Liberatii

Liberatii Gateway

for Oracle Applications

User Manual

(Microsoft Azure Test drive)

microlink

people focused solutions

Gold

Microsoft

Partner

Microsoft

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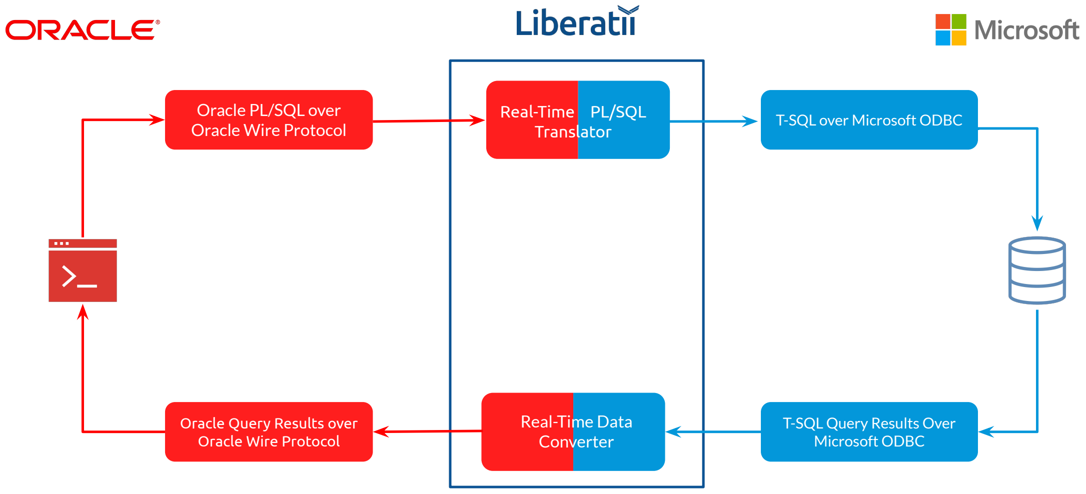
Overview

Liberatii™ Gateway is a real-time database application migration tool. In other words, Liberatii Gateway performs real-time SQL query translation and data conversion between a database application and a different target SQL database.

The first release of Liberatii Gateway supports migrations of Oracle applications to Microsoft databases. To clarify, Liberatii Gateway sits between an Oracle application and a Microsoft SQL database (Cloud, On-Premise), and in real-time with no measurable latency converts all the Oracle PL-SQL statements/result set to Microsoft T-SQL ones.

After deploying Liberatii Gateway (as depicted in the figure below), the Oracle application sends PL/SQL statements to Liberatii Gateway over Oracle wire protocol (TNS), and then Liberatii Gateway translates those statements into Microsoft T-SQL ones and consequently sends them to Microsoft SQL database.

After processing the T-SQL statements by Microsoft SQL database (Azure SQL or SQL server), the returned dataset or messages are converted by Liberatii Gateway to Oracle compatible results or messages and then sent back to the Oracle application over wire protocol.


ORACLE
Liberatii
Microsoft
Oracle PL/SQL over Oracle Wire Protocol
Real-Time PL/SQL Translator
T-SQL over Microsoft ODBC
Oracle Query Results over Oracle Wire Protocol
Real-Time Data Converter
T-SQL Query Results Over Microsoft ODBC

After deploying Liberatii Gateway, there is no need to keep the Oracle database and you can completely move to Microsoft Azure ecosystem and take advantage of its services.

About this Test Drive

Liberatii Gateway for Oracle Applications test drive on Azure market place is a SaaS offering which upon deployment, connects apps developed for Oracle database (11g) using thin JDBC to Azure SQL database without touching the application source code. After deploying you will be given the following information:

Access to Liberatii Gateway for Oracle Applications:

1. Oracle database username
2. Oracle database password
3. Host name
4. Port number
5. Oracle SID

Access to Azure SQL database backend:

1. Azure SQL database address
2. Port number
3. Azure SQL login
4. Azure SQL password
5. Database name

You can use the above information to connect your Oracle database application to an Azure SQL database via Liberatii Gateway as we will outline in the next section.

Requirements

To test Liberatii Gateway for Oracle Applications, you need an Oracle client application and Oracle database drivers on your client system. As for the database driver, Liberatii Gateway is tested with JDBC (thin client) 12.2.0.1.0 driver (ojdbc8.jar) which you can download from the following link:

https://www.oracle.com/technetwork/database/features/jdbc/jdbc-ucp-122-3110062.html.

As an Oracle application, you can download Oracle SQL Developer from the following link:
https://www.oracle.com/technetwork/developer-tools/sql-developer/downloads/sqldev-downloads-174-4412007.html

Once you have downloaded the SQL Developer and related database drivers, you can create scripts to see how seamlessly PL/SQL statements within an Oracle application are translated to T-SQL statements via Liberatii Gateway.

We have also provided a sample PL/SQL script to run in SQL developer available to download from our GitHub repository:
https://github.com/Liberatii/code_samples/blob/master/demo_static.sql

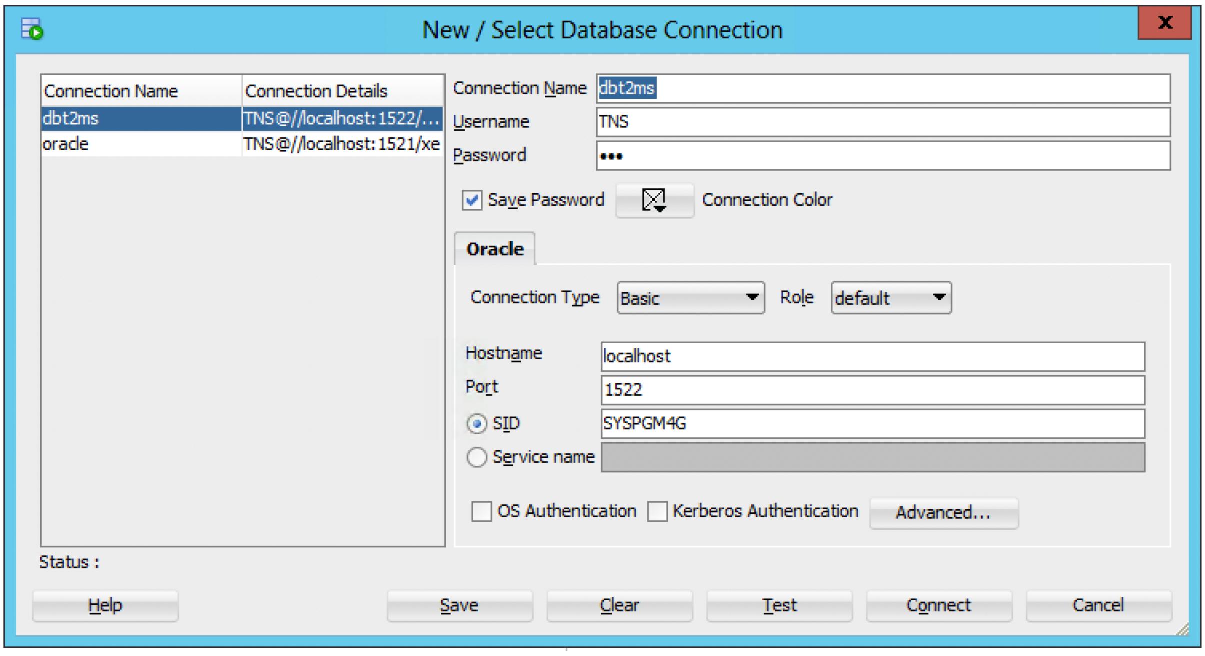
Steps to follow

Create database connections

Assuming that you already have an original Oracle database and a Liberatii Gateway instance with an Azure SQL database, you can create two connections in the SQL developer:

1. *oracle*: which is the connection to the local Oracle 11g database (you can skip this part if you don't have an Oracle database)
2. *dbt2ms*: which is the connection to the Microsoft Azure SQL via Liberatii Gateway

The values used for creating *dbt2ms* connection are the ones given after the launch of test drive:



New / Select Database Connection

Connection Name	Connection Details
dbt2ms	TNS@//localhost:1522/...
oracle	TNS@//localhost:1521/xe

Connection Name: dbt2ms

Username: TNS

Password: •••

☑ Save Password

Connection Color

Oracle

Connection Type: Basic

Role: default

Hostname: localhost

Port: 1522

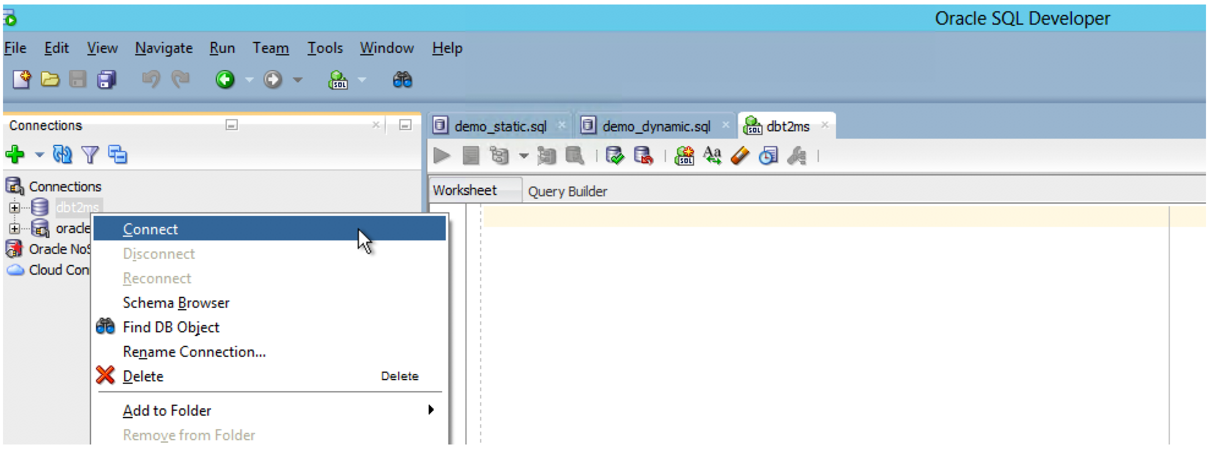
● SID: SYSPGM4G

○ Service name:

□ OS Authentication □ Kerberos Authentication

Status :

Prior to running the demo scripts, you can test both connections (*dbt2ms* and *oracle*), and make sure they are valid connections. Once created, right click on the connection and select *Connect*.



Run the demo script

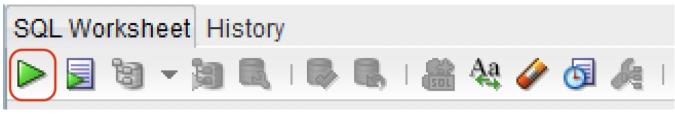
demo_static.sql script includes examples of static SQL and PL/SQL such as:

- Create table with constraints (PRIMARY KEY, NOT NULL, UNIQUE, CHECK and FOREIGN KEY constraints)
- Insert data into tables
- Create index on tables
- Query table (subquery and NVL function)

- Create view
- Query view
- Query table (WHERE EXISTS)
- Query table ((+) operator)
- Query table (FULL OUTER JOIN)
- Create table by CREATE TABLE AS SELECT
- Create package
- Create function with side effects
- Create sequence
- Alter sequences
- Delete from tables
- Update table
- Nested procedures and functions
- Create procedure with simple error handling
- Create procedure with error handling (predefined exceptions and user-defined exception)
- Procedure calls
- Invoking blocks with error handling

You can import the demo script to SQL developer by clicking on *File Menu -> Open* and then select *demo_static.sql* and finally click on open.

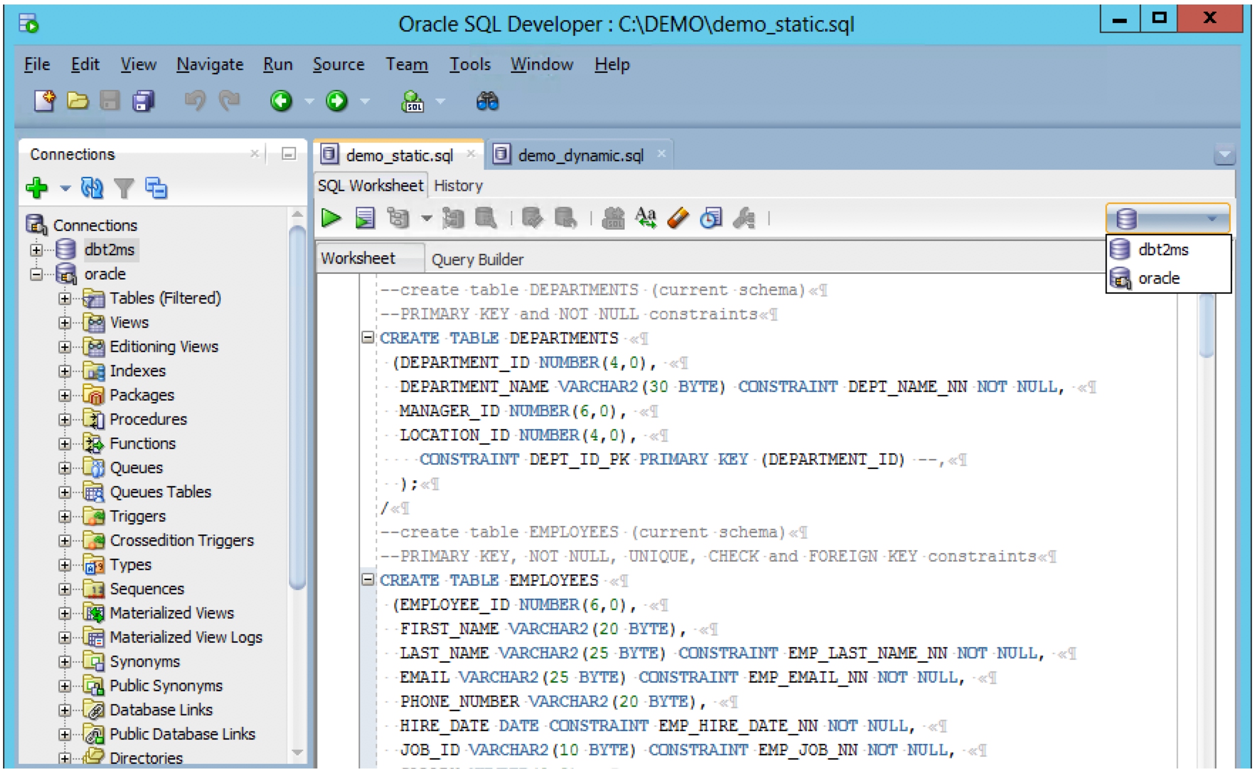
demo_static.sql script contains multiple code blocks and the best way to view the execution is to run code blocks one by one. To do so, select the code block and click on *shift + enter* or click on *Run statement* button.



To run each code block, we have to pay attention to the selected connection. By changing the connection on the top right corner of SQL developer, we can run the code against original Oracle database (oracle connection) or against Azure SQL via Liberatii Gateway (dbt2ms connection).

This would give a better view of Liberatii Gateway's performance as the fetch results and returned messages should be exactly the same on both connections. This is a fundamental pillar of Liberatii SQL translation technology as the applications should not notice the change of backend database while working with Liberatii Gateway.

The script will create objects during execution in the target database but will delete all at the end of the script. Therefore, it is important to run the scripts to the end in order to have a cleaned-up database after the demo.

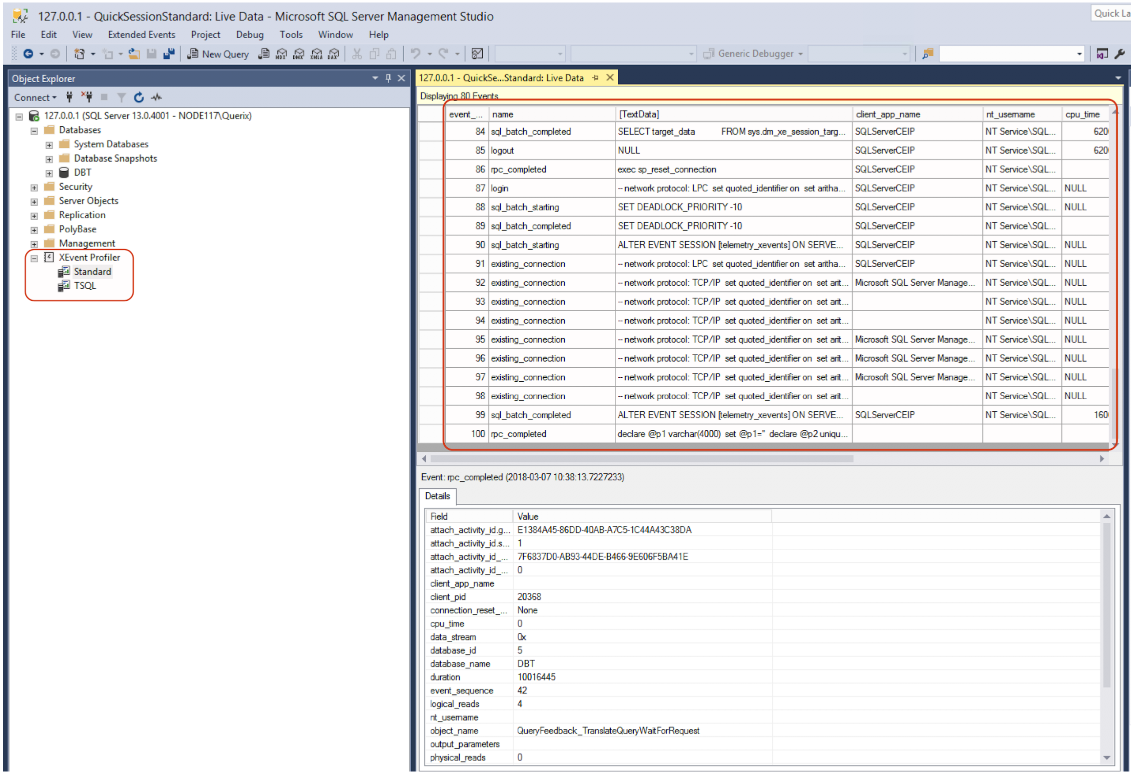


```
--create table DEPARTMENTS (current schema)
--PRIMARY KEY and NOT NULL constraints
CREATE TABLE DEPARTMENTS
 (DEPARTMENT_ID NUMBER(4,0),
  DEPARTMENT_NAME VARCHAR2(30 BYTE) CONSTRAINT DEPT_NAME_NN NOT NULL,
  MANAGER_ID NUMBER(6,0),
  LOCATION_ID NUMBER(4,0),
    CONSTRAINT DEPT_ID_PK PRIMARY KEY (DEPARTMENT_ID) --,
  );
/
--create table EMPLOYEES (current schema)
--PRIMARY KEY, NOT NULL, UNIQUE, CHECK and FOREIGN KEY constraints
CREATE TABLE EMPLOYEES
 (EMPLOYEE_ID NUMBER(6,0),
  FIRST_NAME VARCHAR2(20 BYTE),
  LAST_NAME VARCHAR2(25 BYTE) CONSTRAINT EMP_LAST_NAME_NN NOT NULL,
  EMAIL VARCHAR2(25 BYTE) CONSTRAINT EMP_EMAIL_NN NOT NULL,
  PHONE_NUMBER VARCHAR2(20 BYTE),
  HIRE_DATE DATE CONSTRAINT EMP_HIRE_DATE_NN NOT NULL,
  JOB_ID VARCHAR2(10 BYTE) CONSTRAINT EMP_JOB_NN NOT NULL,
```

Double-checking the translation

In order to further verify the translations from Oracle to Microsoft SQL server, we can activate Microsoft SQL Profiler in SQL Server Management Studio and monitor the live T-SQLs coming to the Microsoft Azure SQL. You can download SQL server management studio from here: https://docs.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms?view=sql-server-2017

To connect to the Azure SQL database, use the credentials given to you after the launch of test drive (see page 3).


127.0.0.1 - QuickSessionStandard: Live Data - Microsoft SQL Server Management Studio
Quick La
File
Edit
View
Extended Events
Project
Debug
Tools
Window
Help
New Query
Generic Debugger
Object Explorer
Connect
127.0.0.1 - QuickSe...Standard: Live Data
Details

127.0.0.1 (SQL Server 13.0.4001 - NODE117\Querix)
- Databases
  - System Databases
  - Database Snapshots
  - DBT
- Security
- Server Objects
- Replication
- PolyBase
- Management
- XEvent Profiler
  - Standard
  - TSQL

Displaying 80 Events

event_...	name	[TextData]	client_app_name	nt_usemame	cpu_time
84	sql_batch_completed	SELECT target_data FROM sys.dm_xe_session_targ...	SQLServerCEIP	NT Service\SQL...	620
85	logout	NULL	SQLServerCEIP	NT Service\SQL...	620
86	rpc_completed	exec sp_reset_connection	SQLServerCEIP	NT Service\SQL...	
87	login	-- network protocol: LPC set quoted_identifier on set aritha...	SQLServerCEIP	NT Service\SQL...	NULL
88	sql_batch_starting	SET DEADLOCK_PRIORITY -10	SQLServerCEIP	NT Service\SQL...	NULL
89	sql_batch_completed	SET DEADLOCK_PRIORITY -10	SQLServerCEIP	NT Service\SQL...	
90	sql_batch_starting	ALTER EVENT SESSION [telemetry_xevents] ON SERVE...	SQLServerCEIP	NT Service\SQL...	NULL
91	existing_connection	-- network protocol: LPC set quoted_identifier on set aritha...	SQLServerCEIP	NT Service\SQL...	NULL
92	existing_connection	-- network protocol: TCP/IP set quoted_identifier on set arit...	Microsoft SQL Server Manage...	NT Service\SQL...	NULL
93	existing_connection	-- network protocol: TCP/IP set quoted_identifier on set arit...		NT Service\SQL...	NULL
94	existing_connection	-- network protocol: TCP/IP set quoted_identifier on set arit...		NT Service\SQL...	NULL
95	existing_connection	-- network protocol: TCP/IP set quoted_identifier on set arit...	Microsoft SQL Server Manage...	NT Service\SQL...	NULL
96	existing_connection	-- network protocol: TCP/IP set quoted_identifier on set arit...	Microsoft SQL Server Manage...	NT Service\SQL...	NULL
97	existing_connection	-- network protocol: TCP/IP set quoted_identifier on set arit...	Microsoft SQL Server Manage...	NT Service\SQL...	NULL
98	existing_connection	-- network protocol: TCP/IP set quoted_identifier on set arit...		NT Service\SQL...	NULL
99	sql_batch_completed	ALTER EVENT SESSION [telemetry_xevents] ON SERVE...	SQLServerCEIP	NT Service\SQL...	160
100	rpc_completed	declare @p1 varchar(4000) set @p1='' declare @p2 uniqu...			

Event: rpc_completed (2018-03-07 10:38:13.7227233)

Field	Value
attach_activity_id.g...	E1384A45-86DD-40AB-A7C5-1C44A43C38DA
attach_activity_id.s...	1
attach_activity_id_...	7F6837D0-AB93-44DE-B466-9E606F5BA41E
attach_activity_id_...	0
client_app_name	
client_pid	20368
connection_reset_...	None
cpu_time	0
data_stream	0x
database_id	5
database_name	DBT
duration	10016445
event_sequence	42
logical_reads	4
nt_usemame	
object_name	QueryFeedback_TranslateQueryWaitForRequest
output_parameters	
physical_reads	0