"
        },
        {
            "service" : "linkedin",
            "handle" : "bensmith"
        }
    ],
    "phone numbers": [
        {
            "type" : "mobile",
            "number" : "555-555-555"
        }
    ]
}

```

Answer Area

Customer is [answer choice].

a nested array
a nested object
a root object

Address is [answer choice].

a nested array
a nested object
a root object

Social media is [answer choice].

a nested array
a nested object
a root object

162

Answer

Answer Area

Customer is [answer choice].

a nested array
a nested object
a root object

Address is [answer choice].

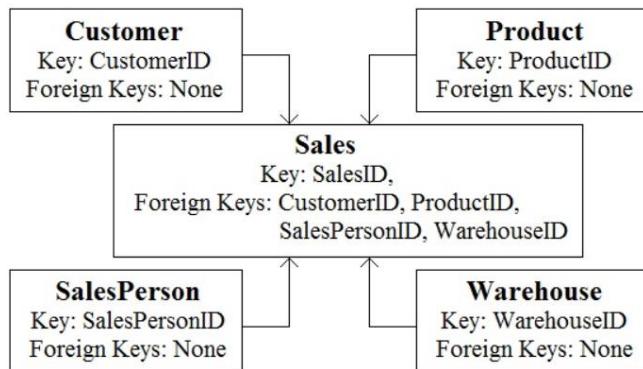
a nested array
a nested object
a root object

Social media is [answer choice].

a nested array
a nested object
a root object

163

Question



The data model is a [answer choice].

transactional model
star schema
snowflake schema

fact
dimension
bridge

Customer is a [answer choice] table.

164

Answer

The data model is a [answer choice].

transactional model
star schema
snowflake schema

Customer is a [answer choice] table.

fact
dimension
bridge

165

Question

A relational database is appropriate for scenarios that involve a high volume of

changes to relationships between entities
geographically distributed writes
transactional writes
writes that have varying data structures

166

Answer

A relational database is appropriate for scenarios that involve a high volume of

changes to relationships between entities
geographically distributed writes
transactional writes
writes that have varying data structures

167

Question

Locations

- An in-memory data integration tool
- The CRM system
- The data warehouse

Answer Area

- | | |
|------------|----------|
| Extract: | Location |
| Load: | Location |
| Transform: | Location |

168

Answer

Answer Area

Extract:	The CRM system
Load:	The data warehouse
Transform:	An in-memory data integration tool

169

Question

A visualization that shows a university's current student enrollment versus the maximum capacity is an example of

	analytics.
cognitive	
descriptive	
predictive	
prescriptive	

170

Answer

A visualization that shows a university's current student enrollment versus the maximum capacity is an example of

	▼
cognitive	
descriptive	
predictive	
prescriptive	

analytics.

171

Question

You need to create an Azure Storage account.

Data in the account must replicate outside the Azure region automatically.

Which two types of replication can you use for the storage account? Each correct answer presents a complete solution.

NOTE: Each correct selection is worth one point.

- A. zone-redundant storage (ZRS)
- B. read-access geo-redundant storage (RA-GRS)
- C. locally-redundant storage (LRS)
- D. geo-redundant storage (GRS)

172

Answer

You need to create an Azure Storage account.

Data in the account must replicate outside the Azure region automatically.

Which two types of replication can you use for the storage account? Each correct answer presents a complete solution.

NOTE: Each correct selection is worth one point.

- A. zone-redundant storage (ZRS)
- B. read-access geo-redundant storage (RA-GRS)**
- C. locally-redundant storage (LRS)**
- D. geo-redundant storage (GRS)**

173

Question

Which statement is an example of Data Manipulation Language (DML)?

- A. REVOKE**
- B. DISABLE**
- C. INSERT**
- D. GRANT**

174

Answer

Which statement is an example of Data Manipulation Language (DML)?

- A. REVOKE
- B. DISABLE
- C. INSERT
- D. GRANT

175

Question

Statements	Yes	No
Azure SQL Database includes a fully managed backup service.	<input type="radio"/>	<input type="radio"/>
Azure SQL Database has built-in high availability.	<input type="radio"/>	<input type="radio"/>
Azure SQL Database can use Azure Advanced Threat Protection (ATP).	<input type="radio"/>	<input type="radio"/>

176

Answer

Statements	Yes	No
Azure SQL Database includes a fully managed backup service.	<input checked="" type="radio"/>	<input type="radio"/>
Azure SQL Database has built-in high availability.	<input checked="" type="radio"/>	<input type="radio"/>
Azure SQL Database can use Azure Advanced Threat Protection (ATP).	<input checked="" type="radio"/>	<input type="radio"/>

177

Question

Statements	Yes	No
You can use Azure Data Studio to query a Microsoft SQL Server big data cluster.	<input type="radio"/>	<input checked="" type="radio"/>
You can use Microsoft SQL Server Management Studio (SSMS) to query an Azure Synapse Analytics data warehouse.	<input checked="" type="radio"/>	<input type="radio"/>
You can use MySQL Workbench to query Azure Database for MariaDB databases.	<input type="radio"/>	<input checked="" type="radio"/>

178

Answer

Statements	Yes	No
You can use Azure Data Studio to query a Microsoft SQL Server big data cluster.	<input checked="" type="radio"/>	<input type="radio"/>
You can use Microsoft SQL Server Management Studio (SSMS) to query an Azure Synapse Analytics data warehouse.	<input checked="" type="radio"/>	<input type="radio"/>
You can use MySQL Workbench to query Azure Database for MariaDB databases.	<input checked="" type="radio"/>	<input type="radio"/>

179

Question

Statements	Yes	No
Platform as a service (PaaS) database offerings in Azure provide built-in high availability.	<input type="radio"/>	<input checked="" type="radio"/>
Platform as a service (PaaS) database offerings in Azure provide configurable scaling options.	<input type="radio"/>	<input checked="" type="radio"/>
Platform as a service (PaaS) database offerings in Azure reduce the administrative overhead for managing hardware.	<input checked="" type="radio"/>	<input type="radio"/>

180

Answer

Statements	Yes	No
Platform as a service (PaaS) database offerings in Azure provide built-in high availability.	<input checked="" type="radio"/>	<input type="radio"/>
Platform as a service (PaaS) database offerings in Azure provide configurable scaling options.	<input checked="" type="radio"/>	<input type="radio"/>
Platform as a service (PaaS) database offerings in Azure reduce the administrative overhead for managing hardware.	<input checked="" type="radio"/>	<input type="radio"/>

181

Question

You have the following SQL query.

```
INSERT INTO dbo.Products (ProductID, ProductName, Price, ProductDescription)
VALUES (1, 'Clamp', 12.48, 'Workbench clamp') ;
```

What are dbo.Products and ProductName? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:

Answer Area

Dbo . Products :	<input type="checkbox"/> A column <input type="checkbox"/> A database <input checked="" type="checkbox"/> A table <input type="checkbox"/> An index
ProductName :	<input type="checkbox"/> A column <input type="checkbox"/> A database <input checked="" type="checkbox"/> A table <input type="checkbox"/> An index

182

Answer

Answer Area

Dbo.Products:	<table border="1"> <tr><td>A column</td></tr> <tr><td>A database</td></tr> <tr style="background-color: #90EE90;"><td>A table</td></tr> <tr><td>An index</td></tr> </table>	A column	A database	A table	An index
A column					
A database					
A table					
An index					
ProductName:	<table border="1"> <tr><td>A column</td></tr> <tr><td>A database</td></tr> <tr><td>A table</td></tr> <tr><td>An index</td></tr> </table>	A column	A database	A table	An index
A column					
A database					
A table					
An index					

183

Question

Statements	Yes	No
You must apply patches to Azure SQL databases regularly.	<input type="radio"/>	<input checked="" type="radio"/>
You need a Microsoft 365 subscription to create an Azure SQL database.	<input checked="" type="radio"/>	<input type="radio"/>
You can use existing Microsoft SQL Server licenses to reduce the cost of Azure SQL databases.	<input type="radio"/>	<input checked="" type="radio"/>

184

Answer

Statements	Yes	No
You must apply patches to Azure SQL databases regularly.	<input type="radio"/>	<input checked="" type="radio"/>
You need a Microsoft 365 subscription to create an Azure SQL database.	<input type="radio"/>	<input checked="" type="radio"/>
You can use existing Microsoft SQL Server licenses to reduce the cost of Azure SQL databases.	<input checked="" type="radio"/>	<input type="radio"/>

185

Question

Which statement is an example of Data Definition Language (DDL)?

- A. SELECT
- B. JOIN
- C. MERGE
- D. CREATE

186

Answer

Which statement is an example of Data Definition Language (DDL)?

- A. SELECT
- B. JOIN
- C. MERGE
- D. CREATE

187

Question

You need to ensure that users use multi-factor authentication (MFA) when connecting to an Azure SQL database.
Which type of authentication should you use?

- A. service principal authentication
- B. Azure Active Directory (Azure AD) authentication
- C. SQL authentication
- D. certificate authentication

188

Answer

You need to ensure that users use multi-factor authentication (MFA) when connecting to an Azure SQL database.
Which type of authentication should you use?

- A. service principal authentication
- B. Azure Active Directory (Azure AD) authentication**
- C. SQL authentication
- D. certificate authentication

189

Question

By default, each Azure SQL database is protected by

a network security group (NSG).
a server-level firewall.
Azure Firewall.
Azure Front Door.

190

Answer

By default, each Azure SQL database is protected by

a network security group (NSG).
a server-level firewall.
Azure Firewall.
Azure Front Door.

191

Question

You need to design and model a database by using a graphical tool that supports project-oriented offline database development. What should you use?

- A. Microsoft SQL Server Data Tools (SSDT)
- B. Microsoft SQL Server Management Studio (SSMS)
- C. Azure Databricks
- D. Azure Data Studio

192

Answer

You need to design and model a database by using a graphical tool that supports project-oriented offline database development.
What should you use?

- A. Microsoft SQL Server Data Tools (SSDT)**
- B. Microsoft SQL Server Management Studio (SSMS)
- C. Azure Databricks
- D. Azure Data Studio

193

Question

Components

Authentication
Firewall
Encryption

Answer Area

- Prevent access to an Azure SQL database from another network.
- Support Azure Active Directory (Azure AD) sign-ins to an Azure SQL database.
- Ensure that sensitive data never appears as plain text in an Azure SQL database.

194

Answer

Components

Authentication
Firewall
Encryption

Answer Area

Firewall	Prevent access to an Azure SQL database from another network.
Authentication	Support Azure Active Directory (Azure AD) sign-ins to an Azure SQL database.
Encryption	Ensure that sensitive data never appears as plain text in an Azure SQL database.

195

Question

A relational database must be used when

a dynamic schema is required.
data will be stored as key/value pairs.
storing large images and videos.
strong consistency guarantees are required.

196

Answer

A relational database must be used when

a dynamic schema is required.
data will be stored as key/value pairs.
storing large images and videos.
strong consistency guarantees are required.

197

Question

Relational data uses ▼ to enforce relationships between different tables.

collections
columns
keys
partitions

198

Answer

Relational data uses ▼ to enforce relationships between different tables.

collections
columns
keys
partitions

199

Question

▼ is a virtual table that contains content defined by a query.

A heap
A stored procedure
A view
An index

200

Answer

▼	
A heap	
A stored procedure	
A view	
An index	

is a virtual table that contains content defined by a query.

201

Question

You have an inventory management database that contains the following table.

ProductName	Quantity
Product1	100
Product2	129
Product3	176

Which statement should you use in a SQL query to change the inventory quantity of Product1 to 270?

- A.** INSERT
- B.** MERGE
- C.** UPDATE
- D.** CREATE

202

Answer

You have an inventory management database that contains the following table.

ProductName	Quantity
Product1	100
Product2	129
Product3	176

Which statement should you use in a SQL query to change the inventory quantity of Product1 to 270?

- A. INSERT
- B. MERGE
- C. UPDATE
- D. CREATE

203

Question

Your company needs to implement a relational database in Azure. The solution must minimize ongoing maintenance. Which Azure service should you use?

- A. Azure HDInsight
- B. Azure SQL Database
- C. Azure Cosmos DB
- D. SQL Server on Azure virtual machines

204

Answer

Your company needs to implement a relational database in Azure. The solution must minimize ongoing maintenance. Which Azure service should you use?

- A. Azure HDInsight
- B. Azure SQL Database**
- C. Azure Cosmos DB
- D. SQL Server on Azure virtual machines

205

Question

Terms	Answer Area
Index	A database object that holds data
View	A database object whose content is defined by a query
Table	A database object that helps improve the speed of data retrieval

206

Answer

Terms	Answer Area
Index	Table
View	View
Table	Index

207

Question

You have an e-commerce application that reads and writes data to an Azure SQL database. Which type of processing does the application use?

- A.** stream processing
- B.** batch processing
- C.** Online Analytical Processing (OLAP)
- D.** Online Transaction Processing (OLTP)

208

Answer

You have an e-commerce application that reads and writes data to an Azure SQL database.
Which type of processing does the application use?

- A.** stream processing
- B.** batch processing
- C.** Online Analytical Processing (OLAP)
- D.** Online Transaction Processing (OLTP)

209

Question

Tools	Answer Area
Azure Data Studio	Tool A graphical tool for managing SQL Server or Azure SQL databases that supports access, configuration, management, and administration tasks.
Microsoft SQL Server Data Tools (SSDT)	Tool A lightweight source code editor with an mssql extension that supports connections to SQL Server and a rich editing experience for T-SQL.
Microsoft SQL Server Management Studio (SSMS)	Tool A lightweight editor that can run on-demand SQL queries and view and save results as text, JSON, or Microsoft Excel files.
Microsoft Visual Studio Code	Tool A development tool for building Azure SQL databases, Microsoft SQL Server relational databases, SQL Server Analysis Services (SSAS) data models, SQL Server Integration Services (SSIS) packages, and SQL Server Reporting Services (SSRS) reports.

210

Answer

Tools	Answer Area
Azure Data Studio	Microsoft SQL Server Management Studio (SSMS) A graphical tool for managing SQL Server or Azure SQL databases that supports access, configuration, management, and administration tasks.
Microsoft SQL Server Data Tools (SSDT)	Microsoft Visual Studio Code A lightweight source code editor with an mssql extension that supports connections to SQL Server and a rich editing experience for T-SQL.
Microsoft SQL Server Management Studio (SSMS)	Azure Data Studio A lightweight editor that can run on-demand SQL queries and view and save results as text, JSON, or Microsoft Excel files.
Microsoft Visual Studio Code	Microsoft SQL Server Data Tools (SSDT) A development tool for building Azure SQL databases, Microsoft SQL Server relational databases, SQL Server Analysis Services (SSAS) data models, SQL Server Integration Services (SSIS) packages, and SQL Server Reporting Services (SSRS) reports.

211

Question

Statements	Yes	No
Relational database tables contain columns and rows	<input type="radio"/>	<input type="radio"/>
Indexes in a relational database describe the data types in a table	<input type="radio"/>	<input type="radio"/>
A database view is a virtual table whose content is defined by a query	<input type="radio"/>	<input type="radio"/>

212

Answer

Statements	Yes	No
Relational database tables contain columns and rows	<input checked="" type="radio"/>	<input type="radio"/>
Indexes in a relational database describe the data types in a table	<input type="radio"/>	<input checked="" type="radio"/>
A database view is a virtual table whose content is defined by a query	<input checked="" type="radio"/>	<input type="radio"/>

213

Question

Statements	Yes	No
When ingesting data from Azure Data Lake Storage across Azure regions, you will incur costs for bandwidth.	<input type="radio"/>	<input checked="" type="radio"/>
You can use blob, table, and file storage in the same Azure Storage account.	<input checked="" type="radio"/>	<input type="radio"/>
You implement Azure Data Lake Storage by creating an Azure Storage account.	<input type="radio"/>	<input checked="" type="radio"/>

214

Answer

Statements	Yes	No
When ingesting data from Azure Data Lake Storage across Azure regions, you will incur costs for bandwidth.	<input checked="" type="radio"/>	<input type="radio"/>
You can use blob, table, and file storage in the same Azure Storage account.	<input checked="" type="radio"/>	<input type="radio"/>
You implement Azure Data Lake Storage by creating an Azure Storage account.	<input checked="" type="radio"/>	<input type="radio"/>

215

Question

When using the Azure Cosmos DB Gremlin API, the container resource type is projected as a

▼
graph.
table.
partition key.
document.

216

Answer

When using the Azure Cosmos DB Gremlin API, the container resource type is projected as a

graph.	▼
table.	
partition key.	
document.	

217

Question

At which two levels can you set the throughput for an Azure Cosmos DB account? Each correct answer presents a complete solution. (Choose two.)
NOTE: Each correct selection is worth one point.

- A. database
- B. item
- C. container
- D. partition

218

Answer

At which two levels can you set the throughput for an Azure Cosmos DB account? Each correct answer presents a complete solution. (Choose two.)
NOTE: Each correct selection is worth one point.

- A. database
- B. item
- C. container
- D. partition

219

Question

Statements	Yes	No
Azure Table storage supports multiple read replicas.	<input type="radio"/>	<input type="radio"/>
Azure Table storage supports multiple write regions.	<input type="radio"/>	<input type="radio"/>
The Azure Cosmos DB Table API supports multiple read replicas.	<input type="radio"/>	<input type="radio"/>
The Azure Cosmos DB Table API supports multiple write regions.	<input type="radio"/>	<input type="radio"/>

220

Answer

Statements	Yes	No
Azure Table storage supports multiple read replicas.	<input checked="" type="radio"/>	<input type="radio"/>
Azure Table storage supports multiple write regions.	<input type="radio"/>	<input checked="" type="radio"/>
The Azure Cosmos DB Table API supports multiple read replicas.	<input checked="" type="radio"/>	<input type="radio"/>
The Azure Cosmos DB Table API supports multiple write regions.	<input checked="" type="radio"/>	<input type="radio"/>

221

Question

Data Store Types	Answer Area
Graph	<input type="text"/> Application users and their default language
Object	<input type="text"/> Medical images and their associated metadata
Key/value	<input type="text"/> Employee data that shows the relationships between employees

222

Answer

Data Store Types	Answer Area
Graph	Key/value
Object	Object
Key/value	Graph

223

Question

You have an Azure Cosmos DB account that uses the Core (SQL) API.

Which two settings can you configure at the container level? Each correct answer presents a complete solution. (Choose two.)

NOTE: Each correct selection is worth one point.

- A. the throughput
- B. the read region
- C. the partition key
- D. the API

224

Answer

You have an Azure Cosmos DB account that uses the Core (SQL) API.

Which two settings can you configure at the container level? Each correct answer presents a complete solution. (Choose two.)

NOTE: Each correct selection is worth one point.

- A. the throughput
- B. the read region
- C. the partition key
- D. the API

225

Your company is designing a data store that will contain student data. The data has the following format.

Question

StudentNumber	StudentInformation
7634634	First name: Ben Last: Smith Preferred Name: Benjamin
7634634	First Name: Dominik Last Name: Paiha Email Address: dpaiha@contoso.com MCP ID: 931817
7634636	First Name: Reshma Last Name: Patel Phone number: 514-555-1101
7634637	First Name: Yun-Feng Last Name: Peng

Which type of data store should you use?

- A. graph
- B. key/value
- C. object
- D. columnar

226

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- B. key/value
- C. object
- D. columnar

227

Question

Which type of non-relational data store supports a flexible schema, stores data as JSON files, and stores all the data for an entity in the same document?

- A. document
- B. columnar
- C. graph
- D. time series

228

Answer

Which type of non-relational data store supports a flexible schema, stores data as JSON files, and stores all the data for an entity in the same document?

- A. document
- B. columnar
- C. graph
- D. time series

229

Question

APIs

- Cassandra API
- Gremlin API
- MongoDB API
- Table API

Answer Area

- Graph data
- JSON documents
- Key/value data

230

Answer

APIs	Answer Area
Cassandra API	
Gremlin API	Graph data
MongoDB API	JSON documents
Table API	Key/value data

231

Question

To configure an Azure Storage account to support both security at the folder level and atomic directory manipulation,

- enable the hierarchical namespace.
- set Account kind to BlobStorage.
- set Performance to Premium.
- set Replication to Read-access geo-redundant storage (RA-GRS).

232

Answer

To configure an Azure Storage account to support both security at the folder level and atomic directory manipulation,

- enable the hierarchical namespace.
- set Account kind to BlobStorage.
- set Performance to Premium.
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233

Question

You can query a graph database in Azure Cosmos DB

- as a JSON document by using a SQL-like language.
- as a partitioned row store by using Cassandra Query Language (CQL).
- as a partitioned row store by using Language-Integrated Query (LINQ).
- as nodes and edges by using the Gremlin language.

234

Answer

You can query a graph database in Azure Cosmos DB

as a JSON document by using a SQL-like language.
as a partitioned row store by using Cassandra Query Language (CQL).
as a partitioned row store by using Language-Integrated Query (LINQ).
as nodes and edges by using the Gremlin language.

235

Question

You manage an application that stores data in a shared folder on a Windows server.

You need to move the shared folder to Azure Storage.

Which type of Azure Storage should you use?

- A.** queue
- B.** blob
- C.** file
- D.** table

236

Answer

You manage an application that stores data in a shared folder on a Windows server.

You need to move the shared folder to Azure Storage.

Which type of Azure Storage should you use?

- A. queue
- B. blob
- C. file
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237

Question

You have an application that runs on Windows and requires access to a mapped drive.

Which Azure service should you use?

- A. Azure Files
- B. Azure Blob storage
- C. Azure Cosmos DB
- D. Azure Table storage

238

Answer

You have an application that runs on Windows and requires access to a mapped drive.
Which Azure service should you use?

- A. Azure Files**
- B. Azure Blob storage
- C. Azure Cosmos DB
- D. Azure Table storage

239

Question

You need to recommend a non-relational data store that is optimized for storing and retrieving text files, videos, audio streams, and virtual disk images. The data store must store data, some metadata, and a unique ID for each file.

Which type of data store should you recommend?

- A. key/value
- B. columnar
- C. object
- D. document

240

Answer

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Which type of data store should you recommend?

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- B. columnar
- C. object**
- D. document

241

Question

Statements	Yes	No
Azure Databricks is an Apache Spark-based collaborative analytics platform.	<input type="radio"/>	<input type="radio"/>
Azure Analysis Services is used for transactional workloads.	<input type="radio"/>	<input type="radio"/>
Azure Data Factory orchestrates data integration workflows.	<input type="radio"/>	<input type="radio"/>

242

Answer

Statements	Yes	No
Azure Databricks is an Apache Spark-based collaborative analytics platform.	<input checked="" type="radio"/>	<input type="radio"/>
Azure Analysis Services is used for transactional workloads.	<input type="radio"/>	<input checked="" type="radio"/>
Azure Data Factory orchestrates data integration workflows.	<input checked="" type="radio"/>	<input type="radio"/>

243

Question

Batch workloads	<input type="checkbox"/>
	process data in memory, row-by-row.
	collect and process data at most once a day.
	process data as new data is received in near real-time.
	collect data and then process the data when a condition is met.

244

Answer

Batch workloads

- process data in memory, row-by-row.
- collect and process data at most once a day.
- process data as new data is received in near real-time.
- collect data and then process the data when a condition is met.

245

Question

You need to gather real-time telemetry data from a mobile application.
Which type of workload describes this scenario?

- A. Online Transaction Processing (OLTP)
- B. batch
- C. massively parallel processing (MPP)
- D. streaming

246

Answer

You need to gather real-time telemetry data from a mobile application.
Which type of workload describes this scenario?

- A. Online Transaction Processing (OLTP)
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247

Question

You have a SQL pool in Azure Synapse Analytics that is only used actively every night for eight hours.
You need to minimize the cost of the SQL pool during idle times. The solution must ensure that the data remains intact.
What should you do on the SQL pool?

- A. Scale down the data warehouse units (DWUs).
- B. Pause the pool.
- C. Create a user-defined restore point.
- D. Delete the pool

248

Answer

You have a SQL pool in Azure Synapse Analytics that is only used actively every night for eight hours.

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- C. Create a user-defined restore point.
- D. Delete the pool

249

Question

Match the types of activities to the appropriate Azure Data Factory activities.

To answer, drag the appropriate activity type from the column on the left to its Data Factory activity on the right. Each activity type may be used once, more than once, or not at all.

NOTE: Each correct match is worth one point.

Select and Place:

Activity Types	Answer Area
Control	<input type="text"/> Copy
Data movement	<input type="text"/> Mapping data flow
Data transformation	<input type="text"/> Until

250

Answer

Activity Types	Answer Area	
Control	Data movement	Copy
Data movement	Data transformation	Mapping data flow
Data transformation	Control	Until

251

Question

Which two Azure services can be used to provision Apache Spark clusters? Each correct answer presents a complete solution. (Choose two.)
 NOTE: Each correct selection is worth one point.

- A. Azure Time Series Insights
- B. Azure HDInsight
- C. Azure Databricks
- D. Azure Log Analytics

252

Answer

Which two Azure services can be used to provision Apache Spark clusters? Each correct answer presents a complete solution. (Choose two.)
NOTE: Each correct selection is worth one point.

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- B. Azure HDInsight**
- C. Azure Databricks**
- D. Azure Log Analytics

253

Question

Which three objects can be added to a Microsoft Power BI dashboard? Each correct answer presents a complete solution. (Choose three.)
NOTE: Each correct selection is worth one point.

- A. a report page
- B. a Microsoft PowerPoint slide**
- C. a visualization from a report**
- D. a dataflow
- E. a text box

254

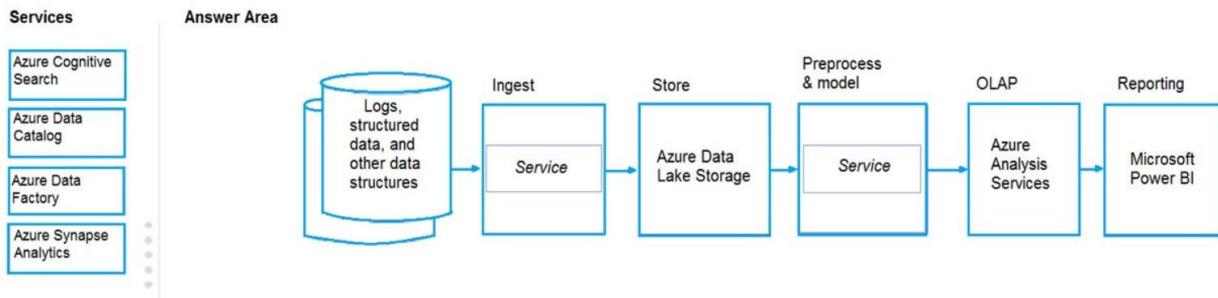
Answer

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255

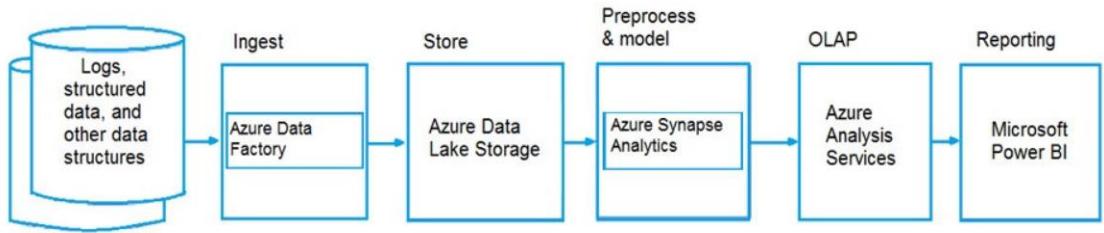
Question



256

Answer

Answer Area



257

Question

Statements	Yes	No
A pipeline is a representation of a data structure within Azure Data Factory	<input type="radio"/>	<input type="radio"/>
Azure Data Factory pipelines can execute other pipelines	<input type="radio"/>	<input type="radio"/>
A processing step within an Azure Data Factory pipeline is an activity	<input type="radio"/>	<input type="radio"/>

258

Answer

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259

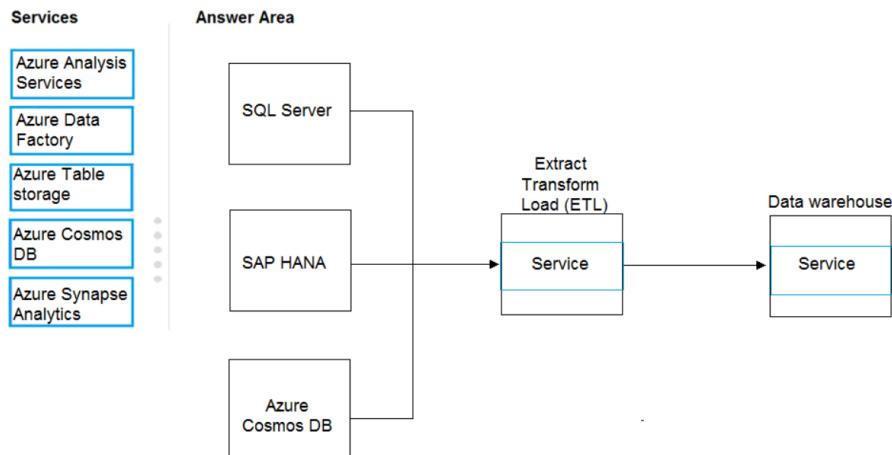
Question

Match the Azure services to the appropriate locations in the architecture.

To answer, drag the appropriate service from the column on the left to its location on the right. Each service may be used once, more than once, or not at all.

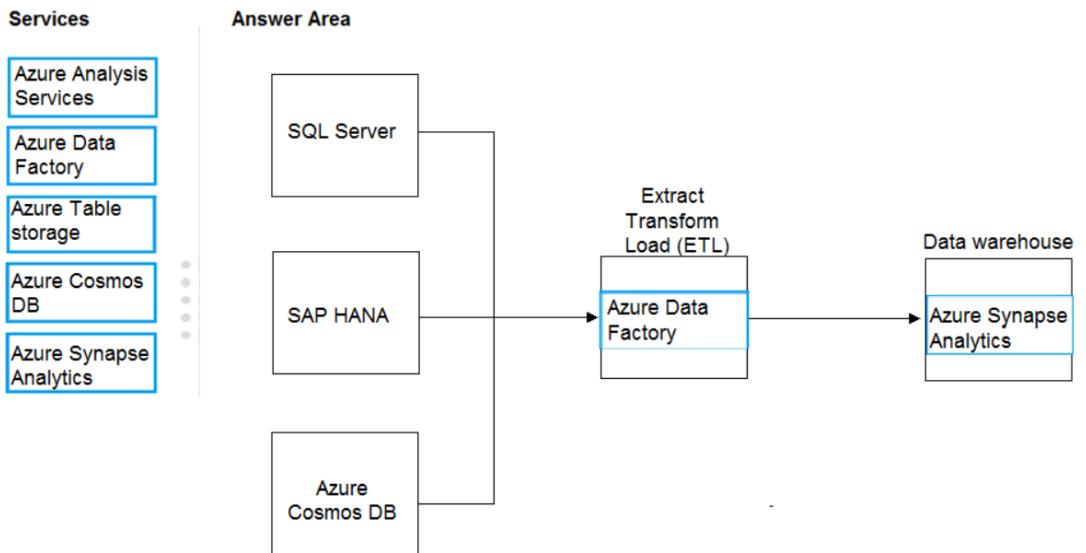
NOTE: Each correct match is worth one point.

Select and Place:



260

Answer



261



Thank You and Good Luck

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