PostgreSQL on Azure Notes

PostgreSQL Specific

User Story: ***As a software engineer I need to provision a managed PostgreSQL service in Azure*** Deployment Options: 1. Single Server 2. Hyperscale (Citus)

Challenge: Make a deployment choice

Choosing between Single server vs Hyperscale (Citus)

Comparison	Single Server	Hyperscale (Citus)
Use Cases		Multi-Tenant Applications or Requires Data Analytics Insights for a large data set, and streaming events
Load of data (1M events)	4 minutes	30 seconds with 32 shards
Data Workload		>= 100 GB of data, ideally 1TB
Best For	Broad range of traditional transactional workloads	Ultra-high performance. Multi-tenant applications and real-time analytical workloads that need sub-second response.
Scales	Up to 64 vCores. Dynamic scaling available	Horizontally scales across multiple machines. 32

Challenge: Create Azure Database for PostgreSQL

Single Server OR Hyperscale (Citus)

Challenge: Configure a server-level firewall rule by adding your client IP address

Firewall rules

Create and manage firewall rules

Challenge: Configures the server's firewall to accept connections from all Azure resources

NB: All Azure resources, including resources not in your subscription will have access. When selecting this option, make sure your login and user permissions limit access to only authorized users.

Connecting to the server from Azure

Challenge: Connect to your Azure Database for PostgreSQL server using Azure Data Studio

Connect to PostgreSQL with Azure Data Studio * Once you install the PostgreSQL extension for Data Studio you may need to restart the application to see it available as a server connection type

Connection to Containerized applications

User Story: ***As a software engineer I need to connect my containerized spring boot applications to use our off-cluster PostgreSQL data service*** **Challenge: Communicate between AKS and Azure PostgreSQLr**

Concept behind connecting AKS and Azure PostgreSQL (Single Server)

1. Via Connection String:

```
String host = "mydemoserver.postgres.database.azure.com";
String database = "mypgsqldb";
String user = "mylogin@mydemoserver";
```

```
String password = "<server_admin_password>";
```

2. Using Open Service Broker
    - Connect applications running in Kubernetes to Azure Database for PostgreSQL using the Open Service Broker for Azure
    - Example Architecture
3. ExpressRoute circuit using private peering
4. Within Java Application
    - Guide on using PostgreSQL JDBC Driver
    - Azure Database for PostgreSQL libraries for Java
5. VNet Service Endpoints (Often the best option)

    How To Guide: Create and manage VNet service endpoints and VNet rules in Azure Database for PostgreSQL - Single Server by using the Azure portal

    - Microsoft.Sql is the formal Azure Service Type Name/Tag needed to be applied to a VNet service endpoint. This will configure service endpoint traffic for all Azure SQL Database, Azure Database for PostgreSQL and Azure Database for MySQL servers on the subnet Ref to PostgreSQL VNet Concepts
    - When configuring the PostgreSQL Service Connection Security (VNet), if a VNet does **not** exist, within the PostgreSQL's Connection Security you can create a new VNet and then you will have to return there and do the Add Existing Virtual Network step.
    - Support for VNet service endpoints is only for General Purpose and Memory Optimized servers.

User Story: ***As a software engineer I need to be aware of best practices and performanace metrics around my managed PostgreSQL service***

- Monitor and gain query Performance Insights (Single Server)
    - TODO: Query Performance View Not Available
- Data Backup
    - Choose between locally redundant or geo-redundant backup service
        - Cannot switch between redundant or geo-redundant once the server is provisioned
    - The minimum retention period for backups is seven days. You can set a retention period of up to 35 days.

- Storage
    - Can add additional storage capacity (automatically or manually) after the creation of the server but storage can only be scaled up, not down. Ref
- Security
    - Turn on Advanced Threat Protection

User Story: ***As a software engineer I need to be aware of the known limitations of my managed PostgreSQL service*** What it means to have an Azure Managed Database

Latest Version generally available: PostgreSQL 11

Single Server Limits

Hyperscale (Citus)

Stretch Goals

1. Migrating Existing Data into Azure PostgreSQL
2. Continue along with PostgreSQL docs