

# Lesson 9: Information Dashboard Design

Dr. Kam Tin Seong  
Assoc. Professor of Information Systems (Practice)  
School of Computing and Information Systems,  
Singapore Management University

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

Source: Stephen Few (2006) Information Dashboard Design

# Why are dashboards so important?

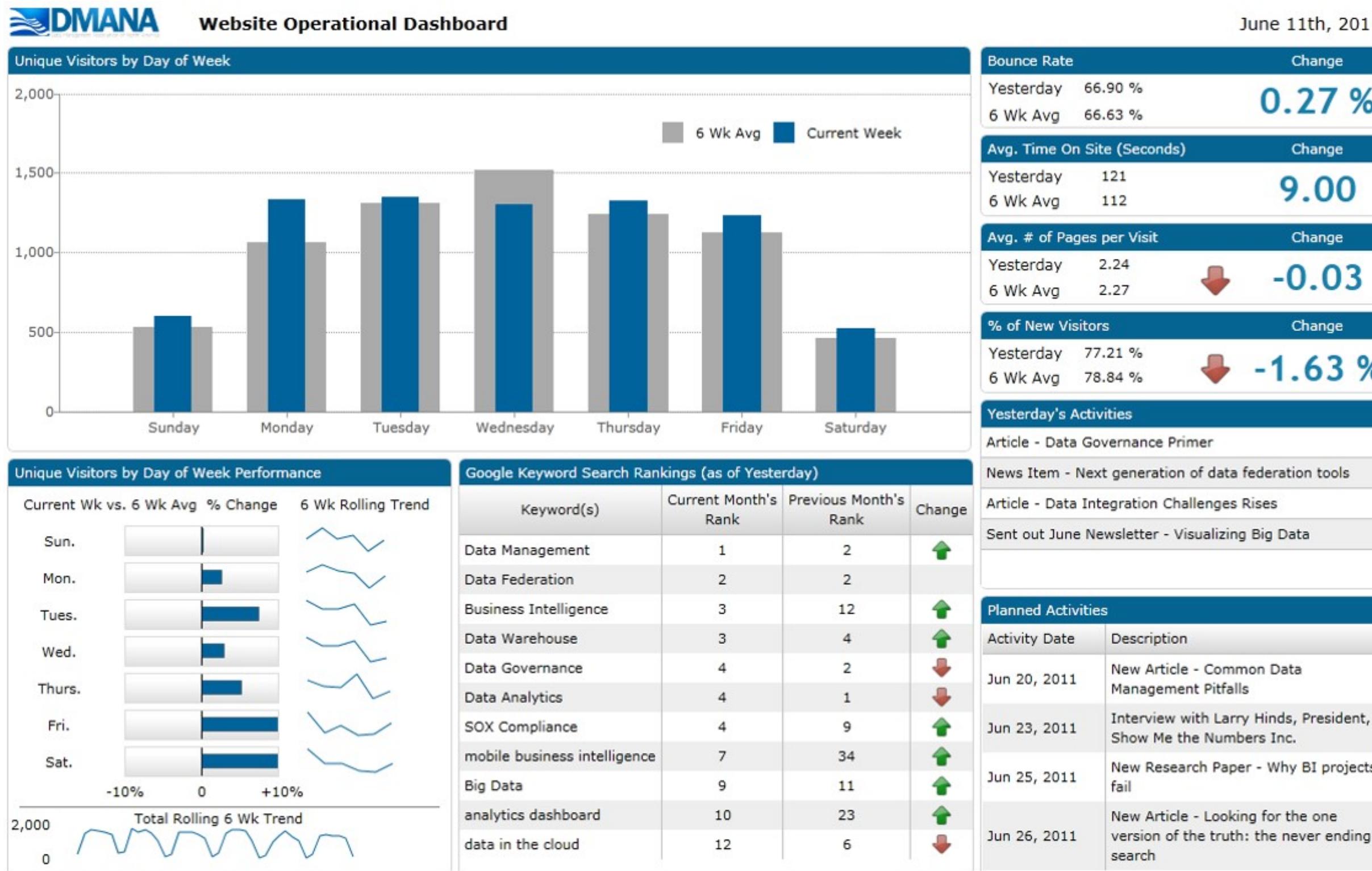
- A well-designed performance dashboard helps you to see more clearly by helping you to understand each fact more quickly so you can find patterns in the storm.



# Classifying Dashboards by Role

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

# Dashboards for operational purpose



# Dashboards for strategic purpose

Sales Strategic Dashboard

Sales Analytical Dashboard

Sales Active Dashboard

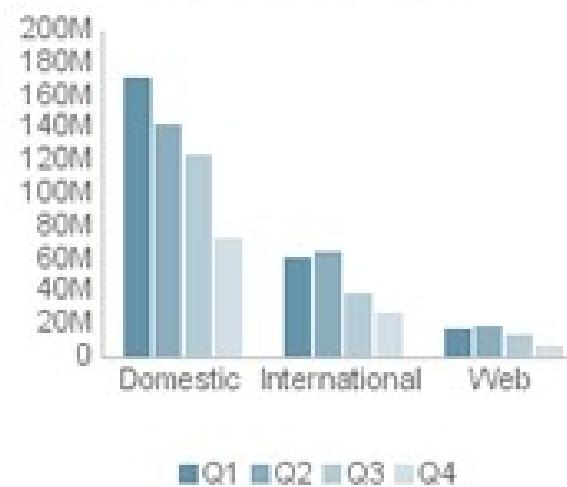
Returns Summary

## Sales Dashboard

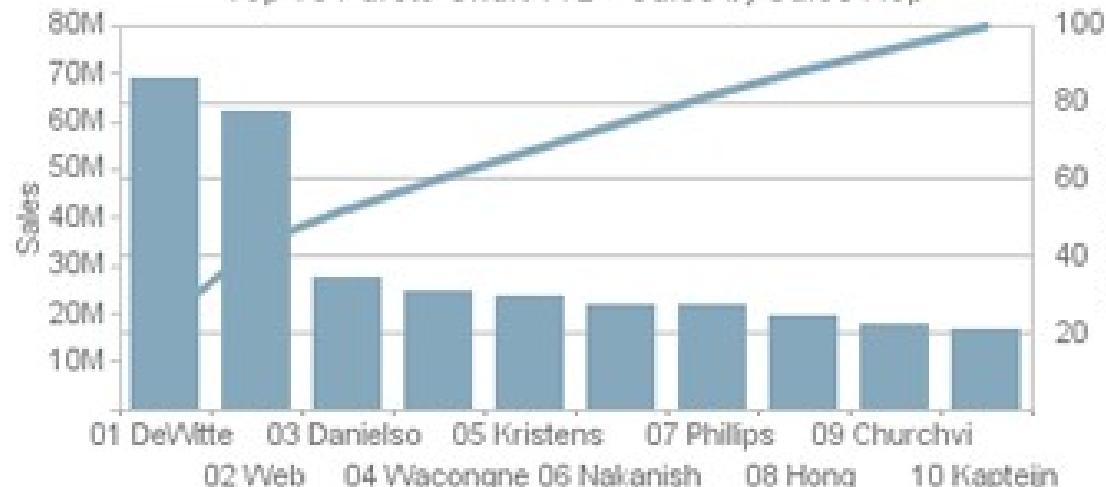
(Data as of July 9, 2007)

(All currency is expressed in U.S. dollars)

YTD Sales Distribution



Top 10 Pareto Chart YTD - Sales by Sales Rep



Sales by Country YTD



Sales Summary — Actuals, | Target, ■ Bad, ■ Satisfactory, ■ Good, ● Attention Required

2 Years (by Quarter)

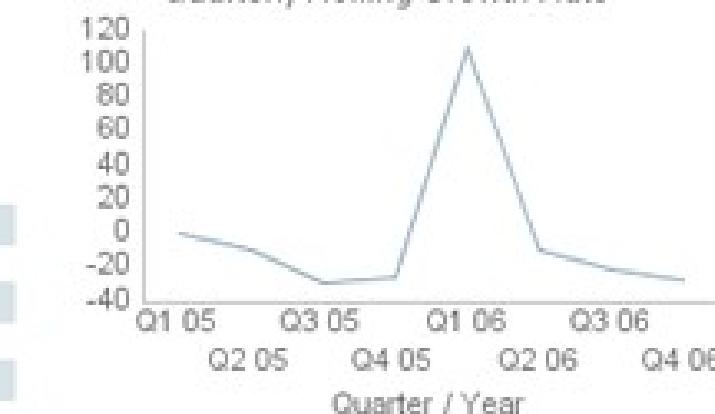
YTD (by Month)

QTD (by Day)

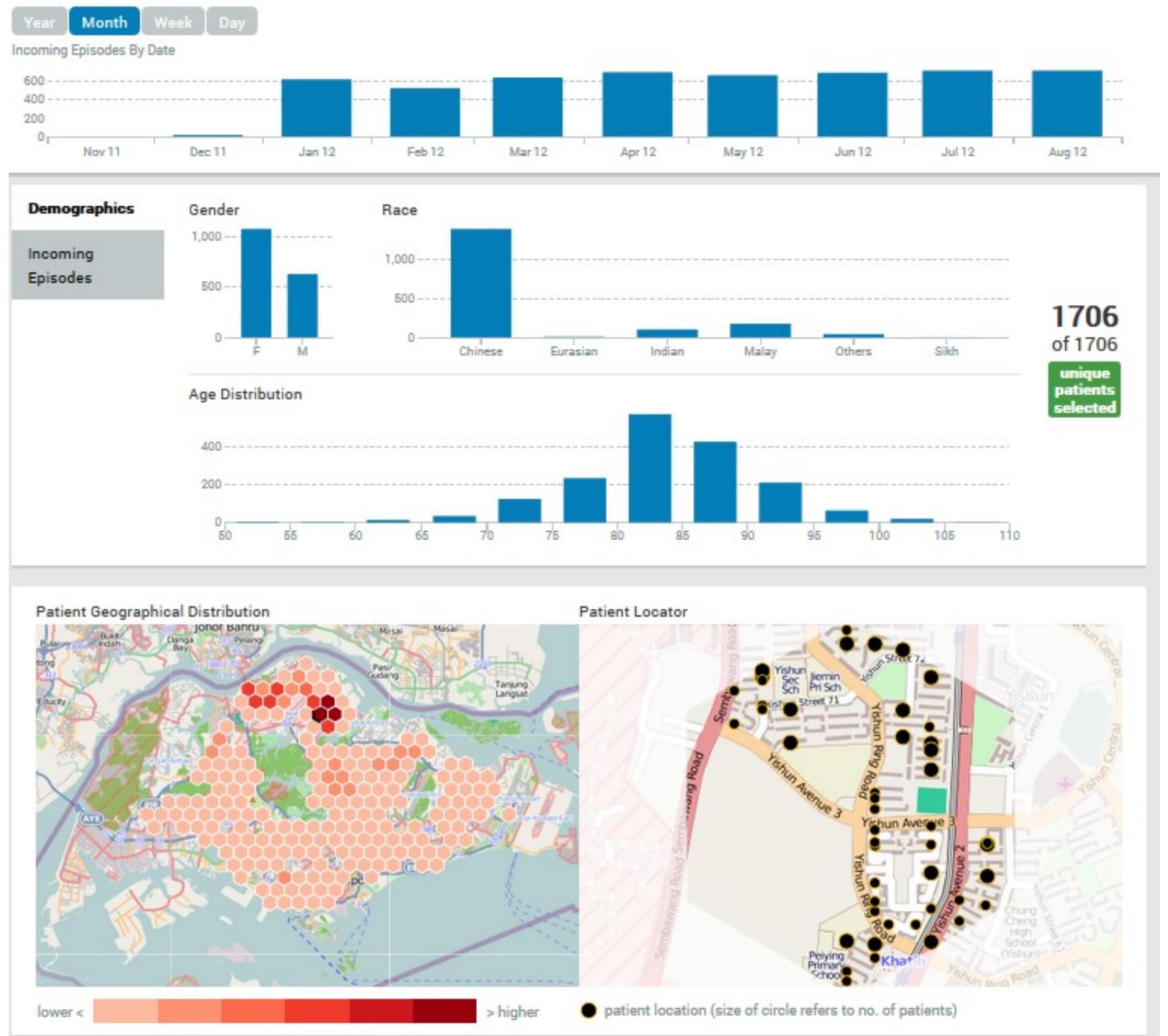
Product Type    Actuals    Variance    Actual vs Target (millions)

Audio	10	.00	<span style="background-color: black; color: black;">Bad</span>	<span style="background-color: #cccccc; color: black;">Satisfactory</span>
Camcorders	11	-1.00	<span style="background-color: #cccccc; color: black;">Bad</span>	<span style="background-color: #cccccc; color: black;">Satisfactory</span>
Cameras	5	1.00	<span style="background-color: black; color: black;">Bad</span>	<span style="background-color: #cccccc; color: black;">Satisfactory</span>
Office	1	.00	<span style="background-color: black; color: black;">Bad</span>	<span style="background-color: #cccccc; color: black;">Satisfactory</span>
Video	14	-1.00	<span style="background-color: black; color: black;">Bad</span>	<span style="background-color: #cccccc; color: black;">Satisfactory</span>

Quarterly Rolling Growth Rate



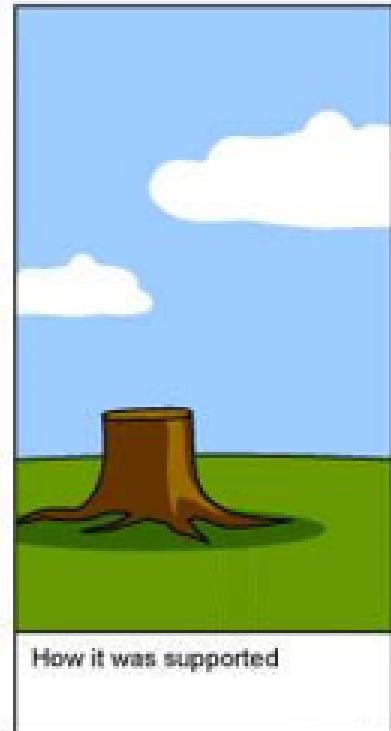
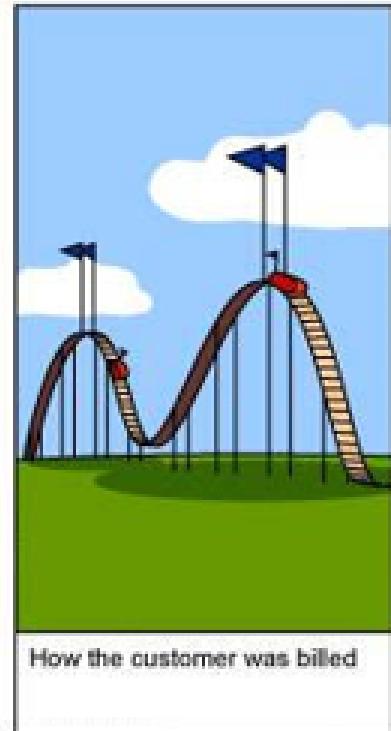
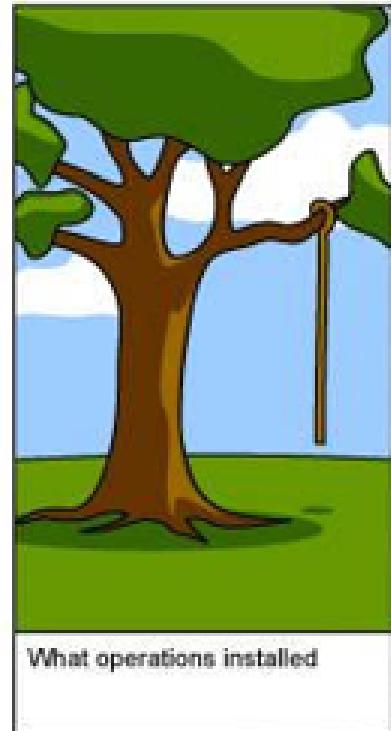
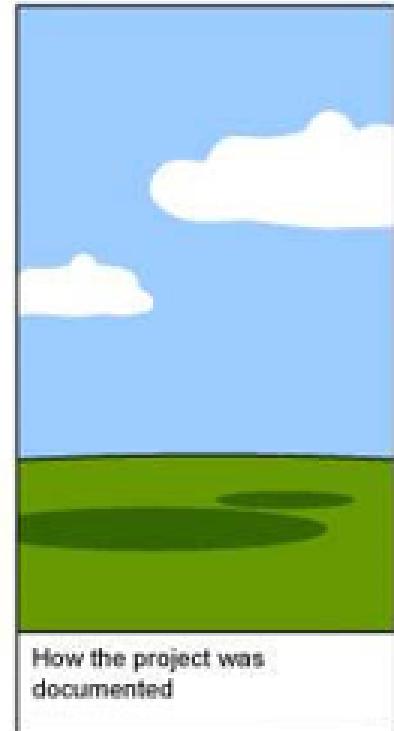
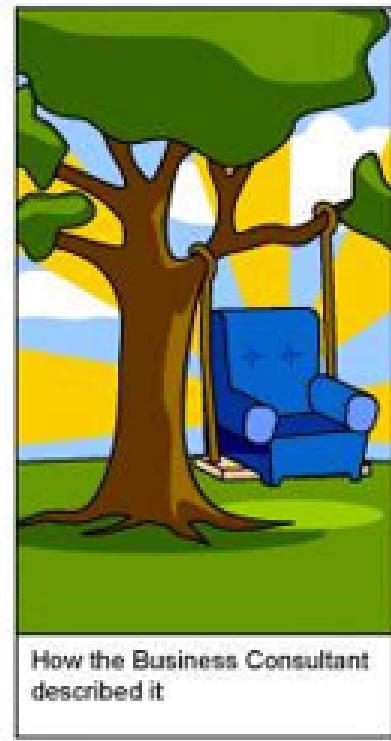
# Dashboards for analytics purpose



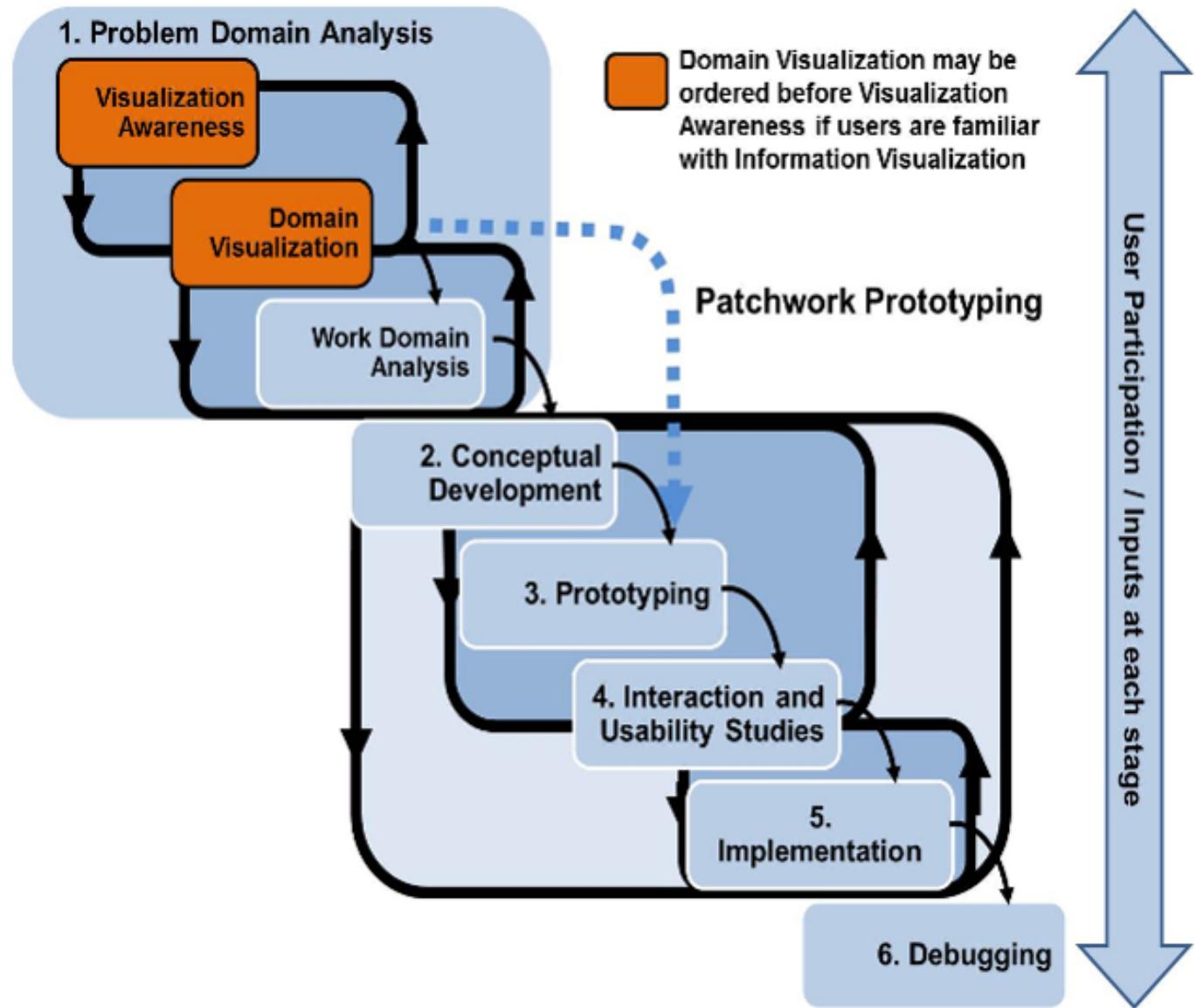
# Best Practices for Dashboard Design

- 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?

	<b>Questions</b>	<b>Implication</b>
<b>Role</b>	What decisions do they make? What questions do they need answered?	Structure the information to make it super easy to answer high priority questions.
<b>Work flow</b>	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.
<b>Data comfort and skills</b>	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.
<b>Business and data expertise</b>	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?

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

# Preparing stage: A User-Centric Dashboard Design Guide

## Information Discrimination

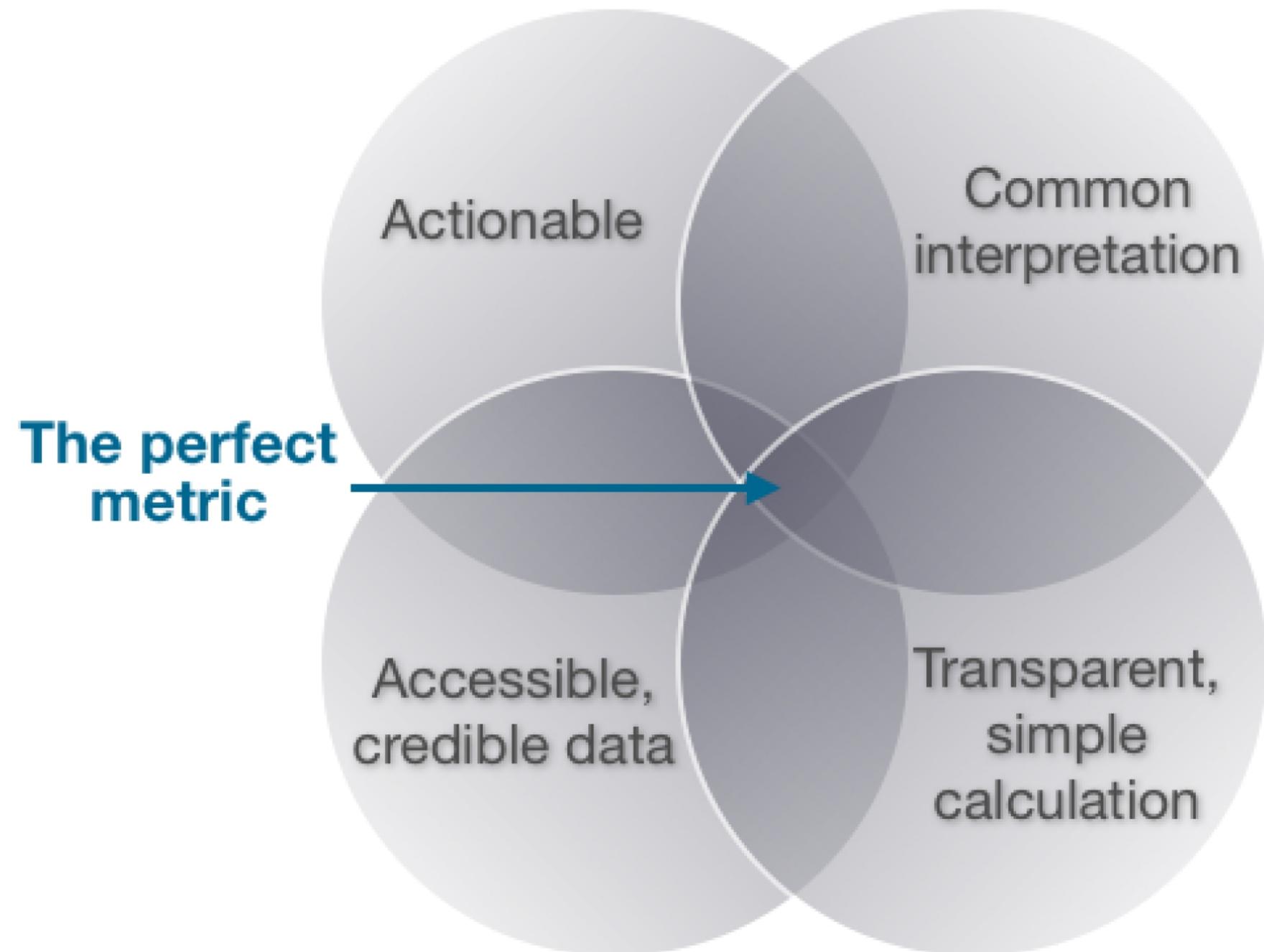
- Find the core
- Ask a better question
- Push to the appendix
- Reporting vs exploration

*“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

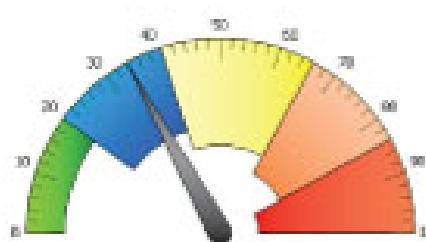
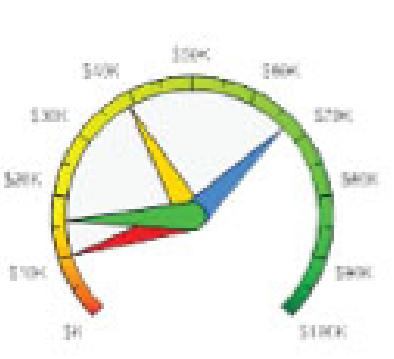
## Choosing the perfect metric

	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

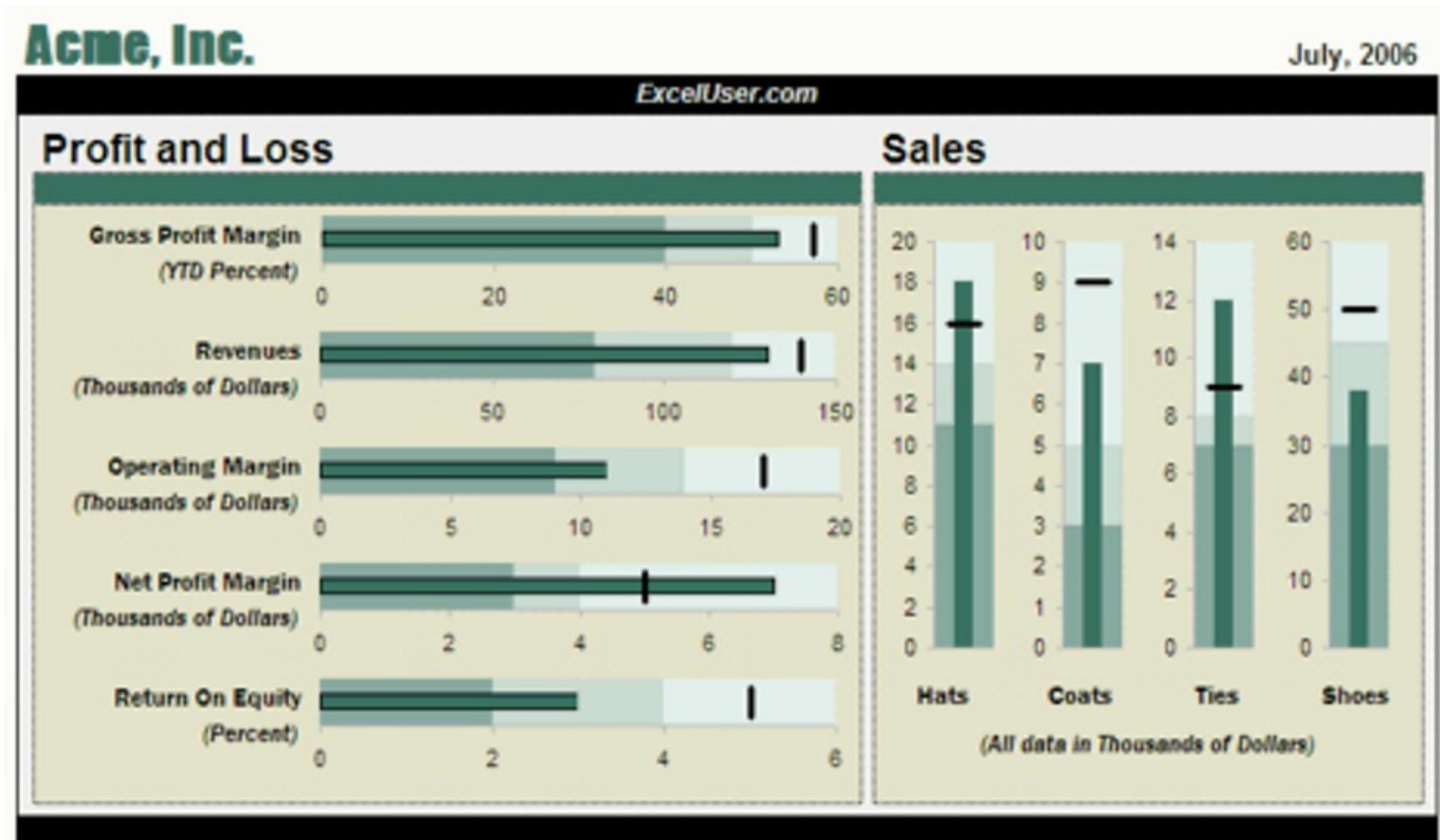
Right tool for the right job?

An assortment of typical dashboard gauges



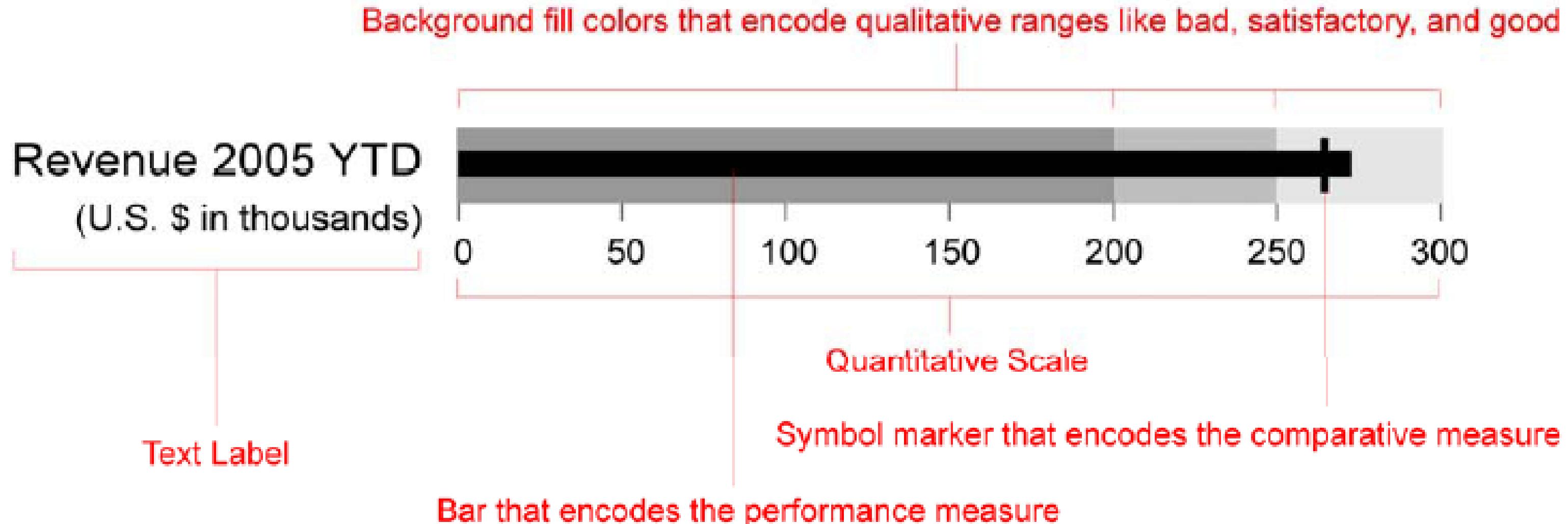
# Ideal graphs for information dashboard: Bullet Graphs

- Bullet graphs to replace gauges.



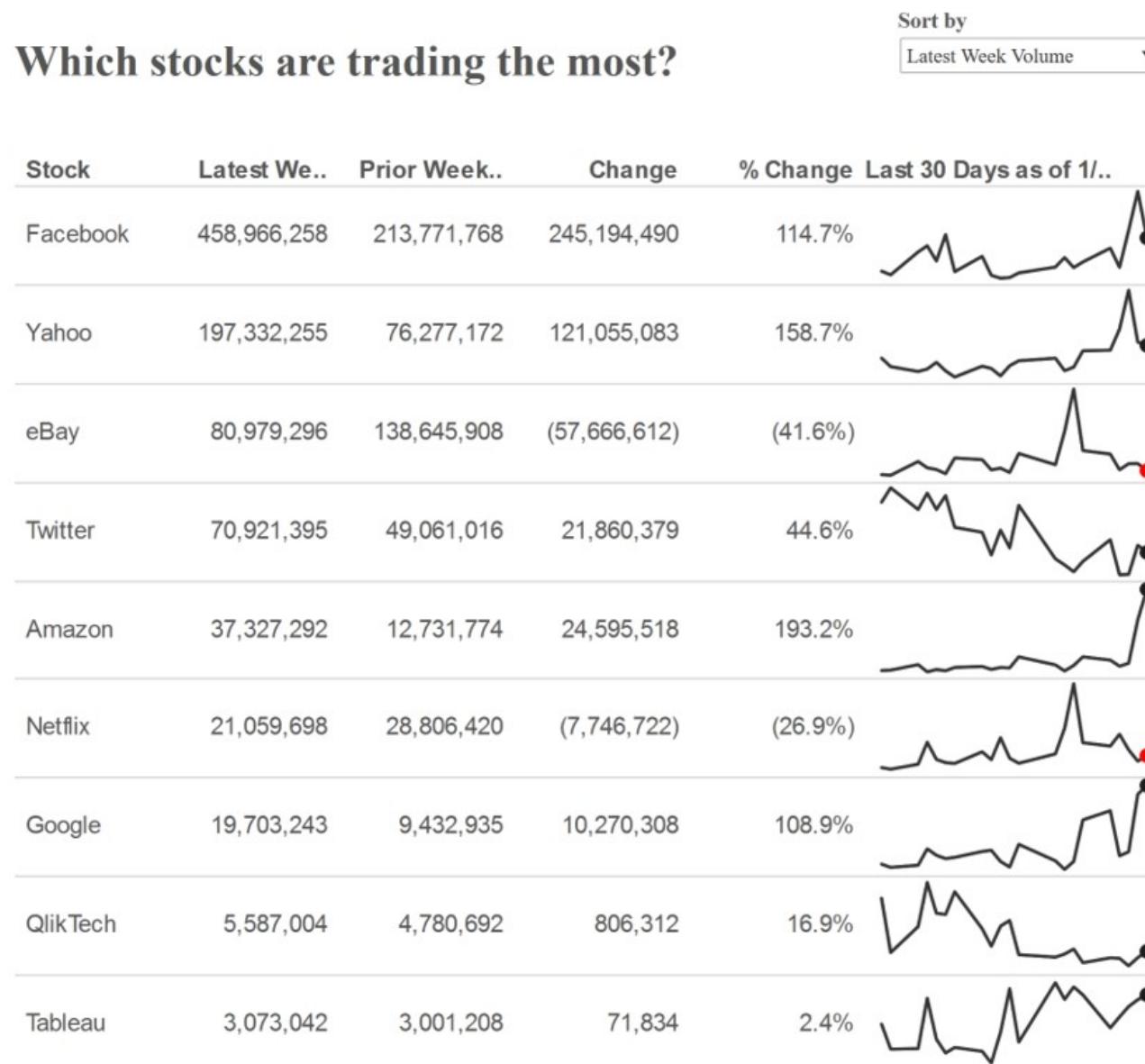
Creator of bullet graph Mr. Stephen Few. Visit [Perceptual Edge](#) for more information.

# Bullet graph design specifications



# Ideal graphs for information dashboard: Sparklines

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



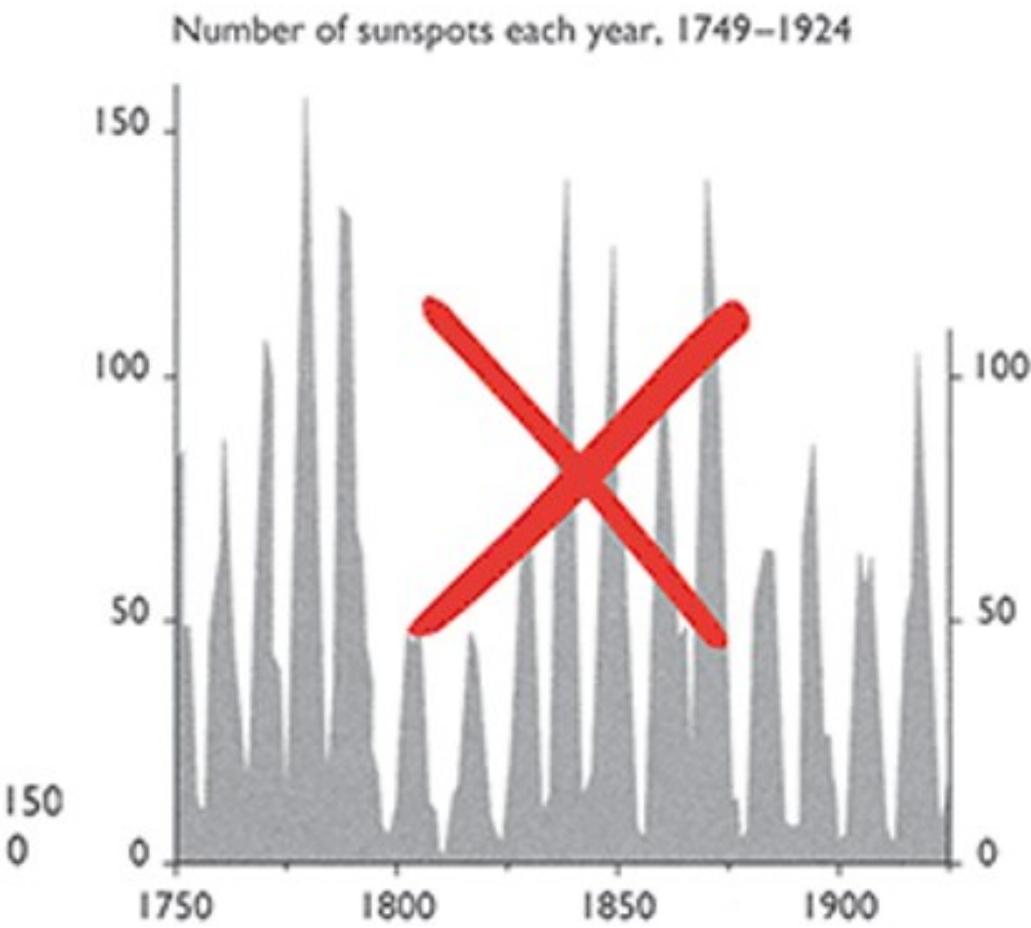
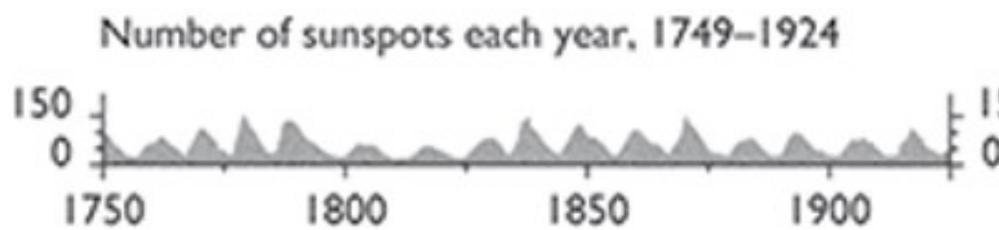
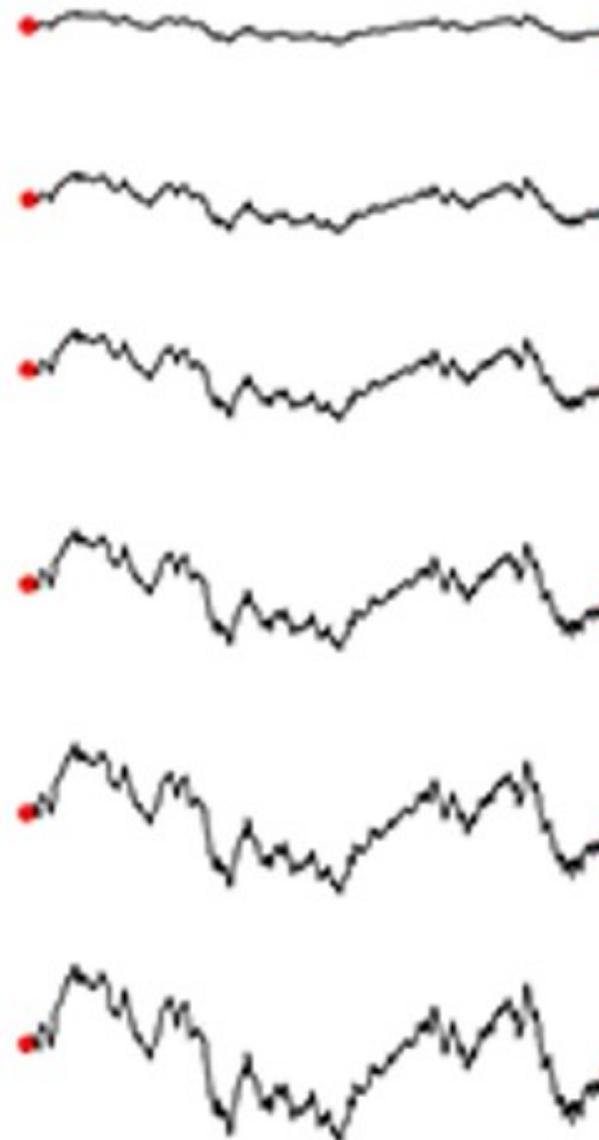
Reference: [Sparklines](#)

# Pre-attentive with colour and symbol

 glucose 6.6 • glucose 6.6

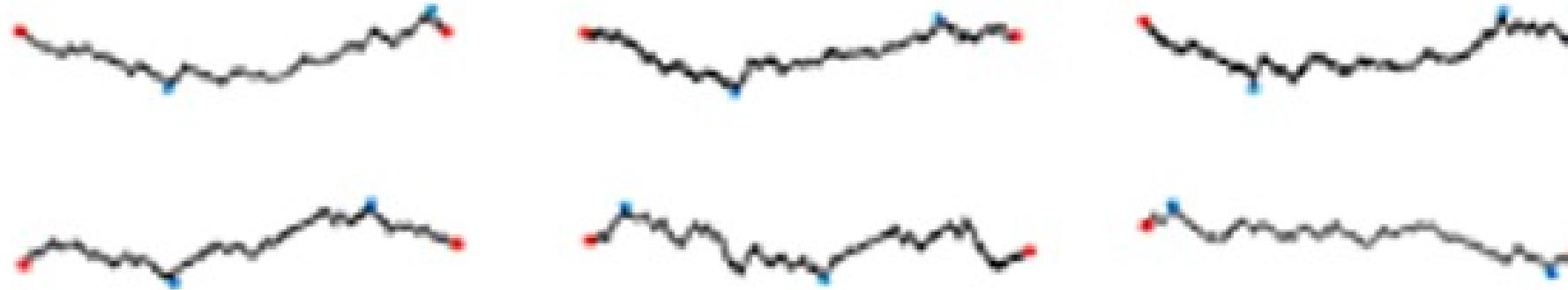
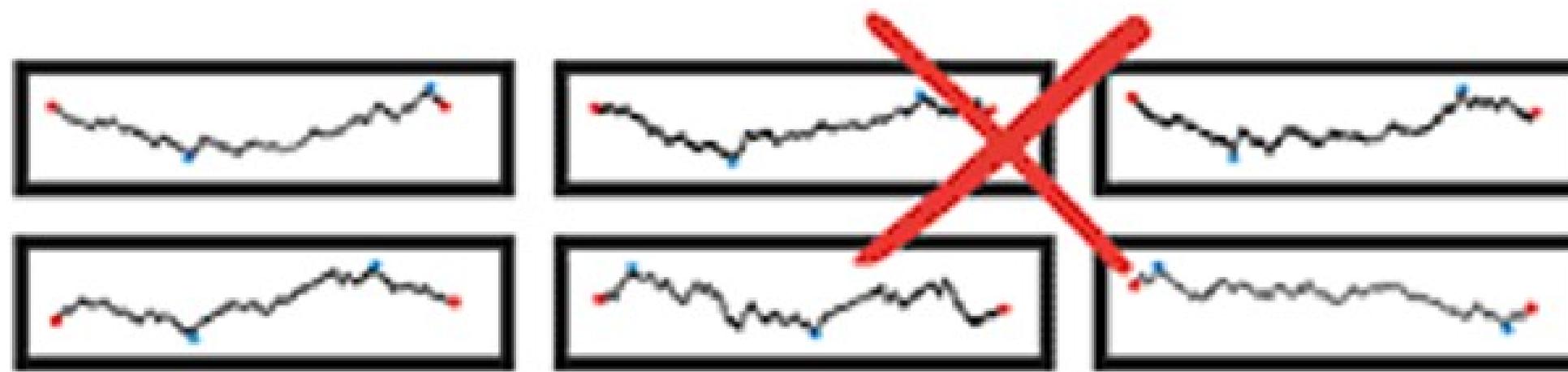
# Aspect ratio

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



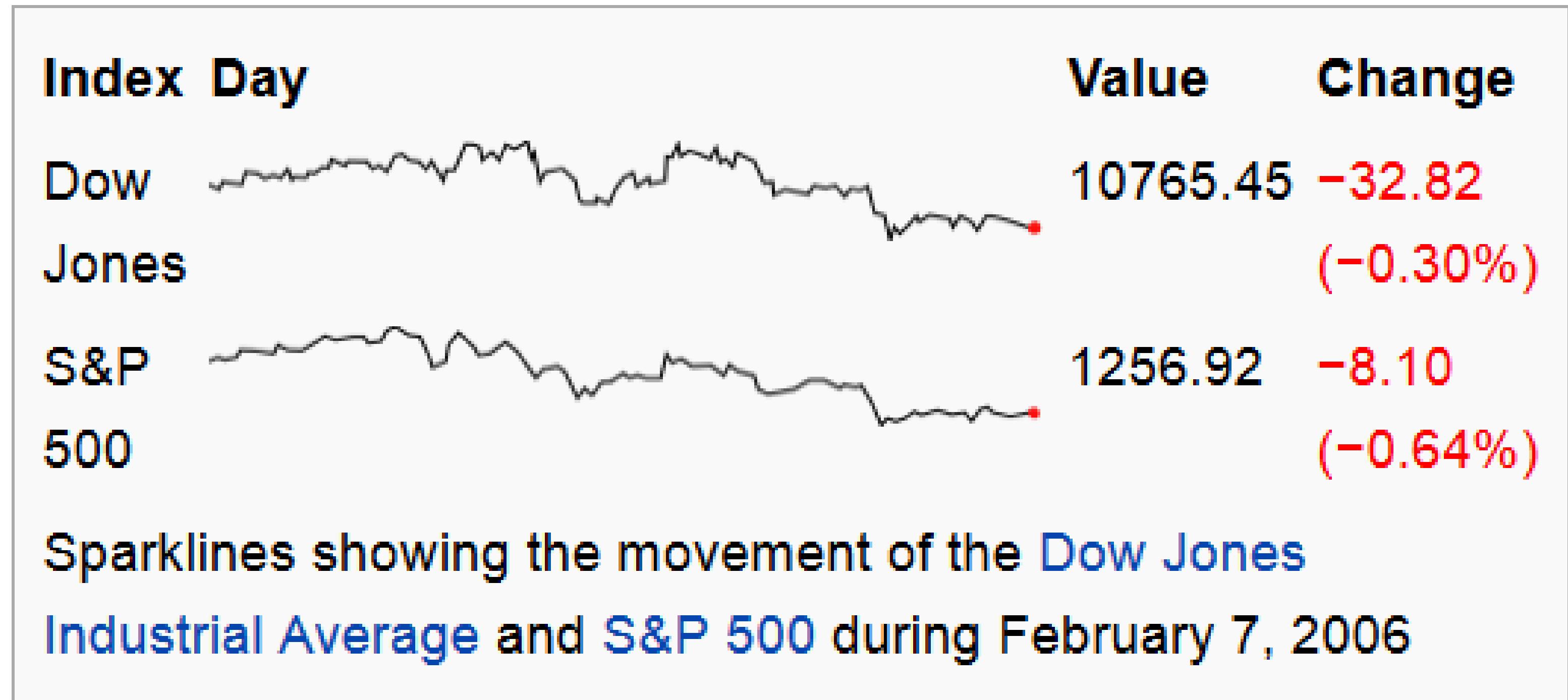
# Unintentional optical clutter

- 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

## 28 day summary with change over previous period

Tweets

**66** ↓21.4%



Tweet impressions

**1.4M** ↑5.1%



Profile visits

**21.9K** ↓9.1%



Mentions

**447** ↓9.3%



Followers

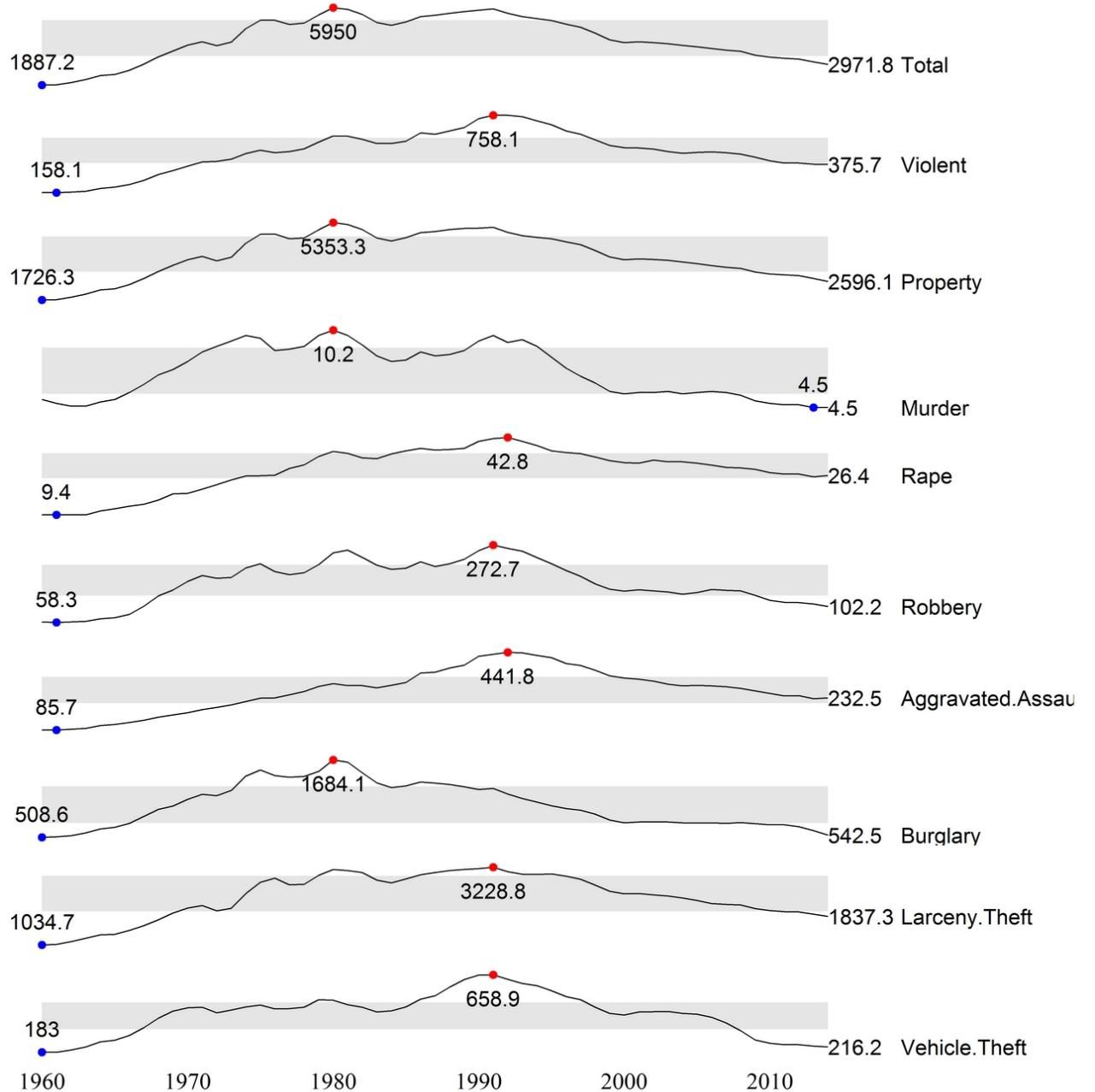
**56.8K** ↑1,143



October 2015 • 3 days so far...

# Sparklines best practice

- Use reference region to provide context



Reference: [Sparklines in ggplot2](#)

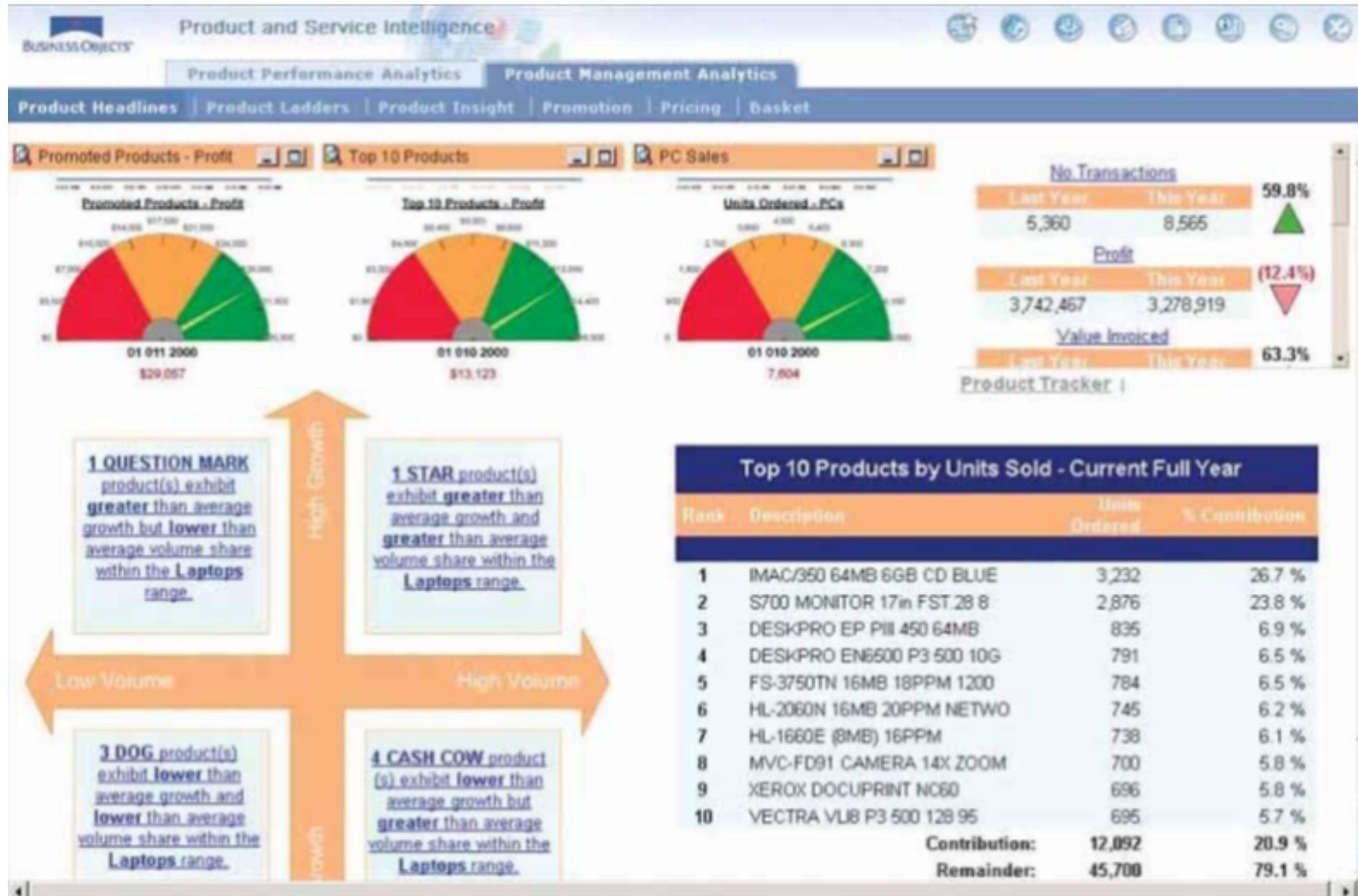
# Best Practices for Dashboard Design

## 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

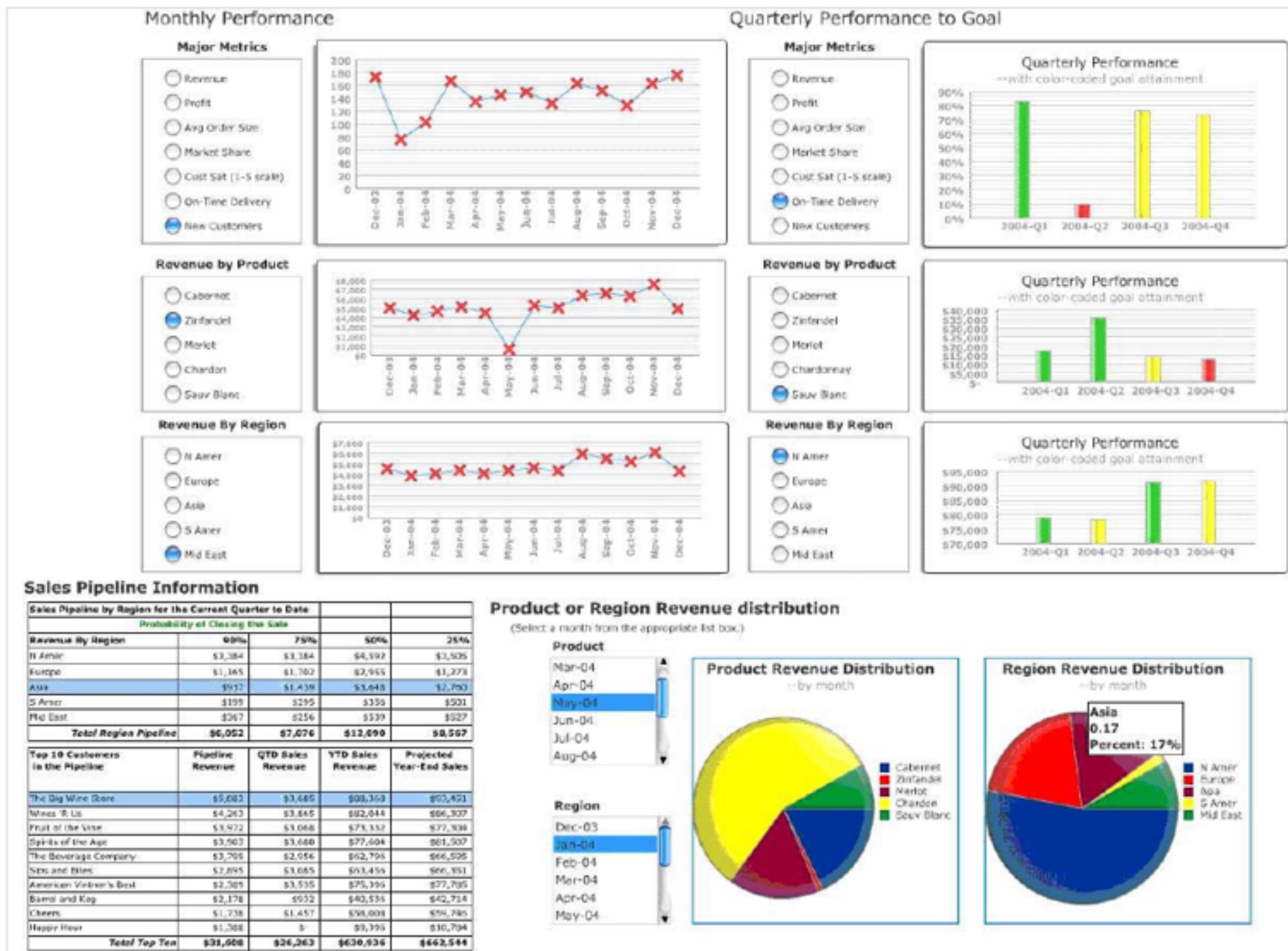
# Common mistakes in dashboard design

- 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

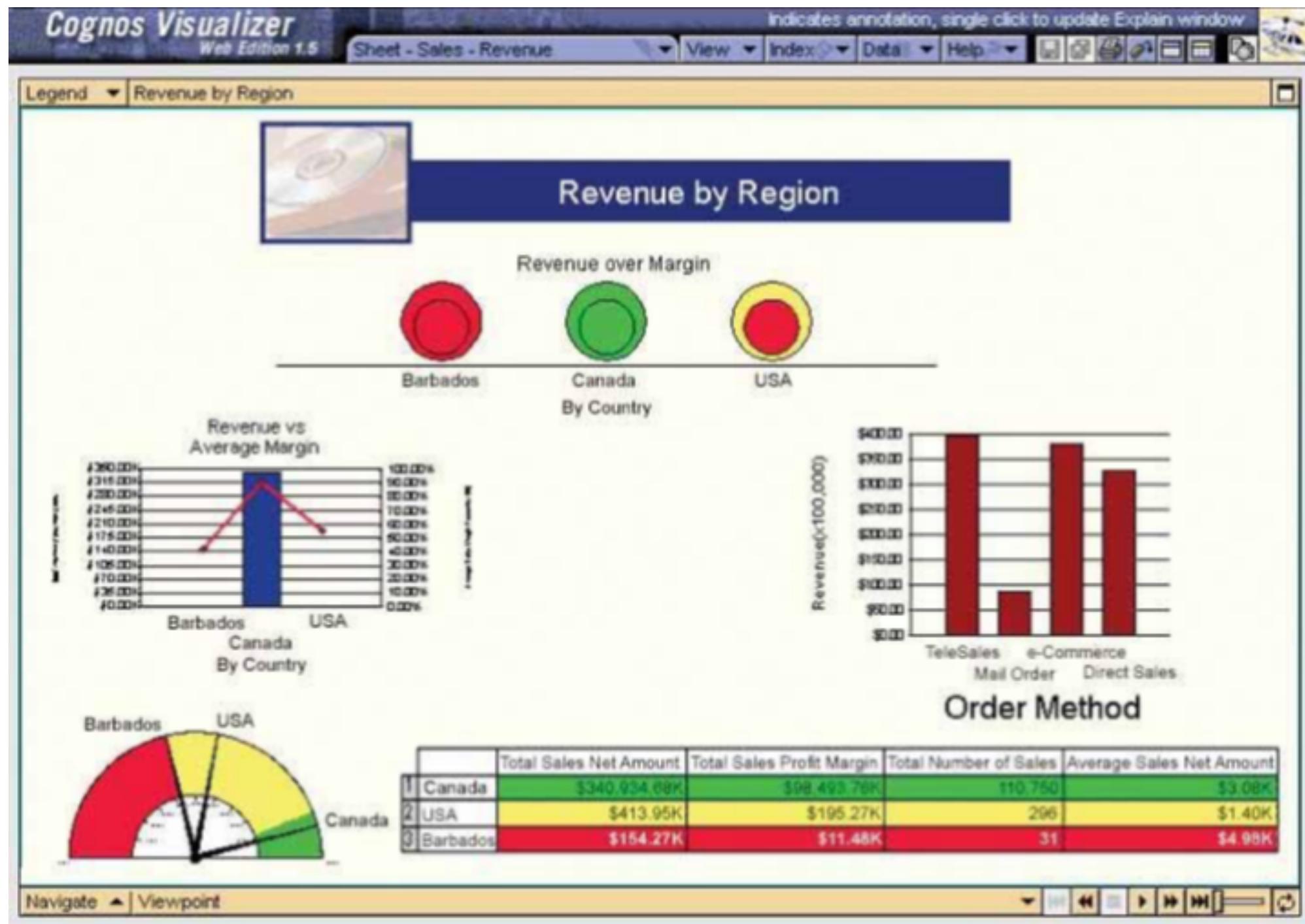
- Displaying excessive detail or precision

The screenshot displays the CELEQUEST Quality Yield Analysis dashboard. The top navigation bar includes 'Activity Server', 'Account Setting', 'Help', and user status 'Signed in as zaphod | Sign Out'. The left sidebar shows a 'Navigation Tree' with 'Dashboards' expanded, listing 'All Dashboards' (selected), 'Quality Yield Analysis' (highlighted in red), and 'Bookmarked Dashboards'. The main content area contains several data visualizations:

- Active Alert Messages:** A table showing alert details. One row is highlighted with a red border: "8/16/2003 Yield Drop in ESS on 60-00..." (Importance: Normal) with timestamp "03/15/2004 17:10:08".
- Board Yield Barchart:** A bar chart comparing yield metrics over different time periods.
- Board Yield Change Barchart:** A bar chart showing yield change over various time intervals.
- Tests Breakdown Pie:** A pie chart illustrating the distribution of test results across different categories.
- Board Yield Table Summary:** A table showing product numbers, descriptions, and detailed yield statistics for specific products. The entire table is highlighted with a red border.

# Common mistakes in dashboard design

- Introducing meaningless variety



# Common mistakes in dashboard design

- Arranging the data poorly



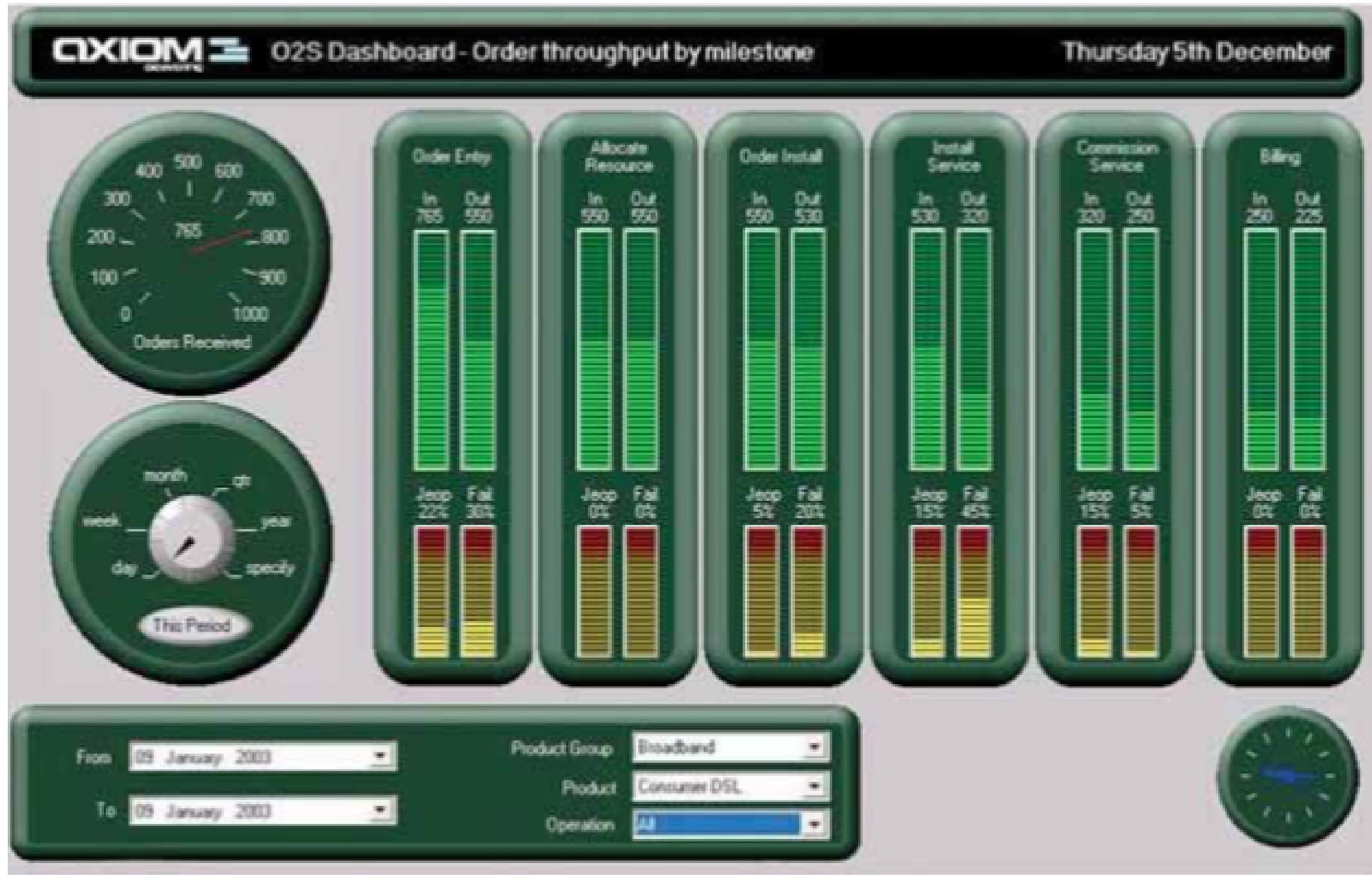
# Common mistakes in dashboard design

- Highlighting important data ineffectively or not



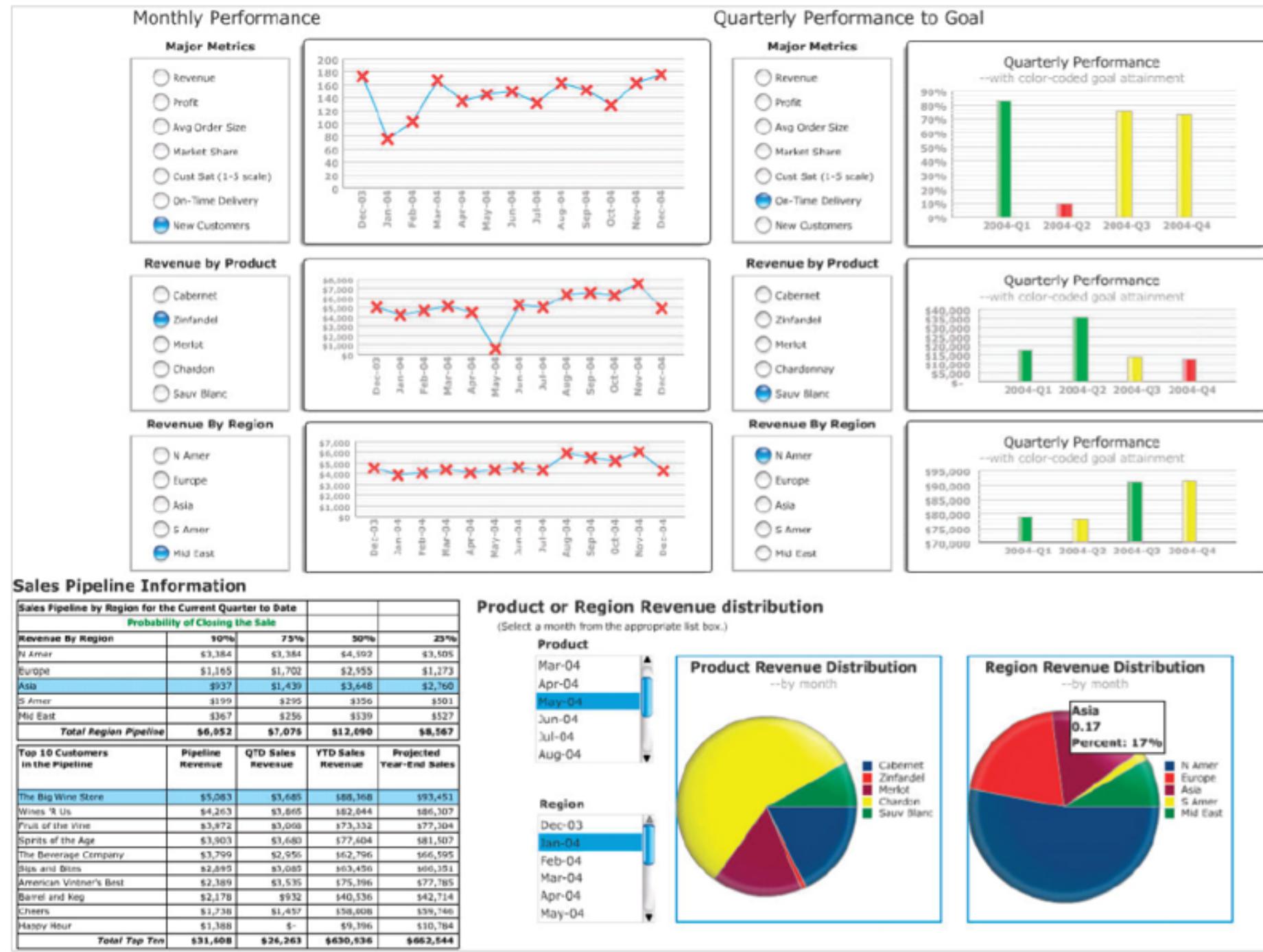
# Common mistakes in dashboard design

- Cluttering the display with useless decoration



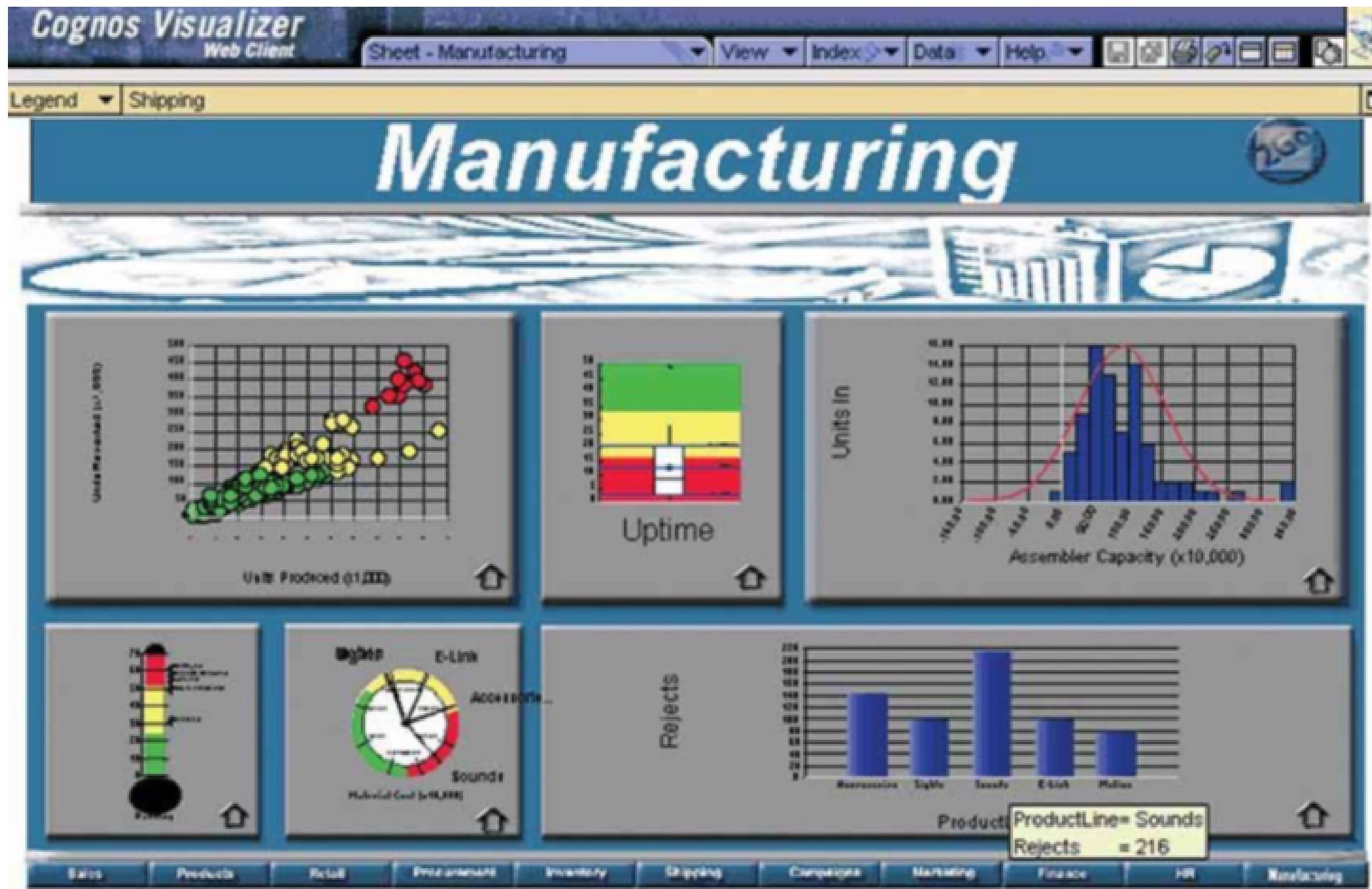
# Common mistakes in dashboard design

- Misusing or overusing colour



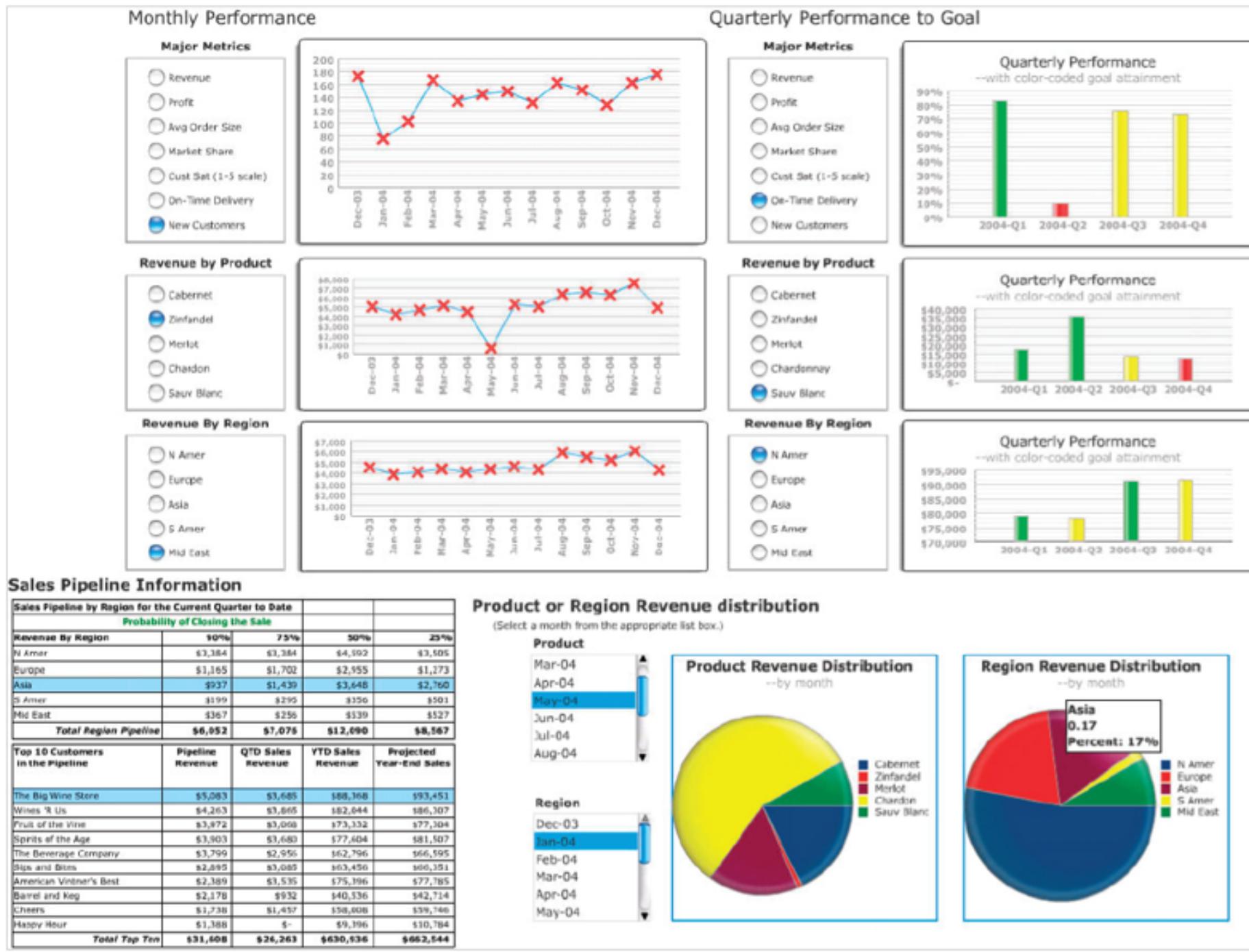
# Common mistakes in dashboard design

- Designing an unattractive visual display



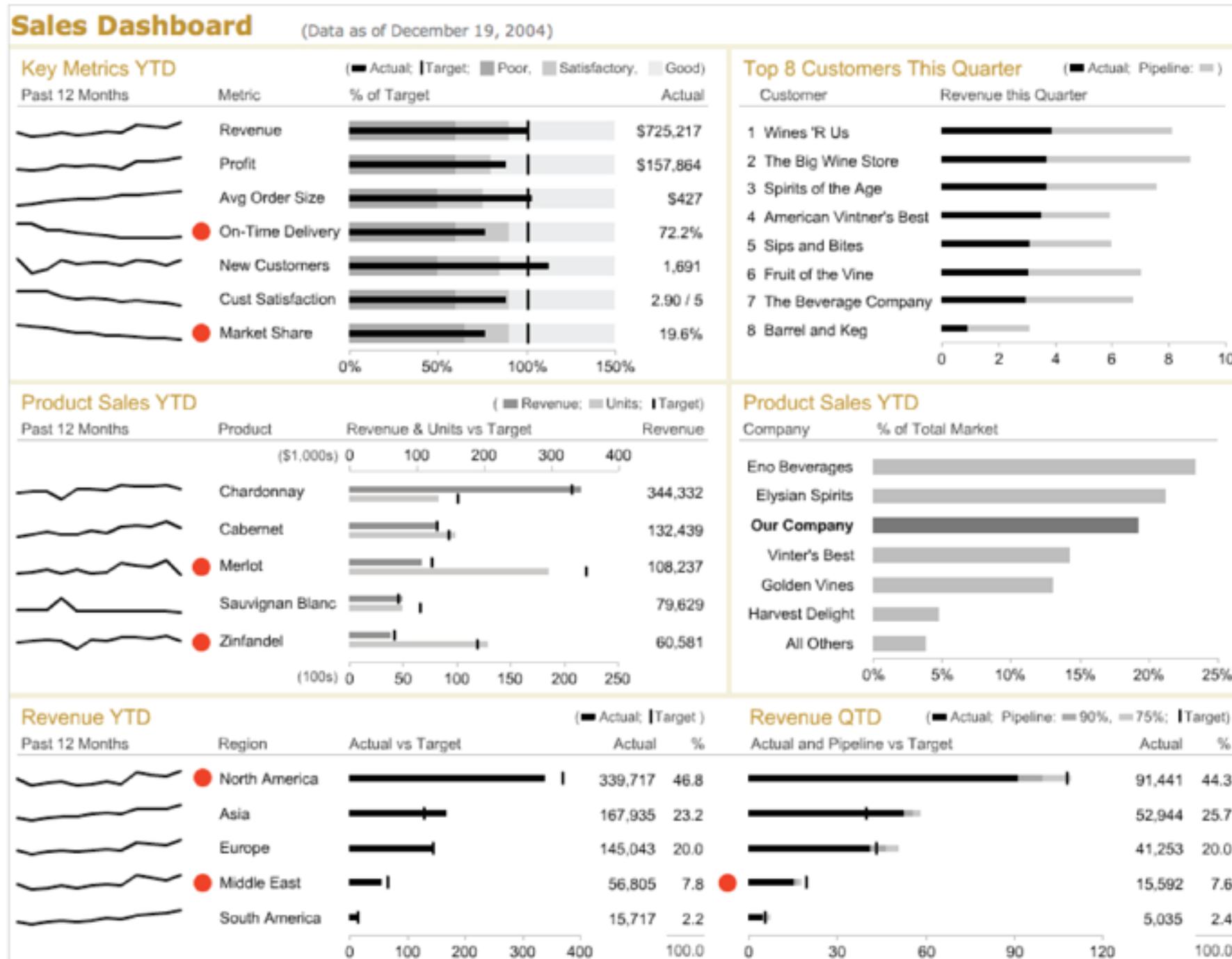
# Common mistakes in dashboard design

- Design that failed to reveal KPIs effectively



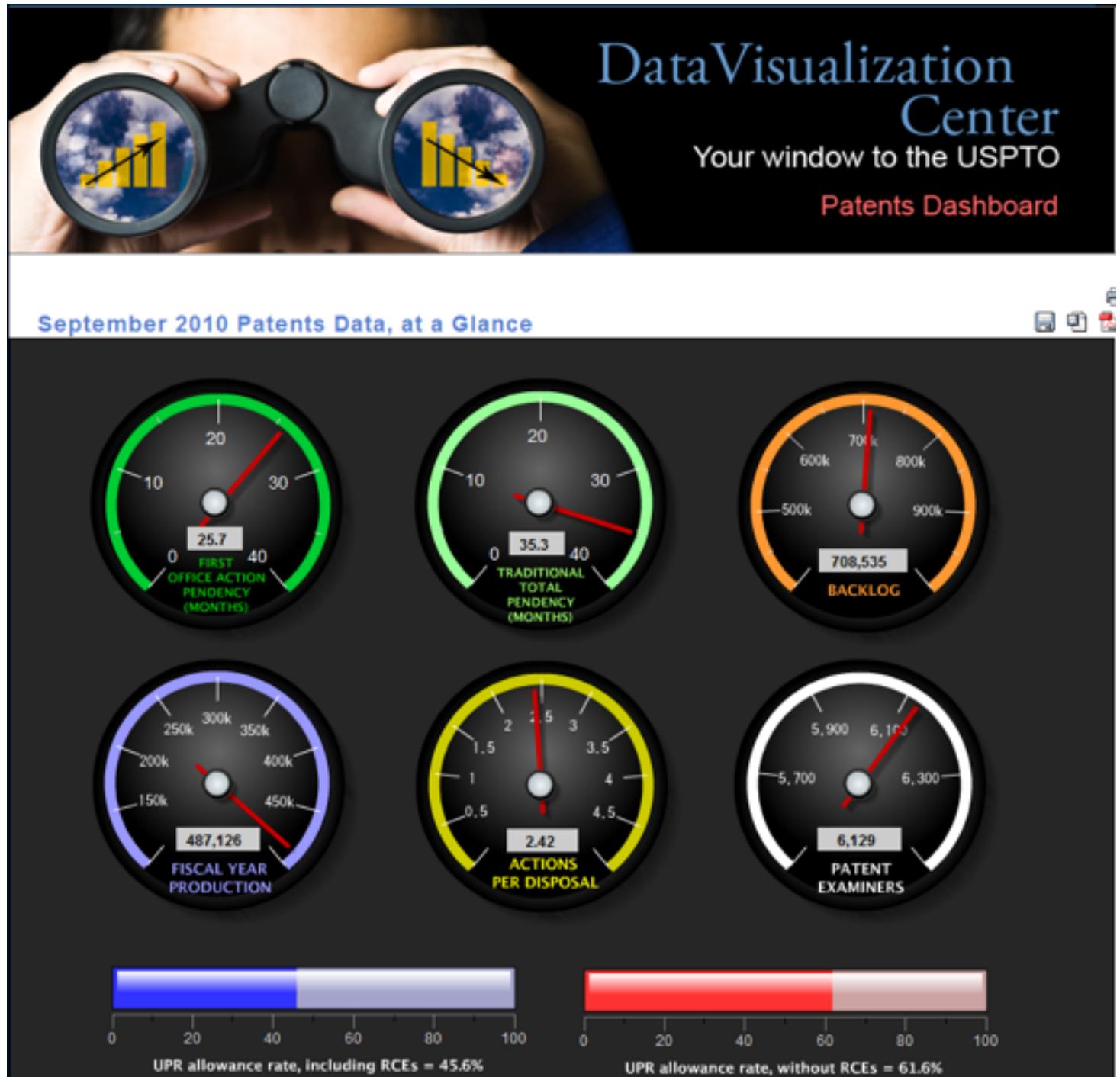
# Alternative dashboard design

- Design that reveals KPIs effectively



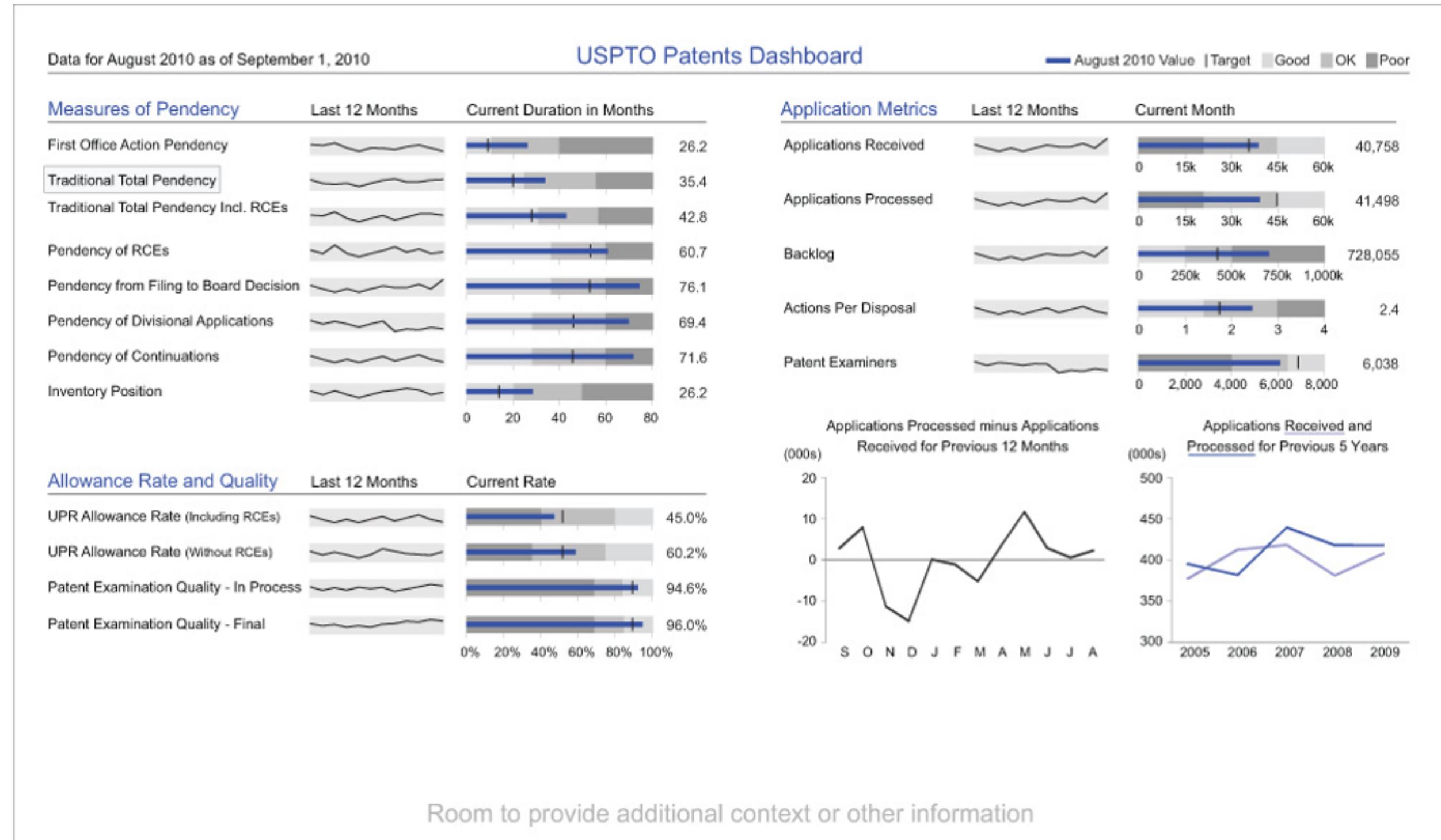
# Common mistakes in dashboard design

- Design with poor layout and clarity



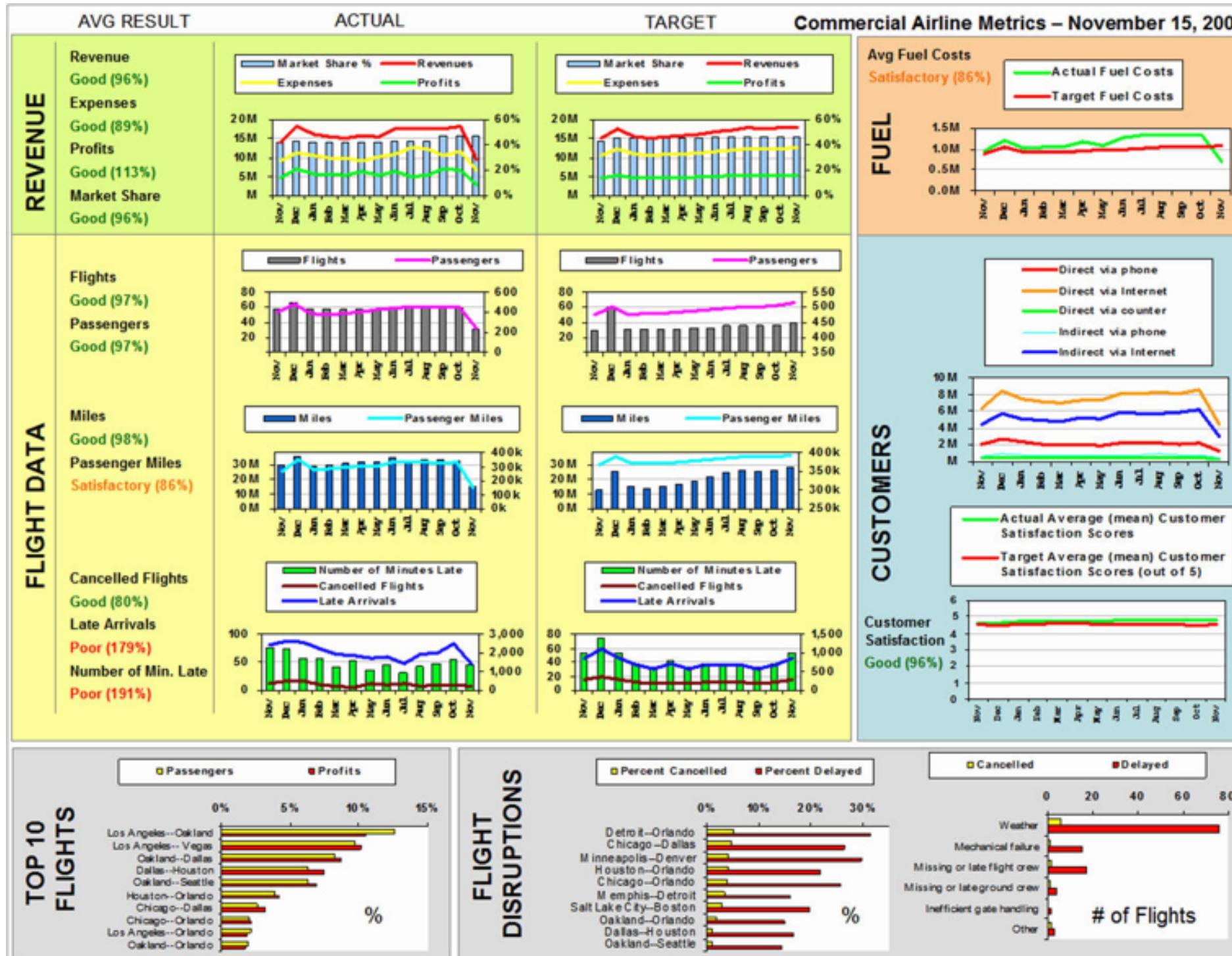
# Alternative dashboard design

- Design with good layout and clarity



# Common mistakes in dashboard design

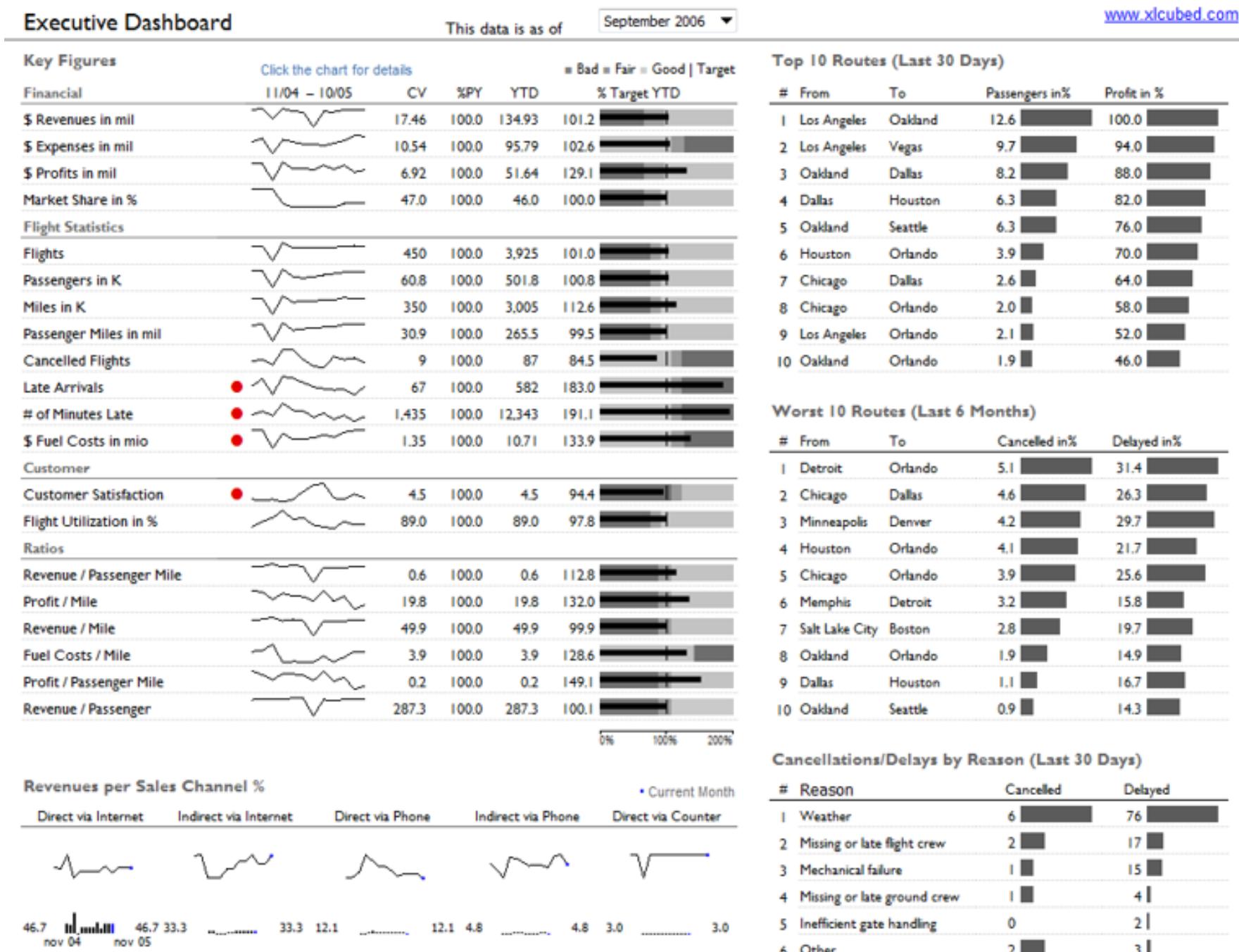
- Design with poor visual aestheticsness



Avoid This!

# 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](#)

