

Going to the Grid:

What the APEX 5.1
Interactive Grid
Means for You
and Your Users



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Note to Early Slide Downloaders:

I edit my slides frequently up to the day of the presentation.

Please check back for the latest slides and references.

**It was the best of times,
it was the worst of times ...**

**Dickens
in Tale of Two Cities**



**It was the best of features,
it was the worst of features ...**

**Anonymous APEX Developer
re Tabular Forms**

About Me ...

- **Mechanical/SW Engineer** - Analyzed, designed, developed, converted, upgraded, enhanced legacy & database applications for 30+ years
- **Building Web/APEX applications** for government, medical, engineering industries since HTMLDB beginnings
- **Leveraging Oracle 10g, 11g, 12c suite of tools**
- **Editor Emeritus, ODTUG Technical Journal**
- **Oracle Ace Associate**
- **APress Author**
- **ODTUG Director**



ORACLE
ACE Associate

About You ...

- Oracle Technology ?
- Years w APEX ?
- APEX Versions ?
- Interactive Reports and Tabular Forms ?
- Customizations ?

Biggest Gripes?

Goals

- Understand Interactive Grid (I-Grid) Features
- How to Build, Upgrade to and Work With an Interactive Grid
- Pros / Cons of Replacing Legacy IRs/Tab Forms w Interactive-Grid

Agenda – Interactive Grid

- Introducing Interactive Grid
- How To Build
- How To Upgrade
- Validations
- **Advanced**
 - JavaScript Customizations
- Pros/Cons ~ Discussion ~ Questions

Evolution: Interactive Reports

- APEX 4.0
 - The New Big Thing
- APEX 4.1
 - More Column Types
 - Improved Group By, Add PIVOT
- APEX 5.0 **← Shift to Widgets**
 - Reengineered – CSS and JS, Widgets
- APEX 5.1 **← All Widgets**
 - Interactive Grid – JQuery Widgets

Evolution: Tabular Forms

- APEX 3 – Bare Bones
- APEX 4.0
 - RadioGroup, PopUp LOV, Simple CB
 - Declarative Validations
- APEX 4.1
 - :COLUMN References
 - Improved Error Handling
- APEX 4.2, 5.0
 - No Major TF enhancements
 - Major IR Rewrite
- APEX 5.1
 - Editable Interactive Grid (a Plugin)

← **Beginning of Shift**

← **All Widgets**

NOTE: APEX 5.1.1 Patch

[John Snyders](#) [Interactive Grid API Improvements](#)

<http://hardlikesoftware.com/weblog/2017/03/28/apex-interactive-grid-api-improvements-in-5-1-1/>

- Toolbar
- Model
- IG Widget
- IG Configuration

Beware

**APEX 5.1.1 IGrid APIS are
DIFFERENT**

from APEX 5.1.0 IGrid APIs ...

**You Will Have To Upgrade < 5.1.1
IGrid Customizations**

In the Sandbox ...



Out of the Sandbox



Interactive Grid == Better Sandbox



Interactive Grid

(Interactive Report or Tab Form)

+ <All the Features You Ever Wanted>

(Thank You APEX Team!)

Interactive Grid

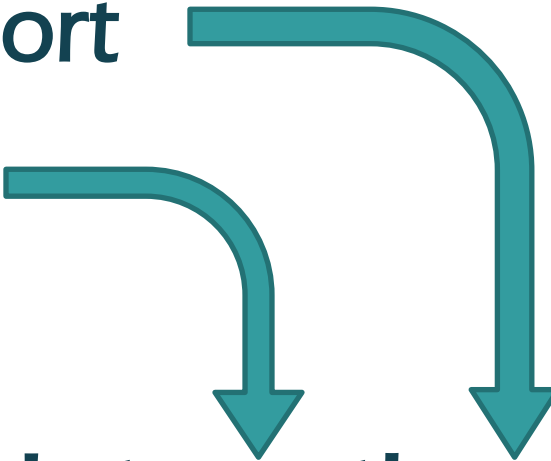
Direction

~~Interactive Report~~

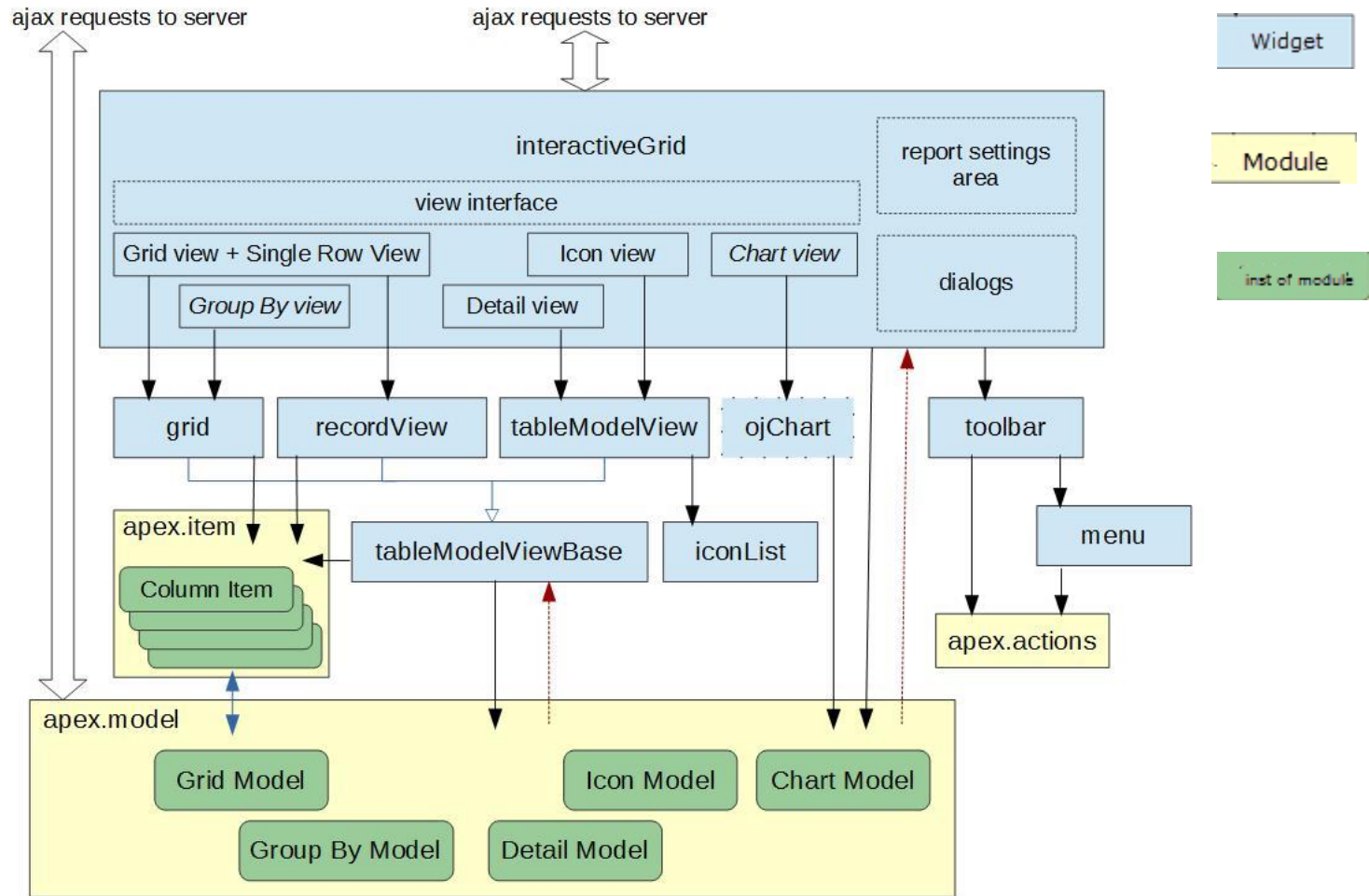
~~Tabular Form~~

Now

Future



Interactive Grid



Interactive Report

- **Generates HTML on Server, part of Page**
- **Data Returned w UI Markup**
- **One Big JS Module**

Interactive Grid

- **HTML Renders on Client**
- **Data/Edits from Server via JSON**
- **Collection of Widgets**

Interactive Report

- **Collections
(pre 5.0)**
- **Browser Decides
Column Width**

```
table-layout: auto;
```

Interactive Grid

- **Model**
- **Each Column is an
Item**
- **Fixed Table
Layout**

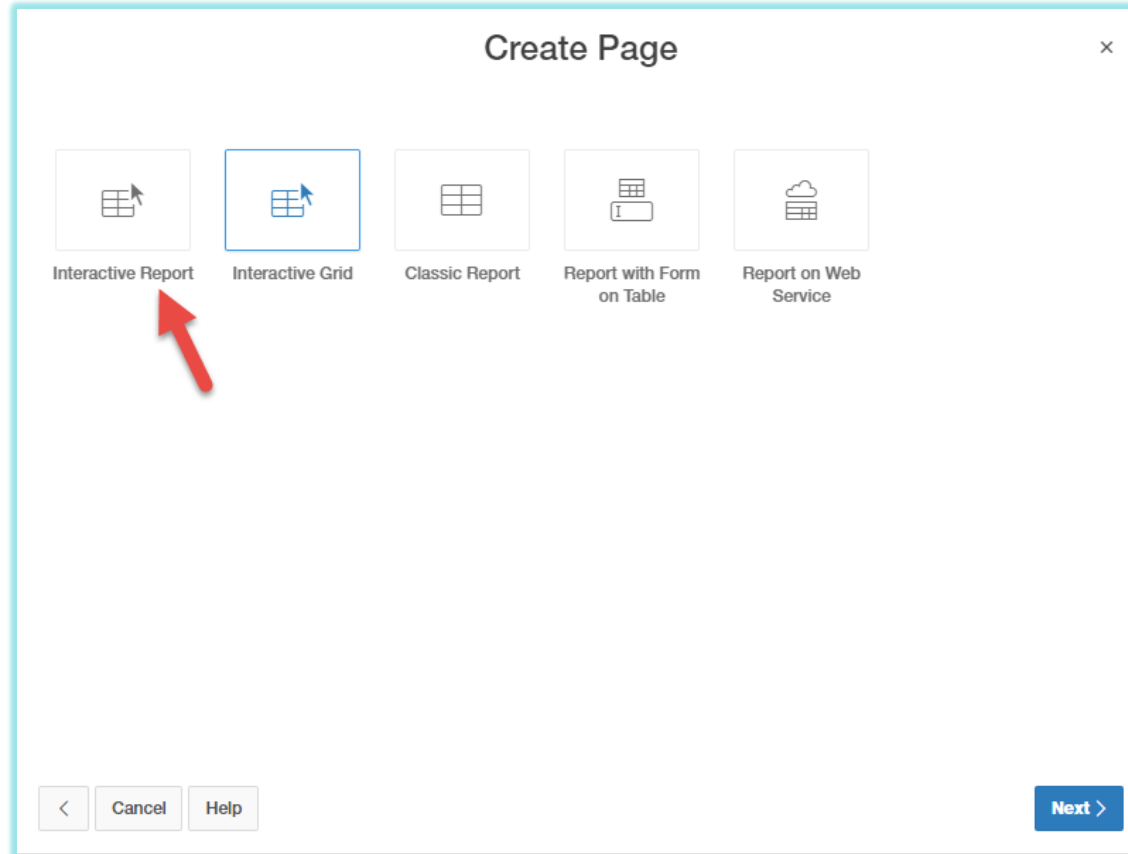
Interactive Grid:

How to Build

ID	Name	Job	Manager	Hire D...	Salary	Comm...
7934	MILLER	Clerk	CLARK	23-JA...	1300	-
7900	JAMES	Clerk	BLAKE	03-DE...	950	-
7876	ADAMS	Clerk	7788	12-JA...	1100	-
7844	TURNER	Sales...	BLAKE	08-SE...	1500	0
7654	MARTIN	Sales...	BLAKE	28-SE...	1250	1400
7521	WARD	Sales...	BLAKE	22-FE...	1250	500
7499	ALLEN	Sales...	BLAKE	20-FE...	1600	300
7369	SMITH	Clerk	7902	17-DE...	800	-
7902	FORD	Analyst	JONES	03-DE...	3000	-
7788	SCOTT	Analyst	JONES	09-DE...	3000	-
7566	JONES	Manager	KING	02-AP...	2975	-
7782	CLARK	Manager	KING	09-JU...	2450	-
7698	BLAKE	Manager	KING	01-MA...	2850	-
7839	KING	Presid...		17-NO...	5000	-

rows selected

Interactive Report – Still There



Tabular Forms == Legacy

Create Page

- Report with Form on Table
- Editable Interactive Grid
- Single Page Master Detail
- Two Page Master Detail
- Form on a Table
- Form on a Procedure
- Form on a SQL Query
- Form on Web Service
- Report and Form on Web Service

No Tabular Form Option! Use Editable Grid

Navigation: < Cancel Help Next >



Editing an Interactive Grid

- Editing Enabled => Yes
 - Row Selector
 - Actions Menu Column
 - PK Hidden by Default
 - Edit, Save Buttons
 - I-Grid Auto Row Processing Process
- Developer has to
 - Add Headings
 - Set Column Types, Static Ids
 - Set a PK Column (If one not Already Set)
 - Set Page “Reload on Submit” to “Only on Success”



Interactive Grid 'E-Grid Casc LOV' doesn't have a primary key column defined which is required for editing or in a master detail relationship.

Contact your application administrator.

Technical Info (only visible for developers)

1. `is_internal_error`: true
2. `apex_error_code`: APEXDEV.IG.NO_PK
3. `component.type`:
APEX_APPLICATION_PAGE_REGIONS
4. `component.id`: 17111353091365601
5. `component.name`: E-Grid Casc LOV
6. `error_backtrace`:

Edit: Column: Set One as a Primary Key

Source

Type	Database Column	▼
Database Column	EMPNO	
Data Type	NUMBER	▼
Query Only	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Primary Key	<input checked="" type="radio"/> Yes <input type="radio"/> No	

Master Detail



For an Editable Interactive Grid, the Page attribute 'Reload on Submit' must be set to 'Only for Success'.

Contact your application administrator.

Technical Info (only visible for developers)

1. `is_internal_error`: true
2. `apex_error_code`:
APEXDEV.IG.RELOAD_ON_SUBMIT_EDITABLE
3. `component.type`:
APEX_APPLICATION_PAGE_REGIONS
4. `component.id`: 17111353091365601
5. `component.name`: E-Grid Casc LOV
6. `error_backtrace`:

----- PL/SQL Call Stack -----

object	line	object
handle	number	name
000007FFC480F540	935	package body APEX_050100.WWV_FLOW_ERROR
000007FFC480F540	1003	package body APEX_050100.WWV_FLOW_ERROR
000007FFC480F540	1395	package body APEX_050100.WWV_FLOW_ERROR
000007FFC480F540	5451	package body APEX_050100.WWV_FLOW_INTERACTIVE_GRID

Edit: Page Reload on Submit

Advanced

Enable duplicate page submissions Yes - Enable page to be re-posted

Reload on Submit

Only for Success

Always

Only for Success

Server Cache

Configuration

Interactive Grid

Demo Interactive Grid

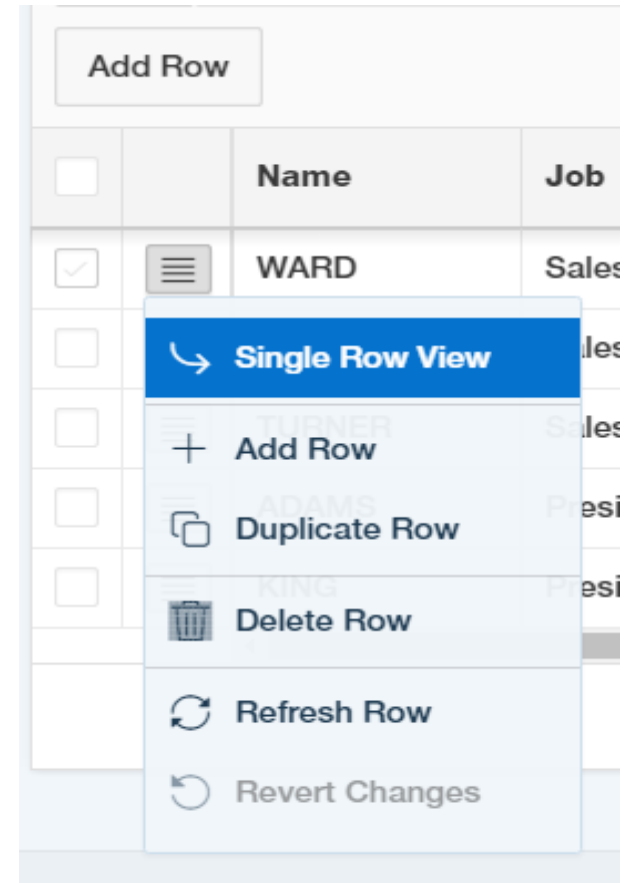
Empno	Ename	Job	Mgr	Hiredate	Sal	Comm	Deptno	Comm Elig	Raise Elig	Riff Elig
7839	ALLEN	SALESMAN	BLAKE	17-NOV-81	4000	-	30	Y	Y	N
7698	BLAKE	MANAGER	KING	01-MAY-81	2850	-	30	N	Y	N
7782	CLARK-SMIT	MANAGER	KING	09-JUN-81	2450	-	10	N	Y	N
7566	JONES	MANAGER	KING	02-APR-81	2975	-	20	N	Y	N
7788	SCOTT	ANALYST	JONES	09-DEC-82	3000	-	20	Y	Y	N
7902	TURNER	SALESMAN	JONES	03-DEC-81	3000	-	30	N	Y	N
7369	SMITH	CLERK	FORD	17-DEC-80	800	-	40	N	Y	N
7499	SMITH-CLARK	CLERK	BLAKE	20-FEB-81	1600	300	30	Y	Y	-
7521	WARD	SALESMAN	BLAKE	22-FEB-81	1250	500	30	Y	Y	-
7654	KING	PRESIDENT		28-SEP-81	1250	1400	40	Y	N	N
7844	TURNER	SALESMAN	BLAKE	08-SEP-81	1500	0	30	Y	Y	-
7876	ADAMS	CLERK	SCOTT	12-JAN-83	1100	-	20	N	Y	N
7900	JAMESON	SALESMAN	BLAKE	03-DEC-81	950	-	30	Y	Y	N

Editable Interactive Grid

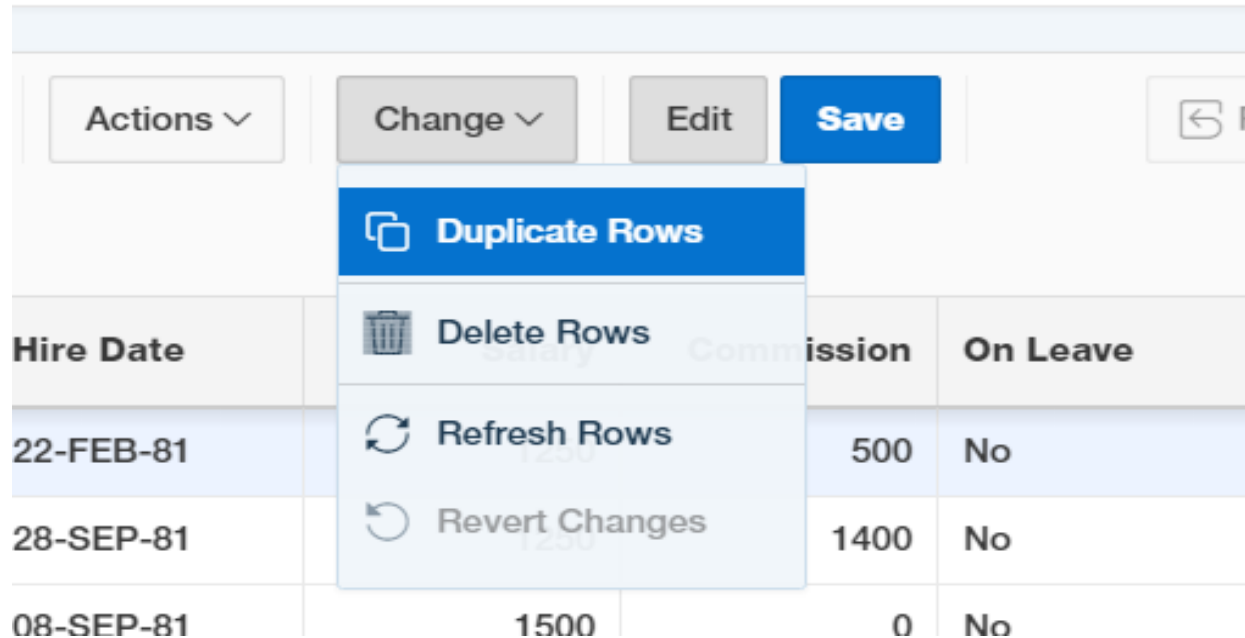
Search: All Text Columns Go Actions Edit

<input type="checkbox"/>		Name	Job	Manager	Hire Date	Salary	Commission	On I
<input checked="" type="checkbox"/>	<input type="button" value="Menu"/>	JAMES	Clerk	BLAKE	03-DEC-81	950	1000	No
<input type="checkbox"/>	<input type="button" value="Menu"/>	SMITH	Clerk	FORD	17-DEC-80	800	-	No
<input type="checkbox"/>	<input type="button" value="Menu"/>	MILLER	Clerk	FORD	23-JAN-82	1300	1000	Yes
<input type="checkbox"/>	<input type="button" value="Menu"/>	BLAKE	Salesman	KING	01-MAY-81	2850	-	No
<input type="checkbox"/>	<input type="button" value="Menu"/>	ALLEN	Salesman	BLAKE	20-FEB-81	1600	300	No

Grid Menu



Customized Toolbar Menu



The screenshot displays a software interface with a toolbar and a data table. The toolbar includes buttons for 'Actions', 'Change', 'Edit', and 'Save'. A dropdown menu is open under the 'Change' button, showing the following options:

- Duplicate Rows
- Delete Rows
- Refresh Rows
- Revert Changes

The background table has the following data:

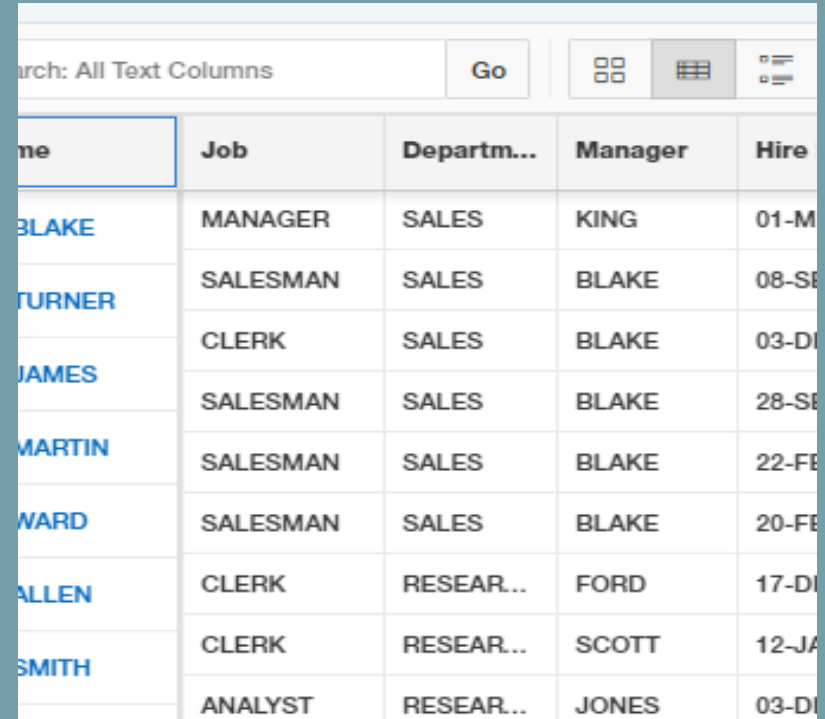
Hire Date	Salary	Commission	On Leave
22-FEB-81	1250	500	No
28-SEP-81	1250	1400	No
08-SEP-81	1500	0	No




Editable Cells → Floating Popups

- Radio Group
- Text Areas (one liner ...)
- Item Plugins
- Anything that dos not fit in cell
- CTRL-F6 collapse/expand popup

Editable Grid:

Row Height,
Column Width,
(No)Stretch,
Master-Detail,
Casc. LOV



Search: All Text Columns Go   

Name	Job	Departm...	Manager	Hire
BLAKE	MANAGER	SALES	KING	01-M
TURNER	SALESMAN	SALES	BLAKE	08-SE
JAMES	CLERK	SALES	BLAKE	03-DI
MARTIN	SALESMAN	SALES	BLAKE	28-SE
WARD	SALESMAN	SALES	BLAKE	22-FE
ALLEN	CLERK	RESEAR...	FORD	17-DI
SMITH	CLERK	RESEAR...	SCOTT	12-JA
	ANALYST	RESEAR...	JONES	03-DI

re Fixed Row Height

- IF Change Height of a Row
 - Ex: Add Icon or Textarea
- Need To Adjust on Both Sides ...
 - Frozen and Unfrozen
- **cellTemplate** property

Col Height

Textareas are one case where you may wish to adjust row (cell) height.

- Note1 is default Textarea display, editable and non-editable.
- Note2 shows use of HTML to wrap text. This cell is not editable c/o the HTML Expression
- Note3 shows use of **celltemplate** property. This cell IS editable.

The **celltemplate** property is APEX 5.1.1 and higher

<input type="checkbox"/>	≡	Empno	Ename ↑≡	Mgr	Job	Hiredate	Sal	Comm	Dept	On L...	Notes	Note2	Notes3
<input checked="" type="checkbox"/>	≡	7876	ADAMS	SCOTT	CLERK	12-JAN-83	1100	-	RESEARCH	Y	Medical Leave	Medical Leave	Medical Leave
<input type="checkbox"/>	≡	7499	ALLEN	BLAKE	SALESMAN	20-FEB-81	1600	300	SALES	N	-		
<input type="checkbox"/>	≡	7698	BLAKE	KING	MANAGER	01-MAY-81	2850	-	SALES	N	Lorem ipsum dolor sit amet, cons...	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut	Lorem ipsum dolor sit amet, conse adipiscing elit, sed do eiusmod ten incididunt ut labore et dolore mag aliqua. Ut enim ad minim veniam, i
<input type="checkbox"/>	≡	7782	CLARK	KING	MANAGER	09-JUN-81	2450	-	ACCOUNTING	N	-		



```
function(config) {  
    config.defaultGridColumnOptions = {  
        cellTemplate: '<div class="wrap-cell">&NOTES.</div>'  
    };  
    return config;  
}
```

Column Widths

- Appearance → “Width” Property Does Not Set Column Width
- Drag and Drop then Report → Save
- Columns
 - Resize
 - Reorder
 - Minimum Width
- Min Width vs Current Width

Actions ▾

Columns

Displayed	Column
<input checked="" type="checkbox"/>	Row Actions
<input checked="" type="checkbox"/>	Ename
<input checked="" type="checkbox"/>	Job
<input checked="" type="checkbox"/>	Manager
<input checked="" type="checkbox"/>	Hiredate
<input checked="" type="checkbox"/>	Sal
<input checked="" type="checkbox"/>	Comm

Column

Row Actions

Minimum Column Width (Pixel)

30

Help

Cancel

Save

NoStretch – APEX 5.1.1

- JS to Set **Per Column**

In Advanced → JavaScript for the Column

```
function(config) {  
    config.defaultGridColumnOptions = {  
        noStretch: true  
    };  
    return config;  
}
```

NoStretch – APEX 5.1.1

- JS to Set Per Grid (All Columns)

In Advanced → JavaScript for the Grid

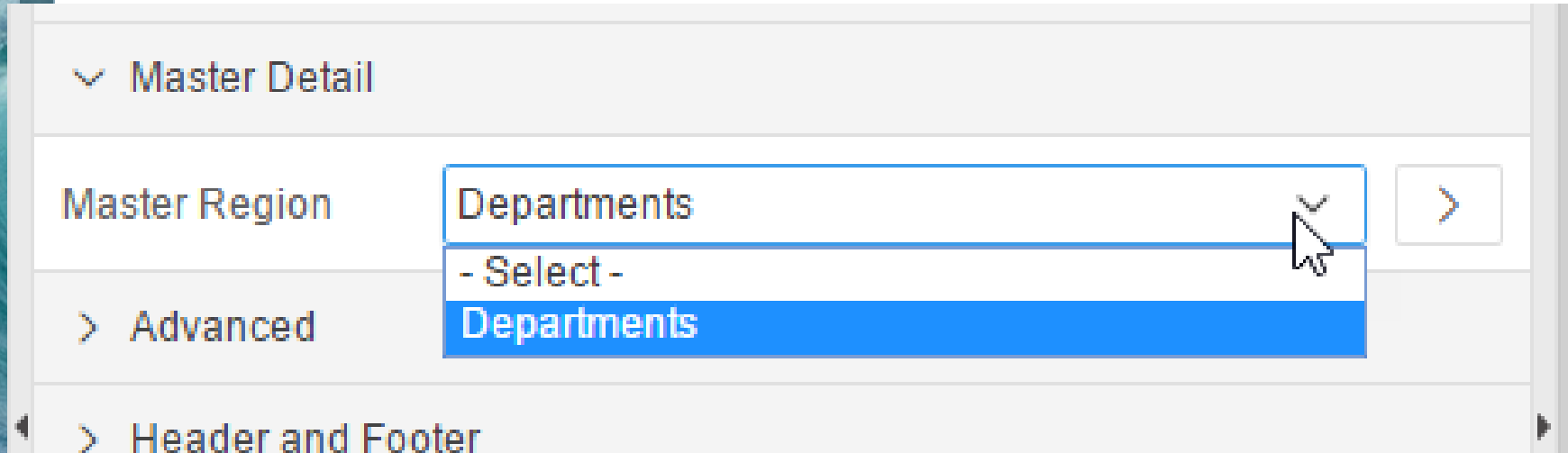
```
function(config) {  
    // Logically we want this to work all the time:  
    //     config.views.grid.features.stretchColumns = false;  
    // but we may not have (the server may not have generated) the grid view  
    // (the views, grid, or features objects)  
    // so we need to check for and add if needed each one using this code  
    var o = config;  
    "views.grid.features".split(".").forEach(function(p) {  
        if ( !o[p] ) {  
            o[p] = {};  
        }  
        o = o[p];  
    });  
    o.stretchColumns = false;  
    return config;  
}
```

**Declarable in
APEX 5.2 ?**


```
function(config) {  
    // Logically we want this to work all the time:  
    //     config.views.grid.features.stretchColumns = false;  
    // but we may not have (the server may not have generated) the grid view  
    // (the views, grid, or features objects)  
    // so we need to check for and add if needed each one using this code  
    var o = config;  
    "views.grid.features".split(".").forEach(function(p) {  
        if ( !o[p] ) {  
            o[p] = {};  
        }  
        o = o[p];  
    });  
    o.stretchColumns = false;  
    return config;  
}
```

**Declarable in
APEX 5.2 ?**

Master-Detail



Grid

- **Disable Detail Grid Save Button**

Cascading LOV

- Just Like Page Item to Page Item

Pick Cascading LOV Parent Column(s)

Search

Name	Label
APEX\$ROW_SELECTOR	
APEX\$ROW_ACTION	
EMPNO	
ENAME	Ename
JOB	Job
MGR	Manager
HIREDATE	Hiredate
SAL	Sal
COMM	Comm
DEPTNO	Dept
COMM_ELIG	Comm?
BASE_ELIG	Base?

Type: Shared Component

List of Values: MANAGER_NAMES

Display Extra Values: Yes No

Display Null Value: Yes No

Null Display Value:

Null Return Value:

Cascading LOV Parent Column(s):

Link

Target:

Source

Type: Database Column

Database Column: MGR

Data Type: NUMBER

Query Only: Yes No

```

SELECT
  apex_item.checkbox (30,
    seq_id,
    'onclick="highlight_row(this, ' || seq_id || ')"',
    NULL,
    ':',
    'f30_' || LPAD (seq_id, 4, '0') ) delete_checkbox,
  apex_item.hidden (31, seq_id)
  || apex_item.select_list_from_query
    (32,
     c001,
     'SELECT dname d, ' || 'deptno r FROM
eba_demo_tf_dept',
     'style="width:220px" '
  || 'onchange="f_set_casc_sel_list_item(this, '
  || 'f33_'
  || LPAD (seq_id, 4, '0')
  || ')"',
  'YES',
  '0',
  '- Select Department -',
  'f32_' || LPAD (seq_id, 4, '0'),
  NULL,
  'NO' ) deptno,
  apex_item.select_list_from_query (33,
    c002,
    'SELECT ename d, '
  || 'empno r FROM eba_demo_tf_emp '
  || 'WHERE deptno = '
  || c001,
    'style="width:220px"',
    'YES',
    '0',
    '- Select Employee ('
  || (SELECT COUNT (*)
      FROM eba_demo_tf_emp
      WHERE deptno = c001)
  || ' ) -',
    'f33_' || LPAD (seq_id, 4, '0'),
    NULL,
    'NO' ) employee
FROM apex_collections
WHERE collection_name = 'DEPT_EMP'
UNION ALL

```

Before (APEX 4.2)

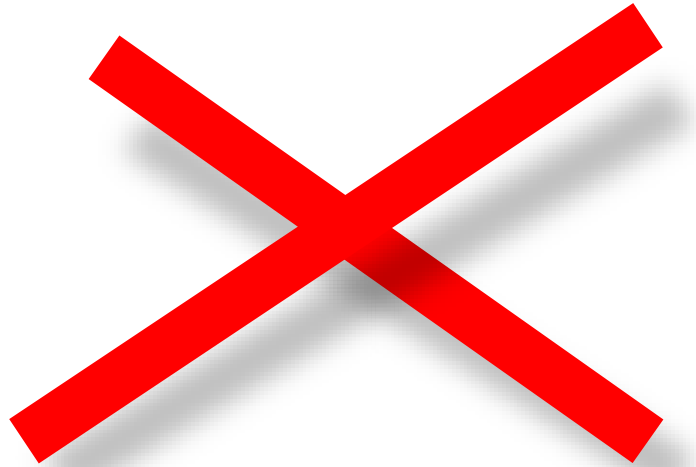
```

SELECT  apex_item.checkbox
        (30,
        NULL,
        'onclick="highlight_row(this, '
        || TO NUMBER (9900 + LEVEL)
        || ')"',
        NULL,
        ':',
        'f30_' || LPAD (9900 + LEVEL, 4, '0') ) delete_checkbox,
        apex_item.hidden (31, NULL)
        || apex_item.select_list_from_query
          (32,
           0,
           'SELECT dname d, ' || 'deptno r FROM eba_demo_tf_dept',
           'style="width:220px" '
        || 'onchange="f_set_casc_sel_list_item(this, '
        || 'f33_'
        || LPAD (9900 + LEVEL, 4, '0')
        || ')"',
        'YES',
        '0',
        '- Select Department -',
        'f32_' || LPAD (9900 + LEVEL, 4, '0'),
        NULL,
        'NO' ) deptno,
        apex_item.select_list_from_query
          (33,
           NULL,
           'SELECT ename d, '
           || 'empno r FROM eba_demo_tf_emp '
           || 'WHERE deptno = '
           || 0,
           'style="width:220px"',
           'YES',
           '0',
           '- Select Employee (0) -',
           'f33_'
           || LPAD (9900 + LEVEL, 4, '0'),
           NULL,
           'NO'
          ) employee
FROM DUAL
WHERE :request = 'ADD_ROWS'
CONNECT BY LEVEL = 2

```

After (APEX 5.1+)

32K Row Limit



Dynamic Action

- Just Like On a Page Item
- Conditions/Action Reference
Any Column In Row
- Cannot Reference Element in
Other Rows

Validations

- Just Like 4.2 Tab Form
- :COLUMN_NAME References
- Dynamic Actions
 - Column Option
- APEX 5.1.1 Patch

Interactive Grid:

End User Perspective

	ID		Name	Job	Manager	Hire D...	Salary	Comm...
	7934		MILLER	Clerk	CLARK	23-JA...	1300	-
	7900		JAMES	Clerk	BLAKE	03-DE...	950	-
	7876		ADAMS	Clerk	7788	12-JA...	1100	-
	7844		TURNER	Sales...	BLAKE	08-SE...	1500	0
	7654		MARTIN	Sales...	BLAKE	28-SE...	1250	1400
	7521		WARD	Sales...	BLAKE	22-FE...	1250	500
	7499		ALLEN	Sales...	BLAKE	20-FE...	1600	300
	7369		SMITH	Clerk	7902	17-DE...	800	-
	7902		FORD	Analyst	JONES	03-DE...	3000	-
	7788		SCOTT	Analyst	JONES	09-DE...	3000	-
	7566		JONES	Manager	KING	02-AP...	2975	-
	7782		CLARK	Manager	KING	09-JU...	2450	-
	7698		BLAKE	Manager	KING	01-MA...	2850	-
	7839		KING	Presid...		17-NO...	5000	-

rows selected

User Perspective: Interactive Grid

Interactive Report

- Pivot
 - Drills
 - + Edit Capability (if enabled)
-

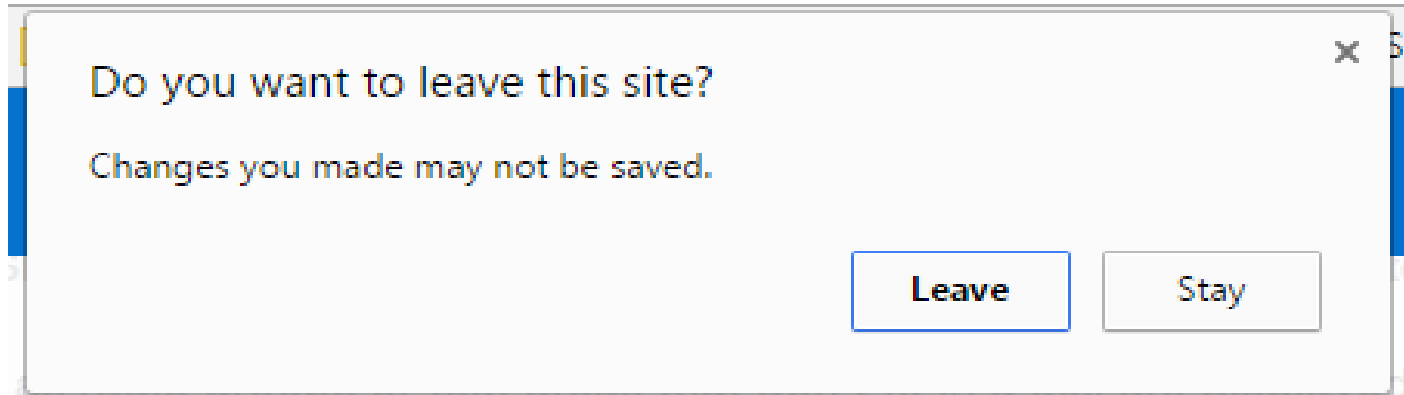
Interactive Grids

Edit Mode Navigation

- Tab or Shift Tab – Next/Previous Cells (right/left within a row)
- Enter or Shift-Enter – Up/Down Column

**So-so for Data Entry Users But > Nothing!
Arrow Keys Do Not Work Here**

- All Edits Stored Locally til Save
- Warning for Unsaved Changes
 - Pagination OK



Interactive Grid:

How to Upgrade an Existing IR or Tabular Form to Interactive Grid

Utilities



Application Dashboard

Review a summary of this application.



Upgrade Application

After upgrading to a new release, review component features.



Attribute Dictionary

Manage item / column user interface defaults for a



Database Object Dependencies

Review the database objects referenced by this ap

- Standard Will Upgrade
- Non-Standard Will Not Upgrade
 - Any Custom Code
 - APEX_ITEM Calls

**Rebuild (Most Often)
Takes Less Time**



Upgrade Interactive Reports?

HOW

- Change Region Type

WHEN

- Standard, No Frills Users → YES
- Considerations
 - Pivot
 - Customized Logic
 - Drills To IRs

Upgrade Tabular Forms?

HOW

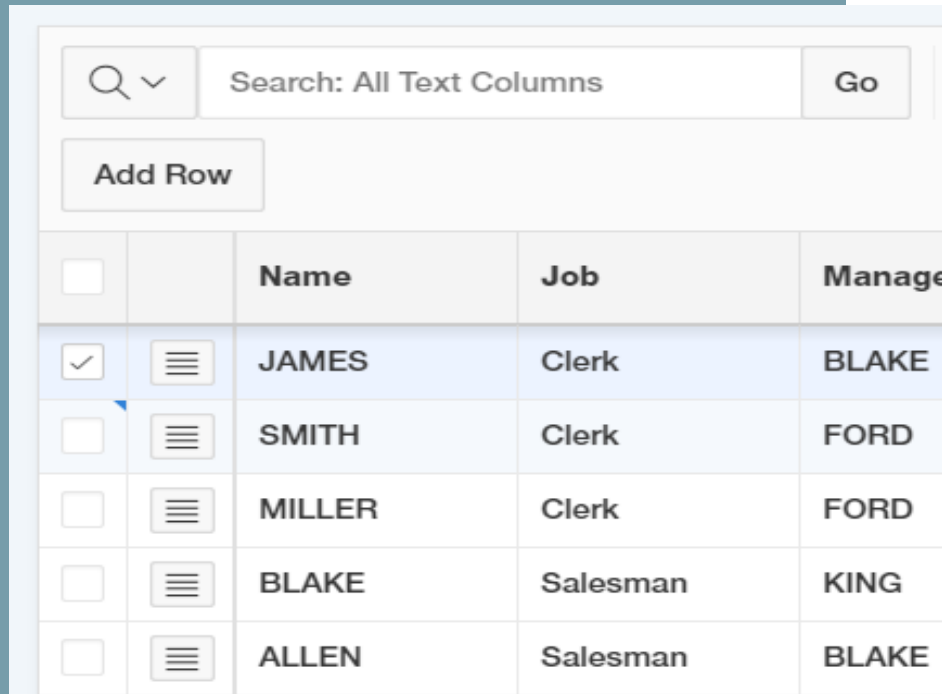
- Upgrade Utility
 - May Need Rework

WHEN

- Standard → YES
- Non-Standard
 - Maintain vs Rebuild
 - Rebuild is Relatively Quick

Interactive Grid:

How to
Customize
Menus, Toolbars
and More



The screenshot shows a user interface for an interactive grid. At the top, there is a search bar with a magnifying glass icon, a dropdown arrow, the text "Search: All Text Columns", and a "Go" button. Below the search bar is a toolbar with an "Add Row" button. The main area is a table with five columns: a selection column, a menu column, a "Name" column, a "Job" column, and a "Manager" column. The first row is selected, indicated by a checkmark in the selection column and a blue background. The data rows are as follows:

<input type="checkbox"/>		Name	Job	Manager
<input checked="" type="checkbox"/>	☰	JAMES	Clerk	BLAKE
<input type="checkbox"/>	☰	SMITH	Clerk	FORD
<input type="checkbox"/>	☰	MILLER	Clerk	FORD
<input type="checkbox"/>	☰	BLAKE	Salesman	KING
<input type="checkbox"/>	☰	ALLEN	Salesman	BLAKE

Customizations

- JavaScript
 - Advanced → JavaScript Code
- Read Widget JS Files to Learn What is Possible
- [Hardlikesoftware.com](https://hardlikesoftware.com)

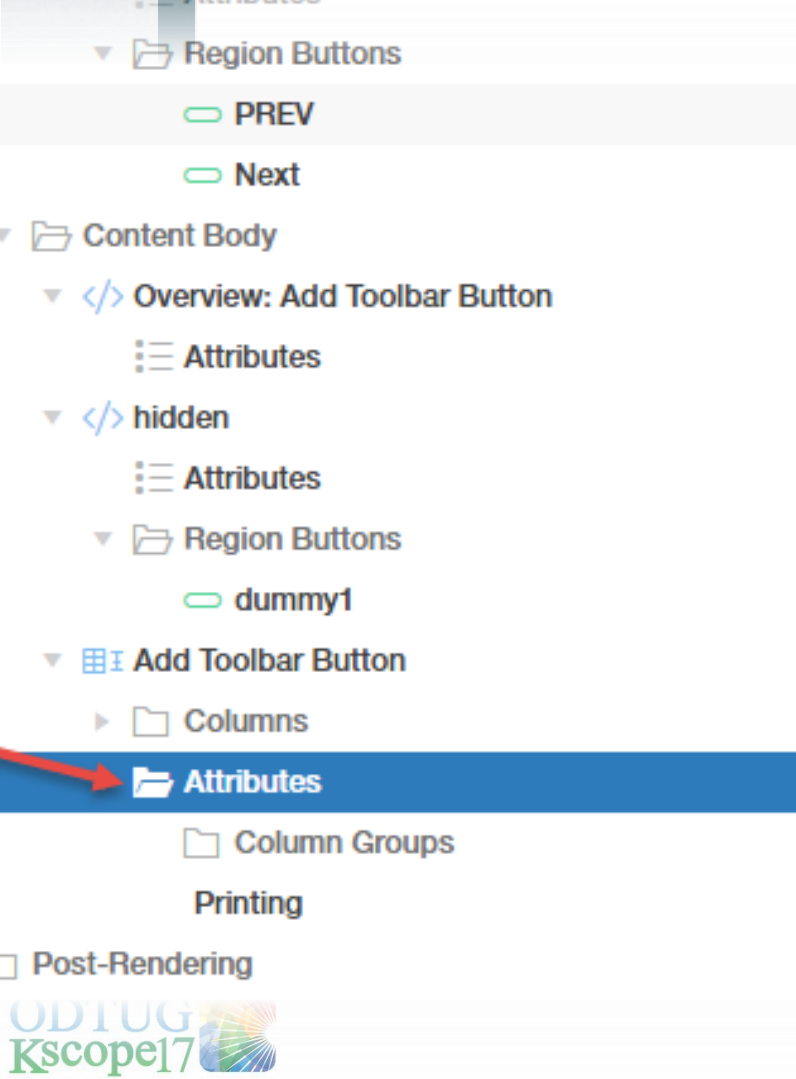
No Longer PL/SQL Collections – Now
JavaScript

I-Grid Customizations

- Much More Flexible
 - Beyond Declarative
- **Attributes → JavaScript Code Region**
 - Grid → Grid Menus
 - Column → Column Menu
(Most of the Time...)

Attributes

- Region Buttons
 - PREV
 - Next
- Content Body
 - Overview: Add Toolbar Button
 - Attributes
 - hidden
 - Attributes
 - Region Buttons
 - dummy1
 - Add Toolbar Button
 - Columns
 - Attributes**
 - Column Groups
 - Printing
- Post-Rendering



Detail View

Show Yes **No**

Advanced

Oracle Text
Index Column - Select -

Email From
Address

JavaScript Code

```
function(config) {  
    var $ = apex.jquery,  
        toolbarData = $.apex.interactiveGrid.copyDefaultToolbar(),  
        lastToolbarGroup = toolbarData[toolbarData.length - 1],  
        createButton = {  
            type: "BUTTON",  
            hot: true,  
            action: "create-employee"  
        };  
    lastToolbarGroup.controls.push( createButton );  
    config.toolbarData = toolbarData;  
}
```


So What (Else) Can I Do ?

From the JavaScript console type:

```
apex.region("igrid_id").widget().interactiveGrid("option","config")
```

Window > Object

⊕ ajaxColumns	"tcf00s9L1Y0i7d8yNoC1_RcHz...IQXu-wAEBW0WghffLWThCes"
ajaxIdentifier	"Rjxh0ZBLS_nEXOKNtpzdgNhNhFbiLys_fRPXWCZegB4"
⊕ appearance	Object { showNullValue="-", useFixedRowHeight=true }
columnGroups	[]
⊖ columns	[Object { id="63921276245062101", name="APEX\$ROW_ACTION", staticId="C63921276245062101", more... }, Object { id="64112665497602308", staticId="C64112665497602308", more... }, Object { id="64113193931602312", name="EMPNO", staticId="C64113193931602312", more... }]
⊕ 0	Object { id="63921276245062101", name="APEX\$ROW_ACTION", staticId="C63921276245062101", more... }
⊖ 1	Object { id="64112665497602308", name="ROWID", staticId="C64112665497602308", more... }
⊕ accessibility	Object { usedAsRowHeader=false }
⊕ appearance	Object { columnCssClasses="", formatExample="" }
dataType	"ROWID"
⊕ default	Object { duplicate=true, value="" }
escape	true
⊖ features	Object { canHide=true, highlight=true, compute=true, more... }
aggregate	true
cantHide	true
compute	true
controlBreak	true
groupBy	true
highlight	true
sort	true
⊕ filter	Object { operators=[2], dateRanges="all", isRequired=false, more... }
⊕ heading	Object { alignment="center", heading="", label="" }
helpid	""

Customization Examples

- Change Toolbar
- Change Grid Menus
- Access Data Model
- Change Action Menu
- “Global” Settings

Change Toolbar

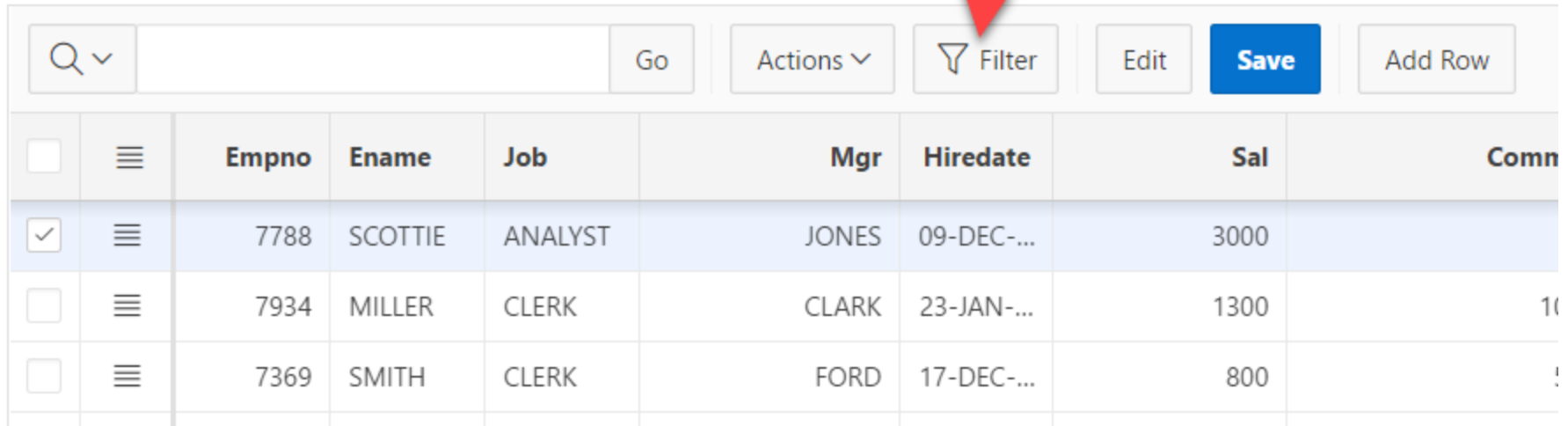
Goes in Grid
Advanced →
JavaScript

```
// toolbarFind is a new API as of 5.1.1
function(config) {
    var $ = apex.jQuery,
        toolbarData = $.apex.interactiveGrid.copyDefaultToolbar(),
        // this is the toolbar group w the Actions menu
        toolbarGroup = toolbarData.toolbarFind("actions1");

    // add a filter button after the actions menu
    toolbarGroup.controls.push( {
        type: "BUTTON",
        action: "show-filter-dialog",
        iconBeforeLabel: true
    });
    config.toolbarData = toolbarData;
    return config;
}
```

Change Toolbar

Custom Toolbar - Added Filter Button



The screenshot shows a custom toolbar with the following buttons from left to right: a search box with a magnifying glass icon and a dropdown arrow, a 'Go' button, an 'Actions' dropdown menu, a 'Filter' button with a funnel icon (highlighted by a red arrow), an 'Edit' button, a blue 'Save' button, and an 'Add Row' button.

<input type="checkbox"/>	☰	Empno	Ename	Job	Mgr	Hiredate	Sal	Comm
<input checked="" type="checkbox"/>	☰	7788	SCOTTIE	ANALYST	JONES	09-DEC-...	3000	
<input type="checkbox"/>	☰	7934	MILLER	CLERK	CLARK	23-JAN-...	1300	10
<input type="checkbox"/>	☰	7369	SMITH	CLERK	FORD	17-DEC-...	800	!

Change Column Menu

**Goes in Column
Advanced →
JavaScript**

```
function(config) {  
    config.features.sort = false;  
    config.features.aggregate = false;  
    config.features.controlBreak = false;  
    config.features.canHide = false;  
    config.features.groupBy = false;  
    // config.filter.isRequired=true;  
    return config;  
}
```

Change Column Menu

Custom Column Actions - EName No Sort, No Aggregate


		Q	Go	Actions	Edit	S
<input type="checkbox"/>	☰	Empno	Ename	Job	Mgr	Hiredate
<input checked="" type="checkbox"/>	☰	7788	<div style="background-color: black; color: white; padding: 5px;"> ☞ ❄ </div>			09-DEC-82
<input type="checkbox"/>	☰	7934				23-JAN-82
<input type="checkbox"/>	☰	7369	<div style="background-color: black; color: white; padding: 5px;"> Q Filter... <div style="background-color: black; color: white; padding: 2px;"> SMITH CLERK FORD </div> </div>			17-DEC-80
<input type="checkbox"/>	☰	7076	ADAMS			17 JAN 82

Change Grid Menu

Goes in Page
JavaScript

```
// exec this after page load, before the IGrid is initialized,
// to catch the initial events
$(function() {
  // listen for view change events for when grid views (not chart, groupby) are created
  $("#emp_igrid").on("interactivegridviewchange", function(event, data) {
    if ( data.view === "grid" && data.created ) {
      var view = apex.region("emp_igrid").widget().interactiveGrid("getViews", "grid"),
          menu$ = view.rowActionMenu$;

      menu$.menu("option").items.push({
        type:"action",
        label:"Hi",
        action: function(menu, element) {
          var record = view.getContextRecord( element )[0];
          alert("Welcome to ODTUG KScope 17, " + view.model.getValue(record, "ENAME") );
        }
      });
    }
  });
});
```



Page Component View Messages Pa

☰ ☰ ☰ ☰

Goes in Page JavaScript

Filter Properties

> Identification

> Appearance

> Navigation Menu

> Navigation

▼ JavaScript

File URLs

Function and Global Variable Declaration

```
// exec this after page load, before the IGrid is initialized,  
// to catch the initial events  
$(function() {  
  // listen for view change events for when grid views (not chart, groupby) are created  
  $("#emp_igrd").on("interactivegridviewchange", function(event, data) {  
    if ( data.view === "grid" && data.created ) {
```

Change Grid Menu

<input type="checkbox"/>	☰	Empno	Ename	Job	
<input checked="" type="checkbox"/>	☰	7788	SCOTTIE	ANALYST	
<input checked="" type="checkbox"/>	☰	7934	MILLER	CLERK	
<input type="checkbox"/>	☰		TH	CLERK	
<input type="checkbox"/>	☰	7876	ADAMS	CLERK	
<input type="checkbox"/>	☰	7499	SMITH-CLA...	CLERK	
<input type="checkbox"/>	☰	7782	CLARK-SMIT	MANAGER	
<input type="checkbox"/>	☰	7566	JONES	MANAGER	
<input type="checkbox"/>	☰	7698	BLAKE	MANAGER	
<input type="checkbox"/>	☰	7654	KING	PRESIDENT	
<input type="checkbox"/>	☰	7839	ALLEN	SALESMAN	

- ↩ Single Row View
- + Add Row
- 📄 Duplicate Row
- 🗑 Delete Row
- 🔄 Refresh Row
- ↶ Revert Changes
- Hi

Access the Model ...

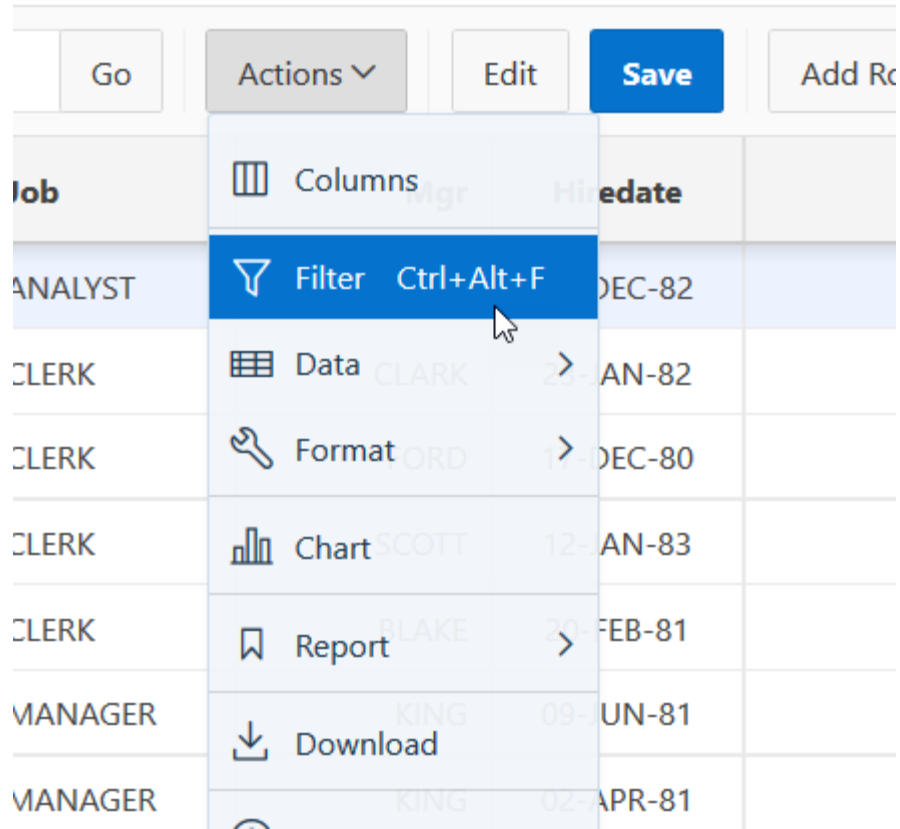
```
menu$.menu("option").items.push({
  type:"action",
  label:"Hi",
  action: function(menu, element) {
    var record = view.getContextRecord( element )[0];
    alert("Welcome to ODTUG KScope 17, " + view.model.getValue(record, "ENAME") );
  }
});
```

Change Action Menu

```
function(config) {  
  config.initActions = function( actions ) {  
    actions.hide("show-aggregate-dialog");  
    actions.lookup("show-filter-dialog").shortcut = "Ctrl+Alt+F";  
    actions.update("show-filter-dialog");  
    actions.lookup("save").shortcut = "Ctrl+Alt+S";  
    actions.update("save");  
  }  
  return config;  
}
```

**Goes in Grid
Advanced →
JavaScript**
I

Change Action Menu



The screenshot shows a software interface with a table and an 'Actions' dropdown menu. The table has columns for 'Job', 'Mgr', 'Hiredate', and others. The 'Actions' menu is open, showing options: Columns, Filter (highlighted), Data, Format, Chart, Report, and Download. A mouse cursor is pointing at the 'Filter' option.

Job	Mgr	Hiredate	
ANALYST		DEC-82	
CLERK	CLARK	29-AN-82	
CLERK	FORD	17-DEC-80	
CLERK	SCOTT	12-AN-83	
CLERK	BLAKE	29-FEB-81	
MANAGER	KING	09-JUN-81	
MANAGER	KING	02-APR-81	

Access Grid, Model, Record...

```
1
|--Get the link element that was clicked
var $te = $(this.triggeringElement);

|--Get the ID of the row
var rowId = $te.closest('tr').data('id');

|--Identify the particular interactive grid
var ig$ = apex.region("emp_igrid").widget();

|--Fetch the model for the interactive grid
var model = ig$.interactiveGrid("getViews","grid").model;

|--Fetch the record for the particular rowId
var record = model.getRecord(rowId);

|-- access the cell values via the column name static id NAME
var comm = model.getValue(record,"COMM");

IF comm < 100 {
  |--Set the values for the RIFF cell
  model.setValue(record,"RIFF","Y");
}
```


“Global” Settings

- JS Function in JS File
- Include File
- Reference JS Function in Advanced → JavaScript Code
- Add Classes on Grids

```
((function($){  
window.thtechIGridApp = {  
  commonIGConfig: function(config) {  
    config.defaultGridViewOptions = {  
      stickyFooter: false  
    };  
    if ($("#" + config.regionStaticId ).hasClass("seqNbr")) {  
      config.defaultGridViewOptions.rowHeader = "sequence";  
    }  
    if ( config.pagination.type === "set" ) {  
      config.defaultGridViewOptions.pagination = {  
        firstAndLastButtons: false,  
        maxLinks: 12  
      };  
    }  
    if ( config.pagination.type === "scroll" ) {  
      config.defaultGridViewOptions.pagination = {  
        showtotalRowCount: false  
      };  
    }  
  }  
};
```

```
if ($("#" + config.regionStaticId ).hasClass("filterOnlyGrid")) {
    config.toolbarData = [
        {
            groupTogether: true,
            controls: [
                {
                    type: "TEXT",
                    id: "search_field",
                    enterAction: "search"
                },
                {
                    type: "BUTTON",
                    action: "search"
                }
            ]
        },
        {
            controls: [
                {
                    type: "BUTTON",
                    action: "show-filter-dialog",
```

I

User Interface Details

Show All

Identification

Attributes

Navigation Menu

Navigation Bar

JavaScript

JavaScript

Content Delivery Network

None (use Web Server) ▼



File URLs

`/i/thtech/js/THTech_Common_IGConfig_wk2.js`

Include Legacy Javascript

Yes

No

Include jQuery Migrate

Yes

No

gReport.search Equivalent

```
// get the IGrid widget
var ig$ = apex.region("emp_igrid").widget();

// get the toolbar widget, the Search Field, pass a value
ig$.interactiveGrid("getToolbar")
    .toolbar("findElement", "search_field").val("BLAKE");

// invoke a search with the value you just set
ig$.interactiveGrid("getActions").invoke("search");
```

Interactive Grid:

Pros, Cons, Discussion

The screenshot displays two interactive grid components. The top component, titled 'Departments', features a search bar with the text 'Search: All Text Columns', a 'Go' button, and an 'Actions' dropdown menu. Below the search bar is a table with two columns: 'Deptno' and 'Dname'. The first row is highlighted in blue and contains the values '10' and 'ACCOUNTING'. The other rows are '20 RESEARCH', '30 SALES', and '40 OPERATIONS'. The bottom component, titled 'Employees', has a similar search bar and table structure. Its table has three columns: 'Empno', 'Ename', and 'Job'. The first row is highlighted in blue and contains the values '7839', 'KING', and 'PRESIDENT'. The other rows are '7782 CLARK MANAGER' and '7934 MILLER CLERK'.

Deptno	Dname
10	ACCOUNTING
20	RESEARCH
30	SALES
40	OPERATIONS

Empno	Ename	Job
7839	KING	PRESIDENT
7782	CLARK	MANAGER
7934	MILLER	CLERK

Upgrade or Not?

- IR Considerations
 - Pivot
 - Customized Logic
 - Drills To IRs
- Tabular Form Considerations
 - Customizations

Best to Rebuild When ...

- Low/Reasonable Volume of IRs/Tabular Forms to Upgrade
- All Features Have a Declarative Equivalent in Interactive Grid

No Sense to Upgrade to Make Extensive Customizations

Prototype !

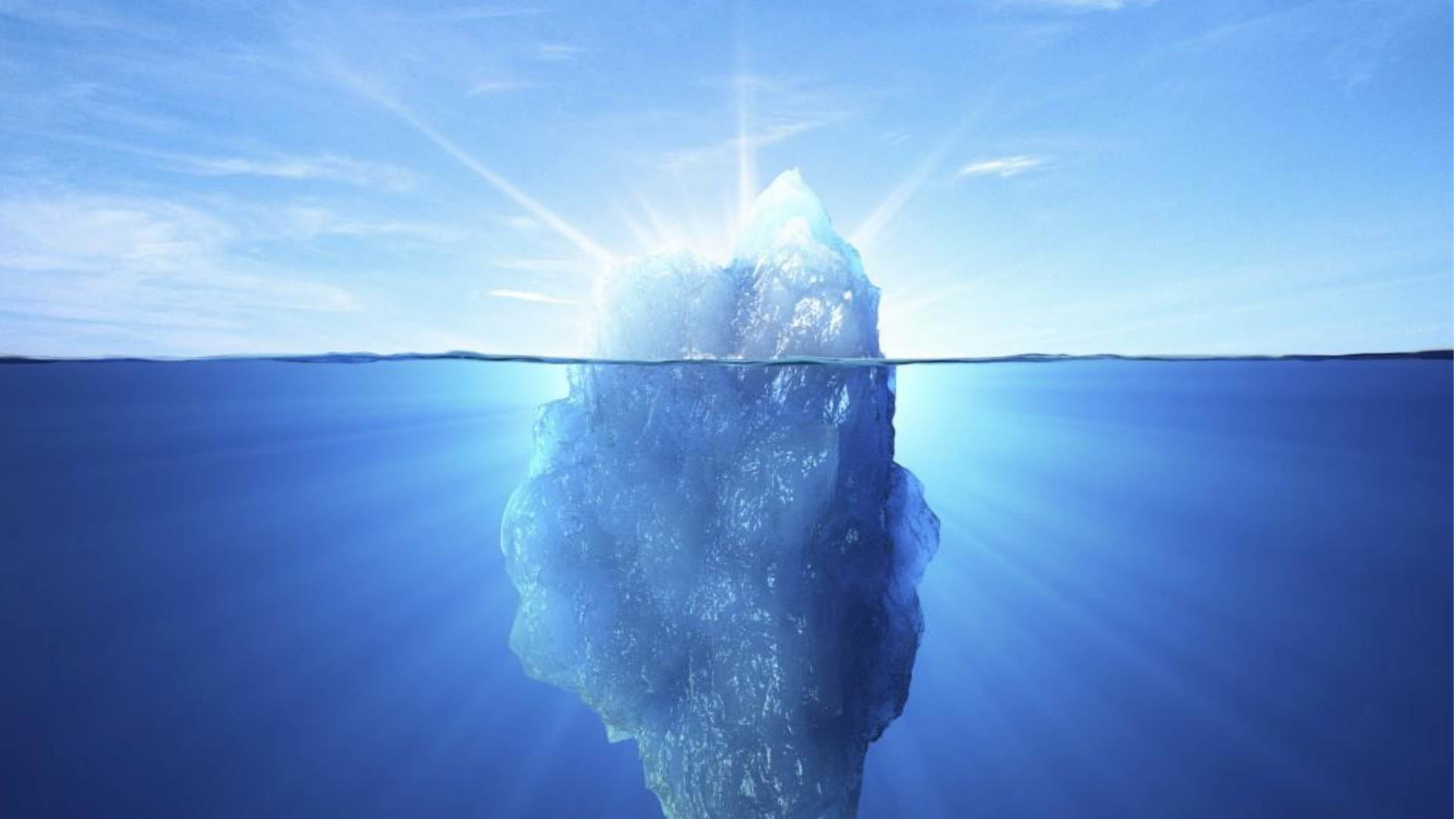
What Interactive Grid Means ...

Developers

- **Bigger Sandbox**
- **THINK Before Build or Upgrade**
- **Brush Up on JavaScript**
 - jQuery Widgets
 - JavaScript Customizations

End Users

- **Cleaner Interface**
- **Improved Loading, Pagination**
- **Tab/Enter Navigation**
- **Inline Edits**
- **More is Possible – Less Work**



There is Much More

- **Pagination Options**
- **Client-Side Validation**
- **Protected Rows**
- **Icon View**
- **Detail View**
- **More Coming!**

Challenge

- Sample Interactive Grid App
- <http://www.hardlikesoftware.com>
- Read the JS Widget Code
`<apex_install_dir>/images/libraries/apex`
- PLAY

Comments? Questions?



Karen Cannell
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Resources

- **Sample Interactive Grids**
APEX 5.1 Sample Application, Editing section
- **Interactive Grids Under the Hood**
<http://hardlikesoftware.com/weblog/2016/06/08/interactive-grid-under-the-hood/>
- **Interactive Grid Column Widths**
<http://hardlikesoftware.com/weblog/2017/01/06/interactive-grid-column-widths/>
- **How to Hack Interactive Grids, Parts I thru IV**
<http://hardlikesoftware.com/weblog/2017/01/18/how-to-hack-apex-interactive-grid-part-1/>
- **APEX: Updating Interactive Grid Cells**
<https://ruepprich.wordpress.com/2017/03/09/apex-updating-interactive-grid-cells/>

Resources, cont'd

- **APEX Client-Side Validation**
<http://hardlikesoftware.com/weblog/2017/05/10/apex-client-side-validation/#more-615>
- **Interactive Grid Column Widths**
<http://hardlikesoftware.com/weblog/2017/01/06/interactive-grid-column-widths/>
- **How to Hack Interactive Grids, Parts I thru IV**
<http://hardlikesoftware.com/weblog/2017/01/18/how-to-hack-apex-interactive-grid-part-1/>
- **APEX: Updating Interactive Grid Cells**
<https://rueprich.wordpress.com/2017/03/09/apex-updating-interactive-grid-cells/>

Join Your Community at Kscope17

Monday, June 26 from 8:00 PM – 10:00 PM in Cibolo Canyon 5



APEX Open Mic Night Sponsored by **insum**

APEX Open Mic Night is one of the highlights of Kscope for the APEX community. It gives the opportunity for attendees to showcase some of the cool features and applications they've built using APEX. For those that want to present, simply show up a few minutes early and sign-up on the sheet provided. Each informal presentation is five minutes long (no slides) followed by a few minutes of Q&A from the audience.



Thank You

Evaluations Please!
Session#286

Karen Cannell
kcannell@thtechnology.com



Advanced Client Validation

- APEX 5.1.1
- Validate Comm
 - JS Using API
- Validate Comm Limit Example
 - Row Level – no HTML5
 - Fire on apexendrecordedit Event
- apexendrecordedit Event
 - When Edit ends

Advanced Client Validation

- **Validate Comm Limit**
 - Row-level Validation (no HTML5)
 - Use JavaScript model API
 - Set Record Validity

APEX 5.1.1

Code Editor - Code



```
1 var validity, message,  
2     ui = this.data,  
3     sal = $v("cSal"),  
4     comm = $v("cComm");  
5  
6 if ( comm == "" || comm < 1.5 * sal ) {  
7     validity = "valid";  
8 } else {  
9     validity = "error";  
10    // use apex.lang api if you want to localize this message  
11    message = "Commission must be less than 1.5 times the Salary";  
12 }  
13 // passing null for the field set the error on the whole row/record  
14 ui.model.setValidity(validity, ui.recordId, null, message);  
15
```

APEX 5.1.1

Validate Comm

APEX 5.1.1

Code Editor - Code

↶ ↷ 🔍 ↔ A..



```
1 | var comm = apex.item("cComm"),
2   |   num = comm.getValue();
3 | if ( num !== "" && (parseFloat(num) != num || num < 0 || num > 10000)) {
4   |   comm.node.setCustomValidity("invalid number"); // this message is only shown if there is no data-valid-message
5 | } else {
6   |   comm.node.setCustomValidity(""); // clear the error
7 | }
8 |
```