Future Trends in Big Data

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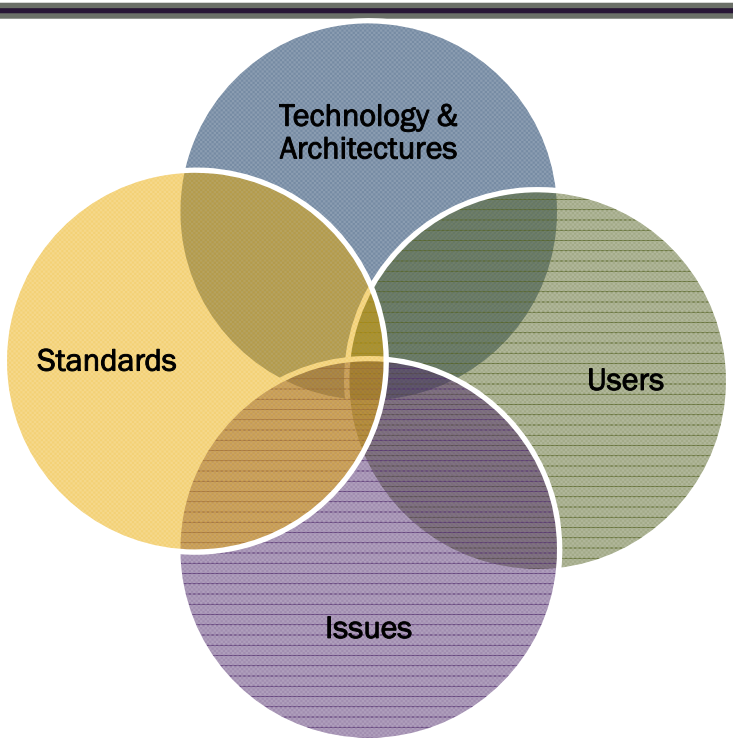
David Boyd

- CTO, L-3 Data Tactics
- NIST Big Data Working Group: Technology Roadmap Co-chair
- ISO/IEC JTC1 Study Group on Big Data contributor
- 35 Years of software development and integration experience in Geospatial, Software Engineering, and Big Data
- Interests
  - Big Data Architectures
  - Text Analytics, semantic technologies and NLP
  - 3D printing
- STEM Outreach
  - FIRST Robotics Mentor (9 years)
  - Founder, board member US STEM Foundation
  - US FIRST Program assistant for outreach (VA/DC)
  - Program advisor for SkyRobotics UAV competition

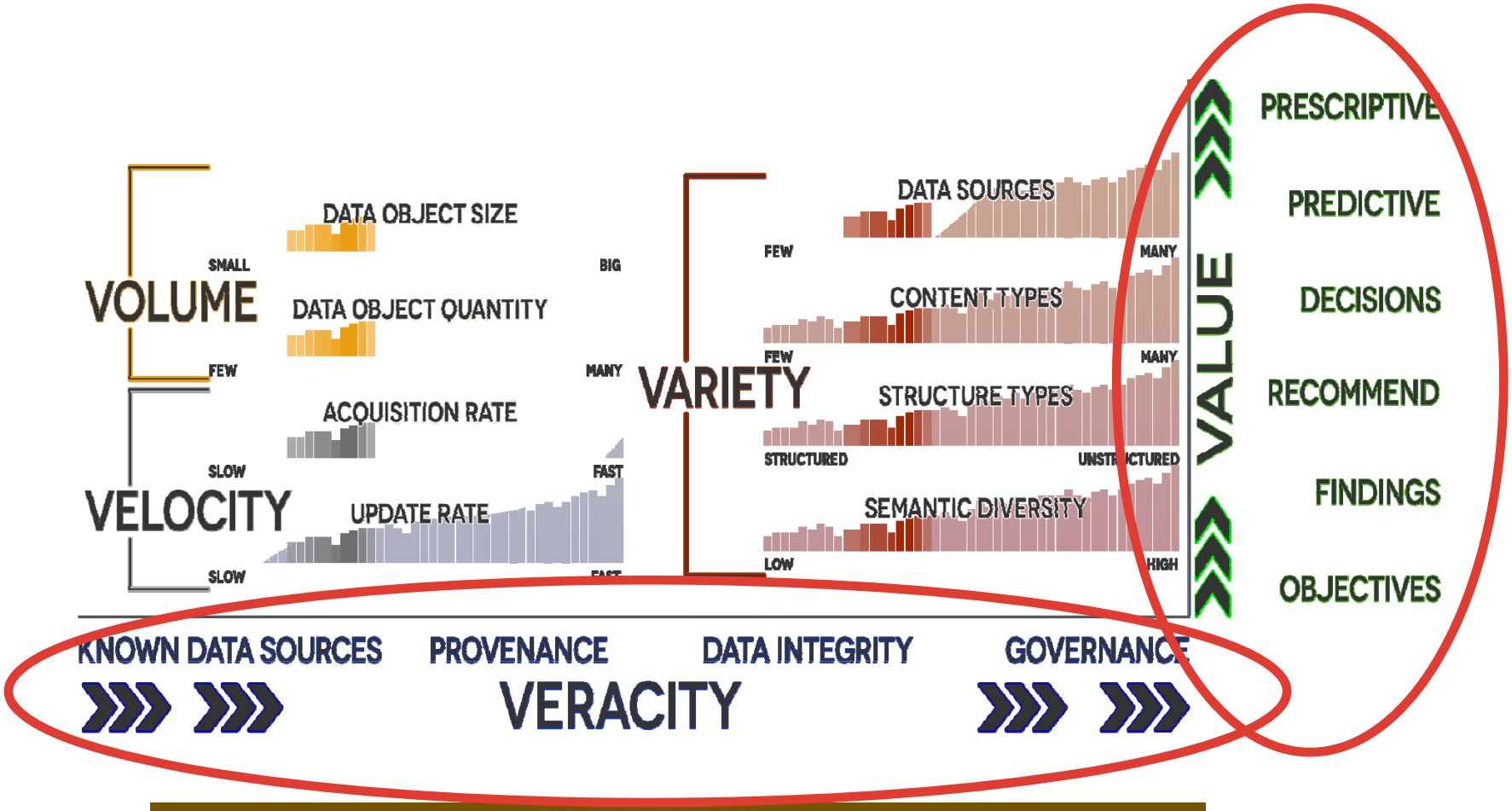
Topics and Disclaimer



Disclaimer:

- The views expressed in this presentation are not meant to represent the position of any of the following:
  - NIST Big Data Public Working Group
  - ISO Study Group on Big Data
  - L-3 Corporation
- The poor graphics are because I failed art class in elementary school

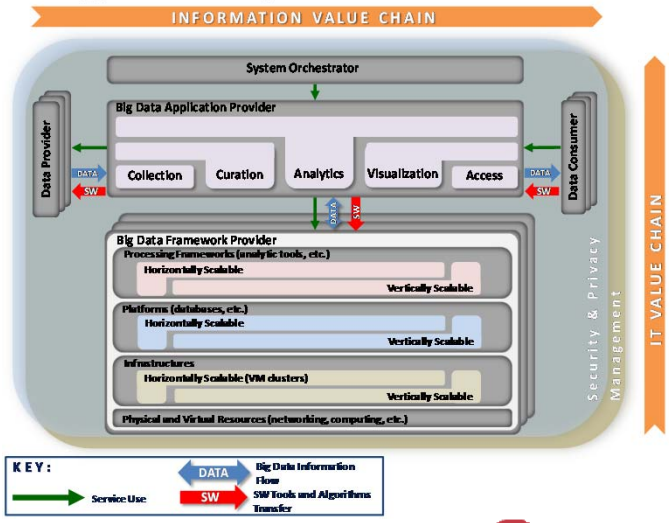
General Trends



Focus will move from just Big Data to Big "Data Problems"

Standards Trends

- Activities
  - NIST Big Data Public Working group is working on version 2 of its reports (Definitions and Taxonomy, Use Cases and Requirements, Reference Architecture, Security and Privacy, Technology Roadmap)
  - The ISO Study group on Big Data has recommended that ISO/IEC JTC1
    - Establish a work group to focus on a reference architecture and definitions along with coordinating Big Data related activities from other committees
    - Have existing committees and work groups investigate the Big Data implications to their standards activities
- Key standards areas
  - Reference Architectures and Definitions
  - Meta-data
  - Interface language extensions
  - Data/File access APIs
- Other possible areas – Benchmarks, Data Quality, Ontologies



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Big Data User Trends

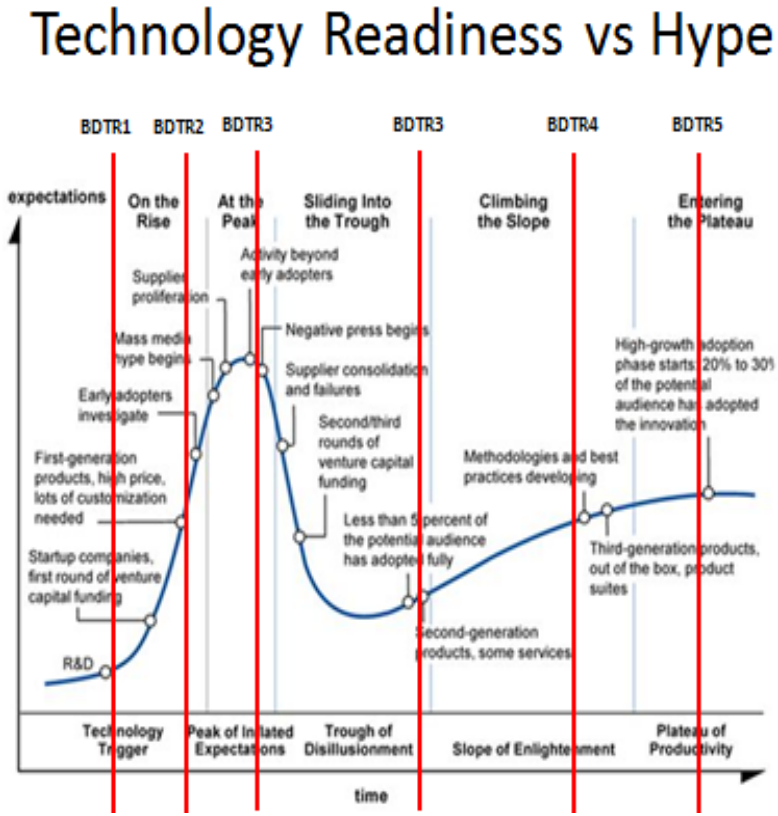
- Value will drive more decisions on Big Data implementations
  - Organizations will do more extensive ROI analysis on their Big Data Programs
- Growth
  - Businesses
  - Governments
  - Individuals
- More focus on value and governance than technology
  - Privacy Fears
  - Security Issues
  - Quality
- Capability Maturity Models for Big Data are already emerging.

Trends in Big Data Issues

- Privacy and security will continue to dominate the issues
  - Impacts of PII spills
  - Impact of better data aggregation remains unknown
- Quality and accuracy of analytics will become critical to trust in results
  - Improper application of statistics/data science
  - Improper interpretation of analytic results (correlation vs causation)

Big Data Technology Trends

- **Technology will continue to follow the Hype Cycle**
  - The challenge as always will be can the technology survive the trough of disillusionment
- **Industry -> Open Source -> Value Resellers -> Standards**
- **An approach to evaluating technology readiness for production applications is needed**



Data Lifecycle: Engineering and Management

Data Infrastructure

Data Architectures

Data Science and Visualization

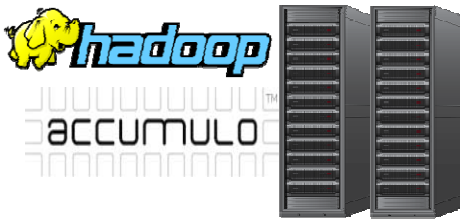
Sensor Collection

Multiple sensor collects and data feeds including raw data and/or document repositories – manual and/or automated control

Data Repositories

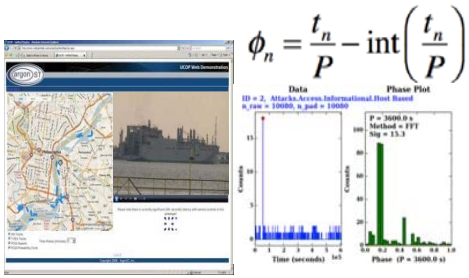
Raw data and collects are cleansed and normalized for storage and further data processing

Repository Refinement



Information is migrated to high performance computing platforms for data fusion and low order data analysis across

Data Refinement and Dissemination



Pre-Analyzed information is used as input to refined higher order data analysis for both predictive and prescriptive results

Data Engineering

Data Management

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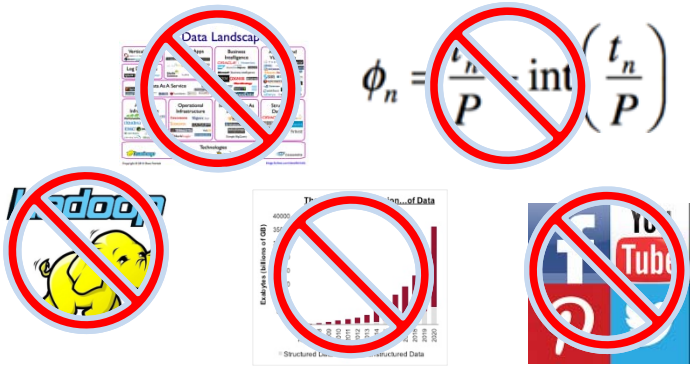
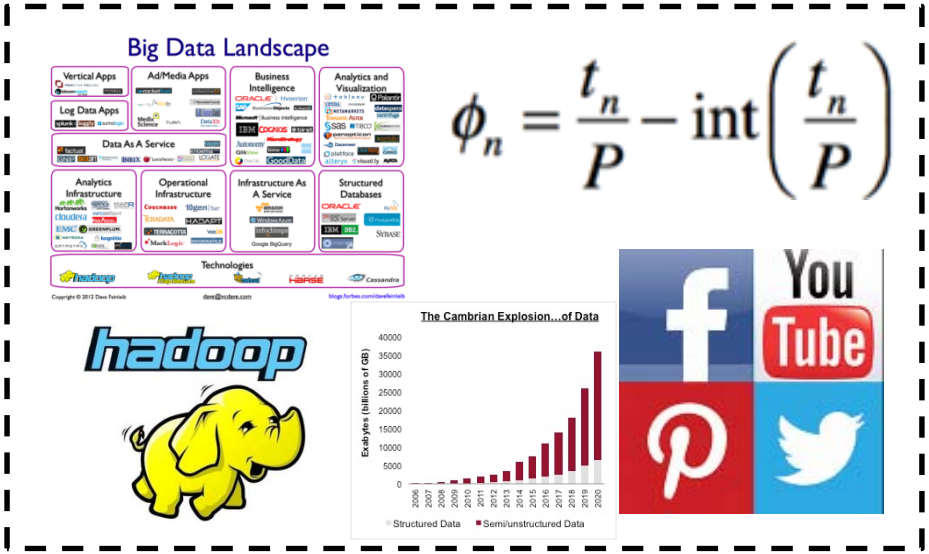
Focus will move from specific technologies and data to the entire data lifecycle

- Focus will move from components
  - Large volumes of data
  - Social Media Data
  - Data Science/Analytics
  - HADOOP
  - Graphics and Charts



- New Service Paradigms will emerge
  - Data As A Service
  - Analytics As A Service

To COLLECTIVELY leveraging a range of components to produce VALUE from DATA



Solutions to Problems

"The goal is to turn data into information, and information into insight."
Carly Fiorina, former CEO of Hewlett-Packard