

4-1. Data Tiering(Data Lake)



SAP HANA Cockpit

SAP HANA Cloud 인스턴스 관리자

The screenshot displays the SAP HANA Cloud Cockpit interface. The left sidebar shows the 'Instances' section. The main area is titled 'All Instances' and includes a search bar and filter options. A table lists the instances:

Status	Name	Type	Notifications	Storage	Cost
HANA Instance					
RUNNING	myhana	SAP HANA		30 GB Memory 120 GB Storage	2 vCPU
RUNNING	myrdl	Data Lake		1 TB	2 vCPU

A context menu is open for the 'myhana' instance, showing various actions. The 'Open in SAP HANA Cockpit' option is highlighted with a red box.

- Edit
- Add Data Lake
- Copy SQL Endpoint
- Copy Instance ID
- Stop
- Upgrade
- Delete
- Open in SAP HANA Cockpit**
To monitor and administer
- Open in SAP HANA Database Explorer
To develop and administer
- Open SQL Console
In SAP HANA Database Explorer

SAP HANA Cloud 인스턴스 관리자

- myhana 인스턴스의 “Actions” 컬럼을 클릭
- Popup 메뉴에서 “**Open in SAP HANA Cockpit**”을 클릭

SAP HANA Cockpit

Data Lake 권한 부여

The screenshot shows the SAP HANA Cockpit interface. At the top, there's a navigation bar with the SAP logo and 'Database Overview' dropdown. Below this, a 'Security and User Management' menu is highlighted with a red box and a yellow circle with the number '1'. The main content area displays various security-related settings and links. On the right side, a 'User & Role Management' panel is visible, with 'User Management' highlighted by a red box and a yellow circle with the number '2'. Other panels include 'Data Encryption', 'Auditing', 'Anonymization Report', 'Authentication', and 'Insufficient Privilege Details'.

SAP HANA Cockpit

- Security and User Management 화면 전환
- “User Management” 클릭

SAP HANA Cockpit

Data Lake 권한 부여

The screenshot shows the SAP HANA Cockpit User Management interface. On the left, a list of users is displayed, with 'DEVUSER' highlighted and circled in red, labeled with a yellow circle containing the number '1'. The right pane shows the details for 'DEVUSER', including its status (Active) and various tabs like 'General Information', 'Authorization Mode', 'Authentication', and 'Custom User Properties'. The 'General Information' tab is active, showing details such as User Name, User Group, Valid From, Last Successful Logon, Creation of Objects in Own Schema, PUBLIC role, Disable ODBC/JDBC Access, Creator, Created At, and Comment. At the bottom of the right pane, the 'AUTHORIZATION MODE' section shows 'Authorization Mode: Local'. A yellow circle containing the number '2' is placed over the 'Assign Roles' button, which is also highlighted with a red box.

SAP HANA Cockpit

- DEVUSER 클릭
- “Assign Roles” 클릭

SAP HANA Cockpit

Data Lake 권한 부여

The screenshot displays the SAP HANA Cockpit User Management interface. The left sidebar shows a list of users, with 'DEVUSER' selected. The main panel shows the 'Role Assignment for User DEVUSER' page. The 'Edit' button is highlighted with a red box.

Users (25)

- User Name
- User Group: DEFAULT
- User status: Active
- DEVUSER**
- User Group: DEFAULT
- User status: Active
- SYS
- User Group: None
- User status: Deactivated
- SYSRDL#CG
- User Group: None
- User status: Active
- SYSRDL#CG_HANAREADER
- User Group: None
- User status: Active

DEVUSER

Active

General Information

User Name: DEVUSER

User Group: DEFAULT

Valid From: 21. 3. 3. PM 9:19

Last Successful Logon: 21. 3. 8. PM 2:28

Creation of Objects in Own Schema: Yes

PUBLIC role: Yes

Disable ODBC/JDBC Access: No

Creator: DBADMIN

Created At: 21. 3. 3. PM 9:19

Role Assignment for User DEVUSER

Se... **Edit**

Role	Schema	Grantor	Grantable to Others
PUBLIC		SYS	No

SAP HANA Cockpit

- “Edit” 버튼 클릭

SAP HANA Cockpit

Data Lake 권한 부여

The screenshot displays the SAP HANA Cockpit User Management interface. The left sidebar shows a list of users, with 'DEVUSER' selected. The main panel shows the 'General Information' for 'DEVUSER', including user name, group, status, and creation details. The right panel, titled 'Role Assignment for User DEVUSER', shows a table of roles assigned to the user. The 'Add' button is highlighted with a red box.

Users (25)

User Name

User Group: DEFAULT

User status: Active

DEVUSER

User Group: DEFAULT

User status: Active

SYS

User Group: None

User status: Deactivated

SYSRDL#CG

User Group: None

User status: Active

SYSRDL#CG_HANAREADER

User Group: None

User status: Active

DEVUSER

Active

General Information

User Name: DEVUSER

User Group: DEFAULT

Valid From: 21. 3. 3. PM 9:19

Last Successful Logon: 21. 3. 8. PM 2:28

Creation of Objects in Own Schema: Yes

PUBLIC role: Yes

Disable ODBC/JDBC Access: No

Creator: DBADMIN

Created At: 21. 3. 3. PM 9:19

Role Assignment for User DEVUSER

Se... Save Cancel Add Remove

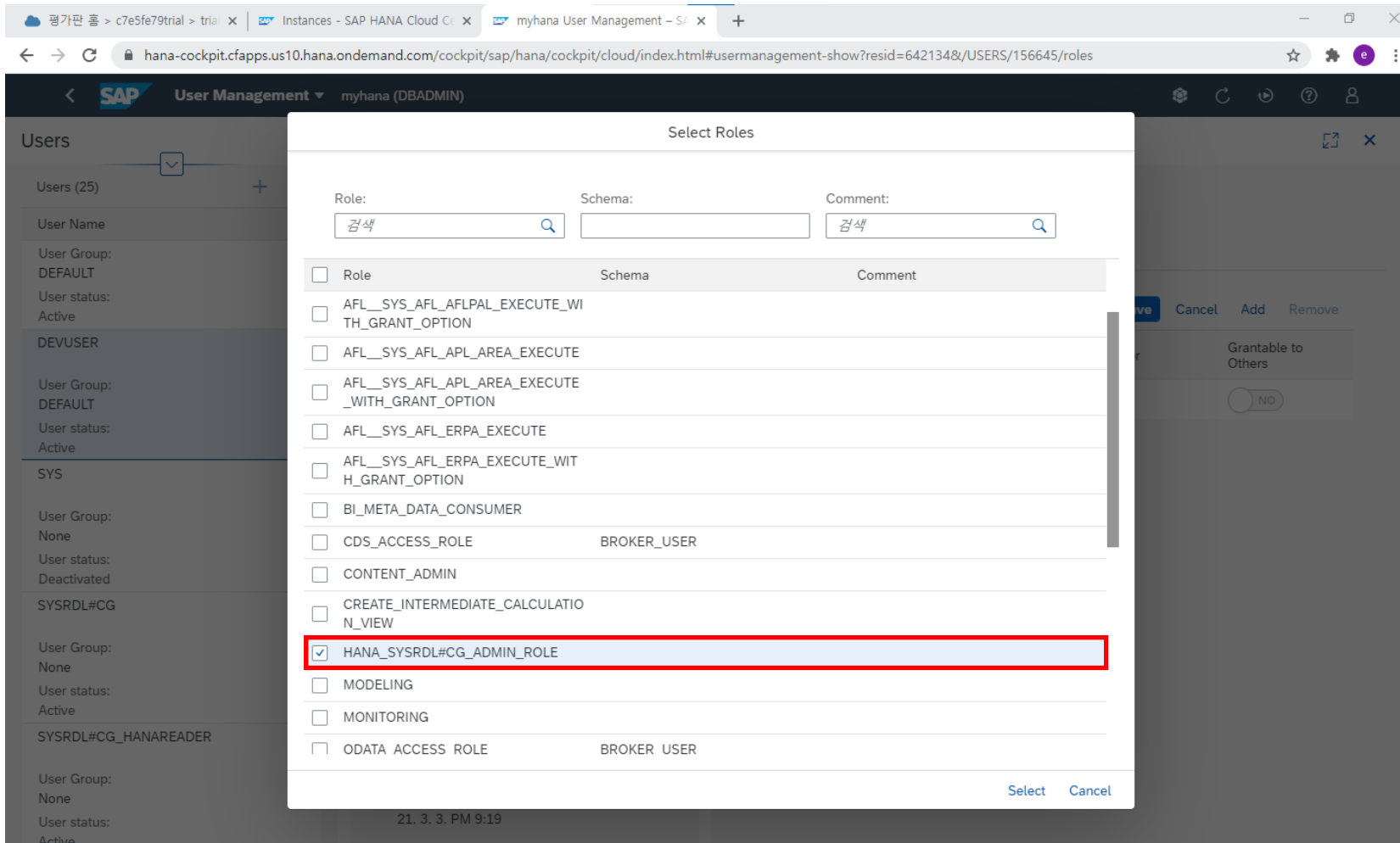
<input type="checkbox"/>	Role	Schema	Grantor	Grantable to Others
<input type="checkbox"/>	PUBLIC		SYS	NO

SAP HANA Cockpit

- “Add” 버튼 클릭

SAP HANA Cockpit

Data Lake 권한 부여



SAP HANA Cockpit

- HANA_SYSRDL#CG_ADMIN_ROLE 선택
- “Select” 버튼 클릭

SAP HANA Cockpit

Data Lake 권한 부여

The screenshot displays the SAP HANA Cockpit User Management interface. On the left, a list of users is shown, with 'DEVUSER' selected. The main panel shows the 'General Information' for 'DEVUSER', including 'User Name: DEVUSER', 'User Group: DEFAULT', 'Valid From: 21. 3. 3. PM 9:19', 'Last Successful Logon: 21. 3. 8. PM 2:28', 'Creation of Objects in Own Schema: Yes', 'PUBLIC role: Yes', 'Disable ODBC/JDBC Access: No', 'Creator: DBADMIN', and 'Created At: 21. 3. 3. PM 9:19'. On the right, the 'Role Assignment for User DEVUSER' panel is open, showing a table of roles and their grant status. The 'Save' button is highlighted with a red box.

Role	Schema	Grantor	Grantable to Others
<input type="checkbox"/> HANA_SYSRDL#C G_ADMIN_ROLE		DBADMIN	<input type="radio"/> NO
<input type="checkbox"/> PUBLIC		SYS	<input type="radio"/> NO

SAP HANA Cockpit

- “Save” 버튼 클릭

SAP HANA Cockpit

Data Lake 권한 부여

The screenshot displays the SAP HANA Cockpit User Management interface. The left sidebar shows a list of users, with 'DEVUSER' selected. The main panel shows the 'Role Assignment for User DEVUSER' configuration. The 'General Information' tab is active, displaying user details such as 'User Name: DEVUSER', 'User Group: DEFAULT', 'Valid From: 21. 3. 3. PM 9:19', and 'Last Successful Logon: 21. 3. 8. PM 2:28'. The 'Role Assignment' table shows the following roles assigned to the user:

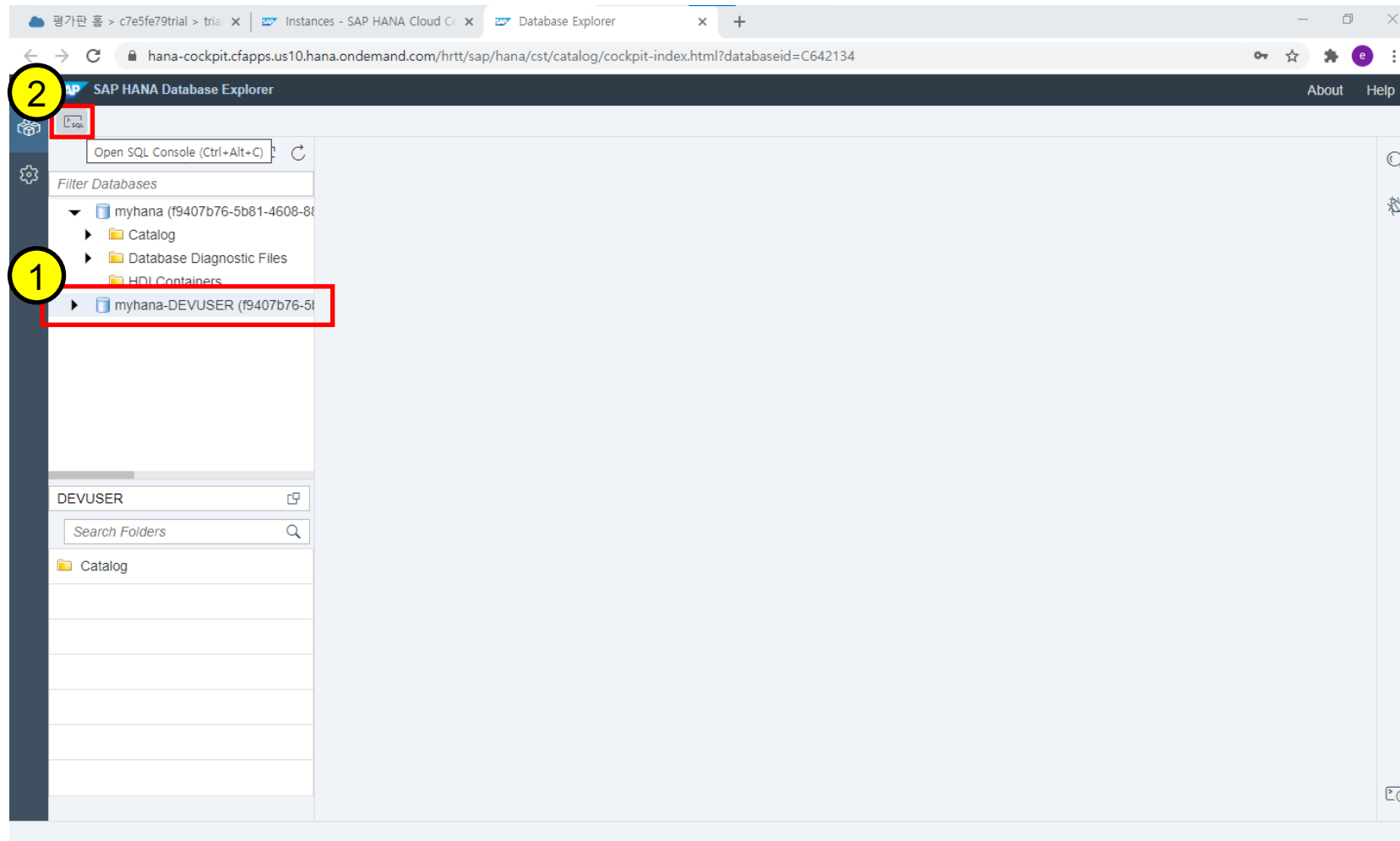
Role	Schema	Grantor	Grantable to Others
HANA_SYSRDL#C G_ADMIN_ROLE		DBADMIN	No
PUBLIC		SYS	No

SAP HANA Cockpit

- 결과 조회

SAP HANA Database Explorer

Data Lake 테이블 생성



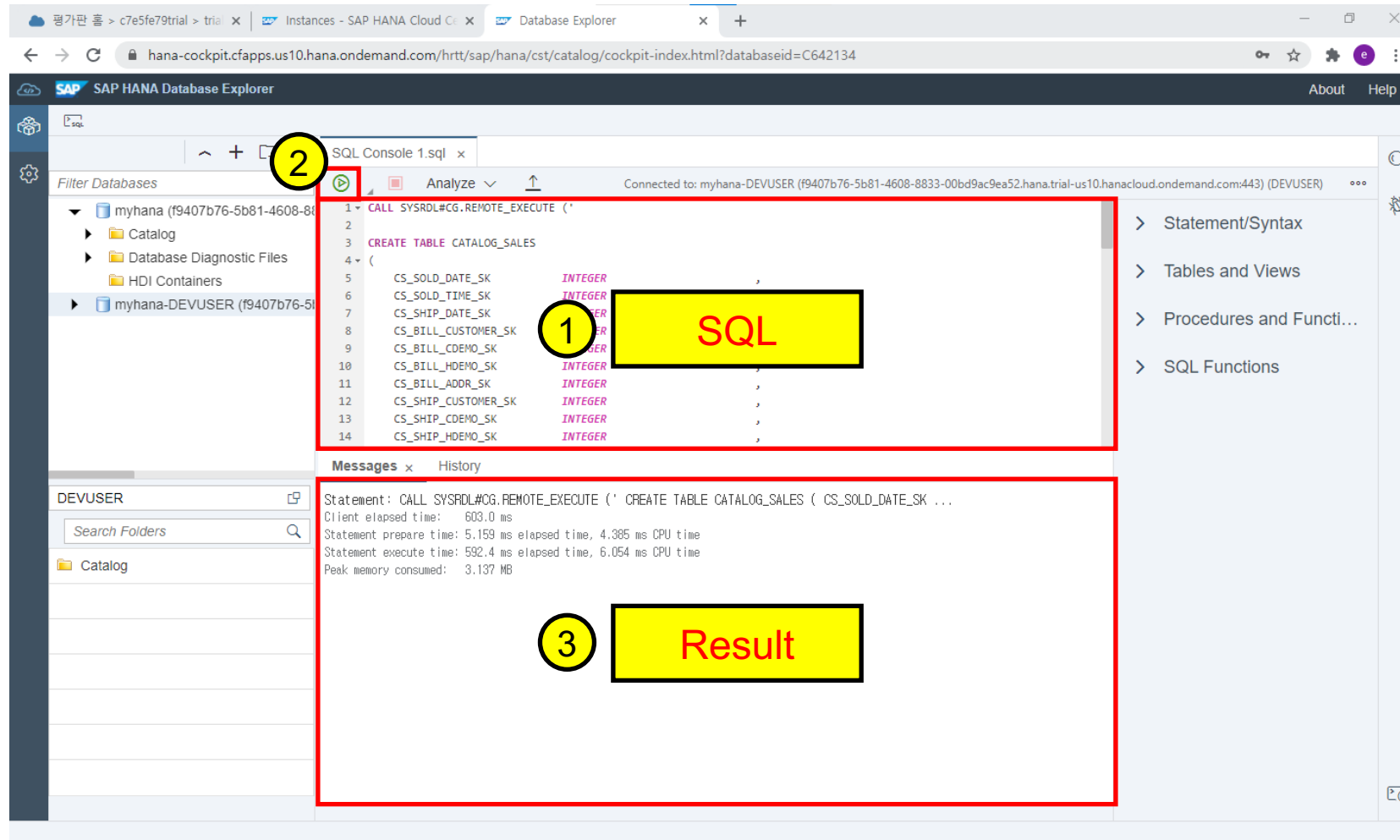
SAP HANA Database Explorer

- DEVUSER Connection 클릭
- “SQL” 버튼 클릭


SAP HANA Database Explorer

Data Lake 테이블 생성

File Location :
https://github.com/euimankim/HANA_Cloud_Enablement



SAP HANA Database Explorer

- create_table_data_lake.sql 파일의 내용을 전체 복사 후 붙여넣기
-  버튼 클릭하면 해당 SQL 실행
- 하단의 Result 부분에 실행 결과 조회

SAP HANA Database Explorer

Data Lake 테이블 생성

The screenshot displays the SAP HANA Database Explorer web interface. On the left sidebar, under 'Filter Databases', the 'Remote Sources' option is highlighted with a red box and a yellow circle containing the number '1'. Below it, in the search results, 'SYSRDL#CG_SOURCE' is also highlighted with a red box and a yellow circle containing the number '2'. The main panel shows an SQL console with a 'CREATE TABLE CATALOG_SALES' statement. The 'Messages' tab at the bottom displays the execution details of the statement.

SQL Console 1.sql x

Connected to: myhana-DEVUSER (f9407b76-5b81-4608-8833-00bd9ac9ea52.hana.trial-us10.hanacloud.ondemand.com:443) (DEVUSER)

```
1 CALL SYSRDL#CG.REMOTE_EXECUTE ('
2
3 CREATE TABLE CATALOG_SALES
4 (
5   CS_SOLD_DATE_SK      INTEGER
6   CS_SOLD_TIME_SK      INTEGER
7   CS_SHIP_DATE_SK      INTEGER
8   CS_BILL_CUSTOMER_SK  INTEGER
9   CS_BILL_CDEMO_SK     INTEGER
10  CS_BILL_HDEMO_SK     INTEGER
11  CS_BILL_ADDR_SK       INTEGER
12  CS_SHIP_CUSTOMER_SK  INTEGER
13  CS_SHIP_CDEMO_SK     INTEGER
14  CS_SHIP_HDEMO_SK     INTEGER
```

Messages x History

Statement: CALL SYSRDL#CG.REMOTE_EXECUTE (' CREATE TABLE CATALOG_SALES (CS_SOLD_DATE_SK ...
Client elapsed time: 603.0 ms
Statement prepare time: 5.159 ms elapsed time, 4.385 ms CPU time
Statement execute time: 592.4 ms elapsed time, 6.054 ms CPU time
Peak memory consumed: 3.137 MB

SAP HANA Database Explorer

- 좌측 메뉴에서 Catalog >> Remote Sources 클릭
- 좌측 하단에서 SYSRDL#CG_SOURCE 클릭

SAP HANA Database Explorer

Data Lake 테이블 생성

The screenshot shows the SAP HANA Database Explorer interface. The left sidebar contains a 'Filter Databases' section with a search bar and a list of database categories. The main area displays the 'SYSRDL#CG_SOURCE' database details, including the adapter name 'IQODBC' and source location 'indexserver'. Below this, there are input fields for 'Database', 'Schema', 'Object', and 'Type'. The 'Schema' field is set to 'SYSRDL#CG'. A 'Search' button is located to the right of the input fields. Below the input fields, there is a table titled 'Remote Objects (2)' with columns for 'Database', 'Schema', 'Object', and 'Type'. The table contains two rows of data. A 'Create Virtual Object(s)' button is located to the right of the table.

1. Schema: **SYSRDL#CG** 선택

2. "Search" 버튼 클릭

3. Data Lake에 생성된 테이블 확인

4. "Create Virtual Objects" 버튼 클릭

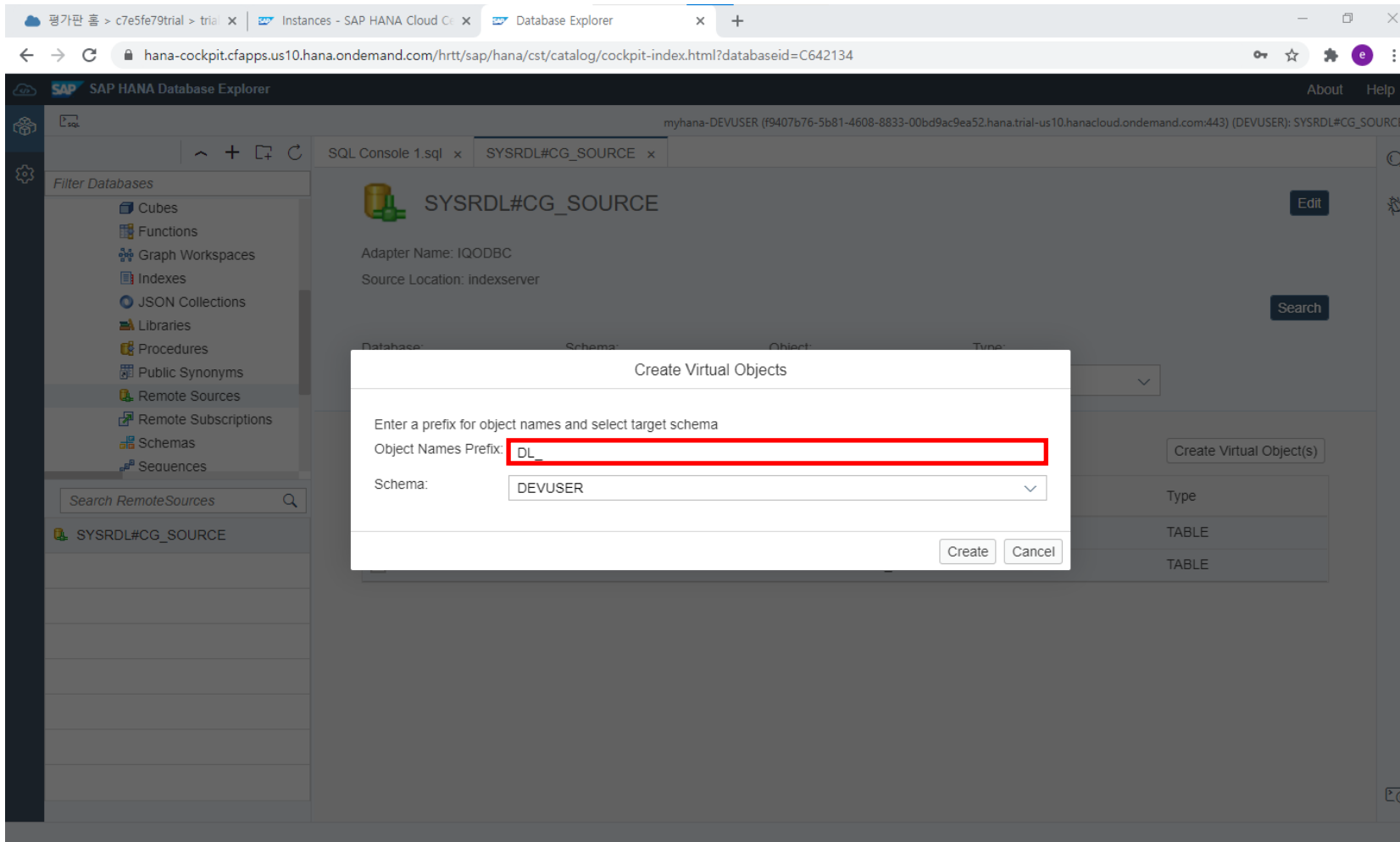
Database	Schema	Object	Type
<NULL>	SYSRDL#CG	CATALOG_SALES	TABLE
<NULL>	SYSRDL#CG	STORE_SALES	TABLE

SAP HANA Database Explorer

- Schema : **SYSRDL#CG** 선택
- "Search" 버튼 클릭
- Data Lake에 생성된 테이블 확인
- "Create Virtual Objects" 버튼 클릭

SAP HANA Database Explorer

Data Lake 테이블에 대한 Virtual 테이블 생성



SAP HANA Database Explorer

- Object Names Prefix : **DL_** 입력
- “Create” 버튼 클릭


SAP HANA Database Explorer

Data Lake 테이블에 대한 Virtual 테이블 생성

The screenshot displays the SAP HANA Database Explorer interface. On the left sidebar, the 'Tables' menu item is highlighted with a red box and a yellow circle containing the number 1. Below this, under the 'DEVUSER' section, a list of tables is shown, with 'DL_CATALOG_SALES' and 'DL_STORE_SALES' highlighted with a red box and a yellow circle containing the number 2. The main area of the interface shows the configuration for 'SYSRDL#CG_SOURCE'. It includes fields for 'Database' (set to <NULL>), 'Schema' (set to SYSRDL#CG), 'Object' (empty), and 'Type' (set to ANY). Below these fields is a table titled 'Remote Objects (2)' with columns for 'Database', 'Schema', 'Object', and 'Type'. The table contains two rows: one for 'CATALOG_SALES' and one for 'STORE_SALES', both of type 'TABLE'. A 'Create Virtual Object(s)' button is located to the right of the table.

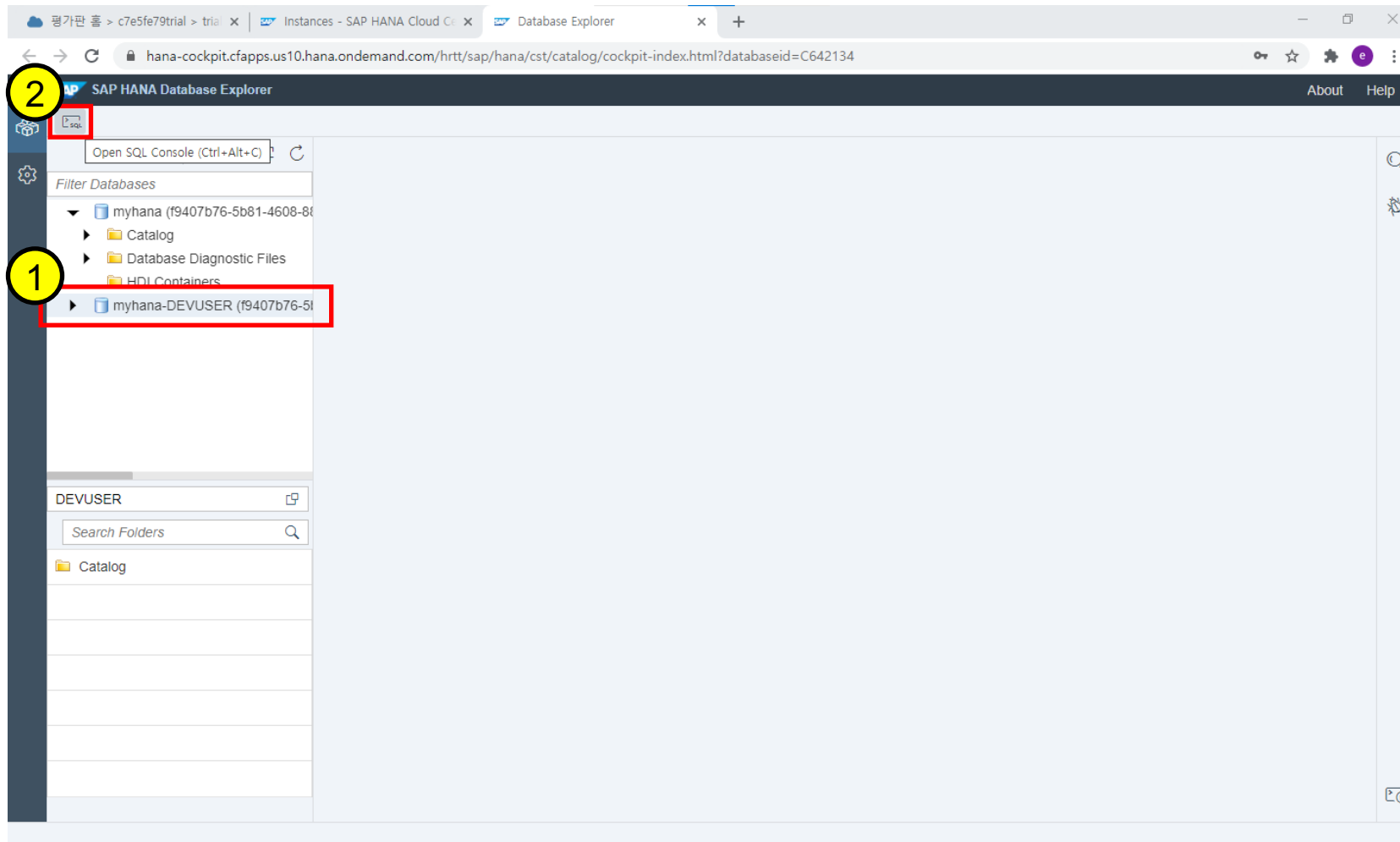
Database	Schema	Object	Type	
<input checked="" type="checkbox"/>	<NULL>	SYSRDL#CG	CATALOG_SALES	TABLE
<input checked="" type="checkbox"/>	<NULL>	SYSRDL#CG	STORE_SALES	TABLE

SAP HANA Database Explorer

- 좌측 메뉴에서 Catalog >> Tables 클릭
- 좌측 하단에 생성한 Virtual Table 리스트 확인
-  : Virtual Table

SAP HANA Database Explorer

AWS S3 File to Data Lake Data Load



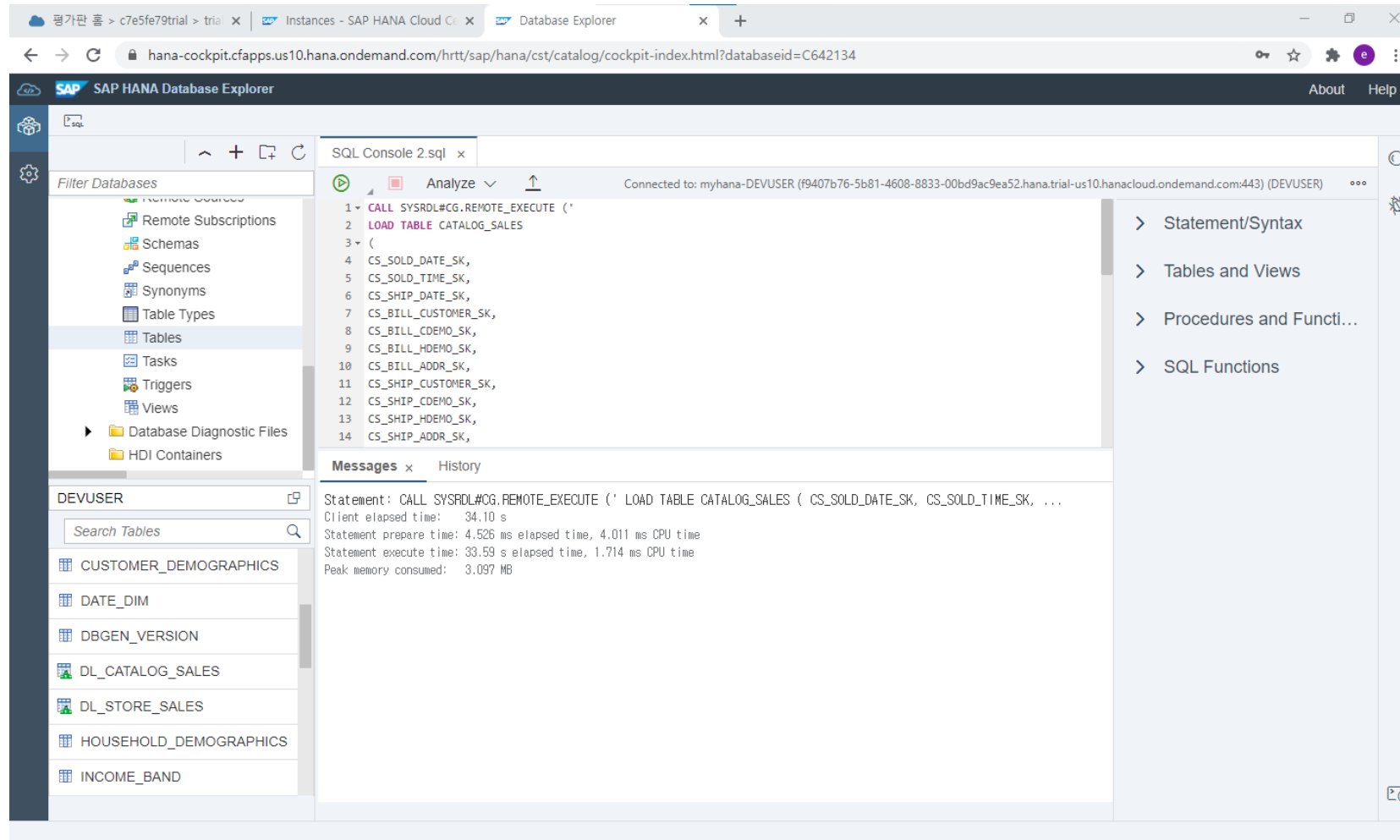
SAP HANA Database Explorer

- DEVUSER Connection 클릭
- “SQL” 버튼 클릭


SAP HANA Database Explorer

AWS S3 File to Data Lake Data Load

File Location :
https://github.com/euimankim/HANA_Cloud_Enablement



SAP HANA Database Explorer

- import_data_data_lake.sql 파일의 내용 중 1 단계 SQL을 복사 후 붙여넣기
-  버튼을 클릭하면 해당 SQL 실행

SAP HANA Database Explorer


AWS S3 File to Data Lake Data Load

File Location :
https://github.com/euimankim/HANA_Cloud_Enablement

The screenshot shows the SAP HANA Database Explorer web interface. The left sidebar displays a tree view of database objects, with 'Tables' selected. The main area shows a SQL console with the query: `select count(*) from DL_CATALOG_SALES`. The result is displayed in a table with one row and one column, showing the count of 1441548. The table has a header row with 'COUNT(*)' and a data row with the value '1441548'.

	COUNT(*)
1	1441548

SAP HANA Database Explorer

- import_data_data_lake.sql 파일의 내용 중 2 단계 SQL을 복사 후 붙여넣기
-  버튼을 클릭하면 해당 SQL 실행
- CATALOG_SALES 테이블의 적재 건수 확인

SAP HANA Database Explorer


AWS S3 File to Data Lake Data Load

File Location :
https://github.com/euimankim/HANA_Cloud_Enablement

The screenshot shows the SAP HANA Database Explorer web interface. The left sidebar displays a tree view of database objects, including 'Tables' and 'Database Diagnostic Files'. The main area shows a SQL console with a query: `select count(*) from DL_STORE_SALES`. The result is displayed in a table with one row and one column, showing the count of 2880404. The result table is highlighted with a red box.

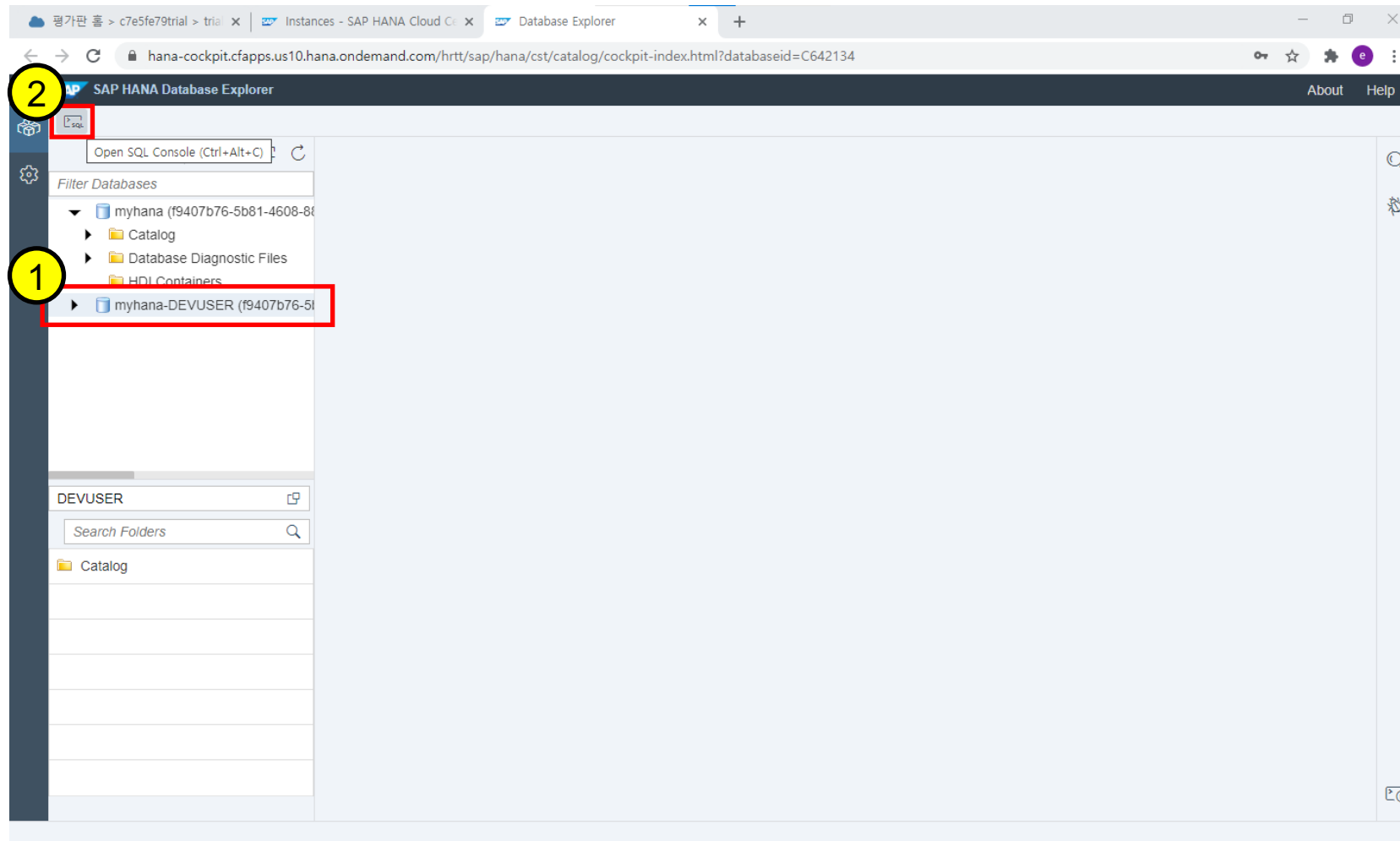
Rows (1)	COUNT(*)
1	2880404

SAP HANA Database Explorer

- import_data_data_lake.sql 파일의 내용 중 3 단계 SQL을 복사 후 붙여넣기
-  버튼을 클릭하면 해당 SQL 실행
- STORE_SALES 테이블의 적재 건수 확인

SAP HANA Database Explorer

HANA Cloud + Data Lake Join Query



SAP HANA Database Explorer

- DEVUSER Connection 클릭
- “SQL” 버튼 클릭

SAP HANA Database Explorer

HANA Cloud + Data Lake Join Query

File Location :
https://github.com/euimankim/HANA_Cloud_Enablement


The screenshot shows the SAP HANA Database Explorer web interface. The left sidebar contains a 'Filter Databases' section with a tree view of database objects: Remote Subscriptions, Schemas, Sequences, Synonyms, Table Types, Tables, Tasks, Triggers, Views, Database Diagnostic Files, and HDI Containers. Below this is a 'DEVUSER' section with a 'Search Tables' input field and a list of tables: CUSTOMER_DEMOGRAPHICS, DATE_DIM, DBGEN_VERSION, DL_CATALOG_SALES, DL_STORE_SALES, HOUSEHOLD_DEMOGRAPHICS, and INCOME_BAND. The main area is titled 'SQL Console 2.sql' and shows a SQL query:

```
1 select c_customer_id, c_first_name || ' ' || c_last_name, sum(ss_net_profit)
2 from customer, dl_store_sales
3 where c_customer_sk = ss_customer_sk
4 group by c_customer_id, c_first_name || ' ' || c_last_name
5 ;
```

 The query is connected to 'myhana-DEVUSER (f9407b76-5b81-4608-8833-00bd9ac9ea52.hana.trial-us10.hanacloud.ondemand.com:443) (DEVUSER)'. Below the query, the 'Result' tab is active, showing 'First 1000 rows' of data. The table has four columns: C_CUSTOMER_ID, C_FIRST_NAME||' '||C_LAST_NAME, and SUM(SS_NET_PROFIT). The first 11 rows are displayed.

	C_CUSTOMER_ID	C_FIRST_NAME ' ' C_LAST_NAME	SUM(SS_NET_PROFIT)
1	AAAAAAAHEKGAAAA	Mark Todd	-29442.46
2	AAAAAAAOKCAAAA	Ann Riggs	-5874.64
3	AAAAAADNKOAAAA	Seth Moore	-18662.89
4	AAAAAADHAAAAA	Freddie Rojas	-18254.72
5	AAAAAAMCEAAAA	Freddie Gamboa	-10527.95
6	AAAAAALBICBAAA	Carl Belcher	-24452.76
7	AAAAAANNJNAAAA	Catherine Murphy	-41568.54
8	AAAAAADNCGBAAA	Sonia Abrams	-28768.60
9	AAAAAAKCOBAAA	Jeff Craig	-22254.34
10	AAAAAAAFGGPAAAA	Nick Diaz	-7342.86
11	AAAAAAHLGPAAAA	Lovd Bartlett	-22326.84

SAP HANA Database Explorer

- query.sql 파일의 내용 중 2 단계 SQL을 복사 후 붙여넣기
-  버튼을 클릭하면 해당 SQL 실행
- Result 에서 결과 조회