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Data Visualization for Oracle Business Intelligence 11g

BIWA Summit 2015

Tim Vlamis

Dan Vlamis

Vlamis Software Solutions

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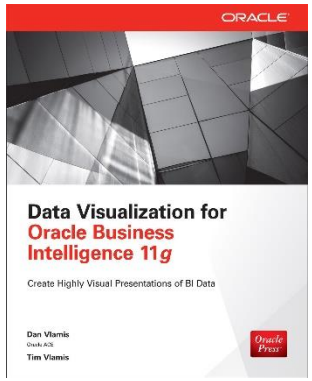
http://www.vlamis.com

Vlamis Software Solutions

- Vlamis Software founded in 1992 in Kansas City, Missouri
- Oracle Gold Partner, Oracle University Partner
- Developed more than 200 Oracle BI systems
- Specializes in ORACLE-based:
  - Business Intelligence
  - Data Warehousing
  - Data Mining and Predictive Analytics
  - Data Visualization
- Expert presenter at major Oracle conferences
- Authors of 2015 book “Data Visualization for Oracle BI 11g”
- Co-author of book “Oracle Essbase & Oracle OLAP”
- www.vlamis.com (blog, papers, newsletters, services)
- Beta tester for OBIEE 11g, 12c
- Conference chair for BIWA Summit 2014, 2015



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Tim and Dan Vlamis

- Tim (business analyst and academic guy)
- 25+ years in business modeling, valuation, and scenario analysis
- Professional Certified Marketer (PCM) from AMA
- Active Member of NICO (Northwestern Institute on Complex Systems)
- Adjunct Professor of Business, Benedictine College
- MBA Kellogg School of Management (Northwestern University)
- BA Economics Yale University

- Dan (OLAP expert and career IT guy)
- 25+ Years in business intelligence/executive information systems
- Led development team at IRI
- Founded Vlamis Software Solutions 20+ years ago in 1993
- Author, speaker, Oracle ACE Director
- BA Computer Science Brown University

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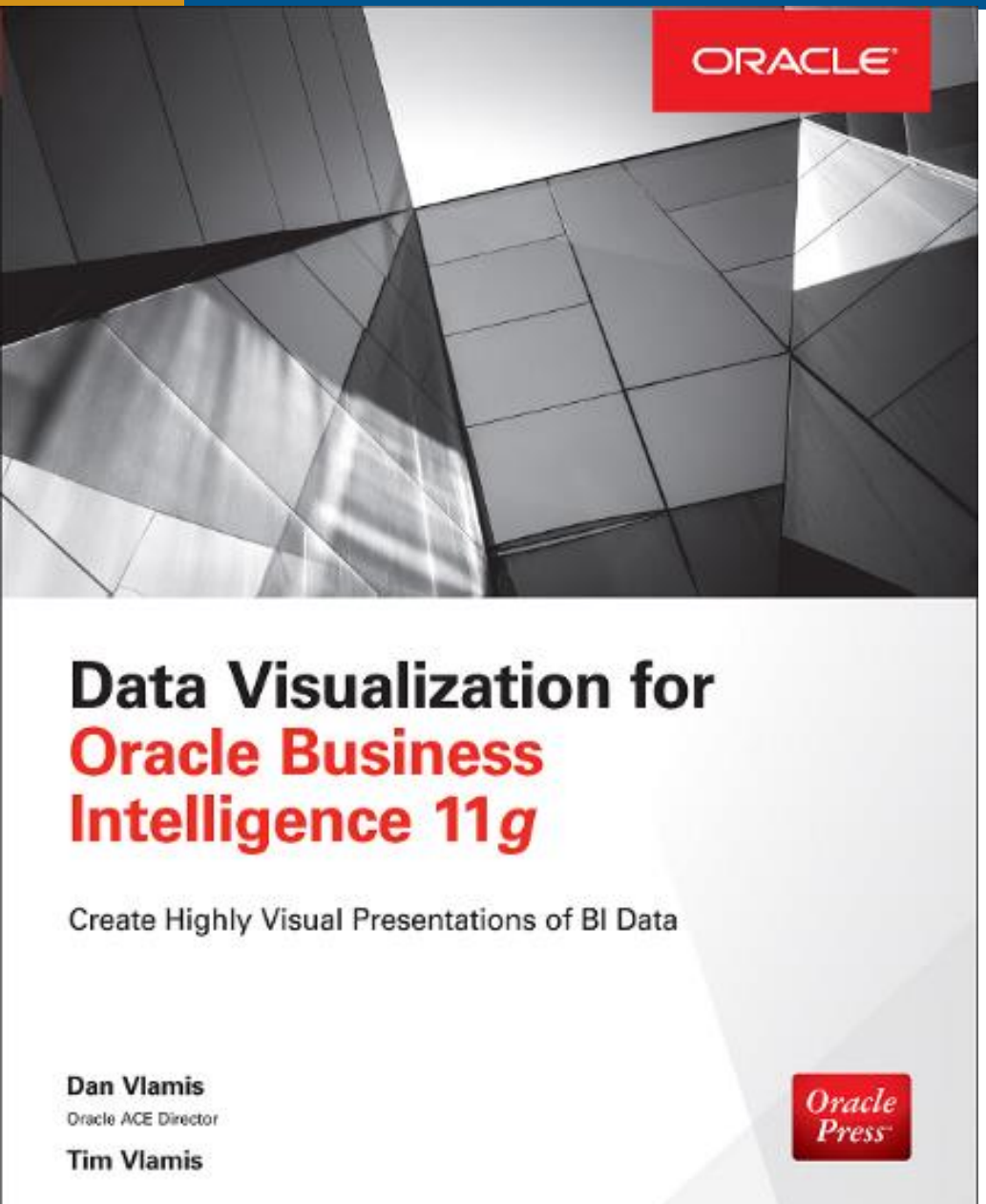
New Book!



Special Thanks to:

Paul Carlstroem

Philippe Lions

Brian Macdonald

Jayant Sharma

Oracle BI Prod Mgmt

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Table of Contents

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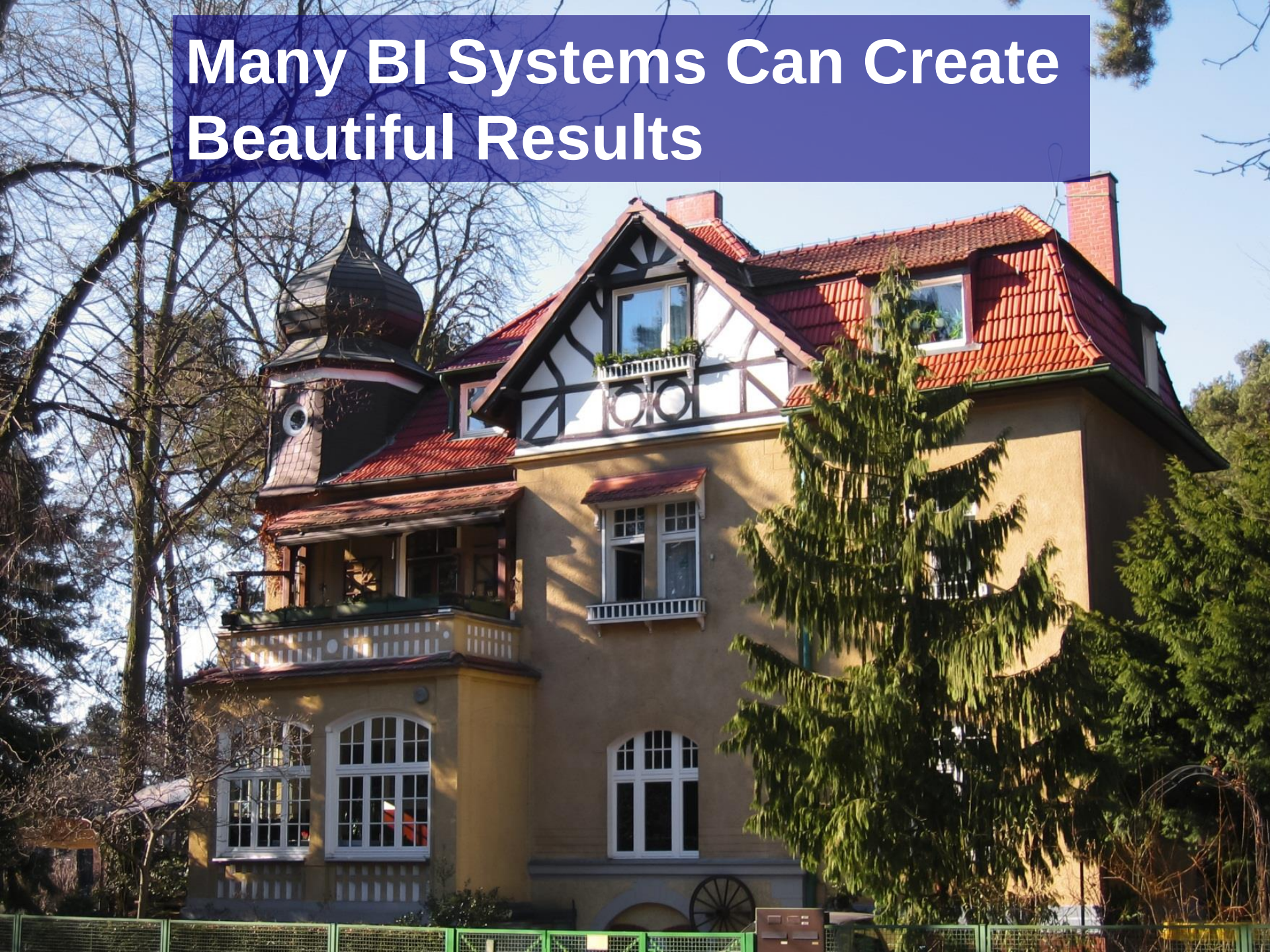
What to expect in the book

- Not a “how to”, more of a “what and why to”
- Not every example is perfect
- Writing process (Tim rough draft, Dan challenge and fix)
- Color challenge (gray scale versus color)
- Content challenge (advanced material requires explanation which we didn’t have space for)

Presentation Agenda

- Human cognition insights
- OBIEE demo
- Table design
  - Best practices
  - When and when not to use
- Graph design
  - Best practices
  - Use cases for different graph types
- Questions from audience at all times

Many BI Systems Can Create Beautiful Results



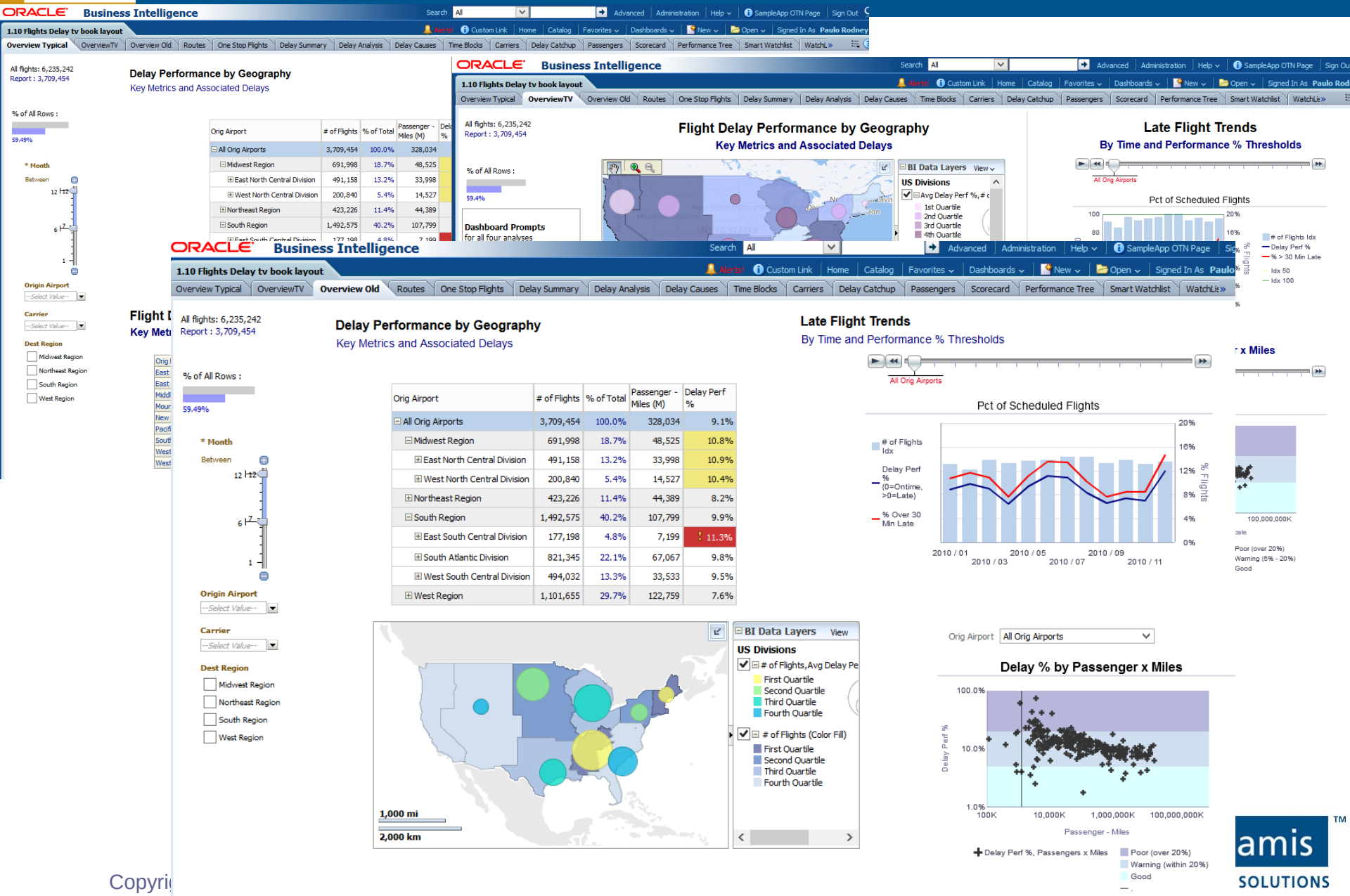
OBI Operates at a Different Scale


Ingredients → Data Quality & Variety

Technique → Data Processing & Prep

Presentation → Data Visualization

OBIEE Demo Content from Chap 1



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All flights: 6,235,242
Report : 3,709,454

% of All Rows :
59.49%

* Month
Between
12 12
6 7
1

Origin Airport
--Select Value--

Carrier
--Select Value--

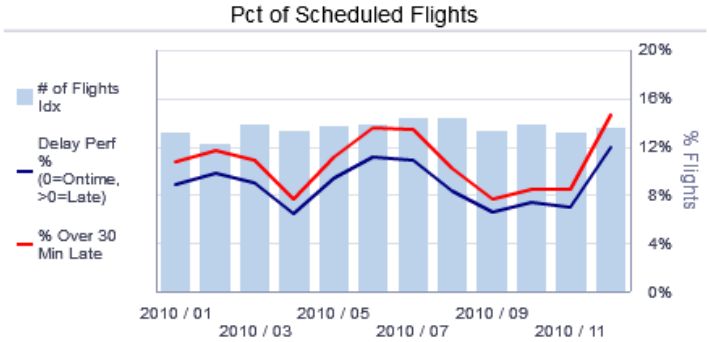
Dest Region
- Midwest Region
- Northeast Region
- South Region
- West Region

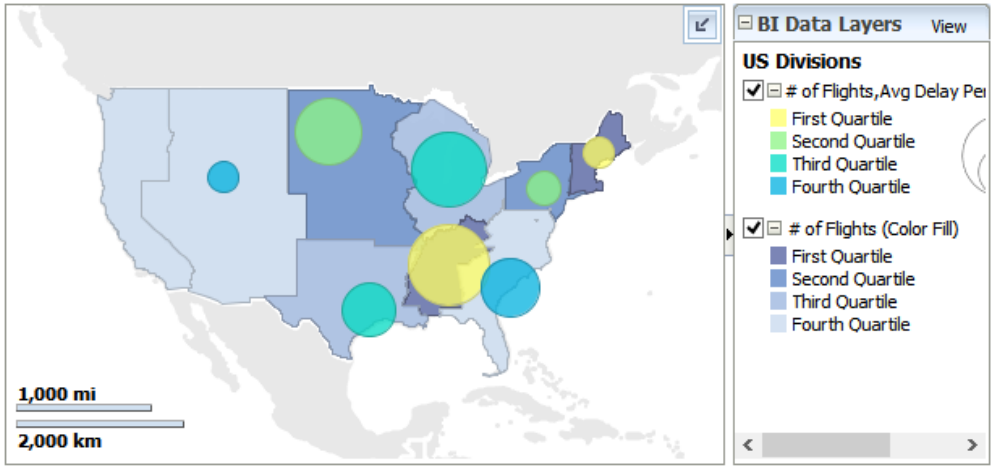
Delay Performance by Geography
Key Metrics and Associated Delays

Orig Airport	# of Flights	% of Total	Passenger - Miles (M)	Delay Perf %
All Orig Airports	3,709,454	100.0%	328,034	9.1%
Midwest Region	691,998	18.7%	48,525	10.8%
East North Central Division	491,158	13.2%	33,998	10.9%
West North Central Division	200,840	5.4%	14,527	10.4%
Northeast Region	423,226	11.4%	44,389	8.2%
South Region	1,492,575	40.2%	107,799	9.9%
East South Central Division	177,198	4.8%	7,199	! 11.3%
South Atlantic Division	821,345	22.1%	67,067	9.8%
West South Central Division	494,032	13.3%	33,533	9.5%
West Region	1,101,655	29.7%	122,759	7.6%

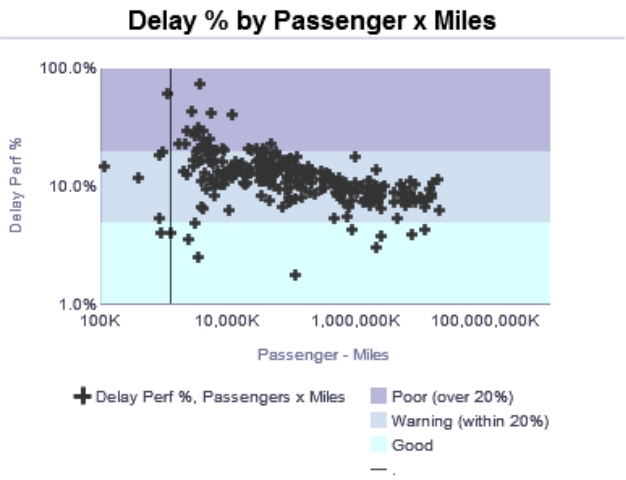
Late Flight Trends
By Time and Performance % Thresholds

All Orig Airports





Orig Airport All Orig Airports



All flights: 6,235,242
Report : 3,709,454

% of All Rows :
59.4%

Dashboard Prompts
for all four analyses

* Month
Between
12 12
6 7
1

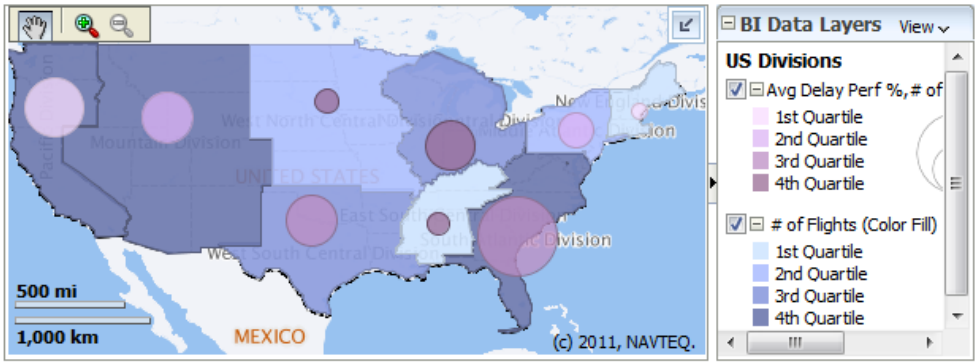
Origin Airport
--Select Value--

Carrier
--Select Value--

Dest Region
- Midwest Region
- Northeast Region
- South Region
- West Region

Flight Delay Performance by Geography

Key Metrics and Associated Delays



BI Data Layers View
US Divisions
Avg Delay Perf %, # of
1st Quartile
2nd Quartile
3rd Quartile
4th Quartile
# of Flights (Color Fill)
1st Quartile
2nd Quartile
3rd Quartile
4th Quartile

Orig Airport	# of Flights	% of Total	Passenger - Miles (M)	Delay Perf %
All Orig Airports	3,709,454	100.0%	328,034	9.1%
Midwest Region	691,998	18.7%	48,525	10.8%
East North Central Division	491,158	13.2%	33,998	10.9%
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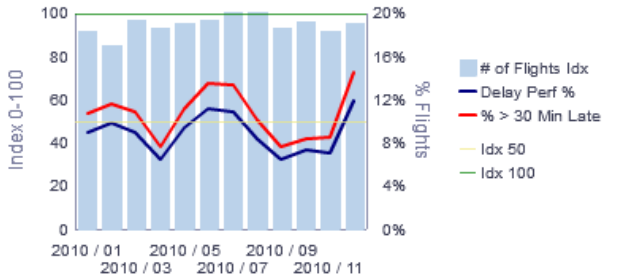
Late Flight Trends

By Time and Performance % Thresholds

All Orig Airports

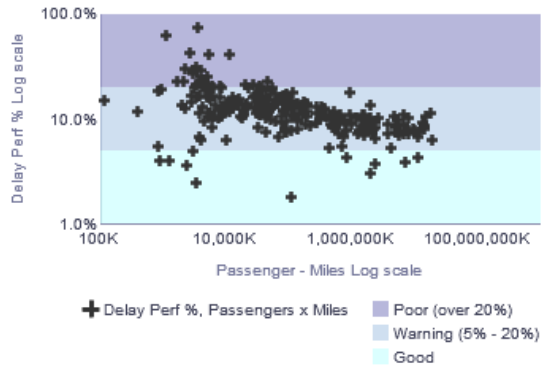
Pct of Scheduled Flights



Delay % by Passenger x Miles

All Orig Airports

Log / Log Scale



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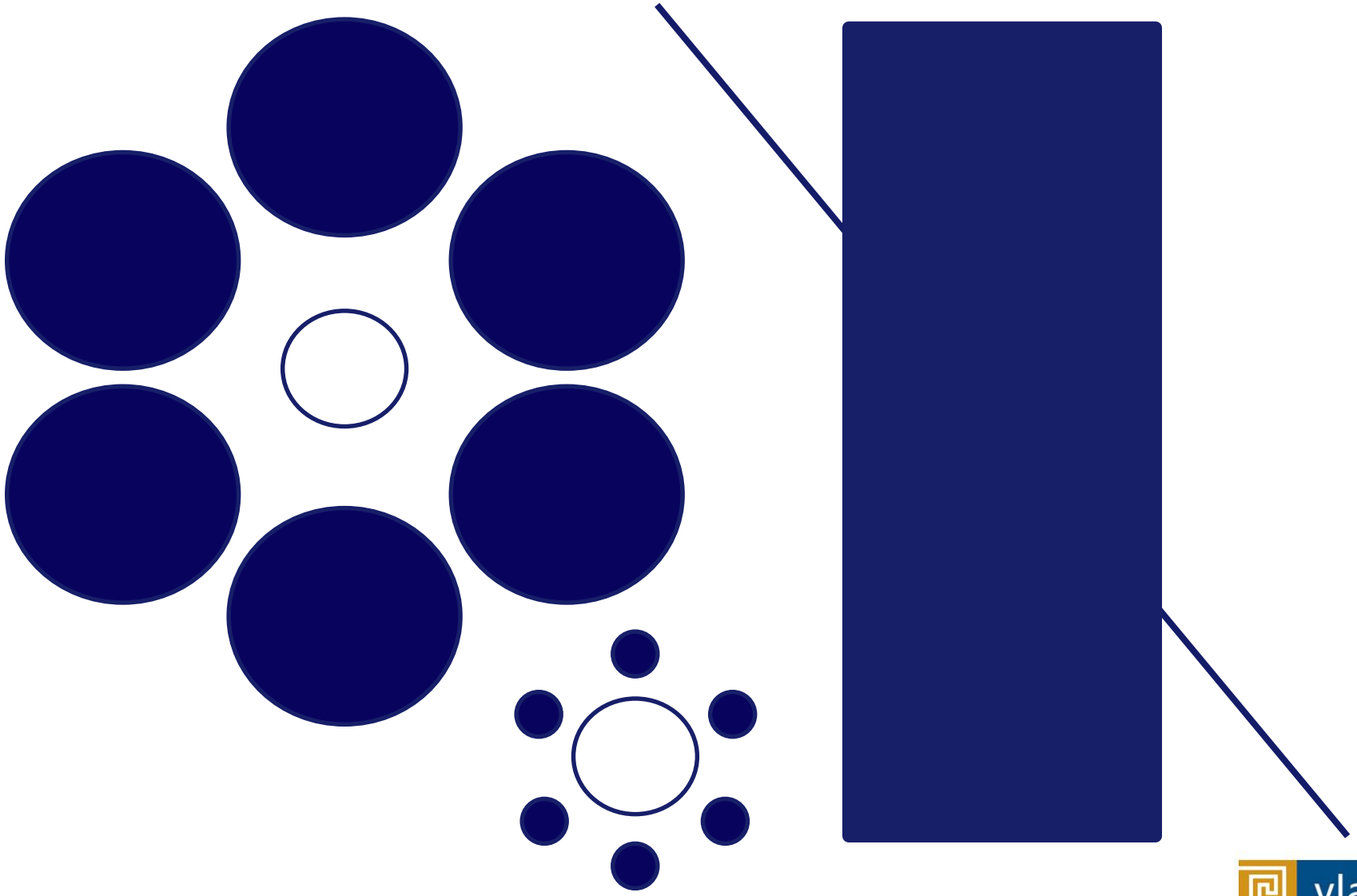
Best Practice Focus

- Best practices are objective guides to what is likely to work best.
- Visualizations should be guided by:
  - Human cognition
  - Accurate representations of data
  - Preferred message (consciously designed by visualization developer)
- Visualizations should NOT be guided by:
  - Taste or what looks “good” to one person
  - Entertain users
  - A desire to “fill the white space”

The Principles of Human Cognition Should Guide BI Dashboard Design

Classic Optical Illusions



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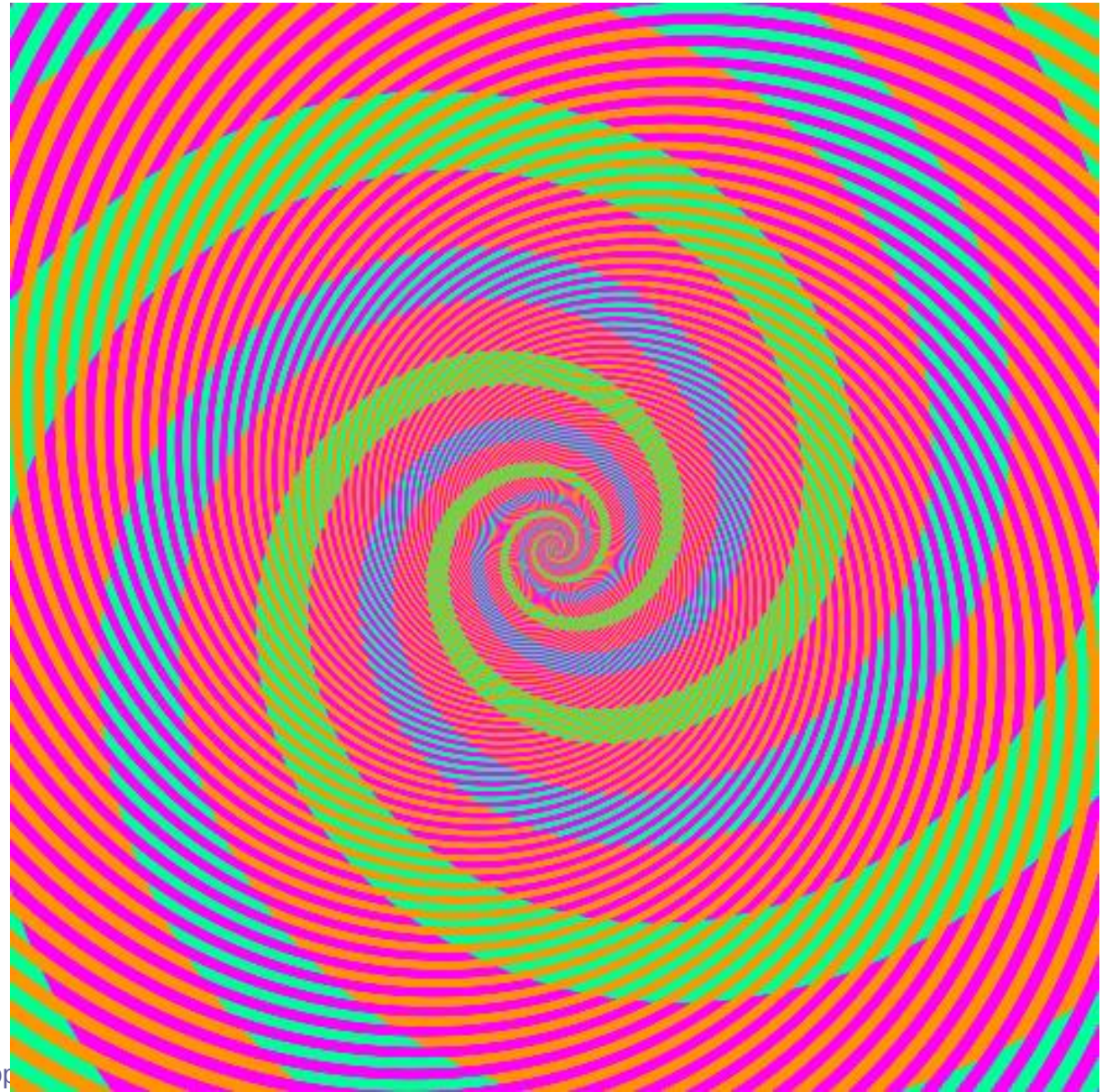
The Spirals are the Same Color



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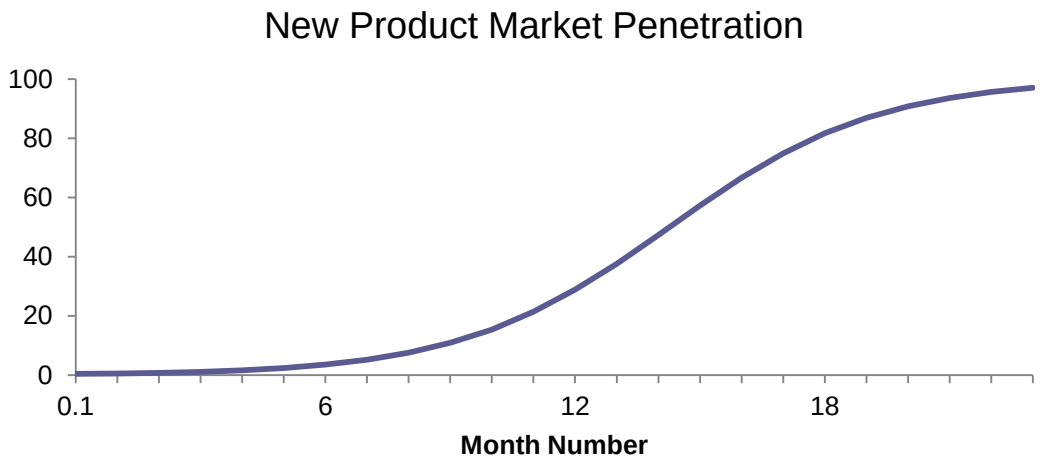
Graphs and Tables

- Graphs and Charts depict visual representations and relationships



- Tables show data organized for lookup of specific, precise values or items.

Order Type	No of Orders	Sales	Billed Quantity	Actual Unit Price
Express	13,980	$14,027,034	1,117,199	$12.56
Secure	29,347	$28,513,745	2,326,540	$12.26
Standard	27,673	$27,459,221	2,213,482	$12.41
Grand Total	**71,000**	**$70,000,000**	**5,657,221**	**$12.37**

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Characteristics of Tables

- Can present data at drastically different scales.
- Can present very different data types simultaneously.
- Can repeat and include multiple sets of the same data values.
- Are extraordinarily dense and include numerous data relationships without direct distortion of the data itself.
- Tables can present “federated” data from different sources in a single simultaneous view.

Pivot Table "Needs" Sentence

I want to see ***Sales*** *(specific selected values)*
by *Product Type and Company (defines rows)*
across *Market Segments (defines columns).*

Year 2010

		Sales						
Product Type	Company	Active Singles	Baby Boomers	Others	Rural based	Seniors	Students	Urban based
Accessories	Genmind Corp	$95,916	$29,746	$23,710	$40,947	$60,397	$59,891	$77,722
	Stockplus Inc.	$128,470	$29,693	$38,455	$68,506	$100,349	$120,508	$111,572
	Tescare Ltd.	$104,461	$35,374	$27,900	$56,392	$96,501	$121,121	$93,280
Accessories Total		**$328,847**	**$94,813**	**$90,064**	**$165,845**	**$257,247**	**$301,520**	**$282,574**
Audio	Genmind Corp	$168,612	$50,236	$21,842	$74,952	$126,754	$133,788	$124,072
	Stockplus Inc.	$215,921	$42,336	$55,632	$124,469	$149,511	$169,330	$144,029
	Tescare Ltd.	$173,022	$61,713	$30,048	$102,717	$162,078	$202,451	$161,995
Audio Total		**$557,555**	**$154,285**	**$107,522**	**$302,137**	**$438,343**	**$505,569**	**$430,096**
Camera	Genmind Corp	$154,930	$50,453	$23,935	$73,360	$129,189	$143,608	$136,459
	Stockplus Inc.	$189,520	$45,571	$57,449	$88,445	$154,237	$181,047	$162,000
	Tescare Ltd.	$182,757	$83,650	$45,512	$89,213	$140,187	$208,441	$151,215
Camera Total		**$527,207**	**$179,675**	**$126,895**	**$251,019**	**$423,613**	**$533,096**	**$449,674**
Cell Phones	Genmind Corp	$120,376	$40,799	$24,293	$61,451	$82,200	$103,754	$97,480
	Stockplus Inc.	$161,238	$47,570	$37,670	$71,548	$129,511	$133,459	$144,812
	Tescare Ltd.	$157,717	$50,948	$30,873	$79,242	$130,167	$164,272	$116,630
Cell Phones Total		**$439,331**	**$139,317**	**$92,837**	**$212,241**	**$341,879**	**$401,484**	**$358,921**
Fixed	Genmind Corp	$144,814	$35,190	$20,000	$94,115	$128,411	$152,767	$138,280
	Stockplus Inc.	$234,518	$56,263	$53,554	$109,985	$160,065	$238,484	$180,872
	Tescare Ltd.	$197,073	$57,671	$50,893	$121,302	$170,018	$173,601	$177,137

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Keys to Effective Tables

Year 2010

		Sales						
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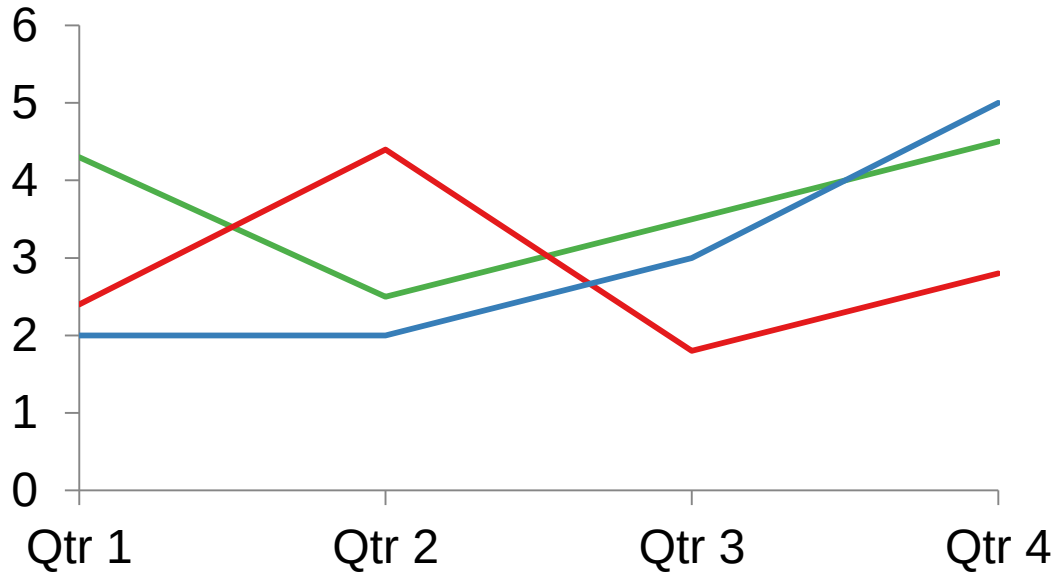
7 Keys to Effective Graphs

- Do not use 3-D effects.
- Avoid “stop light” color palette.
- Prefer pastel color palettes and avoid bright colors.
- Eliminate gridlines, drop shadows, and other graphics.
- Enable interaction for “exploration” graphs.
- Prioritize a single message for “explanation” graphs.
- Above all else, show the data!

Line Graph



- Show a pattern or progression over a continuous range.
- Can be valued within a range to highlight a particular pattern (careful!).
- Maintain a rectangular shape close to golden proportion.
- Use scale marker lines and ranges for context.

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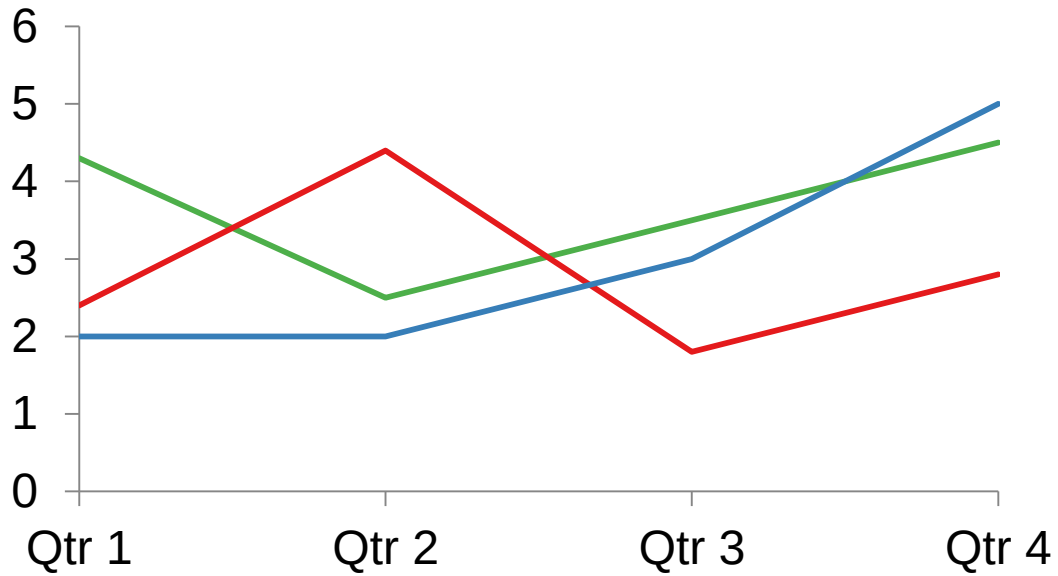
Line Graph



- Use darker versions of standard colors.
- Eliminate grid lines.
- Use zoom function for detailed line graphs.
- Choose curved lines to smooth overall shape.
- Choose stepped lines to emphasize point transitions.

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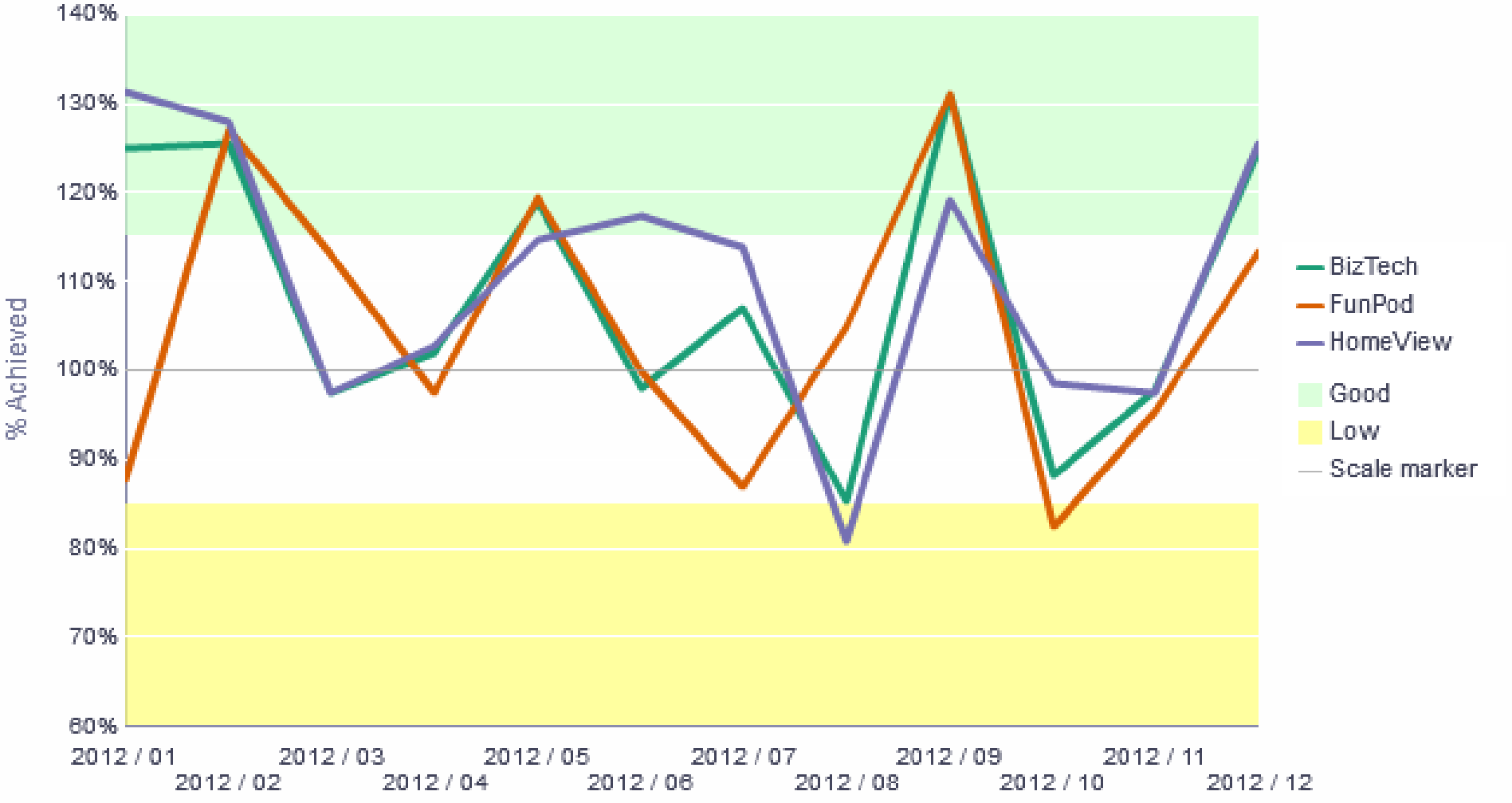
Target Revenue % by Brand for 2012



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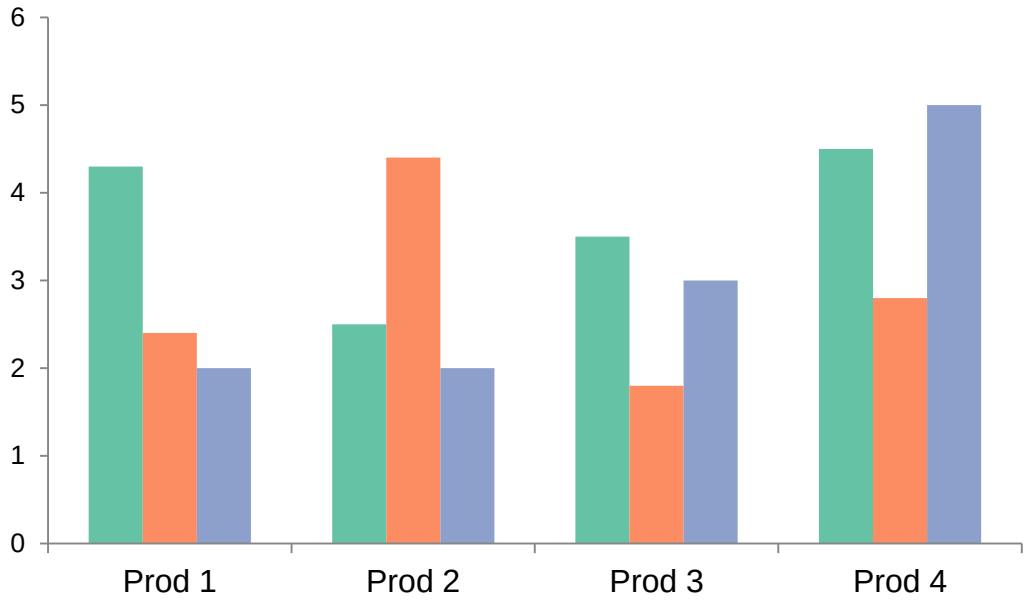
Bar Graphs



- Show nominal data values in comparison to one another.
- Start with zero.
- If use a logarithmic scale, clearly notate.
- Think through sort order carefully.

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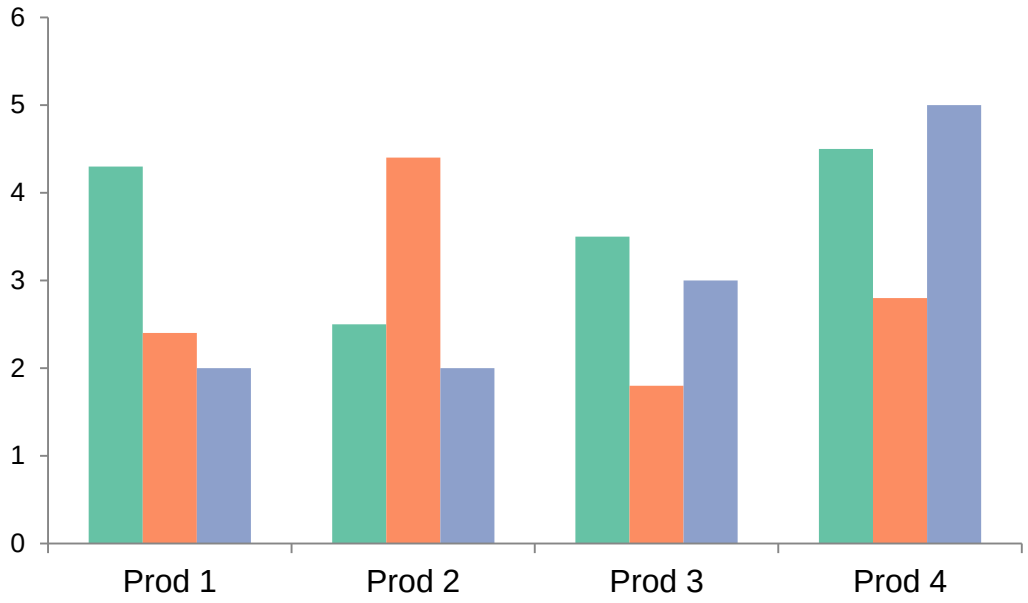
Bar Graphs



- Add data labels as interactive rollover.
- Balance colors.
- If change is most important, graph change.

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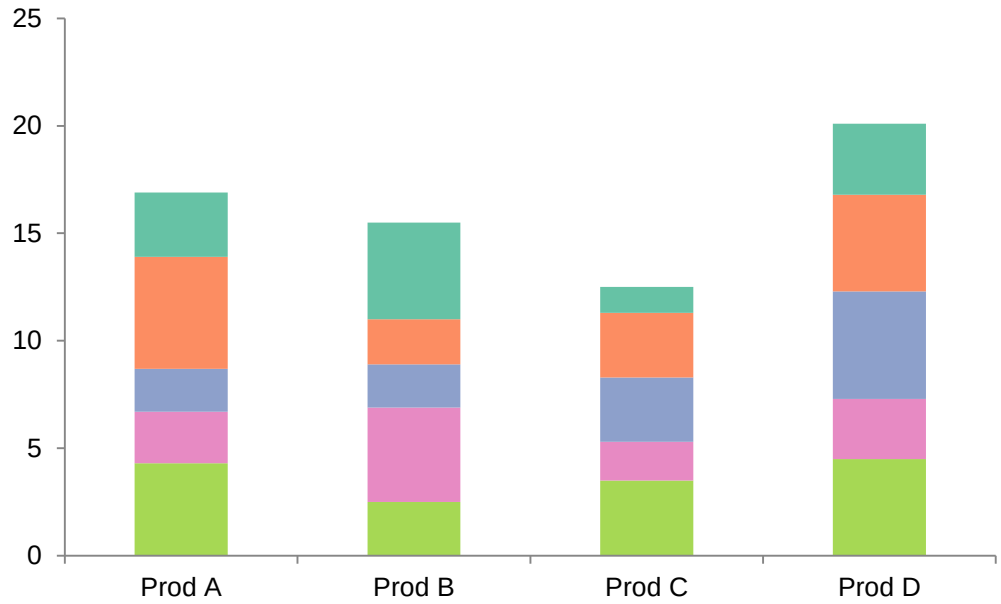
Stacked Bar Chart



- Somewhat confusing, not great for representing change.
- Total is most clearly represented number.
- Typically stack with largest values on the bottom.
- Single scale can make for interesting intra-bar comparisons.

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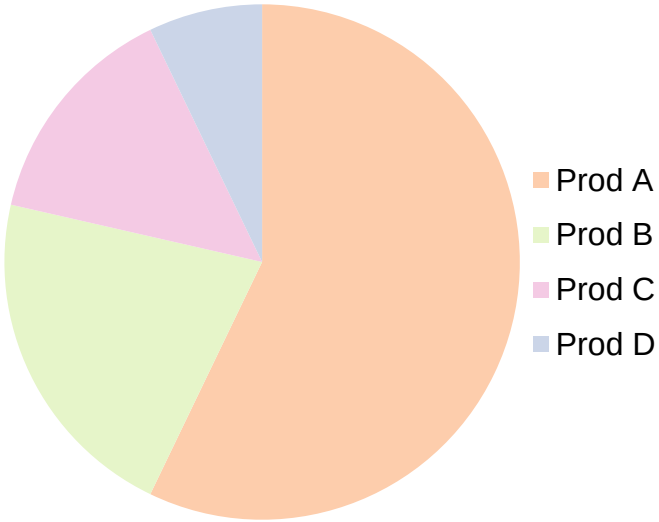
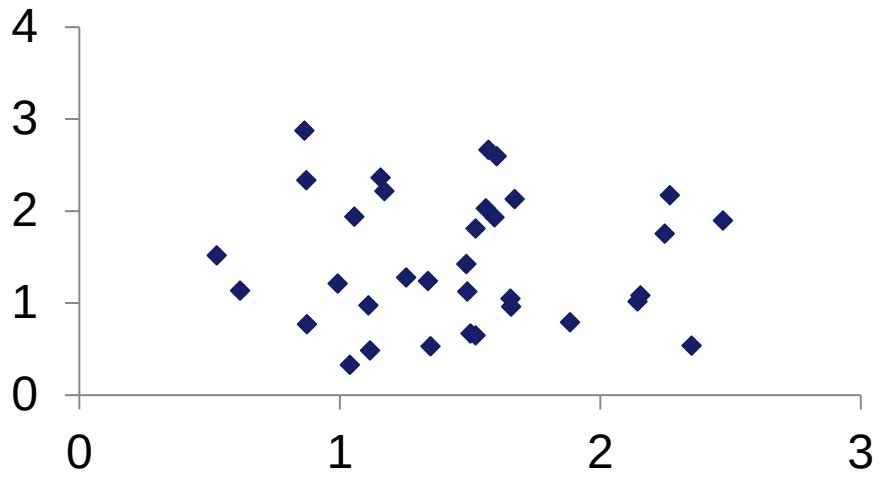
Pie Charts



- Typically used for showing parts of whole by percentage.
- Not great for piece to piece comparisons.
- Limit number of pieces.
- Can be interesting to show lots of pies together if significant differences exist.
- Stephen Few hates them.
- Do not use 3-D.

Scatter Plot



- Shows single data points at the intersection of two values.
- Often depict a large number of discrete data points (hundreds or thousands).
- Useful comparisons of two variables.
- Trend lines are often added.
- Clearly notate if use logarithmic scale(s).

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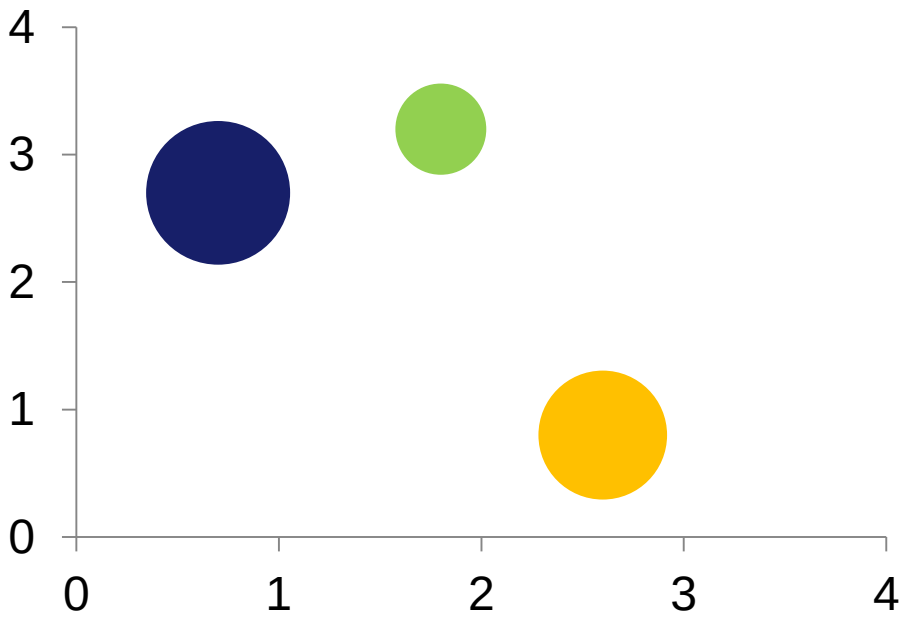
Bubble Chart



- Special type of scatter plot.
- Size of bubble is related to a third variable.
- Color is related to a fourth variable.
- Reduces number of points that can be depicted.
- Best for depicting approximate values and comparisons.

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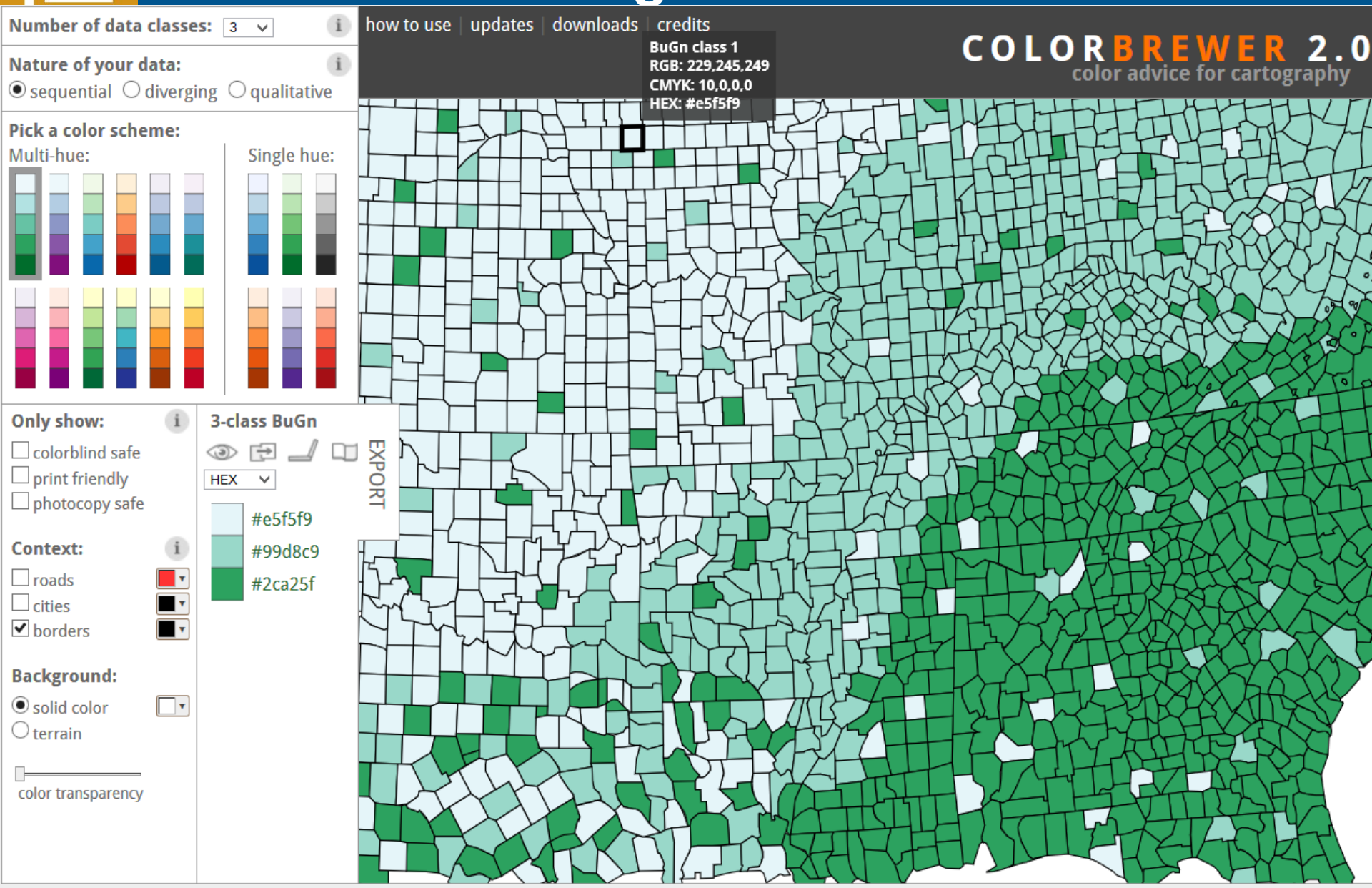
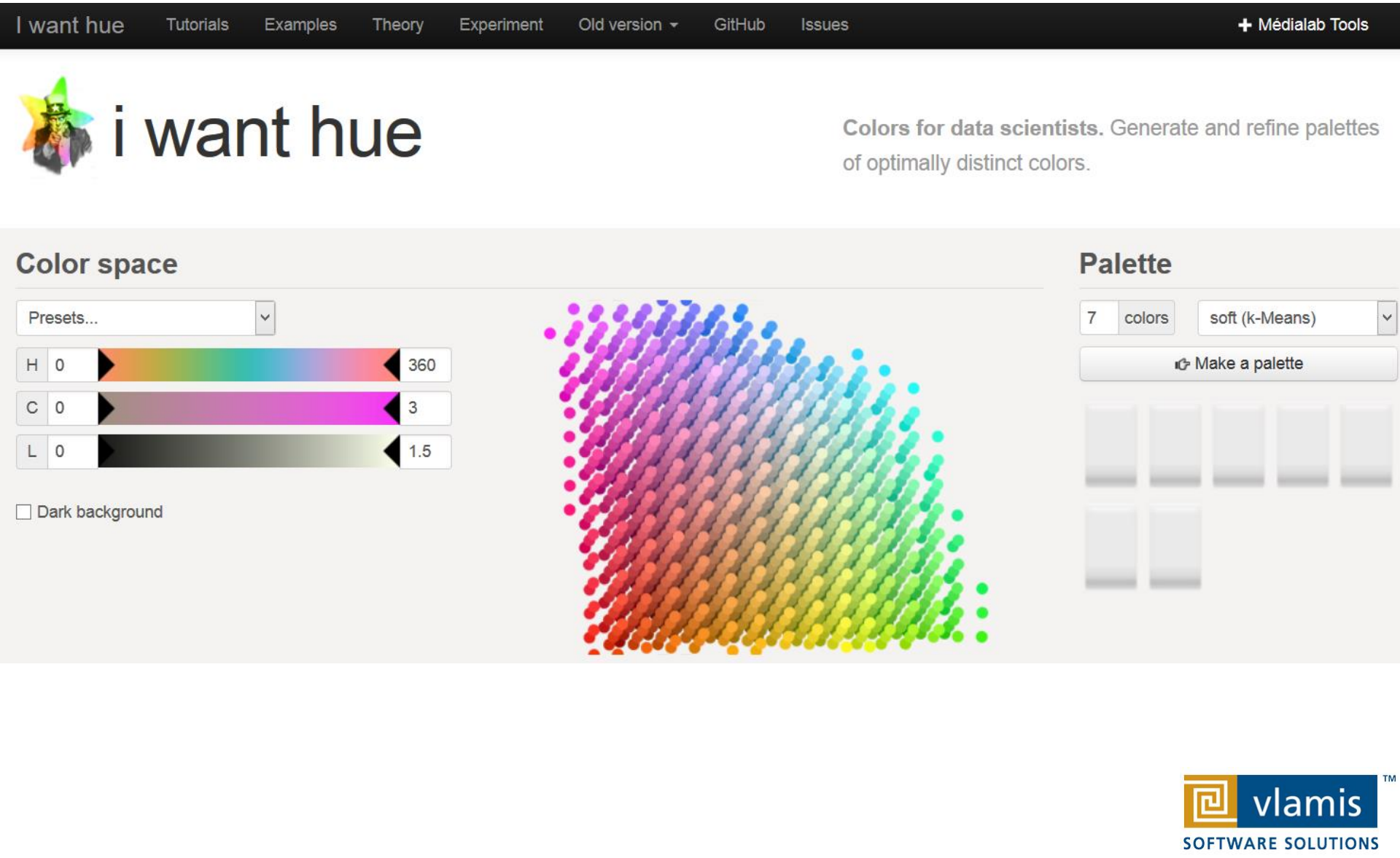
ColorBrewer2.org



i want hue



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Dashboard Definition

A Dashboard is a visual presentation of current summary information needed to manage and guide an organization or activity.

BI Dashboards are Different

- No mechanical systems needed to move indicators.
- Decisions are not typically made on a second-to-second basis.
- BI dashboards are not primarily single situation or single person devices.

BI Dashboards

- Role-based.
- Data selection and filtering are extremely important.
- Dashboards support evidenced-based decision making.
- Shared understanding of business situation is a key benefit.
- Content may be individualized.
- Design should be standardized.

OBIEE Dashboard Overview

- Designed with columns and sections (containers).
- Presentation server is often separate from BI server.
- Dashboards are web-based and are viewed with browsers.
- HTML, XML, and Java coding skills are useful, but not required.

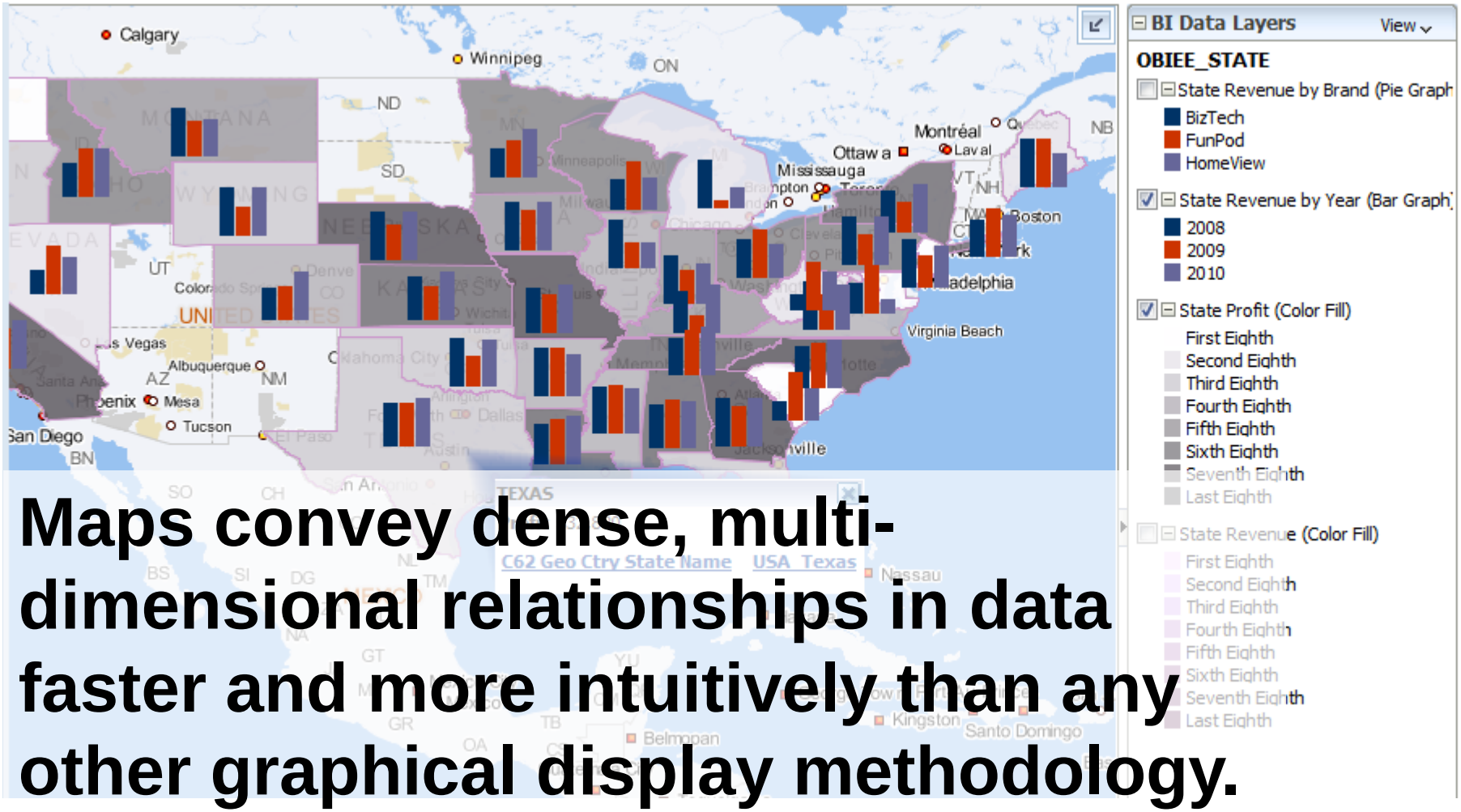
Dashboard Principles

- Promote user interactivity
  - Prompts
  - View and column selectors
  - Hierarchical column drills
  - Column sorts
  - Guided navigation and action links
- Promote data transparency
  - Prompts
  - Filter views
  - Narrative views
  - Master detail linking
- Establish design guidelines for consistency

Maps

- Humans think spatially
- Types of maps
- Map best practices
- Making meaningful maps
- Built-in data sets
- HERE (NAVTEQ) data sets and POI data
- Sources for additional data sets

Why Maps are Powerful



Maps convey dense, multi-dimensional relationships in data faster and more intuitively than any other graphical display methodology.

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When Are Map Views Useful?

- Visualizing data related to geographic locations.
- Showing or detecting spatial relationships and patterns.
- Showing lots of data in a relatively small area.
- Drilling down from a (map) overview to a detailed report, chart, or graph.
- When is location important? Can the dimension be plotted on a map?

Map View Tips

- Think about what scale to use. Different map scales will reveal different patterns and insights.
- Use Variable marker to display two measures on a map at a point – size and color.
- Avoid overlapping shapes too much.
- Be aware of spatial distortions E.g. Texas is larger than Connecticut.
- Look at color palette. www.colorbrewer2.org

Map Definitions

- FEATURE
  - Provide a spatial context: cities, highways, rivers, etc…
  - Features of Interest: store location, postal boundaries, pipelines, etc…
- STYLE
  - Define rendering properties for features
  - Can control fill color, border color, line thickness, line style and more
- THEME
  - Collection of features
  - Typically associated with a spatial geometry layer
  - County/state boundaries, major highways, etc…
- BASEMAP
  - A grouping of themes to create a map
  - Maps can share themes
  - When associating a theme with a map, can specify min scale and max scale (sometimes known as zoom control)
- MAP
  - Basemap with additional themes overlain

Map Interactivity in OBIEE 11g

- Display BI data on top of maps
  - Color fill
  - FOI point display
- Interact with other Dashboard Elements
  - Drive map content with dashboard prompts
  - Drive map content through drilling and navigation
  - Drive other dashboard elements through map interactions
- Reveal additional information on maps through mouseovers
- Drill to map detail

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Map View Formats

- Color Fill (choropleth)
  - Percentile, Value, Continuous binning
  - Dashboard user run-time slider
- Graphs – Bar, Pie
  - Adjustable graph size
  - Series by second dimension
- Bubble (variable sized)
  - Min-Max size specification
  - Color specification
- Variable Shape
  - Circle, Triangle, Diamond
  - Customizable
- Image
  - Imported via MapViewer
  - More can be added from MapBuilder
- Custom Point Layer
  - Uses Lat / Long
  - Does not require a Layer Def

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Trellis Charts

- Trellis Layout of Smaller Charts in a grid with Consistent Scales
- Great for finding structures / patterns in complex data
- Use 2D Layout to View Multidimensional Data (like a timeline –*mental animation*)

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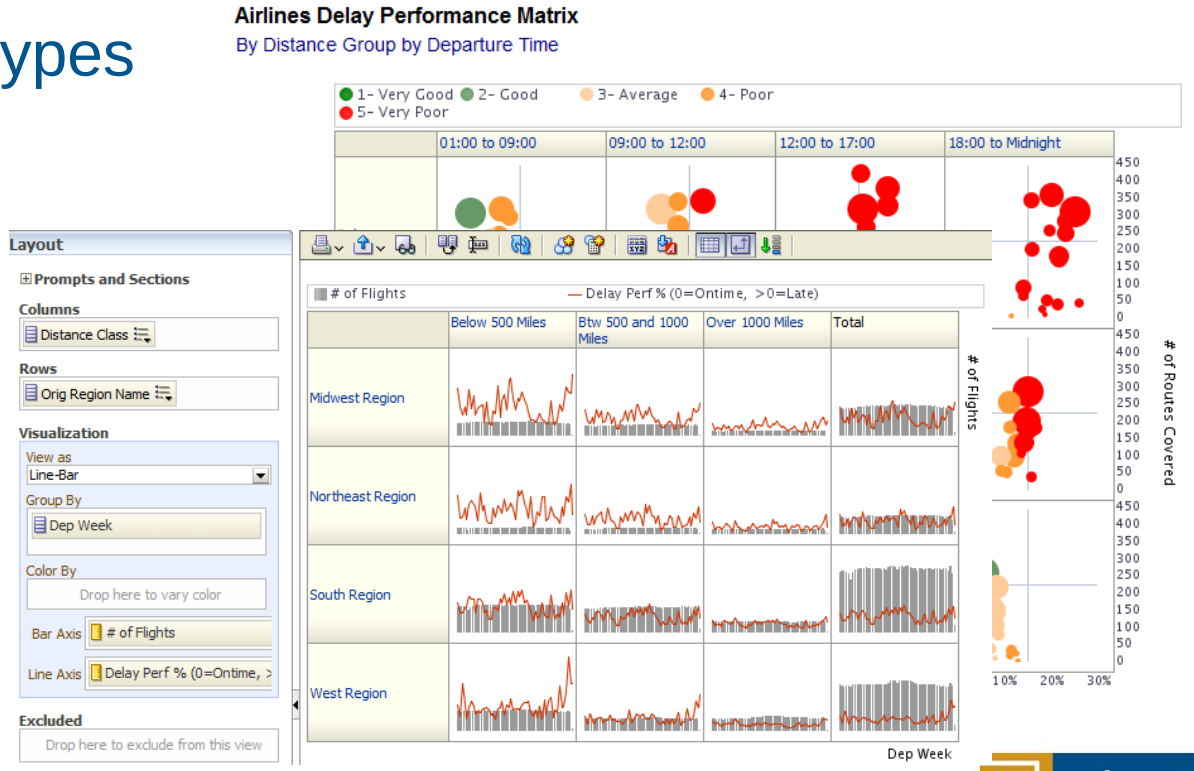
Trellis View - Simple

- Single type of inner visualization
- Common synchronized scale across all graphs
- Has scale showing by default (can turn off)
- Lots of graph types
  - Vertical Bar
  - Horizontal Bar
  - Line
  - Area
  - Line-Bar
  - Pie
  - Scatter
  - Bubble



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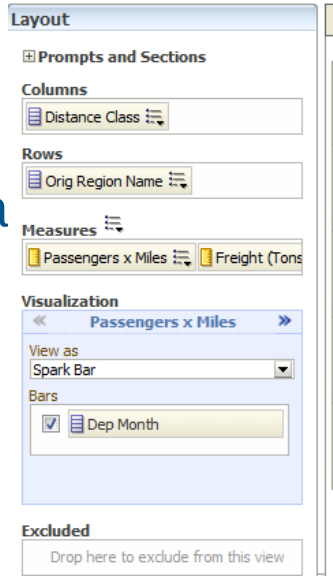
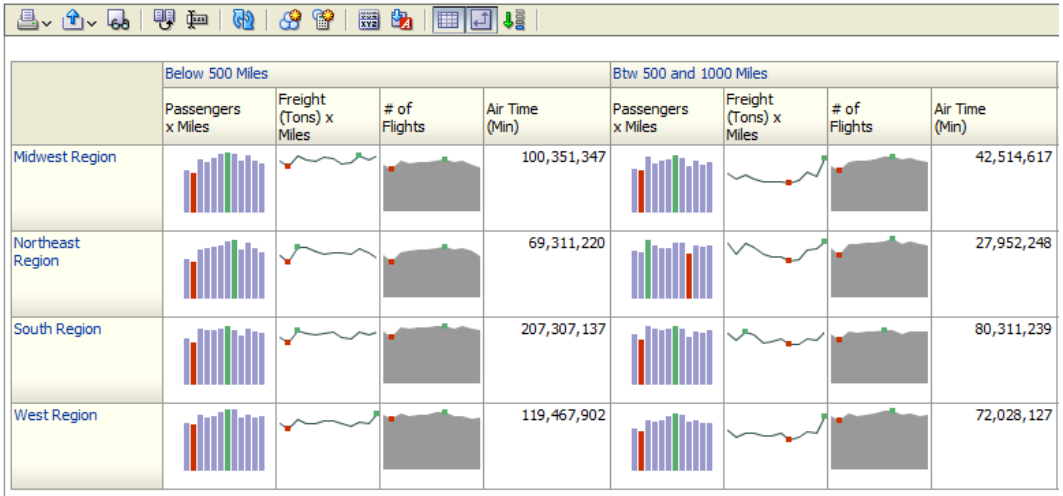
Trellis View - Advanced

- Pivot table with numbers or graphs in cells
- Each microchart has its own scale and not shown
- Most often used to see trend lines
- No axis description, so across should be time
- Can have different visualizations for different measures
  - Spark bar
  - Spark line
  - Spark area
  - numbers





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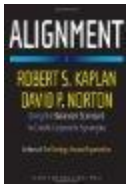
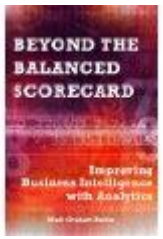
New Trellis Views

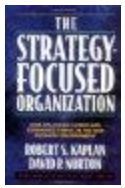
- Does not require Exalytics but need fast Pres Server
- Can display LOTS of data in compact form
- Capable of dense visualizations
  - Great for snapshot of trending
  - Great for comparing patterns across dimension values
- Two types
  - Simple (shows full graphs per cell)
  - Advanced (sparklines – no scales per cell, separate scales)
- Need to think what you're trying to show on a trellis

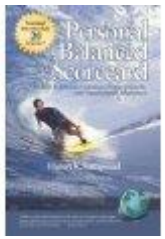
OBI Scorecard & Strategy Management

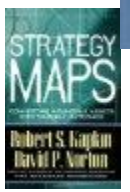
- Integrated toolset in OBIEE
- Follows “Balanced Scorecard” methodology
- Enables corporate goals and objectives to be monitored and managed
- Includes strategy maps, strategy trees, KPI watch lists, and cause and effect maps

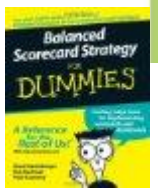


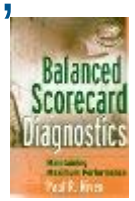


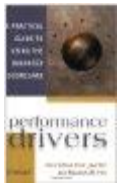


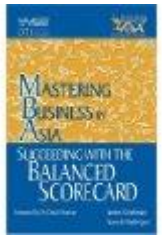


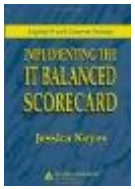


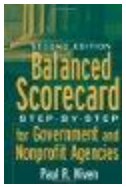


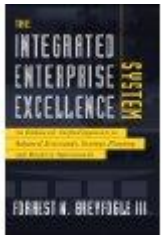


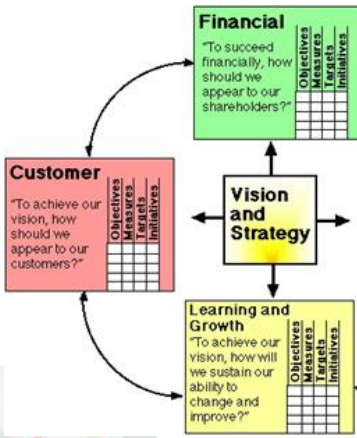












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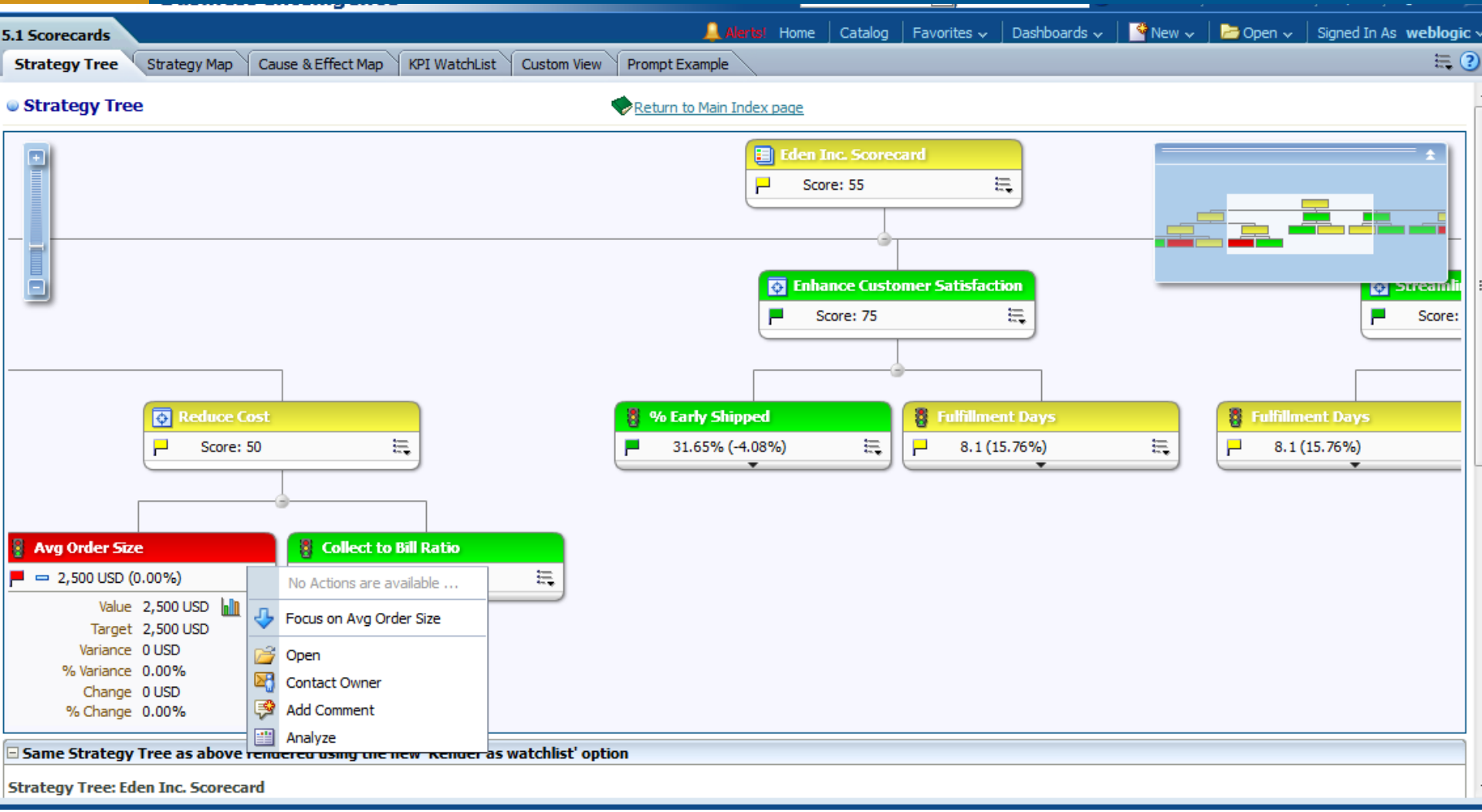
New Contribution Wheel Visualization

Strategy Tree View



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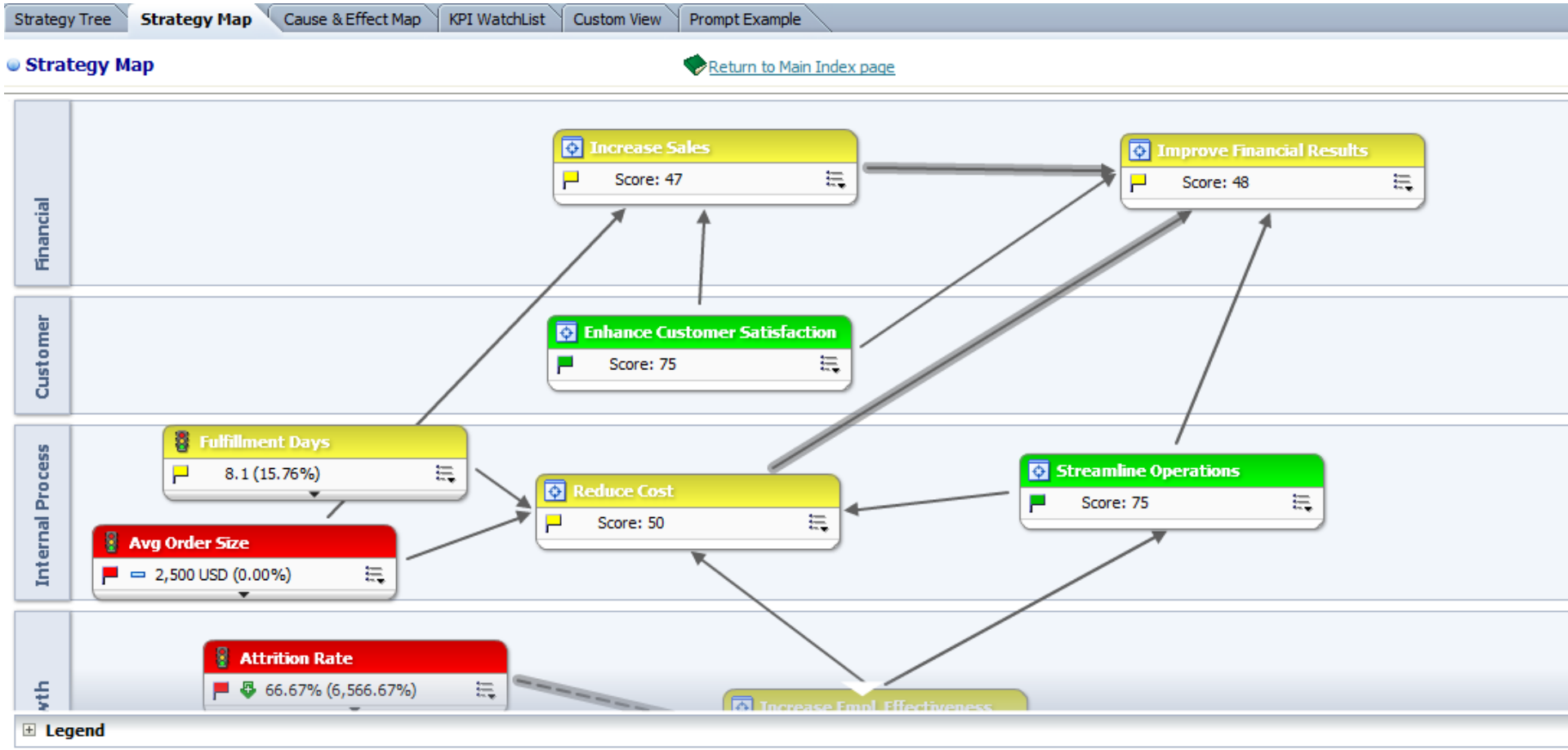
Strategy Map View



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General Advice

- Working with BI Catalog
- Development Standards
- Working with Executives
- Working with IT and DBAs
- Developing Trust in BI Systems
- Getting Started
  - Workshops
  - Assessments
  - Training
  - Metadata Communication and Documentation
- The Long Road

Where to Start

- Workshops
- Assessments
- Training
- Metadata Communication and Documentation

Oracle BI Interactive Dashboards - 8.12 Oracle DataminingTV - Mozilla Firefox

File Edit View History Bookmarks Tools Help

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vm5.vlamis.org:9704/analytics/saw.dll?Dashboard&PortalPath=%2Fshared%2FVlamis%2F8.12 Oracle DataminingTV&page=LTV Prediction

ORACLE Business Intelligence

Search All | Advanced | Administration | Help | SampleApp OTN Page | Sign Out

8.12 Oracle DataminingTV

Custom Link | Home | Catalog | Favorites | Dashboards | New | Open | Signed In As Book

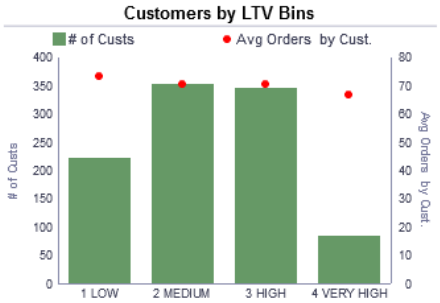
LTV Prediction | LTV Details | Classification Tree | LTV Probabilities | What If Scoring | Geo LTV Prediction | Regression | Regression Model | Results Map

LTV Prediction

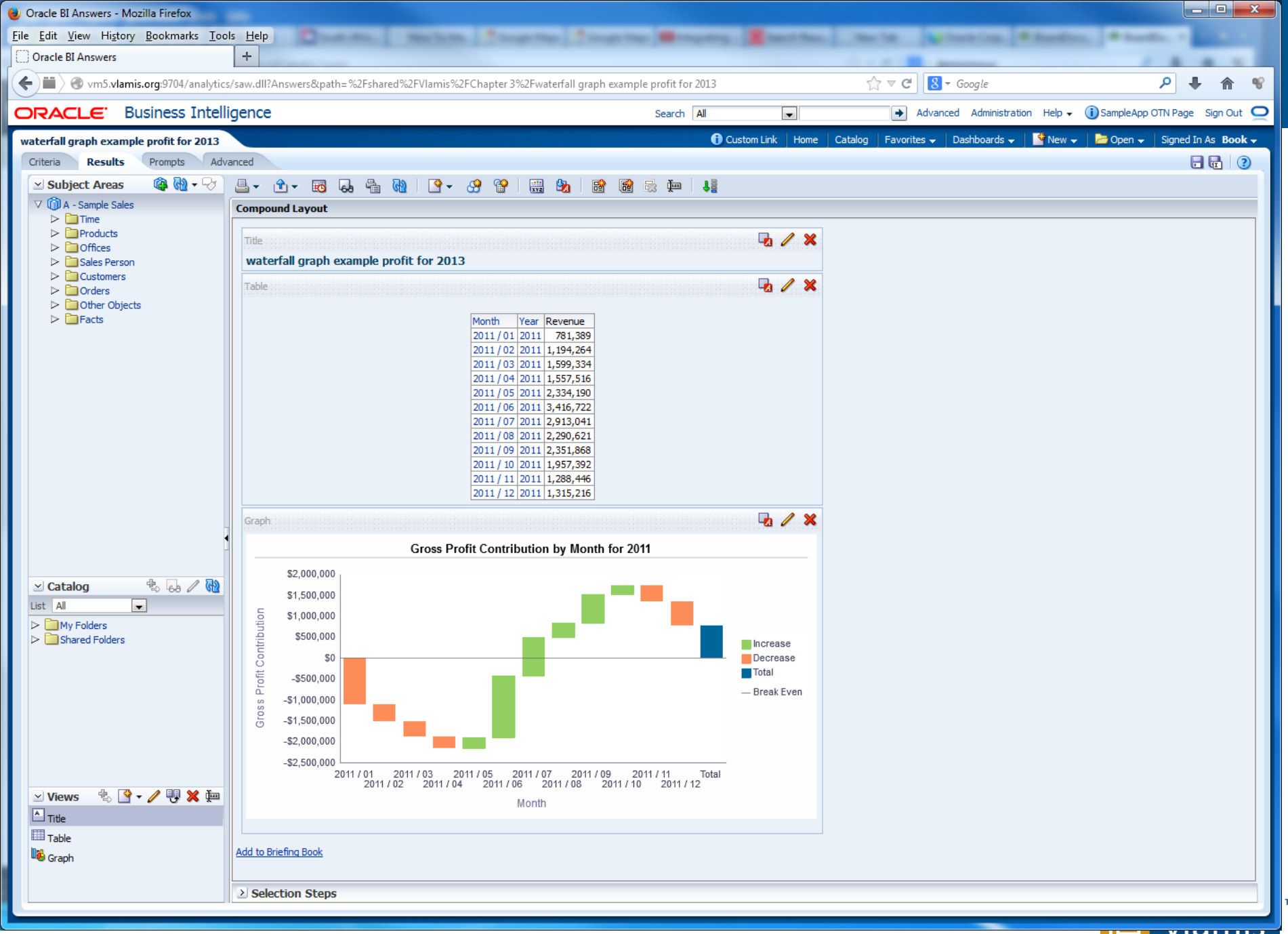
Return to Main Index page

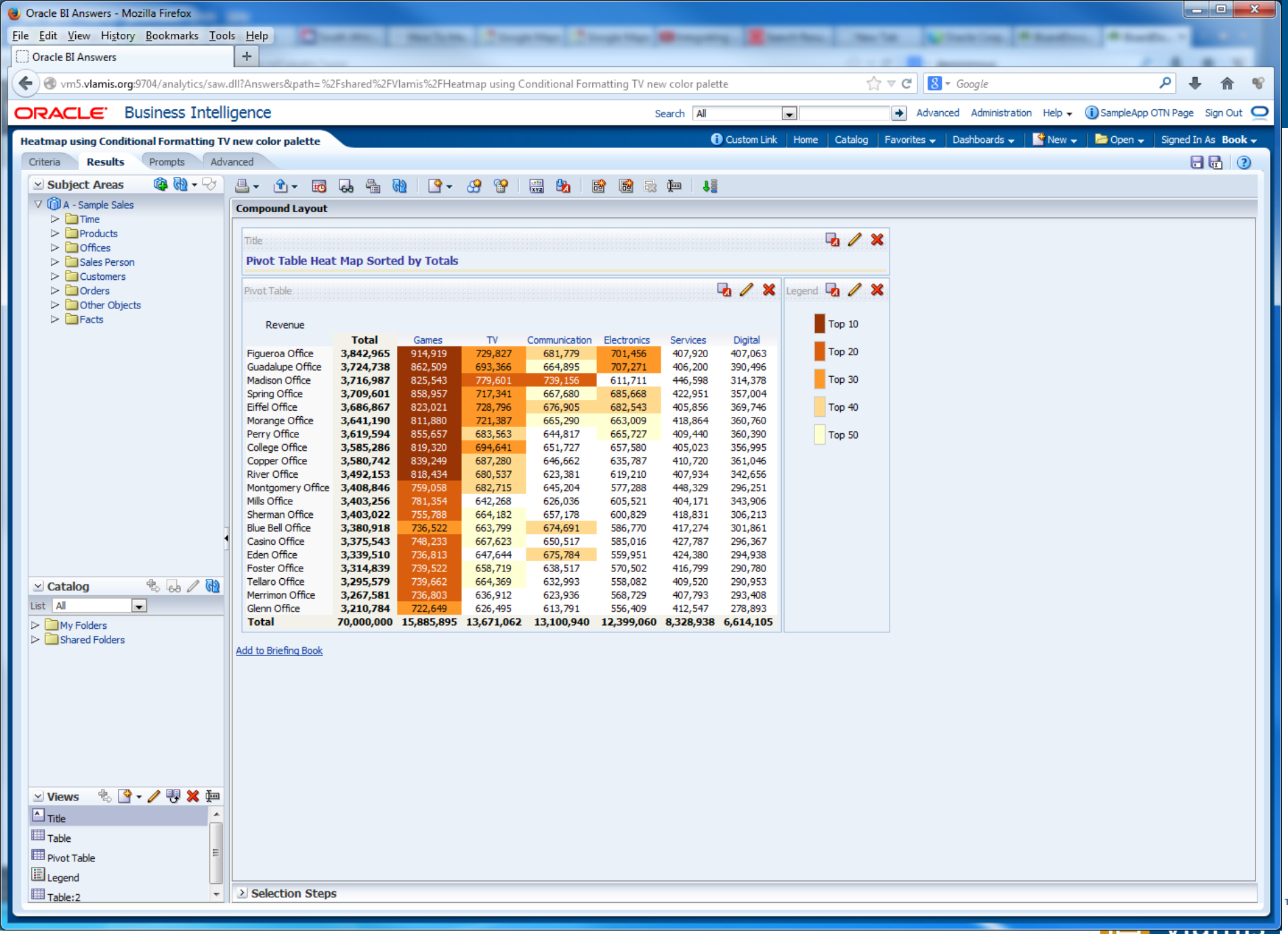
LTV Prediction Overview TV revised visuals

Time run: 4/23/2014 5:12:39 PM



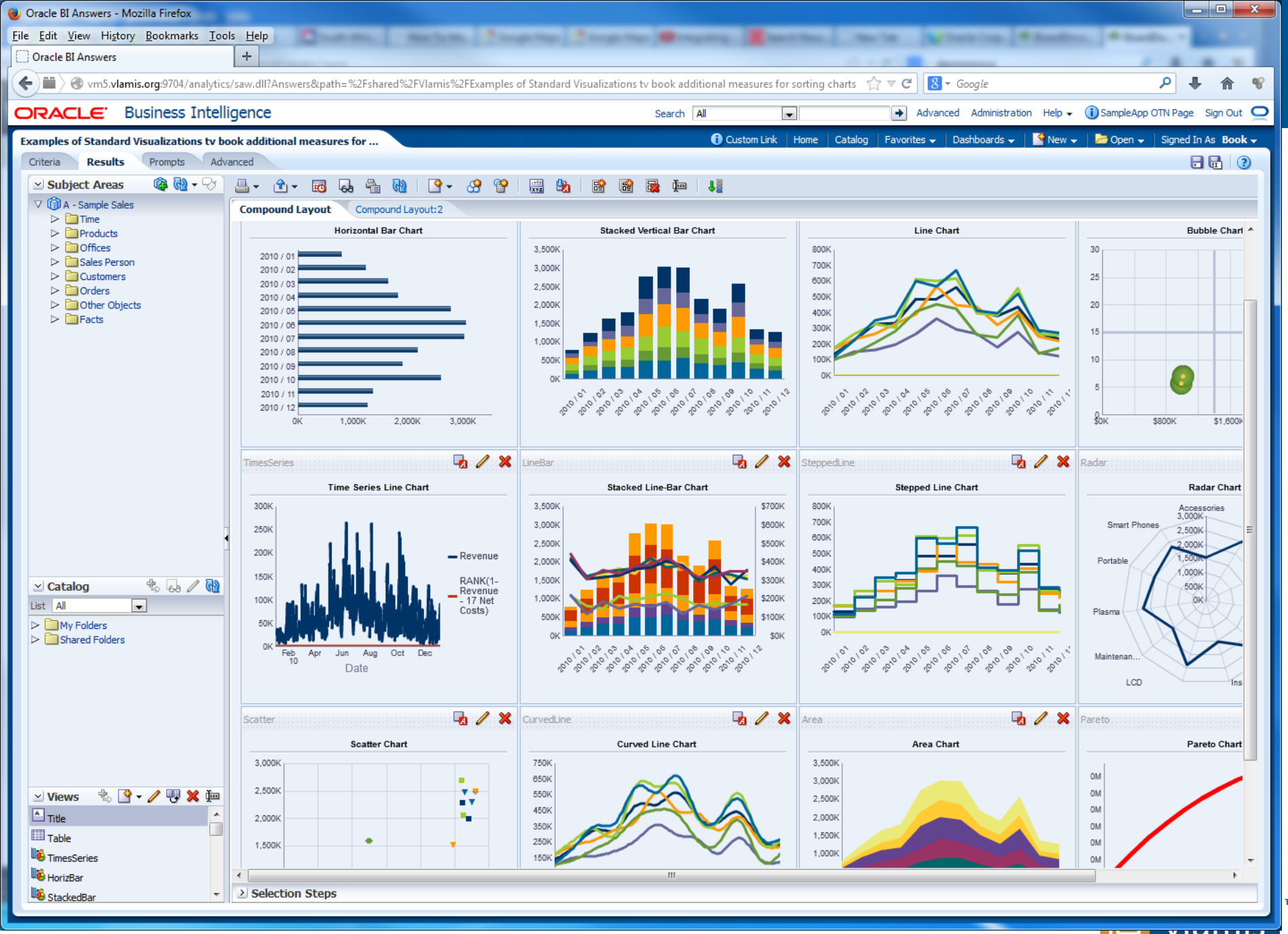
Cust Predicted LTV	# of Custs	Sales	Avg Orders by Cust.
LOW	1,306	$16,053,554	73.58
MEDIUM	2,055	$24,676,519	70.80
HIGH	2,018	$23,752,050	70.53
VERY HIGH	499	$5,517,877	66.96
Grand Total	**5,878**	**$70,000,000**	**71.00**

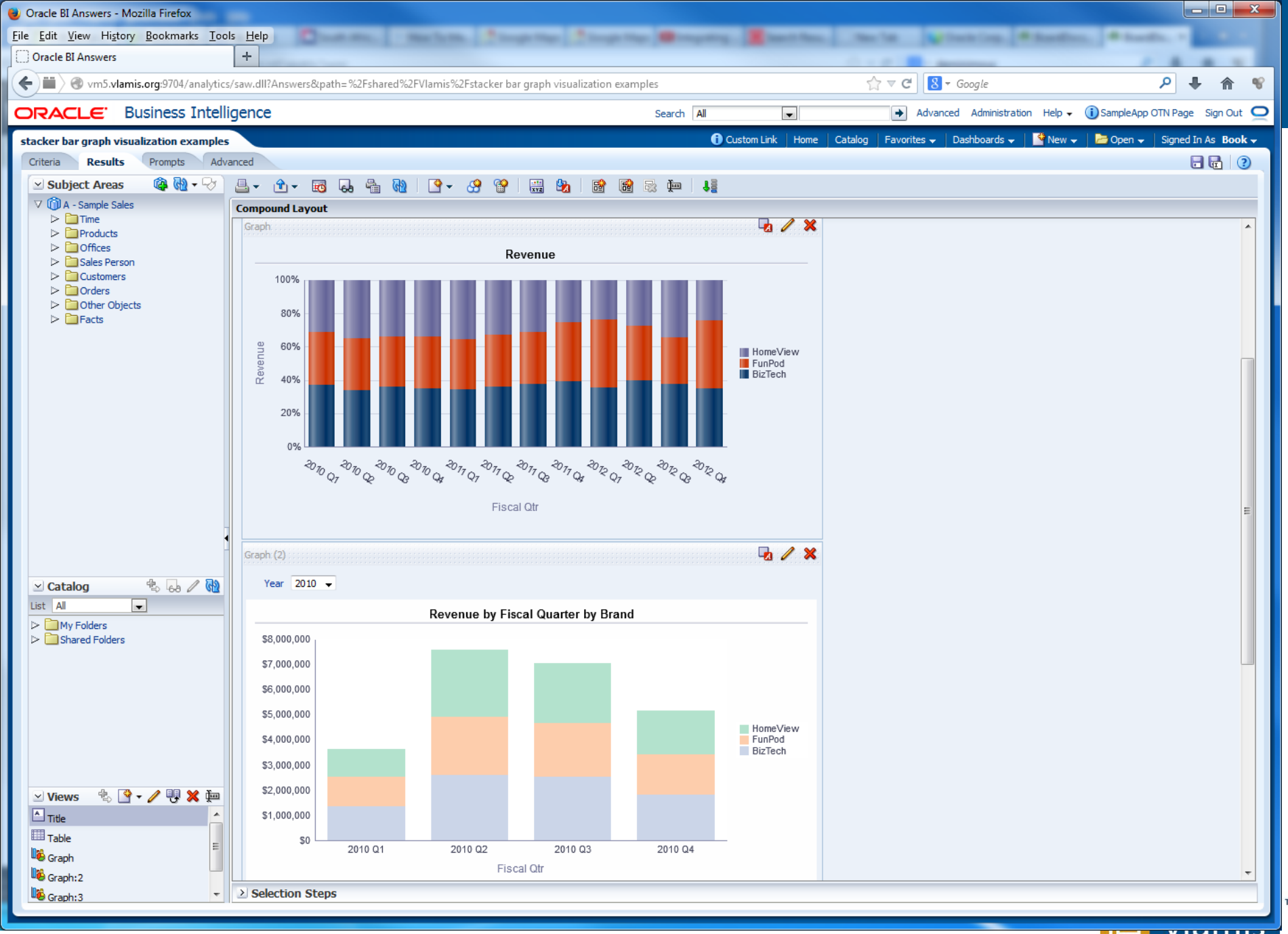


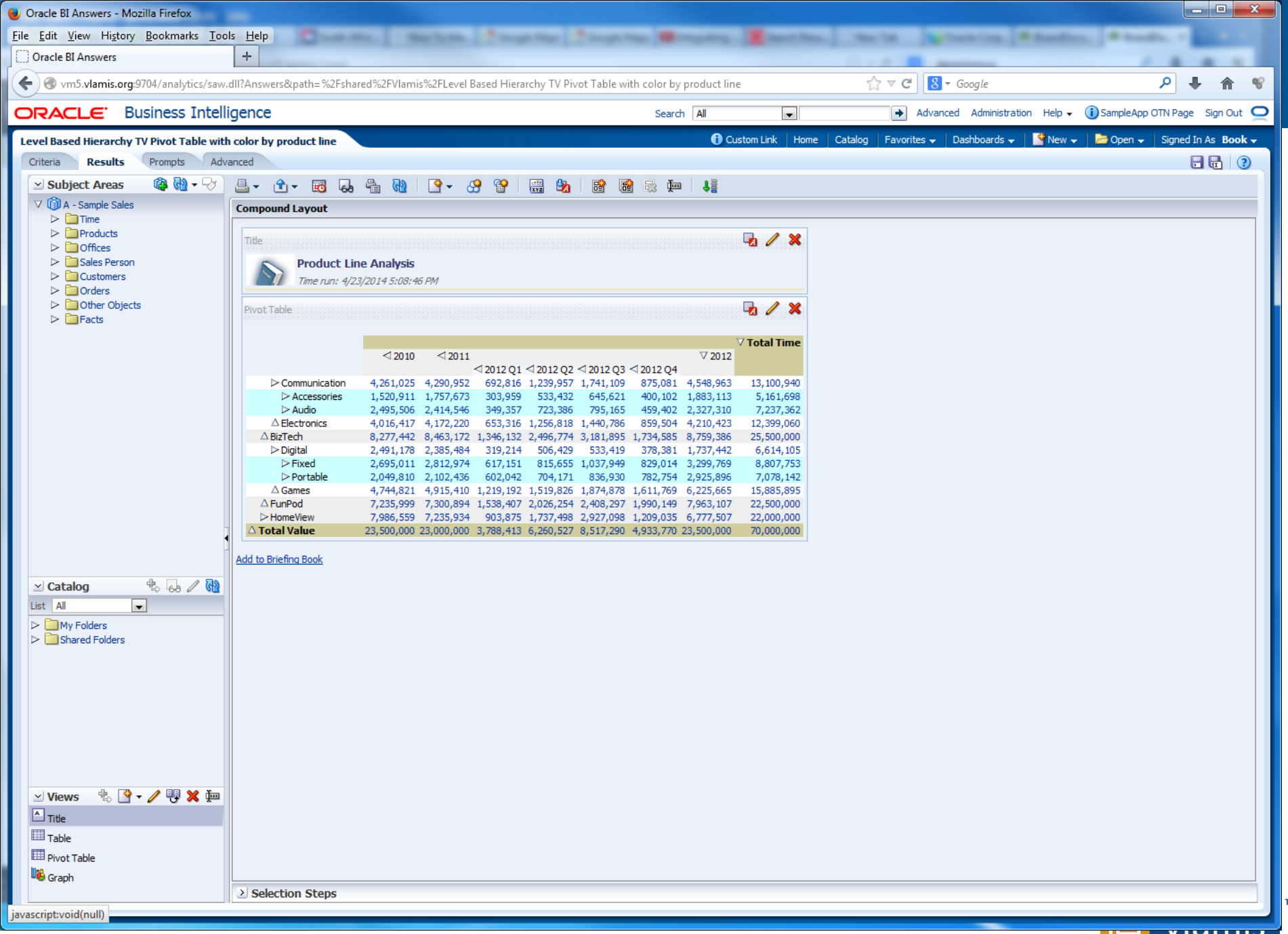


Revenue

	Total	Games	TV	Communication	Electronics	Services	Digital
Figueroa Office	**3,842,965**	914,919	729,827	681,779	701,456	407,920	407,063
Guadalupe Office	**3,724,738**	862,509	693,366	664,895	707,271	406,200	390,496
Madison Office	**3,716,987**	825,543	779,601	739,156	611,711	446,598	314,378
Spring Office	**3,709,601**	858,957	717,341	667,680	685,668	422,951	357,004
Eiffel Office	**3,686,867**	823,021	728,796	676,905	682,543	405,856	369,746
Morange Office	**3,641,190**	811,880	721,387	665,290	663,009	418,864	360,760
Perry Office	**3,619,594**	855,657	683,563	644,817	665,727	409,440	360,390
College Office	**3,585,286**	819,320	694,641	651,727	657,580	405,023	356,995
Copper Office	**3,580,742**	839,249	687,280	646,662	635,787	410,720	361,046
River Office	**3,492,153**	818,434	680,537	623,381	619,210	407,934	342,656
Montgomery Office	**3,408,846**	759,058	682,715	645,204	577,288	448,329	296,251
Mills Office	**3,403,256**	781,354	642,268	626,036	605,521	404,171	343,906
Sherman Office	**3,403,022**	755,788	664,182	657,178	600,829	418,831	306,213
Blue Bell Office	**3,380,918**	736,522	663,799	674,691	586,770	417,274	301,861
Casino Office	**3,375,543**	748,233	667,623	650,517	585,016	427,787	296,367
Eden Office	**3,339,510**	736,813	647,644	675,784	559,951	424,380	294,938
Foster Office	**3,314,839**	739,522	658,719	638,517	570,502	416,799	290,780
Tellaro Office	**3,295,579**	739,662	664,369	632,993	558,082	409,520	290,953
Merrimon Office	**3,267,581**	736,803	636,912	623,936	568,729	407,793	293,408
Glenn Office	**3,210,784**	722,649	626,495	613,791	556,409	412,547	278,893
Total	**70,000,000**	**15,885,895**	**13,671,062**	**13,100,940**	**12,399,060**	**8,328,938**	**6,614,105**







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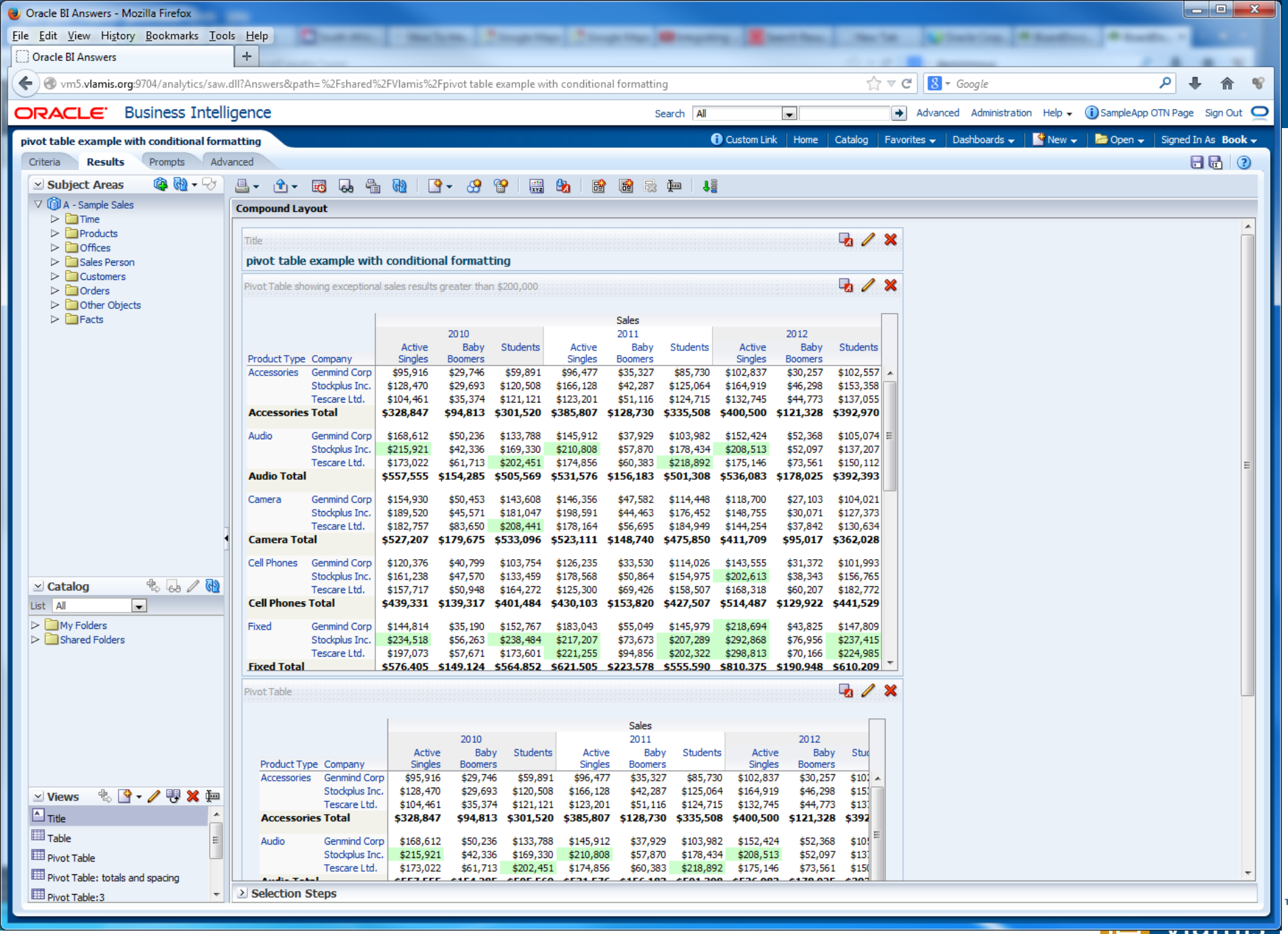

Oracle BI Interactive Dashboards - 8.13 Oracle R Enterprise TV - Mozilla Firefox

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ORACLE Business Intelligence

Search All Advanced Administration Help SampleApp OTN Page Sign Out

8.13 Oracle R Enterprise TV

Custom Link | Home | Catalog | Favorites | Dashboards | New | Open | Signed In As Book

R Integration | R End-User Interaction | **R Workbench** | R Sourcing from BI CEIM | R Sourcing from BI CEIM (end-user) | R Results Object in RPD | BIP Sourcing from R | Quality Control Chart (BIP)

R Workbench

Return to Main Index page

Clear All Filters

Script Name

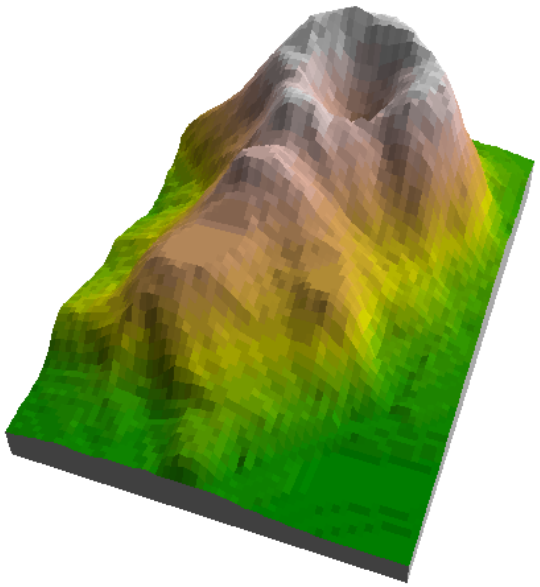
- Association Rules Movies
- Balloon Plot
- BusiestAirports-1
- Clustering with k-Means++
- Conditional Histogram
- Correlation Matrix Ellipses
- Correlation matrix circles
- Enhanced Bar Plot
- Heatmap
- Multipanel Geo Lattice Plot
- Multivariate Star Plot
- MultivariateAdaptiveRegressionSplines
- QCC-1
- RandomRedDots
- Support Vector Machines
- T.Series ACF/PACF
- T.Series Auto ARIMA

Param 1: cursor(select 0 from dual)

Param 2: cursor(select 550 "ore.png.height", 550 "ore.

Apply

Volcano Perspective Plot Graphics Result



Refresh

Volcano Perspective Plot

Edit Script

```
function(n, th=110, ph=40){
# Perspective plot - Maunga Whau, One of 50 Volcanoes in the Aucklanc

z <- 2 * volcano        # Exaggerate the relief
x <- 10 * (1:nrow(z))   # 10 meter spacing (S to N)
y <- 10 * (1:ncol(z))   # 10 meter spacing (E to W)

z0 <- min(z) - 20
z <- rbind(z0, cbind(z0, z, z0), z0)
x <- c(min(x) - 1e-10, x, max(x) + 1e-10)
y <- c(min(y) - 1e-10, y, max(y) + 1e-10)

fill <- matrix("green3", nr = nrow(z)-1, nc = ncol(z)-1)
fill[ , i2 <- c(1,ncol(fill))] <- "gray"
fill[i1 <- c(1,nrow(fill)) , ] <- "gray"

fcol <- fill
zi <- volcano[ -1,-1] + volcano[ -1,-61] +
        volcano[-87,-1] + volcano[-87,-61]  ## / 4
fcol[-i1,-i2] <-
    terrain.colors(20)[cut(zi, quantile(zi, seq(0,1, len = 21)),
                           include.lowest = TRUE)]
par(mar=rep(.5,4))
persp(x, y, 2*z, theta = th, phi = ph, col = fcol, scale = FALSE,
      ltheta = -120, shade = 0.4, border = NA, box = FALSE)
}
```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Questions?

More info

- URL for book
- Table in lobby
- Other presentations by Vlamis
- Collaborate and ODTUG KScope

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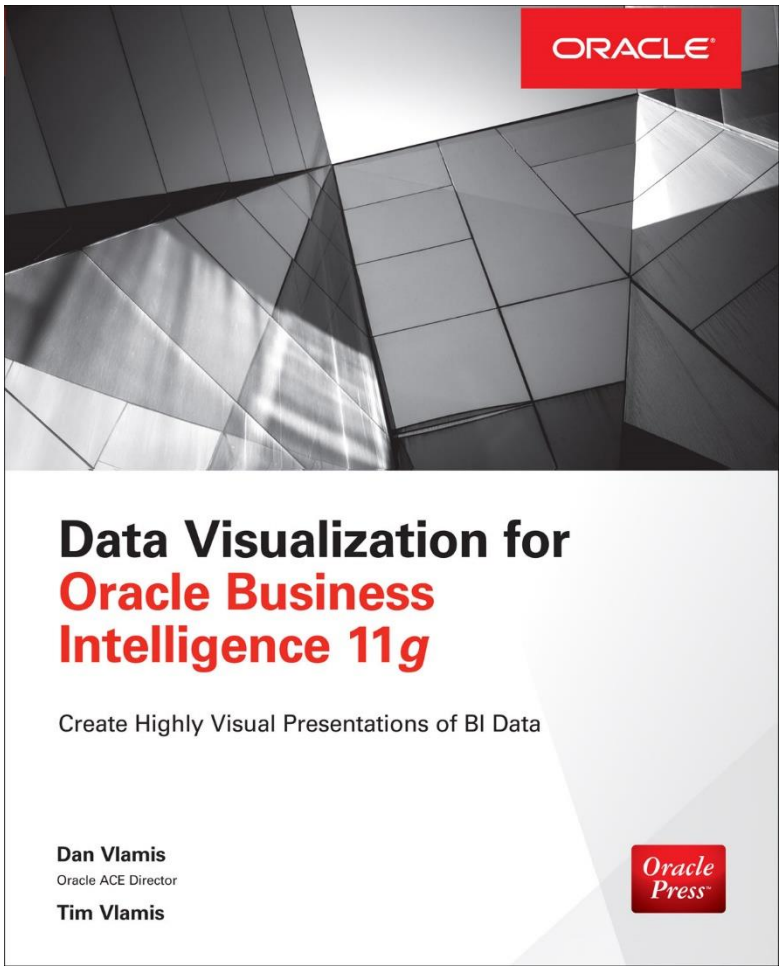
Drawing for Free Book

- Add business card to basket or fill out card



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Thank You!

Thank You for Attending Session

Data Visualization for OBI 11g

Presenter Information:

Dan Vlamis, President

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Vlamis Software Solutions, Inc.

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