Installation, Deployment and Application Management

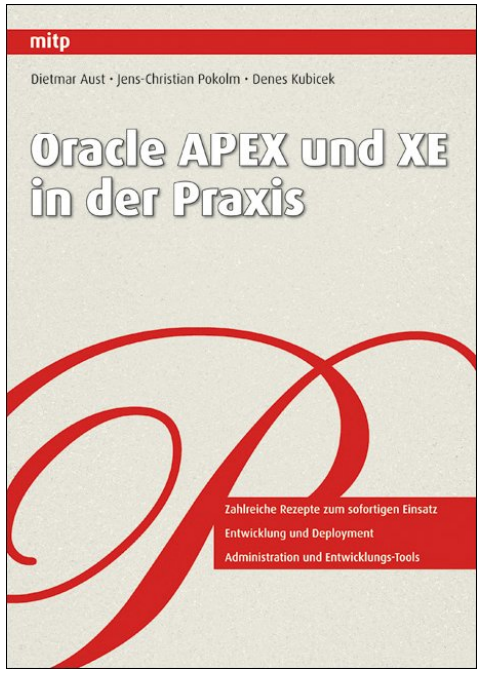
Denes Kubicek

Introduction

* Dipl. oec. Denes Kubicek, Oracle APEX consultant and freelancer
* 5 Years – Head of Department for Order Processing
* 7 Years – IT Manager
* 12 Years experience with Oracle –
* Since 2007 running own business with main focus on APEX and Oracle
* Own Blog – http://deneskubicek.blogspot.com

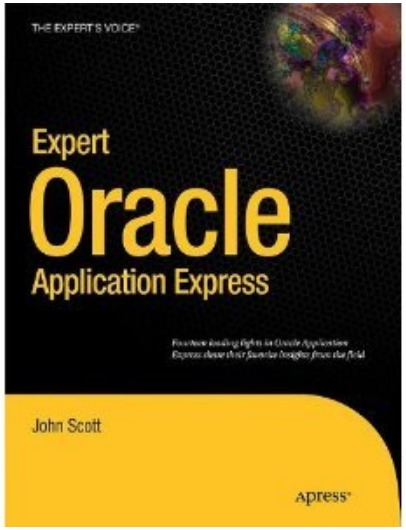
Introduction

* Oracle APEX und XE in der Praxis
  * Published on 21.12.2009
  * First APEX book in german language
* Authors:
  * Denes Kubicek
  * Jens-Christian Pokolm
  * Dietmar Aust



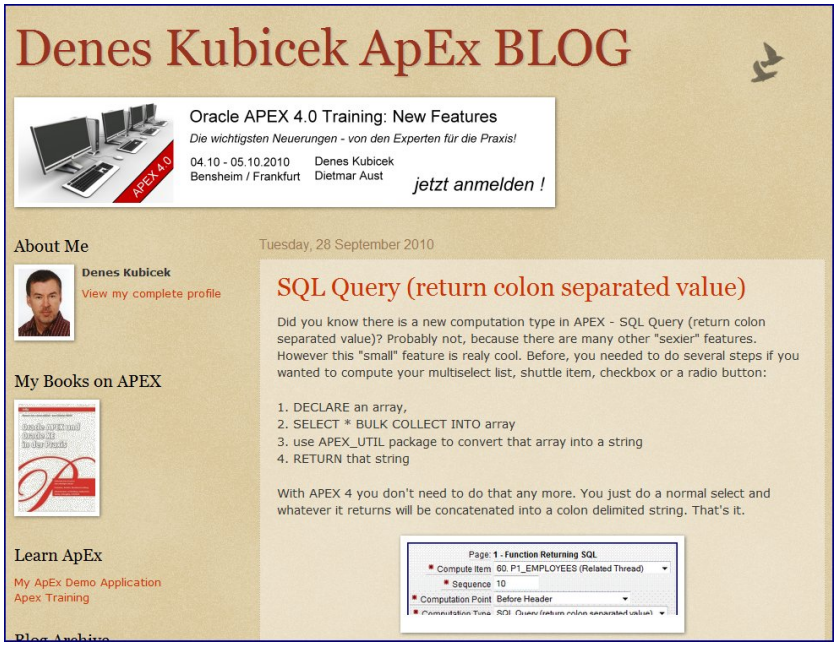
Introduction

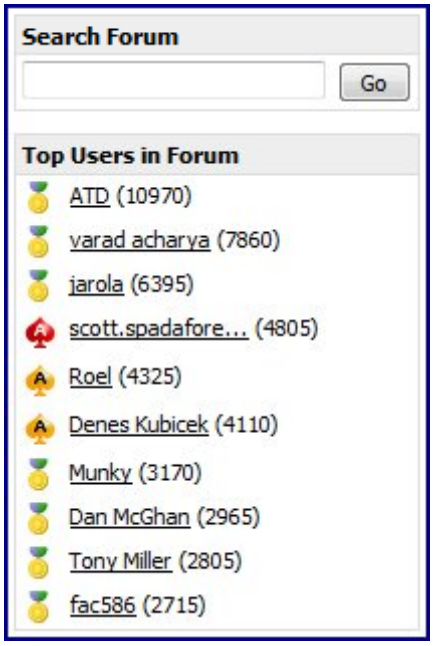
* Expert Oracle Application Express
  * Published on 25.05.2011
  * Charity Project for Carl Backstrom und Scott Spadafore (passed away members of the APEX Team)
* Authors:
  * Dietmar Aust
  * Denes Kubicek
  * Doug Gault
  * Dimitri Gielis
  * Roel Hartman
  * Michael Hichwa
  * Sharon Kennedy…



Introduction

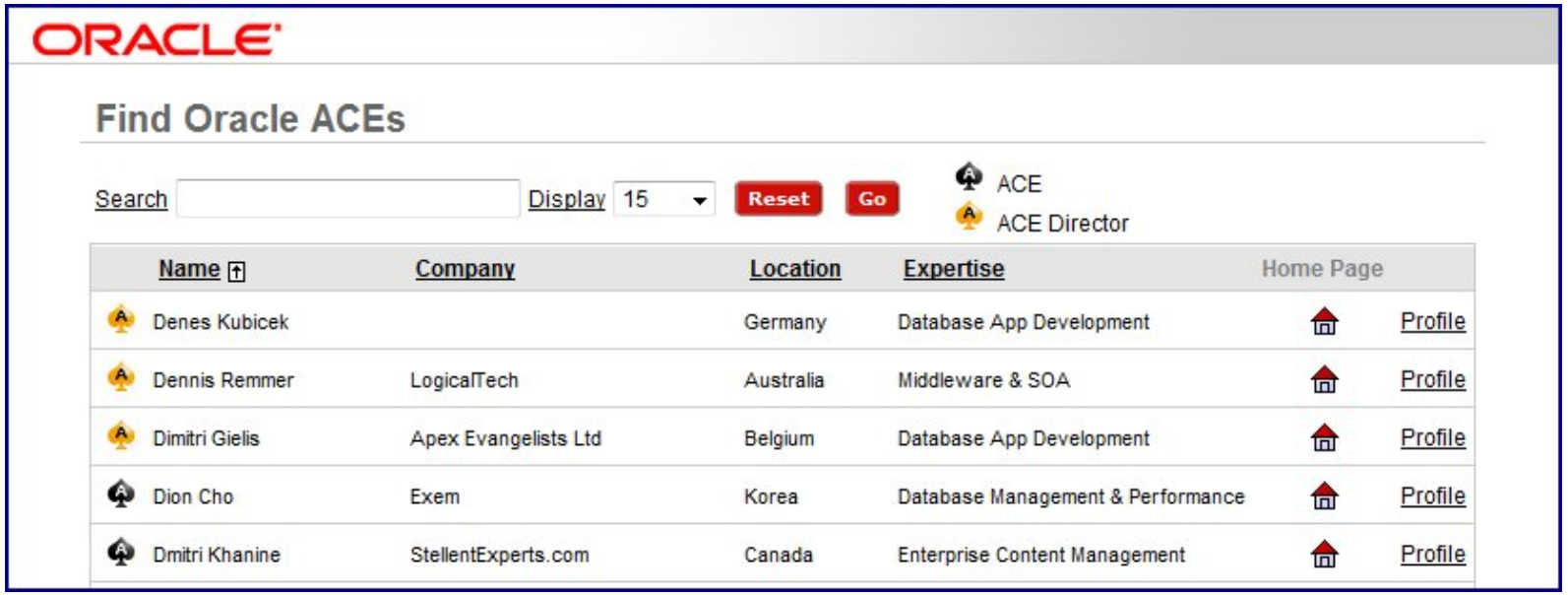
* Oracle Apex Developer of the Year 2008





Introduction

* Oracle ACE Director



ORACLE

Find Oracle ACEs

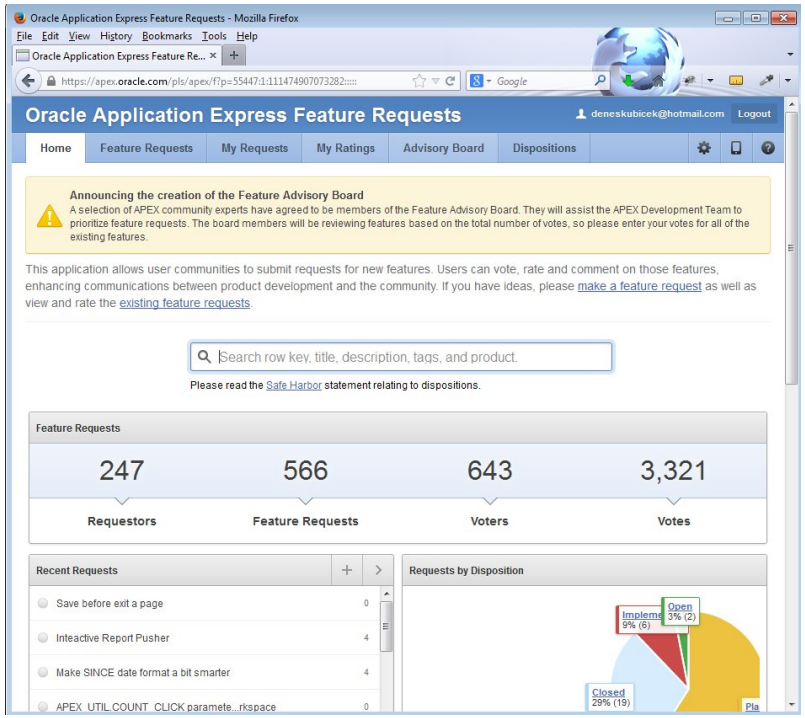
Search Display 15 Reset Go

ACE
ACE Director

Name	Company	Location	Expertise	Home Page	
Denes Kubicek		Germany	Database App Development		Profile
Dennis Remmer	LogicalTech	Australia	Middleware & SOA		Profile
Dimitri Gielis	Apex Evangelists Ltd	Belgium	Database App Development		Profile
Dion Cho	Exem	Korea	Database Management & Performance		Profile
Dmitri Khanine	StellentExperts.com	Canada	Enterprise Content Management		Profile

Introduction

* APEX Advisory Board Member
  * https://apex.oracle.com/pls/apex/f?p=55447:1



Introduction

* APEX and Oracle PL/SQL Projects
* APEX - eBusiness Suite 11g at Synventive GmbH
* Interseroh AG and ALBA – Quote Management Applications
* Siemens AG – Internal Applications
* T-Systems SAP and Apex – multiple Projects and Applications
* T-Shop – Internal Applications
* BASF – Internal Applications
* Postbank multiple Projects and Applications
* Customers in Australia, USA and Luxemburg
* Organizing APEX Trainings sind 2008 – twice a year – APEX Best Practices or APEX New Features
* Internal Tranings – Customized

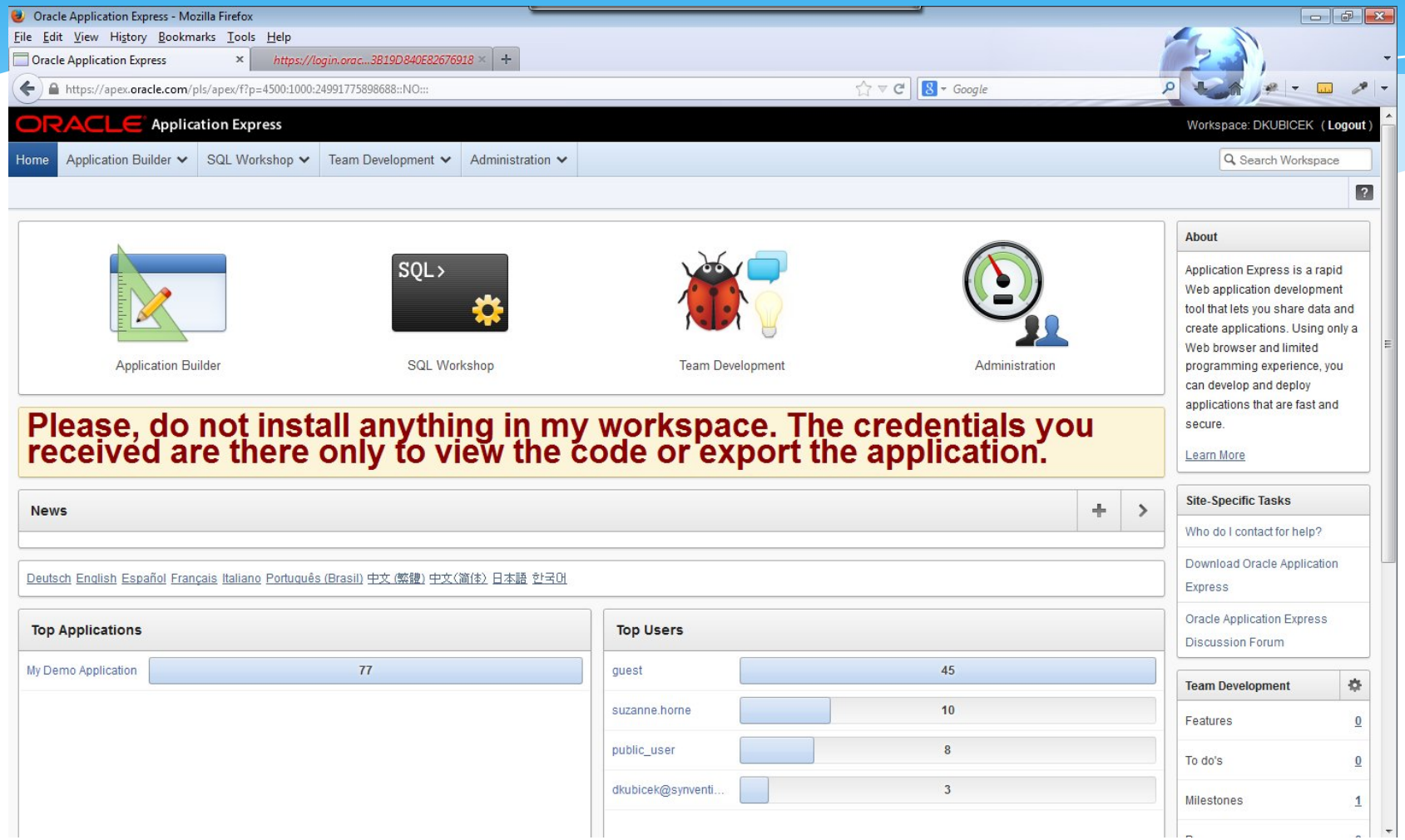
Introduction

* You can write me an email using the following addresses:
  * deneskubicek@yahoo.de
  * training@opal-consulting.de

Agenda

* APEX Builder – now and in the future versions
* APEX jQuery – now and in the future versions
* APEX Listener – advantages
* Using Browsers and Browser Tools
* Application Programming – Best Practices
* Plugins and Dynamic Actions – Best Practices
* Application Deployment – Development / Test / Production
* APEX Web Services
* APEX Community and References

APEX – Builder



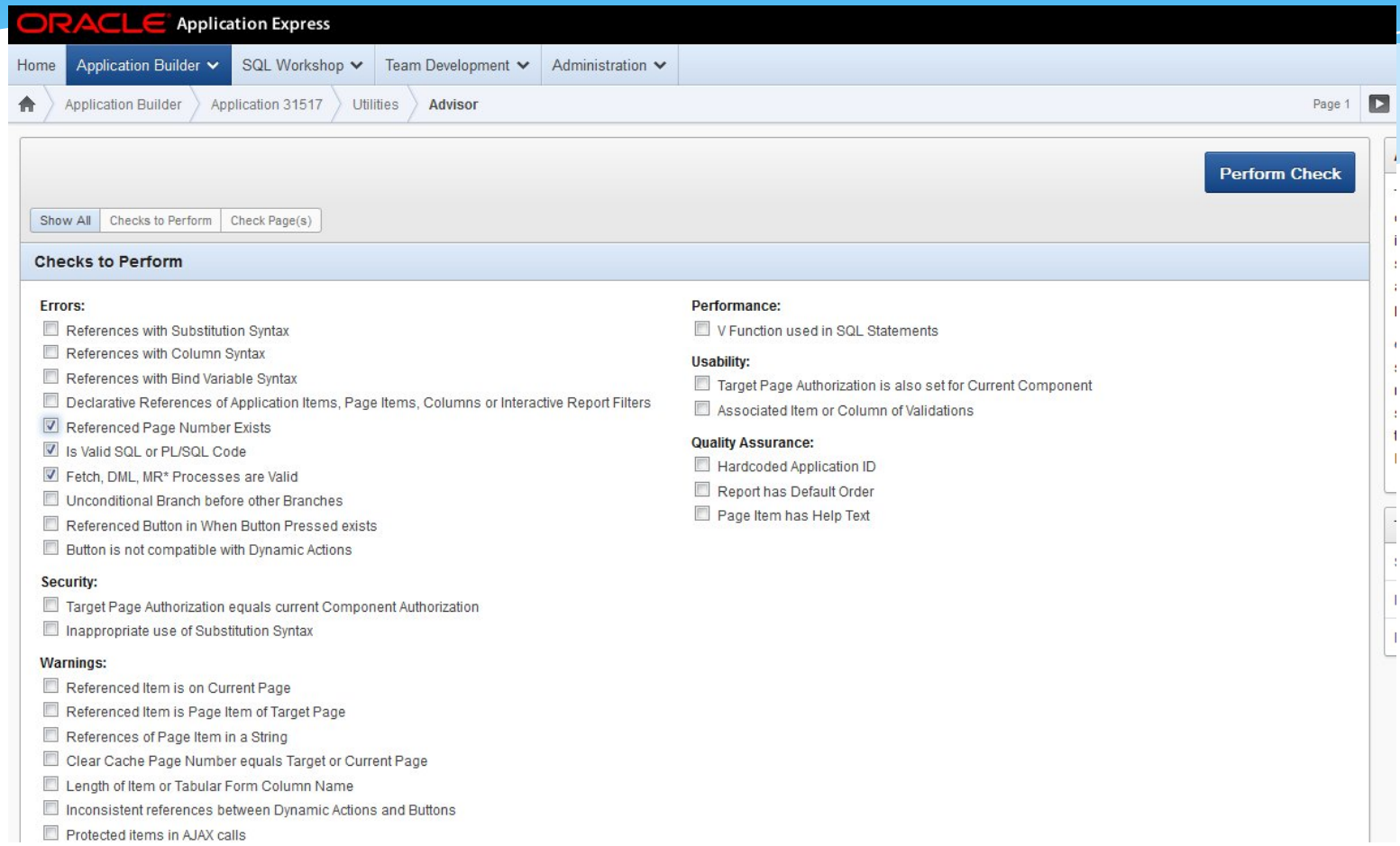
APEX – Builder

* APEX Builder has experienced tremendeous changes since the version 1.5
* Its functionality grows with each new version of APEX
* New Features introduced by APEX 4.0 and higher:
  * Advisor
  * Upgrade Assistant
  * Team Development (first version) and many others
* Many new features to come with the version 5.0

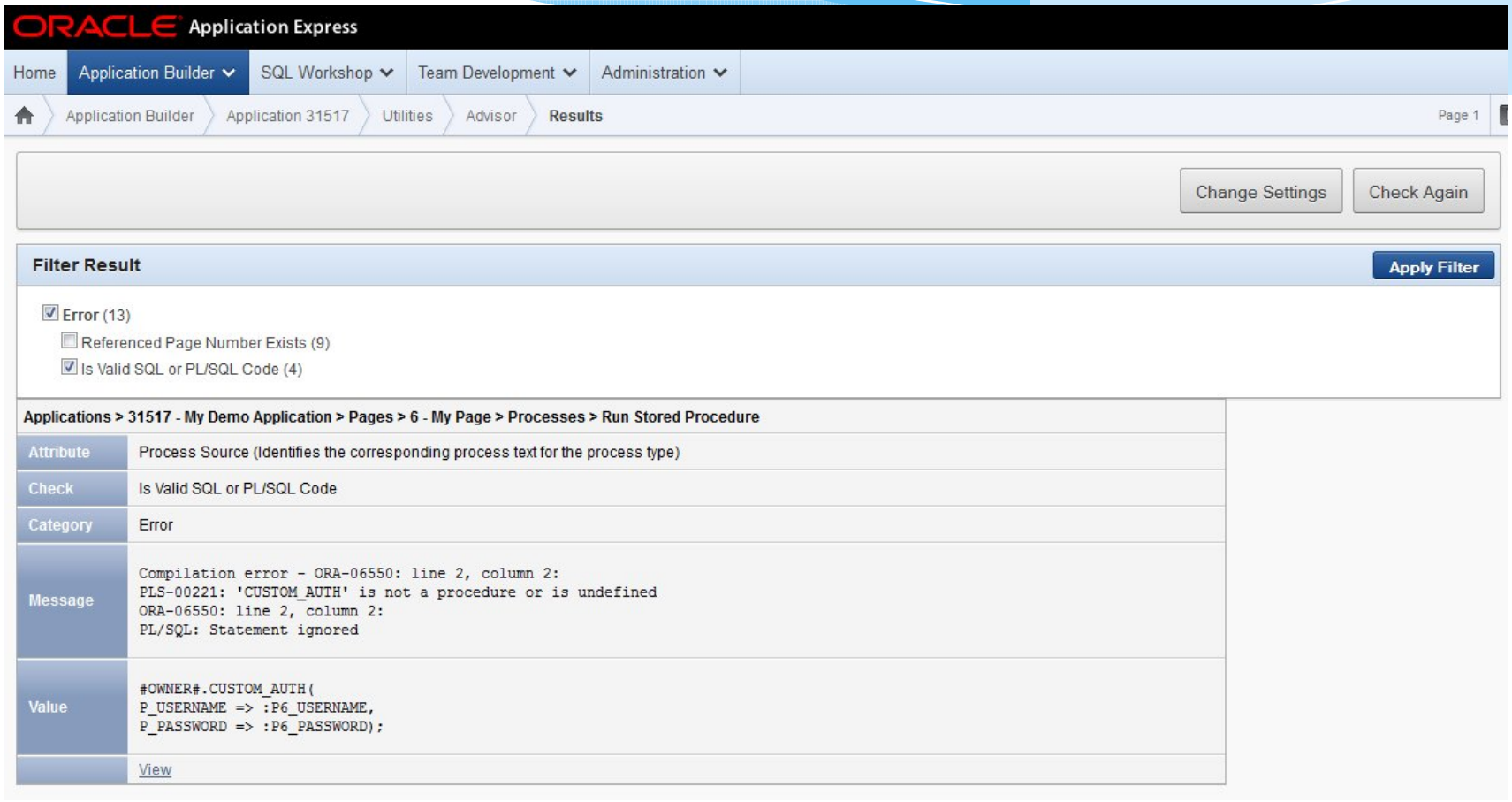
APEX Builder - Advisor

* One of the most important features for the application developers
* Quality assurance prior to delivering to test and production
* Instant access to the affected components
* Filtering capabilities

APEX Builder - Advisor



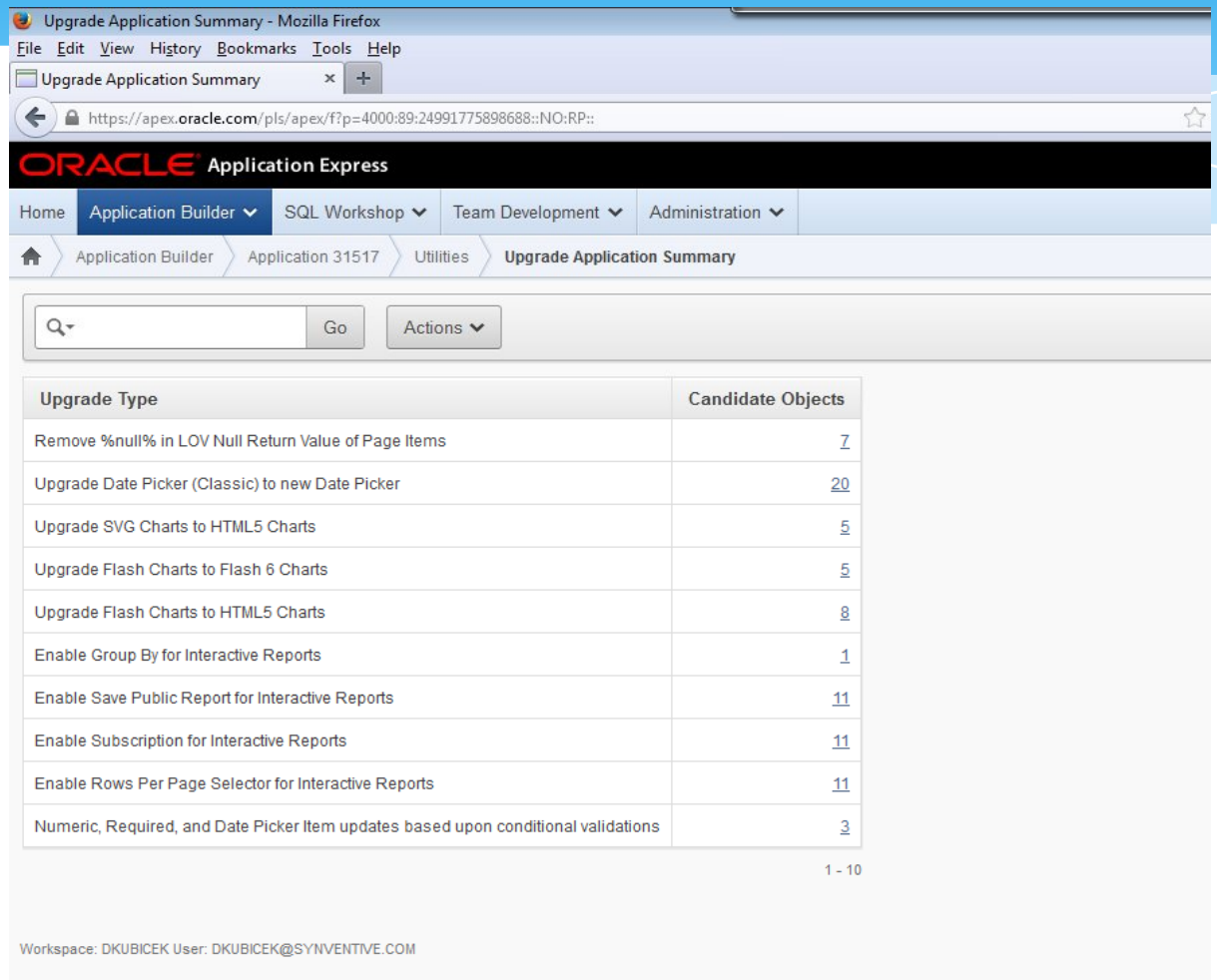
APEX Builder - Advisor



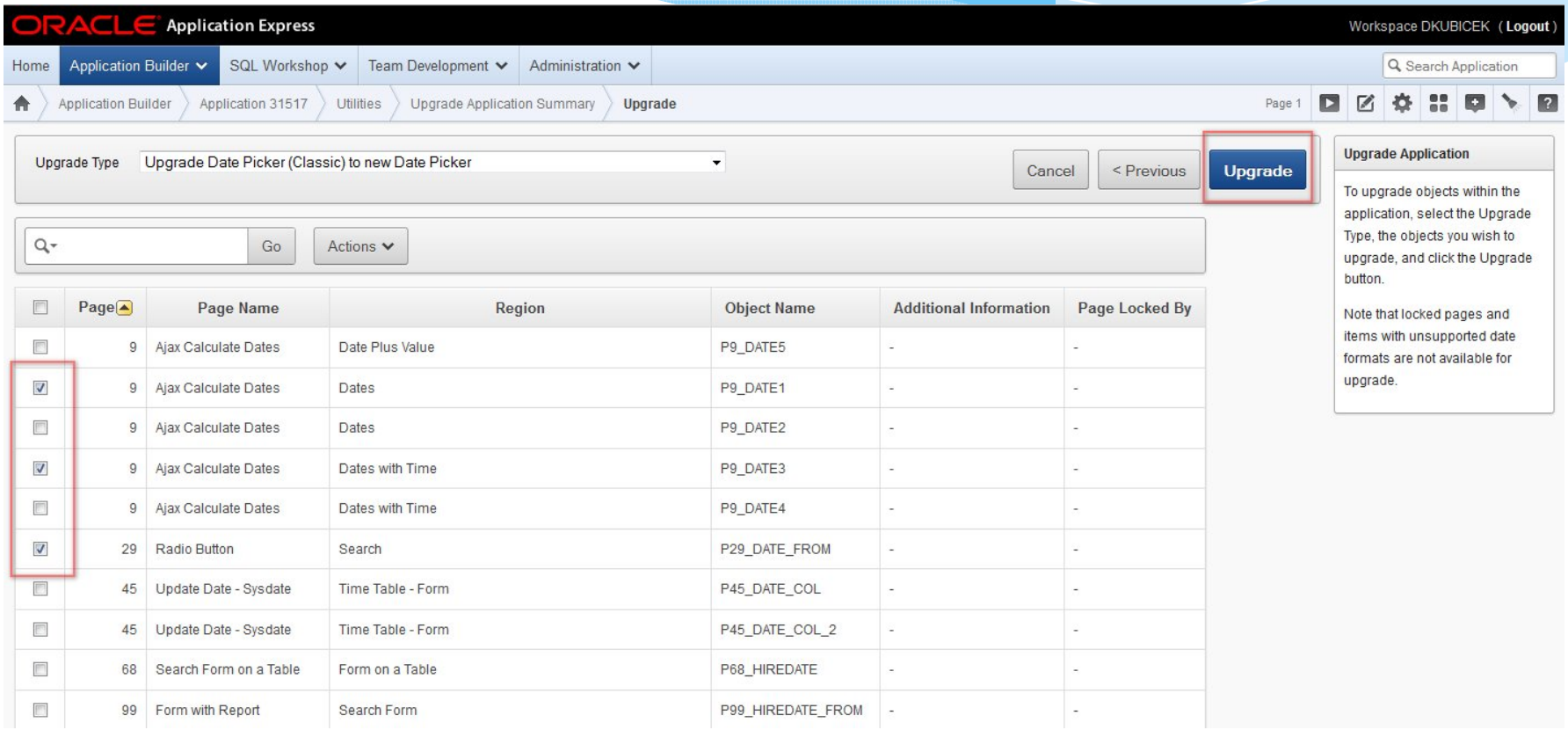
APEX Builder – Upgrade Assistant

* Gives you a posibility to upgrade your application using new components
* Selective approach:
  * Per component
  * Per affected element
* Saves time needed to upgrade applications

APEX Builder – Upgrade Assistant



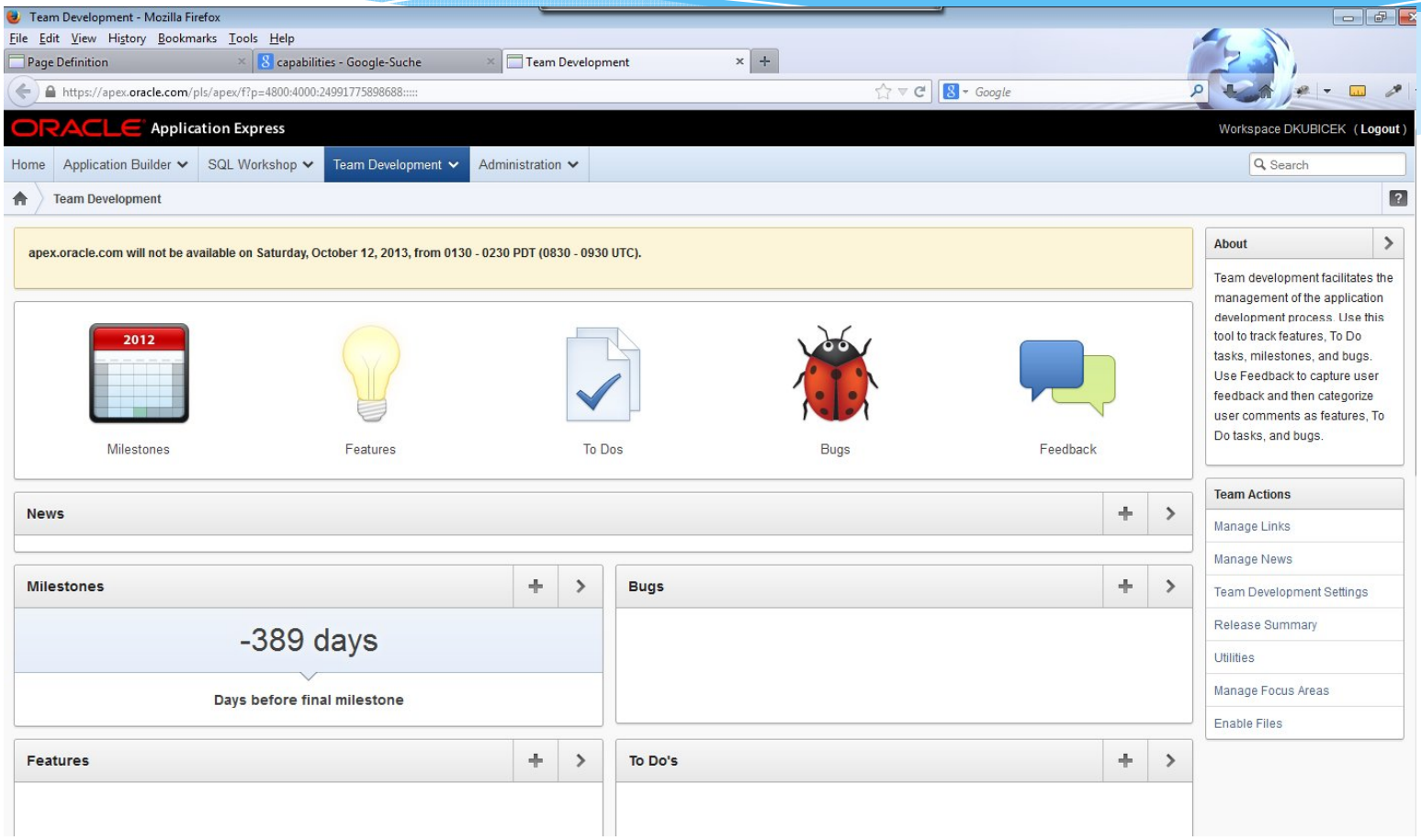
APEX Builder – Upgrade Assistant



APEX Builder – Team Development

* New feature since 4.0
* Purpose is to enhance team development in APEX
* First Version
* Supporting API available
* Will be enhanced in the future versions
* Feedback Creator Assistant

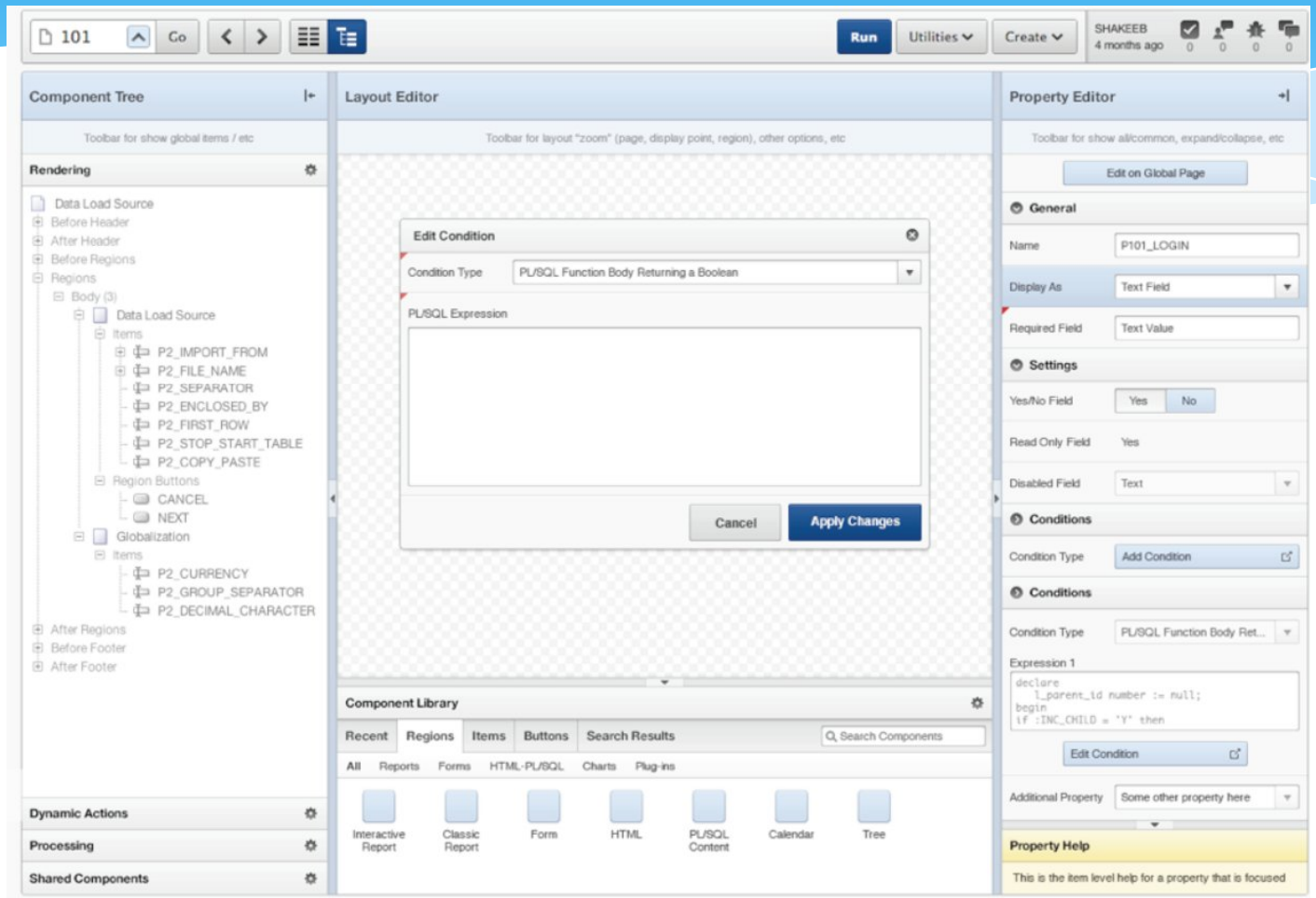
APEX Builder – Team Development



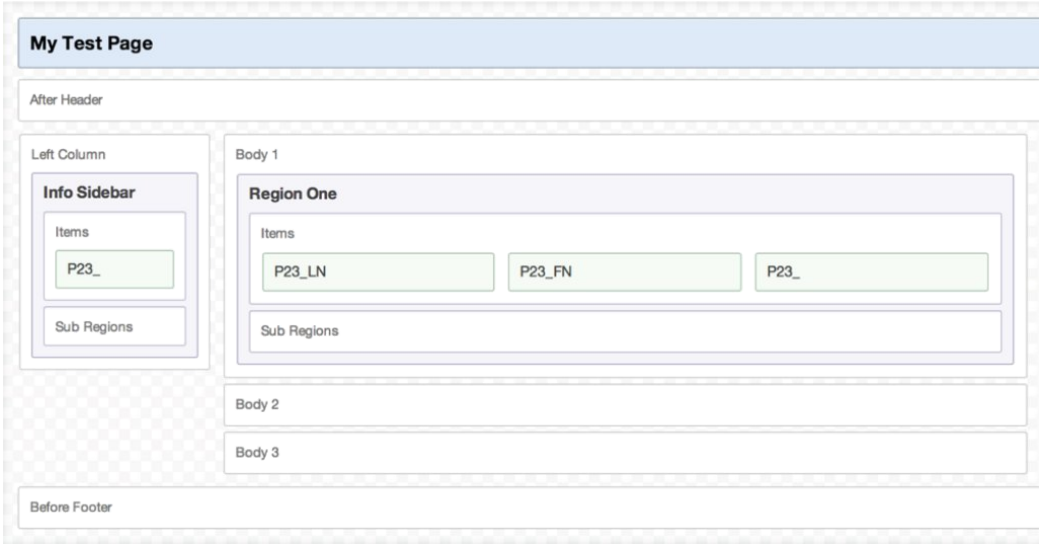
APEX Builder – New Features 5.0

* New interface – new layout
* New approach in editing element properties – similar to Forms
* Drag and Drop capabilities
* New Component Library
* New Region and Item Types
* Authentication for APEX Builder using external sources (LDAP, Active Directory, …)

APEX Builder – New Features 5.0



APEX Builder – New Features 5.0



APEX - jQuery

* APEX 4.0 introduced jQuery as a built in component of APEX
* The future versions of APEX will follow the developement of the jQuery components and include new libraries
* jQuery closed the gap in APEX – APEX had a stong database in the back end but was somehow limited in the front end
* With jQuery practically no limitations for the application development

APEX - jQuery

* jQuery used for APEX Plugins (4.0 and higher)
* jQuery used in APEX Dynamic Actions (4.0 and higher)
* APEX using jQuery Components (4.0 and higher)
  * Modal Windows (Plugins available now – Standard with 5.0)
  * jQuery Grid (5.0)
  * Drag and Drop Development (5.0)
  * jQuery for Mobile Development (4.1 and higher)

APEX - jQuery

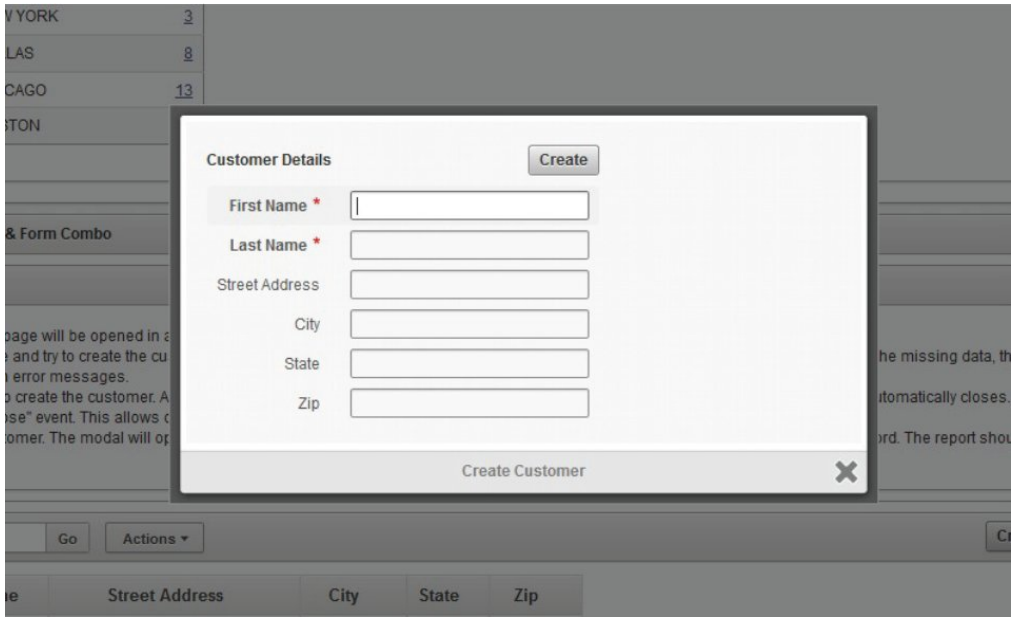
jQuery Grid

Product Details			Units In Stock	Discontinued
Product Name	Quantity per Unit	Unit Price		
Chai	10	$18.00	39	☐
Chang	24	$19.00	66	☑
Aniseed Syrup	12	$10.00	13	☐
Chef Anton's Cajun Seasoning	48	$22.00	53	☐
Chef Anton's Gumbo Mix	36	$21.35	0	☑

Go to page: 1 Show rows: 5 1-5 of 77

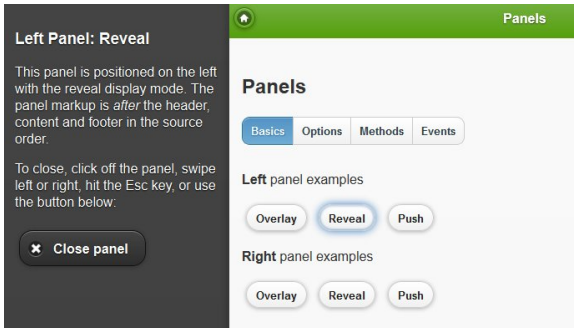
APEX - jQuery

jQuery Modal Dialog



APEX - jQuery

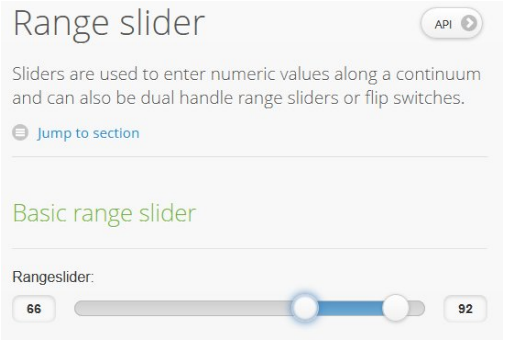
jQuery Mobile (Slide Panel, Range Slider, Reflow Table)



Rank	Movie Title	Year	Rating	Reviews
1	Citizen Kane	1941	100%	74
2	Casablanca	1942	97%	64
3	The Godfather	1972	97%	87
4	Gone with the Wind	1939	96%	87

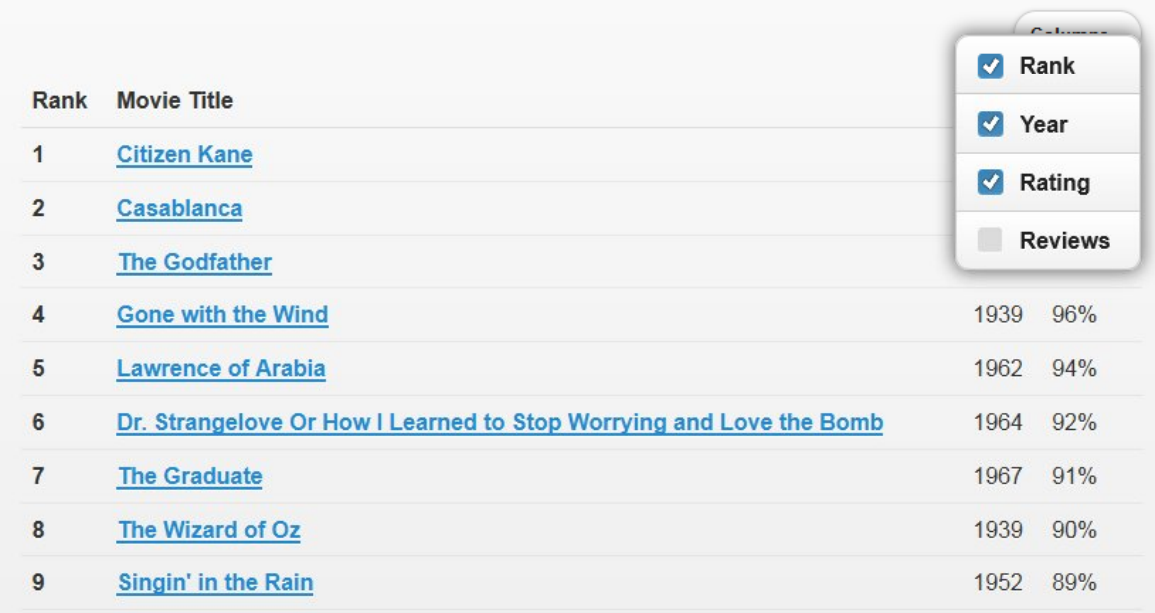
Rank	1
Movie Title	Citizen Kane
Year	1941
Rating	100%
Reviews	74

Rank	2
Movie Title	Casablanca
Year	1942
Rating	97%
Reviews	64



APEX - jQuery

jQuery – Column Toggle Table Report



Rank	Movie Title		
1	Citizen Kane		
2	Casablanca		
3	The Godfather		
4	Gone with the Wind	1939	96%
5	Lawrence of Arabia	1962	94%
6	Dr. Strangelove Or How I Learned to Stop Worrying and Love the Bomb	1964	92%
7	The Graduate	1967	91%
8	The Wizard of Oz	1939	90%
9	Singin' in the Rain	1952	89%

APEX – Listener

* http://docs.oracle.com/cd/E37099_01/doc/doc.20/e25066/install.htm#CHDIDHCD
* APEX Listener 2.0 has no own interface
* Setup through comando line
* Management through SQL Developer
* Requires 11g or higher

APEX – Listener

* Configuration:
  * APEX Listener Standalone or
  * In a combination with the following server:
    * Oracle Weblogic
    * Oracle Glasfish
    * OC4J Container

APEX – Listener

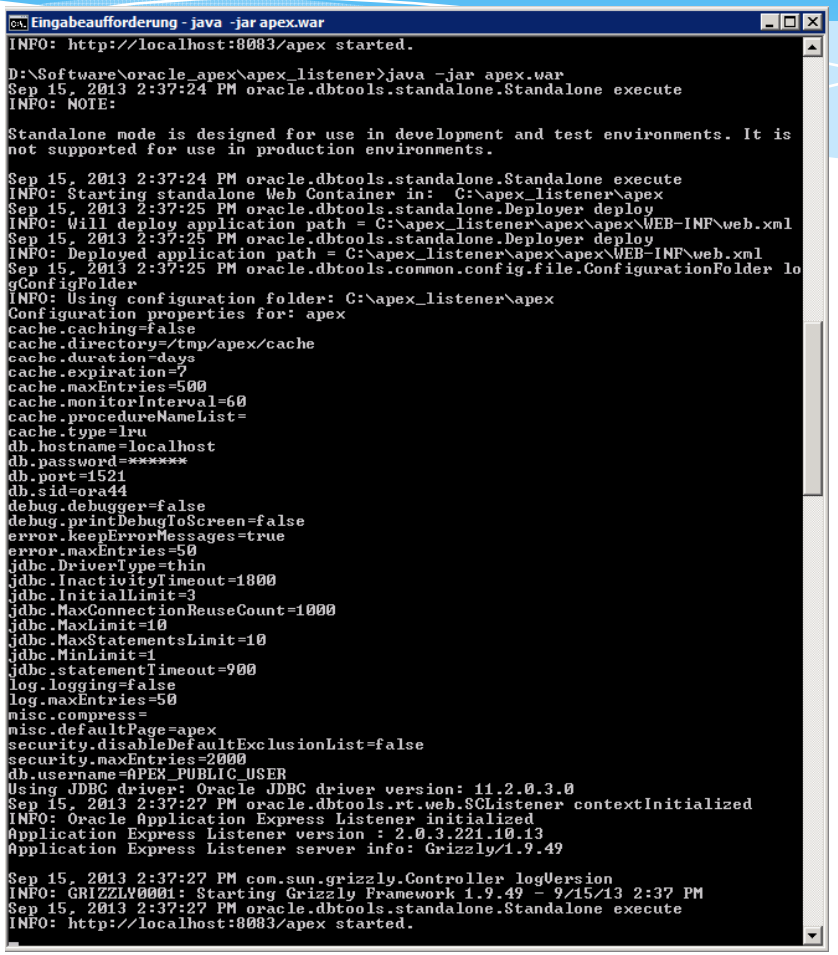
* IMPORTANT!
  * After the installation of APEX run the following script
    * @apex_rest_config.sql

      if you want to use RestFULL Webservices

APEX – Listener

* Step 1: APEX Listener Configuration
  * java -jar apex.war configdir C:\apex_listener (configuration location)
  * Copy images under C:\apex_listener\images, if standalone used. Otherwise use the webserver configuration.
  * java -jar apex.war standalone --apex-images C:\apex_listener\images (standalone)
  * java -jar apex.war (if webserver selected)

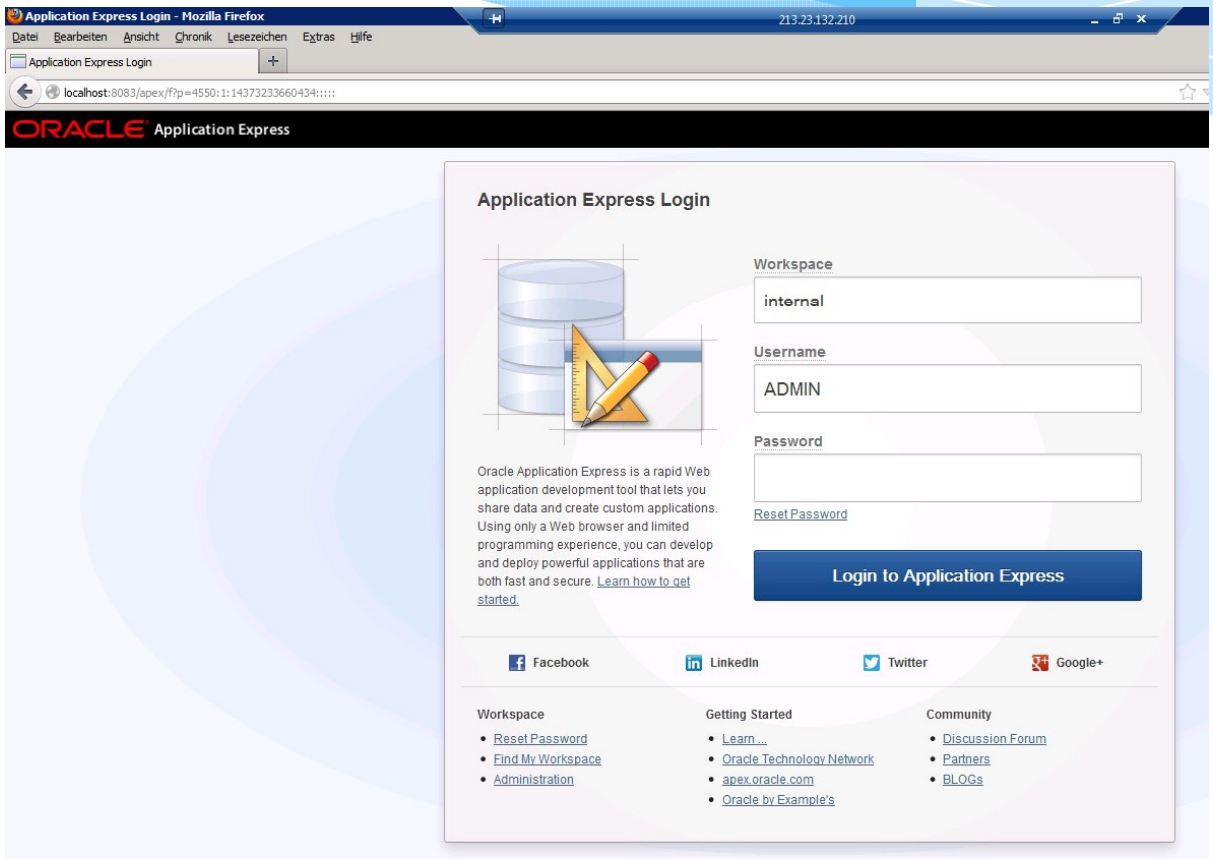
APEX – Listener



APEX – Listener

* Step2: Parameters
  * Databaseserver
  * Port
  * SID
  * APEX_PUBLIC_USER / Passwort
  * APEX_REST_PUBLIC_USER / APEX_LISTENER User Passwort
  * End configuration or run standalone setup

APEX – Listener



APEX – Listener

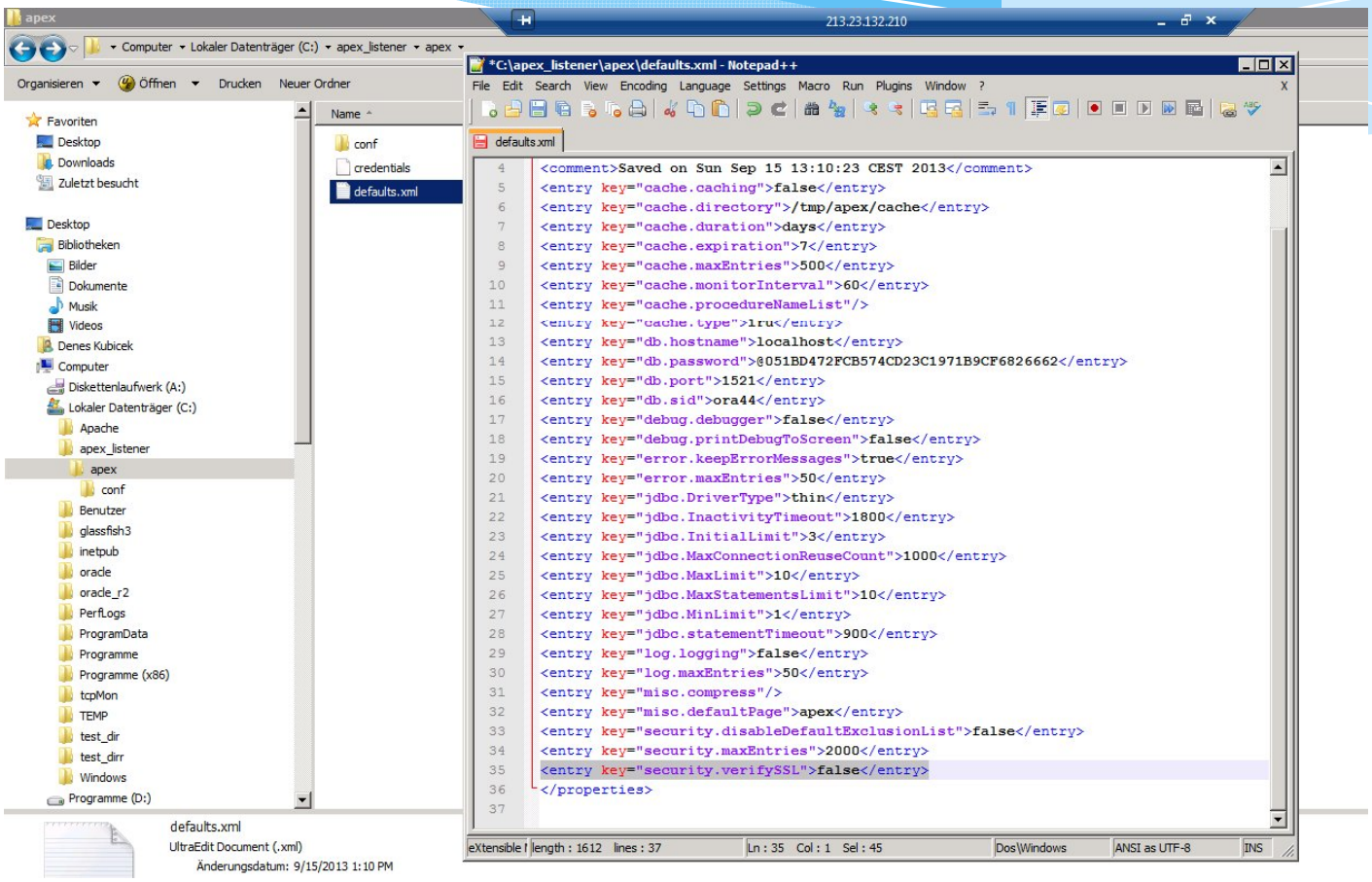
* Step 3: Configuration for the SQL Developer
  * java -jar apex.war user adminlistener "Listener Administrator"
  * ADMINLISTENER user password
  * Edit defaults.xml (C:\apex_listener) and add the following entry

    <properties>….<entry key="security.verifySSL">false</entry></properties>

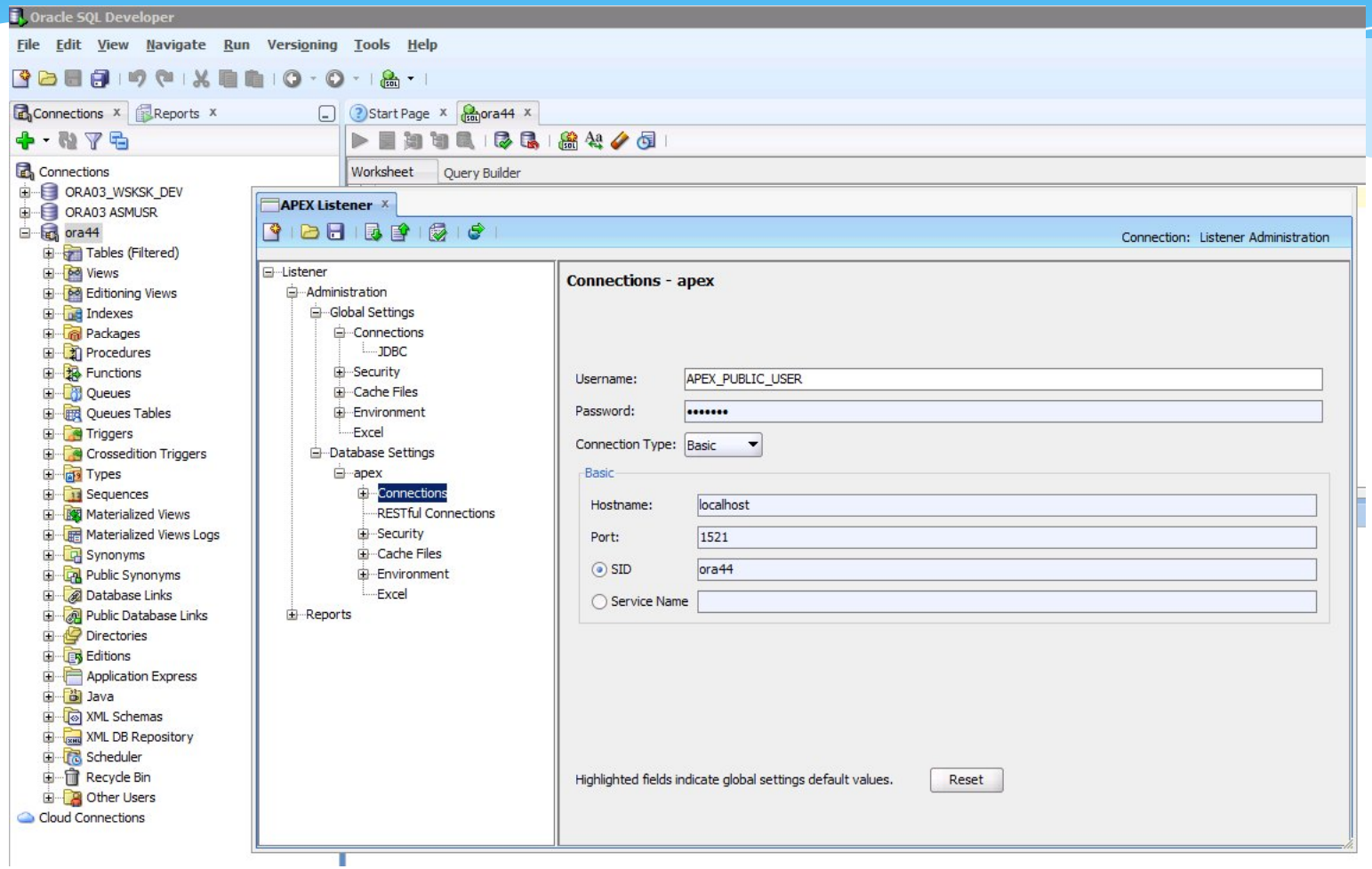
APEX – Listener

```
D:\Software\oracle_apex\apex_listener>java -jar apex.war user adminlistener "Lis
tener Administrator"
Sep 15, 2013 1:13:26 PM oracle.dbtools.common.config.file.ConfigurationFolder lo
gConfigFolder
INFO: Using configuration folder: C:\apex_listener\apex
Enter a password for user adminlistener:
Confirm password for user adminlistener:
Sep 15, 2013 1:13:51 PM oracle.dbtools.standalone.ModifyUser execute
INFO: Created user: adminlistener in file: C:\apex_listener\apex\credentials

D:\Software\oracle_apex\apex_listener>_
```

APEX – Listener

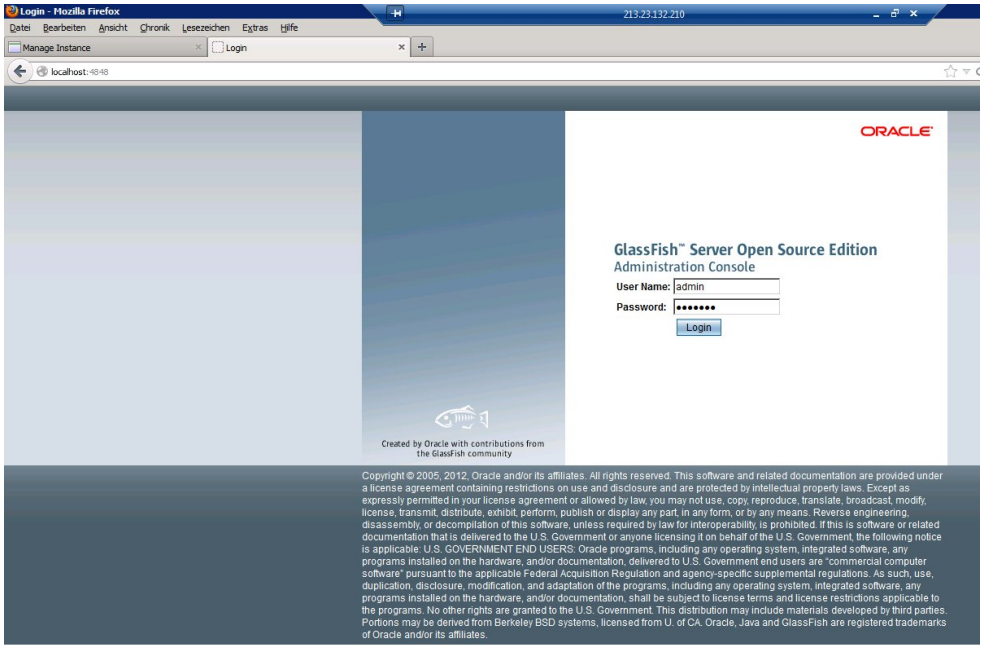


APEX – Listener



APEX – Listener

* Step 4: Glasfish Configuration
  * http://docs.oracle.com/cd/E37099_01/doc/doc.20/e25066/install.htm#CHDIDHCD

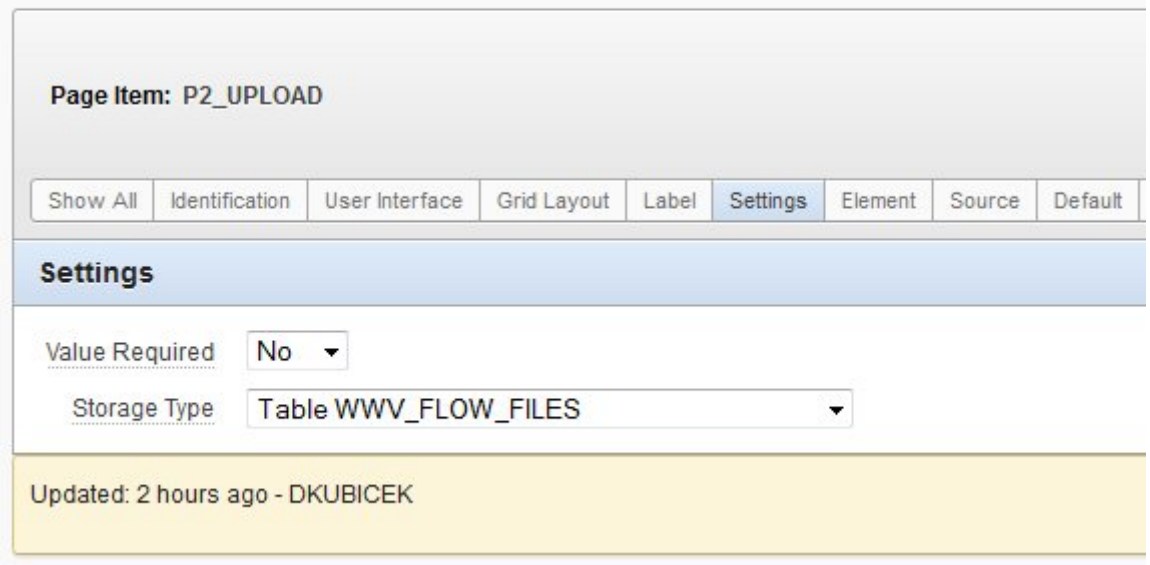


APEX Listener – Excel Import

* APEX Listener can read Excel Files
* Understands special characters
* Simple Setup
* No need to convert to CSV
* You can import multiple tabs (Excel pages)

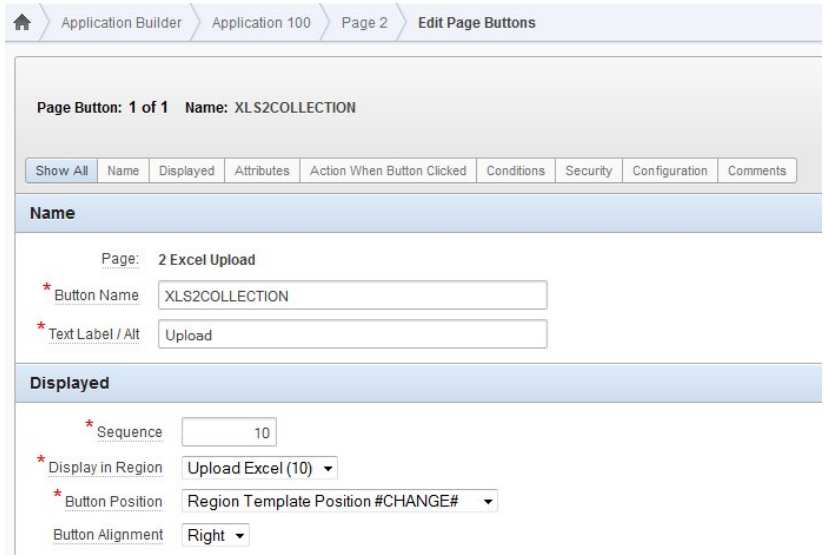
APEX Listener – Excel Import

* Create a file browse element



APEX Listener – Excel Import

* Create a button with the ID XLS2COLLECTION (the ID is important – used as a REQUEST):



APEX Listener – Excel Import

* Change defaults.xml in the APEX Listener configuration file – restart the listener:

```
<entry key="apex.excel2collection">true</entry>
<entry key="apex.excel2collection.onecollection">true</entry>
<entry key="apex.excel2collection.name">EXCEL_COLLECTION</entry>
<entry key="apex.excel2collection.useSheetName">true</entry>
```

APEX Listener – Excel Import

* Create a report using the following SQL:

APEX Listener – Excel Import

```
DECLARE
   v_column     VARCHAR2 (4000);
   v_sql        VARCHAR2 (4000);
   v_length_0   NUMBER;
   v_length_1   NUMBER;
   v_length_2   NUMBER;
BEGIN
   FOR c IN (SELECT    c002 || ':' || c003 || ':' || c004 || ':' || c005 || ':'
                    || c006 || ':' || c007 || ':' || c008 || ':' || c009 || ':'
                    || c010 || ':' || c011 column_title
               FROM apex_collections WHERE collection_name = 'P2_UPLOAD' AND seq_id = 1)
   LOOP
      v_column := c.column_title;
   END LOOP;

   v_column := RTRIM (v_column, ':');
   v_length_1 := LENGTH (v_column); v_length_2 := LENGTH (REPLACE (v_column, ':'));
   v_length_0 := (v_length_1 - v_length_2) + 1; v_sql := 'SELECT ';

   FOR d IN 1 .. v_length_0
   LOOP v_sql := v_sql || 'c' || LPAD (d + 1, 3, '0') || ', ';
   END LOOP;

   v_sql := RTRIM (v_sql, ', ');
   v_sql := v_sql || ' FROM apex_collections WHERE collection_name = ''P2_UPLOAD''
            AND seq_id > 1 AND c004 IS NOT NULL';
   RETURN v_sql;
EXCEPTION
   WHEN OTHERS THEN RETURN 'SELECT ' || 1 || ' error FROM DUAL WHERE 1 = 2';
END;
```

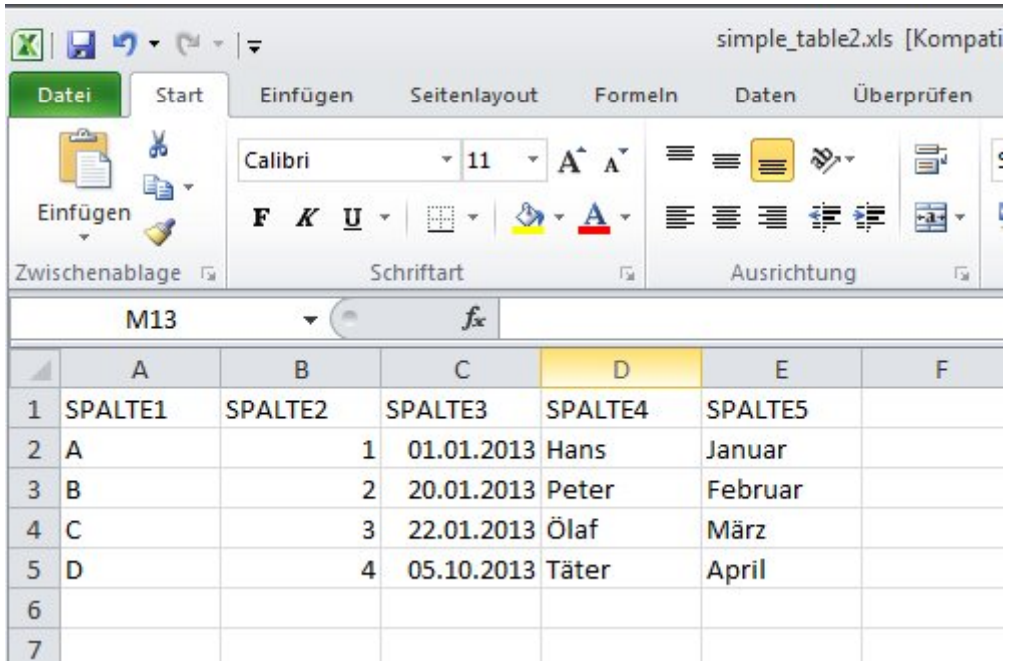
APEX Listener – Excel Import

* Report Attributes > Headings Type > PL/SQL

```
DECLARE
   v_column   VARCHAR2 (4000);
BEGIN
   FOR c IN (SELECT    c002 || ':' || c003 || ':' || c004 || ':' || c005
                     || ':' || c006 || ':' || c007 || ':' || c008 || ':'
                     || c009 || ':' || c010 || ':' || c011 column_title
               FROM apex_collections
              WHERE collection_name = 'P2_UPLOAD' AND seq_id = 1)
   LOOP
      v_column := c.column_title;
   END LOOP;

   v_column := RTRIM (v_column, ':');
   RETURN v_column;
EXCEPTION
   WHEN OTHERS
   THEN
      RETURN NULL;
END;
```

APEX Listener – Excel Import

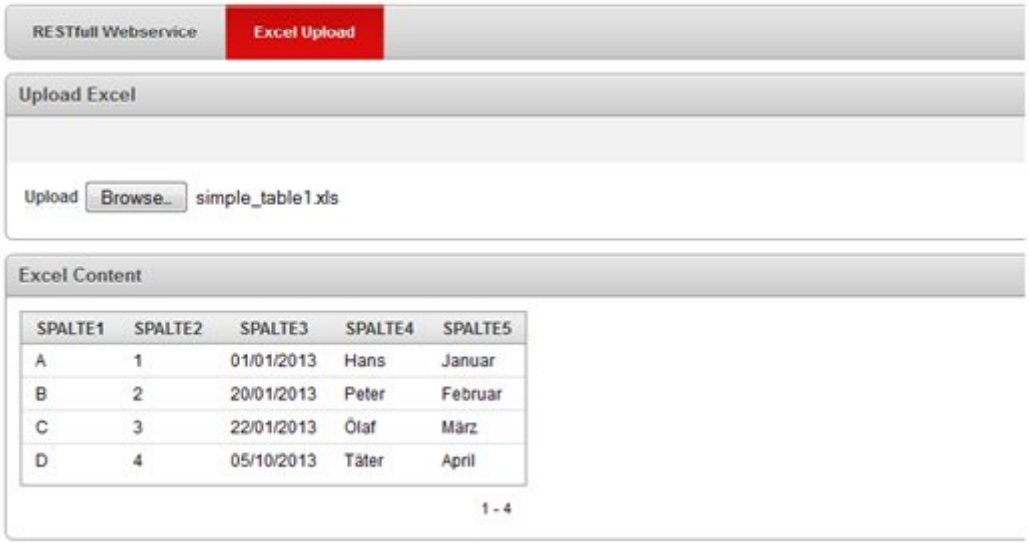
* Create an excel file using table structure and upload it:



	A	B	C	D	E	F
1	SPALTE1	SPALTE2	SPALTE3	SPALTE4	SPALTE5	
2	A	1	01.01.2013	Hans	Januar	
3	B	2	20.01.2013	Peter	Februar	
4	C	3	22.01.2013	Ölaf	März	
5	D	4	05.10.2013	Täter	April	
6						
7						

APEX Listener – Excel Import

* After Upload you should receive something like this:



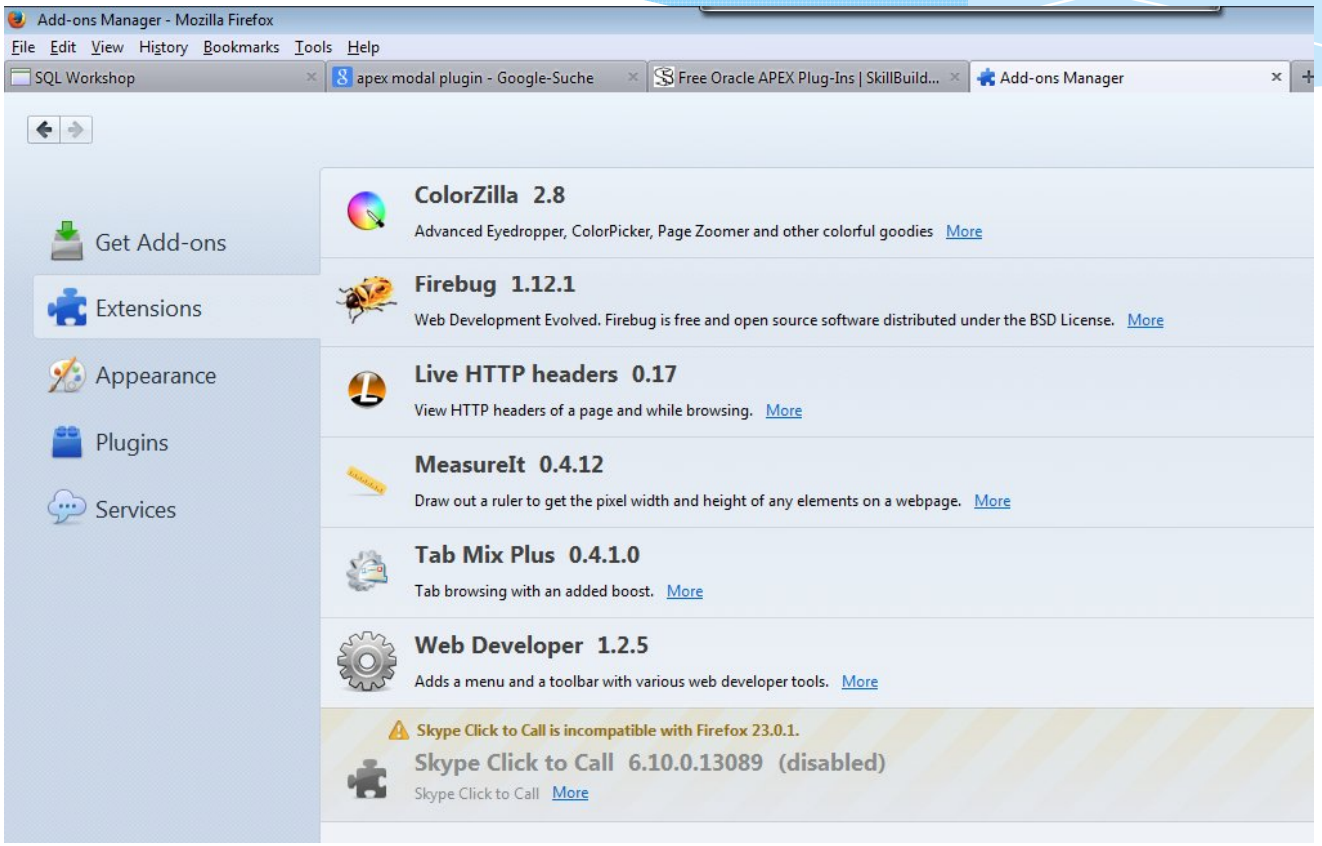
APEX – Using Browsers and Browser Tools

* A Browser is all you need to use APEX and create solid applications
* Firefox ist the no. 1 choice
* You can also use Google Chrome or other browsers
* You need to use IE for testing
* IE9/10 is not suitable for a serious development – although faster than Firefox or Chrome

APEX – Using Browsers and Browser Tools

* Firefox has the most extentions and plugins
* You need these tools and plugins for a development of high quality applications and for a high quality development
* Watch not to use too many plugins – they make your browser slower
* The most important extentions (plugins):
  * Firebug
  * Webdeveloper Toolbar
  * Measureit
  * Colorzilla

APEX – Using Browsers and Browser Tools



APEX – Application Programming – Best Practices

* Work on your PL/SQL skills
* Javascript and jQuery are important to know
* HTML und CSS for layout – high quality applications are also fancy
* APEX and Oracle are developing and chanigng constantly – a good developer must be able to follow this

APEX – Application Programming – Best Practices

* Your developer need to participate in Oracle Forum and in the APEX community
* Continous professional education by training in
  * Best Practices
  * New Features

APEX – Application Programming – Best Practices

* Your approach in developing applications should consider the following rules:
  * Code your application logic using packages
  * Never write bigger PL/SQL blocks in your applications
  * Your applications should only call functions and procedures in your packages
  * Always format your code – use TOAD or SQL Developer
  * Use the components for the purpose they were created for!

APEX – Plugins and Dynamic Actions

* Plugins and Dynamic Actions introduced with 4.0
* In earlier versions of APEX you had to programm single enhancements all over again for each new application – 4.0 standardizes the approach and introduces Plugins and Dynamic Actions – magic word is reusability
* The most of the Plugins based on jQuery sources and combined with PL/SQL Code
* The goal was to introduce standards and minimize time required for the development

APEX – Plugins and Dynamic Actions

* Declarative definition of the processes on the client side
* Dynamic Actions definition using APEX Wizard
  * When?
  * Action?
  * Affected Elements?
* Built-In 'Actions' (Show / Hide, Add / Remove Class, Enable / Disable, Set Value, Execute JavaScript Code, Execute PL/SQL Code and more)
* Plug-in 'Actions' (7 Oracle / 100+ non Oracle and many more to come)

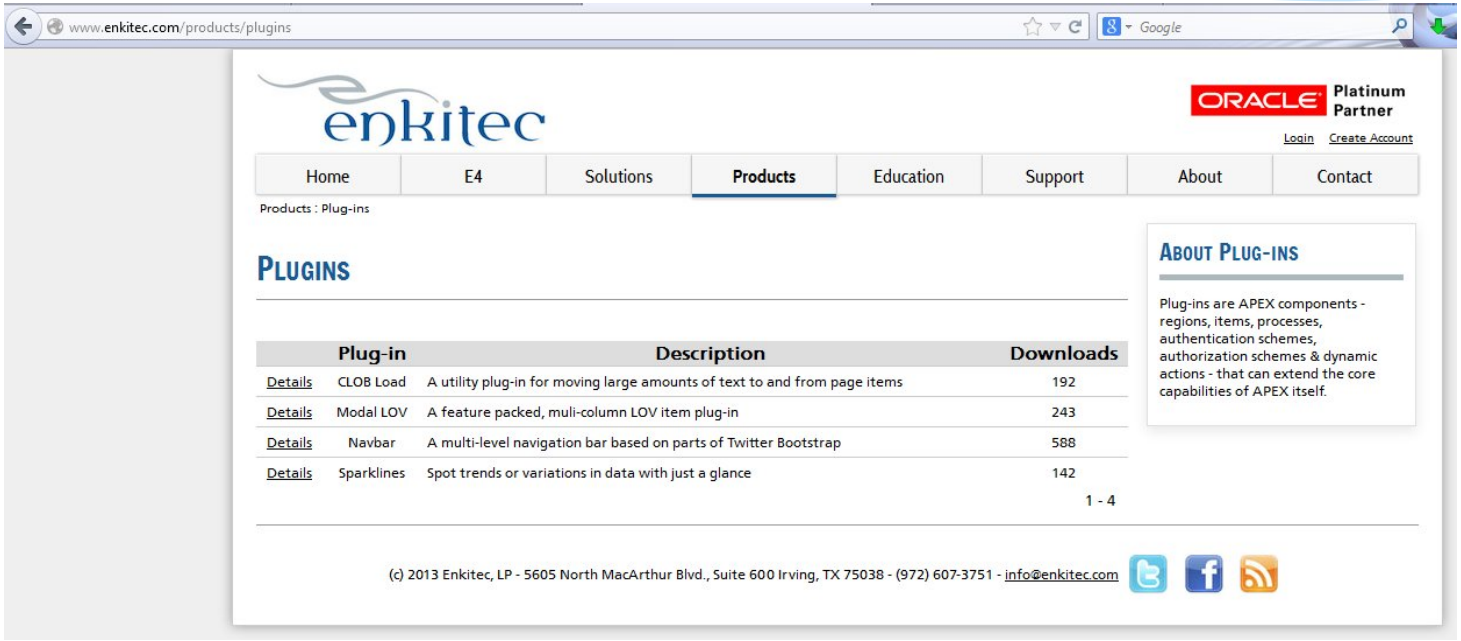
APEX – Plugins and Dynamic Actions

* Suddenly, many plugins available to use in your application
  * One central plugin page:

    http://www.apex-plugin.com/
  * Many providers:
    * http://www.enkitec.com/products/plugins
    * http://skillbuilders.com/Oracle-APEX/APEX-Consulting-Training.cfm?category=apex-plug-ins&tab=free-plugin-downloads

APEX – Plugins and Dynamic Actions

APEX – Plugins and Dynamic Actions



APEX – Plugins and Dynamic Actions

* Prior to using plugins in your application, you will need a good planing strategy
* There are many plugins to choose from which may help you solve your problem quickly
* However, the most of the plugins are not tested properly
* There is no central plugin board which would release a plugin
* Potentialy a plugin could be malicious - malware

APEX – Plugins and Dynamic Actions

* Potentialy a plugin could be a malware
* Many of the plugins work only with a particular version of APEX
* Suddenly, an upgrade problem could become a plugin-problem
* This is reality there, where you have many APEX applications in place – each application needs to be tested first. Usual problems with upgrade is that the plugins don‘t work
* Very often, dynamic actions are used as a replacement for page processes or computations – dynamic actions are meant to replace hand written and hardcoded javascript and ajax

APEX – Plugins and Dynamic Actions

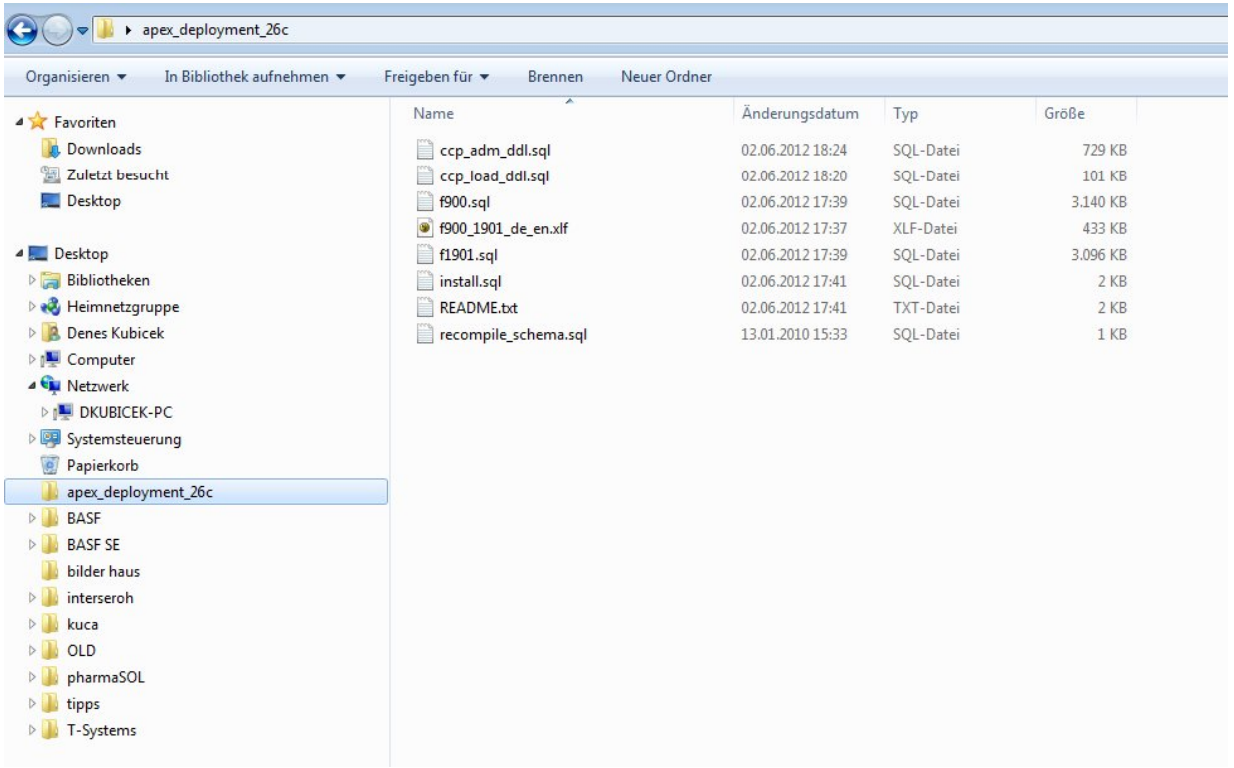
* „Good“ Plugins you should use:
  * http://www.enkitec.com/products/plugins/clob-load
  * http://skillbuilders.com/Oracle-APEX/APEX-Consulting-Training.cfm?category=apex-plug-ins&tab=free-plugin-downloads

APEX – Application Deployment – Development / Test / Production

* The recomended approach for rollouts to test and production ist a script based deployment – command line
* The scripts are including all required DML‘s and DDL‘s
* Using this approach, you will be able to recreate your production at any time to any required release number

APEX – Application Deployment – Development / Test / Production

* Deployment-Script



APEX – Application Deployment – Development / Test / Production

* Your DBA doesn't need to know how to install APEX
* Use SYS or SYSTEM for the installation
* Helps if you use translated applications – no need to seed and publish applications
* You can test your scripts in an integration environment prior to sending it to test or production
* This approach saves time if you use multiple environments – Development, Test, Production
* The bigest andvance if you have an ongoing application development

APEX – Application Deployment – Development / Test / Production

* Deployment-Script – readme.txt

```
IMPORTANT: Prior to the installation set the NLS_LANG to
GERMAN_GERMANY.AL32UTF8.
This is different for C-Shell or K-Shell/Bash.

   On the OS level do the following:

   Bourne or Korn shell:
            NLS_LANG=GERMAN_GERMANY.AL32UTF8
            export NLS_LANG
   C shell:
            setenv NLS_LANG GERMAN_GERMANY.AL32UTF8
   Windows:
            set NLS_LANG=GERMAN_GERMANY.AL32UTF8

After that, you can proceed with the installation:

1. Start sqlplus and login as sys

2. run @install.sql

3. The installation will create a log file:

   apex_deployment_26c.log
```

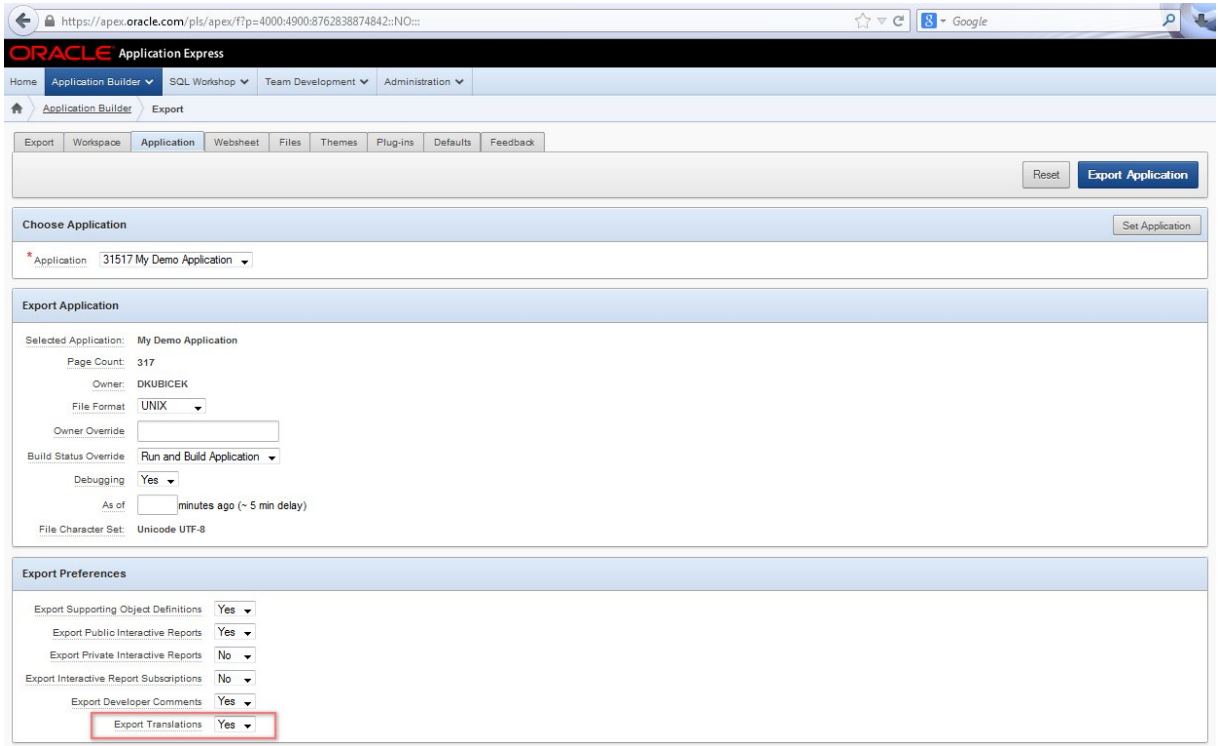
APEX – Application Deployment – Development / Test / Production

* Deployment-Script – install.sql

```
set define '&'
spool install_apex_deployment_26c.log
set verify off

prompt
prompt Run ccp_load_ddl.sql for the schema CCP_LOAD

set define '&'

ALTER SESSION SET CURRENT_SCHEMA = CCP_LOAD;

@ccp_load_ddl.sql;

set define '&'
prompt
prompt Run ccp_adm_ddl.sql for the schema CCP_ADM

set define '&'

ALTER SESSION SET CURRENT_SCHEMA = CCP_ADM;

@ccp_adm_ddl.sql;
```

APEX – Application Deployment – Development / Test / Production

* If deploying multiple languages – do not forget!



APEX – Application Deployment – Development / Test / Production

* Deployment-Script – install.sql – multiple languages

```
DECLARE
   v_workspace_id   NUMBER;
BEGIN
   SELECT workspace_id INTO v_workspace_id FROM apex_workspaces
    WHERE workspace = 'CCP_OC';
   apex_application_install.set_workspace_id (v_workspace_id);
   apex_application_install.generate_offset;
   apex_application_install.set_application_alias ('F'|| apex_application_install.get_application_id);
END;
/

PROMPT Install application 900

@f900.sql;

PROMPT Create Language Mapping for application 1901 (translated)

BEGIN
   FOR c1 IN (SELECT workspace_id FROM apex_workspaces)
   LOOP
      apex_util.set_security_group_id (c1.workspace_id);
      EXIT;
   END LOOP;
   apex_lang.create_language_mapping (p_application_id                 => 900,
                                      p_language                       => 'en',
                                      p_translation_application_id     => 1901
                                     );
   COMMIT;
END;
/...
```

4.2 – undocumented

APEX – Application Deployment – Development / Test / Production

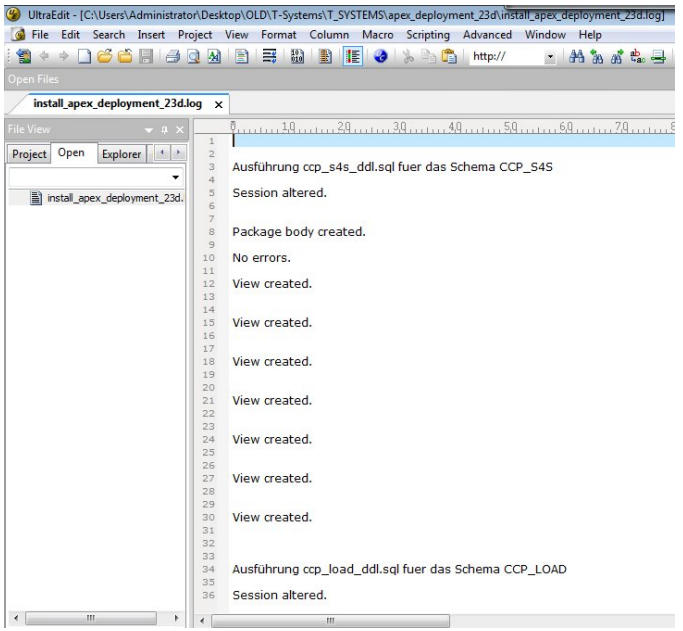
* Deployment-Script – install.sql – multiple languages

```
...
PROMPT Seed Translation for the appliication 900

BEGIN
   FOR c1 IN (SELECT workspace_id FROM apex_workspaces)
   LOOP
      apex_util.set_security_group_id (c1.workspace_id);
      EXIT;
   END LOOP;

   apex_lang.seed_translations (p_application_id => 900, p_language => 'en');
   COMMIT;
END;
/

PROMPT Publish Translation for the appliication 900

BEGIN
   FOR c1 IN (SELECT workspace_id FROM apex_workspaces)
   LOOP
      apex_util.set_security_group_id (c1.workspace_id);
      EXIT;
   END LOOP;

   apex_lang.publish_application (p_application_id      => 900,
                                  p_language            => 'en');
   COMMIT;
END;
/
```

4.2 – undocumented

APEX – Application Deployment – Development / Test / Production

* install.log as a result of the installation
* If no errors then you can close the issue and confirm a successfull installation



APEX – Web-Services

* APEX is capable of consuming two types of webservices:
  * WSDL – SOAP 1.1 or 1.2
  * RestFULL Webservices
* Since 4.2 you can utilize APEX for providing RestFULL Web Services for:
  * APEX Consumers
  * External Parties

APEX – Web-Services

* If you want to use RestFULL Webservices, you will need to set up the Grants:

```
ALTER USER dkubicek GRANT CONNECT THROUGH apex_rest_public_user;
```

* APEX Provides Webservice API, which can be used instead of the graphical interface (better and more efficient)

APEX – Web-Services

* Don‘t forget ACL:

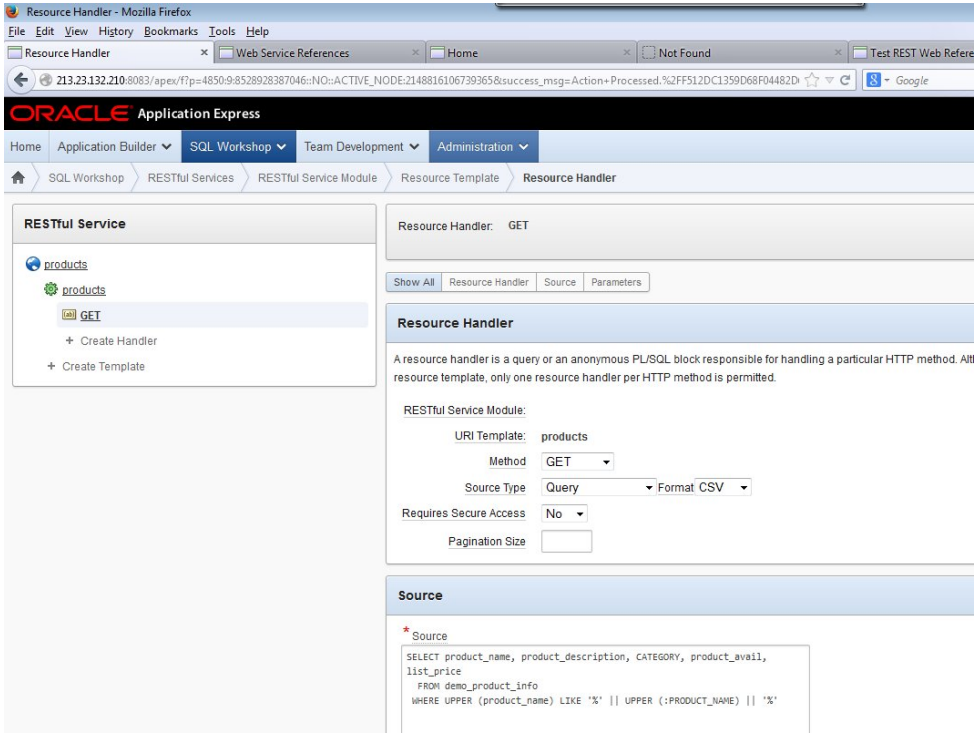
```
DECLARE
   acl_path   VARCHAR2 (4000);
   acl_id     RAW (16);
BEGIN
   SELECT acl
     INTO acl_path
     FROM dba_network_acls
    WHERE HOST = '*' AND lower_port IS NULL AND upper_port IS NULL;
   SELECT sys_op_r2o (EXTRACTVALUE (p.res, '/Resource/XMLRef')) INTO acl_id
     FROM xdb.xdb$acl a, path_view p WHERE EXTRACTVALUE (p.res, '/Resource/XMLRef') = REF (a)
      AND EQUALS_PATH (p.res, acl_path) = 1;
   DBMS_XDBZ.validateacl (acl_id);
   IF dbms_network_acl_admin.check_privilege (acl_path, 'APEX_040200', 'connect') IS NULL
   THEN dbms_network_acl_admin.add_privilege (acl_path, 'APEX_040200', TRUE, 'connect');
END IF;
EXCEPTION
 WHEN NO_DATA_FOUND
   THEN
      dbms_network_acl_admin.create_acl ('power_users.xml', 'ACL that lets power users to connect
to everywhere', 'APEX_040200', TRUE, 'connect');
      dbms_network_acl_admin.assign_acl ('power_users.xml', '*');
END;
/
COMMIT ;
```

APEX – Web-Services

* You can configure webservices in SQL Workshop under RESTfull Services
* You can use these services if your client understands RESTfull
* All APEX applications can consume these webservices as well

APEX – Web-Services

* Webservice – Definition



APEX – Web-Services

* Parameter – Definition

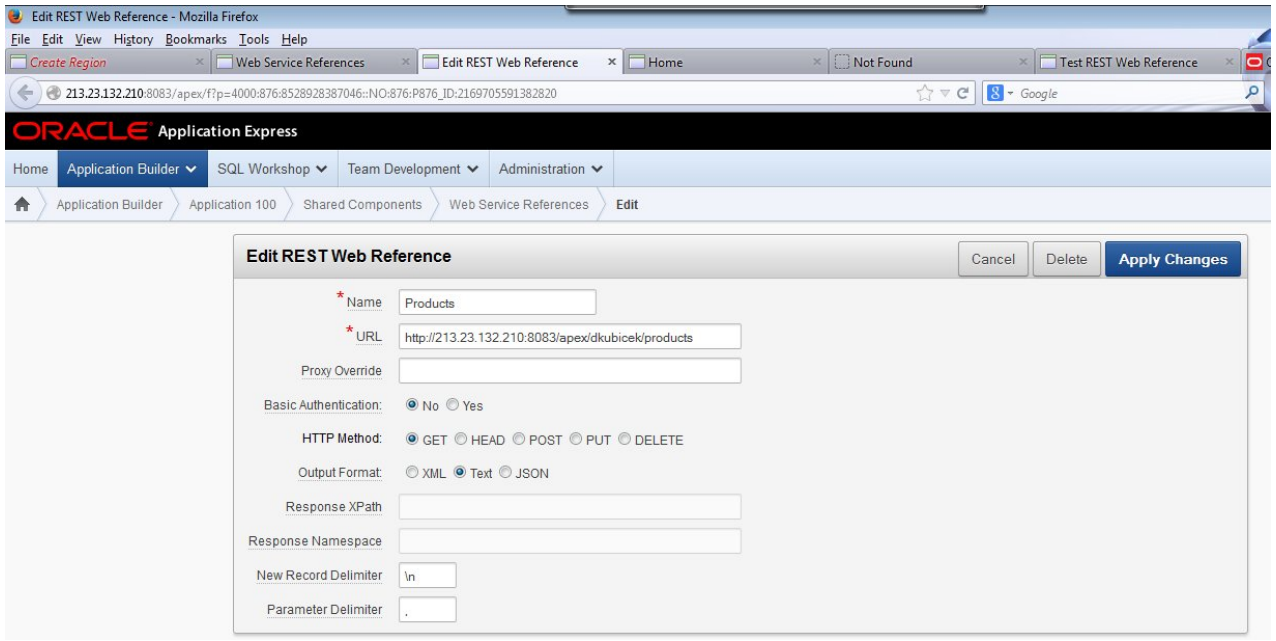
Parameters

Name	Bind Variable Name	Access Method	Source Type	Parameter Type
PRODUCT_NAME	PRODUCT_NAME	IN	HTTP Header	String

1 - 1

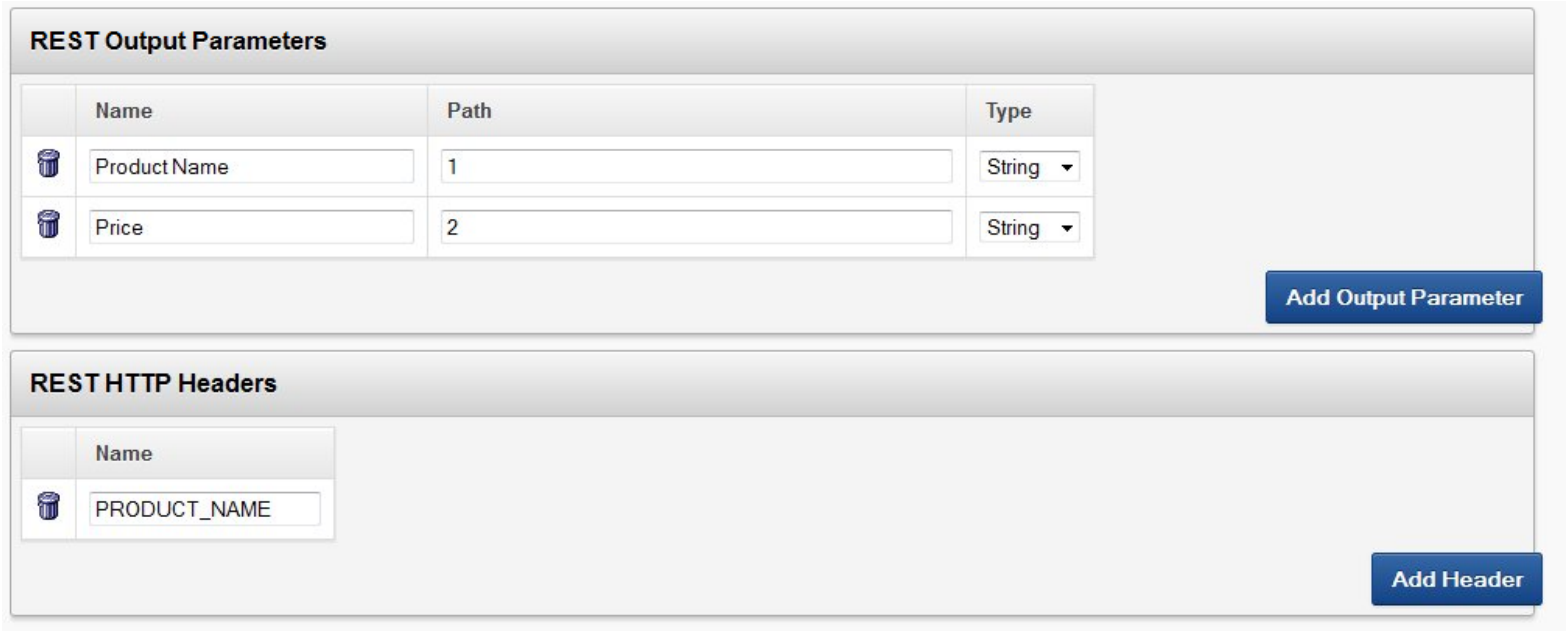
APEX – Web-Services

* Any Application can use an existing webservice – access to it in the Shared Components:



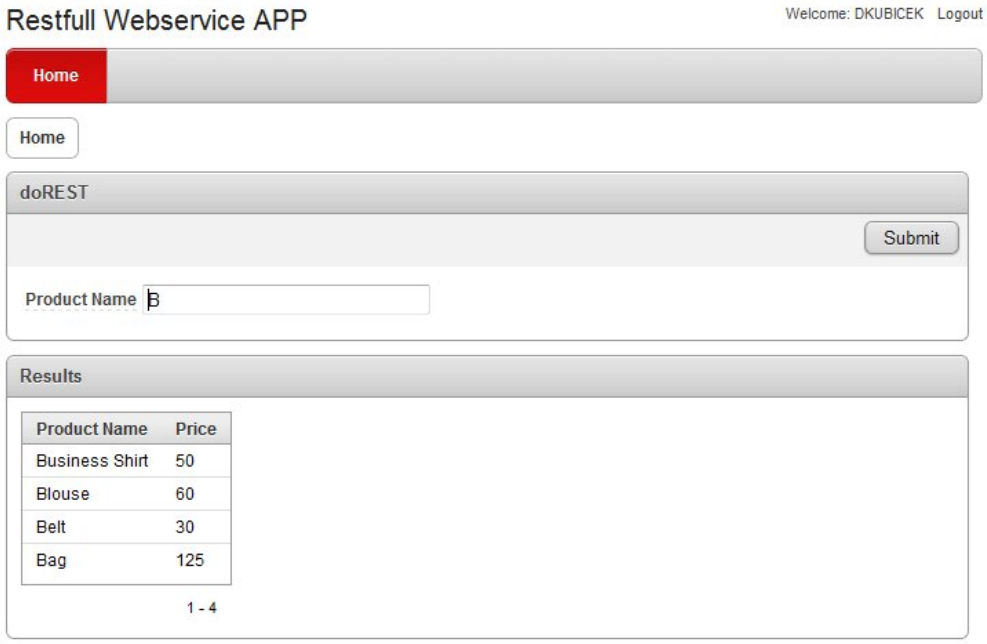
APEX – Web-Services

* APEX hast the RestFULL support since 4.0
* 4.2 enhances the webservice handling



APEX – Web-Services

* Final Result:



APEX – Web-Services

* Web Service API is has more power than the APEX interface
* Web Service API supports both types of web services
* Easier setup and a better error handling
* Example:

APEX – Web-Services

```
DECLARE
   v_url    VARCHAR2 (4000)
      :=    'http://route.nlp.nokia.com/routing/6.2/calculateroute.xml?'
         || 'app_id=_peU-ACkp-j8ovkzFGNU&app_code=gBoUkAMoxoqIWfxWA5DuMQ&waypoint0=geo!'
         || '49.52000000,8.67400000&waypoint1=geo!51.00000000,8.50000000'
         || '&mode0=shortest;truck;traffic:disabled;motorway:1';
   v_clob   CLOB;
BEGIN
   v_clob :=
      apex_web_service.make_rest_request (p_url              => v_url,
                                          p_http_method      => 'GET'
                                         );
   v_xml_type := XMLTYPE.createxml (v_clob);

   SELECT TO_NUMBER
             (REPLACE
                 (EXTRACT (v_xml_type,
                           '*/Response/Route/Summary[1]/Distance/text()'
                          ).getstringval (),
                  '.',
                  ','
                 )
             )
     INTO v_distance
     FROM DUAL;

   HTP.prn (v_distance);
END;
```

APEX – Comunity and References

* APEX has a great and strong comunity
* For many developers APEX is not just a business but also a passion
* APEX Forum is the third most visited forum for Oracle (after Database and PL/SQL)
* APEX Forum has the most new posts
* There are many APEX Blogs dealing with APEX development
* Own page at OTN
* APEX Packaged Applications

APEX – Comunity and References

* https://forums.oracle.com/community/developer/english/oracle_database/application_express
* http://www.odtug.com/apex
* http://www.oracle.com/technetwork/developer-tools/apex/overview/index.html
* http://www.oracle.com/technetwork/developer-tools/apex/application-express/packaged-apps-090453.html

Questions?