

# SQL Trace and TKPROF

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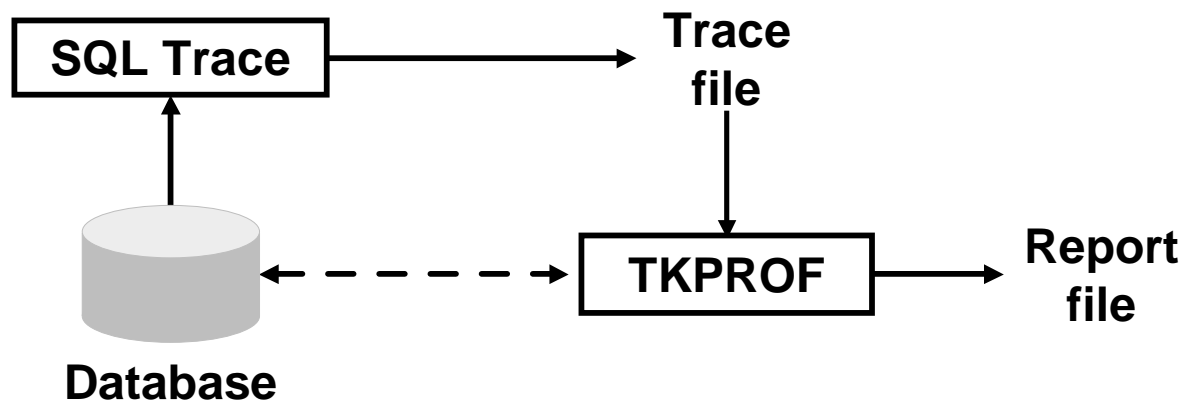
# Objectives

**After completing this lesson, you should be able to do the following:**

- **Configure the SQL Trace facility to collect session statistics**
- **Enable SQL Trace and locate your trace files**
- **Format trace files using the TKPROF utility**
- **Interpret the output of the TKPROF command**

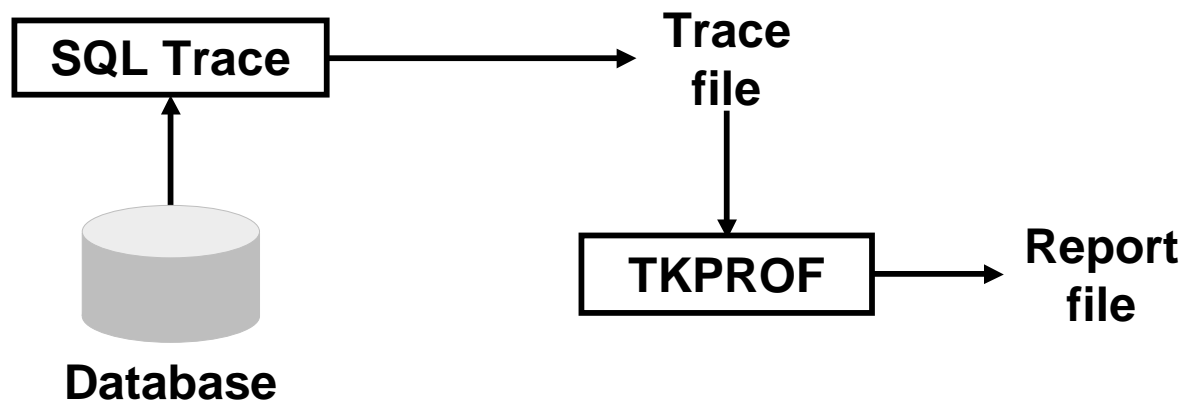
# SQL Trace Facility

- Is enabled at the instance or session level
- Gathers statistics for SQL statements
- Produces output that can be formatted by TKPROF



# How to Use the SQL Trace Facility

1. Set the initialization parameters.
2. Enable tracing.
3. Run the application.
4. Disable tracing and format the trace file.
5. Interpret the output.



# Initialization Parameters

```
TIMED_STATISTICS = {false|true}  
MAX_DUMP_FILE_SIZE = {n|unlimited}  
USER_DUMP_DEST = directory_path
```

- **MAX\_DUMP\_FILE\_SIZE** is measured in operating system blocks.
- **Default USER\_DUMP\_DEST** is the location of the background dump destination.

# Enabling SQL Trace

- For an instance, set the following parameter:

```
SQL_TRACE = TRUE
```

- For your current session:

```
SQL> ALTER SESSION SET sql_trace = true;
```

```
SQL> EXECUTE dbms_session.set_sql_trace(true);
```

- For any session:

```
SQL> EXECUTE dbms_system.set_sql_trace_in_session  
2 (session_id, serial_id, true);
```

# Formatting Your Trace Files

```
OS> tkprof tracefile outputfile [options]
```

## TKPROF command examples:

```
OS> tkprof  
OS> tkprof ora_902.trc run1.txt  
OS> tkprof ora_902.trc run2.txt sys=no  
    sort=execpu print=3
```

# TKPROF Command Options

```
SORT = option  
PRINT = n  
EXPLAIN = username/password  
INSERT = filename  
SYS = NO  
AGGREGATE = NO  
RECORD = filename  
TABLE = schema.tablename
```



# Output of the TKPROF Command

- **Text of the SQL statement**
- **Trace statistics (for statement and recursive calls) separated into three SQL processing steps:**

<b>PARSE</b>	<b>Translates the SQL statement into an execution plan</b>
<b>EXECUTE</b>	<b>Executes the statement (This step modifies the data for INSERT, UPDATE, and DELETE statements.)</b>
<b>FETCH</b>	<b>Retrieves the rows returned by a query (Fetches are performed only for SELECT statements.)</b>

# Output of the TKPROF Command

**Seven categories of trace statistics:**

<b>Count</b>	<b>Number of times procedure was executed</b>
<b>CPU</b>	<b>Number of seconds to process</b>
<b>Elapsed</b>	<b>Total number of seconds to execute</b>
<b>Disk</b>	<b>Number of physical blocks read</b>
<b>Query</b>	<b>Number of logical buffers read for consistent read</b>
<b>Current</b>	<b>Number of logical buffers read in current mode</b>
<b>Rows</b>	<b>Number of rows processed by the fetch or execute</b>

# Output of the TKPROF Command

The TKPROF output also includes the following:

- Recursive SQL statements
- Library cache misses
- Parsing user ID
- Execution plan
- Optimizer mode or hint
- Row source operation

# Example of TKPROF Output: No Index

```
...
select max(cust_credit_limit)
from customers
where cust_city = 'Paris'
```

call	count	cpu	elapsed	disk	query	current	rows
Parse	2	0.01	0.01	0	0	0	0
Execute	2	0.00	0.00	0	0	0	0
Fetch	4	0.08	0.07	1027	1044	0	2
total	8	0.09	0.08	1027	1044	0	2

```
Misses in library cache during parse: 2
Optimizer goal: CHOOSE
Parsing user id: 45
```

Rows	Row Source Operation
1	SORT AGGREGATE (cr=985 r=969 w=0 time=67351 us)
77	TABLE ACCESS FULL CUSTOMERS (cr=985 r=969 w=0 time=67173 us)

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# Example of TKPROF Output: Unique Index

```
...
select max(cust_credit_limit)
from   customers
where  cust_city = 'Paris'
```

call	count	cpu	elapsed	disk	query	current	rows
Parse	1	0.00	0.00	0	0	0	0
Execute	1	0.00	0.00	0	0	0	0
Fetch	2	0.00	0.00	0	59	0	1
total	4	0.00	0.00	0	59	0	1

Misses in library cache during parse: 1

Optimizer goal: CHOOSE

Parsing user id: 45

Rows	Row Source Operation
1	SORT AGGREGATE (cr=59 r=0 w=0 time=731 us)
77	TABLE ACCESS BY INDEX ROWID CUSTOMERS (cr=59 r=0 w=0 time=661 us)
77	INDEX RANGE SCAN CUST_CITY_IDX (cr=2 r=0 w=0 time=145 us)(object id 28482)

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# Some TKPROF Interpretation Pitfalls

- Read consistency trap
- Time trap
- Trigger trap

# Summary

In this lesson, you should have learned how to:

- **Set SQL Trace initialization parameters**
  - `SQL_TRACE, TIMED_STATISTICS`
  - `USER_DUMP_DEST, MAX_DUMP_FILE_SIZE`
- **Enable SQL Trace for a session**

```
ALTER SESSION set sql_trace = true  
dbms_session.set_sql_trace(...)  
dbms_system.set_sql_trace_in_session(...)
```

- **Format trace files with TKPROF**
- **Interpret the output**

# Practice 4: Overview

**This practice covers the following topics:**

- **Viewing and changing initialization parameters**
- **Using the SQL Trace facility**
- **Configuring SQL Trace**
- **Using TKPROF to format trace files**
- **Interpreting TKPROF results**