Data Exploration and Analysis in the Age of Big Data:
Getting Results Faster Than You Thought Possible

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Speakers

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Agenda

- Why analyze big data?
- A four-step analytic process
  - *For big data, exploration, discovery, and visualization*
- A technology stack for exploratory analytics with data in Hadoop
- Process and tool details
  - *Big data, as managed in Hadoop*
  - *Data exploration*
  - *Advanced analytics*
  - *Advanced data visualization*
- Real-world use cases
- Advantages and caveats
- Summary and conclusions

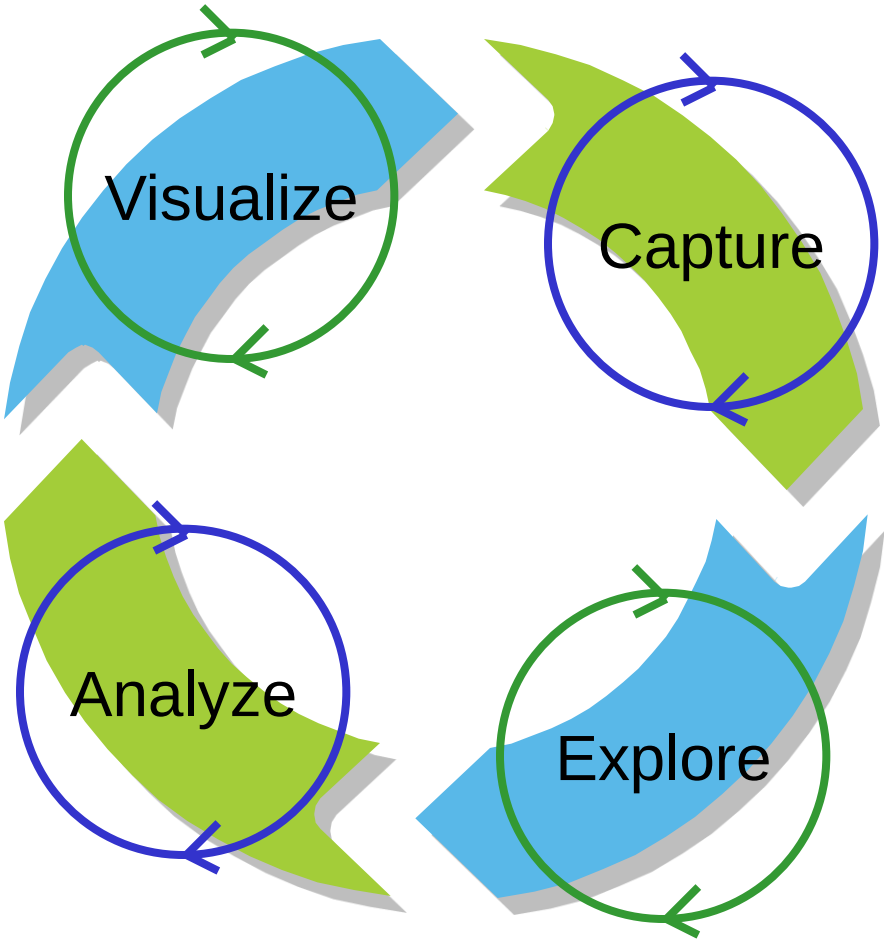
PLEASE TWEET --
@pRussom, @Tableau, #TDWI, #Hadoop, #Analytics, #BigData

Why analyze big data?

- Big data is a valuable resource
  - *Leverage it for business value*
  - *Never be content to merely manage big data as a cost center*
- Get value from big data by analyzing it
  - *Advanced forms of analysis are the main pathways to business value from big data*
  - *Self service makes analytics attainable*
- Most big data is also new data
  - *New sources – machines, sensors, vehicles, facilities, surveillance, devices, "The Internet of Things"…*
  - *Social media, Web apps, mobile apps…*
  - *New data from new sources leads to new insights via analytics*
- Big data provides bigger data samples
  - *Extend the life and value of older analytic applications for risk, fraud, and customer base segmentation*
- Big data increases breadth of older apps
  - *More attributes for complete customer view*
  - *More data points for customer sentiment*

ITERATIVE, FOUR-STEP PROCESS FOR

Exploratory Analytics with Big Data



SIMPLE TECHNOLOGY STACK FOR

Exploratory Analytics with Hadoop Data

FOUR STEPS

- Data Visualization
- Advanced Analytics
- Data Exploration
- Big Data Capture & Mgt

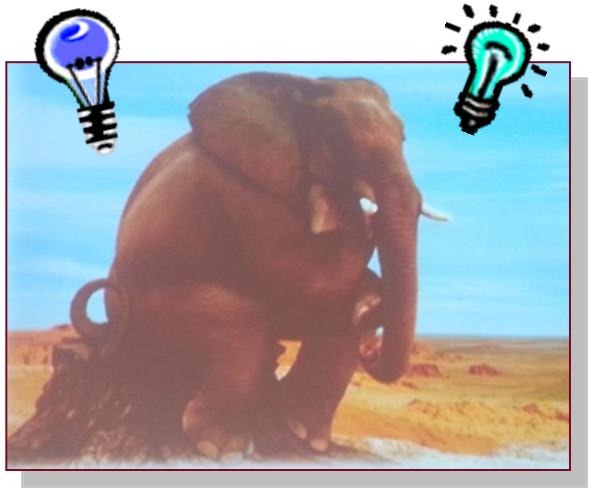
TECH STACK

Tool for
Exploratory Analytics
w/Data Visualization

w/Hadoop Distributed File System (HDFS), MapReduce, and Hadoop Data

CAPTURE BIG DATA

Why Hadoop now?



- Organizations want more business value from big data
  - *Analyzing big data yields value*
  - *Hadoop is built for big data analytics at massive scale*
  - *Also built for new data types, structures, and sources*
- Hadoop complements DW, DI, older Analytics
  - *Hadoop expands the biz value of these traditional platforms*
- Hadoop cracks the nuts that challenge traditional platforms
  - *Text, unstructured data, email archives, audio, video*
  - *Schema-free data, multi-structured data, NoSQL processing*
  - *File-based data: logs, dumps, XML, JSON, CSV, etc…*
  - *New data from: machines, sensors, social media, etc…*
  - *Algorithmic analytics: data mining, statistics, AI, NLP*

Importance of Data Exploration

- Data is the business.
  - *Data keeps a record of organizational activity and performance.*
  - *To know the business, you must know the data.*
- You have to start somewhere.
  - *Poking around in data gives you a sense of what happened*
  - *So you can start building a data set or model that represents a root cause, trend, or other analytic outcome.*
- Browsing data can be inspirational.
  - *This is how you discover new sources*
  - *Or determine which sources of data are appropriate to a specific report or analysis.*
- Exploring data is a prerequisite to analyzing data.
  - *By its natural, analysis makes correlations across data of diverse sources, structures, subjects, and vintages.*
  - *Finding just the right combination for successful analysis depends on data exploration as a first step.*

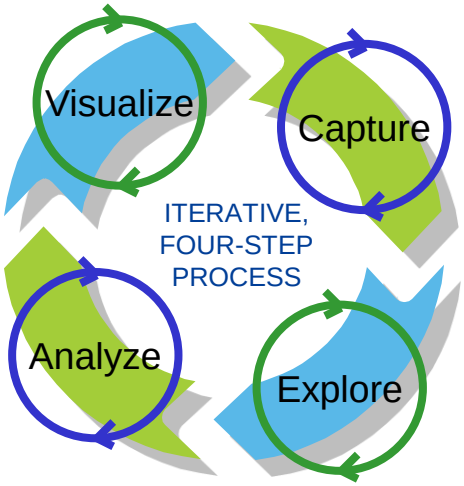
TECHNOLOGY REQUIREMENTS FOR

Data Exploration

- Search technology for exploring diverse data types.
  - *Data exploration should be as easy as Google*
  - *Parse data of many formats and structures*
  - *Allow any question; not confined to a predefined data model*
- Query capabilities in support of data exploration.
  - *Both business and technical users depend on query capabilities*
  - *Find just the right data; structure the result set for immediate use*
- High ease of use for user productivity.
  - *Some users are biz people who need to see data for themselves*
  - *They need a business friendly view*
  - *Ease of use accelerates technical developers' productivity, too*
- Support for all major data platforms, from relational to Hadoop.
  - *A modern data exploration tool needs to go where the data lives.*
- As you explore big data, you also:
  - *Extract data, model the result set, index big data*
  - *Perform these tasks as you go, not ahead of time, for greater agility*

A FEW REQUIREMENTS FOR

Advanced Analytics

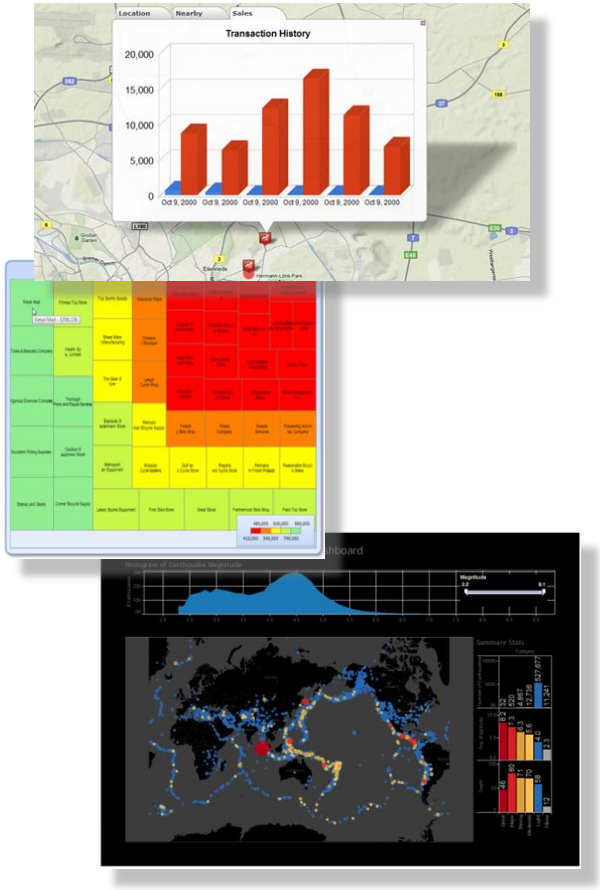


- Seamless integration
  - *In one tool environment, all functions for exploration, analysis, and visualization*
  - *The iterative, four-step process of exploratory analytics demands tight tool integration*
- Advanced forms of analytics
  - *Mining, predictive, statistics, NLP (not OLAP)*
  - *Algorithmic, as well as query based*
- Both canned and home-grown algorithms
  - *Tool should include library of pre-built algorithms*
  - *Tool should also help you write your own*
- High ease-of-use for broad collaboration
  - *Functions for both technical and business users*
  - *Both develop analytic apps and consume them*
  - *Assume that many user types will share their work*

THE IMPORTANCE OF

Data Visualization

- Critical to reaching your audience
  - *Data viz makes your analyses and datasets more consumable for more user types*
  - *Visual appeal makes big data analytics compelling*
- Viz's high ease-of-use empowers more user types
  - *Democratizes big data and analytics*
  - *Speed to insight for shorter decision cycles*
  - *The visualization _is_ the user interface*
  - *Enables visual discovery, customization*
- Seeing data relationships
  - *Critical for users to digest complex big data*
  - *Layering multiple sources, spotting patterns*
  - *Drag-and-drop reveals more relationships*
- Management Dashboards
  - *This is what most users want and need*
  - *Viz makes dashboards more mature, with more visual options and deeper data interaction*



Common Use Cases

For Exploratory Analytics with Hadoop Data

- Web site visitor behavior
- Price optimization in eCommerce
- Customer base segmentation
- Social media sentiment or pattern
- Medical research: DNA, outcomes…
- Quality assurance in manufacturing
- Fraud detection
- Risk calculations
- Facility monitoring & surveillance
- Capacity planning for grids, utilities, networks, facilities…
- Mobile asset management

SPECIAL USE CASE

Seize the many business opportunities of machine data.

- Machine data can be unique
  - *E.g., most robots are one of a kind, generating proprietary data forms*
- Some machine data is generated intermittently, not 24x7
  - *E.g., railcars are commonly fitted with sensors, but these are only read at rail yards or stations*
- GPS data is an important form of machine data
  - *Analyze where your customer makes certain purchases, which of your trucks is nearest the location where one is needed, what route products took from your plant to retail shelves, etc.*
- Machine data contributes to 360-degree views for a more complete and up-to-date picture
  - *Many new customer touch points generate machine data, like mobile apps, Web apps, social media*
  - *Correlate these with other data points for better views*

GETTING STARTED WITH

Exploratory Analytics with Hadoop Data

- Look for a problem to solve or an opportunity to leverage
  - *Finally get biz value from hoarded big data*
  - *Leverage big data from new customer touch points*
- Involve business people in defining applications for Hadoop
  - *Data stewards and data governors*
  - *Biz people affected by big data: CIO, CTO, marketing, sales, Web*
- Indentify how Hadoop data can integrate with other enterprise data
  - *More complete 360-degree views*
  - *Larger data samples for analytic apps for fraud, risk, segmentation*
- Consider a simple two-part technology stack; avoid “big bang”
  - *Integrated tool for data exploration, analytics, visualization*
  - *Hadoop as the data management platform for diverse big data*

ADVANTAGES OF

Exploratory Analytics with Hadoop Data

- Simple technology stack
  - *Just Hadoop Distributed File System (HDFS), MapReduce, and an analytic tool*
- Simple data preparation
  - *Capture raw source data in HDFS*
  - *Extract, model, & index data on-the-fly*
- Short time to use; fast development
  - *Due to simple technology and data preparation*
  - *Due to user-friendly analytic tool*
- Easy access to big data
  - *Productivity for technical developer*
  - *Visibility into business entities and process for end user*
- Leverage untapped big data for organizational advantage

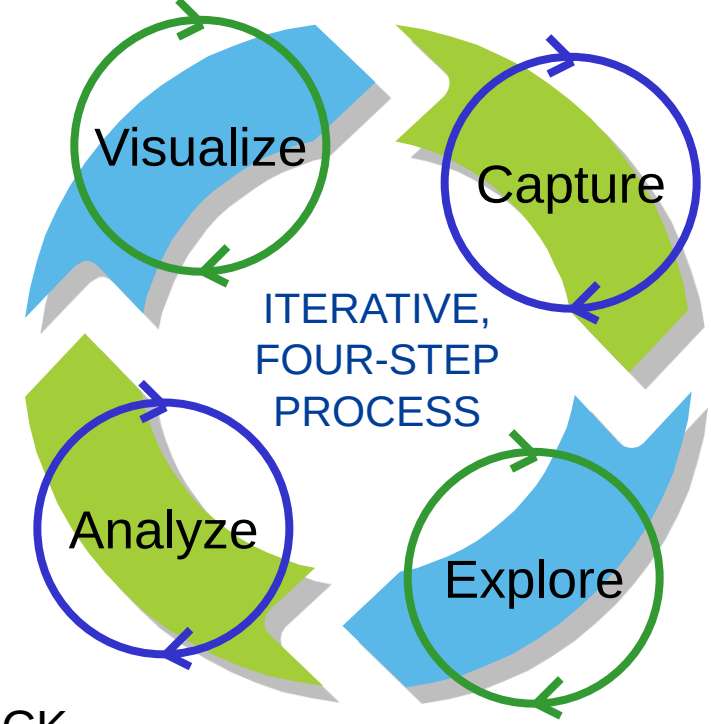
A FEW CAVEATS CONCERNING

Exploratory Analytics with Hadoop Data

- Assumes you have already deployed an HDFS cluster and populated it with big data
- This practice is mostly for ad hoc queries and algorithmic advanced analytics
  - *Rarely for scheduled reporting or real-time monitoring*
- Hadoop won't replace your data warehouse
  - *You still need your DW for standards reports, dashboards, OLAP, performance mgt, functions that require relational data, highly accurate or governed reports, etc…*
  - *Hadoop complements a DW by handling data that few DWs were designed to handle:*
    - Multi-structured data, unstructured data, file-based data, machine data, raw source data, massive data volumes, relatively low cost

IN CLOSING, LET'S REVIEW THE PROCESS STEPS and TECHNOLOGY STACK FOR

Exploratory Analytics with Big Data



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Questions?

Contact Information

If you have further questions or comments:

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