



Beautiful Apps on Data from Everywhere using Oracle APEX

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1998 - today
since 2001

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Agenda

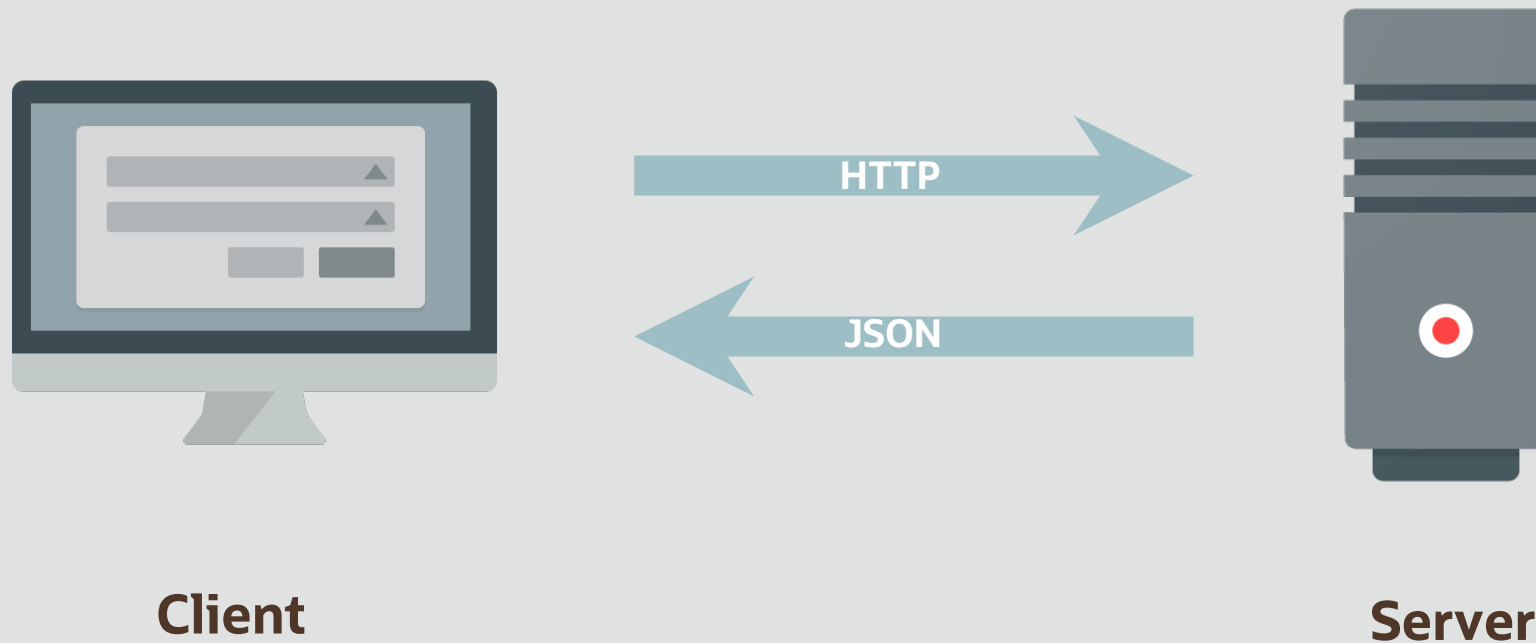
1. REST Overview
2. Remote Data Sources
3. Publishing RESTful Services
4. External Data Sources

REST

Overview

REST | What is it?

REpresentational **S**tate **T**ransfer



REST | Methods

REST communicates over HTTP(s), so it uses HTTP(s) verbs

Method	SQL Equivalent
GET	SELECT
PUT	UPDATE
POST	INSERT
DELETE	DELETE

Oracle REST Data Services (ORDS)

- Provides HTTP Access to Oracle Databases
 - Mid tier application
 - Maps http(s) RESTful Gets and Posts to SQL and PL/SQL
 - Declaratively returns results in JSON format
 - JavaScript friendly
 - Allows virtually every App Dev platform to access an Oracle Database
- Supported feature of the Oracle Database since 2010
- Ships with Oracle Database 12.1.0.2+
- Oracle APEX mid-tier, web toolkit applications, mod_plsql replacement



Remote Data Sources

REST Enabled SQL

REST Enabled SQL | How it works?

- Executing dynamic SQL or PL/SQL on remote databases using ORDS and REST
- APEX passes SQL query to ORDS over REST
- Self-describing JSON response
- Response contains a JSON object with:
 - Result set meta data (column names, data types)
 - The result data
 - Information about pagination

REST Enabled SQL | Prerequisites

- Needs to be enabled in defaults.xml configuration file:

```
<entry key="restEnabledSql.active">true</entry>
```
- Needs REST enabled schema
- Requires authentication (Basic, OAuth2 *)
- Once enabled, REST endpoint available for every REST enabled schema:

```
http://localhost:8080/ords/hr/_/sql
```

```
$ curl -X "POST" "http://localhost:9090/ords/hr/_/sql" \
      -H "Content-Type: application/sql" \
      -u HR:oracle \
      -d '$select * from emp; '
```

REST Enabled SQL | in APEX

- REST-enabled SQL allows components like Reports, Forms, Charts, etc. to use objects on remote databases as a data source.
- A REST-enabled SQL service consists of:
 - A remote server name
 - An endpoint URL
 - `http://host:port/ords/schema`
 - Authorization credential store
- Configured via Shared Components
- Remote Server and Credentials stored at Workspace level

Demo

REST Enabled SQL

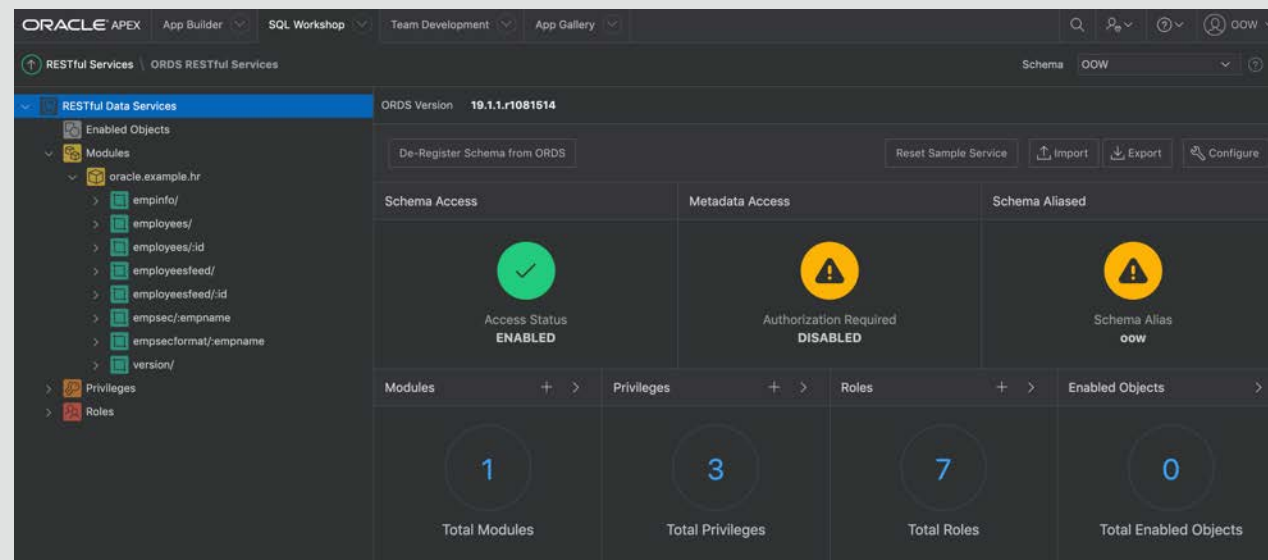
Publishing RESTful Services

REST Workshop

REST Workshop | What is it?

- Declarative REST service support for ORDS-enabled REST services

- REST Workshop supports REST web services developed using the ORDS repository
- Provides super-set of functionality available with old APEX repository
- Existing APEX-based REST services can be migrated



Publishing RESTful Services | **in APEX**

Manual REST	AutoREST
Publish via REST Workshop	Publish via Object Browser Enable Object
You are in charge of Inputs, Outputs, error handling, response codes, formatting	CRUD APIs, no SQL to write
Full control of SQL, PL/SQL	Maintained by ORDS



Demo

REST Workshop

External Data Sources

Web Source Modules

Web Sources | What is it?

- Declarative method to define references to external REST APIs and generic JSON data feeds
- Stores metadata about how to parse response data and map it as a virtual table with rows and columns
- Stored on Workspace level and Shared Components
- Usable as data sources for APEX components such as Interactive Reports, Interactive Grids, Reports, Charts, Forms, etc.

APEX_EXEC | Public API

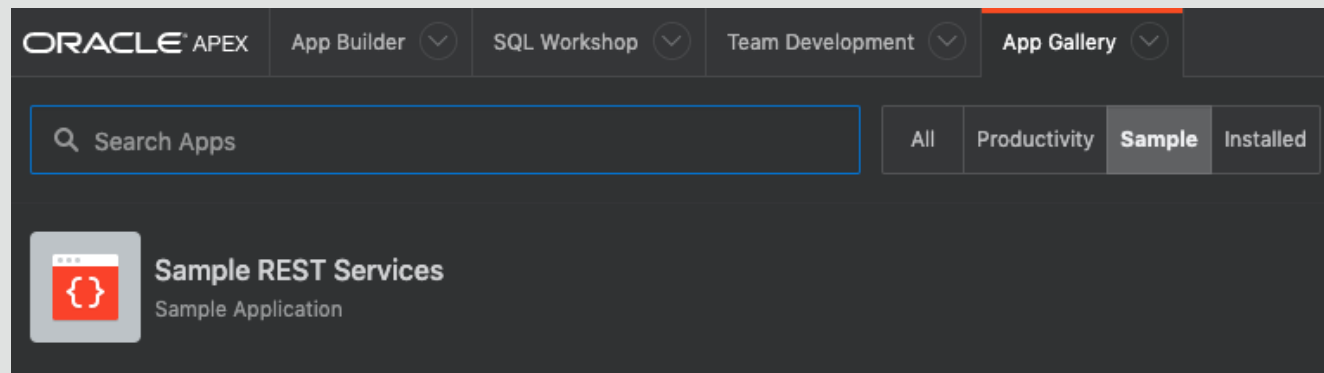
- Provides programmatic access to Web Source Modules or REST Enabled SQL
- Invoke services and fetch data row by row
- No manual HTTP request or response parsing required
- Supports any data processing
- Provides rows and columns

Demo

Web Source Modules

External Web Sources | **APEX Examples**

- [iTunes Search API](#)
- [Twitter API](#)
- [Brazilian ZIP Code API](#)
- [Movie DB API](#)
- Sample REST Services!

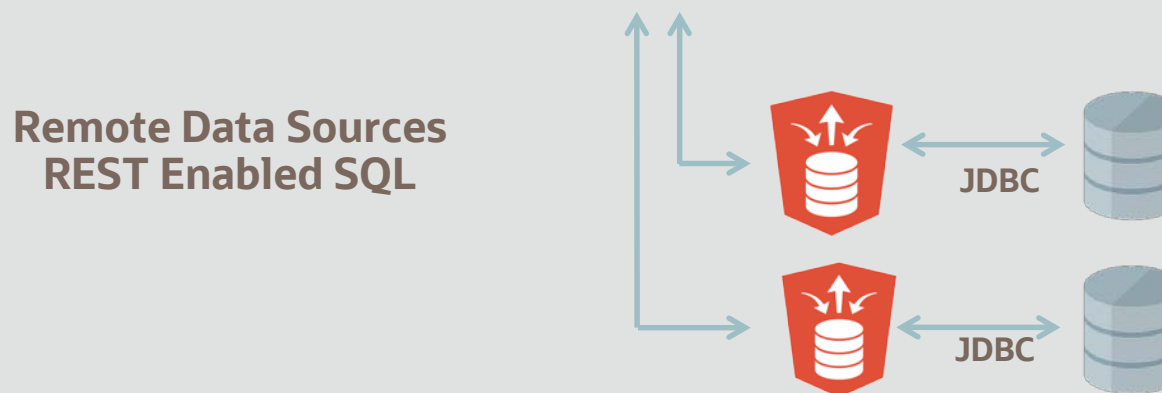
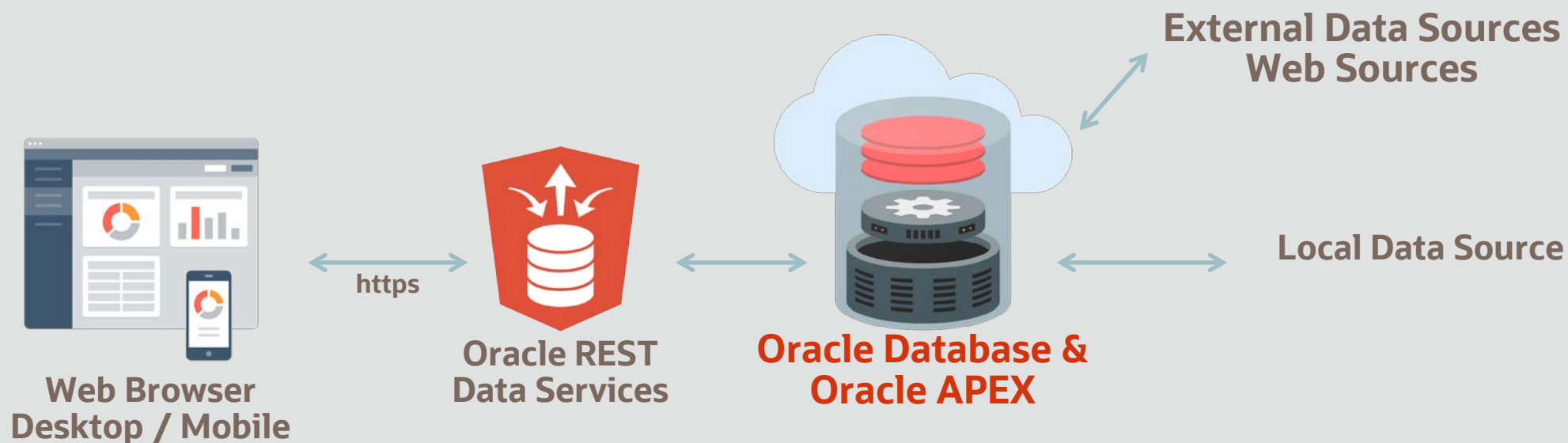


Web Sources | Use Cases

- Access data from other Oracle Databases using REST
 - Similar use case to Remote SQL, however Remote SQL requires privileges to directly access tables on target database via SQL. Many databases do not allow this type of access but do provide standardized REST services.
- Access internal systems (non Oracle DB)
 - Writing extensions to third-party in-house systems that provide REST APIs.
- Access Oracle SaaS functionality
 - Oracle Cloud SaaS customers using APEX to extend these systems.
- Access external APIs (non Oracle Databases)

Summary

Local, Remote, External Data Sources | in APEX



Oracle APEX

**Our mission is to help
people see data in new
ways, discover insights,
unlock endless possibilities.**



Getting Started

- Sign up for the Oracle Cloud Free Tier
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Thank You

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