

thursday 20th of march 2025, APEX World 2025

25 Best Practices in 2025

Oliver Lemm

code of change



about me

Deputy Head of Business Unit APEX / Low Code @ Hyand
Architect, Projekt Manager & Developer



High delivery reliability and international network of locations



■ Cluj-Napoca

■ Pune

> 900
Employees
(of which 160 in shoring
locations)

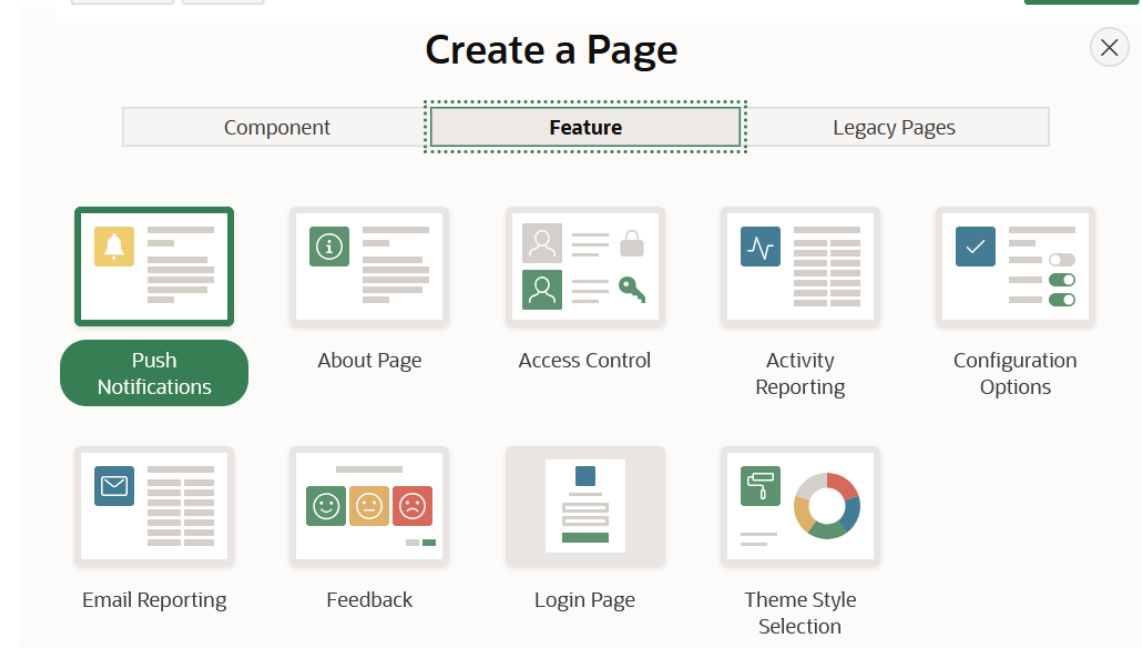
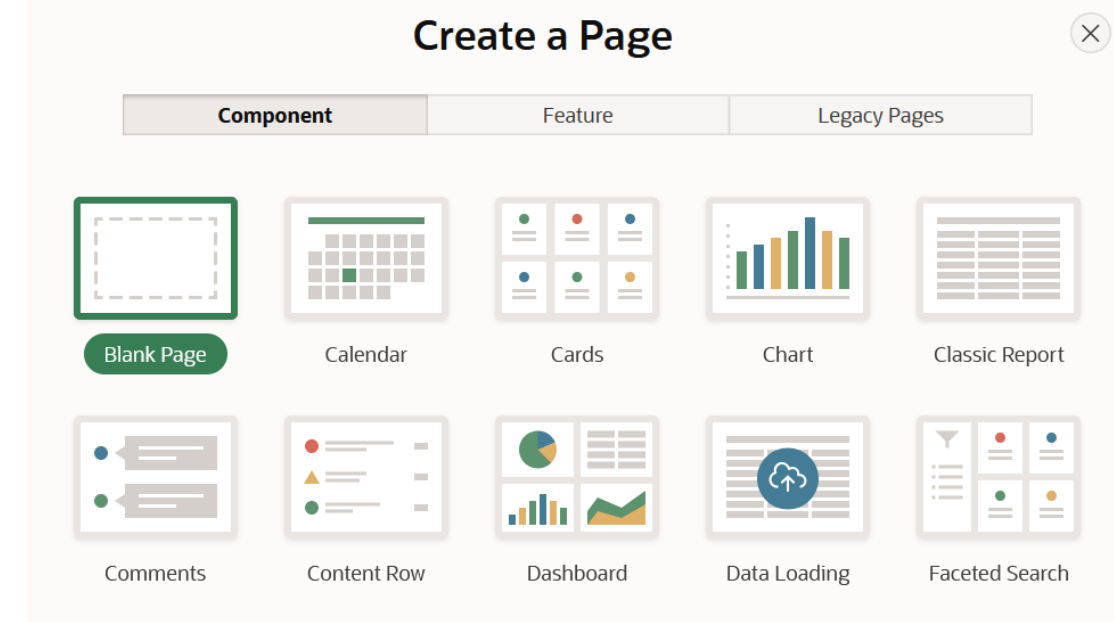
> 150
Clients

> 10
Industries

16
Locations

#1 Low Code Approach

- Use of Wizards
- Select best fitting component
- Reduce Custom Code



#2 Which Report type

1. Faceted Search
2. Smart Filters
3. Interactive Report
4. ~~Interactive Grid~~

Faceted Search

Search...

Job

- Sales Representative (30)
- Shipping Clerk (20)
- Stock Clerk (20)
- Accountant (5)
- Programmer (5)
- Purchasing Clerk (5)
- Sales Manager (5)


[Show All](#)

Total Row Count 107

First Name ↑	Last Name
Adam	Fripp
Alana	Walsh
Alberto	Errazuriz
Alexander	Hunold
Alexander	Khoo
Alexis	Bull
Allan	McEwen

Interactive Report

Search... **Go** 1. Primary Report **Actions**

▶  App Name

App Id	App Name	Region	Region Id
347	APEX Visualizer	Filter	472904998656421813
347	APEX Visualizer	Filter	472904998656421813

Smart Filters

Search Job Sales Representative


Manager **John** (6) Department **Sales** (29) Commission Percent **>=0.3** (7) First Name **David** (2)

First Name ↑	Last Name	Email	Phone Number
Allan	McEwen	AMCEWEN	011.44.1345.829268
Alyssa	Hutton	AHUTTON	011.44.1644.429266



#3 Interactive Report

- First choice when read data in report
- Resolve Foreign Key references in Query
- Use Saved Reports
- Different Labels for Heading and Dialogs
- Define Sorting by Report not by SQL
- APEX Optimizer hints possible

Q v [] Go Actions v

▶  App Id

App Id	App Name	Region	Region Id	Item Name	Item Id
347	APEX Visualizer	Filter	472904998656421813	PO_BEST_PRACTICE	314885362506459796
347	APEX Visualizer	Filter	472904998656421813	PO_APP_ID	472905080376421814
347	APEX Visualizer	Filter	472904998656421813	PO_PAGE_ID	469939809466304171
347	APEX Visualizer	Filter	472904998656421813	PO_COMPONENT	310935329902368238
347	APEX Visualizer	Filter	472904998656421813	PO_LINK	53346090190259584

▶  App Name  2 App Name, Page Name

App Name: Oracle APEX Internal Administration, Page Name: &PRODUCT_NAME. Administration Services

Region	Item Name	Label	Display As
Administration Services	P3_UPGRADE_DATE		Hidden
Instance Tasks	P3_USER	Jump to User	Popup LOV
Instance Tasks	P3_APP	Jump to Application	Popup LOV
Instance Tasks	P3_WORKSPACE	Workspace	Popup LOV
			Count: 4

#4 Overall Count in Reports

- avoid Pagination with “of Z”
- It costs performance
- What is your “added value”?
- Lazy Loading
- Maximum Rows

The screenshot shows a configuration panel with two tabs: 'Region' and 'Attributes'. The 'Attributes' tab is active. It contains a search filter, a 'Layout' section, an 'Appearance' section, and a 'Pagination' section. The 'Pagination' section is highlighted with a red box and includes the following settings:

- Type: Row Ranges X to Y of Z (with pagination)
- Display Position: Bottom - Right
- Partial Page Refresh:

Below the 'Pagination' section is a 'Performance' section with the following settings:

- Lazy Loading:
- Maximum Rows to Process: 5000

Select List
Display Only

row(s) 1 - 30 of 34948 Next ▶

Global Filter	Number Field
	Hidden
Datenstand	Display Only
Kalenderwoche	Display Only

row(s) 1 - 30 of more than 5000 Next ▶

#5 Interactive Grid

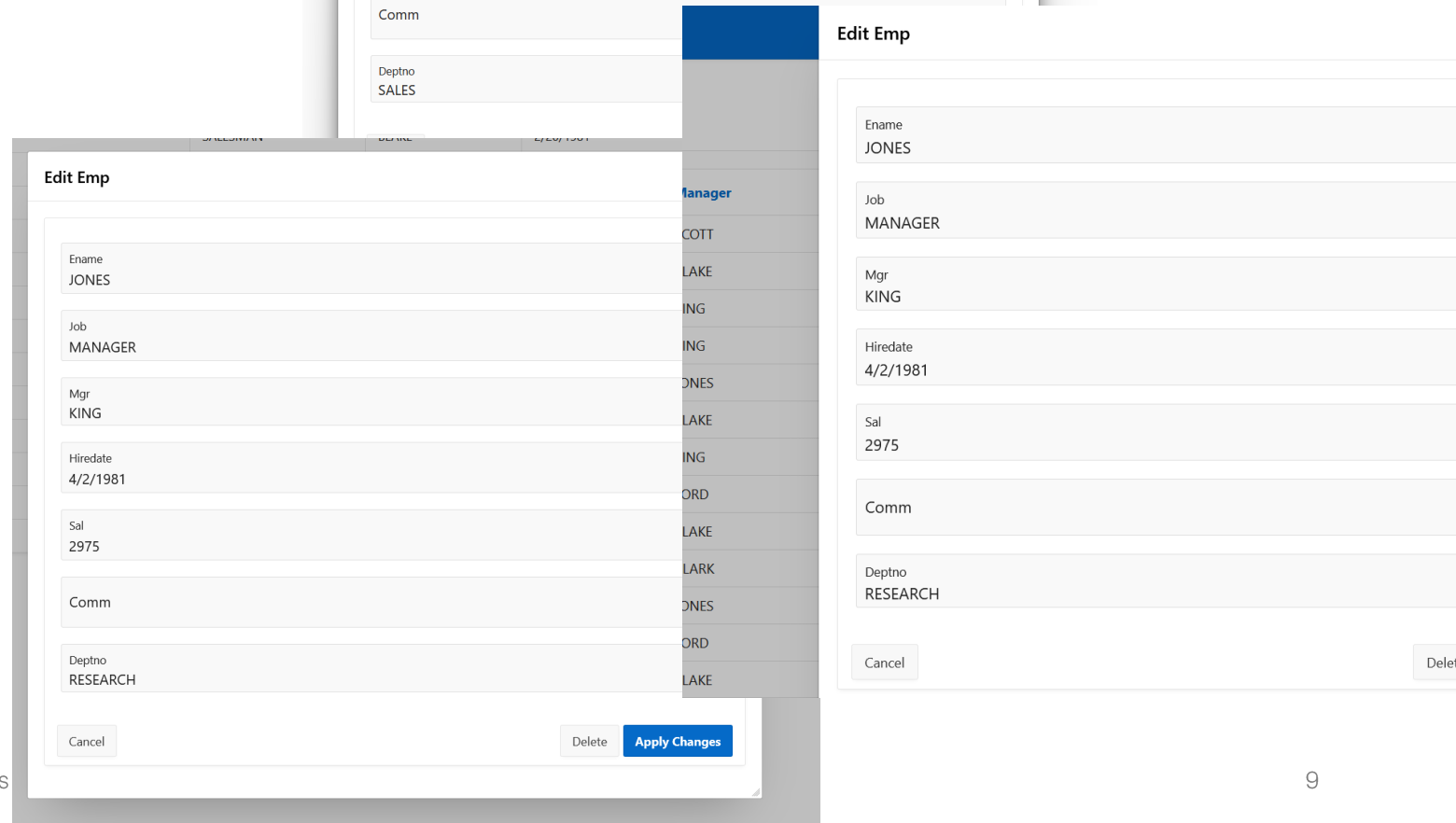
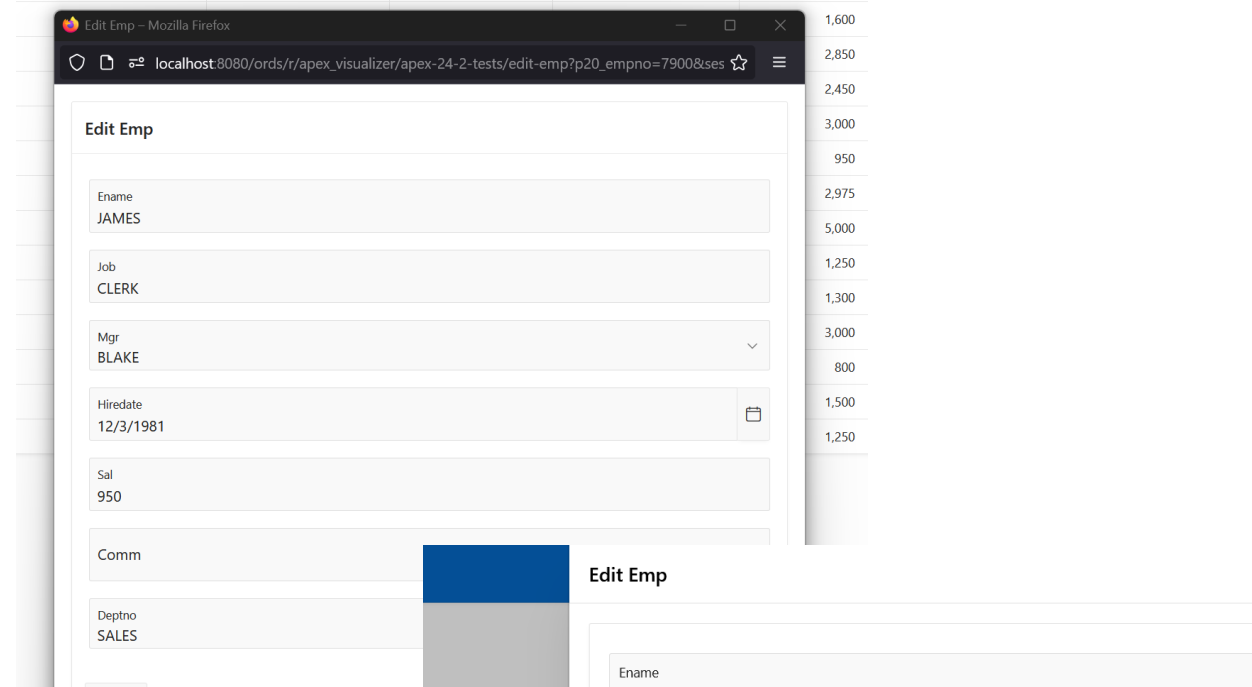
- use only when
 - edit data is required
 - “Item Complexity” not to high
 - amount of validations not to high
- Avoid mixing standard form regions and interactive grid

<input type="checkbox"/>	☰	Ename	Job	Mgr	Hiredate	Sal	Comm	Deptno
<input checked="" type="checkbox"/>	☰	CLARK	MANAGER	KING	6/9/1981	2450		ACCOUNTING
<input type="checkbox"/>	☰	JONES	MANAGER	KING	4/2/1981	2975		RESEARCH
<input type="checkbox"/>	☰	BLAKE	MANAGER	KING	5/1/1981	2850		SALES
<input type="checkbox"/>	☰	ALLEN	SALESMAN	BLAKE	2/20/1981	1600	300	SALES
<input type="checkbox"/>	☰	WARD	SALESMAN	BLAKE	2/22/1981	1250	500	SALES
<input type="checkbox"/>	☰	MARTIN	SALESMAN	BLAKE	9/28/1981	1250	1400	SALES
<input type="checkbox"/>	☰	TURNER	SALESMAN	BLAKE	9/8/1981	1500	0	SALES
<input type="checkbox"/>	☰	JAMES	CLERK	BLAKE	12/3/1981	950		SALES
<input type="checkbox"/>	☰	MILLER	CLERK	CLARK	1/23/1982	1300		ACCOUNTING
<input type="checkbox"/>	☰	SCOTT	ANALYST	JONES	12/9/1982	3000		RESEARCH
<input type="checkbox"/>	☰	FORD	ANALYST	JONES	12/3/1981	3000		RESEARCH
<input type="checkbox"/>	☰	ADAMS	CLERK	SCOTT	1/12/1983	1100		RESEARCH
<input type="checkbox"/>	☰	SMITH	CLERK	FORD	12/17/1980	800		RESEARCH
<input type="checkbox"/>	☰	KING	PRESIDENT		11/17/1981	5000		ACCOUNTING

1 rows selected Total 14

#6 Dialog & Drawer

- Make Dialogs not to “large”
- Modal Dialog for inline context
- Non Modal Dialog for flexible window
- “Non Modal” Drawer on right side



#7 Authentication Scheme

- SSO Schemes for End Users
- SSO Scheme for Developers
- Open Door for testing purposes







- Security Guidelines

Application 137 \ Shared Components \ Authentication Schemes

Authentication Schemes History

Search: [] Go [] Actions []

Name ↑	Is Current	Scheme Type	Subscribed From
Open Door	No	Open Door Credentials	
Oracle APEX Accounts	No	Oracle APEX Accounts	
SAML	Yes	SAML Sign-In	
SSO	No	HTTP Header Variable	

	Name	Description	Status
	Database Accounts	This scheme utilizes database credentials. The user name and password of the database account is used to authenticate the user.	Not Current
	HTTP Header Variable	This scheme relies on an HTTP header variable to contain the username and on an external login method to log in. Oracle APEX presents the available workspaces for the user.	Not Current
	LDAP Directory	This scheme checks credentials against an LDAP repository.	Not Current
	Oracle APEX Accounts	This is the default authentication scheme. It authenticates users against the workspace user repository.	Not Current
	SAML	This scheme uses SAML authentication. Oracle APEX presents the available workspaces for the user.	Current
	Social Sign-In	This scheme uses OAuth2 with a third party authentication provider such as Oracle Identity Cloud Service.	Not Current

#8 Authorization Scheme (declarative way)

- Meaningful name
- Declarative Scheme Type
- Evaluation Point at least as possible

Authorization Scheme

Show All Name Subscription Authorization Scheme Evaluation Point Comments

Name

Application: **1000 UIT_FPP** ?

* Name

Subscription

Reference Master Authorization Scheme From

This is the "master" copy of this authorization scheme.

No authorization schemes subscribe to this authorization scheme.

Authorization Scheme

* Scheme Type ▾

* Item ?

* Value

Identify error message displayed when scheme violated

Evaluation Point

Validate authorization scheme: Once per session ?
 Once per page view
 Once per component
 Always (No Caching)

#9 Authorization Scheme (complex way)

- Define your dynamic Authorization Scheme

- Attributes

APP_COMPONENT_TYPE

APP_COMPONENT_ID

APP_COMPONENT_NAME

- Evaluation Point “Always”

Name

Application: **1000 UIT_FPP** ?

* Name

Subscription

Reference Master Authorization Scheme From

This is the "master" copy of this authorization scheme.

No authorization schemes subscribe to this authorization scheme.

Authorization Scheme

* Scheme Type

* PL/SQL Function Body

```
return authorization_pkg.fk_user_hat_berechtigung(
  pi_app_user      => :APP_USER,
  pi_app_page_id   => :APP_PAGE_ID,
  pi_app_type      => :AI_APP_TYPE,
  pi_app_mode      => :AI_APP_MODE,
  pi_fost_key      => :AI_FOST_KEY,
  pi_fonds_zukts  => :AI_FONDS_ZUKTS,
  pi_user_zukts   => :AI_USER_ZUKTS_SCHREIBEN,
  pi_app_component_type => :APP_COMPONENT_TYPE,
  pi_app_component_id  => :APP_COMPONENT_ID,
  pi_app_component_name => :APP_COMPONENT_NAME
);
```

Identify error message displayed when scheme violated

Evaluation Point

Validate authorization scheme: Once per session ?
 Once per page view
 Once per component
 Always (No Caching)

#10 Build Options

- Deactivate Code or functionality
- Use for Test purposes
- development in progress
- find your “deactivated” components
- No Never Condition

Build Option Cancel Delete Apply Changes

Show All **Attributes** Subscription Associated Components

Attributes

Application **117 APEX 24.2 Tests**

* Build Option ?

Status ?

Default On Export ?

On Upgrade Keep Status ?

Comments

Associated Components					Remove Components
Component ↑	Component Name	Build Option	Page Number	Is Subscribed?	
Page Item	P1_NEW	Feature 1	1		
Page Region	apex_appl_page_ig_columns	Feature 1	2		
Page Region	apex_appl_plugin_settings	Feature 1	2		

1 - 3

Page

Build

Configuration

Build Option

- Select -
- APEX 24.2 Migration
- Commented Out
- Feature 1**
- {Not Feature 1}
- {Not APEX 24.2 Migration}
- {Not Commented Out}

#11 List of Values

- Convert Legacy LOV
- No Static LOV
- Sorting by LOV
- Group
- Additional Display Columns

- Views from another Scheme
- Table Functions
- Complex SQL

Name

* Name

Source

Data Source **Local Database** ?

* Source Type **Table** SQL Query Function Body Returning SQL ?

* Table / View Owner ?

* Table / View Name ?

Where Clause ?

Column Mapping

* Return ?

Display ?

Default Sort ?

Sort Direction ?

Group ?

Group Sort Direction ?

Icon ?

Oracle Text Column ?

Additional Display Columns [Select Columns >](#)

Additional display columns can be defined for item types that support multiple display columns, for example the Popup LOV. For item types that do not support multiple columns, these will be ignored. If adding additional display columns ensure that the return column is included in the column list. The return column can be set to Visible No and Searchable No if you do not want it displayed to users.

[Edit](#) [Reset](#)

	Sequence...	Column Name	Heading	Data Type	Visible	Searchable	Format Mask
☰	10	APPLICATION_NAME	Application Name	VARCHAR2	Yes	Yes	-
☰	10	ITEM_ID	-	NUMBER	No	No	-
☰	20	REGION	Region	VARCHAR2	Yes	Yes	-
☰	30	ITEM_NAME	Item Name	VARCHAR2	Yes	Yes	-
☰	40	LABEL	Label	VARCHAR2	Yes	Yes	-
☰	50	DISPLAY_AS	Display As	VARCHAR2	Yes	Yes	-

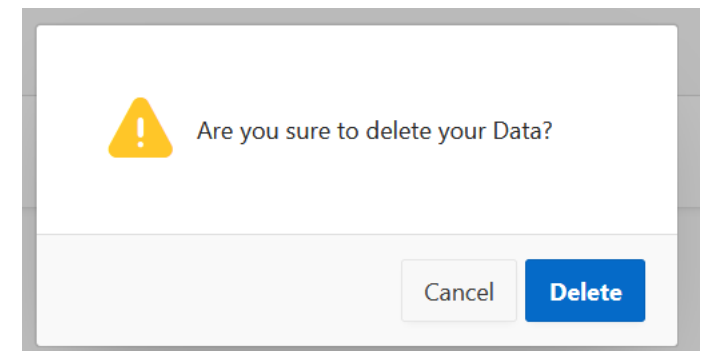
#12 Confirmation Messages

- Asking user for confirmation
- No Custom Code
- Replaces “old”

```
var htmldb_delete_message=“DELETE_CONFIRM_MSG”;  
javascript:apex.confirm(htmldb_delete_message,'DELETE');
```

The screenshot shows the configuration interface for a confirmation message in an Apex application. It is divided into two sections: Behavior and Confirmation.

- Behavior:**
 - Action: Submit Page (dropdown)
 - Execute Validations:
 - Show Processing:
 - Warn on Unsaved Changes: Do Not Check (dropdown)
 - Database Action: - Select - (dropdown)
 - Requires Confirmation:
- Confirmation:**
 - Message: Are you sure to delete your Data? (text area)
 - Style: Warning (dropdown)



#13 UI Customization

1. Universal Theme
2. Theme Roller
3. Component Settings
4. Template Options
5. CSS Adjustments
6. JavaScript Enhancements
7. copy single Templates
8. use your own Theme

Number ↑	Name	Version	Is Universal Theme	Is Current	Subscribed From	Subscribers	Templates
42	Universal Theme - 42 *	24.1	✓	✓	Theme Repository		76

Theme Roller

Filter

- > Regions
- > States
- > Palette
- > Buttons
- > Forms
- > Interactive Reports
- > Layout
 - Header Height 48px
 - Navigation Tree 240px
 - Actions Column 200px
 - Left Side Column 240px
 - Body Content Maximum Width Auto
- > Custom CSS

Save Save As

Settings

Format HTML

Toolbar Intermediate

Toolbar Style Overflow Menu

Minimum Height 180 pixels

Maximum Height pixels

Allow Custom HTML

Template Options

Common

General Use Template Defaults Stretch Form Item

Size Default

Advanced

Item Pre Text Default

Item Post Text Default

Top Margin Default

Bottom Margin Default

Left Margin Default

Right Margin Default

Item Group Display Default

Cancel OK

#14 Computation

- set Single Items
 - easier visible
 - use instead of defaults
- Application Level
 - “On New Instance (new Session)”
 - “After Authentication” set Single Items
- Page Level
 - Condition ITEM IS NULL
 - Security Authorization

Application Computation

Show All Item Subscription Frequency Computation Authorization Conditions

Item

Application: 137 Profil DB ?

Sequence 5 ?

* Computation Item AI_APP_ANZAHL_PROFILE ?

Subscription

Subscribe From

This is the "master" copy of this Computation.

No Computations subscribed to this Computation.

Frequency

Computation Point On New Instance (new session) ?

Computation

Computation Type Expression ?

Language PL/SQL ?

* Computation PDB_GLOBAL_PKG.F_GET_ANZAHL_PROFILE ;

Computation

Filter

Identification

Item Name P210_VORLAGE ?

Execution

Sequence 10

Point Before Regions ?

Computation

Type Static Value ?

Static Value Hyand_MT_MA_Profil_V04

Error

Server-side Condition

Type Item is NULL ?

Item P210_VORLAGE ?

Security

Authorization Scheme - Select - >

Configuration

Build Option - Select - >

#15 Application Items

- Attribute for the whole Application
- Use on all/different pages
- Use prefix like AI for “Application Item”
- Scope “Global” for multiple apps
- Application Items = “Serverside Items”

Application Item

Show All Name Subscription Security Configuration Comments

Name

Application **137 Profil DB**

* Name ?

* Scope ?

Subscription

Subscribe From ?

This is the "master" copy of this application item.

No application items subscribed to this item.

Security

Session State Protection ?

Escape Special Characters ?

Configuration

Build Option ?

Comments

Comments ?

#16 Validations

- Prevent errors > Validations
- Client-side
- Server-side
- Combination of client- & server-side
- Reuse your validations

Validation

Value Required

Maximum Length characters

New

New must have some value.

1 error has occurred

- New must have some value.

Validation

Filter

Identification

Name

Execution

Sequence

Validation

Editable Region

Type

Item

Always Execute

Error

Error Message

Display Location

Associated Item

New

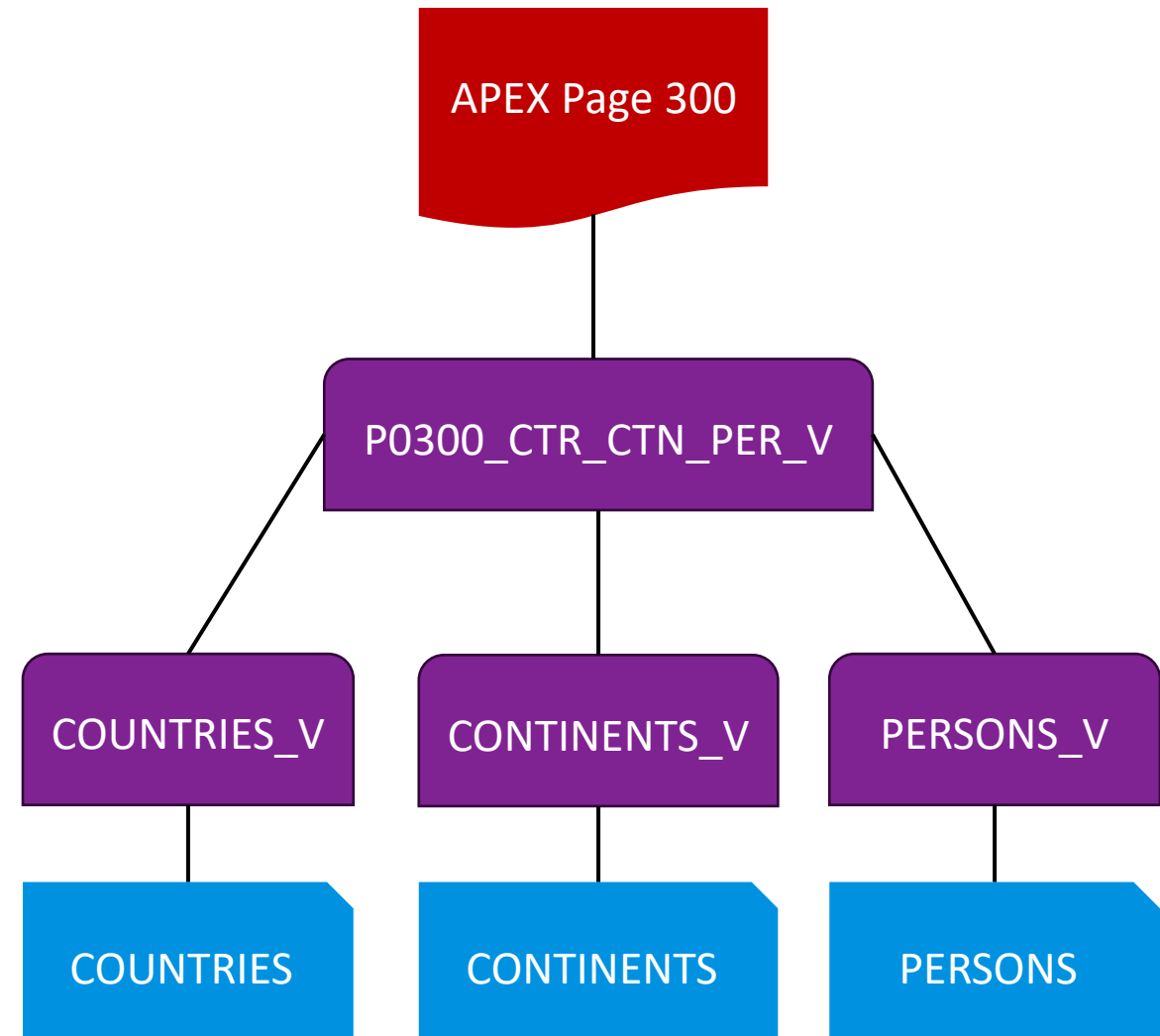
Please insert a value.

1 error has occurred

- Please insert a value. ⓘ

#17 View Layer

- Tables
- View Layer for each table
- View Layer for referencing APEX page
- Datamodel decoupled from APEX
- Views by page document reference
- Invalid DB objects will show up
- Same approach for packages



#18 Compatibility Mode

- Use the latest mode
- Universal Theme dependency
- APEX 5 – Login, Session Timeout, Session State
- APEX 5.1 – Client-Side Validations, DA „Wait for Result“
- Synchronous -> Asynchronous AJAX (DA)
- APEX 19.1 – Rich text Editor max length
- APEX 19.2 – Classic Report empty columns
- APEX 21.2 – APEX_ERROR.ADD_ERROR change
- APEX 24.2 – Extended Substitution Syntax support

Application 102

Definition Security Globalization User Interface Progressive Web App

Show All Name Properties Availability Error Handling Global Notification Sub

Properties

Friendly URLs ?

Allow Feedback ?

Logging ?

Debugging ?

Compatibility Mode 24.2 ?

Accessible Read-Only Items

Application Email From Address 19.2 / 20.1 / 20.2 / 21.1 ?

Proxy Server 5.1 / 18.1 / 18.2

Text Query Function 5.0 4.2 ?

Tokenize Row Search 4.1

Maximum Background Page Process Jobs ?

#19 APEX Advisor

- Always check “Errors”
- Security, Warning, QA and Accessibility based on your requirements
- select checks you need
- check by Page or Application
- false – positive messages!

[▶ Check Page\(s\)](#) [Perform Check](#)

Filter Result [Apply Filter](#)

The results are displayed for the checks that you performed. You can filter the result set by unchecking any category or specific checks under Filter Results and clicking the Apply Filter button.

To address the issues identified, click the View link within each result. Once issues have been fixed, you can use the *Perform Check* button to re-run the report or view *Checks to Perform* to select different checks to be performed.

- Error (26)**
 - References with Substitution Syntax (17)
 - Declarative References of Application Items, Page Items, Columns or Interactive Report Filters (9)
- Security (43)**
 - Authorization (41)
 - Session State Protection (1)
 - Browser Security Settings (1)
- Warning (1)**
 - Clear Cache Page Number equals Target or Current Page (1)
- Quality Assurance (134)**
 - Report has Default Order (22)
 - Deprecated attribute values (112)
- Accessibility (41)**
 - Region has Row Header (38)
 - Page item does not cause an unexpected context change (3)

Applications: 102 - Sample Reporting > Pages: 40 - Drill Down IG > Regions: Projects > Report Columns > PROJECT

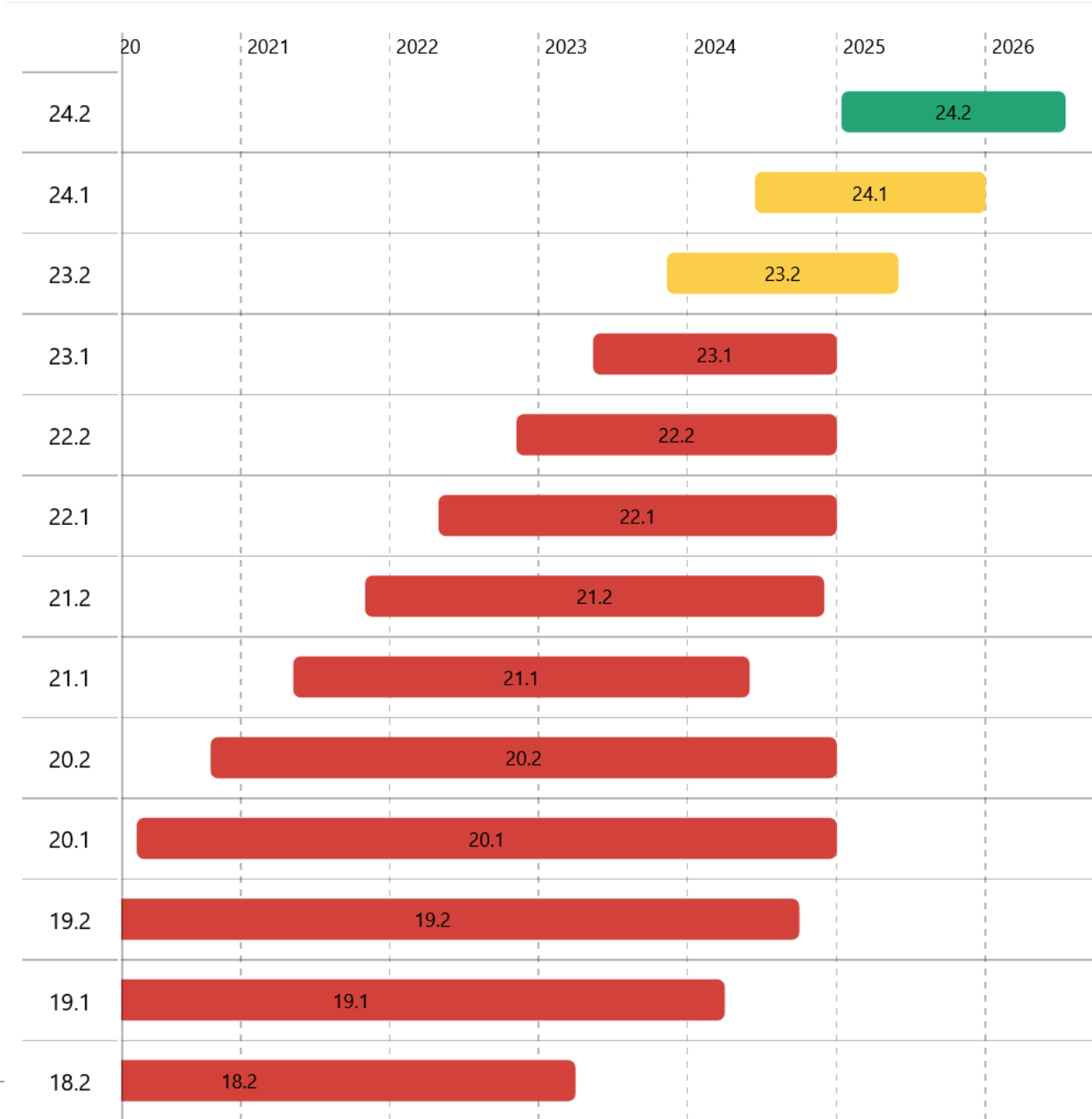
Attribute	Link Target (A custom target to be called when the Link Column is clicked)
Check	Declarative References of Application Items, Page Items, Columns or Interactive Report Filters
Category	Error
Message	IG_PROJECT does not exist.
Value	f?p=&APP_ID.:17:&SESSION.:IG[projects_report]_Costings:&DEBUG.:CR,:IG_PROJECT:&PROJECT.
	View

Attribute	Link Target (A custom target to be called when the Link Column is clicked)
Check	References with Substitution Syntax
Category	Error
Message	PROJECT does not exist.
Value	f?p=&APP_ID.:17:&SESSION.:IG[projects_report]_Costings:&DEBUG.:CR,:IG_PROJECT:&PROJECT.
	View

#20 Latest APEX Release

- Stick to the latest Release
- Upgrade Test first, afterwards Prod and Dev
- Upgrade with first Hotfix => 24.2.1+
- at least upgrade once a year
- the more often your upgrade, less effort to do
- <https://apex.hyand.com/supporttimelines>


APEX Support Timelines




#21 Upgrade Application

- Easy support to upgrade to latest version
- Which changes are out there?
- Which components are affected?

Utilities

 **Application Dashboard**
Review a summary of this application.

 **Upgrade Application**
After upgrading to a new release, review components for upgrading to include the latest features.

↑ SR Application 102 \ Utilities \ Upgrade Application

Q Go Actions

Upgrade Type	Candidate Objects
Enable Rows Per Page Selector for Interactive Reports	19
Upgrade Legacy Form page to page containing Form Region, where appropriate	1
Upgrade jQuery Date Picker to new Date Picker	8
Upgrade Buttons to use Declarative Confirmation Dialogs instead of JavaScript in URLs	1
Upgrade Number Fields to use a decimal virtual keyboard	13
Update all end-aligned Number Fields to start-aligned	13

1 - 6

↑ SR Application 102 \ Utilities \ Upgrade Application \ Upgrade

Upgrade Type: Upgrade jQuery Date Picker to new Date Picker [Cancel] [Upgrade]

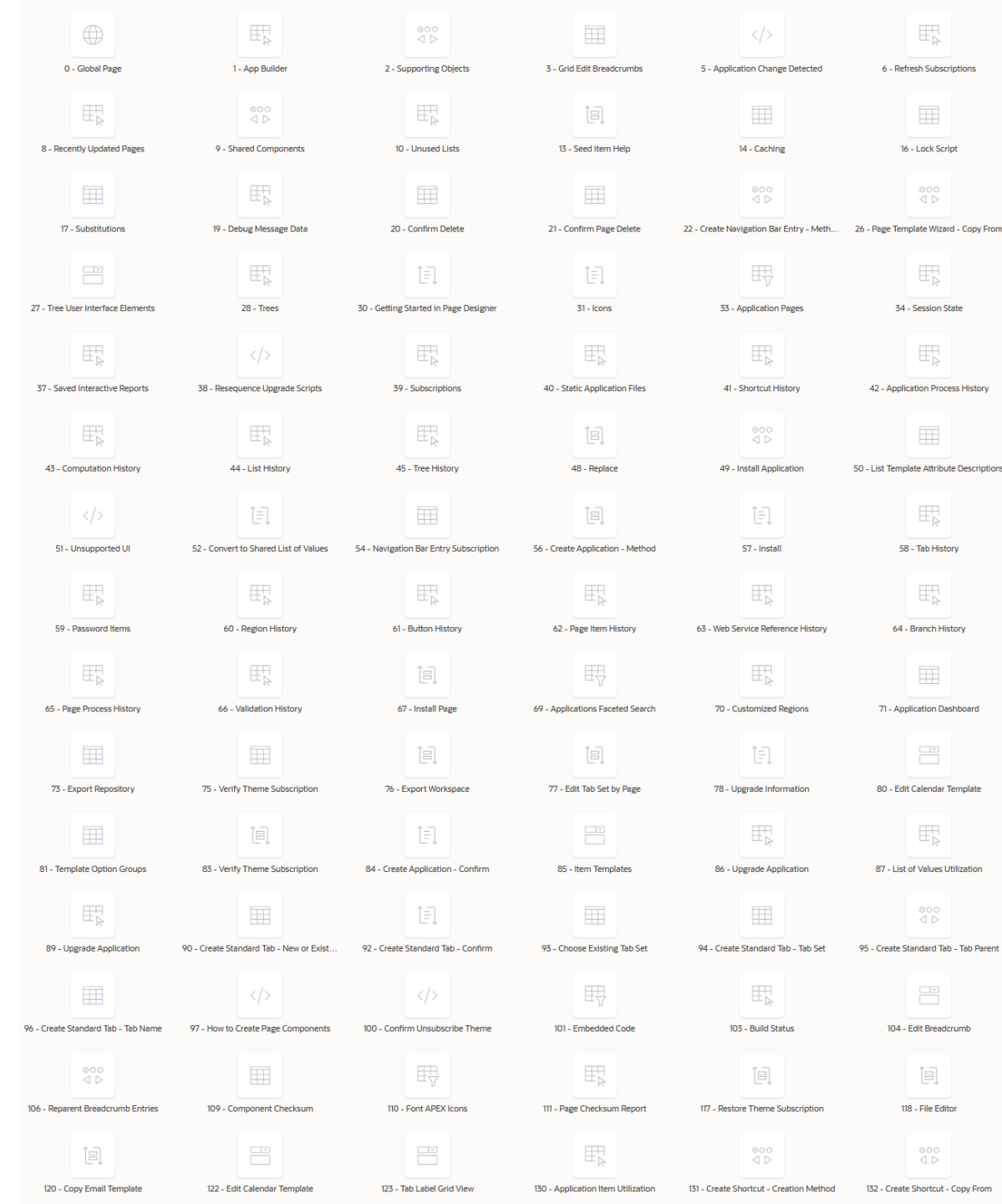
Q Go Actions

<input type="checkbox"/>	Page ↑	Page Name	Region	Object Name	Additional Information	Page Locked By
<input type="checkbox"/>	2	Maintain Project	Maintain Project	P2_END_DATE	-	-
<input type="checkbox"/>	2	Maintain Project	Maintain Project	P2_START_DATE	-	-
<input type="checkbox"/>	17	Interactive Grid	Projects	END_DATE	-	-
<input type="checkbox"/>	17	Interactive Grid	Projects	START_DATE	-	-
<input type="checkbox"/>	37	Linking to Interactive Grids	Interactive Grid	END_DATE	-	-
<input type="checkbox"/>	37	Linking to Interactive Grids	Interactive Grid	START_DATE	-	-
<input type="checkbox"/>	40	Drill Down IG	Projects	FIRST_START_DATE	-	-
<input type="checkbox"/>	40	Drill Down IG	Projects	LAST_END_DATE	-	-

1 - 8 of 8

#22 avoid big monolithic Apps

- more than 100 Pages, try to split
- 1 App – 1 Workspace
- advantages
 - deploy separated
 - higher Security
 - easier to develop
- disadvantages
 - redundant shared objects
 - more Apps



#23 Version Control

- Save the original status
- Make changes transparent

Change User

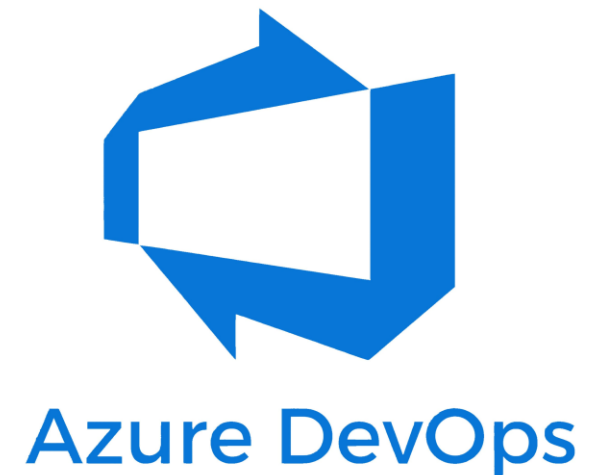
Change Date

- Comment an Issue



#24 Automate Deployment

- SQLcl
- Jenkins
- GitLab
- Azure DevOps



#25 Testing on Copy of Production Environment

Stage View

- Test your Release with Data from production
- Check Bugs with Data from production
- 50% of Bugs are related to complex data

	PREPARE - Checkout Pipeline Parameter Files	PREPARE - Checkout Project SVN Directory	PROD - Datapump Export	Organize Dumps	PROD - Export App(s)	TEST - Delete Old DB Objects	TEST - Datapump Import from PROD	TEST - Recompiling Schema	TEST - Import App(s)
Average stage times:	1s	1s	19s	649ms	7s	4s	23s	4s	7s
#537 Mar 11 13:12 No Changes	1s	959ms	16s	606ms	7s	3s	17s	5s	6s
#536 Mar 11 12:13 No Changes	1s	990ms	16s	672ms	7s	1s	17s	4s	6s
#535 Mar 11 12:12 1 commit	6s	1s	15s	610ms	7s	3s failed	78ms failed	62ms failed	78ms failed
#534 Mar 11 11:57 No Changes	1s	958ms	15s	641ms	7s	3s	18s	5s	5s

#26 Use the Community

- Forums

forums.oracle.com

- Twitter / X / Bluesky

x.com / bsky.app

- APEX Office Hours

apex.oracle.com/officehours

- Conferences

- Linklist

apex.oracle.com/shortcuts

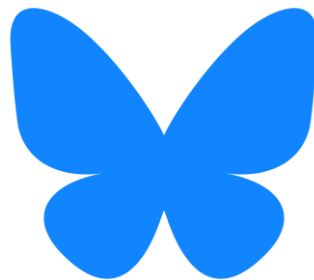
Pinned

Share your Ideas, Suggestions, and Feature Requests 14 comments 2,462 views
Started by **Ed Jones-Oracle** on Feb 16 2023

Posts

Identity column still returning error "unsupported feature with RETURNING clause" 0 comments 1 view
Started by **Jared C** in **APEX** — 3 minutes ago
ora-22816, primary-key

Trend Line Examples 1 comment 18 views
Started by **Brian666H** in **APEX** — 3 hours ago
apex, chart, trendline



Part 4
24.2 What's New
in Oracle APEX 24.2

Oracle APEX Office Hours Recordings

by Oracle APEX

Playlist · 89 videos · 14,755 views

The APEX Development Team hosts regular Office Hour sessions on various topics. Sign up for upcoming [...more](#)





Please fill in your
evaluations



Say Hy_

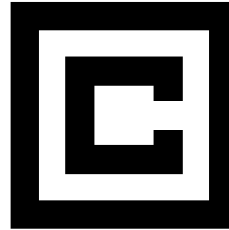
+49 (0) 2102 30 961-0

oliver.lemm@hyand.com

X [@OliverLemm](https://twitter.com/OliverLemm)



[@oliverlemm.bsky.social](https://bsky.app/profile/oliverlemm.bsky.social)



© 2024 – The developed thoughts and ideas are the intellectual property of Hyand and are subject of copyright law. Reproduction, transfer to third parties or use – even of parts – is only permitted with the express of Hyand.