

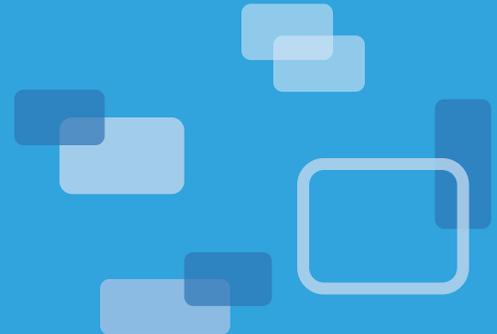
FOEX

Ultimate Guide to Debugging in APEX 21+



Peter Raganitsch

CEO FOEX, Oracle ACE Director



FOEX

#EnterpriseAPEX

FOEX Enterprise Framework

Commercial Plug-ins

Commercial Plug-ins

File Upload & Image Editor

***Kanban / Checklist**

***Standalone TreeGrid**

***Scheduler**

***Image Annotator**

Translation Suite

Websocket / Live Editing

APEX Upgrade

FOS Open Source Plug-ins

FOEX Browser Add-on

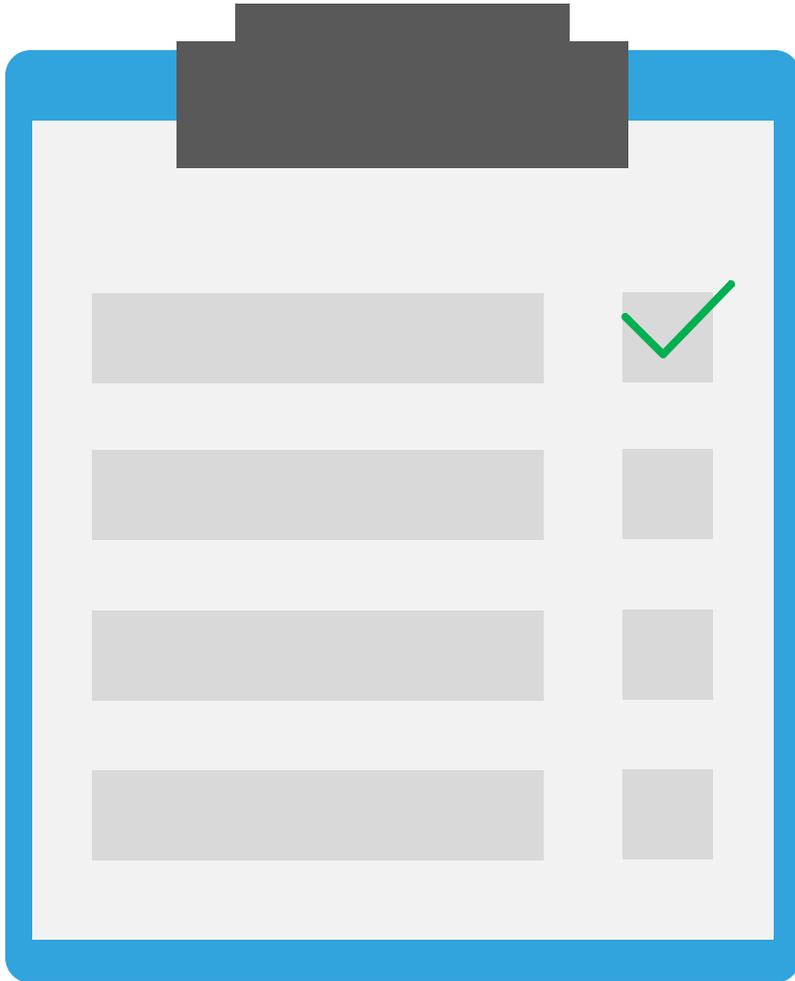
+

FOS Browser Extension

Debug, Dude!



TLDR; Debugging in APEX



1

Activate APEX Debug

2

Open Developer Tools -> Console

3

Run the Page / Click the button

4

Analyze Debug / Console Output

Still here?

Let's look at debug a bit closer

Bug Facts

1.000
Lines of code

20-50
Bugs

5%
Bug Ratio

Why debugging?

- Find a bug
- Inspect weird behaviour
- Make sure, everything works as expected
- Look under the hood
- Investigate Performance
- Understand “foreign” code

Tools

- APEX Debug
- Browser Developer Tools
- SQL Developer Debugging PL/SQL
- Logfiles
- Rubber Duck

Counter Measures

- All code should be in DB Packages
- Modularize
- Write as little code as possible
- Test, Test, Test
- Pair Programming

Explain the Problem

Explain the problem



Explain the problem

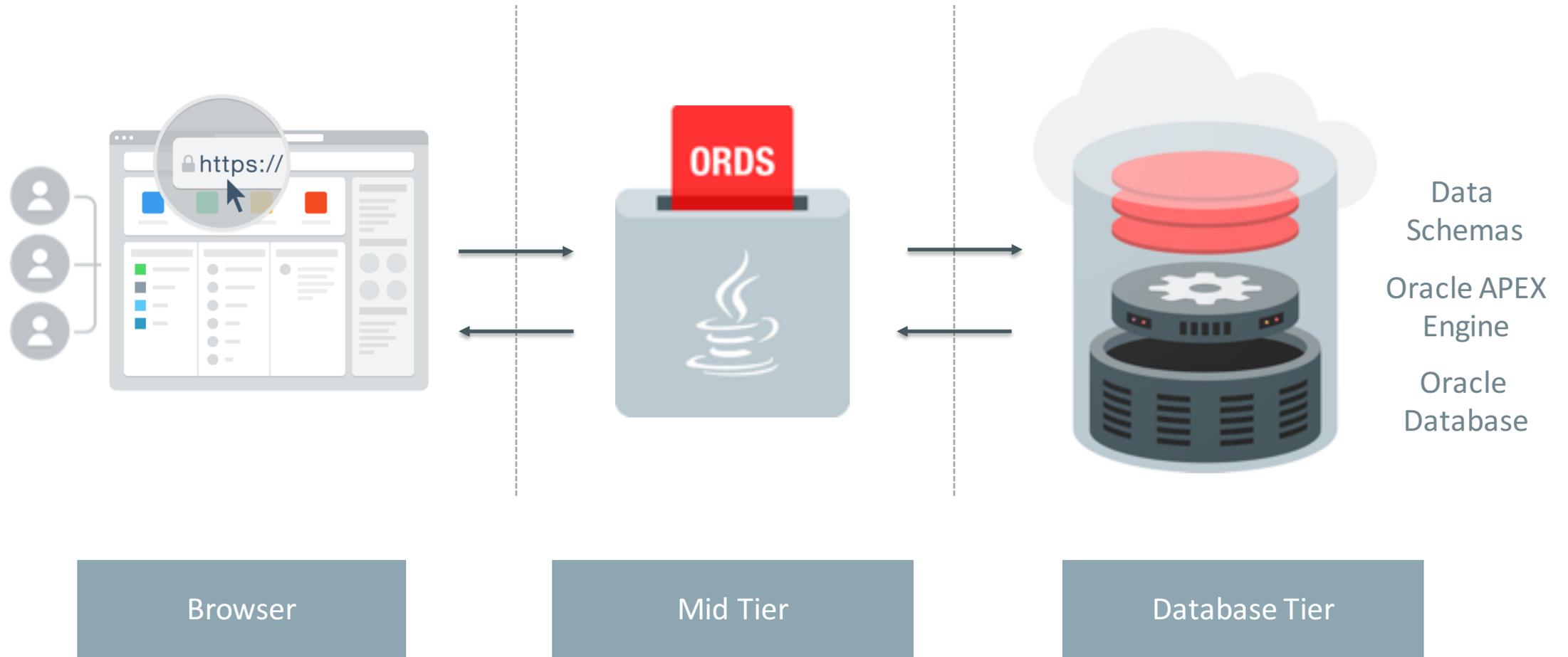


But first...

**Understand how APEX
works !**

APEX Architecture

3 Tier Architecture



ORDS = Oracle REST Data Services

APEX is just PL/SQL

...it creates a HTML Document

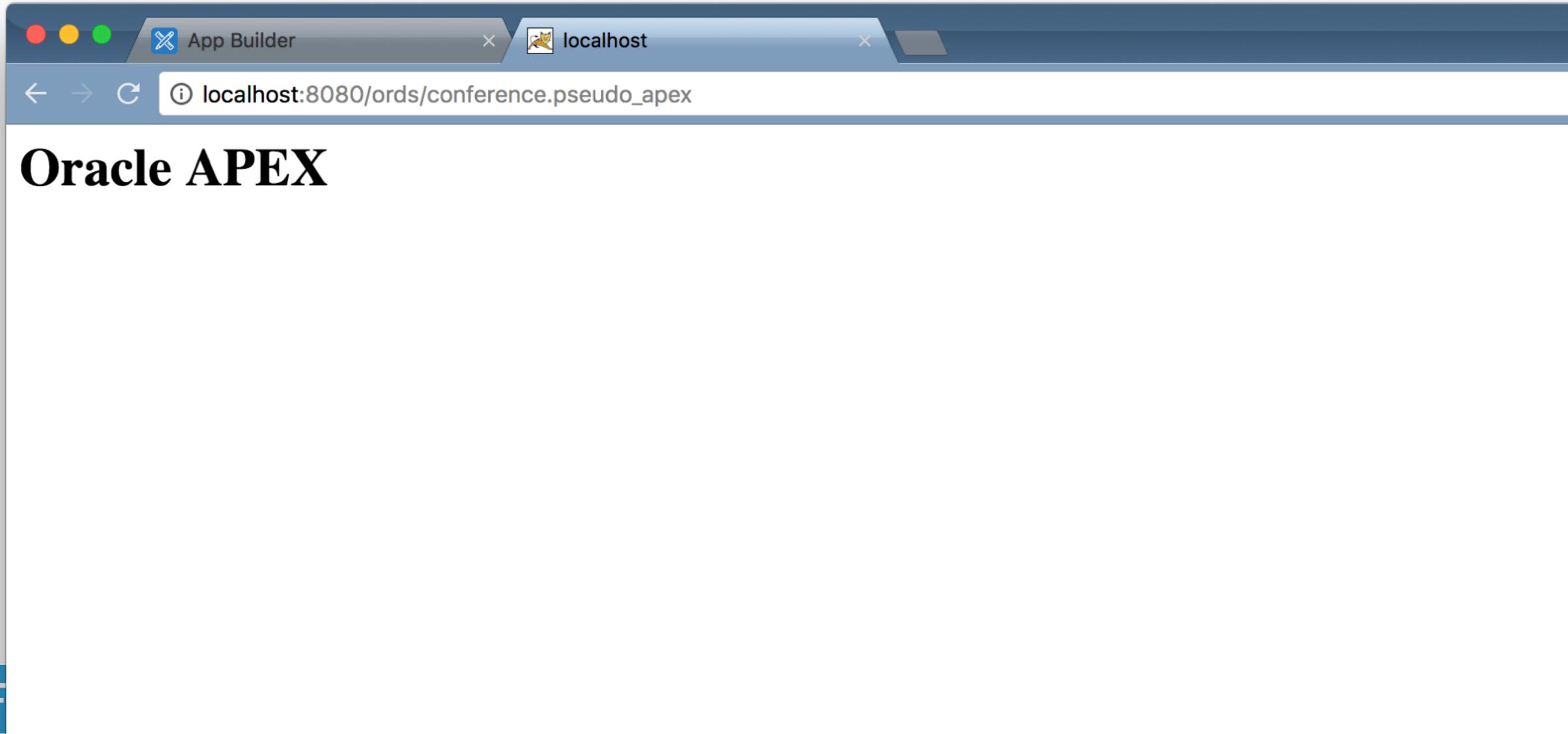
```
HTP.P('<h1>Oracle APEX</h1>');
```

Pseudo APEX Example

```
CREATE OR REPLACE PROCEDURE pseudo_apex
AS
BEGIN
    http.p('<h1>Oracle APEX</h1>');
END pseudo_apex;
/

GRANT EXECUTE ON pseudo_apex TO PUBLIC;
```

Pseudo APEX Example

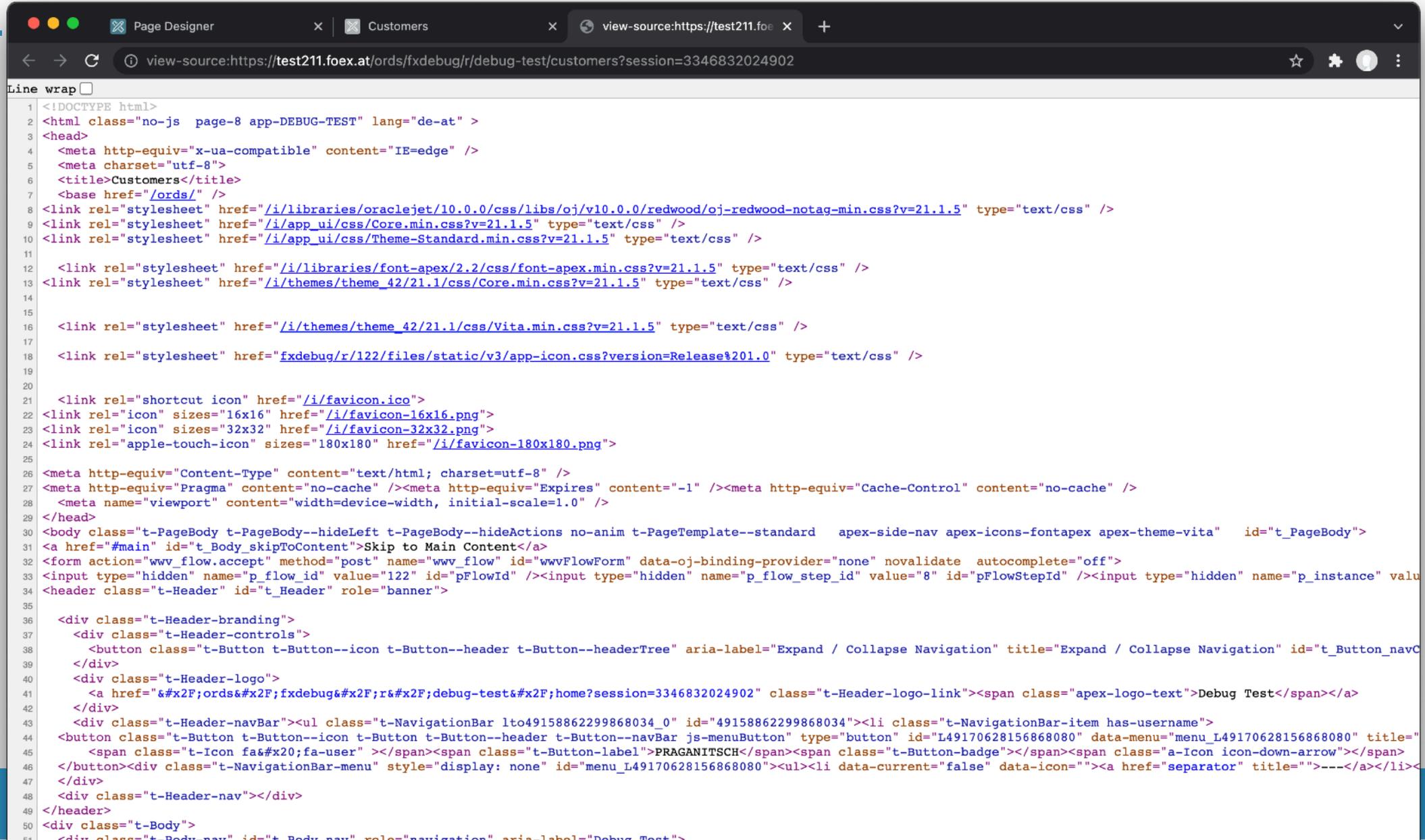


APEX is shown in a browser

The screenshot shows a web browser window with two tabs: 'Page Designer' and 'Customers'. The address bar shows the URL: `test211.foex.at/ords/fxdebug/r/debug-test/customers?session=3346832024902`. The page title is 'Debug Test' and the user is 'praganitsch'. Below the header is a 'Filter' section with three input fields: 'Mgr', 'Min Sal', and 'Deptno'. Below the filters is a search bar with a 'Go' button and an 'Actions' dropdown. A 'Create' button is located in the top right corner of the table area. The table displays employee data with columns: Ename, Job, Mgr, Hiredate, Sal, Comm, and Deptno. Each row has an edit icon on the left.

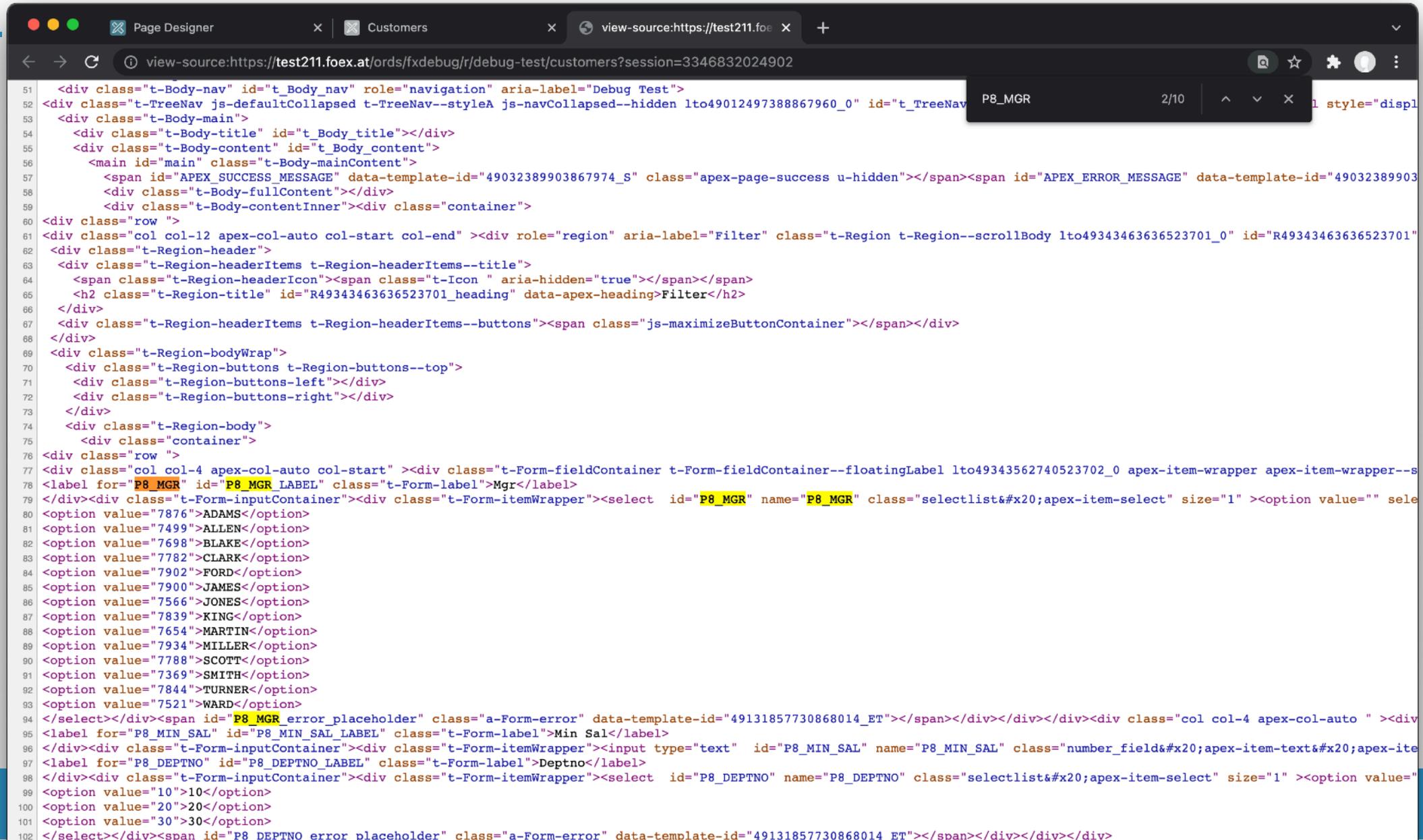
	Ename	Job	Mgr	Hiredate	Sal	Comm	Deptno
	KING	PRESIDENT		17.11.1981	5000		10
	BLAKE	MANAGER	KING	01.05.1981	2850		30
	CLARK	MANAGER	KING	09.06.1981	2450		10
	JONES	MANAGER	KING	02.04.1981	2975		20
	SCOTT	ANALYST	JONES	09.12.1982	3000		20
	FORD	ANALYST	JONES	03.12.1981	3000		20
	SMITH	CLERK	FORD	17.12.1980	800		20
	ALLEN	SALESMAN	BLAKE	20.02.1981	1600	300	30
	WARD	SALESMAN	BLAKE	22.02.1981	1250	500	30
	MARTIN	SALESMAN	BLAKE	28.09.1981	1250	1400	30
	TURNER	SALESMAN	BLAKE	08.09.1981	1500	0	30
	ADAMS	CLERK	SCOTT	12.01.1983	1100		20
	JAMES	CLERK	BLAKE	03.12.1981	950		30
	MILLER	CLERK	CLARK	23.01.1982	1300		10

To the browser it is just some HTML code



```
Line wrap 
1 <!DOCTYPE html>
2 <html class="no-js page-8 app-DEBUG-TEST" lang="de-at" >
3 <head>
4 <meta http-equiv="x-ua-compatible" content="IE=edge" />
5 <meta charset="utf-8">
6 <title>Customers</title>
7 <base href="/ords/" />
8 <link rel="stylesheet" href="/i/libraries/oraclejet/10.0.0/css/libs/oj/v10.0.0/redwood/oj-redwood-notag-min.css?v=21.1.5" type="text/css" />
9 <link rel="stylesheet" href="/i/app_ui/css/Core.min.css?v=21.1.5" type="text/css" />
10 <link rel="stylesheet" href="/i/app_ui/css/Theme-Standard.min.css?v=21.1.5" type="text/css" />
11
12 <link rel="stylesheet" href="/i/libraries/font-apex/2.2/css/font-apex.min.css?v=21.1.5" type="text/css" />
13 <link rel="stylesheet" href="/i/themes/theme_42/21.1/css/Core.min.css?v=21.1.5" type="text/css" />
14
15
16 <link rel="stylesheet" href="/i/themes/theme_42/21.1/css/Vita.min.css?v=21.1.5" type="text/css" />
17
18 <link rel="stylesheet" href="fxdebug/r/122/files/static/v3/app-icon.css?version=Release%201.0" type="text/css" />
19
20
21 <link rel="shortcut icon" href="/i/favicon.ico">
22 <link rel="icon" sizes="16x16" href="/i/favicon-16x16.png">
23 <link rel="icon" sizes="32x32" href="/i/favicon-32x32.png">
24 <link rel="apple-touch-icon" sizes="180x180" href="/i/favicon-180x180.png">
25
26 <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
27 <meta http-equiv="Pragma" content="no-cache" /><meta http-equiv="Expires" content="-1" /><meta http-equiv="Cache-Control" content="no-cache" />
28 <meta name="viewport" content="width=device-width, initial-scale=1.0" />
29 </head>
30 <body class="t-PageBody t-PageBody--hideLeft t-PageBody--hideActions no-anim t-PageTemplate--standard apex-side-nav apex-icons-fontapex apex-theme-vita" id="t_PageBody">
31 <a href="#main" id="t_Body_skipToContent">Skip to Main Content</a>
32 <form action="wv_flow.accept" method="post" name="wv_flow" id="wvFlowForm" data-oj-binding-provider="none" novalidate autocomplete="off">
33 <input type="hidden" name="p_flow_id" value="122" id="pFlowId" /><input type="hidden" name="p_flow_step_id" value="8" id="pFlowStepId" /><input type="hidden" name="p_instance" value="" id="pInstance" />
34 <header class="t-Header" id="t_Header" role="banner">
35
36 <div class="t-Header-branding">
37 <div class="t-Header-controls">
38 <button class="t-Button t-Button--icon t-Button--header t-Button--headerTree" aria-label="Expand / Collapse Navigation" title="Expand / Collapse Navigation" id="t_Button_navC">
39 </div>
40 <div class="t-Header-logo">
41 <a href="/ords/ords/fxdebug/r/debug-test/home?session=3346832024902" class="t-Header-logo-link"><span class="apex-logo-text">Debug Test</span></a>
42 </div>
43 <div class="t-Header-navBar"><ul class="t-NavigationBar lto49158862299868034_0" id="49158862299868034"><li class="t-NavigationBar-item has-username">
44 <button class="t-Button t-Button--icon t-Button--header t-Button--navBar js-menuButton" type="button" id="L49170628156868080" data-menu="menu_L49170628156868080" title="
45 <span class="t-Icon fa-user"></span><span class="t-Button-label">PRAGANITSCH</span><span class="t-Button-badge"><span class="a-Icon icon-down-arrow"></span>
46 </button><div class="t-NavigationBar-menu" style="display: none" id="menu_L49170628156868080"><ul><li data-current="false" data-icon=""><a href="separator" title=""></li>
47 </div>
48 <div class="t-Header-nav"></div>
49 </header>
50 <div class="t-Body">
51 <div class="t-Body-nav" id="t_Body_nav" role="navigation" aria-label="Debug Test">
```

All items can be found in the HTML code



```
51 <div class="t-Body-nav" id="t_Body_nav" role="navigation" aria-label="Debug Test">
52 <div class="t-TreeNav js-defaultCollapsed t-TreeNav--styleA js-navCollapsed--hidden lto49012497388867960_0" id="t_TreeNav
53 <div class="t-Body-main">
54 <div class="t-Body-title" id="t_Body_title"></div>
55 <div class="t-Body-content" id="t_Body_content">
56 <main id="main" class="t-Body-mainContent">
57 <span id="APEX_SUCCESS_MESSAGE" data-template-id="49032389903867974_S" class="apex-page-success u-hidden"></span><span id="APEX_ERROR_MESSAGE" data-template-id="49032389903
58 <div class="t-Body-fullContent"></div>
59 <div class="t-Body-contentInner"><div class="container">
60 <div class="row ">
61 <div class="col col-12 apex-col-auto col-start col-end" ><div role="region" aria-label="Filter" class="t-Region t-Region--scrollBody lto493434636523701_0" id="R493434636523701"
62 <div class="t-Region-header">
63 <div class="t-Region-headerItems t-Region-headerItems--title">
64 <span class="t-Region-headerIcon"><span class="t-Icon " aria-hidden="true"></span></span>
65 <h2 class="t-Region-title" id="R493434636523701_heading" data-apex-heading>Filter</h2>
66 </div>
67 <div class="t-Region-headerItems t-Region-headerItems--buttons"><span class="js-maximizeButtonContainer"></span></div>
68 </div>
69 <div class="t-Region-bodyWrap">
70 <div class="t-Region-buttons t-Region-buttons--top">
71 <div class="t-Region-buttons-left"></div>
72 <div class="t-Region-buttons-right"></div>
73 </div>
74 <div class="t-Region-body">
75 <div class="container">
76 <div class="row ">
77 <div class="col col-4 apex-col-auto col-start" ><div class="t-Form-fieldContainer t-Form-fieldContainer--floatingLabel lto49343562740523702_0 apex-item-wrapper apex-item-wrapper--s
78 <label for="P8_MGR" id="P8_MGR_LABEL" class="t-Form-label">Mgr</label>
79 </div><div class="t-Form-inputContainer"><div class="t-Form-itemWrapper"><select id="P8_MGR" name="P8_MGR" class="selectlist&#x20;apex-item-select" size="1" ><option value="" sele
80 <option value="7876">ADAMS</option>
81 <option value="7499">ALLEN</option>
82 <option value="7698">BLAKE</option>
83 <option value="7782">CLARK</option>
84 <option value="7902">FORD</option>
85 <option value="7900">JAMES</option>
86 <option value="7566">JONES</option>
87 <option value="7839">KING</option>
88 <option value="7654">MARTIN</option>
89 <option value="7934">MILLER</option>
90 <option value="7788">SCOTT</option>
91 <option value="7369">SMITH</option>
92 <option value="7844">TURNER</option>
93 <option value="7521">WARD</option>
94 </select></div><span id="P8_MGR_error_placeholder" class="a-Form-error" data-template-id="49131857730868014_ET"></span></div></div></div><div class="col col-4 apex-col-auto " ><div
95 <label for="P8_MIN_SAL" id="P8_MIN_SAL_LABEL" class="t-Form-label">Min Sal</label>
96 </div><div class="t-Form-inputContainer"><div class="t-Form-itemWrapper"><input type="text" id="P8_MIN_SAL" name="P8_MIN_SAL" class="number_field&#x20;apex-item-text&#x20;apex-ite
97 <label for="P8_DEPTNO" id="P8_DEPTNO_LABEL" class="t-Form-label">Deptno</label>
98 </div><div class="t-Form-inputContainer"><div class="t-Form-itemWrapper"><select id="P8_DEPTNO" name="P8_DEPTNO" class="selectlist&#x20;apex-item-select" size="1" ><option value=""
99 <option value="10">10</option>
100 <option value="20">20</option>
101 <option value="30">30</option>
102 </select></div><span id="P8_DEPTNO_error_placeholder" class="a-Form-error" data-template-id="49131857730868014_ET"></span></div></div></div>
```

Everything can be manipulated in the developer tools

The screenshot shows a web browser window with the URL `test211.foex.at/ords/fxdebug/r/debug-test/customers?debug=YES&session=14276150930962`. The page title is "Debug Test". Below the title is a "Filter" section with three input fields: "Mgr" (a dropdown menu), "Min Sal" (a text input containing "123"), and "Deptno" (a dropdown menu). Below the filter is a search bar with a "Go" button and an "Actions" dropdown. A "Create" button is located in the top right corner of the table area.

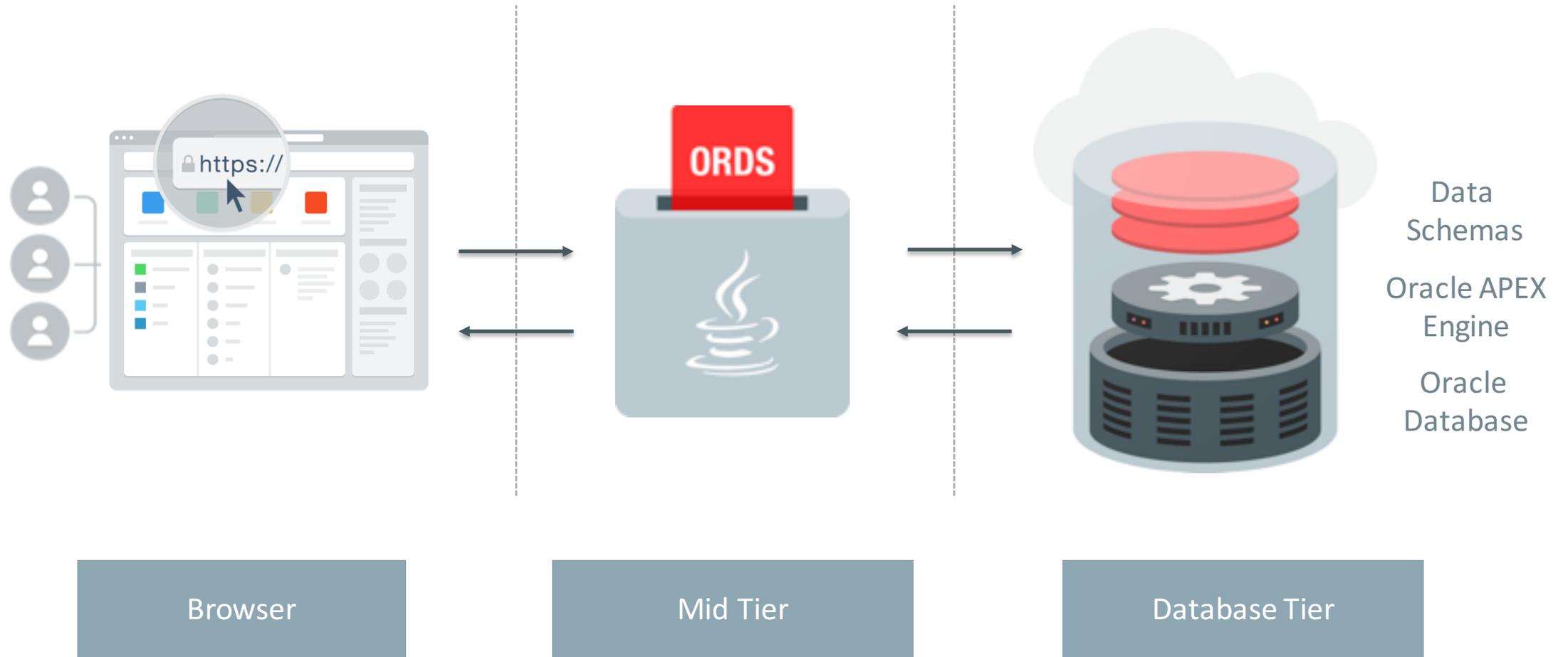
	Ename	Job	Mgr	Hiredate	Sal	Comm	Deptno
	KING	PRESIDENT		17.11.1981	5000		10
	BLAKE	MANAGER	KING	01.05.1981	2850		30
	CLARK						10

Below the table is a navigation bar with buttons: Home, Application 122, Edit Page 8, Session, View Debug, No Debug, Page Info, Quick Edit, and Customize. The developer tools are open at the bottom, showing the "Console" tab. The console log contains the following messages:

```
> apex.item('P8_MIN_SAL').setValue('123')
Dynamic Action Fired: Refresh Report on Filter chagne (NATIVE_REFRESH)
  ▶ {triggeringElement: input#P8_MIN_SAL.number_field.apex-item-text.apex-item-number, affectedElements: jquery.fn.init(1), action: {}, browserEvent: j...y.Event, data: undefined, ...}
< undefined
Server debug log message written: View Identifier = 1136052, Level = 3. https://test211.foex.at/ords/f?p=4000:939:12292760700977::N0:939:P939_PAGE_VIEW_ID:1136052#
  ▶ XHR finished loading: POST "https://test211.foex.at/ords/www_flow.ajax".
```

APEX Architecture

3 Tier Architecture



ORDS = Oracle REST Data Services

The database keeps current item values in Session State

The screenshot shows the Oracle APEX 'Session State' page. The browser address bar displays the URL: test211.foex.at/ords/f?p=4000:34:12547250068481:.... The page has a navigation menu with 'Session' selected. Below the navigation, there are controls for Page (8), Rows (50), Find, and View (Session State). The application details section shows: Application: 122 Debug Test, Session: 3346832024902, User: PRAGANITSCH, Workspace: 49006697903855153, and Browser Language: en. The main content area is titled 'Session State' and contains a table with the following data:

Application	Page	Item Name	Item Value	Display	Label	Encrypted	Data Item Id
122	8	P8_DEPTNO		Select List	Deptno	No	49343700703523704
122	8	P8_MIN_SAL		Number Field	Min Sal	No	49343619781523703

1 - 2

Activate Debug

Developer Toolbar

App Builder Home

localhost:8080/ords/f?p=25355:1:15653564451062:....

APEX Debugging Playground Log Out

Home

Exception in Process

Exception not displayed

Item Value not used

Wrong DA Target

Javascript Error

Page Load AJAX Calls

DA Endless Loop

Additional Notes

Slow Reports

Report based on Colle...

Home

Debugging in APEX

This demo Application shows some examples of things that can go wrong in APEX and gives a chance to show how to find those errors

Debug Levels

- 1 - critical error
- 2 - less critical error
- 4 - default level if debugging is enabled
- 5 - application: messages when procedures/functions are entered
- 6 - application: other messages within procedures/functions
- 8 - Application Express engine: messages when procedures/functions are entered
- 9 - Application Express engine: other messages within procedures/functions

Download

[Download](#) this application in order to install it in your workspace and look at the examples.

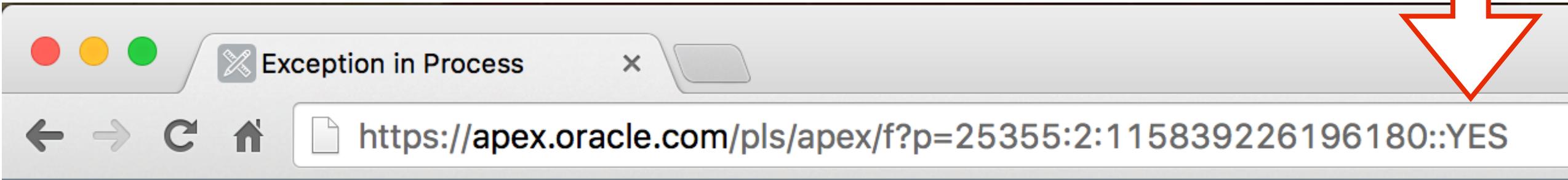
Demo Mode

Home Application 25355 Edit Page 1 Session View Debug Debug Page Info Quick Edit Theme Roller

Application Code

```
APEX_DEBUG.Enable (p_level)
```

URL

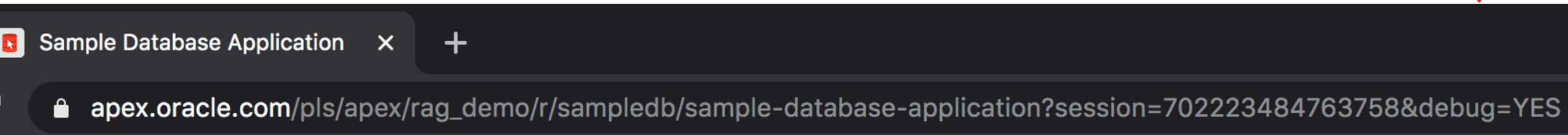
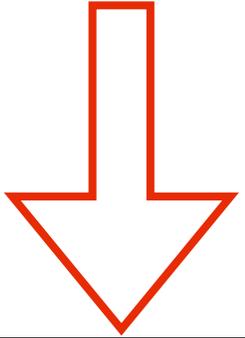


LEVEL1

...

LEVEL9

Friendly URL - APEX 20++



LEVEL1

...

LEVEL9

URL

Definition

Security

Globalization

User Interface

Application 25355

Show All

Name

Properties

Application Icon

Availability

Error Han

Name

Application **25355** ?

* Name ?

Application Alias ?

* Version ?

Application Group ?

Properties

Logging ?

Debugging ?

Remote Activation

```
APEX_SESSION.Set_Debug  
( p_level  
, p_session_id  
)
```

Instance wide Activation

```
APEX_INSTANCE_ADMIN.Set_Parameter  
( p_parameter => 'SYSTEM_DEBUG_LEVEL'  
, p_value      => 9  
)
```

Instance Debug Script d0.sql

```
cd apex/utilities/debug  
sqlplus / as sysdba
```

```
@d0
```

```
Changed debug level from "" to "9"
```

<https://www.oracle-and-apex.com/apex-instance-debugging-on-command-line/>

Instance Debug Script d0.sql

```
cd apex/utilities/debug  
sqlplus / as sysdba
```

```
@d0
```

```
Changed debug level from "9" to ""
```

Debug Levels

- 1 - critical error
- 2 - less critical error
- 4 - **default** level if debugging is enabled
- 5 - application: messages when procedures/functions are entered
- 6 - application: other messages within procedures/functions
- 8 - Application Express engine: messages when procedures/functions are entered
- 9 - Application Express engine: other messages within procedures/functions

FOEX Developer Addon

The screenshot displays the Oracle APEX Page Designer interface. The browser address bar shows the URL: `localhost:8080/ords/f?p=4000:4500:6801988134894::NO::FB_FLOW_ID,FB_FLOW_PAGE_ID:25355,1`. The top navigation bar includes 'ORACLE APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'App Gallery'. The main toolbar contains icons for file operations, a 'Go' button, and a 'Save' button. A red arrow points to a button labeled 'Level6' in the toolbar. The interface is divided into three main sections: a left-hand navigation pane, a central workspace, and a right-hand properties pane.

Left-hand navigation pane: Shows a tree view for 'Page 1: Home'. The tree includes 'Pre-Rendering', 'Regions', and 'Post-Rendering'. Under 'Regions', there are sub-sections for 'Breadcrumb Bar' (containing 'Breadcrumbs' and 'Attributes') and 'Content Body' (containing 'Debugging in APEX', 'Debug Levels', 'Recent Debug Sessions [Global Page]', 'Download', and 'Demo Mode', each with 'Attributes' and 'Items' sub-sections). A 'P1_DEMO_MODE' item is also visible under 'Post-Rendering'.

Central workspace: Displays the 'Home' page layout. It is organized into three main regions: 'BREADCRUMB BAR' (containing 'Breadcrumbs' and 'REGION CONTENT'), 'CONTENT BODY' (containing 'Debugging in APEX', 'Debug Levels', and 'Download', each with 'REGION CONTENT'), and 'ITEMS' (containing 'P1_DEMO_MODE').

Right-hand properties pane: Shows the configuration for the 'Page'. It is divided into several sections: 'Identification' (Name: Home, Page Alias, Title: Home, Page Group: - Select -), 'Appearance' (User Interface: Desktop, Page Mode: Normal, Page Template: Theme Default, Template Options: Use Template Defaults, CSS Classes, Media Type), and 'Navigation Menu'.

History

0.00: S H O W: application="100" page="1" workspace="" request="" session="345345"
0.00: Language derived from: FLOW_PRIMARY_LANGUAGE, current browser language: en-us
0.00: alter session set nls_language="AMERICAN"
0.00: alter session set nls_territory="AMERICA"
0.00: NLS: CSV charset=WE8MSWIN1252
0.00: ...NLS: Set Decimal separator="."
0.00: ...NLS: Set NLS Group separator=","
0.00: ...NLS: Set date format="DD-MON-RR"
0.00: ...Setting session time_zone to dbtimezone
0.00: NLS: Language=en-us
0.00: Application 100, Authentication: CUSTOM2, Page Template: 827414106324436
0.00: ...Supplied session ID can be used
0.00: ...Application session: 345345, user=DEMO
0.00: Session: Fetch session header information
0.00: ...Metadata: Fetch page attributes for application 100, page 1
0.00: Fetch session state from database
0.00: Branch point: BEFORE_HEADER
0.00: Fetch application meta data
0.00: Computation point: BEFORE_HEADER
0.00: ...Perform computation of item: P1_QUOTA, type=QUERY
0.00: ...P1_QUOTA=select to_char(quot, '\$999,999.99') from demo_users where user_name = :APP_USER
0.01: ...Session State: Save Item "P1_QUOTA" newValue=" \$15,000.00" "escape_on_input="N"
0.01: ...Perform computation of item: P1_TOTAL_SALES, type=QUERY
0.01: ...P1_TOTAL_SALES=select to_char(sum(o.order_total), '\$999,999.99') from demo_orders o, demo_users u where o.user_id = u.user_id and u.user_name = :APP_USER
0.01: ...Session State: Save Item "P1_TOTAL_SALES" newValue=" \$9,628.00" "escape_on_input="N"
0.01: Processing point: BEFORE_HEADER
0.01: Show page template header
0.01: Computation point: AFTER_HEADER
0.01: Processing point: AFTER_HEADER
0.01: Authorization Check: "326331436057166130" User: "DEMO" Component: "tab"

Sample Application

DEMO [Print](#) [Logout](#)

0.01: Region: Menu
Home

0.01: Computation point: BEFORE_BOX_BODY
0.01: Processing point: BEFORE_BOX_BODY
0.01: Region: My Quota

My Quota

Please install SVG Viewer to view the chart. [Click here to download.](#)
Your total sales are \$9,628.00
out of a quota of \$15,000.00.

0.01: Item: P1_QUOTA HIDDEN
0.02: Item: P1_TOTAL_SALES HIDDEN

0.02: Computation point: AFTER_BOX_BODY
0.02: Processing point: AFTER_BOX_BODY
0.02: Region: Charts

0.02: Region: My Top Orders

My Top Orders

0.02: show report
0.02: determine column headings
0.02: parse query as: FX_WS_001
0.02: binding: ":APP_USER"="APP_USER" value="DEMO"
0.02: print column headings
0.02: rows loop: 5 row(s)

	Order #	Customer Name	Order Date	Order Total
	7	LaGuardia, Fiorello	04-OCT-19	\$3,800.00
	3	Hartsfield, William	24-OCT-19	\$1,999.00
	1	Dulles, John	03-NOV-19	\$1,200.00
	4	Logan, Edward	19-OCT-19	\$750.00
	2	Hartsfield, William	29-OCT-19	\$599.00

0.02: Region: Sample Application

Sample Application

Welcome to the Sample Application. This application is designed to highlight the features of this product.

0.02: Region: Tasks

Tasks

- ▶ [About this Application](#)
- ▶ [Enter a New Order](#)
- ▶ [Add a New Customer](#)
0.02: Authorization Check: "300442842490532585" User: "DEMO" Component: "listItem"
- ▶ [Add a New Product](#)

View Debug

View Debug

Home

Application 25355

Edit Page 3

Session

View Debug

Debug

Show Grid

Quick Edit

Theme Roller



Debug Message Data

https://apex.oracle.com/pls/apex/f?p=4000:19:102196667817344:::RIR,19:IR_APPLICATION_ID,IR_PAGE_ID:25355,3

Items Pages Queries Tables PL/SQL Images **Debug** Session Errors

Q Go Actions

Application = 25355
Page = 3

View Identifier	Session Id	User	Application	Page	Path Info	Entries	Timestamp
734412624	112776823318447	PRAGANITSCH	25355	3	show	80	10 seconds ago
734410284	102892357244662	DEMO	25355	3	-	1	3 hours ago
734195668	127728793668104	PRAGANITSCH	25355	3	-	1	2 weeks ago
734191840	127728793668104	PRAGANITSCH	25355	3	show	451	2 weeks ago
734191720	127728793668104	PRAGANITSCH	25355	3	show	445	2 weeks ago
734191582	127728793668104	PRAGANITSCH	25355	3	show	80	2 weeks ago
734191538	127728793668104	PRAGANITSCH	25355	3	show	554	2 weeks ago
734191535	127728793668104	PRAGANITSCH	25355	3	show	445	2 weeks ago
734191458	127728793668104	PRAGANITSCH	25355	3	show	124	2 weeks ago
734191455	127728793668104	PRAGANITSCH	25355	3	show	80	2 weeks ago
734191450	127728793668104	PRAGANITSCH	25355	3	show	555	2 weeks ago
734191423	127728793668104	PRAGANITSCH	25355	3	show	444	2 weeks ago

View Debug

The screenshot shows the Oracle APEX Utilities page. The browser address bar displays the URL: `https://apex.oracle.com/pls/apex/f?p=4000:674:13747206680535::NO:::`. The page header includes the Oracle logo and navigation tabs for 'Application Express', 'Application Builder', 'SQL Workshop', 'Team Development', and 'Packaged Apps'. The breadcrumb trail shows 'Application 25355 > Utilities'. The main content area is divided into two columns of utility cards. The 'Debug Messages' card is highlighted in blue. The right sidebar contains a 'Page Specific Utilities' menu with various utility categories.

Utilities		Page Specific Utilities
Application Dashboard Review a summary of this application.	Advisor Perform various checks on this application, including programming errors and best practices.	Cross Page Utilities >
Upgrade Application After upgrading to a new release, review components for upgrading to include the latest features.	Recently Updated Pages View a history of the page updates made on this application.	Page Groups >
Attribute Dictionary Manage item / column user interface defaults for a selected page.	Change History View a detailed report of component updates made on this application.	Region Utilities >
Database Object Dependencies Review the database objects referenced by this application.	Debug Messages Review debug messages generated by this application.	Button Utilities >
Application Express Views Query the various views against Application Express metadata.	Export Repository View a history of application exports.	Item Utilities >
		Computation Utilities >
		Validation Utilities >
		Process Utilities >
		Dynamic Action Utilities >
		Branch Utilities >
		Interactive Report Utilities
		Saved Reports >
		Subscriptions >

View Debug

The screenshot displays the Oracle APEX interface. At the top, the title bar reads "SYS Cloud - ragtest". Below it, the "Query Builder" tab is active, showing a SQL query in a text editor:

```
1 SELECT *
2 FROM APEX_DEBUG_MESSAGES
3 ;
4
5
6
7
```

Below the query editor, the "Query Result" tab is active, showing the results of the query. The status bar indicates "All Rows Fetched: 41 in 0.637 seconds". The results are displayed in a table with the following columns: ID, PAGE_VIEW_ID, MESSAGE_TIMESTAMP, ELAPSED_TIME, EXECUTION_TIME, and MESSAGE.

ID	PAGE_VIEW_ID	MESSAGE_TIMESTAMP	ELAPSED_TIME	EXECUTION_TIME	MESSAGE
1	2000	1 28.09.2015 15:49:54.511035000 +00:00	0.190375	(null)	check session integrity: security_group_id mis
2	22000	21 29.09.2015 05:55:17.316857000 +00:00	0.222492	(null)	check session integrity: security_group_id mis
3	24000	23 29.09.2015 05:55:43.524834000 +00:00	1.382096	(null)	AUTHORIZATION WITH ID #899965464341846074 NOT
4	26000	25 29.09.2015 05:55:48.061685000 +00:00	0.07588	(null)	AUTHORIZATION WITH ID #899965464341846074 NOT
5	42000	41 11.11.2015 11:12:58.160728000 +00:00	0.425447	(null)	check session integrity: security_group_id mis
6	62000	61 11.11.2015 13:24:12.186067000 +00:00	0.144358	(null)	check session integrity: security_group_id mis
7	82000	81 11.11.2015 16:19:35.322857000 +00:00	1.857383	(null)	AUTHORIZATION WITH ID #900258505158109215 NOT
8	84000	83 11.11.2015 16:19:39.164532000 +00:00	0.041156	(null)	AUTHORIZATION WITH ID #900258505158109215 NOT
9	86000	85 11.11.2015 16:19:39.973335000 +00:00	0.058951	(null)	AUTHORIZATION WITH ID #900258505158109215 NOT
10	88000	87 11.11.2015 16:19:40.007006000 +00:00	0.084259	(null)	AUTHORIZATION WITH ID #900258505158109215 NOT
11	102000	101 15.11.2015 18:11:15.620683000 +00:00	0.029049	(null)	check session integrity: security_group_id mis
12	104000	103 15.11.2015 18:11:28.996067000 +00:00	1.927164	0.000333	Logging exception: Sqlerrm: ORA-20987: APEX -

Browser Debug

Browser Developer Tools

The screenshot shows a web browser window with the URL `localhost:8080/ords/f?p=25355:1:6159178170669::LEVEL6::`. The page title is "APEX Debugging Playground" and it includes a "Log Out" link. The main content area displays "Home" and "Debugging in APEX" with a description: "This demo Application shows some examples of things that can go wrong in APEX and gives a chance to show how to find those errors". Below this, there is a "Debug Levels" section with a list: "1 - critical error" and "2 - less critical error".

The browser's developer tools are open to the "Network" tab. The network log shows a list of requests with columns for Status, Method, Domain, File, Prot..., Cause, Type, Transferred, Size, and timing. The requests are all successful (200) and include various CSS files, images, and a JavaScript file.

Status	Method	Domain	File	Prot...	Cause	Type	Transferred	Size	0 ms	1.28 s	2.56 s	3.84 s	5.12 s
200	GET	localhost:8080	jquery_ui_menu.css	HTTP/1.1	stylesheet	css	cached	1.43 KB					
200	GET	localhost:8080	jquery_ui_progressbar.css	HTTP/1.1	stylesheet	css	cached	605 B					
200	GET	localhost:8080	jquery_ui_resizable.css	HTTP/1.1	stylesheet	css	cached	1.14 KB					
200	GET	localhost:8080	jquery_ui_selectable.css	HTTP/1.1	stylesheet	css	cached	260 B					
200	GET	localhost:8080	jquery_ui_slider.css	HTTP/1.1	stylesheet	css	cached	1.34 KB					
200	GET	localhost:8080	jquery_ui_spinner.css	HTTP/1.1	stylesheet	css	cached	1.14 KB					
200	GET	localhost:8080	favicon-180x180.png	HTTP/1.1	img	png	cached	1.56 KB					
200	GET	localhost:8080	favicon-32x32.png	HTTP/1.1	img	png	cached	724 B					
200	GET	localhost:8080	utr-base.js	HTTP/1.1	xhr	js	cached	4.70 KB					

Summary: 205 requests, 2.92 MB / 203.88 KB transferred, Finish: 4.14 s, DOMContentLoaded: 2.98 s, load: 3.01 s

Browser Developer Tools

The screenshot shows a web browser window with the address bar displaying `localhost:8080/ords/f?p=25355:1:17848798061155::LEVEL6::`. The page title is "APEX Debugging Playground" and it includes a "Log Out" link. The main content area has a "Home" heading and a section titled "Debugging in APEX" with the text: "This demo Application shows some examples of things that can go wrong in APEX and gives a chance to show how to find those errors". Below this is a "Debug Levels" section.

The browser's developer tools are open to the Network tab, showing a list of resources. The table below represents the data shown in the Network tab:

Name	Method	Status	Proto...	Type	Initiator	Size	Time	Waterfall
IG.css	GET	200	http/1.1	styles...	f?p=25355:1:1784879806...	1.5 KB	611 ms	
IGDialog.css	GET	200	http/1.1	styles...	f?p=25355:1:1784879806...	4.1 KB	592 ms	
IRR.css	GET	200	http/1.1	styles...	f?p=25355:1:1784879806...	2.4 KB	611 ms	
IconList.css	GET	200	http/1.1	styles...	f?p=25355:1:1784879806...	2.4 KB	590 ms	
LiveTemplateOptions.css	GET	200	http/1.1	styles...	f?p=25355:1:1784879806...	9.6 KB	598 ms	
Menu.css	GET	200	http/1.1	styles...	f?p=25355:1:1784879806...	4.2 KB	596 ms	
RecordView.css	GET	200	http/1.1	styles...	f?p=25355:1:1784879806...	1.6 KB	610 ms	
Splitter.css	GET	200	http/1.1	styles...	f?p=25355:1:1784879806...	4.1 KB	609 ms	
Toolbar.css	GET	200	http/1.1	styles...	f?p=25355:1:1784879806...	2.3 KB	625 ms	
Tree.css	GET	200	http/1.1	styles...	f?p=25355:1:1784879806...	3.7 KB	623 ms	
apex-5-icon-font.woff2	GET	200	http/1.1	font	f?p=25355:1:1784879806...	(from me...	0 ms	
Font-APEX-Small.woff2	GET	200	http/1.1	font	f?p=25355:1:1784879806...	(from me...	0 ms	
data:image/svg+xml;...	GET	200	data	svg+...	f?p=25355:1:1784879806...	(from me...	0 ms	

203 requests | 2.8 MB transferred | 2.9 MB resources | Finish: 1.55 s

Browser Developer Tools

APEX Debugging Playground Log Out

Home

Debugging in APEX

This demo Application shows some examples of things that can go wrong in APEX and gives a chance to show how to find those errors

Debug Levels

- 1 - critical error
- 2 - less critical error
- 4 - default level if debugging is enabled
- 5 - application: messages when procedures/functions are entered

Name	Domain	Type	Transfer Size	Time
f	localhost	document	16.31 KB	156ms
Core.css	localhost	css	(memory)	0.11ms
highcontrast.css	localhost	css	(memory)	0.11ms
Base.css	localhost	css	(memory)	0.09ms
Button.css	localhost	css	(memory)	0.07ms
Calendar.css	localhost	css	(memory)	0.11ms
Combobox.css	localhost	css	(memory)	0.13ms
CustomizeDialog.css	localhost	css	(memory)	0.18ms

Dynamic Actions shown in Console when Debug activated

The screenshot shows the APEX Debugging Playground interface. The main content area displays a "Customers" report with a "Refresh Report" button. The console at the bottom shows a log message for the "Refresh Report (NATIVE_REFRESH)" dynamic action, including the triggering element and affected elements.

Customers

Refresh Report

Customer Report

Customer Id	Now	Cust First Name	Cust Last Name	Cust Street Address1	Cust Street Address2	Cust City	C St
1	26.03.2019 10:51:19	John	Dulles	45020 Aviation Driveasdfas		Sterling	V
	26.03.2019	William	Hartfield	6000 North		Atlanta	G

Notes

The Button "Refresh" has a Dynamic Action attached which triggers a Refresh on "Customers".

When clicking the Button you can see that the Report is not refreshed.

Now switch on DEBUG and open the Javascript Console of your browser. There you'll see a log message when the Button is clicked.

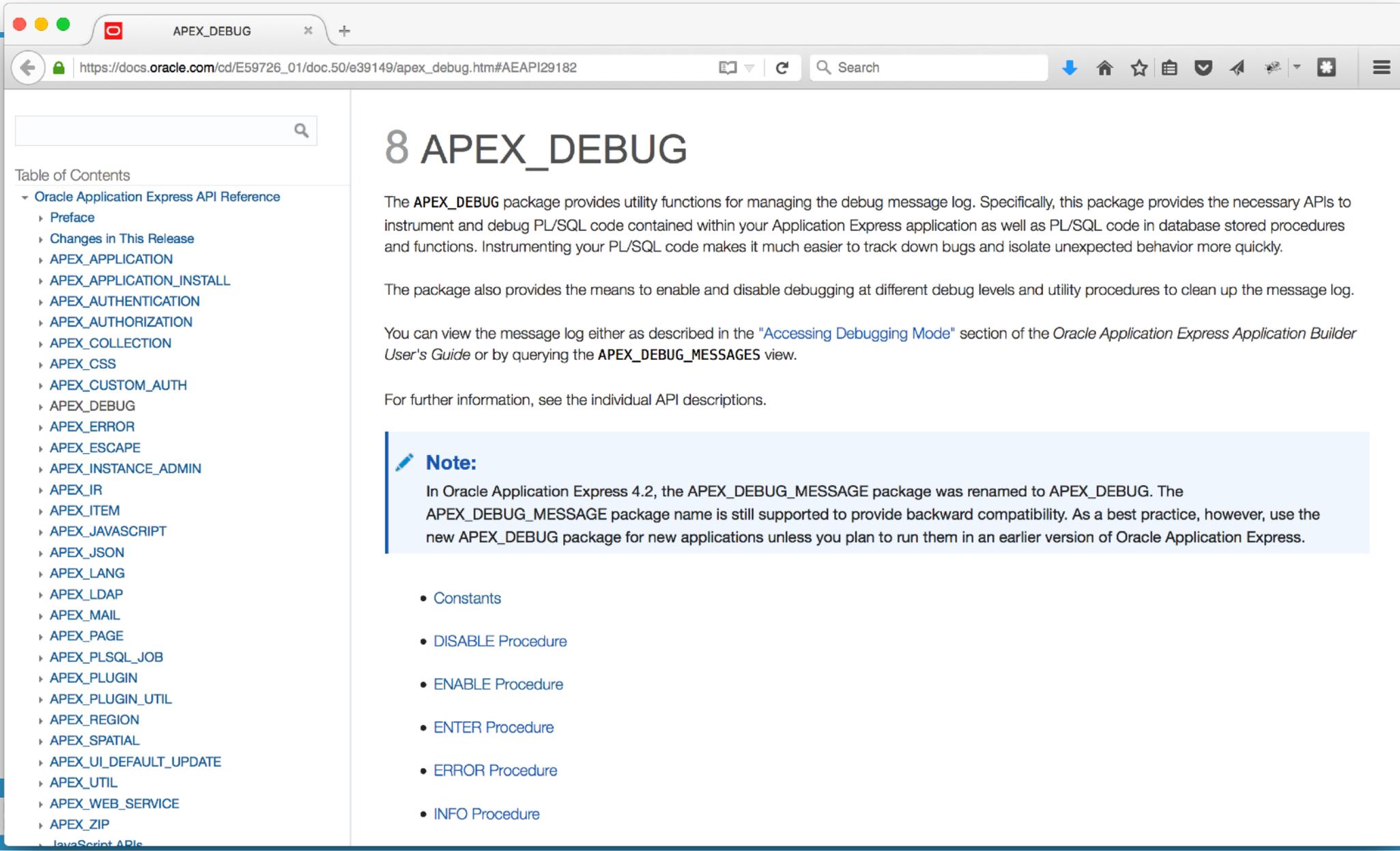
That log message also lets you investigate the "Affected Elements" object, which indicates that

Console Log:

```
Dynamic Action Fired: Refresh Report (NATIVE_REFRESH)
  Object { triggeringElement: button#B15599089012073840838.t-Button.t-Button--icon.t-Button--iconRight.lto15599089012073840838_0.t-Button--hot , affectedElements: {...}, action: {...}, browserEvent: {...}, data: undefined, resumeCallback: undefined }
```

Instrumentalisation

Instrumentalisation



The screenshot shows a browser window with the URL `https://docs.oracle.com/cd/E59726_01/doc.50/e39149/apex_debug.htm#AEAPI29182`. The page title is "8 APEX_DEBUG". The left sidebar contains a "Table of Contents" for the "Oracle Application Express API Reference", listing various API categories such as Preface, Changes in This Release, APEX_APPLICATION, APEX_APPLICATION_INSTALL, APEX_AUTHENTICATION, APEX_AUTHORIZATION, APEX_COLLECTION, APEX_CSS, APEX_CUSTOM_AUTH, APEX_DEBUG, APEX_ERROR, APEX_ESCAPE, APEX_INSTANCE_ADMIN, APEX_IR, APEX_ITEM, APEX_JAVASCRIPT, APEX_JSON, APEX_LANG, APEX_LDAP, APEX_MAIL, APEX_PAGE, APEX_PLSQL_JOB, APEX_PLUGIN, APEX_PLUGIN_UTIL, APEX_REGION, APEX_SPATIAL, APEX_UI_DEFAULT_UPDATE, APEX_UTIL, APEX_WEB_SERVICE, and APEX_ZIP. The main content area features the heading "8 APEX_DEBUG" followed by an introductory paragraph, a paragraph about enabling and disabling debugging, a paragraph about viewing the message log, and a "Note" section. The "Note" section states that in Oracle Application Express 4.2, the APEX_DEBUG_MESSAGE package was renamed to APEX_DEBUG, and that the old package name is still supported for backward compatibility. Below the note is a list of API items: Constants, DISABLE Procedure, ENABLE Procedure, ENTER Procedure, ERROR Procedure, and INFO Procedure.

8 APEX_DEBUG

The `APEX_DEBUG` package provides utility functions for managing the debug message log. Specifically, this package provides the necessary APIs to instrument and debug PL/SQL code contained within your Application Express application as well as PL/SQL code in database stored procedures and functions. Instrumenting your PL/SQL code makes it much easier to track down bugs and isolate unexpected behavior more quickly.

The package also provides the means to enable and disable debugging at different debug levels and utility procedures to clean up the message log.

You can view the message log either as described in the "[Accessing Debugging Mode](#)" section of the *Oracle Application Express Application Builder User's Guide* or by querying the `APEX_DEBUG_MESSAGES` view.

For further information, see the individual API descriptions.

Note:

In Oracle Application Express 4.2, the `APEX_DEBUG_MESSAGE` package was renamed to `APEX_DEBUG`. The `APEX_DEBUG_MESSAGE` package name is still supported to provide backward compatibility. As a best practice, however, use the new `APEX_DEBUG` package for new applications unless you plan to run them in an earlier version of Oracle Application Express.

- Constants
- `DISABLE` Procedure
- `ENABLE` Procedure
- `ENTER` Procedure
- `ERROR` Procedure
- `INFO` Procedure

```
1 PROCEDURE foo (  
2     p_widget_id in number,  
3     p_additional_data in varchar2,  
4     p_emp_rec in emp%rowtype )  
5 IS  
6 BEGIN  
7     APEX_DEBUG.enter  
8         ( 'foo'  
9           , 'p_widget_id'      , p_widget_id  
10          , 'p_additional_data', p_additional_data  
11          , 'p_emp_rec.id'     , p_emp_rec.id  
12          );  
13  
14     APEX_DEBUG.log_page_session_state;  
15  
16     MYPACKAGE.MYFUNCTION;  
17  
18     APEX_DEBUG.log_dbms_output;  
19  
20     APEX_DEBUG.info('foo successfully finished!');  
21 EXCEPTION  
22     WHEN OTHERS THEN  
23         APEX_DEBUG.error('Critical error %s', SQLERRM);  
24         RAISE;  
25 END F00;
```

Instrumentalisation

```
9  begin
10  apex_debug.enable_dbms_output(p_prefix=>'Debug-');
11  apex_debug.error('This is an error');
12  apex_debug.warn('Oho, Warning !');
13  apex_debug.info('info');
14  end;
15  /
```

▶ Query Result x ▶ Script Output x

     | Task completed in 0.278 seconds

```
Debug-ERR|This is an error
Debug-WRN|Oho, Warning !
Debug-INF|info
```

Instrumentalisation - Javascript

The screenshot shows a web browser window with the title "JavaScript APIs". The address bar contains the URL: `https://docs.oracle.com/cd/E59726_01/doc.50/e39149/javascript_api.htm#AEAPI29975`. The page content is titled "apex.debug namespace" and includes a description: "This namespace stores all debug functions of Oracle Application Express." Below this is a list of functions and constants. A "Table of Contents" sidebar is visible on the left, listing various API categories. At the bottom, a code block shows the definition of `apex.debug.LOG_LEVEL`.

JavaScript APIs

`https://docs.oracle.com/cd/E59726_01/doc.50/e39149/javascript_api.htm#AEAPI29975`

apex.debug namespace

This namespace stores all debug functions of Oracle Application Express.

- Log Level Constants
- `apex.debug.error(...*)`
- `apex.debug.getLevel()`
- `apex.debug.info(...*)`
- `apex.debug.log(...*)`
- `apex.debug.message(pLevel,...*)`
- `apex.debug.setLevel(pLevel)`
- `apex.debug.trace(...*)`
- `apex.debug.warn(...*)`

Log Level Constants

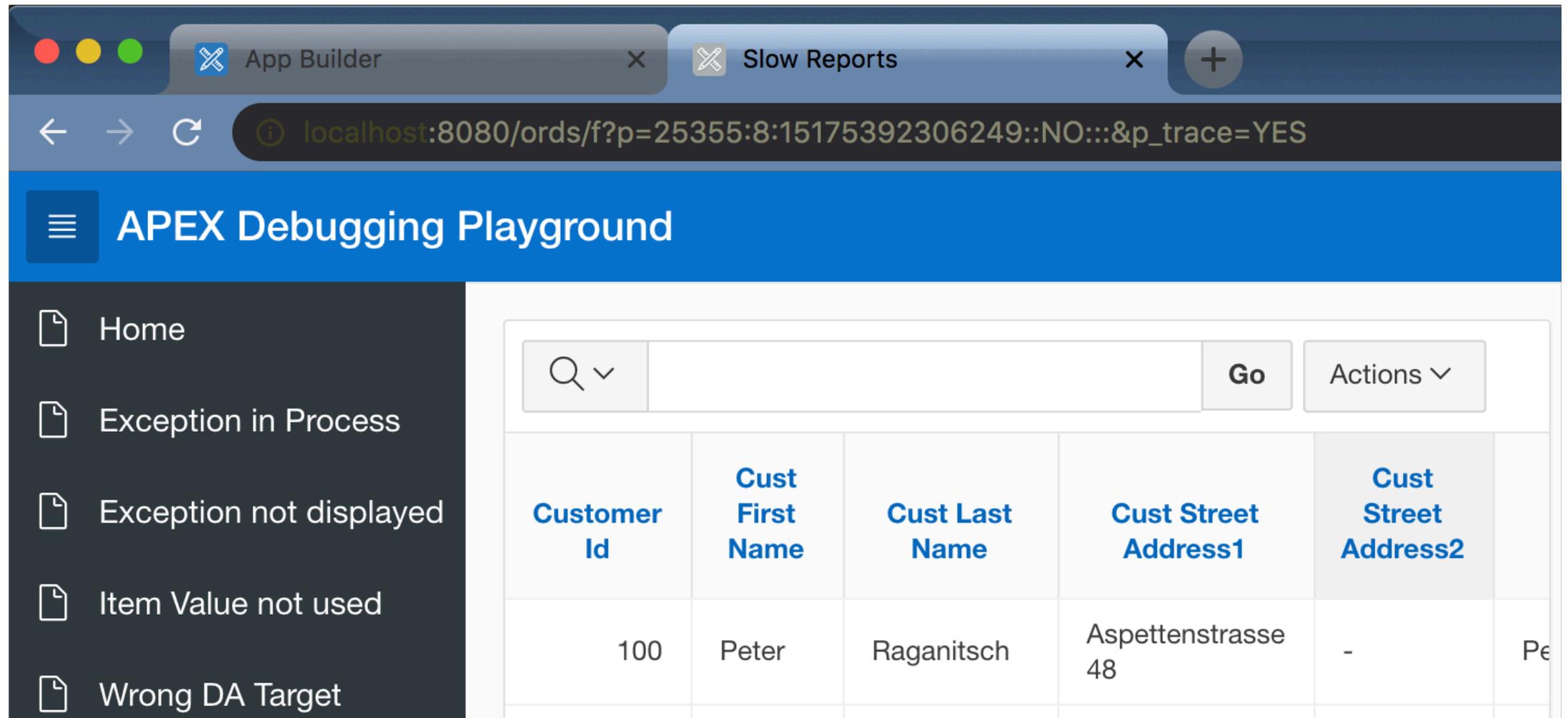
LOG_LEVEL

```
apex.debug.LOG_LEVEL = {
    OFF: 0,
    ERROR: 1,
    WARN: 2,
    INFO: 4
```

PL/SQL Debugger

Trace

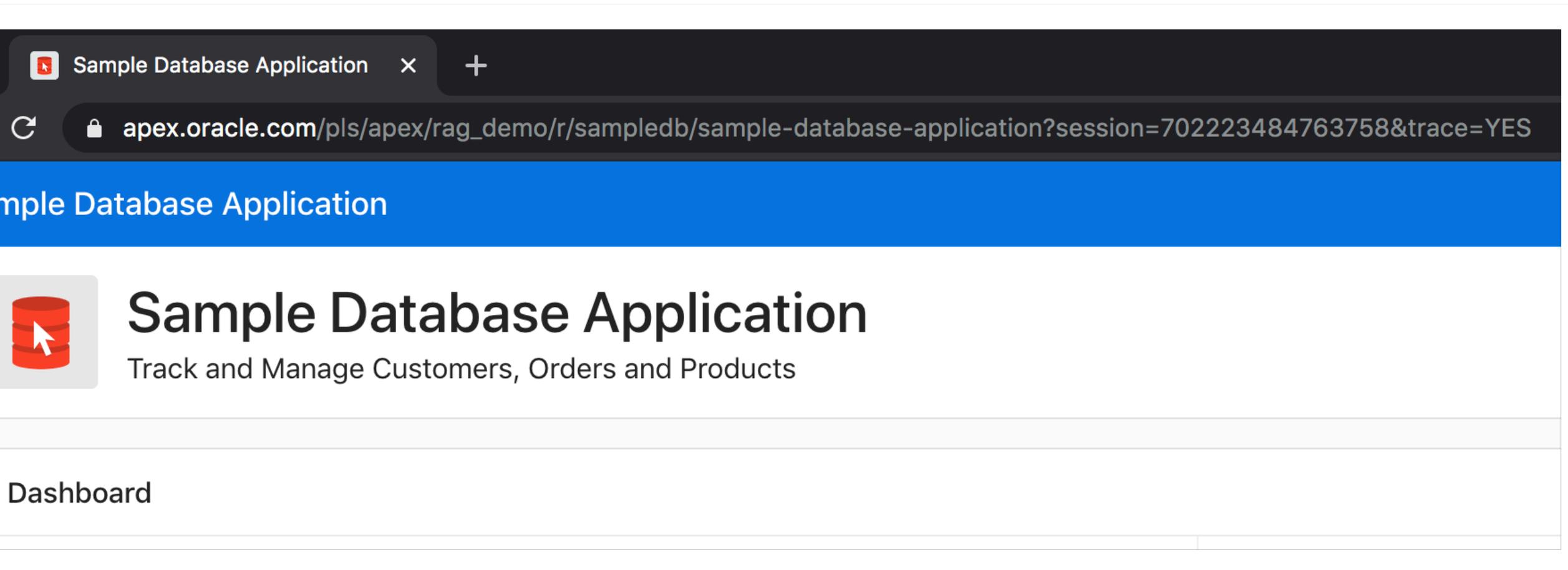
Create Trace using p_trace=YES



The screenshot shows a web browser window with two tabs: "App Builder" and "Slow Reports". The address bar displays the URL `localhost:8080/ords/f?p=25355:8:15175392306249::NO:::&p_trace=YES`. The page title is "APEX Debugging Playground". On the left, a navigation menu lists several items: "Home", "Exception in Process", "Exception not displayed", "Item Value not used", and "Wrong DA Target". The main content area features a search bar with a magnifying glass icon and a "Go" button, followed by an "Actions" dropdown menu. Below this is a table with the following data:

Customer Id	Cust First Name	Cust Last Name	Cust Street Address1	Cust Street Address2	
100	Peter	Raganitsch	Aspettenstrasse 48	-	Pe

Friendly URL - APEX 20: Create Trace using &trace=YES



The screenshot shows a web browser window with a single tab titled "Sample Database Application". The address bar contains the URL: `apex.oracle.com/pls/apex/rag_demo/r/sampledbs/sample-database-application?session=702223484763758&trace=YES`. The page header is blue and contains the text "Sample Database Application". Below the header, there is a red icon of a database cylinder with a white mouse cursor pointing at it. To the right of the icon, the main heading is "Sample Database Application" in a large, bold, black font, followed by the subtitle "Track and Manage Customers, Orders and Products" in a smaller black font. At the bottom of the page, there is a light gray navigation bar with the text "Dashboard".

Query Trace File contents

```
SQL> select PAYLOAD
 2  from   V$DIAG_TRACE_FILE_CONTENTS
 3  where  TRACE_FILENAME = 'orcl12c_ora_4163.trc'
 4  order by LINE_NUMBER;
```

PAYLOAD

```
Trace file /u01/app/oracle/diag/rdbms/orcl12c/orcl12c/trace/orcl12c_ora_4163.trc
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production
Build label:      RDBMS_12.2.0.1.0_LINUX.X64_161003
ORACLE_HOME:     /u01/app/oracle/product/12.2/db_1
System name:     Linux
Node name:       vbgeneric
Release:         3.8.13-118.14.1.el7uek.x86_64
Version:         #2 SMP Mon Oct 31 17:32:03 PDT 2016
Machine:         x86_64
Instance name:  orcl12c
Redo thread mounted by this instance: 1
Oracle process number: 49
Unix process pid: 4163, image: oracle@vbgeneric
```

<https://connor-mcdonald.com/2017/01/23/how-do-i-get-my-trace-files-on-a-db-as-a-service/>

```
*** 2017-01-22T23:53:13.661980-05:00 (ORCL(3))
```

New in APEX 19+

Console Information about AJAX Debug logs

The screenshot shows a web browser window displaying a dashboard for "Sample Database Application". The dashboard includes a search bar, a navigation menu, and several data cards: "Monthly Sales" (\$2,660), "Monthly Orders" (3), "Total Products" (10), and "Total Customers" (7). Below these are sections for "Top Customers" (listing Bradley, Eugene) and "Top Products" (listing Jacket - 18 x \$150).

The Chrome DevTools console is open at the bottom, showing the following log entries:

- Warning: DevTools failed to load SourceMap: Could not load content for chrome-extension://hdokiejnpimakedhajhdlcegeplioahd/sourcemaps/onloadwff.js.map: HTTP error: status code 404, net::ERR_UNKNOWN_URL_SCHEME
- XHR finished loading: GET "https://apex.oracle.com/i/libraries/oraclejet/8.0.0/js/libs/oj/v8.0.0/resources/nls/localeElements.js".
- XHR finished loading: GET "https://apex.oracle.com/i/libraries/oraclejet/8.0.0/js/libs/oj/v8.0.0/resources/nls/en/localeElements.js".
- Error: Server debug log message written: View Identifier = 914523619, Level = ERROR.

```
console.trace
a.error @ desktop_all.min.js?v=20.1.0.00.11:5
m @ desktop_all.min.js?v=20.1.0.00.11:13
n @ desktop_all.min.js?v=20.1.0.00.11:13
apex.event.trigger.H.success @ desktop_all.min.js?v=20.1.0.00.11:13
c @ desktop_all.min.js?v=20.1.0.00.11:2
```

Logfiles

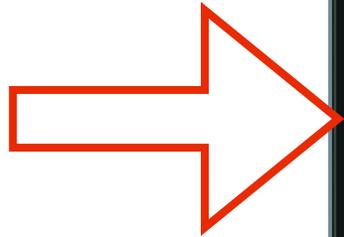
Tomcat Logfile

```
[root@0d1ae146ac39 ~]# tail /opt/tomcat/logs/catalina.2019-03-26.log
    at org.apache.coyote.http11.InternalNioOutputStream.write(SocketOutputStream.java:140)
    at org.apache.coyote.http11.InternalNioOutputStream.addToBB(SocketOutputStream.java:198)
    at org.apache.coyote.http11.InternalNioOutputStream.access$000(SocketOutputStream.java:42)
    at org.apache.coyote.http11.InternalNioOutputStream$SocketOutputStream.doWrite(SocketOutputStream.java:321)
    at org.apache.coyote.http11.filters.ChunkedOutputFilter.doWrite(ChunkedOutputFilter.java:118)
    at org.apache.coyote.http11.AbstractOutputStream.doWrite(AbstractOutputStream.java:256)
    at org.apache.coyote.Response.doWrite(Response.java:491)
    at org.apache.catalina.connector.OutputStream.realWriteBytes(OutputStream.java:391)
    ... 79 more

[root@0d1ae146ac39 ~]# █
```

Turn on ORDS debug messages

```
[root@0d1ae146ac39 ~]# cat /u01/ords/defaults.xml
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<!DOCTYPE properties SYSTEM "http://java.sun.com/dtd/properties.dtd">
<properties>
<comment>Saved on Sun Sep 30 19:11:58 CEST 2018</comment>
<entry key="cache.caching">>false</entry>
<entry key="cache.directory">/tmp/apex/cache</entry>
<entry key="cache.duration">days</entry>
<entry key="cache.expiration">7</entry>
<entry key="cache.maxEntries">500</entry>
<entry key="cache.monitorInterval">60</entry>
<entry key="cache.procedureNameList"/>
<entry key="cache.type">lru</entry>
<entry key="db.hostname">localhost</entry>
<entry key="db.port">1521</entry>
<entry key="db.sid">orcl</entry>
<entry key="debug.debugger">>false</entry>
<entry key="debug.printDebugToScreen">>false</entry>
<entry key="error.keepErrorMessage">>true</entry>
<entry key="error.maxEntries">50</entry>
<entry key="jdbc.DriverType">thin</entry>
<entry key="jdbc.InactivityTimeout">1800</entry>
<entry key="jdbc.InitialLimit">6</entry>
<entry key="jdbc.MaxConnectionReuseCount">10000</entry>
<entry key="jdbc.MaxLimit">40</entry>
<entry key="jdbc.MaxStatementsLimit">10</entry>
<entry key="jdbc.MinLimit">6</entry>
<entry key="jdbc.statementTimeout">900</entry>
<entry key="log.logging">>false</entry>
<entry key="log.maxEntries">50</entry>
<entry key="misc.compress"/>
<entry key="misc.defaultPage">apex</entry>
<entry key="security.disableDefaultExclusionList">>false</entry>
```



Alert Log

```
14 SELECT message_text
15 FROM v$diag_alert_ext
```

Query Result x

SQL | Fetched 50 rows in 0.024 seconds

	MESSAGE_TEXT
1	Starting ORACLE instance (normal) (OS id: 9657)
2	*****
3	Dump of system resources acquired for SHARED GLOBAL AREA (SGA)
4	Domain name: docker/e8ec6ad0253d8262b7caf61a86118819298349d7da7d6b40bb457c8bda5a1e73
5	Per process system memlock (soft) limit = 80M
6	Expected per process system memlock (soft) limit to lock
7	SHARED GLOBAL AREA (SGA) into memory: 1538M
8	Available system pagesizes:
9	4K, 2048K
10	Supported system pagesize(s):
11	PAGESIZE AVAILABLE_PAGES EXPECTED_PAGES ALLOCATED_PAGES ERROR(s)
12	4K Configured 3 393219 NONE

A blue-tinted photograph of a large audience in a lecture hall. Many people have their hands raised, indicating an interactive session or a Q&A period. The text "Questions?" is overlaid in the center in a white, bold, sans-serif font.

Questions?

D2D

APEXd2d

Real-time problem-solving for APEX developers by APEX developers



Sign-up to help or get info @

apexd2d.net

1st event:



Useful Links

Useful Links

- <https://apex.oracle.com/pls/apex/f?p=25355>
- <https://apex.oracle.com/shortcuts>
- https://www.salvis.com/blog/2019/04/08/using-dbms_debug-in-sql-developer/
- <https://www.apexd2d.net>

```
APEX_DEBUG.Enable;
```

Thank you!

Follow FOEX:



@FOEXplugins



FOEXPlugins



foex-gmbh



www.foex.at