IF 4061

Data and Information Visualization

Constructing and Evaluating Your Design Solution

Dessi Puji Lestari

Sekolah Teknik Elektro & Informatika

Acknowledgement

Most of the contents of the slides were taken from Andy Kirk. Data Visualization: A Successful Design Process. Pact Publishing. 2012, chapter 6

Content

- Visualization software, applications, and programs
- Constructing
- Evaluating
- Developing your capabilities

Methodology

1. Purpose & parameters

2. Prepare & explore data

3. Formulate questions

4. Design concepting

5. Construct & launch

For constructing visualizations, technology matters

- All advanced designers need to be able to rely on different tools and capabilities
  - for gathering data, handling, and analyzing it before presenting, and launching the visual design.
- Great concepts and creative ideas, without the means to convert these into built solutions they will ultimately remain unrealized.

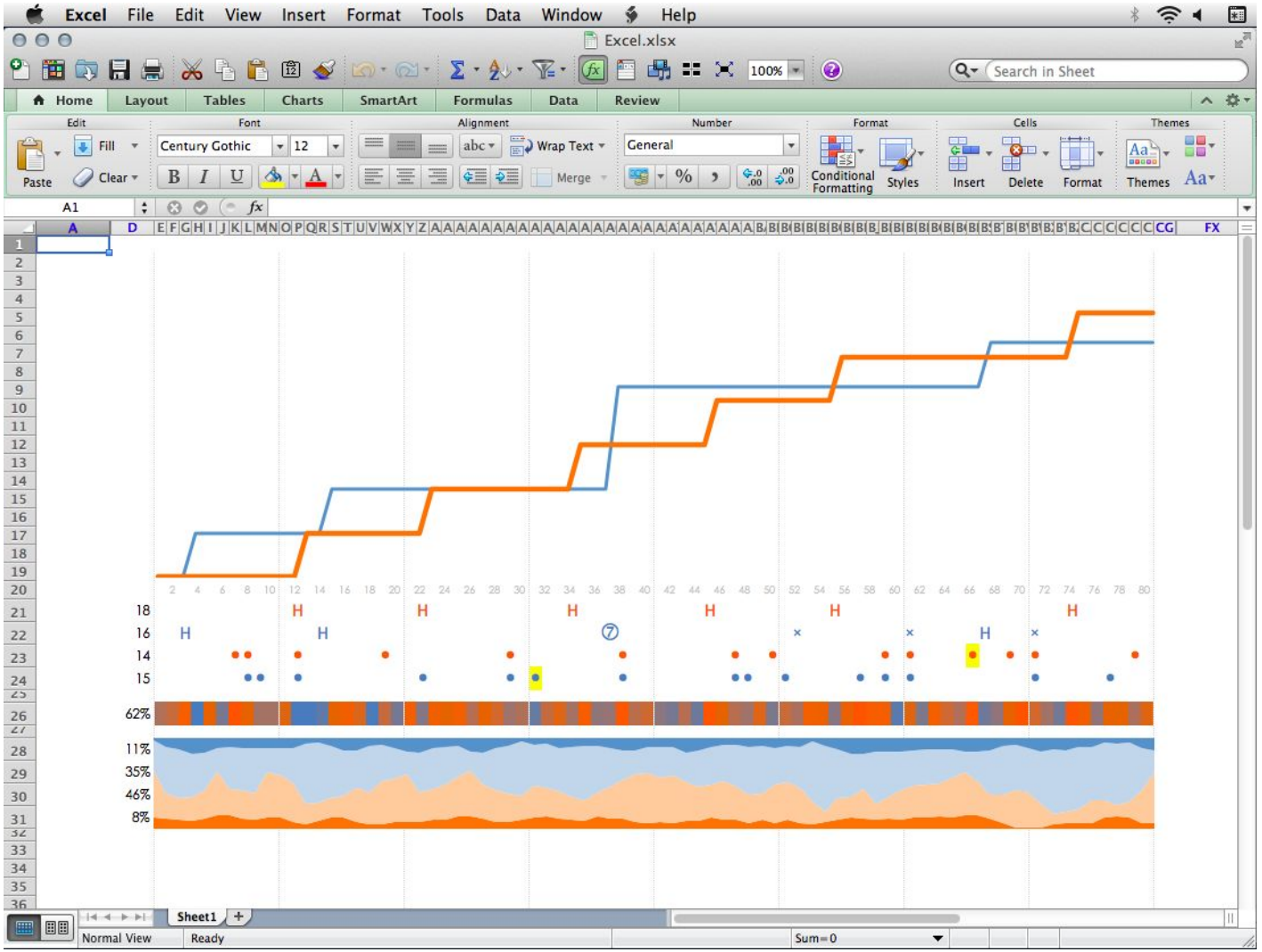
Visualization software, applications, and programs

- Charting and statistical analysis tools
- Programming environments
- Tools for mapping
- Other specialist tools

Charting and Statistical Analysis Tools

- **Microsoft Excel**
- **Tableau**
- **Google Chart Tools**
  - (https://developers.google.com/chart/)
- **Google Visualization API**
  - (https://developers.google.com/chart/interactive/docs/reference)
- **Google Fusion Tables**
  - (http://www.google.com/drive/start/ apps.html)
  - for publishing simple choropleth maps timelines, and a variety of reasonably interactive charts.
- **Wordle** (http://www.wordle.net/)
  - a popular tool for visualizing the frequency of words used in text via "word Clouds"
- **R** (http://www.r-project.org/)
  - an open source language for statistical analysis and graphical techniques.

Excel


Excel File Edit View Insert Format Tools Data Window Help
Excel.xlsx
Search in Sheet
Home Layout Tables Charts SmartArt Formulas Data Review
Century Gothic
12
General
Wrap Text
Merge
Conditional Formatting
Styles
Insert
Delete
Format
Themes
A1
18
16
14
15
62%
11%
35%
46%
8%
Sheet1
Normal View
Ready
Sum=0

Tableu

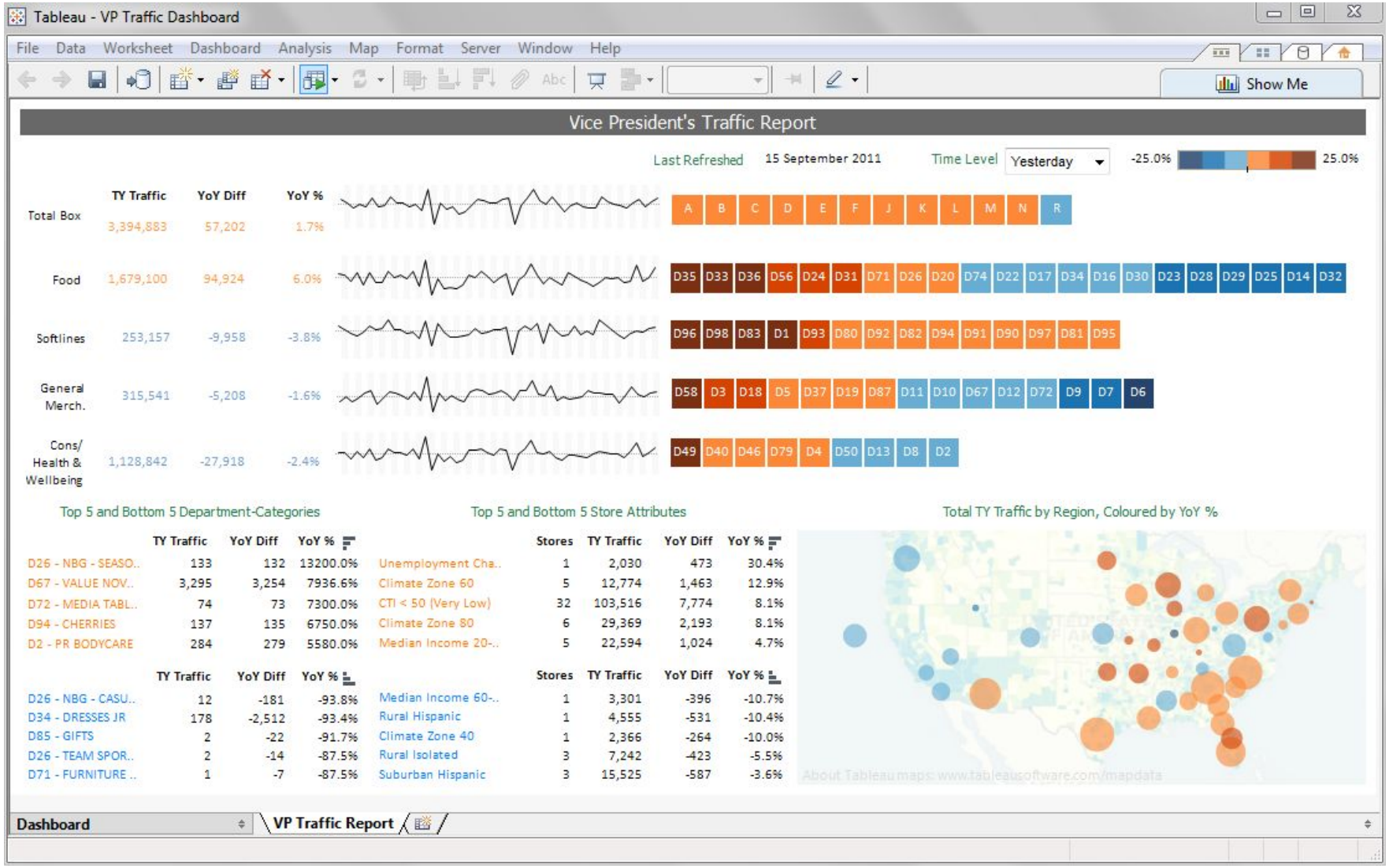
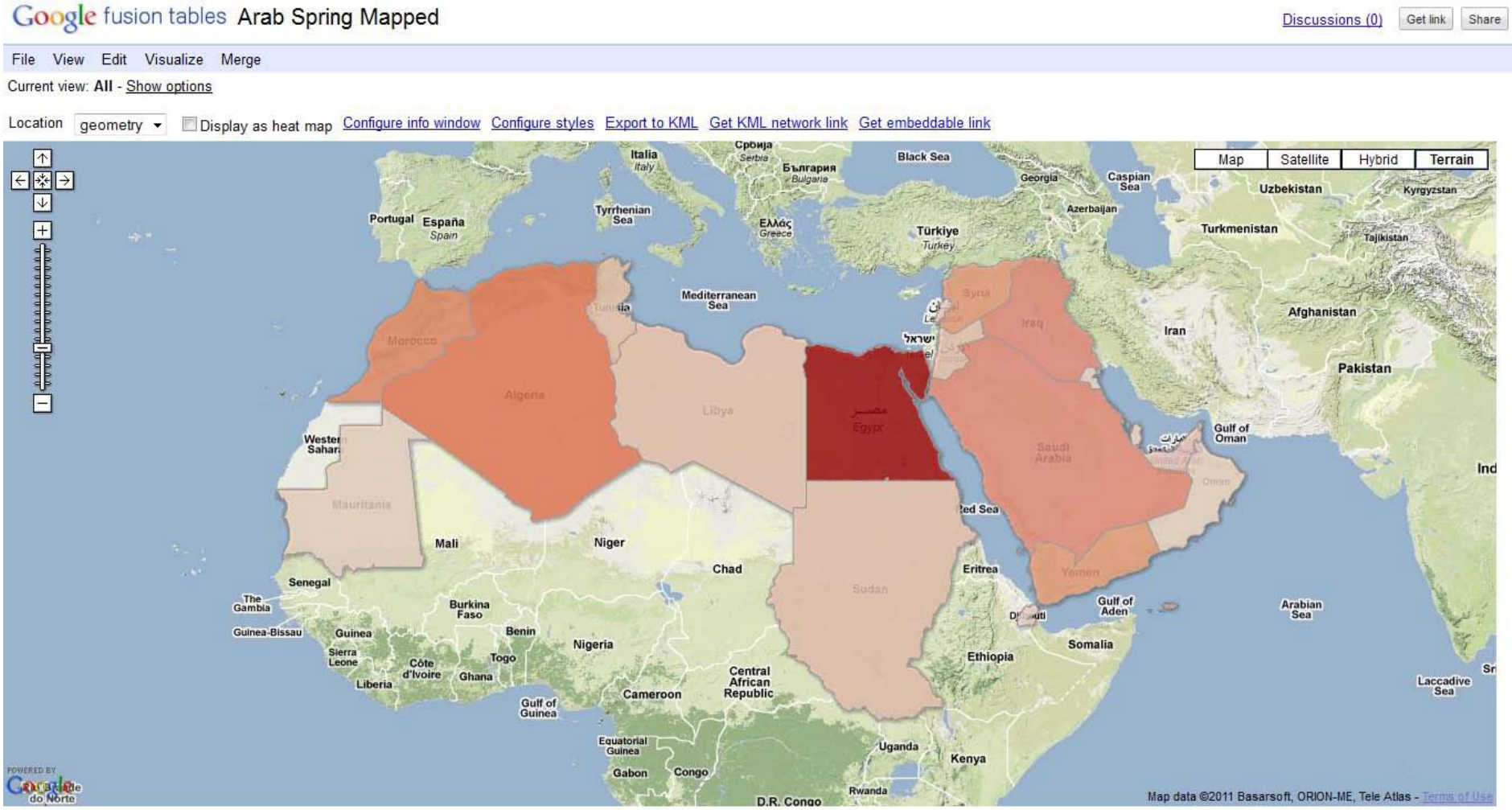


Tableau - VP Traffic Dashboard
File Data Worksheet Dashboard Analysis Map Format Server Window Help
Show Me
Vice President's Traffic Report
Last Refreshed 15 September 2011
Time Level Yesterday
-25.0% 25.0%
TY Traffic YoY Diff YoY %
Total Box 3,394,883 57,202 1.7%
Food 1,679,100 94,924 6.0%
Softlines 253,157 -9,958 -3.8%
General Merch. 315,541 -5,208 -1.6%
Cons/ Health & Wellbeing 1,128,842 -27,918 -2.4%
A B C D E F J K L M N R
D35 D33 D36 D56 D24 D31 D71 D26 D20 D74 D22 D17 D34 D16 D30 D23 D28 D29 D25 D14 D32
D96 D98 D83 D1 D93 D80 D92 D82 D94 D91 D90 D97 D81 D95
D58 D3 D18 D5 D37 D19 D87 D11 D10 D67 D12 D72 D9 D7 D6
D49 D40 D46 D79 D4 D50 D13 D8 D2
Top 5 and Bottom 5 Department-Categories
TY Traffic YoY Diff YoY %
D26 - NBG - SEASO.. 133 132 13200.0%
D67 - VALUE NOV.. 3,295 3,254 7936.6%
D72 - MEDIA TABL.. 74 73 7300.0%
D94 - CHERRIES 137 135 6750.0%
D2 - PR BODYCARE 284 279 5580.0%
TY Traffic YoY Diff YoY %
D26 - NBG - CASU.. 12 -181 -93.8%
D34 - DRESSES JR 178 -2,512 -93.4%
D85 - GIFTS 2 -22 -91.7%
D26 - TEAM SPOR.. 2 -14 -87.5%
D71 - FURNITURE .. 1 -7 -87.5%
Top 5 and Bottom 5 Store Attributes
Stores TY Traffic YoY Diff YoY %
Unemployment Cha.. 1 2,030 473 30.4%
Climate Zone 60 5 12,774 1,463 12.9%
CTI < 50 (Very Low) 32 103,516 7,774 8.1%
Climate Zone 80 6 29,369 2,193 8.1%
Median Income 20-.. 5 22,594 1,024 4.7%
Stores TY Traffic YoY Diff YoY %
Median Income 60-.. 1 3,301 -396 -10.7%
Rural Hispanic 1 4,555 -531 -10.4%
Climate Zone 40 1 2,366 -264 -10.0%
Rural Isolated 3 7,242 -423 -5.5%
Suburban Hispanic 3 15,525 -587 -3.6%
Total TY Traffic by Region, Coloured by YoY %
About Tableau maps: www.tableausoftware.com/mapdata
Dashboard
VP Traffic Report

Google Fusion Tables



Programming environments

- Most popular: **Adobe Flash**
  - a powerful and creative environment for animated and multimedia designs.

- Most contemporary visualization programmers employ a range of powerful JavaScript environments and libraries:
  - **D3.js** (http://d3js.org/).
  - **Protovis** (Stanford Visualization Group)

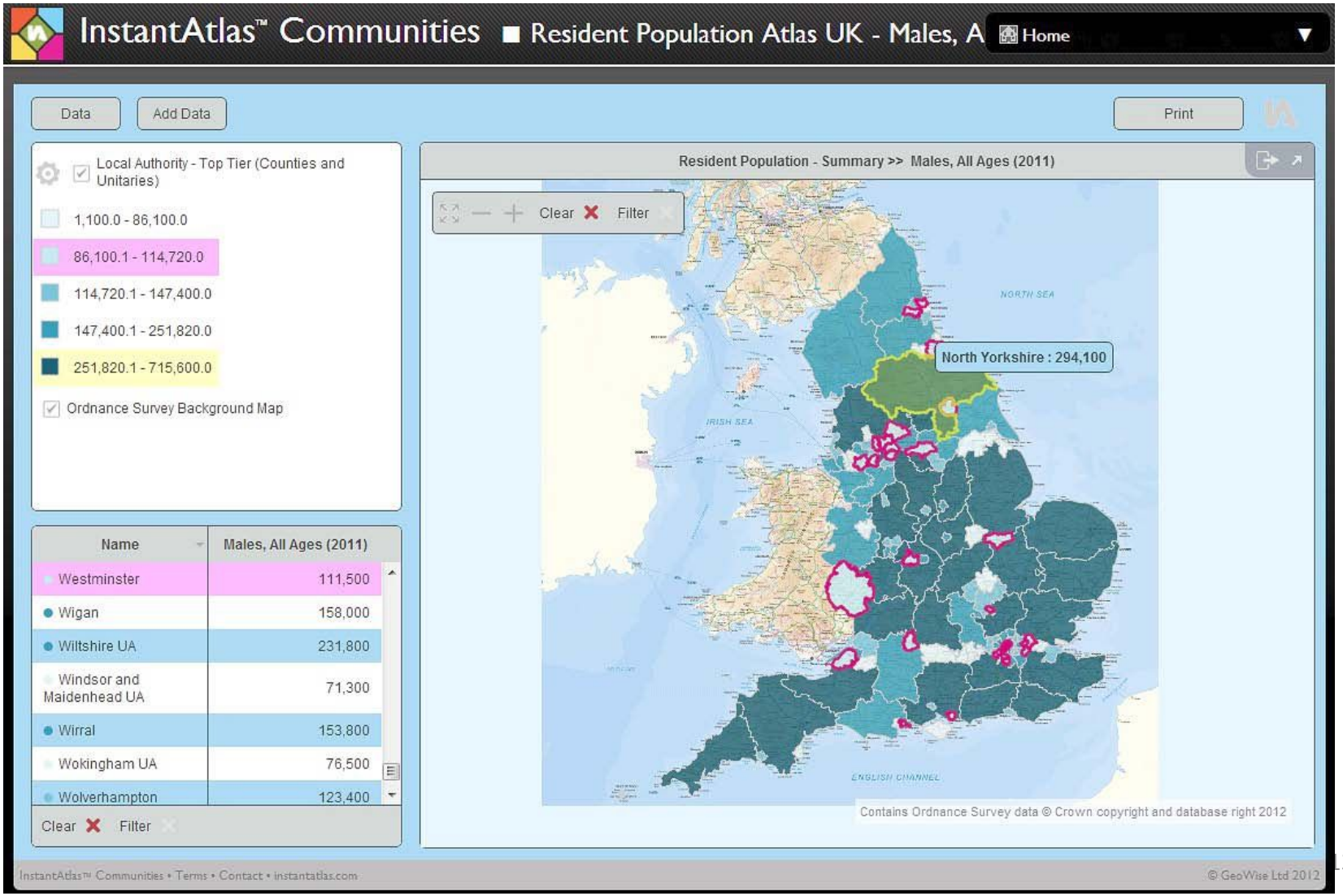
- **Processing**
  - one of the most important solutions for creating powerful, generative, and animated visualizations that sit outside the browser
    - as video, a separate application, or an installation.

Tools for mapping

- **Arc GIS**
  - (http://www.esri.com/software/arcgis)
- **Indiemapper**
  - (http://indiemapper.com/),
- **Instant Atlas**
  - (http://communities.instantatlas.com/)
- **Geocommons**
  - (http://geocommons.com/)
- **CartoDB**
  - (http://cartodb.com
- **TileMill**
  - (http://mapbox.com/tilemill/)

- Some open source mapping frameworks and libraries:
  - **Polymaps** (http://polymaps.org/)
  - **Kartograph** (http://kartograph.org/)
  - **Leaflet** (http://leafletjs.com/)
  - **OpenStreetMap** (http://www.openstreetmap.org/)

Instant Atlas



Other specialist tools

- Infographics are typically manually crafted designs
  - comprising a blend of different visual design elements (charts, illustrations, and diagrams):
    - The vast majority of statics are produced using **Adobe Illustrator**
    - Open source alternative called **Inkscape**

Things to do Before Launching

- Paying attention to the finer details:
  1. Data and statistical accuracy
  2. Functional accuracy
  3. Visual Inference
  4. Formatting accuracy
  5. Annotation accuracy
- Getting feedback from your peer

Paying attention to the finer details:

Data and Statistical Accuracy

- Scan through a good-sized sample of all your visualized data values to ensure:
  - there aren't any erroneous items or incorrect outliers.
- Check the rigor of all your statistics and calculations.

Paying attention to the finer details:

Visualization Accuracy

- Make sure all your representation:
  - *accurately portray the data values* they're associated with
  - functioning effectively
  - does not mislead the user or reader.

Paying attention to the finer details:

Functional Accuracy

- More concerned with interactive pieces:
  - Make sure all the functions and features on perform as we intended?

Paying attention to the finer details:

Visual Inference

- Visual inference should equal data inference:
  - If it looks like data, it should be data.
- If something looks significant through its positioning or color choice:
  - it should be significant.
- If there is any decorative element or other artifact that appears to be implying something it is not meant to:
  - remove it.

Paying attention to the finer details:

Formatting Accuracy

- Check the consistency of your typography : *type, style, and size.*
- Make sure your color usage is consistent down to the RGB or CMYK (cyan, magenta, yellow, key) code level.

Paying attention to the finer details:

Annotation Accuracy

- Read through:
  - all titles
  - Labels
  - introductory text
  - Credits
  - Captions
  - units
- Checking spelling or grammatical errors
- checking to see if things make sense and are succinctly expressed.

Feedback before Launching

- What is their instinctive reaction?
  - Positive, negative, intrigue, confusion, or just a plain "so what?"
- Can they understand how to read the graphic or use the tool?
- Does it have clear explanations and intuitive design
  - in terms of visual hierarchy and structural arrangement?
- Can they derive insight from it?
  - By throwing some test questions to assess the visualization's ability to effectively inform.
- Does it work functionally?
  - any errors, mistakes, programmatic errors, or any other design flaw

Approaching The Finishing Line

"You know you've achieved perfection in design, not when you have nothing more to add, but when you have nothing more to take away."

Antoine de Saint-Exupery

Things to do After Launching

- Post launch evaluation
- Personal point of view

Post-Launch Evaluation

- Was there a positive reaction to the piece we created?
- Did it deliver the appropriate tone of voice?
- Did it reach the intended audience type and volume?
- Were users able to effectively consume or discover insights?
- Were the user experienced the intended consequences of this work?
- What problems did people experience, if any?

Multiple feedback channels (1)

- **Metrics and benchmarks**:
  - For web-based:
    - page views, visits, and visitors, supplemented with social media metrics such as Tweet counts, Facebook likes, Google+ shares, …
- **Client or customer feedback**:
  - fell short, matched, or exceeded their expectations.

Multiple feedback channels (2)

- **Peer review**:
  - Most important and constructive evaluation can come from peers: expert practitioners or thought leaders.
  - There are many examples of bloggers who will conduct a review and critique of new work.
  - Positive review and mention from a peer is worth its weight in gold.

Multiple feedback channels (3)

- **Unstructured feedback**:
  - online comments forms
  - reaction on social media
  - through anecdotal channels (e-mails, in-person conversations, perhaps overheard comments)

Multiple feedback channels (4)

- **Invite user assessment**:
  - You could be more proactive by offering simple mechanisms for users to provide more structured qualitative responses
    - through small-scale questionnaires.

Multiple feedback channels (5)

- **Formal case studies**:
  - Taking things to a more advanced level of evaluation (almost academic in its nature)
  - Using many techniques:
    - Interviews
    - Observations
    - controlled experiments (set tasks, manipulate conditions, and record responses).
  - Often be undertaken by an independent observer for integrity.

Personal Point of View

- Did you accomplish the outcomes you wanted?
- Did you create something you were satisfied with?
- Were you satisfied with how you rationalized the choices?