

Extend Your SQL Developer

Philipp



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<https://www.salvis.com/blog>

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BASEL | BERN | BRUGG | BUKAREST | DÜSSELDORF | FRANKFURT A.M. | FREIBURG I.B.R. | GENÈVE
HAMBURG | KOPENHAGEN | LAUSANNE | MANNHEIM | MÜNCHEN | STUTTGART | WIEN | ZÜRICH

trivadis

Philipp

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



 @phsalvisberg

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Agenda

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1. SQL Developer
2. Extension Types
3. User Defined Extensions
 - Reports
 - Editors
 - Navigators
 - Actions
4. Core Messages

SQL Developer

Facts

trivadis

Project Raptor
in 2005

> 5 Million
Users

Feature-richest
IDE for
Oracle Databases

Based on
JDeveloper

Limited
support for
other DBs

Extendable

Free

Quarterly
Releases

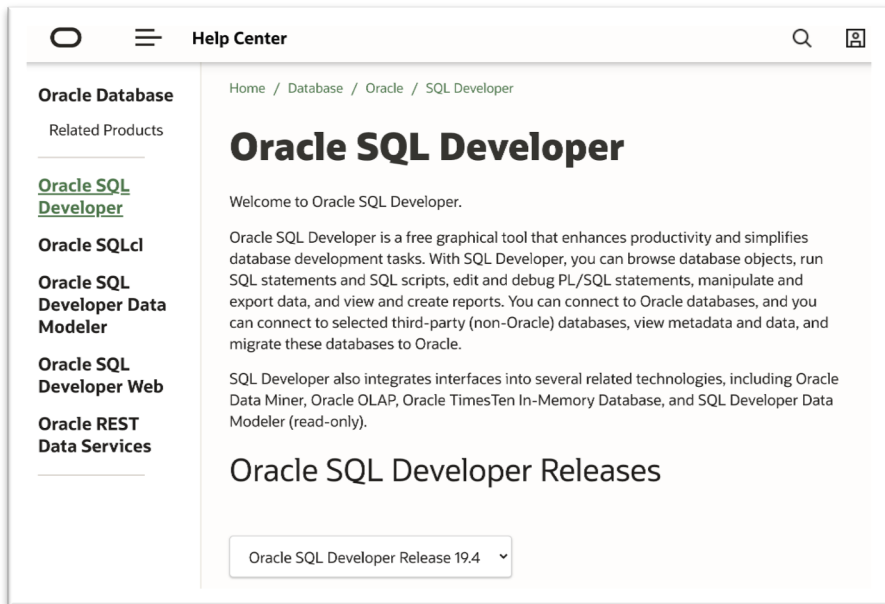


More About SQL Developer

trivadis

Official Documentation

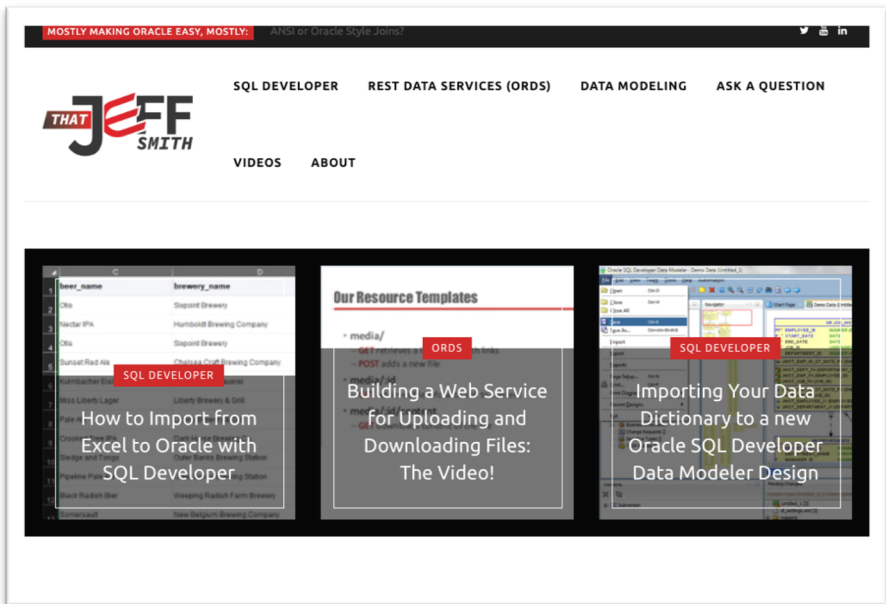
<https://docs.oracle.com/en/database/oracle/sql-developer/>



The screenshot shows the Oracle SQL Developer Help Center. The header includes the Oracle logo, a menu icon, and the text "Help Center". A search icon and a user profile icon are also present. The left sidebar lists "Oracle Database" with "Related Products" including "Oracle SQL Developer", "Oracle SQLcl", "Oracle SQL Developer Data Modeler", "Oracle SQL Developer Web", and "Oracle REST Data Services". The main content area has a breadcrumb trail "Home / Database / Oracle / SQL Developer" and the title "Oracle SQL Developer". Below the title is a welcome message: "Welcome to Oracle SQL Developer." followed by a paragraph describing the tool's capabilities. A second paragraph mentions integration with other Oracle technologies. At the bottom, there is a section titled "Oracle SQL Developer Releases" with a dropdown menu showing "Oracle SQL Developer Release 19.4".

Jeff Smith's Blog

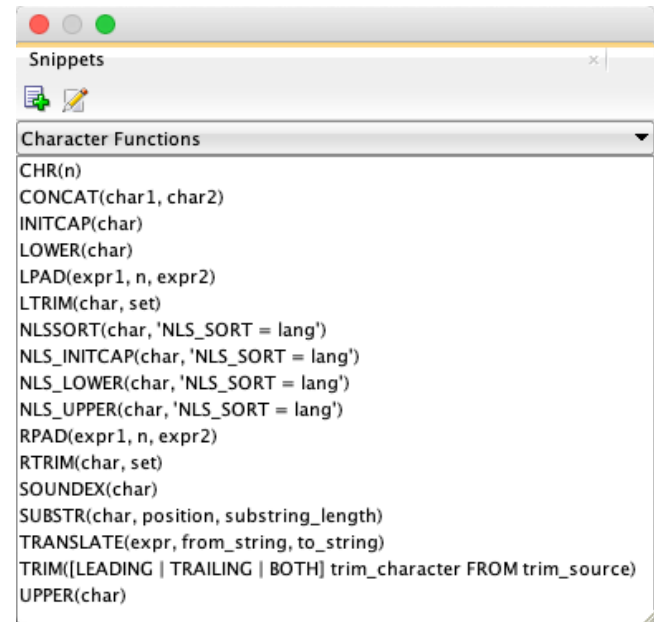
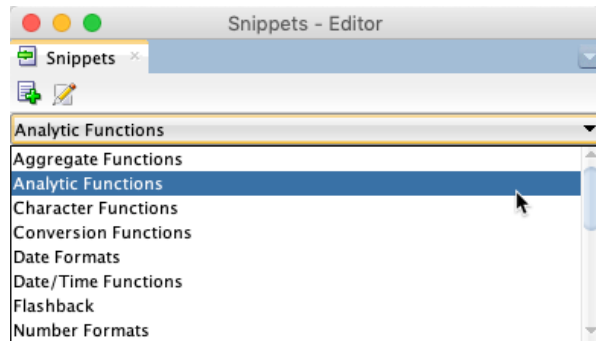
<https://www.thatjeffsmith.com/>



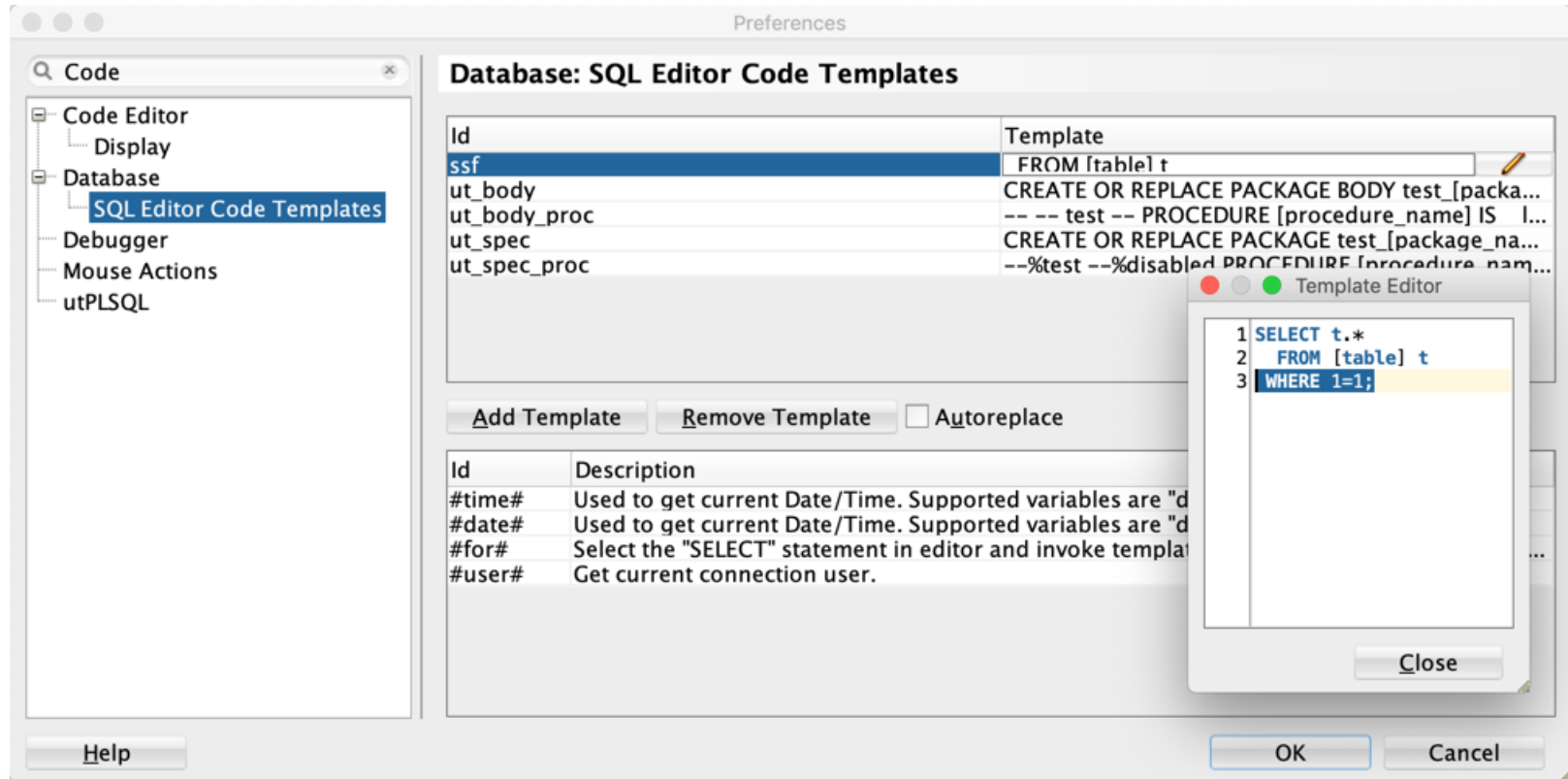
The screenshot shows the homepage of Jeff Smith's blog, "THAT JEFF SMITH". The header features the blog's logo and navigation links for "SQL DEVELOPER", "REST DATA SERVICES (ORDS)", "DATA MODELING", and "ASK A QUESTION". Below these are links for "VIDEOS" and "ABOUT". The main content area is titled "Our Resource Templates" and features three prominent articles: "How to Import from Excel to Oracle with SQL Developer", "Building a Web Service for Uploading and Downloading Files: The Video!", and "Importing Your Data Dictionary to a new Oracle SQL Developer Data Modeler Design". The background of the page shows a collage of screenshots from the SQL Developer application.

Extension Types

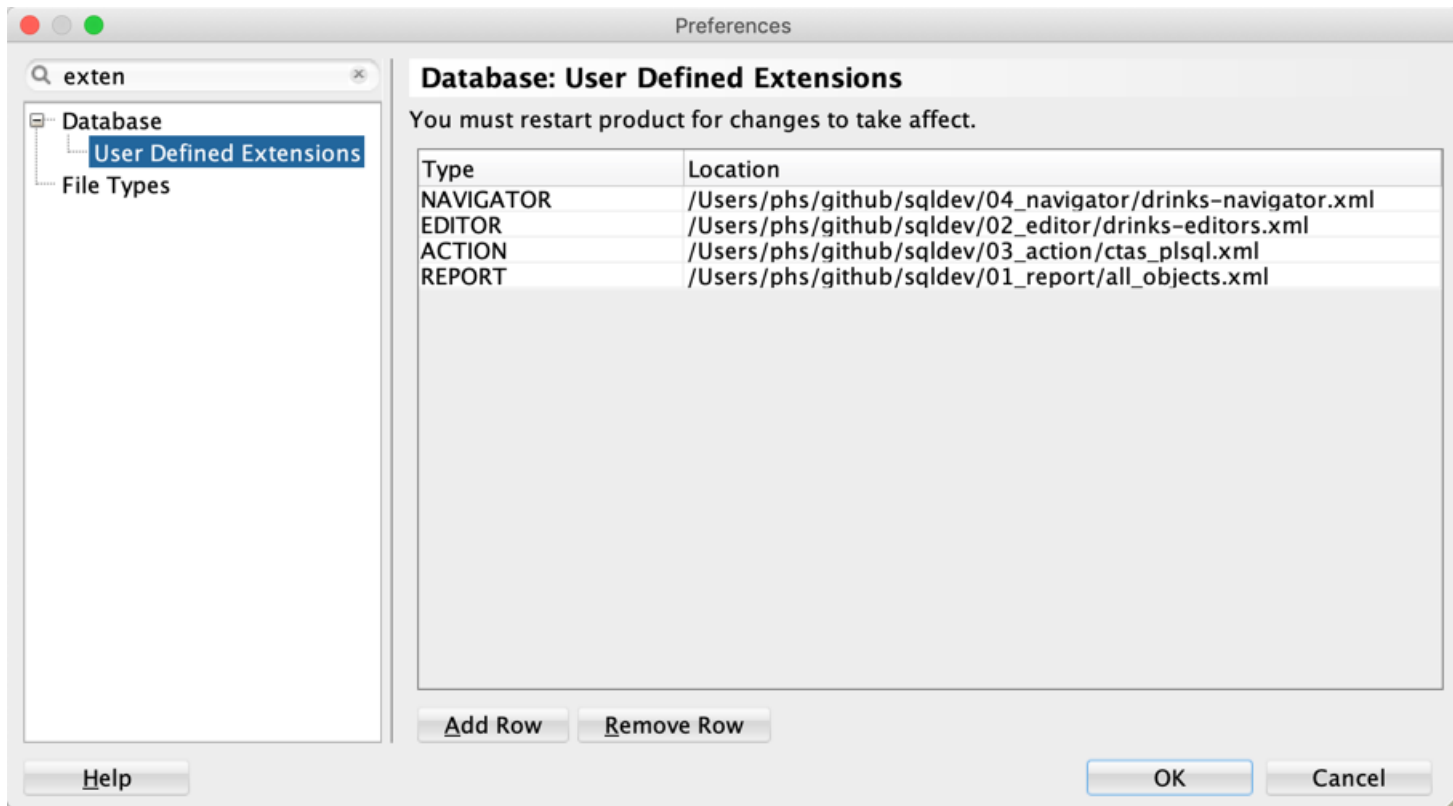
Snippets



Code Templates



XML Extensions (SQL, PL/SQL, JavaScript)



ESDK 2.0 Extensions (Java, OSGi Bundles)



Oracle SQL Developer : Package Body AX.APEX_UTIL_PKG Body@ax-odb-macphs

Connections | APEX_UTIL_PKG Body | Code | Errors | Profiles | Dependencies | Grants | References | Details

ax-odb-macphs

```
140 */
141
142
143 l_returnvalue := 'f?p=' || nvl(p_application_id, v('APP_ID'))
144 || ':' || p_page_id
145 || ':' || nvl(p_session_id, v('APP_SESSION'))
146 || ':' || p_request
147 || ':' || nvl(p_debug, 'NO')
148 || ':' || p_clear_cache
149 || ':' || p_item_names
150 || ':' || ut_url.escape(p_item_values)
151
152
153 return l_returnvalue;
154
155 end get_apex_url;
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Trivadis PL/SQL Cop

Issues | Report

Line	Column	Severity	Characteristics	Message
143	30	3-Critical	Efficiency, Reli...	G-4230: Always use COALESCE instead of NVL, if parameter 2 of the NVL function is a function call or a SE...
145	37	3-Critical	Efficiency, Reli...	G-4230: Always use COALESCE instead of NVL, if parameter 2 of the NVL function is a function call or a SE...
35	5	2-Major	Reliability	G-5060: Avoid unhandled exceptions
94	5	2-Major	Reliability	G-5060: Avoid unhandled exceptions
150	37	2-Major	Security	G-7510: Always prefix ORACLE supplied packages with owner schema name.
185	37	2-Major	Security	G-7510: Always prefix ORACLE supplied packages with owner schema name.
215	55	2-Major	Changeability...	G-7110: Try to use named notation when calling program units.

Oracle SQL Developer

Trivadis PL/SQL Cop

Issues | Report

SQL Developer Editor

Title: Package Body AX.APEX_UTIL_PKG@ax-odb-macphs
Date/time: 2017-02-05 22:02:54

Metrics

Metric	Value	Target
Number of bytes	18,303	
Number of lines (LOC)	737	
Number of comment lines	273	
Number of blank lines	153	
Number of net lines	311	
Number of commands	1	
Number of statements (PL/SQL)	101	
Max. cyclomatic complexity	6	< 11
Max. Halstead volume	1,018	< 1001
Min. maintainability index (MI)	105	> 84
Avg cyclomatic complexity	2	< 11
Avg Halstead volume	181	< 1001
Avg maintainability index (MI)	147	> 84
Number of issues	64	
Number of warnings	64	
Number of errors	0	

PL/SQL Units

PL/SQL Unit	Line	# Lines	# Comment lines	# Blank lines	# Net lines	# Stmt	Cyclomatic complexity	Halstead volume	Maintainability index
apex_util_pkg.get_items	581	48	15	8	25	15	6	1,018	115
apex_util_pkg.get_itemsAnonymousPisqlBlock	606	21	1	3	19	11	5	522	105
apex_util_pkg.setup_apex_session_context	314	31	13	6	12	7	3	228	137
apex_util_pkg.is_item_in_list	680	26	11	4	11	7	3	196	141
apex_util_pkg.get_page_name	20	28	11	4	13	4	2	113	141
apex_util_pkg.get_page_help_text	79	28	11	4	13	4	2	113	141
apex_util_pkg.get_apex_util_item_names	198	23	11	5	7	4	2	177	147
apex_util_pkg.get_apex_util_item_values	227	24	11	6	7	4	2	155	146
apex_util_pkg.get_dynamic_lov_query	257	30	11	6	13	4	2	113	139
apex_util_pkg.get_str_value	350	23	11	4	8	4	2	91	151

Open

oddgen – Code / Text Generators

The screenshot displays the oddgen application interface. On the left, a tree view under 'Generators' shows a hierarchy: 'All Generators' > 'Database Server Generators' > 'Examples' > 'PL/SQL' > 'Emp hierarchy' > 'King' > 'Blake'. The 'Blake' node is selected. On the right, the 'Worksheet' tab shows a table with employee names and salaries:

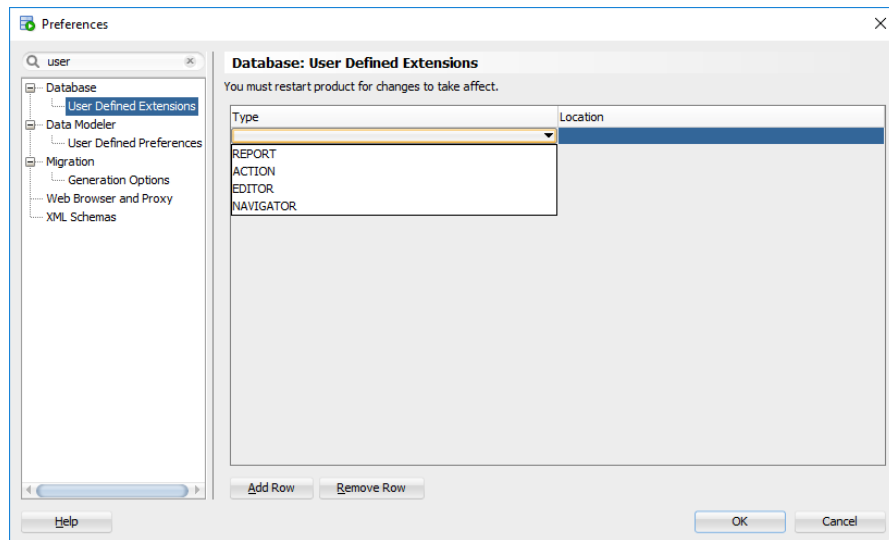
Name	Salary
Blake	2850
Allen	1900
James	950
Martin	2650
Turner	1500
Ward	1750
Total of 6	11600

Below the table, the text 'Salaries with commissions.' is displayed. A dialog box titled 'oddgen - Emp hierarchy' is open in the foreground, containing the text 'Generates salary report of selected employees in the hierarchy.' and a 'Node identifier' field with the value '7698'. The 'Include commission?' checkbox is checked. At the bottom of the dialog are three buttons: 'Generate to worksheet', 'Generate to clipboard', and 'Cancel'.

User Defined Extensions

XML Schemas of User Defined Extensions

<https://github.com/oracle/oracle-db-examples/tree/master/sqldeveloper/extension/xml/schema>



- Reports
 - displays.xsd (includes query.xsd)
- Editors
 - displays.xsd (includes query.xsd)
- Navigators
 - navigators.xsd (includes query.xsd)
- Actions
 - dialogs.xsd (includes useful comments)

Reports

Reports

trivadis

via Java

Oracle SQL Developer : Oracle Application Express Application Pages

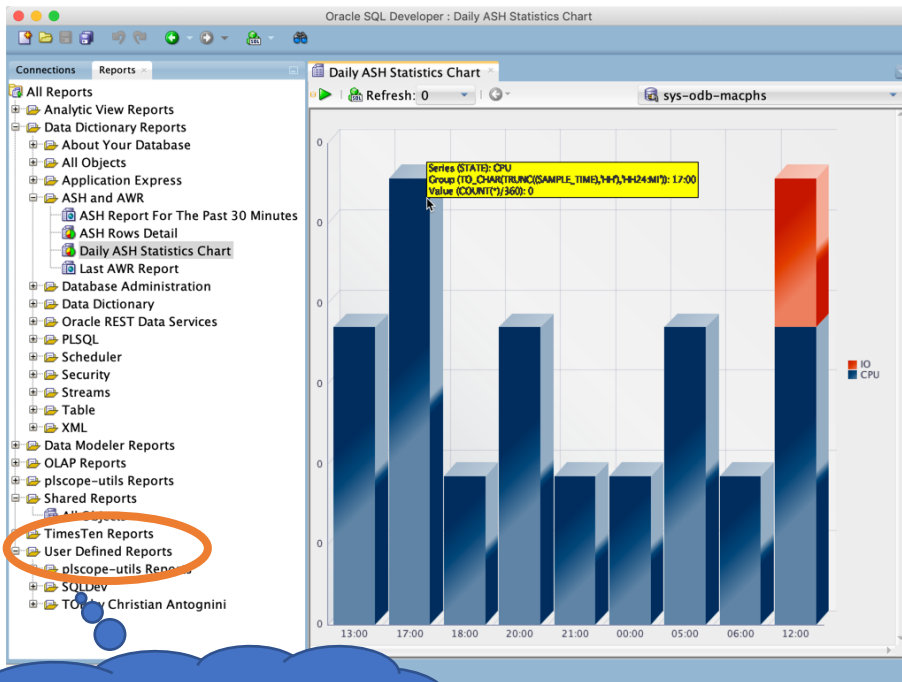
Refresh: 0

WORKSPACE	APPLICATION_ID	PAGE_ID	PAGE_TITLE	PAGE_FUNCTION
1 TVDPDAYS	100	1	Home	Unknown
2 TVDPDAYS	100	2	Dept	Unknown
3 TVDPDAYS	100	3	Form on DEPT (2)	Unknown
4 TVDPDAYS	100	4	Emp	Unknown
5 TVDPDAYS	100	5	Form on EMP (4)	Unknown
6 TVDPDAYS	100	18	TT Hist Dept	Unknown
7 TVDPDAYS	100	19	TT Form on DEPT (18)	Unknown
8 TVDPDAYS	100	20	VT Hist Dept	Unknown
9 TVDPDAYS	100	21	VT Form on DEPT_HV (20)	Unknown
10 TVDPDAYS	100	22	VT/TT Hist Dept	Unknown
11 TVDPDAYS	100	23	VT Form on DEPT_HV (22)	Unknown
12 TVDPDAYS	100	38	TT Hist Emp	Unknown
13 TVDPDAYS	100	39	Form on EMP (38)	Unknown
14 TVDPDAYS	100	40	ABOUT Hist Emp	Unknown

Items Regions Buttons Computations Processes Validations Branches

SEQ	REGION_NAME	TEMPLATE	SOURCE_TYPE	REGION_SOURCE
1	10 Valid Time Filter	Collapsible	HTML/Text	(null)
2	20 Transaction Time Filter	Collapsible	HTML/Text	(null)
3	40 Dept	Interactive Report	Interactive Report	SELECT vt_start, vt_end,

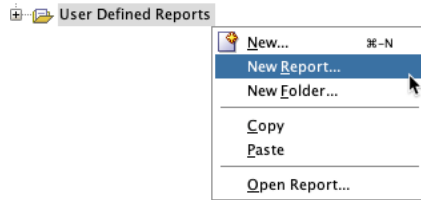
via XML



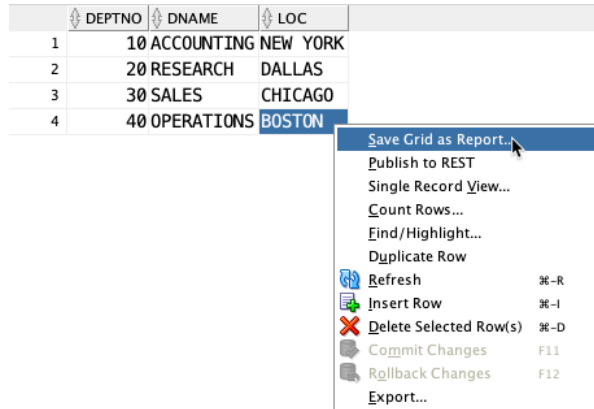
within SQL Developer

Creating Reports

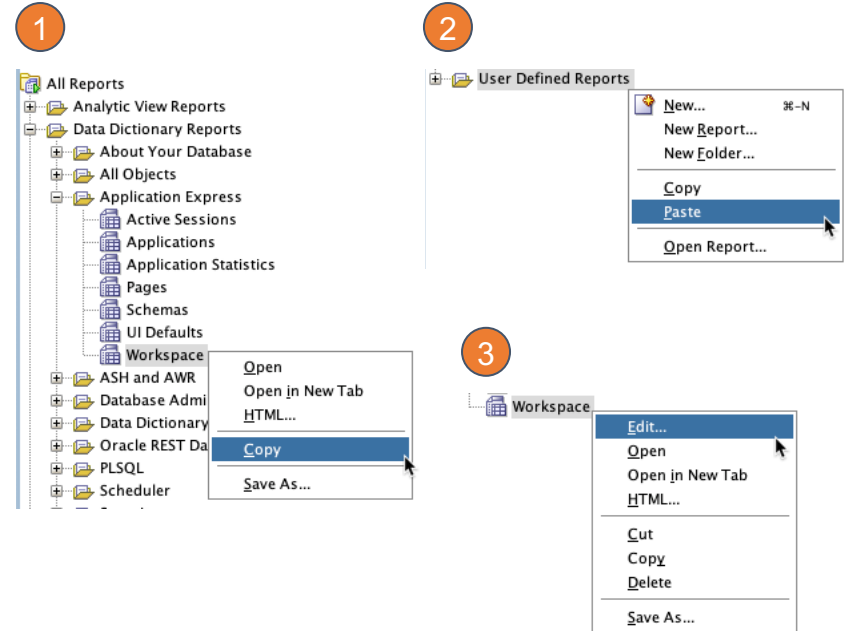
a) From Scratch



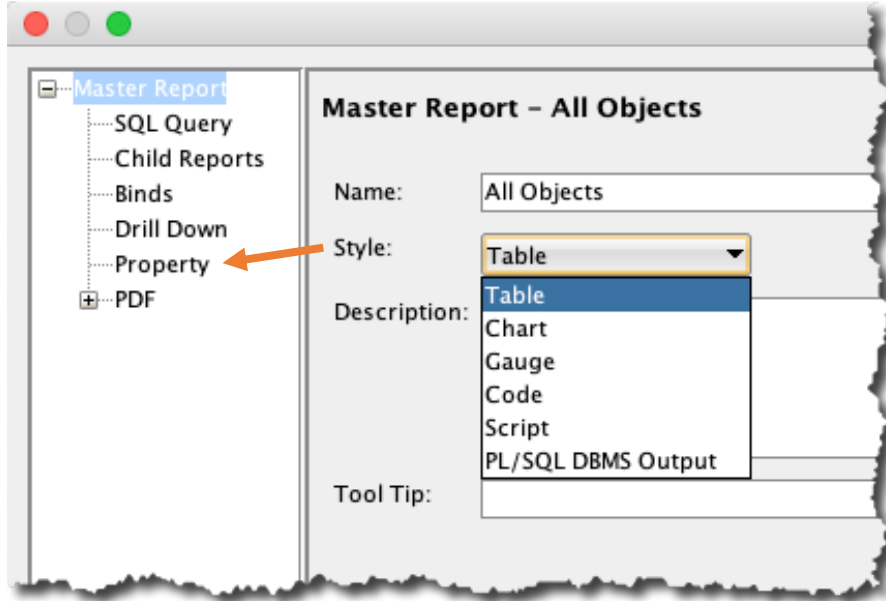
c) From Result Table



b) From Existing Report

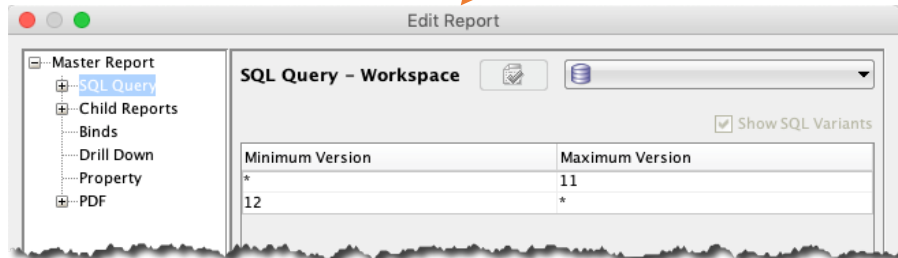
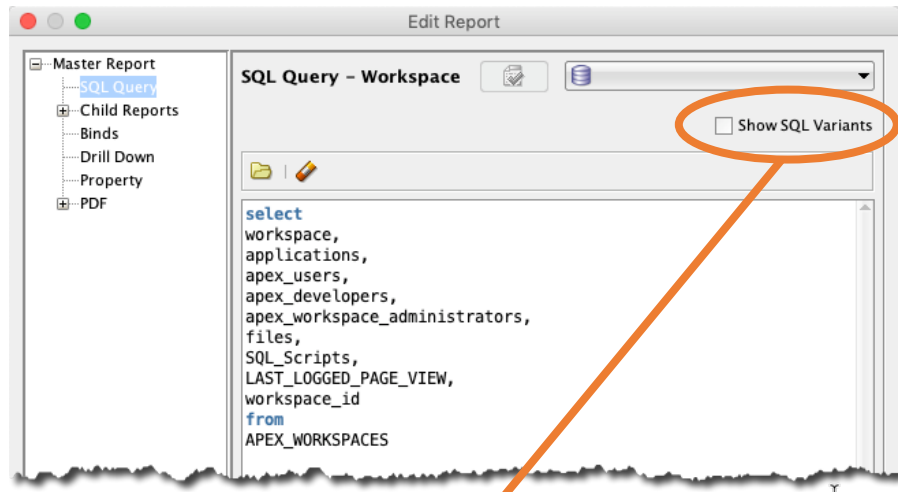


Styles



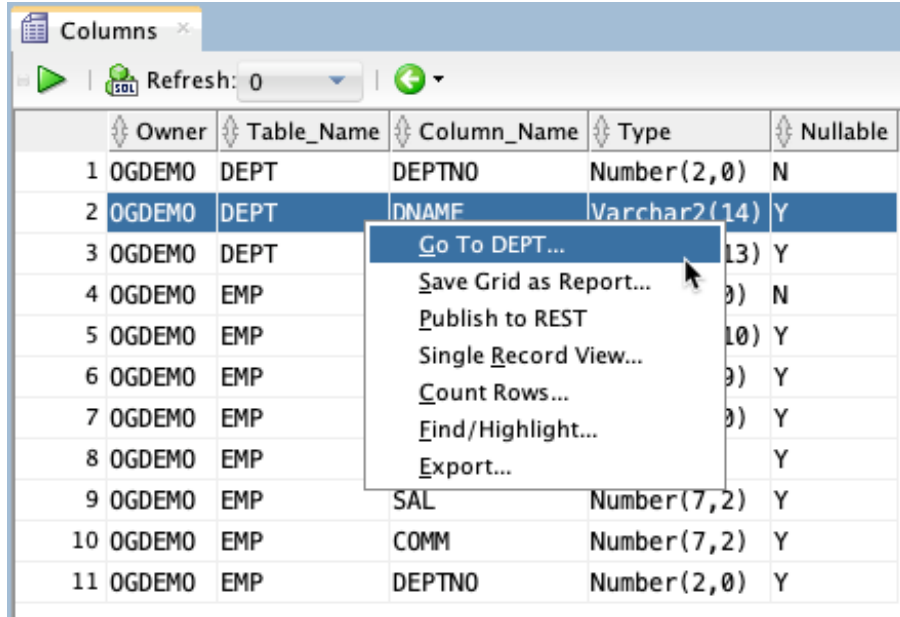
- Table (default)
- Chart (Bar, Pie, Line, Area, Combination, Scatter, Bubble, Polar, Radar, Pareto, Funnel, 3D)
- Gauge (Dial, Status Meter)
- Code (output presented as in worksheet editor, output must provide new lines)
- Script (script output as in worksheet)
- PL/SQL DBMS Output (prints dbms_output, ignores line feeds, use script with enable dbms_output)

Query



- Query is mandatory
 - SELECT statement
 - Anonymous PL/SQL Block
 - SQL*Plus Script
- Everything else is optional
- SQL Variants
 - DB version range
 - e.g. to optimize query based on available data dictionary views and columns

"Go To <ObjectName>..." Context Menu



The screenshot shows a database tool interface with a table grid. The grid has columns: Owner, Table_Name, Column_Name, Type, and Nullable. A context menu is open over the row where Table_Name is 'DEPT' and Column_Name is 'DNAME'. The menu options are: 'Go To DEPT...', 'Save Grid as Report...', 'Publish to REST', 'Single Record View...', 'Count Rows...', 'Find/Highlight...', and 'Export...'. The 'Go To DEPT...' option is highlighted by the mouse cursor.

	Owner	Table_Name	Column_Name	Type	Nullable
1	OGDEMO	DEPT	DEPTNO	Number(2,0)	N
2	OGDEMO	DEPT	DNAME	Varchar2(14)	Y
3	OGDEMO	DEPT			
4	OGDEMO	EMP			
5	OGDEMO	EMP			
6	OGDEMO	EMP			
7	OGDEMO	EMP			
8	OGDEMO	EMP			
9	OGDEMO	EMP	SAL	Number(7,2)	Y
10	OGDEMO	EMP	COMM	Number(7,2)	Y
11	OGDEMO	EMP	DEPTNO	Number(2,0)	Y

- "Go To <ObjectName>..." is available when query has result columns named
 - sdev_link_owner
 - sdev_link_type
 - sdev_link_name
- These columns are hidden
- Opens the associated editor for the "linked" object type

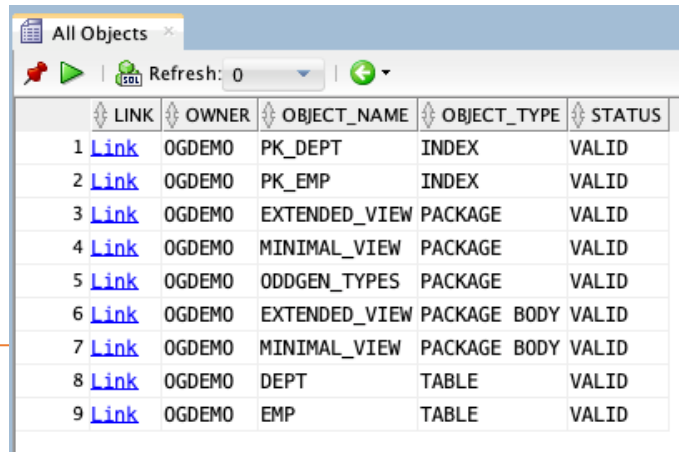
Hyperlink Column

SQLDEV:LINK

:<object_owner>:<object_type>:<object_name>

[:<line>:<col>] [:<label>]:<drill_class>

```
select 'SQLDEV:LINK:'
      || owner
      || ':'
      || object_type
      || ':'
      || object_name
      || ':Link:oracle.dbtools.raptor.controls.grid.DefaultDrillLink'
as link,
owner, object_name, object_type, status
from all_objects
where owner = :OWNER or owner is null
order by owner, object_type, object_name
```



	LINK	OWNER	OBJECT_NAME	OBJECT_TYPE	STATUS
1	Link	OGDEMO	PK_DEPT	INDEX	VALID
2	Link	OGDEMO	PK_EMP	INDEX	VALID
3	Link	OGDEMO	EXTENDED_VIEW	PACKAGE	VALID
4	Link	OGDEMO	MINIMAL_VIEW	PACKAGE	VALID
5	Link	OGDEMO	ODDGEN_TYPES	PACKAGE	VALID
6	Link	OGDEMO	EXTENDED_VIEW	PACKAGE BODY	VALID
7	Link	OGDEMO	MINIMAL_VIEW	PACKAGE BODY	VALID
8	Link	OGDEMO	DEPT	TABLE	VALID
9	Link	OGDEMO	EMP	TABLE	VALID

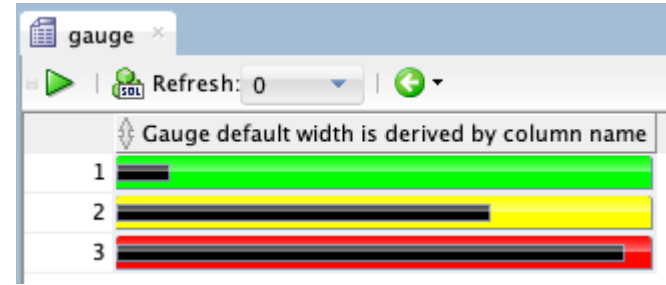
Gauge Column

SQLDEV:GAUGE

:<min>:<max>

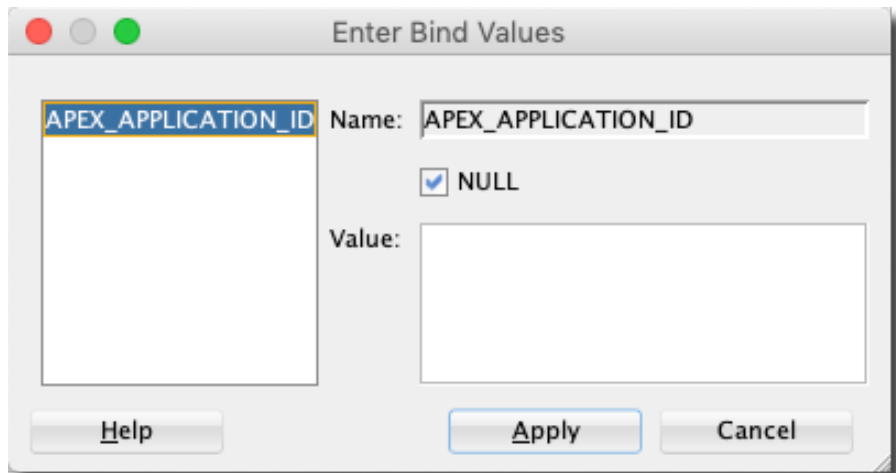
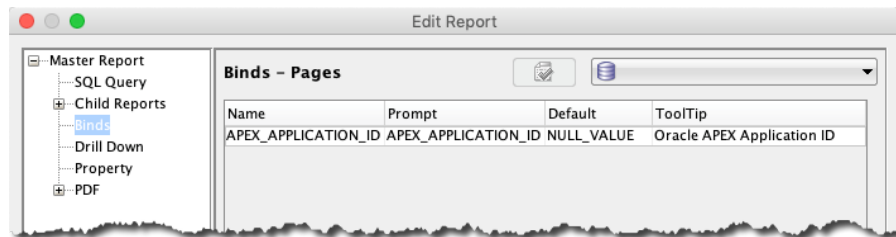
:<low_threshold>:<upper_threshold>

:<value>



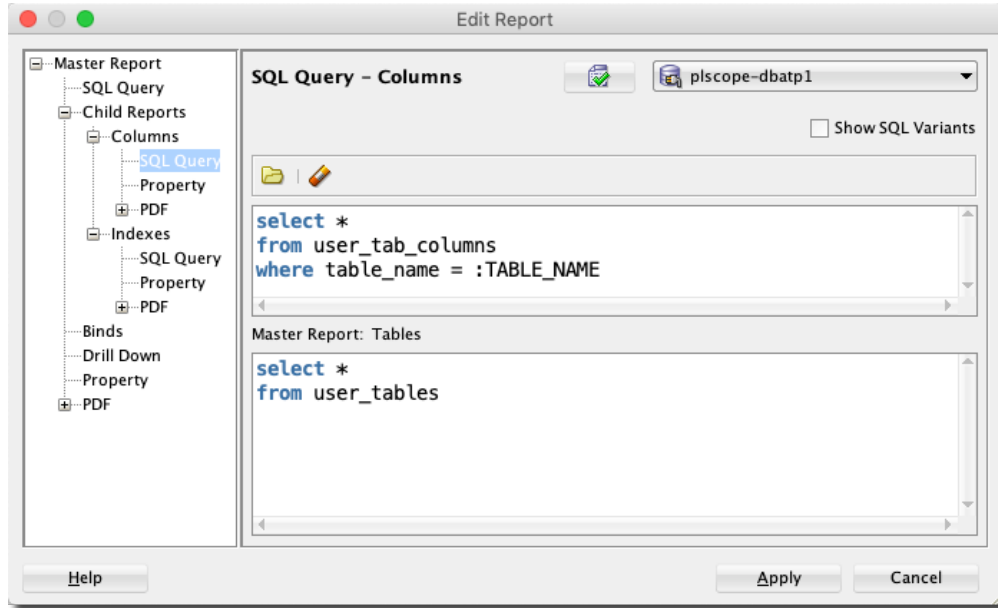
```
select 'SQLDEV:GAUGE:0:100:0:0:'  
      || value as "Gauge default width is derived by column name"  
from (  
  select 10 as value from dual  
  union all  
  select 70 as value from dual  
  union all  
  select 95 as value from dual  
)
```

Binds



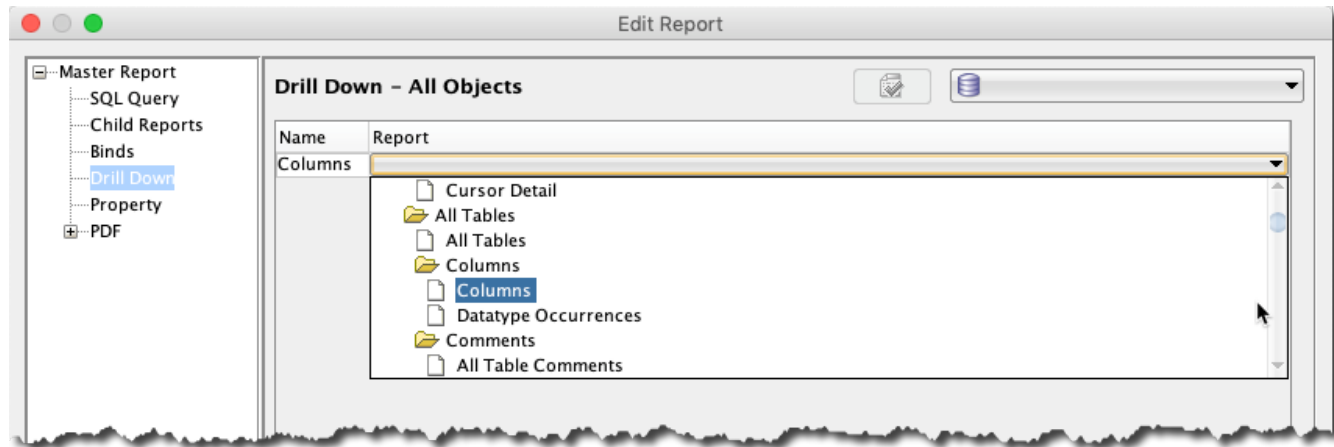
- Bind are identifiers prefixed with a colon
 - e.g. :APEX_APPLICATION_ID
- Properties for each bind used in the query
 - Name
 - Prompt
 - Default value
 - Tool tip
- "Enter Bind Values" Dialog
 - Before every execution

Child Reports



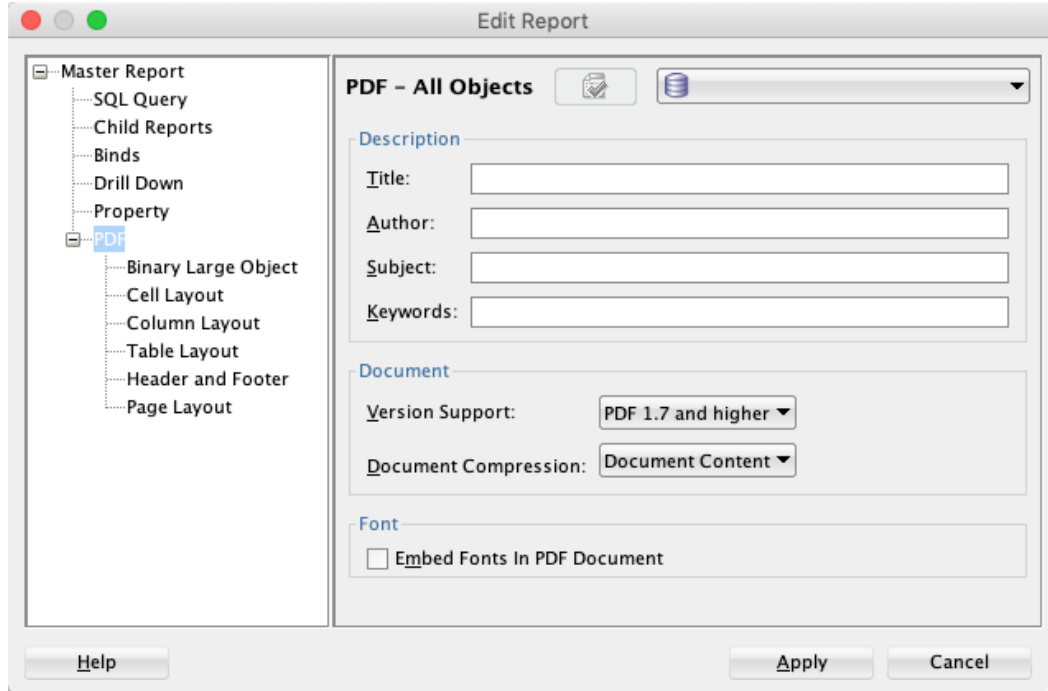
- Executed per selected parent row
- Each child report is shown in an own tab
- Parent row columns are binds
- Binds are case sensitive (upper case)

Drill Down Reports



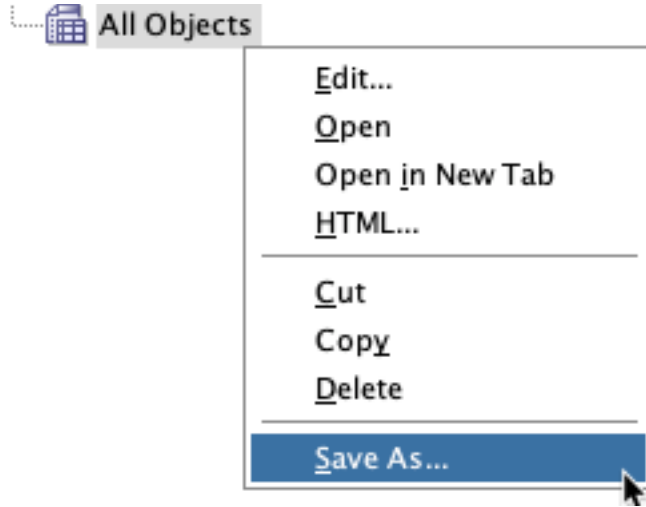
- Similar to child report
- Opens a report via context menu
- Current result row columns are passed as binds to drill down report

PDF Settings



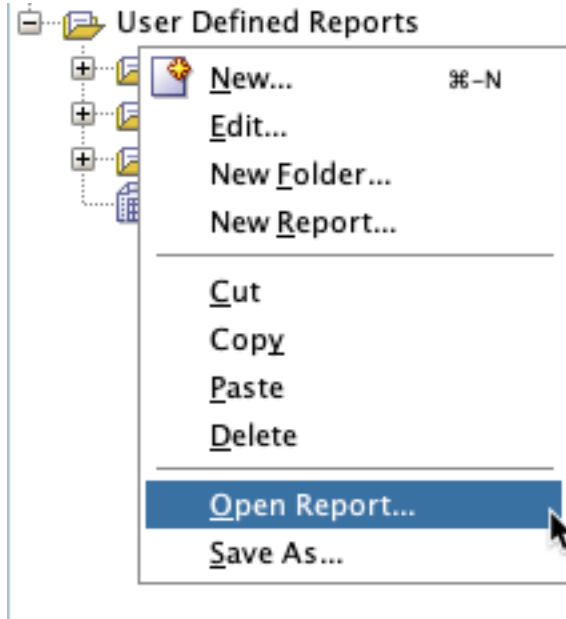
- Configure PDF Layout
- Grid result can be exported
 - CSV, Delimited, JSON, XML
 - Insert, Loader
 - Excel, HTML
 - PDF, Text

Exporting Reports



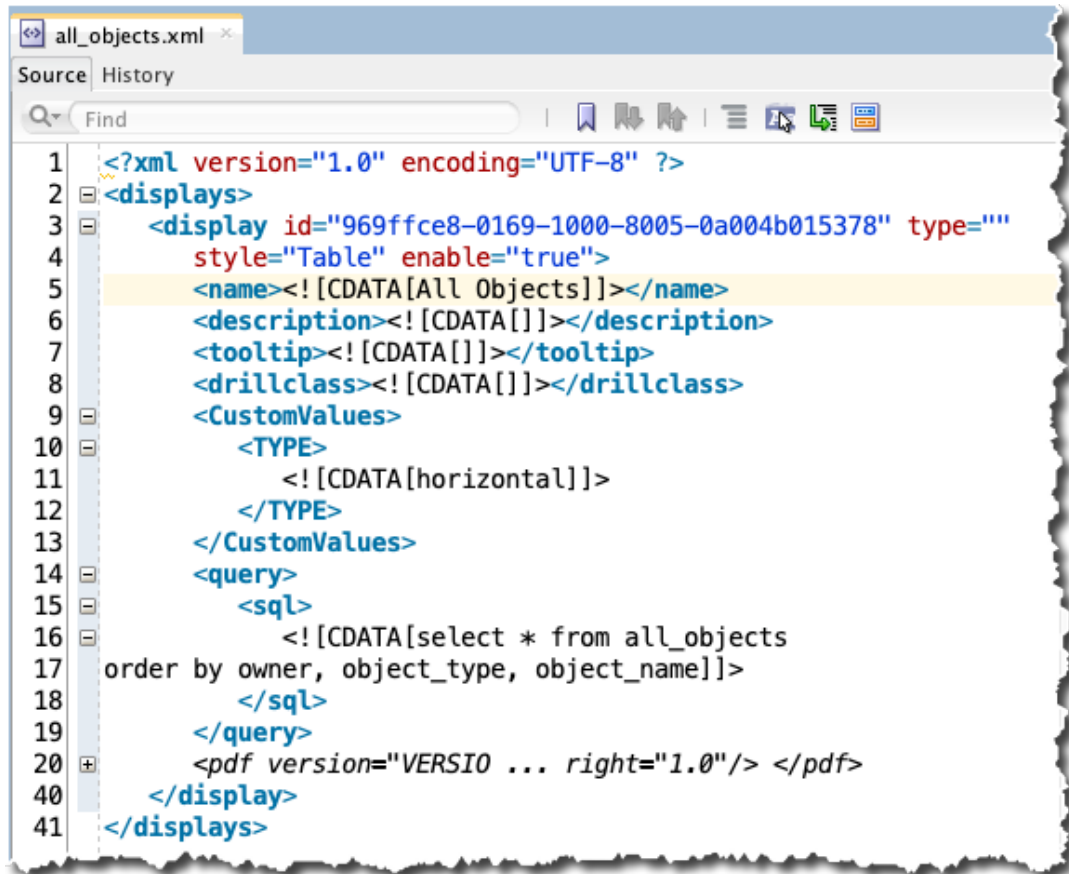
- Context Menu in Reports Window
- XML Format
- Single Report
- Group of Reports (Folder)

Import Reports



- Read "Open" as "Import"
- Report is copied
 - into "User Defined Reports" folder
 - `${ide.pref.dir}/UserReports.xml`
 - Visible in all SQL Developer installations

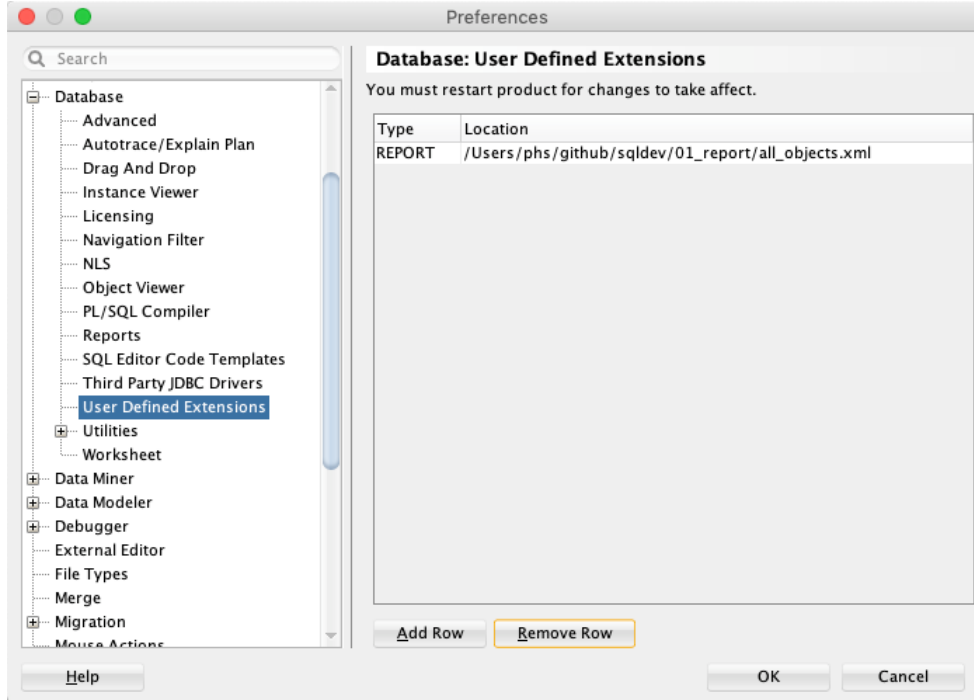
XML Source – Example



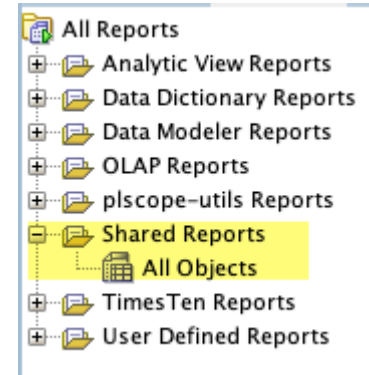
```
1 <?xml version="1.0" encoding="UTF-8" ?>
2 <displays>
3   <display id="969ffce8-0169-1000-8005-0a004b015378" type=""
4     style="Table" enable="true">
5     <name><![CDATA[All Objects]]></name>
6     <description><![CDATA[]]></description>
7     <tooltip><![CDATA[]]></tooltip>
8     <drillclass><![CDATA[]]></drillclass>
9     <CustomValues>
10      <TYPE>
11        <![CDATA[horizontal]]>
12      </TYPE>
13    </CustomValues>
14    <query>
15      <sql>
16        <![CDATA[select * from all_objects
17 order by owner, object_type, object_name]]>
18      </sql>
19    </query>
20    <pdf version="VERSI0 ... right="1.0"/> </pdf>
40  </display>
41 </displays>
```

- Formatted
- PDF node is collapsed
- Modify in
 - XML editor
 - SQL Developer (open, export)
- Configuration item for VCS

Installing Reports (XML Extension)



- Database Preferences
 - User Defined Extensions
 - XML file is referenced
- SQL Developer must be restarted
- Shared Reports



Editors

Object Type Details

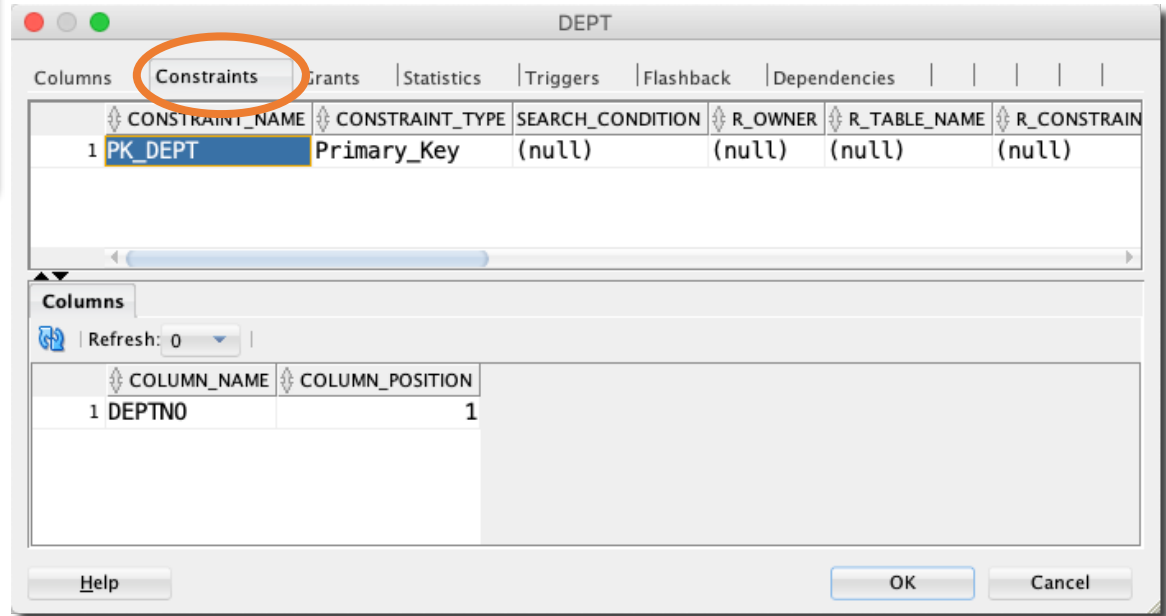
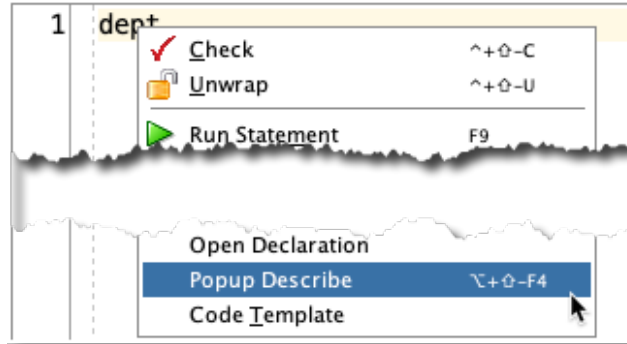
The screenshot displays the Oracle SQL Developer interface. On the left, the 'Connections' pane shows a tree view with 'plscope-odb-macphs' expanded, revealing a 'Tables (Filtered)' folder containing several tables, including 'DEPT'. The main window is titled 'DEPT' and has several tabs: 'Columns', 'Data', 'Model', 'Constraints', 'Grants', 'Statistics', 'Triggers', 'Flashback', 'Dependencies', 'Details', and 'Partitions'. The 'Constraints' tab is selected and highlighted with an orange circle. The 'Flashback' tab is also highlighted with an orange circle. The 'Columns' tab is highlighted with an orange circle. The 'Constraints' tab displays a table of constraints for the 'DEPT' table:

	CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_C
1	PK_DEPT	Primary_Key	(null)	(null)	(null)	(null)

Below the constraints table, the 'Columns' tab is selected, showing a table of columns for the 'DEPT' table:

	COLUMN_NAME	COLUMN_POSITION
1	DEPTNO	1

Popup Describe



Reports vs. Editors

Reports

```
<?xml version="1.0" encoding="UTF-8" ?>
<displays>
  <display
    id="969ffce8-0169-1000-8005-0a004b015378"
    type=""
    style="Table"
    enable="true"

  >
  ...
</display>
</displays>
```

Editors

```
<?xml version="1.0" encoding="UTF-8" ?>
<displays>
  <display

    type="editor"
    style="Table"
    enable="true"
    objectType="TABLE,VIEW,PACKAGE,PACKAGE BODY"

  >
  ...
</display>
</displays>
```

Object Types (Excerpt)

- DATABASE LINK
- DIRECTORY
- FUNCTION *)
- INDEX
- JOB
- MATERIALIZED VIEW
- MATERIALIZED VIEW LOG
- OPERATOR
- PACKAGE *)
- PACKAGE BODY *)
- PROCEDURE *)
- QUEUE
- RECYCLEBIN
- SYNONYM
- TABLE
- TRIGGER *)
- TYPE *)
- TYPE BODY *)
- VIEW

*) Popup Describe only, see also <https://github.com/oracle/oracle-db-examples/blob/master/sqldeveloper/extension/java/DumpObjectTypesAction/README.md>

Binds

The following bind variables can be used in SQL statements of an editor:

- :OBJECT_OWNER
- :OBJECT_TYPE
- :OBJECT_NAME

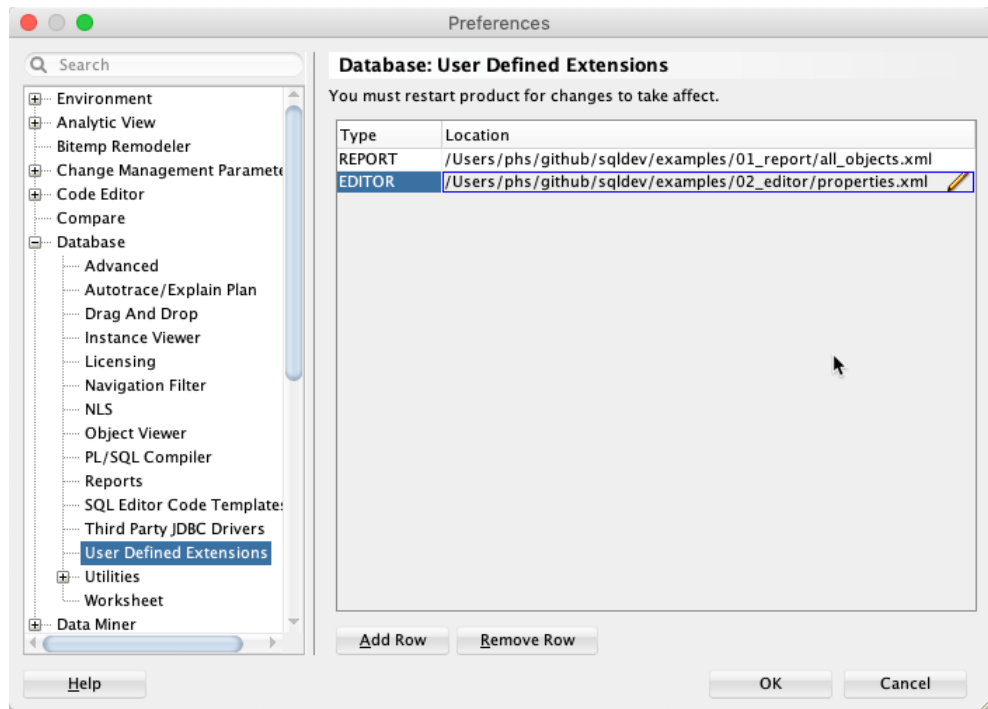


DBA-Views
optimization



```
select * from sys.all_objects
where owner = :OBJECT_OWNER
      and (object_type = :OBJECT_TYPE OR :OBJECT_TYPE IS NULL)
      and (object_name = :OBJECT_NAME OR :OBJECT_NAME IS NULL)
order by owner, object_type, object_name
```

Installing Editors (XML Extension)



- Database Preferences
 - User Defined Extensions
 - XML file is referenced
- SQL Developer must be restarted

Name	Value
1 OWNER	SCOTT
2 OBJECT_NAME	EMP
3 SUBOBJECT_NAME	(null)
4 OBJECT_ID	78662
5 DATA_OBJECT_ID	78662
6 OBJECT_TYPE	TABLE
7 CREATED	24.01.2019 22:34:48
8 LAST_DDL_TIME	24.01.2019 22:34:48
9 TIMESTAMP	2019-01-24:22:34:48
10 STATUS	VALID
11 TEMPORARY	N
12 GENERATED	N
13 SECONDARY	N
14 NAMESPACE	1
15 EDITION_NAME	(null)
16 SHARING	NONE
17 EDITIONABLE	(null)
18 ORACLE_MAINTAINED	N
19 APPLICATION	N
20 DEFAULT_COLLATION_USING_NLS_COMP	
21 DUPLICATED	N
22 SHARDED	N
23 CREATED_APPID	(null)
24 CREATED_VSNID	(null)
25 MODIFIED_APPID	(null)
26 MODIFIED_VSNID	(null)

Demo



Connections Reports

plscope-odb-macphs

Worksheet Query Builder

1 dd_util

Preferences

user def

Database

- User Defined Extension
- Data Miner
 - Node Settings
 - Transforms
 - Filter Columns
 - Data Modeler
 - Model
 - Physical
 - Oracle
 - User Defined Preference
 - Migration
 - Generation Options
 - Web Browser and Proxy
 - XML Schemas

Database: User Defined Extensions

You must restart product for changes to take affect.

Type	Location
NAVIGATOR	/Users/phs/github/sqldev/examples/030_navigator/soft-drink...
EDITOR	/Users/phs/github/sqldev/examples/020_editor/drinks-editor...
EDITOR	/Users/phs/github/sqldev/examples/020_editor/ashtop.xml
EDITOR	/Users/phs/github/sqldev/examples/020_editor/properties.xml
ACTION	/Users/phs/github/sqldev/examples/040_action/ctas_javascrrip...
REPORT	/Users/phs/github/sqldev/examples/010_report/tpt.xml
REPORT	/Users/phs/github/sqldev/examples/010_report/ashtop.xml

Add Row Remove Row

Help OK Cancel

Tables (Filtered)

- DBMSPCC_BLOCKS
- DBMSPCC_RUNS
- DBMSPCC_UNITS
- DEPT
- DEPTSAL
- DEPTSAL_ERR
- EMP
 - EMPNO
 - ENAME
 - JOB
 - MGR
 - HIREDATE
 - SAL
 - COMM
 - DEPTNO

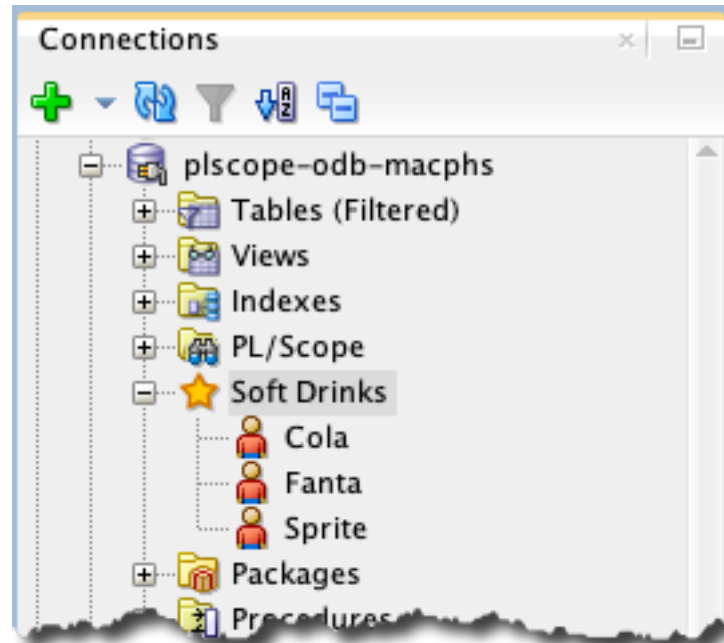
Views

- PLSCOPE_COL_USAGE
- PLSCOPE_IDENTIFIERS
- PLSCOPE_INS_LINEAGE
- PLSCOPE_NAMING
- PLSCOPE_STATEMENTS
- PLSCOPE_TAB_USAGE

Line 1 Column 6 | Insert | Modified | Unix/Mac: L

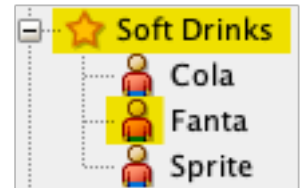
Navigators

Navigator by Example (1)



Navigator by Example (2)

```
1 <navigator RESOURCE_FILE="oracle.dbtools.raptor.navigator.OracleNavigatorResource">
2   <objectType connType="Oracle" id="soft-drinks" weight="203">
3     <folder>
4       <icon RSKEY="OracleIcons.FAVORITES"></icon>
5       <label RSKEY="Soft Drinks"/>
6       <queries>
7         <query>
8           <sql constrained="true">
9             <![CDATA[ SELECT 'Co ... S type FROM dual ]]>
19          </sql>
20        </query>
21      </queries>
22    </folder>
23    <node>
24      <icon RSKEY="OracleIcons.USER" />
25    </node>
26  </objectType>
27 </navigator>
```



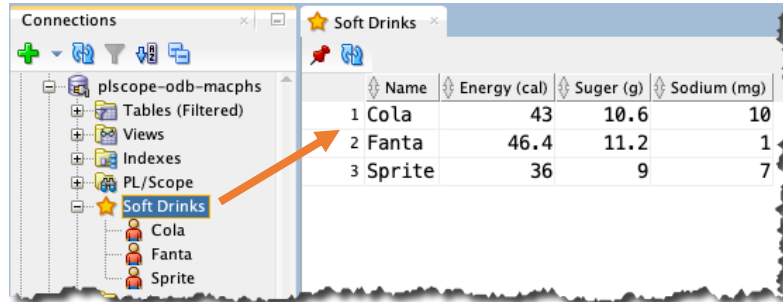
Navigator by Example (3)

```
7      <query>
8      <sql   constrained="true">
9      <![CDATA[
10 SELECT 'Cola' AS name, 'soft-drinks' AS type
11        FROM dual
12 UNION ALL
13 SELECT 'Fanta' AS name, 'soft-drinks' AS type
14        FROM dual
15 UNION ALL
16 SELECT 'Sprite' AS name, 'soft-drinks' AS type
17        FROM dual
18      ]]>
19      </sql>
20    </query>
```



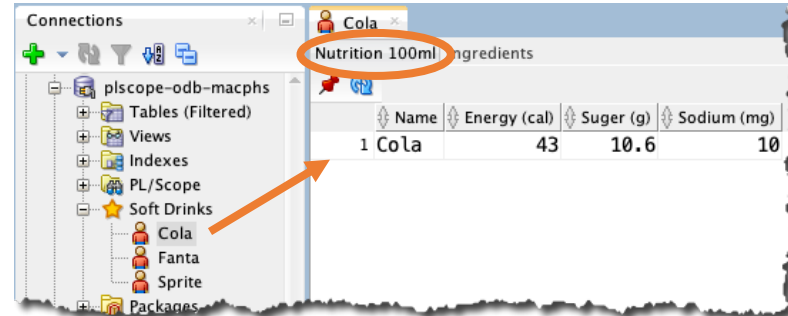
Editors

soft-drinks_FOLDER

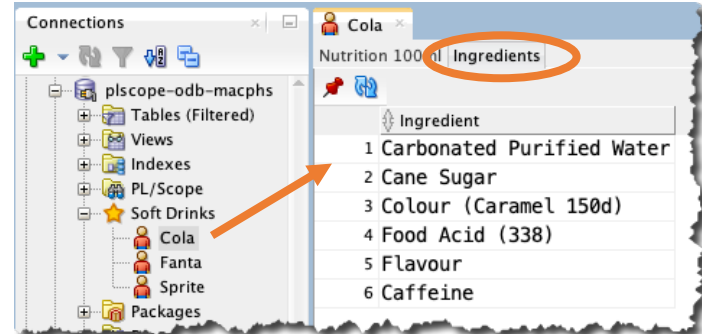


	Name	Energy (cal)	Sugar (g)	Sodium (mg)
1	Cola	43	10.6	10
2	Fanta	46.4	11.2	1
3	Sprite	36	9	7

soft-drinks

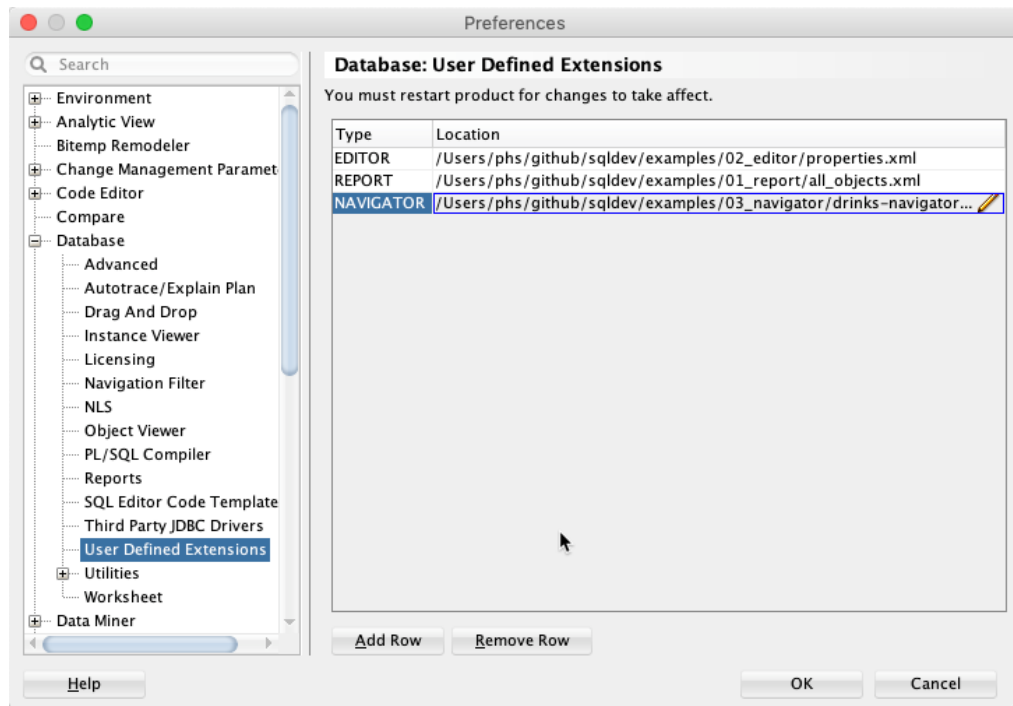


	Name	Energy (cal)	Sugar (g)	Sodium (mg)
1	Cola	43	10.6	10



	Ingredient
1	Carbonated Purified Water
2	Cane Sugar
3	Colour (Caramel 150d)
4	Food Acid (338)
5	Flavour
6	Caffeine

Installing Editors (XML Extension)

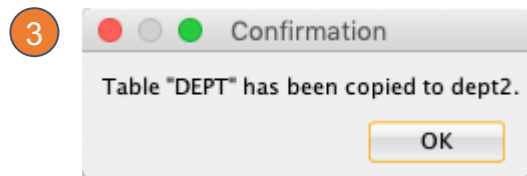
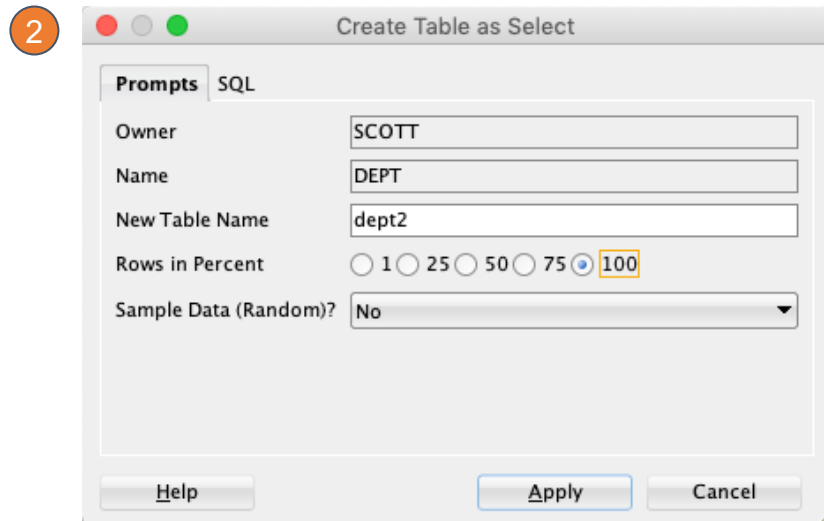
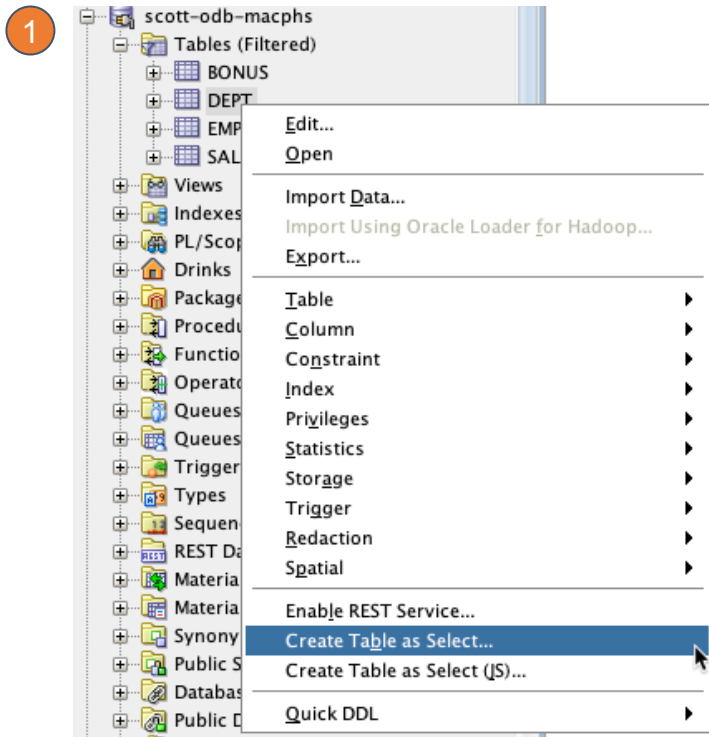


- Database Preferences
 - User Defined Extensions
 - XML file is referenced
- SQL Developer must be restarted



Actions

Action by Example (1)



Action by Example (2)

```
<items>
  <item type="TABLE" reloadparent="true">
    <title>Create Table as Select...</title>
    <prompt>
      <label>New Table Name</label>
    </prompt>
    <prompt type="radio">
      <label>Rows in Percent</label>
      <value><![CDATA[STATIC:1:25:50:75:100]]></value>
    </prompt>
    <prompt>
      <label>Sample Data (Random)?</label>
      <value><![CDATA[STATIC:No:Yes]]></value>
    </prompt>
  ...

```



Only one type!

Action by Example (3a – PL/SQL)

```
<sql>
  <![CDATA[
declare
  l_sql varchar2(32767) := 'create table #0# as select * from ' ||
                           '"#OBJECT_OWNER#"."#OBJECT_NAME#"';
  l_count integer;
begin
  if '#1#' != '100' then
    if '#2#' = 'No' then
      select count(*) * #1# / 100 into l_count
      from "#OBJECT_OWNER#"."#OBJECT_NAME#";
      l_sql := l_sql || ' where rownum <= ' || l_count;
    else
      l_sql := l_sql || ' sample(#1#)';
    end if;
  end if;
  execute immediate l_sql;
end;
  ]]>
</sql>
```

Action by Example (3b – JavaScript)

```
<script>
  <![CDATA[
var tab = '' + OBJECT_OWNER + '."' + OBJECT_NAME + '';
var sql = 'create table ' + prompt0 + ' as select * from ' + tab;
if (prompt1 != '100') {
  if (prompt2 == 'No') {
    var sqlCount = 'select to_char(count(*) * to_number(:percent) / 100) AS col from ' + tab;
    var map = new java.util.HashMap();
    map.put('percent', prompt1);
    var count = dbutil.executeReturnOneCol(sqlCount, map);
    sql = sql + ' where rownum <= ' + count;
  } else {
    sql = sql + ' sample(' + prompt1 + ')';
  }
}
dbutil.execute(sql);
  ]]>
</script>
```

Action by Example (4)

```
...
<help>Copy a table. Completely or a chosen subset in percent.</help>
<confirmation>
  <title>Confirmation</title>
  <prompt>Table "#OBJECT_NAME#" has been copied to #0#.</prompt>
</confirmation>
</item>
</items>
```

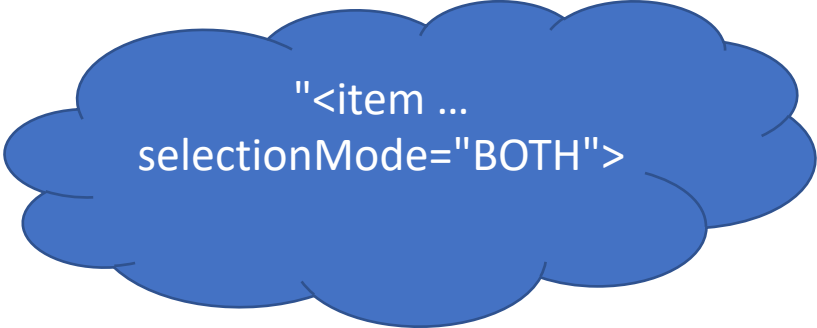
Object Types (Excerpt)

- APEX[_FOLDER]
- COLUMN
- CONNECTION
- DATABASE LINK[_FOLDER]
- DIRECTORY[_FOLDER]
- FUNCTION[_FOLDER]
- INDEX
- JAVA[_FOLDER]
- JOBS[_FOLDER]
- MATERIALIZED VIEW[_FOLDER]
- MATERIALIZED VIEW LOG[_FOLDER]
- PACKAGE[_FOLDER]
- PACKAGE_BODY
- PROCEDURE[_FOLDER]
- PUBLIC DATABASE LINK
- PUBLIC SYNONYM[_FOLDER]
- RECYCLEBIN
- SEQUENCE[_FOLDER]
- SYNONYM[_FOLDER]
- TABLE[_FOLDER]
- TYPE[_FOLDER]
- USER[_FOLDER]
- VIEW[_FOLDER]
- XDB
- XDB_SUBFOLDER
- XML SCHEMA

see also <https://github.com/oracle/oracle-db-examples/blob/master/sqldeveloper/extension/java/DumpObjectTypesAction/README.md>

PL/SQL & SQL Placeholders

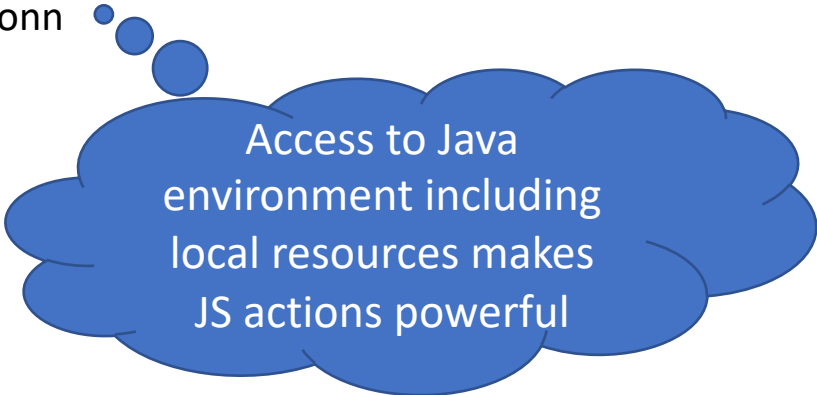
- #COLUMN_NAME#
 - #CHILD_NAME#
 - #CONN_TYPE#
 - #OBJECT_FOLDER_TYPE#
 - #OBJECT_ID#
 - #OBJECT_NAME#
 - #OBJECT_NAMES#
 - #OBJECT_OWNER#
 - #OBJECT_OWNERS#
 - #OBJECT_TYPE#
- #0#
 - #1#
 - #2#
 - ...
 - #<n>#



"<item ...
selectionMode="BOTH">

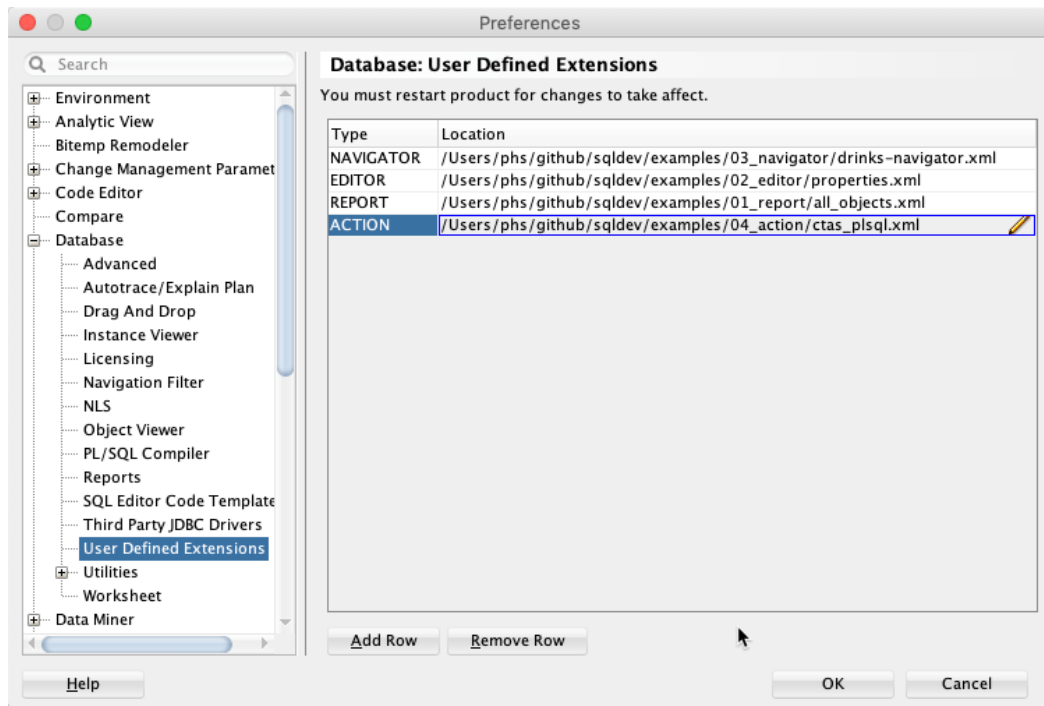
JavaScript Variables

- COLUMN_NAME
- CHILD_NAME
- CONN_TYPE
- OBJECT_FOLDER_TYPE
- OBJECT_ID
- OBJECT_NAME
- OBJECT_NAMES
- OBJECT_OWNER
- OBJECT_OWNERS
- OBJECT_TYPE
- prompt0
- prompt1
- prompt2
- ...
- prompt<n>
- dbutil
- conn

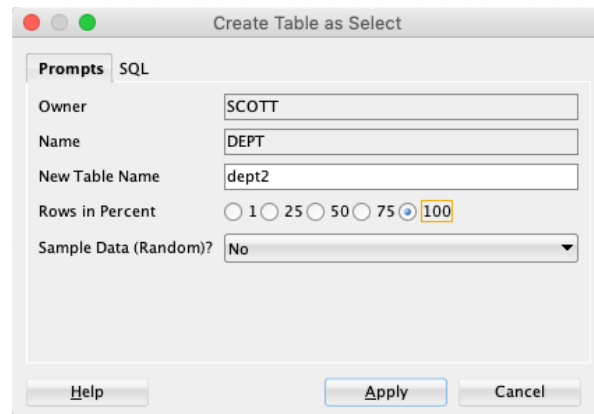


Access to Java
environment including
local resources makes
JS actions powerful

Installing Actions (XML Extension)



- Database Preferences
 - User Defined Extensions
 - XML file is referenced
- SQL Developer must be restarted



Core Messages

Everyone Can Write Extensions

- Start with Reports.
- Editors are basically Reports.
- Navigators and Actions are powerful, but not that simple to master.
- Look for examples and links to related resources, e.g. in <https://github.com/PhilippSalvisberg/sqldev>.
- Ask for help in the [SQL Developer Space](#).





Making a **WORLD** possible
in which **intelligent IT**
facilitates **LIFE and WORK** as a
matter of course.