

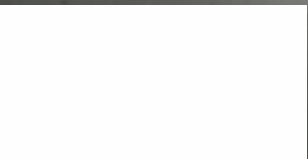
The logo for AMIS, featuring the letters 'AMIS' in a bold, red, sans-serif font. A red swoosh underline is positioned below the letters, starting under the 'A' and ending under the 'S'.

AMIS

Friends of Oracle and Java

The background of the slide features a grayscale photograph of several people walking on a paved surface. Their shadows are cast long and dark on the ground. A thick, solid red diagonal band cuts across the image from the top left towards the bottom right. The main title text is overlaid on the lower right portion of the image.

Creating Intuitive & Interactive Dashboards with the ADF Data Visualization Components

A solid white rectangular box is located in the bottom left corner of the slide.

Frank Houweling
UKOUG 2014

Agenda

- Why data visualization is important
- Examples where DVTs are used
- Graph demo: ADF Performance Monitor
- Basic steps creating a graph (ADF11g)
- Special features
 - colors, mouseover info, alerts, reference line, animation 3D, clicklistener, hide and show, stacked graphs, dual graphs, e.g.
- Advanced Graph Examples
 - Bubble, Spark, Treemap
- Other Tips & Challenges
- 12.1.3 DVT Components

Why data visualization is important

- Use of the power of visualization to present information
- Call to action to our end user instead of showing raw data - as we frequently do today
- Visualizations can be used to help end users focus on what is relevant: aggregate, exception, trend, comparison etc.



Glance, Scan, Commit

- Oracle Alta UI
- Oracle follows the “glance, scan, commit” design philosophy
 - start in an overview/dashboard mode with small information containers
 - These containers show only key information for the user to glance
 - If the user is interested in anything he can zoom in on the subject (Scan the information)
 - When the user needs to complete a task he navigates to the commit mode



Oracle Alta

- Work Better Application

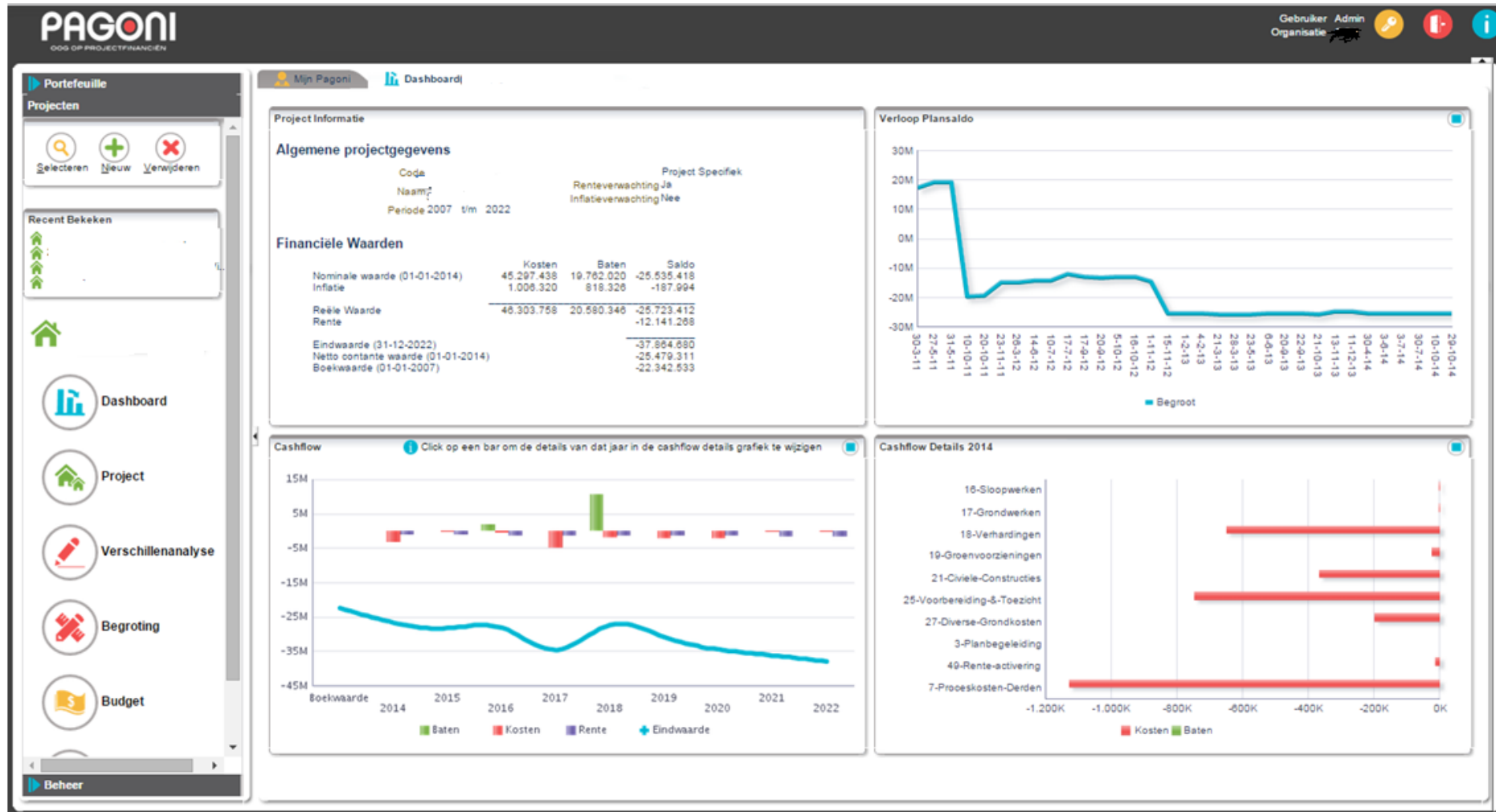


Fusion Applications



Dashboard interactive graphs

- Dashboard of financial management application for local governments



WLS Enterprise Manager

ORACLE Enterprise Manager Cloud Control 12c Setup Help GUEST_SUPER_ADMIN1 Log Out

Grid Targets Favorites History Search Target Name

Page Refreshed Jul 29, 2011 4:39:05 AM PDT

Enterprise Summary

Overview View All Targets
Targets Monitored 2905

Status
Targets with Status 2241

Incidents
Open 1097
Updated in last 24 hours 696

Category	Open	Warning	Error	Critical
Availability	95	244	60	-
Performance	-	4	-	-
Security	-	122	-	-
Others	95	934	62	-

Problems
Open 36 Without Service Request 36
Updated in last 24 hours 30

Jobs
Suspended Executions (last 7 days) 15
Problem Executions (last 7 days) 4267
Action Required Executions (last 7 days) 0

Patch Recommendations
View by Classification Target Type

Classification	Count
Other Recommendations	50
Security	60

Inventory and Usage

Show Hosts See Details

Platform	Hosts	OS Patches
Enterprise Linux Server release 5.6 (Carthage)	39	No
Enterprise Linux AS release 4 (October Update 8)	15	No
Enterprise Linux Server release 5.4 (Carthage)	6	No
SunOS	5	No
Red Hat Enterprise Linux Server release 6.0 (Santiago)	3	No

Compliance Summary

Compliance Frameworks Compliance Standards

View View Trends

Name	Target Evaluations	Violations	Average Compliance Score (%)
No data to display			

Least Compliant Targets

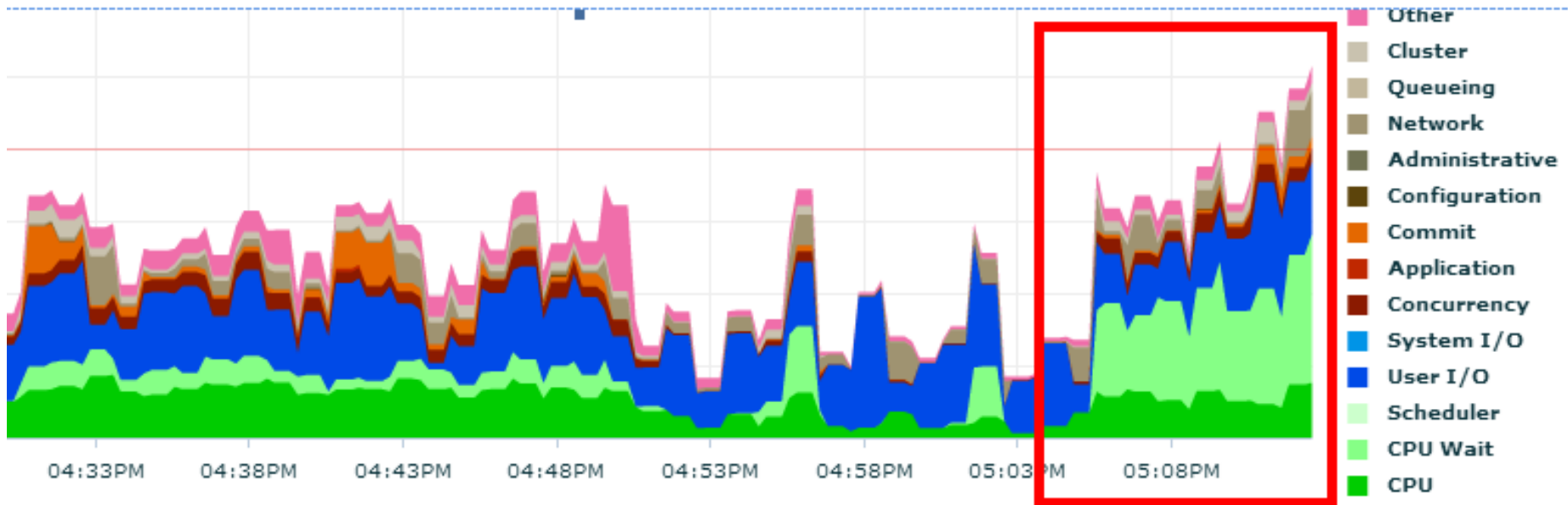
Target Name	Target Type	Standard Evaluations	Violations	Average Compliance Score (%)
slc00ahq.us.oracle.com	Host	0 0 1	1 0 0	51
adc2170590.us.oracle.com	Host	1 0 0	2 0 0	51
staic01.us.oracle.com	Host	1 0 0	1 0 0	51
adc2120071.us.oracle.com	Host	1 0 0	2 0 0	51
slc00eif.us.oracle.com	Host	0 0 1	0 0 0	100

Service Requests

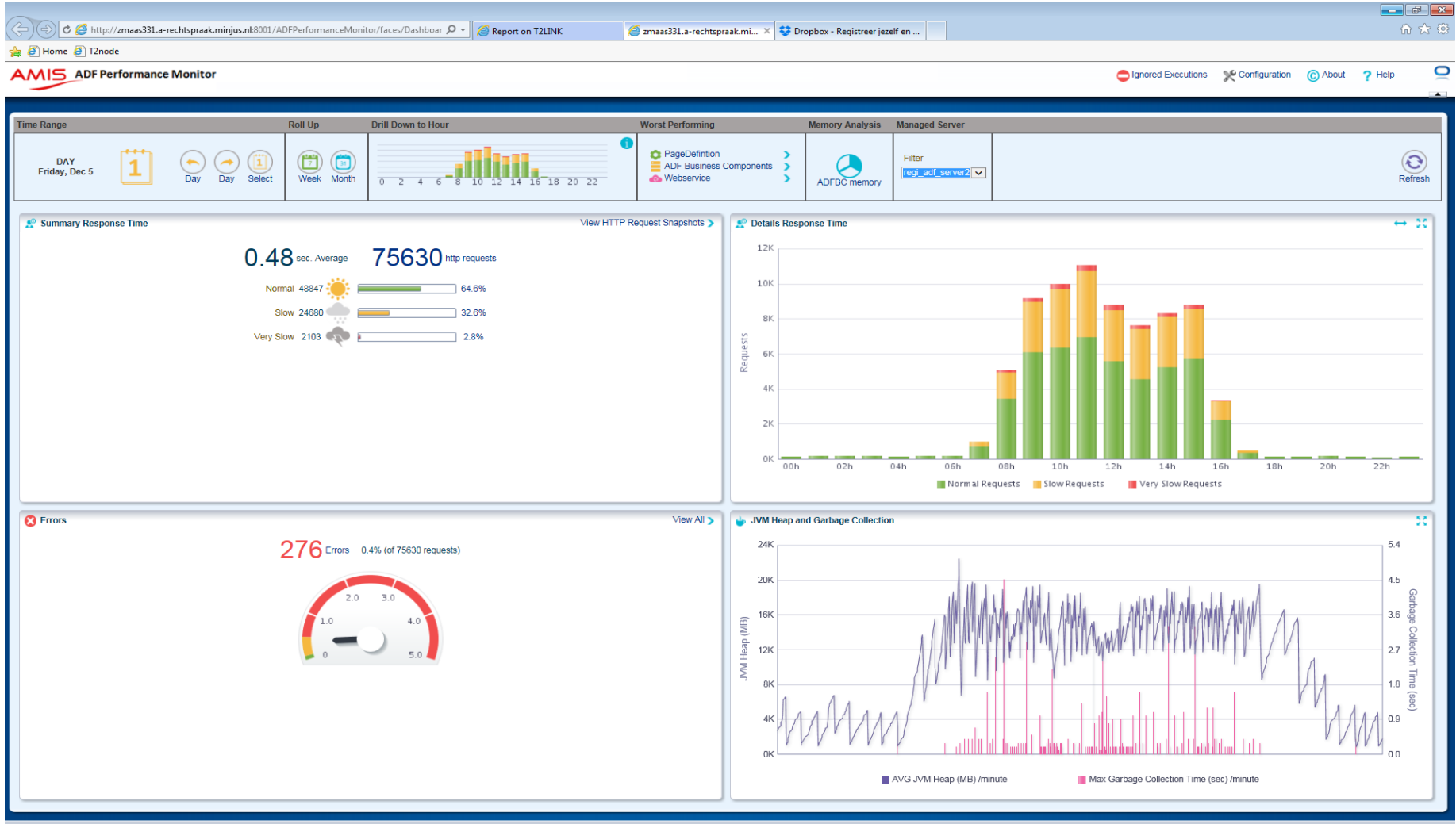
My Oracle Support
You cannot access My Oracle Support while in offline mode.

ADF DVTs in Monitoring Tools

- Database EM



Demo ADF Performance Monitor Dashboard



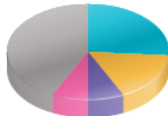
Demo ADF Performance Monitor Errors Overview

AMIS ADF Performance Monitor Ignored Executions Configuration About Help

ERRORS

Date/Time Range Start: 2013-12-30 00:00:00 End: 2014-01-05 23:59:59 Show search region

Errors (42)



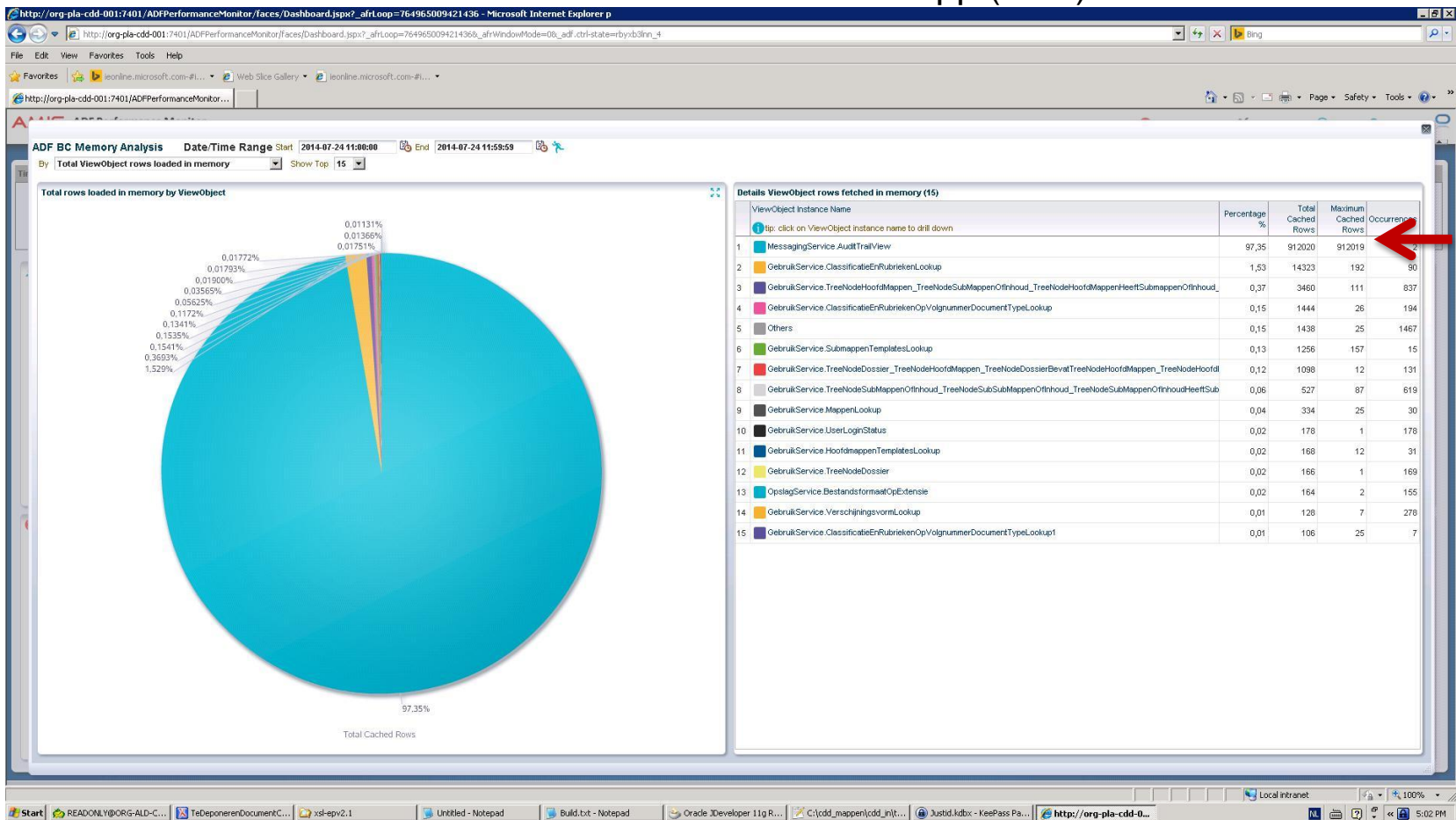
- class java.lang.NullPointerException (11)
- ORA-04068: existing state of packages has been discarded ORA-04061: existing st... (7)
- ORA-02292: integrity constraint (PGLPAG_KPN_KND_FK) violated - child record fo... (3)
- ORA-00001: unique constraint (PGLPAG_IPT_UK_01) violated ORA-06512: at PGLPAG.....
- other (18)

HTTP Requests (42) Request Time Database process time Button/Link clicked on User ID Session details Server

Snapshot	Exception Message	Response Time (Sec)	Time in Database (Sec)	Request Time	Button/Link clicked on	User ID
✘ snapshot	ORA-04068: existing state of packages has been discarded ORA-04061: existing st...	9.35	0.24	01-03 15:40:49	-	admin@oga
✘ snapshot	Er is geen bedrijfsnummer bekend bij dit plan.	0.55	0.00	01-03 10:27:29	tk	admin@st_geb
✘ snapshot	ORA-04068: existing state of packages has been discarded ORA-04061: existing st...	0.46	0.00	01-03 15:41:01	PagMainMenuPagg001Start	admin@oga
✘ snapshot	ORA-02290: check constraint (PGLPAG_BGG_CK_02) violated ORA-06512: at PGLPAG_...	0.40	0.33	01-03 09:43:45	pagadflib_train_finish	admin@oga
✘ snapshot	ORA-04068: existir	0.38	0.13	01-03 16:06:24	-	admin@oga
✘ snapshot	Er is geen bedrijfsn ORA-02290: check constraint (PGLPAG_BGG_CK_02) violated ORA-06512: at PGLPAG_BGG_CREATE, line 90 ORA-06512: at PGLPAGA001_PJT_CREATE_ACTIE, line 70 ORA-06512: at PGLPAGA001_PJT_CREATE_ISI, line 2 ORA-04088: error during execution of trigger PGLPAGA001_PJT_CREATE_ISI	0.18	0.03	01-03 10:26:21	tk	admin@st_geb
✘ snapshot	ORA-02292: integrity constraint (PGLPAG_KPN_KND_FK) violated - child record fo...	0.16	0.06	01-03 17:28:50	deleteKmkDialog	admin@oga
✘ snapshot	Write failed: Broken pipe	0.15	0.00	01-02 14:52:04	-	admin@oga
✘ snapshot	ORA-04068: existing state of packages has been discarded ORA-04061: existing st...	0.15	0.00	01-03 16:09:02	ADF_Dialog	admin@st_kvs
✘ snapshot	popView(): No view has been pushed.	0.11	0.00	01-03 10:31:36	pagadflib_lov_annulleer	admin@OGA
✘ snapshot	ORA-00001: unique constraint (PGLPAG_IPT_UK_01) violated ORA-06512: at PGLPAG...	0.10	0.04	12-31 10:50:19	cttSBC	admin@oga
✘ snapshot	ORA-00001: unique constraint (PGLPAG_PJT_UK_01) violated ORA-06512: at PGLPAG...	0.10	0.03	01-03 16:44:51	pagadflib_train_finish	admin@oga
✘ snapshot	ORA-00001: unique constraint (PGLPAG_IPT_UK_01) violated ORA-06512: at PGLPAG...	0.10	0.00	12-31 11:22:40	cttSBC	admin@oga

Loaded Rows in Memory ADF BC Memory Analyzer

- In this production ADF app, for a single ViewObject instance, more than **900.000** rows were loaded in the ADF app (Blue) !



Demo ADF Performance Monitor Slow Activation of ApplicationModule

AMIS ADF Performance Monitor Ignored Executions

HTTP REQUESTS

REQUEST CALL STACK

ADF Web Request Message

ADF Executions	Time (ms)	Percent of Request	Time in Request (ms)
HTTP Request	40353	<div style="width: 100%;"></div>	0
ADF Phase jsfrestoreview	7	<div style="width: 100%;"></div>	2
ADF Phase initcontext	0	<div style="width: 100%;"></div>	10
ADF Phase preparemodel	30344	<div style="width: 100%;"></div>	10
create()	0	<div style="width: 100%;"></div>	17
afterConnect()	0	<div style="width: 100%;"></div>	17
activateState(), AM=CountriesService	8256	<div style="width: 100%;"></div>	19
refreshRegion() region=pageDef=SearchEmployeesPageDef, viewPort=/search-employees/S	0	<div style="width: 100%;"></div>	8276
create()	0	<div style="width: 100%;"></div>	8279
afterConnect()	0	<div style="width: 100%;"></div>	8279
activateState(), AM=HRService	7	<div style="width: 100%;"></div>	8280
refreshRegion() region=pageDef=SearchJobsPageDef, viewPort=/jobs/SearchJobs	0	<div style="width: 100%;"></div>	8290
refreshRegion() region=pageDef=SearchJobsPageDef, viewPort=/jobs/SearchJobs	0	<div style="width: 100%;"></div>	8291
refreshRegion() region=pageDef=...	0	<div style="width: 100%;"></div>	8291
create()	0	<div style="width: 100%;"></div>	8295
afterConnect()	0	<div style="width: 100%;"></div>	8295
activateState(), AM=HRService	2	<div style="width: 100%;"></div>	8296
create()	0	<div style="width: 100%;"></div>	8302
afterConnect()	0	<div style="width: 100%;"></div>	8302
activateState(), AM=HRService	22048	<div style="width: 100%;"></div>	8303
rollback(), AM=HRService	0	<div style="width: 100%;"></div>	8902
activateIteratorState()	21442	<div style="width: 100%;"></div>	8909
executeQueryForCollection() VO=HRService.LocationsViewRO	111	<div style="width: 100%;"></div>	8917
Fetching, creating rows for HRService.LocationsViewRO, fetched: 4999	1708	<div style="width: 100%;"></div>	9029
activateTransients()	19605	<div style="width: 100%;"></div>	10745
executeIteratorBinding(Lc	0	<div style="width: 100%;"></div>	30352
refreshRegion() region=/UISh	0	<div style="width: 100%;"></div>	30353
ADF Phase isfrenderresponse	11	<div style="width: 100%;"></div>	30354

Execution Details

method=activateState
 AM=HRService
 definition=hr.demo.model.service.HRService
 instance=@1249911
 execution time=22048

Execution Details

method=activateTransients()
 details=HRService.LocationsViewRO
 execution time=19605

Demo ADF Performance Monitor Slow Passivation of ApplicationModule

AMIS ADF Performance Monitor Ignored Exe

HTTP REQUESTS

Date/Time Range Start: 2014.03.31 00:00:00 End: 2014.04.06 23:59:59

REQUEST CALL STACK

ADF Web Request Message

ADF Executions	Time (ms)	Percent of Request	Time in Request (ms)
HTTP Request	53067		0
ADF Phase jsfrestoreview	5		3
ADF Phase initcontext	0		9
ADF Phase preparemodel	30963		9
ADF Phase jsfapplyrequestvalues	53		30974
invokeOperation(GetViewCriteria)	0		30978
invokeOperation(GetViewCriteria)	0		30980
ADF Phase jsfprocessvalidations	11		31028
ADF Phase jsfupdatemodelvalues	12		31039
ADF Phase validatemodelupdates	2		31051
ADF Phase jsfinvokeapplication	18043		31054
executeIteratorBinding(EmployeesView1Iterator)	18032		31060
executeQuery()	18032		31060
executeQueryForCollection() VO=HRService.EmployeesView1, times executed=2	18011		31072
Fetching, creating rows for HRService.EmployeesView1, fetched: 35	6		49085
ADF Phase metadatacommit	0		49102
ADF Phase jsfrenderresponse	133		49103
ADF Phase preparerender	16		49103
getQueryHitCount() VO=HRService	1		49174
passivateState(), AM=HRService	5		49240
rollback(), AM=HRService	0		49248
passivateState(), AM=CountriesService	1		49248
rollback(), AM=CountriesService	0		49252
passivateState(), AM=HRService	3796		49253
passivateState()	2058		49253
passivateTransients()	2058		49253
rollback(), AM=HRService	0		53063
passivateState(), AM=HRService	1		53063

Execution Details

method=passivateState
AM=HRService
definition=hr.demo.model.service.HRService
instance=@1444129
execution time=3796

Execution Details

method=passivateTransients()
details=HRService.LocationsViewRO
execution time=2058

Demo ADF Performance Monitor ¹⁶

Worst ApplicationModule activations & passivations overview

- Monitor aggregates of ApplicationModule activations and passivations
 - AVG, Occurrences, Total Exec Time, Min, Max
 - Zoom in into single executions

AMIS ADF Performance Monitor Ignored Executions Configuration About Help

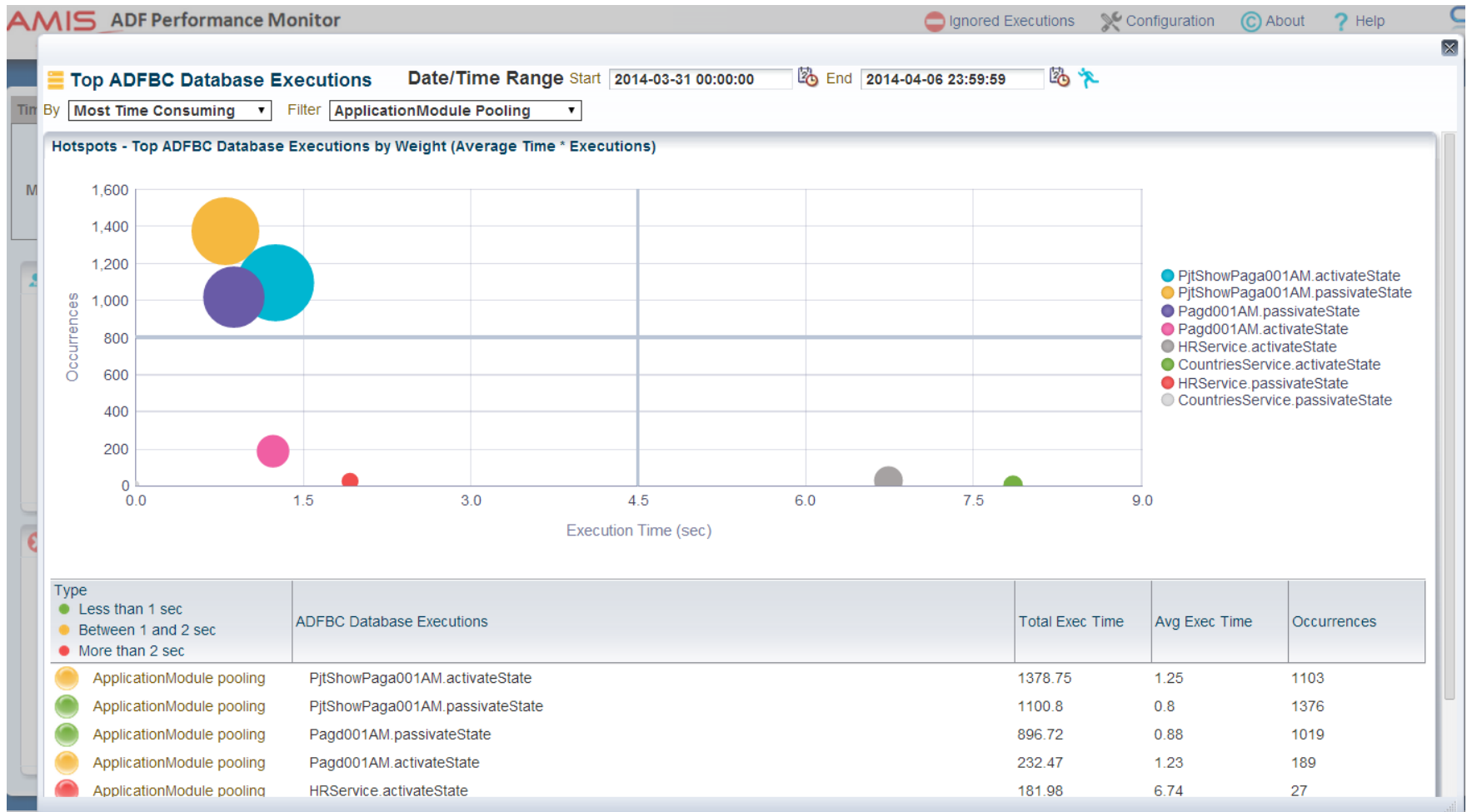
Top ADFBC Database Executions Date/Time Range Start End

By Filter

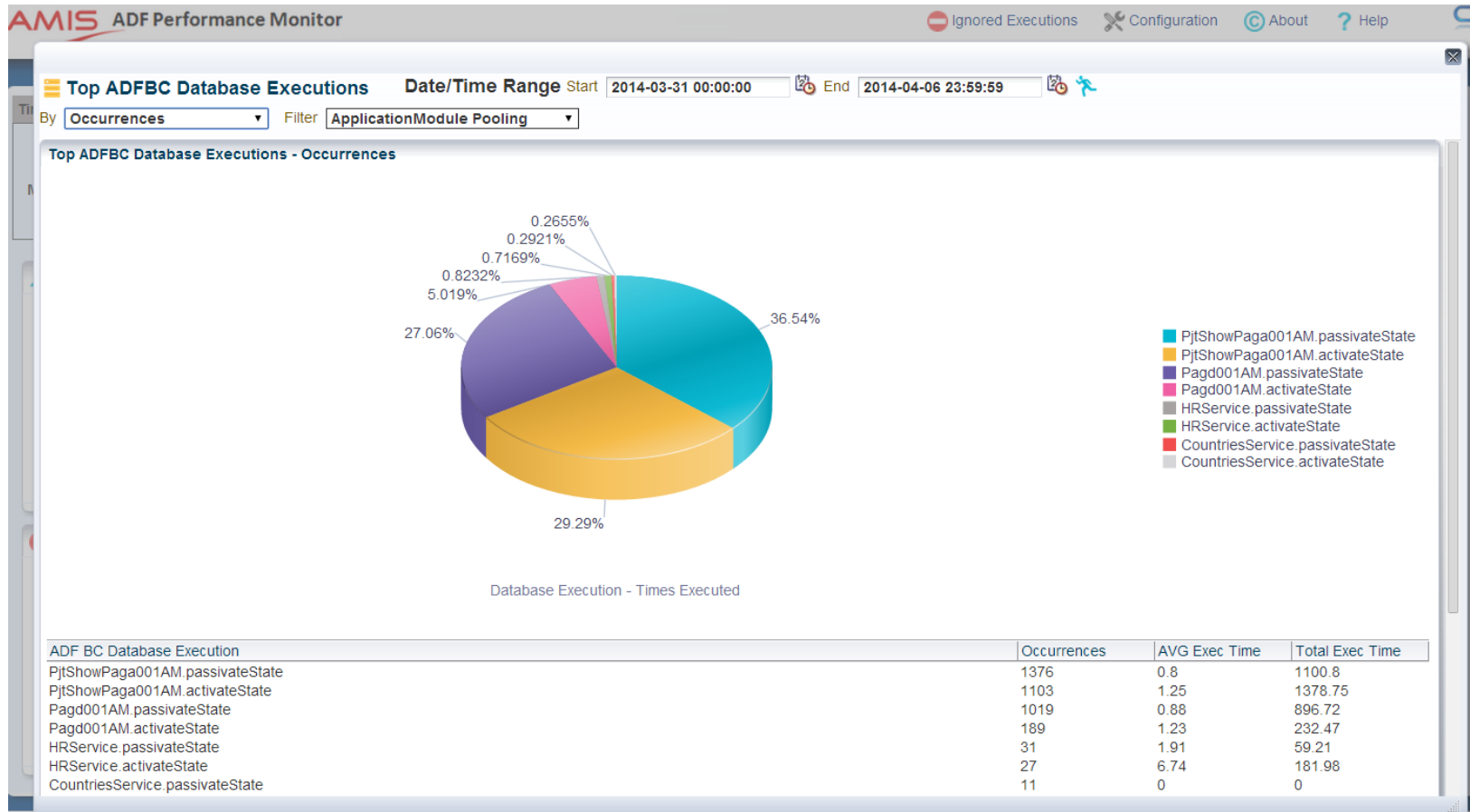
TOP ADFBC Database Executions by Execution Time Show Min Show Max tip: click on Database Execution link to zoom in

Type	ADF BC Database Execution	AVG Execution Time	Occurrences	Total Exec Time
● Less than 1 sec				
● Between 1 and 2 sec				
● More than 2 sec				
● ApplicationModule pooling	CountriesService.activateState	7.84	10	78.4
● ApplicationModule pooling	HRService.activateState	6.74	27	181.98
● ApplicationModule pooling	HRService.passivateState	1.91	31	59.21
● ApplicationModule pooling	PjtShowPaga001AM.activateState	1.25	1103	1378.75
● ApplicationModule pooling	Pagd001AM.activateState	1.23	189	232.47
● ApplicationModule pooling	Pagd001AM.passivateState	0.88	1019	896.72
● ApplicationModule pooling	PjtShowPaga001AM.passivateState	0.80	1376	1100.8
● ApplicationModule pooling	CountriesService.passivateState	0.00	11	0

Demo ADF Performance Monitor Worst ApplicationModule activations & passivations overview



Demo ADF Performance Monitor Occurrences overview



Agenda

- Why data visualization is important
- Examples where DVTs are used
- Graph demo: ADF Performance Monitor
- **Basic steps creating a graph (ADF11g)**
- Special features
 - colors, mouseover info, alerts, reference line, animation 3D, clicklistener, hide and show, stacked graphs, dual graphs, e.g.
- Advanced Graph Examples
 - Gauges, Bubble, Spark, Treemap
- Other Tips & Challenges
- 12.1.3 DVT Components

Basic Steps Creating a Graph - 1

- Create a ADFBC ViewObject with raw graph data
- Drag and drop the ViewObject from the DataControl to the page

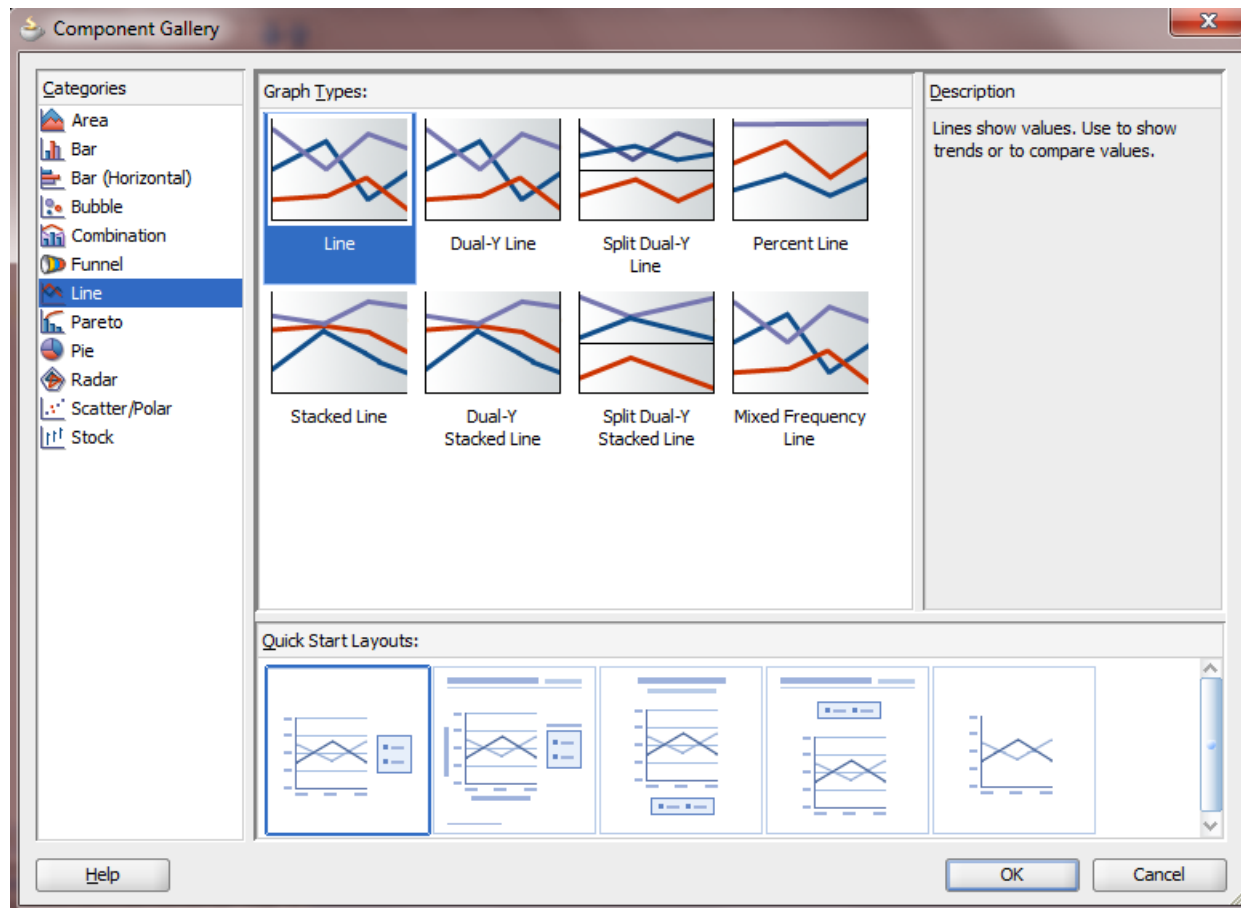
The screenshot illustrates the initial step of creating a graph in an ADF page. On the left, the 'Data Controls' pane shows a list of View Objects, with 'ActiveRequestsAMinuteVO' selected. A blue arrow points from this View Object to the 'Graph...' option in a context menu that is open over a table row in the page markup. The page markup shows a table structure with a row selected for editing. The context menu includes options like 'Carousel', 'Form', 'Gantt', 'Gauge...', 'Geographic Map', 'Graph...', 'Multiple Selection', 'Navigation', 'Single Selection', 'Table', 'Tree', and 'Cancel'.

```

676 <af:panelBox text="Line Graph" id="pbl"
677 <f:face
678 </af:panelBox
679 </f:facet>
680 </af:panelBox
681 <f:facet name="
682 <af:panelGr
683 <trh:tabl
684 <trh:ro
685 <trh:
686 <af:
687 </trh:
688 <trh:
689 <af:
690 </trh:
691 <trh:
692 <trh:
693 <trh:
694 <af:outputText value="#{pageFlc
        rendered="#{pageFlc
        id="otl1"/>
695 </trh:cellFormat>
696
    
```

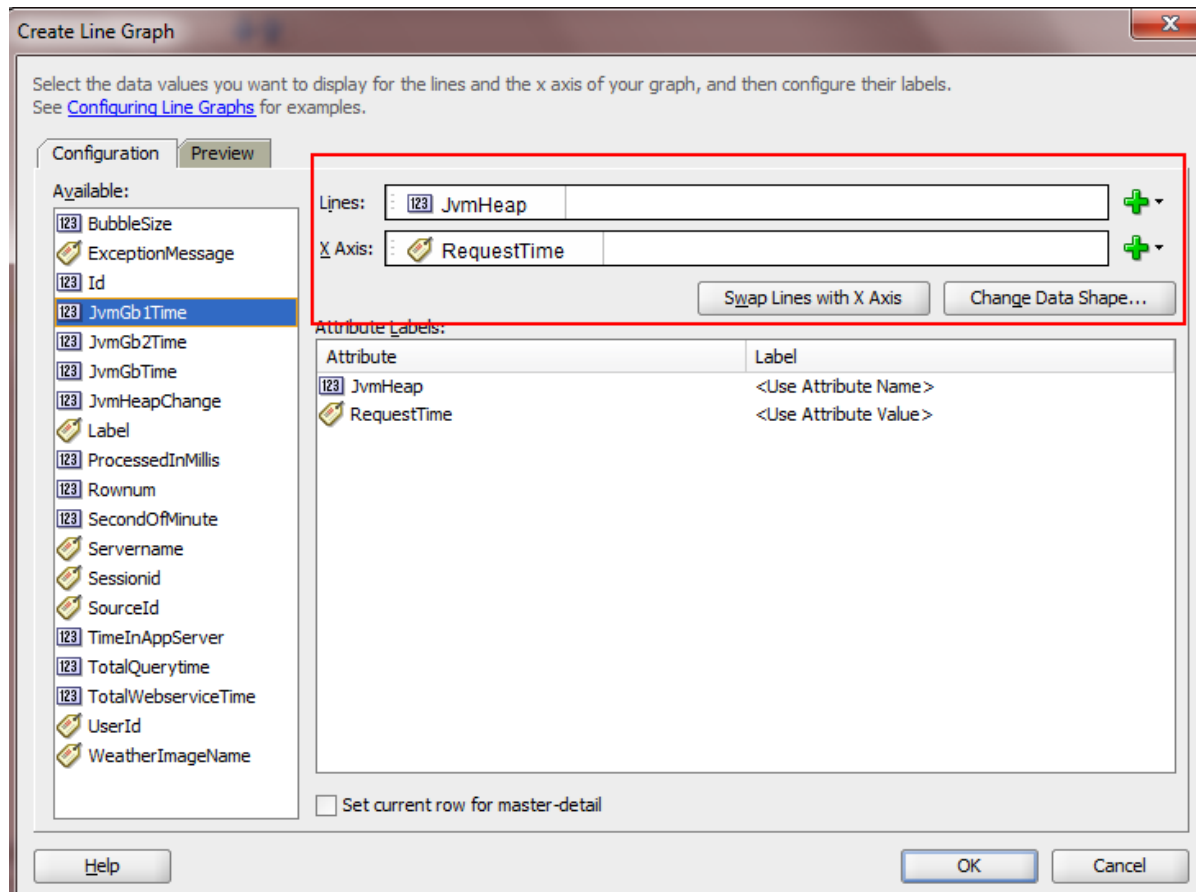
Basic Steps Creating a Graph - 2

- Select Category and Graph Type



Basic Steps Creating a Graph - 3

- Select X and Y attributes



Basic Steps Creating a Graph - 4

- Generated code in page

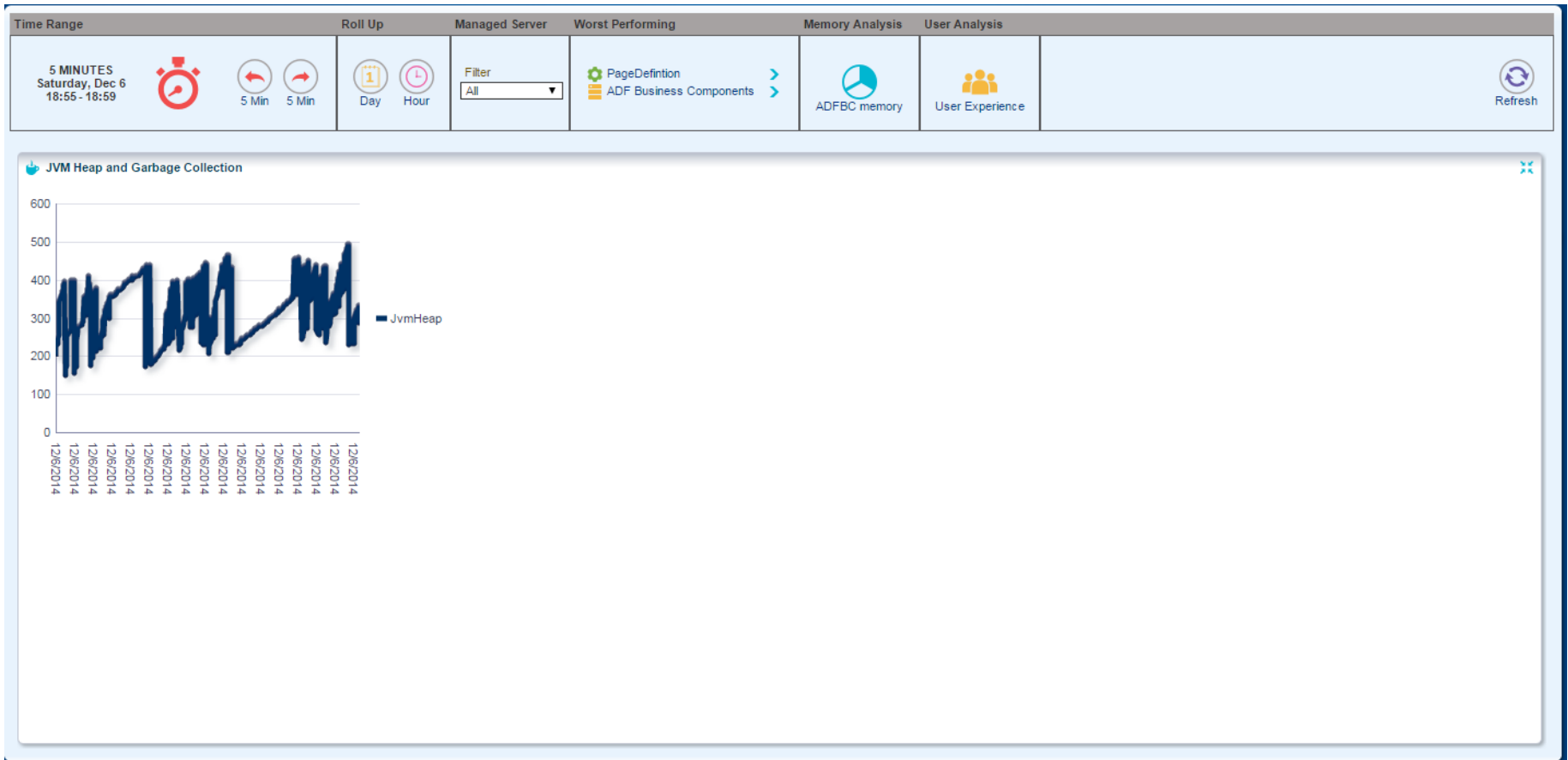
```
<dvt:lineGraph id="lineGraph1"
               value="#{bindings.ActiveRequestsAMinuteV07.graphModel}"
               subType="LINE_VERT_ABS">
  <dvt:background>
    <dvt:specialEffects/>
  </dvt:background>
  <dvt:graphPlotArea/>
  <dvt:seriesSet>
    <dvt:series/>
  </dvt:seriesSet>
  <dvt:olAxis/>
  <dvt:ylAxis/>
  <dvt:legendArea automaticPlacement="AP_NEVER"/>
</dvt:lineGraph>
```

- Generated code in PageDef

```
<graph IterBinding="ActiveRequestsAMinuteIterator"
       id="ActiveRequestsAMinuteV07"
       xmlns="http://xmlns.oracle.com/adfm/dvt" type="LINE_VERT_ABS">
  <graphDataMap leafOnly="true">
    <series>
      <data>
        <item value="JvmHeap"/>
      </data>
    </series>
    <groups>
      <item value="RequestTime"/>
    </groups>
  </graphDataMap>
</graph>
```

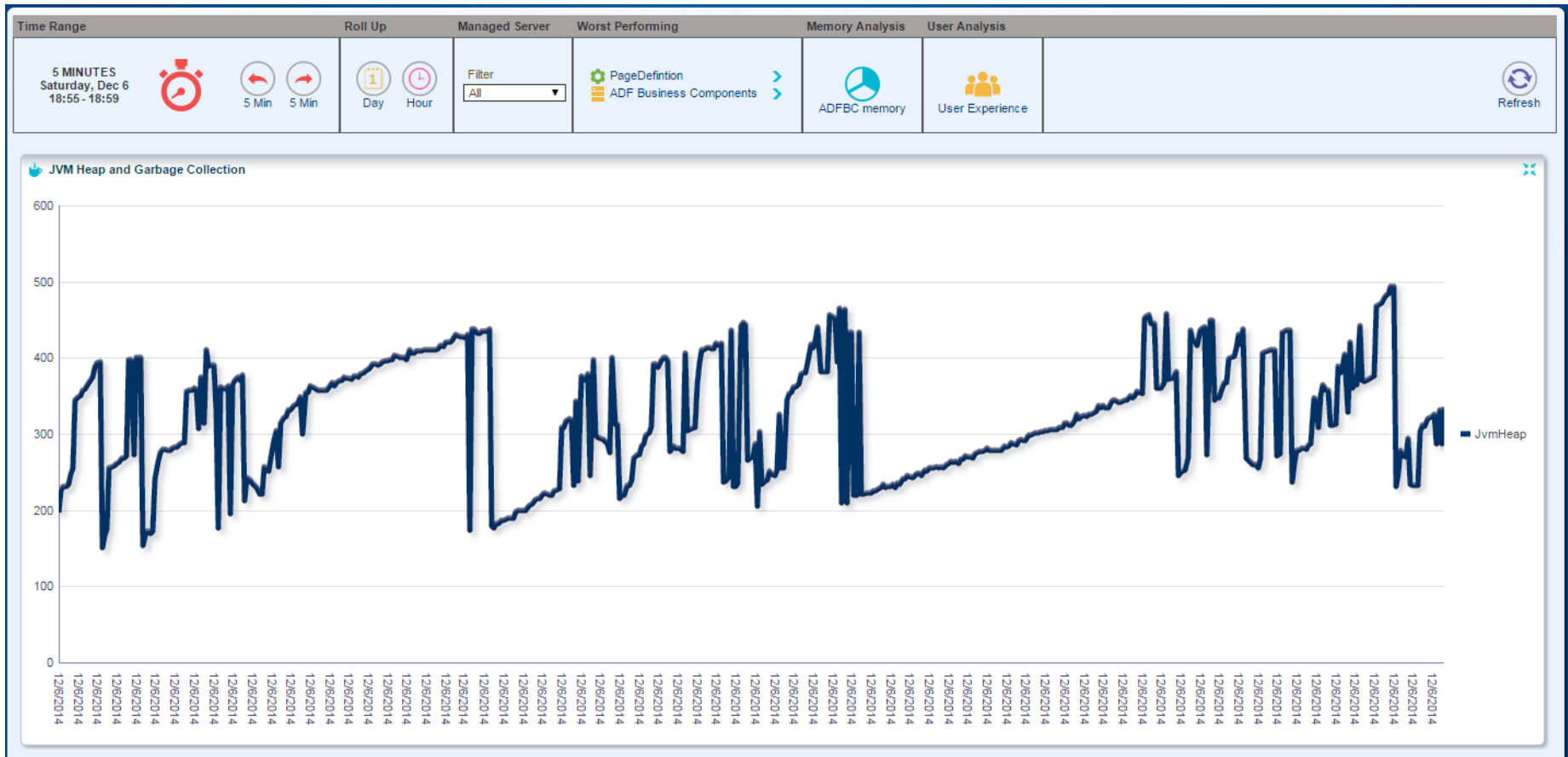
Basic Steps Creating a Graph - 5

- Result:



Basic Steps Creating a Graph - 6

- Add attribute **dynamicResize="DYNAMIC_SIZE"** to `dvt:lineGraph` :



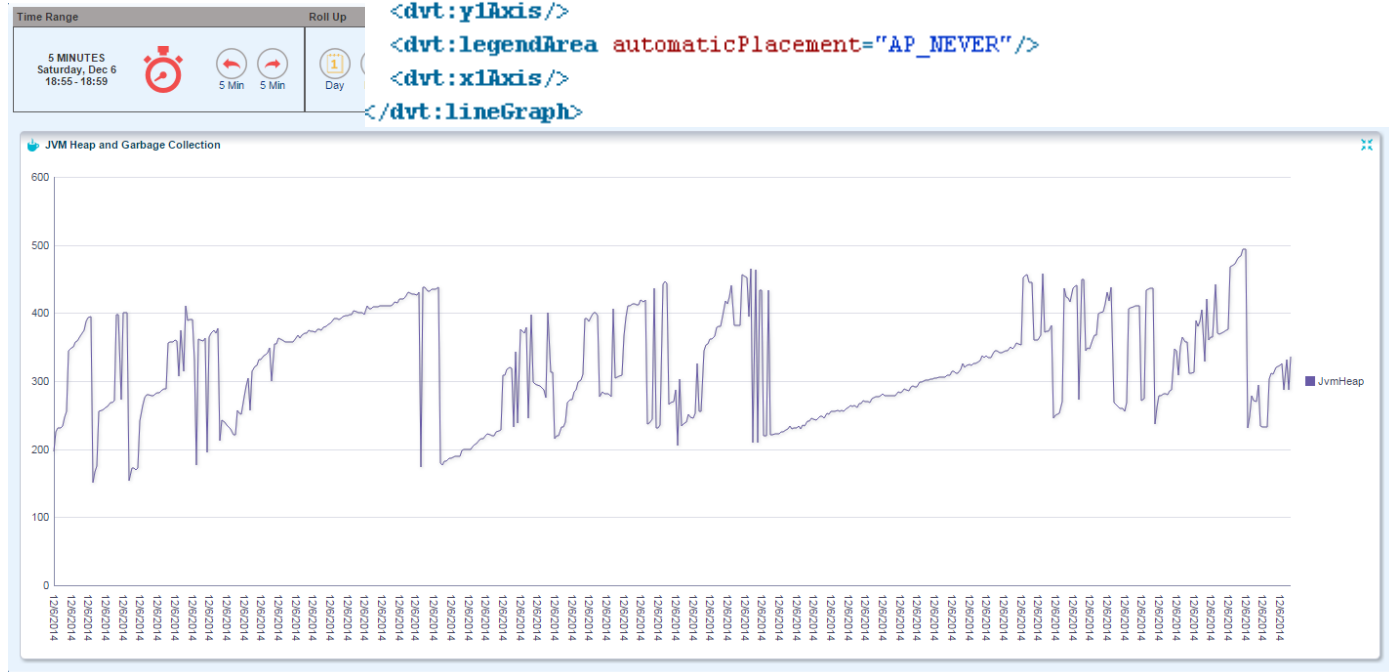
Basic Steps Creating a Graph - 8

- Colors are defined in `<dvt:seriesSet>`
 - Add a line color
 - Add a line width
 - Add a marker type

```

<dvt:lineGraph id="lineGraph1" shortDesc="JVM HeapSpace" dynamicResize="DYNAMIC_SIZE"
  rendered="#{pageFlowScope.MainDashBoardBean.timeRange == '5 MINUTES'}"
  value="#{bindings.ActiveRequestsAMinuteV07.graphModel}"
  subType="LINE_VERT_ABS">
  <dvt:background>
    <dvt:specialEffects/>
  </dvt:background>
  <dvt:graphPlotArea/>
  <dvt:seriesSet>
    <dvt:series color="#695BA7" lineWidth="1" markerType="MT_MARKER"/>
  </dvt:seriesSet>
  <dvt:o1axis/>
  <dvt:y1axis/>
  <dvt:legendArea automaticPlacement="AP_NEVER"/>
  <dvt:x1axis/>
</dvt:lineGraph>

```



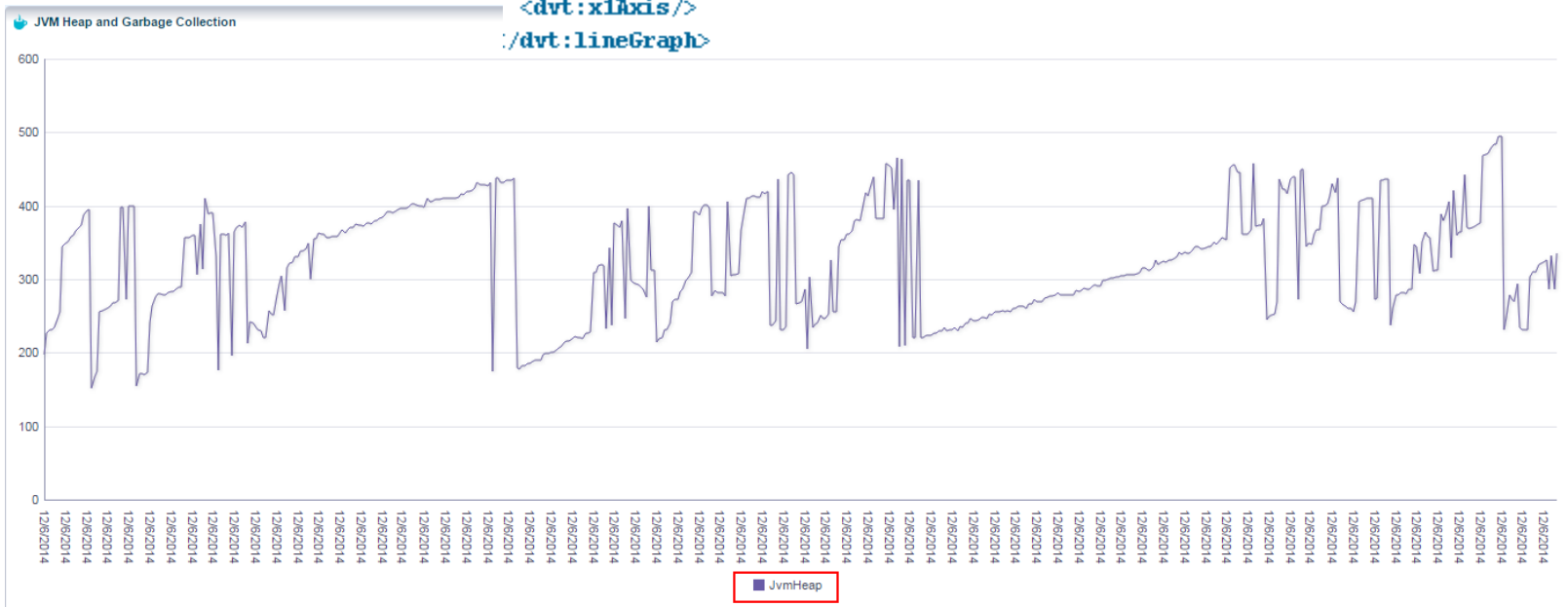
Basic Steps Creating a Graph - 9

- Position the legend

```

<dvt:lineGraph id="lineGraph1" shortDesc="JVM Heapspace" dynamicResize="DYNAMIC_SIZE"
  rendered="#{pageFlowScope.MainDashBoardBean.timeRange == '5 MINUTES'}"
  value="#(bindings.ActiveRequestsAMinuteV07.graphModel)"
  subType="LINE_VERT_ABS">
  <dvt:background>
    <dvt:specialEffects/>
  </dvt:background>
  <dvt:graphPlotArea/>
  <dvt:seriesSet>
    <dvt:series color="#695BA7" lineWidth="1" markerType="MT_MARKER"/>
  </dvt:seriesSet>
  <dvt:olAxis/>
  <dvt:ylAxis/>
  <dvt:legendArea automaticPlacement="AP_NEVER" position="LAP_BOTTOM"/>
  <dvt:xlAxis/>
</dvt:lineGraph>

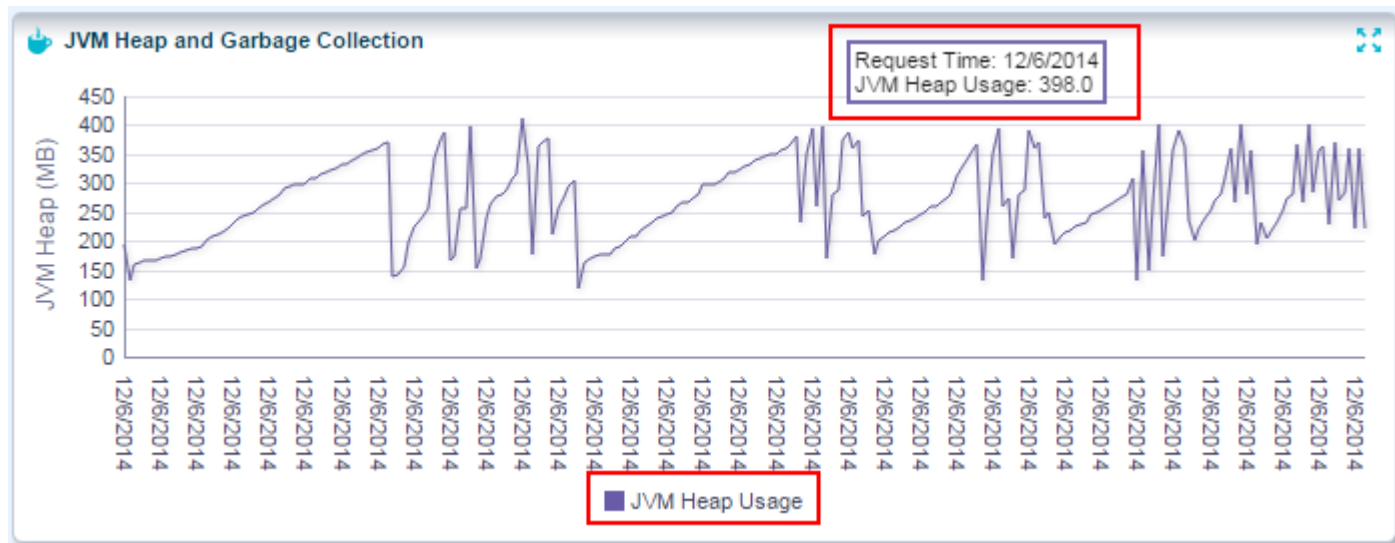
```



Basic Steps Creating a Graph - 10

- In PageDefinition
 - Change Legend text
 - Change mouseover attribute labels

```
<graph IterBinding="ActiveRequestsAMinuteIterator"
      id="ActiveRequestsAMinuteV07"
      xmlns="http://xmlns.oracle.com/adfm/dvt" type="LINE_VERT_ABS">
  <graphDataMap leafOnly="true">
    <series>
      <data>
        <item value="JvmHeap" label="JVM Heap Usage" />
      </data>
    </series>
    <groups>
      <item value="RequestTime" itemLabel="Request Time" />
    </groups>
  </graphDataMap>
</graph>
```



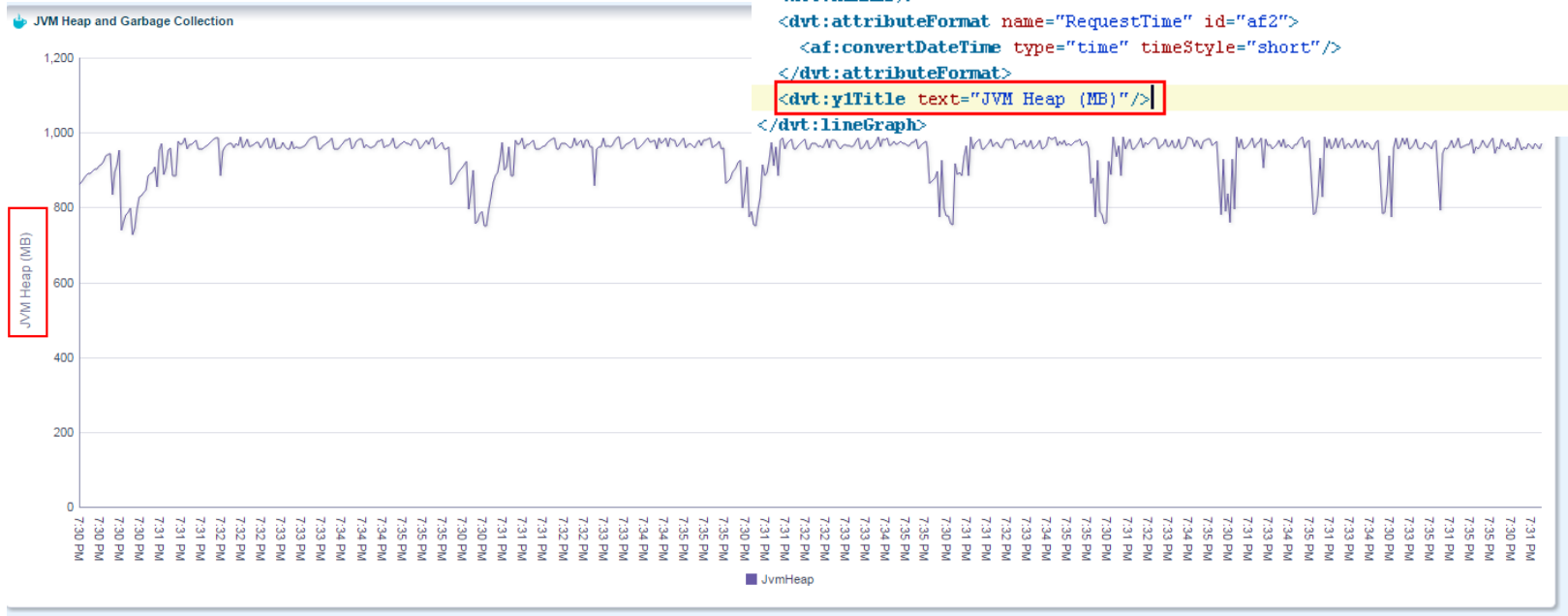
Basic Steps Creating a Graph - 11

- Add Titles

```

<dvt:lineGraph id="lineGraph1" shortDesc="JVM Heapspace"
dynamicResize="DYNAMIC_SIZE"
rendered="{pageFlowScope.MainDashBoardBean.timeRange == '5 MINUTES'}"
value="{bindings.ActiveRequestsAMinuteV07.graphModel}"
subType="LINE_VERT_ABS">
  <dvt:background>
    <dvt:specialEffects/>
  </dvt:background>
  <dvt:graphPlotArea/>
  <dvt:seriesSet>
    <dvt:series color="#695BA7" lineWidth="1" markerType="MT_MARKER"/>
  </dvt:seriesSet>
  <dvt:olAxis/>
  <dvt:y1Axis/>
  <dvt:legendArea automaticPlacement="AP_NEVER"
position="LAP_BOTTOM"/>
  <dvt:x1Axis/>
  <dvt:attributeFormat name="RequestTime" id="af2">
    <af:convertDateTime type="time" timeStyle="short"/>
  </dvt:attributeFormat>
  <dvt:y1Title text="JVM Heap (MB)"/>
</dvt:lineGraph>

```



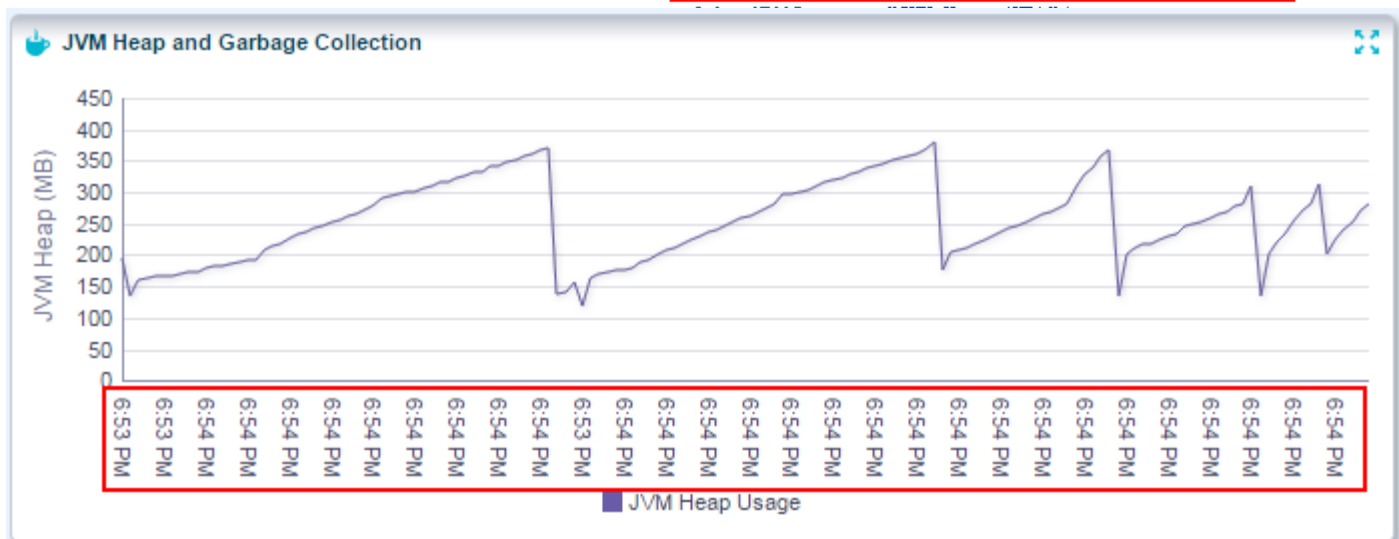
Basic Steps Creating a Graph - 12

- Show Time instead of Date on X-axis

```

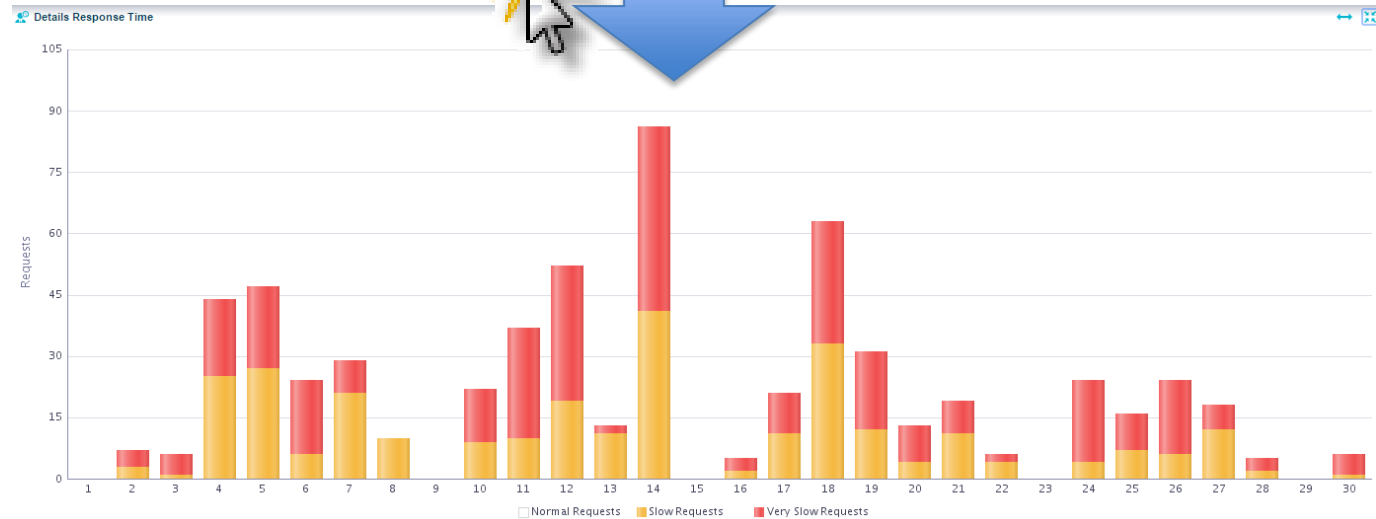
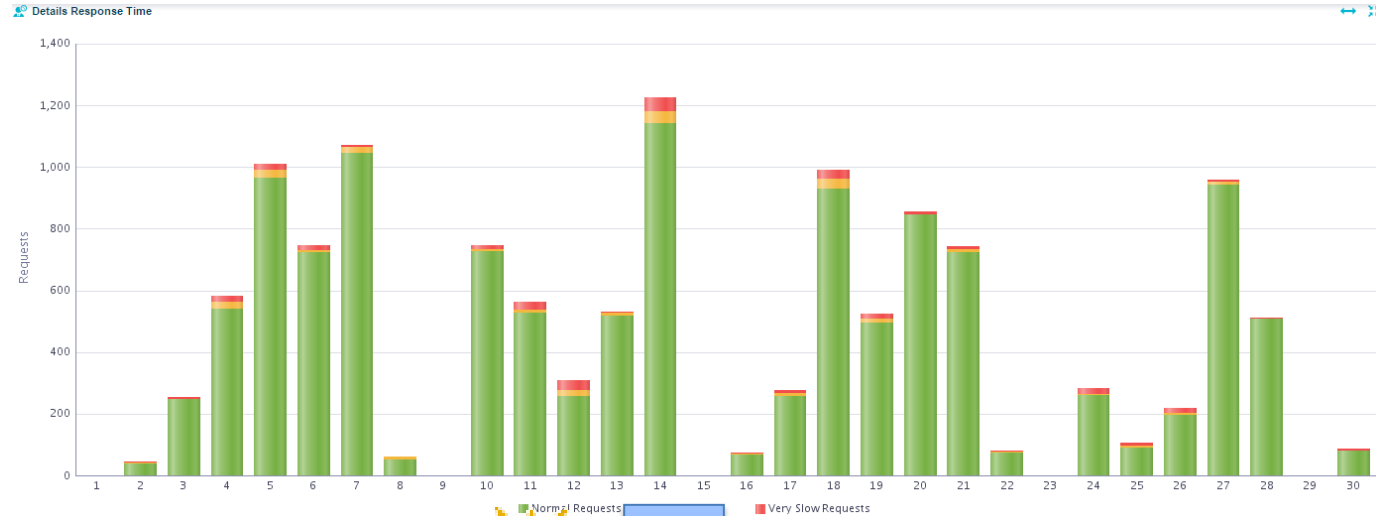
<dvt:lineGraph id="lineGraph1" shortDesc="JVM Heapspace"
  dynamicResize="DYNAMIC_SIZE"
  rendered="#{pageFlowScope.MainDashboardBean.timeRange == '5 MINUTES'}"
  value="#{bindings.ActiveRequestsAMinuteV07.graphModel}"
  subType="LINE_VERT_ABS">
  <dvt:background>
    <dvt:specialEffects/>
  </dvt:background>
  <dvt:graphPlotArea/>
  <dvt:seriesSet>
    <dvt:series color="#695BA7" lineWidth="1" markerType="MT_MARKER"/>
  </dvt:seriesSet>
  <dvt:olAxis/>
  <dvt:ylAxis/>
  <dvt:legendArea automaticPlacement="AP_NEVER"
    position="LAP_BOTTOM"/>
  <dvt:xlAxis/>
  <dvt:attributeFormat name="RequestTime" id="af2">
    <af:convertDateTime type="time" timeStyle="short"/>
  </dvt:attributeFormat>

```



Basic Steps Creating a Graph - 13

- Hide and Show Behavior
- Click on legend item
- Graph is rescaled !



Basic Steps Creating a Graph - 13

- Just add
hideAndShowBehavior="withRescale"

```
<dvt:barGraph id="barGraph4"  
  rendered="{pageFlowScope.MainDashboardBean.timeRange=='DAY'}"  
  contentDelivery="immediate"  
  styleClass="AFStretchWidth"  
  clickListener="{pageFlowScope.MainDashboardBean.onClick}"  
  hideAndShowBehavior="withRescale"  
  imageFormat="PNG" dynamicResize="DYNAMIC_SIZE"  
  shortDesc="HTTP Requests by Hour"  
  value="{bindings.SummaryRequestAnHourRibbonBar.graphModel}"  
  subType="BAR_VERT_STACK"  
  inlineStyle="width:300px; height:80.0px;">  
<dvt:background>
```

Agenda slide

- Why data visualization is important
- Examples where DVTs are used
- Graph demo: ADF Performance Monitor
- Basic steps creating a graph (ADF11g)
- **Special features**
 - colors, mouseover info, alerts, reference line, animation 3D, clicklistener, hide and show, stacked graphs, dual graphs, e.g.
- Advanced Graph Examples
 - Gauges, Bubble, Spark, Treemap
- Other Tips & Challenges
- 12.1.3 DVT Components

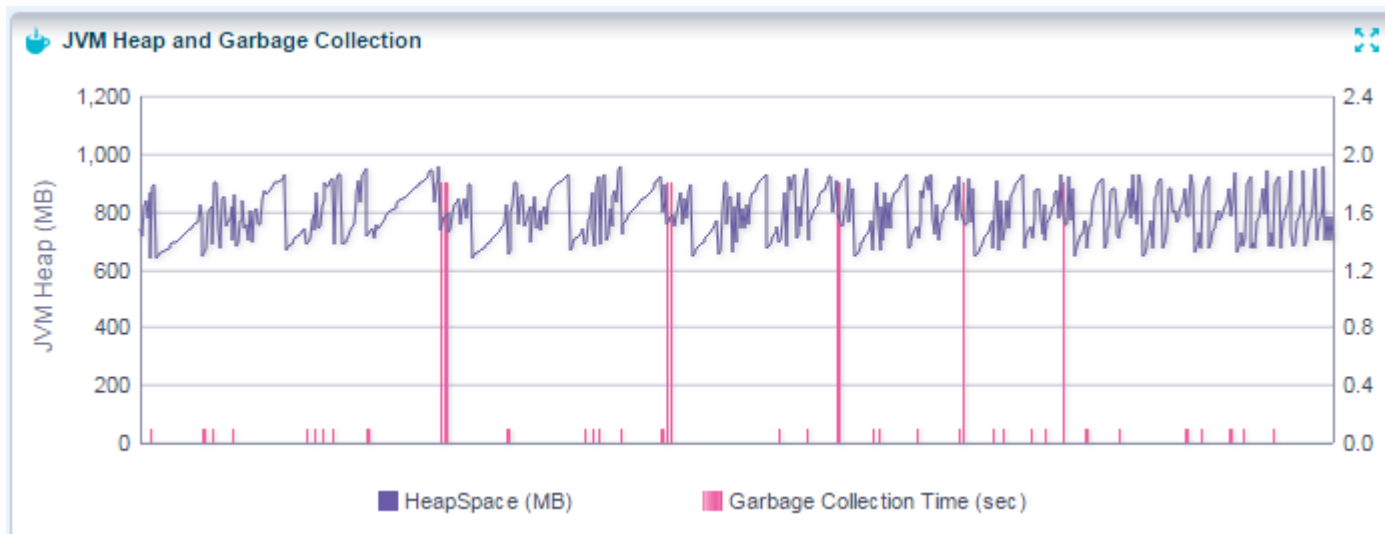
Special Features - 1

- Combination Graph

```
<dvt:comboGraph id="comboGraph1" contentDelivery="immediate"
  shortDesc="JVM Heapspace" dynamicResize="DYNAMIC_SIZE"
  hideAndShowBehavior="withRescale"
  value="#{bindings.ActiveRequestsAMinuteV06.graphModel}"
  subType="COMBINATION_VERT_ABS_2Y">
  <dvt:seriesSet>
    <dvt:series color="#695BA7" lineWidth="1" markerType="MT_DEFAULT"/>
    <dvt:series color="#F05FA3" markerType="MT_BAR"/>
  </dvt:seriesSet>
  <dvt:y1Title text="JVM Heap (MB)"/>
  <dvt:legendArea automaticPlacement="AP_NEVER" position="LAP_BOTTOM"/>
</dvt:comboGraph>
```

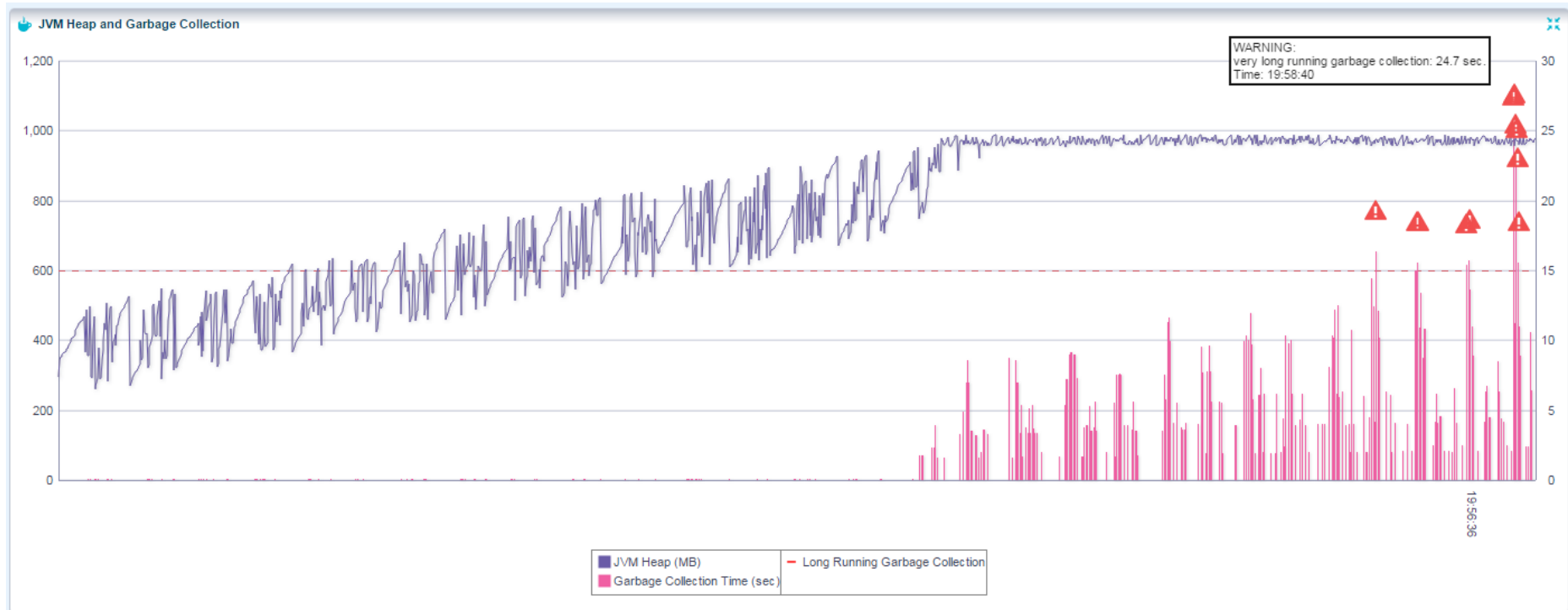
PageDef

```
<graph IterBinding="ActiveRequestsAMinuteIterator"
  id="ActiveRequestsAMinuteV06"
  xmlns="http://xmlns.oracle.com/adfm/dvt"
  type="COMBINATION_VERT_ABS_2Y">
  <graphDataMap leafOnly="true">
    <series>
      <data>
        <item value="JvmHeap" label="HeapSpace (MB)"/>
        <item value="JvmGbTime" label="Garbage Collection Time (sec)"/>
      </data>
    </series>
    <groups>
      <item value="RequestTime" label="Label"/>
    </groups>
  </graphDataMap>
</graph>
```



Special Features – 2 (Alerts)

- Alerts
 - Warn, alert user for something
 - Show custom image
 - Add mouse over message



Special Features – 2 (Alerts)

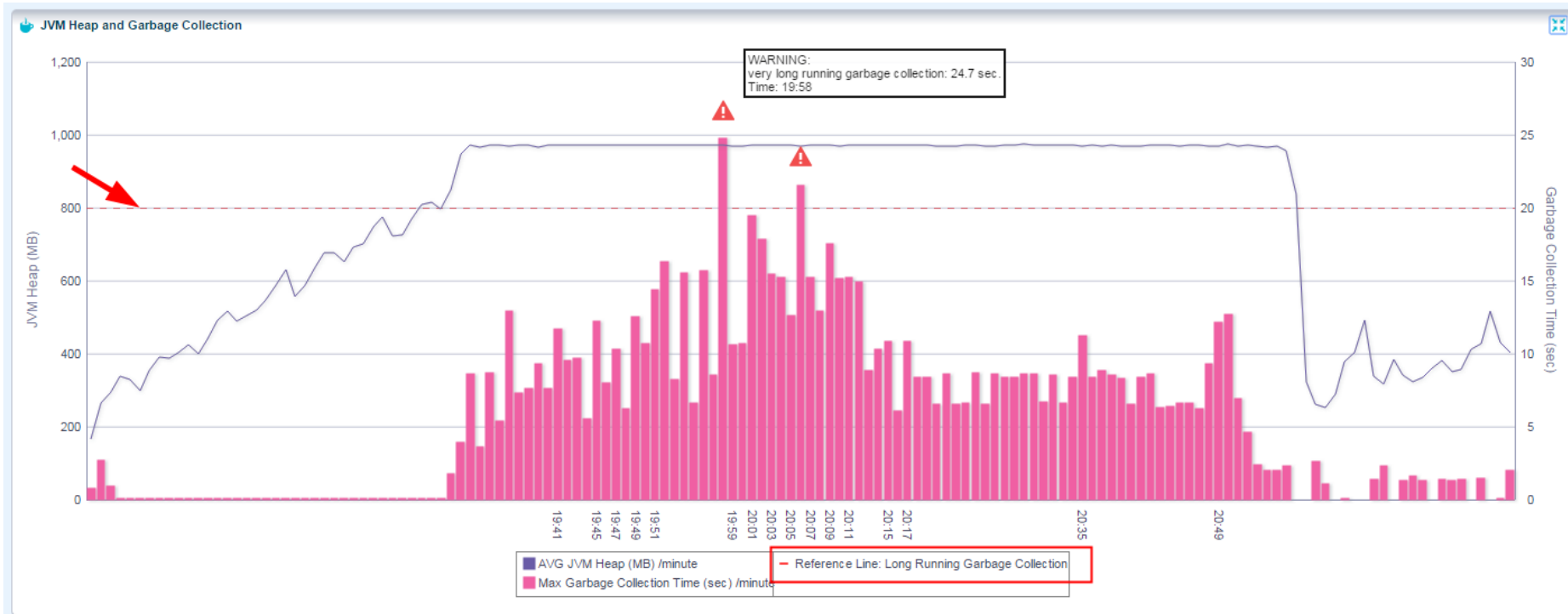
```
<dvt:comboGraph id="lineGraph5" styleClass="AFStretchWidth"
    contentDelivery="immediate"
    rendered="#{pageFlowScope.MainDashboardBean.timeRange=='WEEK' || page1
hideAndShowBehavior="withRescale"
    dynamicResize="DYNAMIC_SIZE"
    shortDesc="JVM Heap and Garbage Collection"
    value="#{bindings.JVMHeapADayVO.graphModel}"
    subType="COMBINATION_VERT_ABS_2Y">
    <dvt:alertSet alertMap="#{pageFlowScope.MainDashboardBean.alertMapJVMHeapADay}"
        id="vgjklk"/>
    <dvt:background>
        <dvt:specialEffects/>
    </dvt:background>
    <dvt:graphPlotArea/>
    <dvt:seriesSet>
        <dvt:series color="#695BA7" lineWidth="1" markerType="MT_MARKER"/>
        <dvt:series color="#F05FA3" lineWidth="1" markerType="MT_BAR"/>
    </dvt:seriesSet>
    <dvt:y1Axis axisMinValue="0" axisMinAutoScaled="false"/>
    <dvt:y2Axis axisMinValue="0" axisMinAutoScaled="false"/>
    <dvt:legendArea automaticPlacement="AP_NEVER"
        position="LAP_BOTTOM"/>
    <dvt:y1Title text="JVM Heap (MB)"/>
    <dvt:y2Title text="Garbage Collection Time (sec)"/>
</dvt:comboGraph>
```

Special Features – 2 (Alerts)

```
public Map getAlertMapJVMHeapADay() {  
  
    int slowGCcollection = 15; //static threshold of 15 seconds for very slow JVM garbage collections  
    DCIteratorBinding iteratorBinding = ADFUtils.findIterator("JVMHeapADayVOIterator");  
    ViewObject viewObject = iteratorBinding.getViewObject();  
    Map alertMap = new HashMap();  
    if (viewObject != null) {  
  
        //This construction with creating a new rowSetIterator is needed to not skip the first row.  
        RowSetIterator rowSetIterator = viewObject.createRowSetIterator(null);  
        rowSetIterator.reset();  
        int index = 0;  
  
        while (rowSetIterator.hasNext()) {  
            Row row = rowSetIterator.next();  
            BigDecimal gbTime = (BigDecimal)row.getAttribute("GbTime");  
            String label = (String)row.getAttribute("Label");  
            if (gbTime.doubleValue() > slowGCcollection) {  
                Alert alert = new Alert();  
                //X value of alert  
                alert.setXValue(label);  
                //Y value is plotted against the Y1 or Y2-axis.  
                alert.setYValueAssignment(1);  
                //Y value of alert  
                alert.setYValue(gbTime.doubleValue() + 2);  
                //set custom image  
                alert.setImageSource("/images/warningred.png");  
                //mouseover text in alert  
                alert.setText("WARNING:\nvery long running garbage collection: " + gbTime.doubleValue() + " sec.\nTime: " + label);  
                alertMap.put(new Integer(index), alert);  
                index++;  
                System.out.println("ALERT ADDED.. gbTime: " + gbTime);  
            }  
        }  
    }  
    return alertMap;  
}
```

Special Features – 3 Reference Line

- Reference Line
 - JVM Garbage Collection is considered as very long running when > 20 Seconds



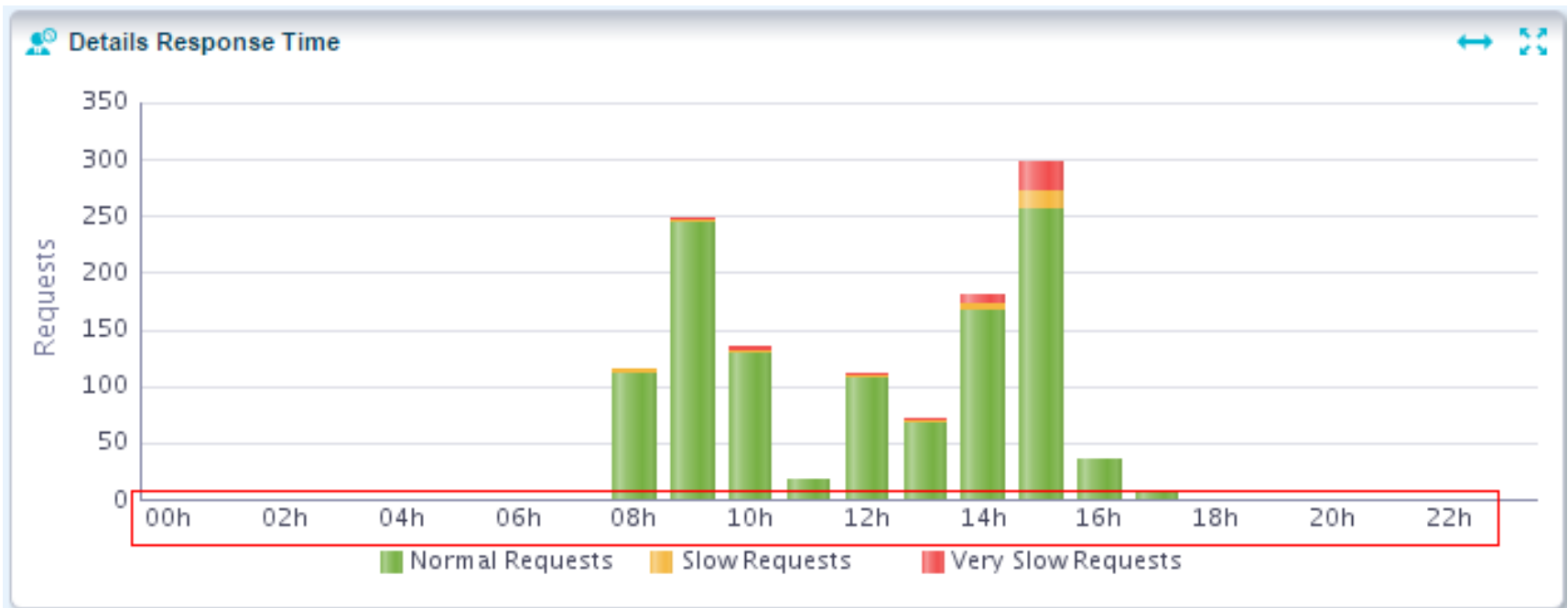
Special Features – 3 Reference Line

- You can make the reference line dynamic with EL expression

```
<dvt:comboGraph id="lineGraph5" contentDelivery="immediate"
  rendered="#{pageFlowScope.MainDashboardBean.timeRange=='WEEK' || pageFlowScop
  hideAndShowBehavior="withRescale"
  dynamicResize="DYNAMIC_SIZE"
  shortDesc="JVM Heap and Garbage Collection"
  value="#{bindings.JVMHeapADayVO.graphModel}"
  subType="COMBINATION_VERT_ABS_2Y">
  <dvt:referenceObjectSet>
    <dvt:referenceObject lineWidth="1"
      lineValue="#{pageFlowScope.MainDashboardBean.longGarbageCollection}"
      association="Y2AXIS" color="#ff4242"
      displayedInLegend="true"
      text="Reference Line: Long Running Garbage Collection"
      lineStyle="LS_DASH"/>
  </dvt:referenceObjectSet>
  <dvt:alertSet alertMap="#{pageFlowScope.MainDashboardBean.alertMapJVMHeapADay}"
    id="vgjklk"/>
```

Special Features – 4 Custom Label on Axis

- Custom Label on X-axis
 - Transient attributes are useful



Special Features – 4 Custom Label on Axis

- Steps custom label on axis:
 - Create a Transient attribute
 - Generate the *ViewRowImpl*
 - Add your custom code

Name	Type	Alias Name	Entity Usage	Info
HourOfDay	BigDecimal	HOUR_OF_DAY		Calculated 'HOUR_OF_DAY'
SumNormal	BigDecimal	SUM(NORMAL)		Calculated 'SUM(NORMAL)'
SumSlow	BigDecimal	SUM(SLOW)		Calculated 'SUM(SLOW)'
SumVerySlow	BigDecimal	SUM(VERY_SLOW)		Calculated 'SUM(VERY_SLOW)'
HourOfDayLabel	String	VIEW_ATTR		Transient
HourOfDayRibbonBarLabel	String	VIEW_ATTR		Transient

```

<graph IterBinding="SummaryRequestAnHourBarVOIterator"
  id="SummaryRequestAnHourBarVO"
  xmlns="http://xmlns.oracle.com/adfm/dvt" type="BAR_VERT_STACK">
  <graphDataMap leafOnly="true">
    <series>
      <data>
        <item value="SumNormal" label="Normal Requests"/>
        <item value="SumSlow" label="Slow Requests"/>
        <item value="SumVerySlow" label="Very Slow Requests"/>
      </data>
    </series>
    <groups>
      <item value="HourOfDay" label="HourOfDayLabel" itemLabel="Hour"/>
    </groups>
  </graphDataMap>
</graph>

```

```

/**
 * Return CUSTOM X-axis label for hour of day
 * Return label for every 2 hours
 */
public String getHourOfDayLabel() {
    //return (String) getAttributeInternal(HOUROFDAYLABEL);
    int value = getHourOfDay().intValue();
    int a = value%2;
    if(a==0)
        return ""+(value<10?"0":"")+getHourOfDay().intValue()+"h";
    return "";
}

```


Special Features – 4 Custom Label on Axis

- Set the VO transient attribute as value to the label attribute of the group item

```
<graph IterBinding="SummaryRequestAnHourBarVOIterator"
  id="SummaryRequestAnHourBarVO"
  xmlns="http://xmlns.oracle.com/adfm/dvt" type="BAR_VERT_STACK">
  <graphDataMap leafOnly="true">
    <series>
      <data>
        <item value="SumNormal" label="Normal Requests"/>
        <item value="SumSlow" label="Slow Requests"/>
        <item value="SumVerySlow" label="Very Slow Requests"/>
      </data>
    </series>
    <groups>
      <item value="HourOfDay" label="HourOfDayLabel" itemLabel="Hour"/>
    </groups>
  </graphDataMap>
</graph>
```

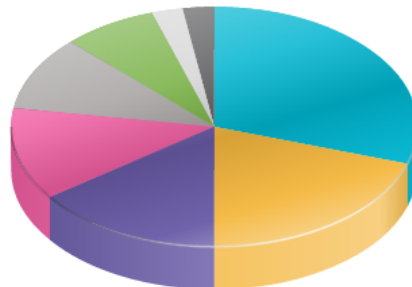
Special Features - 5

- Three D effect
- Be careful; does it add value to end-users ?

```

<dvt:pieGraph id="pieGraph3" dynamicResize="DYNAMIC_SIZE"
styleClass="AFStretchWidth"
hideAndShowBehavior="withRescale"
contentDelivery="lazy" shortDesc="Exceptions"
inlineStyle="height:200px;"
value="#{bindings.ExceptionsVO.graphModel}"
subType="PIE" customLayout="CL_NONE"
threeDEffect="true">
<dvt:background>
  <dvt:specialEffects/>
</dvt:background>
<dvt:graphPieFrame/>
<dvt:seriesSet>
  <dvt:series color="#00B6D1"/>
  <dvt:series color="#F5B83F"/>
  <dvt:series color="#695BA7"/>

```



oracle.mds.core.MetadataNotFoundException (8)	8
oracle.adf.controller.ControllerException (8)	8
java.lang.NullPointerException (6)	6
java.lang.ArithmeticException (5)	5
java.net.SocketException (4)	4
java.lang.IllegalArgumentException (3)	3
javax.naming.NameNotFoundException (1)	1
other (1)	1

Special Features - 6

- Animation
- Be careful; does it add value to end-users ?

```

<dvt:pieGraph id="pieGraph3" dynamicResize="DYNAMIC_SIZE"
  styleClass="AFStretchWidth"
  hideAndShowBehavior="withRescale"
  contentDelivery="lazy" shortDesc="Exceptions"
  inlineStyle="height:200px;"
  value="#{bindings.ExceptionsVO.graphModel}"
  subType="PIE" customLayout="CL_NONE"
  threeDEffect="true" animationDuration="2000"
  animationOnDisplay="cubeToRight"/>
  
```

Errors (40)

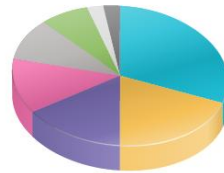


- oracle.mds.core.MetadataNotFoundException (12)
- oracle.adf.controller.ControllerException (8)
- java.lang.NullPointerException (6)
- java.lang.ArithmeticException (5)
- java.net.SocketException (4)
- java.lang.IllegalArgumentException (3)
- javax.naming.NameNotFoundException (1)
- other (1)

```

<dvt:background>
  <dvt:specialEffects/>
  
```

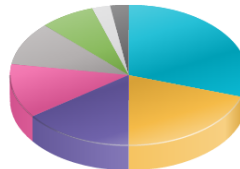
Errors (40)



- oracle.mds.core.MetadataNotFoundException (12)
- oracle.adf.controller.ControllerException (8)
- java.lang.NullPointerException (6)
- java.lang.ArithmeticException (5)
- java.net.SocketException (4)
- java.lang.IllegalArgumentException (3)
- javax.naming.NameNotFoundException (1)
- other (1)

Show Top 7

Errors (40)

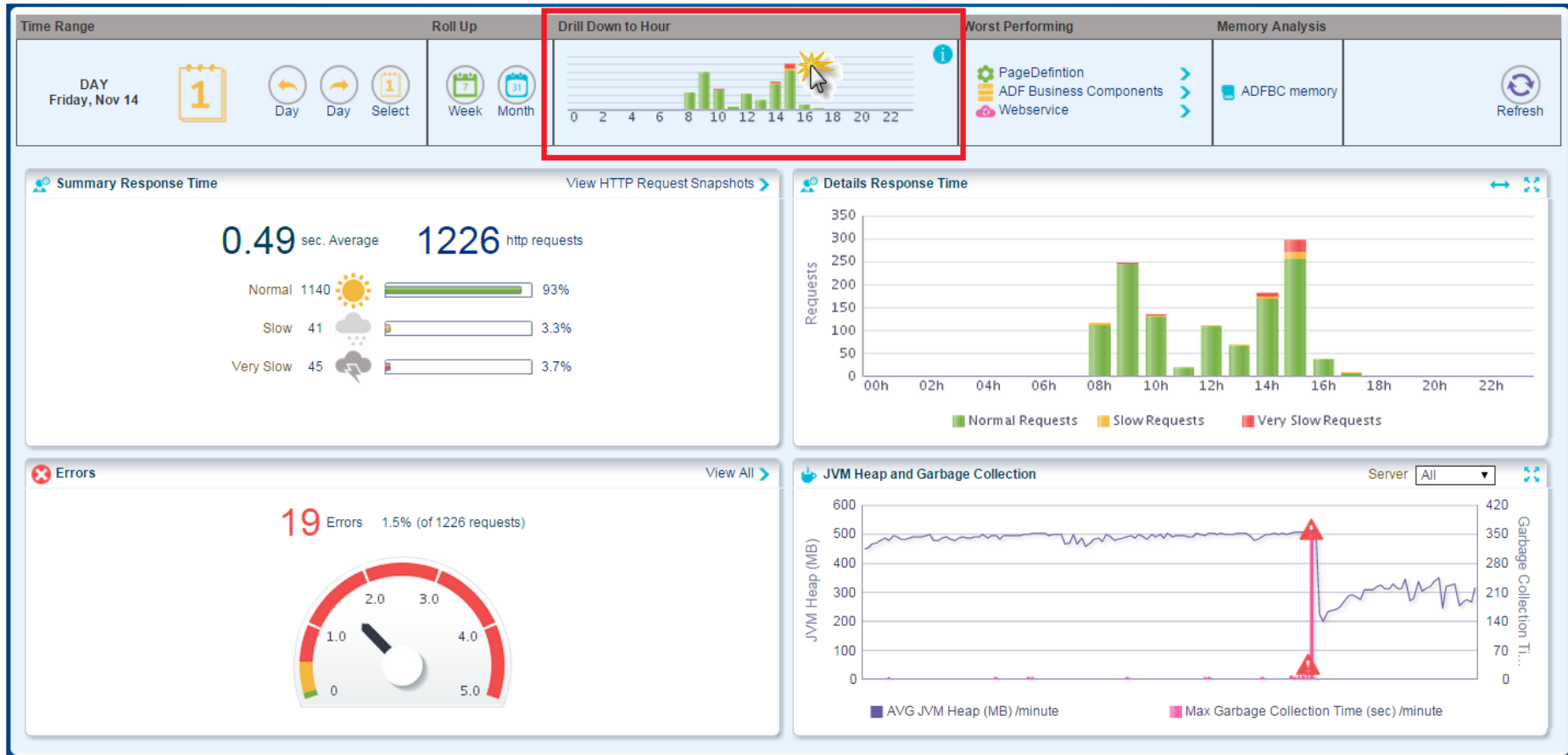


- oracle.mds.core.MetadataNotFoundException (12)
- oracle.adf.controller.ControllerException (8)
- java.lang.NullPointerException (6)
- java.lang.ArithmeticException (5)
- java.net.SocketException (4)
- java.lang.IllegalArgumentException (3)
- javax.naming.NameNotFoundException (1)
- other (1)

Show Top 7

Special Features – 7 Make the graph interactive

- Click on graph and zoom in from Day to Hour Overview

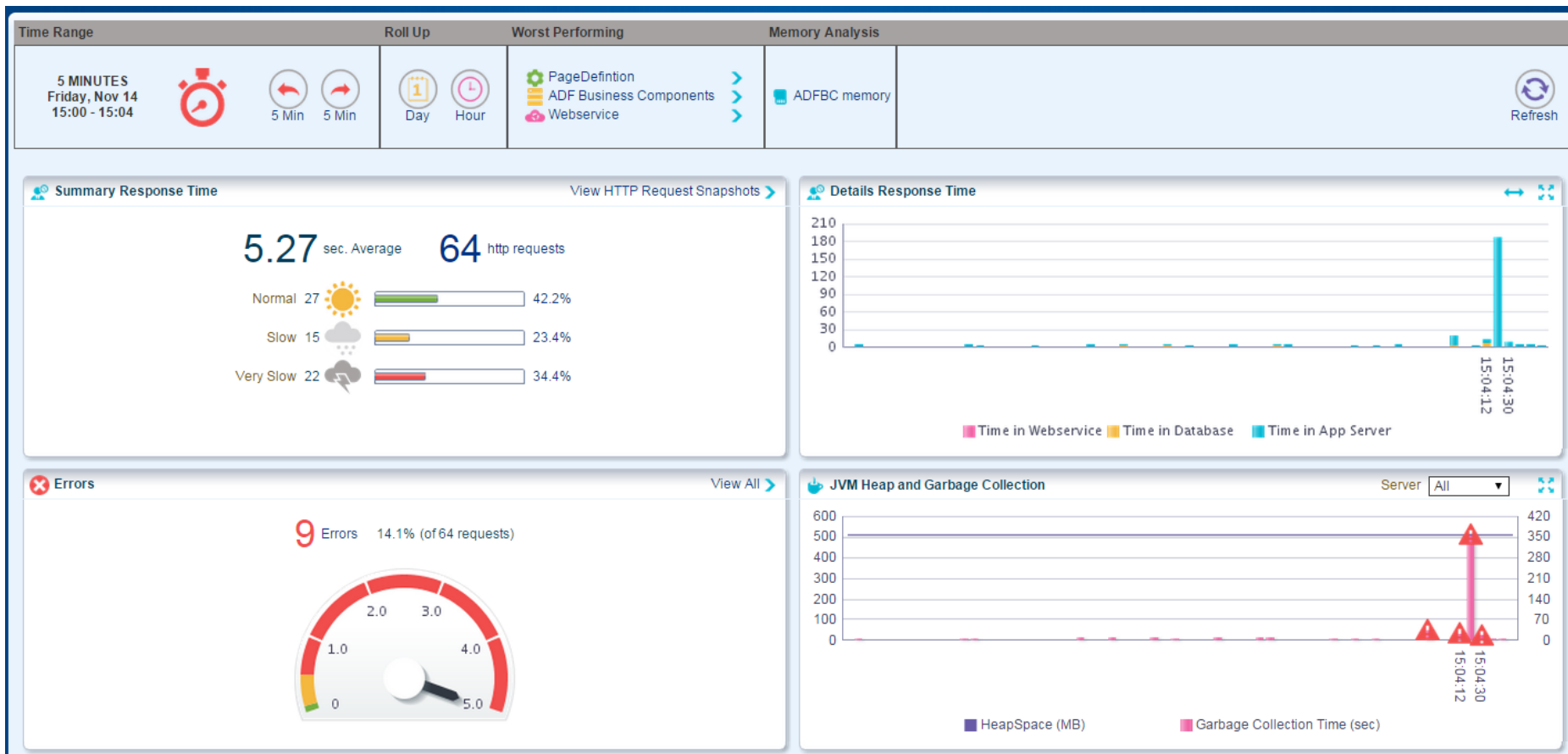


Special Features – 7 Make the graph interactive

- Zoom in from Hour to Five Minute Overview



Special Features – 7 Make the graph interactive



Special Features – 7

Make the graph interactive

- Add a clickListener

```
<dvt:barGraph id="barGraph5" styleClass="AFStretchWidth"
  contentDelivery="immediate"
  rendered="#{pageFlowScope.MainDashboardBean.timeRange=='HOURL'}"
  inlineStyle="width:300px; height:80.0px;"
  clickListener="#{pageFlowScope.MainDashboardBean.onClickActiveSessionsrequestAMinute}"
  hideAndShowBehavior="withRescale"
  imageFormat="PNG" dynamicResize="DYNAMIC_SIZE"
  shortDesc="Response Time"
  value="#{bindings.SummaryRequestsFiveMinutesBarVO.graphModel}"
  subType="BAR_VERT_STACK">
</dvt:barGraph>
```

- In Managed Bean

```
public void onClickActiveSessionsrequestAMinute(ClickEvent clickEvent) {

    ComponentHandle handle = clickEvent.getComponentHandle();
    ComponentInfo componentInfo = handle.getComponentInfo();
    timeRange = "5 MINUTES";

    if (componentInfo instanceof oracle.dss.util.DataComponentInfo) {
        DataComponentInfo dataComponentInfo = (DataComponentInfo)componentInfo;
        minute = dataComponentInfo.getColumn();
    }
    refresh();
}
```


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- Why data visualization is important
- Examples where DVTs are used
- Graph demo: ADF Performance Monitor
- Basic steps creating a graph (ADF11g)
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- **Advanced Graph Examples**
 - Gauges, Bubble, Spark, Treemap
- Other Tips & Challenges
- 12.1.3 DVT Components

Advanced Graph Example 1: Bubble Graph

- Displays three dimensions of data; x, y and z value; z value is the size of the bubble
- Can facilitate the understanding of social, economical, and other relationships



Advanced Graph Example 1: Bubble Graph

- See complete example at AMIS blog at:
 - <http://technology.amis.nl/2013/03/13/adf-dvt-speed-date-interactive-bubble-graph/>
 - Life Expectancy by Country
 - Life expectancy (y-axis), income a year (x-axis) and the population (bubble size) is shown.
 - In steps of 10 years, for the last 50 years (1970, 1980, 1990, 20000 and 2010).



Advanced Graph Example 1: Bubble Graph

- ClickListener again to make it interactive and to navigate to detail graph





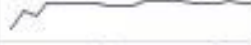

















Advanced Graph Example 1: Bubble Graph

```
public void onClick(ClickEvent clickEvent) {
    ComponentHandle componentHandle = clickEvent.getComponentHandle();
    if (componentHandle instanceof DataComponentHandle) {
        DataComponentHandle handle = (DataComponentHandle)componentHandle;
        Attributes[] attr = (handle).getGroupAttributes();
        for (int i = 0; i < attr.length; i++) {
            Attributes a = attr[i];
            Object obj = a.getValue(a.ID_ATTRIBUTE);
            //Check if we have our ViewObject ID attribute
            if ("Country".equals(obj.toString())) {
                selectedCountry = (String)a.getValue(a.ID_VALUE);
                System.out.println("selectedCountry=" + selectedCountry);
            }
        }
        //Do something interesting with selectedCountry
        BindingContainer bindingContainer = BindingContext.getCurrent().getCurrentBindingsEntry();
        OperationBinding operationBinding = bindingContainer.getOperationBinding("ExecuteWithParamsSele");
        operationBinding.getParamsMap().put("p_year", null);
        operationBinding.getParamsMap().put("p_country", selectedCountry);
        operationBinding.execute();
        renderDetailGraph = true;
        renderGraph = false;
        AdfFacesContext.getCurrentInstance().addPartialTarget(panelStrech);
    }
}
```

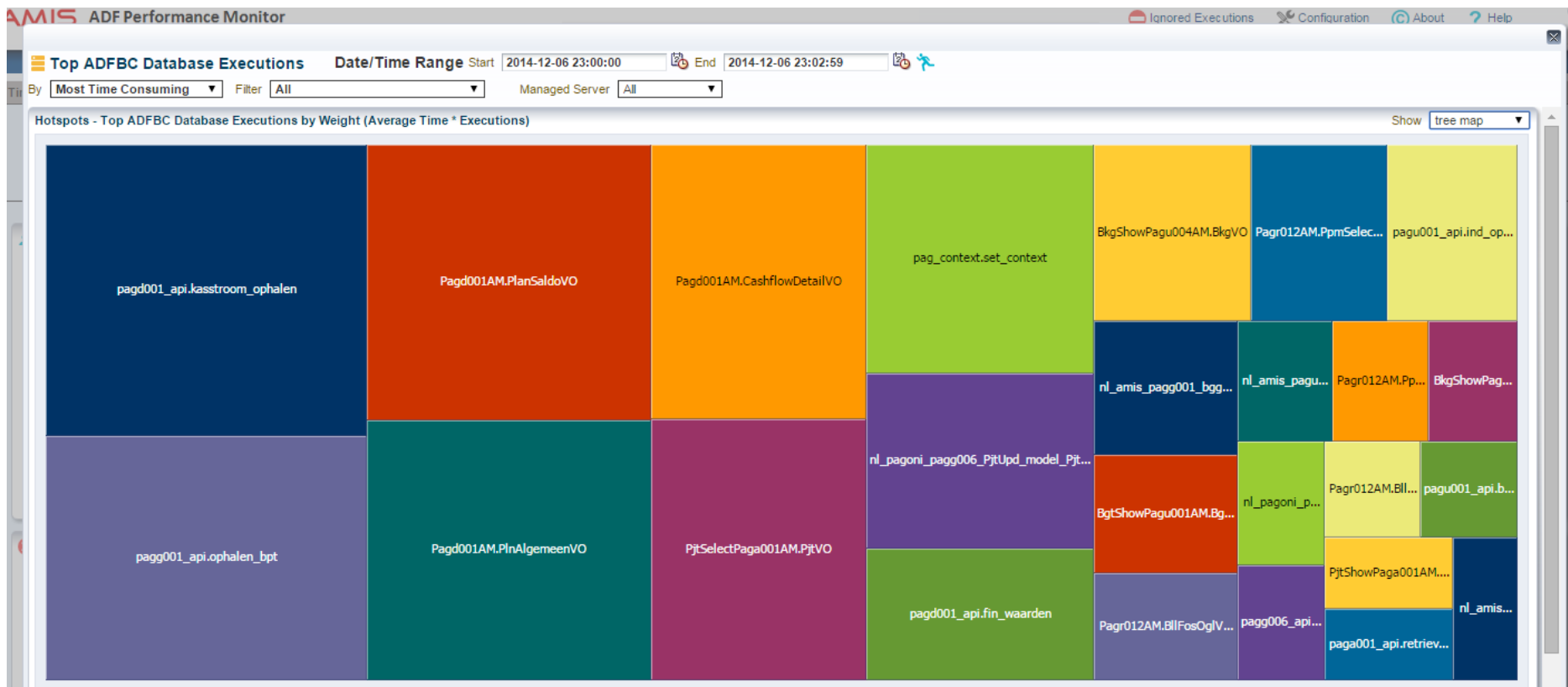
Advanced Graph Example 2: Spark Graph

- See complete example at AMIS blog at:
 - <http://technology.amis.nl/2011/07/27/tour-de-france-2011-analysis-using-adf-dvt-graphs-part-4-spark-charts/>

Ranking	Ridernumber	Name	Team	Gap	Overall Rank throughout Stages	Gap with Cadel Evans through Stages
1	141	EVANS Cadel	BMC RACING TEAM			
2	11	SCHLECK Andy	TEAM LEOPARD-TREK	+ 01' 34"		
3	18	SCHLECK Frank	TEAM LEOPARD-TREK	+ 02' 30"		
4	181	VOECKLER Thomas	TEAM EUROPCAR	+ 03' 20"		
5	1	CONTADOR Alberto	SAXO BANK SUNGARD	+ 03' 57"		
6	21	SANCHEZ Samuel	EUSKALTEL - EUSKAD	+ 04' 55"		
7	161	CUNEGO Damiano	LAMPRE - ISD	+ 06' 05"		
8	91	BASSO Ivan	LIQUIGAS-CANNOND	+ 07' 23"		
9	52	DANIELSON Tom	TEAM GARMIN - CERVO	+ 08' 15"		
10	108	PERAUD Jean-Christophe	AG2R LA MONDIALE	+ 10' 11"		

Advanced Graph Example 3: TreeMap

- Total execution time of worst ADF BC performing executions
 - The performance impact of frequent invoked executions can be much higher than executions that occur only a few times but are very slow on average



Advanced Graph Example 3: TreeMap

- Set the label (text) and value attribute (size on map)

```
<dvt:treemap id="t5" styleClass="AFStretchWidth"
    rendered="#{pageFlowScope.DatabaseExecutionsBean.totalTimeGraph=='treemap'}"
    contentDelivery="lazy"
    inlineStyle="height:500px;"
    value="#{bindings.DatabaseBottlenecksWeightedV02.treeModel}"
    var="row">
  <af:switcher facetName="#{row.hierTypeBinding.name}"
    id="s11">
    <f:facet name="DatabaseBottlenecksWeightedV020">
      <dvt:treemapNode value="#{row.WeightedTime}"
        label="#{row.NrlQuery}" id="tn1">
        <dvt:attributeGroups value="#{row.NrlQuery}"
          type="color" id="agl"/>
      </dvt:treemapNode>
    </f:facet>
  </af:switcher>
</dvt:treemap>
```

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- 12.1.3 DVT Components

Colors

- Use a color palette to make look and feel of graphs consistent

Color Palette

This palette consists of 1 neutral and 7 key colors. Use key colors to draw the eye to important data or facts.

Neutral	Green	Teal	Blue
Yellow	Orange	Red	Violet

Challenges ADF DVT < 12.1.3

- Number Formatting a bit difficult
- Date/Time on X-axis a bit difficult
- Axis attributes *minorIncrement* and *majorIncrement* does not always seem to work
- Area graph
 - A bit hard too click on data point

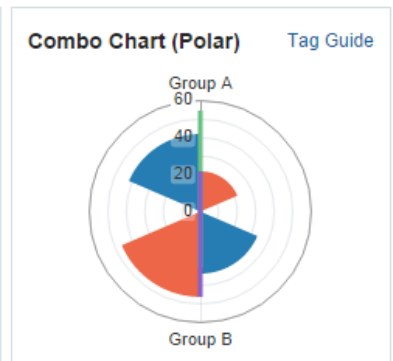
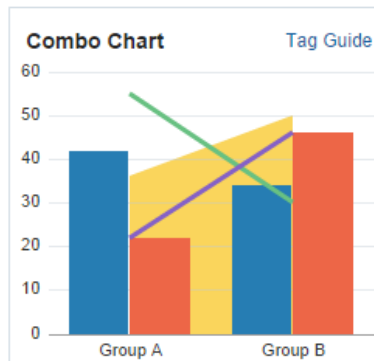
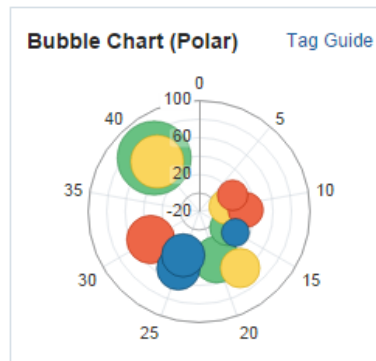
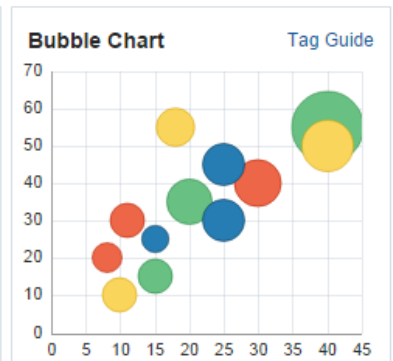
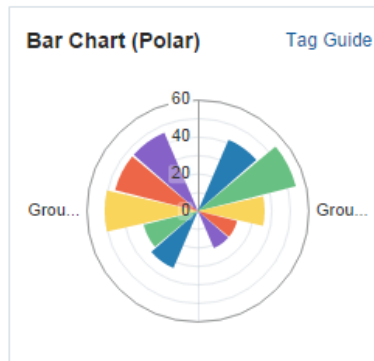
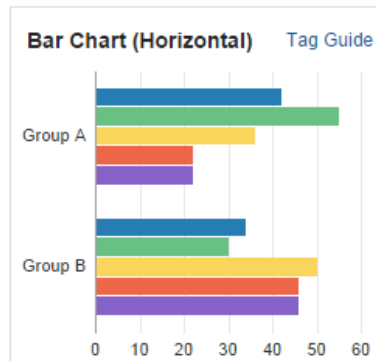
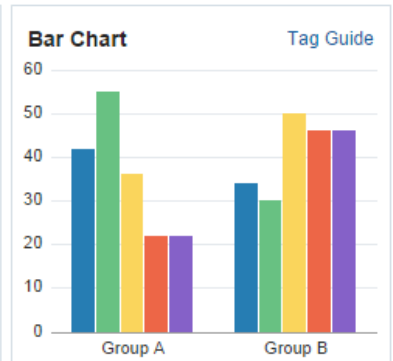
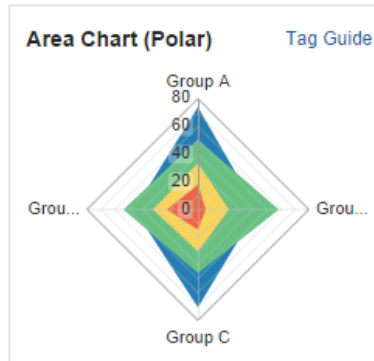
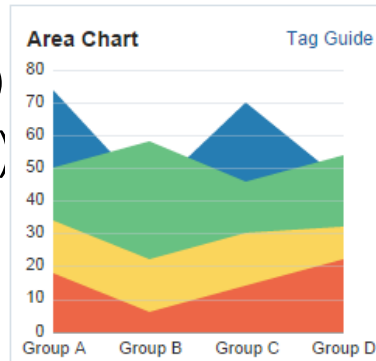
```
<dvt:xlaxis axisMinValue="0" axisMaxValue="23" minorIncrement="2"  
majorIncrement="2" axisMinAutoScaled="false"  
axisMaxAutoScaled="false"/>
```

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- **12.1.3 DVT Components**

ADF 12.1.3. Data Visualization Components

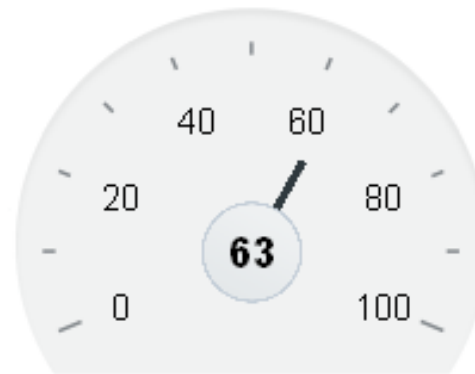
- Since ADF11g R1 (2008)
- Since ADF 12.1.3 (2014)
Over 30+ (improved) chart types
- Mobile first design/touch support
- Improved Server Scalability
- Redesigned zoom and scroll
- Much Simpler Styling



New Gauges

- Gauge types
 - LED
 - status meter
 - Dial
 - new rating gauge
 - Supports input (Rating only)

Dial Gauge



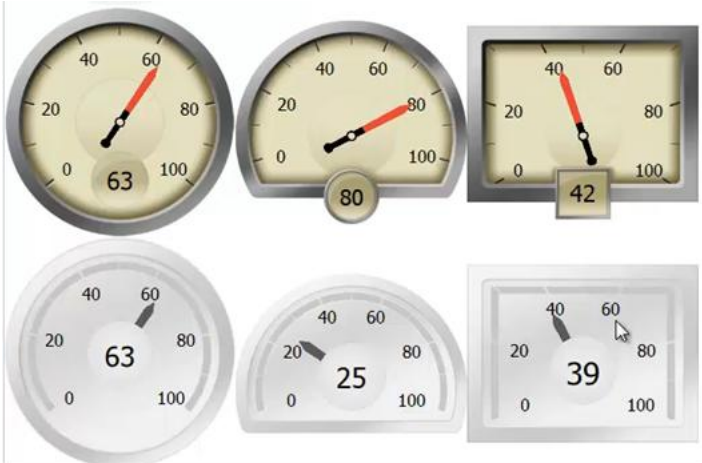
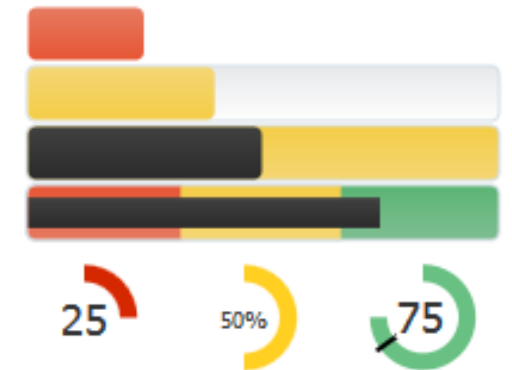
LED Gauge



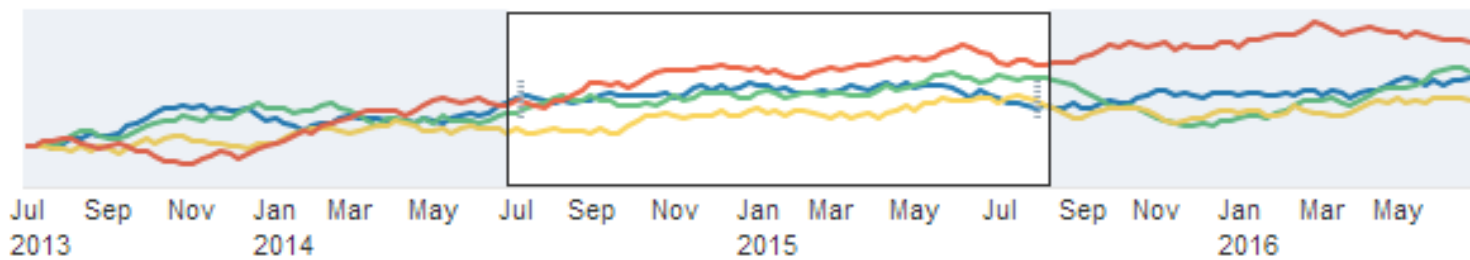
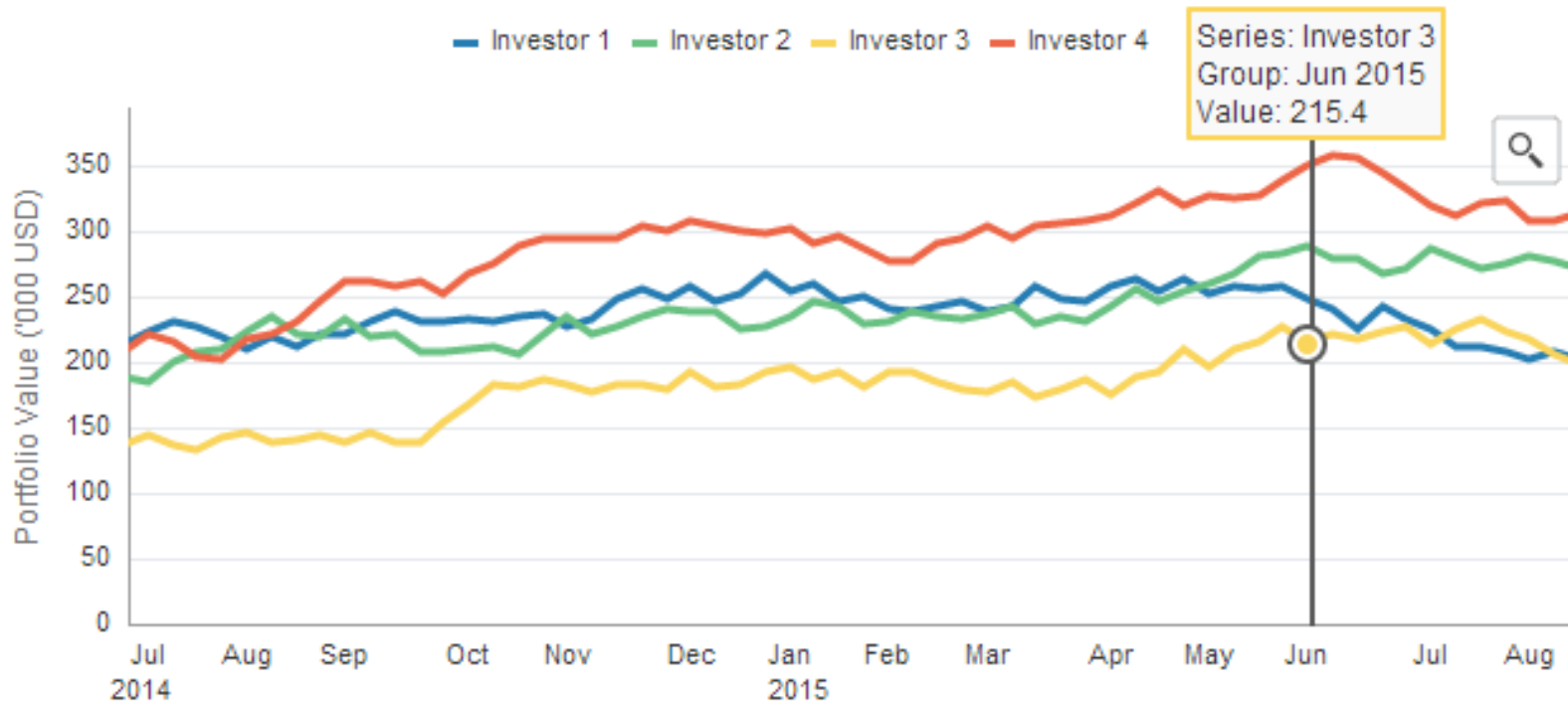
Rating Gauge



Status Meter Gauge

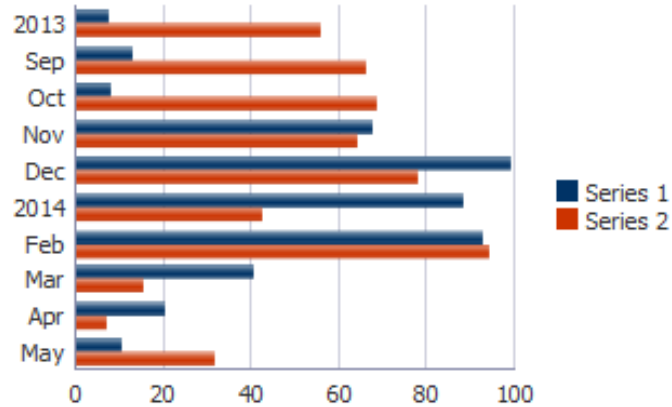


New Designed Zoom and Scroll

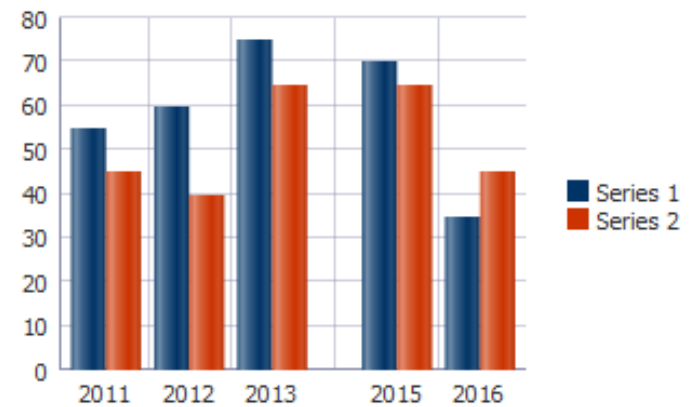


Improved Time axis

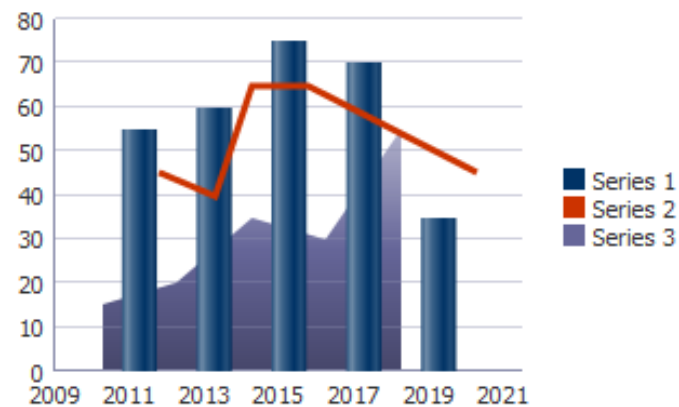
Time Axis Nested Labels: Year and Month



Time Axis with Irregular Intervals

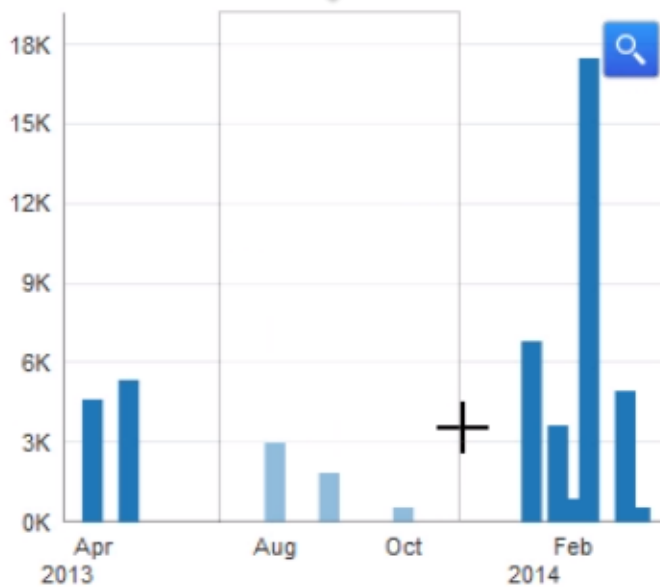


Mixed Frequency Time Axis

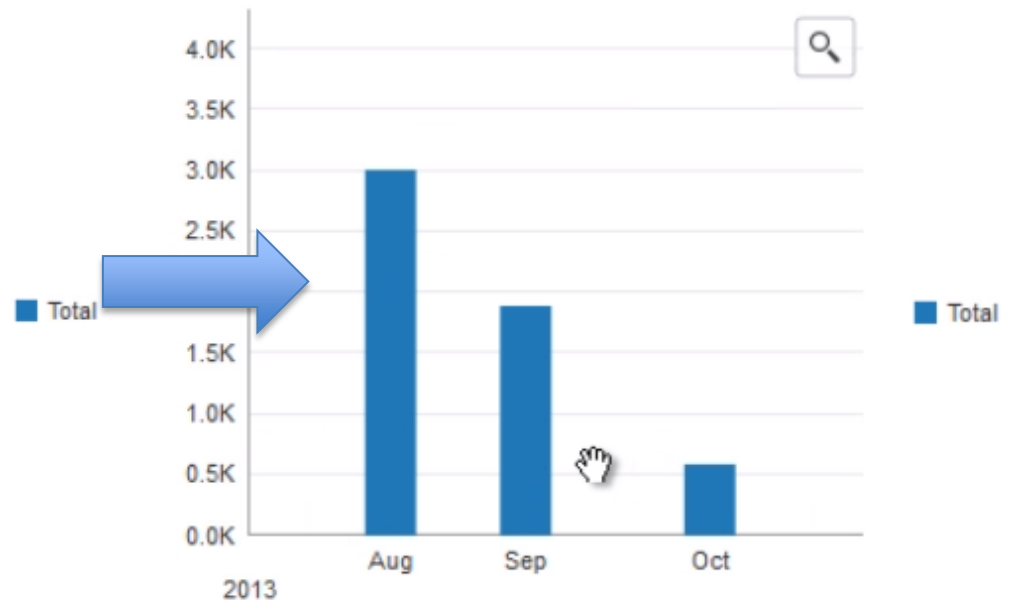


Marquee zoom and selection

Customer Management
Order History

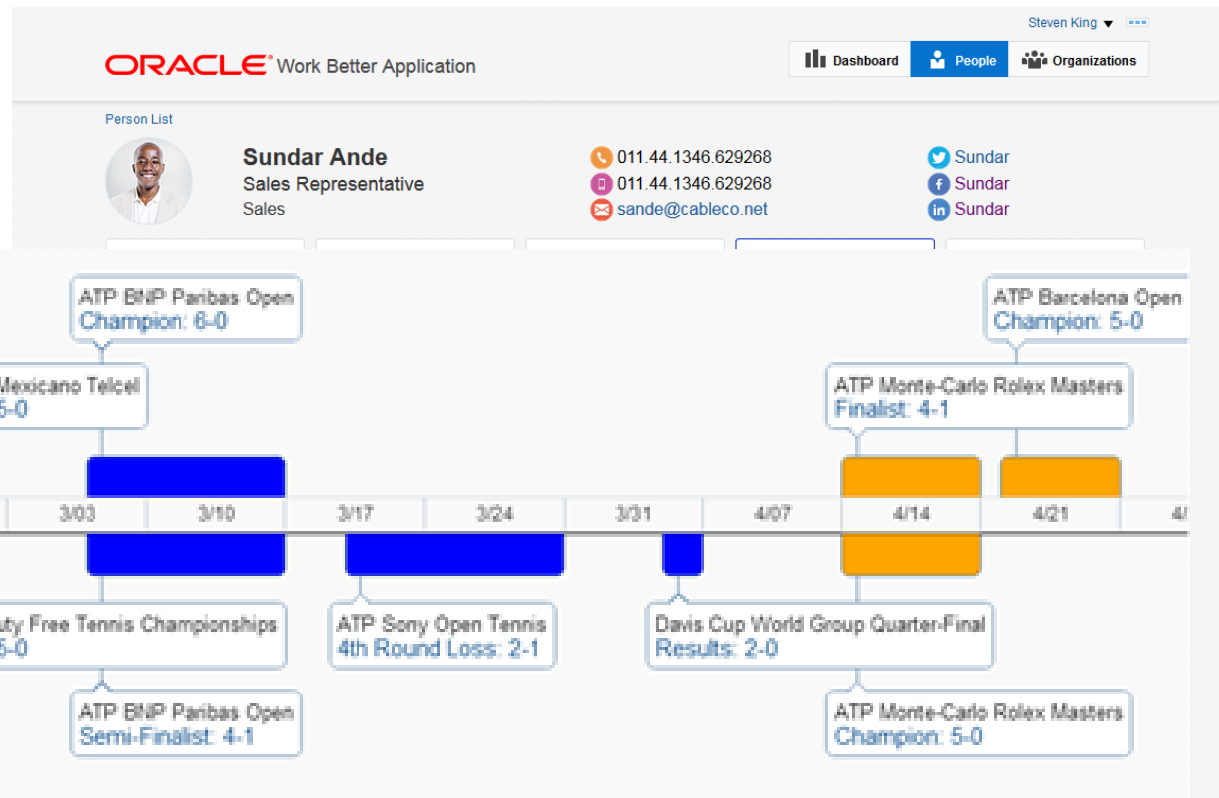


Customer Management
Order History

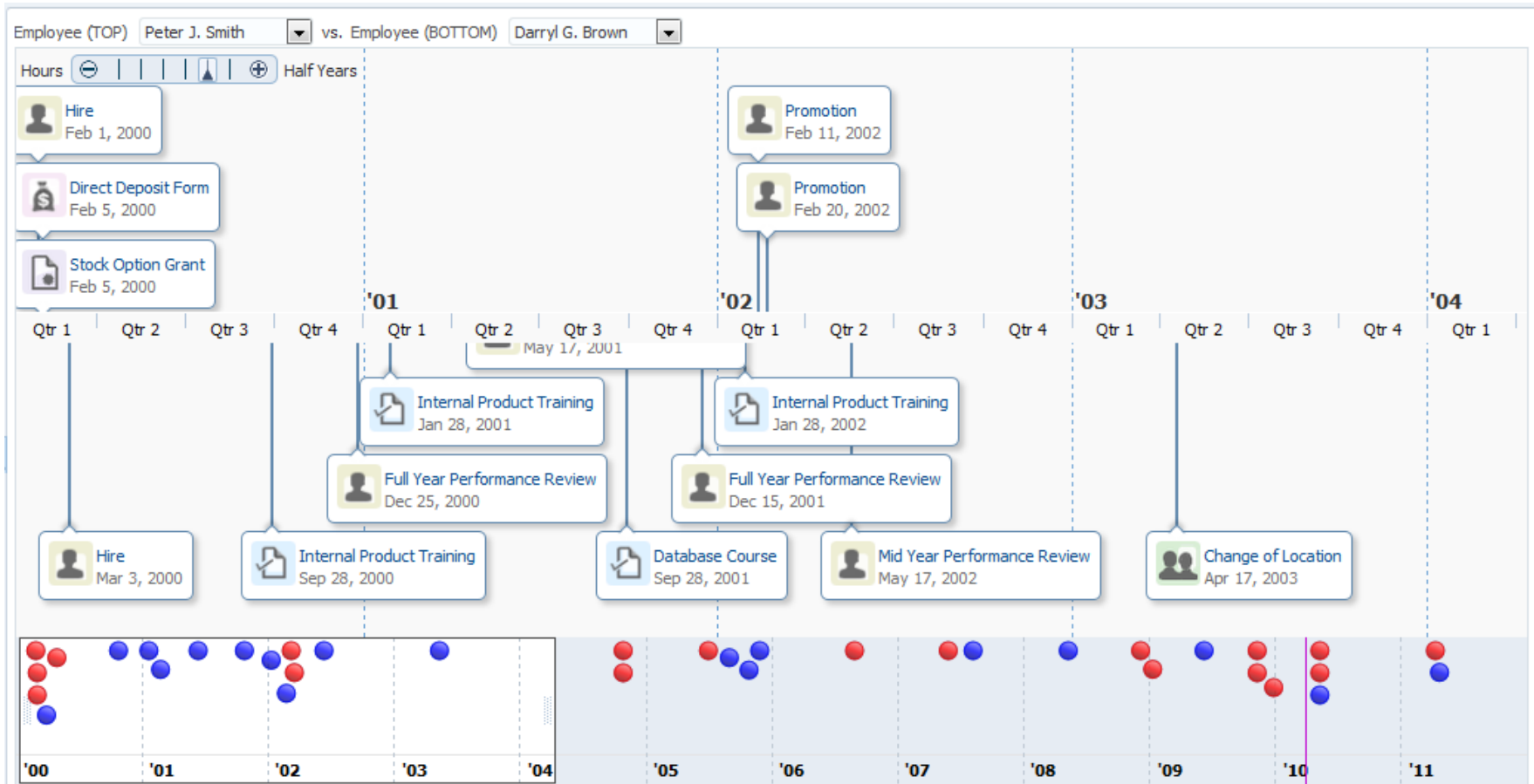


Time Line

- Visualize Events on an Interactive Timeline
- Support for time duration (yet MAF only, ADF will have it soon as well)

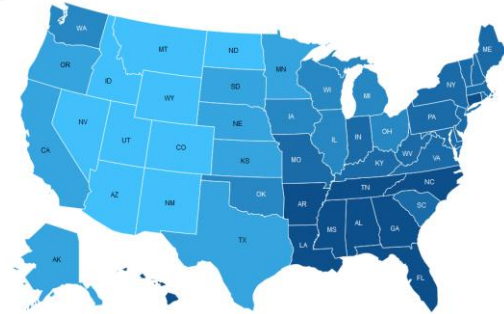


TimeLine

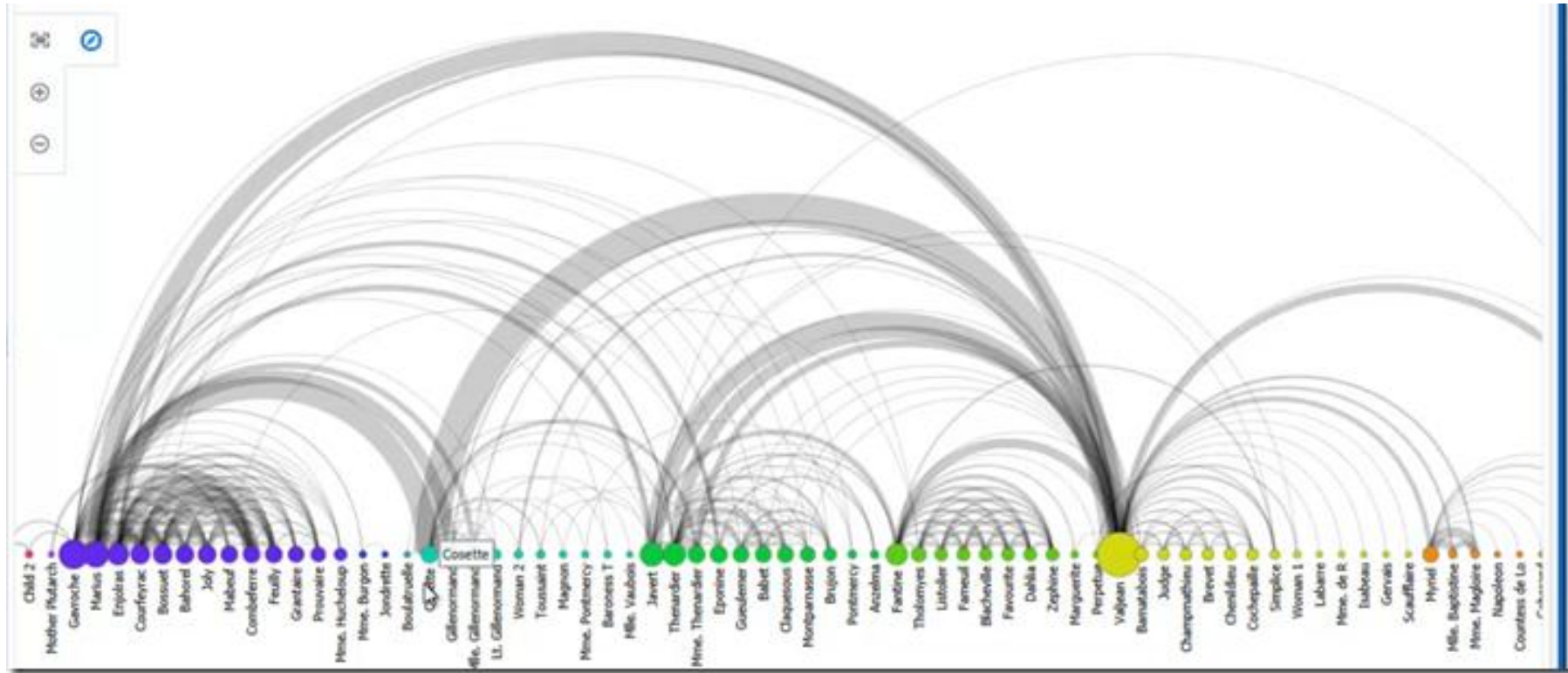


Thematic Map - New Features

- Image markers (option to set the orientation)
- Smart data zooming
- Drill down
- Support for custom base maps
- Hide area layer
- Marker locations can be updated

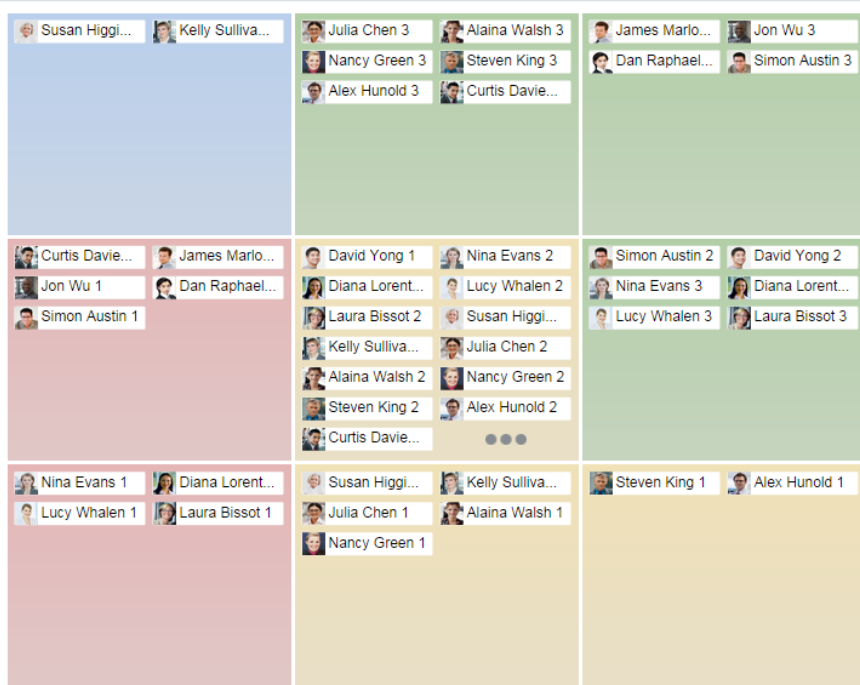


New Visualization: Diagram



New Visualization: Nbox (Yet MAF only)

- Visualizes and compares data across two dimensions
- Supports various options for color coding, marker shapes, and grouping



ADF Faces Component Demo

- <http://jdevadf.oracle.com/adf-richclient-demo/faces/index.jspx>

The screenshot shows a web browser displaying the Oracle Data Visualization demo application. The page features a navigation menu on the left with categories like 'Tag Guide', 'Feature Demos', and 'Visual Designs'. The main content area is titled 'Overview' and contains a grid of ten data visualization components: a network diagram, a map of a road network, a line chart, a bubble chart of countries, a map of Redwood Shores, a US state map, a portrait of Steven King, a map of Florida, a map of the USA with flight paths, and a bubble chart of countries. Below the grid, there is a text block describing the ADF Data Visualizations and a 'What's New' section with two more bubble charts. At the bottom, there are 'Print Content' and 'Show Attachment' buttons.

Oracle Data Visualization

View Source | Skin | Javascript Optimization | Settings | Accessibility | About ASPEN... | Home

Feature Demos > Data Visualization Demo

Tag Guide

Feature Demos

- Data Visualization Gallery
- Chart
- Diagram
- Gantt
- Gauge
- Geographic Map
- Hierarchy Viewer
- Legacy
- Pivot Filter Bar
- Pivot Table
- Sunburst
- Thematic Map
- Timeline
- Treemap
- Drag and Drop
- Dynamic Faces
- Emailable Page
- File Explorer
- Help and Hints
- Layout Basics
- LOV Basics
- Menu Model Usages
- Optimized Lifecycle
- Panel Springboard App
- PostBack
- Query Basics
- Sample Page Templates
- Table Components Basics

Visual Designs

Styles

Commonly Confused

Overview | Components | Featured Demos

The **ADF Data Visualizations** deliver responsive interactivity and animation across a broad set of industry leading HTML5 components, including:

- 30+ Chart types, including spark charts, dual-y, and stacked varieties
- Gauges: Dial, LED, Rating, and Status Meter
- Gantt Charts: Project, Resource Utilization and Scheduling
- Maps: Geographic and Thematic
- And Many Others: Diagram, Hierarchy Viewer, Pivot Table, Sunburst, Timeline and Treemap

What's New

Print Content | Show Attachment

Graph and Chart: Migration Strategy

- Going forward, all the new features are introduced in DVT Charts
- Old Graph and Gauge tags deprecated in cases where the new tags are available
- Editing existing data-bound instances of deprecated tags is still supported

Challenges

- Data integrity (extremely max values or extremely low values)
- Sometimes better AVG values to get more insight
- Do not use too many data points
- Make graphs understandable; tell the end-user what is showed
 - clear legend
 - mouseover message
 - set X and Y title
- Keep it simple (!)

Learn More

- <https://blogs.oracle.com/data-visualizations/>
- <http://technology.amis.nl/>
- <http://jdevadf.oracle.com/adf-richclient-demo/faces/index.jspx>
- <http://www.oracle.com/webfolder/ux/middleware/alta/index.html>

