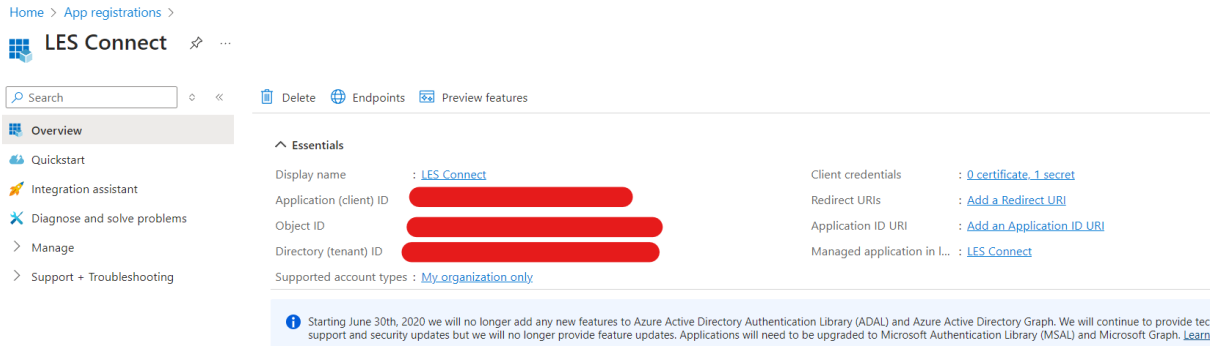
Accessing Azure SQL Database without Whitelisting IP: Using Service Principal and App Registrations

Connecting a Python application to Azure SQL Database without IP whitelisting is achievable by using Azure AD for authentication. Here's a concise guide on how to do it with a Service Principal and App Registration.

Step 1: Create an App registration



Step 2: Set AD Admin for SQL Server

Follow these steps to set an AD Admin for your Azure SQL Logical Server.

Step 3: Grant Database Access

Run the following SQL commands to grant access:

```
CREATE USER [MyApp] FROM EXTERNAL PROVIDER
EXEC sp_addrolemember 'db_owner', 'MyApp'
```

Step 4: Retrieve Access Token

Install the necessary libraries:

```
pip install pyodbc
```

Use the following Python code to retrieve and use the access token:

```


import pyodbc

tenant_id = "<Tenent ID>"
service_principal_id = f"<Client ID>@{tenant_id}"
```

```
service_principal_secret = "<Secret Key>"

# Define your SQL Server details
server_name = "tcp:<Database server Name>,1433"
database_name = "<Database name>"
queryStr = 'SELECT 1 AS a, 2 AS b UNION ALL SELECT 2 AS a, 3 AS b'

# Define the SQL Server ODBC connection string
conn_str = (
    f"DRIVER={{ODBC Driver 18 for SQL Server}};"
    f"SERVER={server_name};"
    f"DATABASE={database_name};"
    f"UID={service_principal_id};"
    f"PWD={service_principal_secret};"
    f"Authentication=ActiveDirectoryServicePrincipal"
)

# Establish the connection
conn = pyodbc.connect(conn_str)

# Execute a query
cursor = conn.cursor()
cursor.execute("""SELECT TOP (1000) [Table]
      ,[stopName]
      ,[locationAddress1]
      ,[locationAddress2]
      ,[locationCity]
      ,[StateAbbreviation]
      ,[locationZip]
  FROM [dbo].[AdminLocations]""")
rows = cursor.fetchall()
for row in rows:
    print(row)
```

Conclusion

By following these steps, you can securely connect to Azure SQL Database without whitelisting IP addresses, using Service Principal and App Registration. For more detailed information, visit Azure AD Library for Python and Microsoft documentation.