

The APEX - API Treasure Chest

March 2016
OGh_nI 2016
Ulrike Brenner

- Oracle Developer since 1999
- Oracle DB 8-12c
- SQL
PL/SQL
Oracle Forms/Reports
APEX
- Software-Developer
Teamleader
Consultant



API

Application Programming Interface

in computer science:

a set of routines, protocols and tools for
building software and applications

APEX-APIs

- PL/SQL - packages
 - Directly in APEX in SQL or a PL/SQL-block
 - Encapsulate in database - packages

APEX-APIs

Oracle Application Express API Reference is intended for application developers who are building database-centric web applications using Oracle Application Express.

APEX-APIs

Oracle Application Express API Reference is intended for application developers who are building database-centric web applications using Oracle Application Express.

APEX-APIs

- Used by APEX itself
- Tested
- Supported

- no need to reinvent the wheel

APEX-APIs

- APEX 5 (each new APEX-version)
 - New Features
 - Deprecated and Desupported Features

APEX-APIs

- APEX 5
 - 28 packages
 - ca. 500 procedures /functions
 - JavaScript APIs
- Application Express API Reference:
https://docs.oracle.com/cd/E59726_01/doc.50/e39149/toc.htm

Collections in der DB

- **Associative Arrays (index-by tables)**
- **Nested Tables**
- **Varrays**

APEX_COLLECTION

- Temporarily (within an APEX-session) capture of one or more non scalar values
 - Rows
 - Columns
- Insert / Update / Delete

APEX_COLLECTION

- Workflow / Wizard
e.g. Data entry wizard
 -) Load a file
 -) Connect csv-values to table columns
 -) Analysis of data before final insert/update/delete
- Performance
e.g. Repeated use of time consuming selects

APEX_COLLECTION

- Collection-Name: max 255 character (name is always stored uppercase)
- SEQ_ID = unique ID of a row per collection
- C001 -> C050: character - columns
- N1->N5 / D1->D5: number / date
- CLOB001, BLOB001, XMLTYPE001

APEX_COLLECTION

- CREATE_COLLECTION
- CREATE_OR_TRUNCATE_COLLECTION
- CREATE_COLLECTION_FROM_QUERY
- CREATE_COLLECTION_FROM_QUERY2
- CREATE_COLLECTION_FROM_QUERY_B
- CREATE_COLLECTION_FROM_QUERYB2

APEX_COLLECTION

APEX_COLLECTION.

CREATE_COLLECTION_FROM_QUERY

```
( p_collection_name =>
                          'MY_COLLECTION'
, p_query               =>
                          'SELECT DEPTNO
                              , DNAME
                              FROM DEPT'
);
```

APEX_COLLECTION

```
APEX_COLLECTION.
```

```
CREATE_COLLECTION_FROM_QUERY
```

```
( p_collection_name =>  
                                'MY_COLLECTION'  
, p_query                =>  
                                'SELECT DEPTNO  
                                , DNAME  
                                FROM DEPT'  
);
```


APEX_COLLECTION

APEX_COLLECTION.

CREATE COLLECTION FROM QUERY

```
( p_collection_name =>  
                                'MY_COLLECTION'  
, p_query =>  
                                'SELECT DEPTNO  
                                , DNAME  
                                FROM DEPT'  
);
```

APEX_COLLECTION

APEX_COLLECTION.

CREATE_COLLECTION_FROM_QUERY

```
( p_collection_name =>  
    'MY_COLLECTION'  
, p_query          =>  
    'SELECT DEPTNO  
    , DNAME  
    FROM DEPT'  
);
```

APEX_COLLECTION

View: APEX_COLLECTIONS (plural!)

```
SELECT SEQ_ID
       , C001 AS DEPTNO
       , C002 AS DNAME
  FROM APEX_COLLECTIONS
 WHERE COLLECTION_NAME =
        'MY_COLLECTION'
;
```

APEX_COLLECTION

View: APEX_COLLECTIONS (plural!)

```
SELECT SEQ_ID
       , C001 AS DEPTNO
       , C002 AS DNAME
FROM APEX_COLLECTIONS
WHERE COLLECTION_NAME =
       'MY_COLLECTION'
;
```

APEX_COLLECTION

View: APEX_COLLECTIONS (plural!)

```
SELECT SEQ_ID
       , C001 AS DEPTNO
       , C002 AS DNAME
FROM APEX_COLLECTIONS
WHERE COLLECTION_NAME =
       'MY_COLLECTION'
;
```

APEX_COLLECTION

View: APEX_COLLECTIONS (plural!)

```
SELECT SEQ_ID
       , C001 AS DEPTNO
       , C002 AS DNAME
FROM APEX_COLLECTIONS
WHERE COLLECTION_NAME =
        'MY_COLLECTION'
;
```

APEX_COLLECTION

- Add / Update / Delete Member
- Resequence Collection / Sort Members
- Truncate Collection
- Delete | / all Collections
- ...

APEX_COLLECTION

- Packaged Applications
 - Sample Collections

APEX_IR

Interactive Report

- Query that is executed by the user including all used filters
 - Interactive report as “filter”
 - (Performance analysis)

APEX_IR

- Executed query
- Clear report settings
- Change subscriptions (email / language)
- Delete report (saved IR)
- Change report owner (saved IR)

APEX_IR

Recommended only in submit-process
(due to report download process)

- Add filter
- Clear report
- Reset report

APEX_IR

```
vIRReport APEX_IR.t_report;
```

```
vIRReport := APEX_IR.Get_Report  
            ( p_page_id      IN NUMBER  
              , p_region_id  IN NUMBER  
            );
```

Executed query:

```
vIRReport.sql_query
```

Used Filter:

```
vIRReport.binds(i).name
```

```
vIRReport.binds(i).value
```

APEX_IR

```
vIRReport APEX_IR.t_report;
```

```
vIRReport := APEX_IR.Get_Report  
    ( p_page_id    IN NUMBER  
      , p_region_id IN NUMBER  
    );
```

Executed query:

```
vIRReport.sql_query
```

Used Filter:

```
vIRReport.binds(i).name
```

```
vIRReport.binds(i).value
```

APEX_IR

```
vIRReport APEX_IR.t_report;
```

```
vIRReport := APEX_IR.Get_Report  
            ( p_page_id      IN NUMBER  
              , p_region_id  IN NUMBER  
            );
```

Executed query:

```
vIRReport.sql_query
```

Used Filter:

```
vIRReport.binds(i).name
```

```
vIRReport.binds(i).value
```

APEX_IR

```
vIRReport APEX_IR.t_report;
```

```
vIRReport := APEX_IR.Get_Report  
            ( p_page_id      IN NUMBER  
              , p_region_id  IN NUMBER  
            );
```

Executed query:

```
vIRReport.sql_query
```

Used Filter:

```
vIRReport.binds(i).name
```

```
vIRReport.binds(i).value
```

APEX_IR

```
vIRReport APEX_IR.t_report;
```

```
vIRReport := APEX_IR.Get_Report  
            ( p_page_id    IN NUMBER  
              , p_region_id IN NUMBER  
            );
```

Executed query:

```
vIRReport.sql_query
```

Used Filter:

```
vIRReport.binds(i).name
```

```
vIRReport.binds(i).value
```


APEX_IR

Interactive Report

- Packaged Applications
 - Sample Reporting
 - page | |

APEX_ZIP

- New feature with APEX 5
- zip / unzip files

APEX_ZIP

- **ADD_FILE**
 - adds BLOBs to a ZIP-file
- **FINISH**
 - called to finish the ZIP-file after all files were added

APEX_ZIP

- **GET_FILES**
 - Returns all filenames of a ZIP-file (BLOB) in an array
 - Including the path
- **GET_FILE_CONTENT**
 - Returns a single File from ZIP-file

APEX_ITEM

- Creates APEX-items dynamically
 - Checkbox, Radiogroup
 - Date-Popup
 - Select-List
 - Textfields, Textareas
 - Hidden Items

APEX_DEBUG

Extend Debug-Message-Logs in PL/SQL Code

- Easier trouble-shooting
- With APEX 4.2:

APEX_DEBUG_MESSAGE
->APEX_DEBUG

APEX_DEBUG

- Error (level 1)
output always generated
- Message (default level 4)
only when debug is enabled
 - Substitution strings (%s)

APEX_DEBUG

```
APEX_DEBUG.ERROR  
  ( p_message IN VARCHAR2  
    , p0      IN VARCHAR2  
                                     DEFAULT NULL  
    , p1      IN VARCHAR2  
                                     DEFAULT NULL  
    . . . . .  
    , p9      IN VARCHAR2  
                                     DEFAULT NULL  
    , p_max_length IN PLS_INTEGER  
                                     DEFAULT 1000  
  ) ;
```


APEX_DEBUG

APEX_DEBUG.ERROR

```
( p_message IN VARCHAR2
, p0        IN VARCHAR2
           DEFAULT NULL
, p1        IN VARCHAR2
           DEFAULT NULL
. . . . .
, p9        IN VARCHAR2
           DEFAULT NULL
, p_max_length IN PLS_INTEGER
           DEFAULT 1000
);
```

APEX_DEBUG

APEX_DEBUG_ERROR

```
( p_message IN VARCHAR2
, p0          IN VARCHAR2
              DEFAULT NULL
, p1          IN VARCHAR2
              DEFAULT NULL
. . . . .
, p9          IN VARCHAR2
              DEFAULT NULL
, p_max_length IN PLS_INTEGER
              DEFAULT 1000
);
```

APEX_DEBUG

APEX_DEBUG.ERROR

```
( p_message IN VARCHAR2
, p0          IN VARCHAR2
              DEFAULT NULL
, p1          IN VARCHAR2
              DEFAULT NULL
, .....
, p9          IN VARCHAR2
              DEFAULT NULL
, p_max_length IN PLS_INTEGER
              DEFAULT 1000
);
```

APEX_DEBUG

APEX_DEBUG.ERROR

```
( p_message IN VARCHAR2
, p0        IN VARCHAR2
              DEFAULT NULL
, p1        IN VARCHAR2
              DEFAULT NULL
  . . . . .
, p9        IN VARCHAR2
              DEFAULT NULL
, p_max_length IN PLS_INTEGER
              DEFAULT 1000
);
```

APEX_DEBUG

- TOCHAR

converts **BOOLEAN** to **VARCHAR2**

APEX_DEBUG

- Selection of additional texts / messages / error messages
- via GUI in debug-mode
- View: APEX_DEBUG_MESSAGES

APEX_DEBUG

- Enable (level 1-9) / disable
- Remove debug by age / by app

JS - apex.debug

- new with APEX 5
- written in the Browser-console
- apex.debug.error
- apex.debug.log
- ...

JSON

- JavaScript object notation
- Textbased data-interchange format

JSON

- Valid JavaScript
- Compared to XML
 - Easier human readable
 - Less overload

JSON

```
{ "dept" : [  
  { "deptno" : 10  
    , "dname" : "ACCOUNTING"  
    , "emp" : [  
      { "empno" : 7839  
        , "ename" : "KING"  
        , "sal" : 5000  
      }  
      , { "empno" : 7782  
        , ...  
      }  
    ]  
  }  
]
```

..

APEX_JSON

- Invented with APEX 5
- Can be used directly in the database
- Usable without an APEX-Session

Native JSON

- native JSON from db-version 12.1.0.2
- JSON_VALUE, JSON_QUERY, JSON_TABLE
- No native creation of JSON

<http://sql-plsql-de.blogspot.co.at/2015/05/apexjson-ohne-apex-json-erzeugen-mit.html>

APEX_JSON

- Parse
- Read
- Generate

- XML <-> JSON

JavaScript APIs

- `$v()` - `apex.item(pNd).getValue`
 - only difference with arrays -
`$v: values separated by :`
- `$s()` - `apex.item(pNd).setValue()`

Installation of APEX- Application

- Import application via GUI
- Execute SQL-script via command-line developertool (e.g.: SQL-Plus)

Installation of APEX- Application

- Same workspace (same workspace-ID)
- Same developer instance
- Same application-ID
- @f1234.sql

APEX_APPLICATION_

INSTALL

- Modify application attributes during the application installation process
 - Workspace ID
 - Application ID
 - Offset
 - Parsing schema ...

APEX_APPLICATION_

INSTALL

- Import application into different workspace using different parsing schema.

APEX_APPLICATION_

INSTALL

- Application:
1234
- New workspace:
MY_WS_PROD
- New parsing schema:
MY_PROD_SCHEMA

APEX_APPLICATION_

INSTALL

```
SELECT WORKSPACE_ID  
      INTO vWorkspaceID  
      FROM APEX_WORKSPACES  
      WHERE WORKSPACE = 'MY_WS_PROD'  
;
```

```
APEX_APPLICATION_INSTALL.  
  SET_WORKSPACE_ID(vWorkspaceID);
```

APEX_APPLICATION_

INSTALL

```
SELECT WORKSPACE_ID  
      INTO vWorkspaceID  
      FROM APEX_WORKSPACES  
      WHERE WORKSPACE = 'MY_WS_PROD'  
;
```

```
APEX_APPLICATION_INSTALL.  
  SET_WORKSPACE_ID(vWorkspaceID) ;
```

APEX_APPLICATION_

INSTALL

```
SELECT WORKSPACE_ID
      INTO vWorkspaceID
      FROM APEX_WORKSPACES
      WHERE WORKSPACE = 'MY_WS_PROD'
;
```

```
APEX_APPLICATION_INSTALL.
      SET_WORKSPACE_ID(vWorkspaceID);
```

APEX_APPLICATION_

INSTALL

```
APEX_APPLICATION_INSTALL.  
  GENERATE_OFFSET;
```

```
APEX_APPLICATION_INSTALL.  
  SET_SCHEMA ( 'MY_PROD_SCHEMA' );
```

```
@f1234.sql
```


APEX_APPLICATION_

INSTALL

```
APEX_APPLICATION_INSTALL.  
  _  
  GENERATE_OFFSET;
```

```
APEX_APPLICATION_INSTALL.  
  _  
  SET_SCHEMA ( 'MY_PROD_SCHEMA' );
```

```
@f1234.sql
```

APEX_APPLICATION_

INSTALL

```
APEX_APPLICATION_INSTALL.  
  _  
  GENERATE OFFSET;
```

```
APEX_APPLICATION_INSTALL.  
  _  
  SET_SCHEMA ( 'MY_PROD_SCHEMA' );
```

```
@f1234.sql
```

APEX_APPLICATION_

INSTALL

```
APEX_APPLICATION_INSTALL.  
  GENERATE_OFFSET;
```

```
APEX_APPLICATION_INSTALL.  
  SET_SCHEMA ( 'MY_PROD_SCHEMA' );
```

```
@f1234.sql
```

APEX_APPLICATION_

INSTALL

Automatic installation of supporting objects:

```
APEX_APPLICATION_INSTALL.
```

```
SET_AUTO_INSTALL_SUP_OBJ
```

```
( p_auto_install_sup_obj => true );
```

APEX_APPLICATION_

INSTALL

Automatic installation of supporting objects:

```
APEX_APPLICATION_INSTALL.  
SET_AUTO_INSTALL_SUP_OBJ  
  
( p_auto_install_sup_obj => true );
```

APEX-APIs

- Enjoy reading the documentation!
- https://docs.oracle.com/cd/E59726_01/doc.50/e39149/toc.htm



Ulrike Brenner

click-click IT Solutions

Aspettenstraße 48
A-2380 Perchtoldsdorf

ulrike.brenner@click-click.at
<http://www.click-click.at>