Data science
the business point of view

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Presentation outline

- Big data – the new natural resource
- The data scientists – the new, modern gold miners
- How you can make most of your Data Science opportunity

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Big data – the new natural resource

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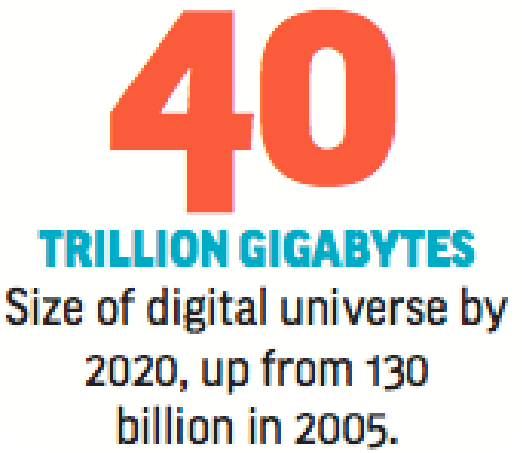
Big data – the new natural resource

- **Observations** captured one by one and entered manually on paper or in the computer
- **Human activity** on the web leaves traces captured by various entities
- **Internet of things** – streams of data automatically captured from sensors or human activity into databases or sophisticated graphs

- Many “mountains” of data
  - Cost of storage low, # of devices/sensors higher every year
  - Reasons to store: financial vs other (competitive advantage)
  - Creating Data + Metadata (data about the data)

90% of all of the world’s data generated in the last two years

Source: Accenture white paper 2013



Source: IDC Digital Universe study, April 2014

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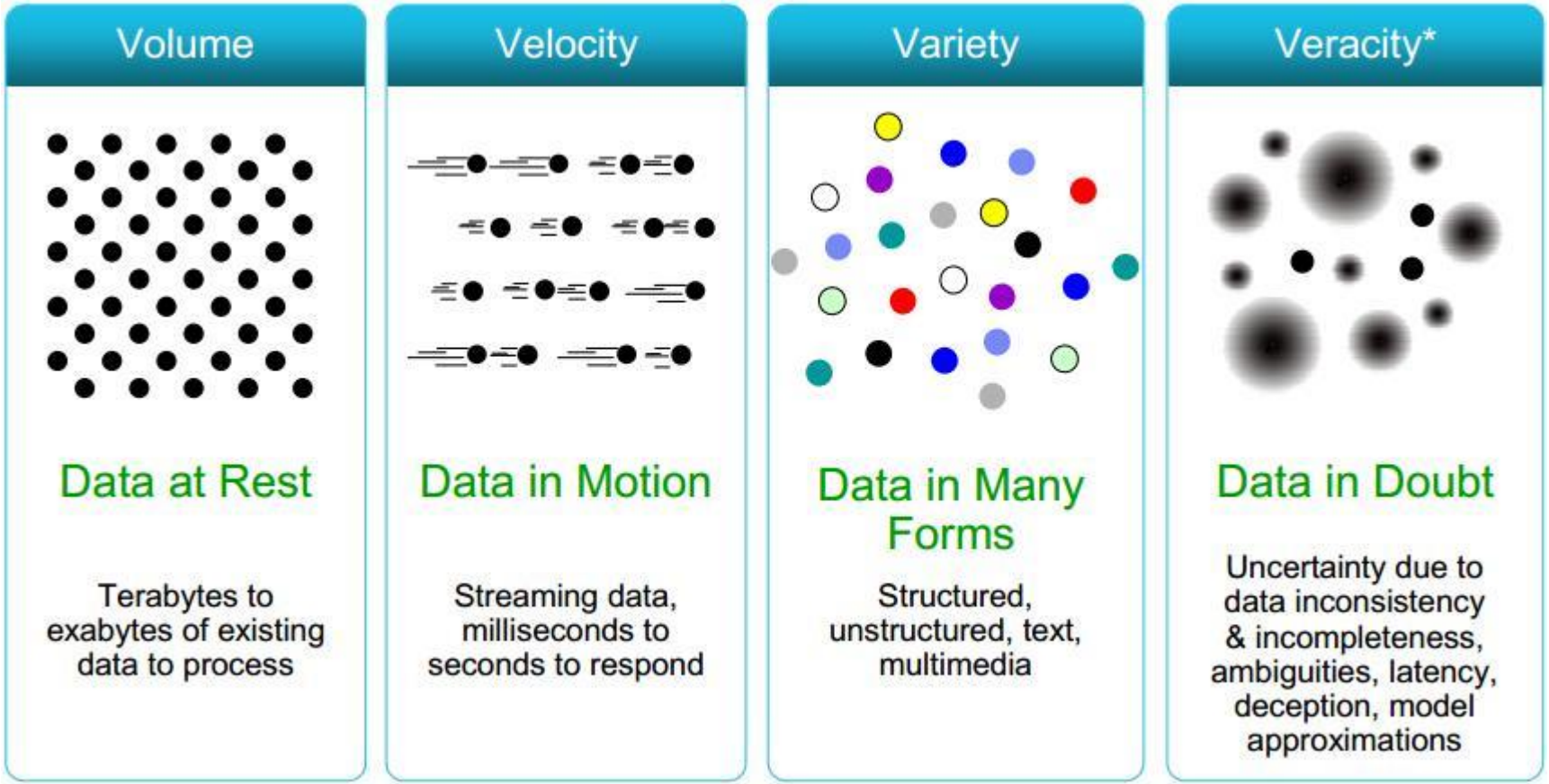
Big Data characteristics



Source: http://www.datasciencecentral.com/profiles/blogs/data-veracity

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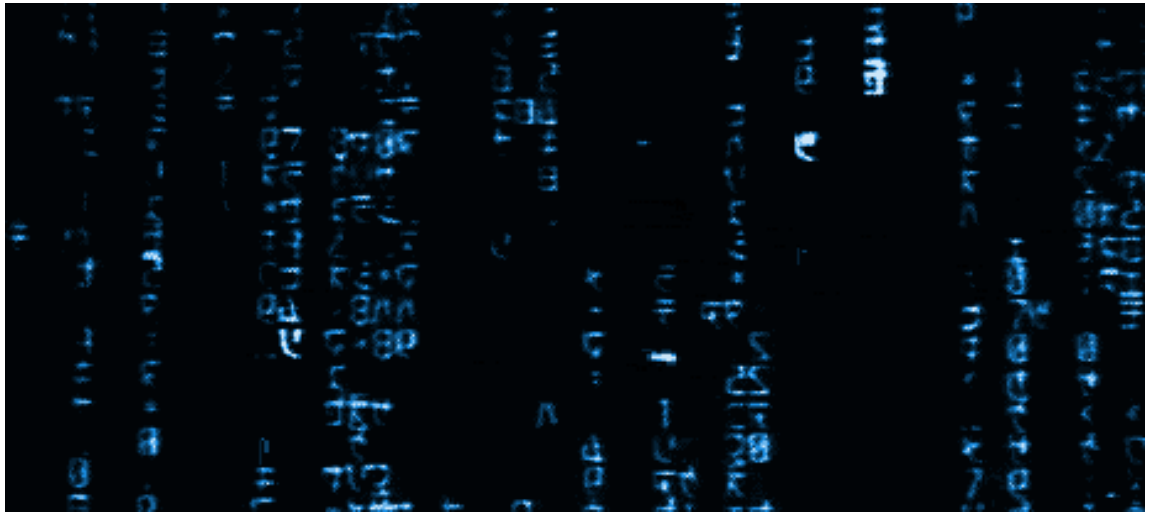
Who produces/collects data and for what purpose?

- **Users/individuals** – they like to keep/share what they produce. “Sentimental value” vs “make money”. Data mostly shared.
- **Businesses** – optimize/grow the business – make more money. Data mostly NOT shared except when the main business is collection & sale of data and or insights.
- **Government** – Govern/protect/serve citizens. Mostly NOT shared, except sometimes for information purposes and public transparency. Sometimes they try to make a buck to balance gov operating costs.
- **Education institutions** – research purposes. Data shared to the extent allowed by research and community scrutiny.



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The landscape of big data and the tools to mine it

- Mountains of data collected today but businesses are interested only in the golden nuggets : metrics vs insights vs predictive analytics
- Few bridges between mountains
  - Data sets in diff frameworks/storage models that don't necessarily talk with each other
- Even fewer data miners
  - Few know how to apply the Scientific method to big data sets
- Nascent data mining within most orgs (BRONZE AGE?)
  - **High hopes** for what they can get out of advanced analytics.
  - **Organization** don't have (YET) the capabilities they need to exploit big data
  - **Lack of alignment** on key issues for people inside individual organizations.

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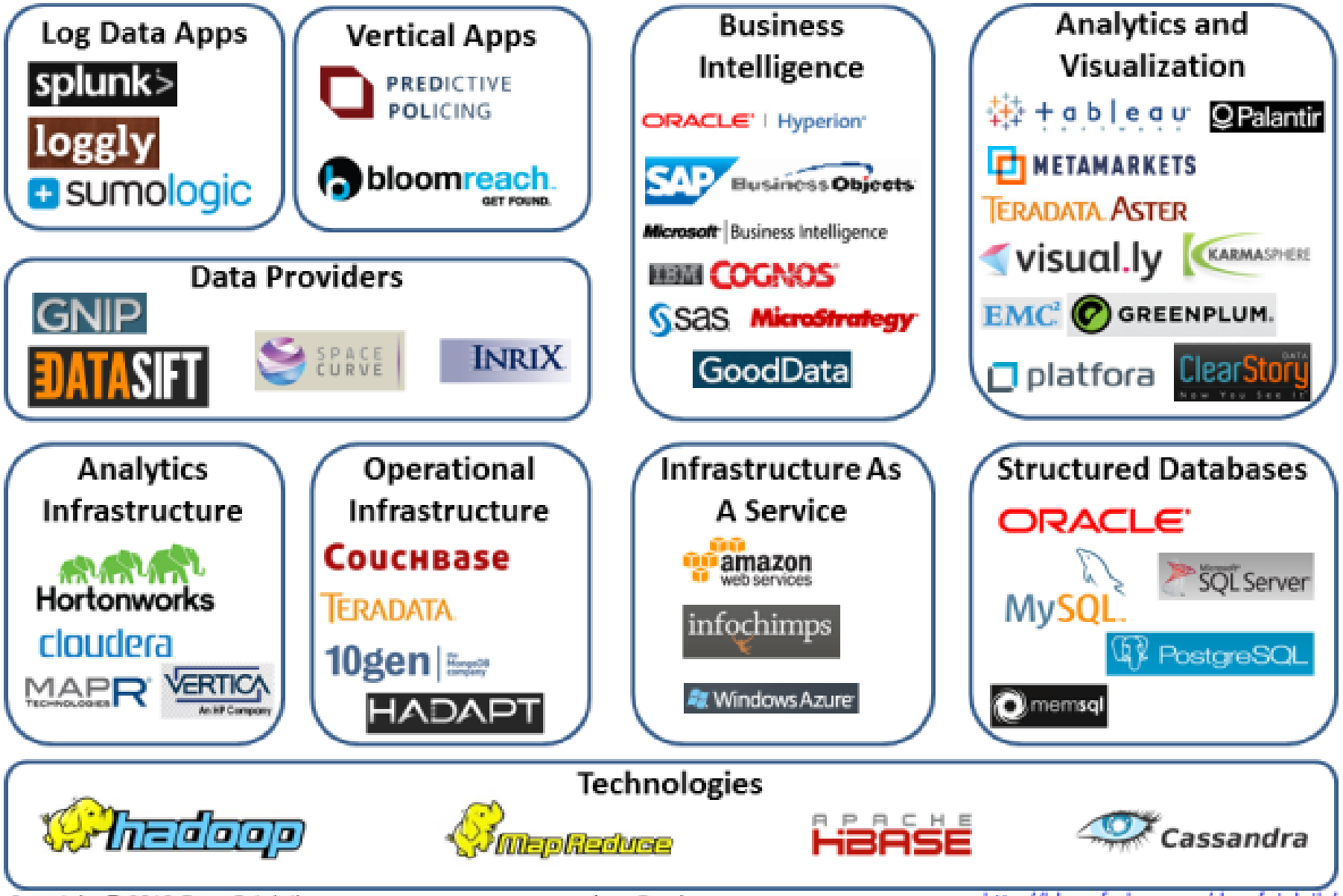
Big Data Landscape



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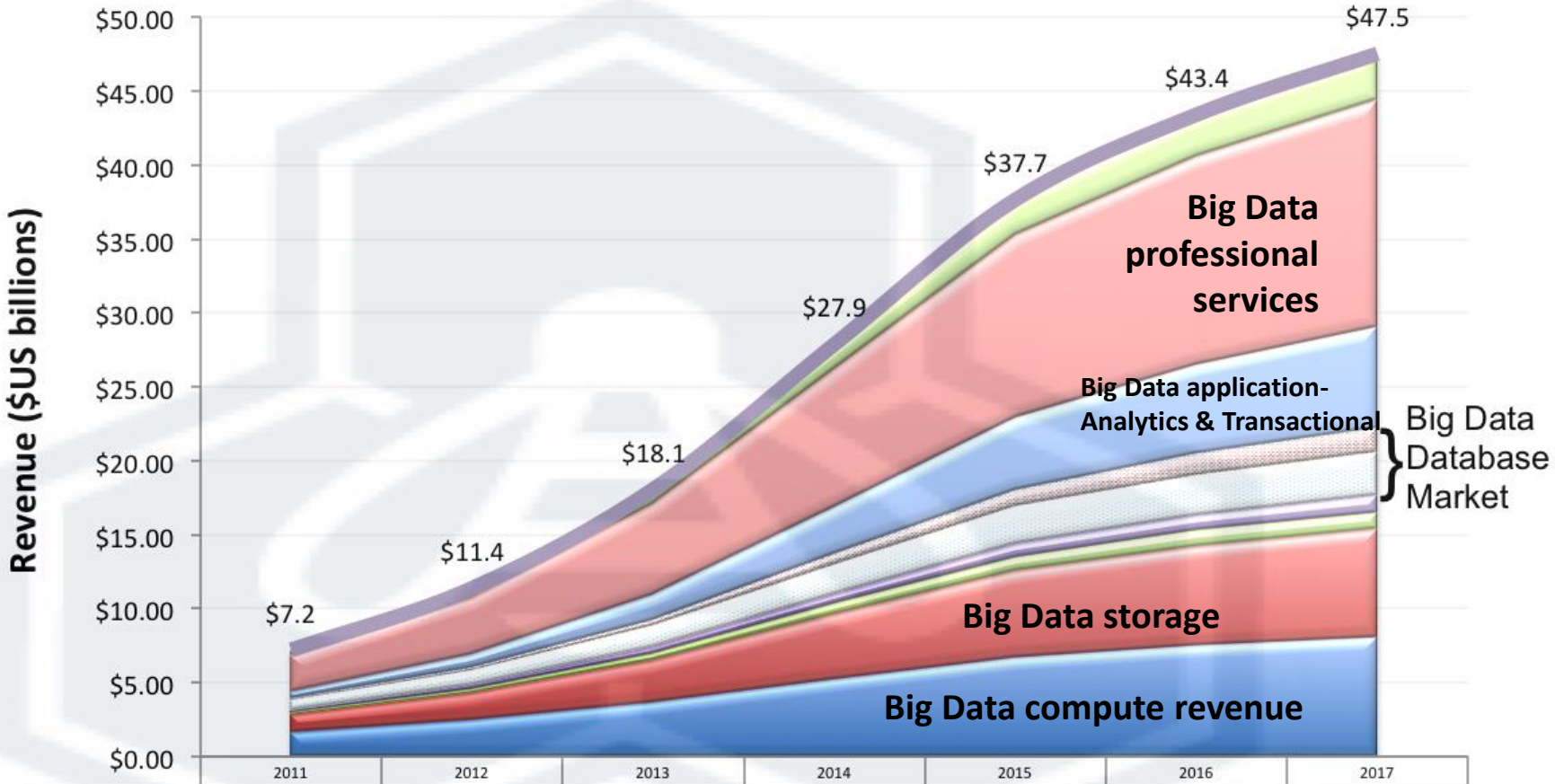
http://blogs.forbes.com/davefeinleib/

Big Data Market Forecast by Component, 2011-2017 ($US billions)



	2011	2012	2013	2014	2015	2016	2017
Big Data XaaS Revenue	$0.34	$0.60	$1.03	$1.71	$2.43	$2.87	$3.19
Big Data Professional Services Revenue	$2.43	$3.85	$6.07	$9.24	$12.31	$14.06	$15.30
Big Data Application (Analytic and Transactional) Revenue	$0.48	$0.93	$1.77	$3.24	$4.94	$6.05	$6.89
Big Data NoSQL Database Revenue	$0.10	$0.19	$0.39	$0.73	$1.14	$1.41	$1.62
Big Data SQL Database Revenue	$0.72	$1.02	$1.45	$2.00	$2.48	$2.74	$2.91
Big Data Infrastructure Revenue	$0.15	$0.25	$0.42	$0.67	$0.93	$1.08	$1.19
Big Data Networking Revenue	$0.18	$0.28	$0.44	$0.67	$0.89	$1.02	$1.11
Big Data Storage Revenue	$1.16	$1.83	$2.88	$4.39	$5.85	$6.68	$7.27
Big Data Compute Revenue	$1.64	$2.45	$3.64	$5.23	$6.70	$7.50	$8.06
Total Big Data Revenue	$7.2	$11.4	$18.1	$27.9	$37.7	$43.4	$47.5
Database as % of Total Big Data Market	11.4%	10.7%	10.2%	9.8%	9.6%	9.6%	9.5%

Source: © Wikibon Big Data Model 2011-2017

Big data market to reach almost $50bn by 2017

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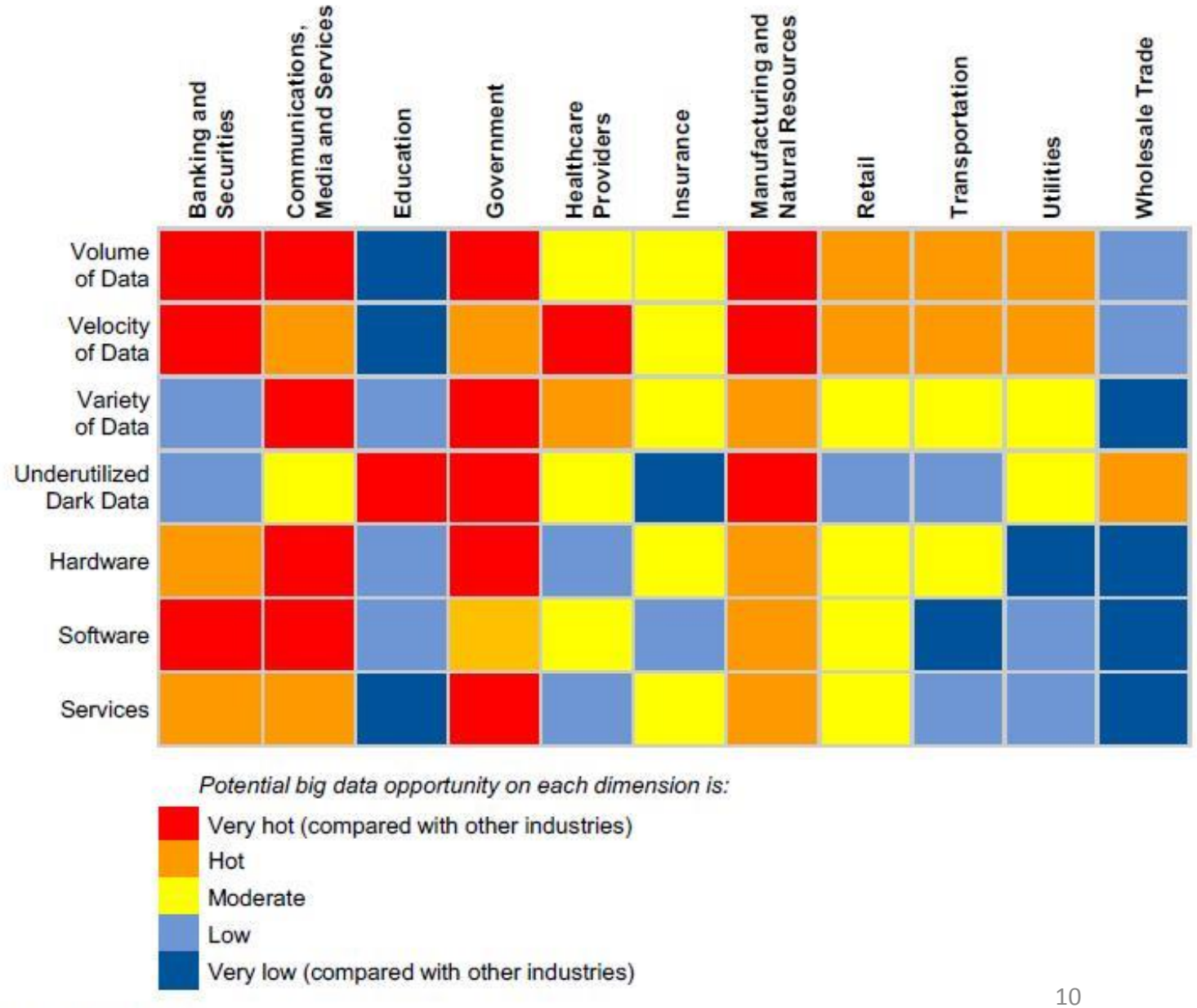
Greatest potential opportunities for Big Data (from a volume of data perspective):

- Banking and securities
- Communications
- Media and Services
- Government
- Manufacturing
- Natural Resources

Figure 2. Big Data Opportunity Heat Map by Industry



Source: Gartner (July 2012)

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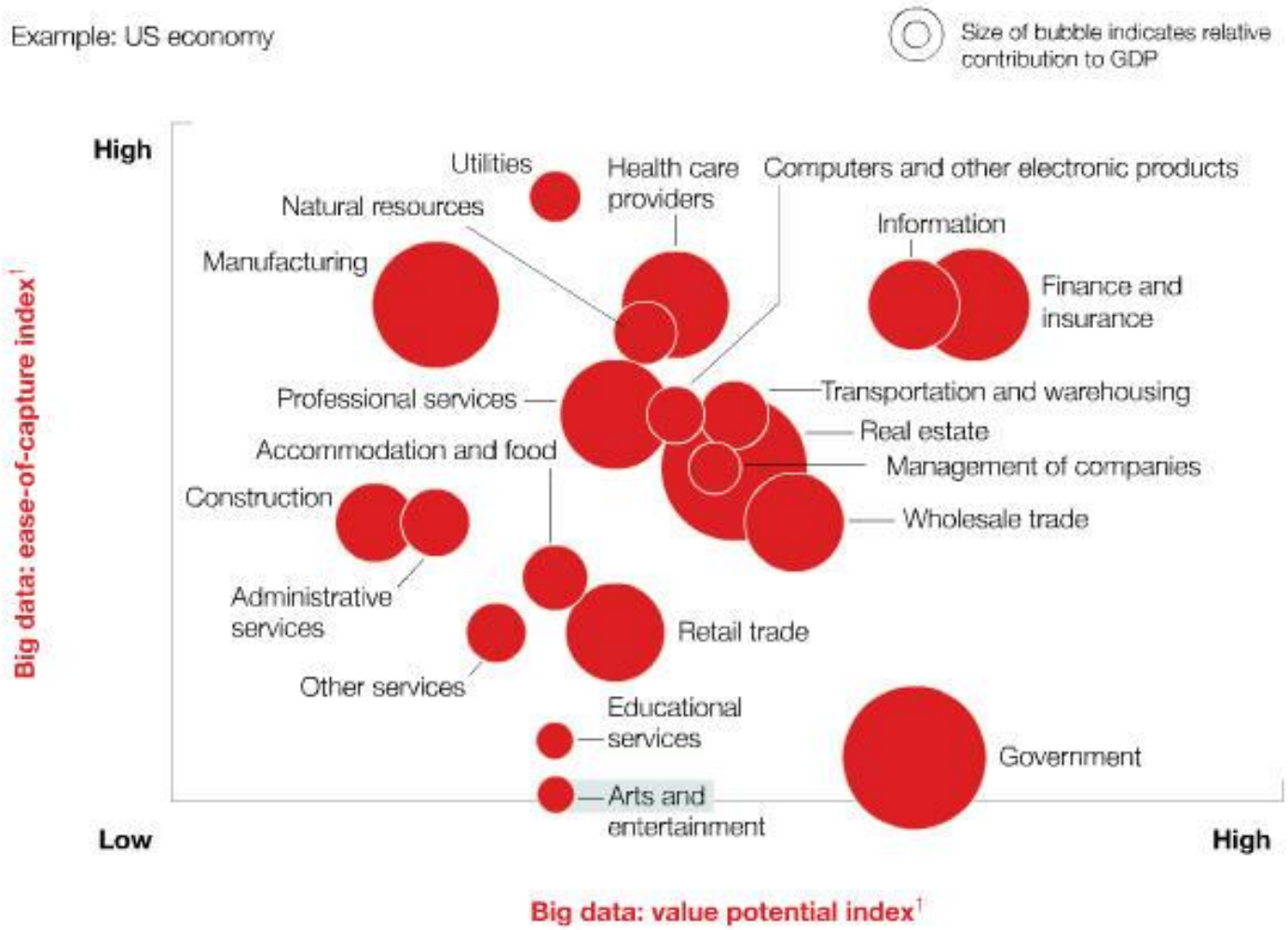
Finance and insurance is EASY to capture and has HIGH value potential

Construction data NOT EASY to capture and has LOW value potential

What about ….?

- Computers and other electronic products
- Healthcare
- Educational Services

The ease of capturing big data's value, and the magnitude of its potential, vary across sectors.



[1] For detailed explication of metrics, see appendix in McKinsey Global Institute full report *Big data: The next frontier for innovation, competition, and productivity*, available free of charge online at mckinsey.com/mgi.

Source: US Bureau of Labor Statistics; McKinsey Global Institute analysis

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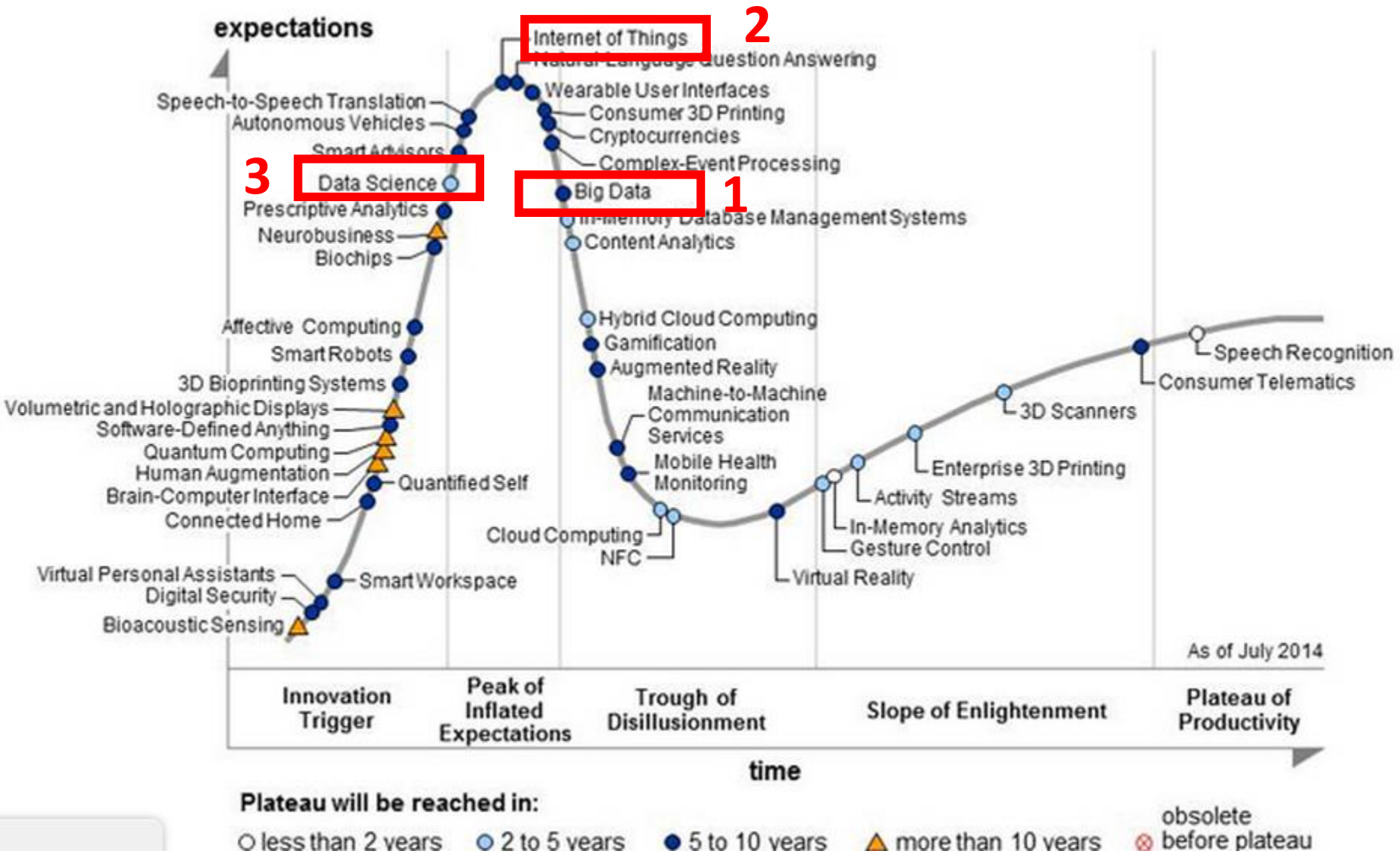
Gartner's 2014 Hype Cycle for Emerging Technologies



Which will influence more the way companies do business in the future?

- 1, 2, 3 ?
- 1, 3, 2 ?
- 3, 2, 1 ?

http://www.forbes.com/sites/gilpress/2014/08/18/its-official-the-internet-of-things-takes-over-big-data-as-the-most-hyped-technology/

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Data Scientists –
the new, modern, gold miners

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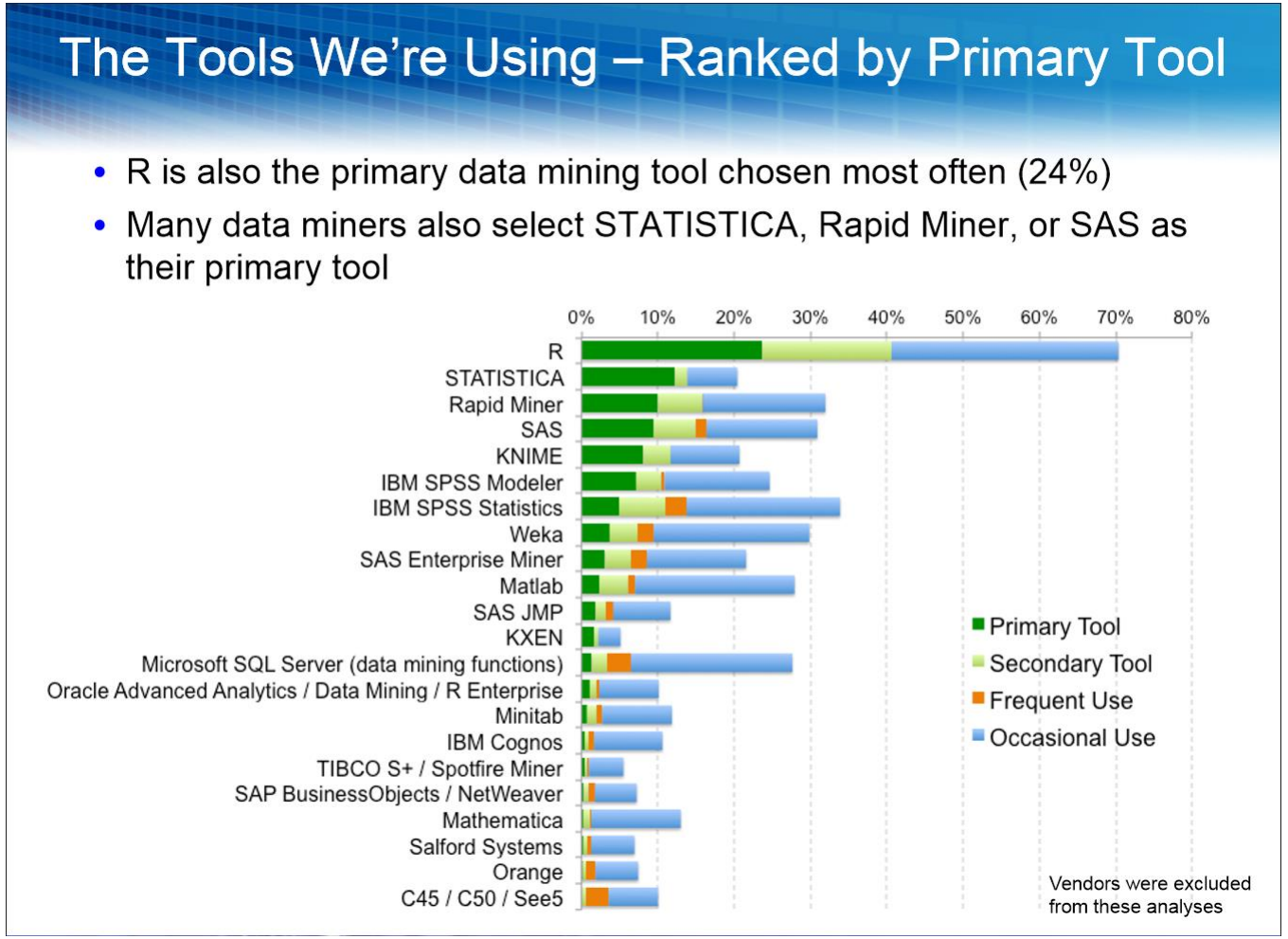
Data scientists, the modern gold miners

- Must know how to construct intelligent hypotheses
- Understand the principles of experimental testing and design
- Able to evaluate the validity of data analyses.
- A background in scientific experimental design will be particularly valued (randomized testing and experimentation becomes more commonplace)



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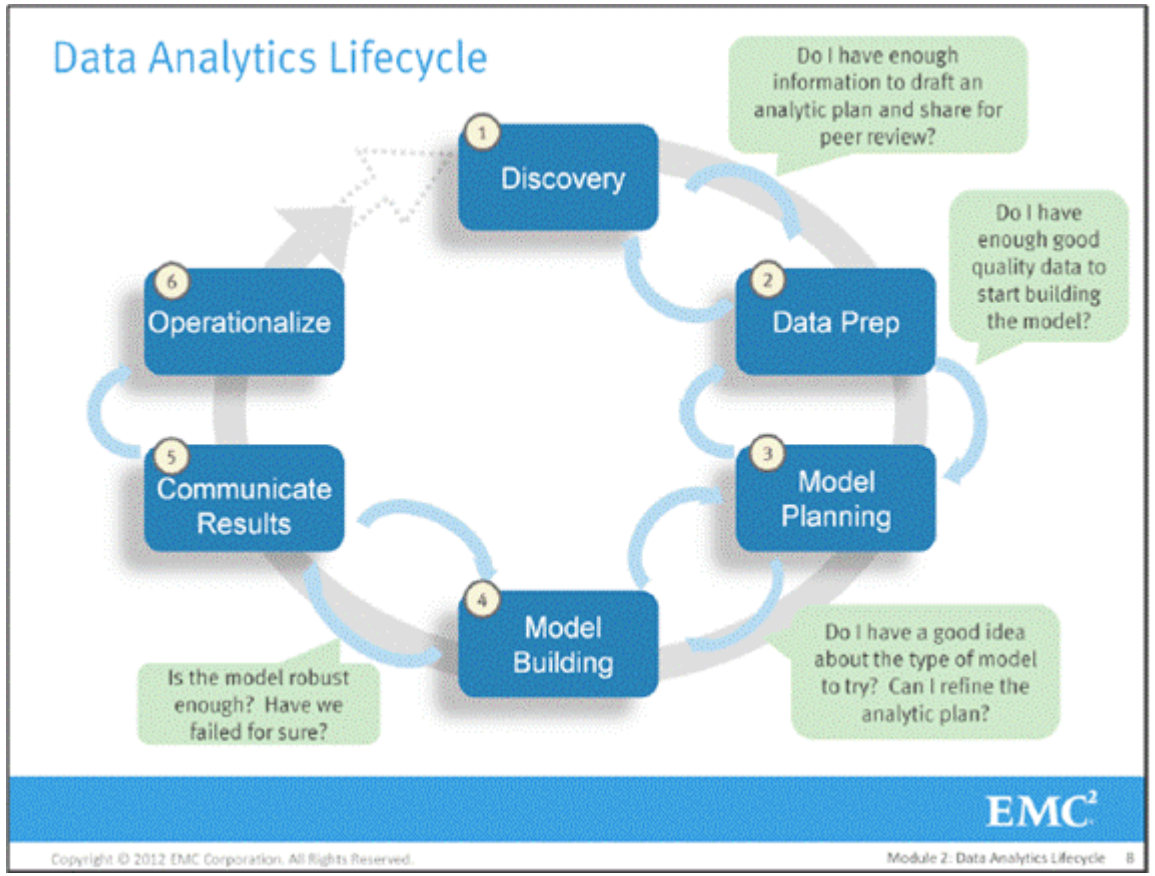
Data analytics everywhere… forever? Forever ever?

- Data collection –make vs buy
- Data preparation – 60% of project time!!!
- Analysis based on clear objectives from org
- Insights/predictions/forecasts
- Recommend optimizations to business
- Present to decision makers
- Management actions
- Results

Rinse and repeat



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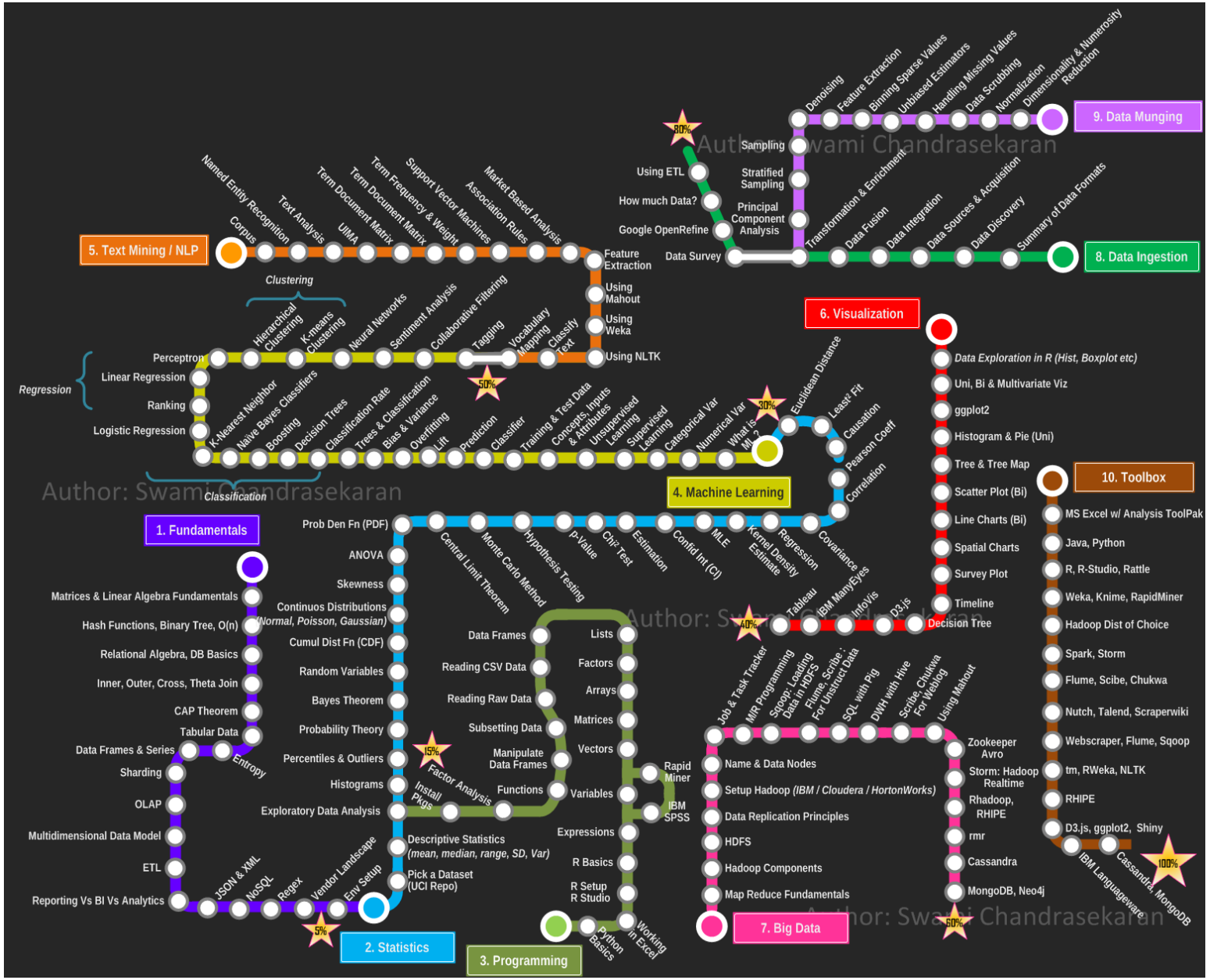
Looking for the (perfectly) skilled Data Scientist?

Keep looking…

in Data Science specialization may be key



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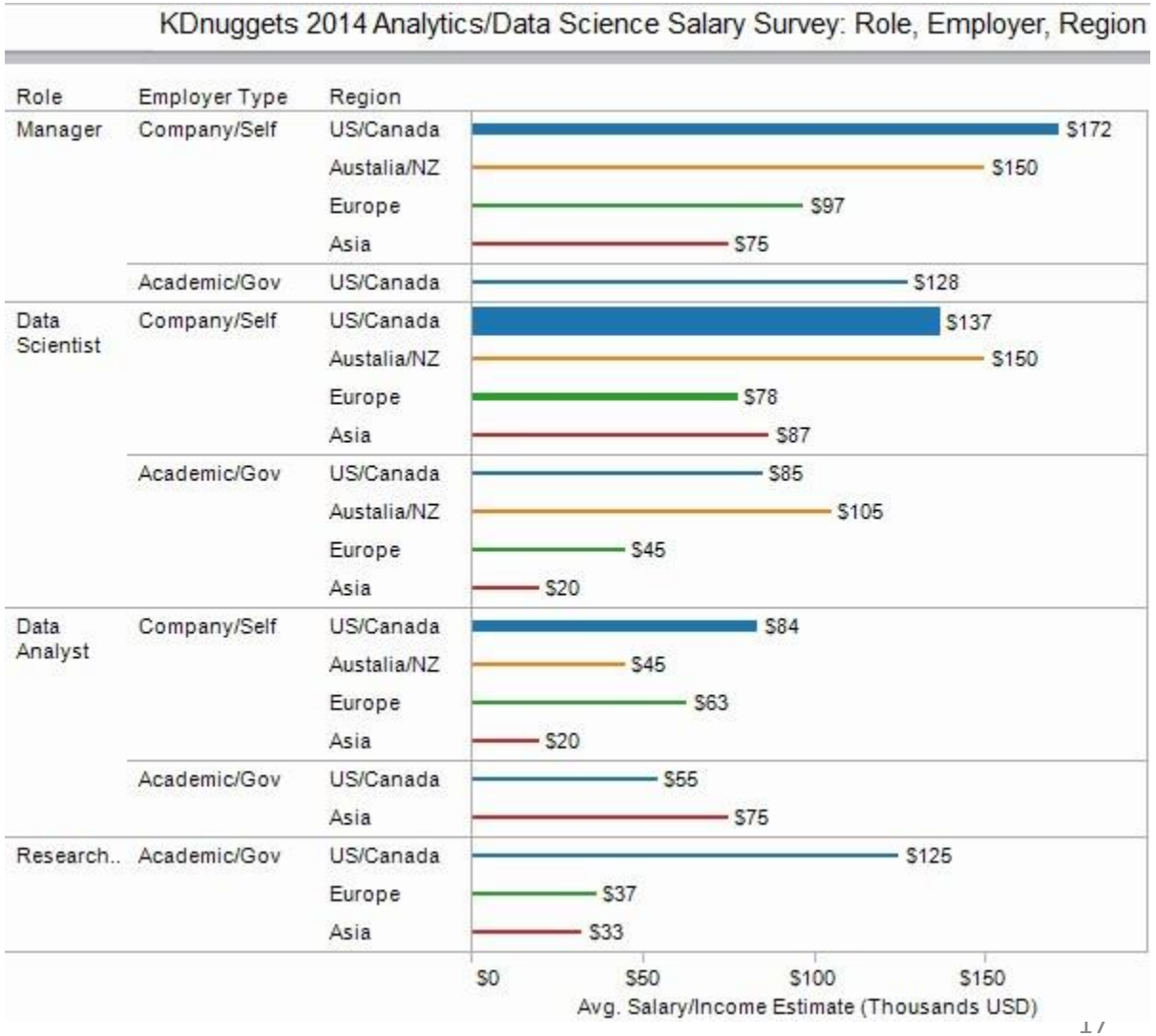
Pay rates for data scientists around the world

US/Canada – life is good

Australia/NZ - thought leaders

Outsource oppts : Asia and Europe



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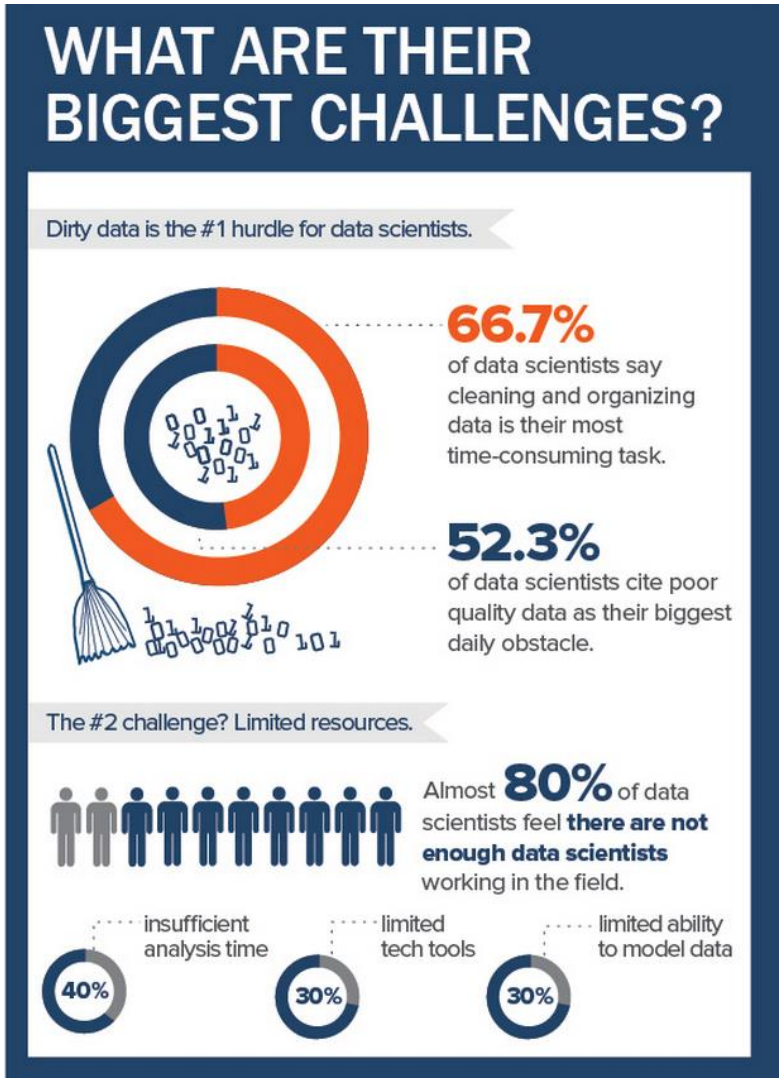
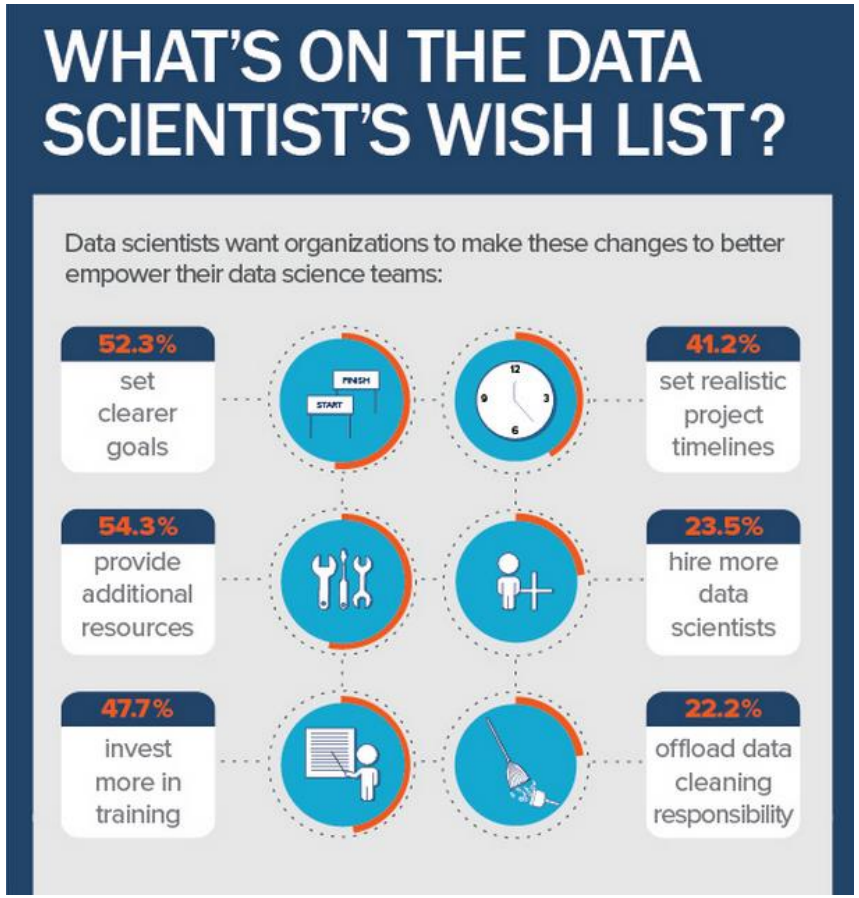
Working hard and dreaming about a better future





Source: Crowdflower Data Scientist report 2014

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Food for thought: Data Forensics not Data Science could be the skill shortage

- 2011- McKinsey : US alone short of 140,000 and 190,000 people with deep analytical skills
- 2014 Capgemini - the biggest challenge in big data is often the provenance of the data.
  - "you only get out what you put in"

- From enterprise data (largely controlled) to lots of disparate sources
- 100s of small variations in the way business is conducted = "finer adjustments" that need more accuracy not less.
- Knowing more about your data sources can better inform your modelling

3 key dimensions to asses data:

1. **Provenance** – do you trust that source, what level of quality can we expect in the data? Adjust models accordingly

2. **Legality** important to understand what is and isn't allowed

3. **Sensitivity** - breaching some ethical boundaries?
   - brand reputation and image can make or break companies,
   - impact of people knowing about your use of their data (NSA revelations; Target "targeting" pregnant women)

Understanding your data sources could be the real skill in turning big data into value

http://www.capgemini.com/blog/capping-it-off/2014/02/data-forensics-not-data-science-will-be-the-skill-shortage-for-the-big

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How you can make most of your Data Science opportunity

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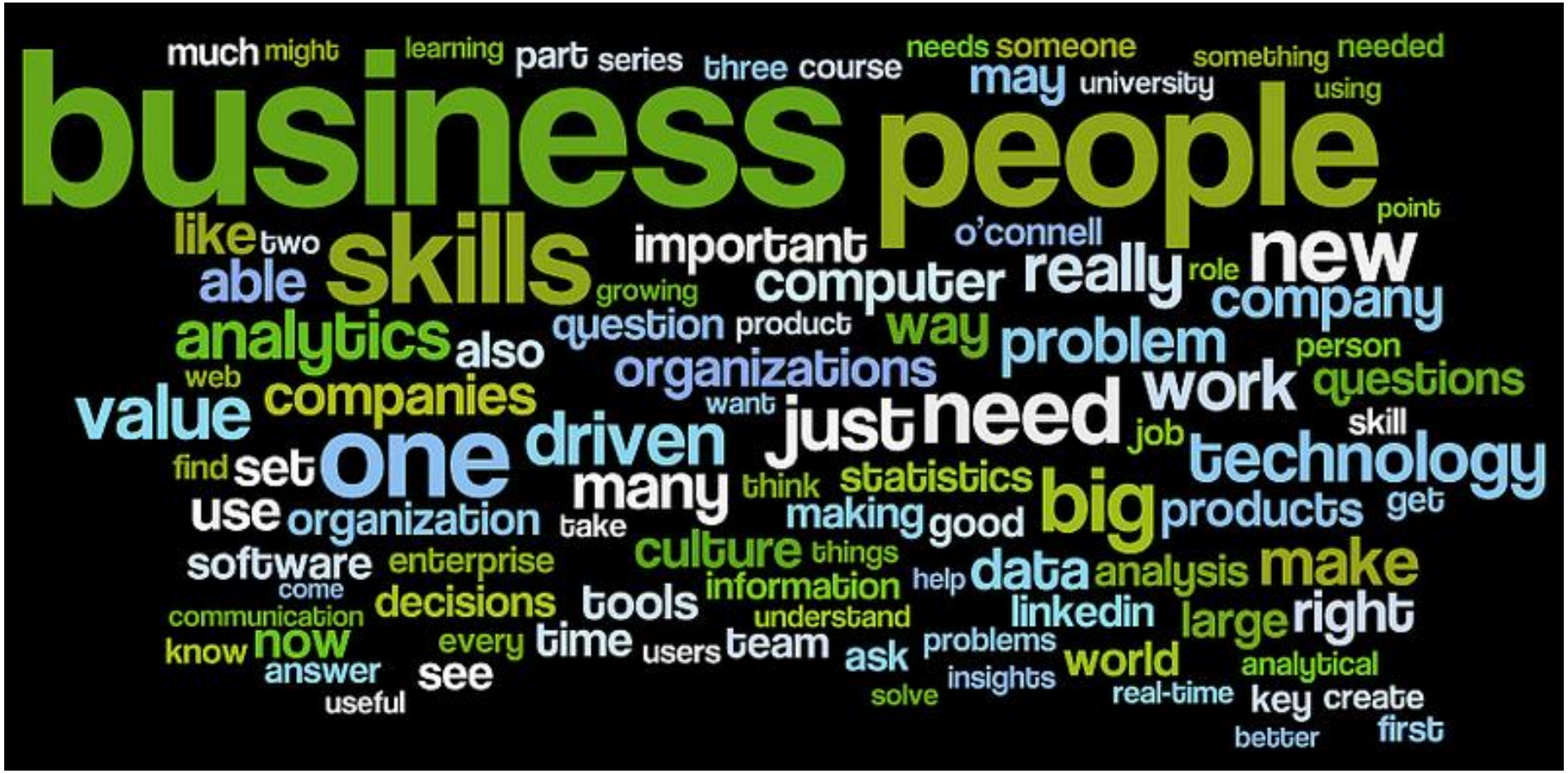
Data Science – mostly about business ?

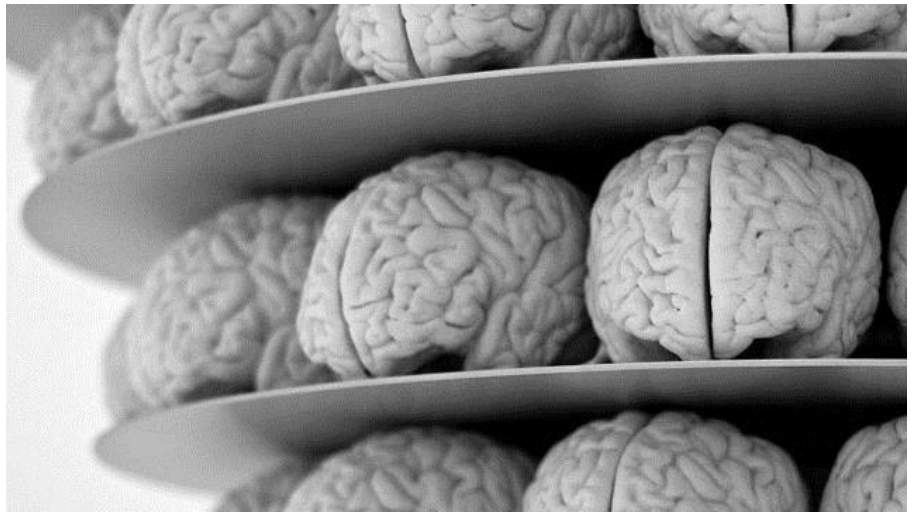


Source: Forbes "what is a data scientist" series word cloud

Data Scientists - helping change business and the world

Which job will you help replace?

- Front-line Military Personnel Will Be Replaced With Robots
- Private Bankers and Wealth Managers Will Be Replaced With Algorithms
- Lawyers, Accountants, Actuaries, and Consulting Engineers Will Be Replaced With Artificial Intelligence



What are the jobs that will be in demand in this brave new world only a decade away?

- Personal Worker Brand Coaches And Managers, **Professional Triber**, Freelance Professors, Urban Farmers, End-Of-Life Planner, Senior Carer, **Remote Health Care Specialist**, Neuro-Implant Technicians, Smart-Home Handyperson, **Virtual Reality Experience Designer**, Sex Worker Coach

http://www.fastcompany.com/3046277/the-new-rules-of-work/the-top-jobs-in-10-years-might-not-be-what-you-expect

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Data Science is : Science & Art

- **Where do you fit?** – where you can add most value today
- **Where do you want to be?** – where you can get paid best and work the least (or where you like it most)
- **Gravitate** towards companies with big data sophistication and thought leaders in big data (high tech, cloud companies, pharma… etc)
- **Start in science and move into art**
- **Packaging & delivery** of insights can be as important as content
- **Connect** with fellow data scientists
- **Kaggle** can help you grow - Data Hero?

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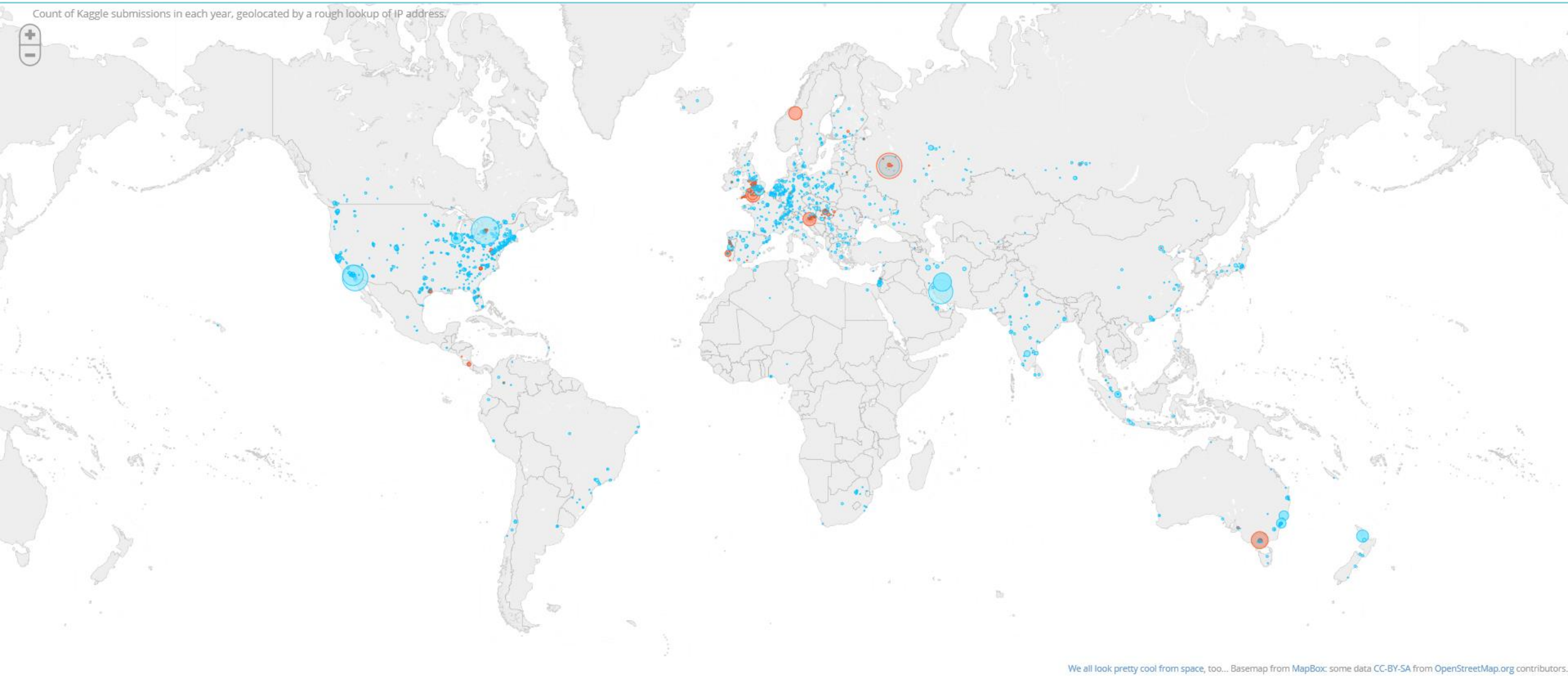
Kaggle submissions by IP location 2011



Source: http://garimeme.com/kaggle/grown.html#2.50/18.70/7.00

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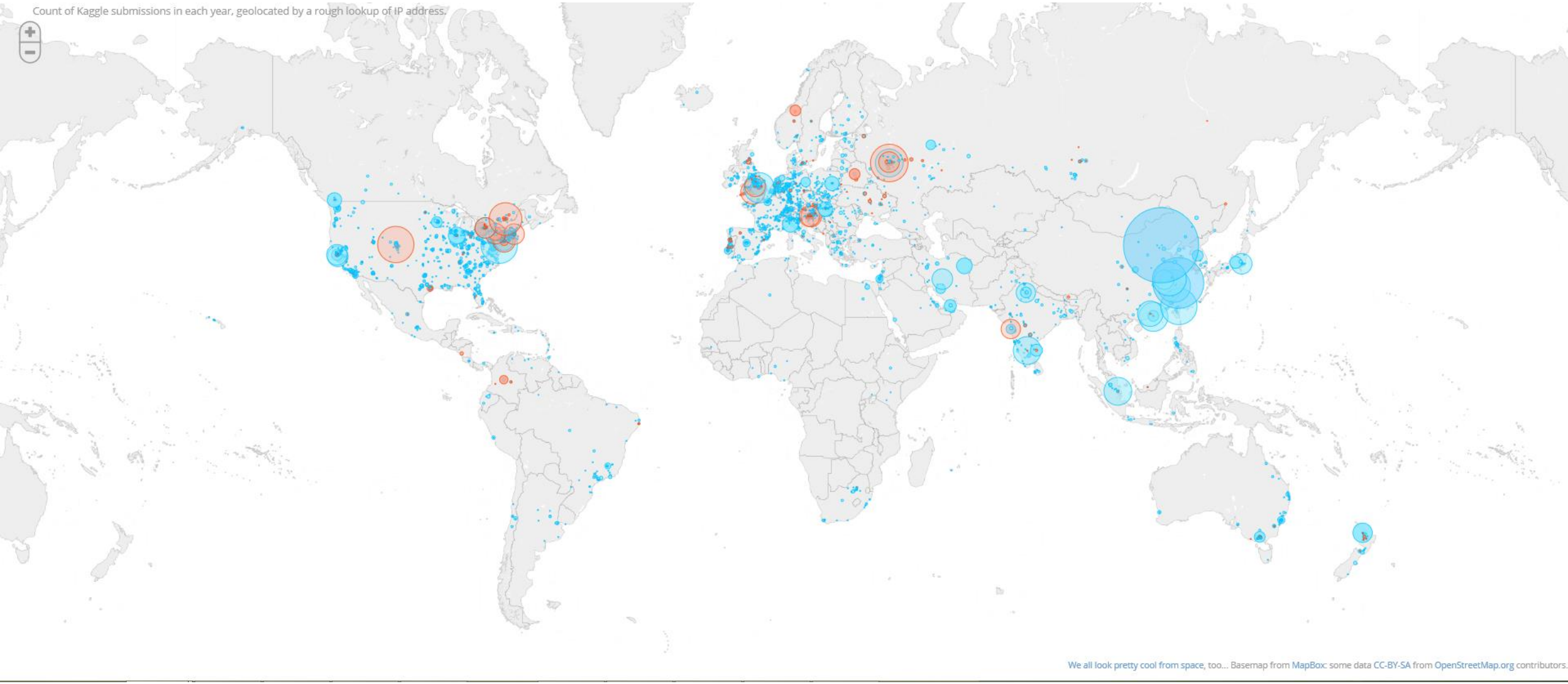
Kaggle submissions by IP location 2012



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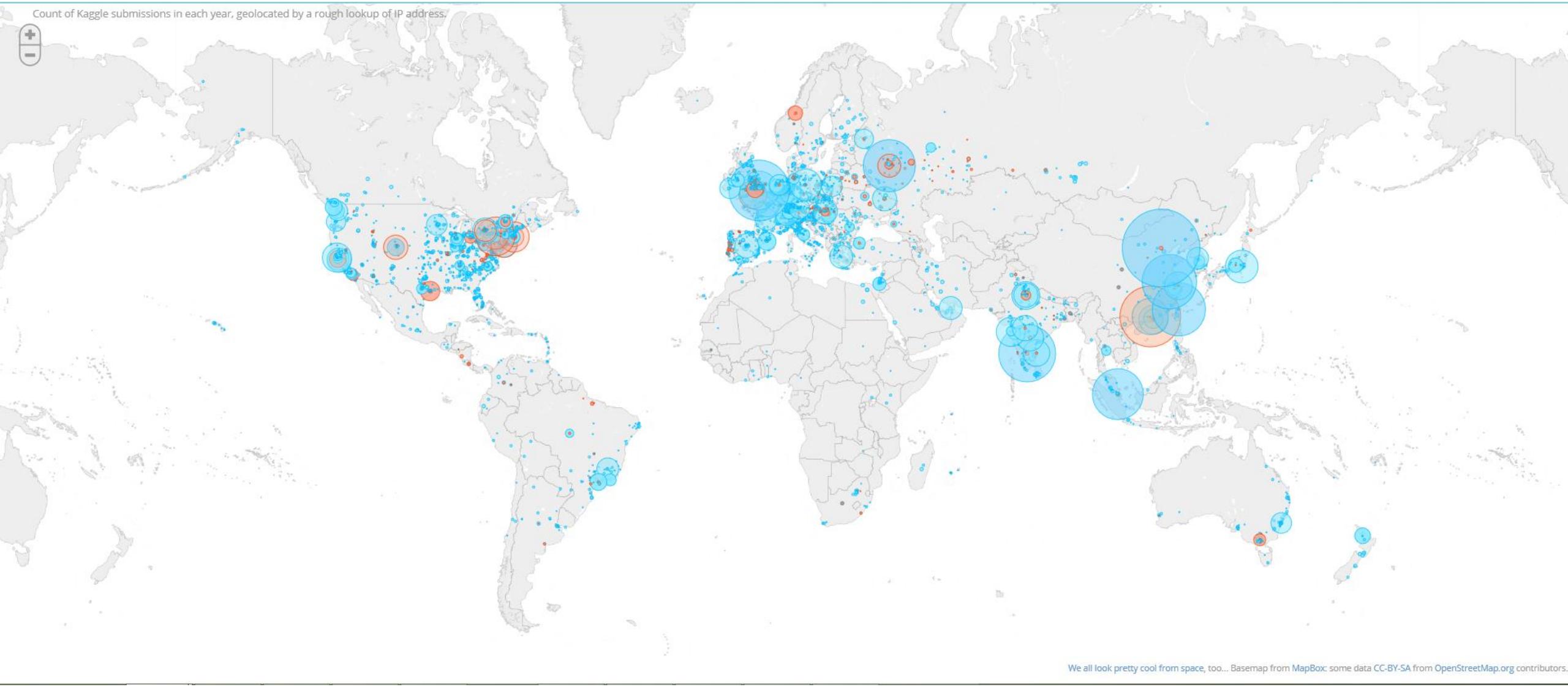
Kaggle submissions by IP location 2013



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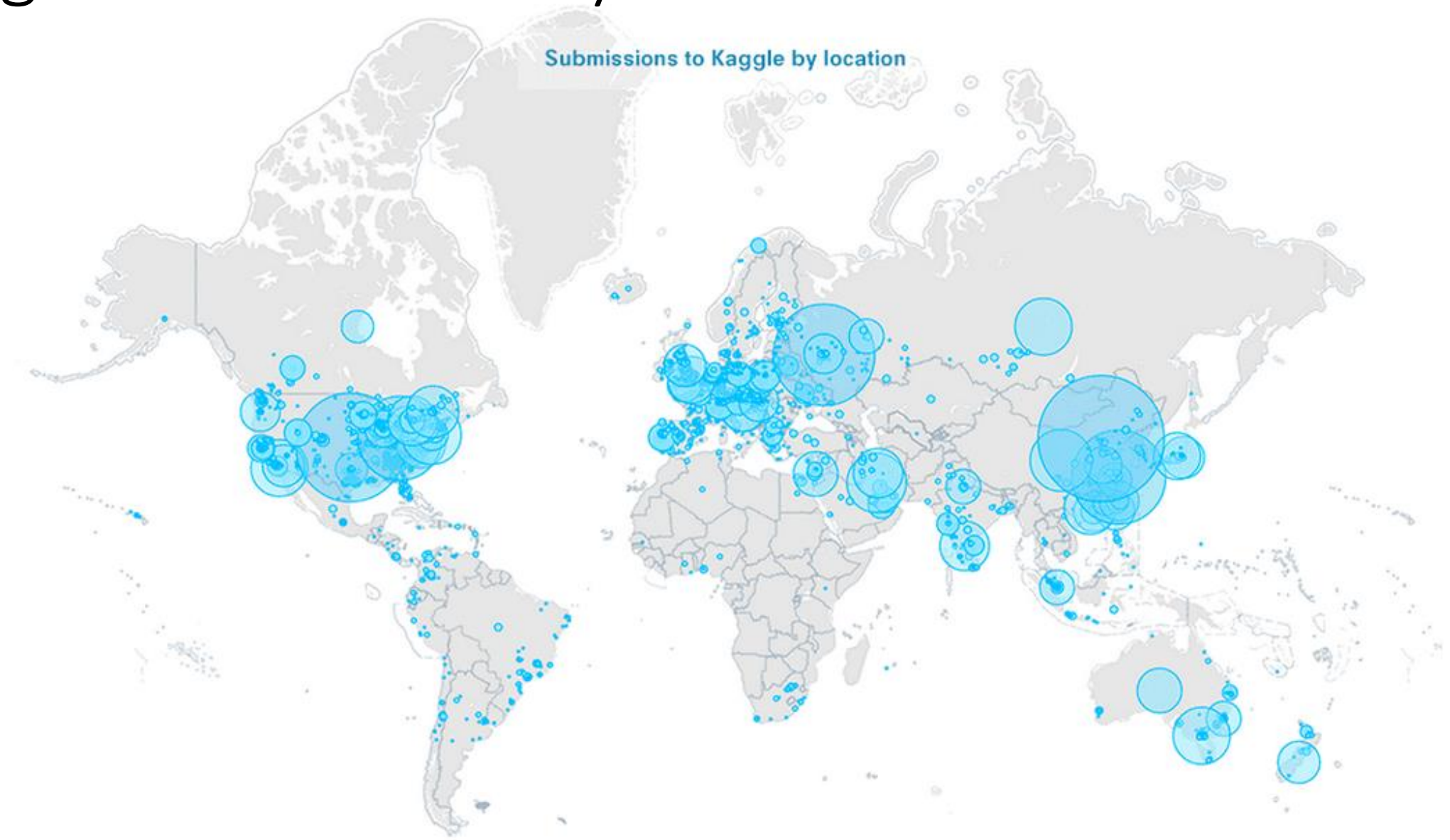
Kaggle submissions by IP location 2014



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Summary

- Big Data – the new natural resource
- Everyone is looking for the gold nuggets
- Data Scientists – the new, modern gold miners
- Data Science tools - bronze age
- Data science is here to stay and you are in the right boat
- Data Science = Science & Art
- Find the start point that is right for you and….

…. Get to rule Kaggle!

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Q & A

…Marius plans to make his first million in the next 5yrs
with a project/company powered by Data Science…

What is your plan?

Let’s chat

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