Query the Fabric Lakehouse Data Outside the Fabric

To access Microsoft Fabric Lakehouse data in an external application using the **SQL analytics endpoint**, you need to follow specific implementation steps, fulfill prerequisites, and be prepared for several common blockers. Below is a comprehensive guide based on authoritative sources and direct usage examples[[1]](#fn1)[[2]](#fn2)[[3]](#fn3).

**Direct Answer**

You can connect external applications to Fabric Lakehouse data using the SQL analytics endpoint via ODBC/JDBC drivers (e.g., Python's pyodbc), provided you have the endpoint’s connection string and the right authentication (Service Principal or user credentials)[[1]](#fn1)[[2]](#fn2). Blocking issues often include workspace permissions, endpoint provisioning delays, and authentication configuration[[4]](#fn4)[[5]](#fn5).

**Implementation Guide**

**Prerequisites**

* **Fabric Premium Workspace access:** You must have a Fabric workspace with Premium or higher capacity[[3]](#fn3)[[6]](#fn6).
* **Lakehouse created:** Your data must be stored in a Fabric Lakehouse, which automatically generates a SQL analytics endpoint[[2]](#fn2)[[3]](#fn3).
* **SQL analytics endpoint ready:** Database tables (typically Delta tables) should exist, and SQL endpoint provisioning should be successful.
* **Python and required libraries:** Latest Python, Microsoft ODBC Driver 18 or 17 for SQL Server, and pyodbc library[[1]](#fn1).
* **Workspace permissions:** Contributor or higher access, Service Principal membership for automated access[[2]](#fn2)[[4]](#fn4).
* **Authentication:** Either an Azure Active Directory Service Principal or user credentials with proper privileges.

**Step-by-Step Implementation**

1. **Get SQL Connection String**
   * Locate the endpoint URL in Lakehouse Details/Settings (looks like xxxx.datawarehouse.fabric.microsoft.com)[[2]](#fn2)[[7]](#fn7).
2. **Install Required Python Components**
   * Install/upgrade Python and pip.
   * pip install pyodbc
   * Download Microsoft ODBC Driver for SQL Server (Windows, Mac, Linux supported)[[1]](#fn1).
3. **Prepare Authentication**
   * For programmatic access, use Active Directory authentication with Service Principal. Ensure the principal is given access (Member + Build & Read permissions on workspace and dataset)[[4]](#fn4).
   * Enable “Service principals can call Fabric APIs” in tenant settings; enable XMLA Read/Write if using semantic models[[4]](#fn4).
4. **Code Example (Python)**

import pyodbc  
  
connection\_string = (  
 "DRIVER={ODBC Driver 18 for SQL Server};"  
 "SERVER={your\_sql\_analytics\_endpoint};"  
 "DATABASE={lakehouse\_name};"  
 "UID={service\_principal\_client\_id};"  
 "PWD={service\_principal\_secret};"  
 "Authentication=ActiveDirectoryServicePrincipal"  
)  
  
cnxn = pyodbc.connect(connection\_string)  
cursor = cnxn.cursor()  
cursor.execute("SELECT TOP 100 \* FROM [your\_table]")  
for row in cursor.fetchall():  
 print(row)

* + JDBC connection also supported for other environments[[2]](#fn2).

1. <https://www.linkedin.com/pulse/programmatically-query-microsoft-fabric-lakehouse-brice-baro>

1. <https://docs.ataccama.com/one/latest/sources/lakehouse-sql-analytics-endpoint.html>

1. <https://learn.microsoft.com/en-us/fabric/data-engineering/lakehouse-sql-analytics-endpoint>

1. <https://www.reddit.com/r/MicrosoftFabric/comments/1m0ume7/how_get_data_from_a_fabric_lakehouse_using/>

1. <https://www.reddit.com/r/MicrosoftFabric/comments/1l4sipp/updated_delays_in_synchronising_the_lakehouse/>

1. <https://learn.microsoft.com/en-us/fabric/data-warehouse/query-warehouse>

1. <https://radacad.com/microsoft-fabric-lakehouse/>

1. <https://learn.microsoft.com/en-us/fabric/database/sql/query-sql-analytics-endpoint>

1. <https://learn.microsoft.com/en-us/fabric/governance/external-data-sharing-overview>

1. <https://learn.microsoft.com/en-us/fabric/data-warehouse/get-started-lakehouse-sql-analytics-endpoint>

1. <https://learn.microsoft.com/en-us/fabric/data-warehouse/sql-analytics-endpoint-performance>

1. <https://www.reddit.com/r/MicrosoftFabric/comments/1bs7886/programmatically_query_sql_analytics_endpoint/>

1. <https://www.youtube.com/watch?v=B2x6ggpKFqU>

1. <https://datacrafters.io/secure-external-data-sharing-microsoft-fabric/>

1. <https://robkerr.ai/query-fabric-table-csharp/>

1. <https://intellifysolutions.com/blog/microsoft-fabric-lakehouse-vs-data-warehouse/>

1. <https://www.youtube.com/watch?v=toTKGYwr278>

1. <https://www.youtube.com/watch?v=TeutxliZVRU>

1. <https://community.qlik.com/t5/Connectivity-Data-Prep/Microsoft-Fabric-Lakehouse-amp-Qlik-Cloud-Analytics/td-p/2442001>

1. <https://campus.datacamp.com/courses/introduction-to-microsoft-fabric/working-with-lakehouses?ex=5>

1. <https://learn.microsoft.com/en-us/fabric/data-warehouse/query-warehouse>

1. <https://community.fabric.microsoft.com/t5/Data-Warehouse/Lakehouse-under-PPu/m-p/4274830>

1. <https://www.red-gate.com/simple-talk/databases/sql-server/bi-sql-server/choosing-between-the-lakehouse-and-warehouse-in-microsoft-fabric/>

1. <https://www.serverlesssql.com/enabling-microsoft-fabric-60-day-trial/>

1. <https://www.youtube.com/watch?v=TeutxliZVRU>

1. <https://www.azureguru.net/demystifying-roles-access-in-microsoft-fabric-lake-house>

1. <https://learn.microsoft.com/en-us/fabric/data-warehouse/get-started-lakehouse-sql-analytics-endpoint>

1. <https://learn.microsoft.com/en-us/fabric/security/security-managed-private-endpoints-overview>

1. <https://www.reddit.com/r/MicrosoftFabric/comments/1iofr2n/clarification_on_direct_lake_mode_and_sql/>

1. <https://radacad.com/microsoft-fabric-lakehouse/>

1. <https://www.reddit.com/r/MicrosoftFabric/comments/1ecuszy/fabric_lakehouse_tables_not_showing_in_sql/>

1. <https://intellifysolutions.com/blog/microsoft-fabric-lakehouse-vs-data-warehouse/>

1. <https://data-marc.com/2023/05/24/overcoming-the-fear-exploring-microsoft-fabric-from-a-power-bi-angle/>

1. <https://radacad.com/what-is-the-xmla-endpoint-for-power-bi-and-why-should-i-care/>

1. <https://community.powerbi.com/t5/Power-Query/Connect-to-Datasets-in-PowerBI-via-SSMS/td-p/603247>

1. <https://azure.microsoft.com/en-us/pricing/details/microsoft-fabric/>

1. <https://microsoftlearning.github.io/DP-900T00A-Azure-Data-Fundamentals/Instructions/Labs/dp900-04b-fabric-lake-lab.html>

1. <https://docs.ataccama.com/one/latest/sources/lakehouse-sql-analytics-endpoint.html>

1. <https://learn.microsoft.com/en-us/fabric/data-engineering/lakehouse-sql-analytics-endpoint>

1. <https://www.c-sharpcorner.com/article/managed-private-endpoints-in-microsoft-fabric2/>