Lesson 9:
Information Dashboard Design

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Content

- Introducing information dashboard
- Information dashboard design best practices
- Common mistakes in dashboard design
- Ideal graphs for information dashboard
  - Bullet graph
  - Sparklines
  - Bandlines

Introducing information dashboard

A visual display

of

the most important information needed to achieve one or more objectives

that have been

consolidated on a single computer screen

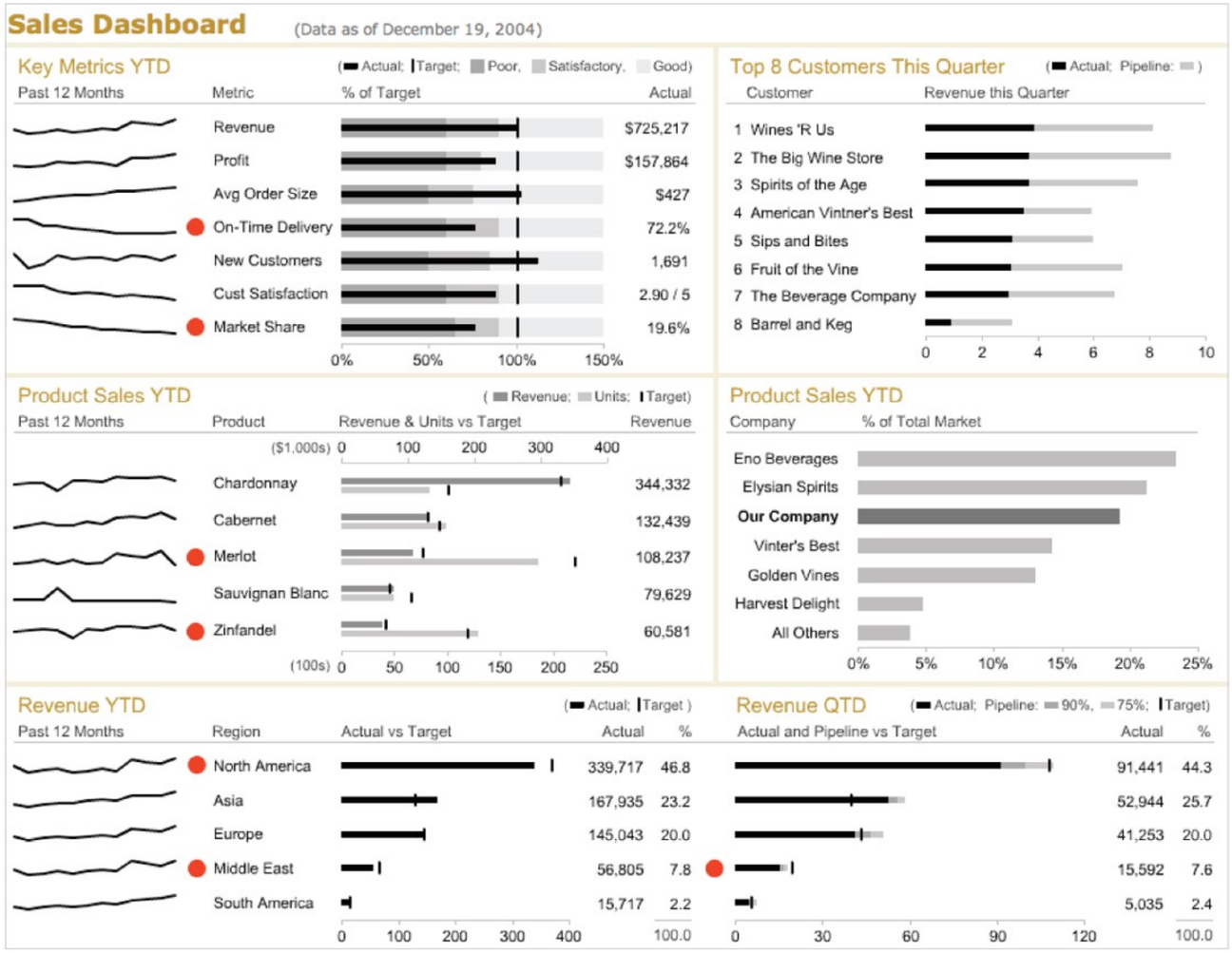
so it can be

monitored at a glace

Source: Stephen Few (2006) Information Dashboard Design

Why are dashboards so important?

- A well-designed performance dashboard helps you to see more clearly by helping you to understand each fact more quickly so you can find patterns in the storm.



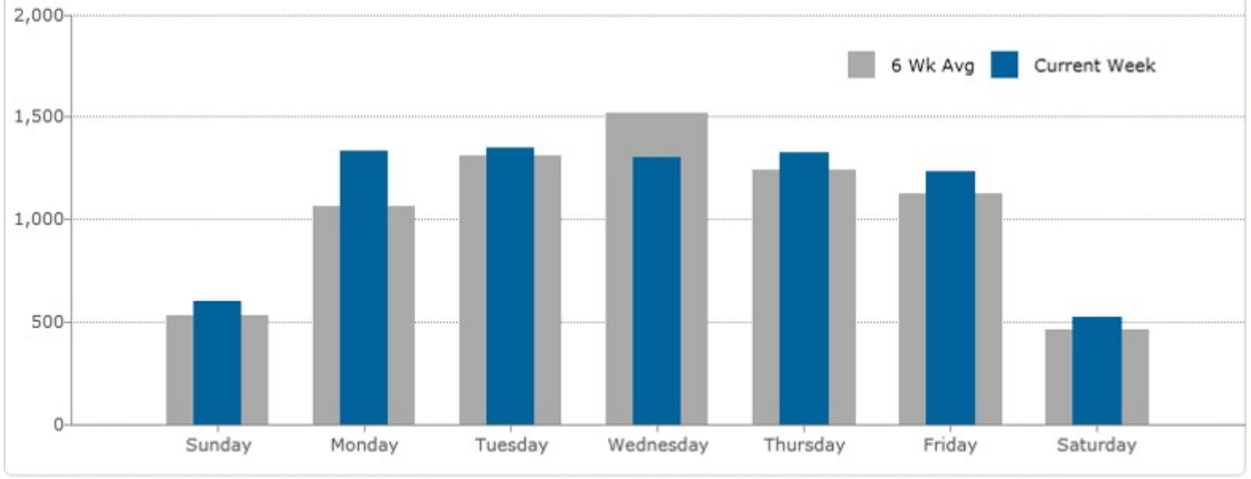
Classifying Dashboards by Role

- Dashboards for strategic purpose
- Dashboards for operational purpose
- Dashboards for analytics purpose

Dashboards for operational purpose

DMANA **Website Operational Dashboard** June 11th, 2011

Unique Visitors by Day of Week



Bounce Rate		Change
Yesterday	66.90 %	0.27 %
6 Wk Avg	66.63 %	

Avg. Time On Site (Seconds)		Change
Yesterday	121	9.00
6 Wk Avg	112	

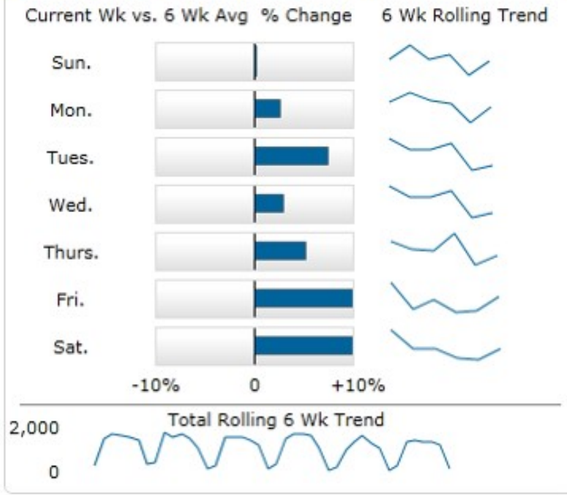
Avg. # of Pages per Visit		Change
Yesterday	2.24	-0.03
6 Wk Avg	2.27	

% of New Visitors		Change
Yesterday	77.21 %	-1.63 %
6 Wk Avg	78.84 %	

Yesterday's Activities

- Article - Data Governance Primer
- News Item - Next generation of data federation tools
- Article - Data Integration Challenges Rises
- Sent out June Newsletter - Visualizing Big Data

Unique Visitors by Day of Week Performance



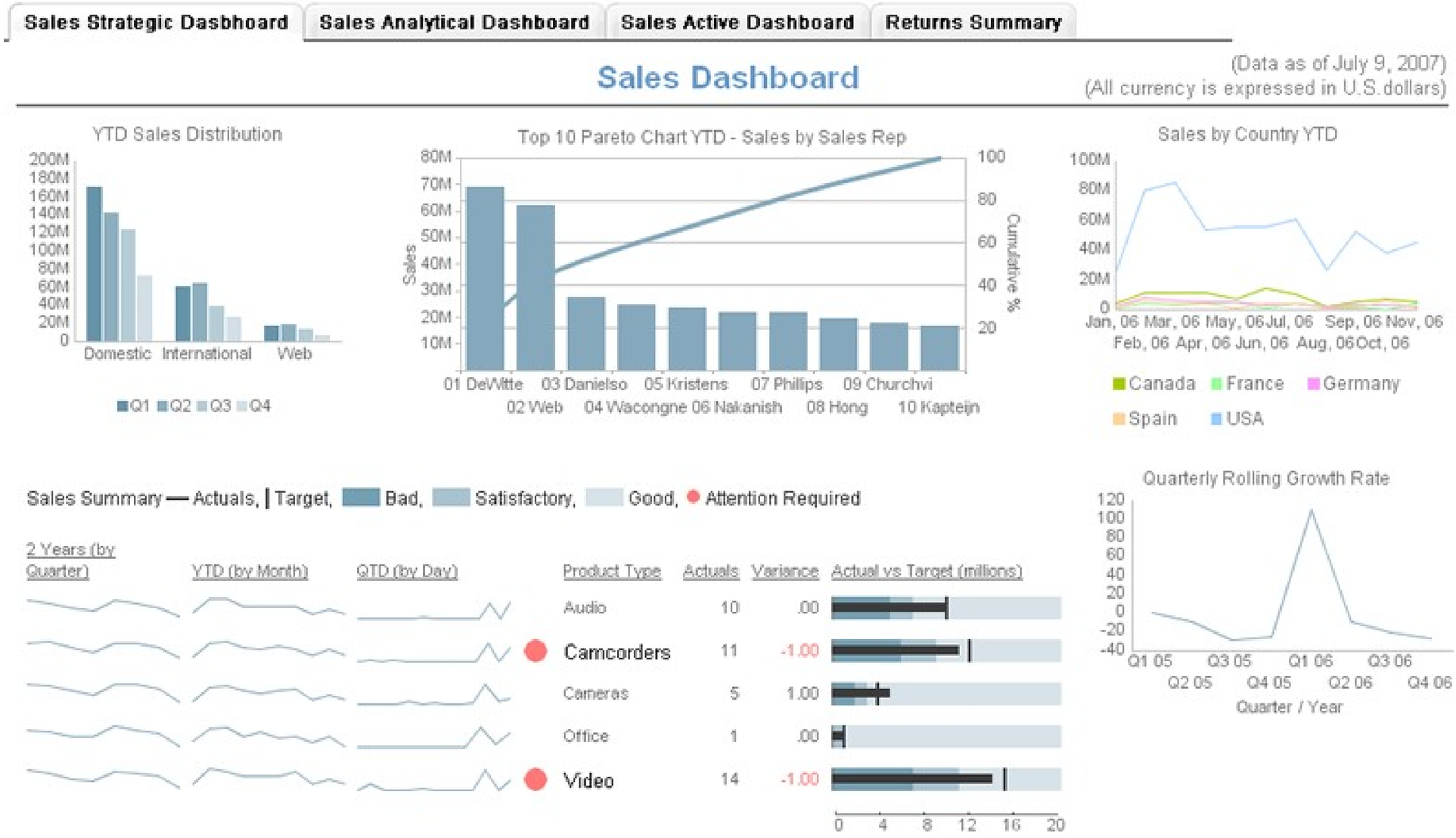
Google Keyword Search Rankings (as of Yesterday)

Keyword(s)	Current Month's Rank	Previous Month's Rank	Change
Data Management	1	2	↑
Data Federation	2	2	
Business Intelligence	3	12	↑
Data Warehouse	3	4	↑
Data Governance	4	2	↓
Data Analytics	4	1	↓
SOX Compliance	4	9	↑
mobile business intelligence	7	34	↑
Big Data	9	11	↑
analytics dashboard	10	23	↑
data in the cloud	12	6	↓

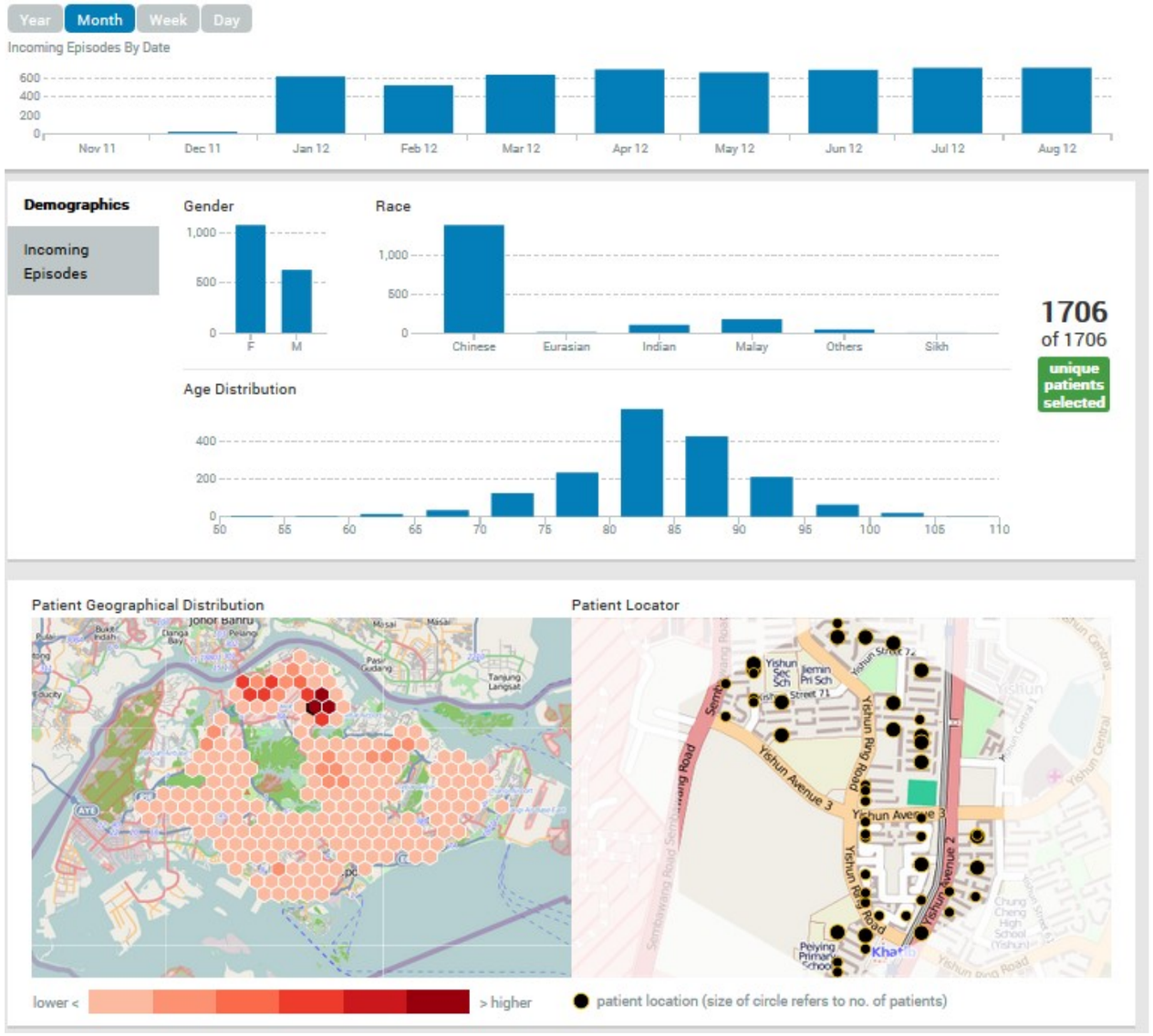
Planned Activities

Activity Date	Description
Jun 20, 2011	New Article - Common Data Management Pitfalls
Jun 23, 2011	Interview with Larry Hinds, President, Show Me the Numbers Inc.
Jun 25, 2011	New Research Paper - Why BI projects fail
Jun 26, 2011	New Article - Looking for the one version of the truth: the never ending search

Dashboards for strategic purpose



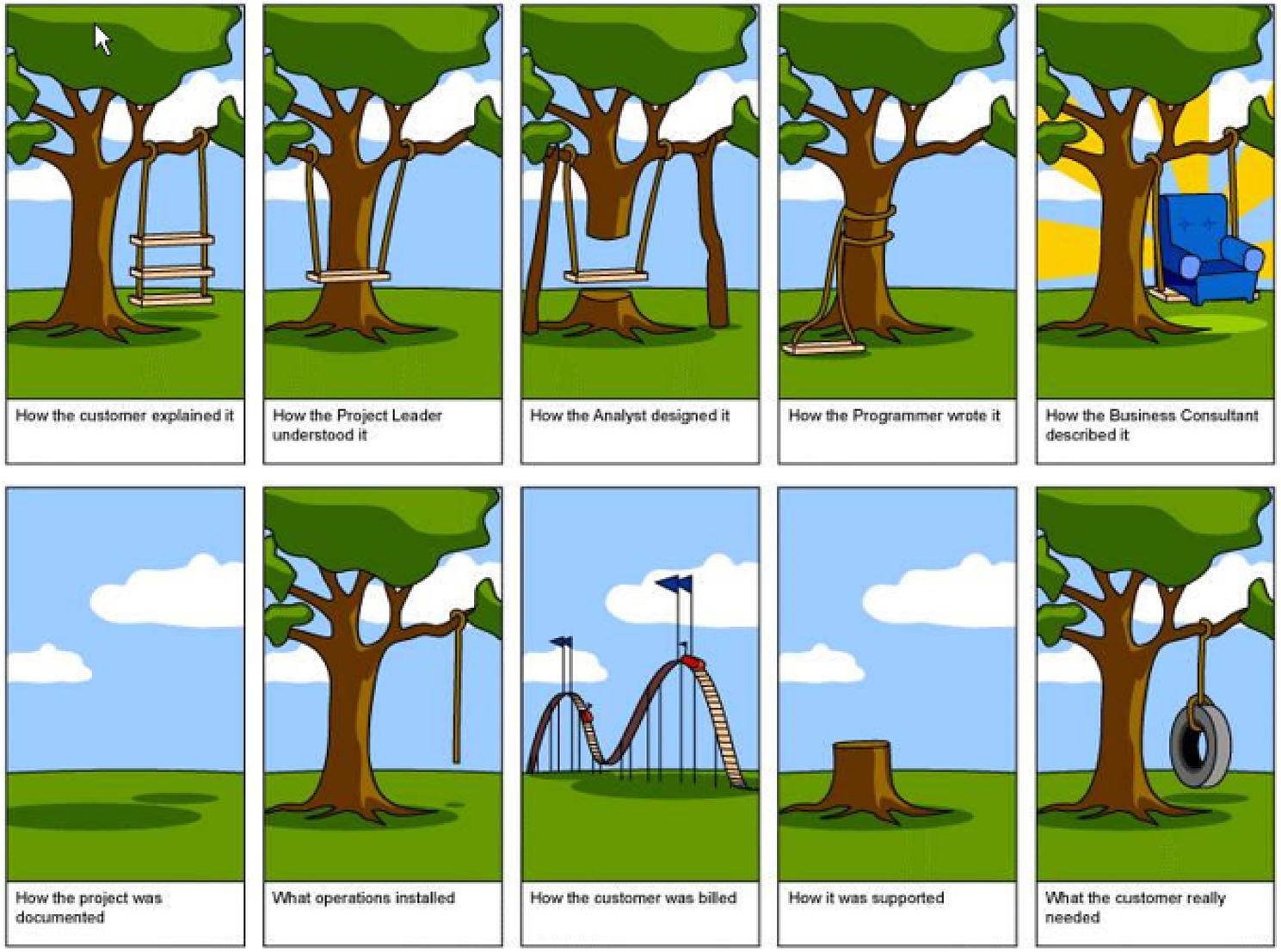
Dashboards for analytics purpose



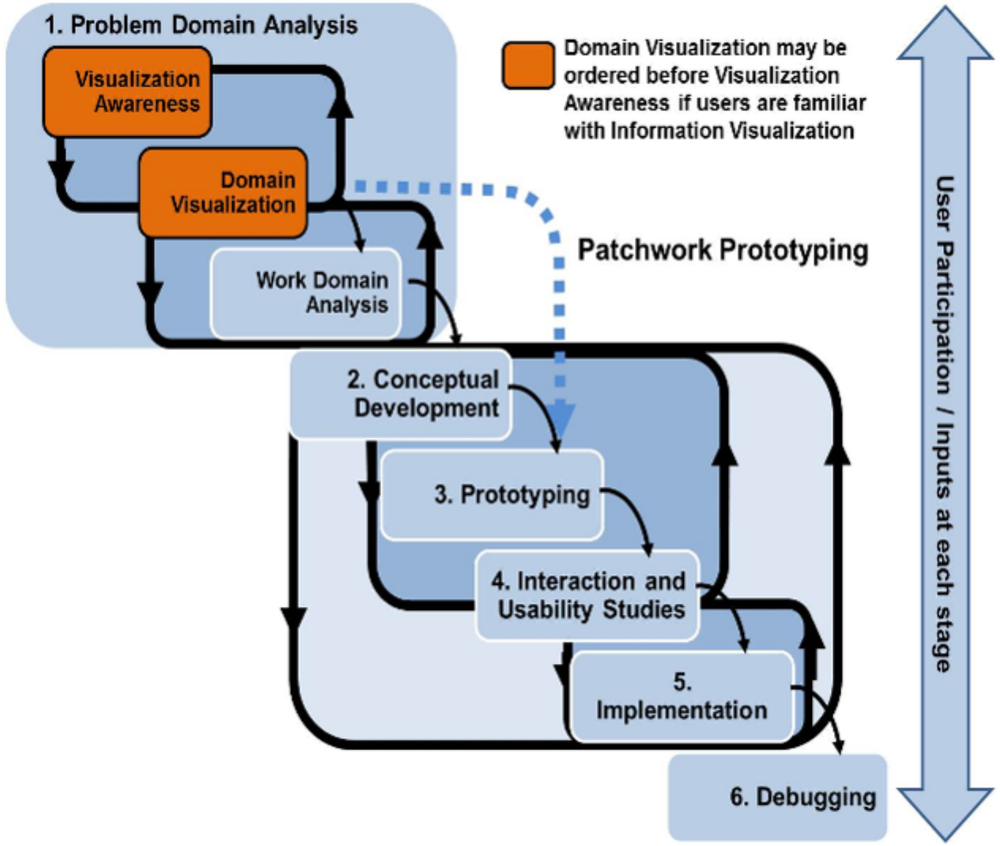
Best Practices for Dashboard Design

- Preparing stage
  - Target the user
  - Know what value your dashboard will add
  - Display only actionable information
- Design stage
  - Right tool for the right job
  - Context
  - Layout and clarity
  - Visual aesthetics

Preparing stage: Target the user



Preparing stage: User-centered Design Process



Reference: Developing and Applying a User-Centered Model for the Design and Implementation of Information Visualisation

Preparing stage: A User-Centric Dashboard Design Guide

- Who is my target audience?

- What value will the dashboard add?

- What type of dashboard am I creating?

Preparing stage: A User-Centric Dashboard Design Guide

Who is my target audience?

	Questions	Implication
Role	What decisions do they make? What questions do they need answered?	Structure the information to make it super easy to answer high priority questions.
Work flow	In what context will they be reviewing the dashboard? What information are they using on a daily basis? How much time do they have to review the numbers?	The form and information display needs to fit into an existing work flow.
Data comfort and skills	How sophisticated are they with using data? Are they proficient in Excel? Do they enjoy digging into the numbers?	The dashboard level of detail and analytical capability should match the audiences' comfort zones.
Business and data expertise	How familiar are they with the key performance metrics? Do they understand where the data comes from? Are they familiar with internal company or industry terminology?	This determines the need for embedded explanations and use of natural language.

Preparing stage: A User-Centric Dashboard Design Guide

What value will the dashboard bring?

- Help management define what is important.
- Educate people in the organization about the things that matter.
- Set goals and expectations for specific individuals or groups.
- Help executives sleep at night because they know what’s going on.
- Encourage specific actions in a timely manner.
- Highlight exceptions and provide alerts when problems occur.
- Communicate progress and success.
- Provide a common interface for interacting with and analysing important business data.

Preparing stage: A User-Centric Dashboard Design Guide

What type of dashboard am I creating?

Scope	☐ **Broad:** Displaying information about the entire organization		☐ **Specific:** Focusing on a specific function, process, product, etc.	
Business role	☐ **Strategic:** Provides a high-level, broad, and long-term view of performance		☐ **Operational:** Provides a focused, near-term, and tactical view of performance	
Time horizon	☐ **Historical:** Looking backwards to track trends	☐ **Snapshot:** Showing performance at a single point in time	☐ **Real-time:** Monitoring activity as it happens	☐ **Predictive:** Using past performance to predict future performance
Customization	☐ **One-size-fits-all:** Presented as a single view for all users		☐ **Customizable:** Functionality to let users create a view that reflects their needs	
Level of detail	☐ **High:** Presenting only the most critical top-level numbers		☐ **Drill-able:** Providing the ability to drill drill down to detailed numbers to gain more context	
Point of view	☐ **Prescriptive:** The dashboard explicitly tells the user what the data means and what to do about it		☐ **Exploratory:** User has latitude to interpret the results as they see fit	

Preparing stage: A User-Centric Dashboard Design Guide

Information Discrimination

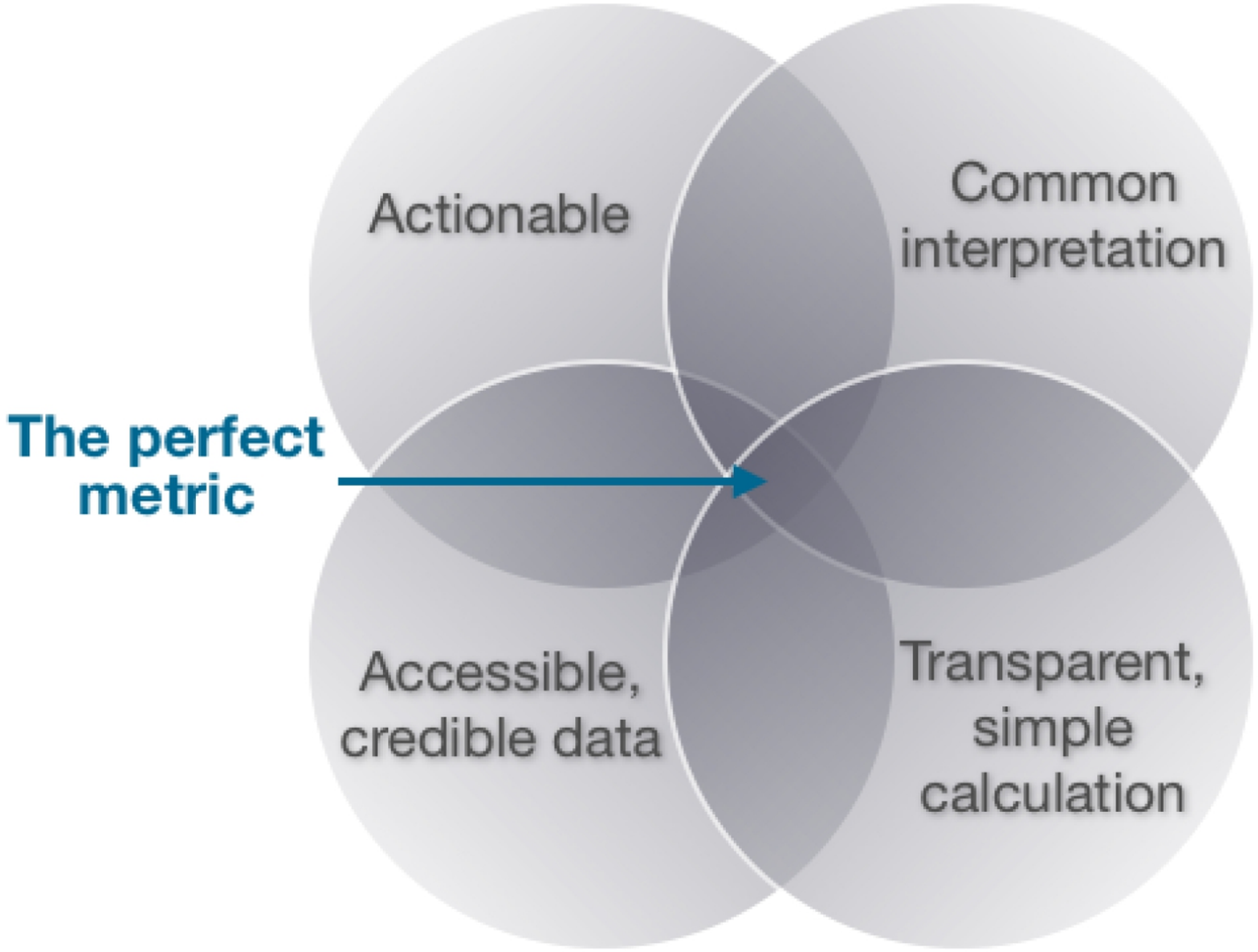
- Find the core
- Ask a better question
- Push to the appendix
- Reporting vs exploration

"Data isn't like your kids, you don't have to pretend to love them equally."

Amanda Cox, NY Times

Preparing stage: A User-Centric Dashboard Design Guide

Choosing the perfect metric



Preparing stage: A User-Centric Dashboard Design Guide

Choosing the perfect metric

	Description	Common mistakes
Actionable	It is clear the source of the problem or necessary actions when the metric goes up, down, flat or off-target	It is too broad for specific groups to impact (e.g. customer satisfaction). Focus on absolute measures rather than changes (e.g. total sales vs. change in sales)
Common interpretation	People in the organization recognize what the metric means	It uses data definitions that aren't well understood (e.g. leads vs. prospects).
Transparent, simple calculation	How the metric is generated is shared and easy to understand	Attempting to create a compound metric that combines a bunch of factors
Accessible, credible data	The data can be acquired with modest effort from a source that people trust.	Pursuing the perfect metric that is hard to gather rather than using a close proxy.

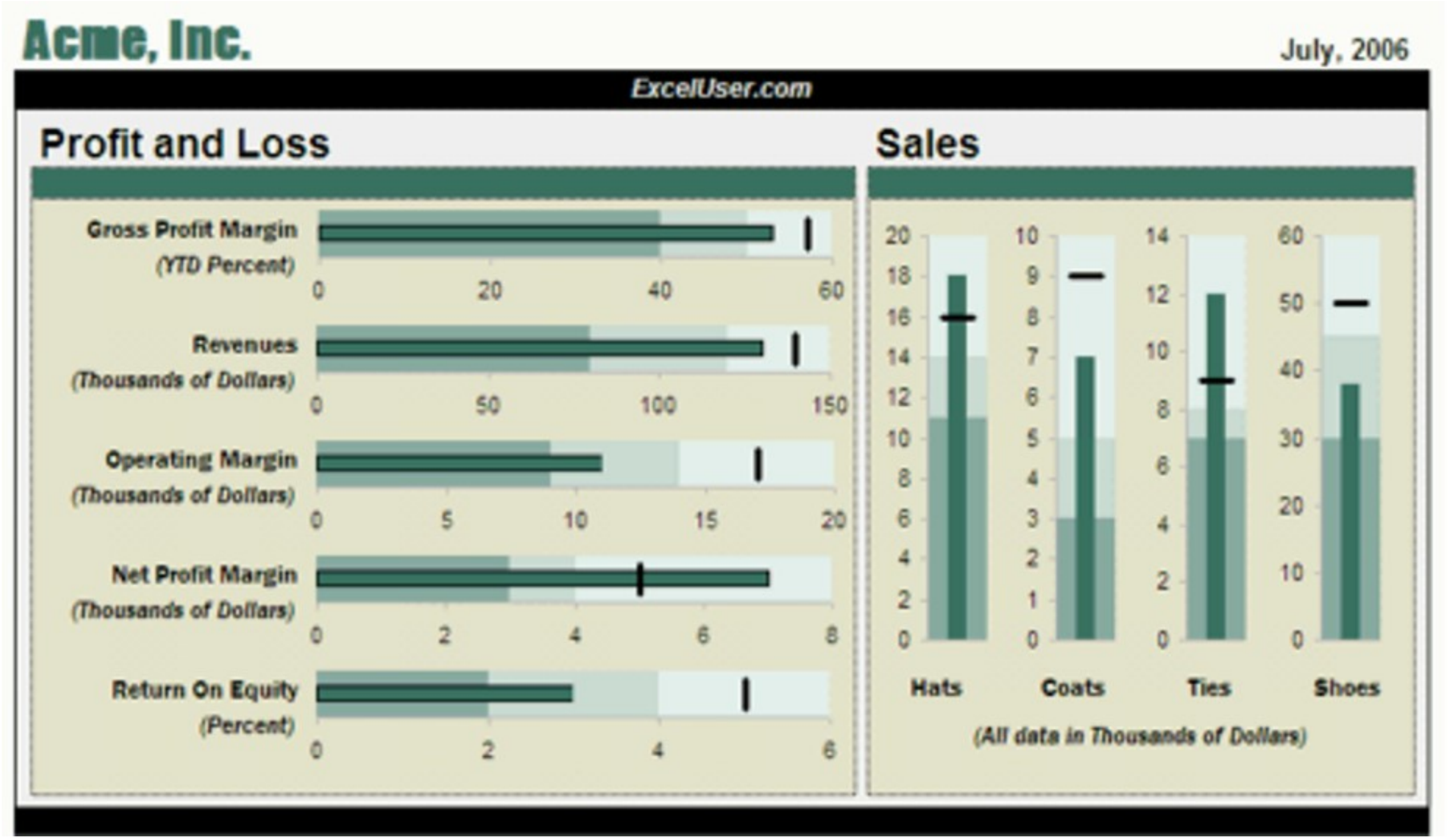
Ideal graphs for information dashboard

Right tool for the right job?

An assortment of typical dashboard gauges

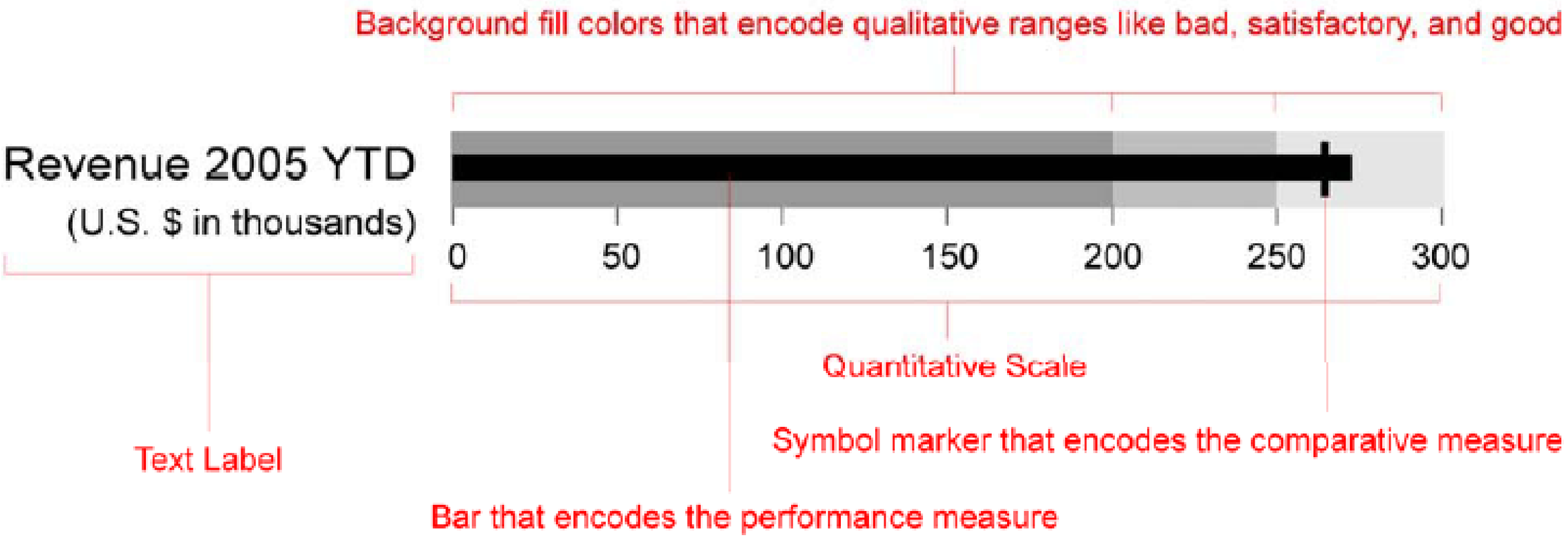
Ideal graphs for information dashboard: Bullet Graphs

- Bullet graphs to replace gauges.



Creator of bullet graph Mr. Stephen Few. Visit Perceptual Edge for more information.

Bullet graph design specifications



Ideal graphs for information dashboard: Sparklines

- A sparkline is a very small line chart, typically drawn without axes or coordinates.

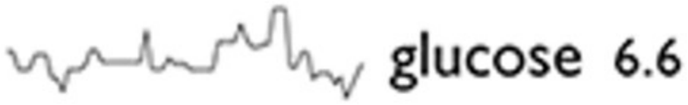
Which stocks are trading the most?

Sort by: Latest Week Volume

Stock	Latest We..	Prior Week..	Change	% Change	Last 30 Days as of 1/..
Facebook	458,966,258	213,771,768	245,194,490	114.7%	
Yahoo	197,332,255	76,277,172	121,055,083	158.7%	
eBay	80,979,296	138,645,908	(57,666,612)	(41.6%)	
Twitter	70,921,395	49,061,016	21,860,379	44.6%	
Amazon	37,327,292	12,731,774	24,595,518	193.2%	
Netflix	21,059,698	28,806,420	(7,746,722)	(26.9%)	
Google	19,703,243	9,432,935	10,270,308	108.9%	
QlikTech	5,587,004	4,780,692	806,312	16.9%	
Tableau	3,073,042	3,001,208	71,834	2.4%	

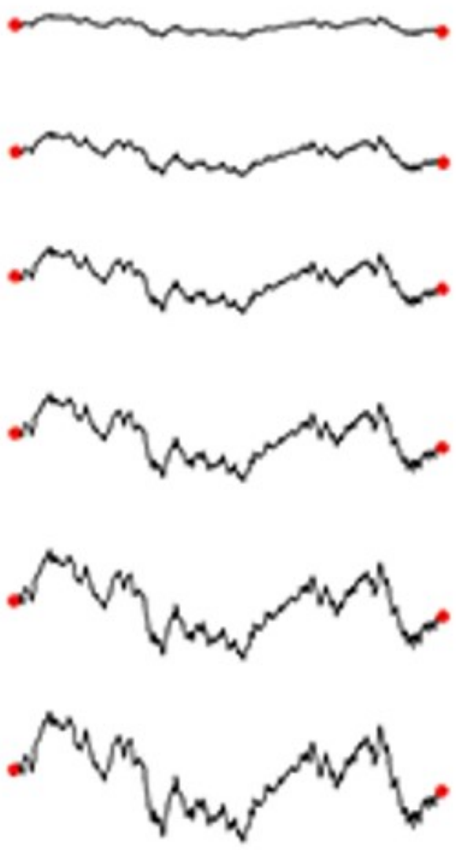
Reference: Sparklines

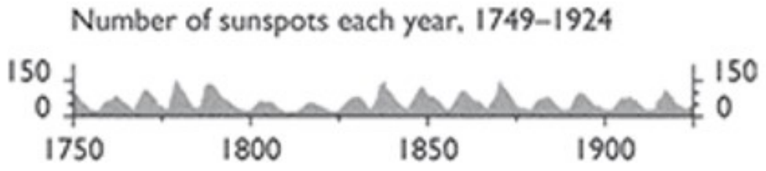
Pre-attentive with colour and symbol

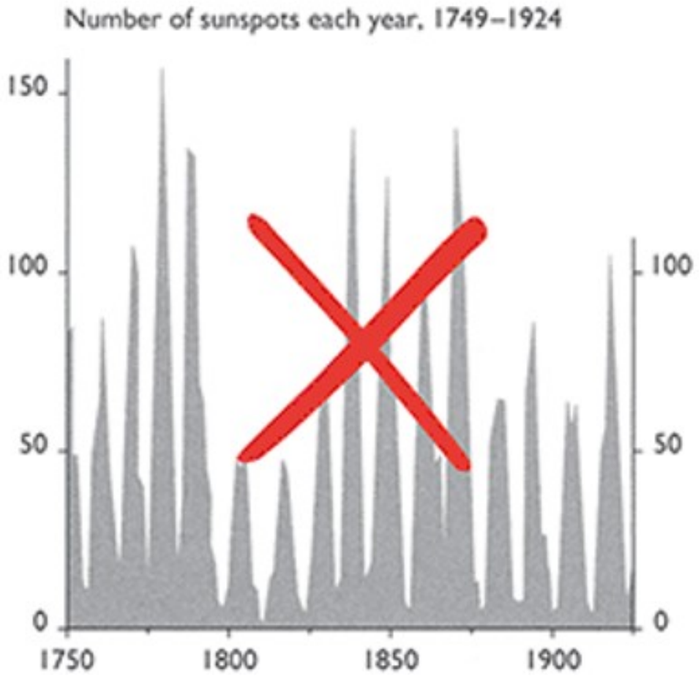


Aspect ratio

- A graphic's width/height ratio makes a big difference in displaying data.

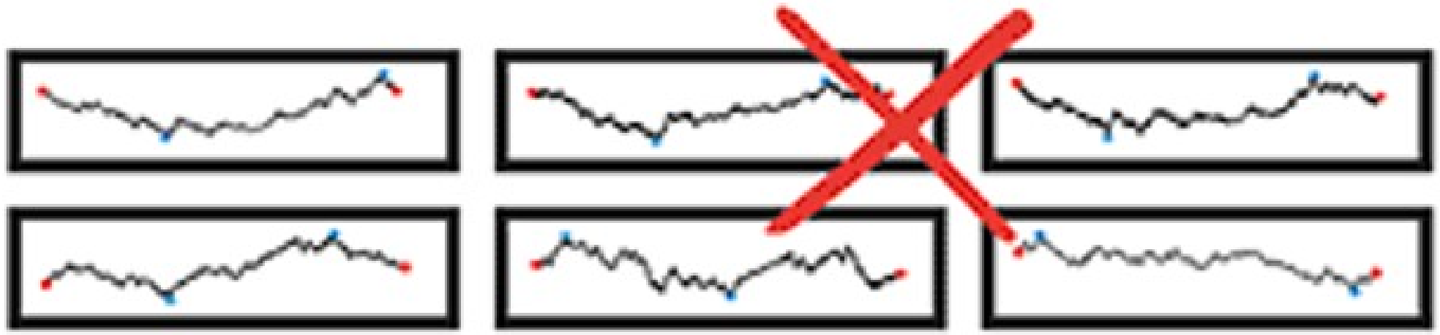


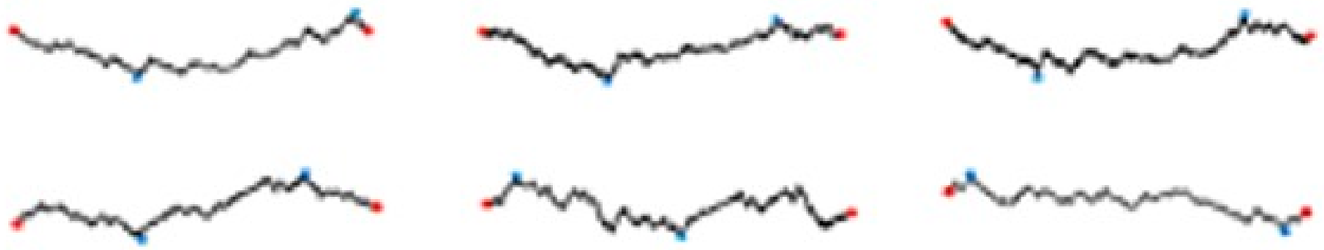




Unintentional optical clutter

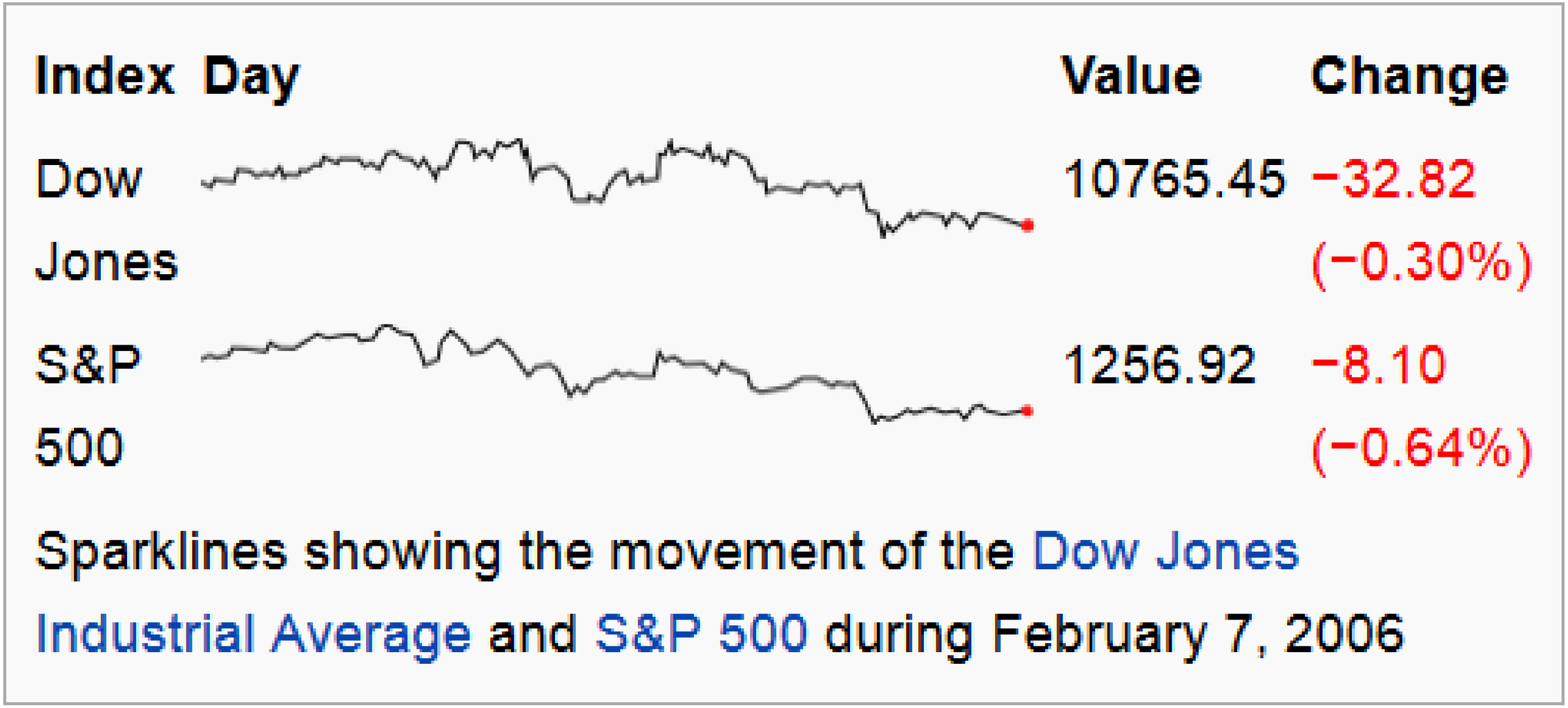
- Areas surrounding data-lines may generate unintentional optical clutter. Strong frames produce melodramatic but content-diminishing visual effects.





Sparklines best practice

- Enriched with context

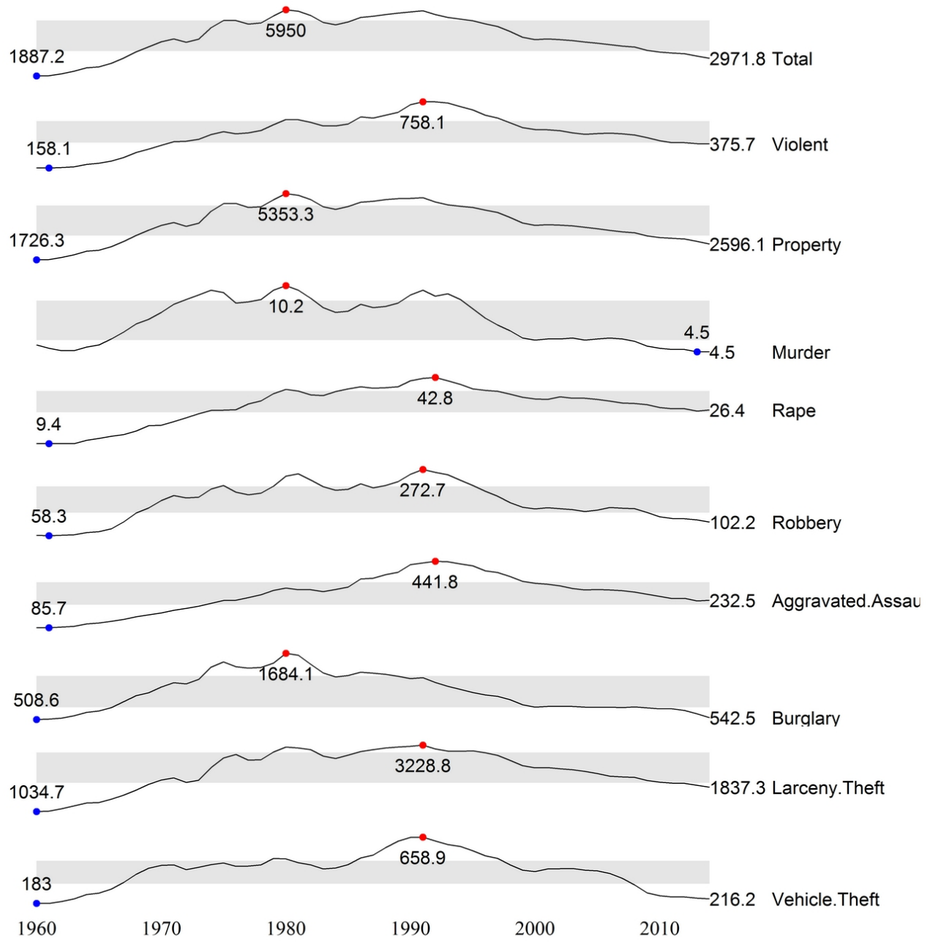


Sparklines best practice

- Use reference line to provide context

Sparklines best practice

- Use reference region to provide context



Reference: Sparklines in ggplot2

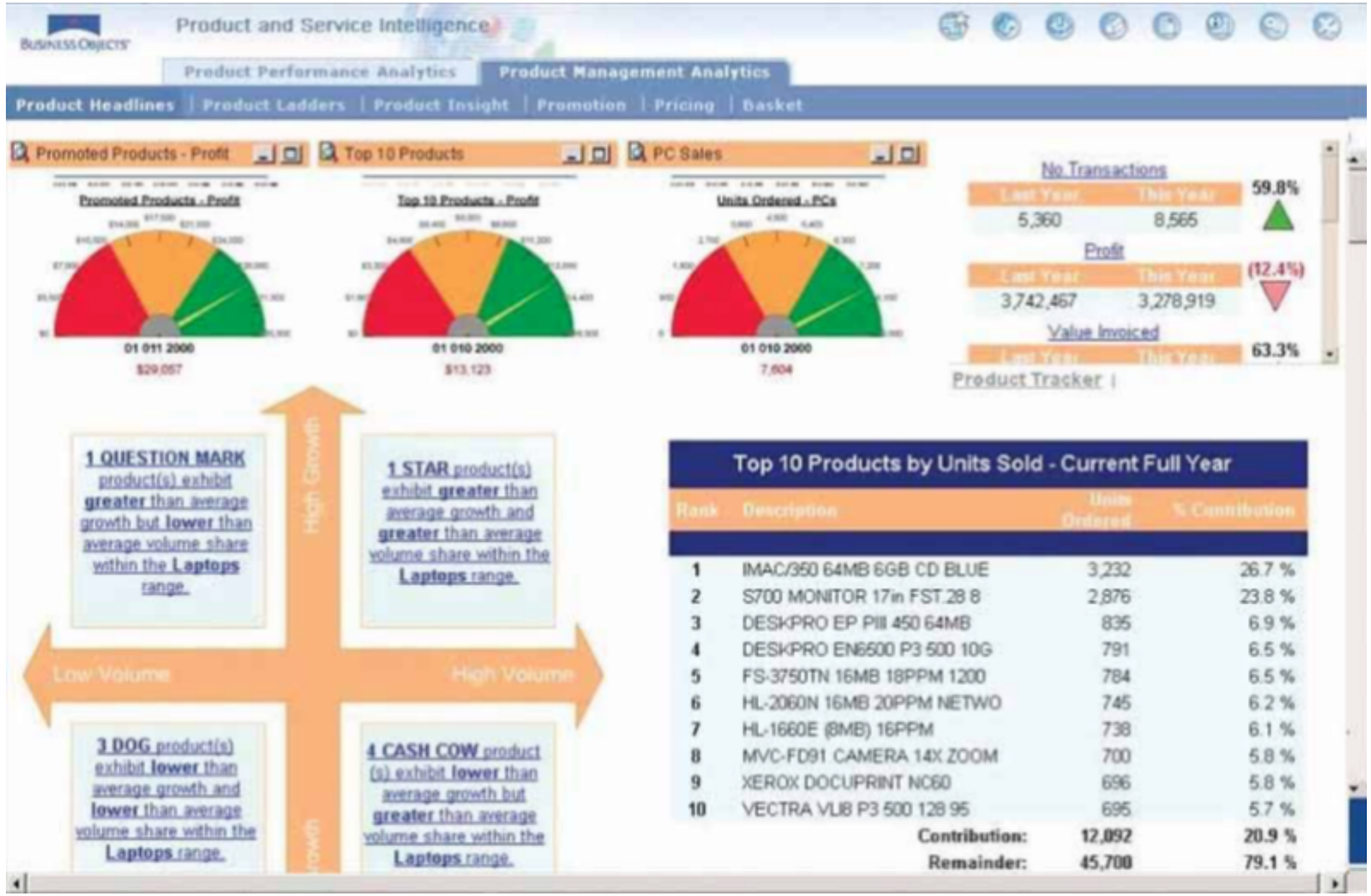
Best Practices for Dashboard Design

Common mistakes in dashboard design

- Exceeding the boundaries of a single page
- Supplying inadequate context for the data
- Displaying excessive detail or precision
- Exposing measure indirectly
- Choosing inappropriate display media
- Introducing meaningless variety
- Using poorly designed display media
- Encoding quantitative data inaccurately

Common mistakes in dashboard design

- Exceeding the boundaries of a single page and requiring the viewer to scroll

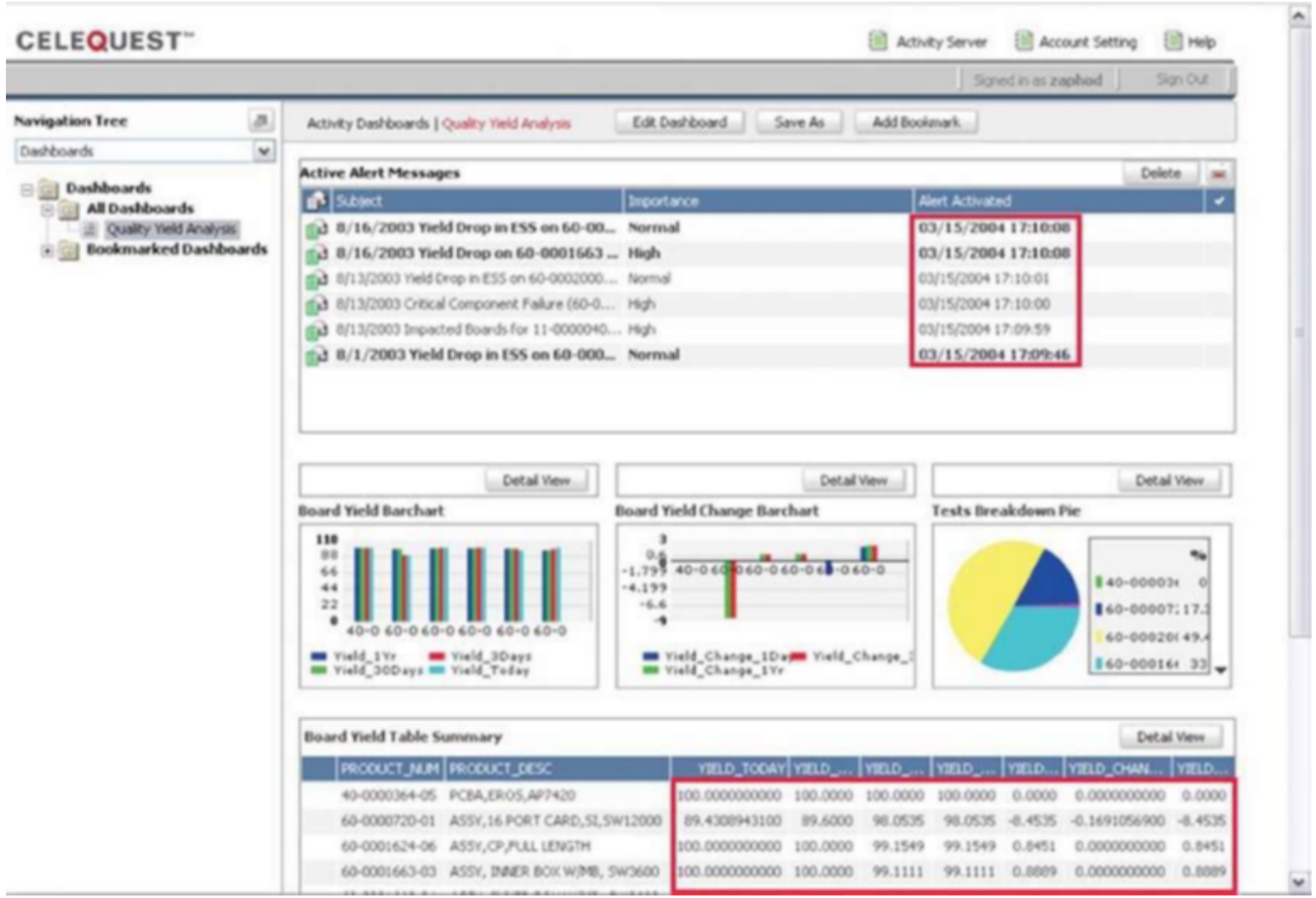


Common mistakes in dashboard design

- Fragmenting data into separate screen

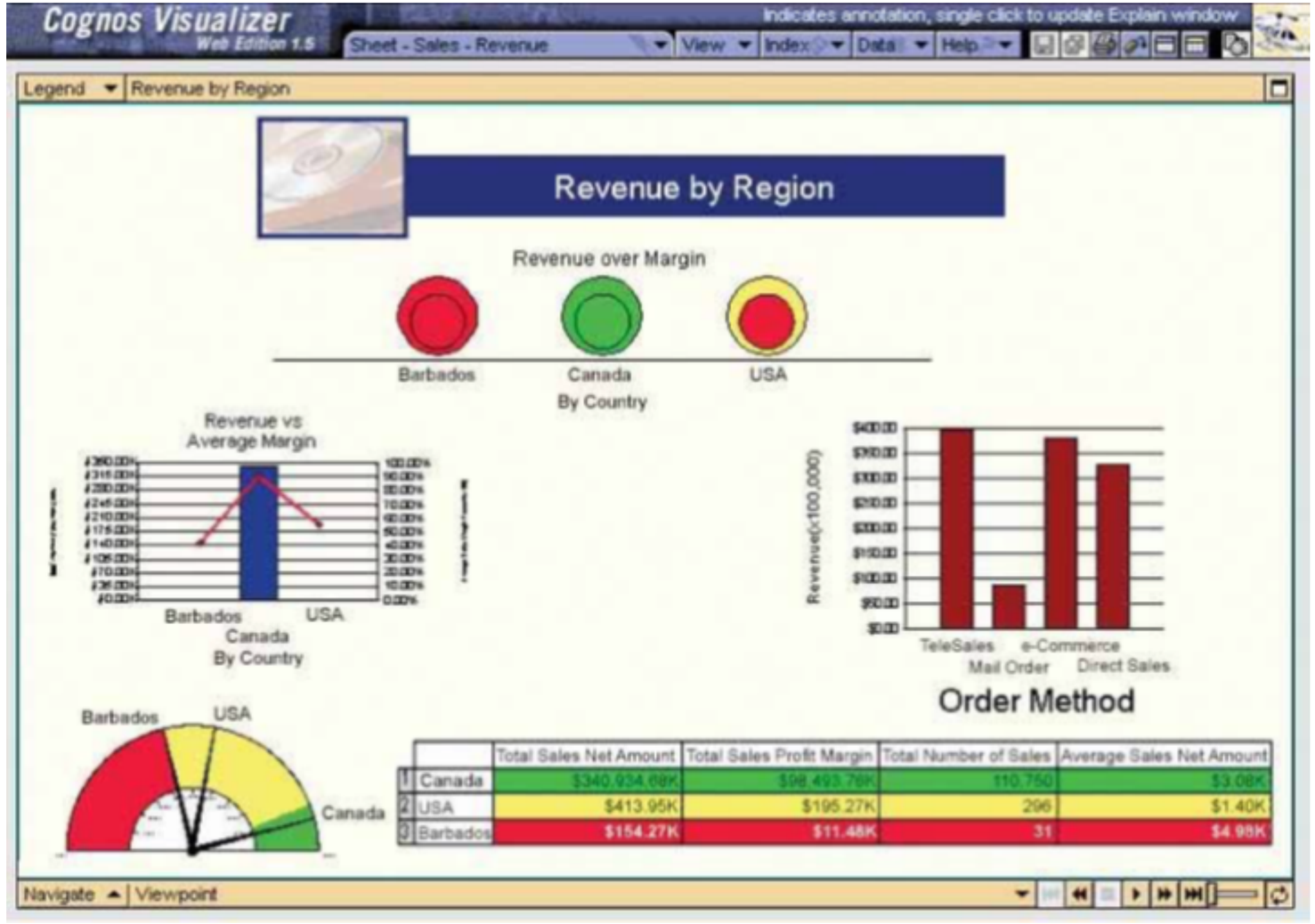
Common mistakes in dashboard design

- Displaying excessive detail or precision



Common mistakes in dashboard design

- Introducing meaningless variety



Common mistakes in dashboard design

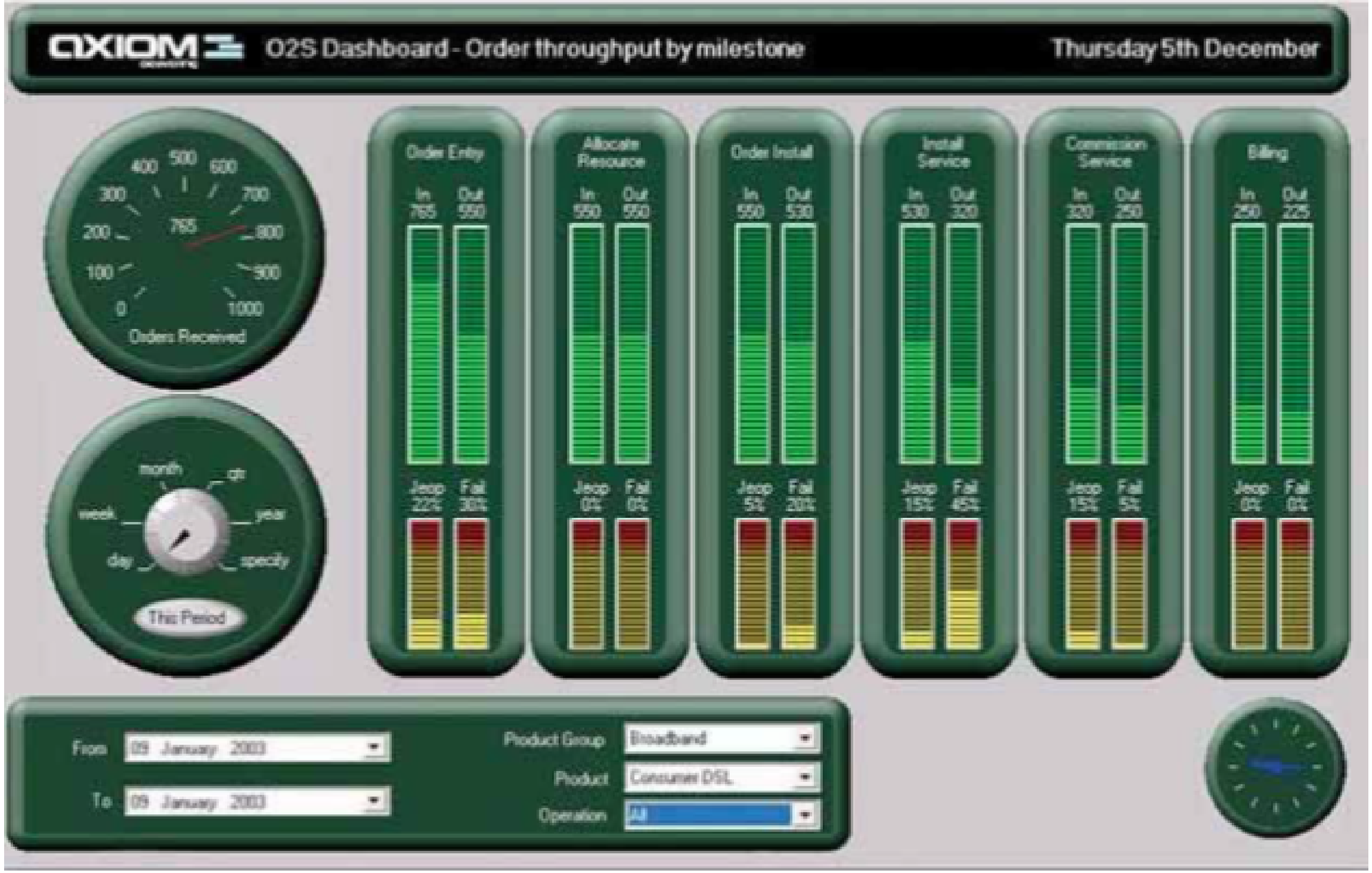
- Arranging the data poorly

Common mistakes in dashboard design

- Highlighting important data ineffectively or not

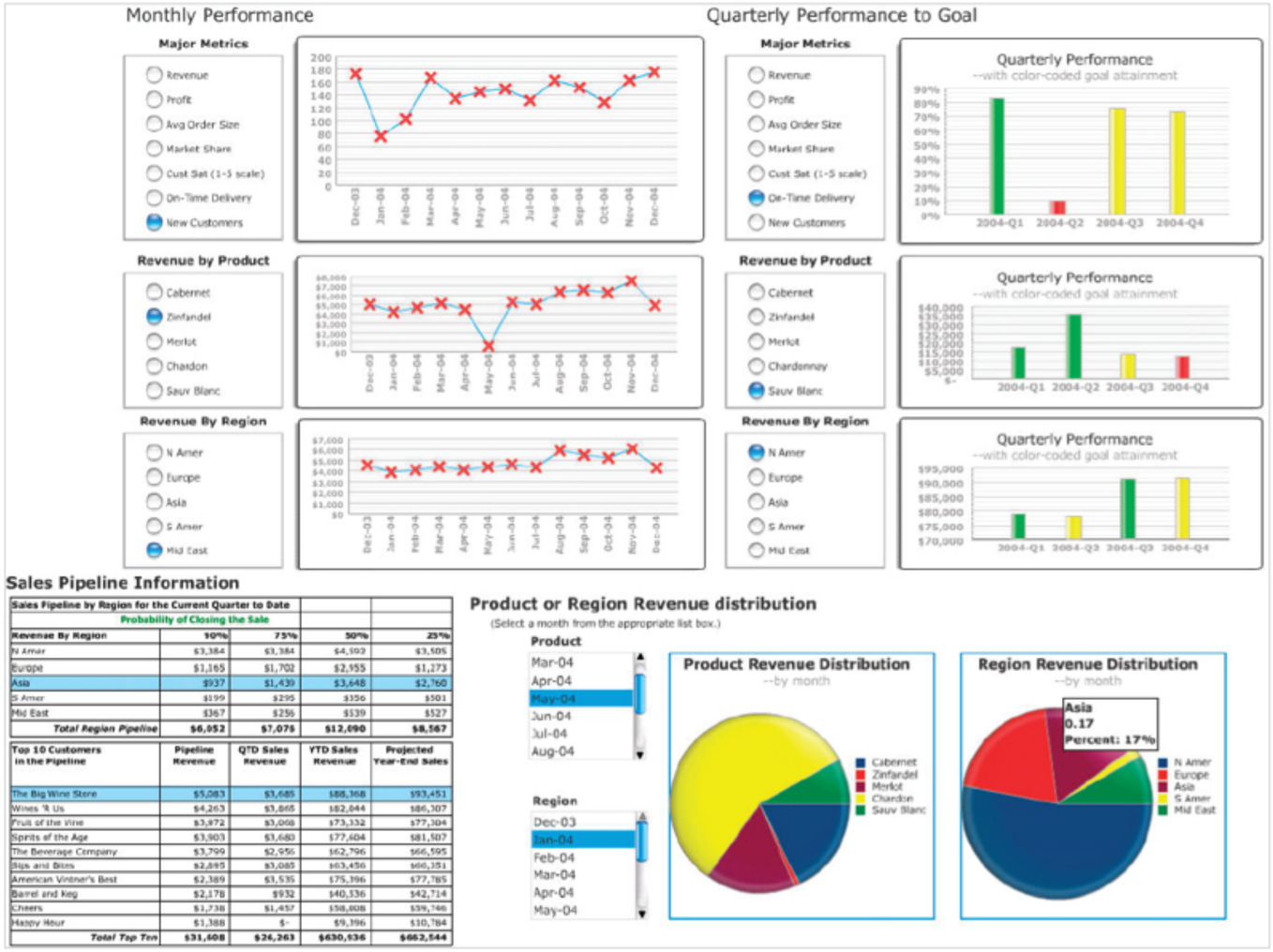
Common mistakes in dashboard design

- Cluttering the display with useless decoration



Common mistakes in dashboard design

- Misusing or overusing colour

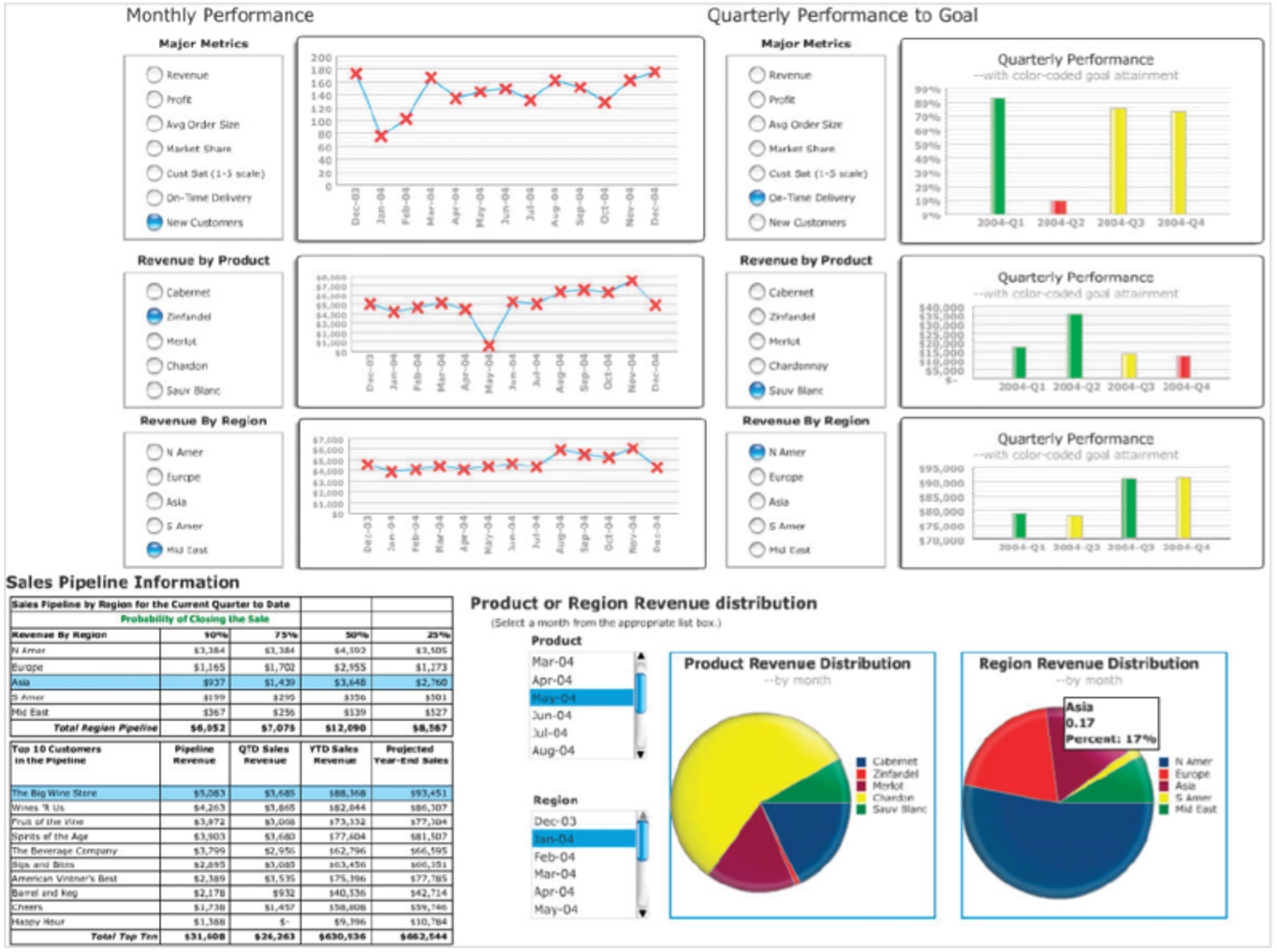


Common mistakes in dashboard design

- Designing an unattractive visual display

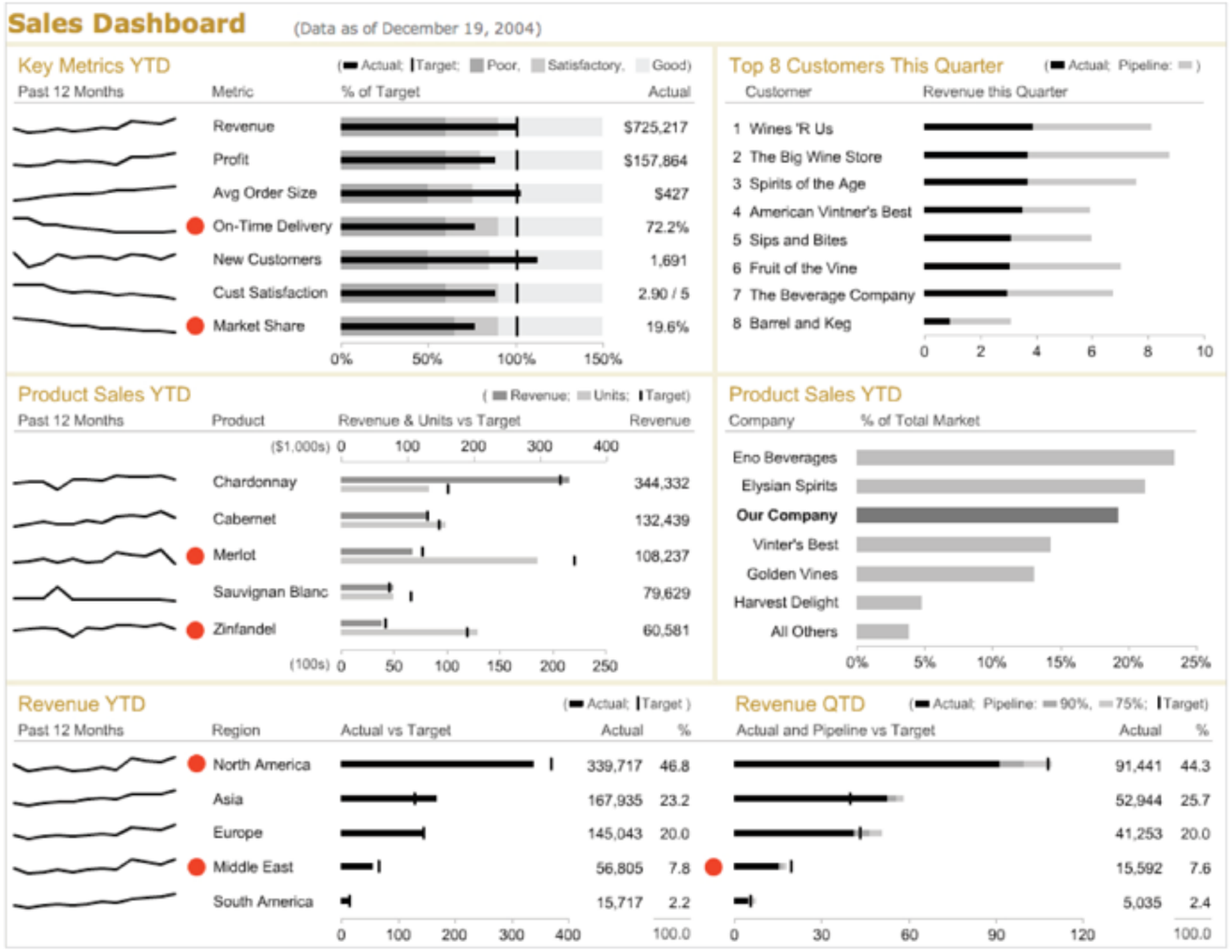
Common mistakes in dashboard design

- Design that failed to reveal KPIs effectively



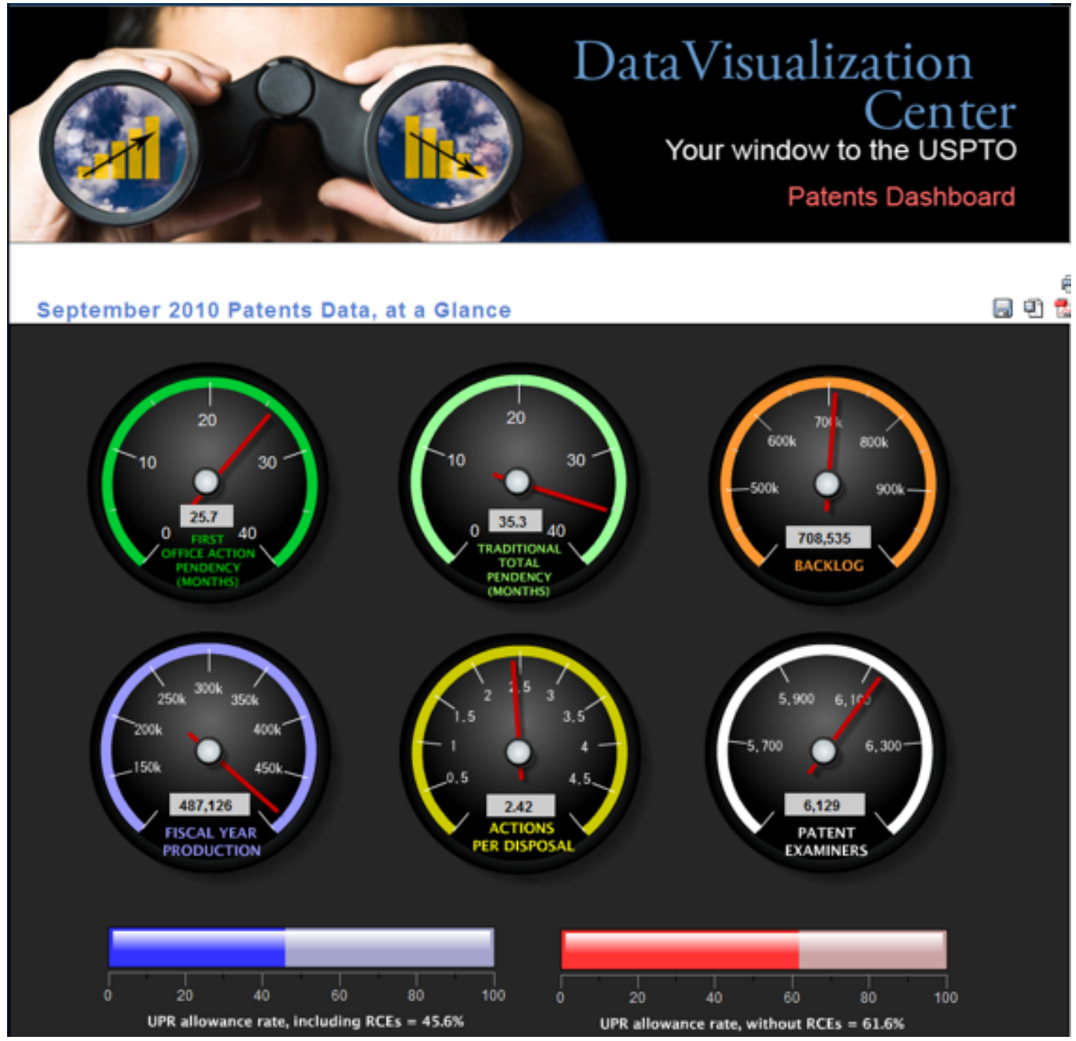
Alternative dashboard design

- Design that reveals KPIs effectively



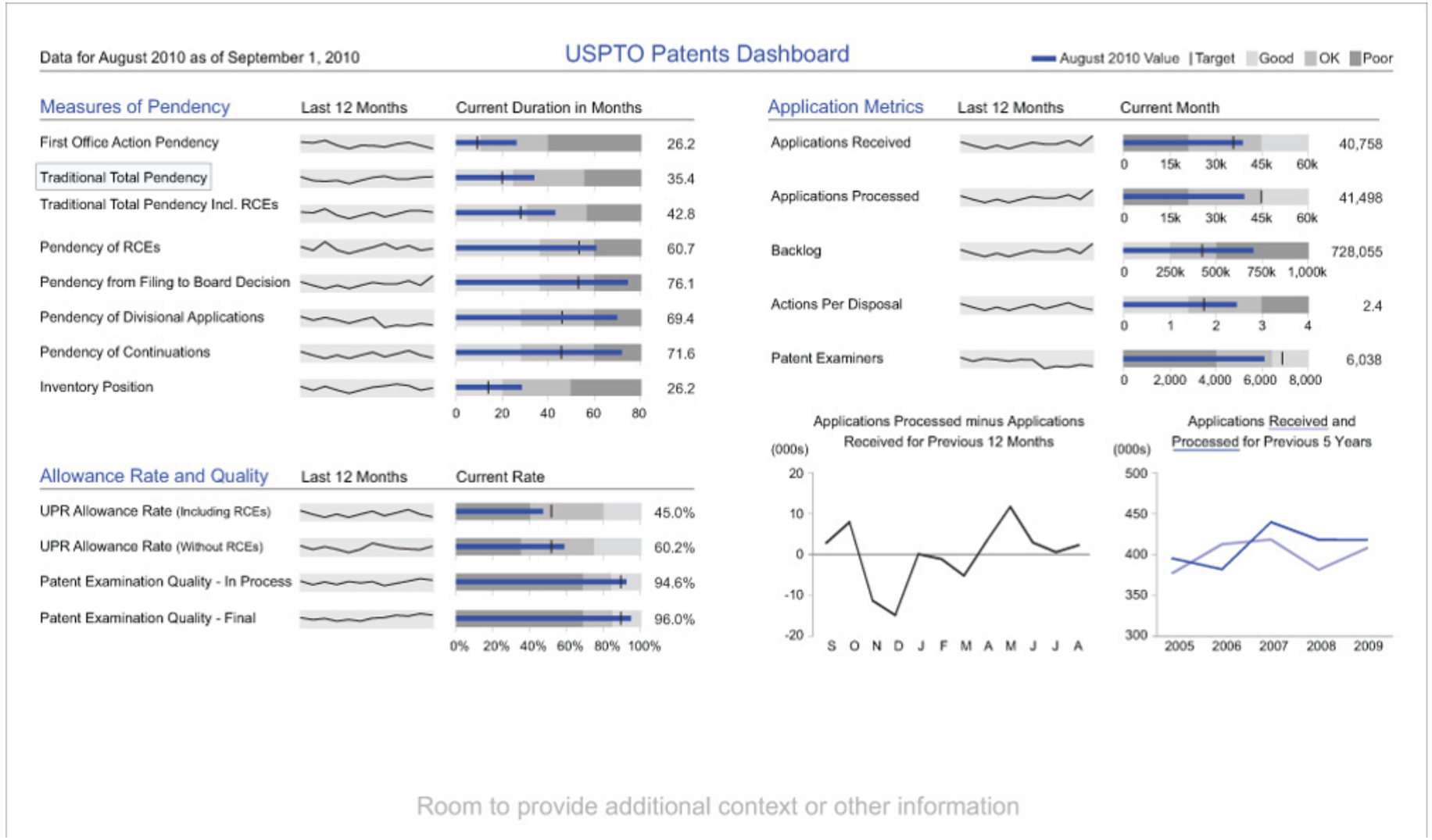
Common mistakes in dashboard design

- Design with poor layout and clarity



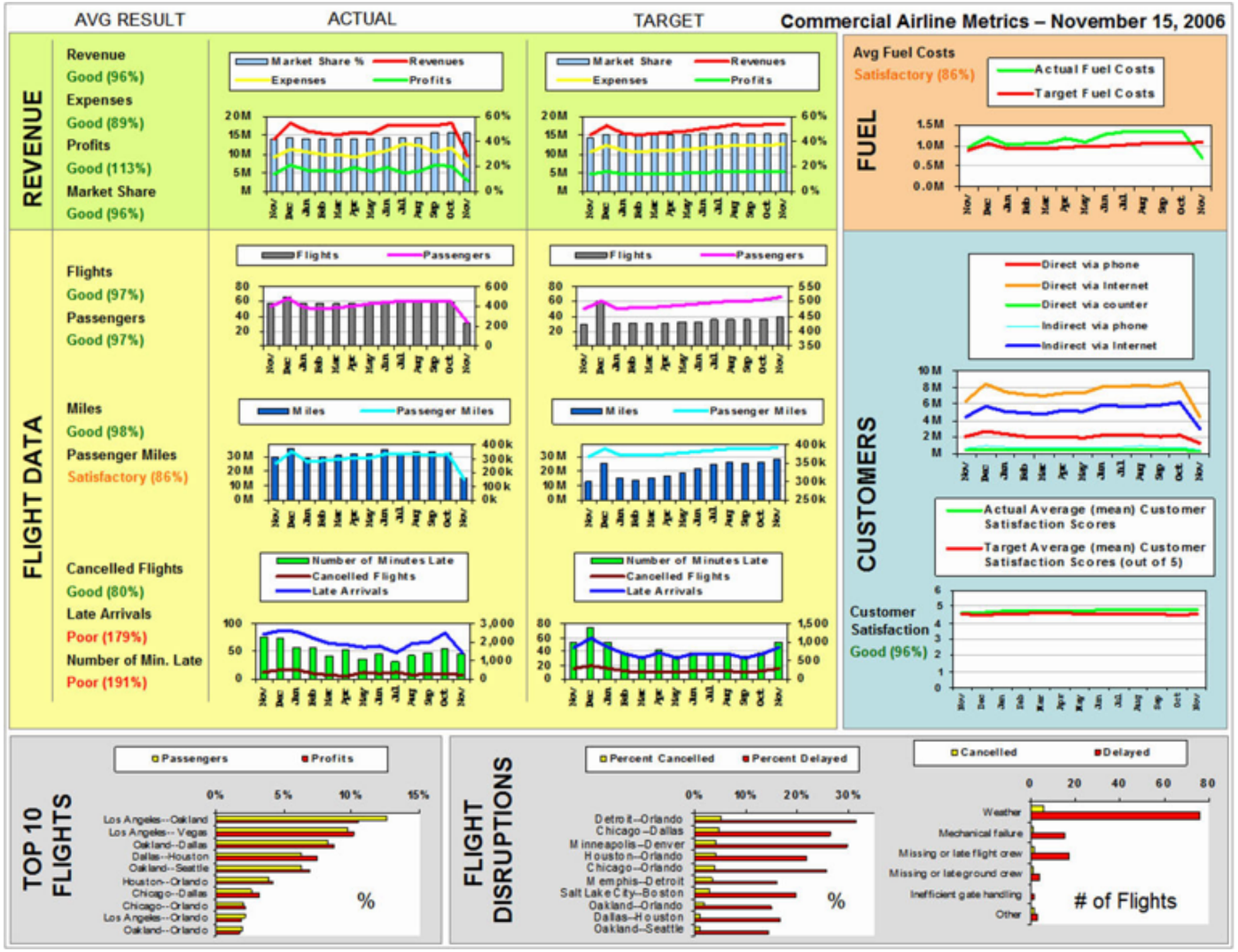
Alternative dashboard design

- Design with good layout and clarity



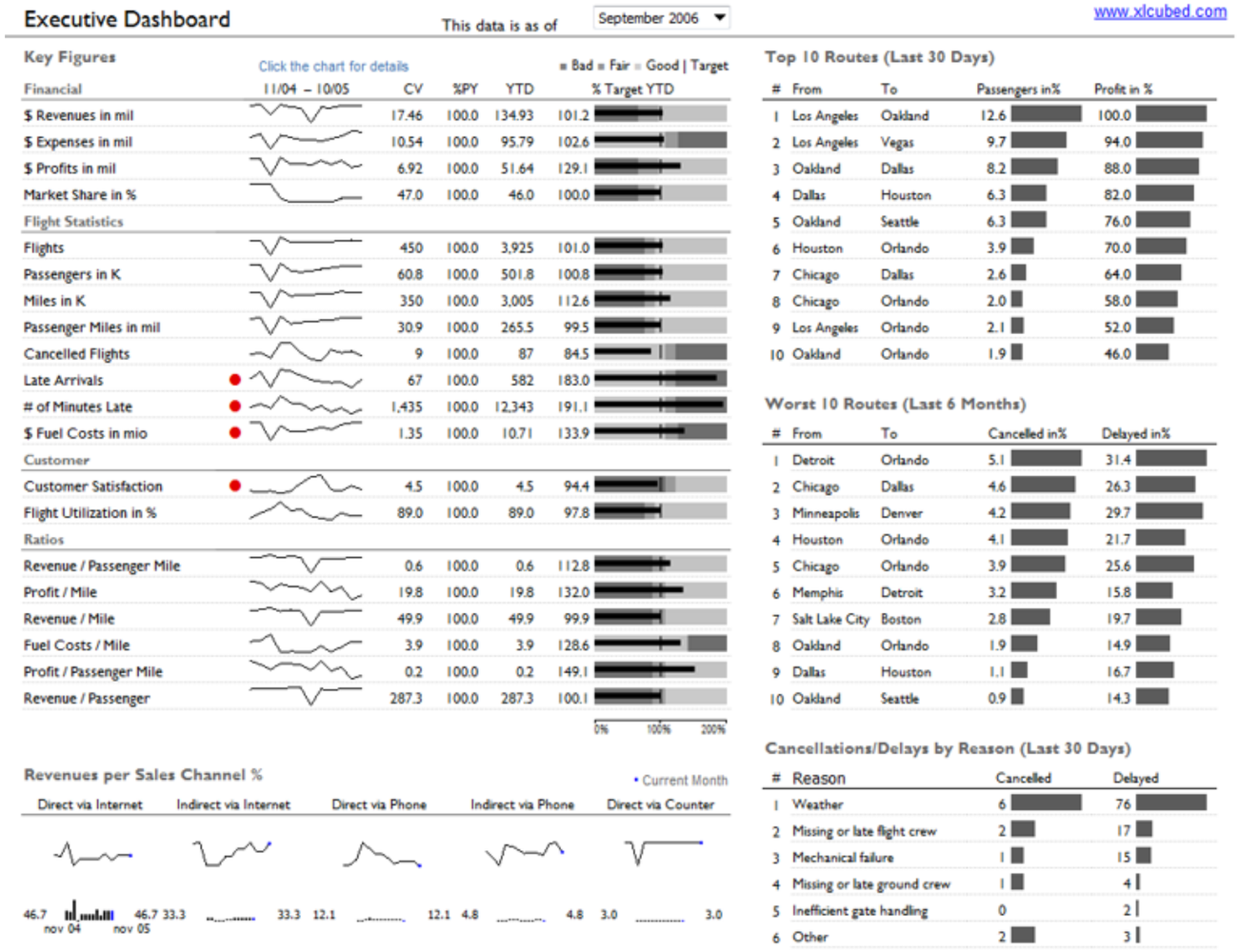
Common mistakes in dashboard design

- Design with poor visual aestheticsness



Alternative dashboard design

- Design with good visual aestheticsness



References

Dashboard Design

- A Guide to Creating Dashboards People Love to Use
- 5 Best Practices for Creating Effective Dashboards
- The Must Do’s of Marketing Dashboards
- Making Flow Happen
- With Dashboards: Formatting and layout Definitely Matter
- Dashboard Design for real-Time Situation Awareness

References

Dashboard Design

- Dashboard Design for Rich and Rapid Monitoring
- Pervasive Hurdles to Effective Dashboard Design
- Why Most Dashboards Fail
- Dashboard Confusion
- Dashboard Confusion Revisited
- Dashboard Design for at-a-glance monitoring

References

Bullet Chart & Sparklines

- Bullet graph @wiki
- Bullet Graph Design Specification
- Sparkline theory and practice
- Best Practices for Scaling Sparklines in Dashboard
- Introducing Bandlines