Integrating OBI with D3 to Expand Built-in Functionality

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Heartland Oracle Users Group

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Presenter

- Arthur Dayton – Senior Consultant
  - Speaker
  - Teacher
  - Education Chair IOUG North American Oracle Spatial and Graph Special Interest Group
  - Contributing Member to ODTUG BI Community committee
  - Dad to 2 boys

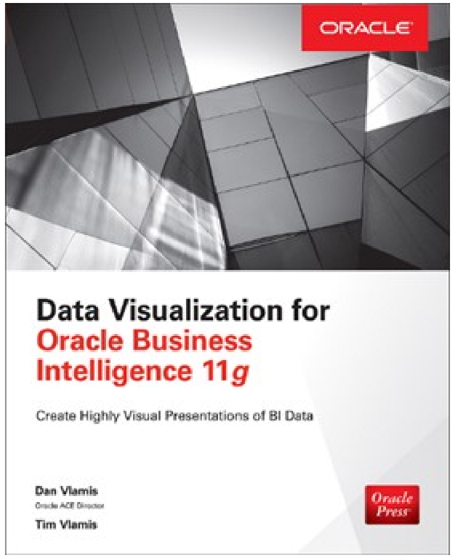
Vlamis Software Solutions

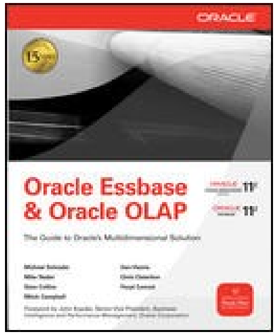
- Vlamis Software founded in 1992 in Kansas City, Missouri
- Developed 200+ Oracle BI and analytics systems
- Specializes in Oracle-based:
    - Enterprise Business Intelligence & Analytics
    - Analytic Warehousing
    - Data Mining and Predictive Analytics
    - Data Visualization
- Multiple Oracle ACEs, consultants average 15+ years
- www.vlamis.com (blog, papers, newsletters, services)
- Co-authors of book “Data Visualization for OBI 11g”
- Co-author of book “Oracle Essbase & Oracle OLAP”
- Oracle University Partner
- Oracle Gold Partner

ORACLE EDUCATION RESELLER

ORACLE APPROVED EDUCATION CENTER

ORACLE Gold Partner
Specialized
Oracle Business Intelligence
Foundation Suite 11*g*


ORACLE
Data Visualization for Oracle Business Intelligence 11*g*
Create Highly Visual Presentations of BI Data
Dan Vlamis
Oracle ACE Director
Tim Vlamis
Oracle Press


ORACLE
Oracle Essbase & Oracle OLAP

CELEBRATING EXCELLENCE vlamis 25 YEARS SOFTWARE SOLUTIONS

Abstract

Many organizations encounter situations where they have report requirements that simply cannot be achieved with the built-in functionality of Oracle Business Intelligence (OBI), including Oracle Analytics Cloud (OAC).

However, OBI provides the functionality to integrate your data with JavaScript libraries such as D3 to create custom interactive visualizations in Answers, Data Visualization, and Data Visualization Desktop.

This session will show you examples of what is possible based on real-life business cases using freely available open source libraries such as D3.

We will also discuss the steps for integrating external libraries with OBI, and provide an overview of what libraries are available to create custom visualizations.

CELEBRATING EXCELLENCE
vlamis 25 YEARS
SOFTWARE SOLUTIONS

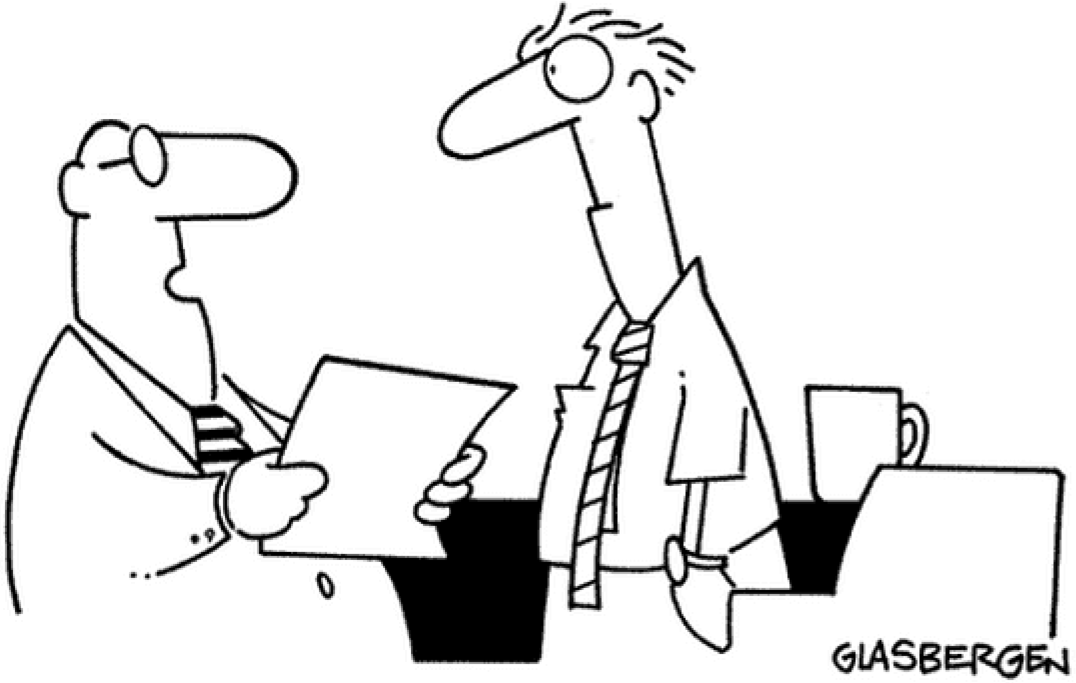
“Best Practice”

- Attitude of IT is often bend the organization to the software under the guise of “best practice”
- Don’t customize
- Change business processes to conform with software

- Sometimes organizations have a need for visualizations that don’t come out of box

Scenario

Copyright 2004 by Randy Glasbergen.
www.glasbergen.com



"I want you to find a bold and innovative way to do everything exactly the same way it's been done for 25 years."

Scenario

- We have a report that is manually prepared for 100’s of areas
- The report is an industry standard way of looking at something
- There isn’t a way to create the visualization with OBI out of the box
- There is significant potential time savings if the report can be automated
- Not even a slight chance you will convince operations to change report and you might be fired for even suggesting it

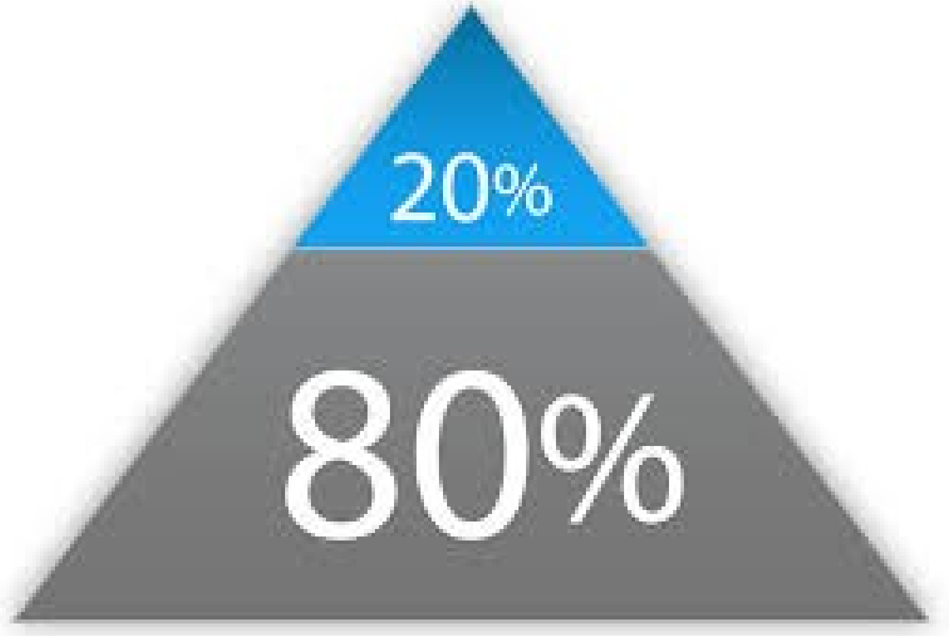
Give Them What They Want

Let's not throw the baby out with the bath water.

Use What We Have

What do we have with OBI

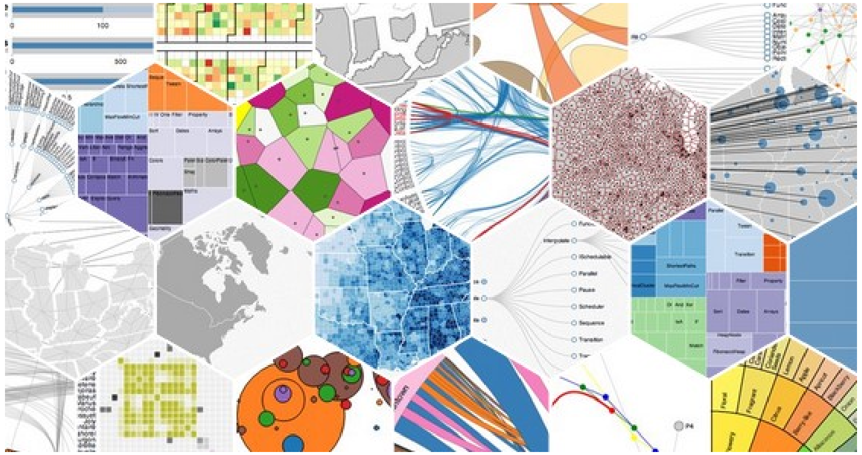
- Data
- Metadata
- Connectivity
- Delivery
- Security
- Scalability
- Extensibility
- Familiarity
- Missing - the thing



How do we get the rest of the way?

- Step 1 - Make what we need available
- Step 2 - Create an analysis to make data available
- Step 3 - Create what we need

Where do we get what we need?



jQuery

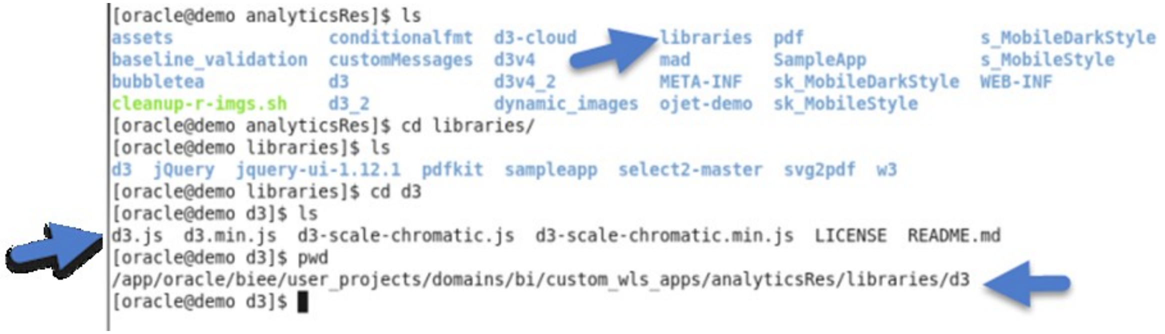
write less, do more.

Step 1 - Making Libraries Available

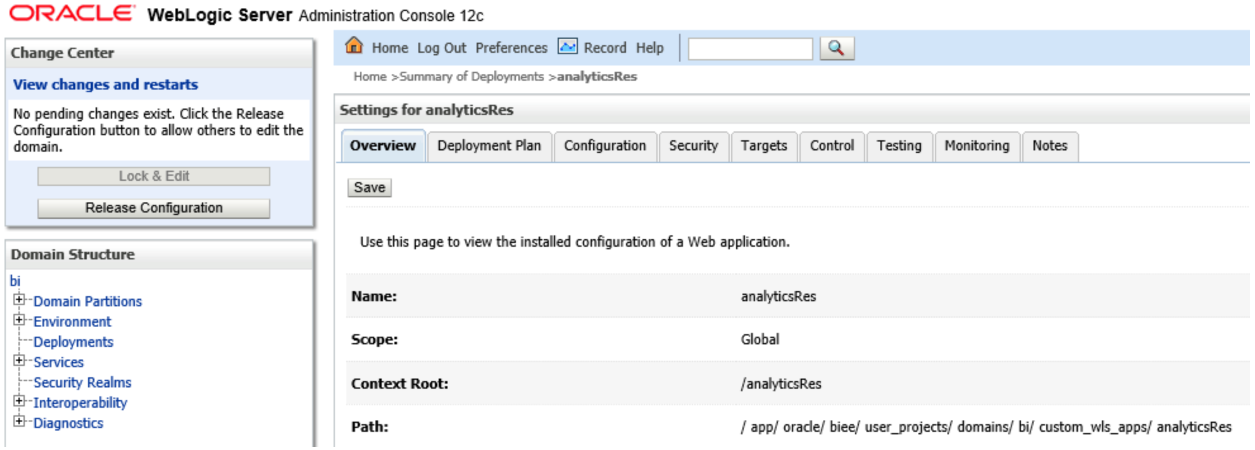
- Three possible approaches
  - **Scenario 1 – I have control of my OBI server or the person who does is reasonable and will do stuff if I ask them to and therefore I can put files on my OBI server and deploy the analyticsRes directory.**
  - **Scenario 2 – You can reference links outside your corporate firewall**
  - **Scenario 3 – Nobody trusts you or it’s just too painful and I wanna do it right now!**

Scenario 1 - I have control of my OBI server

Place files on file system and deploy directory as application (analyticsRes)



```
[oracle@demo analyticsRes]$ ls
assets               conditionalfmt  d3-cloud        libraries  pdf                 s_MobileDarkStyle
baseline_validation  customMessages  d3v4            mad        SampleApp           s_MobileStyle
bubbletea            d3              d3v4_2          META-INF   sk_MobileDarkStyle  WEB-INF
cleanup-r-imgs.sh    d3_2            dynamic_images  ojet-demo  sk_MobileStyle
[oracle@demo analyticsRes]$ cd libraries/
[oracle@demo libraries]$ ls
d3  jQuery  jquery-ui-1.12.1  pdfkit  sampleapp  select2-master  svg2pdf  w3
[oracle@demo libraries]$ cd d3
[oracle@demo d3]$ ls
d3.js  d3.min.js  d3-scale-chromatic.js  d3-scale-chromatic.min.js  LICENSE  README.md
[oracle@demo d3]$ pwd
/app/oracle/biee/user_projects/domains/bi/custom_wls_apps/analyticsRes/libraries/d3
[oracle@demo d3]$ 
```



ORACLE WebLogic Server Administration Console 12c
Change Center
View changes and restarts
Lock & Edit
Release Configuration
Domain Structure
bi
Domain Partitions
Environment
Deployments
Services
Security Realms
Interoperability
Diagnostics
Home Log Out Preferences Record Help
Home >Summary of Deployments >analyticsRes
Settings for analyticsRes
Overview
Deployment Plan
Configuration
Security
Targets
Control
Testing
Monitoring
Notes
Save

No pending changes exist. Click the Release Configuration button to allow others to edit the domain.

Use this page to view the installed configuration of a Web application.

Name: analyticsRes

Scope: Global

Context Root: /analyticsRes

Path: / app/ oracle/ biee/ user_projects/ domains/ bi/ custom_wls_apps/ analyticsRes

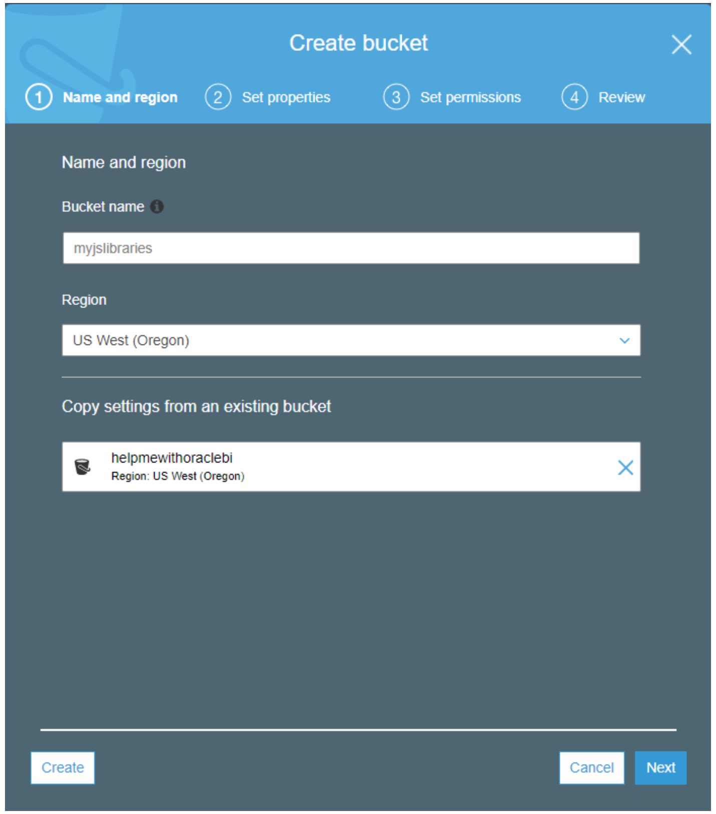
Scenario 2 – Reference external links

Hosted libraries:

```
<script src="https://d3js.org/d3.v4.min.js"></script>

<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.2.1/jquery.min.js"></script>
```

Scenario 2 – Reference external links

Storage Buckets: AWS S3

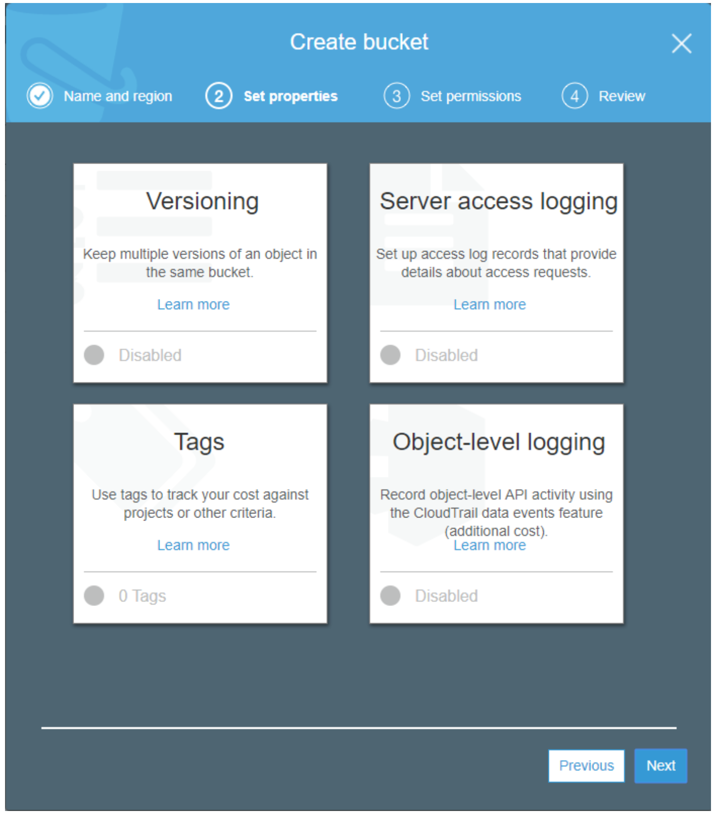

Create bucket
① Name and region
② Set properties
③ Set permissions
④ Review
Create
Cancel
Next

Name and region

Bucket name: myjslibraries

Region: US West (Oregon)

Copy settings from an existing bucket: helpmewithoraclebi
Region: US West (Oregon)

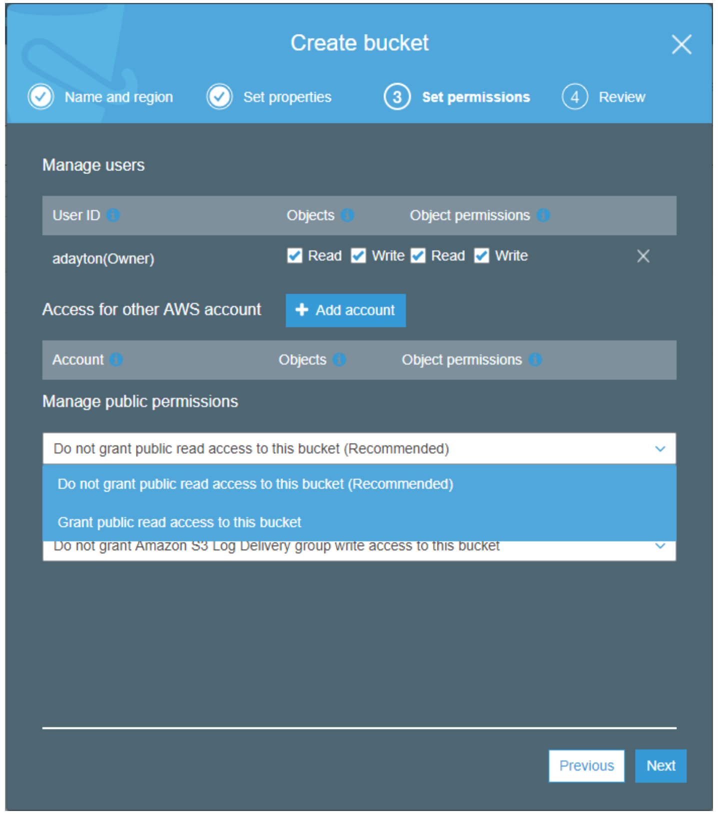

Create bucket
Name and region
② Set properties
③ Set permissions
④ Review
Learn more
Previous
Next

Versioning: Keep multiple versions of an object in the same bucket. — Disabled

Server access logging: Set up access log records that provide details about access requests. — Disabled

Tags: Use tags to track your cost against projects or other criteria. — 0 Tags

Object-level logging: Record object-level API activity using the CloudTrail data events feature (additional cost). — Disabled


Create bucket
Name and region
Set properties
③ Set permissions
④ Review
Add account
Previous
Next

Manage users

User ID	Objects	Object permissions
adayton(Owner)	☑ Read ☑ Write	☑ Read ☑ Write

Access for other AWS account

Account	Objects	Object permissions

Manage public permissions

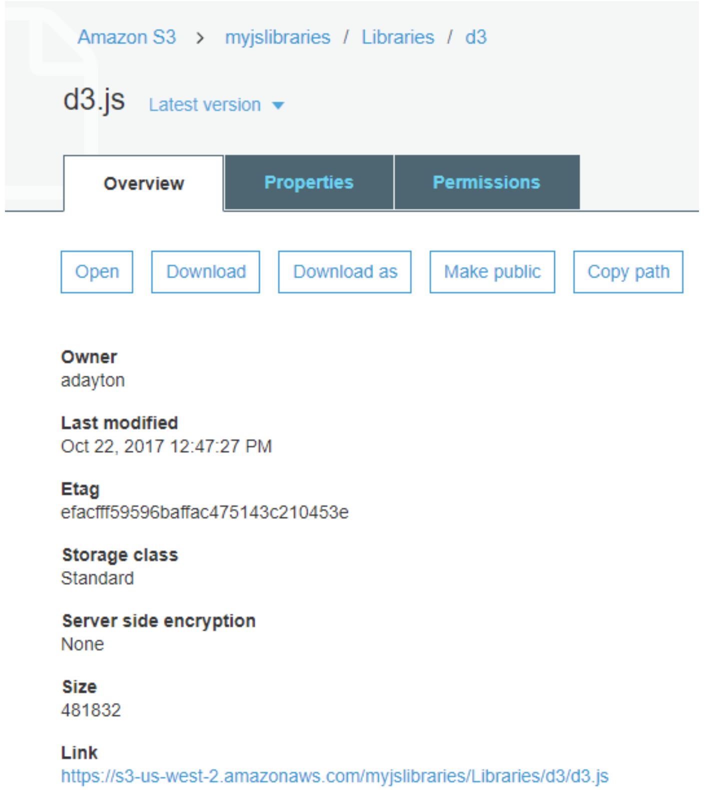
Do not grant public read access to this bucket (Recommended)
- Do not grant public read access to this bucket (Recommended)
- Grant public read access to this bucket

Do not grant Amazon S3 Log Delivery group write access to this bucket

Scenario 2 – Reference external links

Storage Buckets: AWS S3

<script src=" https://s3-us-west-2.amazonaws.com/myjslibraries/Libraries/d3/d3.js "></script>


Amazon S3 › myjslibraries / Libraries / d3
d3.js
Latest version ▾
Overview
Properties
Permissions
Open
Download
Download as
Make public
Copy path

Owner
adayton

Last modified
Oct 22, 2017 12:47:27 PM

Etag
efacfff59596baffac475143c210453e

Storage class
Standard

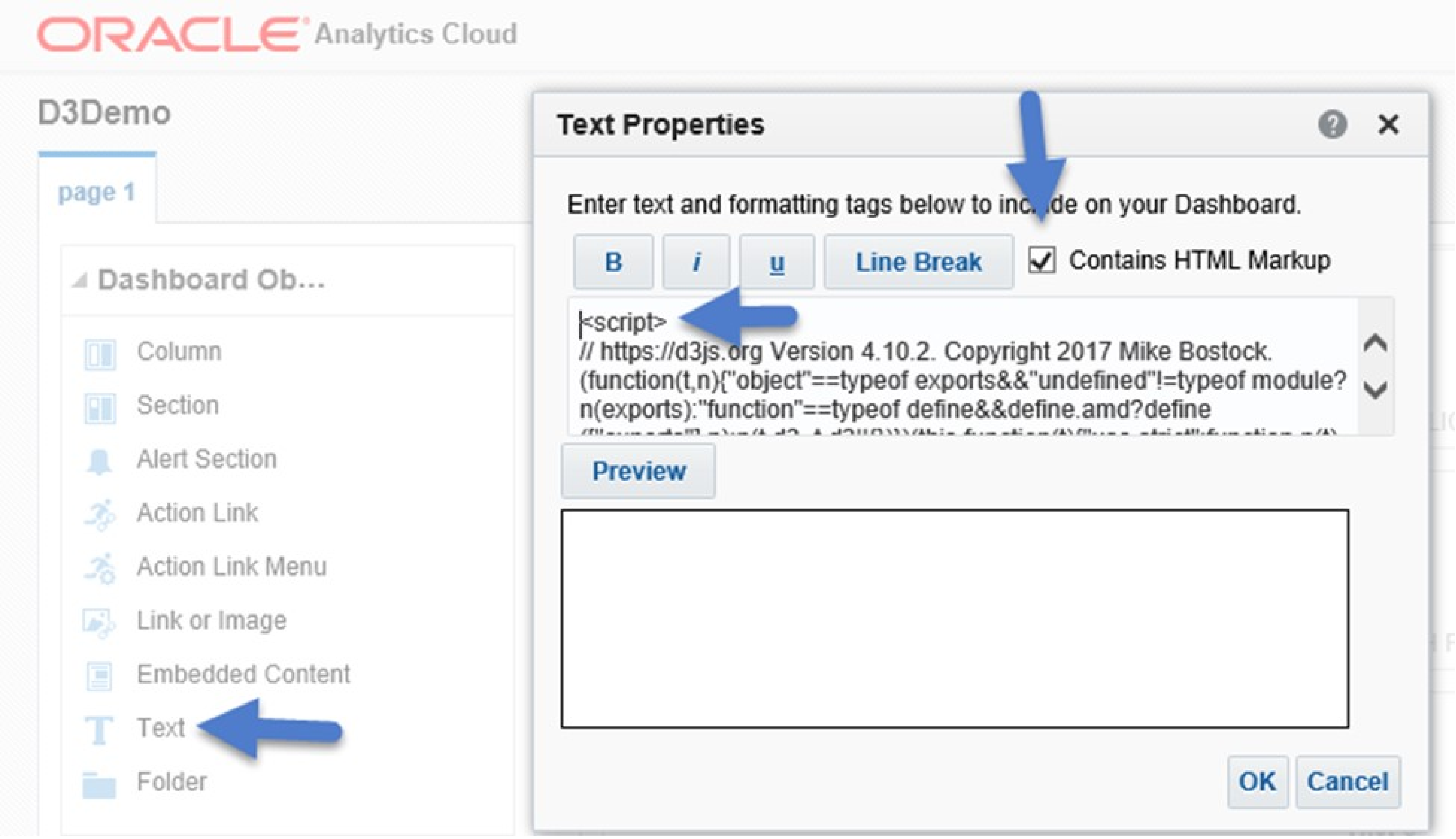
Server side encryption
None

Size
481832

Link
https://s3-us-west-2.amazonaws.com/myjslibraries/Libraries/d3/d3.js

Scenario 3 – I wanna do it right now!

Copy paste library code to a text area on your dashboard


ORACLE Analytics Cloud
D3Demo
page 1
Dashboard Ob...
Column
Section
Alert Section
Action Link
Action Link Menu
Link or Image
Embedded Content
Text
Folder
Text Properties
B
i
u
Line Break
Preview
OK
Cancel

Enter text and formatting tags below to inc de on your Dashboard.

☑ Contains HTML Markup

```
<script>
// https://d3js.org Version 4.10.2. Copyright 2017 Mike Bostock.
(function(t,n){"object"==typeof exports&&"undefined"!=typeof module?
n(exports):"function"==typeof define&&define.amd?define
```

Step 2 - Create an analysis

Create a narrative view to pump data into JSON

Format:

Prefix –

```
<script>
 var myVar={};
 myVar.data=[];
```

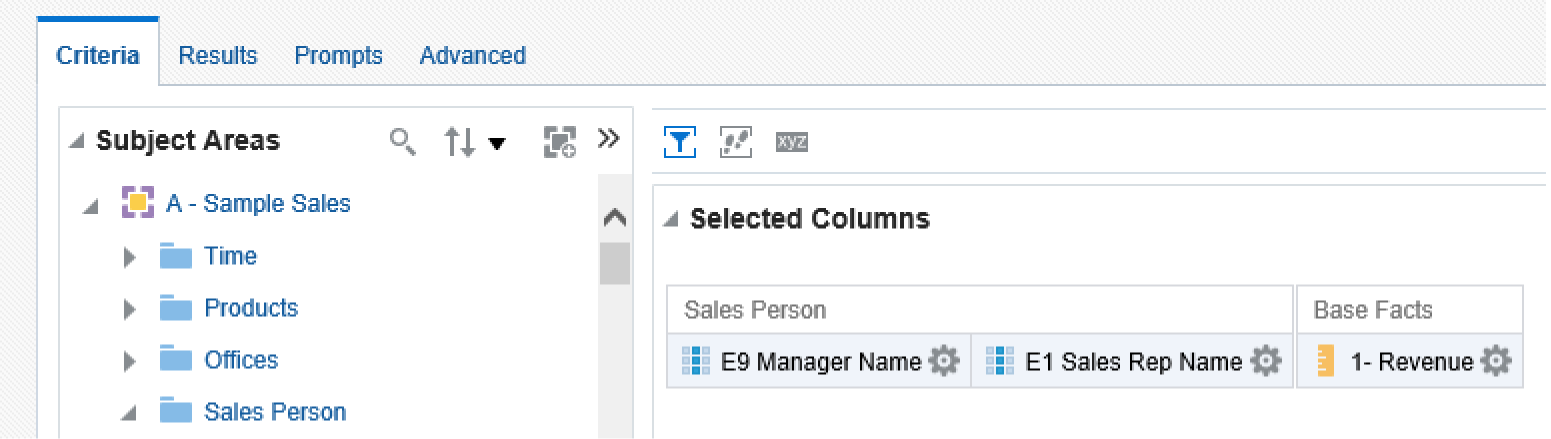
Narrative -

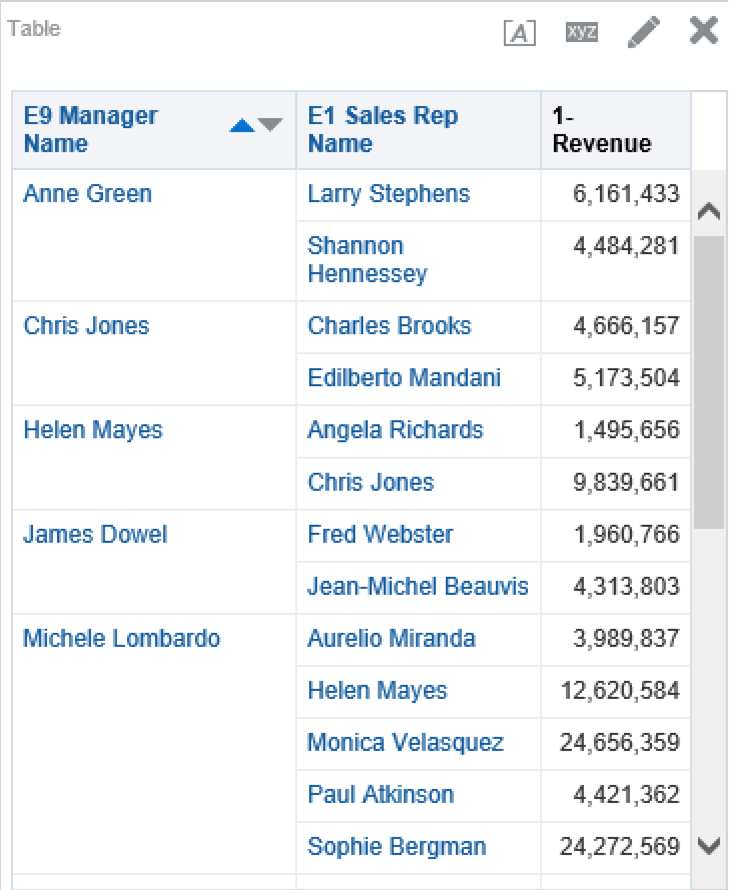
```
myVar.data.push({“col1”:@1,”col2”:@2});
```

Postfix –

```
//do something with myVar.data
 </script>
```

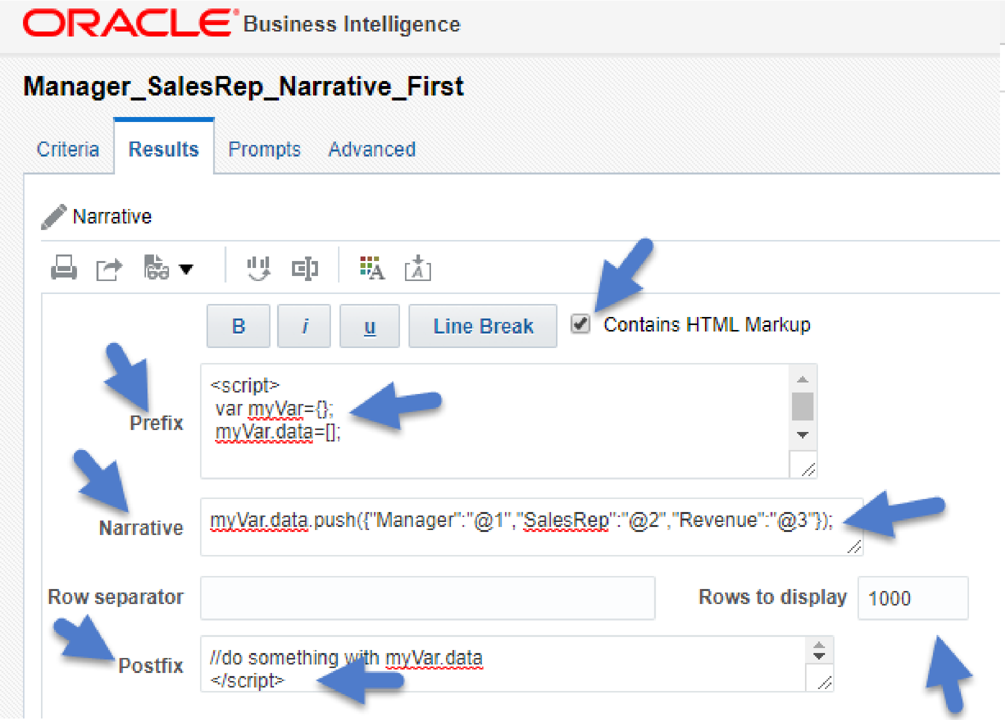
Step 2 - Create an analysis


Criteria
Results
Prompts
Advanced
Subject Areas
A - Sample Sales
Time
Products
Offices
Sales Person
Selected Columns
Sales Person
Base Facts
E9 Manager Name
E1 Sales Rep Name
1- Revenue



E9 Manager Name	E1 Sales Rep Name	1- Revenue
Anne Green	Larry Stephens	6,161,433
	Shannon Hennessey	4,484,281
Chris Jones	Charles Brooks	4,666,157
	Edilberto Mandani	5,173,504
Helen Mayes	Angela Richards	1,495,656
	Chris Jones	9,839,661
James Dowel	Fred Webster	1,960,766
	Jean-Michel Beauvis	4,313,803
Michele Lombardo	Aurelio Miranda	3,989,837
	Helen Mayes	12,620,584
	Monica Velasquez	24,656,359
	Paul Atkinson	4,421,362
	Sophie Bergman	24,272,569

Step 2 - Create an analysis



Manager_SalesRep_Narrative_First

☑ Contains HTML Markup

Prefix:

```
<script>
 var myVar={};
 myVar.data=[];
```

Narrative:

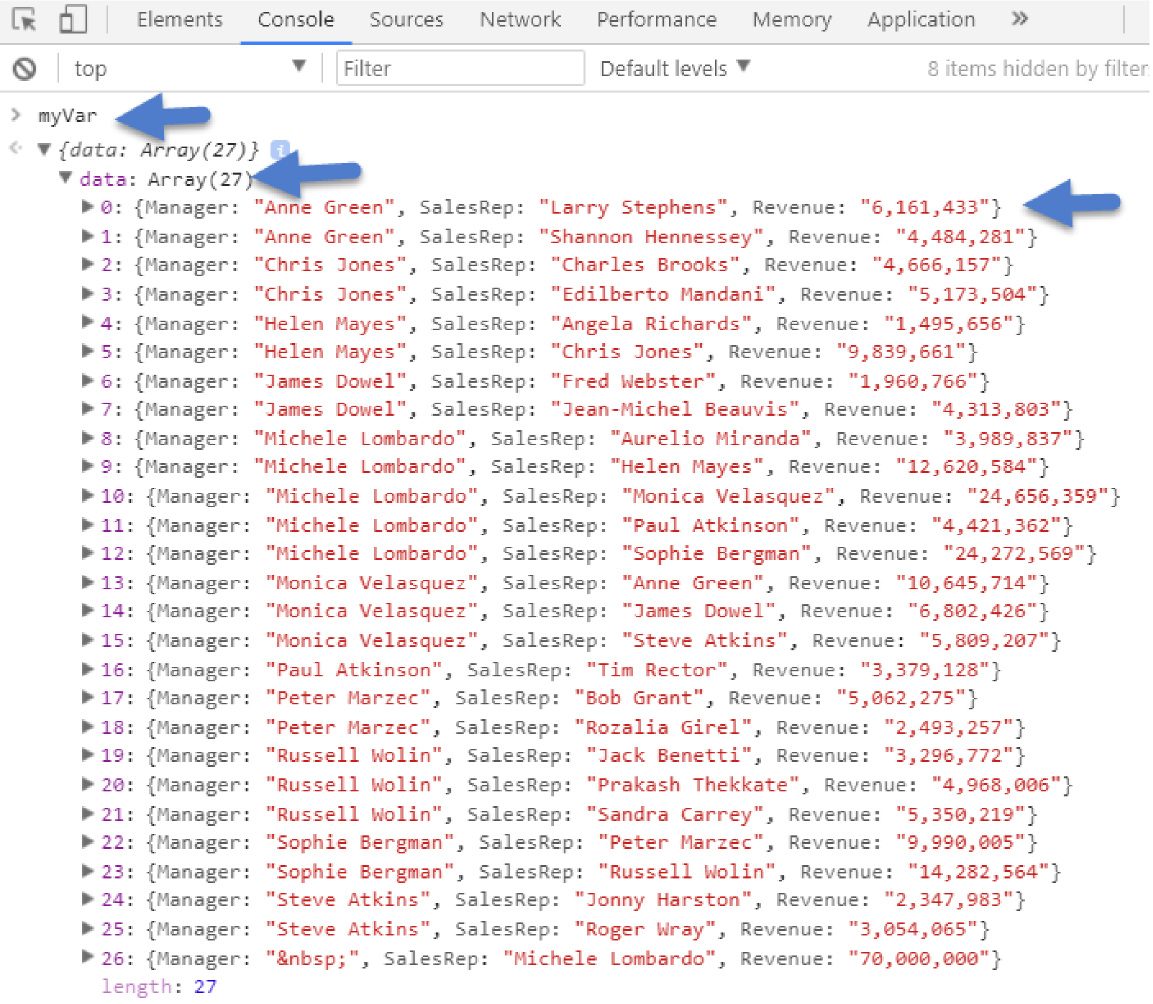
```
myVar.data.push({"Manager":"@1","SalesRep":"@2","Revenue":"@3"});
```

Row separator:

Rows to display: 1000

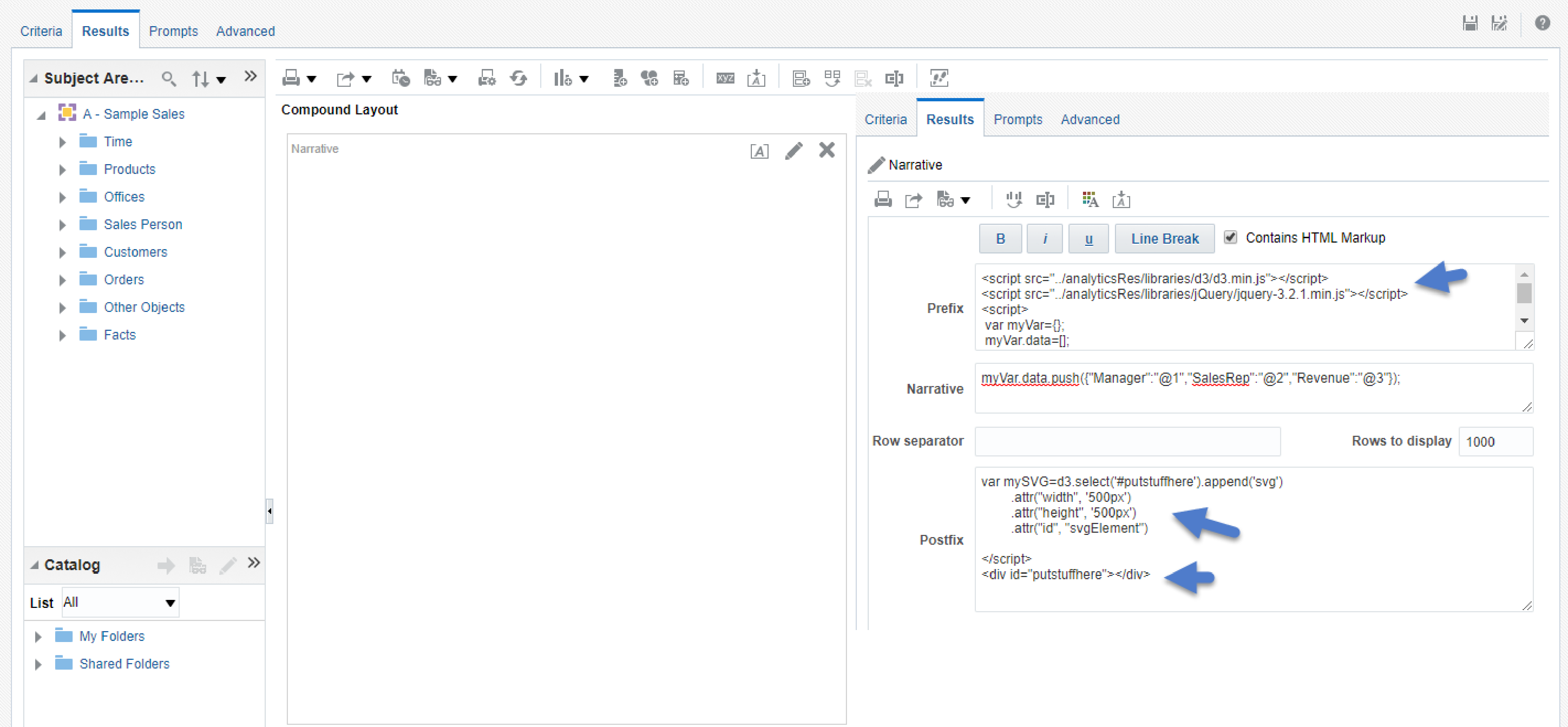
Postfix:

```
//do something with myVar.data
</script>
```



```
> myVar
< ▼{data: Array(27)}
   ▼data: Array(27)
     ▶0: {Manager: "Anne Green", SalesRep: "Larry Stephens", Revenue: "6,161,433"}
     ▶1: {Manager: "Anne Green", SalesRep: "Shannon Hennessey", Revenue: "4,484,281"}
     ▶2: {Manager: "Chris Jones", SalesRep: "Charles Brooks", Revenue: "4,666,157"}
     ▶3: {Manager: "Chris Jones", SalesRep: "Edilberto Mandani", Revenue: "5,173,504"}
     ▶4: {Manager: "Helen Mayes", SalesRep: "Angela Richards", Revenue: "1,495,656"}
     ▶5: {Manager: "Helen Mayes", SalesRep: "Chris Jones", Revenue: "9,839,661"}
     ▶6: {Manager: "James Dowel", SalesRep: "Fred Webster", Revenue: "1,960,766"}
     ▶7: {Manager: "James Dowel", SalesRep: "Jean-Michel Beauvis", Revenue: "4,313,803"}
     ▶8: {Manager: "Michele Lombardo", SalesRep: "Aurelio Miranda", Revenue: "3,989,837"}
     ▶9: {Manager: "Michele Lombardo", SalesRep: "Helen Mayes", Revenue: "12,620,584"}
     ▶10: {Manager: "Michele Lombardo", SalesRep: "Monica Velasquez", Revenue: "24,656,359"}
     ▶11: {Manager: "Michele Lombardo", SalesRep: "Paul Atkinson", Revenue: "4,421,362"}
     ▶12: {Manager: "Michele Lombardo", SalesRep: "Sophie Bergman", Revenue: "24,272,569"}
     ▶13: {Manager: "Monica Velasquez", SalesRep: "Anne Green", Revenue: "10,645,714"}
     ▶14: {Manager: "Monica Velasquez", SalesRep: "James Dowel", Revenue: "6,802,426"}
     ▶15: {Manager: "Monica Velasquez", SalesRep: "Steve Atkins", Revenue: "5,809,207"}
     ▶16: {Manager: "Paul Atkinson", SalesRep: "Tim Rector", Revenue: "3,379,128"}
     ▶17: {Manager: "Peter Marzec", SalesRep: "Bob Grant", Revenue: "5,062,275"}
     ▶18: {Manager: "Peter Marzec", SalesRep: "Rozalia Girel", Revenue: "2,493,257"}
     ▶19: {Manager: "Russell Wolin", SalesRep: "Jack Benetti", Revenue: "3,296,772"}
     ▶20: {Manager: "Russell Wolin", SalesRep: "Prakash Thekkate", Revenue: "4,968,006"}
     ▶21: {Manager: "Russell Wolin", SalesRep: "Sandra Carrey", Revenue: "5,350,219"}
     ▶22: {Manager: "Sophie Bergman", SalesRep: "Peter Marzec", Revenue: "9,990,005"}
     ▶23: {Manager: "Sophie Bergman", SalesRep: "Russell Wolin", Revenue: "14,282,564"}
     ▶24: {Manager: "Steve Atkins", SalesRep: "Jonny Harston", Revenue: "2,347,983"}
     ▶25: {Manager: "Steve Atkins", SalesRep: "Roger Wray", Revenue: "3,054,065"}
     ▶26: {Manager: "&nbsp;", SalesRep: "Michele Lombardo", Revenue: "70,000,000"}
      length: 27
```

Step 3 – Create Visualization (1)


Criteria
Results
Prompts
Advanced
Subject Are…
A - Sample Sales
Time
Products
Offices
Sales Person
Customers
Orders
Other Objects
Facts
Catalog
List All
My Folders
Shared Folders
Compound Layout
Narrative
Criteria
Results
Prompts
Advanced
Narrative
B
i
u
Line Break

☑ Contains HTML Markup

Prefix

```
<script src="../analyticsRes/libraries/d3/d3.min.js"></script>
<script src="../analyticsRes/libraries/jQuery/jquery-3.2.1.min.js"></script>
<script>
 var myVar={};
 myVar.data=[];
```

Narrative

```
myVar.data.push({"Manager":"@1","SalesRep":"@2","Revenue":"@3"});
```

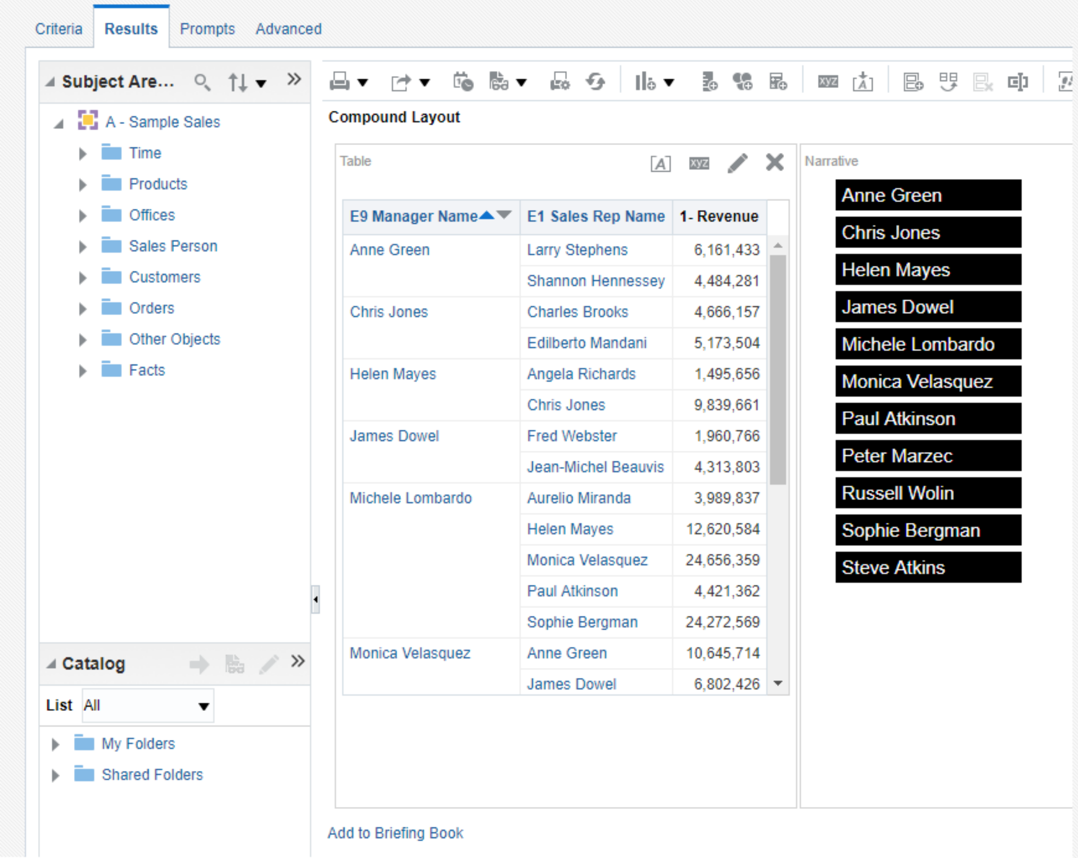
Row separator

Rows to display 1000

Postfix

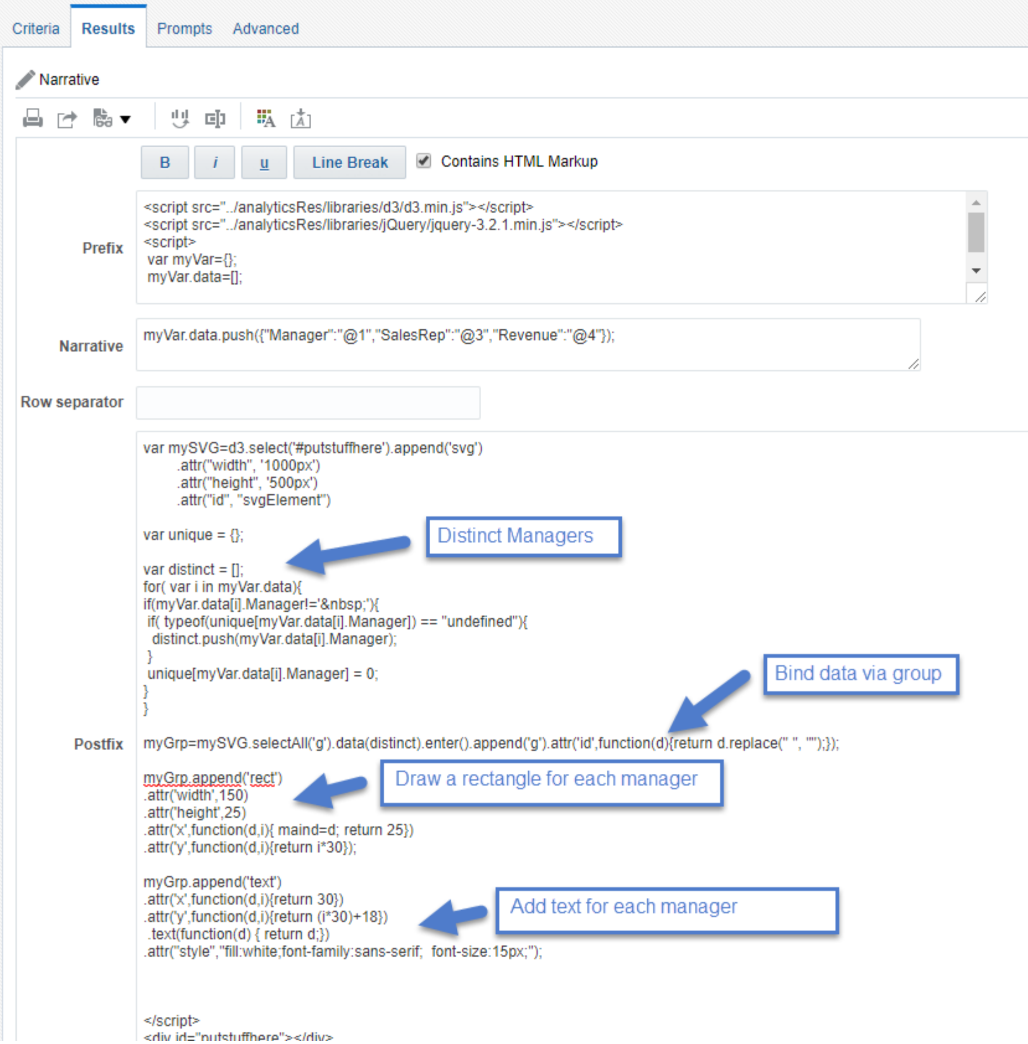
```
var mySVG=d3.select('#putstuffhere').append('svg')
        .attr("width", '500px')
        .attr("height", '500px')
        .attr("id", "svgElement")

</script>
<div id="putstuffhere"></div>
```

Step 3 – Create Visualization (2)


Criteria
Results
Prompts
Advanced
Subject Are...
A - Sample Sales
Time
Products
Offices
Sales Person
Customers
Orders
Other Objects
Facts
Catalog
List All
My Folders
Shared Folders
Compound Layout
Table
Narrative
Add to Briefing Book

E9 Manager Name	E1 Sales Rep Name	1- Revenue
Anne Green	Larry Stephens	6,161,433
	Shannon Hennessey	4,484,281
Chris Jones	Charles Brooks	4,666,157
	Edilberto Mandani	5,173,504
Helen Mayes	Angela Richards	1,495,656
	Chris Jones	9,839,661
James Dowel	Fred Webster	1,960,766
	Jean-Michel Beauvis	4,313,803
Michele Lombardo	Aurelio Miranda	3,989,837
	Helen Mayes	12,620,584
	Monica Velasquez	24,656,359
	Paul Atkinson	4,421,362
	Sophie Bergman	24,272,569
Monica Velasquez	Anne Green	10,645,714
	James Dowel	6,802,426

Anne Green
Chris Jones
Helen Mayes
James Dowel
Michele Lombardo
Monica Velasquez
Paul Atkinson
Peter Marzec
Russell Wolin
Sophie Bergman
Steve Atkins


Criteria
Results
Prompts
Advanced
Narrative
B
i
u
Line Break

☑ Contains HTML Markup

Prefix

```
<script src="../analyticsRes/libraries/d3/d3.min.js"></script>
<script src="../analyticsRes/libraries/jQuery/jquery-3.2.1.min.js"></script>
<script>
 var myVar={};
 myVar.data=[];
```

Narrative

```
myVar.data.push({"Manager":"@1","SalesRep":"@3","Revenue":"@4"});
```

Row separator

Postfix

```
var mySVG=d3.select('#putstuffhere').append('svg')
        .attr("width", '1000px')
        .attr("height", '500px')
        .attr("id", "svgElement")

var unique = {};

var distinct = [];
for( var i in myVar.data){
if(myVar.data[i].Manager!='&nbsp;'){
 if( typeof(unique[myVar.data[i].Manager]) == "undefined"){
  distinct.push(myVar.data[i].Manager);
 }
 unique[myVar.data[i].Manager] = 0;
}
}

myGrp=mySVG.selectAll('g').data(distinct).enter().append('g').attr('id',function(d){return d.replace(" ", "");});

myGrp.append('rect')
.attr('width',150)
.attr('height',25)
.attr('x',function(d,i){ maind=d; return 25})
.attr('y',function(d,i){return i*30});

myGrp.append('text')
.attr('x',function(d,i){return 30})
.attr('y',function(d,i){return (i*30)+18})
 .text(function(d) { return d;})
.attr("style","fill:white;font-family:sans-serif;  font-size:15px;");



</script>
<div id="putstuffhere"></div>
```

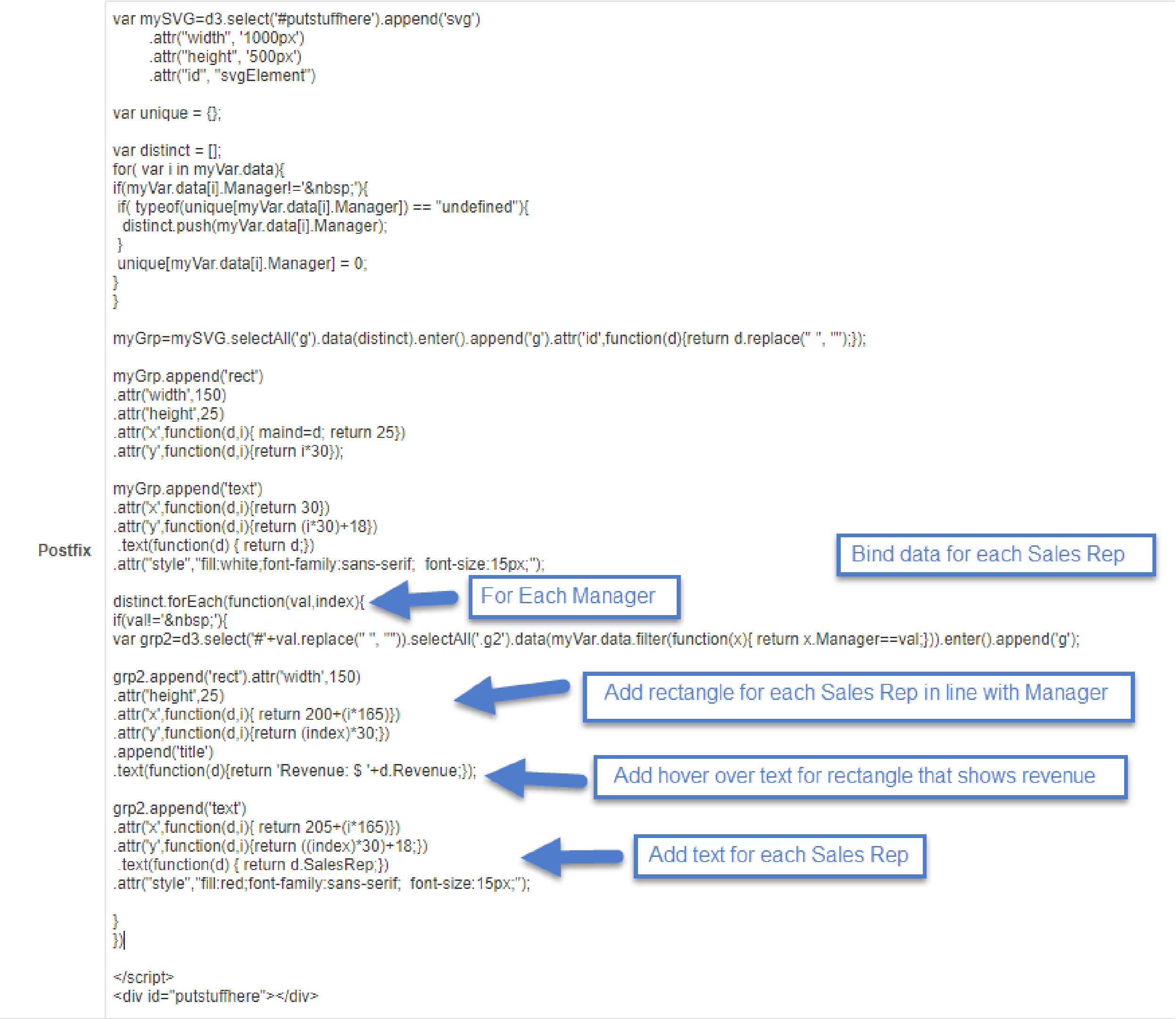
Distinct Managers

Bind data via group

Draw a rectangle for each manager

Add text for each manager

Step 3 – Create Visualization (3)



Postfix

```
var mySVG=d3.select('#putstuffhere').append('svg')
        .attr("width", '1000px')
        .attr("height", '500px')
        .attr("id", "svgElement")

var unique = {};

var distinct = [];
for( var i in myVar.data){
if(myVar.data[i].Manager!='&nbsp;'){
 if( typeof(unique[myVar.data[i].Manager]) == "undefined"){
  distinct.push(myVar.data[i].Manager);
 }
 unique[myVar.data[i].Manager] = 0;
}
}

myGrp=mySVG.selectAll('g').data(distinct).enter().append('g').attr('id',function(d){return d.replace(" ", "");});

myGrp.append('rect')
.attr('width',150)
.attr('height',25)
.attr('x',function(d,i){ maind=d; return 25})
.attr('y',function(d,i){return i*30});

myGrp.append('text')
.attr('x',function(d,i){return 30})
.attr('y',function(d,i){return (i*30)+18})
 .text(function(d) { return d;})
.attr("style","fill:white;font-family:sans-serif;  font-size:15px;");

distinct.forEach(function(val,index){
if(val!='&nbsp;'){
var grp2=d3.select('#'+val.replace(" ", "")).selectAll('.g2').data(myVar.data.filter(function(x){ return x.Manager==val;})).enter().append('g');

grp2.append('rect').attr('width',150)
.attr('height',25)
.attr('x',function(d,i){ return 200+(i*165)})
.attr('y',function(d,i){return (index)*30;})
.append('title')
.text(function(d){return 'Revenue: $ '+d.Revenue;});

grp2.append('text')
.attr('x',function(d,i){ return 205+(i*165)})
.attr('y',function(d,i){return ((index)*30)+18;})
 .text(function(d) { return d.SalesRep;})
.attr("style","fill:red;font-family:sans-serif;  font-size:15px;");

}
})

</script>
<div id="putstuffhere"></div>
```

Bind data for each Sales Rep

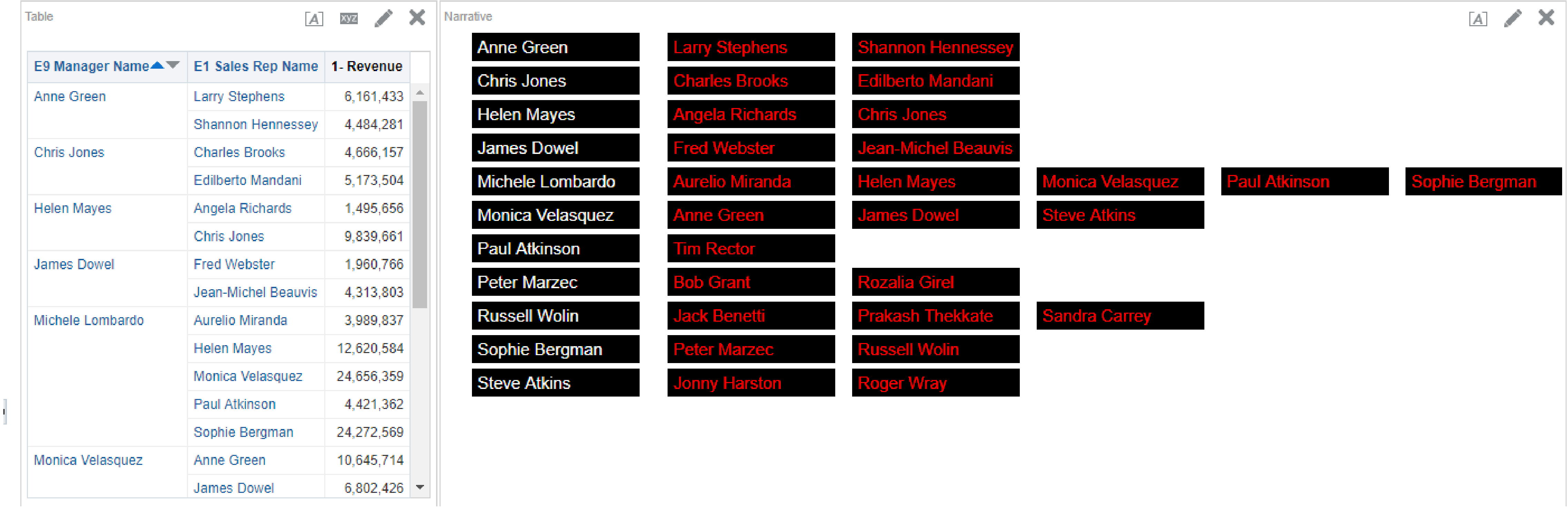
For Each Manager

Add rectangle for each Sales Rep in line with Manager

Add hover over text for rectangle that shows revenue

Add text for each Sales Rep

Step 3 – Create Visualization (4)



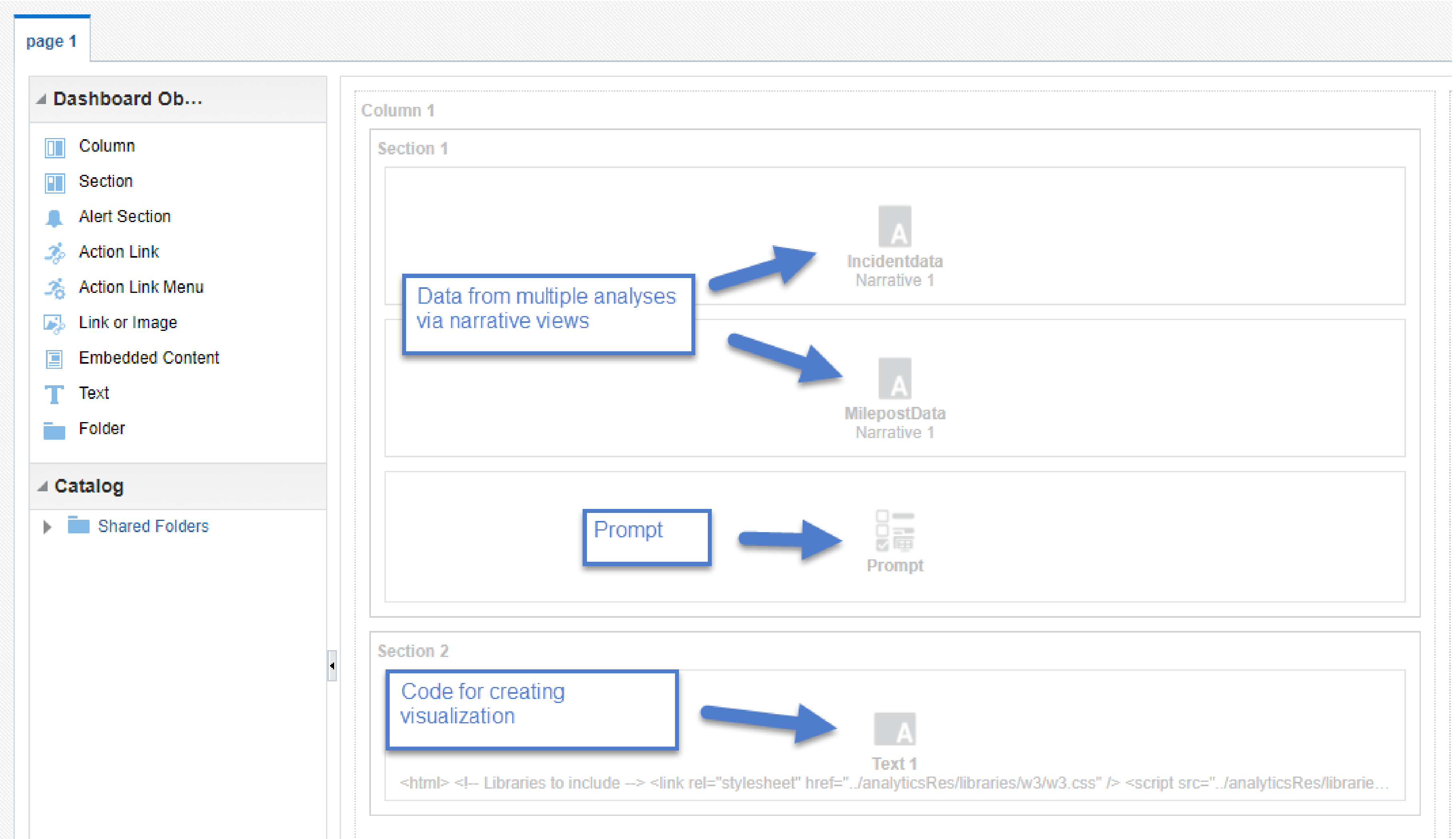
E9 Manager Name	E1 Sales Rep Name	1- Revenue
Anne Green	Larry Stephens	6,161,433
	Shannon Hennessey	4,484,281
Chris Jones	Charles Brooks	4,666,157
	Edilberto Mandani	5,173,504
Helen Mayes	Angela Richards	1,495,656
	Chris Jones	9,839,661
James Dowel	Fred Webster	1,960,766
	Jean-Michel Beauvis	4,313,803
Michele Lombardo	Aurelio Miranda	3,989,837
	Helen Mayes	12,620,584
	Monica Velasquez	24,656,359
	Paul Atkinson	4,421,362
	Sophie Bergman	24,272,569
Monica Velasquez	Anne Green	10,645,714
	James Dowel	6,802,426

Anne Green	Larry Stephens	Shannon Hennessey			
Chris Jones	Charles Brooks	Edilberto Mandani			
Helen Mayes	Angela Richards	Chris Jones			
James Dowel	Fred Webster	Jean-Michel Beauvis			
Michele Lombardo	Aurelio Miranda	Helen Mayes	Monica Velasquez	Paul Atkinson	Sophie Bergman
Monica Velasquez	Anne Green	James Dowel	Steve Atkins		
Paul Atkinson	Tim Rector				
Peter Marzec	Bob Grant	Rozalia Girel			
Russell Wolin	Jack Benetti	Prakash Thekkate	Sandra Carrey		
Sophie Bergman	Peter Marzec	Russell Wolin			
Steve Atkins	Jonny Harston	Roger Wray			

Going Crazy

- Visualize incident data on mountain passes on I-70
  - Need elevation chart
  - Need context menus
  - Need auto arrange
  - Need to be able to render pictures if available
  - Need to prompt
  - Need to print
  - Need to put on dashboard with other vizualizations

Dashboard Design


page 1
Dashboard Ob...
Column
Section
Alert Section
Action Link
Action Link Menu
Link or Image
Embedded Content
Text
Folder
Catalog
Shared Folders
Column 1
Section 1
Incidentdata
Narrative 1
MilepostData
Narrative 1
Prompt
Section 2
Text 1

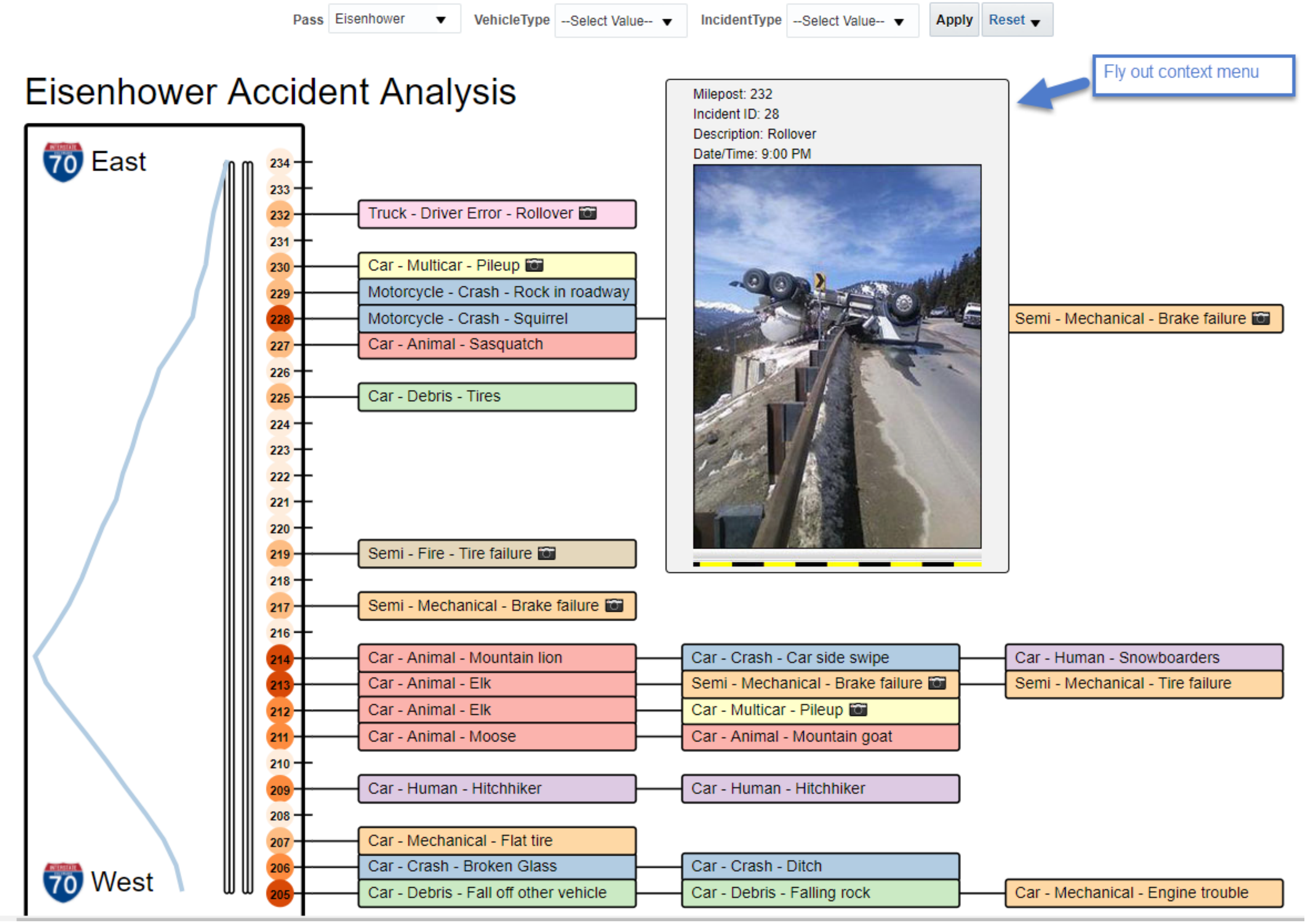
Data from multiple analyses via narrative views

Prompt

Code for creating visualization

```
<html> <!-- Libraries to include --> <link rel="stylesheet" href="../analyticsRes/libraries/w3/w3.css" /> <script src="../analyticsRes/librarie...
```

Dashboard



Pass Eisenhower ▼ VehicleType --Select Value-- ▼ IncidentType --Select Value-- ▼ Apply Reset ▼

Fly out context menu

Eisenhower Accident Analysis

Milepost: 232
Incident ID: 28
Description: Rollover
Date/Time: 9:00 PM

232 Truck - Driver Error - Rollover 📷
230 Car - Multicar - Pileup 📷
229 Motorcycle - Crash - Rock in roadway
228 Motorcycle - Crash - Squirrel | Semi - Mechanical - Brake failure 📷
227 Car - Animal - Sasquatch
225 Car - Debris - Tires
219 Semi - Fire - Tire failure 📷
217 Semi - Mechanical - Brake failure 📷
214 Car - Animal - Mountain lion | Car - Crash - Car side swipe | Car - Human - Snowboarders
213 Car - Animal - Elk | Semi - Mechanical - Brake failure 📷 | Semi - Mechanical - Tire failure
212 Car - Animal - Elk | Car - Multicar - Pileup 📷
211 Car - Animal - Moose | Car - Animal - Mountain goat
209 Car - Human - Hitchhiker | Car - Human - Hitchhiker
207 Car - Mechanical - Flat tire
206 Car - Crash - Broken Glass | Car - Crash - Ditch
205 Car - Debris - Fall off other vehicle | Car - Debris - Falling rock | Car - Mechanical - Engine trouble

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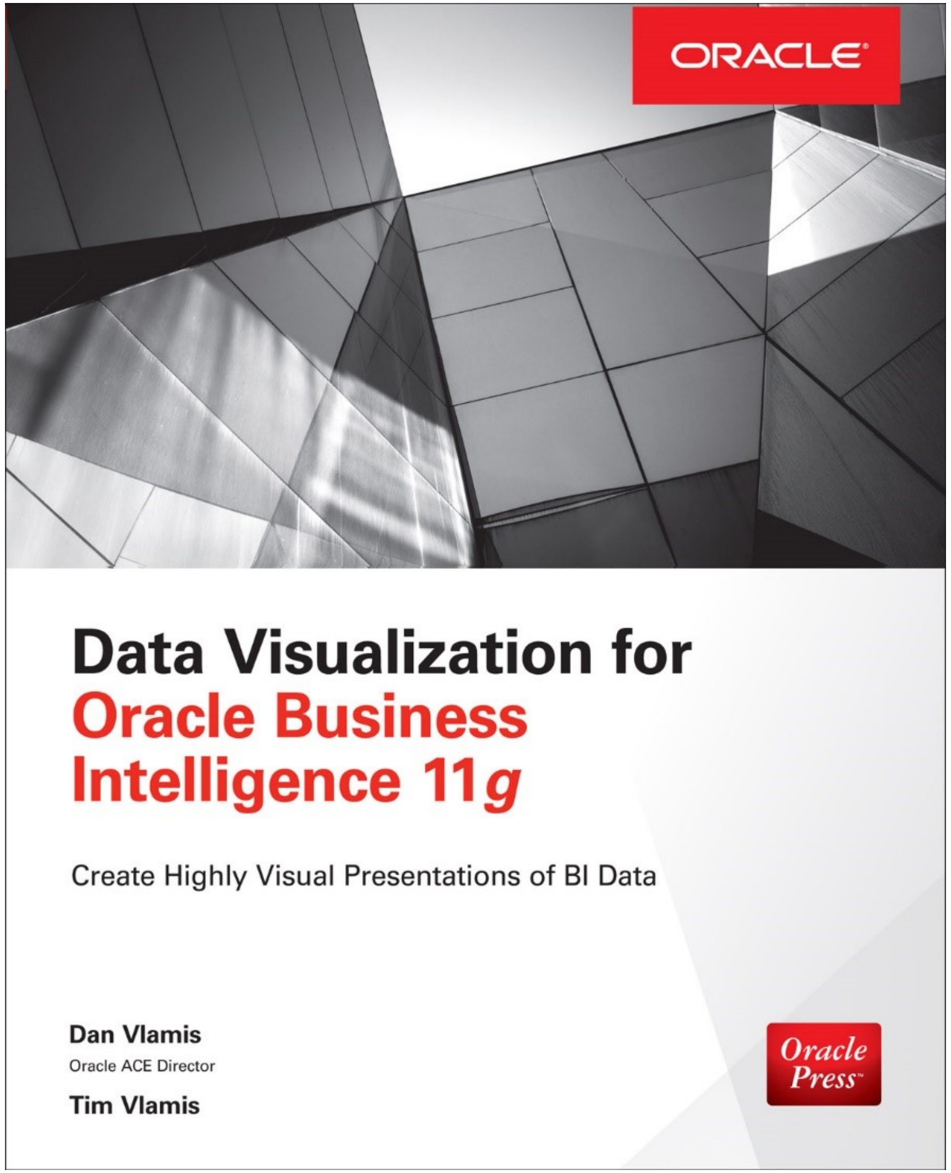
SOFTWARE SOLUTIONS

Drawing for Free Book

Add business card to basket or fill out card


ORACLE
Data Visualization for Oracle Business Intelligence 11g
Create Highly Visual Presentations of BI Data
Dan Vlamis
Oracle ACE Director
Tim Vlamis
Oracle Press

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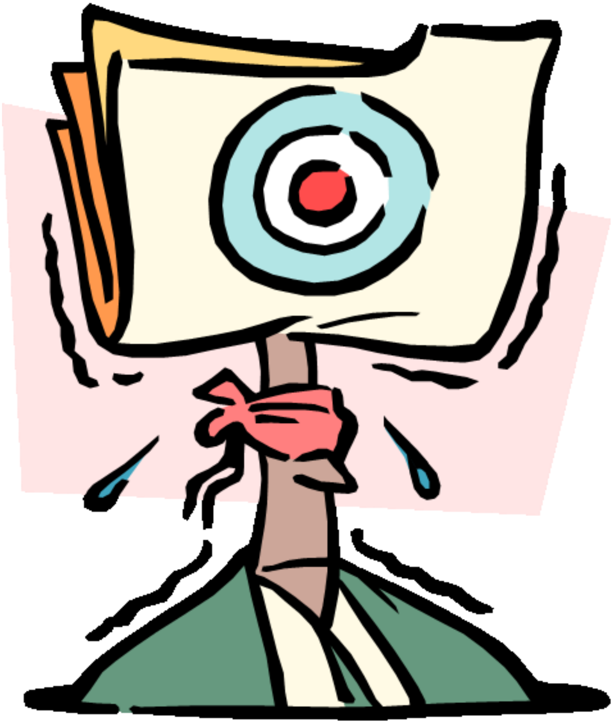Questions?