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Oracle SQL Developer 3.0

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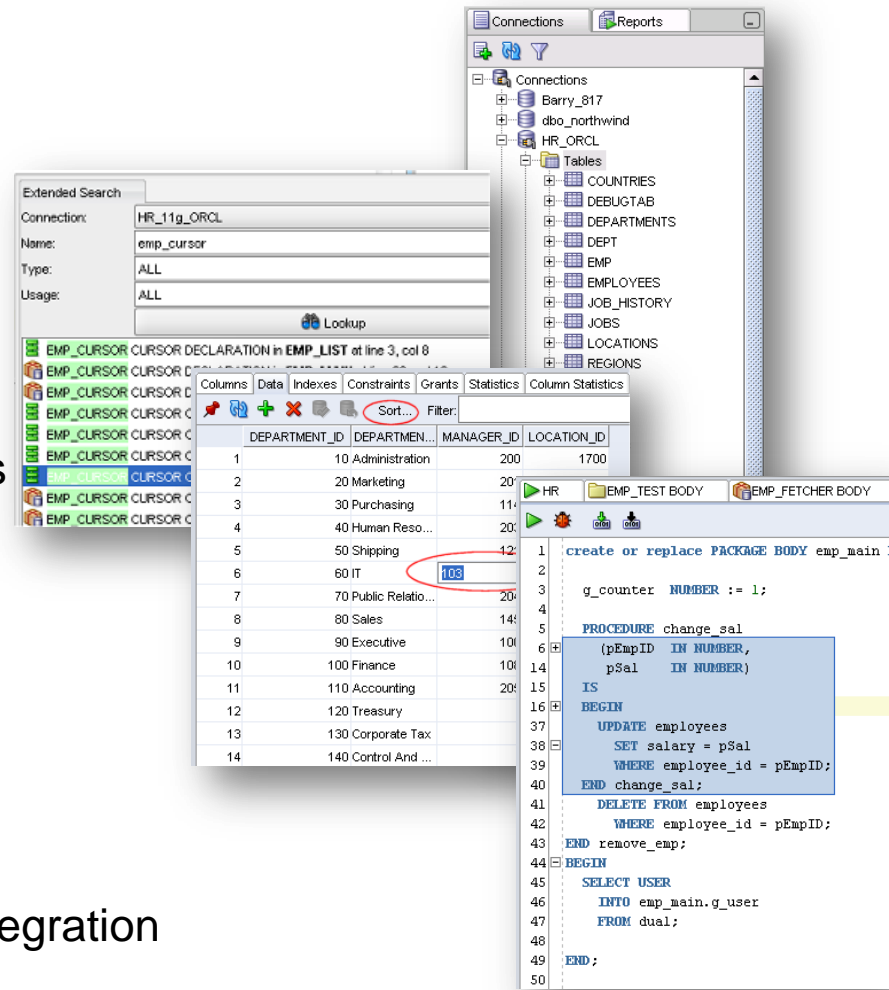
Overview and History

Release History

- **SQL Developer 3.0 – 2011 (Production Release)**
 - Introduces wide spectrum of new features
- **SQL Developer 2.0 – 2009/2010**
 - Introduced PL/SQL Unit Testing, Data Modeler viewer
 - SQL Developer 2.1.1 – March '10
- **SQL Developer 1.5.x – 2008 /2009**
 - Introduced version control and file management
 - SQL Developer 1.5.4 – Full translation supporting 9 languages
 - **SQL Developer 1.5.5 – Shipped with Oracle Database 11g Release 2**
 - SQL Developer 1.5.6 – Bundled with Oracle JDeveloper 11g
- **SQL Developer 1.2.x – 2007**
 - Introduced database migration
- **SQL Developer 1.x – 2006/2007**
 - **SQL Developer 1.1.3 – Oracle Database 11g Release 1**
 - Initial production release – March 2006

Oracle SQL Developer Feature Overview

- Database connections
- Browse, query, update objects
- SQL Worksheet
- Query Builder
- Data import and export
- Object export
- PL/SQL edit and debug
- Database and user-defined reports
- User-defined extensions
- Files and source code control
- Unit Testing
- Third-party databases
- Database migration
- Oracle APEX integration
- TimesTen In-memory database integration
- Oracle Data Miner integration



New Features with SQL Developer 1.5.x

SQL Developer 1.5.5 ships with Oracle Database 11g Release 2

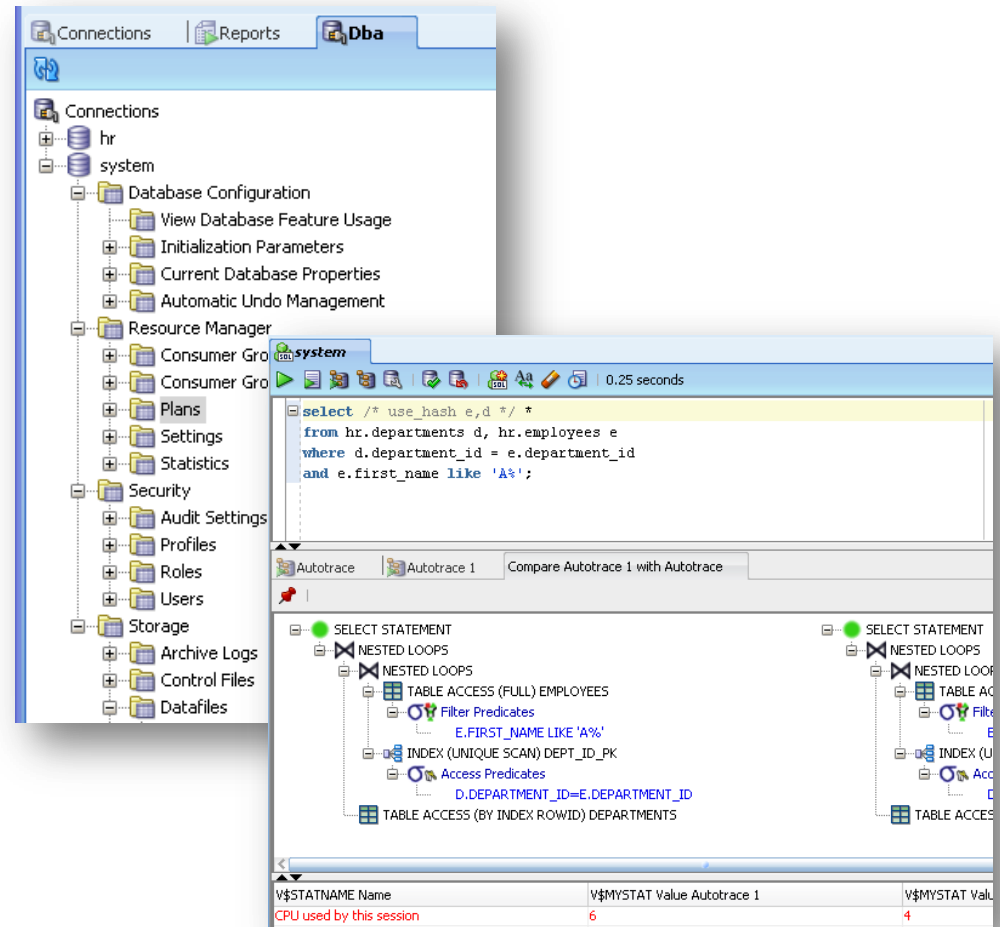
- Database connections
 - OS authentication, Proxy, LDAP
 - Force thick driver usage
 - Group connections in folders
- Navigator support for
 - Queues, Queue tables
 - Browse and load Java
 - Generating DB documentation
 - Managing the database
- Schema copy and compare
- Create new table on XLS import
- Tuning support
 - Hierarchical Profiler
 - GUI view of trace files
- SQL Worksheet includes
 - Updated SQL formatter
 - Code refactoring options
 - Increased code insight
 - Code templates
 - Flashback
- Extended search
- Integrated support for versioning and source control systems:
 - CVS and Subversion
- Migration
 - Sybase Adaptive Server
- Integrated support for TimesTen In-memory database

New Features with SQL Developer 2.1

- PL/SQL Unit Testing
- Data Modeler Viewer
- Migration support for IBM DB2 UDB and Teradata
- Updated Data Grids
 - Manage columns, filter on data
- New SQL Worksheet
 - Dockable dbms_output, multiple worksheets
- Increased Connections navigator support for
 - Jobs, Editions (for Database 11g Release 2), XML DB Repository
- Updated display editors
 - PL/SQL edit mode, subpartitions
- Version Control support for Serena Dimensions, Perforce
- Updated filtering mechanism
 - Schema level, generated objects

New Features with Oracle SQL Developer 3.0

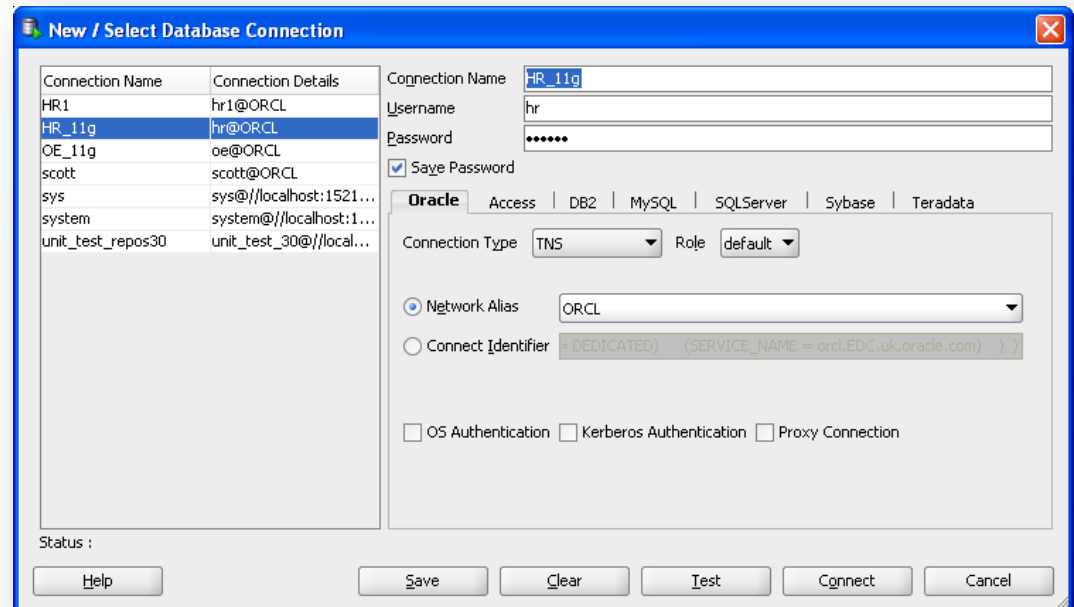
- Schema browser
- Query Builder
- PL/SQL updates
- Import and Export updates
- PDF file support
- Extended Unit Testing
- DBA Navigator
- Extended Tuning Support
- DBMS Scheduler
- Database migration
- Spatial support
- Data Miner



Feature Overview

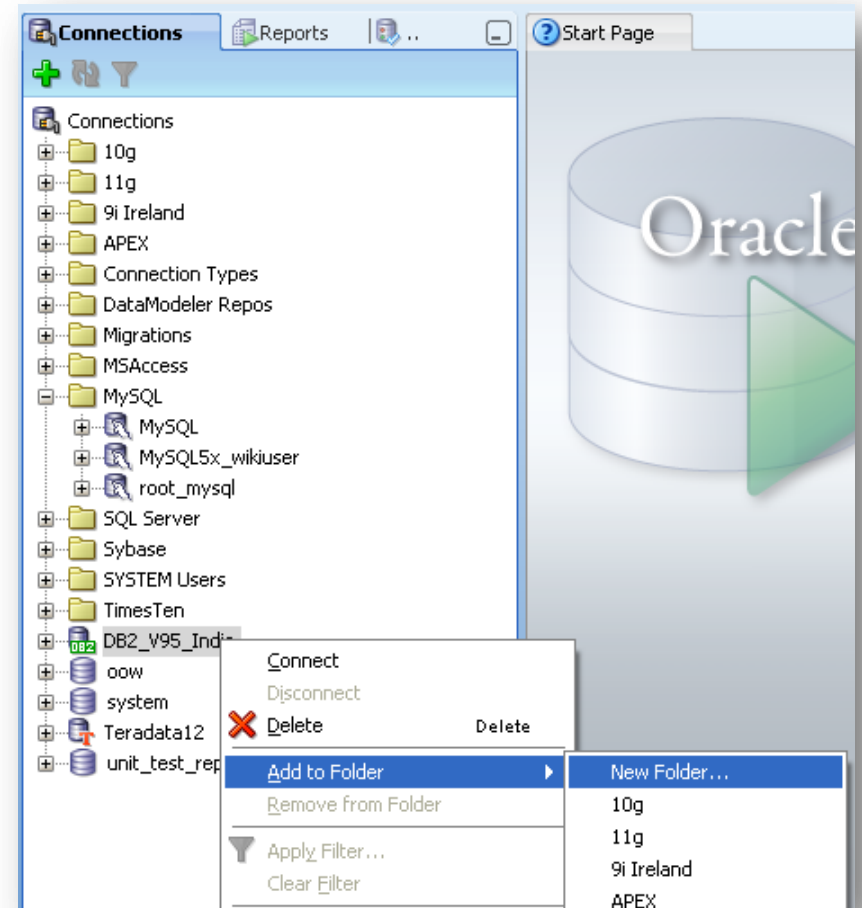
Database Connections

- Connection Support
 - Basic, TNS, LDAP, Advanced
 - External authentication
 - Proxy connections
 - Third-party database
 - Password expiration
 - Use thick driver for strong authentication
 - Kerberos Authentication
- Create, save and test
 - Multiple databases
 - Multiple schemas
- Import and export
- Reuse
 - Database browsing
 - PL/SQL development
 - Running reports



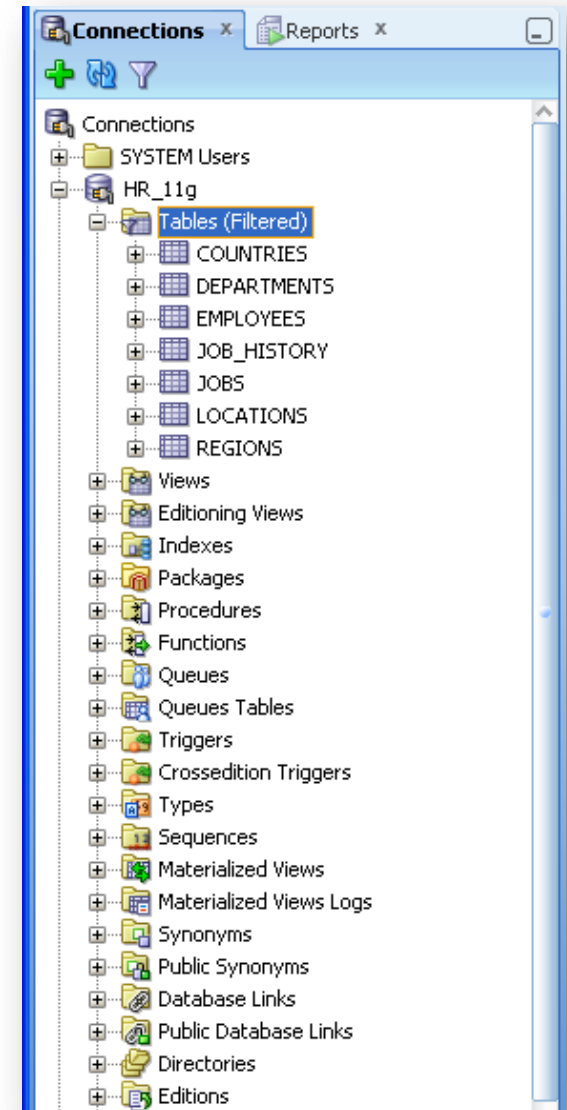
Grouping Connections

- Logically group connections using folders
- Create and manage folders
- Add new connections to folders
- Create local connections



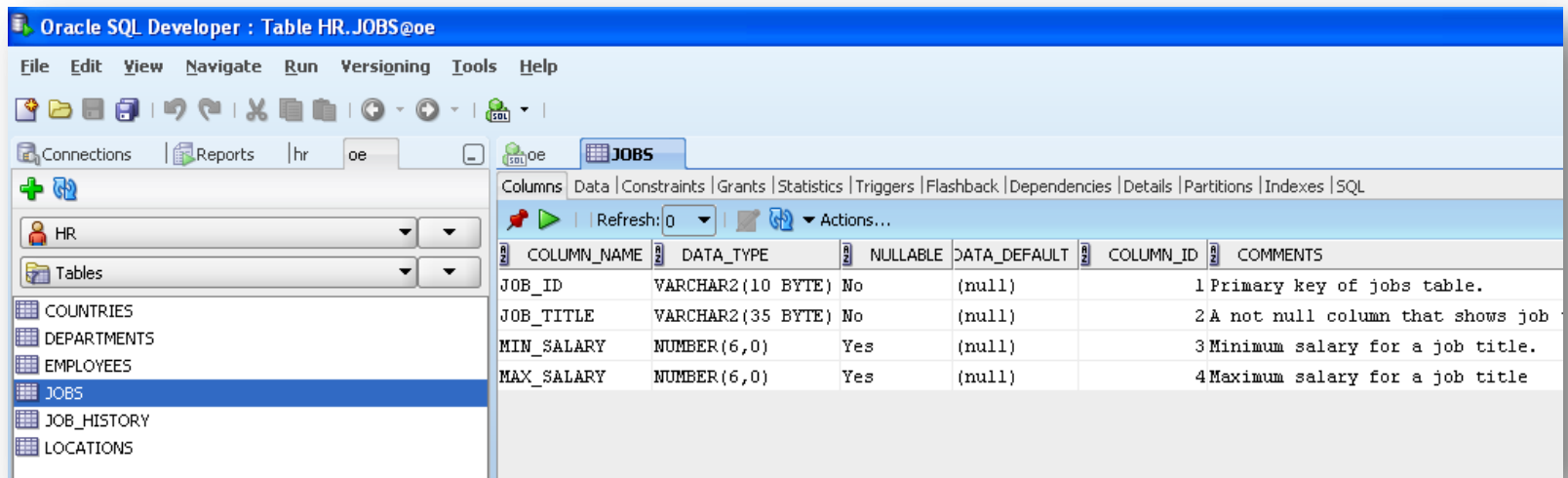
Creating and Browsing Objects

- Connection Navigator - Tree based object browser
- Context menu utilities
- Create and edit database objects
 - Tables, Views, Indexes, Sequences
 - Packages, Procedures, Functions, Triggers, Types
 - Materialized Views and Logs
 - Synonyms (public and private)
 - Directories, Database Links (includes Public)
 - Application Express
 - Queues, Queue Tables
 - Browse and Load Java
 - XML Schemas, XML DB Repository
 - Jobs
 - Editions (Oracle Database 11g Release 2)
 - Recycle Bin
 - Other Users
- Generate DB Doc
- Run Manage Database report



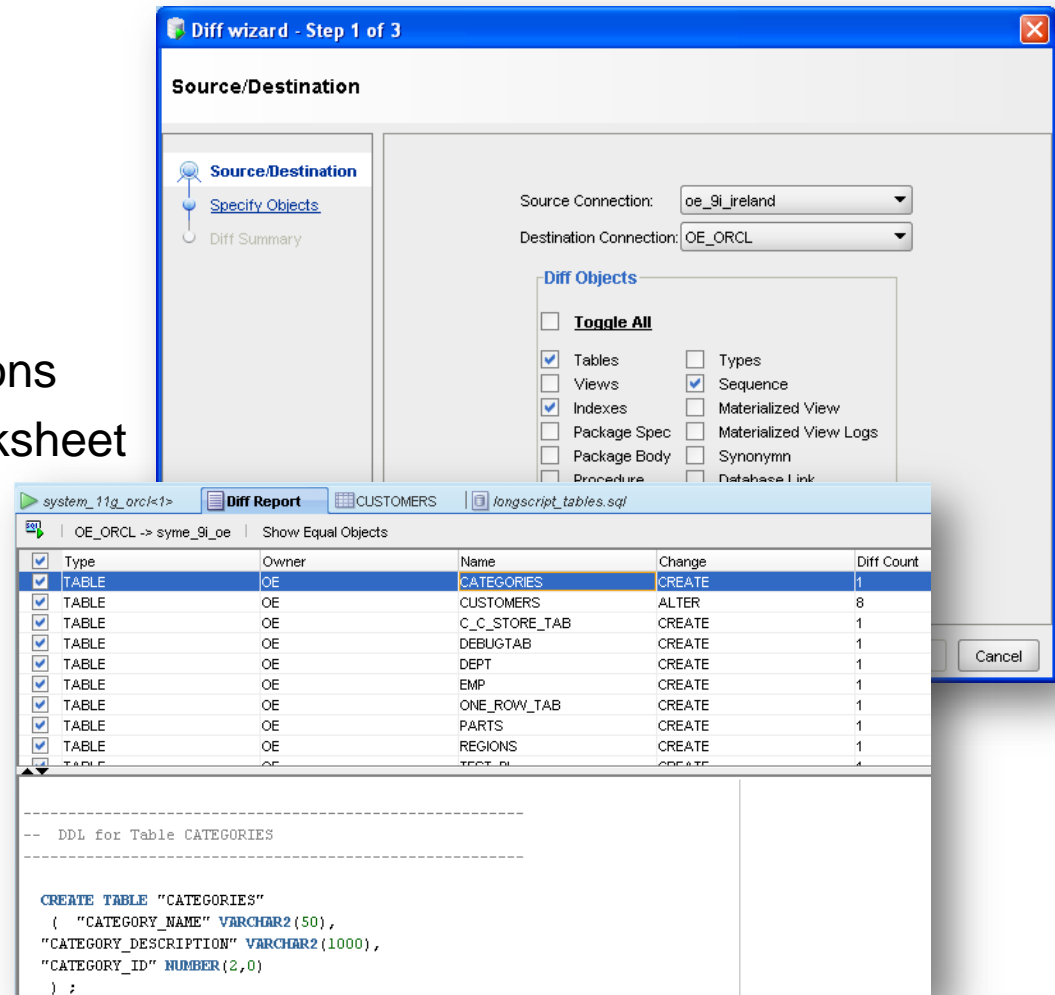
Schema Browser

- Alternate view of object browser
- Select and filter object type
- Select and filter users
- Additional client-side filter



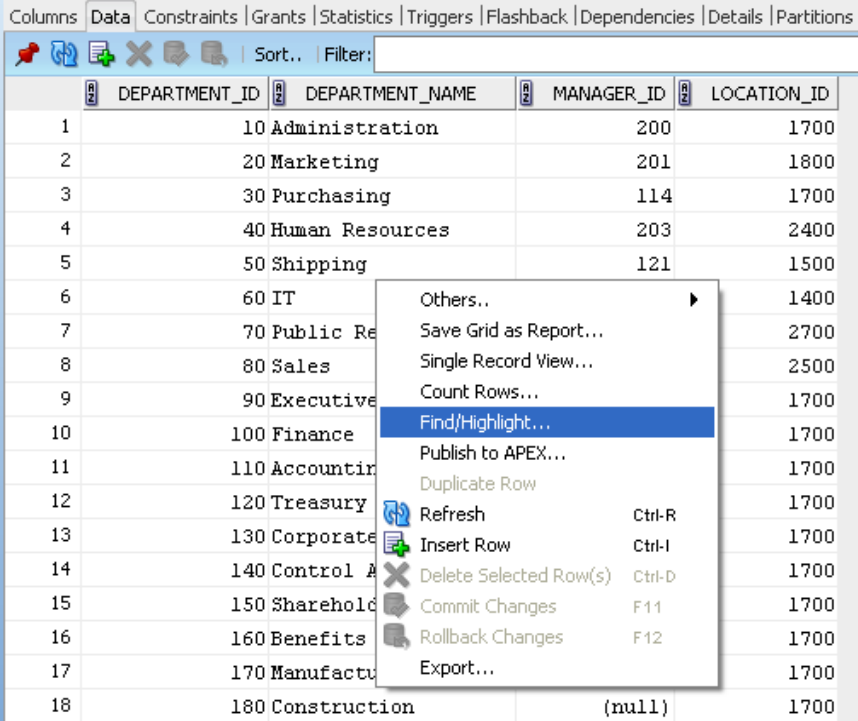
Schema Copy and Compare

- Schema Copy
 - Create new objects
 - Truncate objects
 - Drop objects
 - Summary report of actions
 - Log output to SQL Worksheet
- Schema Compare
 - Specify object types
 - Specify objects
 - Review diff summary
 - Summary report
 - Statements sent to SQL Worksheet



Data Grids: Querying and Updating Data

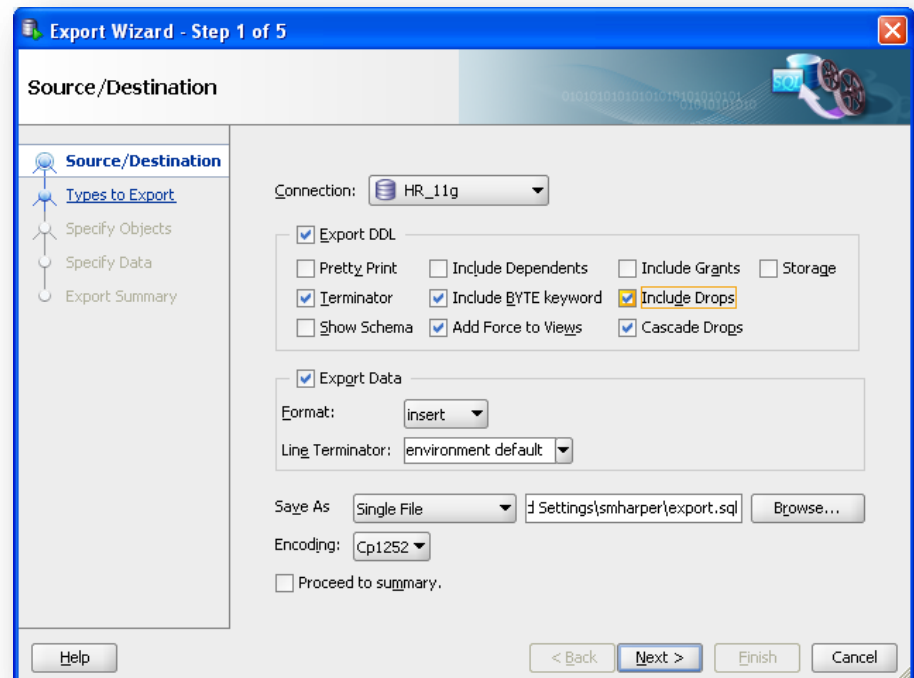
- Browse table and views data grid
 - Filter, Sort
- Context menus offer
 - Single record view
 - Duplicate row
 - Count rows
 - Save Grid as a report
 - Highlight data
- Manage columns
 - Reorder
 - Hide and show columns
 - Data filters
- Track updates in message log
- Recall filters
- Single value updates in data grid
- Clear grid settings



	DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
1	10	Administration	200	1700
2	20	Marketing	201	1800
3	30	Purchasing	114	1700
4	40	Human Resources	203	2400
5	50	Shipping	121	1500
6	60	IT		1400
7	70	Public Re		2700
8	80	Sales		2500
9	90	Executive		1700
10	100	Finance		1700
11	110	Accountin		1700
12	120	Treasury		1700
13	130	Corporate		1700
14	140	Control A		1700
15	150	Sharehold		1700
16	160	Benefits		1700
17	170	Manufactu		1700
18	180	Construction	{null}	1700

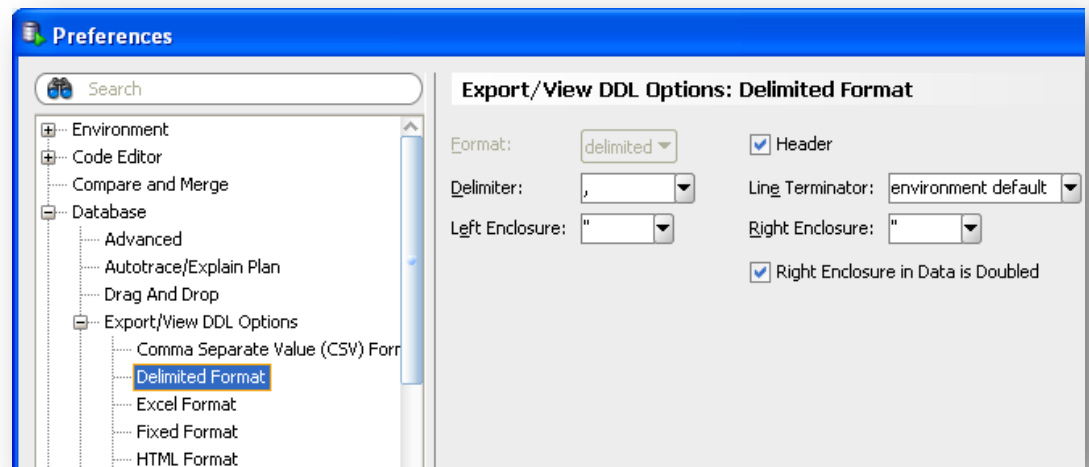
Exporting and Importing

- Context menu DDL and data export
 - Text, CSV, Insert, Loader, XML, HTML, XLS, PDF
- Import Data
 - MS Excel data import
 - Create table on import
- Export wizard
 - Parameters to include:
 - Schema owner
 - Drop statements
 - Storage syntax
 - Inline constraints syntax
 - Export data
 - Export grants
 - Export opens in SQL Worksheet



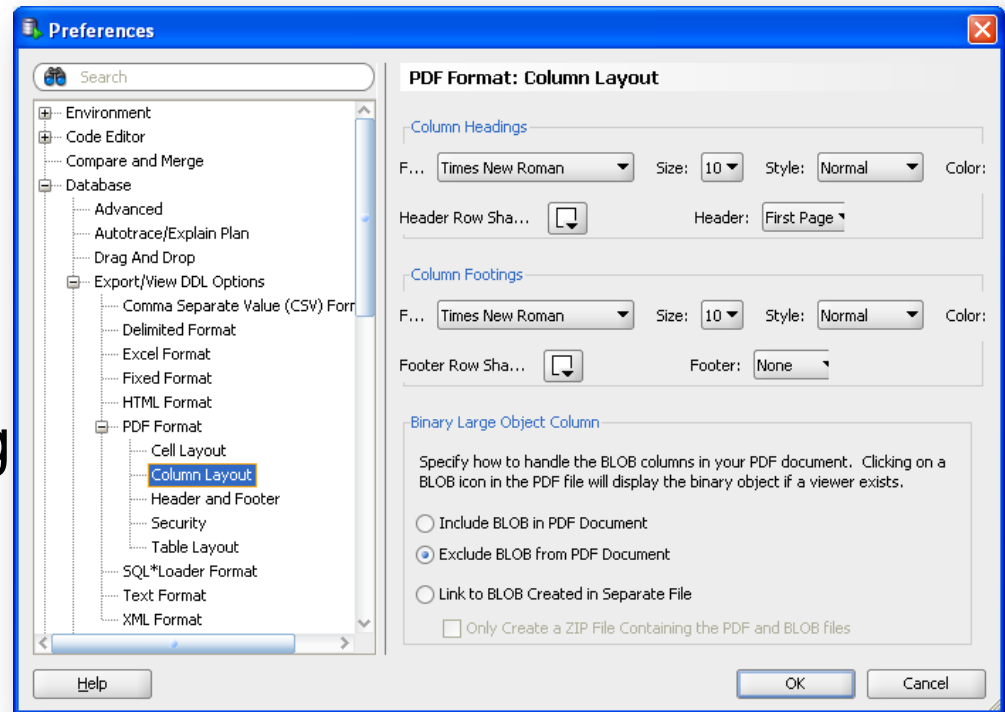
Exporting Data

- Export metadata and data for a schema, selected object types or selected objects
- Customizable user interface
- Configurable metadata and data format options
- Target options to send output to single or multiple files and directories
- Preferences manage
 - Delimiters
 - Enclosures
 - Record terminators
 - Encoding
 - Headers



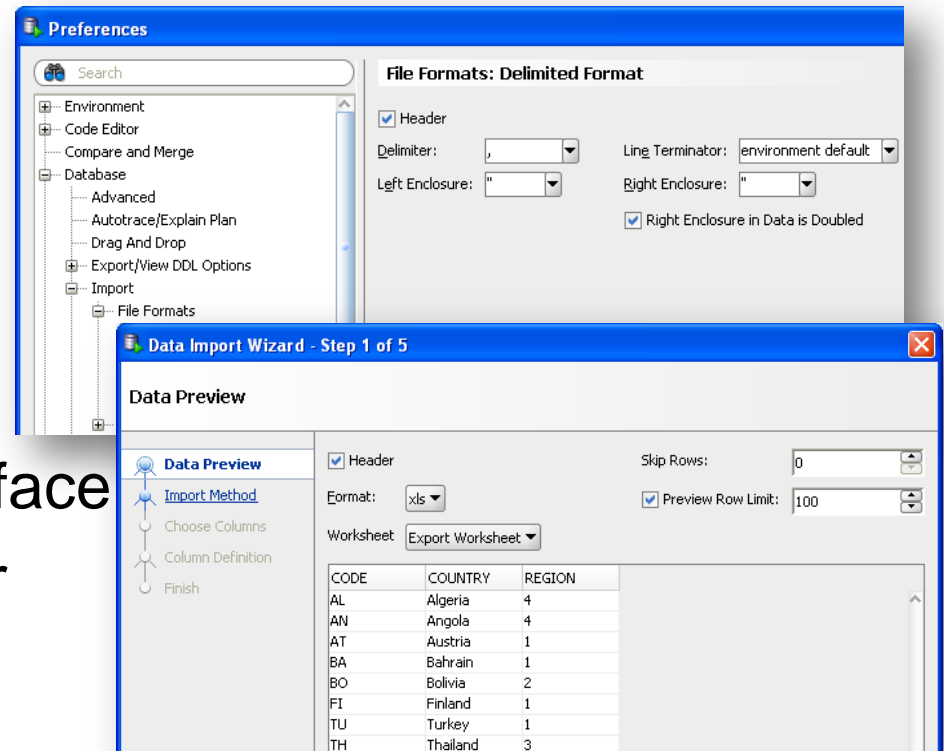
Exporting to PDF

- New data format support for PDF
- Configure PDF file format using preferences
- Customizable Layouts
- Provides security to encrypt and password-protect
- Provides option to include BLOBs including
 - Images
 - Video
 - Spreadsheets



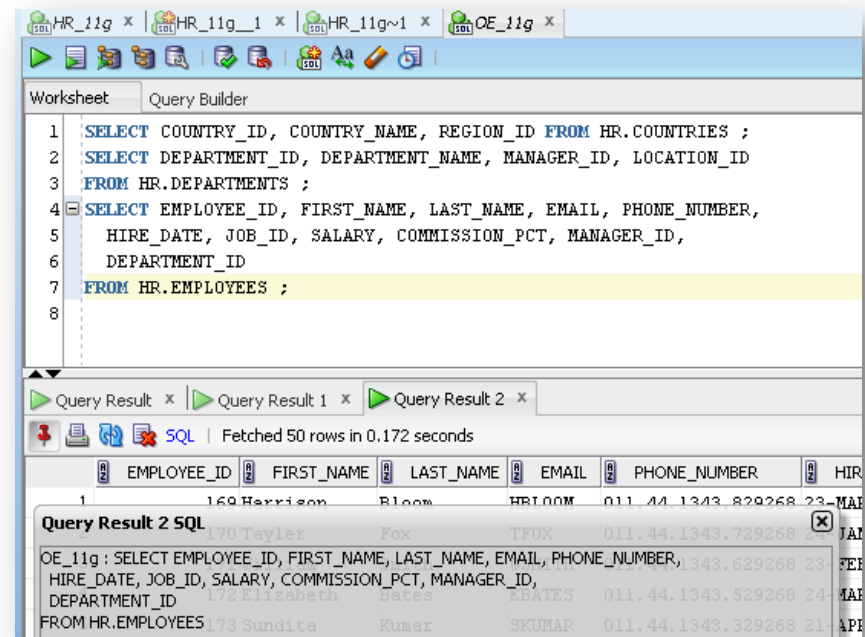
Importing Data

- Various import methods
 - Insert and insert script
 - External table, staging external table,
 - SQL*Loader
- Customizable user interface
- Delimited file support for specifying delimiters, enclosures, record terminators, encoding and header
- Dynamic data preview provides view of file as changes to the definition are made



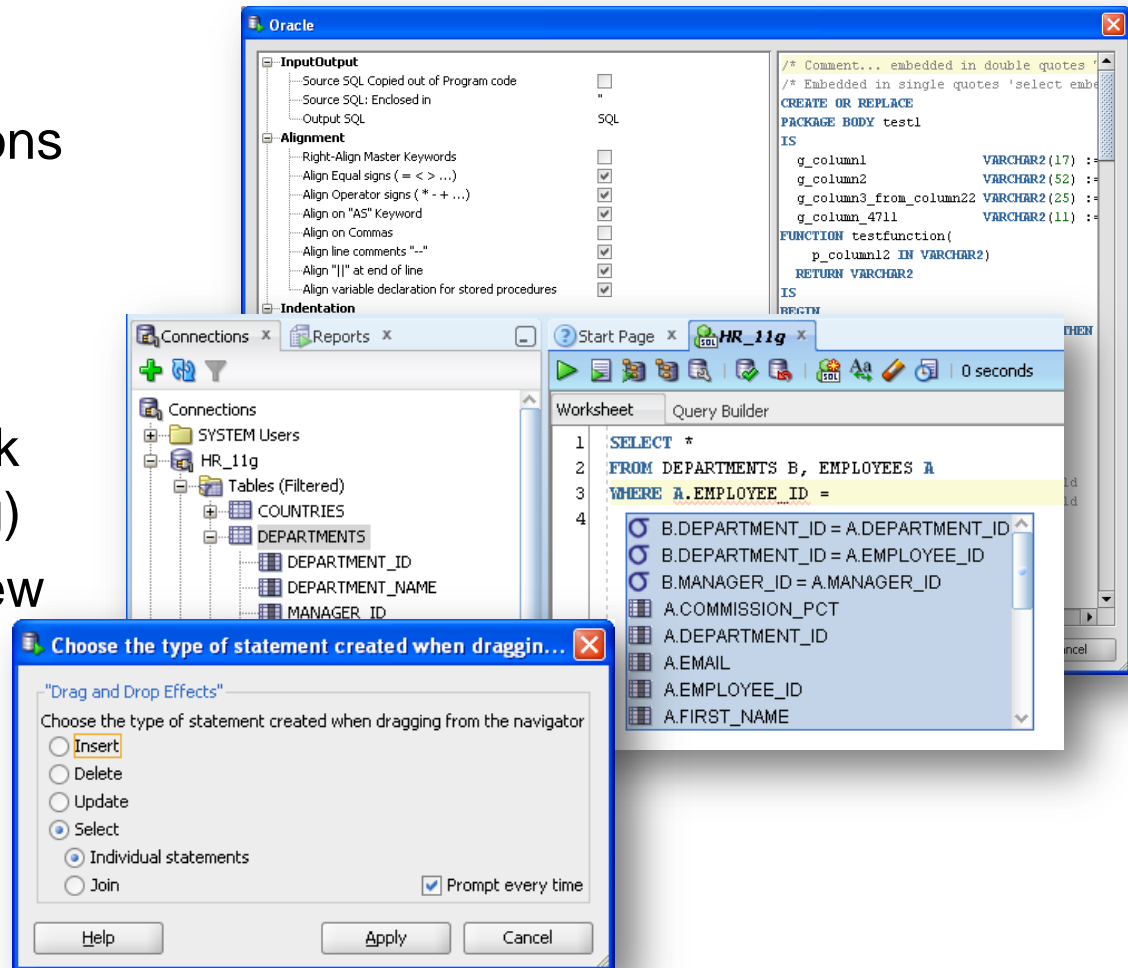
General Features of the SQL Worksheet

- Drag and drop choices for queries
 - Select for individual statements
 - Select and join tables
 - Insert, update, delete
- Execute queries and scripts
 - Single statement execution
 - Multiple statement execution
 - Script execution
- Command support for
 - SQL*Plus
 - SQL and PL/SQL
- Open multiple worksheets
 - Unshared worksheets – ctrl-shift-N
 - Shared worksheets – alt-F10
 - Dockable SQL Command History
- Supporting windows
 - SQL Tuning Advisor
 - Explain Plan and Autotrace
 - HTP and OWA output



Editing Code in the SQL Worksheet

- Code insight
- Code refactoring options
- Syntax highlighting
- Code templates
- Code snippets
- Record level flashback (Oracle Database 11g)
- Formatting with preview
- Bind variable support



Query Builder

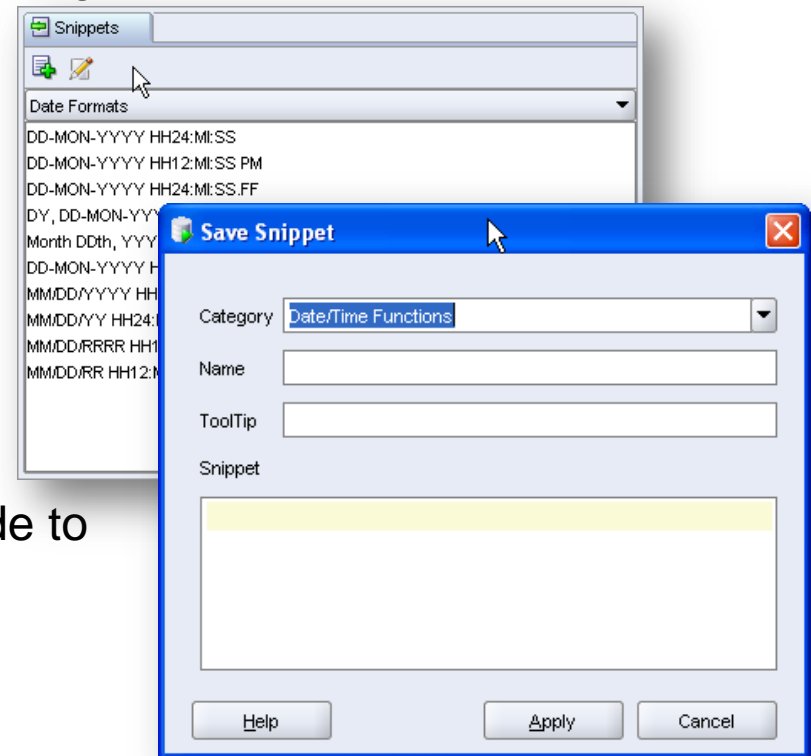
- Drag and drop query building
- Integrated with SQL worksheet
- Supports
 - Multiple object selection
 - Switch from Query Builder and Worksheet
 - Aggregates, Alias, Order By, Group By, Where clauses
 - Repeated tables
 - Union, intersect, minus and subqueries

The screenshot displays the Oracle SQL Developer Query Builder interface. The main window shows a query built from four tables: REGIONS, COUNTRIES, LOCATIONS, and DEPARTMENTS. The query includes the following columns: REGION_NAME, COUNTRY_NAME, CITY, and DEPARTMENT_NAME. The results show 7 rows selected.

REGION	COUNTRY	CITY	DEPARTMENT
Americas	Canada	Toronto	1
Americas	United States of America	Seattle	21
Americas	United States of America	South San Francisco	1
Americas	United States of America	Southlake	1
Europe	Germany	Munich	1
Europe	United Kingdom	London	1
Europe	United Kingdom	Oxford	1

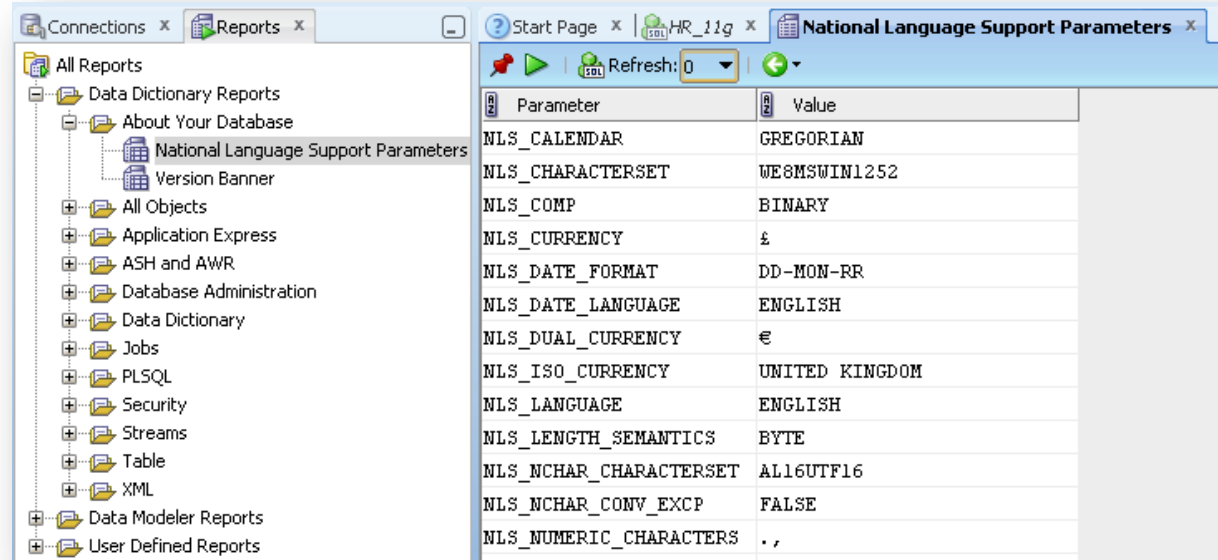
Code Snippets and Templates

- Code Snippets
 - Drag and drop code from snippet categories to SQL Worksheet or code editor
 - Start typing to invoke code insight
 - Create new
 - Categories
 - Snippets
- Code Templates
 - Add ID and code in preferences
 - In SQL Worksheet, start typing code to invoke code insight



Creating and Running Reports

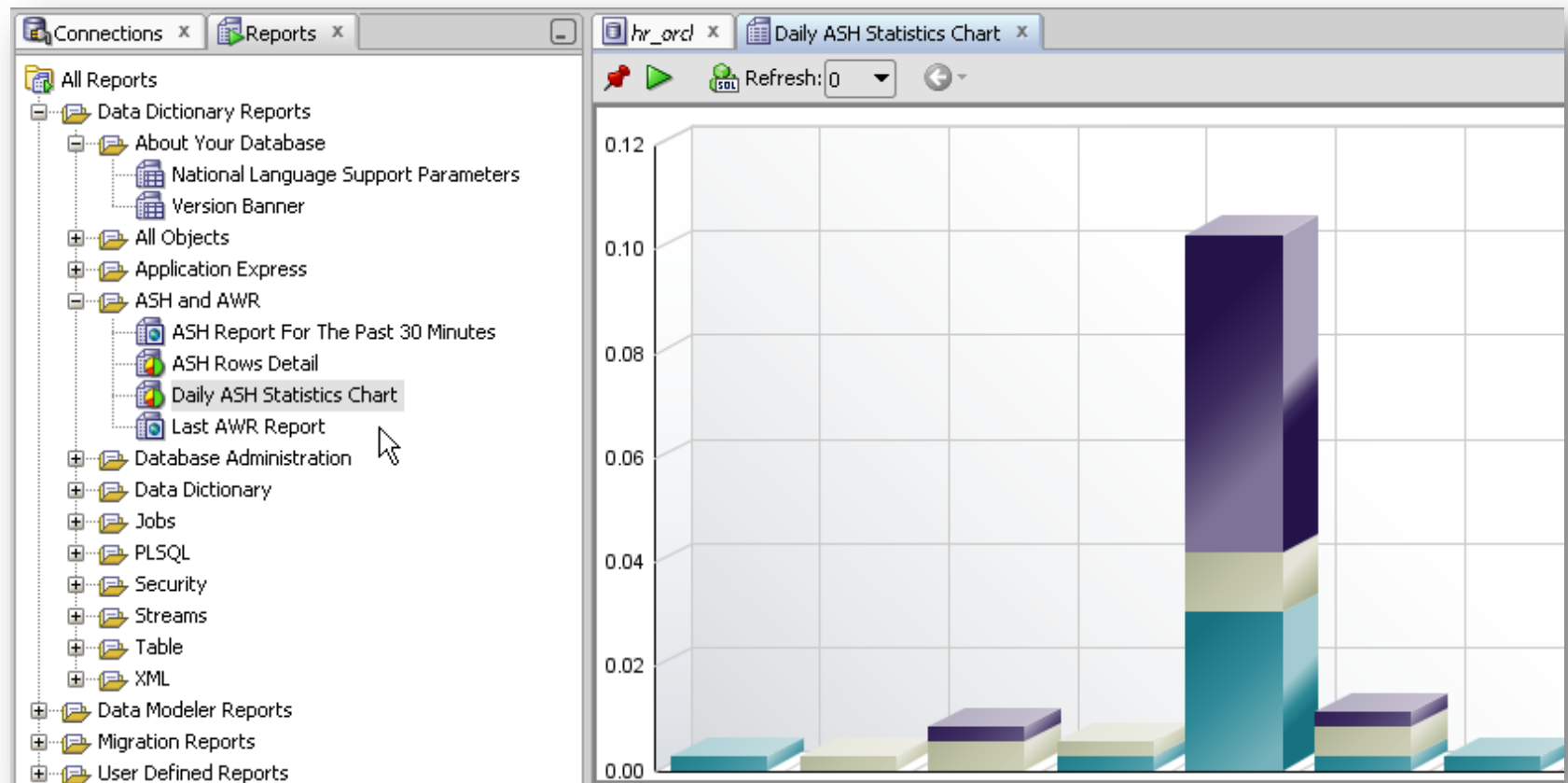
- Shipped Reports
 - DBA
 - System
 - Oracle APEX
 - Migration
- User Defined
 - Charts
 - Gauges
 - Master/detail
 - Drill down
 - Script
 - HTML
 - Code



The screenshot shows the Oracle APEX Reports interface. The left pane displays a tree view of reports, with 'National Language Support Parameters' selected under 'Data Dictionary Reports'. The right pane shows the report's content, which is a table of NLS parameters and their values. The table has two columns: 'Parameter' and 'Value'.

Parameter	Value
NLS_CALENDAR	GREGORIAN
NLS_CHARACTERSET	WE8MSWIN1252
NLS_COMP	BINARY
NLS_CURRENCY	£
NLS_DATE_FORMAT	DD-MON-RR
NLS_DATE_LANGUAGE	ENGLISH
NLS_DUAL_CURRENCY	€
NLS_ISO_CURRENCY	UNITED KINGDOM
NLS_LANGUAGE	ENGLISH
NLS_LENGTH_SEMANTICS	BYTE
NLS_NCHAR_CHARACTERSET	AL16UTF16
NLS_NCHAR_CONV_EXCP	FALSE
NLS_NUMERIC_CHARACTERS	.,

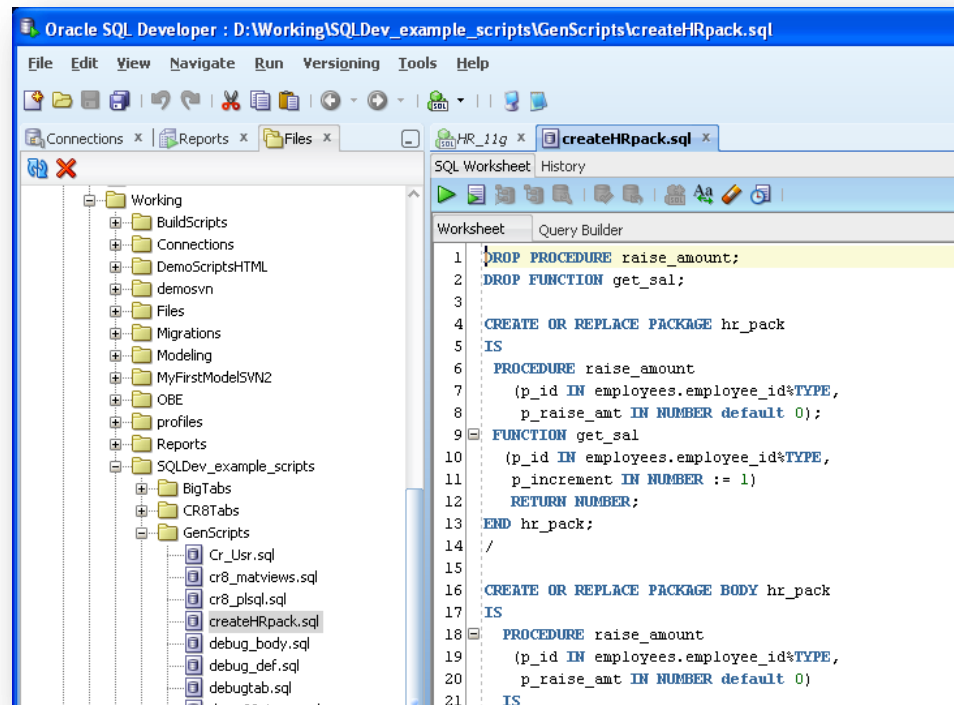
ASH and AWR Reports



File Based Development

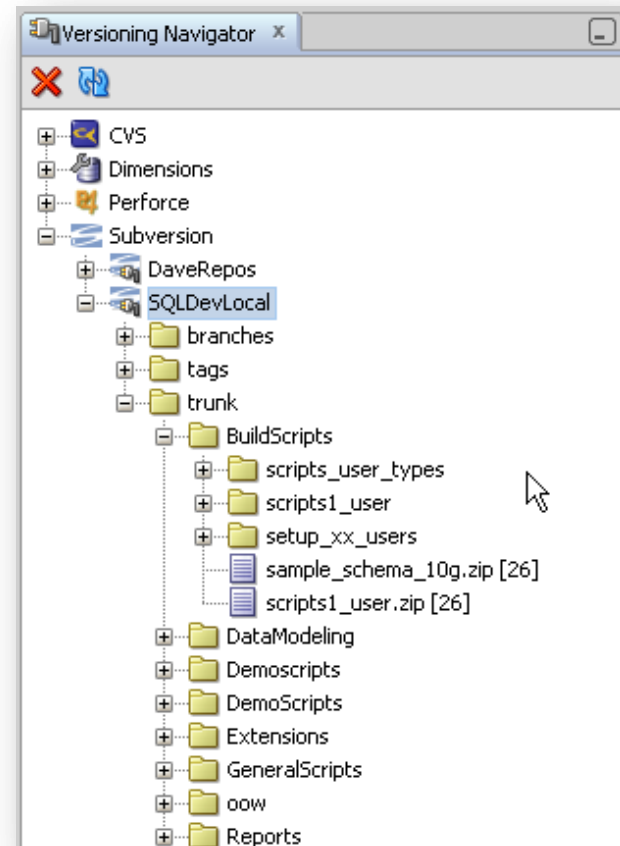
SQL Developer supports file based development

- Explore files in the Files navigator
- Open files in the SQL Worksheet
- Place files under version control
- Execute against a connection
- Syntax formatting



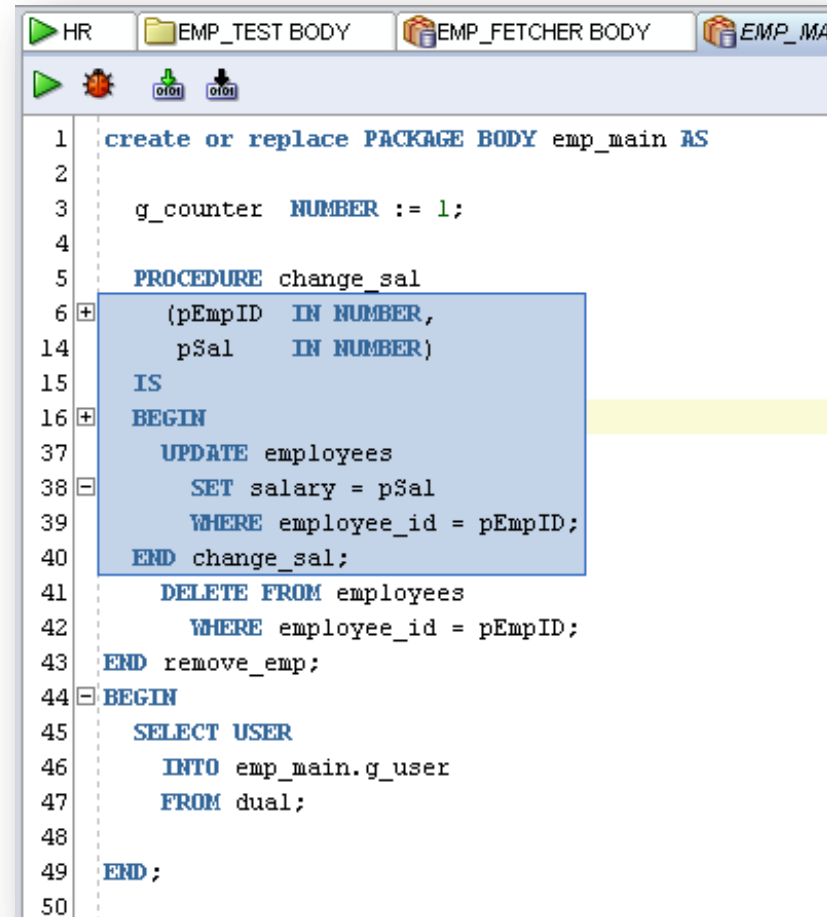
Integrated Version Control Support

- SQL Developer provides integrated support for versioning and source control systems
 - Subversion
- Use Check for Updates to add integrated support for
 - CVS (Concurrent Versions System)
 - Perforce
 - Serena Dimensions
- Access using
 - View > Team > Versioning Navigator
 - Versioning menu



Working with PL/SQL

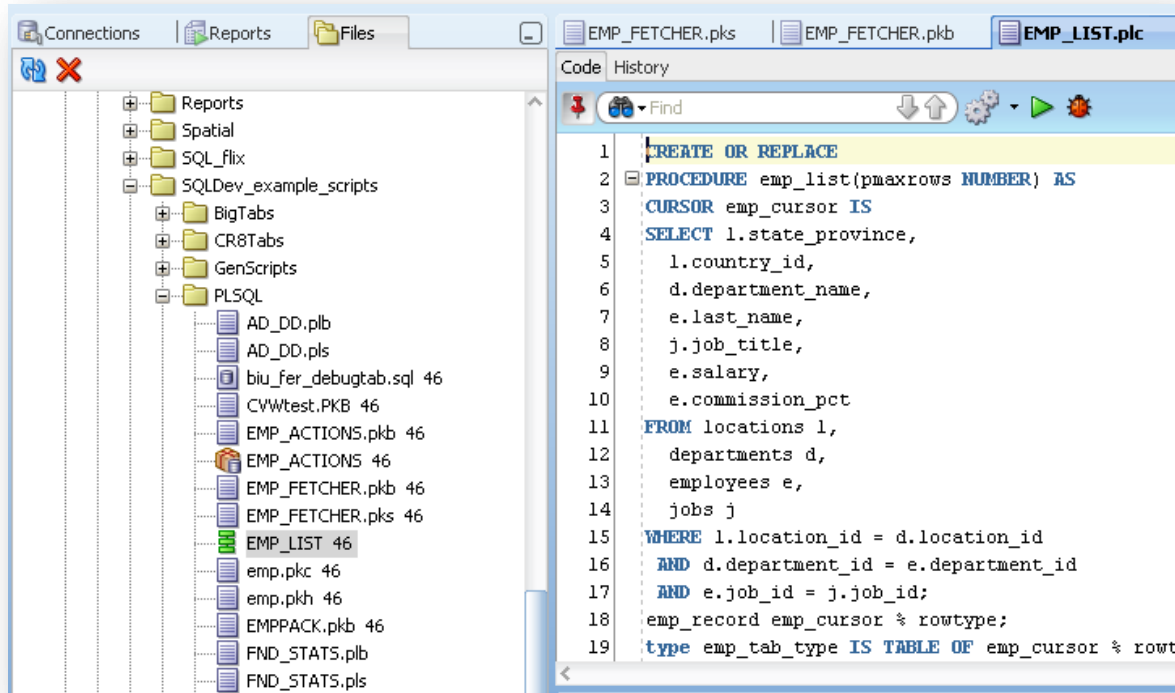
- Create and edit PL/SQL code
 - Code editor
 - Syntax highlighting
 - Code formatter
 - Code insight (auto complete)
 - Code folding
 - Code snippets and Templates
- Use dialogs to create
 - Procedures, functions, triggers
 - Package spec and body
- Compile and run PL/SQL
- Debug
 - Remote debug with environment variable SET ORA_DEBUG_JDWP



```
1  create or replace PACKAGE BODY emp_main AS
2
3      g_counter  NUMBER := 1;
4
5      PROCEDURE change_sal
6      (pEmpID  IN NUMBER,
14     pSal     IN NUMBER)
15  IS
16  BEGIN
37      UPDATE employees
38      SET salary = pSal
39      WHERE employee_id = pEmpID;
40  END change_sal;
41
42      DELETE FROM employees
43      WHERE employee_id = pEmpID;
44  END remove_emp;
45  BEGIN
46      SELECT USER
47      INTO emp_main.g_user
48      FROM dual;
49  END;
50
```

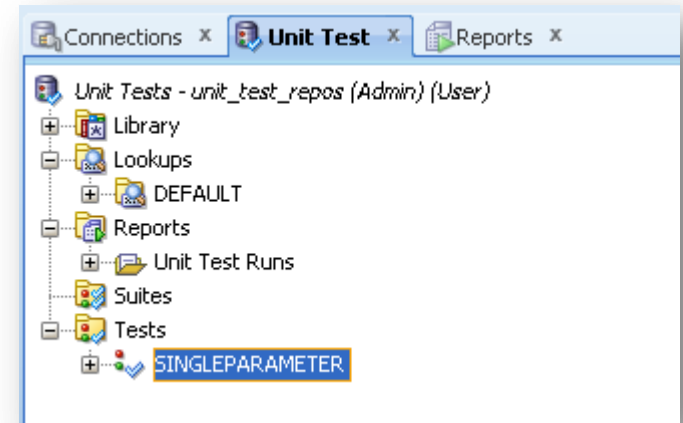

PL/SQL Updates

- Debugging PL/SQL tagged file
- Run and debug procedures with ref cursors
 - Display ref cursor data



PL/SQL Unit Testing

- Create tests with one or more implementations
- Build up suites of tests
- Run test reports
- Store reusable components in a library
- Build static and dynamic lookups
- Support multiple users through a repository
- Build up code coverage stats
- Run tests from the command line
- Target any database



PL/SQL Unit Testing

The screenshot displays the Oracle SQL Developer interface for PL/SQL Unit Testing. The left pane shows a tree view of the test repository, including Unit Tests, Suites, and Tests. The main pane shows the details of the AWARD_BONUS test, including its procedure signature and a dynamic value query. A dialog box is open for Test Implementation 1, showing a table of parameters and a process validation query.

Unit Tests - unit_test_repos30 (Admin)

- Library
- Lookups
- DEFAULT
- Reports
 - Unit Test Runs
 - All Suite Runs
 - All Test Implementation Runs
 - All Test Runs
 - Suite Runs Code Coverage
 - Suite Test Implementation Runs
 - Suite Test Runs
 - Test Implementation Runs
 - Test Runs Code Coverage
 - User Test Runs
- Suites
 - Tests
 - AWARD_BONUS
 - Test Implementation 1
 - Test Implementation 2
 - AWARD_BONUS_UKOUG
 - DOUBLEPARAMETER
 - DOUBLEPARAMETER_ukoug
 - MyProcTest
 - PROC_IN_MULTIPLE
 - PROC_IN_NUMBER

Details | **Results**

PROCEDURE HR1.AWARD_BONUS(EMP_ID IN NUMBER,SALES_AMT IN NUMBER)

Startup Process

Table or Row Copy

"TMP\$AWARD_BONUS" := SELECT ROWID AS SRC\$ROWID, s.* FROM "EMPLOYEES" s

☒ Gather Code Coverage Statistics

Test Implementation 1

Parameter	Datatype	in/out	Input
EMP_ID	NUMBER	IN	EMP_ID
SALES_AMT	NUMBER	IN	SALES_AMT

Dynamic Value Query select EMP_ID, SALES_AMT from AWARD_BONUS_DYN_QUERY

Expected Result **Success** **ANY** Enter expected error number or "ANY".

Process Validation

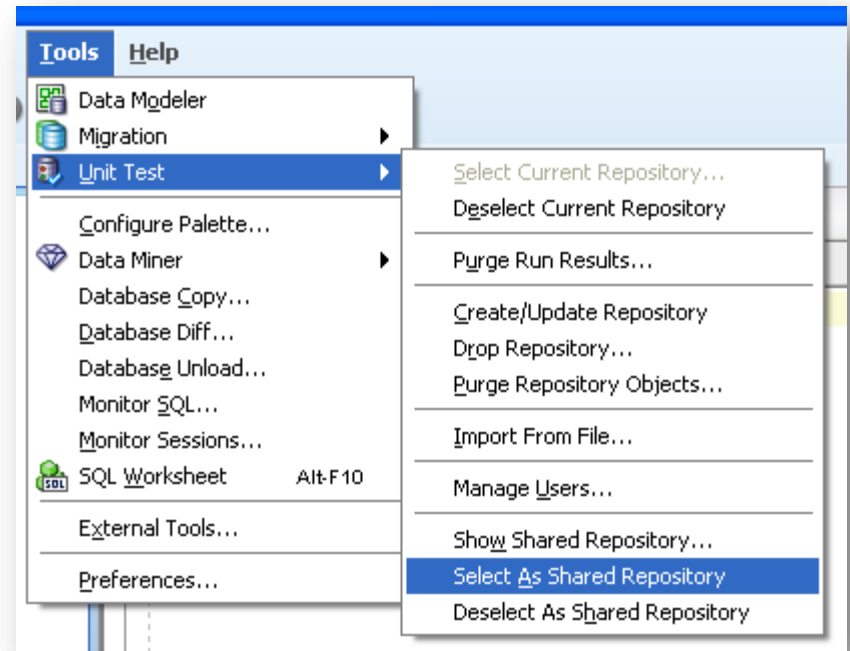
Query returning no row(s)

☒ Apply

SELECT * FROM EMPLOYEES WHERE SALARY > 200000 AND COMMISSION_PCT IS NOT NULL

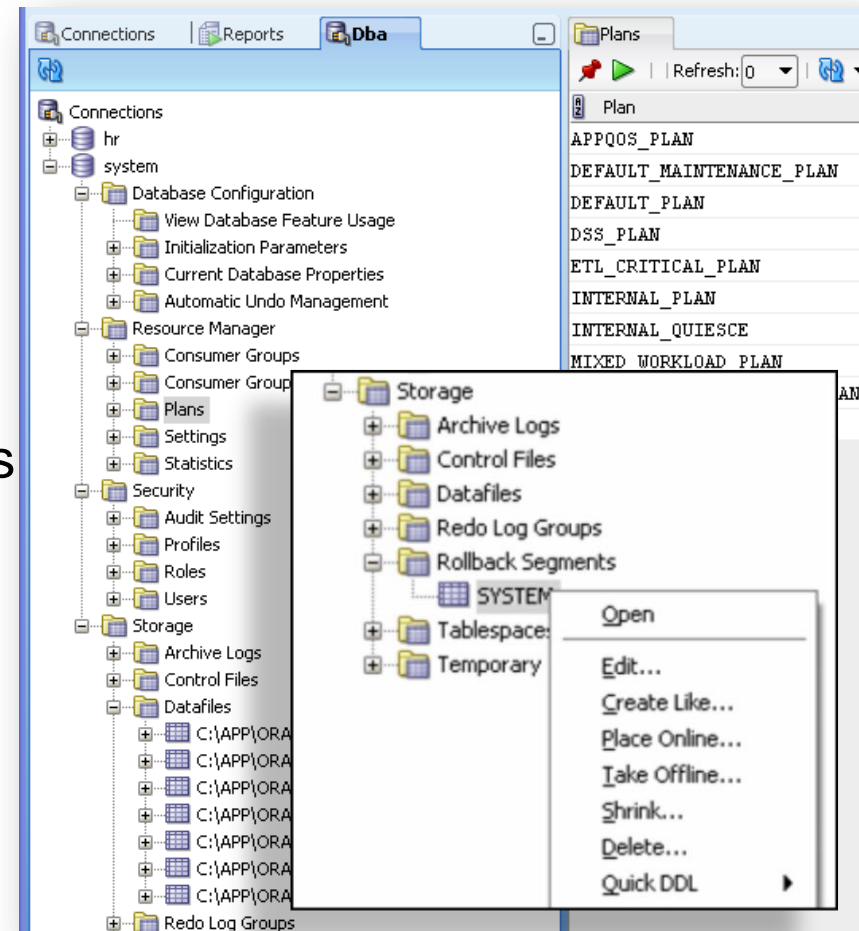
Unit Test Updates

- Enhanced multi-user support
- Support added for abstract data types
 - PL/SQL VARRAY
 - PL/SQL Nested Table
 - PL/SQL Associative Array
 - Ref Cursors
- Multiple startups and teardowns
- Purge run results
 - All results
 - Set of results



DBA Navigator

- Browse and maintain database configuration
- Review and manage database using the resource manager
- Browse, update and create security options
- Update and review storage objects
- Create users and roles



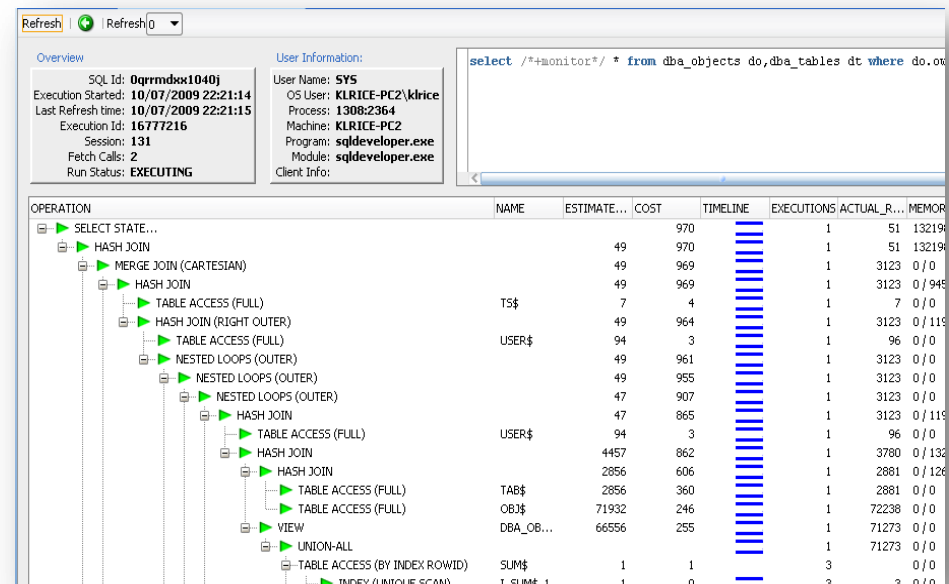
Refactor, Review, Search, Tune and Monitor

SQL Developer provides a PL/SQL related utilities

- Explain Plan, Autotrace and Diff
- SQL Tuning Advisor
- PL/SQL Hierarchical Profiler
- Extended Search using PL/SQL
- SQL Monitor
- SQL Developer PL/SQL Reports
- General refactoring
- APEX refactoring

Real-Time SQL Monitoring

- Real time view of SQL
- Drill to view details
- Visual indicators for current step
- Queries over 5 seconds monitored
- Use `/*+MONITOR*/`
- `DBMS_SQLTUNE.REPORT_SQL_MONITOR`



SQL Tuning Advisor

- Requires *advisor* and *administer SQL Tuning* set privileges
- Review all advice or select individual components
 - Stale or missing statistics
 - Generation of SQL Profiles with in depth detail
 - Manual restructuring of SQL
 - Use of indexes

SQL Tuning Advisor

5.766 seconds

Implement Type

- Statistics
- SQL Profile
- Indexes
- Restructure SQL

Overview Detail

Tuning Task Name: **staName51030**
Tuning Task Owner: **HR**
Workload Type: **SQL Statement**
Scope: **COMPREHENSIVE**
Completion Status: **COMPLETED**

```
select owner
```

"Owner",
initcap(object_type)
object_name
initcap(status)
created
nvl(last_ddl_time,created)

FINDINGS	RECOMMENDATIONS	RATIONALE
Optimizer statistics for table "SYS"."OBJAUTH\$" and its indices are stale.	Consider collecting optimizer statistics for this table.	The optimizer requires up-to-date statistics for the table in order to select a good execution plan.
A potentially better execution plan was found for this statement.	Consider accepting the recommended SQL profile.	This attribute adjusts optimizer estimates.

Compare Explain Plan and Autotrace Results

- Compare results of two queries
 - Gather Explain Plan/Autotrace results for first query
 - Pin results
 - Modify query
 - Gather second set of plan results
 - Compare plans

The screenshot displays the Oracle SQL Developer interface. At the top, a query is entered in the SQL editor:

```
select /* use_hash e,d */ *  
from hr.departments d, hr.employees e  
where d.department_id = e.department_id  
and e.first_name like 'A%';
```

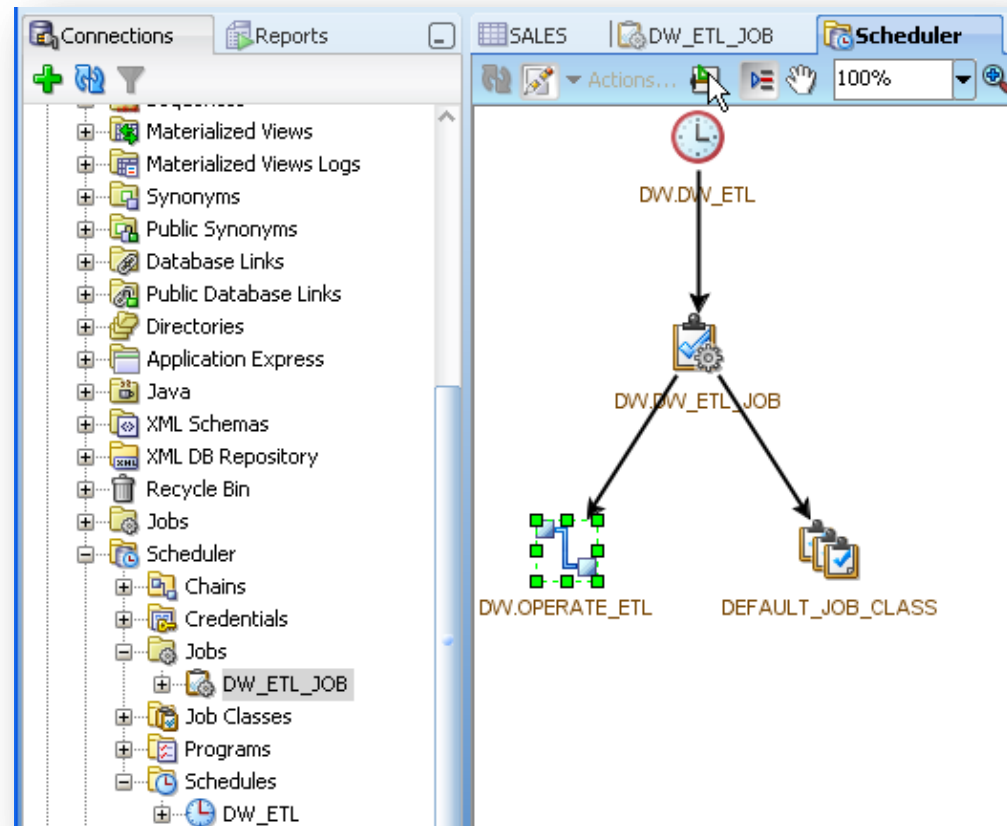
Below the editor, the 'Autotrace' tab is active, showing a comparison of two autotrace results. The left pane shows the 'Autotrace 1' results, and the right pane shows the 'Compare Autotrace 1 with Autotrace' results. Both panes display a hierarchical explain plan for the query. The plan starts with a 'SELECT STATEMENT' node, followed by 'NESTED LOOPS', 'NESTED LOOPS', 'TABLE ACCESS (FULL) EMPLOYEES', 'Filter Predicates' (E.FIRST_NAME LIKE 'A%'), 'INDEX (UNIQUE SCAN) DEPT_ID_PK', 'Access Predicates' (D.DEPARTMENT_ID=E.DEPARTMENT_ID), and 'TABLE ACCESS (BY INDEX ROWID) DEPARTMENTS'.

At the bottom, a table compares the V\$STATNAME values for the two autotrace runs:

V\$STATNAME Name	V\$MYSTAT Value Autotrace 1	V\$MYSTAT Value Autotrace
CPU used by this session	6	4
CPU used when call started	6	4
DB time	7	5

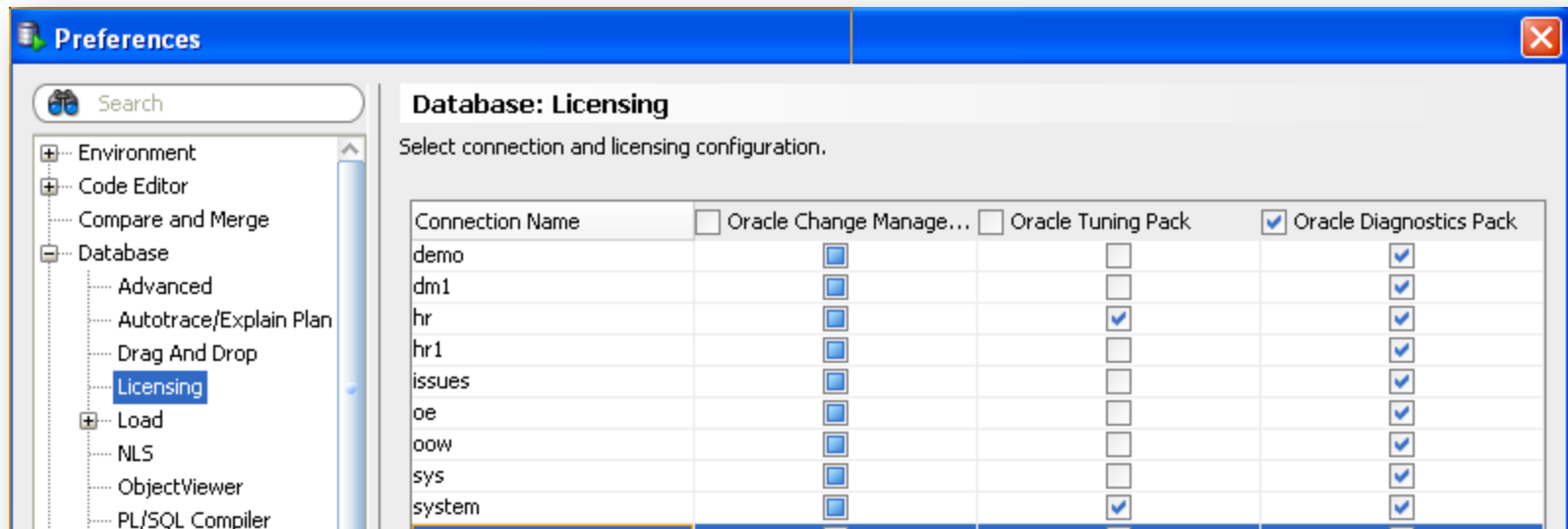
DBMS Scheduler

- DBMS Scheduler allows you to control when and where various tasks take place
- Scheduler node provides
 - Chains
 - Credentials
 - Jobs & Job Classes
 - Programs
 - Schedules
- Design Editor view for graphical representation



Management Pack Preference Setting

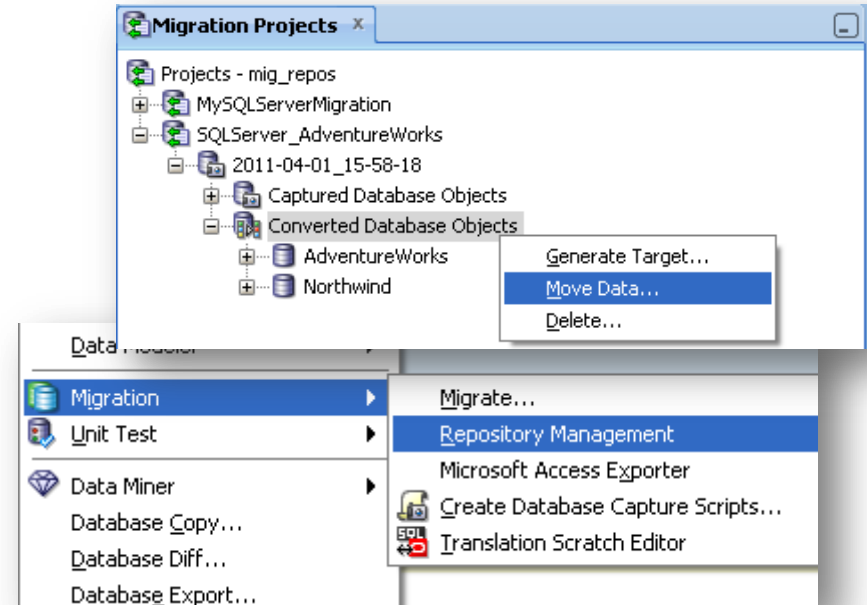
- SQL Developer supports Oracle Database Management packs
 - Oracle Diagnostic Pack (ASH and AWR Reports)
 - Oracle Change Management Pack (Database Diff)
 - Oracle Tuning Pack (SQL Tuning Advisor, Monitor SQL)



Feature Focus Areas

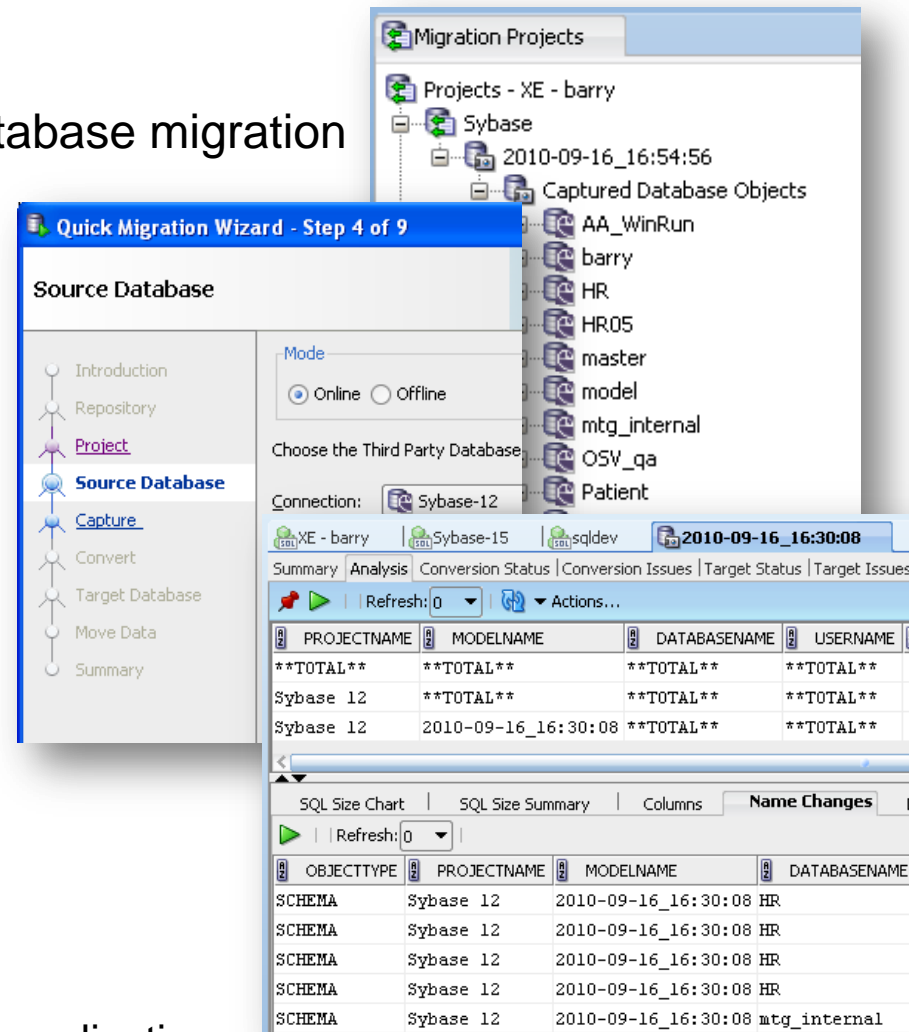
SQL Developer Migrations

- Logical equivalence
- Least Privilege Migration
 - Users can migrate any object they can access
- Simple and expert modes using repository
- Sync Mode
 - Capture a snapshot of 3rd party database metadata
 - Static target used in the migration
 - Visual correlation of derived database objects
- All existing functionality supported
 - Offline data migration using generated scripts
 - Offline meta data load using SQL scripts
- Multiple projects, concurrent users, customizable



Database Migration Projects

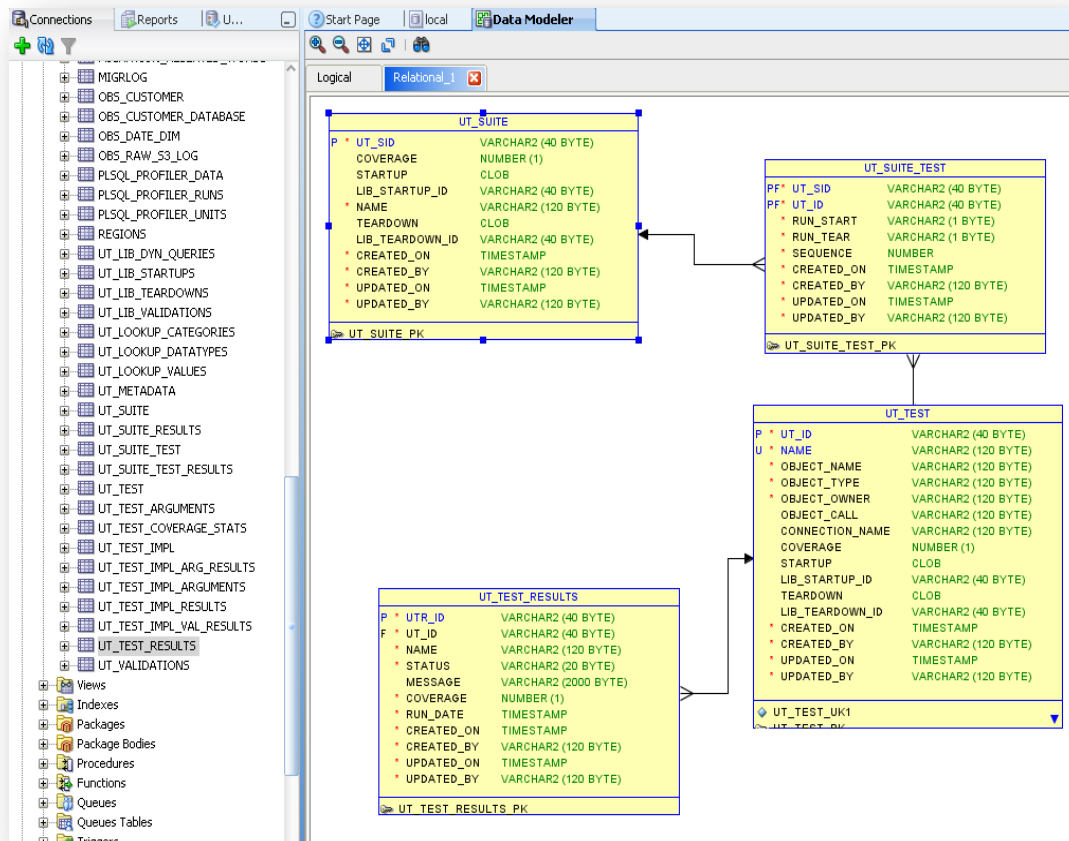
- Migration navigator for 3rd party database migration
- Copy to Oracle
 - Right click and copy to a connection
- Server Capture for multi-database
- Migration Wizard
 - Drives all phases of migration
- Command line support
 - All migration features
- Migration Reports
 - Project Estimation/Server Analysis
 - Conversion Issues
 - Data Quality metrics
 - Target objects verification
- Client application scanning
 - Identifies 3rd party database calls in applications



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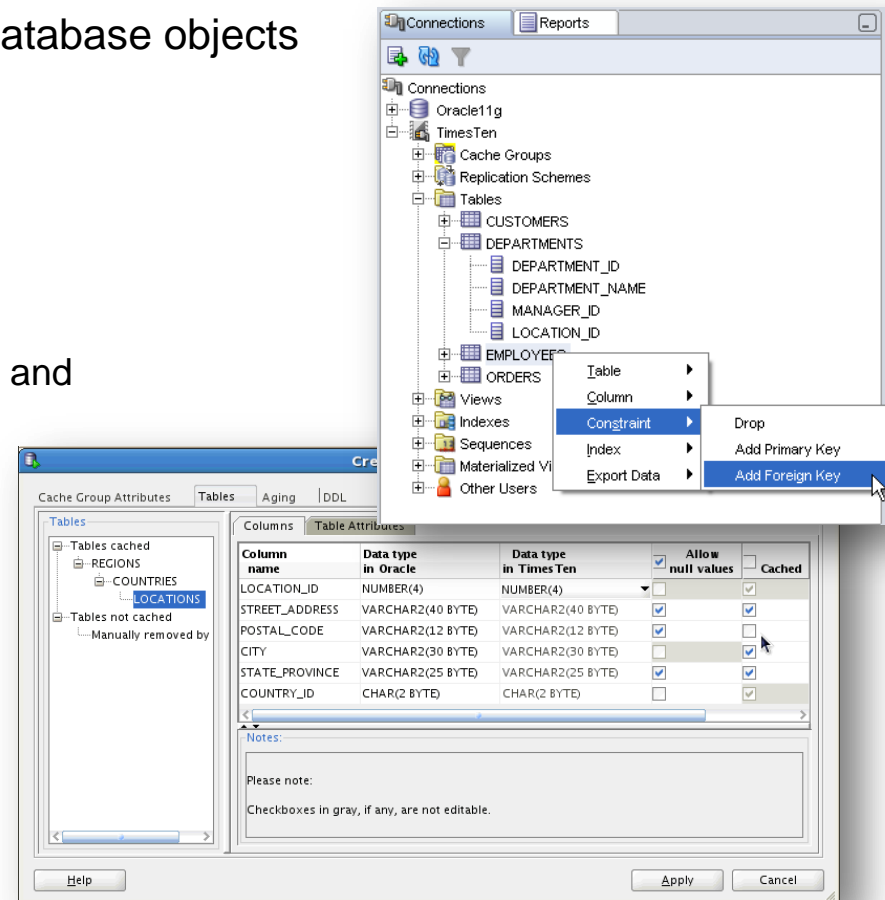
Integrated Data Modeling

- Create, update and save models
- Open existing models
- Import to create models
- Drag and drop tables to create relational model
- Work with Design Rules
- Generate DDL
- Browse with thumbnail view



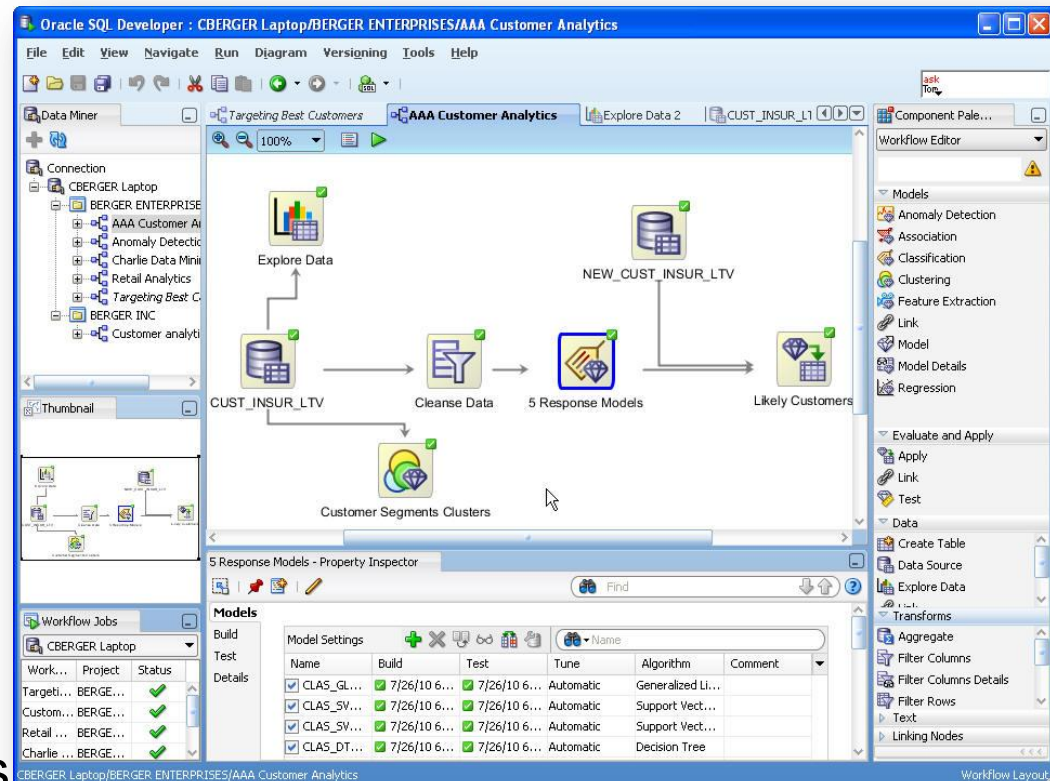
TimesTen In-Memory Database Support

- Browse, edit, create, modify TimesTen database objects including users
- In-Memory Database Cache
 - Create/drop/alter cache groups
 - Load/unload, flush, refresh cache data
- PL/SQL support
 - Create/Replace/Drop, Edit, Compile, Run, and Export procedures/functions/packages
- Show SQL execution plans and update table and column statistics
- Access SQL Worksheet for ad-hoc SQL queries, execute TimesTen built-in procedures and ttlsql commands
- Run pre-defined database and objects reports
- Manipulate cached data in both TimesTen and Oracle at the same time

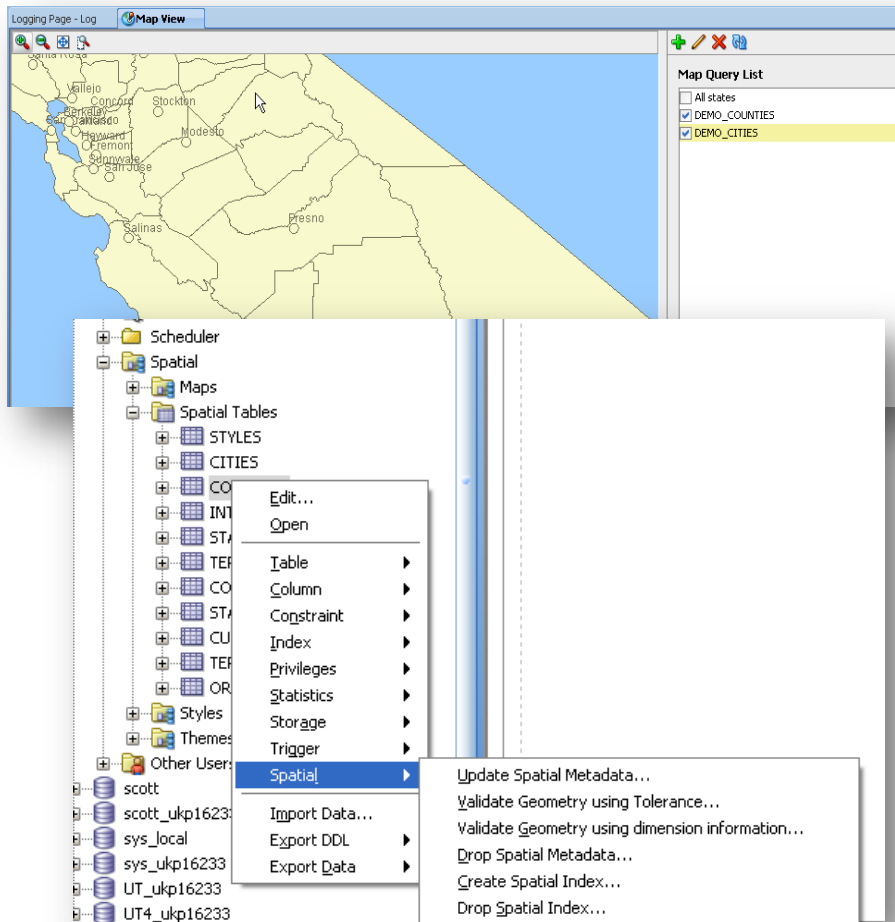


Oracle Data Miner

- Graphical User Interface for data analysts
- Build and evaluate data mining models
- Apply predictive models
- Share analytical workflows
- Deploy SQL, apply code and scripts
- Predict customer behavior
- Identify key factors
- Predict next-likely product
- Customer profiling
- Detect fraud and anomalies
- Mine “text” and unstructured data



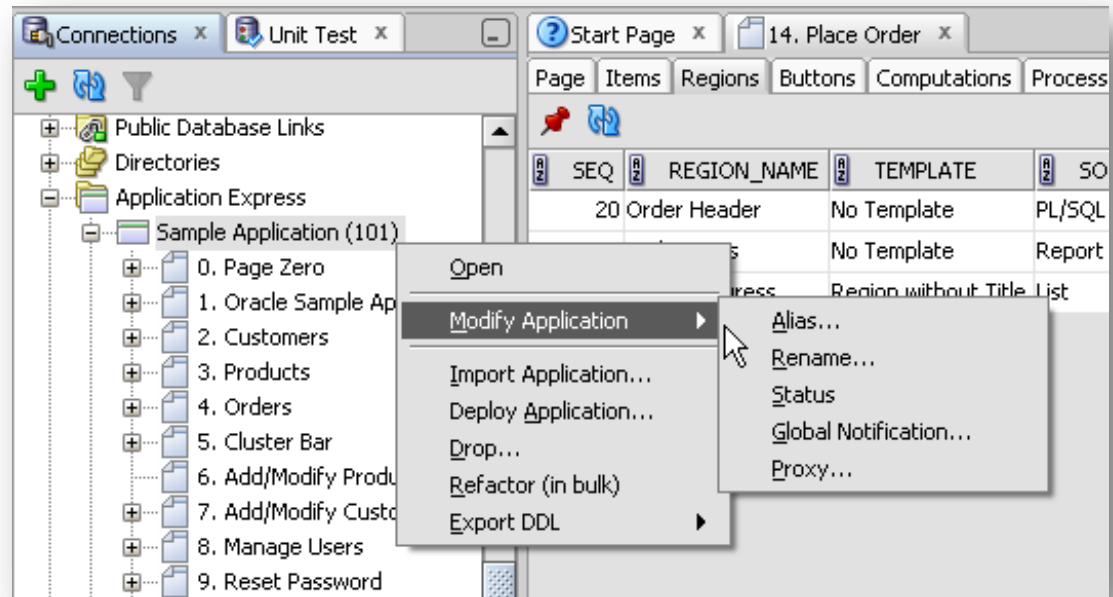
Managing Oracle Spatial Information



- Data Management
 - Maintain spatial metadata and indexes
 - Support for spatial validation
- Data Querying
 - Create spatial queries
 - Generate spatial shapes
 - Display query results in map view
- Map support
 - Display layers in a map based on map queries
 - Drag and drop spatial tables onto map view for quick display
 - Use spatial snippets

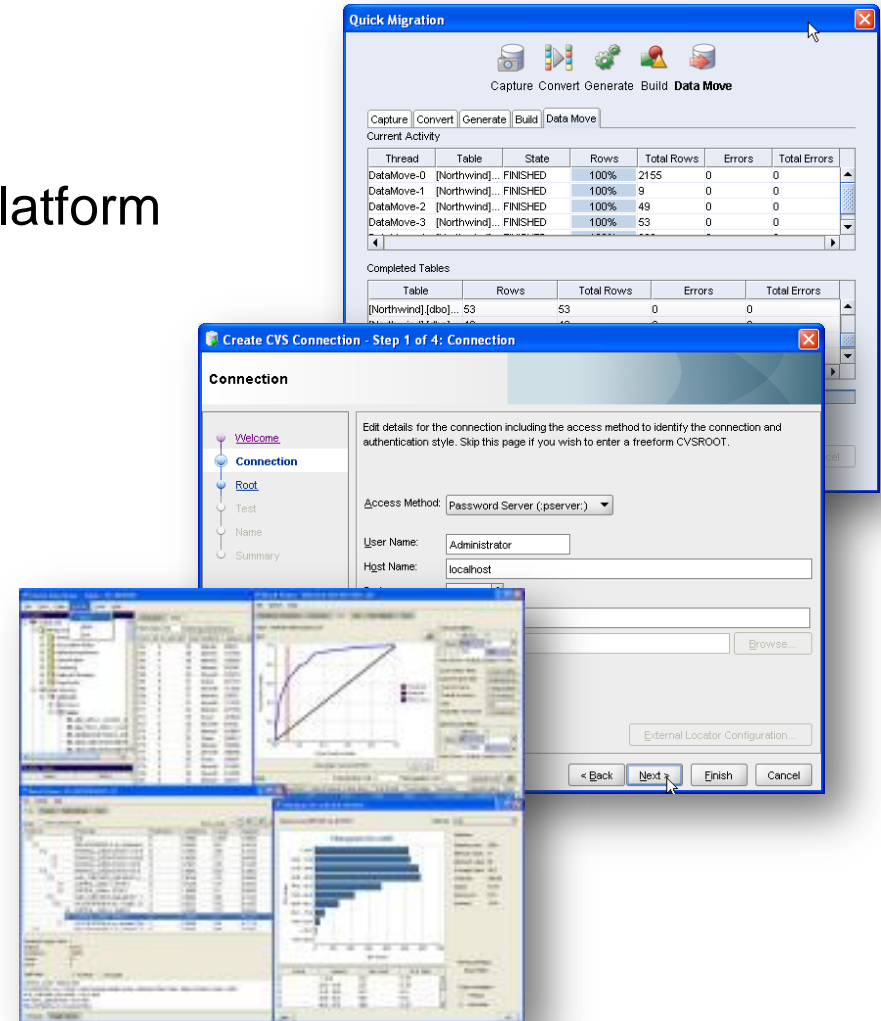
SQL Developer and Oracle APEX 3.0.1+

- Connect to and browse all Oracle APEX applications associated with a database schema
 - Application level
 - Page level
- Run reports on:
 - Workspaces
 - Applications
 - Pages
 - Schemas
- Context menu support
 - Importing, exporting
 - Deploying
 - Dropping
 - Modifying applications



SQL Developer's Extensible Framework

- Easily extended
 - Based on the Fusion Client Platform
- Oracle custom extensions:
 - Migration Workbench
 - TimesTen
 - Data Miner
 - Rdb (under development)
 - Oracle Spatial
- Third Party extensions
 - Various third party available





More Information

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SQL Developer Exchange

<http://sqldeveloper.oracle.com>

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Feature Requests

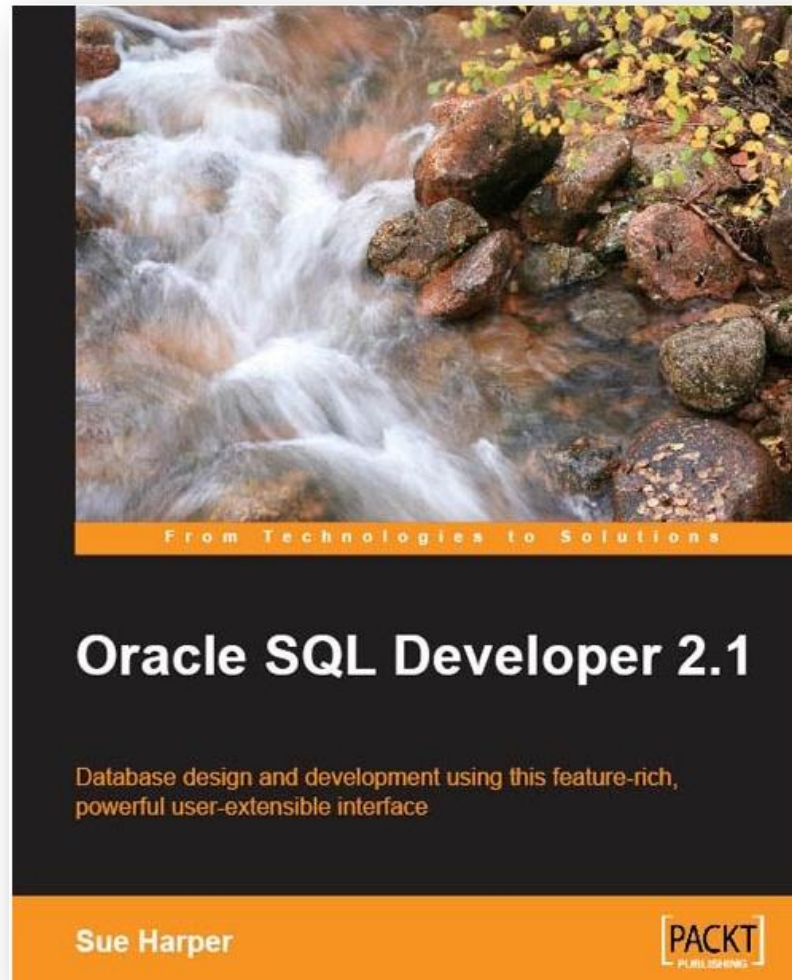
Features requested here are not guaranteed to be implemented. The Product Development team will be using these requests to assist in deciding the product direction.

Do not log bugs here. This is for new functionality to be implemented. Use the [SQL Developer Forum](#) or [Metalink](#) for bug reports.

Rows

	Title	Description	Created	Updated	Weight	Status
	Better PL/SQL Formatting	Much like Toad does, with the proper formatting of a select statement with each additional column na	07-SEP-06	24-APR-08	269.0	In Release 1.5
	Code Insight for Aliased Tables	Please allow code insight/complete to work on aliased table names in the sql editor. SELECT x.	22-AUG-06	15-NOV-06	248.0	In Release 1.1
	Add data(base) modelling features	As it is called sql DEVELOPER I think it should support more of the development cycle. This includes	07-SEP-06	24-APR-08	230.0	Accepted
	Add sortable columns	Would like to be able to click on column header and sort	31-JUL-06	23-OCT-06	209.0	In Release 1.1
	Integration with Subversion	Would really like the ability to connect to Subversion repositories from within SQL Developer.	31-AUG-06	24-APR-08	187.0	In Release 1.5
	Run/debug PL/SQL file	Add the ability to run/debug in a file-based code editor. From the forum (Posted Nov 15, 2006): 1.1	14-DEC-06	25-JUN-07	179.0	Awaiting Community Votes
	Team Coding	That would be nice to have some kind of Team Coding feature as a cooperative source control feature.	01-NOV-06	24-APR-08	175.0	In Release 1.5

Finding More Detail



Finding More Detail

www.oracle.com/technetwork/developer-tools/sqldeveloper/

- SQL Developer on OTN
 - White papers, Oracle by Example (OBE), online demos, models and scripts
 - www.oracle.com/technetwork/developer-tools/sqldeveloper/
- SQL Developer Exchange
 - Add feature requests: sqldeveloper.oracle.com
- Forums
 - SQL Developer
forums.oracle.com/forums/forum.jspa?forumID=260
- Book
 - Oracle SQL Developer 2.1
- Webcasts

Summary

- Connects, Reports, Files DBA navigators
 - Browse, query, update objects
- SQL Worksheet
 - Query Builder
- Data export and import
- SQL Tuning
 - SQL query adviser, Explain, Diff
- PL/SQL
 - Create, edit debug, Unit Testing
- Extensible framework
 - User defined extensions
 - Database migration projects
 - Oracle TimesTen, Oracle Data Miner, Oracle Spatial Management
- Oracle APEX integration

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