IBM Visual Analytics Products and Solutions

Graham Wills, IBM Software Group
STSM, Visualization Chief Architect
December 2013
CURRENT ANALYTIC SOLUTIONS
Big Families

- **IBM SPSS products**
  - use statistical analysis, data and text mining, predictive modeling and decision optimization to anticipate change and take action to improve outcomes.

- **IBM Cognos products**
  - provides you with the integrated dashboards, scorecards, reporting, analysis, and planning and budgeting capabilities you need to gain and act on fact-based insights.

- **IBM OpenPages products**
  - OpenPages GRC software allows your organization to manage enterprise operational risk and compliance initiatives using a single, integrated solution.

- **IBM Algorithmics products**
  - helps businesses like yours to gain transparency into financial risks in advance, providing information that is vital to your organization.

- **IBM Varicent products**
  - deliver measurable improvements in how your organization’s finance, sales, human resources and IT teams operate.
IBM Content Analytics

- a search and analytics platform that combines the power of content analytics with the scale of enterprise search in one offering
- uses rich-text analysis to surface new, actionable insights from enterprise content.
SPSS Statistics and Modeler

- an extensive predictive analytics platform that is designed to bring predictive intelligence to decisions made by individuals, groups, systems and the enterprise.

- By providing a range of advanced algorithms and techniques that include text analytics, entity analytics, decision management and optimization, SPSS Modeler can help you consistently make the right decisions—from the desktop or within operational systems.
i2 Analyst’s Notebook

- a data analysis and visualization environment that enables government agencies and private sector businesses to maximize the value of the mass of information that they collect.
- allows analysts to quickly collate, analyze and visualize data from disparate sources.
- reduces the time required to discover key information in complex data and to deliver timely, actionable intelligence to help identify, predict, prevent, and disrupt criminal, terrorist, and fraudulent activities.
Cúram Business Intelligence and Analytics

- a decision support solution that helps social program organizations analyze the effectiveness of their programs and gain insight into the efficiency of their operations.

- consists of embedded analytics, domain specific dashboards, a complete Extract, Transform, Load (ETL) framework and tool-independent, pre-defined, domain-specific data marts.

- delivers contextually relevant, embedded reports, prepackaged domain specific reports and a reporting architecture for the production of standard and ad-hoc reports, trend analysis, and tracking of key performance indicators
Open Pages GRC

- an integrated governance, risk and compliance platform that enables companies to manage risk and regulatory challenges across the enterprise.
- provides a set of core services and functional components that span risk and compliance domains including operational risk, policy and compliance, financial controls management, IT governance and internal audit.
WHAT’s The Big Picture?
Data Rich & Information Poor (DRIP)

- Computer and network technology has made it trivial to capture, store, manipulate and disseminate ever increasing amounts of data.
- This data has VOLUME, VELOCITY and VARIETY
Visualization: The premise

- Human visual system has evolved over time to spot patterns, outliers and trend
- Gain insight, by visually assessing data first, perform deeper analysis afterward
- Visualization is the ‘face’ of analysis
- Visualization is a force multiplier, not stand-alone technology
- Visualization is not just about reporting and “business graphics”

“A great visualization is worth a million data points”
What do we need to support analytic vis?

Visually appealing
Interactive

Advanced visualizations – beyond bar/pie
Handling the unknown - Breadth

Portable – mobile, web, desktop
First class support for mobile environments

In-market flexibility – extensible

Scalable
Highly tuned engine
Vis by example: Standard Presentation

- **DATA**: Basic functionality by any system for analyzing data is to filter, slice and dice to create a view of the data you want
- **TABLE**: Presenting the data in the simplest form
- **CHART**: Standard recommendation: To compare two categories of counts, use a clustered bar chart

<table>
<thead>
<tr>
<th>Month</th>
<th>Y1998</th>
<th>Y2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>13880</td>
<td>17308</td>
</tr>
<tr>
<td>1</td>
<td>10484</td>
<td>20596</td>
</tr>
<tr>
<td>2</td>
<td>9847</td>
<td>16183</td>
</tr>
<tr>
<td>3</td>
<td>6952</td>
<td>10355</td>
</tr>
<tr>
<td>4</td>
<td>9393</td>
<td>6229</td>
</tr>
<tr>
<td>5</td>
<td>12870</td>
<td>10931</td>
</tr>
<tr>
<td>6</td>
<td>9330</td>
<td>10598</td>
</tr>
<tr>
<td>7</td>
<td>14726</td>
<td>9835</td>
</tr>
<tr>
<td>8</td>
<td>11893</td>
<td>9913</td>
</tr>
<tr>
<td>9</td>
<td>7815</td>
<td>3249</td>
</tr>
<tr>
<td>10</td>
<td>6419</td>
<td>4458</td>
</tr>
<tr>
<td>11</td>
<td>9900</td>
<td>17779</td>
</tr>
</tbody>
</table>
Visualization by example

- **Adapt the layout to the data:** Months are cyclical; use a polar axis. This allows the user to spot seasonal effects more easily.

- **Bars are not good for comparisons:** Change to **aligned points**. This allows the years to be compared directly.

- **Engage the user:** Use a custom symbol appropriate for the domain.
Let’s Scale that Data up a Little …

- Original data set had all commercial US flights for a 20 year period
- Not just one big table; associated data are:
  - Airport Locations (geo-data)
  - Induced Network Graphs (airplane connections, hubs etc.)
  - Weather data (numeric and text)
  - Both of the above have Temporal components
2014 Top Trends - Visualization

Visual Storytelling
- Big and no longer “sneered” at
- #1 most mentioned trend by industry experts

Interactive Visual Analytics
- Customers prefer compelling interfaces to simple analytics rather than complex interfaces to powerful ones

Real-time/Big Data
- Large amount of sensor data
- New techniques needed for summarization
- Handle unstructured & streaming data

Simple, Clean, Mobile-Friendly
- Simpler, cleaner, mobile-friendly visualizations
- “Pretty good charts” are not good enough
IBM’s Unique Visualization Approach

Old Way – Charts are “Types”

- Fixed Set of “supported charts”
  - If it isn’t in the list, you can’t have it

- Expensive and slow to innovate
  - Each new chart is a new development effort

- “Ad hoc” features tightly coupled to type
  - E.g. “Animation only implemented for Hans Rosling-style bubble charts, not for all charts”
  - Adding a new feature to 20 charts is a large effort

Kills innovation

Our Way – Grammar of Graphics

- A language-based specification of a chart

- In terms of features, not “types”, e.g.

- “bar chart” = basic 2D coordinates, categorical x numeric displayed with intervals dropped from locations

- “line chart” = basic 2D coordinates, any x numeric displayed with lines connecting locations

- “histogram” = basic 2D coordinates, numeric x statistic binned counts, displayed with intervals dropped from locations

- Orthogonal set of features describes all common charts, virtually all uncommon charts, and most cutting-edge research charts
IBM Rapidly Adaptive Visualization Engine

- Not a prescribed “Library of Charts”
- A highly adaptive framework that allows each integrator to quickly create and customize their own library of charts and interactive visualizations
- Based on the SPSS “Grammar of Graphics” approach
  - Use a simple language to describe a visualization
  - Language has the flexibility to describe known chart types
  - Language has the extensibility to describe new advanced visualizations
Cross-Platform and Platform Optimized

A single description provides the same visualization in Web, Mobile and Desktop.
RAVE Enables Visual Analytic Solutions

- Ability to build any type of visualization
- Standard cross-IBM technology
- Applications can use and add to a known library of already-built analytic visualizations
- Enterprise-Ready
  - Internationalizable
  - Accessible
  - Adaptive
Visual Analytics Snapshots

Common, traditional business charts

More advanced/ non-traditional business charts

Visualizations that would typically require a dedicated graphics programmer
Visual Analytics: Client Solutions

- Over 20 custom visualizations created based on either articulated customer requirements or invented based on customer-provided data.
Visual Analytics: Embedded in Products
Result

- The Visualization adapts to the Analytic
- Maximizes the impact and utility of the powerful analytics that exist throughout IBM’s product family
- Simplifies customer experience and allows the immersive analytic experience
Some of the 25+

RAVE-ENABLED Product Examples
Analytics Zone

Marketplace - In Beta
AnalyticsZone the leading community on Business Analytics.

Explore 8 of 30

- Bubble
  - Visualization
  - by IBM

- Bubble - Packed
  - Visualization
  - by IBM

- Dial
  - Visualization
  - 80%

- Network
  - Visualization
  - by IBM

- Network with bubbles
  - Visualization
  - by IBM

- Radar
  - Visualization
  - by IBM
Business Analytics software

Allows custom visualizations in Cognos
IBM SPSS Analytic Catalyst is a new analysis tool that makes predictive analytics and discovery more accessible to business analysts than ever before. IBM® SPSS® Analytic Catalyst uses the power of SPSS Analytic Server to automatically uncover key insights and predictive drivers in data without the need for programming or advanced statistical knowledge. These results are presented as interactive visuals with plain language summaries for easy consumption. The automation of several analysis steps lowers the barrier of entry for predictive analytics and offers significant time-savings needed for timely and confident decisions.

Using the power of SPSS Analytic Server Hadoop is a Java-based programming framework that supports the processing of large data sets in a distributed computing environment. Hadoop makes it possible to run applications on systems with thousands of nodes involving thousands of terabytes.
Supporting Motion/Interactivity – Research “TwitterViz”

- Support for interactions like zoom/pan
- Interactivity based on roll-over/click
- Animation based on streaming data
- Interactions for zoom/pan
- Animation for streaming data
Summary

- IBM is making a significant investment in Analytic Visualization. RAVE technology is a key part of that.

- The RAVE project is focused on some key values:
  - Extreme flexibility
  - Cross-platform consistency/portability
  - Support for animated/interactive visualizations

- Becoming the IBM Standard
  - A component in several products in market
  - Being implemented across IBM

IBM Analytics Zone: http://analyticszone.com

Graham Wills:
Twitter @GrahamWills
Linked-In grahamwills
Blog http://workingvis.com