Intelligent Data Management with SQL Server

Session: 7

Azure SQL

Objectives

- Explain Azure SQL
- List the features and benefits of Azure SQL
- State the differences between Azure SQL and on-premises SQL Server
- Explain steps to connect Azure SQL with SSMS

Introduction

- Cloud computing is a technology trend involving delivery of software, platforms, and infrastructure as services through Internet or networks.
- Microsoft Azure is a key offering in Microsoft's suite of cloud computing products and services.
- Database functions of Microsoft's cloud platform are provided by Microsoft Azure SQL Database, which is commonly known as **Azure SQL**.

- Data on Azure SQL does not have the constraint of being location-specific.
- This means that the data stored in SQL Azure can be viewed and edited from any location, as the entire data is stored on cloud storage platform.

Azure SQL 1-3

Cloud based relational database service that leverages existing SQL Server technologies

Extends functionality of Microsoft SQL Server for developing applications that are Web-based, scalable, and distributed

Is not just a single product but refers to a family of managed, intelligent, and secure products that use the SQL Server database engine in the Azure cloud

Azure SQL 2-3

- Was earlier known by other names such as SQL Azure, SQL Server Data Services, SQL Services, and Windows Azure SQL Database.
- Can be used to store and manage data using queries and other functions that are similar to SQL Server 2019.
- Enables users to perform relational queries, search operations, and synchronize data with mobile users and remote back offices. Azure SQL can store and retrieve both structured and unstructured data.
- Can also be used in collaboration with other Azure applications, through Visual Studio IDE.

Azure SQL 3-3

One of the competitors to Azure SQL is Amazon Web Services (AWS) and its Relational Database Services (RDS) product. Azure SQL is often compared to AWS RDS.

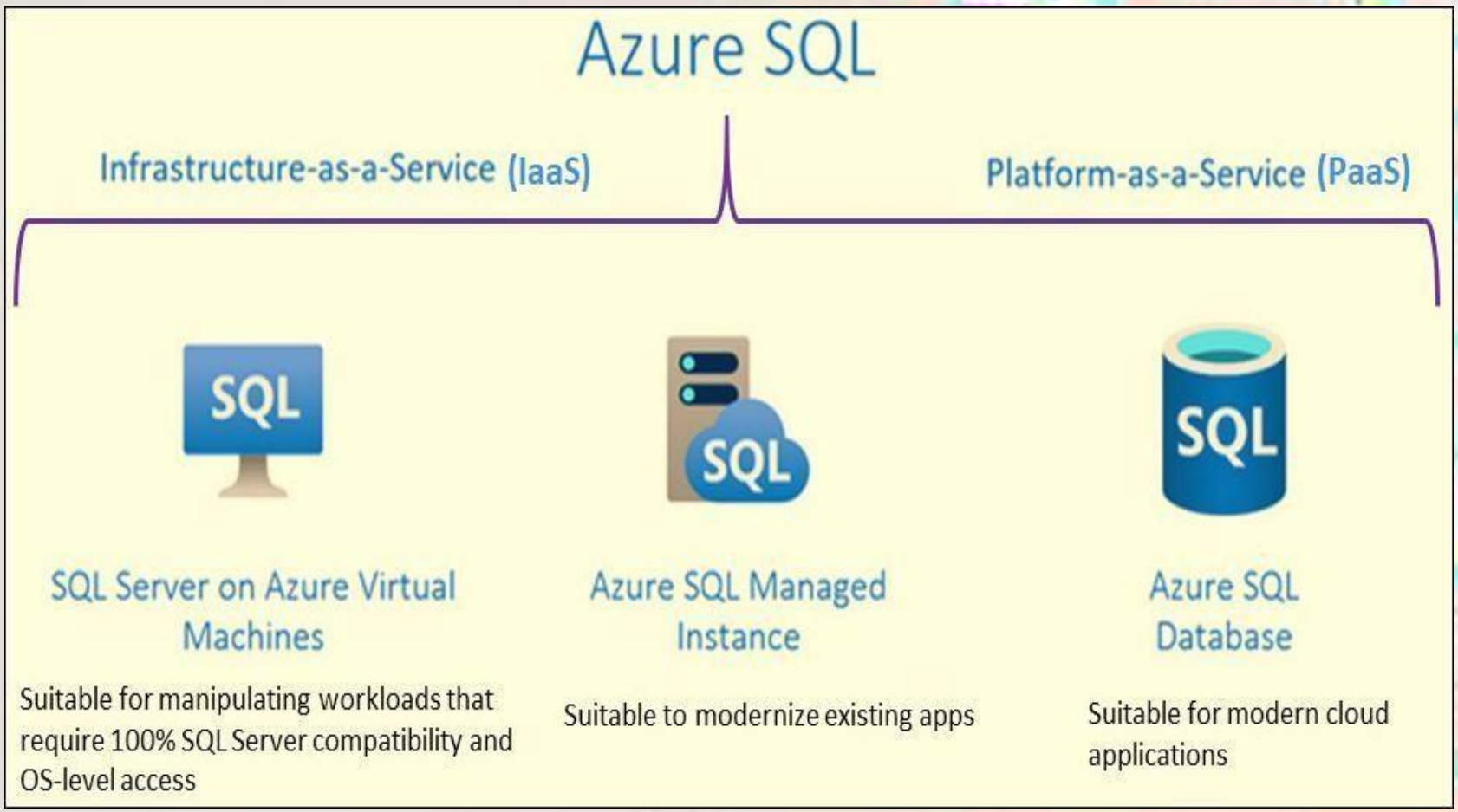
Azure SQL is:

- Both cloud based as well as on-premises applications can use the Azure SQL database.
- Applications retrieve data from Azure SQL through a protocol known as Tabular Data Stream (TDS).

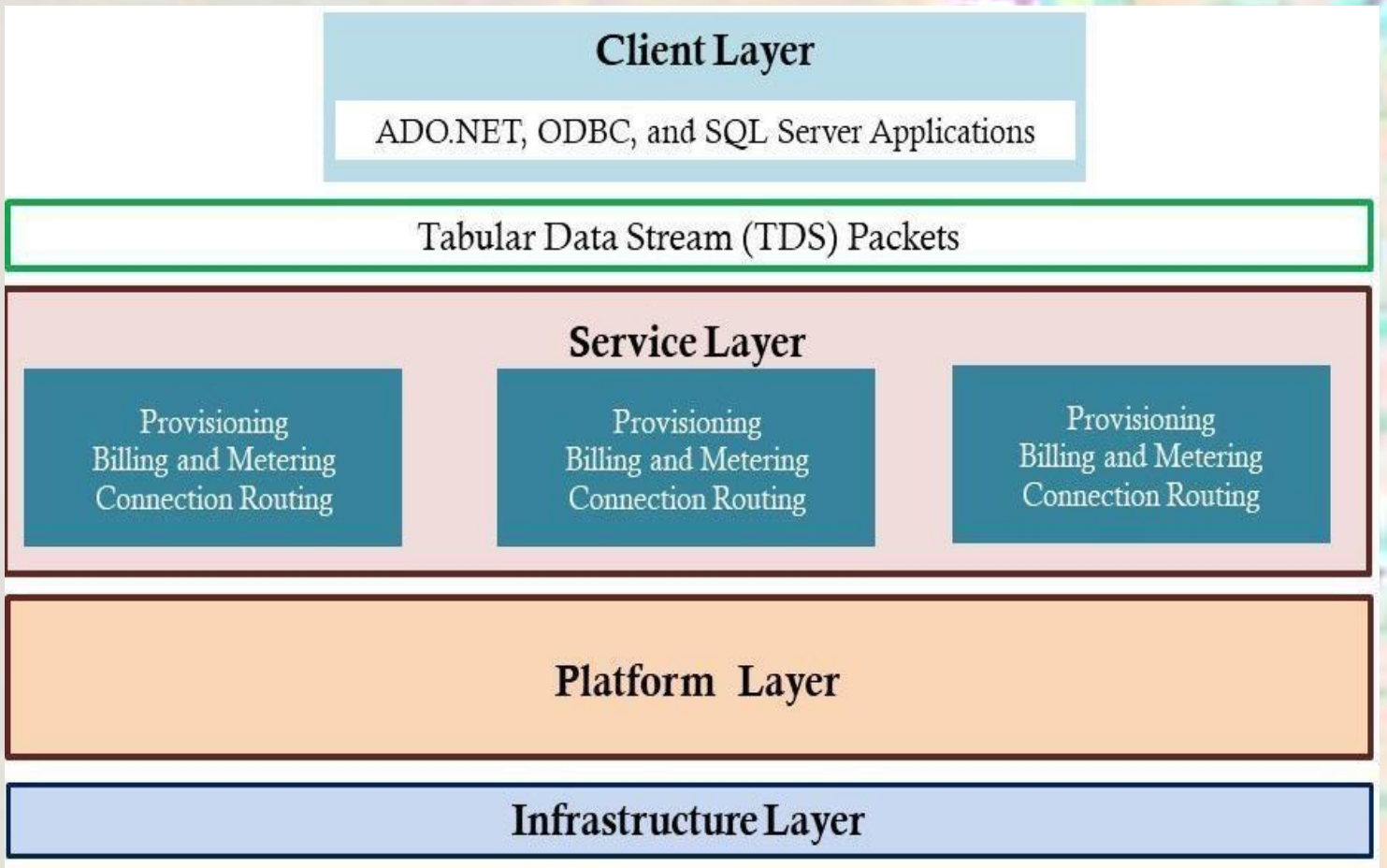
Services and Products in the Azure SQL Family

SQL Server on Azure Virtual Machines	Azure SQL Managed Instance	Azure SQL Database	Azure SQL Edge
Facilitates migration of existing apps or building new apps on the cloud for mission-critical SQL Server workloads.	Is the intelligent, scalable, cloud database service combining the broadest SQL Server engine compatibility with benefits of a fully managed platform as a service.	Is the intelligent, scalable, relational database service built for the cloud. It is always up to date, with AI-powered and automated features that optimize performance.	Is a small-footprint, edge-optimized SQL database engine with built-in Artificial Intelligence (AI).

Azure SQL Services



Azure SQL Architecture 1-2



Azure SQL Architecture 2-2

Client Layer

Acts as an interface for applications. Includes SQL Server tools, Open Database Connectivity (ODBC), ADO.NET, and Hypertext Preprocessor (PHP).

TDS transfers data between applications and SQL Databases and also communicates with applications.

Platform Layer

Includes systems (data nodes) that host actual Azure SQL Server in the data center. Each SQL Database is stored in one of the nodes and is replicated twice across two different physical servers. Azure SQL ensures that multiple copies of servers are kept within the Azure Cloud. It also ensures that the copies are synchronized when data in them is manipulated.

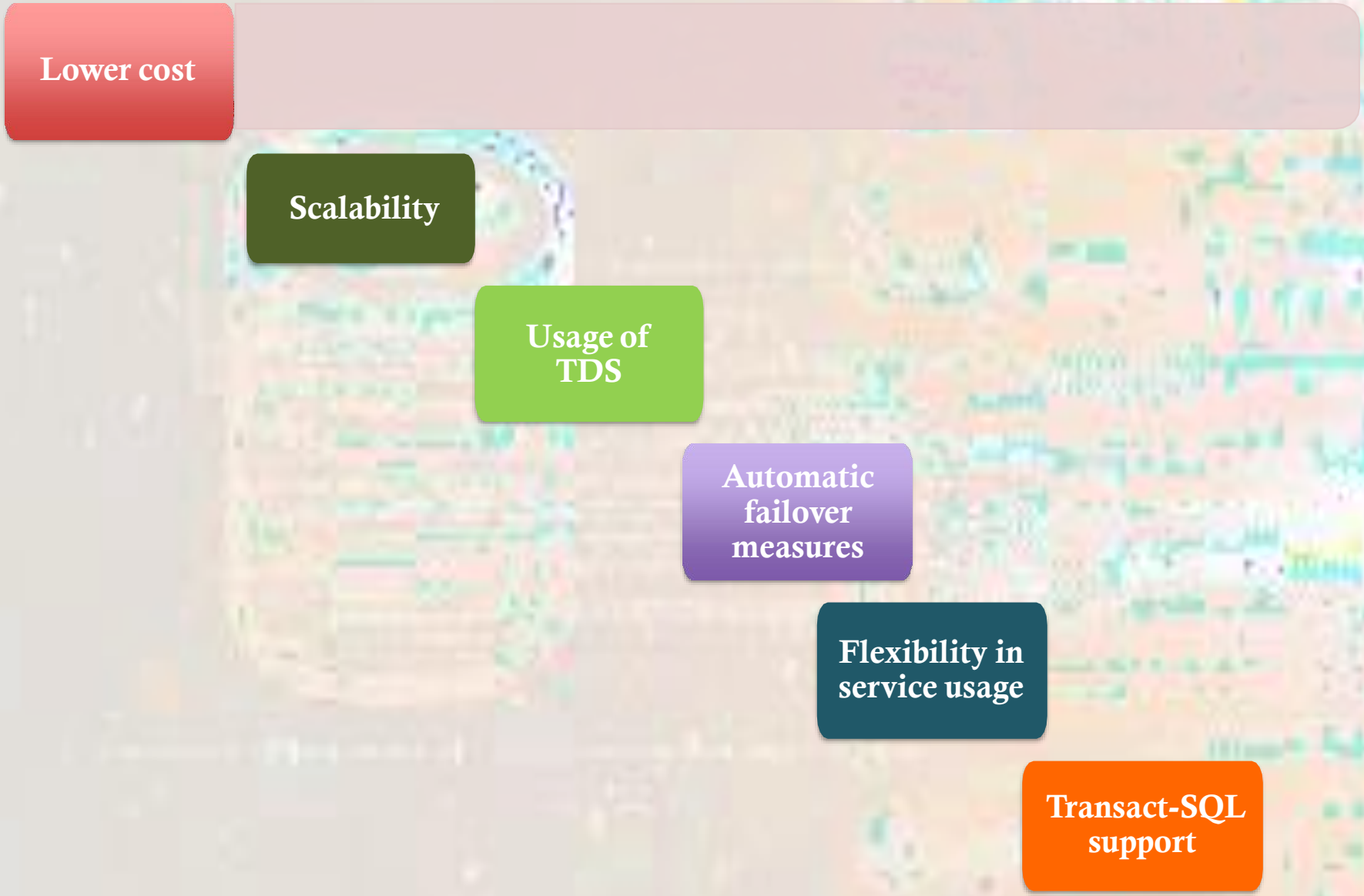
Service Layer

Lies in between platform and client layers and acts as a doorway between the two. It validates Microsoft Azure SQL Database requests and authenticates a user. Also, it establishes a connection between client and server and routes packets using this connection.

Infrastructure Layer

Is the bottom-most layer of the architecture and is responsible for administration of OS and physical hardware.

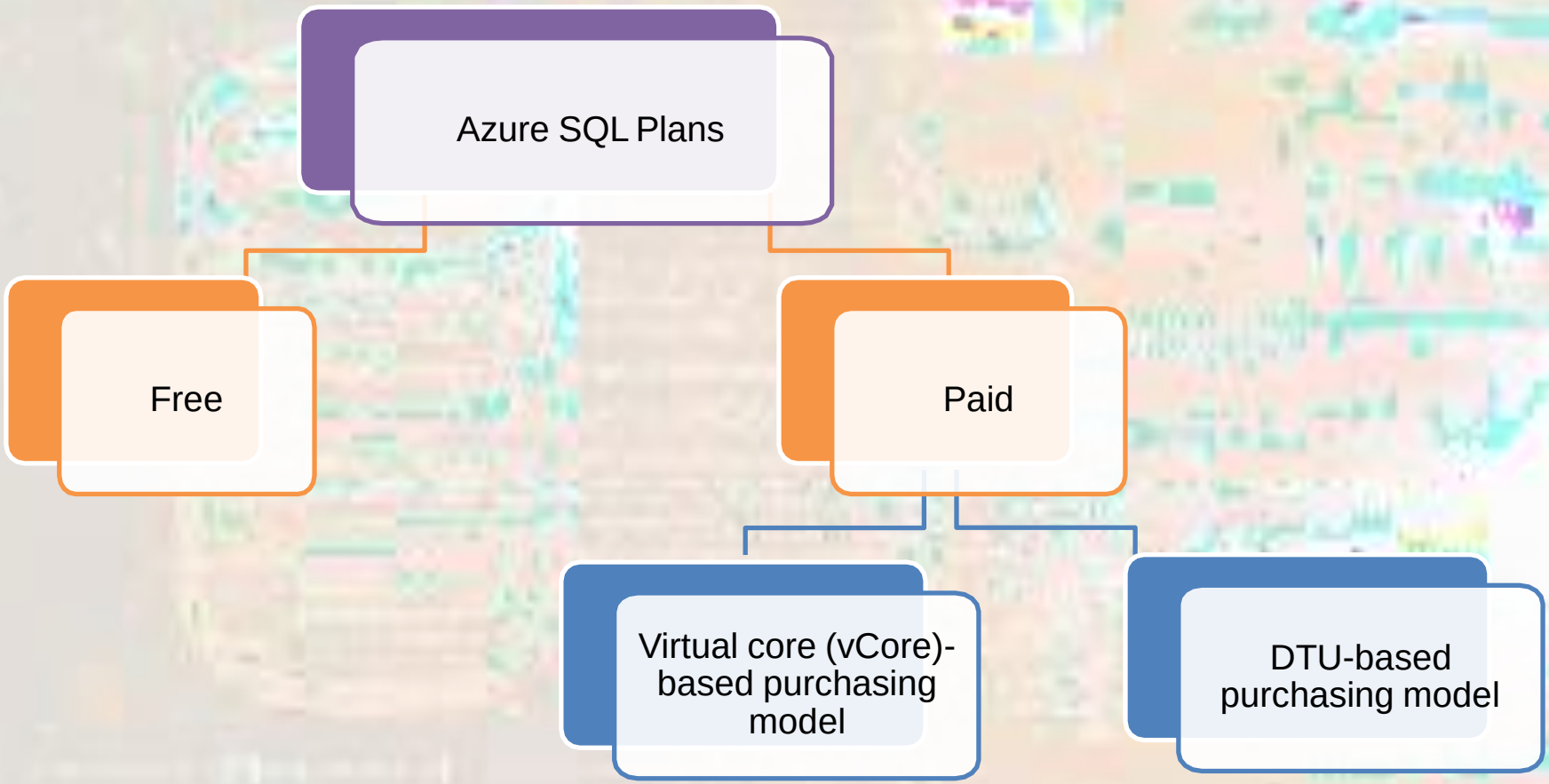
Features and Benefits of Azure SQL



Difference between Azure SQL and On-Premises SQL Server

Tools	On-premises SQL Server provides a number of tools for monitoring and management. All these tools may not be supported by Azure SQL, as there are a limited set of tools that are available in this version.
Backup	Backup and restore function must be supported in on-premises SQL Server for disaster recovery. For Azure SQL, as all the data is on the cloud platform, backup and restore is not required.
USE statement	USE statement is not supported by Azure SQL. Hence, the user cannot switch between databases in Azure SQL as compared to on-premises SQL Server.
Authentication	Azure SQL supports only SQL Server authentication and on-premises SQL Server supports both SQL Server authentication and Windows Authentication.
Transact-SQL support	Not all Transact-SQL functions are supported by Azure SQL.
Accounts and Logins	In Azure SQL, administrative accounts are created in the Azure management portal. Hence, there are no separate instance-level user logins.
Firewalls	Firewalls settings for allowed ports and IP addresses can be managed on physical servers for on-premises SQL Server. As an Azure SQL database is present on cloud, authentication through logins is the only method to verify the user.

Azure SQL Pricing



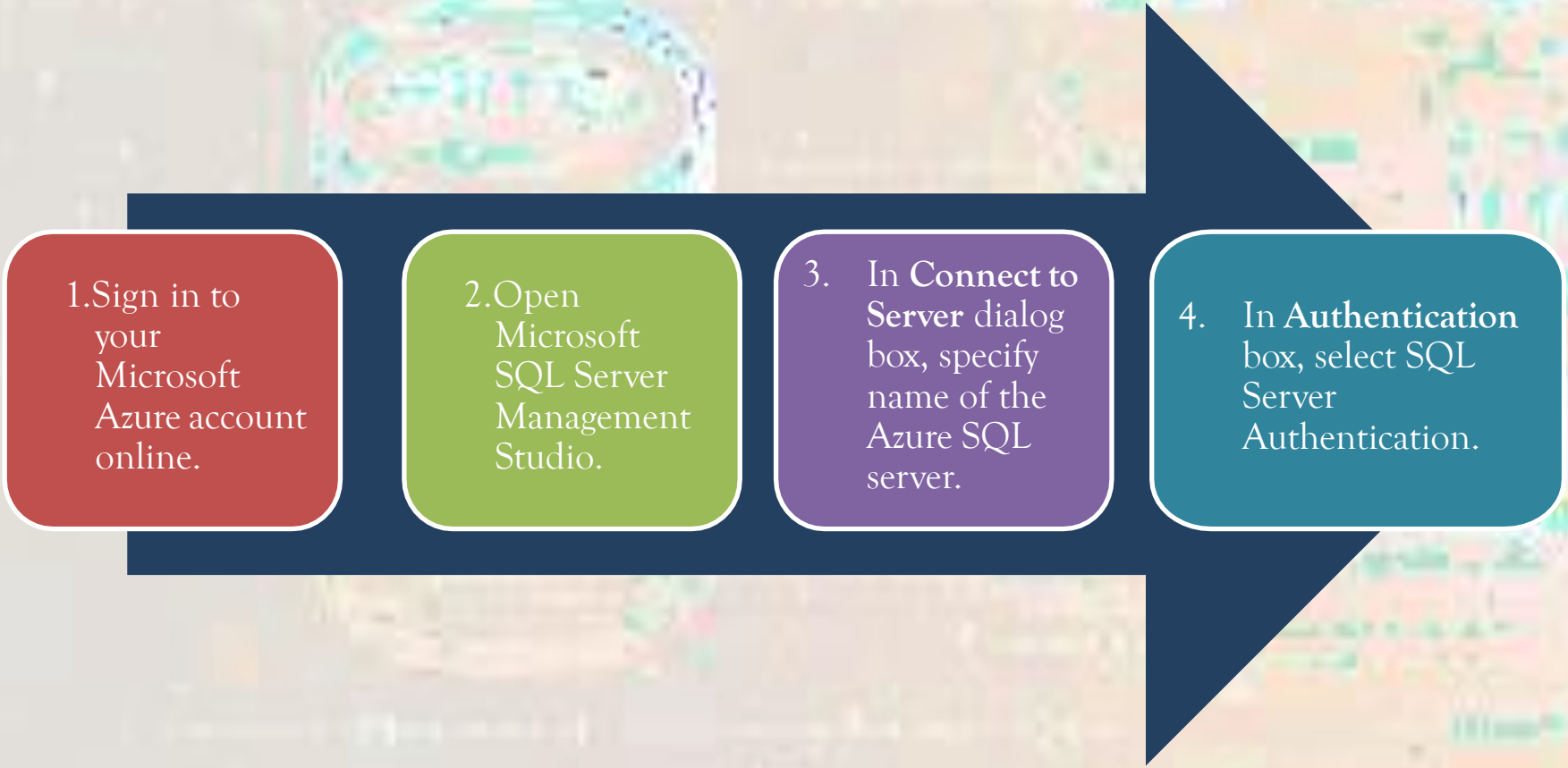
Connect to SQL Azure with SSMS 1-4

- Creating a database on the cloud:

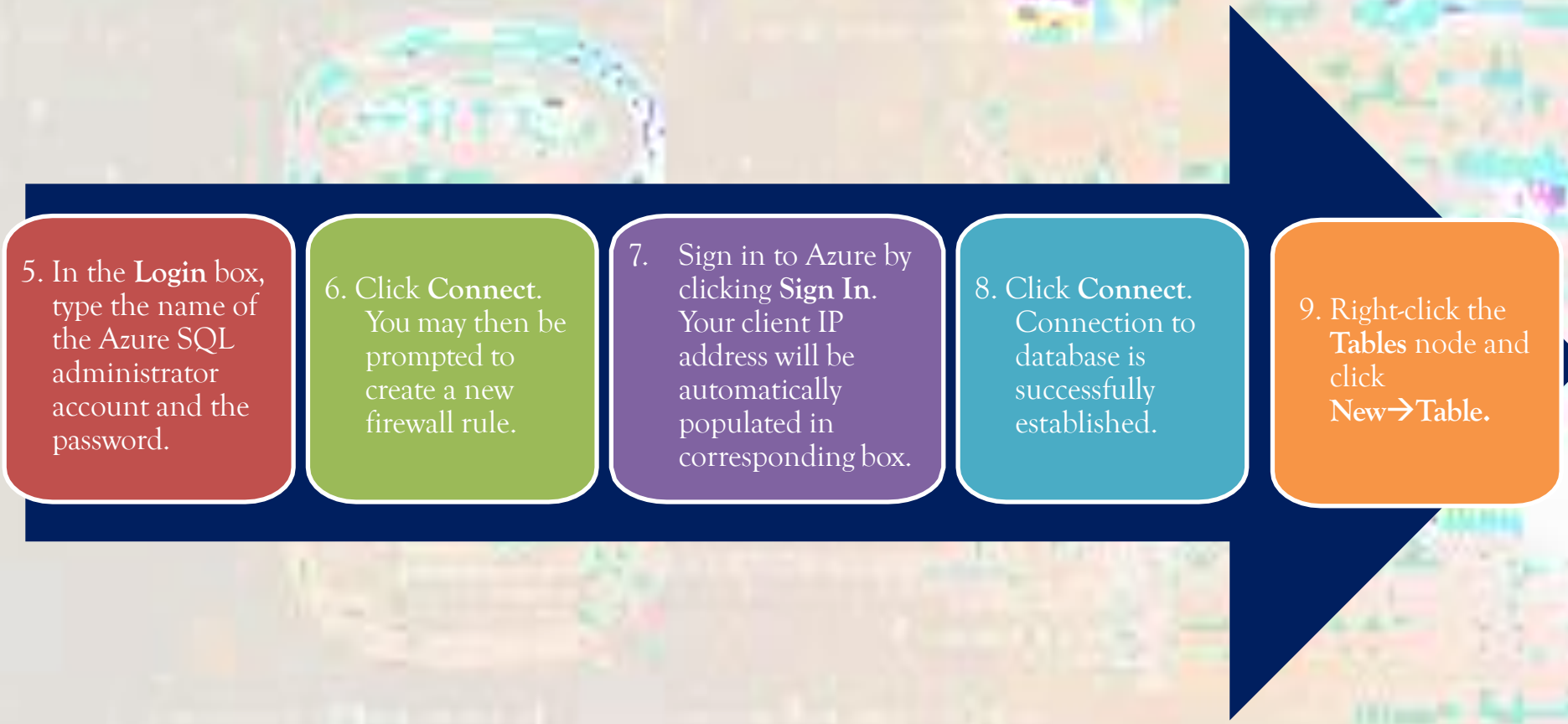
1. Type the address http://portal.azure.com in the Address bar of your browser and sign up/sign in.
2. Click **Start** under **Start with an Azure free trial**. Fill in the required information for a new Azure SQL account. Verify your identity through phone and credit card.
3. Click **SQL databases** under Azure services. The **SQL databases** page will be displayed.
4. Click **Create SQL database** at the bottom of the page. You will be asked to fill up information such as database name and server name.
5. When you finish creating the new server and specify that server name, click **Review+create** on **Create SQL Database** page. The database will be successfully created.

Connect to Azure SQL with SSMS 2-4

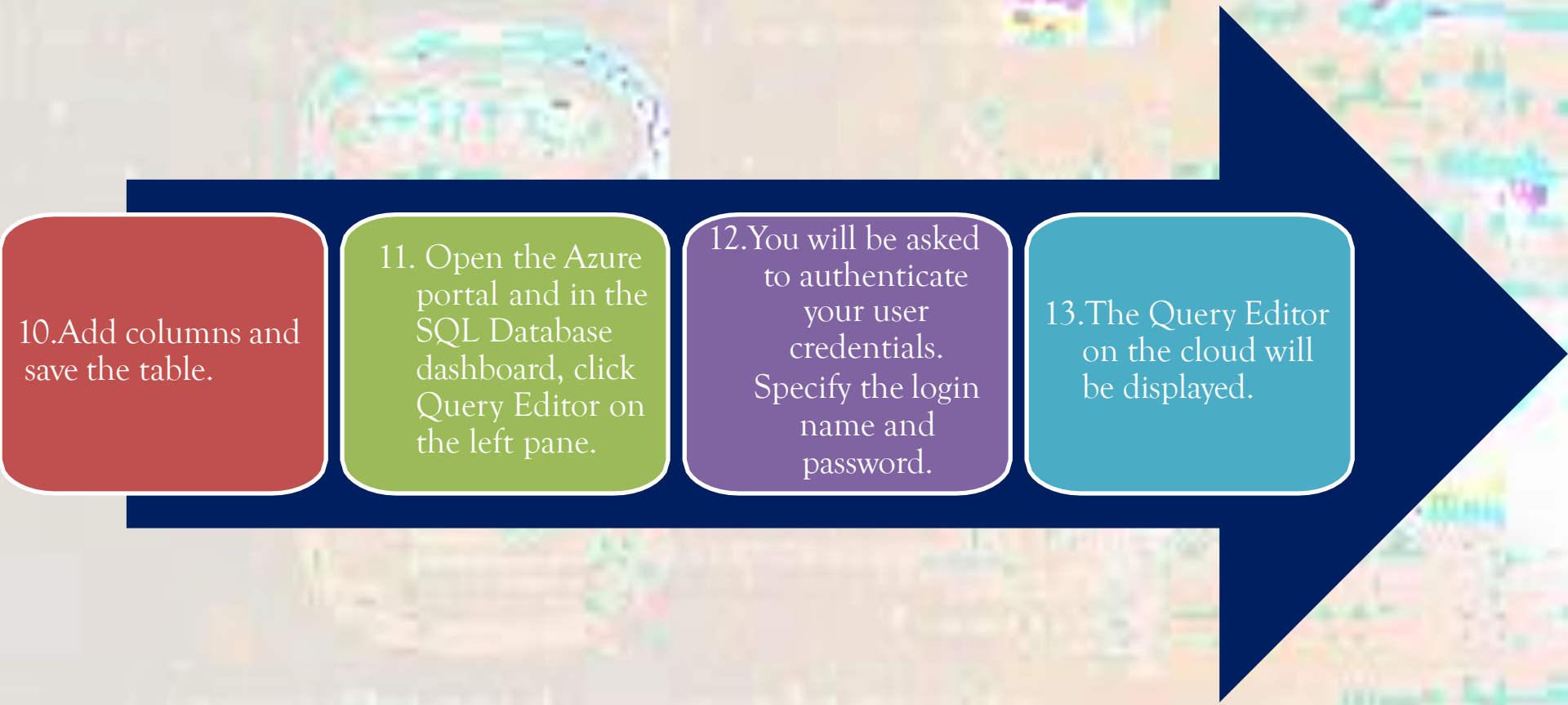
- The process of connecting SQL Azure with SSMS is as follows:



Connect to Azure SQL with SSMS 3-4



Connect to Azure SQL with SSMS 4-4



Summary

- Microsoft Azure SQL is a cloud based relational database service that leverages existing SQL Server technologies.
- Azure SQL enables users to perform relational queries, search operations, and synchronize data with mobile users and remote back offices.
- Azure SQL can store and retrieve both structured and unstructured data.
- Applications retrieve data from Azure SQL through a protocol known as Tabular Data Stream (TDS).
- SQL Server on Azure Virtual Machines, Azure SQL Database, Azure SQL Managed Instance, and Azure SQL Edge are the services under Azure SQL.
- Users can connect to Azure SQL using SSMS.