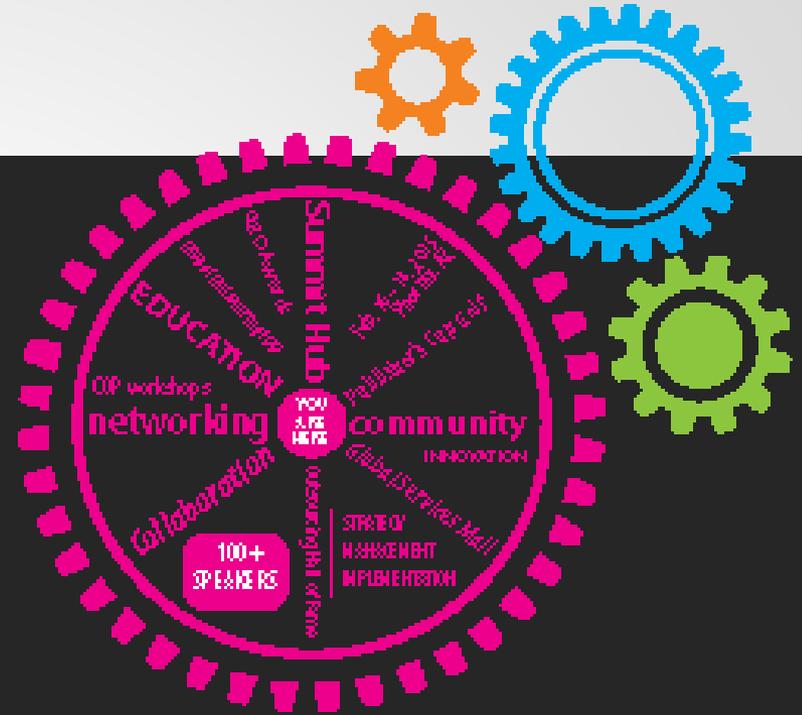


The 2015 Outsourcing World Summit®
JW Marriott Phoenix Desert Ridge | Phoenix, Arizona
February 16-18, 2015

Big Data is here:
What can you
actually
do with it

Boris Kontsevoi
President & Founder, Intetics Co.





The 2015 Outsourcing World Summit®

- Head Office: **Chicago, IL**
- Regional Offices:
 - Düsseldorf, Germany
 - Tokyo, Japan
- Delivery Centers:
 - Minsk, Belarus
 - Kyiv, Ukraine
 - Kharkiv, Ukraine
 - Hanoi, Vietnam
 - Krakow, Poland

- Established **1995**
- Over **450 full time employees**
- About **130 “crowd” contractors**
- Customers in **30+ countries**
- **300+ successful projects**

- ✓ 2014 **Top 100 Chicago Innovation**
- ✓ 2014 **EOA Best Project Award**
- ✓ 2006-2015 **Top Outsourcing 100**
- ✓ 2007-2014 **Global Services 100**
- ✓ 2009-2014 **Software 500**
- ✓ 7-time **Inc 5000 Honoree**
- ✓ 2010 **European IT Excellence Award**

Core Competence: Building effective distributed teams for full cycle Software Product Design in conditions of incomplete specifications and talent shortage.

WHERE SOFTWARE
CONCEPTS COME ALIVE

intetics
20 years of quality
software development.





Agenda



What we're going to cover today...

- What is Big Data
- Where are we now
 - People: profile, skills, shortage?
 - Challenges
- Use Cases
 - Location Based Services
 - Internet of Things
 - Omni-channel Retail
 - Other uses & tools
- Tips for you
- Conclusions & Trends



BIG DEAL

What's the big deal?



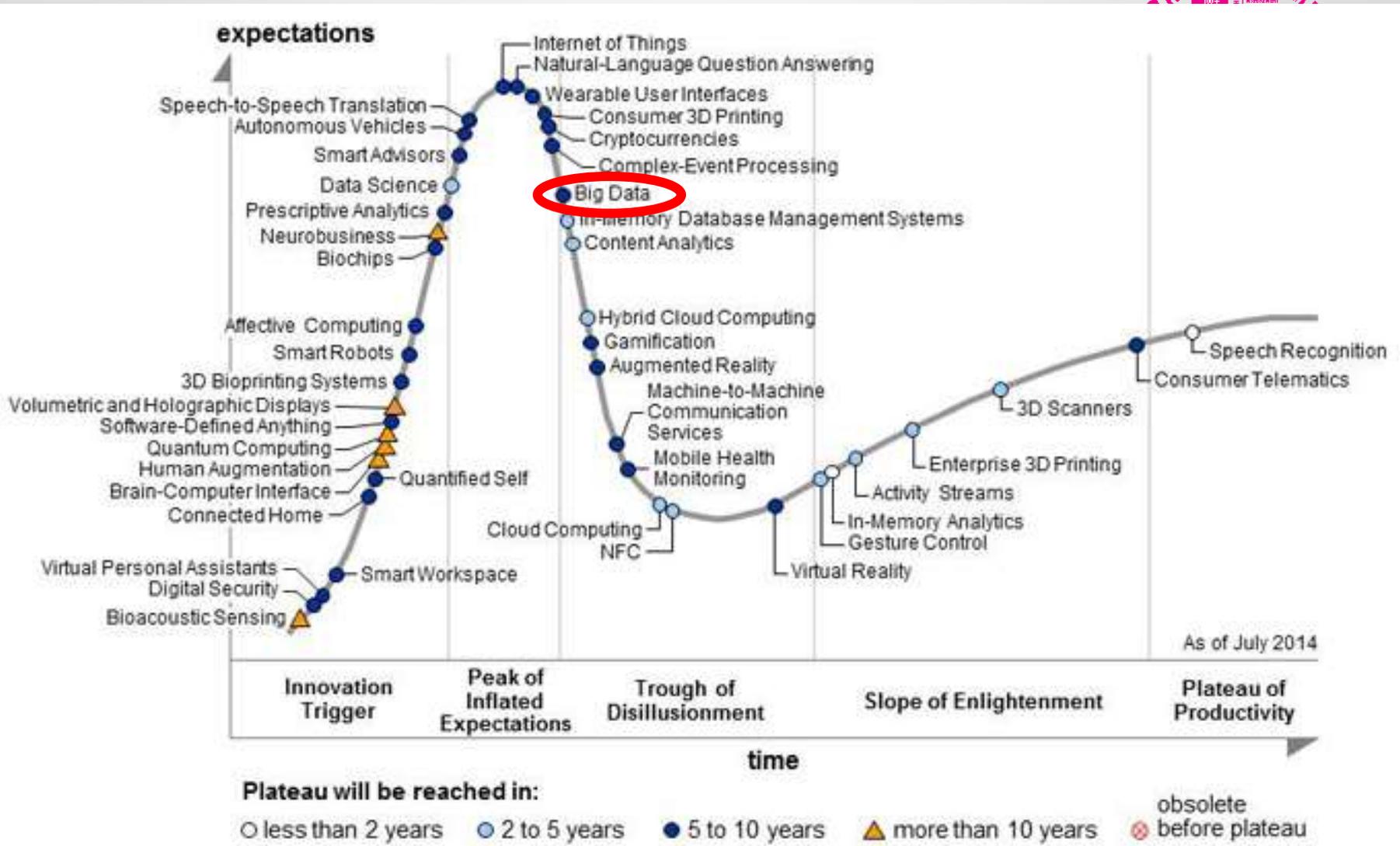
- Industry growing at 27% annual compound growth rate
- Increasing number of Big Data projects:
 - 2014: 13% of companies deployed Big Data projects (up from 8% in 2013)
 - 73% of organizations have invested or plan on investing in Big Data projects in the next 2 years (up from 64% in 2013)
- 80% of companies improve decision-making as a result of Big Data projects
- The average ROI was 46% with average spending of about \$10 million
- **Big Data and Outsourcing:**
 - Labor Arbitrage remains the main drive
 - Often considered as a core expertise and remains in-house
 - Nonetheless, more long-term partnerships
 - Outsourcing for function & expertise rather than resources

- ➔ **\$32.4 billion through 2017**
(6x the overall ICT market growth)
- ➔ **Experimenting stage,**
companies evolve big data opps
- ➔ **Expecting fast adoption**





WHERE DOES BIG DATA FIT





What is BIG DATA



- **Term first appearance: 1997 at NASA** (connected to a data visualization problem)

- **Big Data Definition:**

Wikipedia: *“an all-encompassing term for any collection of data sets so large and complex that it becomes difficult to process them using traditional data processing applications. The challenges include analysis, capture, curation, search, sharing, storage, transfer, visualization, and privacy.”*

Oxford Dictionary: *“data of a very large size, typically to the extent that its manipulation and management present significant logistical challenges.”*

Google Dictionary: *“extremely large data sets that may be analyzed computationally to reveal patterns, trends, and associations, especially relating to human behavior and interactions.”*

Urban: *“is data which you cannot handle.”*

My: *“a set of technologies for getting new knowledge from data around us.”*



What is BIG DATA

Big Data has 4 dimensions:

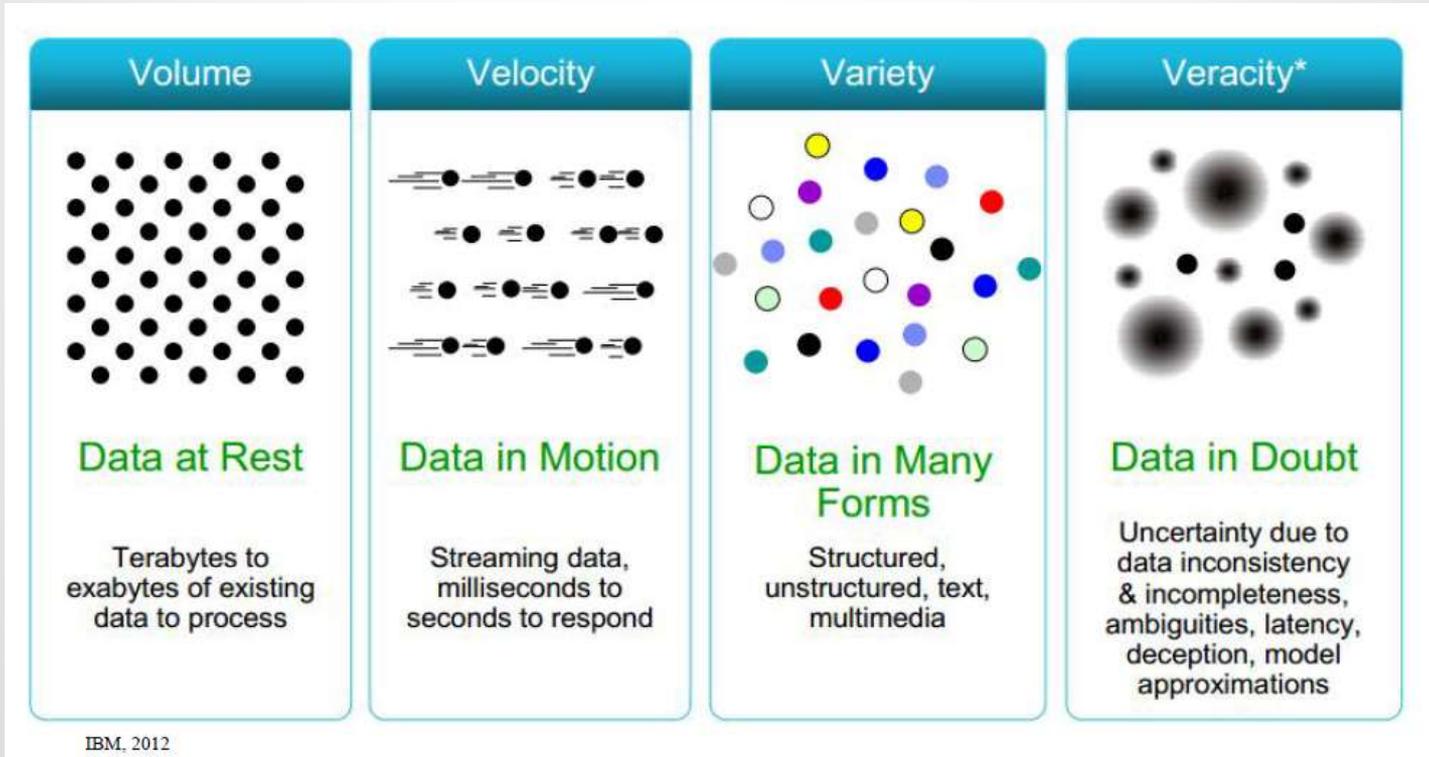


Volume:
(People + Devices + Storage +...)

Velocity:
(Data is everywhere)

Variety:
(People + Devices + Social + ...)

Veracity:
(Why are you sure Johnny likes Pepsi?)





1. VOLUME



1 Zettabyte = 10^{21} bytes = 1 billion terabytes

- **Volume of retail data (non-cash transactions):** 366 billion transactions in 2013, 5.6% annual increase in mature markets & 20% in developing markets
- **Mobile transactions** expected to grow annually by 60+% through 2015 (with over 245 million mobile payment users)



2. VELOCITY

- In 2013 there was more mobile devices on Earth than people
- Internet of Things is coming



Source: SuperMonitoring 2013



- Consumers always on with internet and mobile
- Data can be acquired and streamed in real-time
- ...Storage became cheap: \$700 per MB in 1981 to \$.00002 in 2010

3. VARIETY

Data coming from different channels:

- Transactions
- Communications
- Social Networks
- Research
- Stats and Demographics
- Content generation
- Location Data
- Devices

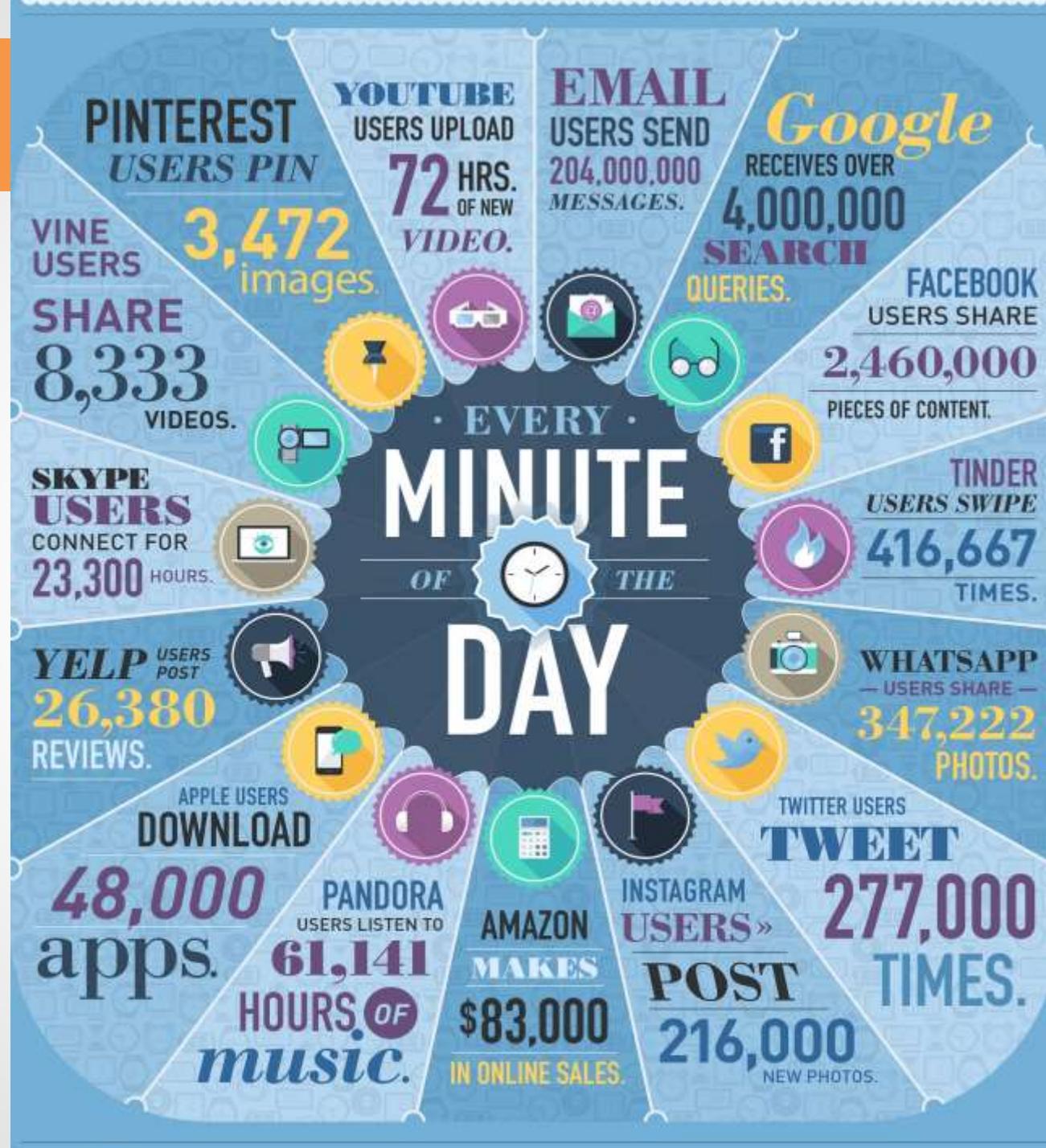
Every minute:

- 204 million e-mails
- Amazon makes \$83,000 in sales
- Etc.

→ In 2014, the digital universe was equal to **1.7 megabytes a minute per every person** on Earth.

→ **Internet population is 2.4 billion people** with 14.3% AGR

Credit: DOMO





4. VERACITY



Credit: IDC

- Having data does not mean its usable
- Only 37% of data will be useful in 2020
- Less than 5% of useful data was actually analyzed in 2013; to double by 2020

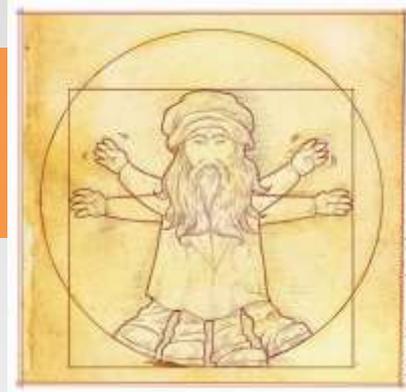


Where are we now: GOAL



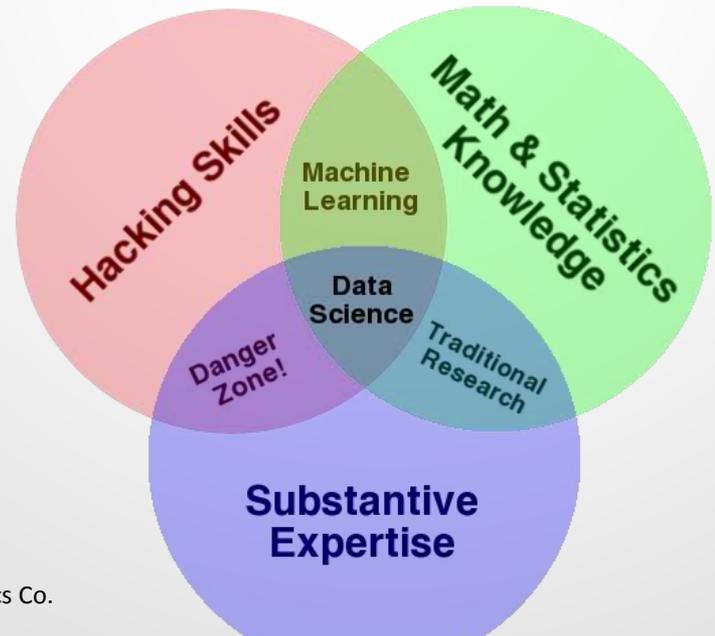
Reporting	Descriptive Analytics	Predictive Analytics	Prescriptive Analytics
Reporting & graphic representation	Insights & some conclusions	Predicting outcome of events	Modeling outcome & prescribing actions
<i>Business Information Systems</i>	<i>Decision Making Systems</i>	<i>Business Intelligence Systems</i>	<i>Knowledge Management Systems</i>
<i>Relational Databases Few Data Feeds</i>	<i>Set of databases / Data warehouse</i>	<i>Data warehouses / Distributed databases</i>	<i>Distributed databases Vary of data sources</i>
<i>Simple mathematics</i>	<i>Advanced methods</i>	<i>Scientific methods</i>	<i>Scientific Research</i>
<i>Simple programming or no programming skills</i>	<i>Some business and medium programming skills</i>	<i>Strong business, mathematical and programming skills</i>	<i>"Machiavelli" Skills</i>

PEOPLE – Profile



Anatomy of a GREAT Data Scientist

- “Part analyst, part artist”; “like a Renaissance individual”
- Technical & business understanding to solve problems that have most value
- 45% have 3 years of experience





PEOPLE – Profile

Figure 10. Data Scientists by Region

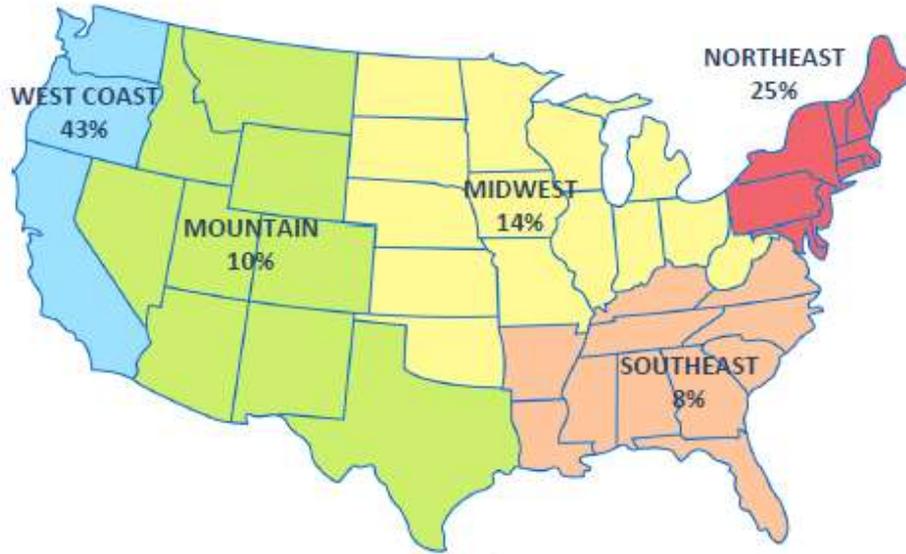
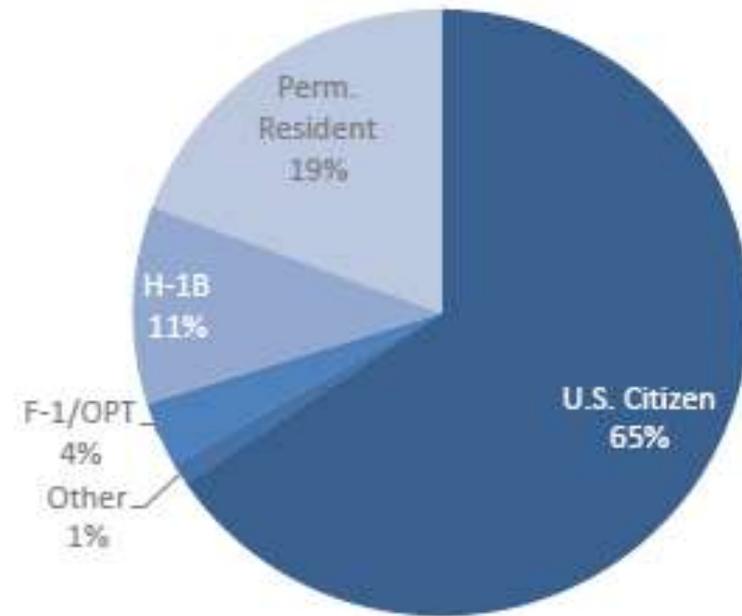


Figure 11. Data Scientists by Residency Status



- Majority of data scientists on the West Coast (where there's only 15% of US population)
- Majority US citizens; but at least 35% are immigrants with applications sponsored by employers
- Where is analytical talent employed? [McKinsey Interactive Feature](#)

(http://www.mckinsey.com/assets/dotcom/HomeFeatures/BigData/MCK_Q_BigData_rollover.html)



PEOPLE – Skills



Communication artist:

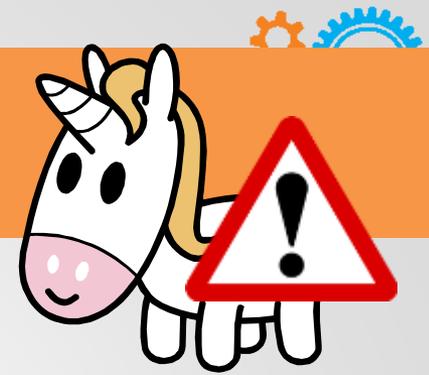
- Understanding of the field (*what data to analyze to get results*)
- Help figure out what data sources to explore
- Creativity to explore and experiment
- Storytelling skills
 - Can't make good decisions about data if cannot tell the story based on data (not fit into existing story)
- Project management skills
 - Ability to work in/with team
- Ethics (understanding what data can be used and when)
- Design skills



Geeky analyst:

- Mathematics
 - Diffusion geometry, matrix computations...
- Statistical tools
 - R, SPSS, SciPy, Stata...
- Programming languages
 - Python, C++, MATLAB, Ruby...
- SQL Databases
- Distributed computing systems
 - Hadoop, Hbase, Cassandra, Hive...
- Data Mining
- Data modeling
 - ERWin, ORM Diagrams, UML class diagrams...
- Predictive modeling
- Machine Learning
- Visualization
 - D3.js, Tableau, Flare, HighCharts...

PEOPLE – Shortage



- **Obstacle? Skilled data scientists hard to find**
 - 54% of North American executives claim that finding right people is the #1 obstacle in big data projects (PWC)
 - Very few academic programs in the field (most being designed right now)
 - **Gartner**: 100K+ analysts shortage through 2020
 - **McKinsey**: shortage of 140-190K of analytical experts & shortage of 1.5 million managers able to make decisions based on data
 - By 2018 the US alone may face a 50 to 60% gap between supply and demand of analytic talent

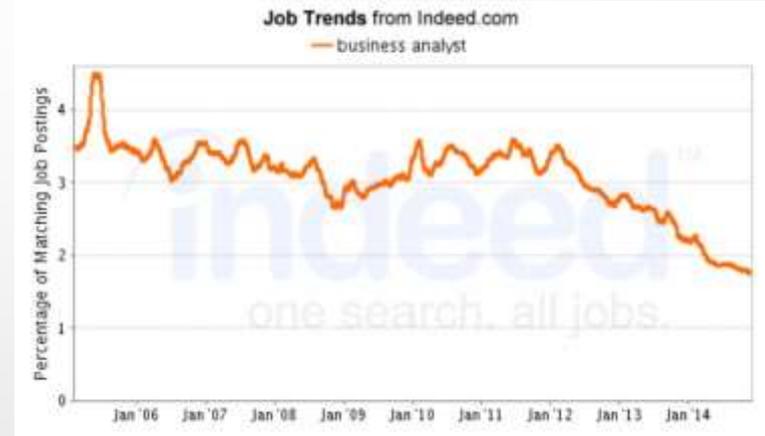
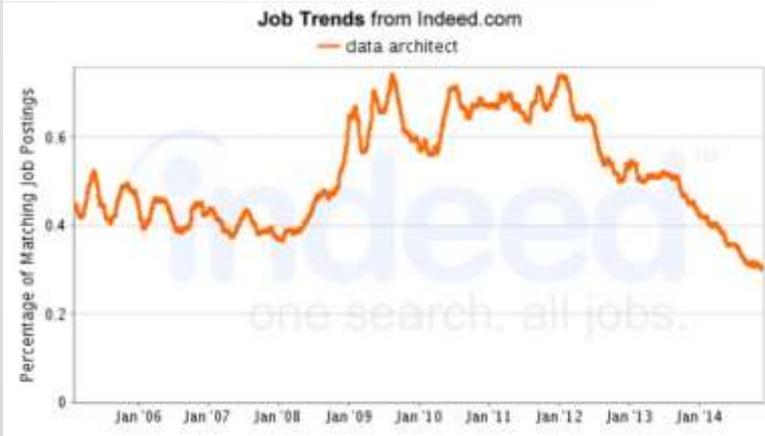
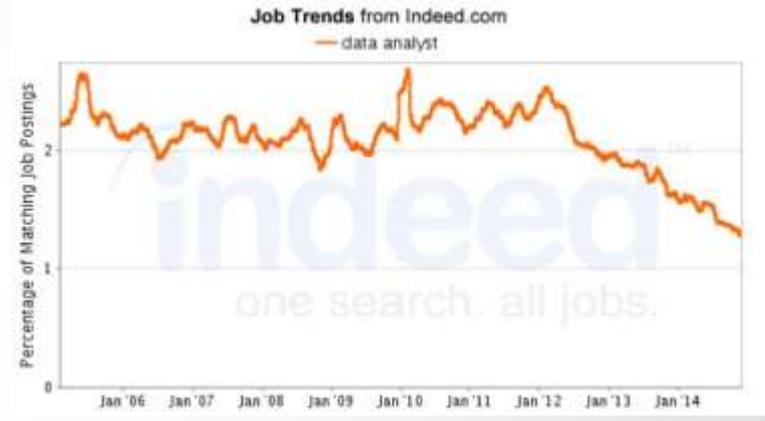
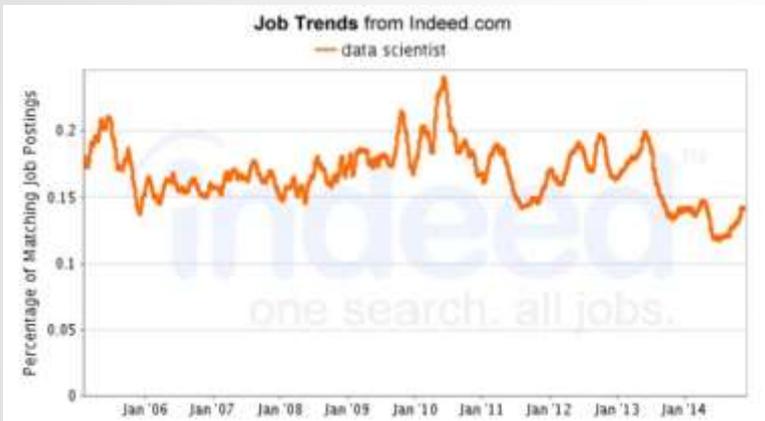
- Yet the shortage is being overcome rather quickly
 - Many executives don't notice the shortage
 - Smaller companies are empowering cross-functional teams, not searching for unicorns
 - Many bridge gaps with **teams** consisting of analysis experts and business “translators”
 - Though according to a poll on KD Nuggets only 6% of responders in US prefer teams

Region	% Individual approach	% Not sure	% Team approach
US (147)	41%	12%	47%
Europe (76)	51%	12%	37%
Asia (41)	51%	2%	46%
Latin America (12)	42%	17%	42%
Africa and Middle East (12)	33%	8%	58%
Canada (11)	18%	9%	73%
Australia/NZ (5)	80%	20%	0%

PEOPLE – Shortage?



Indeed.com current job trends: Demand for Data Scientists, Data Analysts, Data Architects & Business Analysts decreasing since 2012-2013. The same picture for Hadoop, MongoDB, etc.





CHALLENGES



Organizational challenges in Big Data projects

- Extracting and structuring data currently labor intensive → lower productivity
- Necessity to train employees to become “data scientists” and make data-driven decisions
 - Only 35% of big decisions are data-driven (PWC)
- External teams as a way to deal with problems beyond internal capabilities
- If working with external teams, need also to figure out how to grow internal capability
 - Look for providers who can also transfer information to in-house team

PLUS

- Most organizations have no idea what to do with big data
- OR how to secure data
 - Fairly okay with securing data in storage
 - What about securing real-time data?



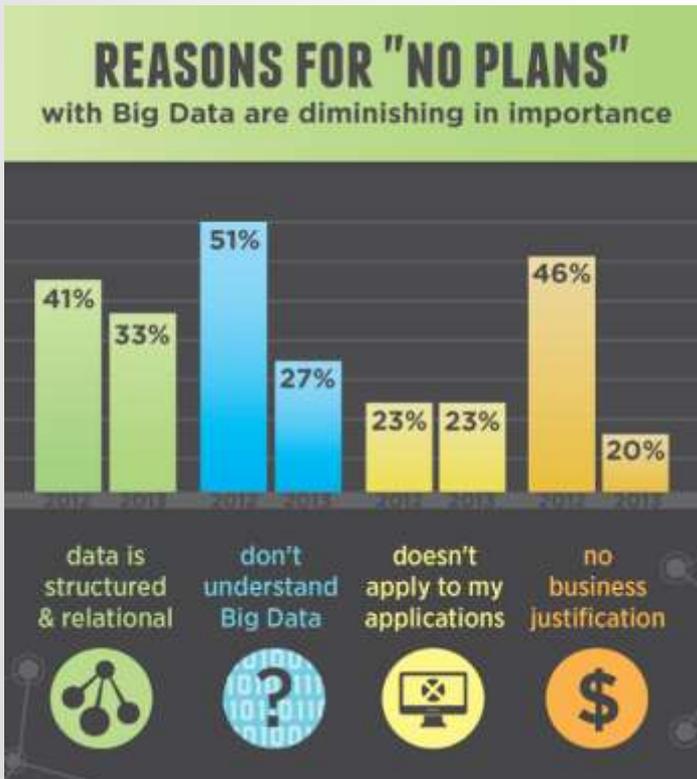


USE CASES



Data Use Today

- Reasons not to use big data are diminishing
- Big data projects doubled 2012-2013

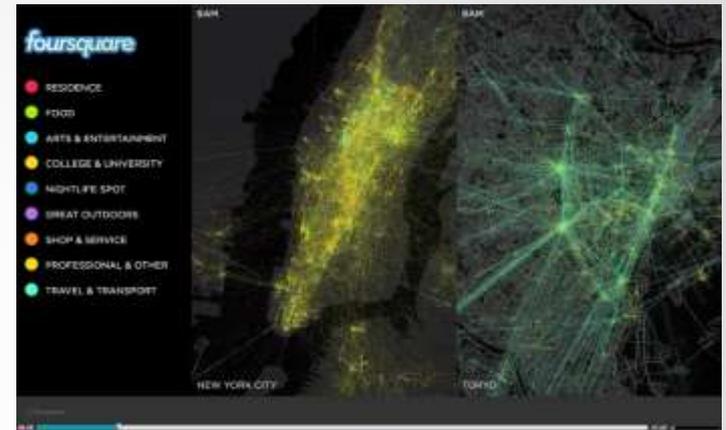




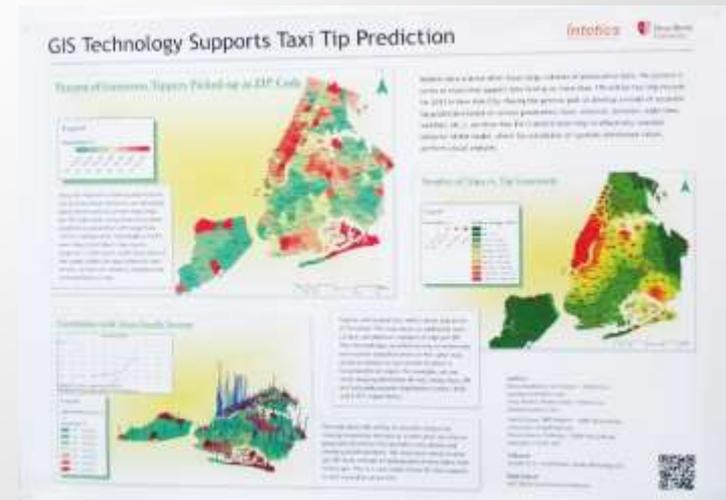
Big Data and LBS

Location-Based Services: “General class of computer program-level services that use location data to control features”

- **LBS data generation: Foursquare**
 - Data on people’s location all over the world
 - Crowdsourced data; rely on check-ins
 - Data sold to merchants for location-based advertising
 - Became location-based layer API for Amex, Uber, Bing, Airbnb...
- **LBS predictions: NYC Taxis**
 - Database of 170 million taxi tip records used to predict tipping expectations for taxis in NYC.
 - Resulted in map that includes geographic visualization of the number of generous tippers by ZIP-code, correlation of generous tipping and mean family income, and popularity of a particular location by looking at number of trips vs. tip generosity.



Visualization of Foursquare check-ins: Pulse of NYC and Tokyo, 2013

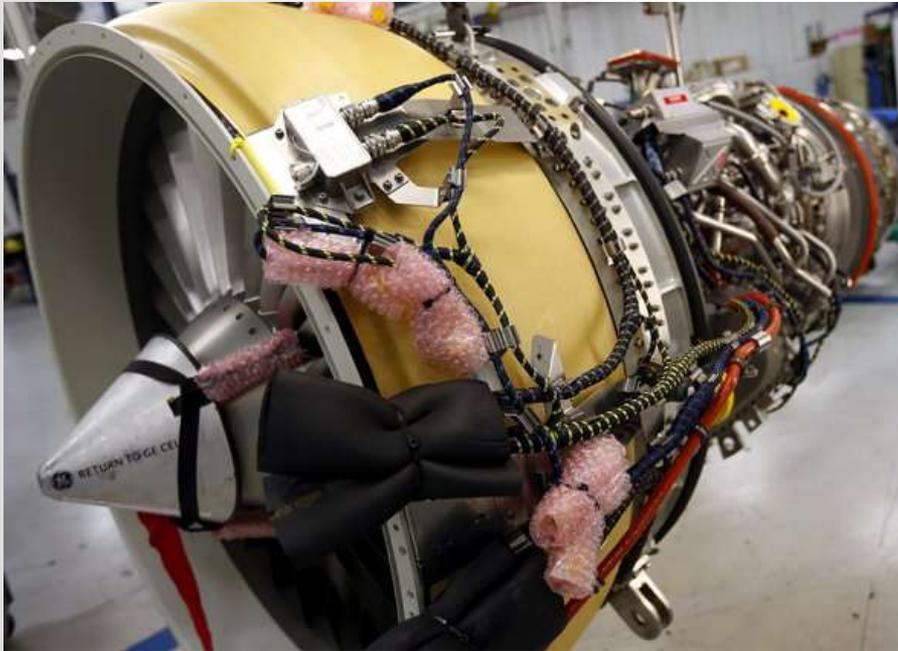




Big Data and Internet of Things



- Rapid growth of data will require a different approach to infrastructure
- Need for more data management and analysis



- **GE: Infrastructure & Analytics:**
 - Sensors on all equipment (1.4 mill of medical pieces; 28,000 jet engines, etc.)
 - 50 million pieces of data from 10 million sensors
 - Infrastructure: “Industrial Internet”
 - New flexible data platform called Predix, used by Cisco, Intel, AT&T, etc
 - Heavily recruiting data scientists: transferring from within; creating own training program
 - Potential for \$20 billion in annual savings

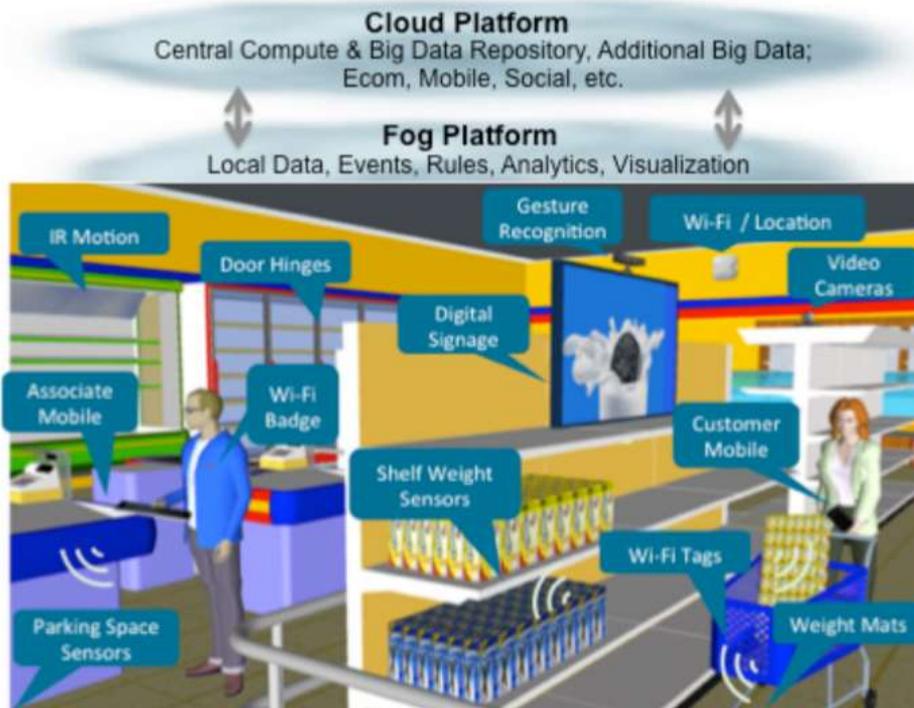


Big Data and Omni-channel



Big Data and Omni-channel Systems

- Better understand customer patterns with data from social and in-store information (like purchases, security etc.)
- Real-time awareness



Flexible, hyper-local, real-time, sensor fusion, and big data analytics driving the next generation of Retail Value Chains

- **American Apparel:**
 - Getting same data in-store as online
 - The whole mix: Combining location, IoT, Analytics, and Big Data to optimize shopping experience
- **Macy's:**
 - Investing heavily
 - Online sector growing at 50% annual rate (faster than any other part of the business)
 - Concentrating on customer-centric personalization

Other BD applications



- **Time Warner Cable** analyzes price changes and promotions to predict impact on subscriptions and disconnects
- **Verizon** integrates unstructured data into existing data to get full insights about customer behavior
- **Walmart** created a search engine that includes semantic data, which has improved the chance of completing a purchase by 10-15%
- A **fast food chain** optimizes its drive-thru menu based on how long the line is (long line = menu displays items that can be served quickly)
- **Morton's Steakhouse** served dinner to a frequent customer at the airport when he (jokingly) tweeted about his late flight arrival: they had to use social, customer records, and figure out what flight he was on)
- Re-using archived data to discover instances of fraud – **Infinity Property** was able to recover \$12 million with their new algorithm.
- **Hospitals** analyze medical data to predict which patients are likely to be readmitted – and attempt to start preventive care instead
- **Manufacturers** monitor vibration data to predict replacement and maintenance times



BIG DATA TOOLS

BIG DATA LANDSCAPE, VERSION 3.0

Exited: Acquisition or IPO

Infrastructure	Analytics	Applications
NoSQL Databases FOUNDATIONDB, DATASTAX, redis, mongoDB, COUCHBASE, KEROSPIKE, HYPERTABLE, CLOUDANT, OhmData, Neoaj, SOHEB	Analytics Platforms databricks, QuantCell, PERVASIVE, QUAVUS, Datermeer, KARMA, collective, PRECOG, datastora	Ad Optimization aggregate Knowledge, rocketfuel, TAPAD, alMatch, MediaMath, theblue desk, ad across
Cloud HADOOP On Prem, HADAPT, cloudera, spice, Zettaset, amazon, MAPR, Microsoft, Hortonworks, Pivotal, MORTAR, infochimps, Du bale, @alliscale, JETHRO, amazon	BI Platforms birst, pentaho, GoodData, SiSense, platfora	Marketing LATTICE ENGINES, Sailthru, gainsight, Q RelateIQ, Tellpart, persado, bloomreach, CLICKFOX, Pursway
NewSQL Databases MarkLogic, TRANSILTYCE, Rain, paradigm4, deepdb, skySQL, Clustrix, VoltDB	Unstructured Data BASIS, ATTIVO, GENERAL SENTIMENT, semantrio, DIGITAL REASONING, Quid, Palantir	Finance Lendo, cignifi, LendUp, KENSHO, OnDeck
MPP Databases TERADATA, InfiniDB, VERTICA, Pivotal, PARACCEL	Data Visualization tableau, visual.ly, Roambi, Chart.io, Quantum4D, ACTUATE, Kitenga, Ayasdi, ISS	Human Capital evolv, entelo, gild
Graph Databases Neoaj, aster data, InfiniteGraph	Machine Learning SKYTREE, bigml, vicarious, wise.io, context relevant	Legal JUDICATA, RAVEL, Lex Machina
Cloud-Sourcing microTASK, servio, mobileworks	Analytics Services IBM WATSON, reactor labs, AI, vicarious, THINK BIG, VALANCE, DATA SCIENCE, OPERA, IO	Government / Regulation mark43, enigma, FORTSCALE, feedzai
Data Transformation TRIFACTA, Paxata, DataTamer, KALIDO, revelytix, SHIKH, IRON, syncsoft	Statistical Computing SAS, SAS, SAS, SAS, SAS	Education / Learning KNEWTON, PANORAMA, Clever
Storage DATAGUISE, Stormpath, IMPERA, Cleversafe, SIMPLESTORAGE, Comserve	Big Data Search hp, Lucidworks, antology	Health Recombinex, Ginger.io, FLATIRON, THE CLIMATE CORPORATION
App Dev. CONTINUITY, wibidata	Real-Time METAMARKETS, amiato, causata	Industries tubular, OPOWER, SIGHT MACHINE
Cross Infrastructure / Analytics SAP, SSAS, IBM, Google, Microsoft, vmware, amazon, 1010data, talend, TERADATA, hp, NetApp		
Open Source Framework: Hadoop, YARN, HDFS, Spark, Query / Data Flow: HBASE, CASSANDRA, SCIO, ORACLE, mongoDB, triak, Sqoop, Coordination / Work-flow: ZooKeeper, Storm, Machine Learning: MLlib, Cloud Deploy, Search: Solr, LUCENE		
Data Sources Data Mkts: Windows Azure, bluekai, DataMarket, factual, Data Sources: DATA.GOV, premise, YODLEE, xignite, plaid, Sensor Data: kinsa, SKYCATCH, fitbit, RunKeeper, Withings, BASIS, estimate, incubators & Schools: zipflion, GA, INSIGHT, DataLine		



Tips for your business



AT LEAST:

- Start collecting data
- If you have data, analyze & visualize it
- Find a data scientist
- If you can't find the right one (too expensive etc.) ...train internally
- Outsource to experts

AT LAST:

A Typical Big Data Project:

- Define the needs and objectives
- Asses level of understanding
- Allocate/Find resources
- Propose analytic models
- Asses available data
- Collect data / Organize secure storage
- Integrate & Clean data
- Evaluate tools available on the market
- Implement analytic models
- Visualize output (dashboard)
- Make predictions
- Give prescriptions ...if you can



Conclusions & Predictions



Data growth

- Data production in 2020 will be 44x greater than in 2009
- Xenobytephobia might become more common (fear of uncontrolled big data)
- Possible to achieve 1 googol bytes in 200 years or sooner

Big Data will continue to play an increasing role

- Better efficiency & productivity, more cost savings
- More & more applications; Appearance of complex analytical platforms
- More usable data
- More real-time analytics

Special legislation may appear

- To protect privacy
- Ensure data security

Resources

- Talent pool will grow through new educational programs & increased corporate training
- Data scientists may be encapsulated at big solution providers

Outsourcing & Offshoring

- Outsourcing of Big Data will grow because of lack of internal expertise
- Offshore won't be able to supply "business objectives" specialists
- More hybrid, onshore/offshore teams will be created to leverage cost



Thank you!

Q&A

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<http://www.intetics.com/custom-software-development-company/corporate-blog/>



www.linkedin.com/in/boriskontsevoi



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