



Best Practices for Dashboard Design with SAP BusinessObjects Design Studio

Best Practices for Dashboard Design with SAP BusinessObjects Design Studio

Agenda



Best Practices on

- Requirements & Prototyping
- Dashboard “Design”
- Performance

Best Practices for Dashboard Design with SAP BusinessObjects Design Studio Requirements & Prototyping

What is a “dashboard” actually ?



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*"...a **visual** display of the **most important** information needed to **achieve** one or more **objectives**; consolidated and arranged on a **single screen** so the information can be monitored **at a glance**"*

Stephen Few

*"An effective dashboard is the product not of cute gauges, meters and traffic lights, but rather of informed design: more science than art, **more simplicity than dazzle**. It is, above all else, about communication"*

Stephen Few

What is a “dashboard” actually ?

- Dashboards
 - ... are visual displays
 - ... should be presented on a single screen
 - ... should instantly accessible
 - ... need to support the objectives of the viewers
 - ... should only show relevant information
 - ... should help to gain an instant understanding of the data
 - ... should use the space economically

Approximate allocation of the human body's senses

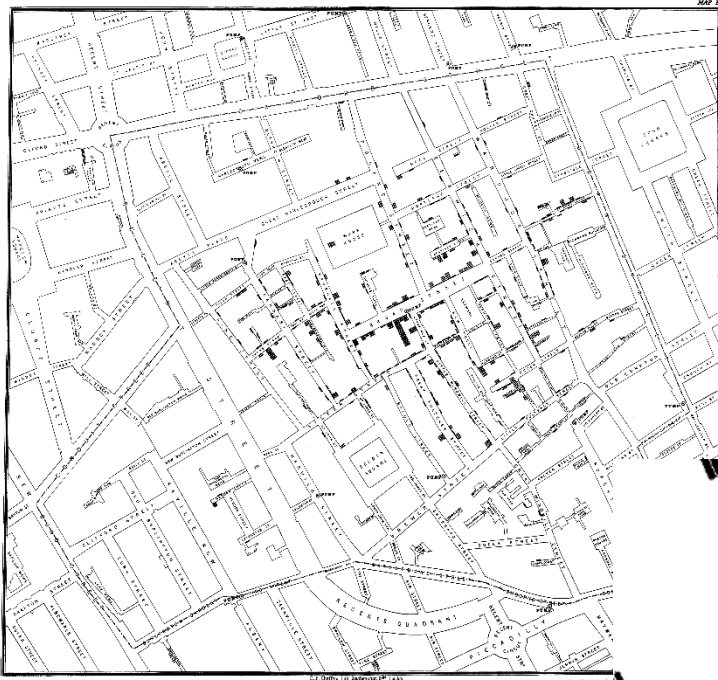


70 %



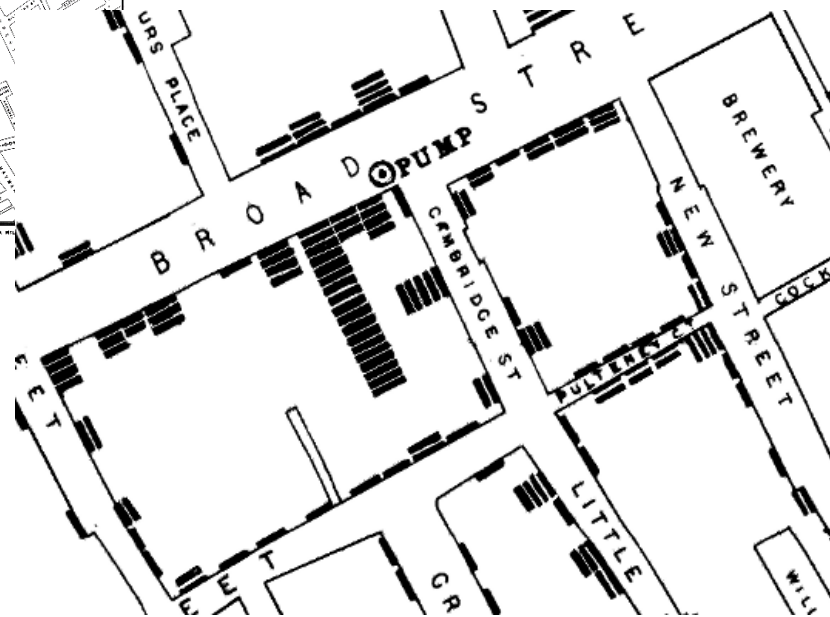
30 %

Why is visualization so important ?

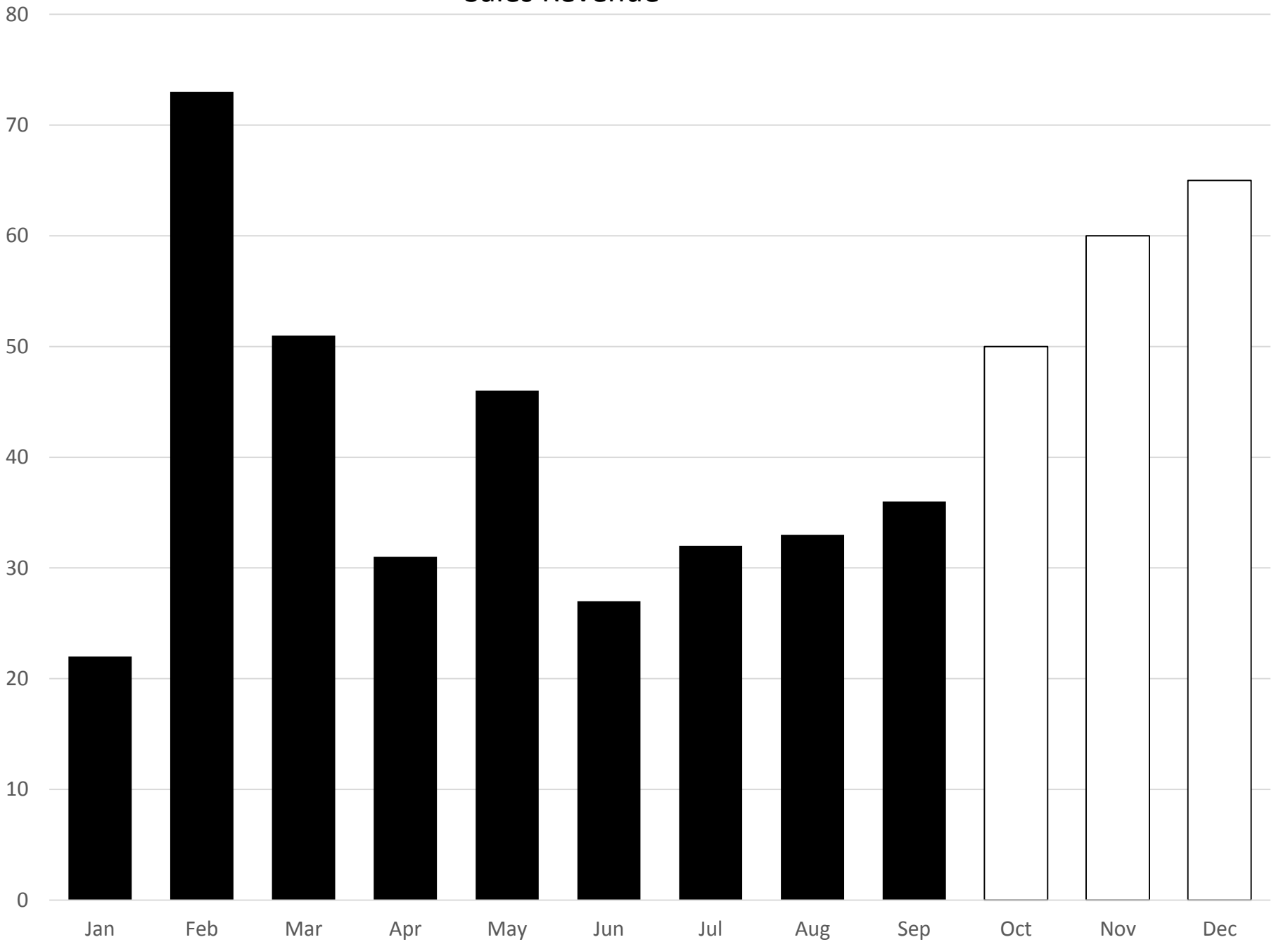


John Snow's (circa 1854) deduction that a cholera epidemic was caused by a bad water pump, circa 1854.

Horizontal lines indicate location of deaths.



Sales Revenue



- Start with understanding the business problems, not the data structure
- Use a “Top – Down” approach
 - Start with the Problem
 - Learn what the associated business goals are
 - Identify how the impact can be measured
- Learn about existing “solutions” to the problem
 - Do reports or dashboards already exist ?
 - How are people using them ?
 - What do people “like” and “don’t like” about them ?
- “A day in their shoes”
 - If needed follow your users
 - Record their workflows
- Remember : Different business area can mean different skill set
 - A power user in Finance <> a power user in sales

You are not the expert – you are there to listen and take lots of notes

- Which business problem are you trying to solve ?
We are currently unable to quickly see a holistic view on our overall worldwide product sales performance. We are unable to identify underperforming products and we are unable to compare sales by individual countries, individual products, or individual sales representatives.
- What are your measurable goals ? What is your “to-be-state” ?
 - Increase the close rate of the individual sales rep by 10%
 - Increase product profitability by 20% by removing least profitable products
 - Increase sales pipeline by 25% in Latin America and Africa
 - Reduce Product Cost by 15% by eliminating low performing products
- What can we “visualize” to measure the impact ? (> what are the KPIs)
 - Sales Quota, Sales Quota Achievement rate
 - Sales Pipeline, Projected close
 - Product Profitability
 -

- DATA related requirements
 - Define and document all your KPIs and measures
 - Outline all required data sources
 - Identify potential data model changes
- USER INTERACTION related requirements
 - How are users going to use the dashboard ? (desktop, tablet, phone)
 - How is the navigation path of the user ?
 - What user interaction are required ? (Print, Export, Sharing, commenting, ...)
- DASHBOARD DESIGN related requirements
 - Overall Layout of the dashboard
 - Corporate Identity
 - “Design” aspects for consuming data

- Prototyping
 - Start with a User Story (short, simple, from the perspective of the business user)
 - Leverage a agile methodology and gather feedback frequent
 - Consider the different devices and different user interactions
 - Create your own library of templates for mockups
 - Try to create interactive mockups

- Prototyping Software
 - Balsamiq (<https://balsamiq.com/products/mockups/>)
 - Mockups; large online library of templates
 - Axure (<http://www.axure.com/>)
 - Interactive HTML mockups
 - OmniGraffle (<https://www.omnigroup.com/omnigraffle/>)
 - Mac, iPad

... and remember there's nothing quicker than grabbing a pen and paper (or a pen and a tablet 😊)

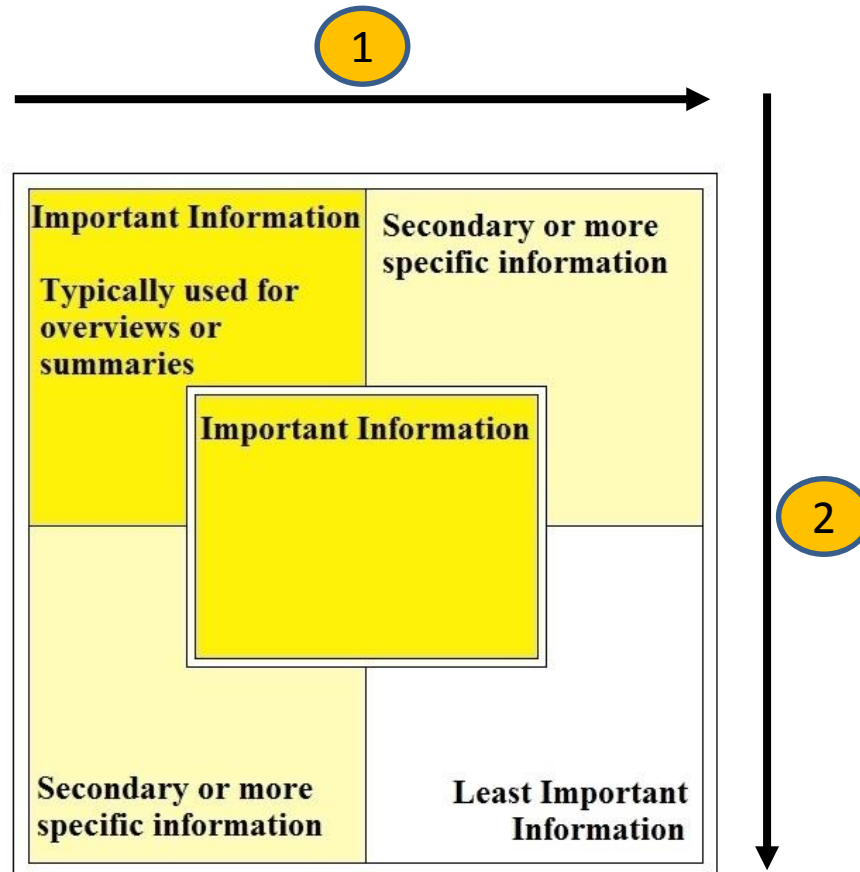
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Dashboard “Design”

Simple Rules for Dashboard Design

1. Placement of the elements
2. Relative size of elements
3. Design Consistency
4. Usage of color (or not)
5. Usage of the “right” visualization
6. Remove clutter
7. Avoid Data Fragmentation
8. Consider User Interactions

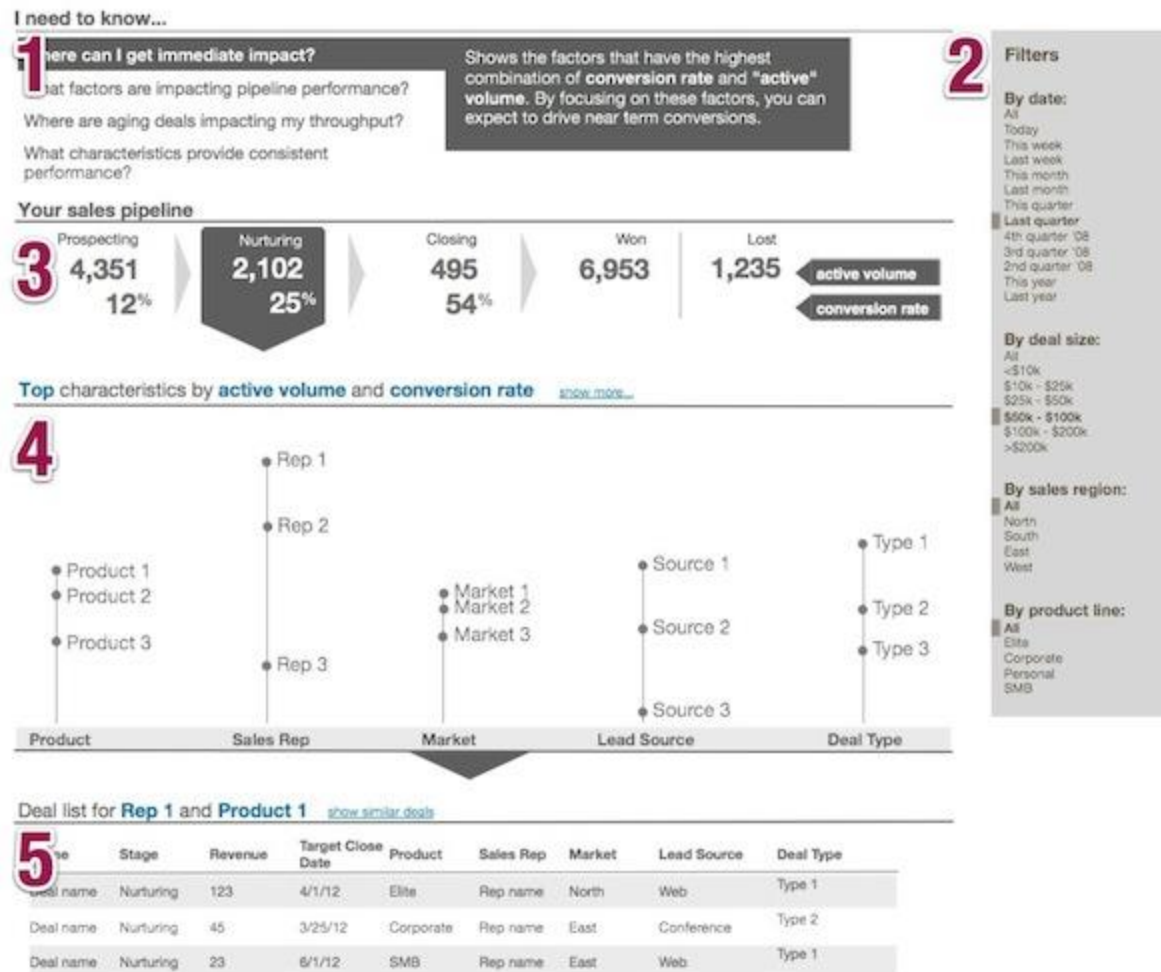
- Place your most important information in the upper left
- Place least important information in the lower right



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Simple Rules for Dashboard Design – Placement of Elements

- Consider the “structure” of the underlying system
 - Example: sales leads move through stages in a pipeline (think of a sales funnel !)



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Simple Rules for Dashboard Design – Placement of Elements

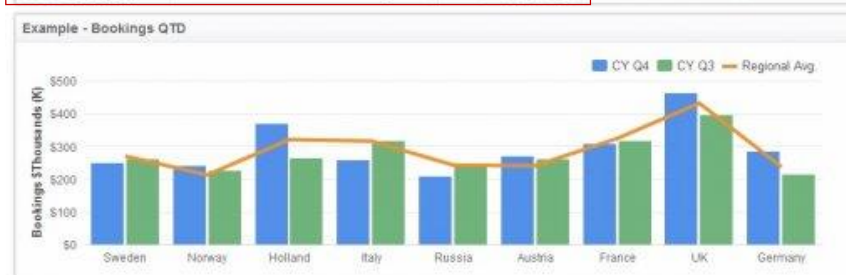


- More space used implies higher importance
- Same size implies equal importance
- Use Highlighting as part of your dashboard design (but do not over-do it)
- Add some variation in size that is given to a specific visualization in the dashboard

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Simple Rules for Dashboard Design – Relative Size

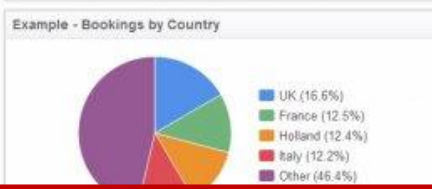
Highlighting



Example - Stock Quotes

Company	Price	Change	% Chg	Volume
Apple Inc.	\$541.39	\$0.00	0.00%	0.0 M
Google Inc.	\$696.88	\$0.00	0.00%	0.0 M
Microsoft Corpora	\$27.32	-\$0.00	0.00%	0.0 M
International Bus	\$194.20	\$0.00	0.00%	0.0 M
Intel Corporation	\$20.65	\$0.00	0.00%	0.0 M

Variation in Size



Highlighting



Good Design Choices

- Unambiguously marked panels
- Easily distinguished panels, based on different media usage
- Good use of separation
- Good use of colors (usage of RED for alerts)

- Styles
- Labels
- Colour
- Icons
- Display methods
- Scales
- Navigation elements
-

Simple Rules

- Use Design Studio templates and CSS to achieve design consistency
- Use colors only with a meaning (for example : red = Ferrari, Diet Coke = silver)

Bad Design Choices

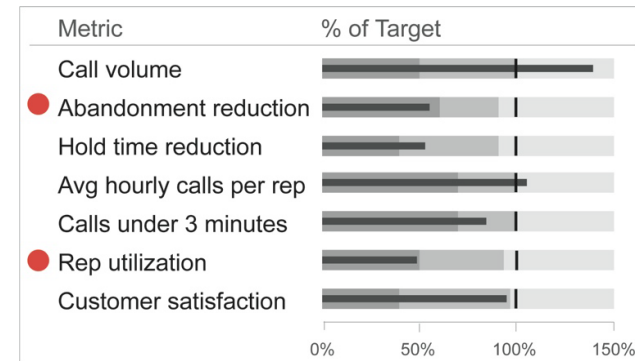
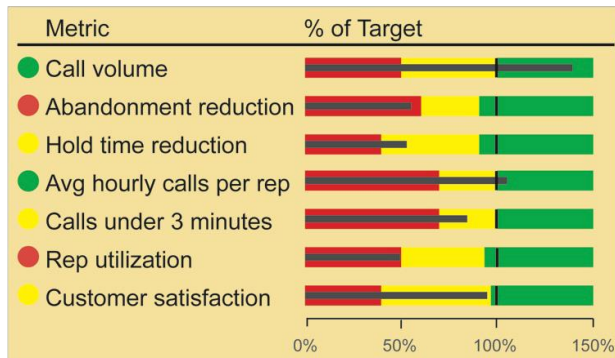
- Red, Yellow, Green is used for gauges on the right hand side
- Yellow is used for “Forecast” in the Bookings chart
- Yellow is used in the Customer Satisfaction chart (bottom left)



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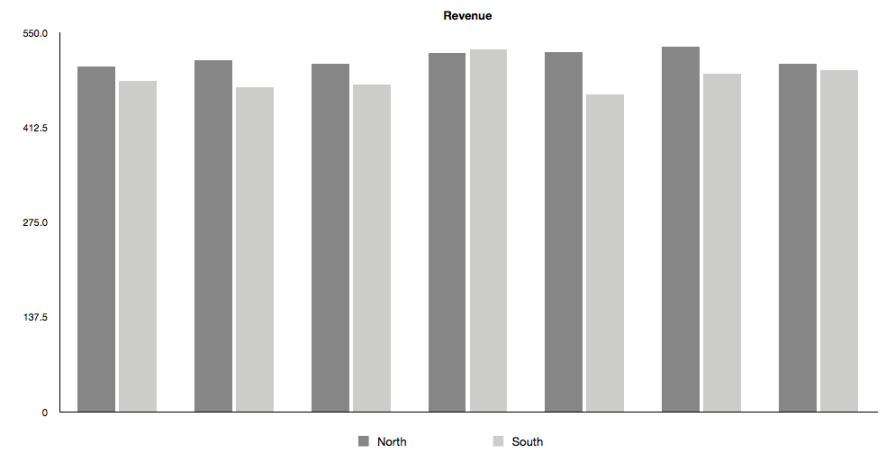
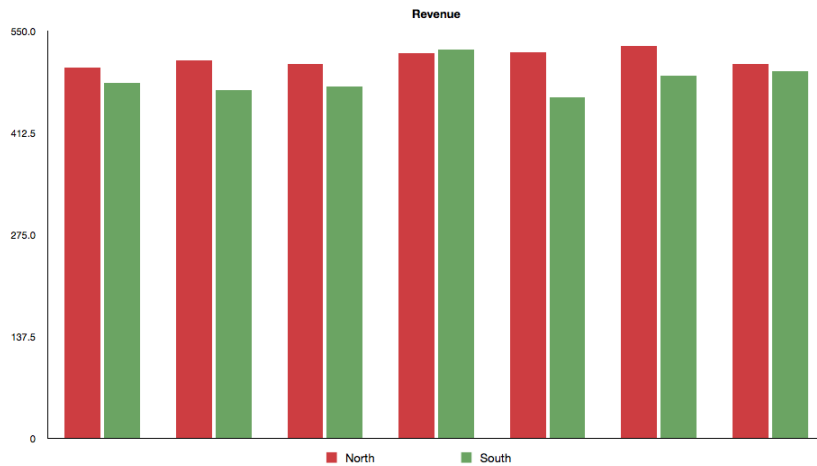
Simple Rules for Dashboard Design – Usage of color

- Before using color ask yourself
 - Do we need the color ?
 - Does the color have any meaning ?



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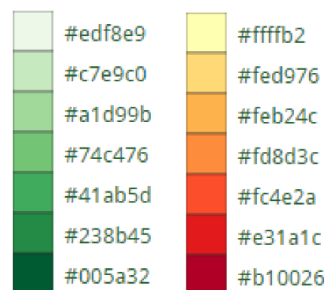
Simple Rules for Dashboard Design – Usage of color



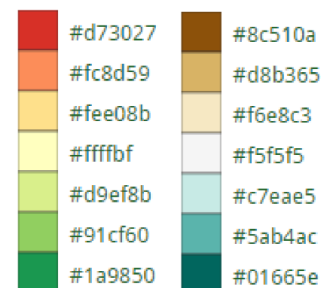
Source: <http://www.performance-ideas.com/2012/08/15/dashboard-colors/>

- Humans can only differentiate effectively around 7 color steps
- Adding more qualitative colors usually just adds noise....
- **Sequential** scheme: when you are ordering values from low to high.
- **Divergent** scheme: when the values are ordered and there is a critical mid-point (e.g. an average or zero).
- **Categorical** scheme: when data falls into distinct groups (e.g. Products) and therefore requires contrast between adjacent colors.

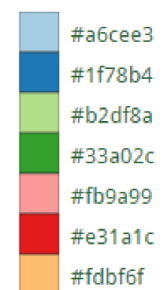
Sequential



Diverging



Qualitative



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Simple Rules for Dashboard Design – Usage of color

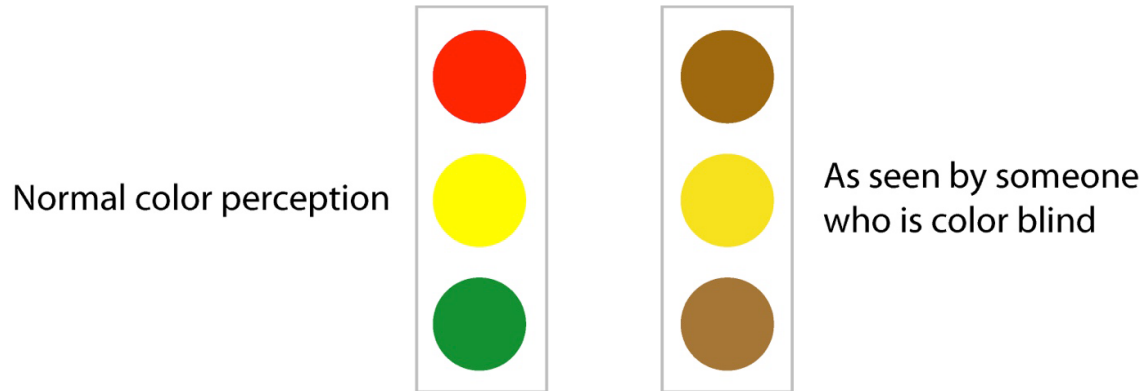
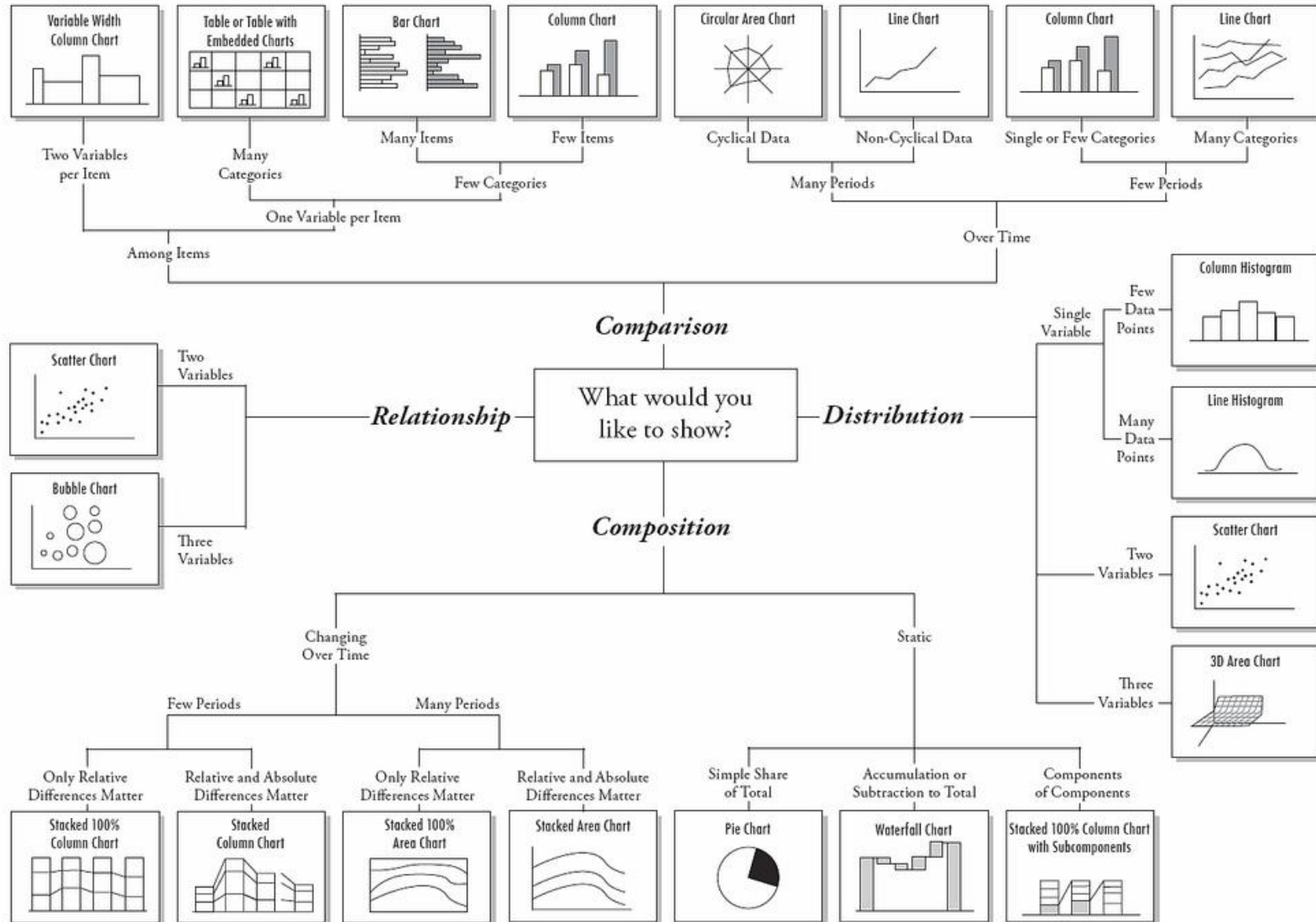
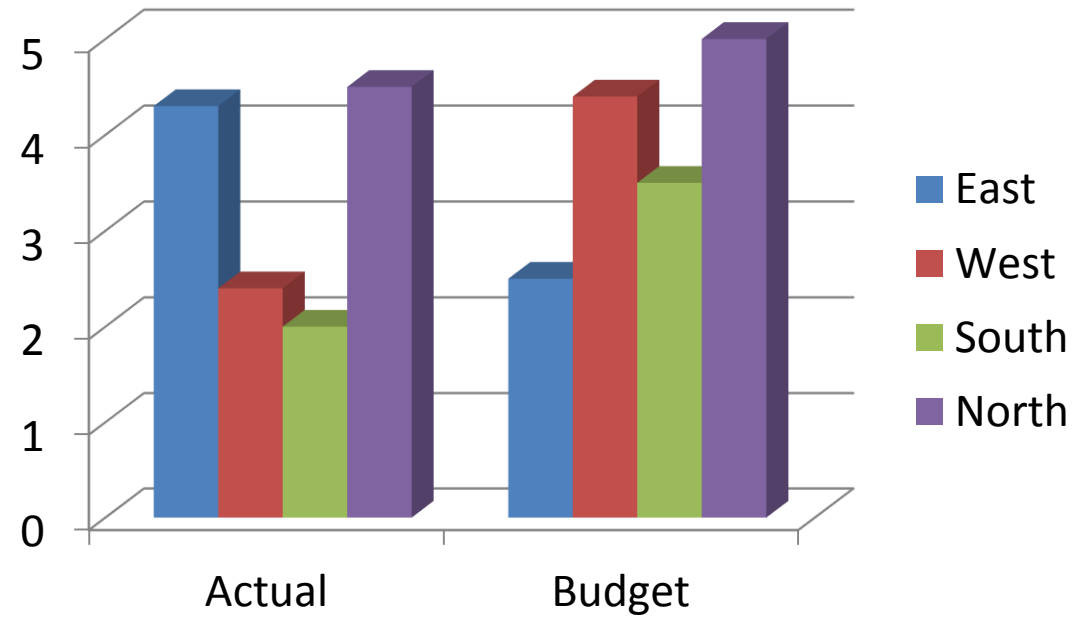


Chart Suggestions—A Thought-Starter



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Simple Rules for Dashboard Design – Usage of the “right” visualization

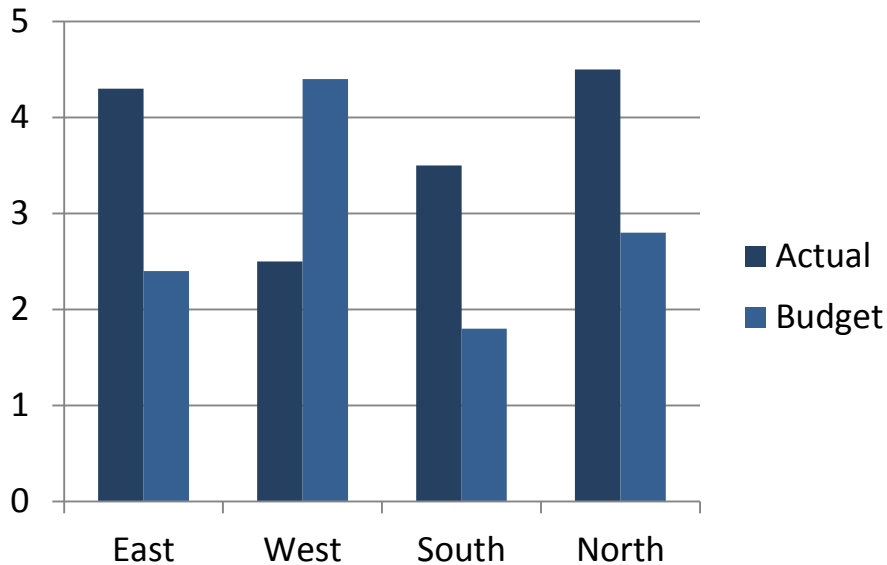


Bad Design Choices

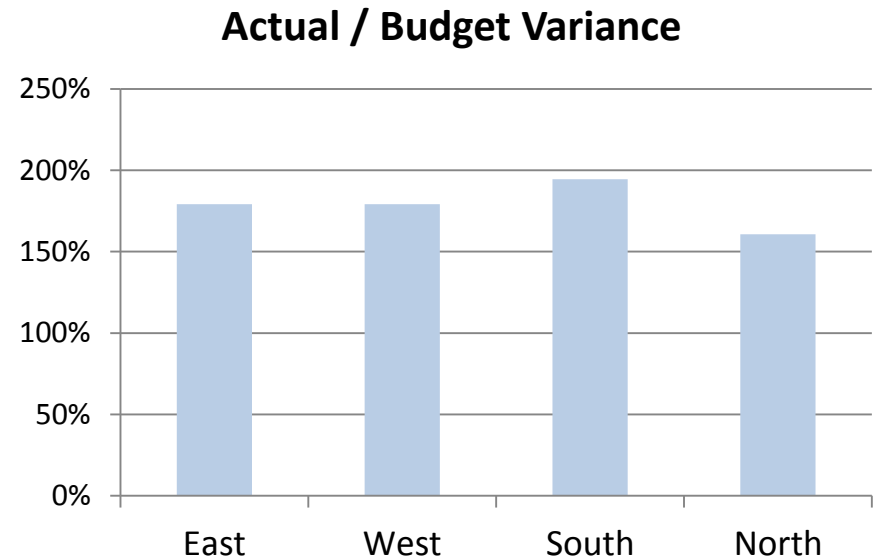
- Too much color
- Colors are too bright (distracting)
- 3D View does not add any values
- Actual and Budget can't be compared

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Simple Rules for Dashboard Design – Usage of the “right” visualization



Actual and Budget can be compared now



Do we need to show Actual vs Budget or just the variance ?

A **large share** of ink on a graphic should present **data** -information, the ink changing as the data change. **Data-ink is the non erasable core** of a graphic, the non-redundant ink arranged in response to variation in the numbers represented. Then Data-ink ratio = data-ink / total ink used to print the graphic.

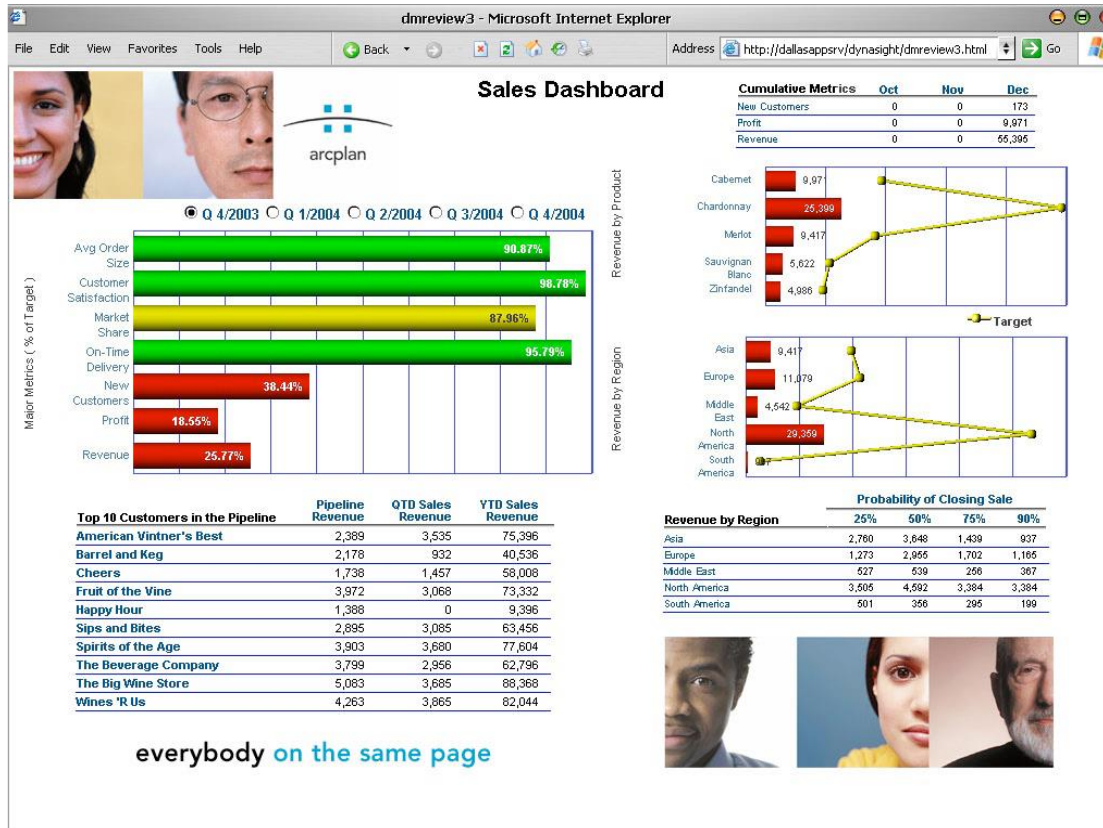
Edward Tufte

Simple Rules

- Reduce the non-data pixels
 - Eliminate all unnecessary non-data elements
 - Graphics, borders, color usage without meaning, fill colors, grid lines, ...
 - De-emphasize the remaining non-data elements
- Enhance the data
 - Highlight the most important data elements

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Simple Rules for Dashboard Design – Remove clutter



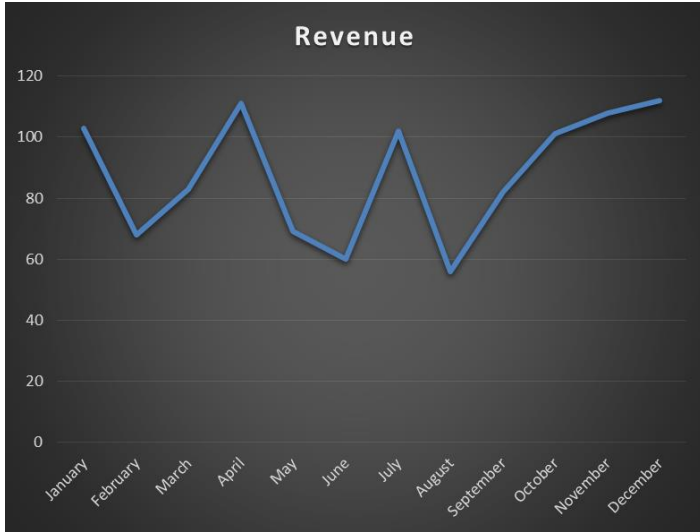
- Images
- Logo
- Slogan
- Bold lines

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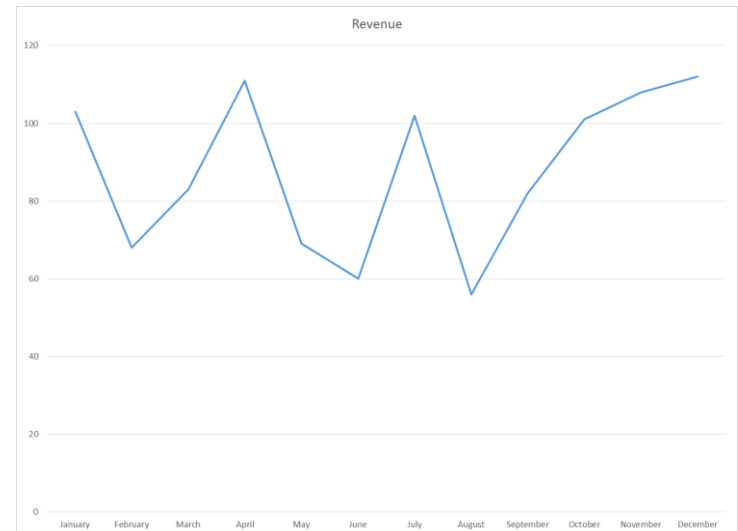
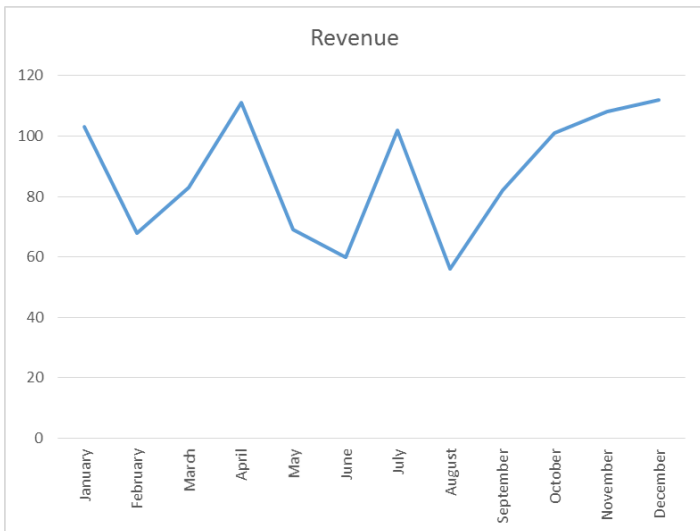
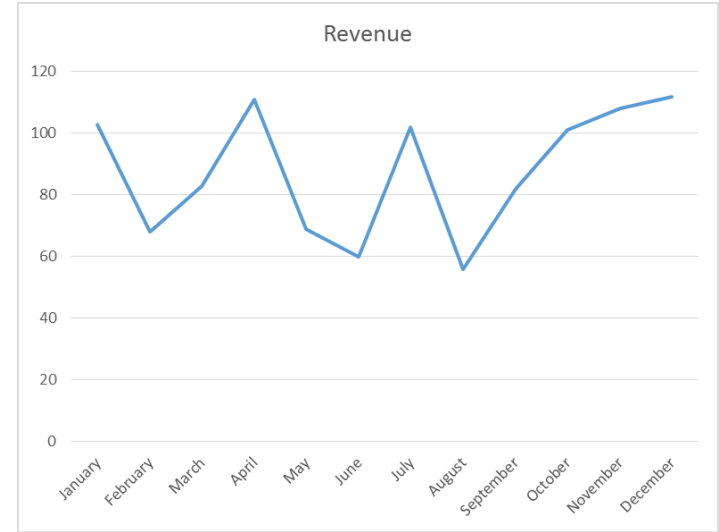
Simple Rules for Dashboard Design – Remove clutter



Bad



Good

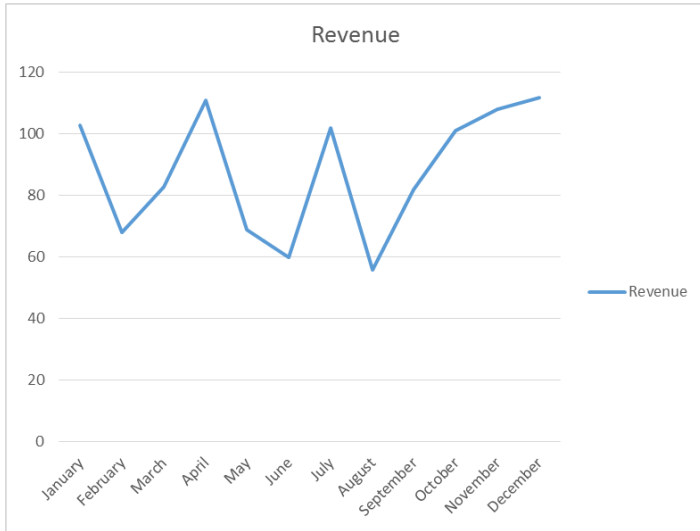


Best Practices for Dashboard Design with SAP BusinessObjects Design Studio

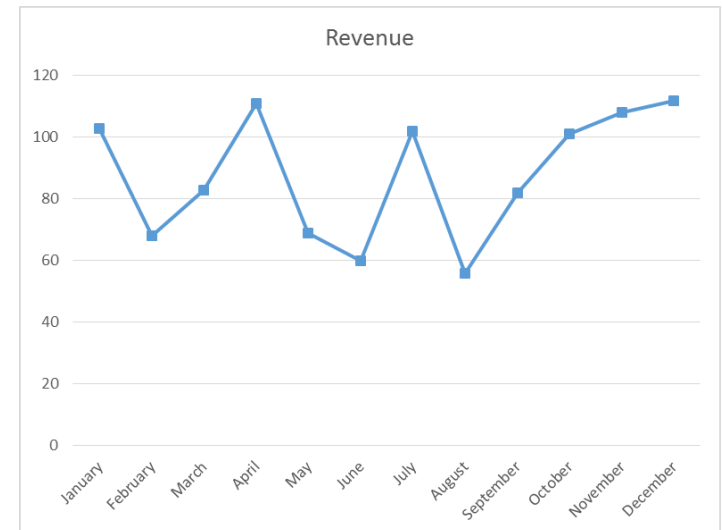
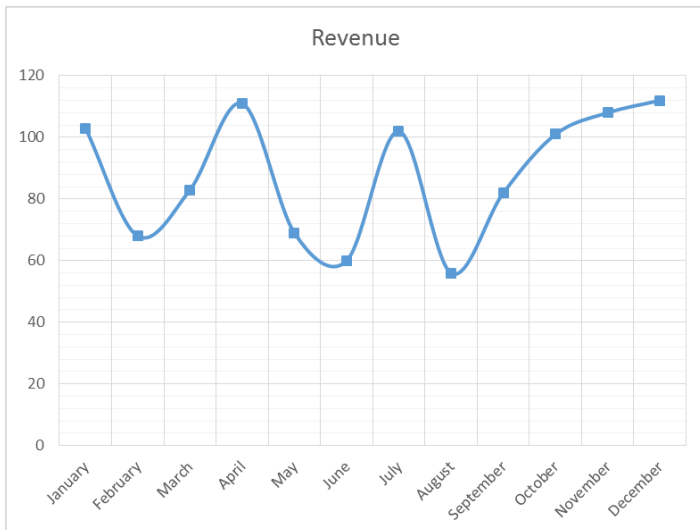
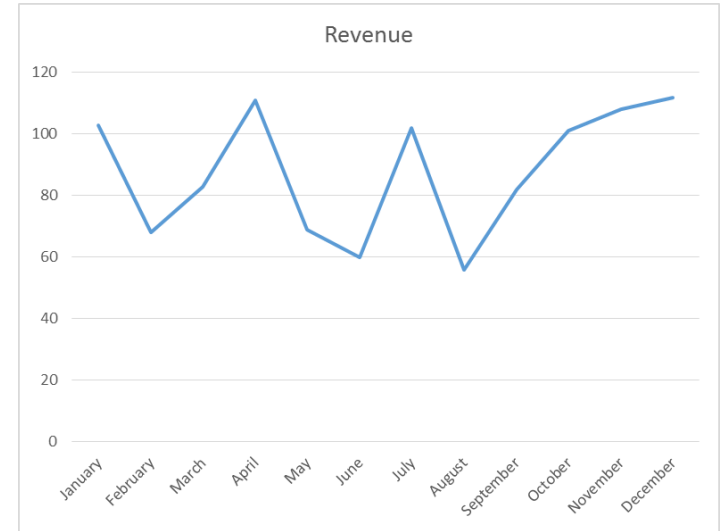
Simple Rules for Dashboard Design – Remove clutter



Bad



Good



*A major benefit of a well designed dashboard is the ability to **compare data**, leading to more insight*

- Fragmenting data
 - Separate data into several screens
 - Separate into “instances” of the same screen by using navigation (> Tabs, ...)

Simple Rules

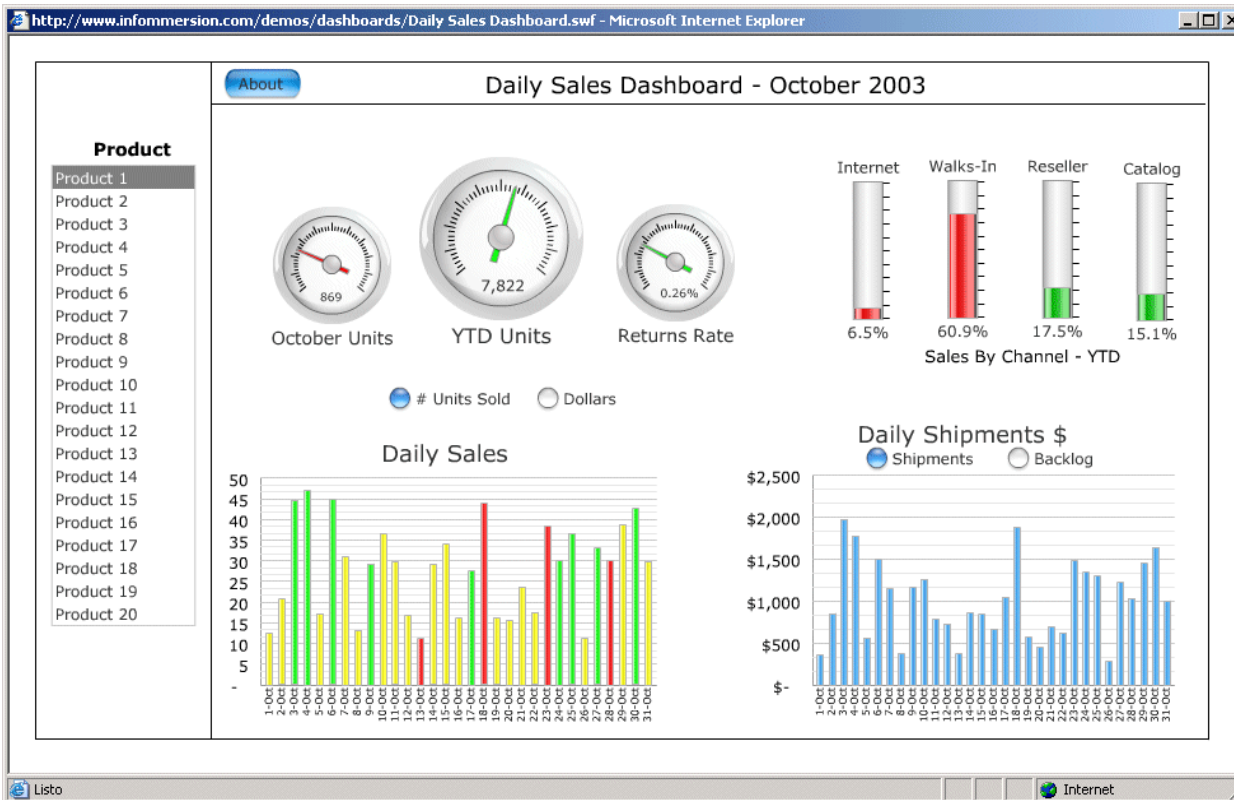
- Avoid data fragmentation when the user needs the “bigger picture” comparisons
- Use fragmentation to your advantage to organize unrelated information
- Combine data into a single visualization if it produces a meaningful result
- Place related items closer together (rule of proximity)

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Simple Rules for Dashboard Design – Avoid Data Fragmentation

Data Fragmentation

- Daily sales broken down for each product
- No product comparison possible



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Simple Rules for Dashboard Design – Consider User Interaction

- Provide your dashboard with a “Help” option
- Provide “Simple Navigation Help”
- Think about options to save space

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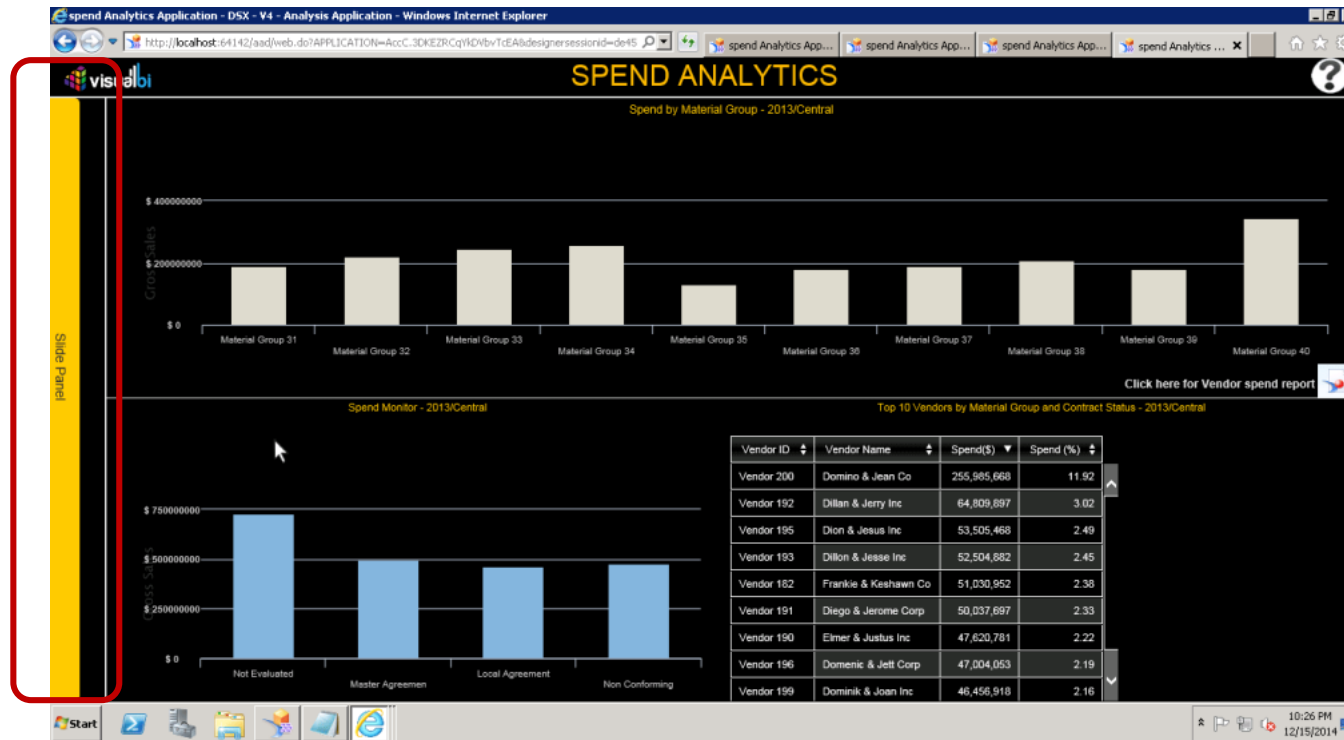
Simple Rules for Dashboard Design – Consider User Interaction



Best Practices for Dashboard Design with SAP BusinessObjects Design Studio

Simple Rules for Dashboard Design – Consider User Interaction

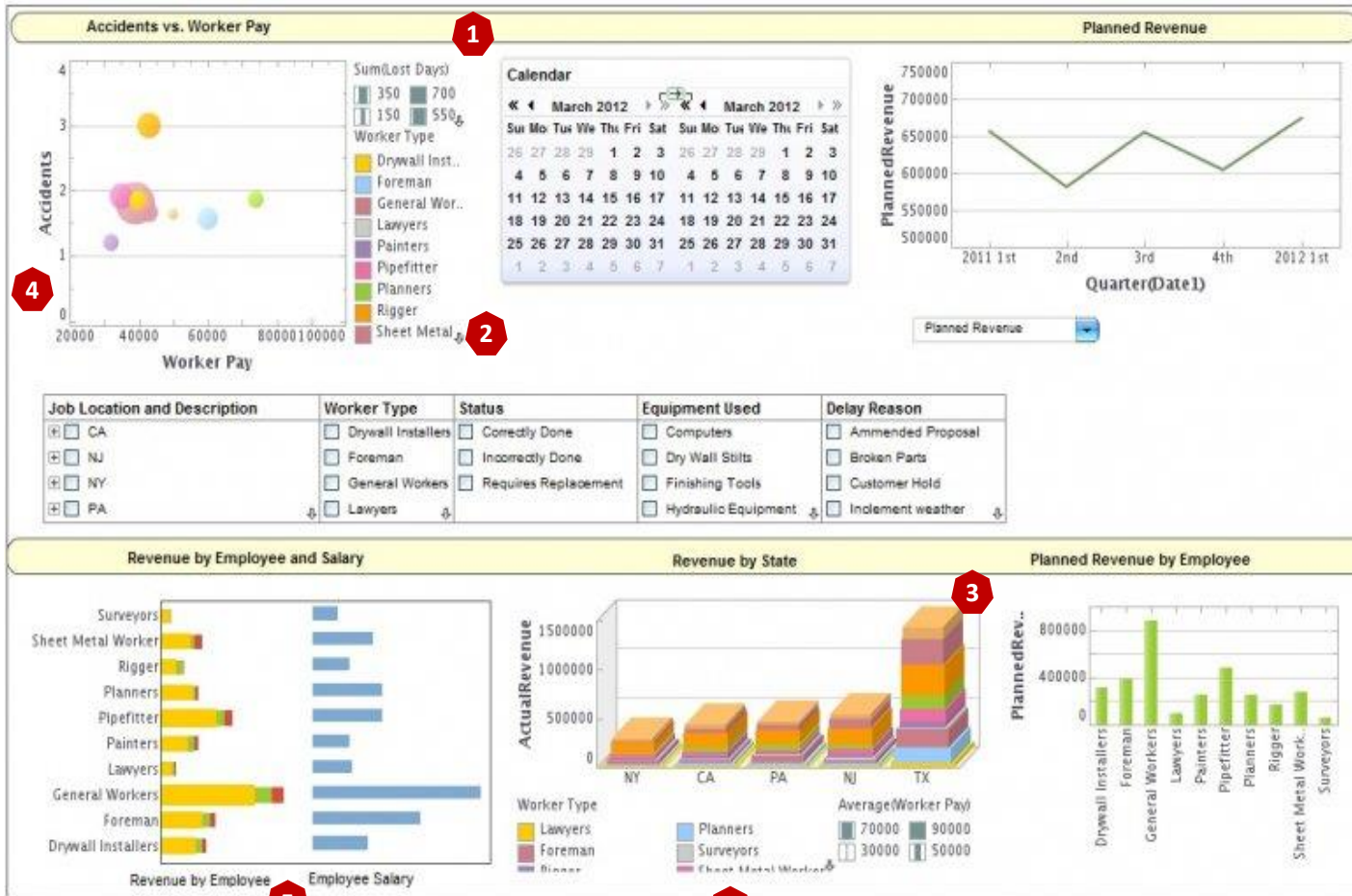
Saving space with a simple side panel to hide elements such as filters



<http://scn.sap.com/community/businessobjects-design-studio/blog/2015/01/27/css-tips-tricks-sliding-panel-transition-in-sap-design-studio>

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Some Examples



Bad Design Choices

- (1) Not clear what the top right 'sum (lost days)' graphical element refers to.
- (2) The colour palette contains ten items, which exceeds the upper limit of short-term memory.
- (3) The width variations in the 2D stacked bar chart are meaningless
- (4) The colour-pair associations are no longer used in the 2D stacked bar chart, with the same colours used across all occupations
- (5) Chart is missing a scale and explanation of the color usage
- (6) Incomplete legend

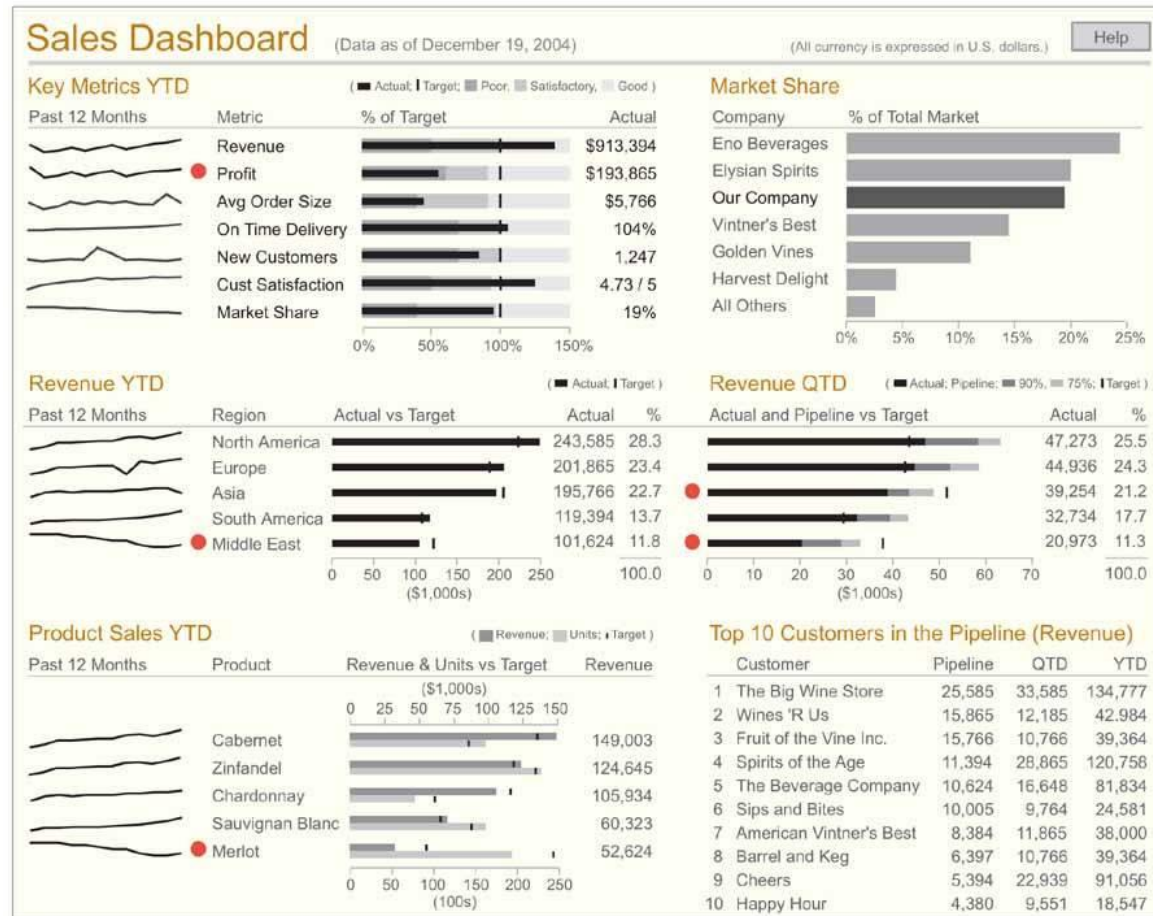
Best Practices for Dashboard Design with SAP BusinessObjects Design Studio

Some Examples



Good Design Choices

- Little use of colors
- Top left area is used for most critical information
- Very concise display media
- Key measures are shown in charts and as actual text display
- No “clutter” (> simple Help option)
- Data is only separated by using “white space”



- Your dashboard must fit on a single screen (no scrolling on any device)
- Place most important information top left, but also consider the “flow” of data
- Use colors in a meaningful and consistent way
- Measures should always be shown with context
- Choose the “right” measure (Actual & Budget vs Variance)
- Data visualizations should always come with scales and labels
- Comparable data should be on identical scales

Best Practices for Dashboard Design with SAP BusinessObjects Design Studio

Performance Topics

- Data Sources
 - Only load those data sources at startup, that are really needed for the initial screen
 - In case of tabs / pagebooks, load data sources per “view”
 - Add logic to not load the data twice
 - Add “Background processing” to your application
 - Screens become visible quicker, while data sources are still loading
- Note:
 - SAP BusinessObjects Design Studio is loading the data source sequentially (not in parallel) prior to release 1.5
 - Parallel Loading of BEx Queries is planned for the release 1.5 of SAP Design Studio

- BEx Query Design
 - For large sets of key figures, use the option - “Use Selection of Structure Members” in transaction RSRT (Query Monitor) as part of the Query Properties
 - Query Read Mode should be configured to read data while navigate (Transaction RSRT, Query Monitor)
 - Leverage the capabilities of the Restricted Key and Calculated Key Figures
 - Leverage SAP Variables as part of the BEx Query
 - Can be shared across queries, minimizing development downstream
 - List of Values are being generated automatically

- **Display Attributes**
 - As part of the definition of Display Attributes in SAP NetWeaver BW it is also possible to configure if the Display Attribute should be displayed as part of the F4 Help / List of Values for a BEx Variable.
 - As large list of values can consume a lot memory, you should consider carefully if those Display Attributes are really needed as part of the list of values and in case they are not needed you should remove them from the list of value by changing the configuration in SAP NetWeaver BW.
- **Additional Option:**
 - Starting with SAP NetWeaver BW 7.01 Support Package 09 / SAP NetWeaver BW 7.30 Support Package 3 customers can use the BAdI `RSR_VARIABLE_F4_RESTRICT_BADI` to use a set of criteria to restrict the list of members for an input screen. For more information, see F1 help for this BAdI (transaction SE18, enhancement spot `RSR_VARIABLE_F4_RESTRICT`).
 - See Note 1416952

- Variables vs Filter
 - Design Studio 1.3 does automatically merge all variables
 - With release 1.5 the behavior can be configured
 - Changes to the “variables” will impact all queries that contain variables (also those datasources that are not using the involved variable)
 - Use “On Variable Initialization” and not “On Startup” to configure defaults (avoiding second initialization)
- There are three options to filter data (ordered according to performance impact – High to Low)
 1. setVariable
 2. setFilter
 3. setDataSelection

- Variables
 - If needed set variable values right after each other (setVariableValue)
 - >> Results in a single backend call
 - Try to use “On Variable Initialization” over “On Startup”
 - >> Variable Initialization happens before Startup
 - >> If done at “On Startup” you might initialize variables twice

Performance – Design Studio Sizing

- Design Studio Sizing
 - Follow the standard SAP BusinessObjects BI 4.x sizing details (www.sap.com/bisizing)
 - Consider allocating a separate APS Server for SAP Design Studio
 - Ensure the DSL Bridge is sized correct (“Memory hungry”)
 - Make sure the session parameters for Design Studio are set correct (default is 15)
 - Design Studio APS Heap Size
 - Recommendation : 20 – 25 Users / 8 GB, but larger apps require adjustments
 - See SAP note 1177020 for details
- Enabling JavaScript Compression to Enhance BI Platform 4.1 Performance
 - See SAP note 1931691 for details
- How to measure performance
 - URL Parameter **&PROFILING=X**

SCN Blog:

<http://scn.sap.com/community/businessobjects-design-studio/blog/2014/10/31/why-sizing-matters-for-sap-design-studio-performance>

<http://scn.sap.com/community/businessobjects-design-studio/blog/2013/12/08/design-studio-tips-and-tricks-measuring-performance>

- Design Studio Client Customization
 - Setting JVM Mode to “server”
 - Memory allocation

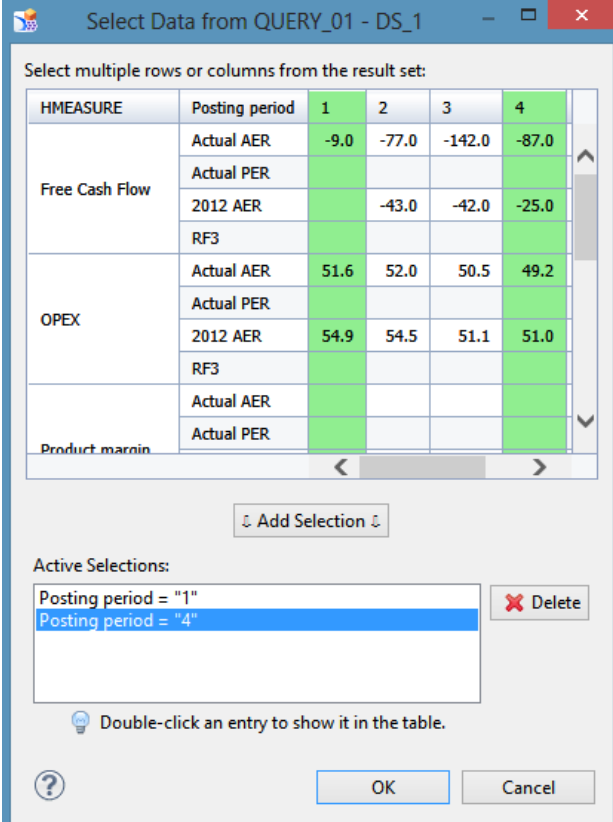
<http://visualbi.com/blogs/design-studio/sap-design-studio-client-tool-customization-part-01/>

<http://visualbi.com/blogs/design-studio/sap-design-studio-client-tool-customization-part-02/>

<http://scn.sap.com/community/businessobjects-design-studio/blog/2014/11/26/design-studio-14-client-tools--first-view>

Performance – Data Selection

- Using data selection feature for charts to reduce the number of data sources in your application.
- Select Dimensions / Key Figures to display in different charts via UI or Scripting API to reduce the number of required data sources



Select Data from QUERY_01 - DS_1

Select multiple rows or columns from the result set:

HMEASURE	Posting period	1	2	3	4
Free Cash Flow	Actual AER	-9.0	-77.0	-142.0	-87.0
	Actual PER				
	2012 AER		-43.0	-42.0	-25.0
	RF3				
OPEX	Actual AER	51.6	52.0	50.5	49.2
	Actual PER				
	2012 AER	54.9	54.5	51.1	51.0
	RF3				
Product margin	Actual AER				
	Actual PER				

↓ Add Selection ↓

Active Selections:

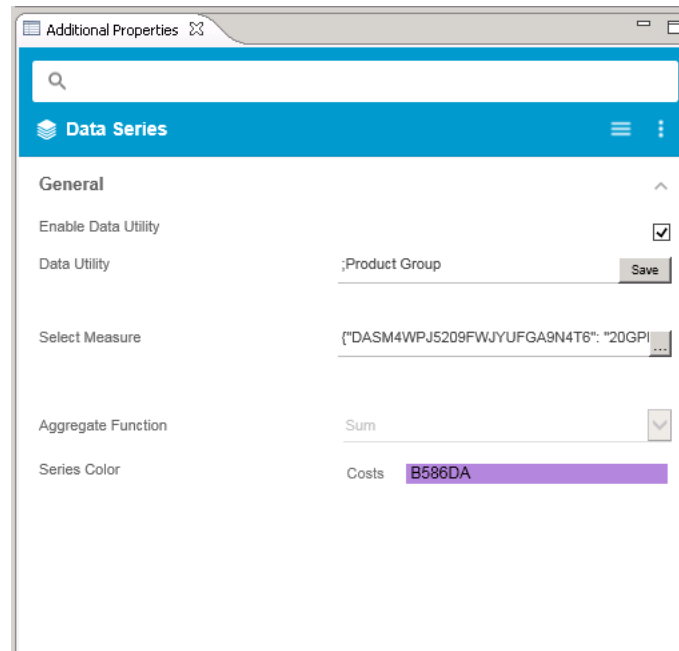
- Posting period = "1"
- Posting period = "4"

ⓧ Delete

💡 Double-click an entry to show it in the table.

ⓧ ? OK Cancel

- Visual BI Extensions – Data Utility
 - Allows to select dimensions and measures for a specific chart
 - Gives the option to select a single data source for several charts



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Performance – Visual BI Extensions (VBX) Data Utility



1. Data Source

Initial View of QUERY_SIMPLE - DS_1

Product Group	Product Category	Costs	Net Value
Cameras	Digital Compact Cameras	11,009,006,769.68	17,133,238,996.00
	Digital SLR	29,680,072,890.24	38,475,450,890.00
Cell Phone Accessories	Cell Phone Cases	1,048,096,056.94	1,365,909,732.00
	Handfree Sets	2,186,930,190.43	3,536,516,231.00
Cell Phones	Android Phones	6,744,092,178.39	10,559,843,351.00
	Apple iOS	4,741,911,048.60	6,671,621,835.00
	Blackberry OS	4,112,430,753.99	6,686,929,288.00
	Windows Phone	1,284,698,330.50	1,993,758,640.00
Laptops	Laptop	15,998,543,838.79	28,435,904,042.00
	Mac Book	30,078,872,442.83	39,051,021,822.00
MP3 & Headphones	Headphones	2,355,009,959.01	2,648,289,467.00
	MP3 Player	9,230,458,259.90	12,556,551,740.00
TV	LCD TV	41,580,801,221.30	58,118,196,052.00
	Plasma TV	61,427,130,113.57	81,694,420,539.00

2. Select Dimension(s)

Columns

Columns

Rows

Product Group
Product Category

Preview

2. Select Measure(s)

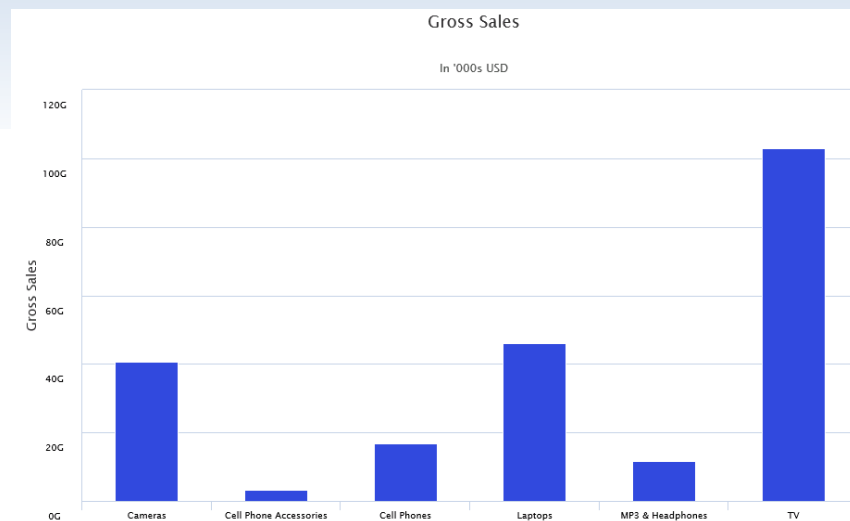
Select Data from QUERY_SIMPLE - DS_1

Product Group	Product Category	Costs	Net Value	Open order quantity	Open Order Value	Order Quantity
Cameras	Digital Compact Cameras	11,009,006,769.68	17,133,238,996.00	3,020,575	1,156,344,825.00	44,745,554
	Digital SLR	29,680,072,890.24	38,475,450,890.00	3,771,782	2,597,950,768.00	55,851,610
Cell Phone Accessories	Cell Phone Cases	1,048,096,056.94	1,365,909,732.00	3,018,538	92,876,040.00	44,771,116
	Handfree Sets	2,186,930,190.43	3,536,516,231.00	3,015,123	238,136,777.00	44,759,369
Cell Phones	Android Phones	6,744,092,178.39	10,559,843,351.00	3,735,894	713,682,156.00	55,878,099
	Apple iOS	4,741,911,048.60	6,671,621,835.00	2,068,669	451,268,281.00	33,528,915
	Blackberry OS	4,112,430,753.99	6,686,929,288.00	1,514,041	452,698,259.00	22,364,312
	Windows Phone	1,284,698,330.50	1,993,758,640.00	1,517,252	135,022,068.00	22,400,660
Laptops	Laptop	15,998,543,838.79	28,435,904,042.00	3,018,867	1,920,876,383.00	44,682,658
	Mac Book	30,078,872,442.83	39,051,021,822.00	3,766,224	2,631,897,076.00	55,864,878
MP3 & Headphones	Headphones	2,355,009,959.01	2,648,289,467.00	2,266,109	178,933,441.00	33,529,913
	MP3 Player	9,230,458,259.90	12,556,551,740.00	5,275,278	846,061,252.00	78,295,340
TV	LCD TV	41,580,801,221.30	58,118,196,052.00	4,530,822	3,918,358,878.00	67,138,648

1. Data Source

2. Select Dimension(s)

2. Select Measure(s)



Performance – Scripting

- On Variable Initialization
 - Use this event to set values for variables
- On Background Processing
 - Use this event to “chain” the loading of data sources
 - Can also be used to populate values for components that are not visible initially. For example a listbox for a customer selection on “Tab 2” when “Tab 1” is the initial view

Order of items

1. Initialize Data sources
2. On Variable Initialization
3. Prompt dialog (mandatory variables without values)
4. Initialize Application
5. On Startup
6. Rendering of components
7. On Background Processing

- Parallel Query Execution / Processing Groups
 - Supported with SAP BusinessObjects Design Studio 1.5+
 - Data Sources can be assigned to a Processing Group
 - Each Processing Group will result in a single backend session
 - Example:
 - Dashboard with 5 BEx Queries configured in 5 Processing Groups (>> all queries in a parallel)
 - >> 5 backend sessions for a single user execution of the dashboard

- Parallel Query Execution / Processing Groups
 - Allows to parallelize the data requests
 - Resultset requests at rendering are parallelized as well
- Session Handling
 - Each processing group results in 1 additional session (per user)
 - Example: 5 Processing Groups
 - Result 6 Sessions (1 main session, 1 session per processing group)
- Sizing Implications
 - Very little impact on memory usage
 - Higher impact on CPU Usage (more requests in a shorter window)
 - Parallel sessions should be considered like additional “concurrent users”
 - More details: SAP Note 1177020

- Current Limitations for Processing Groups
 - Processing Groups / Parallel query execution is only supported with SAP BusinessObjects BI as platform for SAP BusinessObjects Design Studio
 - Parallel query execution can not be used with planning-enabled BEx queries
 - Parallel query execution can not be used in combination with merged variables. Variables need to be “un-merged”.

- Should you always use Parallel Data Sources ?
 - Data Sources with short runtime should not always be executed in parallel as the overhead might become too large
 - Data Sources that need to be “visible” right away for the user are good candidates for becoming parallel data sources
 - Also consider the time it takes for variables, as variables need to become unmerged

Important SAP Notes

- Important SAP Notes for SAP Design Studio
 - 1894594 - Design Studio - Support Note for NetWeaver Add-On
 - 1773751 - Design Studio - Support Note for Client
 - 1963416 - Simplified example for problem analysis
 - 1931691 - Performance hints for Design Studio applications
 - 1894504 - Design Studio - Support Note for BIP Add-On
 - 1177020 - SAP BusinessObjects Design Studio - Sizing Information
 - 1983117 - Design Studio - Support Note for DSL with BIP Add-On
 - 1760372 - SAP BusinessObjects Design Studio - Release Schedule

Additional Resources:

- [Stephen Few on Amazon](#)
- [Stephen Few – Perceptual Edge](#)
- [SUCCESS Rules \(Hichert\)](#)
- [Hichert – Before and After Examples](#)
- [The Functional Art: An introduction to information graphics and visualization \(Voices That Matter\)](#)
- [The Functional Art](#)
- [Visualize This: The FlowingData Guide to Design, Visualization, and Statistics](#)
- [Don't Make Me Think](#)
- [Lean UX](#)
- [Interaction Design Foundation](#)
- [Designing Data Visualizations: Representing Informational Relationships](#)
- [Beautiful Visualization: Looking at Data through the Eyes of Experts](#)
- [Knowledge Is Beautiful](#)
- [Agile Data Warehousing Project Management: Business Intelligence Systems Using Scrum](#)

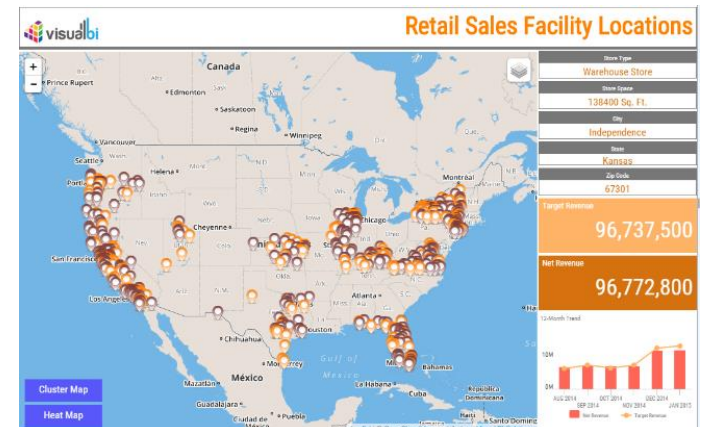
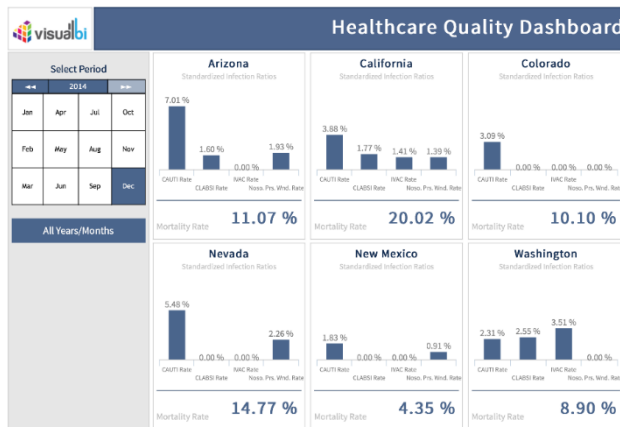
Visual BI Extensions for SAP BusinessObjects Design Studio 30 Day Trial



Download your 30 Day Trial from:

www.visualbi.com/DSXtrial

You will receive all components (charts, maps, selectors, utilities)
No functional limitation



Thank You

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