ORACLE®

APEX Evangelists
Oracle Specialists

Extending Oracle E-Business Suite Release 12 Using Oracle Application Express

Integration of Oracle APEX and EBS

Table of Contents

- What is Oracle E-Business Suite (EBS)
- What is Oracle Application Express (APEX)
- Oracle EBS R12 and Oracle APEX together
- Live Demo

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A very short introduction to Oracle E-Business Suite

Kevin Bouwmeester

Technical Architect

Oracle ERP Presales Benelux

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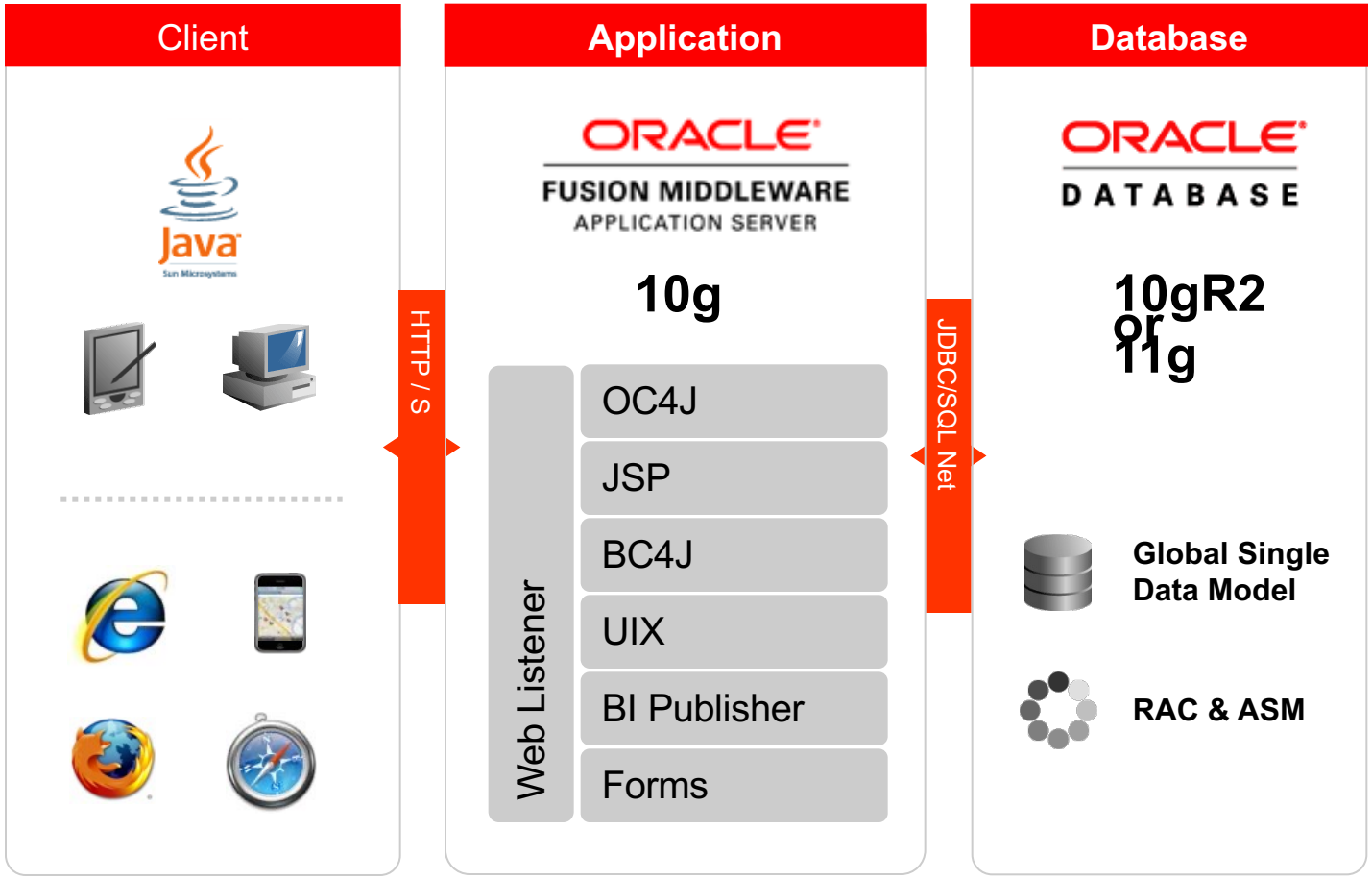
Sales & Order Management
Procurement
Manufacturing
Customer Relationship Management
ORACLE
E-BUSINESS SUITE
Inventory
Hello
Customer Service
Fulfillment
Reporting
Business Intelligence
Financial & Asset Management

The Technology Stack



Let's see it!

ORACLE
*Gebruikersnaam
(bijvoorbeeld michiel.jan.smit)
*Wachtwoord
(bijvoorbeeld 4u99v23)
Inloggen
Annuleren
Inlogassistentie
Toegankelijkheid
Geen
Selecteer een taal:
Deutsch
Dansk
Español
Français
Italiano
Norsk
Nederlands
Português
Svenska
Suomi
English
Informatie over deze pagina
Beslotenheidsverklaring
Copyright (c) 2006, Oracle. Alle rechten voorbehouden.

ORACLE iProcurement

Navigator | Favorieten | Winkelwagen | Beginpagina | Uitloggen | Voorkeuren | Help | Diagnose

Winkel | Bestelaanvragen | Ontvangst | Contractanten

Winkels | Boodschappenlijsten | Niet-catalogusaanvraag | Aanvraag contractant

Zoeken in Hoofdwinkel Uitvoeren Uitgebreid zoeken

Winkels

Dit is de afbeelding van de winkel.

Hoofdwinkel
Eén winkel voor alles wat u nodig hebt

Exchange Marketplace
Punchout to OracleExchange

Computers
Punchout to Dell Computers UK

Legal Services
Legal Services

Travel
Informational Catalogs to external travel sites.

IT Equipment
Punchout to MoreDirect.com

Transparent Exchange Marketplace
Transparent Exchange Marketplace

Maintenance
Maintenance supplies, tools, and services

Facilities Equipment
Facilities Equipment

eAM Maintenance Supplies
eAM Maintenance Supplies

eAM Assets
eAM Assets

Winkelwagen

De winkelwagen bevat 1 regel.

Recentelijk toegevoegde regels

Organizer, Bind... 100000 EA

Winkelwagen bekijken en afrekenen

Inkoopnieuws

- Veelgestelde vragen raadplegen
- Inkoopbeleid bekijken

This is where the customer puts their own purchasing news items (this is an HTML plugin).

Mijn bestelaanvragen

Volledige lijst

Bestelaanvraag	Omschrijving	Totaal (USD)	Status	Kopiëren	Wijzigen	Expresontvangst
16750		98.70	Goedgekeurd			
16748		18,500.00	Goedgekeurd			
16746		14,766.15	Goedgekeurd			
16745		2,086.95	Goedgekeurd			
16744		18,778.65	Goedgekeurd			

Mijn meldingen

Volledige lijst

Soort	Vanaf	Onderwerp	Verstuurd
Bestelaanvraag	Stock, Pat	Purchase Requisition 16564 is goedgekeurd.	01-feb-2012
Goedkeuring inkooporder	Brown, Casey	Standard Purchase Order 6738 is goedgekeurd.	28-mei-2011

TIP Vakantieregels: meldingen doorsturen of automatisch beantwoorden.

Gebruikers

Gebruikersnaam

Wachtwoord

Omschrijving

Status

Afloopdatum wachtwoord

- Dagen
- Toegangen
- Geen

Persoon

Klant

Leverancier

E-mail

Fax

Geldig

Vanaf 02-FEB-2012

Tot

Directe autorisaties | Indirecte autorisaties | Beveiligingsattributen

Autorisatie	Applicatie	Omschrijving	Beveiligings-groep	Geldig Vanaf	Geldig Tot

Data Model

Sections
Section ID
Parent ID
Thread ID
Dir
Title
Descr
KeyWords
Published
Integer
Integer
Integer
VarChar
Char
VarChar
VarChar
TinyInt
Files
FileNo
SectionID
Title
Annotation
Text
Mode
PubDate
UpdDate
KeyWords
AuthorID
Integer
Integer
VarChar
VarChar
Text
VarChar
DateTime
DateTime
VarChar
VarChar
ProductCategory
CategoryID
CategoryName
Department
Dept No
Department
Head Dept
Mngr No
Budget
Location
Phone No
DeptNo
VarChar(25)
DeptNo
EmpNo
EmpNo
Budget
VarChar(12)
Sales DataBase
TimeKey
CustomerKey
ShipperKey
ProductKey
EmployeeKey
ItemFreight
ItemQuanity
ItemAll
Discount
Employee
EmployeeKey
EmployeeID
EmployeeName
BDate
HDate
Customer
CustomerKey
CustomerID
CompanyName
ContactName
Title
Address
City
Region
PCode
Country
Phone
Mphone
Fax
Email
TimeDate
WeekDay
Month
Year
Quarter
Holiday
YearMonth
WeekOfYear
Action

Database Objecten

- Tabellen
- Views
- Synonymen
- Sequences
- PL/SQL Packages

Database Objecten

1. APPS.PER_PEOPLE
   View in APPS schema welke alleen effectieve records zien op basis van de datum van gebruikerssessie.
2. APPS.PER_PEOPLE_S
   Synonym naar sequence in HR schema welke PERSON_ID genereert.
3. APPS.PER_ALL_PEOPLE_F
   Synonym in APPS schema welke wijst naar de tabel in HR schema.
4. APPS.PER_PEOPLE_F
   View met HR security regels geimplementeerd. Afhankelijk van ingelogde gebruiker zie je alleen records waar je toegang voor hebt.

Resultaat

```
select count(*) from per_people;
-- 0       VIEW
select count(*) from per_people_f;
-- 33945   VIEW
select count(*) from per_all_people;
-- 0       VIEW
select count(*) from per_all_people_f;
-- 33945   SYNONYM
```

Log in

```
BEGIN
  APPS.FND_GLOBAL.APPS_INITIALIZE
  ( USER_ID => 1318      -- OPERATIONS
  , RESP_ID => 51089     -- HR Vision NL
  , RESP_APPL_ID => 800 -- PER
  );
  Mo_Global.init ('PO');
END;
```

And there was light…

```
SELECT count(*) FROM ra_customer_trx;  -- 0 records

BEGIN
APPS.FND_GLOBAL.APPS_INITIALIZE
( USER_ID => 1318      -- OPERATIONS
, RESP_ID => 50794     -- NL Vision NL
, RESP_APPL_ID => 222 -- PER
);
Mo_Global.init ('PO');
END;

SELECT count(*) FROM ra_customer_trx; -- 18602 records
```

What is Oracle Application Express (APEX)

Dimitri Gielis

APEX Evangelists

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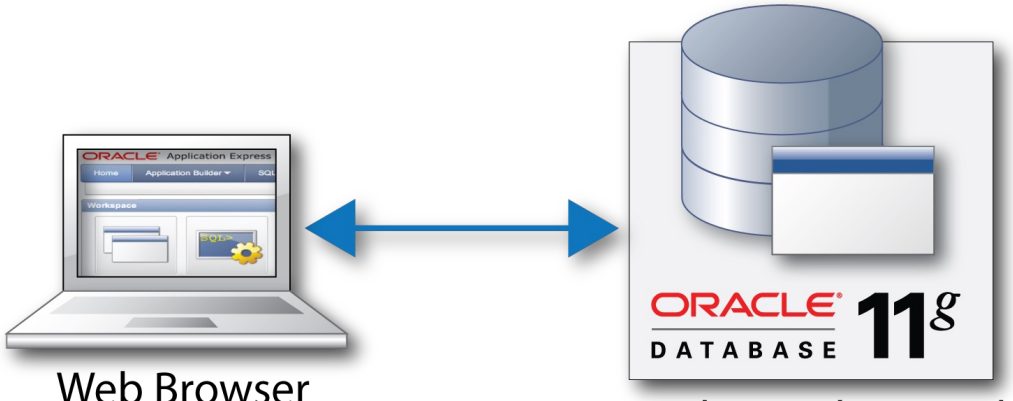
Oracle Application Express (APEX)

What is Oracle APEX?

- Database centric Rapid Application Development (RAD) Tool
- No cost feature of the Oracle Database – All Editions
- 100% Browser-Based and Declarative
- Use SQL Workshop to create and manage DB objects
- Use Application Builder to create Web 2.0 Applications
- Leverage SQL skills to build reports, charts and forms
- Popular; extremely active OTN forum, high adoption



Web Browser

Oracle Database with
Oracle Application Express

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Oracle Application Express (APEX)

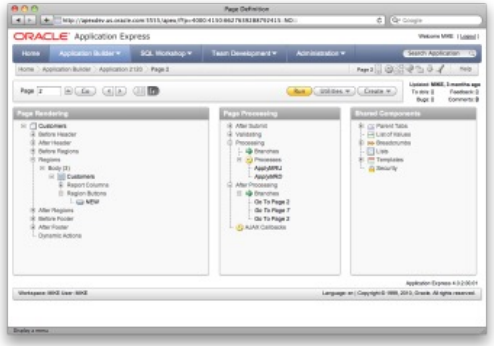
Benefits of Oracle APEX

No Cost Feature of

RAD

In Browser Development

Declarative Web 2.0



Leverage SQL Skills

Self Service

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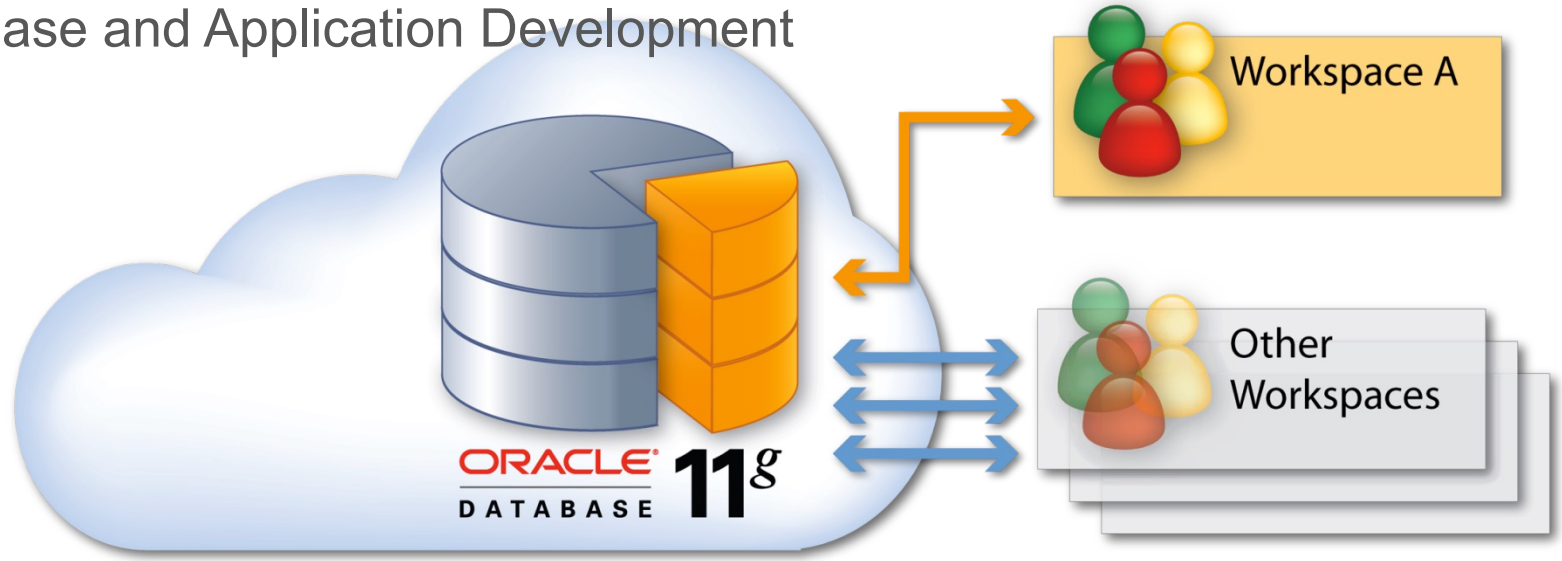
Oracle Application Express (APEX)

Private Cloud Development Service

- Allows IT Departments to provide DB as a Service
- One Oracle instance supports 100's of "Workspaces"
- Workspaces provide access to one or more DB Schemas
- Multi-tenant provisioning supports consolidation
- Fully Automated Self-service Provisioning
- Database and Application Development



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Oracle Application Express (APEX)

Public Cloud

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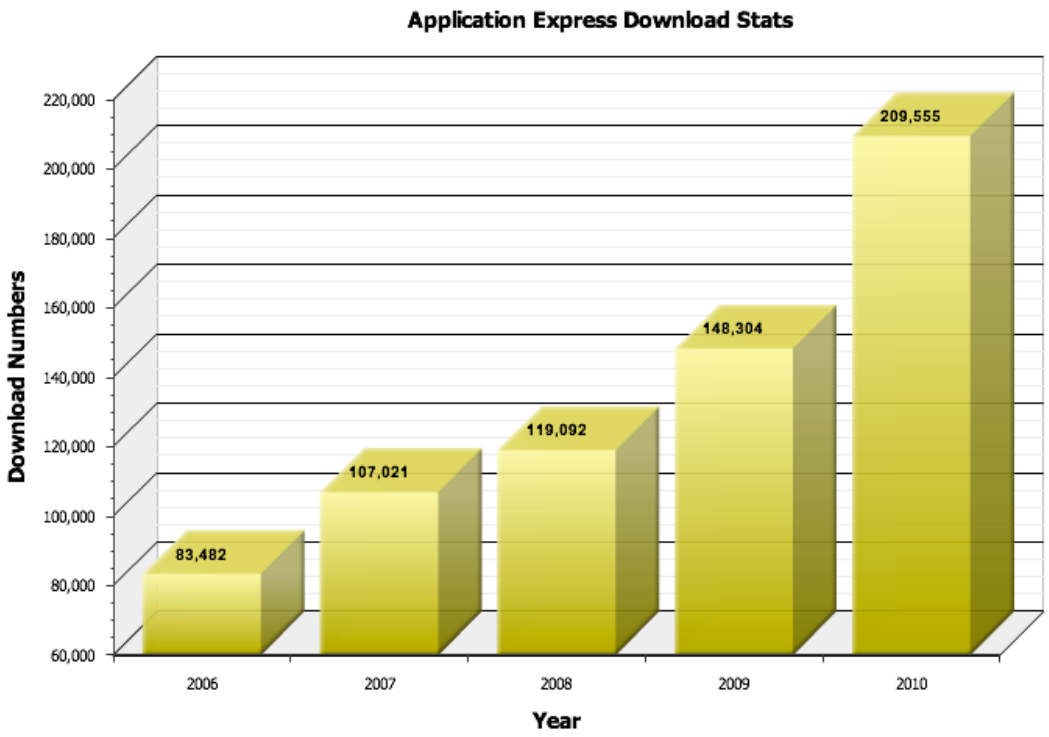
Oracle Application Express (APEX)

OTN downloads by Calendar Year



- Oracle Application Express is distributed on OTN and with all editions of the database including Oracle XE.
- APEX is the number 3 most popular discussion forum on OTN, only behind “Database” and “SQL”
- Over 8 books have been published in the last 2 years on APEX, we are expecting at least 3 in CY 2011

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Building Applications in Oracle APEX

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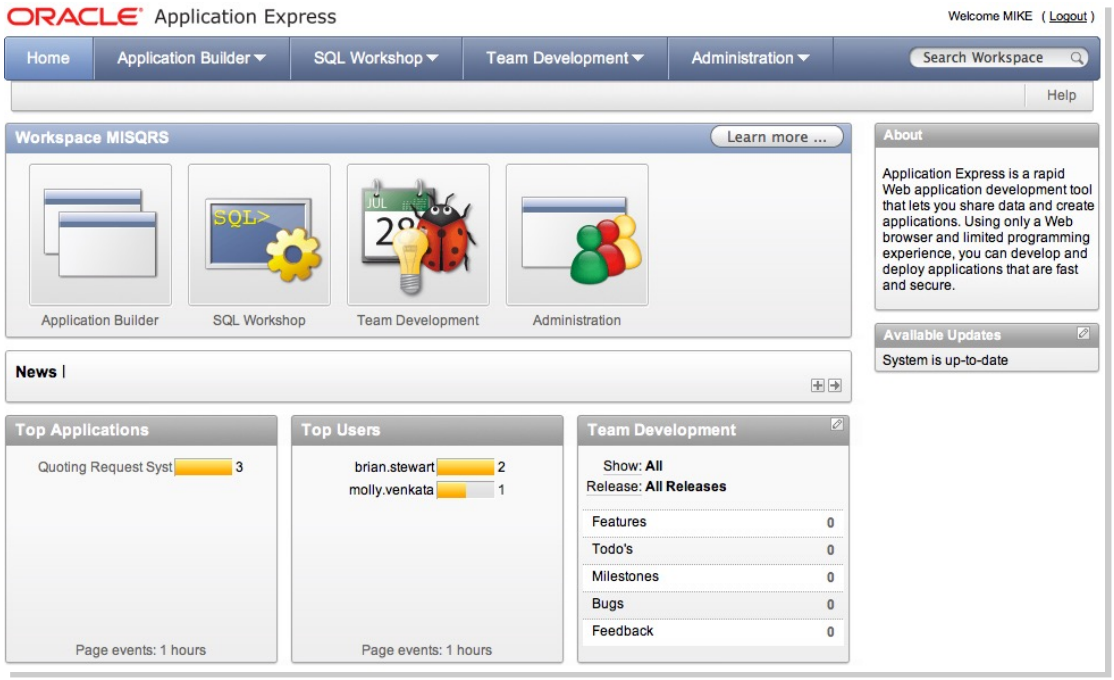
Building Applications in Oracle APEX

Oracle APEX Database and Application Development



- Oracle application development home page
- Click Application Builder to develop applications
- Click SQL Workshop to develop database

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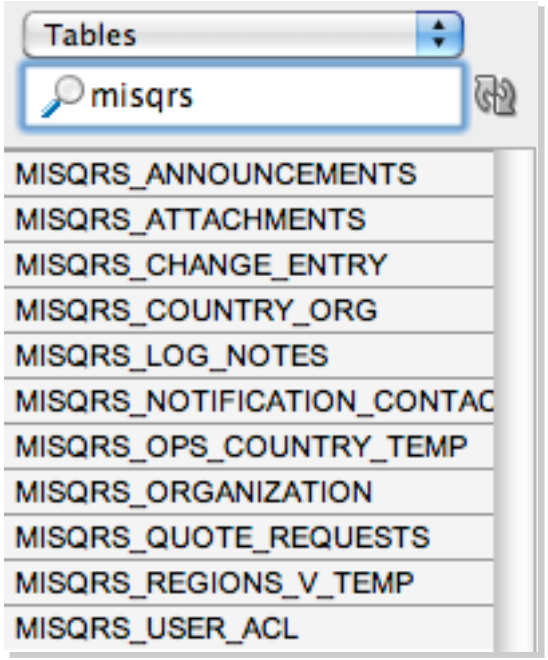
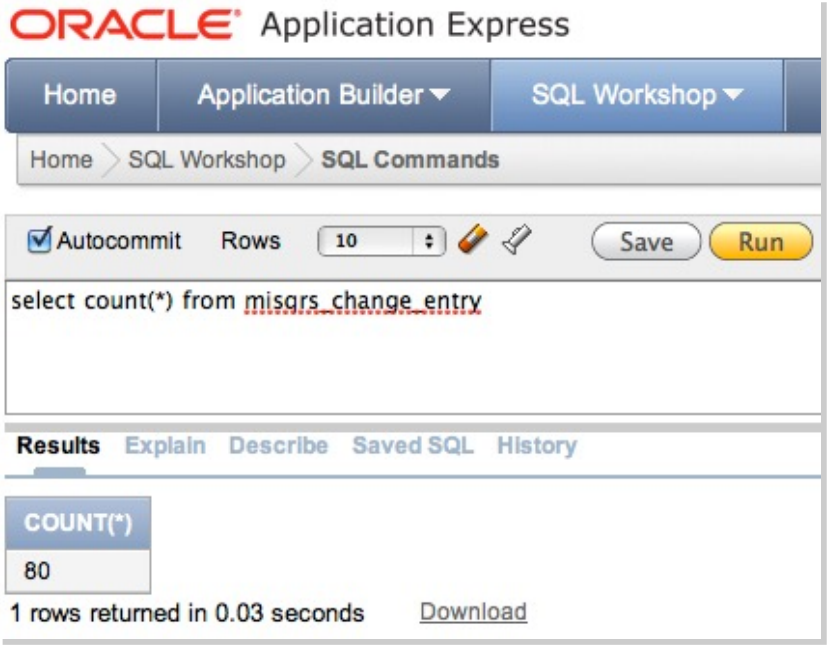
Building Applications in Oracle APEX

Full SQL Capabilities using APEX SQL Workshop

Browse Database Objects



Run SQL or SQL Scripts



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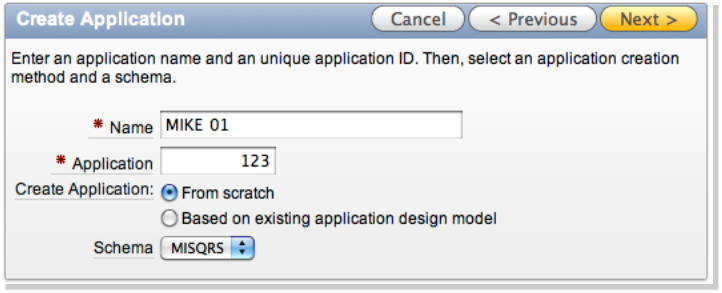
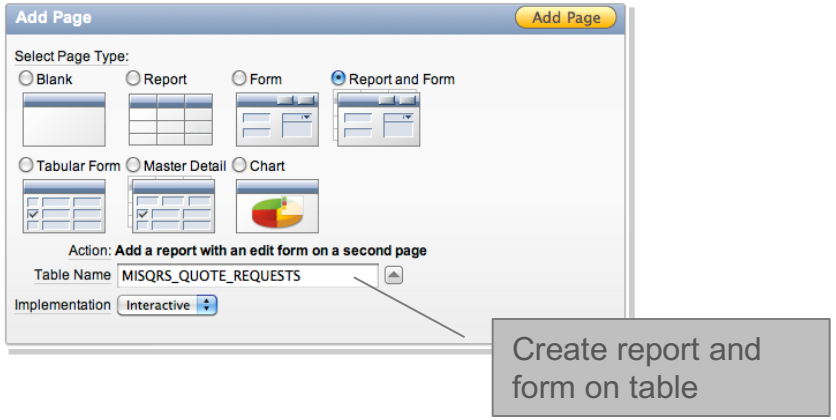
Building Applications in Oracle APEX

Creating an application

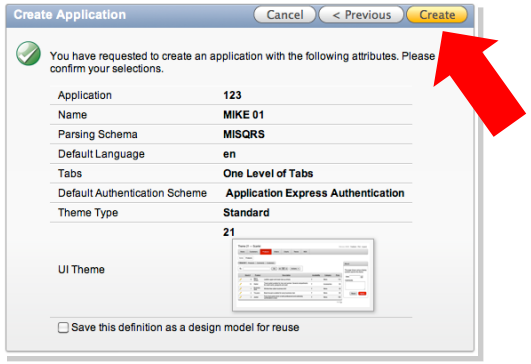
1. Initiate Create App Wizard



2. Add Pages



3. Confirm and Create



4. Run Applications

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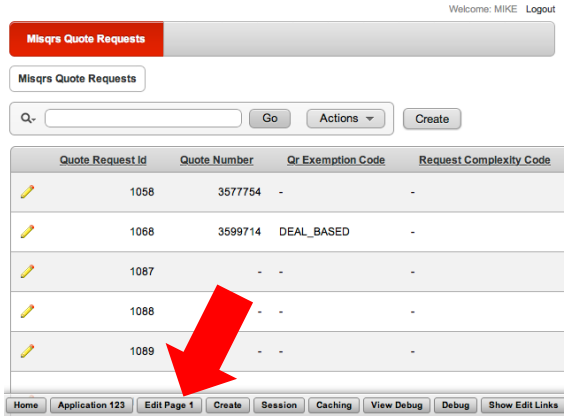
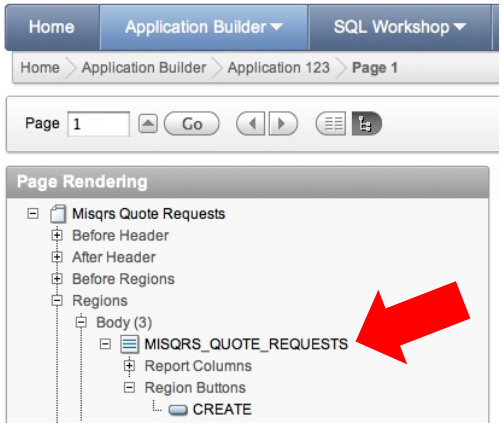
Building Applications in Oracle APEX

Developing an application

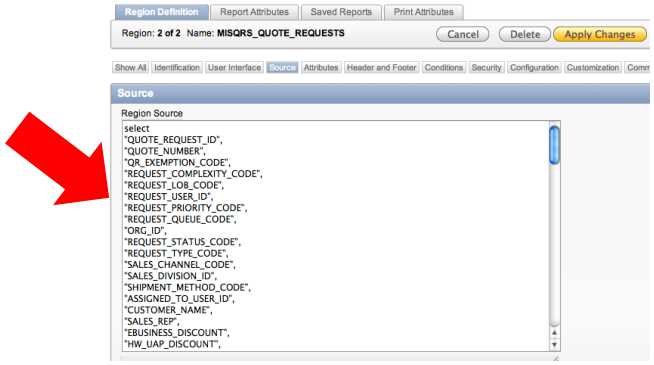
1. Click to edit page



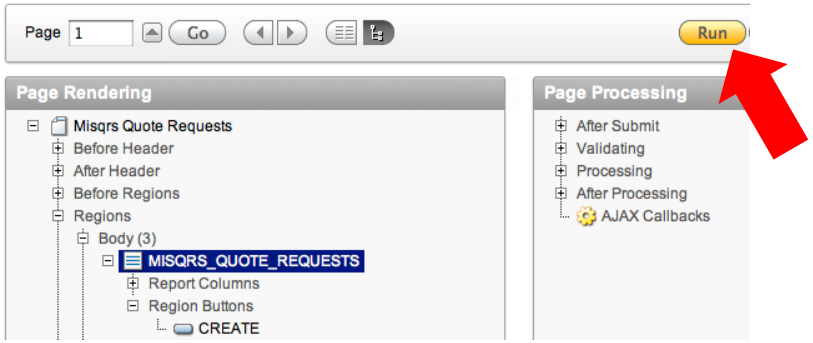
2. Click to edit page component



3. Edit component



4. Run page to view changes



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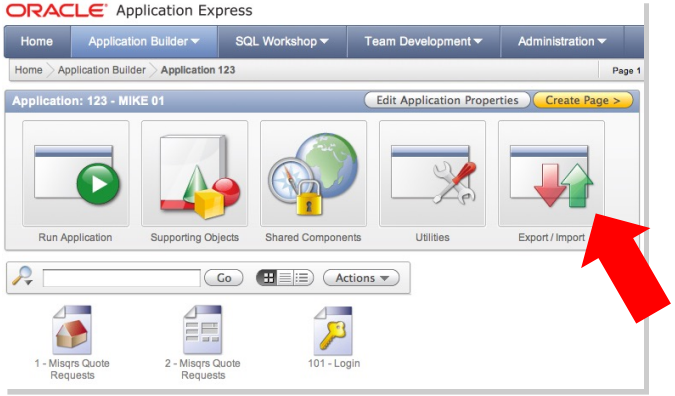
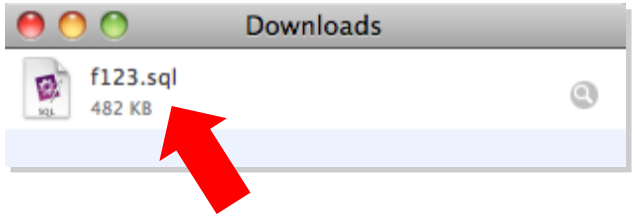
Building Applications in Oracle APEX

Deploying an application

1. Export Application



2. Export generates a SQL Script



3. Provide File to DBA

4. DBA Runs Script in Production

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Extending Oracle EBS R12 with APEX

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Integration options #1 – INSERT

```
INSERT INTO FND_USER
( USER_ID
, USER_NAME
, PASSWORD
, START_DATE
, EMPLOYEE_ID)
VALUES
( FND_USER_SEQ.NEXTVAL
, ‘KEVIN.BOUWMEESTER@ORACLE.COM’
, ‘welcome12’
, SYSDATE
, 9817
);
```

Integration options #2 – PL/SQL API

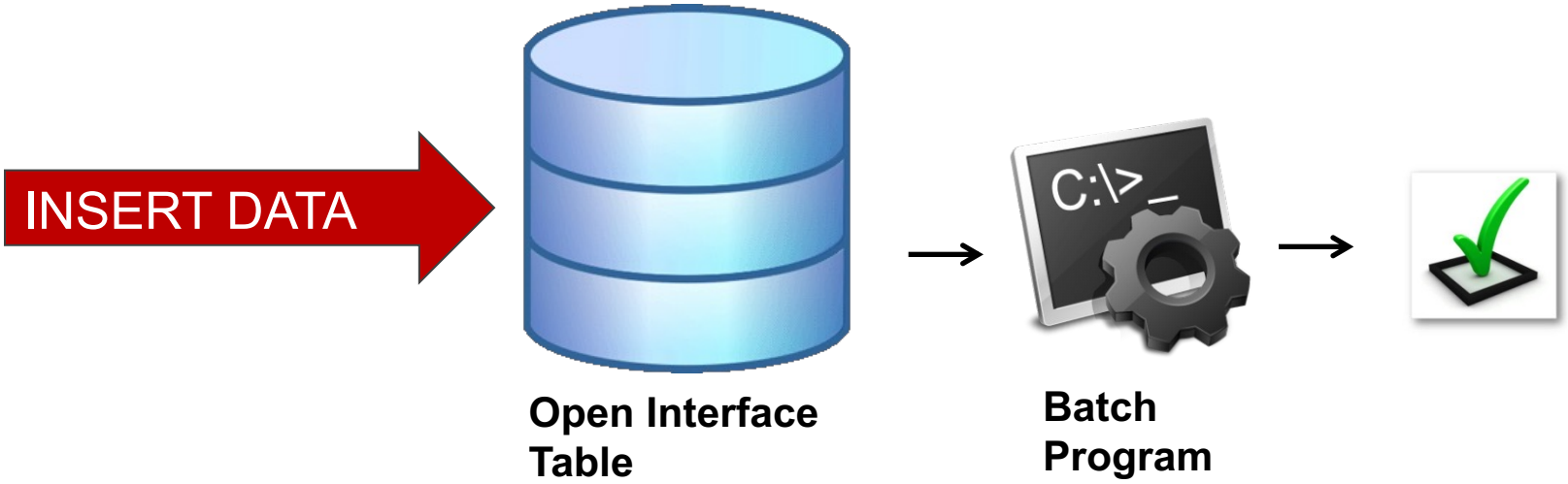
```
DECLARE
  v_user_id number;
BEGIN

  v_user_id := fnd_user_pkg.createuserid
  ( x_user_name => ‘KEVIN.BOUWMEESTER@ORACLE.COM’
  , x_owner => 'X‘
  , x_unencrypted_password => ‘welcome12’
  , x_start_date => sysdate);

  COMMIT;

END;
```

Integration option #3 – Open Interface



Integration Option #4 – Web Service

ORACLE Integration Repository

Home Logout Preferences Help Personalize Page Diagnostics

Integration Repository

View Product Family

- Advanced Planning
- Applications Technology
- Communications
- Contracts Suite
- Discrete Manufacturing
- Exchange Suite
- Financial Globalizations Suite
- Financial Payables Suite
- Financial Receivables Suite
- Financial Services Applications
- Financials
- Human Resources Suite
- Interaction Center
- Marketing Suite
- Marketing and Sales Suite
- Order Management Suite
  - Advanced Pricing
  - Configurator
  - Order Capture
  - Order Management
    - Sales Order
  - Release Management
  - Shipping Execution Common
  - Transportation Execution
- Process Manufacturing
- Procurement
- Product Lifecycle Management
- Projects Suite
- Public Sector
- Sales Suite
- Service Suite
- Supply Chain Management
- University

Sales Order

Search

Personalize Stack Layout: (ListHeader)

Export

Previous 1-10 Next 10

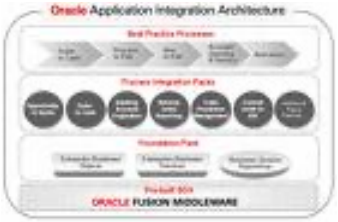
Name	Internal Name	Product	Type	Status	Description
INBOUND: Cancel Purchase Order XML Transaction	ONT:CPO	Order Management	XML Gateway Map	Active	This is the message map to support the inbound Cancel PO (Purchase Order Cancellation) XML transaction which, through the population of data in the header and line open interface tables, allows the full cancellation of sales orders in Order Management and also supports the partial and full cancellation of sales order lines.
INBOUND: Cancel Purchase Order XML Transaction	ONT:CPO	Order Management	Web Service	Active	This is the message map to support the inbound Cancel PO (Purchase Order Cancellation) XML transaction which, through the population of data in the header and line open interface tables, allows the full cancellation of sales orders in Order Management and also supports the partial and full cancellation of sales order lines.
OUTBOUND: Purchase Order Acknowledgment (855/ORDRSP)	EC:POAO	Order Management	EDI	Active	This is the source file to support the outbound Purchase Order Acknowledgments EDI transaction which reports order status after the order has been booked.
OUTBOUND: Purchase Order Change Acknowledgment (865/ORDRSP)	EC:POCAO	Order Management	EDI	Active	This is the source file to support the outbound Purchase Order Change Acknowledgments EDI transaction which reports order status after post-booking changes to the order have occurred.
Order Management Acknowledgments Open Interface	ECEPOAO	Order Management	Open Interface	Active	This concurrent program allows users to run the outbound Purchase Order Acknowledgments EDI transaction which reports order status after the order has been booked.
Order Management Acknowledgments Open Interface	ECEPOCAO	Order Management	Open Interface	Active	This concurrent program allows users to run the outbound Purchase Order Acknowledgments transaction which reports order status after post-booking changes to the order have occurred.
Order Management Profile Option Retrieval API	OE_PROFILE	Order Management	PL/SQL		
Order Management Sales Orders Open Interface	ECEPOCI	Order Management	Open Interface		
Order Management Sales Orders Open Interface	ECEPOI875	Order Management	Open Interface		
Process Order API	OE_ORDER_PUB	Order Management	PL/SQL		

Export

Oracle E-Business Suite Seeded Integration Interfaces

Custom Integration Interfaces (Written by Partners / Customers)

SOA Integration



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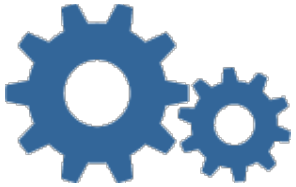
PEOPLESOFT ENTERPRISE

Services

Services



Apache Axis

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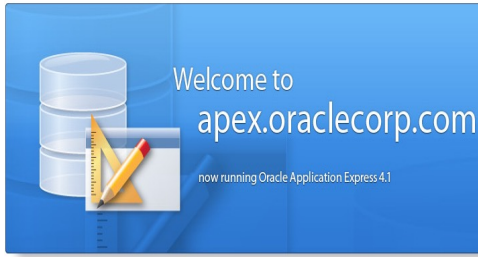
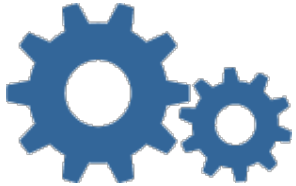


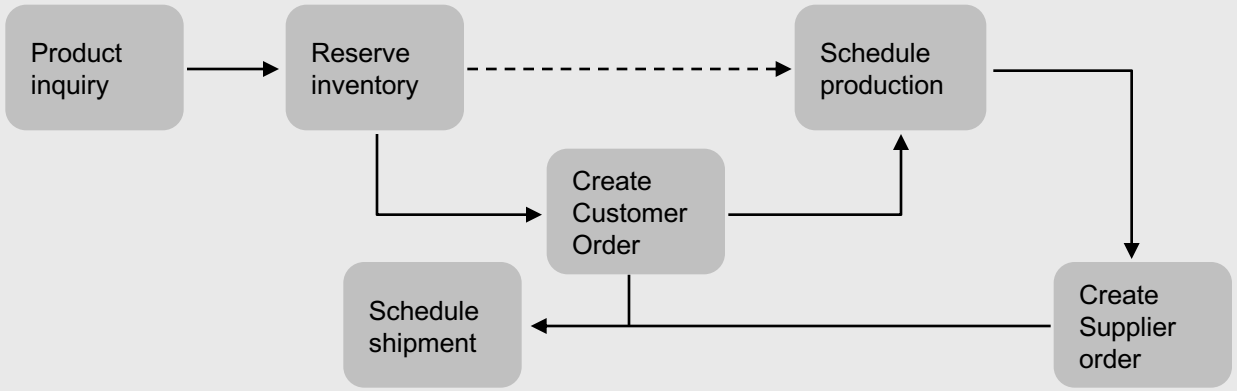


3rd Party
Standard WS
Client

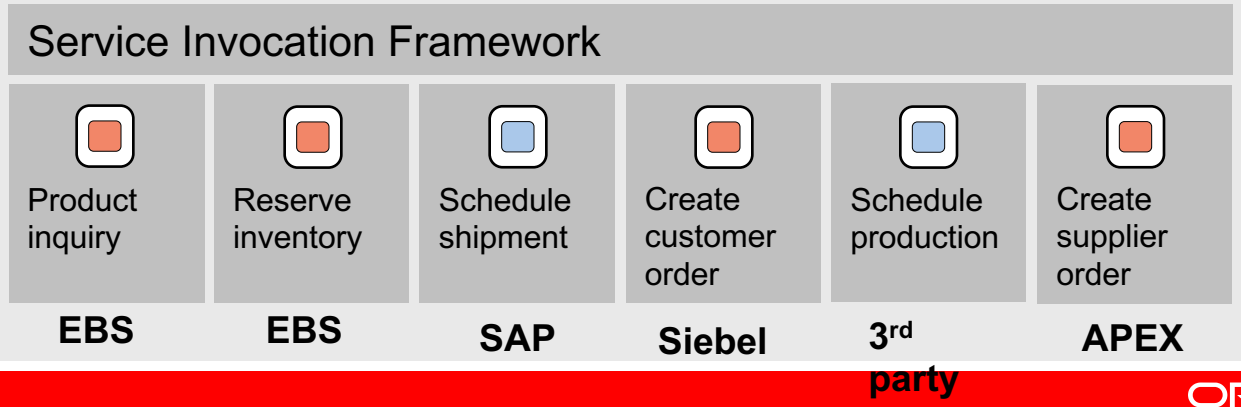
Achieving Users & IT Alignment

IT exposed as Services to Users

Users World
Processes

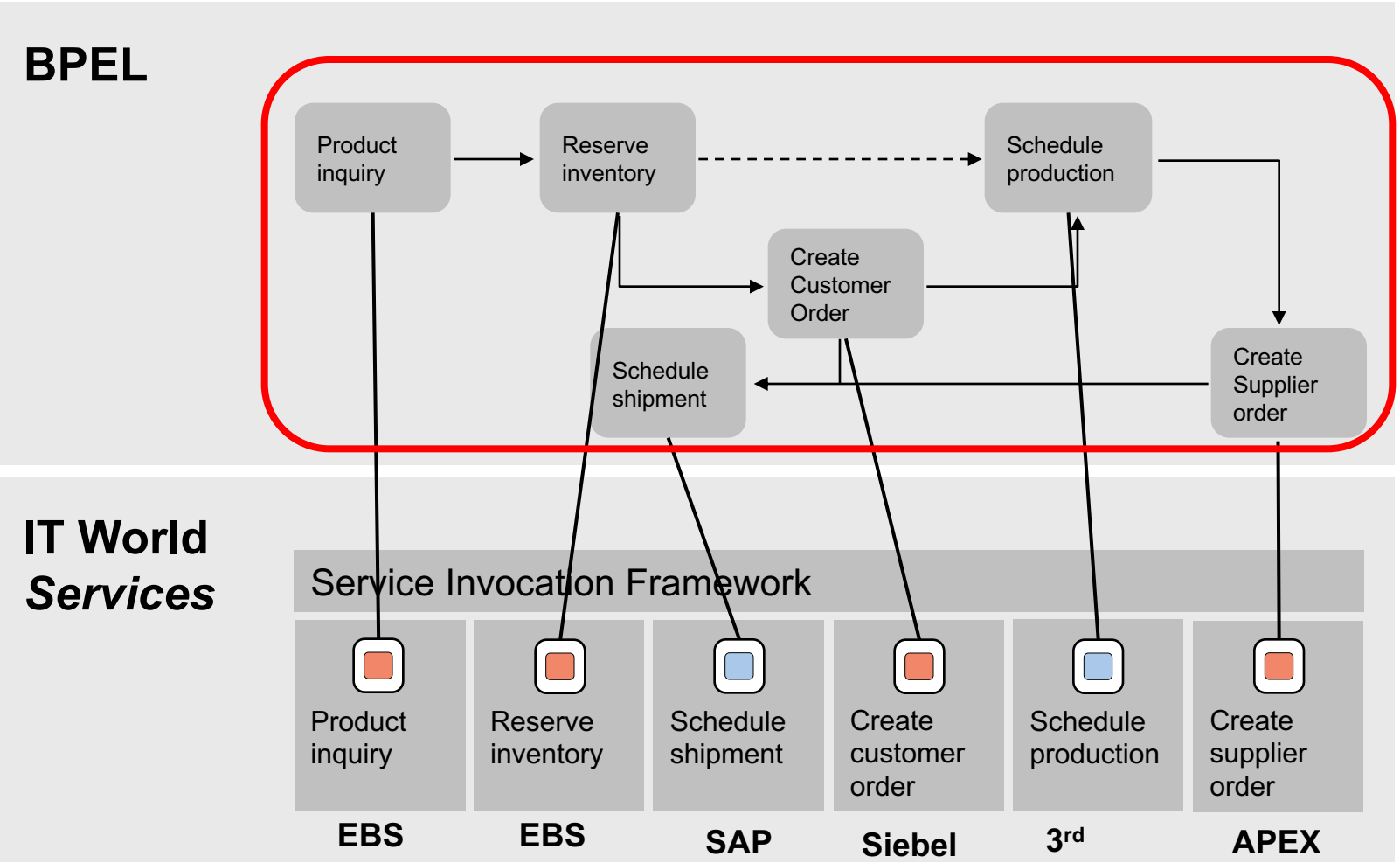


IT World
Services



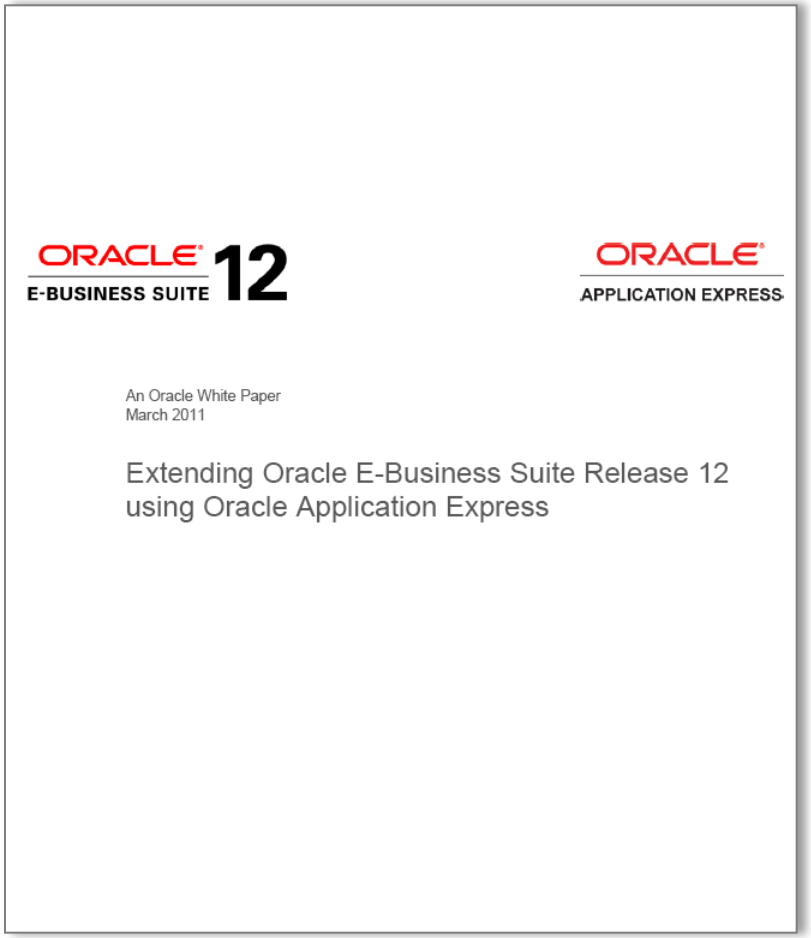
Achieving Users & IT Alignment

IT exposed as Services to Users



Oracle White Paper

- Outlines best practices for developing fully supported extensions
- Provides recommended architecture
- Detailed steps for configuration, integration and security
- Includes sample application and code
- Collaboration between Oracle E-Business Suite and Oracle Application Express development teams


ORACLE E-BUSINESS SUITE 12

ORACLE APPLICATION EXPRESS

An Oracle White Paper
March 2011

Extending Oracle E-Business Suite Release 12 using Oracle Application Express

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http://www-content.oracle.com/ocom/groups/public/@otn/documents/webcontent/345780.pdf
Oracle Support Link https://metalink.oracle.com/metalink/plsql/showdoc?db=NOT&id=1306563.1

Extending Oracle EBS R12 w/ APEX

Use Cases

- Custom Application Development
  - Building New applications
  - Utilizing custom DB schemas
  - Real time read-only access to EBS data
  - Custom data collection
  - Interfacing via standard APIs
  - Reporting and data analysis
  - Modernization of custom Oracle Forms applications
- Customization of Existing EBS Pages and Process Flows
  - Oracle APEX is NOT capable of supporting this use case

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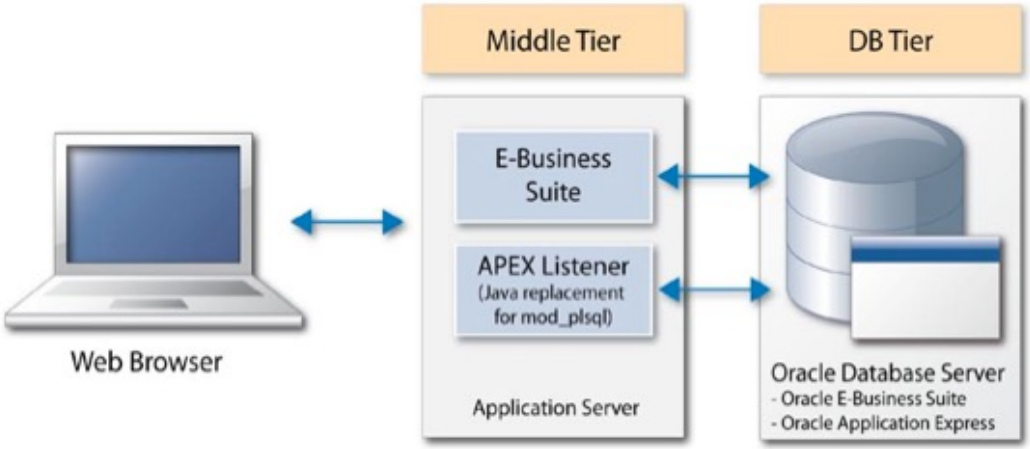
Extending Oracle EBS R12 w/ APEX

Architecture



- Runtime only Application Express installed into EBS Database
- Java based APEX Listener provides mid tier
- Oracle HTTP Server (OHS) and mod_plsql are NOT used

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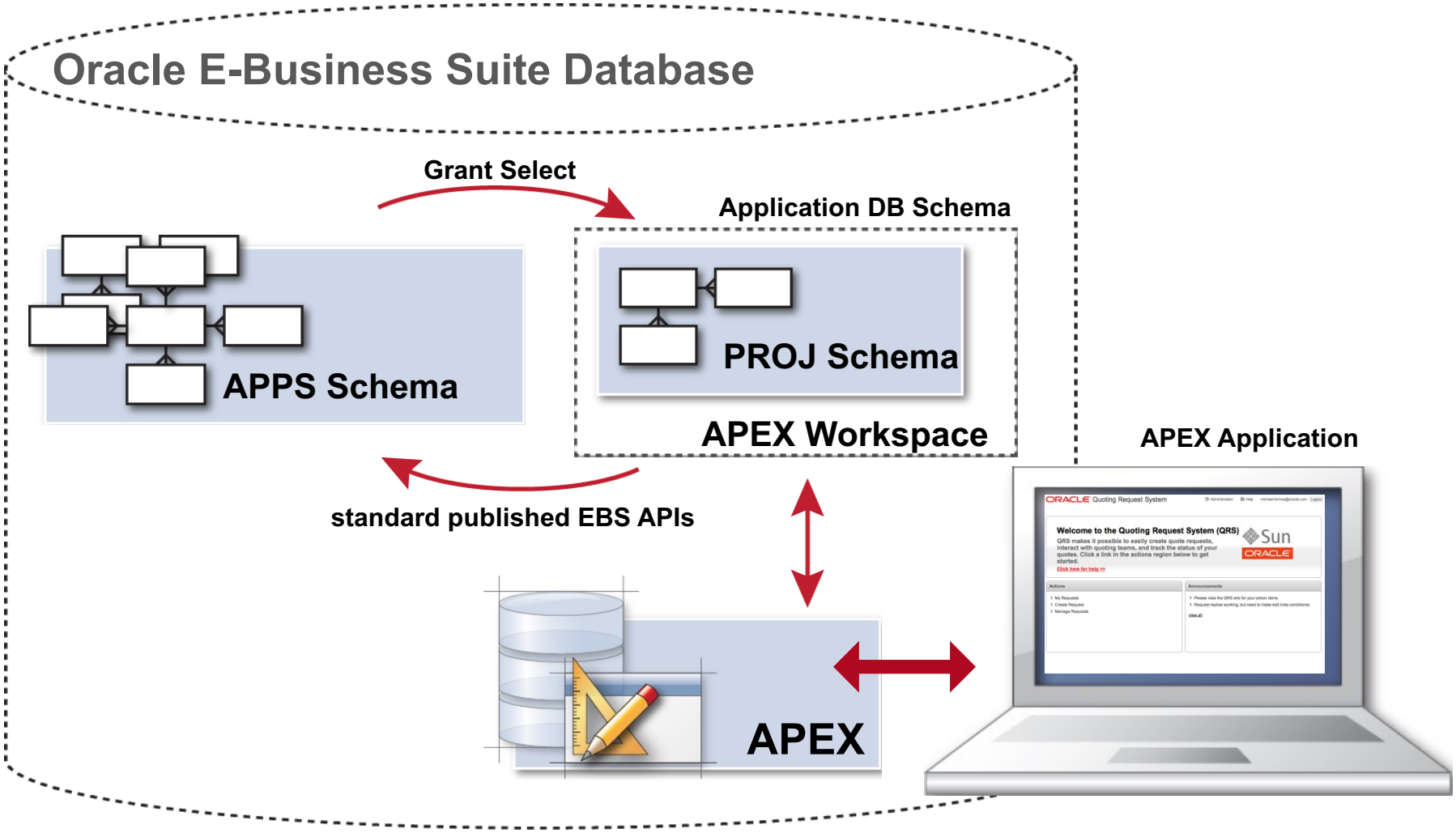
Extending Oracle EBS R12 w/ APEX

Architecture



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Oracle E-Business Suite Extensions

Development and Deployment

- Development performed on development instance of EBS
- Deployment or patching of applications is via a SQL plus script
- Deployment is performed connected as application schema, not APPS
- Privileges on APPS tables selectively granted to application DB schema
- Using database schema allows applications to run with least privilege
- EBS Menus provide links to APEX Applications
- Look and feel can mimic EBS or use a different user interface theme
- Workspaces allow multiple teams to develop and deploy independently

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Oracle E-Business Suite Extensions

Development and Deployment

- SQL within applications is run as the applications database schema
- Database resource manager can constrain resource consumption
- Monitoring of applications can be done using Oracle Enterprise Manager
- Client info is set for each session with application and page
- Oracle APEX sets the client info for each request which allows the DBA to correlate the slow SQL to an application, page, and user (using EM).
- APEX Authentication same as EBS (SSO, OAM, Custom)
- APEX Authorization Schemes enforce EBS roles and responsibilities
- Both SOAP and RESTful web services can be used within applications

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Extending Oracle EBS R12 w/ APEX

Differences between Oracle APEX and other Products

- Oracle BI Publisher
  - BI publisher complements Oracle APEX by providing enterprise reporting
  - Oracle APEX has built in hooks to interface with BI publisher
- OBIEE
  - OBIEE is query only, Oracle APEX allows insert, update, delete
  - OBIEE supports many databases, APEX supports only Oracle
  - Oracle APEX is frequently used to add update capabilities to OBIEE applications
- Oracle JDeveloper and ADF
  - Both products are designed to build modern HTML Web Applications
  - Oracle APEX is targeted at departmental opportunitic applications with fewer developers
  - Oracle APEX is targeted at the SQL professional, JDeveloper is targeted at the Java professional
  - Oracle APEX supports self service private cloud with database and application development
- Oracle Forms
  - Both are declarative, both leverage developers SQL skills
  - APEX builds Native HTML Web Applications, Forms does not
  - APEX has greater control over user interface
  - APEX allows queries to be built on SQL and not default DB blocks

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Internal Examples of Oracle APEX

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Internal Examples of Oracle APEX

Recently Developed Applications

- Quote Request System (QRS)*
- Oracle Store
- Oracle Partner Store
- Web Quote
- SOLAR – Solutions and Requirements Tracking
- Safeguard*
- Oracle Learning Library
- Resource Request System (RRS)
- Completive Programs (Terminate Teradata …)
- OIP Lite*
- Sun Backlog Reporting (OTRS / GCM / 10.7 / Quoting)

* not yet production

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Internal Examples of Oracle APEX

QRS Application – Home Page

ORACLE Quoting Request System

Administration | Help | michael.hichwa@oracle.com | Logout

Welcome to the Quoting Request System (QRS)

QRS makes it possible to easily create quote requests, interact with quoting teams, and track the status of your quotes. Click a link in the actions region below to get started.

Click here for help >>

Sun ORACLE

Actions

- My Requests
- Create Request
- Manage Requests

Announcements

- Please view the QRS wiki for your action items

Request replies working, but need to make edit links conditional.

view all

- Menu options available controlled via roles and responsibilities
- Administration privileges controlled via roles and responsibilities

https://gsibb-apex.oraclecorp.com/apex/f?p=12578:100

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Internal Examples of Oracle APEX

QRS Application – Manage Requests

ORACLE Quoting Request System

Administration | Help | michael.hichwa@oracle.com | Logo

Home > Manage Requests Queue

Go | Actions | Create Request > | Reset Report

	Request	Quote	Summary	Type	Status	Customer	Reseller Customer	Organization	Country	LOB
	2047	3625688	Testing trace	Direct Quote	Triage In	QUALCOMM	-	Oracle America, Inc.	United States	Communications/Telco
	2046	Testing trace	Testing trace	Direct Quote	New	Testing customer	-	Oracle America, Inc.	United States	Communications/Telco
	2044	test counttry	test country	Direct Quote	New	test country	-	Oracle America, Inc.	United States	Communications/Telco
	1023	3607722	96GB Flash PCIe card - Agilent	Direct Quote	Revised Request	AGILENT TECHNOLOGIES	-	Oracle America, Inc.	United States	Communications/Telco
	1038	3577752	test456	Indirect Quote	New	Klikon Solutions Pty Ltd	test456	Oracle Corporation Australia Pty Limited	Australia	Communications/Telco
	2011	new request - test attachments	new request - test attachments	Internal Order	New	testing attachments from create	-	Oracle America, Inc.	United States	Communications/Telco
	2038	GCM Quote #, WebQuote #	Exadata for Exxon	Indirect Quote	New	Exxon	Partner name	Oracle America, Inc.	United States	Global OEM Customer

- Views control access to rows, all access is controlled by EBS
- Data joined from local tables and EBS tables

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Internal Examples of Oracle APEX

QRS Application – Quote Details

Product Lines

line 1.0.1 should be quantity 5

Line #	Part #	Description	Unit List Price	Quantity	Extended Net Price
1.0	✓ XTA-FAS-S3IE96GB-N	96GB Flash PCIe card	US$4695	1	US$3286.5
1.0.1	✓ B58121	Oracle Premier Support for Systems	US$563.4	1	US$394.38
Oracle Premier Support for Systems	✓ Indicates supported item(s)				**US$368.088**
				Total	US$4048.97

- Page allows comments to be placed by sales to quoters
- Details of quote pulled directly from quoting
- Change requests and quote responses all stored in local tables
- MISQRS schema on GSI owns local tables

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Internal Examples of Oracle APEX

QRS Application – Local Tables

ORACLE Application Express

Welcome MIKE (Logout)

Home | Application Builder | SQL Workshop | Team Development | Administration

Home > SQL Workshop > Object Browser

Schema MISQRS Help

Tables

HTMLDB_PLAN_TABLE
MISQRS_ANNOUNCEMENTS
MISQRS_ATTACHMENTS
MISQRS_CHANGE_ENTRY
MISQRS_COUNTRY_ORG
MISQRS_LOG_NOTES
MISQRS_NOTIFICATION_CONTAC
MISQRS_OPS_COUNTRY_TEMP
MISQRS_ORGANIZATION
MISQRS_QUOTE_REQUESTS
MISQRS_REGIONS_V_TEMP
MISQRS_USER_ACL
PAT_TEST
TESTMG_DEBUG

MISQRS_CHANGE_ENTRY Create

Table | Data | Indexes | Model | Constraints | Grants | Statistics | UI Defaults | Triggers | Dependencies | SQL

Add Column | Modify Column | Rename Column | Drop Column | Rename | Copy | Drop | Truncate | Create Lookup Table

Column Name	Data Type	Nullable	Default	Primary Key
CHANGE_ENTRY_ID	NUMBER	No	-	1
CHANGE_ENTRY_STATUS	VARCHAR2(30)	Yes	-	-
QUOTE_REQUEST_ID	NUMBER	Yes	-	-
REQUEST	CLOB	Yes	-	-
RESPONSE	CLOB	Yes	-	-
CREATED_BY	NUMBER	Yes	-	-
CREATED_DATE	TIMESTAMP(0) WITH LOCAL TIME ZONE	Yes	-	-
LAST_UPDATED_BY	NUMBER	Yes	-	-
LAST_UPDATED_DATE	TIMESTAMP(0) WITH LOCAL TIME ZONE	Yes	-	-
RESPONSE_CREATED_BY	NUMBER	Yes	-	-
RESPONSE_CREATED_DATE	TIMESTAMP(0) WITH LOCAL TIME ZONE	Yes	-	-
RESPONSE_LAST_UPDATED_BY	NUMBER	Yes	-	-
RESPONSE_LAST_UPDATED_DATE	TIMESTAMP(0) WITH LOCAL TIME ZONE	Yes	-	-

1 - 13

- List of tables owned by database schema MISQRS
- Note ability to add columns and create new tables

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Internal Examples of Oracle APEX

QRS Application – Views on EBS data

ORACLE Application Express

Welcome MIKE (Logout)

Home | Application Builder | SQL Workshop | Team Development | Administration

Home > SQL Workshop > Object Browser

Schema MISQRS Help

Views

MISQRS_EMPLOYEES_V
MISQRS_QUOTE_HEADERS_V
MISQRS_QUOTE_LINES_V
MISQRS_QUOTE_LINES_V_NR
MISQRS_QUOTE_REQUESTS_OR
MISQRS_REGIONS_V
MISQRS_SALES_DIVISION_V
MISQRS_SHIPMENTS_V
MIS_ASO_SHIPMENTS_V_NR

View Code Data Grants UI Defaults Dependencies SQL

```
CREATE OR REPLACE FORCE VIEW  "MISQRS_EMPLOYEES_V" ("USER_ID", "EMAIL_ADDRESS", "FIRST_NAME", "LAST_NAME")
  select  d.user_id, a.email_address, a.first_name, a.last_name
from   hr_people_l1_l2_data_v a
    ,  HR_PERSON_TYPES_LOOKUP_V c
    ,  FND_USER d
WHERE  1=1
and    a.person_type_id = c.person_type_id
and    sysdate between a.effective_start_date and a.effective_end_date
and    sysdate between a.pptuf_effective_start_date and a.pptuf_effective_end_date
and    a.current_employee_flag = 'Y'
and    c.user_person_type = 'Employee'
and    c.active_flag = 'Y'
and    a.person_id = d.employee_id
/
```

- Browsing database views shows references to APPS tables
- Developer only sees what the MISQRS schema has been granted

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Live Demo

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Live Demo

Accessing EBS data from APEX

- Create new APEX application
- Interactive Report with all employees
  - Query data from EBS through a View
- Form to update email address of employee
  - Update through EBS API from APEX
- Calendar with the birthdays of the employees
- Chart when people where hired
- Call the chart from the EBS menu
  - Automatic Authentication and Authorization
  - EBS Profiles, Function, Menu, Responsibility

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