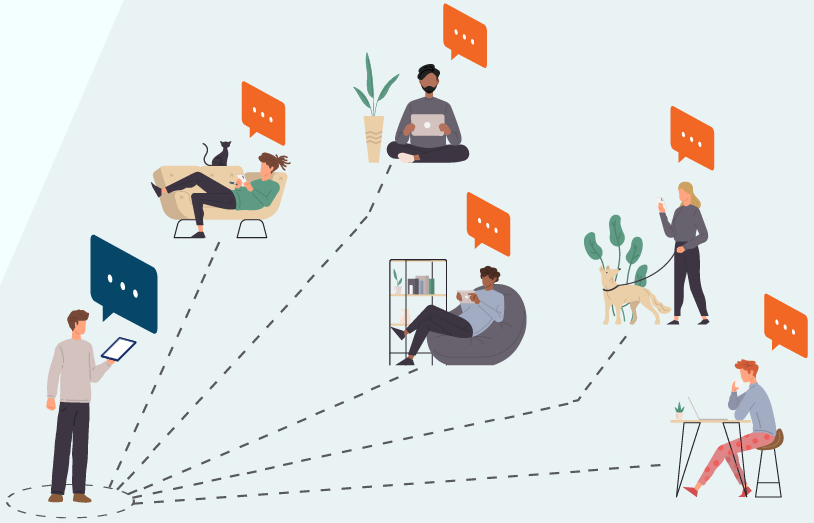
ODTUG | Learn from Home SERIES

Tuesday, May 19th - Friday, May 22nd



Using the PL/SQL Debugger

ODTUG – Learn from Home Series

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20.05.2020

Philipp

- Database centric development
- Model Driven Software Development
- Author of free SQL Developer Extensions PL/SQL Unwrapper, PL/SQL Cop, utPLSQL, plscope-utils, oddgen and Bitemp Remodeler

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Agenda

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1. Fundamentals
2. Prerequisites
3. Run & Debug in SQL Developer
4. Run APEX App & Debug in SQL Developer
5. Core Messages

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Fundamentals

PL/SQL Debugger in SQL Developer

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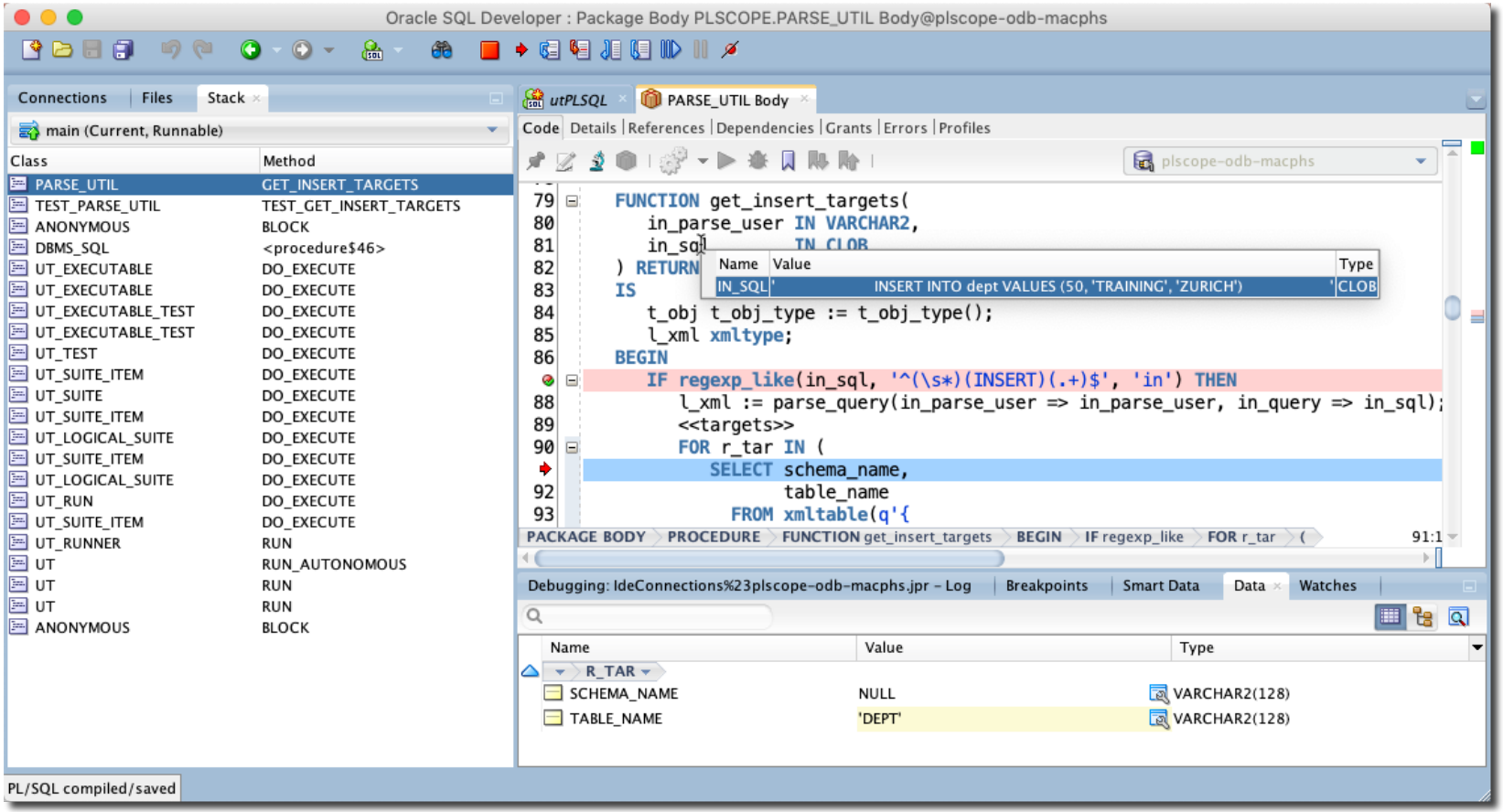

DBMS_DEBUG (deprecated since 12.2)

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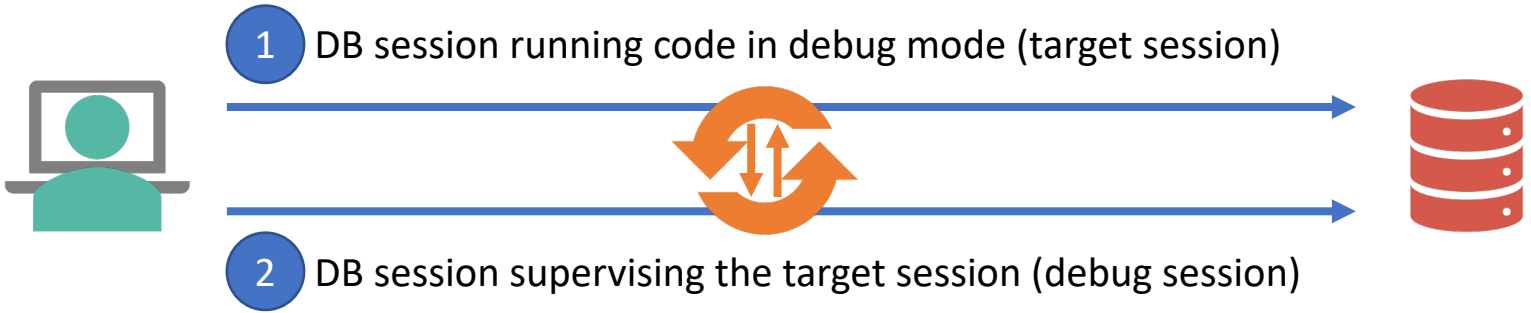

DBMS_DEBUG_JDWP (available since 9.0)

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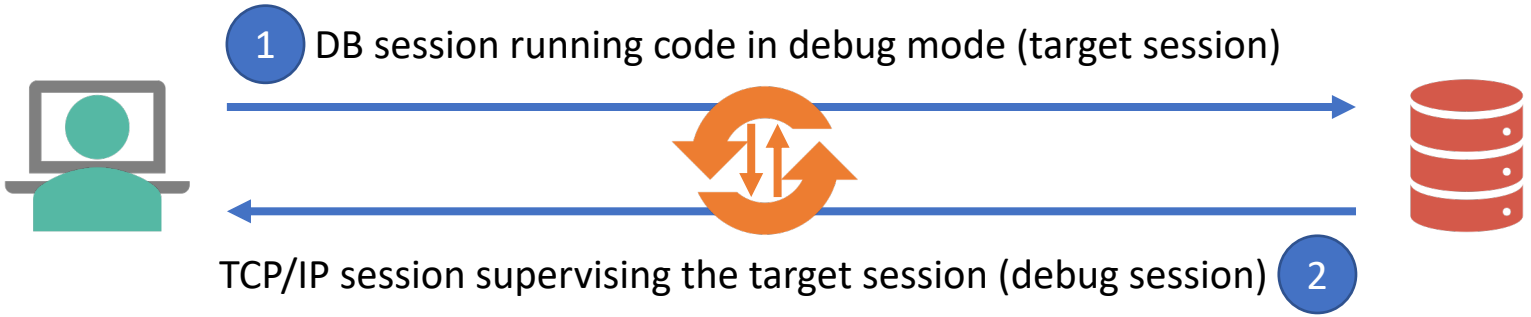

Comparison

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Topic	DBMS_DEBUG	DBMS_DEBUG_JDWP
TOAD (Quest)	✅	⛔
PL/SQL Developer (Allround Automations)	✅	⛔
SQL Developer (Oracle)	✅	✅
Debug PL/SQL	✅	✅
Debug Java Stored Procedures	⛔	✅
Debug Java and PL/SQL (same session)	⛔	✅
Remote Debugging (e.g. from APEX applications)	⛔	✅

New in SQL Developer 20.2: Select Debugging Package in Preferences

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Prerequisites

Compile for Debug

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- Set environment (PLSQL_DEBUG is deprecated)

```
ALTER SESSION SET plsql_optimize_level = 1;
```

- Compile all PL/SQL code in current schema

```
BEGIN
   FOR r IN ( -- not handled by dbms_utility.compile_schema
      SELECT object_name
        FROM user_objects
       WHERE object_type = 'TYPE BODY')
   LOOP
      EXECUTE IMMEDIATE 'ALTER TYPE ' || r.object_name || ' COMPILE BODY';
   END LOOP;
   dbms_utility.compile_schema(
      schema          => USER,
      compile_all     => true,
      reuse_settings => false
   );
END;
```

Privileges to Debug Own Sessions

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- Allows a user to connect his current session to a debugger

```
GRANT DEBUG CONNECT SESSION TO <user>;
```

Privileges to Debug Other Sessions

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- Allows a user to connect a session by any logon user to a debugger

```
GRANT DEBUG CONNECT ANY TO <user>;
```

- Allows a user to connect any of the specified user's logon sessions to a debugger to debug another user's session or his own

```
GRANT DEBUG CONNECT ON USER <logon_user> TO <user>;
```

Visibility of Other's Code

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- Access to public and nonpublic variables, methods, and types
- Place a breakpoint in procedure, function, package, type, view (trigger) or table (trigger)

```
GRANT DEBUG ON <object_name> TO <user>;
```

- Access to public and nonpublic variables, methods, and types of any PL/SQL code in the DB
- Place breakpoint in any PL/SQL code in the DB

```
GRANT DEBUG ANY PROCEDURE TO <user>;
```

Remote Debugging

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- Allow DBMS_DEBUG_JDWP to establish a connection over TCP/IP to the debug host

```
BEGIN
  dbms_network_acl_admin.append_host_ace (
    host => '<host_name>',
    ace  => sys.xs$ace_type(
                privilege_list => sys.xs$name_list('JDWP') ,
                principal_name => '<user>',
                principal_type => sys.xs_acl.ptype_db
            )
  );
END;
```

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Run & Debug in SQL Developer

Use Case

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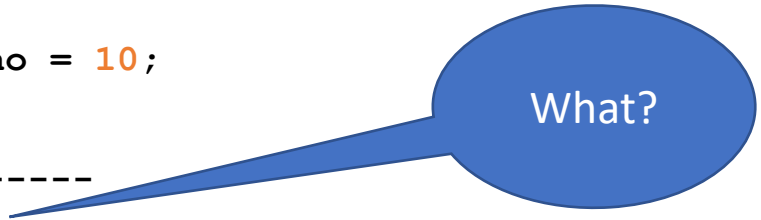
```
SQL> select * from dept;

    DEPTNO DNAME          LOC
---------- -------------- -------------
        10 ACCOUNTING     NEW YORK
        20 RESEARCH       DALLAS
        30 SALES          CHICAGO
        40 OPERATIONS     BOSTON

SQL> update dept set loc = 'ZURICH' where deptno = 10;

1 row updated.

SQL> select * from dept where deptno = 10;

    DEPTNO DNAME          LOC
---------- -------------- -------------
        10 ACCOUNTING     NEW YORK
```



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Demo 1

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Run APEX App & Debug in SQL Developer

Grant Privileges

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- Access from APEX_PUBLIC_USER to parsing schema OGDEMO
- Avoid "ORA-01031: insufficient privileges"

```
GRANT DEBUG CONNECT ON USER apex_public_user to ogdemo;
```

- Access to breakpoints and variables from APEX_PUBLIC_USER
- Necessary to work with the PL/SQL Debugger

```
GRANT DEBUG ANY PROCEDURE to apex_public_user;
```

Does This Work? – No!

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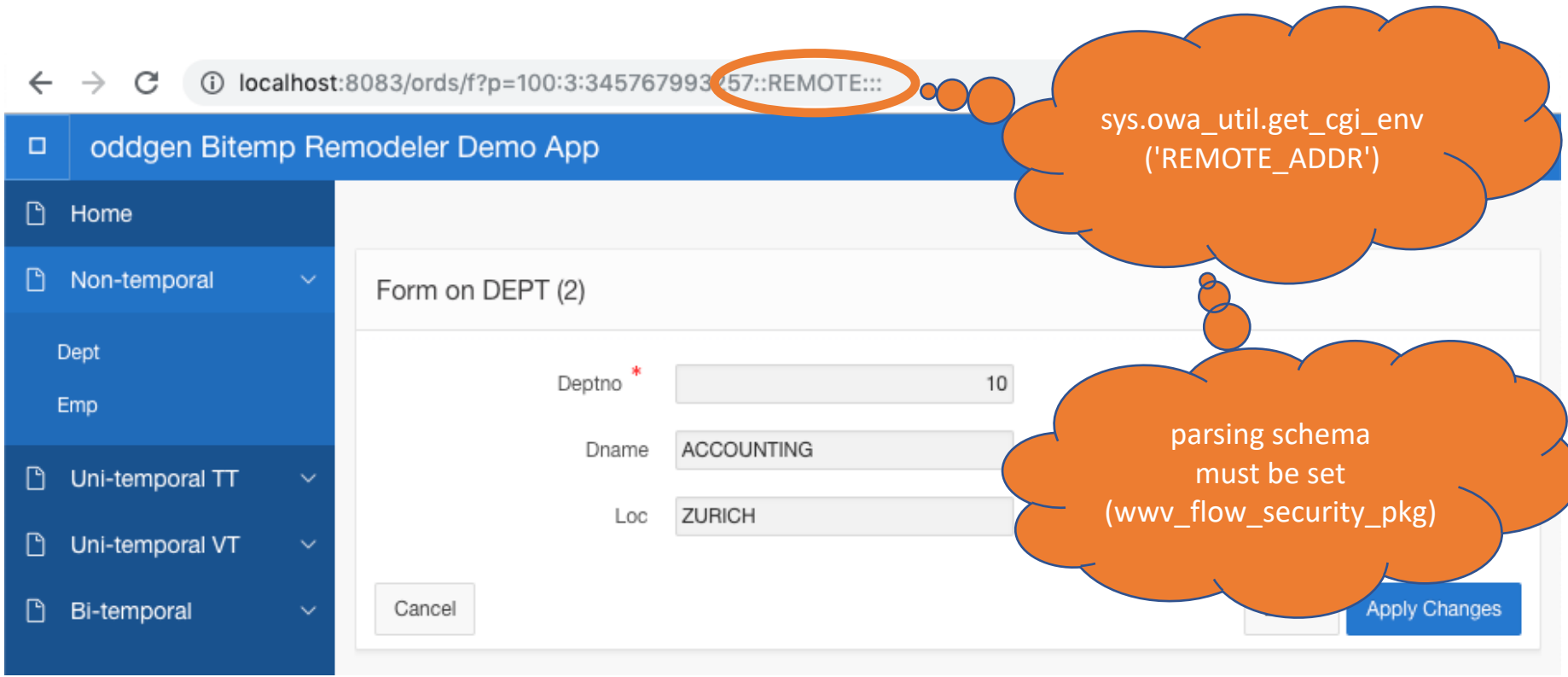

Connect From Browser to SQL Developer

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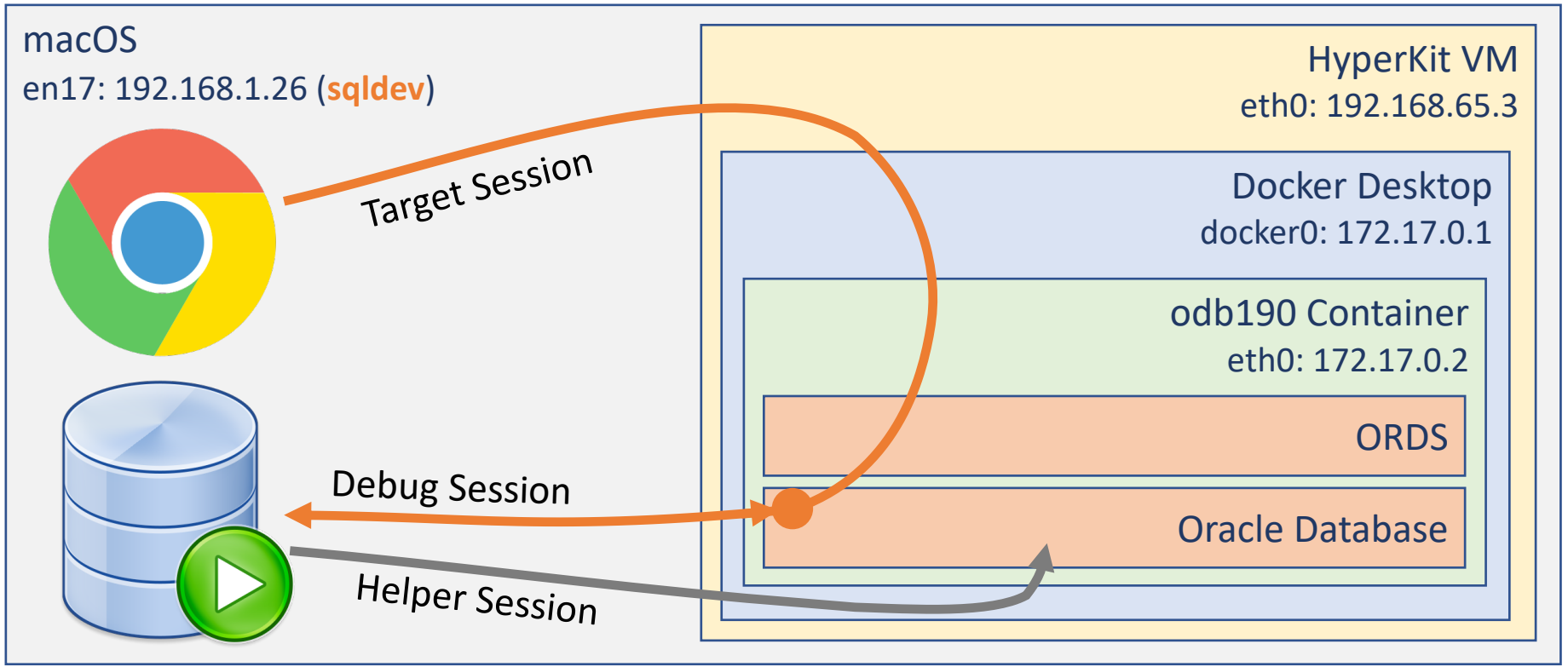

Listen for Incoming Debug Connections

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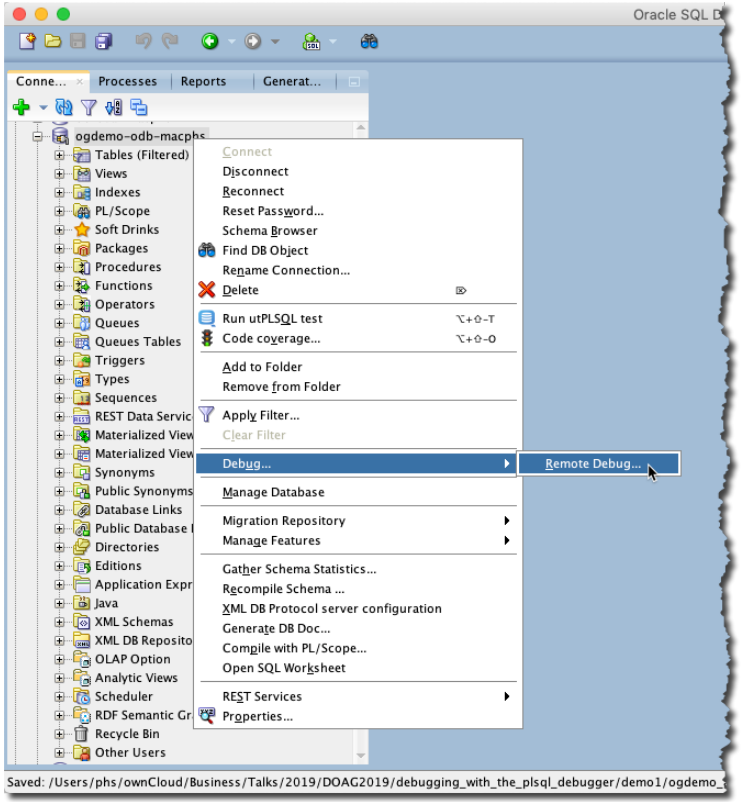
1



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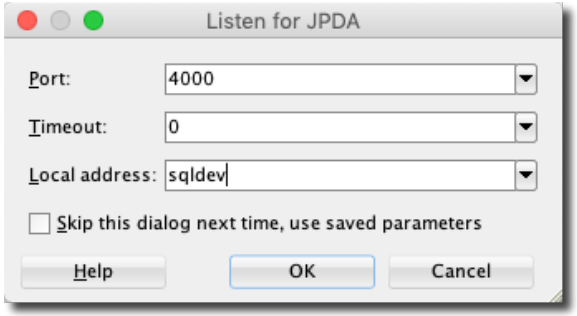

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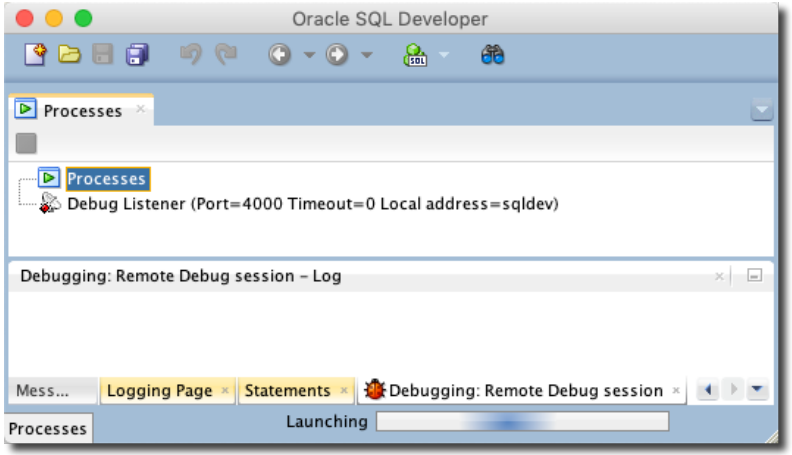

Connect to Debugger from APEX App

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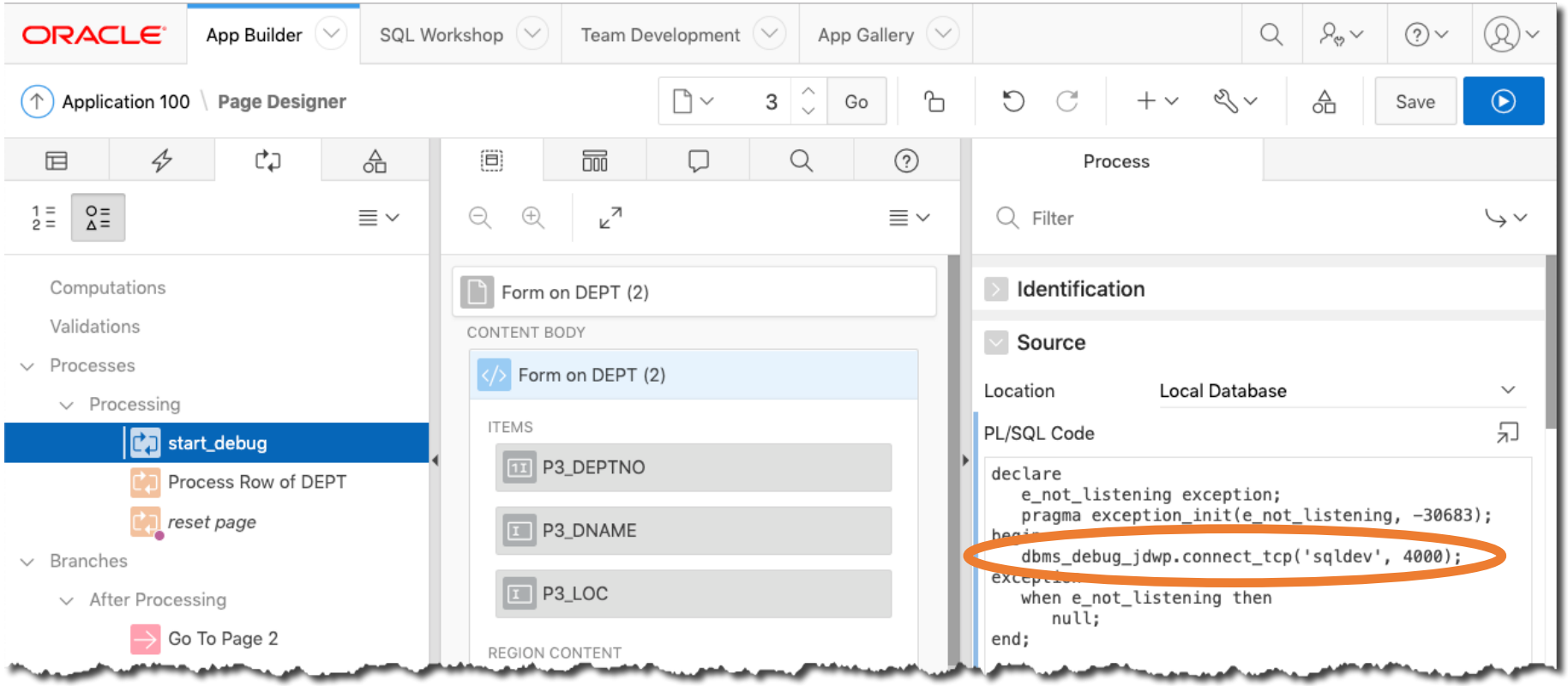

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Demo 2

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Core Messages

Instrument Your Code

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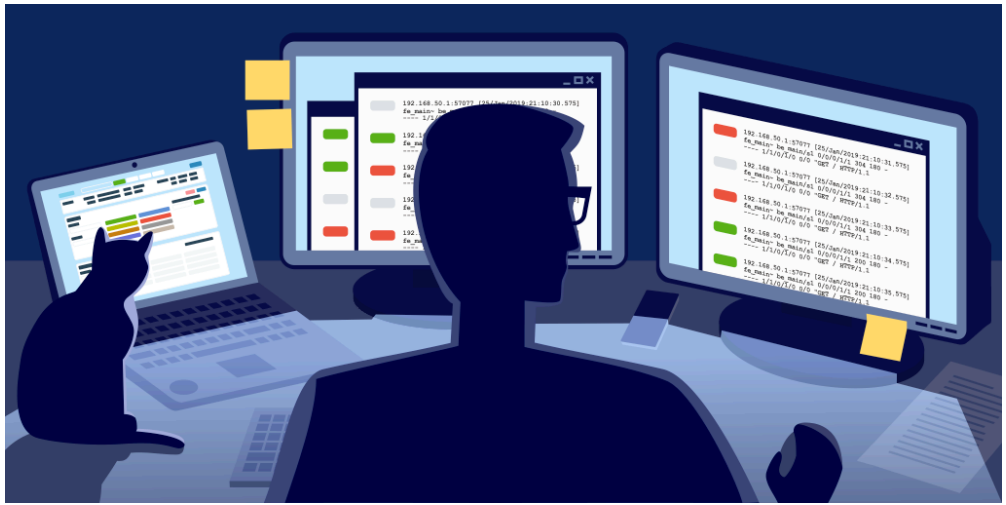
- The PL/SQL debugger is no replacement for log messages in your code
- Look at existing frameworks, such as
  - APEX_DEBUG
  - Logger
- Use log levels consistently
- Change log level filters at runtime
- Avoid ad-hoc Instrumentation



Use the PL/SQL Debugger

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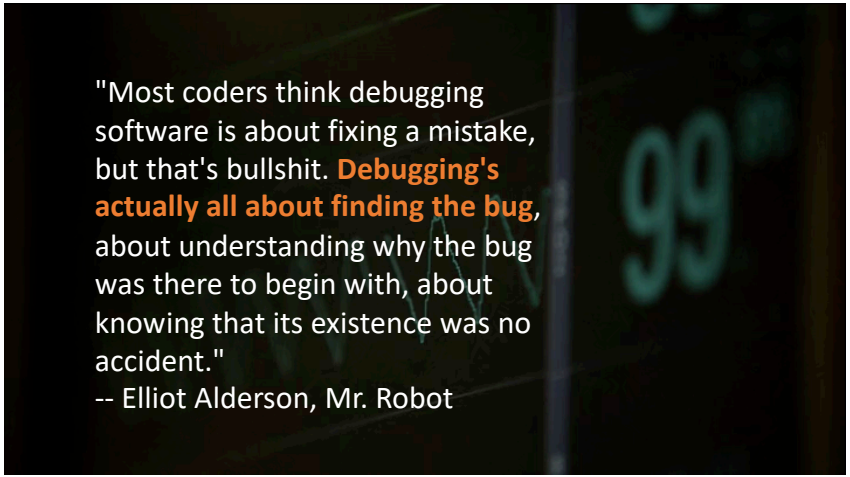
- Set up the PL/SQL Debugger in your development environment
- The PL/SQL Debugger is not perfect
  - You cannot change code while debugging
  - Showing or changing values has limitations
  - Expression support is poor
  - Querying data in the target session is not possible in SQL Developer
- But it helps
  - Finding bugs
  - Understanding the code



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