

Oracle Assessment Query Execution Logs and Source Code Extraction Prerequisites

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1. Introduction

LeapLogic's Assessment profiles existing inventory, identifies complexity, performs dependency analysis, and provides recommendations for migration to modern data platform.

Assessment checklist

Information	Format	Availability?
Oracle Query Logs (SQL given below)	File Export in text format	Choose an item.
Hardware Configuration	File Export in text format	Choose an item.
Software Version	Inline in the document	Choose an item.
Database Object Count	File Export in text format	Choose an item.
Database Volume	File Export in text format	Choose an item.
High Data Volume Tables	File Export in text format	Choose an item.
Total Number of Users	File Export in text format	Choose an item.
Data for Partitioning / Bucketing	File Export in text format	Choose an item.
Source Code (Extracts)	File Export	Choose an item.

Follow the steps in section 2, 3 to collect the required information for assessment.

2. Prerequisites

See the below prerequisites for the extraction of Oracle query execution logs.

- AWR should be up and running
- AWR retention should be greater than 1, example, if retention is 30, system retrieves 30 days of query logs
- TOPNSQL should be set to maximum. If it isn't, we may not get all the SQL details

Limitation - SQL with <10 sec execution time will not come in logs (Oracle default behavior)

SQL to check current AWR settings:

```
select * from dba_hist_wr_control
```

- AWR settings can be modified using the below command

```
dbms_workload_repository.modify_snapshot_settings(interval => 60,retention => 43200,topnsql  
=>'MAXIMUM');
```

Follow the steps in section 3, 4 to collect the required information for assessment.

3. Security Considerations and Disclaimer

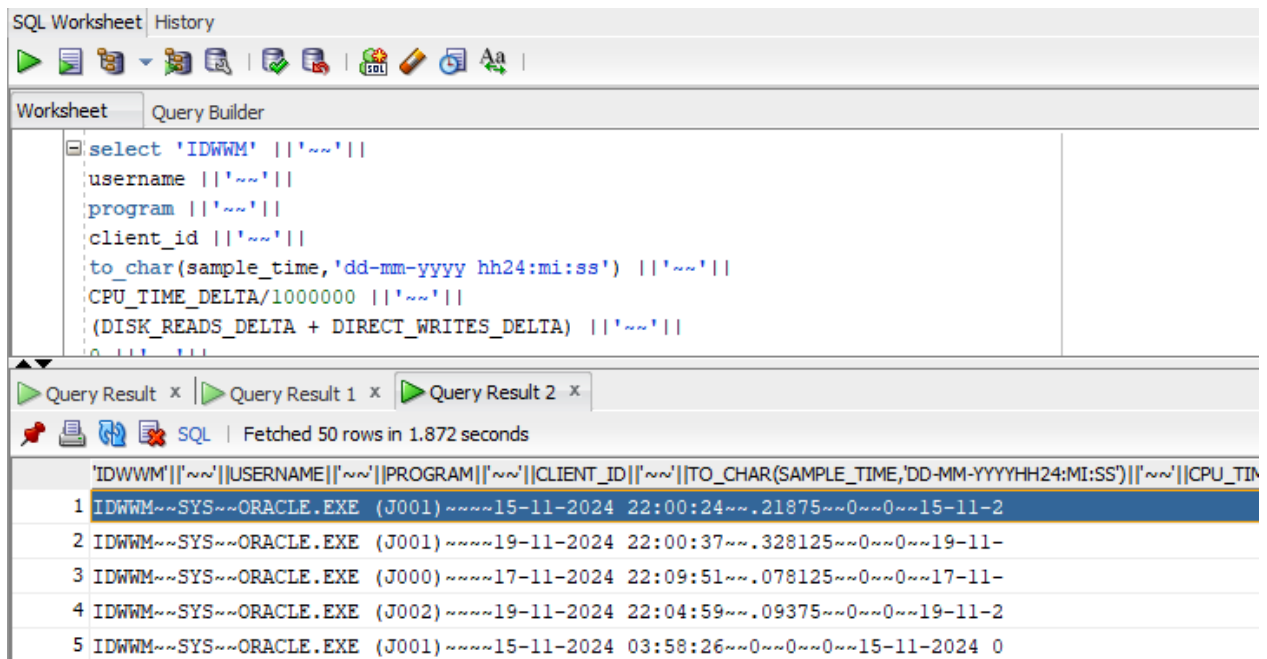
The intention of this document is to export just the database objects and schema. LeapLogic does not need any kind of customer data for executing assessment or code transformation.

- The steps given in this document for exporting the required workloads does not alter or modify any data.
- It primarily consists of Select queries only.
- The required metadata is fetched from the system tables, not from the tables used in the customer's environment.

4. Assessment Process

Use SQL Developer (Preferred) to export all your database objects and logs. Follow the below given steps to start exporting the workloads from your environment.

1. Run the respective queries that you see in the subsequent sub-sections using SQL Developer.

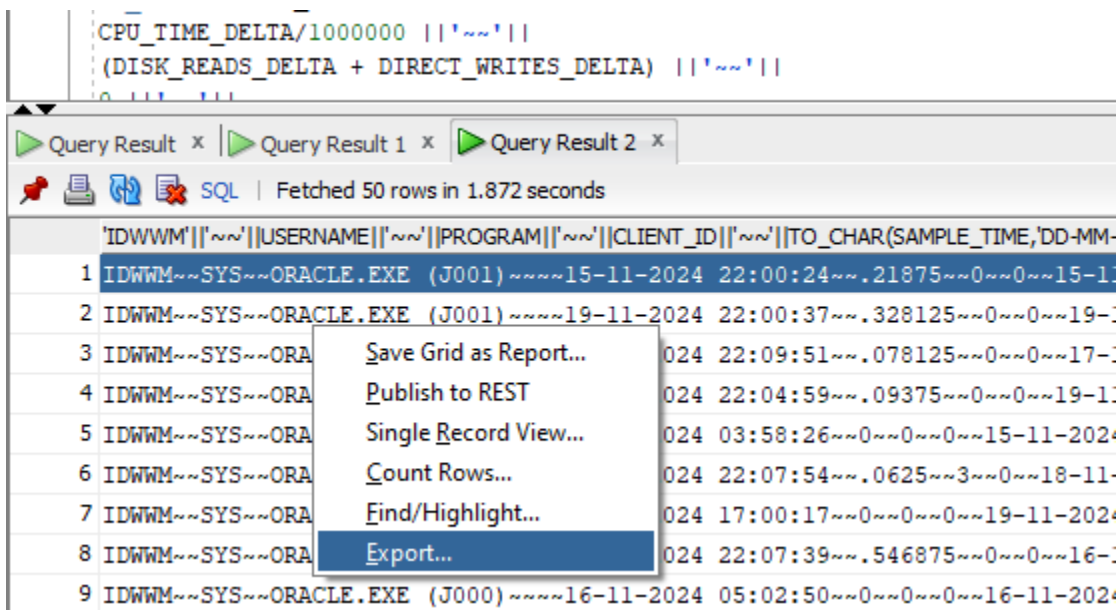


The screenshot shows the SQL Developer interface. The top pane displays a SQL query that selects various system metrics for the IDWWM session. The bottom pane shows the results of the query, which are 50 rows of data. The first row is highlighted in blue.

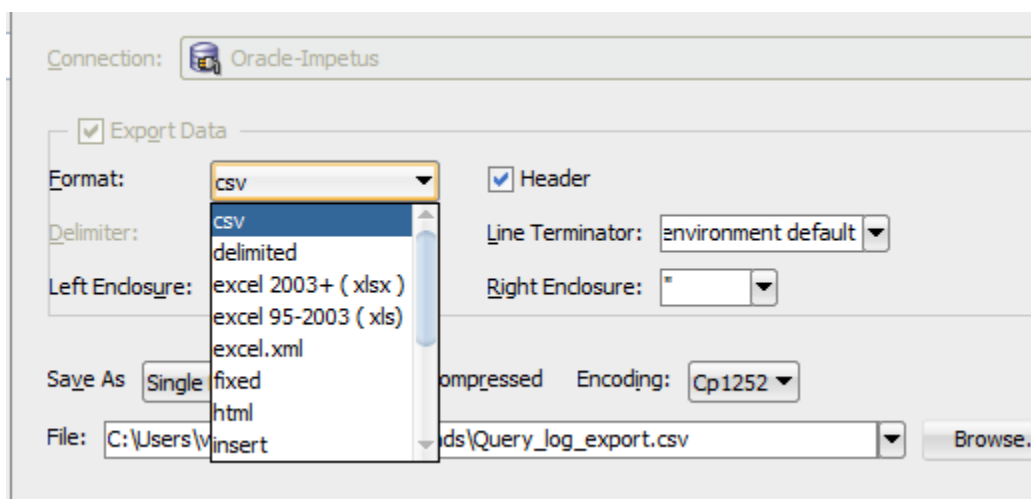
```
select 'IDWWM' || '~' ||  
username || '~' ||  
program || '~' ||  
client_id || '~' ||  
to_char(sample_time,'dd-mm-yyyy hh24:mi:ss') || '~' ||  
CPU_TIME_DELTA/1000000 || '~' ||  
(DISK_READS_DELTA + DIRECT_WRITES_DELTA) || '~' ||  
0 || '~' ||
```

	IDWWM	~	USERNAME	~	PROGRAM	~	CLIENT_ID	~	TO_CHAR(SAMPLE_TIME,'DD-MM-YYYYHH24:MI:SS')	~	CPU_TIN
1	IDWWM	~	SYS	~	ORACLE.EXE	~	(J001)	~	15-11-2024 22:00:24	~	.21875~0~0~15-11-2
2	IDWWM	~	SYS	~	ORACLE.EXE	~	(J001)	~	19-11-2024 22:00:37	~	.328125~0~0~19-11-
3	IDWWM	~	SYS	~	ORACLE.EXE	~	(J000)	~	17-11-2024 22:09:51	~	.078125~0~0~17-11-
4	IDWWM	~	SYS	~	ORACLE.EXE	~	(J002)	~	19-11-2024 22:04:59	~	.09375~0~0~19-11-2
5	IDWWM	~	SYS	~	ORACLE.EXE	~	(J001)	~	15-11-2024 03:58:26	~	0~0~0~15-11-2024 0

2. Right-click on the result and choose "Export".



3. In the **Export wizard**, choose **CSV** as the **format**.



4. Enable the compression, specify the file name and location for the export file.

5. Click "Next" and then "Finish" to export the query result to a compressed file.

4.1 Logs Extraction

This requires query log in a CSV format. It should be enabled on the data warehouse. The CSV file must have following columns (~~ separated file) retrieved from DBA_HIST* tables.

```
Filler~~UserName~~Progam~~ClientID~~StartTime~~CPUTime~~TotalIOCount~~ParserCPUTime~~FirstRes
pTime~~FirstStepTime~~ProcID~~QueryID~~MaxCPUTime~~MaxIO~~totalCPU~~totalIO~~Query_Executio
n_Time~~SchemaNAME~~SQLTYPE~~SQLTEXTINFO~~ execution_frequency
```

There are two options for query execution log extraction. The preferred one is GUI based. In case, there're any problems encountered with the GUI-based option, then PL/SQL-based option can be used.

4.1.1 Option I: GUI Based

Preferably, use a GUI tool such as SQL Developer or Toad etc. for gathering the log information from Oracle. All the environment specific variables are highlighted in **Green**.

The SQL query to collect the required log information is as given below.

```
select 'IDWWM' || '~~' ||
username || '~~' ||
program || '~~' ||
client_id || '~~' ||
to_char(sample_time,'dd-mm-yyyy hh24:mi:ss') || '~~' ||
CPU_TIME_DELTA/1000000 || '~~' ||
```

```

(DISK_READS_DELTA + DIRECT_WRITES_DELTA) || '~' ||
0 || '~' ||
to_char(sample_time + ELAPSED_TIME_DELTA/86400000000,'dd-mm-yyyy hh24:mi:ss') || '~' ||
to_char(sample_time,'dd-mm-yyyy hh24:mi:ss') || '~' ||
0 || '~' ||
a.sql_id || '~' ||
CPU_TIME_DELTA/1000000 || '~' ||
(DISK_READS_DELTA + DIRECT_WRITES_DELTA) || '~' ||
sum(CPU_TIME_DELTA/1000000) over (partition by trunc(sample_time)) || '~' ||
sum(DISK_READS_DELTA + DIRECT_WRITES_DELTA) over(partition by trunc(sample_time)) || '~' ||
ELAPSED_TIME_DELTA/1000000 || '~' ||
parsing_schema_name || '~' ||
v.command_name || '~' ||
sql_text || '~' ||
executions_delta
from
(
select t.*,row_number() over(partition by snap_id,sql_id order by sample_time) as rn from
dba_hist_active_sess_history t
where cast( sample_time as date) between to_date('15-11-2024', 'dd-mm-yyyy') and to_date('20-11-
2024', 'dd-mm-yyyy')
)a,
dba_hist_sqlstat b,
dba_hist_sqltext c,
dba_users d,
v$sqlcommand v
where
a.sql_id = b.sql_id
and a.snap_id = b.snap_id
and b.sql_id = c.sql_id
and d.user_id = a.user_id
and a.rn = 1
and c.command_type=v.command_type
order by a.sql_id;

```

Note: Modify the highlighted text above to adjust date range.

4.1.2 Option II: PL/SQL Based

In case of any problem with the GUI-based option, execute the attached PL/SQL block.



extract_oracle_log.
docx

Note: Replace all the highlighted variables (in green) as per the requirements in the extract_oracle_log.docx

4.2 Hardware Configuration

The details of hardware configuration are required for the calculation of total CPU utilization. Please provide the following details.

- Oracle series and specs (Cores, RAM, HDD/SDD)
- Number of nodes in the cluster (RAC)

4.3 Software Version

This query provides the software version in use. Save its results in a CSV file.

```
select * from v$version
```

4.4 Database Objects

This query provides the count of database objects in use. Save its results in a CSV file.

```
select owner,object_type,count(object_name) from dba_objects group by owner,object_type;
```

4.5 Database Volume

This query provides the database volume greater than 10 GB in use. Save its results in a CSV file.

Note: The filter condition can be changed for collecting lower volumes.

```
select owner,sum(bytes)/1024/1024/1024 from dba_segments group by owner order by 2 desc;
```

4.6 High Data Volume Tables

This query provides results for tables with high data volume. Save its results in a CSV file. This SQL will collect databases with volume equal or above 10 GB.

Note: The filter condition can be changed for collecting lower volumes.

```
select
  a.owner,
  a.segment_name as table_name,
  a.tab_size_gb,
```



```

    b.partitioning_type,
    b.partition_count,
    c.num_rows
from
(
    select owner,segment_name,sum(bytes)/1024/1024/1024 tab_size_gb from dba_segments where
segment_type='TABLE'
    group by owner,segment_name
)a
left outer join dba_part_tables b
on a.owner = b.owner
and a.segment_name = b.table_name
left outer join dba_tables c
on a.owner = c.owner
and a.segment_name = c.table_name

```

4.7 Users

This query provides the total number of users. Save its results in a CSV file.

```
select username from dba_users
```

4.8 Data for Partitioning / Bucketing

This query extracts table size and column details to be utilized for partitioning and bucketing recommendations. Save the result in a CSV file.

```

SELECT Sys_context('userenv', 'db_name') AS DATABASE_NAME,
DBA_TAB.table_name AS Table_Name,
Sum(us.bytes)AS TABLE_SIZE_BYTES,
Nvl(ut.num_rows, 0) AS NUM_ROWS,
DBA_TAB.column_name AS Column_Name,
Nvl(DBA_TAB.num_distinct, 0) AS num_unique_val
FROM dba_tab_columns DBA_TAB
JOIN user_segments US
ON ( DBA_TAB.table_name = us.segment_name )
JOIN user_tables ut
ON( DBA_TAB.table_name = ut.table_name )
WHERE owner NOT IN ( 'ANONYMOUS', 'APEX_040200', 'APEX_PUBLIC_USER',
'APPQOSSYS',
'AUDSYS', 'BI', 'CTXSYS', 'DBSNMP',
'DIP', 'DVF', 'DVSYS', 'EXFSYS',
'FLOWS_FILES', 'GSMADMIN_INTERNAL', 'GSMCATUSER',

```

```
'GSMUSER',
'HR', 'IX', 'LBACSYS', 'MDDATA',
'MDSYS', 'OE', 'ORACLE_OCM', 'ORDDATA',
'ORDPLUGINS', 'ORDSYS', 'OUTLN', 'PM',
'SCOTT', 'SH', 'SI_INFORMTN_SCHEMA',
'SPATIAL_CSW_ADMIN_USR',
'SPATIAL_WFS_ADMIN_USR', 'SYS', 'SYSBACKUP', 'SYSDG',
'SYSKM', 'SYSTEM', 'WMSYS', 'XDB',
'SYSMAN', 'RMAN', 'RMAN_BACKUP', 'OLAPSYS',
'APEX_030200', 'OWBSYS' )
GROUP BY Sys_context('userenv', 'db_name'),
        DBA_TAB.table_name,
        Nvl(DBA_TAB.num_distinct, 0),
        Nvl(ut.num_rows, 0),
        DBA_TAB.column_name;
```

5. Database Objects

There are two options for extracting database objects like tables, views, and procedures. The first option is to use the Oracle SQL Developer tool. The second option is to use a Java-based utility.

5.1 DDL Export – Using SQL Developer

Oracle SQL Developer is an integrated development environment for working with SQL in Oracle databases. You can download it as either an installer or zip file from the [official website](#).

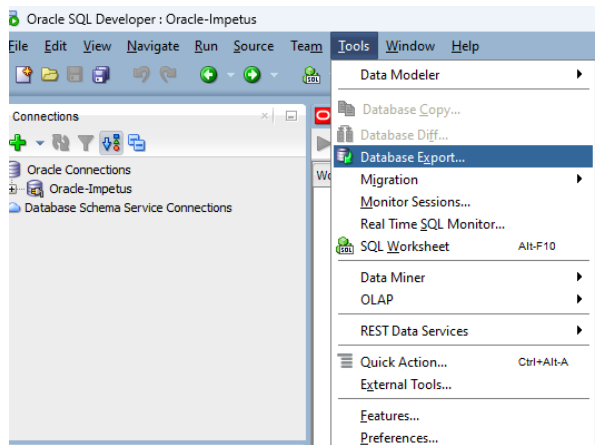
Follow these steps once **SQL Developer** is set up.

Connect to Oracle using SQL Developer

Connect to the server using SQL Developer by entering details such as the **hostname/IP**, **username**, **password**, **port**, and **SID**. Test the connection and save it.

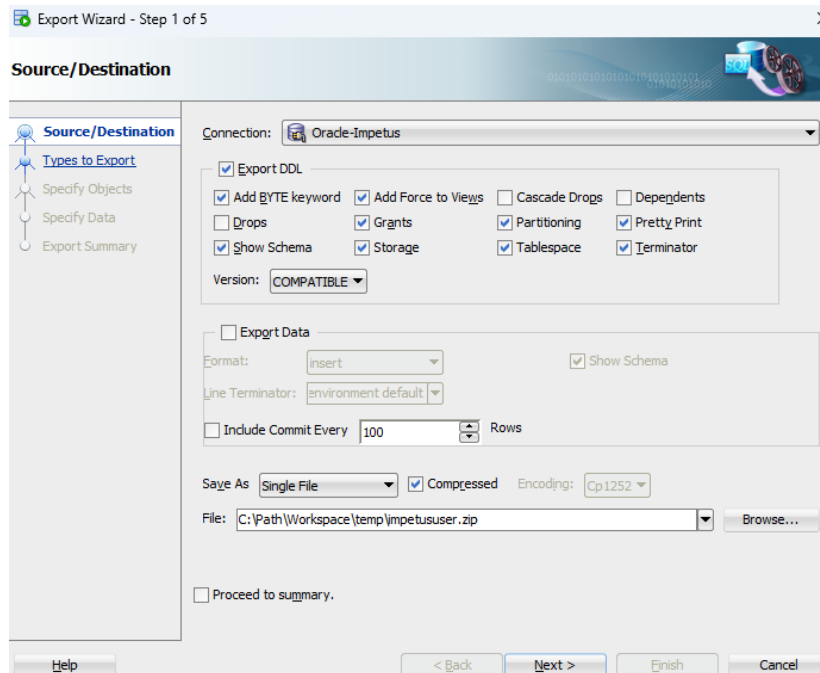
The screenshot shows the 'New / Select Database Connection' dialog box in Oracle SQL Developer. The dialog is divided into two main sections: 'Connection Name' and 'Connection Details'. The 'Connection Details' section is further divided into 'User Info' and 'Details' tabs. The 'User Info' tab is active, showing fields for 'Name' (Oracle-Impetus), 'Database Type' (Oracle), 'Authentication Type' (Default), 'Username' (impetususer), 'Password' (masked with dots), 'Role' (default), and 'Connection Type' (Basic). The 'Details' tab is also visible, showing fields for 'Hostname' (impetus-oracle-server), 'Port' (1521), 'SID' (ORCL), and 'Service name'. At the bottom of the dialog, there are buttons for 'Help', 'Save', 'Clear', 'Test', 'Connect', and 'Cancel'.

After connecting to Oracle, navigate to **Tools** and select the **Database Export** option.

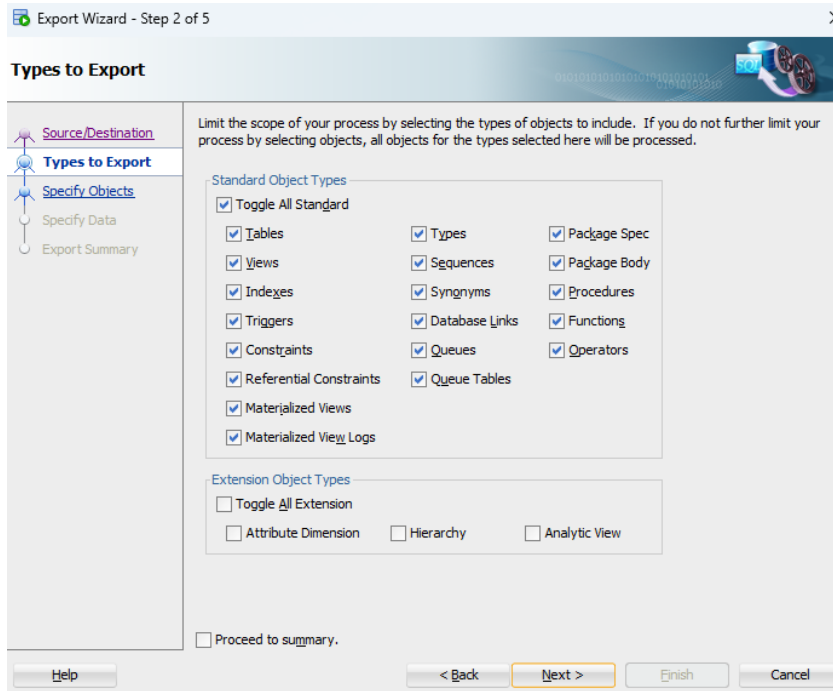


On the Source/Destination screen:

- Select the Oracle connection saved in the first step.
- Check only the **Export DDL** option and uncheck the **Export Data** option.
- Enable the **Compression** option.
- Specify the file **path** and file name.
- Retain all the default settings.
- Click **Next**.

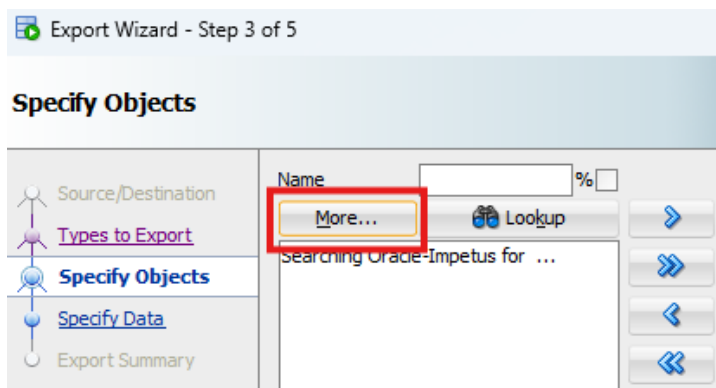


On the **Types to Export** screen, retain all the default options and click **Next**.



On the **Specify Objects** screen:

- Click on **More** and ensure the **Type** is set to **ALL OBJECTS**.
- Click **Next**.



Finally, you will see the **Export Summary**. Click **Finish** to export the DDLs.

5.2 DDL Export – Using Java Utility

Another option is to export database objects using the **Java Utility**. Click [here](#) to download. This utility is compatible with both **Linux** and **Windows** environments.

Windows Environment

After downloading the utility, extract the zip file and navigate to the bin folder. Modify the **highlighted** variables in the **schema_extract.bat** file.

Note: The utility has been tested with **Java 8**.

```
set IDW_WMG_HOME=C:\\Path\\Oracle_code_extractor
set IDW_WMG_LOG=%IDW_WMG_HOME%\\logs
set IDW_WMG_CONF=%IDW_WMG_HOME%\\conf
set JAVA_HOME=C:\\Program Files\\Java\\jdk1.8.0_121

%JAVA_HOME%\\bin\\java -Xms512m -Xmx1024m -Xmn128m -Xss256k -XX:MetaspaceSize=64m
-XX:MaxMetaspaceSize=512m -XX:+UseParallelOldGC -XX:LargePageSizeInBytes=4m -
XX:+PrintGCDetails -XX:+UseCompressedOops -XX:+PrintGCDateStamps -verbosegc -
Xloggc:%IDW_WMG_HOME%\\run\\gc_schema_ex.log -XX:+HeapDumpOnOutOfMemoryError -
XX:HeapDumpPath=%IDW_WMG_HOME%\\run\\ -cp "%IDW_WMG_HOME%\\lib\\"*
com.impetus.idw.wmg.db.core.code.extract.EDWCodeExtractor "oracle_assessment"
"%IDW_WMG_HOME%\\temp\\" "oracle" "SID" "HOST" "PORT" "Username" "Password"
"Schema1,schema2"
```

After making the required changes, double-click the **schema_extract.bat** file. The utility will begin extracting the database objects for the specified schema, saving them to the **temp** folder.

Linux Environment

After downloading the utility, extract the zip file and navigate to the bin folder. Modify the **highlighted** variables in the **schema_extract.sh** file.

Note: The utility has been tested on **Java 8**.

```
export IDW_WMG_HOME="$(cd "$(dirname "$0")/.." ; pwd)";
export IDW_WMG_LOG="${IDW_WMG_HOME}/logs/"
export IDW_WMG_CONF="${IDW_WMG_HOME}/conf/"
export JAVA_HOME="/opt/jdk1.8.0_181"

${JAVA_HOME}/bin/java -Xms512m -Xmx1024m -Xmn128m -Xss256k -XX:MetaspaceSize=64m -
XX:MaxMetaspaceSize=512m -XX:+UseParallelOldGC -XX:LargePageSizeInBytes=4m -
XX:+PrintGCDetails -XX:+UseCompressedOops -XX:+PrintGCDateStamps -verbosegc -
Xloggc:${IDW_WMG_HOME}/run/gc_schema_ex.log -XX:+HeapDumpOnOutOfMemoryError -
XX:HeapDumpPath=${IDW_WMG_HOME}/run/ -cp :${IDW_WMG_HOME}/lib/*
com.impetus.idw.wmg.db.core.code.extract.EDWCodeExtractor "oracle_assessment"
"${IDW_WMG_HOME}/temp/" "oracle" "${sid}" "${IP}" "1521" "${username}" "${pwd}"
"${SchemaName1},{SchemaName2}..."
```

After making the required changes, execute the **schema_extract.sh** file.

```
sh schema_extract.sh
```

The utility will begin extracting the database objects for the specified schema, saving them to the **temp** folder.

6. Source Code Assessment

Provide the below active or in-scope Oracle source code artifacts as applicable in the migration scope.

Sl. No.	Code Artifact	Criticality	Remarks
1	Orchestration Scripts (Control-M / Autosys / Cron etc.)	Must	To identify interdependencies across scheduler scripts / jobs, queries, and dependent workloads
2	Procedures / Functions*	Must	To identify workload complexity, query count, effort estimation and technical debt
3	Packages*	Must	To identify PL/SQL count, complexity and effort estimations
4	Views	Must	To identify view complexity, patterns and effort estimations
5	Shell Scripts*	Must	To identify count, dependencies, SQL queries and PL/SQL, logics (example email, notification etc.) and effort estimations
6	DDL	Must	To identify column usage, and provide recommendation on column level lineage, and query optimization on the target system
7	DML / SQL Files*	Must	To identify count, dependencies, SQL queries and effort estimations
8	CTL Files*	Must	To identify source data type and formats example Delimiters, JSON etc.
9	Sequences	Must	To estimate efforts, example, custom sequence
10	Indexes	Could	To recommend partitioning / bucketing strategy (depends on the target of choice)

Note:

Limit: Assuming the orchestration script is a trigger point for every single use case execution in the existing setup. If you are not comfortable sharing all the workloads, then share those workloads which are referred or executed through the orchestration scripts. However, in such scenarios the scope and effort estimates will be based on the given workloads.