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Data Visualization for Oracle Business Intelligence 11g

BIWA Summit 2015

Tim Vlamis

Dan Vlamis

Vlamis Software Solutions

816-781-2880

http://www.vlamis.com

BIWA SIG

- Started in summer of 2006
- BIWA Summits since 2007, first one near DC, rest in CA
- BIWA Summit 2015 took place Jan 27-29, 2015 at Oracle HQ
- Focus on Advanced Analytics, Big Data, BI, DW, EPM, IoT
- Managed by Volunteer Board Members and Oracle Advisors

BIWA SIG

Better Information Better Results

www.oraclebiwa.org

BIWA Summit 2016, Jan 26-28

Oracle HQ Conference Center

Business Intelligence, Warehousing and Analytics

and Spatial

IOUG Special Interest Group

www.biwasummit.org

NoCOUG

IOUG independent oracle users group

IOUG independent oracle users group For the Complete Technology & Database Professional

COLLABORATE 15 – IOUG Forum

April 12-16, 2015
Mandalay Bay Resort and Casino
Las Vegas, NV

The IOUG Forum Advantage

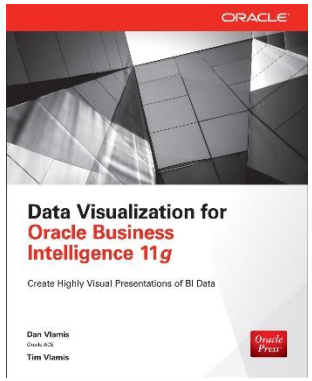
- Save more than $1,000 on education offerings like pre-conference workshops
- Access the brand-new, specialized IOUG Strategic Leadership Program
- Priority access to the hands-on labs with Oracle ACE support
- Advance access to supplemental session material and presentations
- Special IOUG activities with no "ante in" needed - evening networking opportunities and more

www.collaborate.ioug.org

Follow us on Twitter at @IOUG or follow the conference hashtag #C15LV!

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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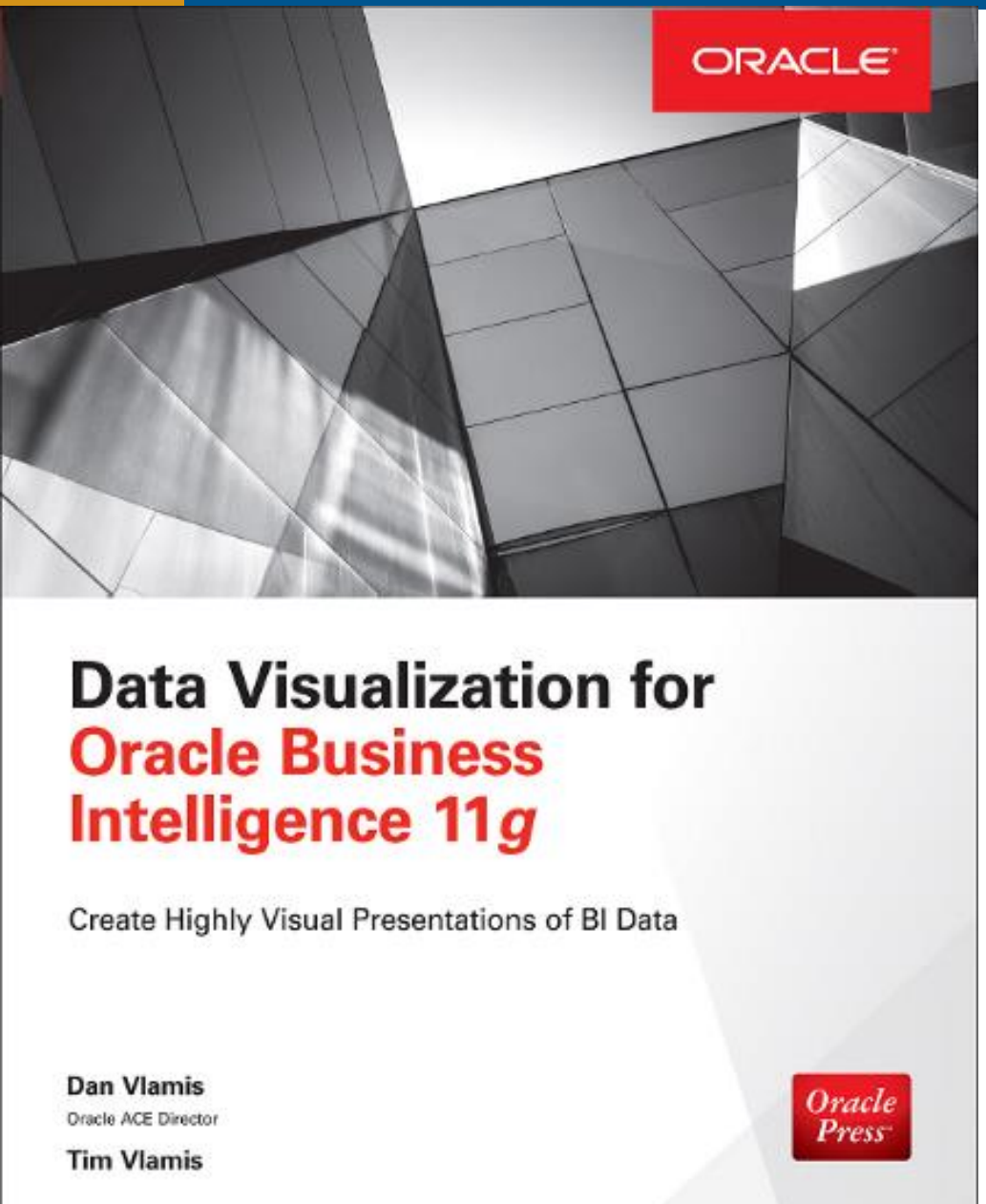
New Book!



Special Thanks to:

Paul Carlstroem

Philippe Lions

Brian Macdonald

Jayant Sharma

Oracle BI Prod Mgmt

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Table of Contents

1. Introduction	1
2. Tables	19
3. Graphs	59
4. Maps	93
5. Advanced Visualizations	123
6. BI Publisher	157
7. Dashboard Design & Mechanics	177
8. Dashboard Interactions	205
9. Scorecard & Strategy Management	233
10. Mobile	245
11. Other Visualization Topics	269
12. General Advice	299
Index	315

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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)

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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

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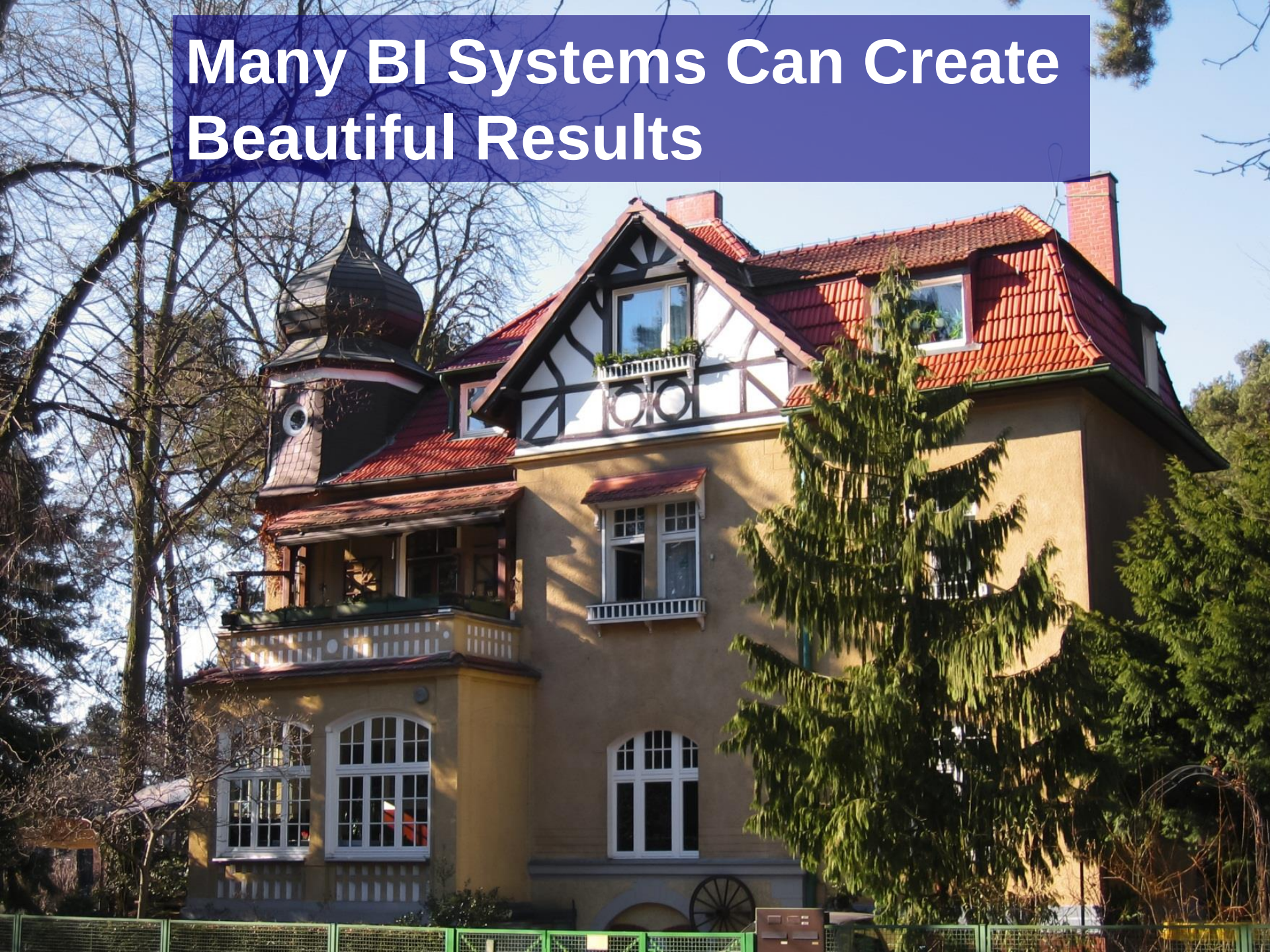
Many BI Systems Can Create Beautiful Results



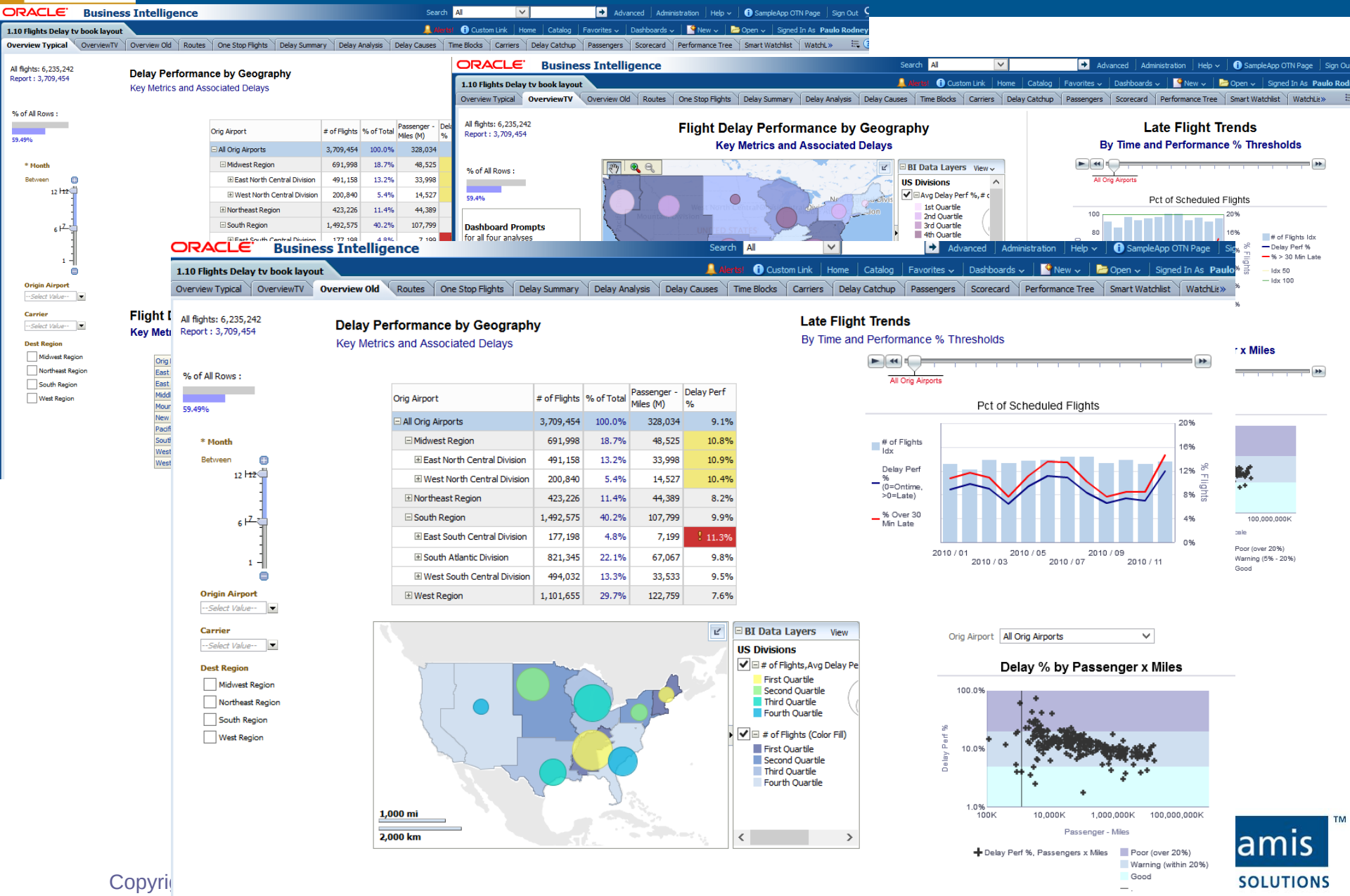
OBI Operates at a Different Scale

Ingredients → Data Quality & Variety

Technique → Data Processing & Prep

Presentation → Data Visualization

OBIEE Demo Content from Chap 1



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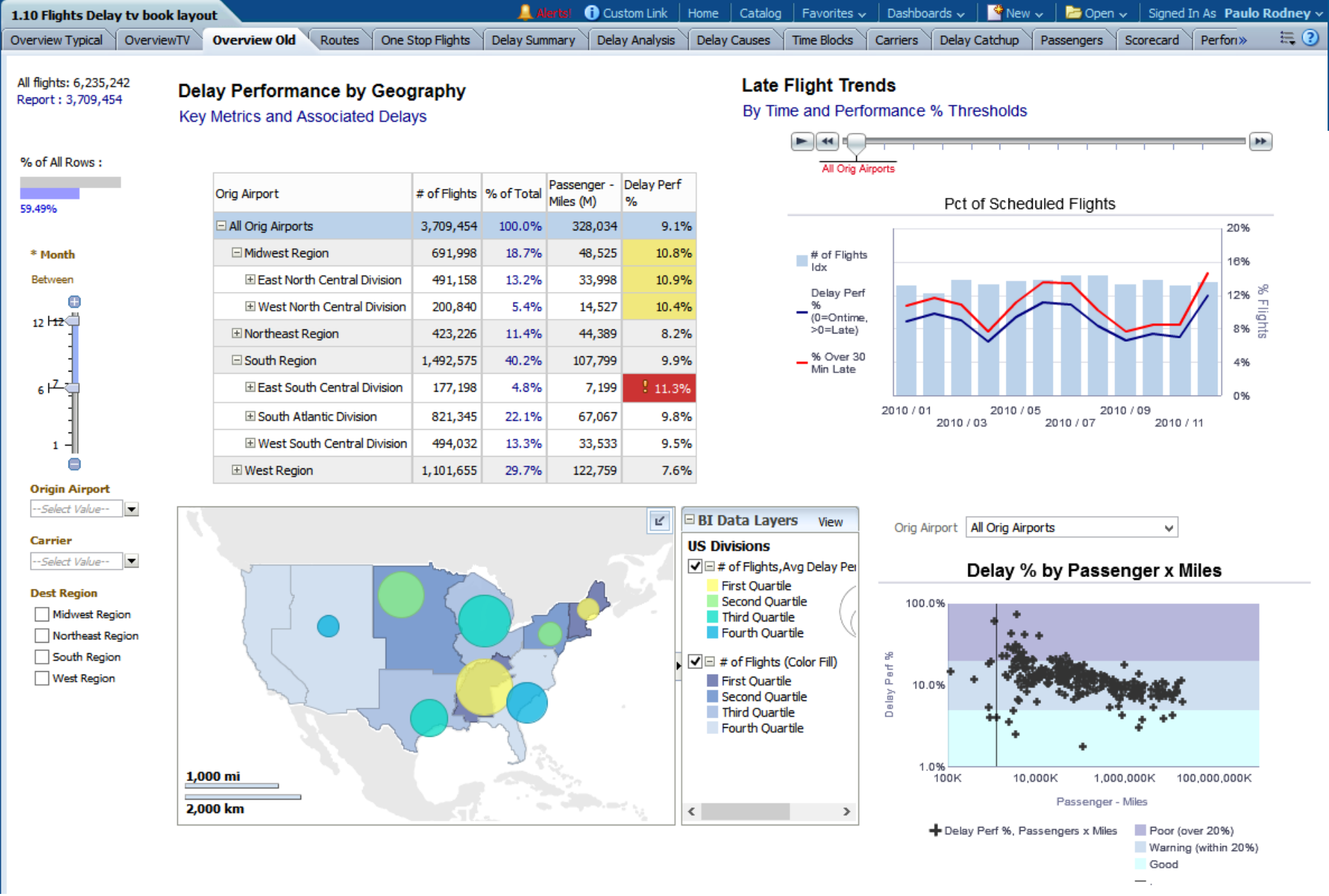

Orig Airport	# of Flights	% of Total	Passenger - Miles (M)	Delay Perf %
All Orig Airports	3,709,454	100.0%	328,034	9.1%
Midwest Region	691,998	18.7%	48,525	10.8%
East North Central Division	491,158	13.2%	33,998	10.9%
West North Central Division	200,840	5.4%	14,527	10.4%
Northeast Region	423,226	11.4%	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%

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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

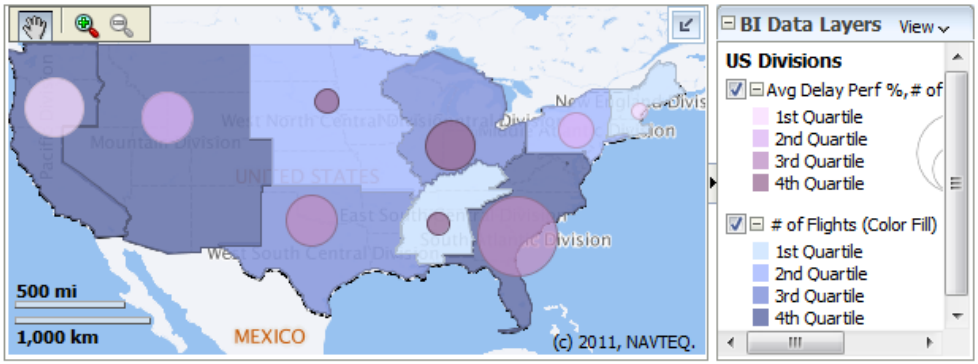
Origin Airport
--Select Value--

Carrier
--Select Value--

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

Flight Delay Performance by Geography

Key Metrics and Associated Delays



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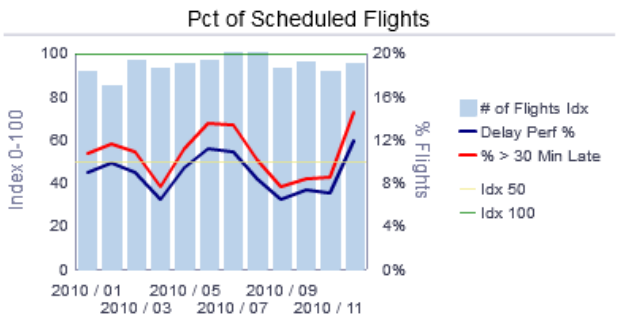
Late Flight Trends

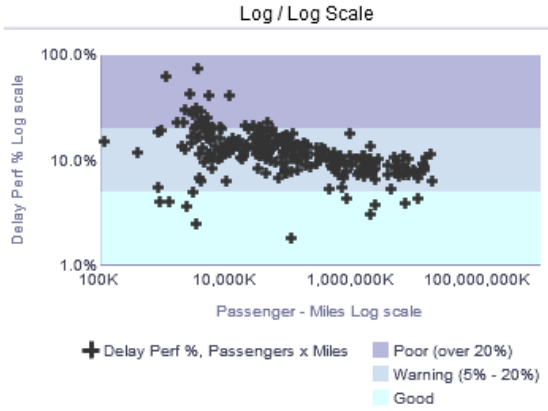
By Time and Performance % Thresholds

All Orig Airports



Delay % by Passenger x Miles

All Orig Airports



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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”

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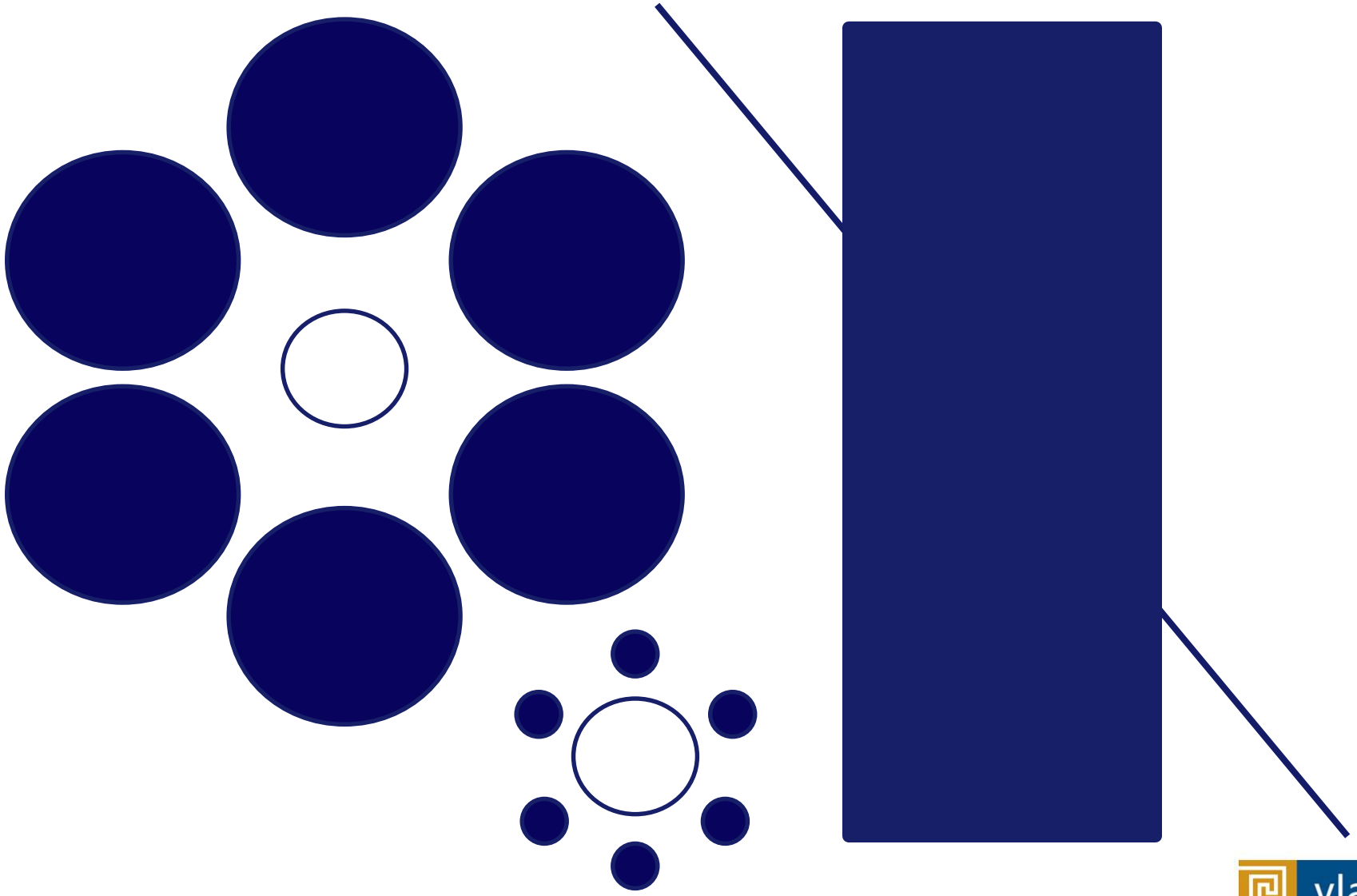
The Principles of Human Cognition Should Guide BI Dashboard Design

Classic Optical Illusions



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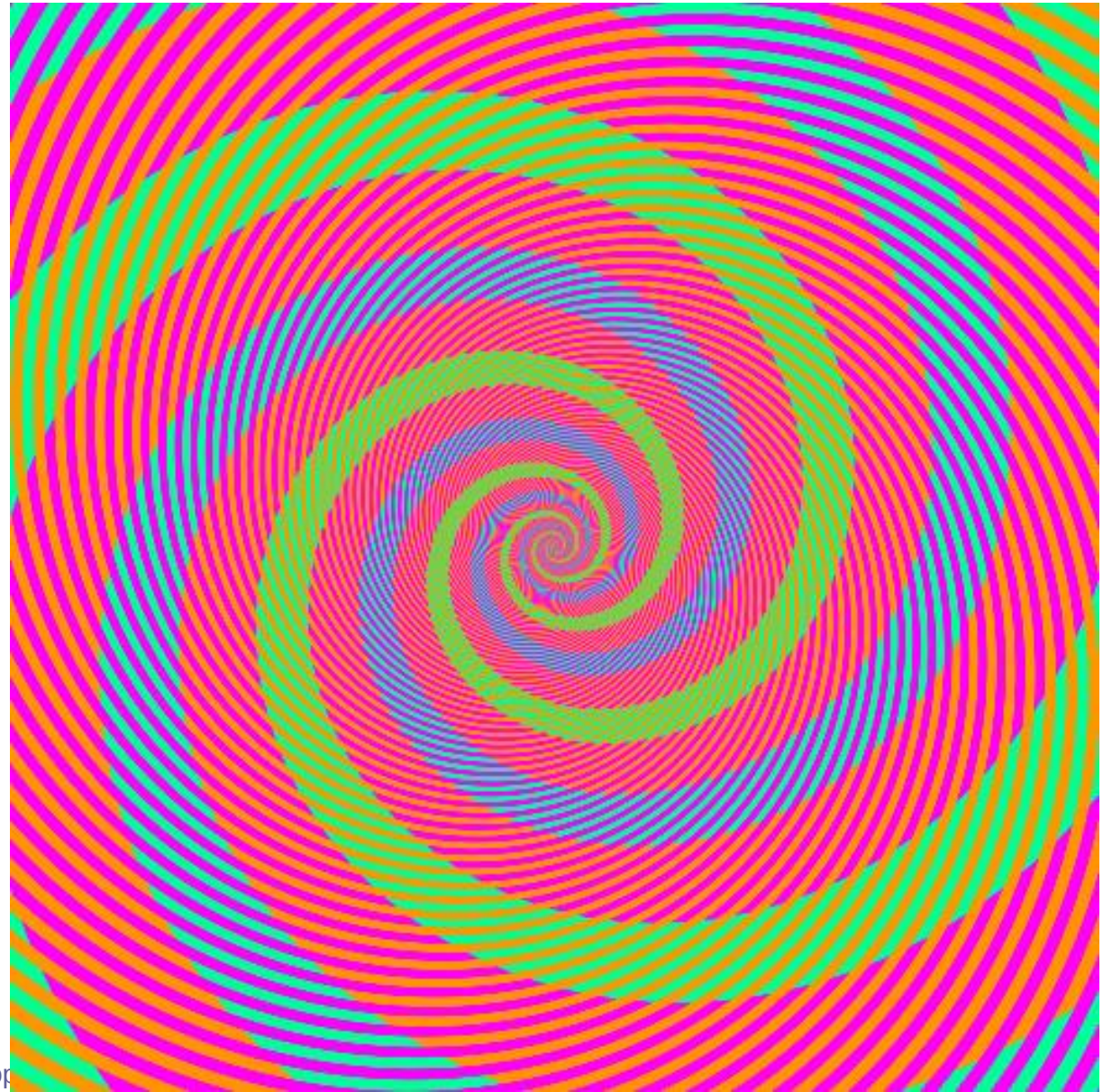
The Spirals are the Same Color



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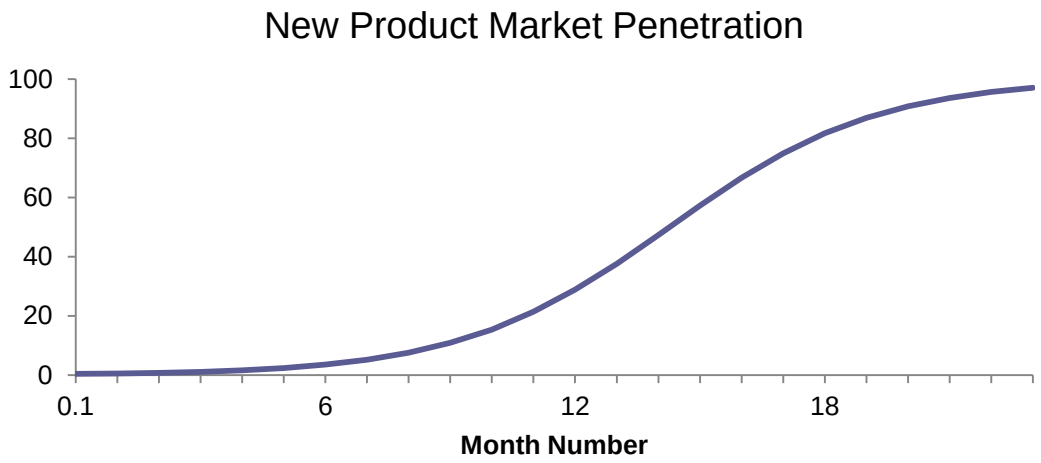
Graphs and Tables

- 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.

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Pivot Table "Needs" Sentence

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

Sales (specific cell values)
Product Type and Company (defines rows)
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						
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
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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!

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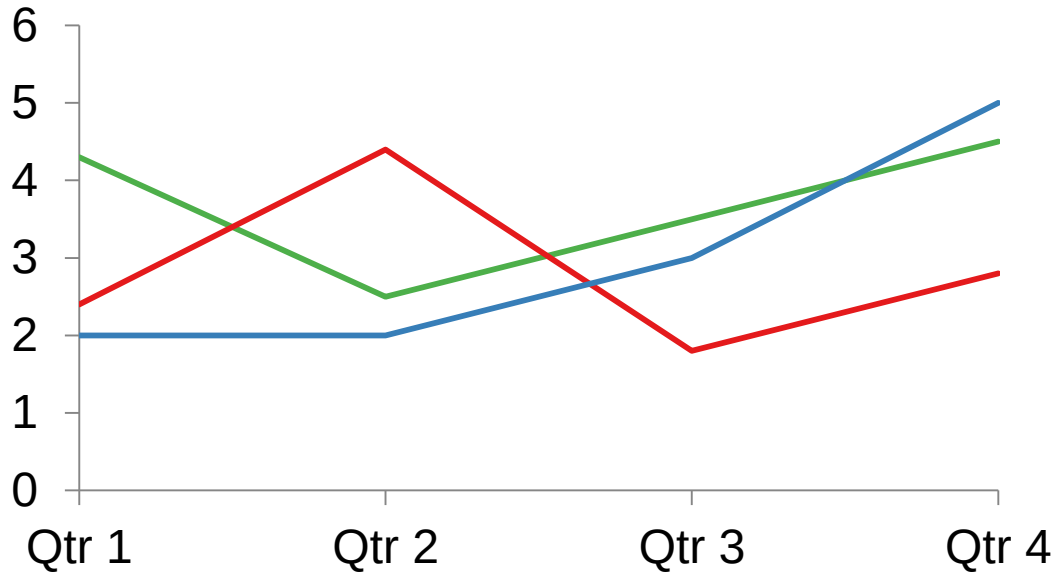
Line Graph



- 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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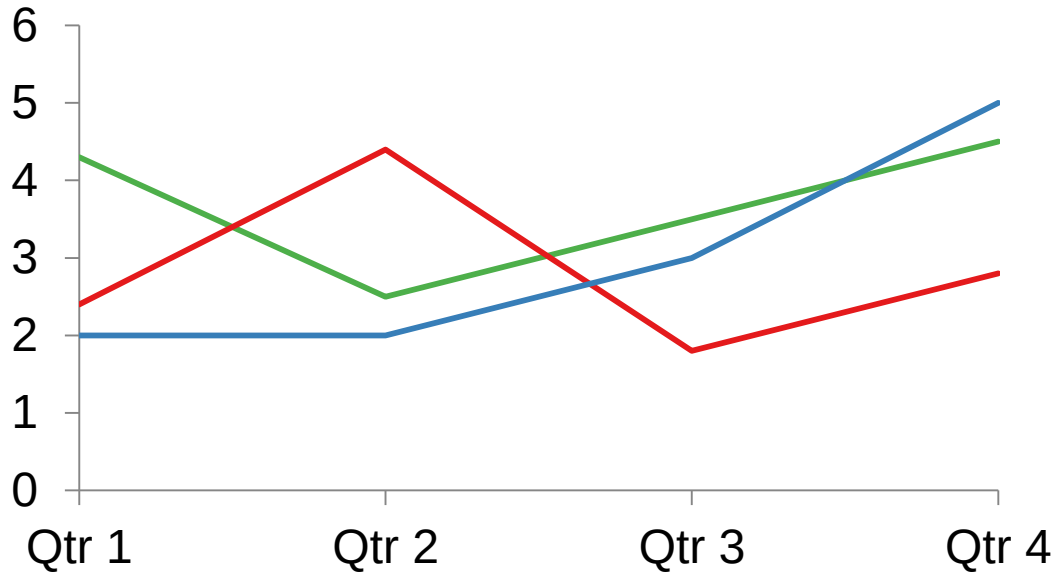
Line Graph



- 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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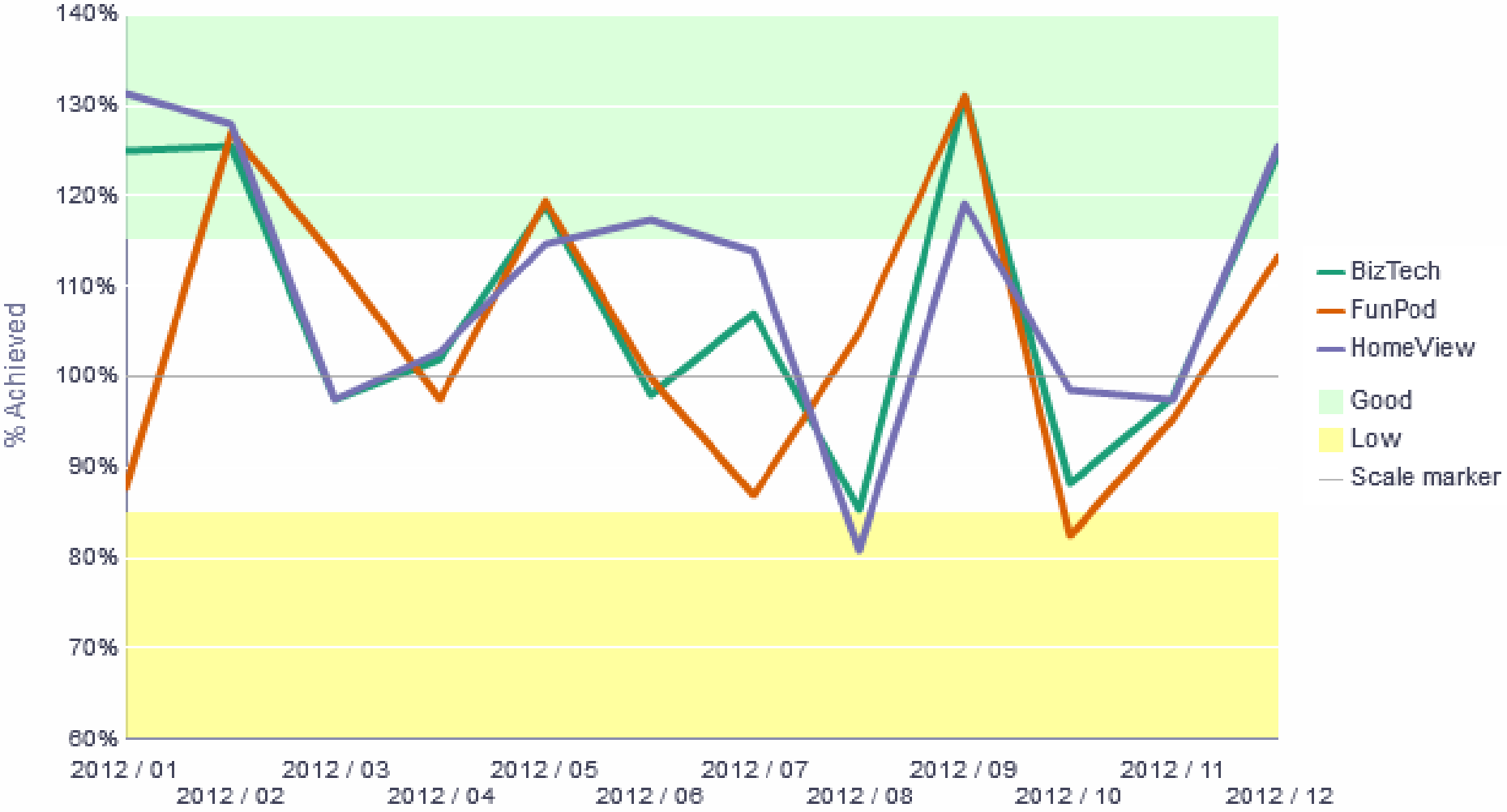
Target Revenue % by Brand for 2012



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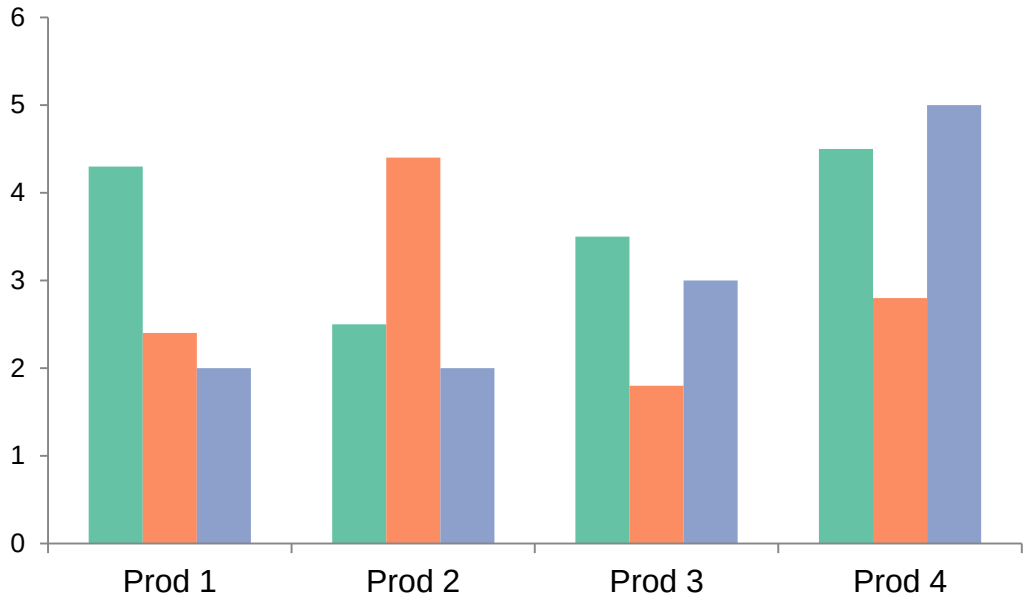
Bar Graphs



- 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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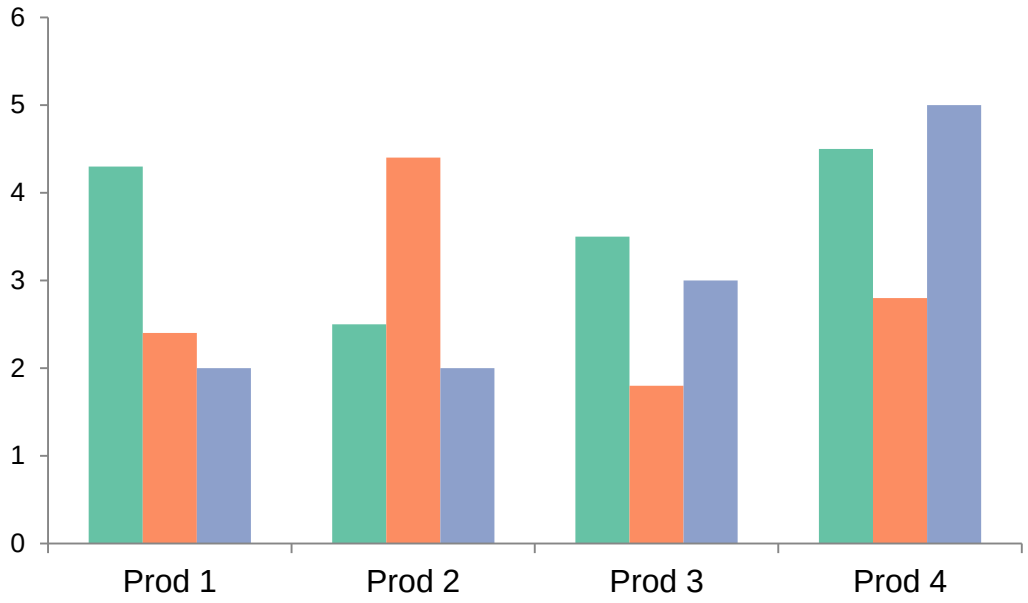
Bar Graphs



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

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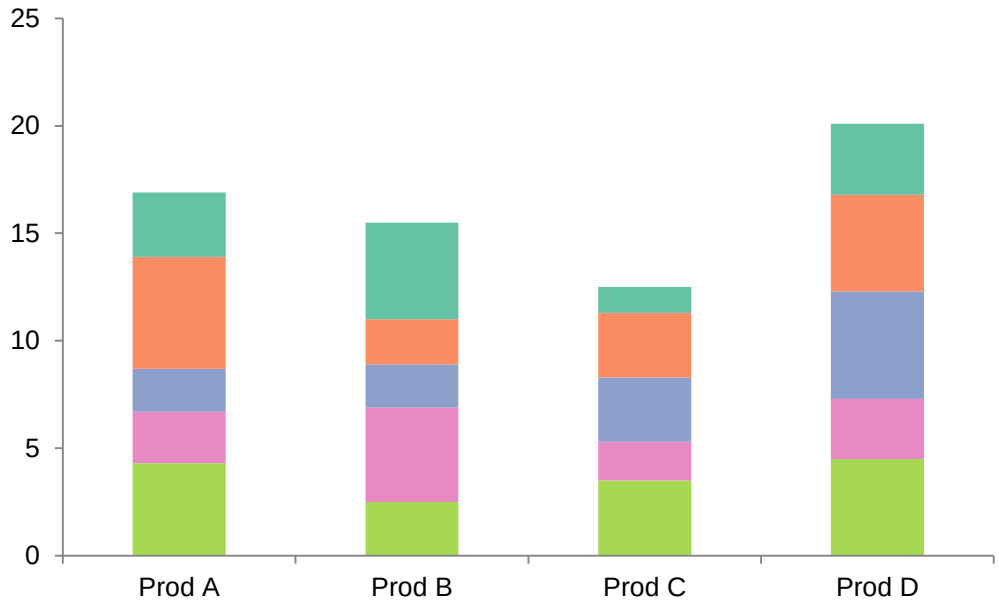
Stacked Bar Chart



- 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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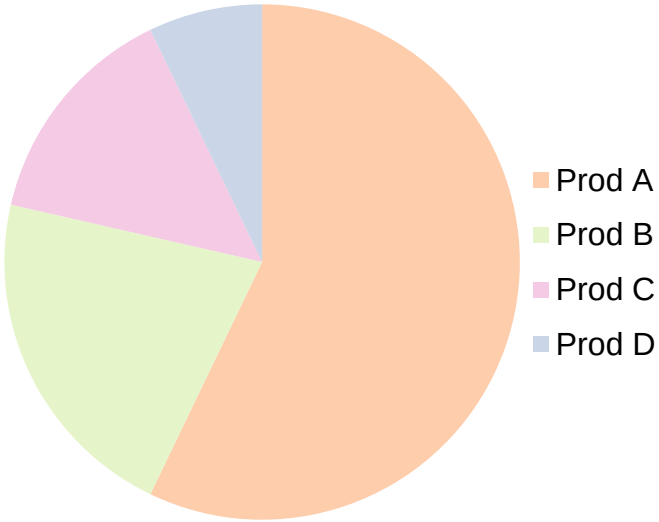
Pie Charts



- 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.

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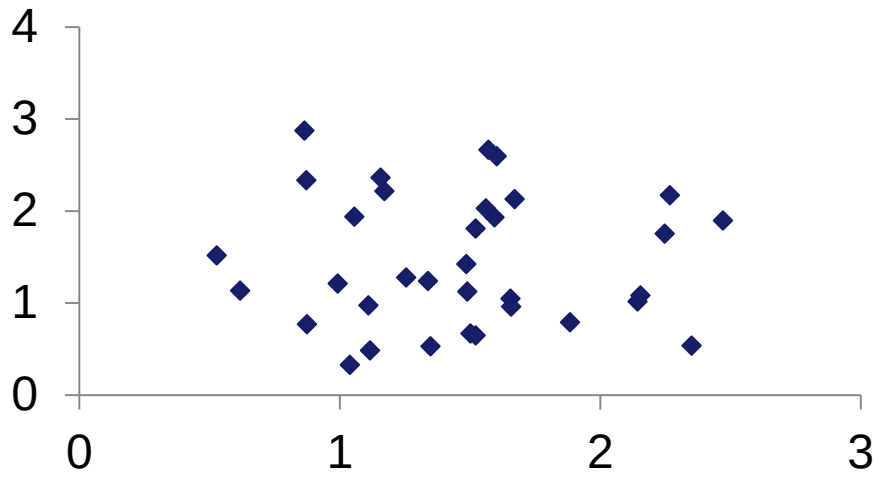
Scatter Plot



- 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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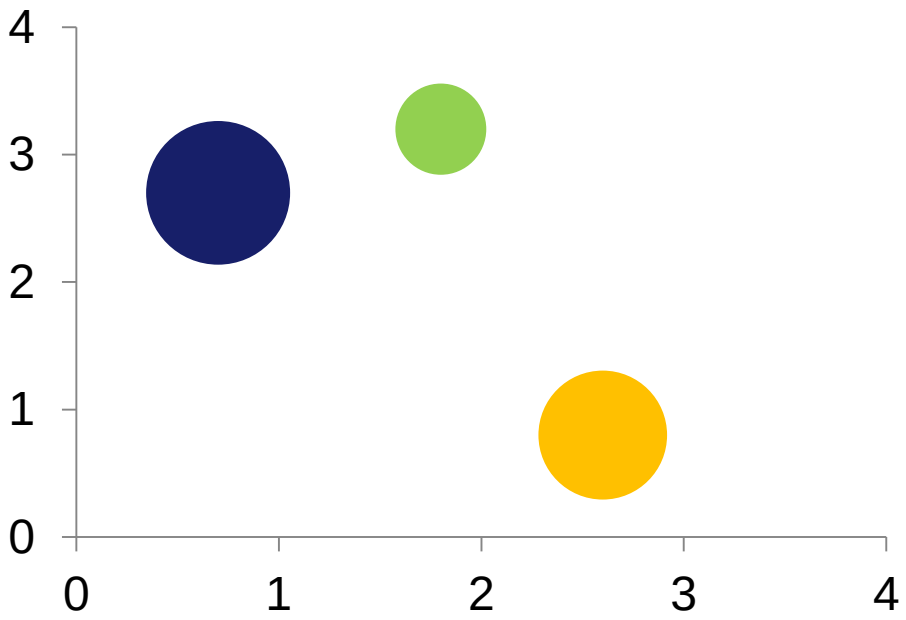
Bubble Chart



- 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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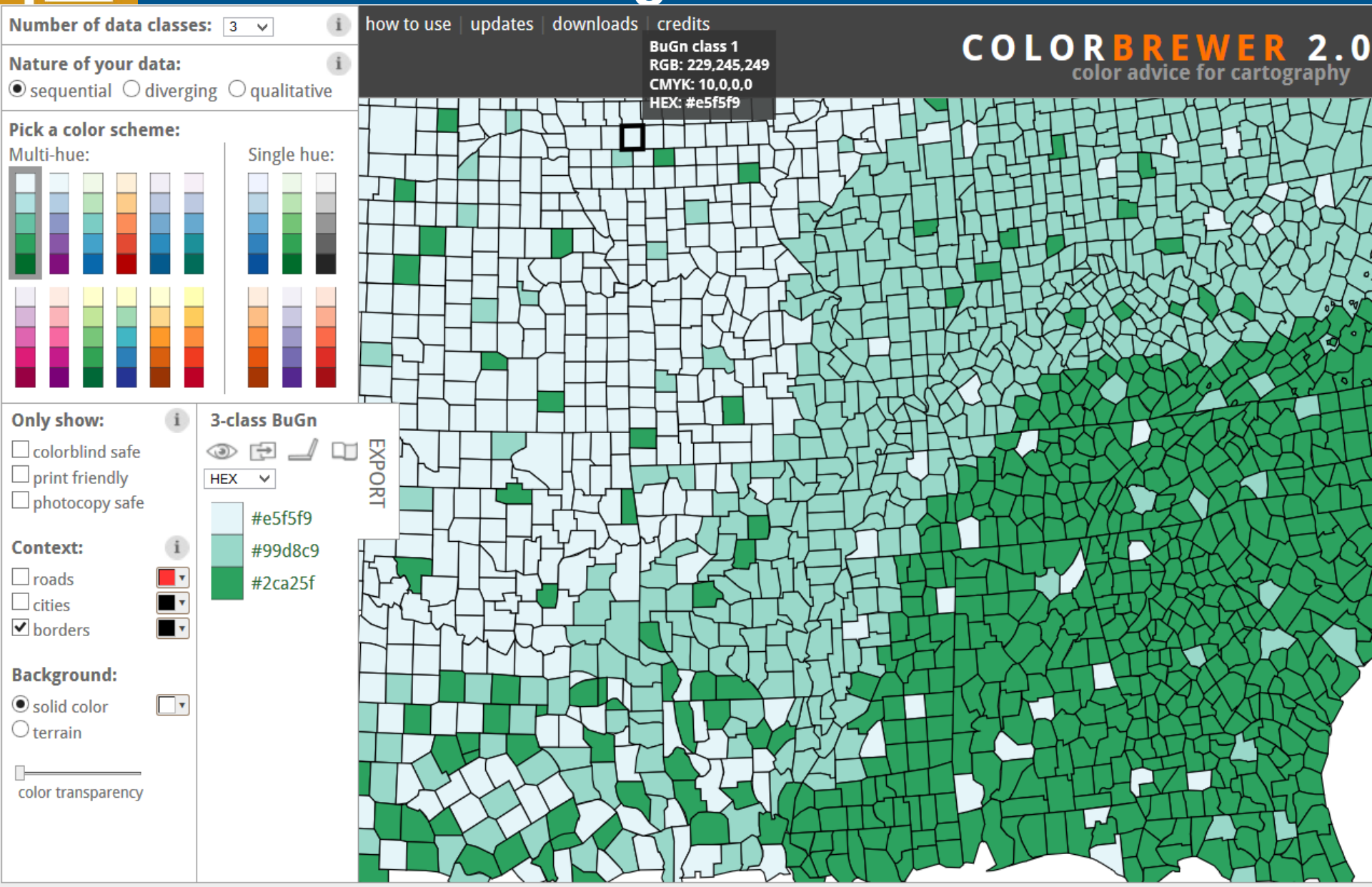
ColorBrewer2.org



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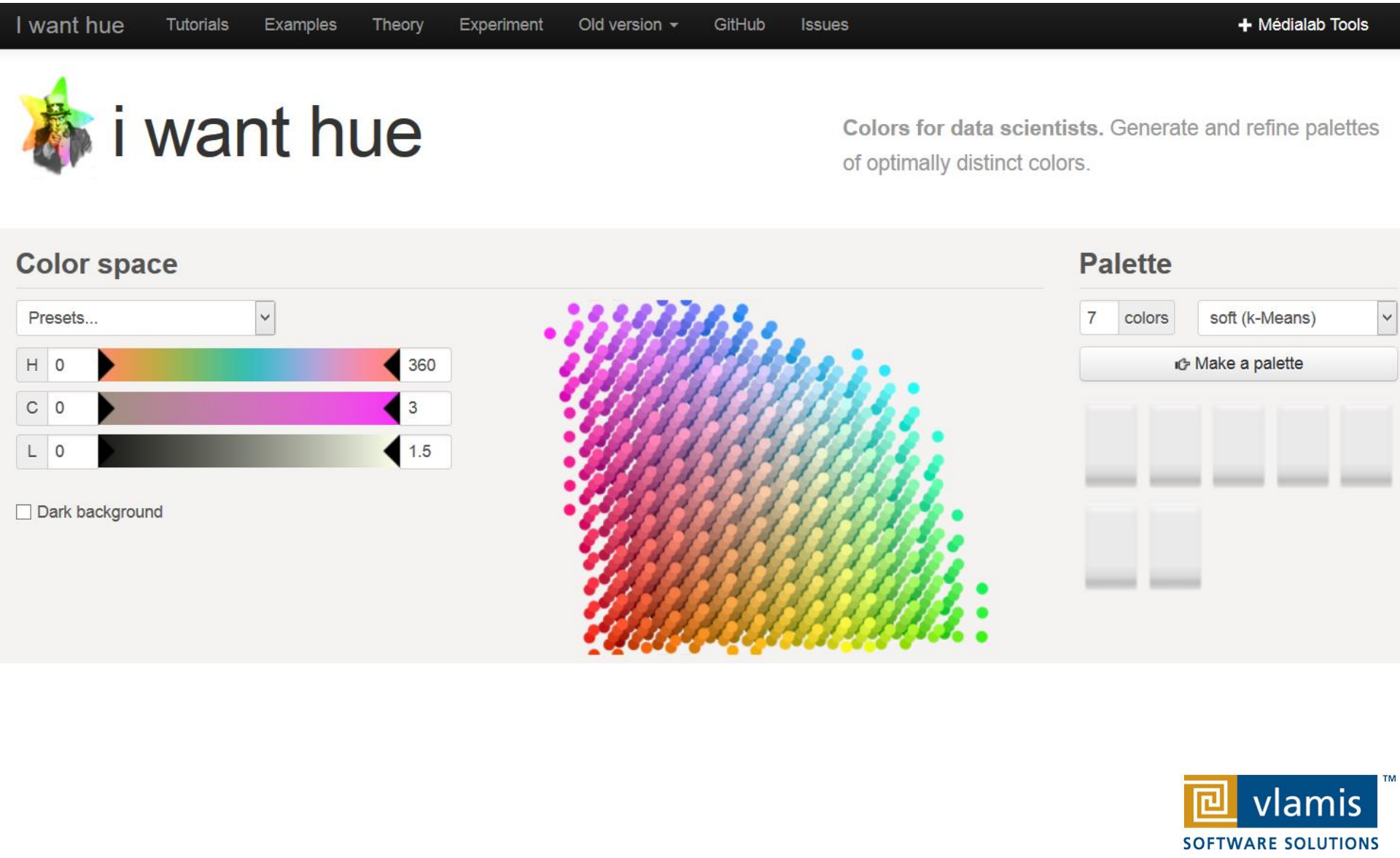
axismap

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.

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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.

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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.

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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.

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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

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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

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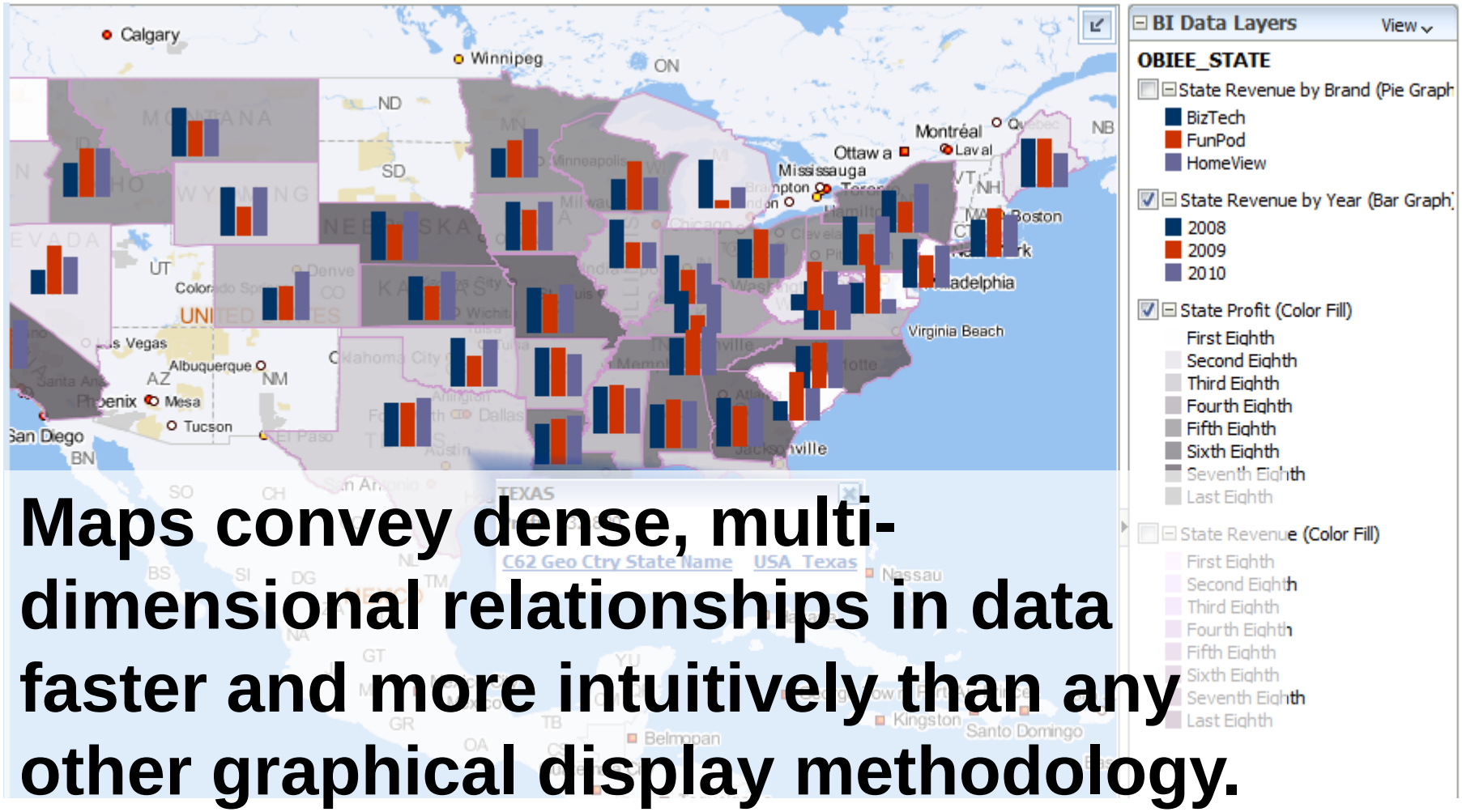
Why Maps are Powerful



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?

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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

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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

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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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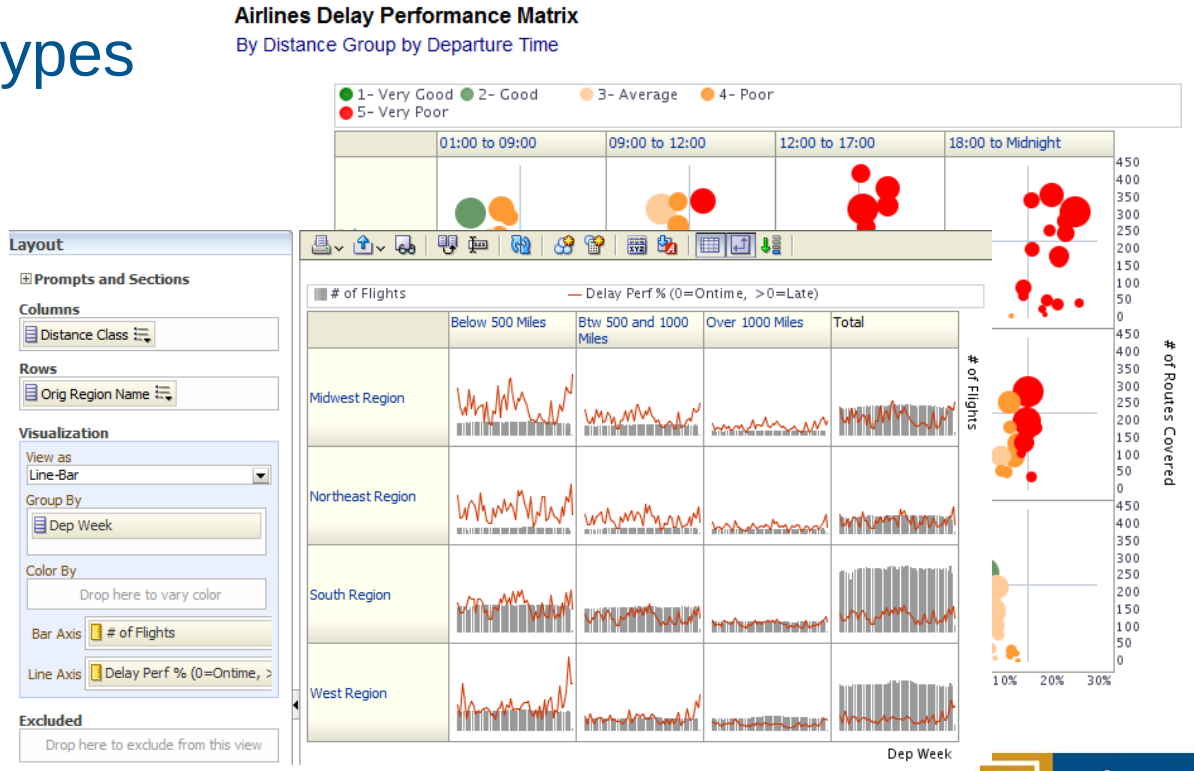
Trellis View - Simple

- 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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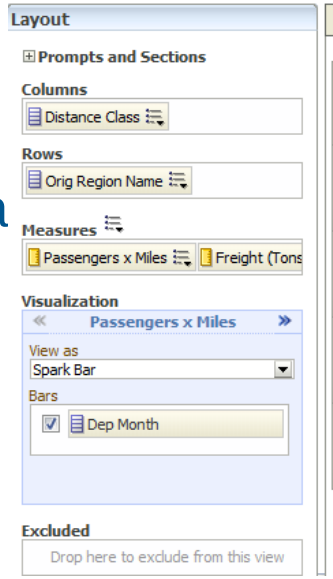
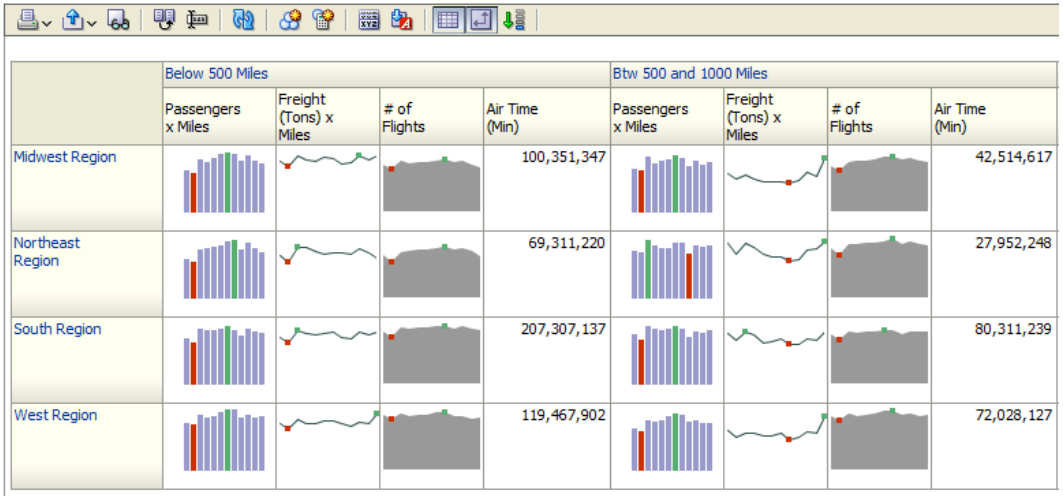
Trellis View - Advanced

- 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

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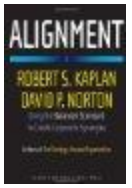
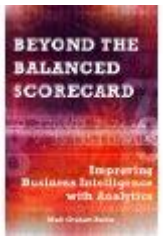
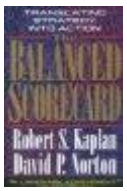
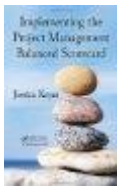
OBI Scorecard & Strategy Management

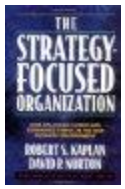
- Integrated toolset in OBIEE
- Follows “Balanced Scorecard” methodology
- Enables corporate goals and objectives to be monitored and managed
- Includes strategy maps, strategy trees, KPI watch lists, and cause and effect maps

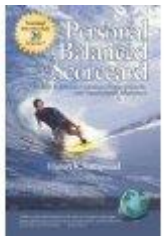


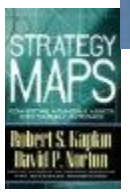


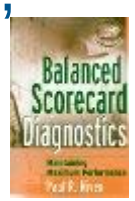


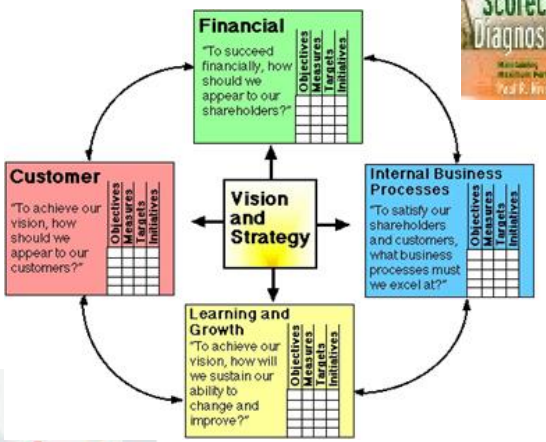


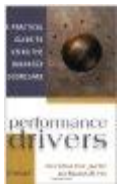


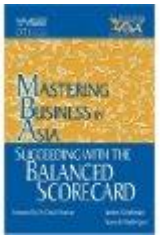


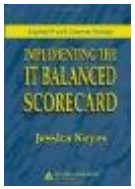


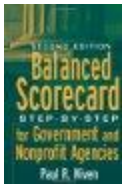


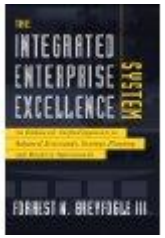












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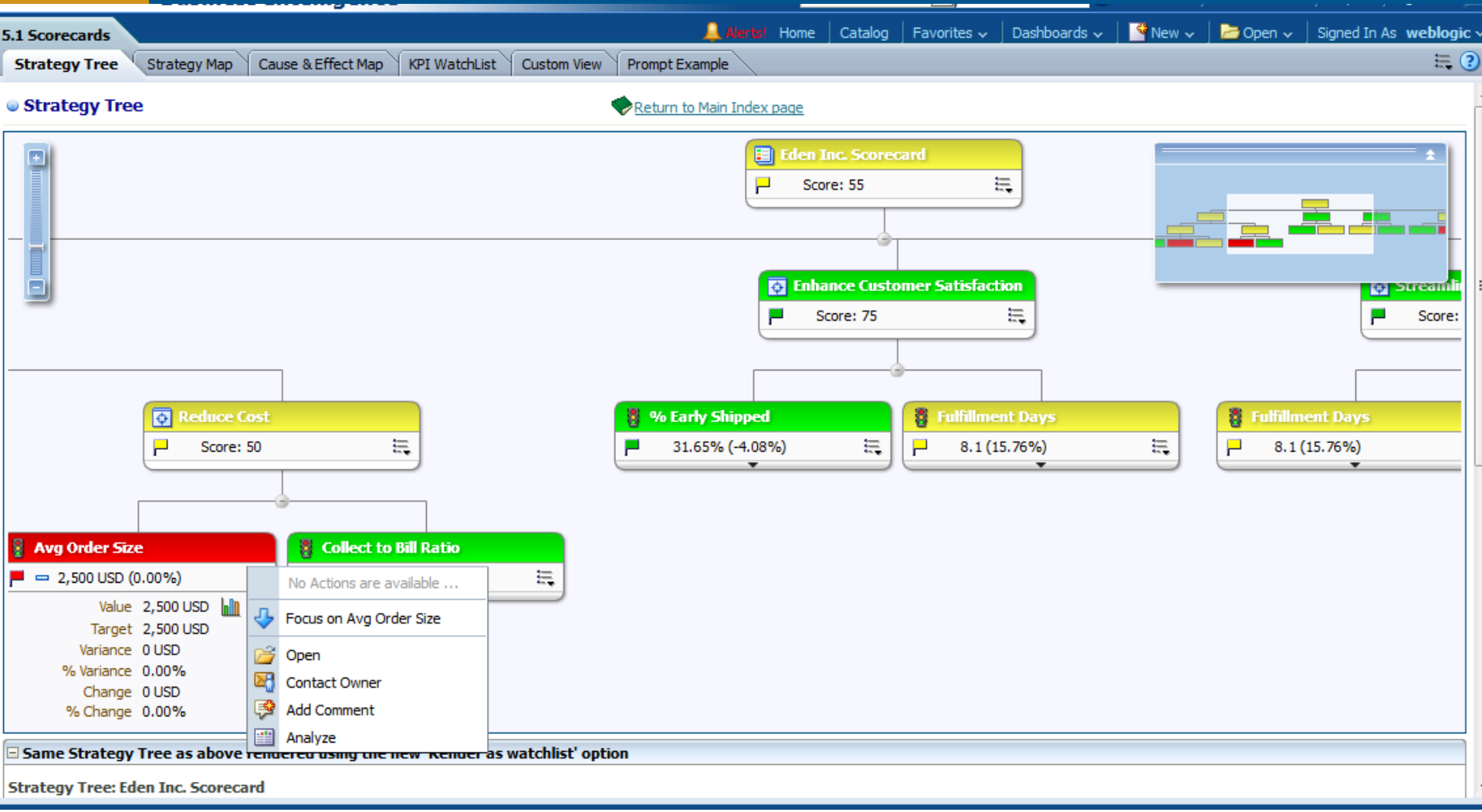
New Contribution Wheel Visualization

Strategy Tree View



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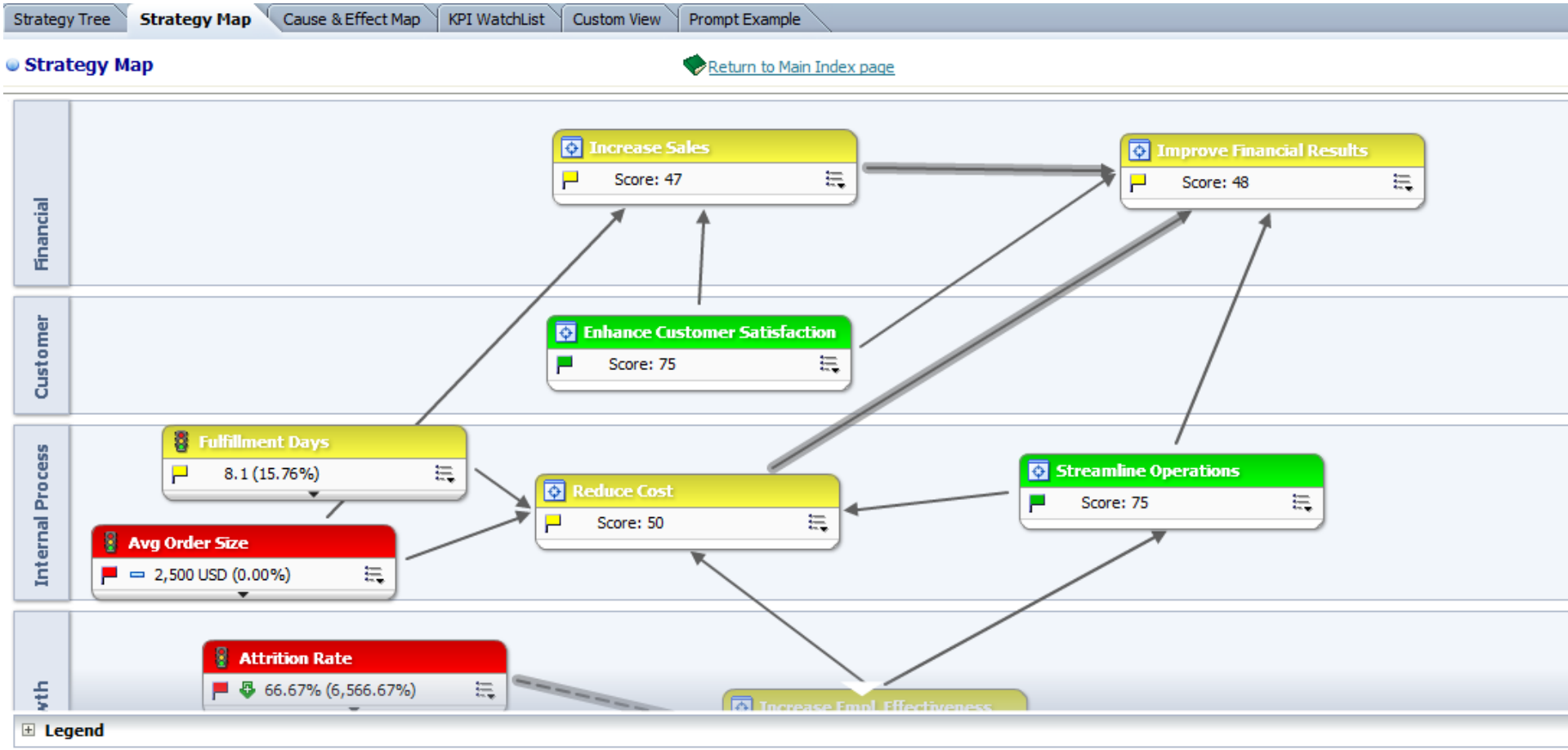
Strategy Map View



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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

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Where to Start

- Workshops
- Assessments
- Training
- Metadata Communication and Documentation

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Oracle BI Interactive Dashboards - 8.12 Oracle DataminingTV - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Oracle BI Interactive Dashboards - 8.12 O...

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

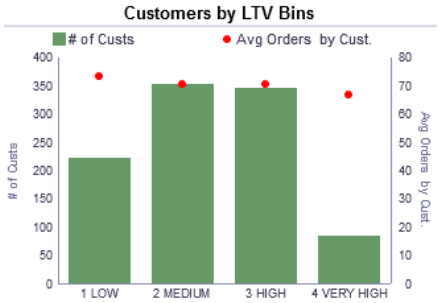
LTV Prediction | LTV Details | Classification Tree | LTV Probabilities | What If Scoring | Geo LTV Prediction | Regression | Regression Model | Results Map

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**

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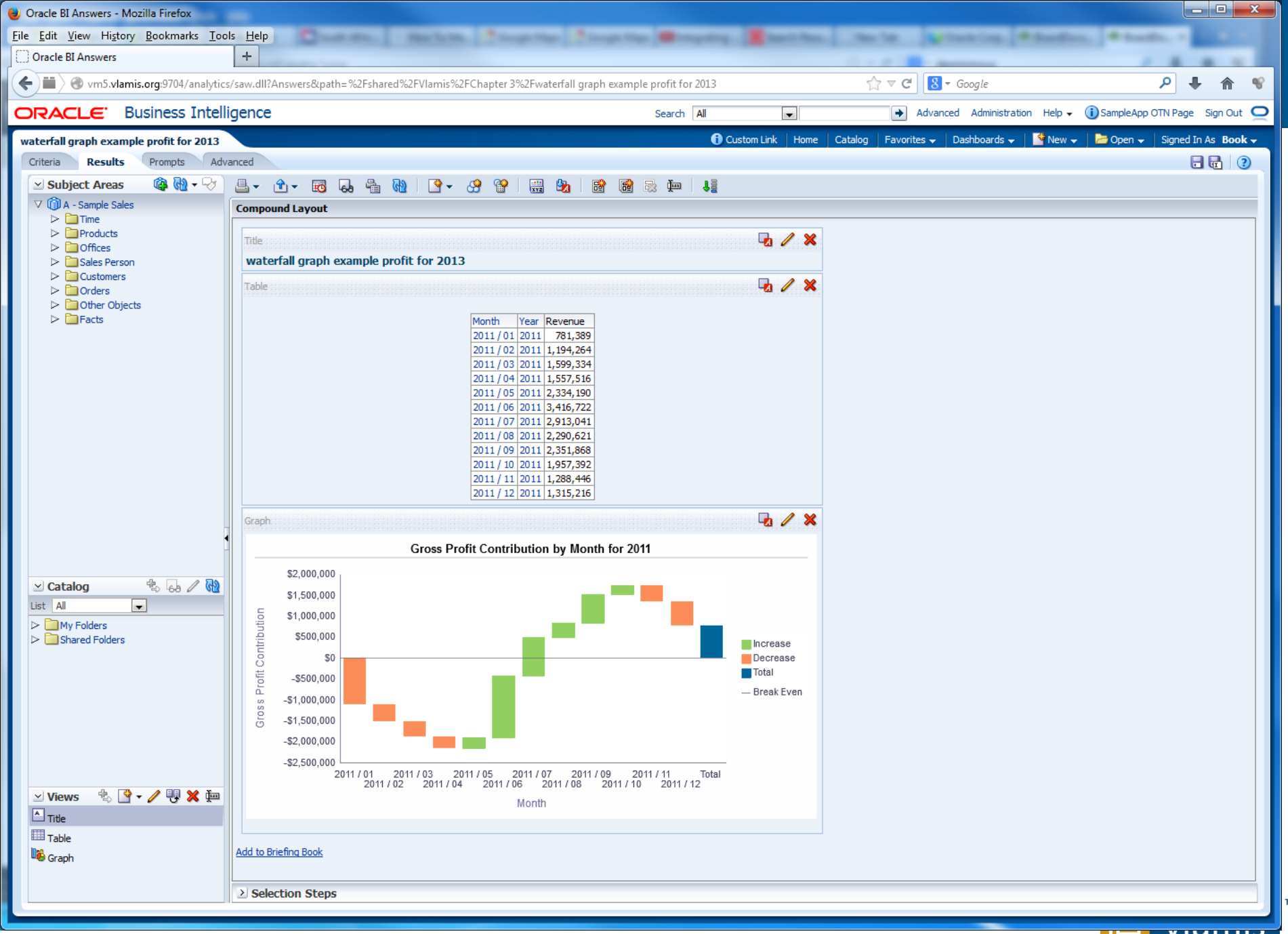

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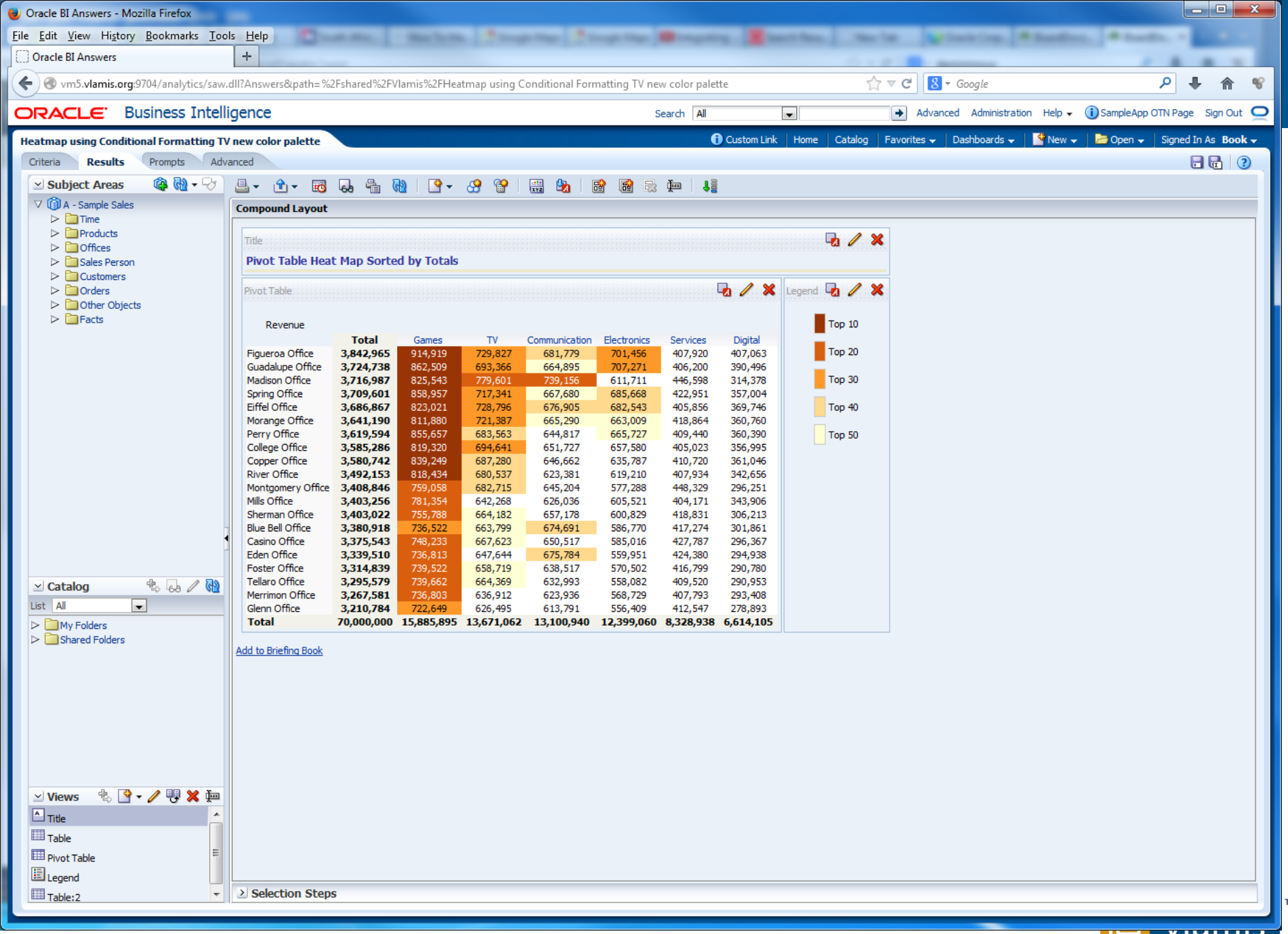

Revenue

	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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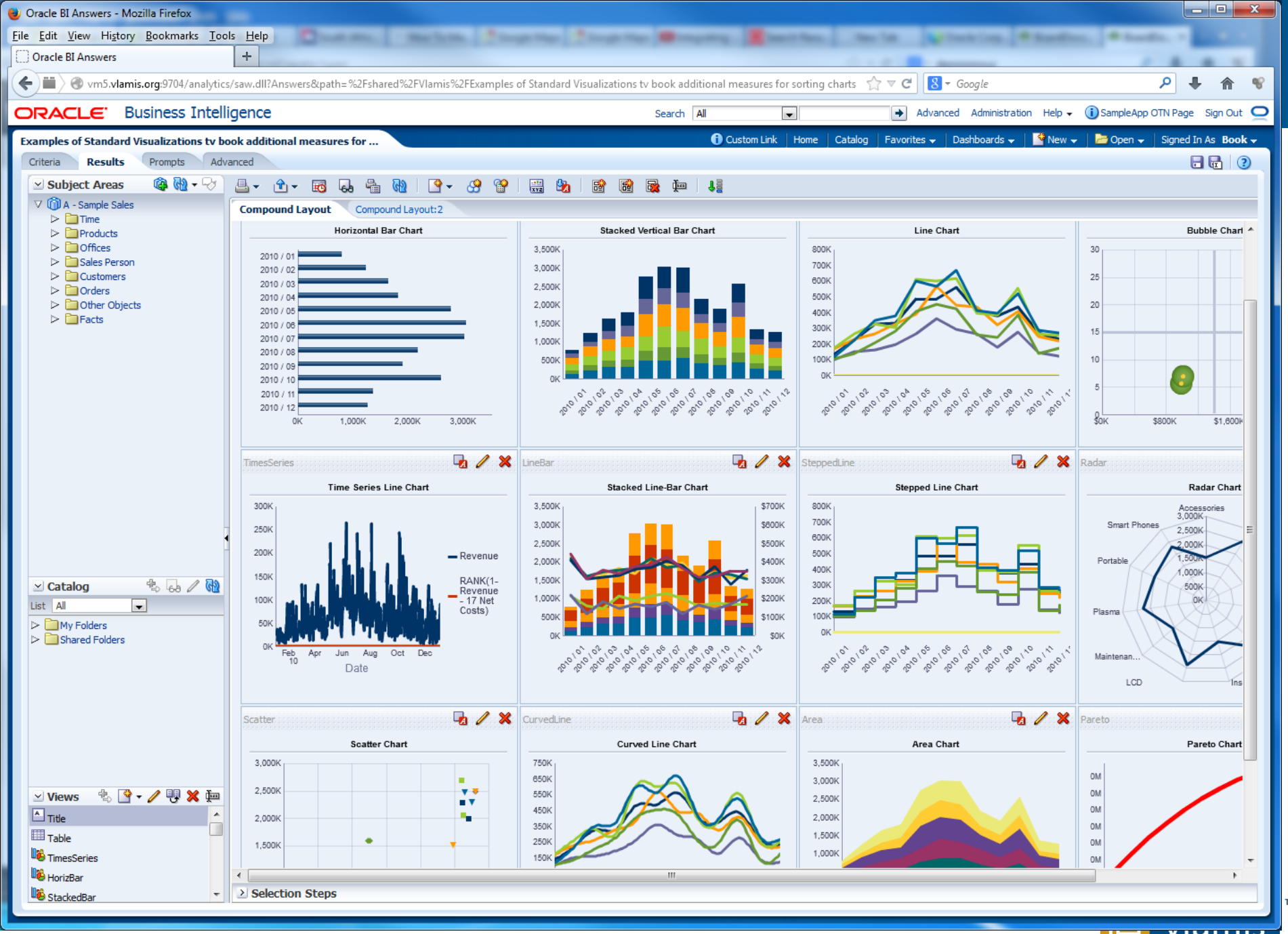

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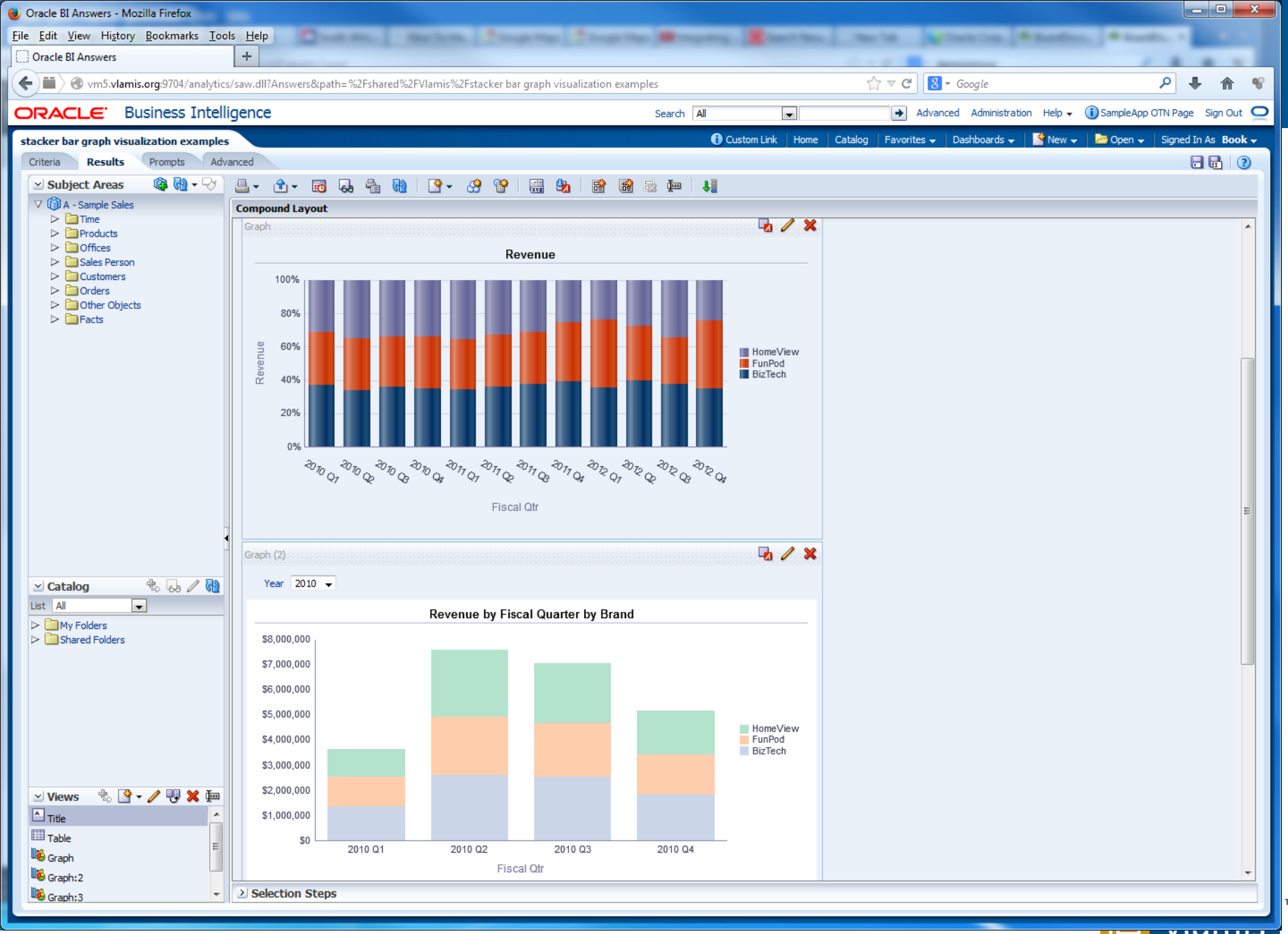

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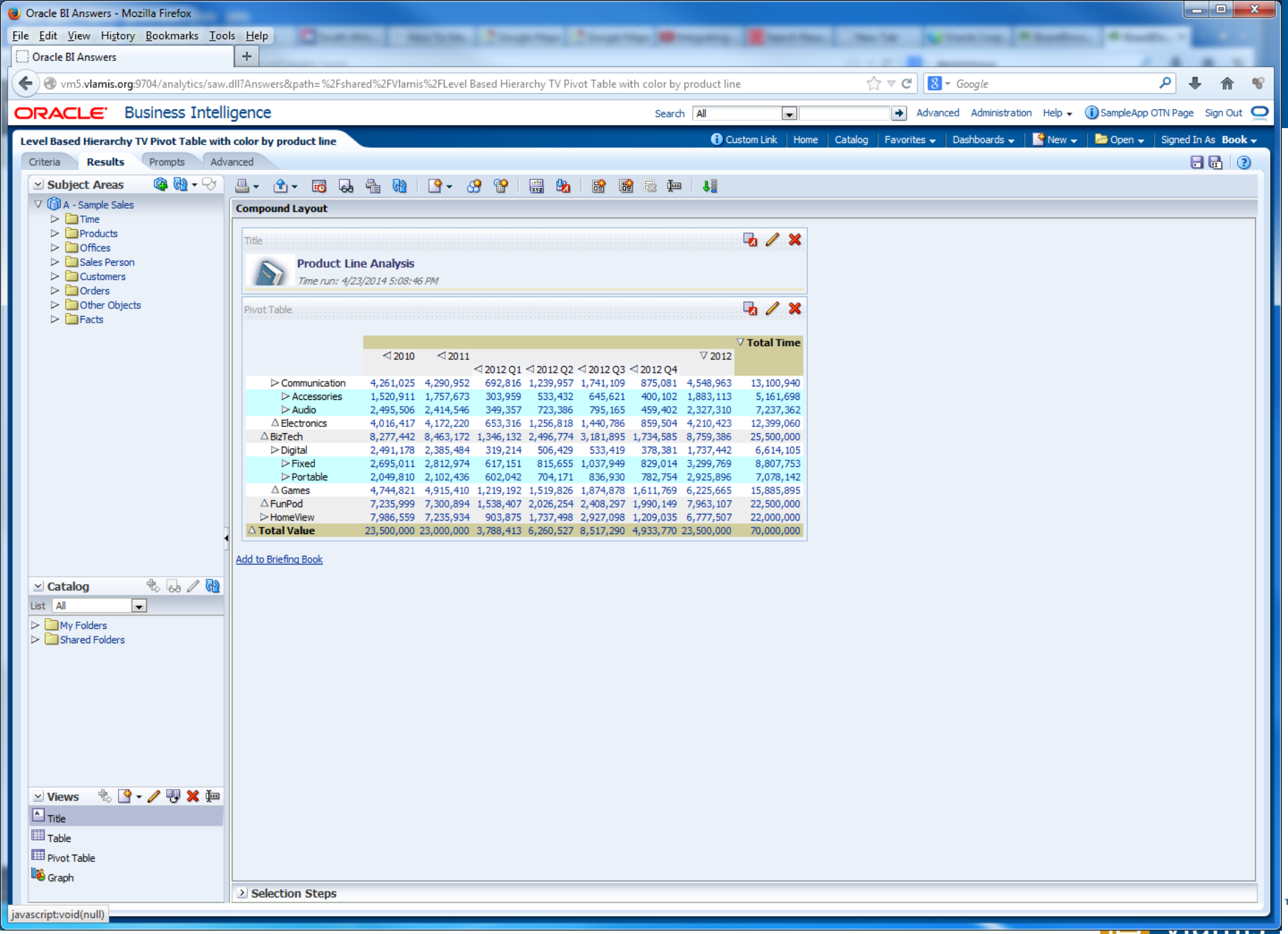

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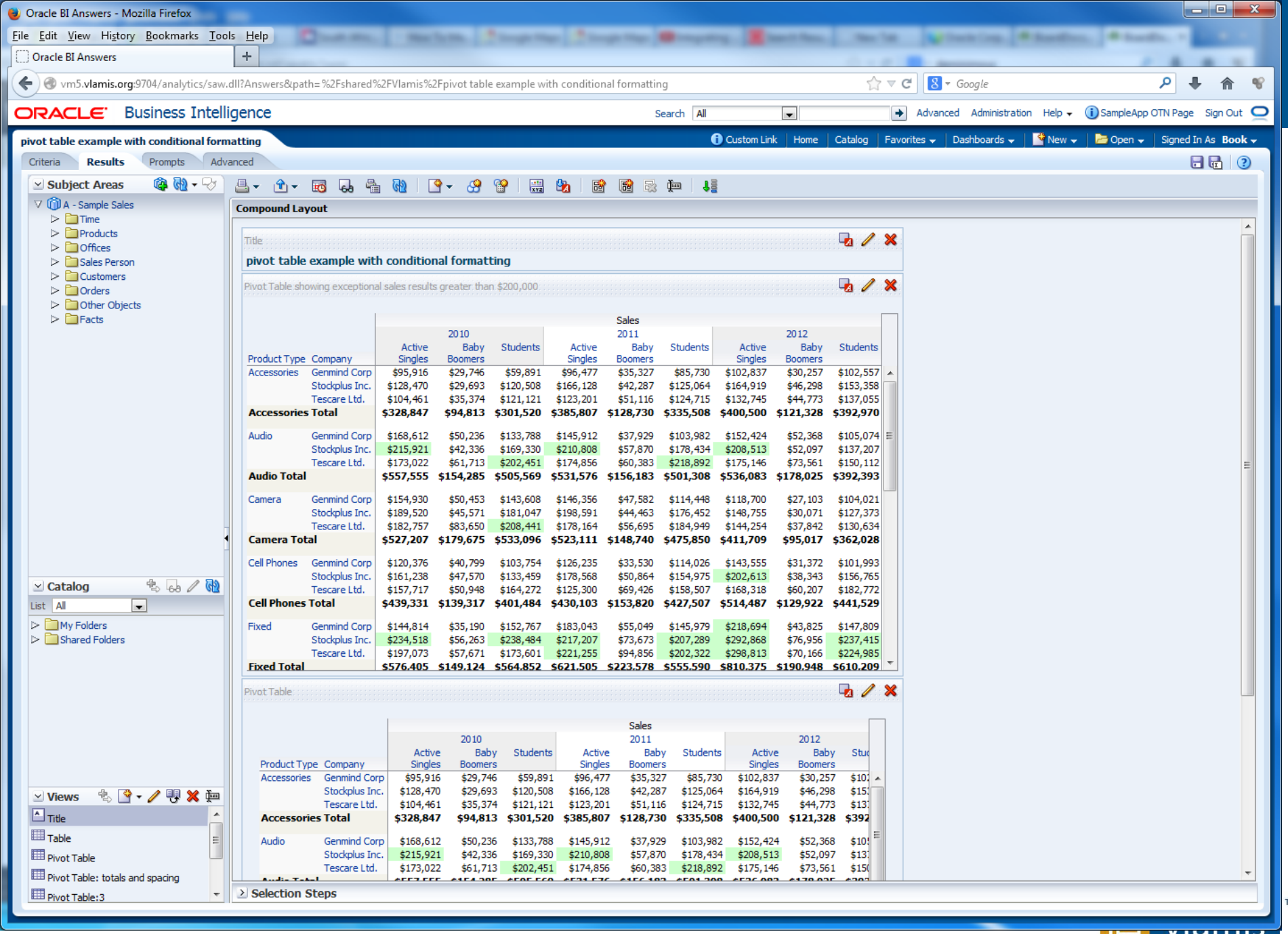

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Oracle BI Interactive Dashboards - 8.13 Oracle R Enterprise TV - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Oracle BI Interactive Dashboards - 8.13 O...

vm5.vlamis.org:9704/analytics/saw.dll?Dashboard&PortalPath=%2Fshared%2FVlamis%2F8.13 Oracle R Enterprise TV&page=R Workbench

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

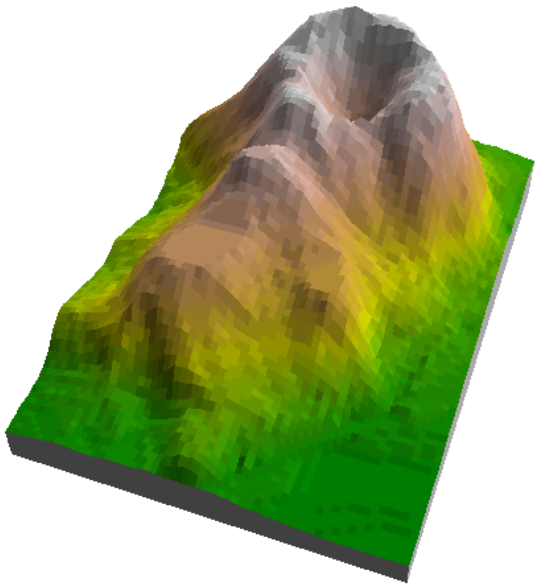
- Association Rules Movies
- Balloon Plot
- BusiestAirports-1
- Clustering with k-Means++
- Conditional Histogram
- Correlation Matrix Ellipses
- Correlation matrix circles
- Enhanced Bar Plot
- Heatmap
- Multipanel Geo Lattice Plot
- Multivariate Star Plot
- MultivariateAdaptiveRegressionSplines
- QCC-1
- 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?

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More info

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Thank You!

Thank You for Attending Session

Data Visualization for OBI 11g

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