



How to Load Data, Let Me Count The Ways ... Revisited

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utah oracle users group

About Me ...

- TH Technology – Oracle Consulting Services, APEX Focus
- Mechanical/SW Engineer - Analyzed, designed, developed, converted, upgraded, enhanced legacy & database applications for 30+ years
- Building Web/APEX applications for government, medical, engineering industries since HTMLDB beginnings
- Leveraging Oracle 10g, 11g, 12c suite of tools
- Oracle Ace Associate
- APress Author – Expert Oracle APEX
- ODTUG Director
- Editor Emeritus, ODTUG Technical Journal





ODTUG
Kscope18
ORLANDO, FLORIDA • JUNE 10-14



Agenda

- Scope
- 2012 til Cloud
- Cloud +

Agenda

Developer Perspective

- ~~Datapump~~
- ~~SQL Loader~~
- ~~Data Integrator~~

Agenda

- **SQL Developer**
- **External Table Enhancements**
- **APEX Data Load Options**
- **REST Web Services**



Focus

Application Data Loads / Processes



SQL Developer

SQL Developer

- One-Of Loads
- Quick Data Population
- Migrations
- Cart

SQL Developer

- Data Import Utility
- Cart

SQL Developer – Data Import

- Create Table / Import Data
- XLSX, XLS, CSV, TXT, DSV

Export Data

- XML, JSON too!



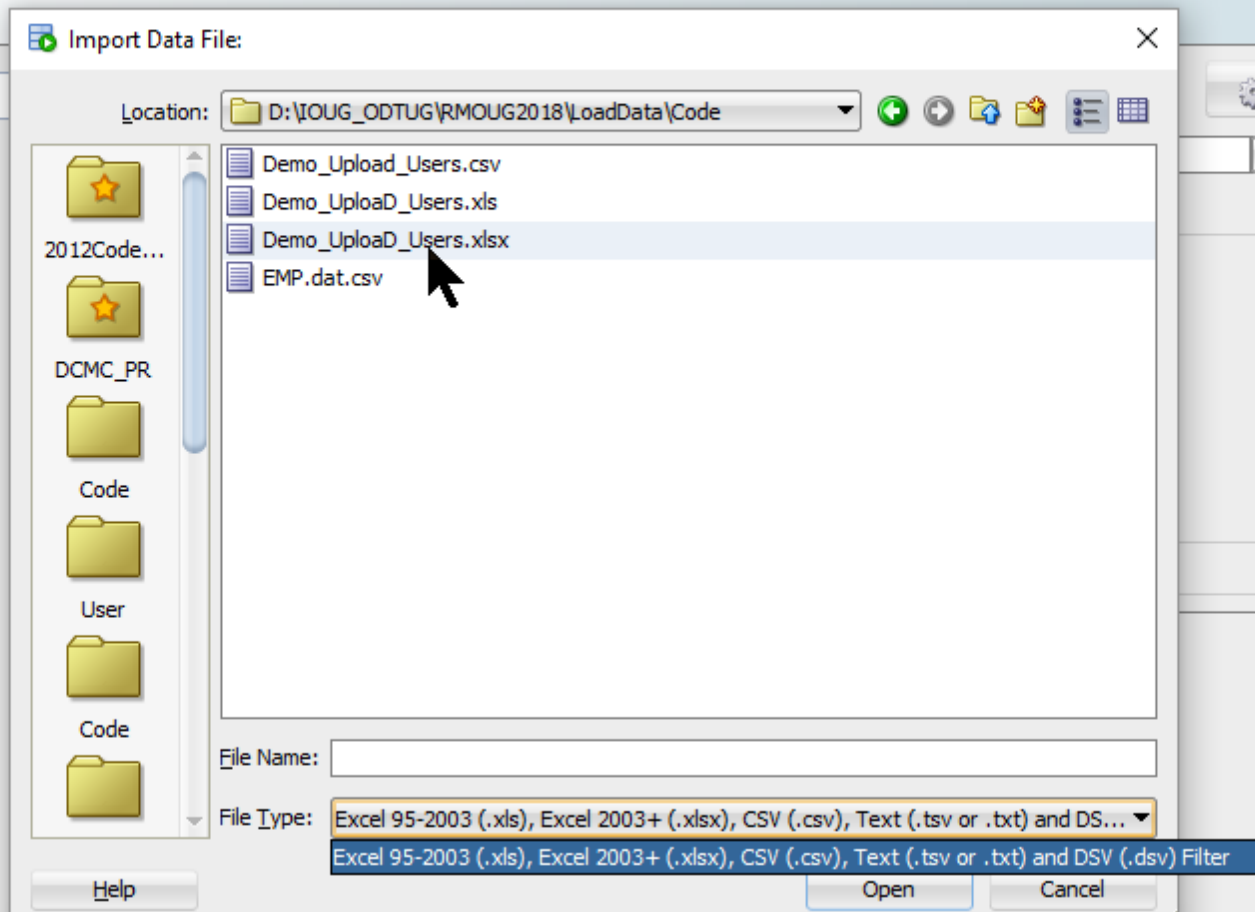
Demo – SQL Developer Import / Export

- True XLS/XLSX and More
- Export: JSON, XML, SQL Loader, More
- Opt to Generate Scripts including control files

Data Preview

Data Preview

- Import Method
- Choose Columns
- Column Definition
- Finish



Restore State

Browse...

SQL Developer - Cart

- Allows Moving Lots of Objects
 - SQLLDR Scripts
- Schema Agnostic
- Save for Reuse
- Export to SQL LDr
- Copy Connection to Connection

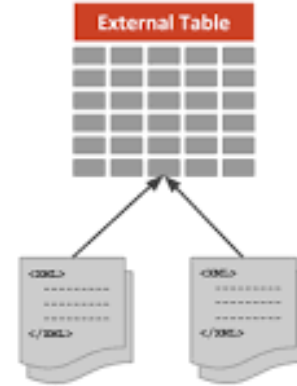
SQL Developer

Benefits

- **Most Flexibility**
 - Import / Export Types
 - True XLSX, XLS
- **Builds Scripts For You**
- **Manual (Not Programmatic)**

Limitations

- **Manual (Not Programmatic)**
- **One-Of Loads**



External Tables

12g Enhancements

External Tables - Enhancements

- **Override Parameters at Runtime**
 - DIRECTORY, BAD/LOG/DISCARDFILE – literal only
 - LOCATION, REJECT LIMIT – literal or bind variable
- **PARTITION, SUBPARTITION**
 - **By Column, Location, Directory**

External Tables - More Enhancements

- **ORACLE_DATAPUMP Access**
 - Create a .DMP File using CTAS
 - Load Data From a Datapump Export
- **Extended Data Types: VARCHAR2(32767)**
 - On-Prem 12.2 is NOT Config by Default
 - > 4000 char are “Implicit LOBs” w Storage, etc. of LOBS, w No Control
- **Direct NFS Support**
 - Improve Performance Default for > 1G files.
 - DNFS_ENABLE, DNFS_READBUFFERS

External Tables – Override Parameters

- **Wildcards**

LOCATION ('emp_ext*.dmp')

LOCATION ('emp_ext?.dmp')

* - multi char ?- single char

- **Directory Only**

- for Bad, Discard, Logfile

Override at Query

```
SELECT * FROM EMP_EXT
EXTERNAL MODIFY (
  ACCESS PARAMETERS (
    BADFILE UTOUG_TMP: 'emp_ext.bad'
    LOGFILE UTOUG_TMP
    NODISCARDFILE )
  LOCATION ('EMP*.dat')
  REJECT LIMIT 5 );
```

Old Way Code ...

```
-- LOOP to read each file ...
IF IS_NEW_FILE( v_filename) THEN

  -- point external table to this file
  v_alter_str :=
  'ALTER TABLE MY_EXT_TABLE LOCATION ('''||v_filename||''')';
  EXECUTE IMMEDIATE ( v_alter_str );

--loop through the contents
  FOR ext_tbl_rec IN c_ext_tbl LOOP
    ...
    ...
  END LOOP;
END IF;
--- END LOOP to read each file
```

Demo

LOCATION

- Change
- Wildcard

PARTITION – Check it Out



External Tables – Override Parameters

- **FIELDS CSV**
 - **Can Omit Optional Directives**

**FIELDS CSV WITH EMBEDDED TERMINATED BY '\,'
OPTIONALLY ENCLOSED BY '\"'**

External Tables – Override Parameters

- Default (all fields) NULLIF
- ALL FIELDS OVERRIDE
 - Shortcut – Takes Fields as They Are
- FIELD NAMES

FIRST | FIRST IGNORE | ALL | ALL IGNORE | NONE

External Tables – Partitioned

```
) REJECT LIMIT UNLIMITED
PARTITION BY LIST (country_code)
(PARTITION part_gbr VALUES ('GBR') LOCATION ('gbr1.txt', 'gbr2.txt'),
 PARTITION part_usa VALUES ('IRE')
  DEFAULT DIRECTORY tmp_dir2 LOCATION ('ire1.txt', 'ire2.txt'),
 PARTITION part_others VALUES ('XXX') );
```

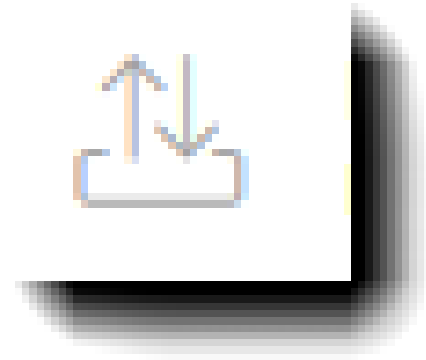
External Tables

Use Cases

- **Any SQL Statement**
 - Code!
- **Enhancements**
 - Faster
 - **Param Override**
 - **DATAPUMP**
 - **Hadoop, Hive**
 - **SQLldr**

Limitations

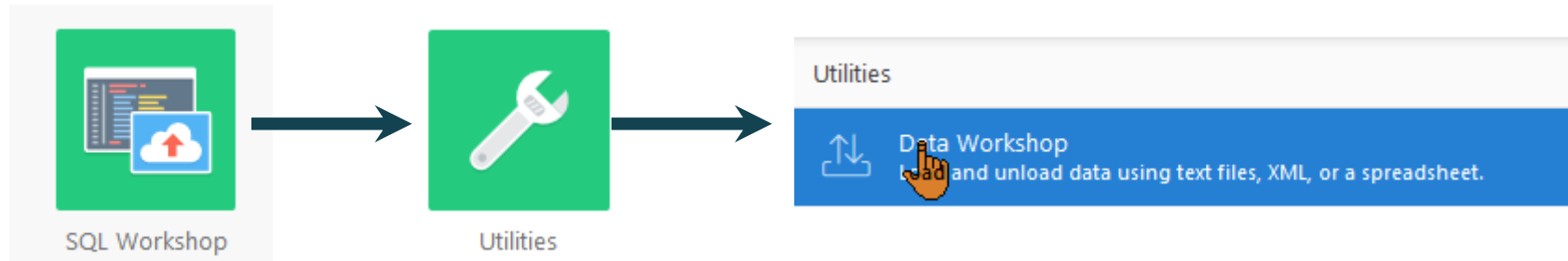
- **Need Directory Object**



APEX Data Workshop

**APEX User (Developer) Guided
Data Upload**

SQL Workshop → Utilities → Data Load Workshop



- Demo



APEX Data Load Utility

Pros / Use Cases

- “Spreadsheet” Data
- Simple, Quick

Limitations

- Developer
- Manual
- “Spreadsheet Data”



Load Employees

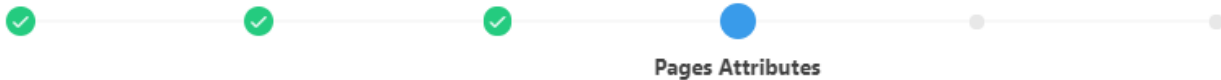
APEX Data Load Wizard

End User Data Upload Wizard

APEX Data Load Wizard

- “Spreadsheet”
 - CSV or Tab or Copy/Paste

Create Data Load Wizard



Pages Attributes

This page provides a short descriptive name for each page of the data load wizard to be created. Please provide the page name, number, and region names to use in the data load wizard.

	Page Name	Page Number
* Step 1	<input type="text" value="Data Load Source"/> (?)	<input type="text" value="203"/>
* Step 2	<input type="text" value="Data / Table Mapping"/> (?)	<input type="text" value="204"/>
* Step 3	<input type="text" value="Data Validation"/> (?)	<input type="text" value="205"/>
* Step 4	<input type="text" value="Data Load Results"/> (?)	<input type="text" value="210"/>
* Page Mode	<input checked="" type="radio"/> Normal <input type="radio"/> Modal Dialog (?)	
Breadcrumb	<input type="text" value="- do not add breadcrumb region to page -"/> (?)	

APEX Data Load Wizard

Pros / Use Cases

- “Spreadsheet” Data by Default
- End-User
- Reusable APEX Wizard
- Transformations *
- Customizable #

Limitations

- End User
- Not Automatic
- Not Schedulable

* Limited Transforms, No Logging # IFF Customize, Must Revisit Each Upgrade

Extend the Data Load Wizard

- **EXCEL2COLLECTION Plugin**
 - True XLS, XLSX
- Custom Load/Reload Collections
- Custom Transformations
- Custom Logging
- **PAIN with Every Upgrade**



APEX File Browse + Custom Code

**Write Your Own!
Endless Possibilities, Full Control**



~~APEX Listener XLS/XLSX Upload~~

**Load Spreadsheet Into a Collection
No More, as of APEX 5.1, JSON
Parsing**



oracle.example.hr

REST Web Services

New Way To “GET” Data

REST Web Services

- **Easy to REST-Enable**
 - Via APEX
 - Via SQL Developer
 - Consolidating into ORDS !!
- **GET, POST, PUT (update), DELETE**
- **Large Volumes**
 - Batch or Batch Utilities
 - Stored Procedure(s)

Enter Web Services

- Previously we used code, Flat Files and External Tables.
 - Across the board, Move is to Web Services – so that Flat File may be a Web Service to consume.
- How to Consume Web Service in Code ?
 - **APEX_WEB_SERVICE** .. Comes w APEX in Cloud Services
 - **APEX_JSON** – for Parsing
 - PL/SQL for Your Logic

Web Services

Pros / Use Cases

- **GET or POST Data**
- **Simple to Enable/Build via ORDS**
- **Works in Cloud**

Limitations

- **Coding**

Many More Options

- Node.js
 - Dan McGhan Presentation
- Java
- ETL Products
- COTS Products



Summary

Lots to Assess, Discuss ...

Data Load Options

On Premise

- SQL Developer
- **External Tables**
- **APEX Data Load Utility, Wizard**
- **Web Services**

Cloud

- SQL Developer
- **External Tables ****
- **APEX Data Load Utility, Wizard**
- **Web Services**

** Must Upload Files to Cloud Object Store/Block Volume

Data Load Options

Load Method

- SQL Developer
- APEX Data Load Utility
- APEX Data Load Wizard
- Custom Solutions
- Web Services

Best For ...

- Setup
- Setup
- End User Small-Medium File Size (Uploadable)
- Build to Fit
- Small to Medium Data Load/Transfers ??



Questions ?



Comments ?





Thank You

Evaluations Please!

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References

- External Tables

<https://blogs.oracle.com/datawarehousing/the-first-really-hidden-gem-in-oracle-database-12c-release-2:-runtime-modification-of-external-table-parameters>

<https://docs.oracle.com/en/database/oracle/oracle-database/12.2/sutil/oracle-external-tables-concepts.html#GUID-ACF1D3AA-1D61-4682-AEC5-42C944756E12>

- EXCEL2COLLECTION – Anton Scheffer, AMIS

[https://apex.oracle.com/pls/apex/f?p=33308:1:11021951952762:::~:PLSQL=EXCEL2COLLECTION](https://apex.oracle.com/pls/apex/f?p=33308:1:11021951952762:::)

- SQL Developer

That Jeff Smith <https://www.thatjeffsmith.com/sql-developer/>

Oracle <http://www.oracle.com/technetwork/developer-tools/sql-developer/overview/index.html>

- REST Web Services – All Over!

Oracle <http://www.oracle.com/technetwork/developer-tools/rest-data-services/overview/index.html>

Oracle-base <https://oracle-base.com/articles/misc/articles-misc#ords> (and others – check out other categories here)

That Jeff Smith <https://www.thatjeffsmith.com/oracle-rest-data-services-ords/>

Adding Wallets <https://apex.oracle.com/pls/apex/germancommunities/apexcommunity/tipp/6121/index-en.html>

These Will Get You Started – Be Sure you Reference the Latest Materials as Oracle 12c and the latest SQL Developer and ORDS Versions have Made Big Strides!

Good Luck – Happy Coding!