

JavaScript in Apex

Aljaž Mali





Quick introduction

- IT Solutions Architect at Abakus plus, d.o.o
- SIOUG - Member of Executive Committee
- Oracle Certified Professional 9i, 11g
- Oracle Application Express Developer Certified Expert
- My first Apex (HtmlDB) presentation: HTMLDB – just a toy?, SIOUG, Portorož 2004
- Apex Meetups





Public appearances

- **HTMLDB – just a toy?, SIOUG, Portorož 2004**
- It's good to know your own backyard (Trace Analyzer, dbms_profiler), SIOUG, Portorož 2005
- Oracle Database Standard Edition, SIOUG, Portorož 2008
- Create table, SIOUG, Portorož 2009
- With Oracle Forms to future, SIOUG, Portorož 2010
- Oracle Listener, SIOUG, Portorož 2011
- Apex Plugins, SIOUG, Ljubljana 2012
- Apex Workshop: All you need to start working with Apex, Ljubljana 2012
- Apex Listener, SIOUG, Mengeš 2013
- Apex and jQuery, SIOUG, Mengeš 2013
- Apex Dynamic Actions, SIOUG, Mengeš 2013
- JavaScript in Apex, SIOUG, Ljubljana 2014
- JavaScript in Apex, SROUG, Zlatibor, Serbia, 2015
- Apex Meetups, Ljubljana, Kranj, 2015
- Apex Shared Components, SIOUG, Portorož, 2015
- JavaScript in Apex, HROUG, Rovinj, Croatia, 2015





Abakus plus, d.o.o.

History

from 1992, ~20 employees

Applications:

special (DB – Newspaper Distribution, FIS – Flight Information System)

ARBITER – the ultimate tool in audit trailing

APPM – Abakus Plus Performance and Monitoring Tool

Services:

DBA, OS administration, programming (MediaWiki, Oracle)

networks (services, VPN, QoS, security)

open source, monitoring (Nagios, OCS, Wiki)

Hardware:

servers, **backup server**, **SAN storage**, firewalls

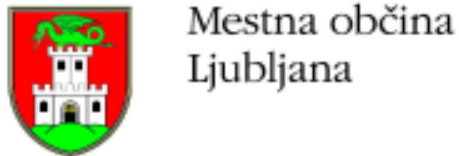
Infrastructure:

from 1995 GNU/Linux (**20 years of experience!**)

Oracle on GNU/Linux: since RDBMS 7.1.5 & Forms 3.0 (**before Oracle!**)

>20 years of experience with High-Availability!







Agenda

- What is JavaScript?
- JavaScript and Apex
- JavaScript API
 - namespaces
 - confirm, submit
 - apex.item
 - apex.server
 - apex.lang
 - apex.debug
- Asynchronous Ajax
- HighCharts





Let's start with a joke

- Apex is just for a small applications
- Apex is not an enterprise tool
- Apex is just for internal applications
- Apex will not scale (my favorite)

...
...
...
...





Customer Quotes

<http://www.oracle.com/technetwork/developer-tools/apex/application-express/apex-quotes-1863317.html>

"At Northgate Revenues & Benefits, we have used APEX to replace our legacy Oracle Forms system comprising around 1500 Forms. Our user interface has 10,000 end users daily, across 172 clients, who this year sent out over 12 million Council Tax annual bills worth £15billion and will pay out benefits of over £13billion. Our clients now experience, on average, sub second response times across a working day. We are continuing to leverage our investment in Oracle Application Express by delivering citizen facing solutions as well as launching the conversion of our Social Housing application which will replace 3,500 Oracle Forms running at 100 clients worldwide, with a total of 15,000 end users managing circa 3,000,000 properties. Oracle Application Express has helped us to make the move away from Oracle Forms whilst delivering benefits to our clients and our business."

-- Alan Powell, Director of Products and Services, Northgate Public Servicest





JavaScript

<http://en.wikipedia.org/wiki/JavaScript>

' ʒɑ: ə, ɪ

JavaScript (/d ɪ v ʃkr ɪ pt/; **JS**) is a dynamic computer programming language[5]. It is most commonly used as part of web browsers, whose implementations allow client-side scripts to interact with the user, control the browser, communicate asynchronously, and alter the document content that is displayed.[5] It is also being used in server-side network programming (with Node.js), game development and the creation of desktop and mobile applications.





JavaScript

- JavaScript and Java are unrelated
- is actually derived from C
- Originally developed by Brendan Eich (Netscape)
<http://brendaneich.com/>
- Officially managed by Mozilla Foundations
<https://developer.mozilla.org/en-US/docs/Web/JavaScript>
- JavaScript is based on ECMAScript standard





JavaScript

http://tsdr.uspto.gov/#caseNumber=75026640&caseType=SERIAL_NO&searchType=statusSearch

Trademark Status & Document Retrieval (TSDR) ?

SEARCH	MULTI-SEARCH ?
US Serial No	75026640
	Status Documents

Mark:	JAVASCRIPT	No Image exists for this case.
US Serial Number:	75026640	Application Filing Date: Dec. 01, 1995
US Registration Number:	2416017	Registration Date: Dec. 26, 2000

Current Owner(s) Information

Owner Name:	ORACLE AMERICA, INC.		
Owner Address:	500 ORACLE PARKWAY REDWOOD SHORES, CALIFORNIA 94065 UNITED STATES		
Legal Entity Type:	CORPORATION	State or Country Where Organized:	DELAWARE



JavaScript and Apex

https://docs.oracle.com/cd/E59726_01/doc.50/e39143/toc.htm#HTMRN242

New Browser Requirements

Because Oracle Application Express relies upon standards-compliant HTML5, CSS3, and JavaScript, Oracle recommends that you use the latest web browser software available for the best experience. The following applications have been tested with Oracle Application Express:

- Mozilla Firefox 35
- Google Chrome 40
- Apple Safari 7
- Microsoft Internet Explorer 9





JavaScript and Apex

ORACLE Application Express

Application Builder | SQL Workshop | Team Development | Packaged Apps

Application 65729 > User Interfaces > User Interface Details

Definition | Security | Globalization | **User Interface**

User Interface Details

Cancel | Delete | **Apply Changes**

Show All | Identification | Attributes | Navigation Menu | Navigation Bar | **JavaScript** | Cascading Styl... | Concatenated ...

JavaScript

Content Delivery Network: ?

File URLs:

Include Legacy Javascript: ?

Include jQuery Migrate: ?

About

Use the user interface details to define the specific settings for the selected user interface type.

Attributes enable you to select the home and login pages that users are redirected to when they access this user interface. You can also set the current theme style and global page.

Using the Navigation Menu you can select the list and position used to render the navigation menu as well as setting the navigation menu list template.

Navigation Bar settings enable you to select list and list templates. Selecting classic implementation uses tabs instead of a list.

The JavaScript, Cascading Style Sheet and Concatenated Files attributes can be used to select alternate content delivery networks, load additional CSS files and to optimize the way JavaScript and CSS files are loaded.



Legacy JavaScript APIs

https://docs.oracle.com/cd/E59726_01/doc.50/e39149/javascript_api.htm#AEAPI30227

Work has commenced to reduce the overall size of JavaScript that is loaded by Oracle Application Express when rendering a page. JavaScript functions that are no longer served on every page are gradually being moved to a legacy JavaScript file, which can be found in */libraries/apex/legacy.js*

```
/**
 * @fileOverview
 * This file holds for legacy purpose all the old non-namespaced JavaScript functions of APEX.
 *
 * */

/**
 * @deprecated Use apex.submit, or Dynamic Action "Submit Page"
 * @function
 * */
function doSubmit(pOptions){
    apex.submit(pOptions);
}

/**
 * @deprecated Use apex.confirm, or Dynamic Action "Confirm"
 * @function
 * */
function confirmDelete(pMessage,pOptions){
    apex.confirm(pMessage,pOptions);
}
```





JavaScript API - namespaces

- apex.da namespace
- apex.debug namespace
- apex.event namespace
- apex.item
- apex.lang namespace
- apex.navigation namespace
- apex.server namespace
- apex.storage namespace
- apex.util namespace
- apex.widget namespace
- non-namespace Javascript APIs





JavaScript – submit, confirm

```
//legacy.js
function doSubmit(pOptions){
    apex.submit(pOptions);
}

apex.submit( 'DELETE' );

apex.submit({
    request:"CONFIRM",
    set:{"P1_CONF_X1":654, "P1_CONF_X2":321},
    showWait:true
});

apex.confirm("Set values and submit?", {
    request:"CONFIRM",
    set:{"P1_CONF_X1":123, "P1_CONF_X2":456},
    showWait:true
});
```





JavaScript - getElementById

```
// Get element by id = "demo"  
var x = document.getElementById("demo");  
  
// Change (property) - color  
x.style.color = "red";  
  
// Set value  
document.getElementById("myText").value = "Johnny Bravo";  
  
//Set value - ReadOnly  
$("#myROText ").text("To display");
```





Non namespace

```
//Text item and Display only item  
$x("P1_TEXT").value; //text item  
$x("P1_TEXT").value = "Some text";
```

```
$("#P1_DISPLAY").text("To display"); //display only  
x=$("#P1_DISPLAY").text(); // jQuery
```

```
//Read value - same for edit or display only item  
x = $v("P1_TEXT");  
y = $v("P1_DISPLAY");
```

```
//Set value - same for edit or display only item  
$s("P1_TEXT", "New text");  
$s("P1_DISPLAY", "Also new");
```





apex.item namespace

- apex.item(pNd)
- apex.item(pNd).addValue(pValue)
- apex.item(pNd).disable()
- apex.item(pNd).enable()
- **apex.item(pNd).getValue()**
- apex.item(pNd).hide(pHideRow)
- apex.item(pNd).isEmpty()
- apex.item(pNd).setFocus()
- apex.item(pNd).setStyle(pPropertyName, pPropertyValue)
- **apex.item(pNd).setValue(pValue, pDisplayValue, pSuppressChangeEvent)**





apex.item namespace

apex.item(pNd).getValue()

- `$v2 = apex.item(pNd).getValue // shortcut`
- taking into account the current item type (same as \$v)
- Returns array of string values if the item supports multiple values





apex.item namespace

```
apex.item( pNd ).setValue(pValue,  
                          pDisplayValue,  
                          pSuppressChangeEvent)
```

- \$s = apex.item (pNd).setValue //shortcut
- pDisplayValue: in case of Popup LOV display value
- pSuppressChangeEvent

```
apex.item( "P1_ITEM" ).setValue( "10" );  
apex.item( "P1_ITEM" ).setValue( "10", "SALES", true );
```





apex.server namespace - AJAX

Application Process:DO_SOMETHING1

```
htp.p('Parameter 1: ' || APEX_APPLICATION.g_x01);  
htp.p('Parameter 2: ' || APEX_APPLICATION.g_x02);
```

JavaScript

```
var ajaxRequest =  
    new htmldb_Get(null,  
                  $v('pFlowId'),  
                  'APPLICATION_PROCESS=DO_SOMETHING1',  
                  $v('pFlowStepId'));  
ajaxRequest.addParam('x01', 'Value 1');  
ajaxRequest.addParam('x02', 'Value 2');  
var ajaxResult = ajaxRequest.get();
```





apex.server namespace - AJAX

Application Process:DO_SOMETHING1

```
http.p('Parameter 1: ' || APEX_APPLICATION.g_x01);  
http.p('Parameter 2: ' || APEX_APPLICATION.g_x02);
```

JavaScript

```
apex.server.process (  
    "DO_SOMETHING1",  
    { x01: 'Value 1'  
      ,x02: 'Value 2'  
    }  
    ,{ dataType: 'text',  
        success: function(pData){alert(pData)}  
    }  
);
```





apex.server namespace - AJAX

Application Process:DO_SOMETHING2

```
htp.p('Parameter 1: ' || APEX_APPLICATION.g_x01);  
htp.p('Parameter 2: ' || APEX_APPLICATION.g_x02);  
htp.p('Page item P1_AJAX: ' || :P1_AJAX );
```

JavaScript

```
apex.server.process (  
    "DO_SOMETHING2",  
    { x01: 'Value 1'  
      ,x02: $v('P1_AJAX')  
      ,pageItems: "P1_AJAX"  
    }  
    ,{ dataType: 'text',  
        success: function(pData){alert(pData)}  
    }  
);
```





apex.server namespace - AJAX

Application Process:DO_SOMETHING3

```
declare
  l_max number;
begin
  l_max := nvl(l_max,5);

  if APEX_APPLICATION.g_x01 > 10 then
    l_max := 10;
  else
    l_max := APEX_APPLICATION.g_x01;
  end if;

  wwv_flow_utilities.pause(l_max);
end;
```





apex.server namespace - AJAX

JavaScript (DO_SOMETHING3)

```
function Ajax3() {
  if ($v('P1_AJAX')==='') {
    alert('Please enter a value!');
    apex.item( "P1_AJAX" ).setFocus();
  }
  else{
    apex.server.process (
      "DO_SOMETHING3",
      { x01: $v('P1_AJAX')},
      { dataType: 'text'
        , success: function(pData){alert('Done')}}
      , loadingIndicator: '#P1_AJAX'
    )
  }
}
```





apex.server namespace - AJAX

Application Process:DO_SOMETHING4

```
update sroug2015  
  set datum = sysdate;
```

JavaScript

```
function Ajax4() {  
  apex.server.process (  
    "DO_SOMETHING4",  
    {},  
    { dataType: 'text'  
      , success: function(pData){  
        apex.event.trigger(document,  
          "refresh_date_report");  
      }  
    }, loadingIndicator: '#P1_AJAX'  
  );  
}
```





apex.server namespace - AJAX

▼ Identification	
Name	Refresh date report
▶ Execution Options	
▼ When	
Event	Custom ◇ ☰
Custom Event	refresh_date_report
Selection Type	JavaScript Expression ◇ ☰
JavaScript Expression	<div style="border: 1px solid #ccc; padding: 2px;">document</div> ↶
Condition	- Select - ◇ ☰

▼ Identification	
Action	Refresh ◇ ☰
▼ Affected Elements	
Selection Type	Region ◇
Region	..Date Report ◇ >



Asynchronous Ajax

- Dynamic Actions, Wait For Result equal to yes
 - synchronous ajax request
- This will change in future release
 - Requests will be asynchronous
 - Apex 5.0 Release Notes
 - https://docs.oracle.com/cd/E59726_01/doc.50/e39143/toc.htm#HTMRN270
- Applications must not rely on the currently synchronous behavior
- Wait For Result will still work
- <http://hardlikesoftware.com/weblog/2015/04/15/apex-and-asynchronous-ajax/>
- <https://community.oracle.com/thread/3675812>





Dynamic Actions - asynchronous

- Move PL/SQL code from dynamic action to application process
- Do the rest in “Execute JavaScript code”
- apex.server.process - by default in async mode

▼ ⚡ DA_ASYNC

▼ 📁 True

Execute JavaScript Code

📁 False

```

spinner = apex.util.showSpinner($("#filter"));

apex.server.process (
  "AP_ASYNC_DEMO",
  { pageItems: ["P2_COUNT"]
  },
  {
    dataType: 'text',
    success: function(pData){
      $s('P2_COUNT_NEW', pData);
      $('#ir_report').trigger('apexrefresh');
      spinner.remove();
    }
  }
);

```



apex.debug

- debug.error – always
- debug.info
- debug.log
- debug.trace – only on level APP_TRACE
- debug.warn
- debug.message(pLevel,)
- debug.setLevel(pLevel)
- debug.getLevel()
- debug.LOG_LEVEL =
{OFF:0, ERROR:1, WARN:2, INFO:4, APP_TRACE:6, ENGINE_TRACE:9}

Debug log level is synchronized with the hidden item #pdebug that comes from the server





apex.debug

```
console.log('Current log level: ' + apex.debug.getLevel());
```

```
apex.debug.info('Info message');
```

```
apex.debug.warn('Warning message');
```

```
apex.debug.error('Error message');
```

```
apex.debug.setLevel(apex.debug.LOG_LEVEL.APP_TRACE);
```

```
apex.debug.trace("Events: ", event);
```

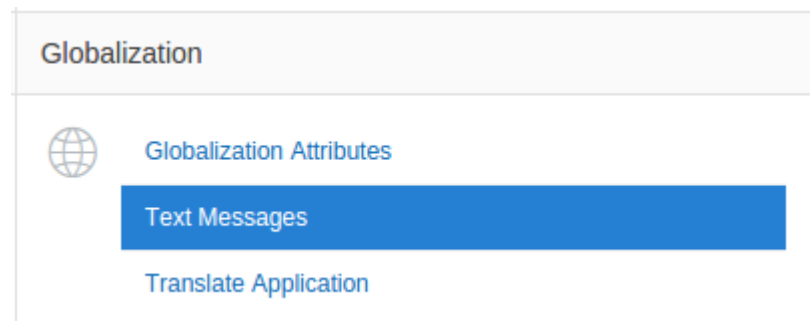




apex.lang

- apex.lang.addMessages
- apex.lang.clearMessages
- apex.lang.format
- apex.lang.formatMessage
- apex.lang.formatMessageNoEscape
- apex.lang.formatNoEscape
- apex.lang.getMessage

Create/Edit Text Message



Messages are designed to provide translation services for use in PL/SQL.

Application: **65729 SROUG2015** ?

* Name ?

Language ?

Used in JavaScript ?

* ?

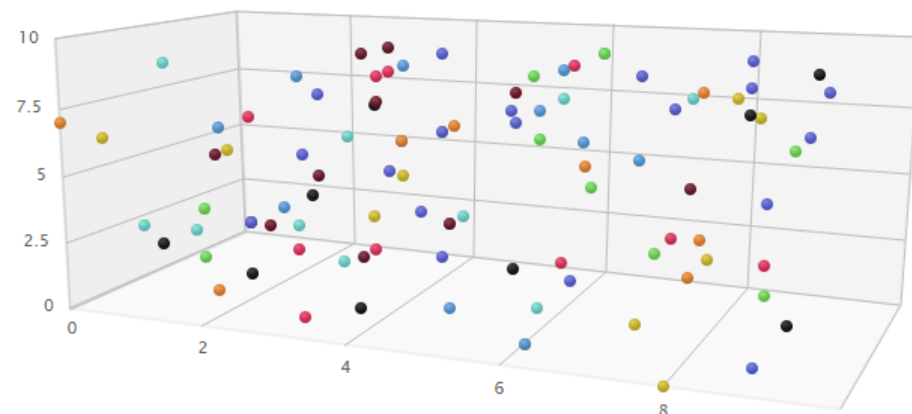
Text (Example: Tax: %0 Total amount %1)





HighCharts

- <http://www.highcharts.com/>
- JavaScript library
- Free for Non-commercial
- More options
 - HighStock
 - HighMaps



```
<script src="/i/highstock.js"></script>  
<script src="/i/exporting.js"></script>
```





HighCharts

Application Process: REFRESH_REPORT

```
--{ "name": "Tokyo" , "data": [ 7, 6.9, 9.5, ... ] }
```

```
apex_json.open_object;  
  apex_json.write('name', APEX_APPLICATION.g_x01);  
  apex_json.open_array('data');  
  --  
  for cur in (select val  
              from hc_temperatures  
              where city = upper(APEX_APPLICATION.g_x01))  
  loop  
    apex_json.write(cur.val);  
  end loop;  
  --  
  apex_json.close_array;  
apex_json.close_object;
```





HighCharts

JavaScript

```
function Refresh_Report() {
  apex.server.process (
    "REFRESH_REPORT",
    { x01: $v('P6_CITY')},
    {
      dataType: 'json',
      success: function(pData){draw_chart(pData)},
      loadingIndicator: '#P6_CITY'
    }
  );
};
```





HighCharts

```
function draw_chart(pData){
  $(function () {
    $('#container').highcharts({
      title: {text: 'Monthly Average Temperature', x: -20 //center },
      subtitle: {text: 'Source: WorldClimate.com', x: -20
      },
      xAxis: {
        categories: ['Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun','Jul', 'Aug', 'Sep', 'Oct', 'Nov', 'Dec']
      },
      yAxis: {
        title: {text: 'Temperature (°C)'},
        plotLines: [{ value: 0, width: 1, color: '#808080' }]
      },
      tooltip: { valueSuffix: '°C' },
      legend: {
        layout:'vertical', align:'right',verticalAlign:'middle', borderWidth:0},
      series: [pData]
    });
  });
}
```





JavaScript in Apex

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