

ORACLE APPLICATION EXPRESS, ORACLE REST DATA SERVICES, & WEBLOGIC 12C

AUTHOR: BRAD GIBSON
SENIOR SOLUTIONS ARCHITECT
ADVIZEX

AGENDA

- Introductions
- Test Environment Overview
- Oracle Application Express (APEX) 5.0
- Oracle REST Data Services
- Oracle WebLogic 12c
- Tools
 - Oracle SQL Developer
 - Oracle JDeveloper 12c
 - Postman App
 - CURL



INTRODUCTIONS - ME

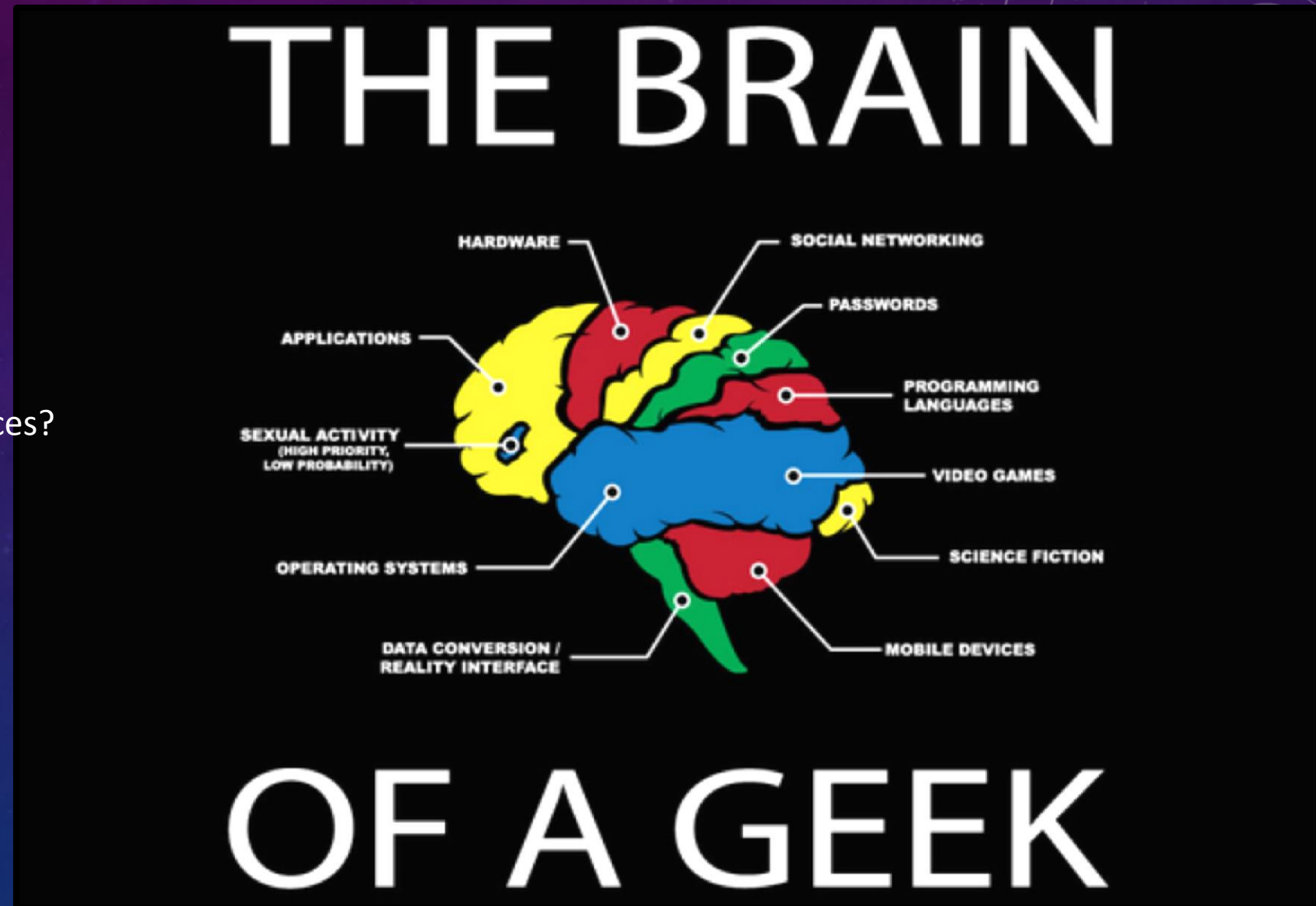


- Brad Gibson
Senior Solutions Architect – AdvizeX
Since 2002 (TUSC, Rolta Solutions, AdvizeX)
- Experience
 - Application Architecture
 - Custom Development using JAVA, PERL, PYTHON, PHP, Android Mobile Applications
 - Arduino & Raspberry PI Development
 - Application Server Management
 - US Naval Submarine Force - Electronics Technician
 - Linux and UNIX System Administration
 - Oracle ExaLogic
- <http://linkedin.com/in/gibsonb>



INTRODUCTIONS - YOU

- How many DBAs?
- How many developers?
 - Java
 - PL/SQL
 - Web Services
 - Oracle Application Express
- Who is currently using RESTful services?
- Oracle Fusion Middleware – ADF
- Oracle Forms/Reports



TEST ENVIRONMENT

ORACLE VIRTUAL MACHINE (OVM)

- Hardware & Software
 - Dell PowerEdge 2950 – Gen II
 - 32 GB RAM
 - Dual Quad-core Zeon Processors
 - Custom Built Linux Server
 - Hosts NFS for VMs
 - Hosts Oracle VM Manager in Oracle VirtualBox
 - Uses Prebuilt OVM Images for DB
 - Oracle VirtualBox for OVM Manager
- Virtual Machines
 - adminvm1 – WebLogic 12c
 - Oradb1 – Oracle 11g Database



TEST SYSTEM OVERVIEW

Client

Oracle Virtual Machine Environment

VM Server: servmon1

VM: adminvm1

- WebLogic 12c (ORDS 3.0)
- Apache 2.4

VM: oradb1

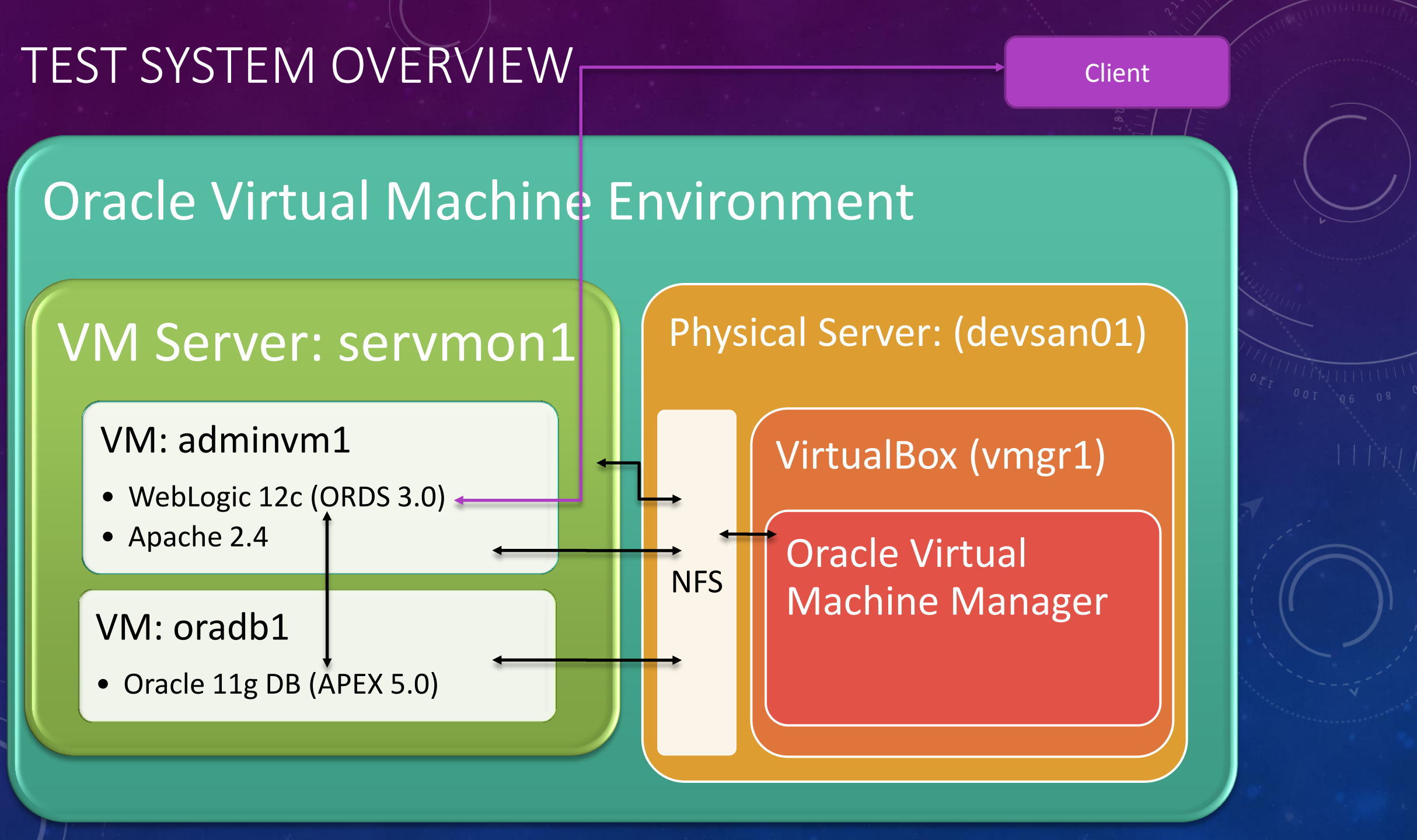
- Oracle 11g DB (APEX 5.0)

Physical Server: (devsan01)

VirtualBox (vmgr1)

Oracle Virtual Machine Manager

NFS



ORACLE VM MANAGER

The screenshot shows the Oracle VM Manager interface. The left sidebar displays a tree view with 'Server Pools' containing 'DevPool' and 'servmon1', and 'Unassigned Servers' and 'Unassigned Virtual Machines'. The main area shows a table of virtual machines:

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Processors	Keymap	Operating System
adminvm1	Stopped		Normal	servmon1	2048	2048	2	2	en-us	Oracle Linux 5
adminvm2	Stopped		Normal	servmon1	1024	1024	1	1	en-us	Oracle Linux 5
nagios1	Stopped		Normal	servmon1	2048	2048	2	2	en-us	Oracle Linux 5
oradb1	Running		Normal	servmon1	4096	4096	2	1	en-us	None

Below the table, the 'Configuration' tab for 'oradb1' is shown:

- Name: oradb1
- Status: Running
- Operating System: None
- Keymap: en-us
- Max. Processors: 2
- Processors: 1
- Max. Memory (MB): 4096
- ID: 0004fb0000060000878b8457ab0cb529
- Domain ID: 1
- Memory (MB): 4096
- Processor Cap: 100
- Priority: 50
- Mouse Type: Default
- Domain Type: Xen PVM
- Start Policy: Use server
- High Availability: No
- Repository for Configuration File: ovmrepo
- Boot Order:
- Network Boot Path:

```
[oracle@oradb1 ~]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.3.0 Production on Tue Jun 9 15:26:30 2015

Copyright (c) 1982, 2011, Oracle. All rights reserved.

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL>
```

The screenshot shows the Oracle VM VirtualBox Manager window. The 'Machine' menu is open, showing options: New, Settings, Show, Discard. The 'Details' tab is selected, showing the following information:

- General**
 - Name: Oracle VM Manager 3.2.4-b524
 - Operating System: Oracle (64 bit)
- System**
 - Base Memory: 4908 MB
 - Processors: 3
 - Boot Order: Floppy, CD/DVD, Hard Disk
 - Acceleration: VT-x/AMD-V, Nested Paging, PAE/NX
- Display**
 - Video Memory: 12 MB
 - Remote Desktop Server: Disabled
 - Video Capture: Disabled
- Storage**
 - Controller: IDE Controller
 - IDE Secondary Master: [CD/DVD] Empty
 - Controller: SATA Controller
 - SATA Port 0: OracleVMManager3.2.4-b524-disk1.vmdk (Normal, 25.00 GB)
 - SATA Port 1: OracleVMManager3.2.4-b524-disk2.vmdk (Normal, 10.00 GB)

ORACLE APPLICATION EXPRESS 5.0

- Main Documentation Link
 - https://docs.oracle.com/cd/E59726_01/index.htm
- Installation Guide
 - https://docs.oracle.com/cd/E59726_01/install.50/e39144/toc.htm
- Schema is APEX_50000 for Version 5.0

ORACLE APEX INSTALLATION REQUIREMENTS

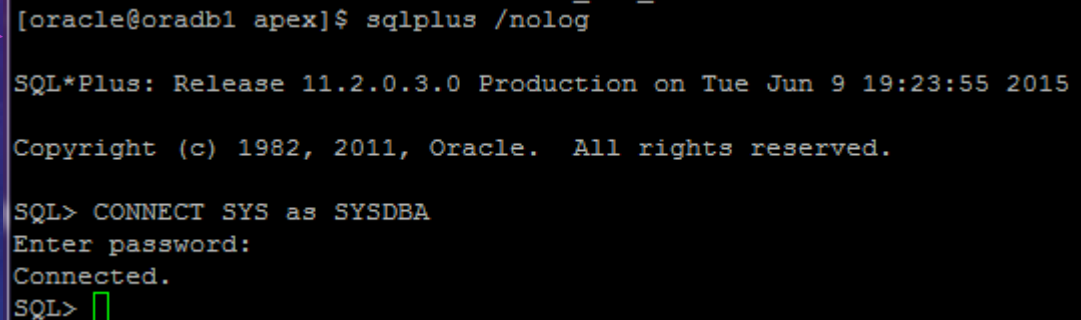
- Database Requirements
 - At least Oracle Database Version 11.1.0.7 for version 5.0
 - Memory target of at least 300MB
 - Oracle XML DB
- Browser Requirements
 - Firefox 35+
 - Chrome 40+
 - Safari 7+
 - Internet Explorer 9+
- Disk Space
 - > 220MB APEX Tablespace
 - > 100MB SYSTEM Tablepace
 - > 256MB for English Only Install

```
SQL> select username from sys.all_users where username like 'APEX%';  
USERNAME  
-----  
APEX_030200  
APEX_PUBLIC_USER  
SQL> █
```

```
[oracle@oradb1 ~]$ sqlplus / as sysdba  
  
SQL*Plus: Release 11.2.0.3.0 Production on Tue Jun 9 15:26:30 2015  
  
Copyright (c) 1982, 2011, Oracle. All rights reserved.  
  
Connected to:  
Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64bit Production  
With the Partitioning, OLAP, Data Mining and Real Application Testing options  
  
SQL> SHOW PARAMETER PFILE;  
  
NAME                                TYPE                                VALUE  
-----                                -  
spfile                              string                              /u01/app/oracle/product/11.2.0  
                                     /dbhome_1/dbs/spfileORCL.ora  
  
SQL> SHOW PARAMETER MEMORY_TARGET;  
  
NAME                                TYPE                                VALUE  
-----                                -  
memory_target                       big integer                          1616M  
SQL> █
```

INSTALLATION OF APEX VERSION 5.0

- Download From: http://download.oracle.com/otn/java/appexpress/apex_5.0.zip
- Unzip Distribution
 - Unzip apex_5.0.zip
- Change to the apex folder gets created when you unzip the file
- Start a sqlplus session as sys
- Development Environment Install:
 - @apexins.sql SYS AUX SYS AUX TEMP /i/
- Runtime Environment Install Script
 - @apxrtins.sql SYS AUX SYS AUX TEMP /i/

A terminal window showing a SQL*Plus session. The prompt is [oracle@oradb1 apex]\$ and the command entered is sqlplus /nolog. The output shows the SQL*Plus release information (11.2.0.3.0) and the copyright notice. The user then enters the command SQL> CONNECT SYS as SYSDBA, followed by Enter password: and Connected. The prompt returns to SQL> with a green cursor.

```
[oracle@oradb1 apex]$ sqlplus /nolog

SQL*Plus: Release 11.2.0.3.0 Production on Tue Jun 9 19:23:55 2015

Copyright (c) 1982, 2011, Oracle. All rights reserved.

SQL> CONNECT SYS as SYSDBA
Enter password:
Connected.
SQL> 
```

APEX INSTALLATION RESULTS

```
PL/SQL procedure successfully completed.

Thank you for installing Oracle Application Express 5.0.0.00.31

Oracle Application Express is installed in the APEX_050000 schema.

The structure of the link to the Application Express administration services is
as follows:
http://host:port/pls/apex/apex_admin (Oracle HTTP Server with mod_plsql)
http://host:port/apex/apex_admin      (Oracle XML DB HTTP listener with the embed
ded PL/SQL gateway)
http://host:port/apex/apex_admin      (Oracle REST Data Services)

The structure of the link to the Application Express development interface is as
follows:
http://host:port/pls/apex (Oracle HTTP Server with mod_plsql)
http://host:port/apex      (Oracle XML DB HTTP listener with the embedded PL/SQL
gateway)
http://host:port/apex      (Oracle REST Data Services)

PL/SQL procedure successfully completed.

1 row selected.

Disconnected from Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64
bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options
[oracle@oradb1 apex]$
```

```
SQL> select username from sys.all_users where username like 'APEX%';

USERNAME
-----
APEX_030200
APEX_050000
APEX_PUBLIC_USER
```


ORACLE APEX LISTENER OPTIONS

- Oracle REST Data Services (ORDS) 2.0.3 or later
- Embedded PL/SQL Gateway
 - This is installed by default starting with 11g R1
- Oracle HTTP Server with mod_plsql
- Oracle Recommends ORDS be used as the Listener

INSTALLING ORDS

- Download:
 - <http://www.oracle.com/technetwork/developer-tools/rest-data-services/downloads/index.html>
- Extract to WebLogic Server
 - Run: `java -jar ords.war`
 - Provide connection details
- Copy images folder from apex
 - Run: `java -jar ords.war static /u01/apex/images`
- Verify ORDS_REST_PUBLIC_ACCOUNT
- Disable Embedded PL/SQL Gateway

ORDS GOTCHAS

- User accounts locked or expired
- Wrong password
- Images folder not correctly configured
- Create unlimited password life profile for APEX accounts

```
SQL> CREATE PROFILE UNLIMITED_PASSWORD
SESSIONS_PER_USER DEFAULT
2 3 CPU_PER_SESSION DEFAULT
4 CPU_PER_CALL DEFAULT
5 CONNECT_TIME DEFAULT
6 IDLE_TIME DEFAULT
7 LOGICAL_READS_PER_SESSION DEFAULT
8 LOGICAL_READS_PER_CALL DEFAULT
9 COMPOSITE_LIMIT DEFAULT
10 PRIVATE_SGA DEFAULT
11 FAILED_LOGIN_ATTEMPTS DEFAULT
12 PASSWORD_LIFE_TIME UNLIMITED
13 PASSWORD_REUSE_TIME DEFAULT
14 PASSWORD_REUSE_MAX DEFAULT
```

```
at weblogic.servlet.provider.ContainerSupportProviderImpl$WlsReque
at weblogic.work.ExecuteThread.execute(ExecuteThread.java:311)
at weblogic.work.ExecuteThread.run(ExecuteThread.java:263)
Caused By: java.sql.SQLException: ORA-28000: the account is locked

at oracle.jdbc.driver.T4CTTIoer.processError(T4CTTIoer.java:450)
at oracle.jdbc.driver.T4CTTIoer.processError(T4CTTIoer.java:392)
```

```
SQL> SELECT username, account_status FROM dba_users where username like 'APEX%';
```

USERNAME	ACCOUNT_STATUS
APEX_LISTENER	OPEN
APEX_REST_PUBLIC_USER	OPEN
APEX_PUBLIC_USER	LOCKED (TIMED)
APEX_050000	EXPIRED & LOCKED

INSTALLING ORACLE WEBLOGIC 12C (12.1.3)

- Download Generic install
 - `java -jar fmw_12.1.3.0.0_wls.jar`
- Complete installation with the default settings
 - Beware of the ports if you are running additional software
 - 7001, 5556 are the default ports
- The configuration wizard will start, accept the defaults
- Create a new machine and server for REST services
 - You can specify the port for the new server as 7004 or any other value you desire
- Deploy ords.war and i.war that are created during the ORDS installation
 - Accept the defaults when deploying except for the security

WEBLOGIC 12C CONSOLE - DEPLOYMENTS

The screenshot displays the Oracle WebLogic Server Administration Console 12c interface. The browser address bar shows the URL: `adminvm1.gibsonsystems.com:7001/console/console.portal?_nfpb=true&_pageLabel=CoreServerServerTablePa`. The console title is "ORACLE WebLogic Server Administration Console 12c".

Left Sidebar:

- Change Center:** View changes and restarts. Configuration editing is enabled. Future changes will automatically be activated as you modify, add or delete items in this domain.
- Domain Structure:** base_domain
 - Environment
 - Deployments
 - Services
 - Security Realms
 - Interoperability
 - Diagnostics
- How do I...:**
 - Create Managed Servers
 - Clone servers
 - Delete Managed Servers
 - Delete the Administration Server
 - Start and stop servers

Top Navigation: Home Log Out Preferences Record Help. Welcome, weblogic Connected to: base_domain.

Summary of Servers:

Configuration | Control

A server is an instance of WebLogic Server that runs in its own Java Virtual Machine (JVM) and has its own configuration. This page summarizes each server that has been configured in the current WebLogic Server domain.

Customize this table

Servers (Filtered - More Columns Exist)

New Clone Delete Showing 1 to 2 of 2 Previous Next

☐	Name	Type	Cluster	Machine	State	Health	Listen Port
☐	AdminServer(admin)	Configured			RUNNING	✓ OK	7001
☐	RestServer	Configured		adminvm1	RUNNING	✓ OK	7004

New Clone Delete Showing 1 to 2 of 2 Previous Next

ORDS DEPLOYED TO WEBLOGIC 12C

 Customize this table

Deployments

|

Showing 1 to 2 of 2 Pre

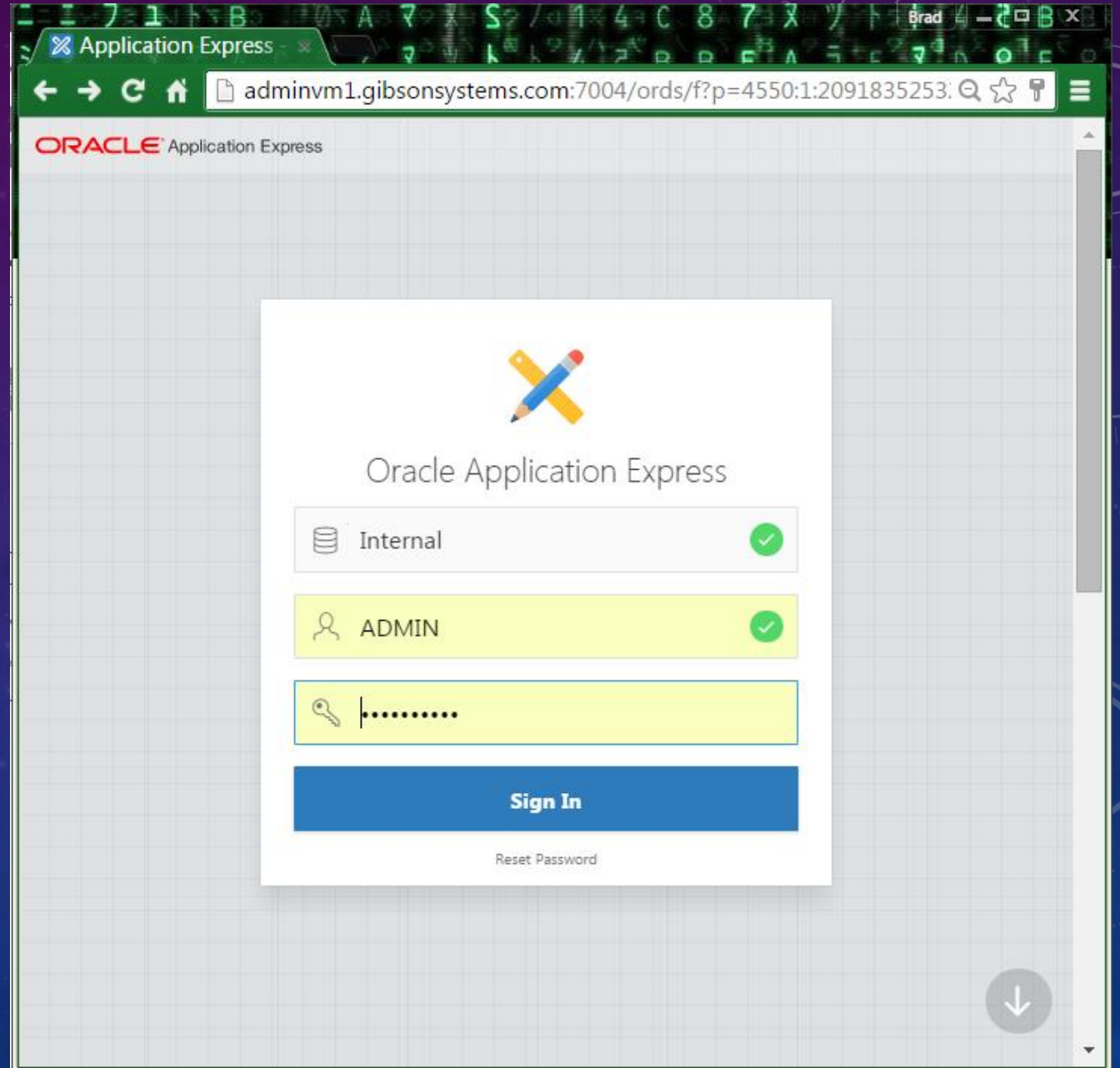
☐ Name 	State	Health	Type	Targets	Deployment Order
☐   i	Active	 OK	Web Application	RestServer	100
☐   ords	Active	 OK	Web Application	RestServer	100

|

Showing 1 to 2 of 2 Pre

APEX INTERNAL LOGIN

<http://adminvm1:7004/ords/apex>



The screenshot shows a web browser window with the title "Application Express". The address bar displays the URL "adminvm1.gibsonsystems.com:7004/ords/f?p=4550:1:2091835253". The page header includes the "ORACLE" logo and "Application Express". The main content area features a login form with the following elements:

- A logo consisting of two crossed pencils (one blue, one yellow) above the text "Oracle Application Express".
- A selection box with a database icon, the text "Internal", and a green checkmark.
- A selection box with a person icon, the text "ADMIN", and a green checkmark.
- A password input field with a key icon and masked characters ".....".
- A blue "Sign In" button.
- A "Reset Password" link below the "Sign In" button.

A scroll bar is visible on the right side of the page, and a download icon is located in the bottom right corner.

ORACLE APPLICATION EXPRESS VIA WEBLOGIC 12C

The screenshot shows the Oracle Application Express SQL Workshop interface. The browser address bar displays the URL: `adminvm1.gibsonsystems.com:7004/ords/f?p=4500:3002:13181734881161:::`. The interface includes a top navigation bar with tabs for Oracle Application Express, Application Builder, SQL Workshop (selected), Team Development, and Packaged Apps. Below the navigation bar, there are five main icons: Object Browser, SQL Commands, SQL Scripts, Utilities, and RESTful Services. The main content area is divided into two sections: 'Recently Created Tables' and 'Recent SQL Commands'. The 'Recently Created Tables' section lists several tables, all created 21 hours ago. The 'Recent SQL Commands' section shows 'No SQL commands found'. On the right side, there is a sidebar with sections for 'About', 'Schema', and 'Create Object'. The 'Schema' section shows the default database schema as 'ORDSDEV'. The 'Create Object' section lists options: Table, View, Index, Sequence, and Type.

SQL Workshop

adminvm1.gibsonsystems.com:7004/ords/f?p=4500:3002:13181734881161:::

ORACLE Application Express Application Builder SQL Workshop Team Development Packaged Apps

Object Browser SQL Commands SQL Scripts Utilities RESTful Services

Recently Created Tables

Table Name	Created
APEX\$TEAM_DEV_FILES	21 hours ago
APEX\$WS_ROWS	21 hours ago
APEX\$WS_LINKS	21 hours ago
APEX\$WS_TAGS	21 hours ago
APEX\$WS_FILES	21 hours ago
APEX\$WS_WEBPG_SECTION_HISTORY	21 hours ago
APEX\$WS_HISTORY	21 hours ago

Recent SQL Commands

No SQL commands found

About

The SQL Workshop provides tools to view and manage database objects. To create new database objects click on the **Object Browser** icon then click the **Create** button.

Schema

Select the default database schema for your SQL Workshop session.

ORDSDEV Set

Create Object

- Table
- View
- Index
- Sequence
- Type

ORACLE RESTFUL SERVICES

The screenshot shows the Oracle RESTful Services interface. The browser address bar displays `adminvm1.gibsonsystems.com:7004/ords/f?p=4850:9:6317520466085:::9:P9_ID,ACTIVE_NODE:52473570450208`. The top navigation bar includes tabs for Application Express, Application Builder, SQL Workshop, Team Development, and Packaged Apps. The breadcrumb trail indicates the path: RESTful Services > RESTful Service Module > Resource Template > Resource Handler.

The left sidebar lists several resource templates under the `oracle.example.hr` namespace, including `empinfo/`, `employees/`, `employees/{id}`, `employeesfeed/`, `employeesfeed/{id}`, `empsec/{empname}`, and `empsecformat/{empname}`. Each template has a `GET` method and a `Create Handler` button.

The main panel is titled "Resource Handler: GET" and contains the following configuration:

- RESTful Service Module: `hr/`
- URI Template: `employees/`
- Method: `GET`
- Source Type: `Query`
- Format: `JSON`
- Requires Secure Access: `No`
- Pagination Size: `7`

A description states: "A resource handler is a query or an anonymous PL/SQL block responsible for handling a particular HTTP method. Although multiple resource handlers can be defined for a resource template, only one resource handler per HTTP method is permitted."

The "Source" section contains a SQL query:

```
1 select empno "suri", empno, ename
2   from (
3     select emp.*,
4            row_number() over (order by empno) rn
5     from emp
6     ) tmp
7  where rn between :row_offset and :row_count
```


RESTFUL URL AND JSON

← → ↻ 🏠  adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/

```
{"next":{"$ref":"http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/?page=1"},"items":[{"uri":  
{"$ref":"http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7369"},"empno":7369,"ename":"SMITH"}, {"uri":  
{"$ref":"http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7499"},"empno":7499,"ename":"ALLEN"}, {"uri":  
{"$ref":"http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7521"},"empno":7521,"ename":"WARD"}, {"uri":  
{"$ref":"http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7566"},"empno":7566,"ename":"JONES"}, {"uri":  
{"$ref":"http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7654"},"empno":7654,"ename":"MARTIN"}, {"uri":  
{"$ref":"http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7698"},"empno":7698,"ename":"BLAKE"}, {"uri":  
{"$ref":"http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7782"},"empno":7782,"ename":"CLARK"}]}
```

REST – REPRESENTATIONAL STATE TRANSFER

An Architectural Style

- Based on a PhD Dissertation by Roy Fielding
 - Also a principle author of HTTP
- ORDS – Oracle REST Data Services
- Accesses RESOURCES over the Web via URIs
- A REPRESENTATION of the resource is what gets transferred
 - May have many forms, XML, JSON, Text all from the same URI
- URIs do not change over time

REST – REPRESENTATION STATE TRANSFER

An Architectural Style

- Client-Server
- Stateless
- Supports Caching
- Layered
- Uniformly Accessible
- Extendable at runtime

VOCABULARY OF REST

- RESTful Service
- **Resource**
 - Resource Oriented Architecture – ROA
 - Collection Resource
 - Entity Resource
- Resource Module
- Resource Template
- URI
- URI Template
- Resource Handler

POPULAR REST APIs

- Google
- Facebook
- Twitter
- Amazon
- Salesforce
- YouTube
- DropBox
- Flickr`

Follow ProgrammableWeb to get API news and alerts as they break

+Follow

Share

 ProgrammableWeb

API NewsAPI DirectoryFor API ProvidersFor

ProgrammableWeb: the world's largest API repository, **GROWING DAILY**

Filter APIs

By Category

REST ✕

☐ Include Deprecated APIs

API Name	Description	Category	Updated
Twitter	The Twitter micro-blogging service includes two RESTful APIs. The Twitter REST API methods allow developers to access core Twitter data. This includes update timelines, status data, and user...	Social	12.08.2006
Flickr	The Flickr API can be used to retrieve photos from the Flickr photo sharing service using a variety of feeds - public photos and videos, favorites, friends, group pools, discussions, and more. The...	Photos	09.04.2005
Facebook	The Facebook API is a platform for building applications that are available to the members of the social network of Facebook. The API allows applications to use the social connections and profile...	Social	08.16.2006
Amazon Product Advertising	What was formerly the ECS - eCommerce Service - has been renamed the Product Advertising API. Through this API developers can retrieve product information. The API exposes Amazon's product data...	ECommerce	12.02.2005

REST TESTING TOOLS – POSTMAN CHROME APP

The screenshot displays the Postman Chrome App interface. On the left, the 'History' tab shows a recent GET request to `http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/`. The main workspace shows the 'Builder' tab for the same request. The URL is `http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/`. The response status is `200 OK` with a time of `161ms`. The response body is displayed in 'Pretty' JSON format:

```
1 {
2   "next": {
3     "$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/?page=1"
4   },
5   "items": [
6     {
7       "uri": {
8         "$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7369"
9       },
10      "empno": 7369,
11      "ename": "SMITH"
12    },
13    {
14      "uri": {
15        "$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7499"
16      },
17      "empno": 7499,
18      "ename": "ALLEN"
19    },
20    {
21      "uri": {
22        "$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7521"
23      },
24      "empno": 7521,
25      "ename": "WARD"
26    },
27  ]
28 }
```

RESPONSE CODES REQUIRED

- Server Errors should return 500
- Unable to find requested data returns a 404
- Return 200 for successful requests

```
oracle@adminvm1:~  
[oracle@adminvm1 ~]$ curl -v http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/  
* About to connect() to adminvm1.gibsonsystems.com port 7004  
*   Trying 192.168.1.207... connected  
* Connected to adminvm1.gibsonsystems.com (192.168.1.207) port 7004  
> GET /ords/ordsdev/hr/employees/ HTTP/1.1  
> User-Agent: curl/7.15.5 (x86_64-redhat-linux-gnu) libcurl/7.15.5 OpenSSL/0.9.8b zlib/1.2.3 libidn/0  
.6.5  
> Host: adminvm1.gibsonsystems.com:7004  
> Accept: */*  
>  
< HTTP/1.1 200 OK  
< Date: Thu, 11 Jun 2015 11:25:53 GMT  
< Transfer-Encoding: chunked  
< Server: Oracle-REST-Data-Services3.0.0.121.10.23  
< Content-Type: application/json  
< ETag: "/wzqZfFpqfQCqnculJx6GrpobN6UUFR1bFyKZ4xvLGHxrUogbl5H5Fmhp5Xh210OcfQ18M9tDEDJ3j5rWtlrHA=="  
* Connection #0 to host adminvm1.gibsonsystems.com left intact  
* Closing connection #0  
{  
  "next": {"$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/?page=1"},  
  "items": [  
    {"uri": {"$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7369"},  
      "empno": 7369,  
      "ename": "SMITH"},  
    {"uri": {"$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7499"},  
      "empno": 7499,  
      "ename": "ALLEN"},  
    {"uri": {"$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7521"},  
      "empno": 7521,  
      "ename": "WARD"},  
    {"uri": {"$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7566"},  
      "empno": 7566,  
      "ename": "JONES"},  
    {"uri": {"$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7654"},  
      "empno": 7654,  
      "ename": "MARTIN"},  
    {"uri": {"$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7698"},  
      "empno": 7698,  
      "ename": "BLAKE"},  
    {"uri": {"$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7782"},  
      "empno": 7782,  
      "ename": "CLARK"}  
  ]  
}
```

HTTP'S ROLE IN REST

Http Request Methods

Create = POST

Retrieve Data = GET

Update Data = PUT

Delete Data = DELETE

Http Response Codes

1xx Informational

2xx Success

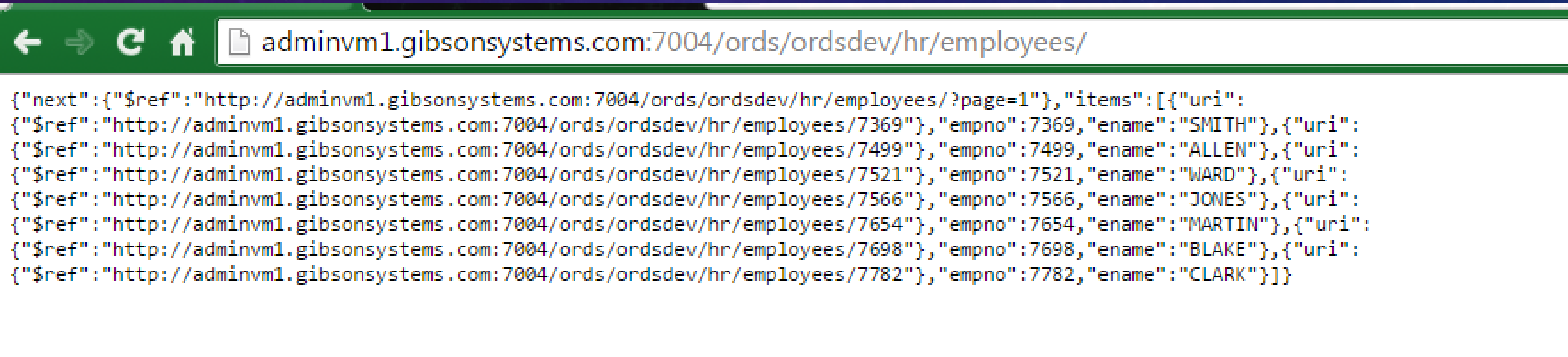
3xx Redirection

4xx Client Error

5xx Server Error

HATEOAS (HYPERMEDIA)

- Hypermedia as the Engine of Application State
 - Requires that producers and consumers agree on a set of links to be returned with each call



The screenshot shows a web browser window with the address bar displaying the URL: `adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/`. The browser's address bar has navigation icons (back, forward, refresh, home) on the left. The main content area of the browser displays a JSON response from the API. The JSON is a list of employee records, each containing a self-referencing link in the `next` field and a list of `items`. The `items` list contains seven employee objects, each with a `uri` field pointing to a specific employee record.

```
{
  "next": {
    "$ref": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/?page=1"
  },
  "items": [
    {
      "uri": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7369",
      "empno": 7369,
      "ename": "SMITH"
    },
    {
      "uri": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7499",
      "empno": 7499,
      "ename": "ALLEN"
    },
    {
      "uri": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7521",
      "empno": 7521,
      "ename": "WARD"
    },
    {
      "uri": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7566",
      "empno": 7566,
      "ename": "JONES"
    },
    {
      "uri": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7654",
      "empno": 7654,
      "ename": "MARTIN"
    },
    {
      "uri": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7698",
      "empno": 7698,
      "ename": "BLAKE"
    },
    {
      "uri": "http://adminvm1.gibsonsystems.com:7004/ords/ordsdev/hr/employees/7782",
      "empno": 7782,
      "ename": "CLARK"
    }
  ]
}
```

RICHARDSON MATURITY MODEL

- Level 0 – Not RESTful
- Level 1 – Get resources via URIs
- Level 2 – Post/Put Data
 - Make use of proper methods and
- Level 3 - HATEOAS

WEBLOGIC SUPPORT FOR REST

- WebLogic Server supports Jersey 1.13 JAX-RS Reference Implementation as an implementation of the JSR-311 JAX-RS 1.1 specification
 - <https://jcp.org/en/jsr/summary?id=311>
- Provides
 - Jersey
 - JAX-RS API
 - JSON Processing and Streaming
 - OAuth

JAVA IMPLEMENTATIONS OF JAX-RS SPECIFICATION

- Jersey - This is the reference implementation
- Other Implementations
 - RESTEasy
- Current Version of the JAX-RS Spec
 - 1.x
 - Code Annotations
 - Server Side API
 - 2.x
 - HATEOAS
 - Asynchronous
 - Adds Builder tools
 - Content Negotiation

CONSUMING REST JSON RESULTS

- JSON is directly convertible to a JavaScript Object
- JSON is lightweight compared to XML
- Tons of pre-built libraries
- JQuery Friendly
- Human Readable

REST SECURITY

- Jersey Supported – OAuth Core 1.0
 - OAuth Signature Library
 - OAuth Jersey Client Filter
 - OAuth Jersey Server Request Wrapper
 - <http://oauth.net/core/1.0/>
- Must use a transport-layer security protocol (TLS/SSL)
- Defines 3 Request URLs
 - Request Token URL
 - User Authentication URL
 - Access Token URL

