



OSIsoft®
REGIONAL
SEMINARS 2012
The **Power** of **Data**



The Power of Data

Presented by **Brad McBride**
Regional Director, Sales

“Every day I wake up and ask, ‘how can I **flow data better, **manage** data better, **analyze** data better?’”**

Rollin Ford, CIO Wal-Mart





New York Stock Exchange



VISA: 300 Million Transactions / Day



amazon.com

Hello. [Sign in](#) to get personalized recommendations

Your Amazon.com

Today's Deals

Shop All Departments

Books

Music & Games

Search

All Departments

[Ad Feedback](#)



NALCO

Refined Knowledge provides visibility into water and process systems to optimize performance and drive down TCO.



DATA SOURCES



Combined Experience Level
300+ years



Higher Performance

Turn Data into Actionable Knowledge

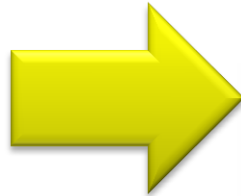
- Catch upsets before they occur
- Identify improvement opportunities
- Optimize process systems

Refined Knowledge

OSIsoft. USERS CONFERENCE 2012

© OSIsoft/IPC | IJC2012

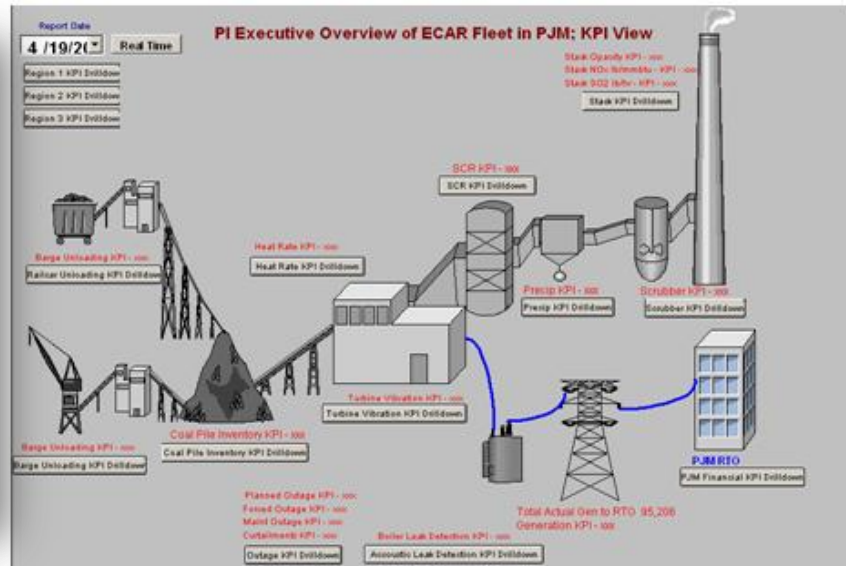




The Challenge Provide Those That Need The Data The Big Picture

PI Helps Control Production Costs

Controllable Cost	Units	Actual	Target	Design	Deviation from Target (Btu/Kwh)	Cost (\$/Shift)	Total (\$/Shift)
Main Steam Pressu	PSIG	1,985	2,000	2,000	-15	\$6.48	\$0
Main Steam Temperat	F	976	962	1,050	88	\$32.04	\$2
1st FH Steam Temperat	F	976	948	1,050	102	\$59.76	\$3
1st Reheat Attempt	lb/hr	1,079	0	0	1,079	\$1.86	\$0
Excess Ai	%	21.4	19.8	14.0	7.4	\$20.86	\$1
Exit Gas Temperatu	F	359.4	329.7	305	54.7	\$150.12	\$17
Steam Coil Air Heaters	klb/hr						
Condense	in. of HG	1.13	0.92	0.77	0.36	\$64.98	\$8
HP Feedwater Heate	Btu/Kwh	5.2	0	0	5.2	\$8.61	\$1
LP Feedwater Heaters	Btu/Kwh						
Auxiliary Pow	Mw	14.33	16.08	15.41	-1.75	\$186.90	\$13
Total Operator Controllable C						\$25.79	\$6





Why do it - whats it all about?

- Process Data is a Huge Untapped Asset
- The only definitive record of Plant Performance
- Trending is not enough - we are only human!
- Key issues surround the **combination** of plant variables.



Unlock the Value in Process Data

Making Money with Statistics & Datamining

David Stockill
Shell Global Solutions International
12th April 2001

Shell Global Solutions

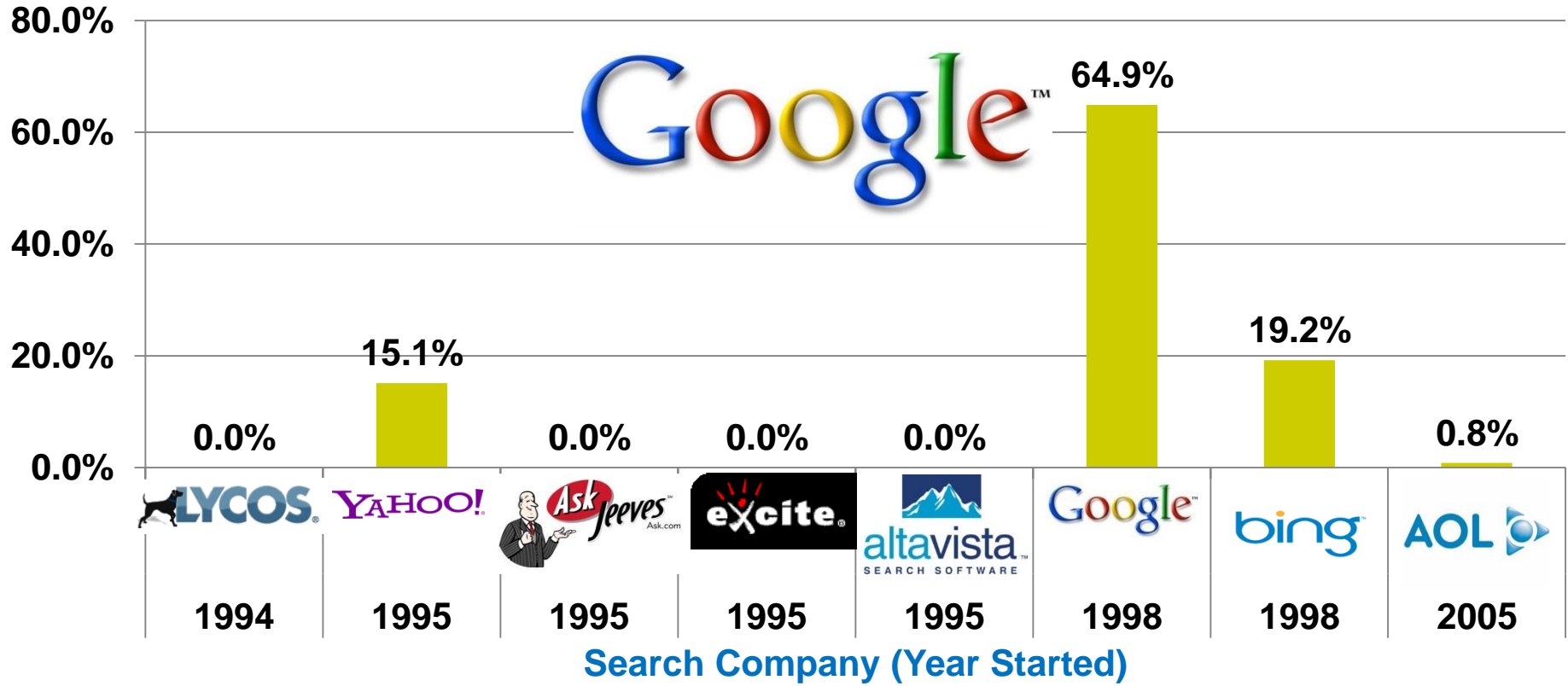
7

The VISA logo is displayed in a large, blue, sans-serif font.The WALMART logo is shown in blue, with the tagline "ALWAYS LOW PRICES." in a smaller blue font below it. A red script logo that says "Always." is positioned below the tagline.The amazon.com logo is presented in a grey, sans-serif font, with the yellow curved arrow logo positioned below the text.

**Companies that invest in the
value that data provides
will prosper.**

The NALCO logo features a stylized blue graphic above the word "NALCO" in a blue, sans-serif font.The AEP logo consists of the letters "AEP" in a white, bold, sans-serif font, set against a red, trapezoidal background.

US Core Web Search Market Share - Aug 2012



Search Company (Year Started)

<http://finance.boston.com/boston/news/read?GUID=22253566>

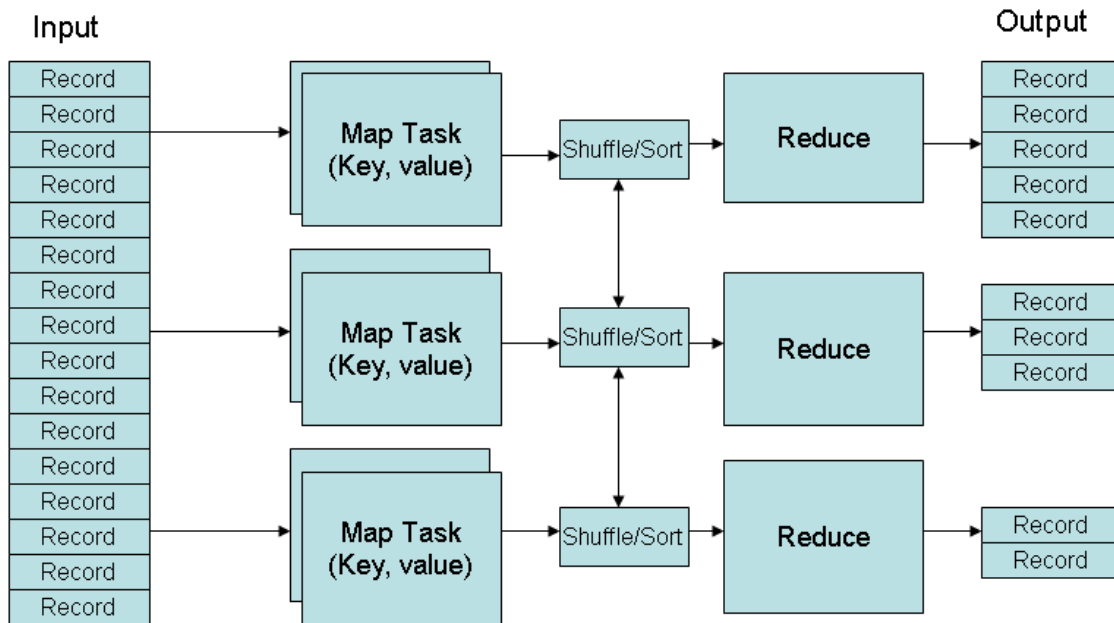


- Why did they beat the earlier contenders?
 - Recognized there was more data than meets the eye (**clicks**)
 - Technology: **Map-Reduce**



"This Google Algorithm always works for me!"

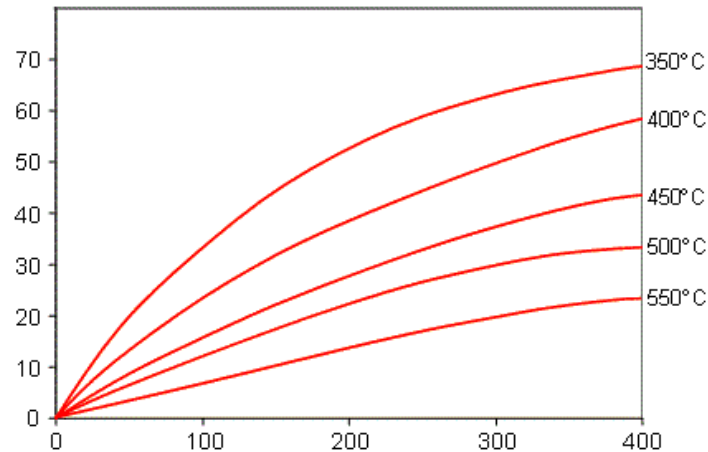
Map-Reduce



- Technology
- Acts on data
- Solves a specific class of problems



- Early to Mid-1980s: started out in Advanced Control
 - Technology: **Advanced Control**
 - Recognized there was more data than meets the eye (**historize the real-time data**)



Business Success

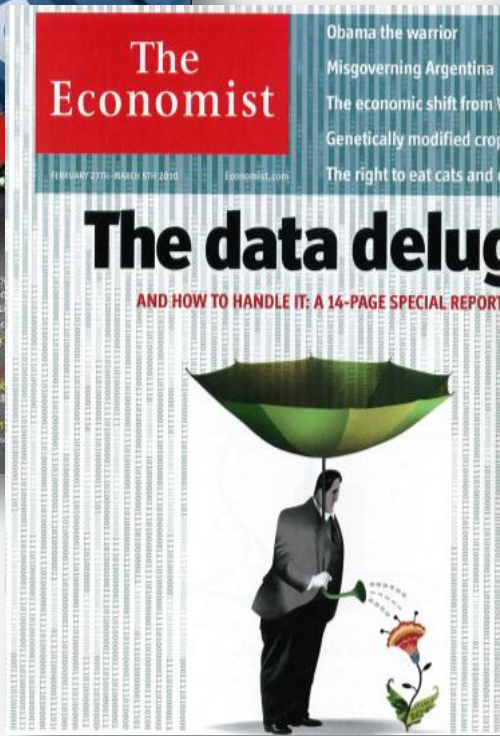
- Advanced control: a metaphor for business success?
 - In market availability
 - Matching production to customer demand
 - Regulatory compliance

Infrastructure

- Most efficient way to deliver services needed by many.
 - Communication
 - Energy
 - Water
 - Transportation
- Data Infrastructure
 - As important as other infrastructure
 - Collects and Organizes data
 - Includes tools that help transform data into knowledge
 - Integral to the success of the other infrastructures

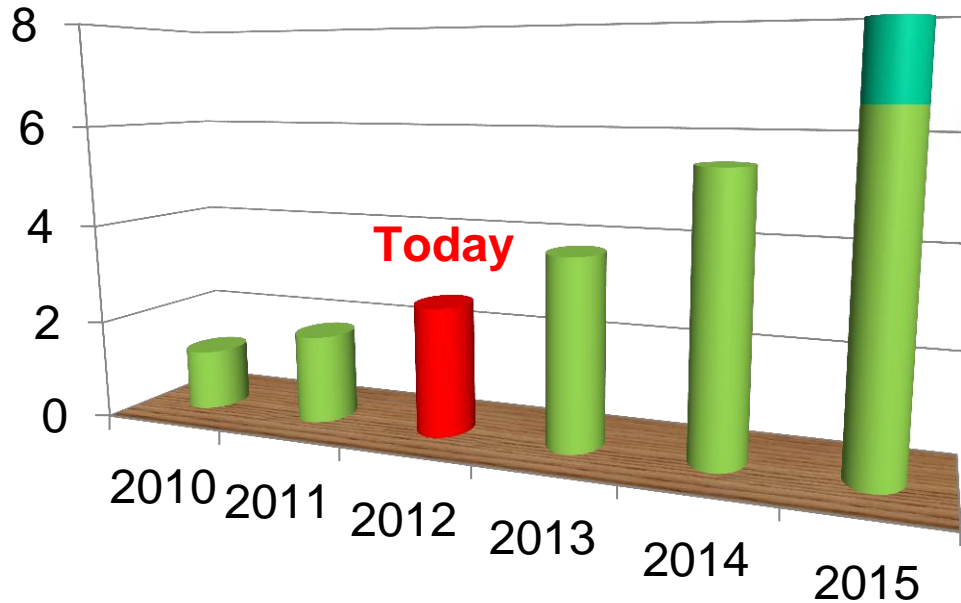


How do we **overcome** the **data challenges?**



Big Data

World's Information



~18%
Cloud

10^{21} bytes
(1 billion TB)

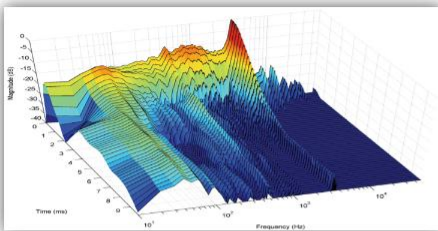


ZETTABYTES
REFLECTED

Source: <http://www.emc.com/leadership/programs/digital-universe.htm>

PI SERVER 2012

(SCALABILITY: 20+ MILLION PI TAGS)



Synchro Phasors

4.8K data streams, 120Hz
3 years online
Unique Events: 55 Trillion
Estimated Data: 430TB

430TB



Data Center

100K cells, 2M breakers
10 years online
Unique Events: 105 Trillion
Estimated Data: 840TB

840TB



Automated Metering

20M meters, 5-min reads
7 years online
Unique Events: 177 Trillion
Estimated Data: 1,410TB

1,410
TB



Fleet Monitoring

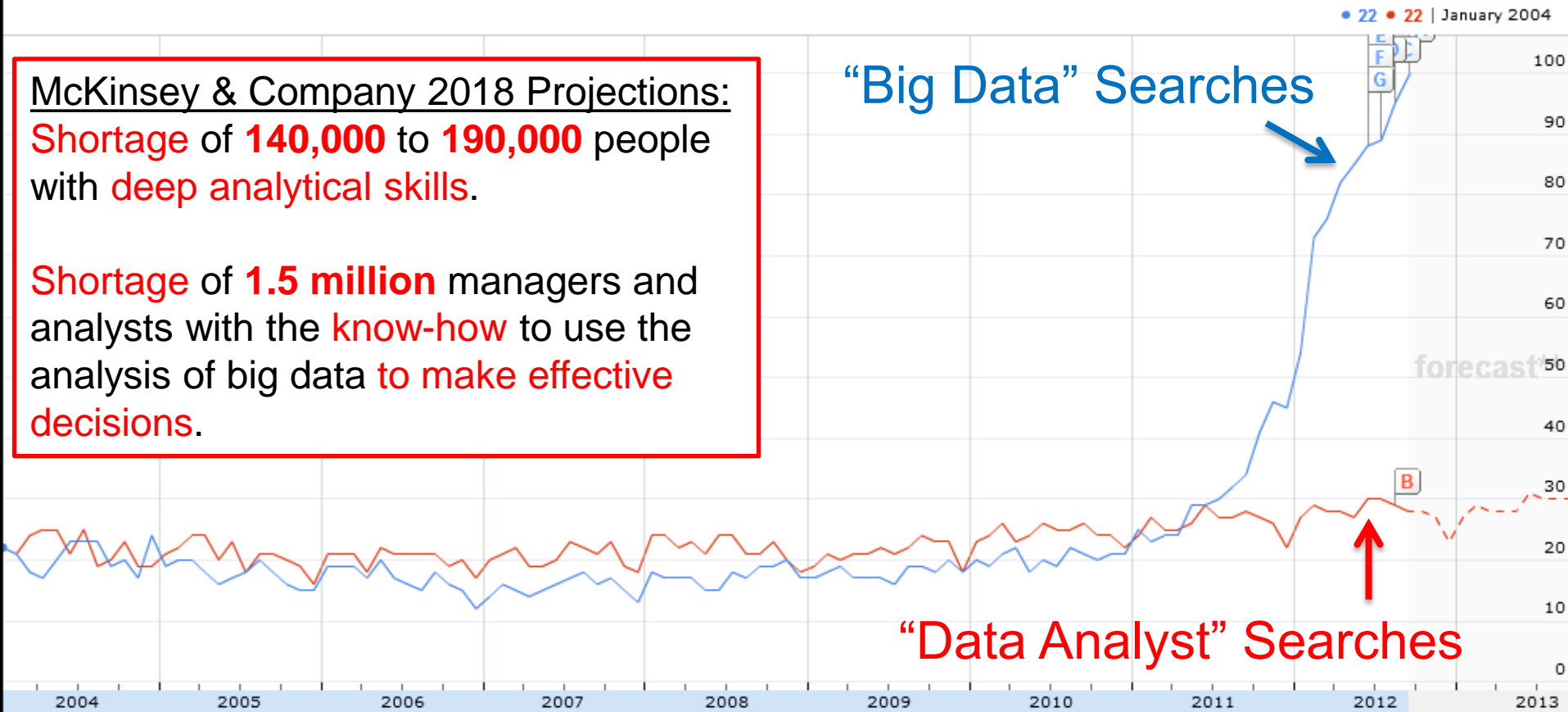
1K assets, 1M points
10 years online
Unique Events: 6,307 Tr
Estimated Data: 50,460TB

50,460
TB

Big Data Skills Are Lacking

McKinsey & Company 2018 Projections:
Shortage of **140,000** to **190,000** people with **deep analytical skills**.

Shortage of **1.5 million** managers and analysts with the **know-how** to use the analysis of big data to **make effective decisions**.



"Data Analyst" Searches

"Big Data" Searches

forecast

Addressing the Data Skills Shortage

STANFORD UNIVERSITY

Stanford Center for Professional Development

Data Mining and Analysis

STATS202

► Online

Description

In the Information Age, there is an unprecedented amount of data being collected and stored — by banks, supermarkets, internet retailers, security services, etc. So, now that we have all this data, what do we with it?

The discipline of data mining and analysis provides crunchers with the tools and framework to discover meaningful patterns in data sets of any size and scale. It allows us to turn all this data into valuable, actionable information. In this course, learn how to explore, analyze, and leverage data.

Topics Include

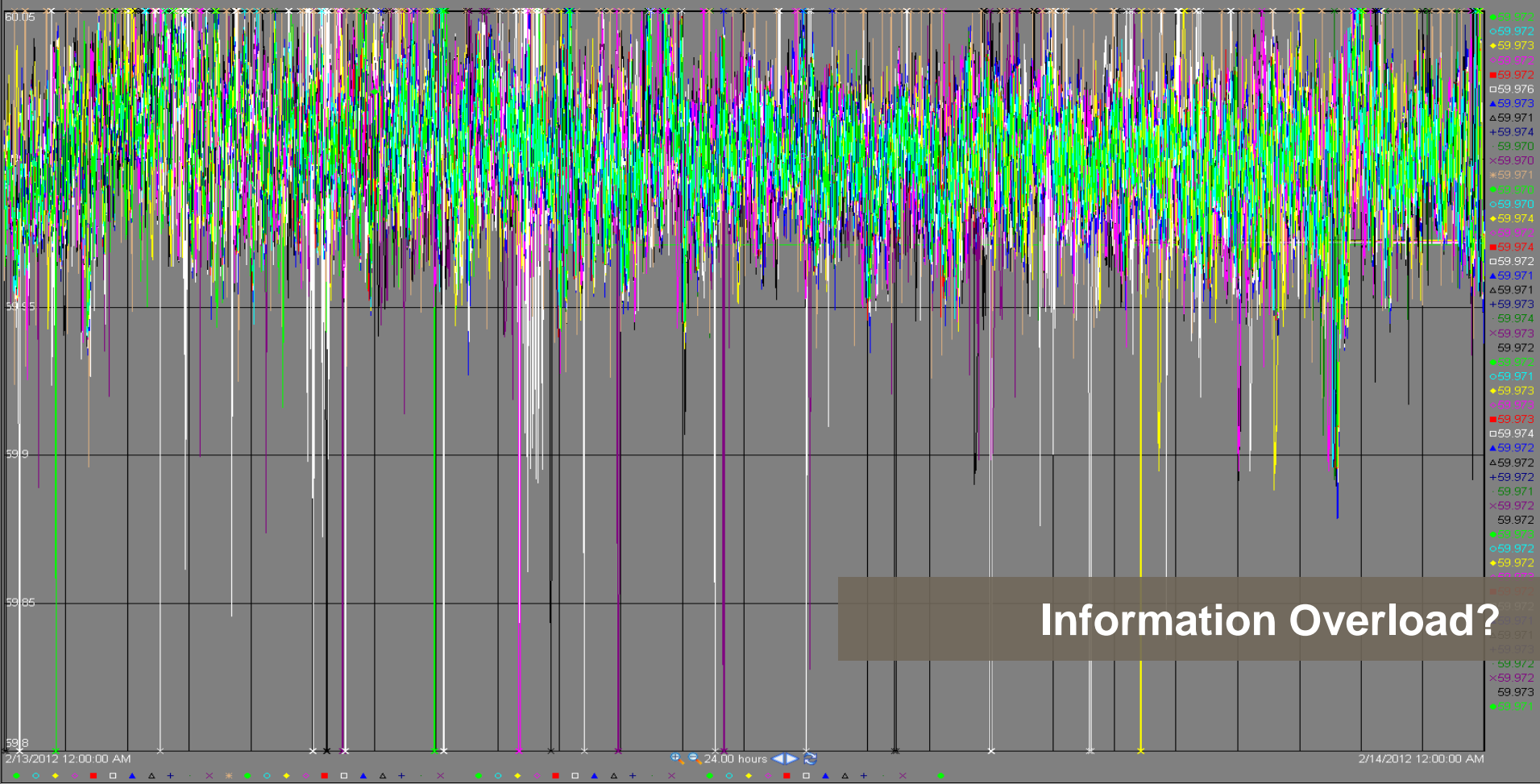
- Decision trees
- Neural networks
- Association rules
- Clustering
- Case-based methods
- Data visualization



On-Demand Learning at Your Fingertips



Watch us on YouTube



Information Overload?



Information Overload?



116

Y 4.G 74⁷:c-L

Metadata (Card Catalog)

Elements

- Distribution grid
 - Layers
 - Arizona
 - California
 - San Diego
 - District 01
 - District 02
 - Neighborhood A1
 - SD-02_A1-001
 - SD-02_A1-002
 - SD-02_A1-003
 - SD-02_A1-004
 - SD-02_A1-005
 - SD-02_A1-006
 - SD-02_A1-007
 - SD-02_A1-008
 - SD-02_A1-009
 - SD-02_A1-010
 - SD-02_A1-011
 - SD-02_A1-012
 - SD-02_A1-013
 - SD-02_A1-014
 - SD-02_A1-015
 - SD-02_A1-016
 - SD-02_A1-017

Elements

Transfers

Library

Unit of Measure

MyPI

Notifications

Contacts

Power factor

SD-02_A1-001

General Child Elements Attributes Ports Version

SD-02_A1-001

Name	Value	Unit Of Measure
Meter Alarming		
High Amps	1500 A	ampere
High Voltage	245 V	volt
Low PF	90 %	percent
Meter Configuration		
Contracted Amps	150 A	ampere
Coordinates	<None>	<None>
Installation date	1/1/2007 12:00:00 AM	<None>
Last inspection	1/1/2007 12:00:00 AM	<None>
Meter Power		
Amperage	2173.79644310348 A	ampere
Amps range	2000 A	ampere
Apparent power	500.540378262017 kVA	kilovoltamp
Contracted Amps	150 A	ampere
High Amps	1500 A	ampere
High Voltage	245 V	volt
Low PF	90 %	percent
Phases	3	<None>
Power consum...	7.91365308033049 kWh	kilowatt hour
Power factor	99.8803055824083 %	percent
Power Statistics	<None>	<None>

Group by: Category

Name: Power factor

Description:

Configuration Item:

Categories: Meter Power

UOM: percent

Value Type: Double

Value: 99.8803055824083 %

Data Reference: Formula

Settings...

A=Real power;UOM-kW;B=Apparent power;UOM-kW;A/B*100;UOM=%

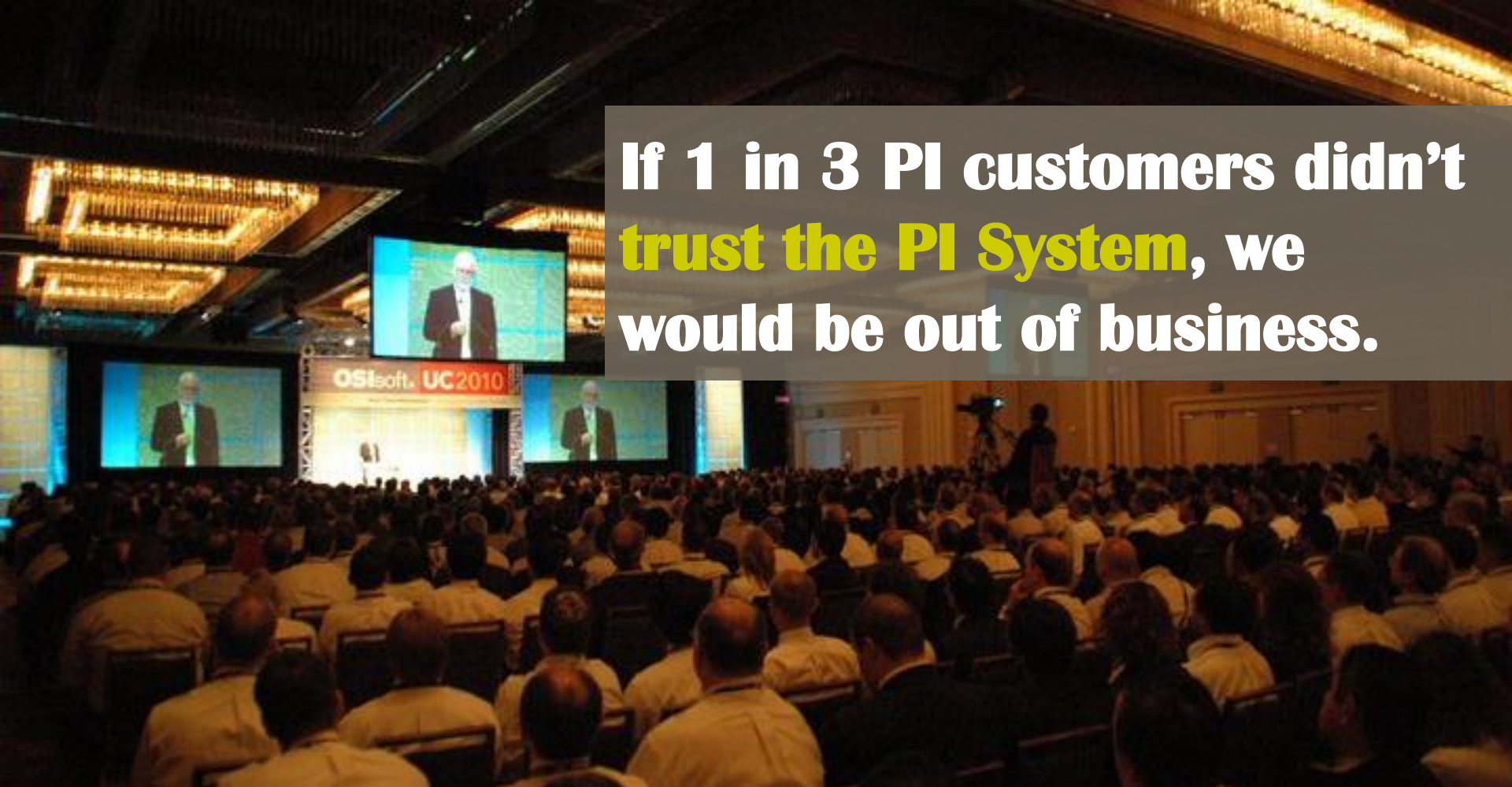
Metadata (PI AF)

Trust the Data

“1 in 3 business leaders don’t trust the information they use to make decisions.”

IBM





If 1 in 3 PI customers didn't trust the PI System, we would be out of business.

What are the **keys** to
realizing & unlocking
the **power of data?**

Unlocking the Power of Data

- Understanding the problems at hand--what are you trying to solve. What questions are you trying to answer?

“The important and difficult job is never to find the right answers, it is to find the right question.”

Peter Drucker, *The Practice of Management*

“The formulation of a problem is often more important than its solution.”

Einstein

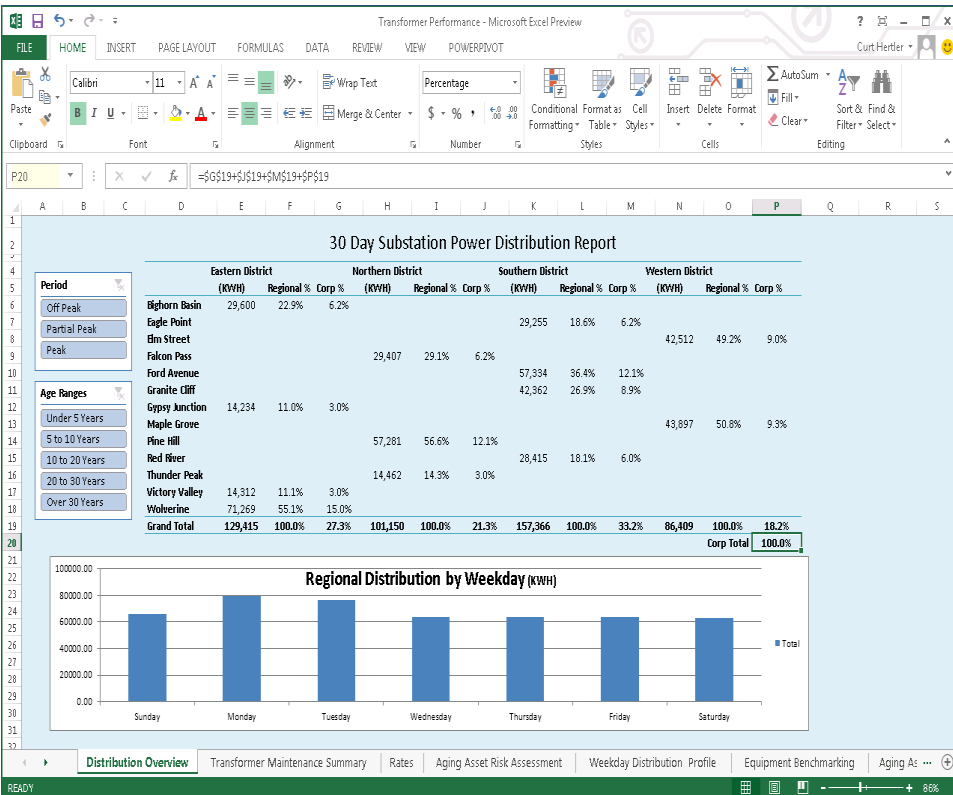
Keys to Unlocking the Power of Data

- Collect ALL the data. Think beyond the obvious and especially consider data that may not last long.
- Utilize technology and develop skills to do the analyses
- Harness people's ingenuity, insight and creativity to have some ideas that can be proven or disproven with proper data analysis.

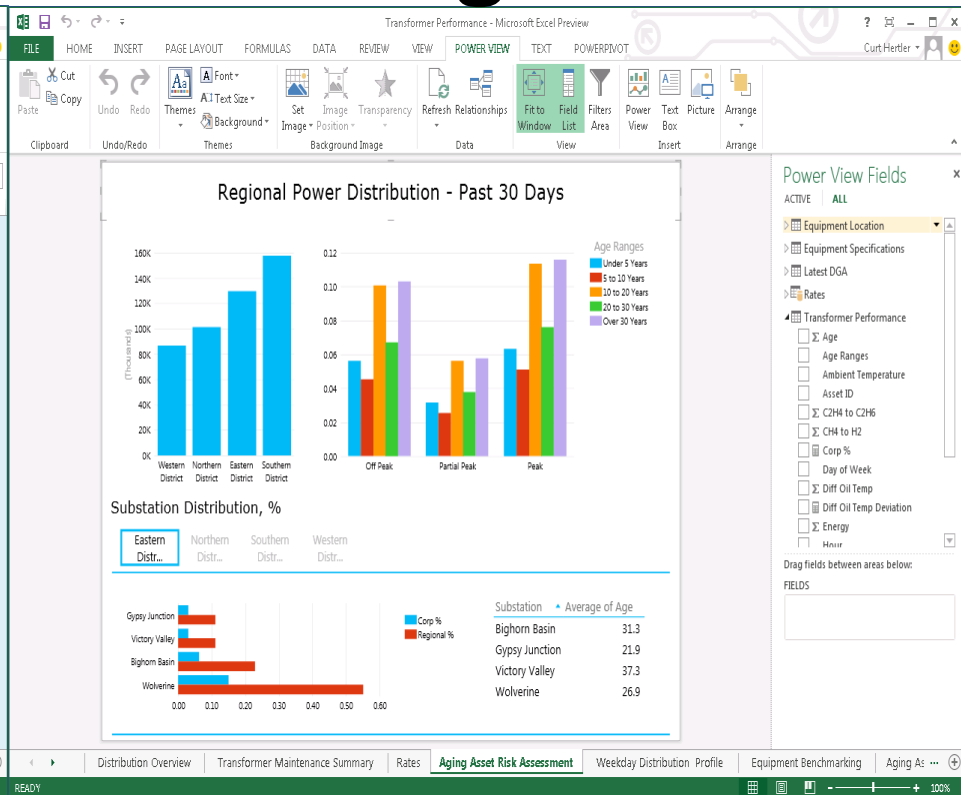
Technology & Skills



Microsoft Business Intelligence



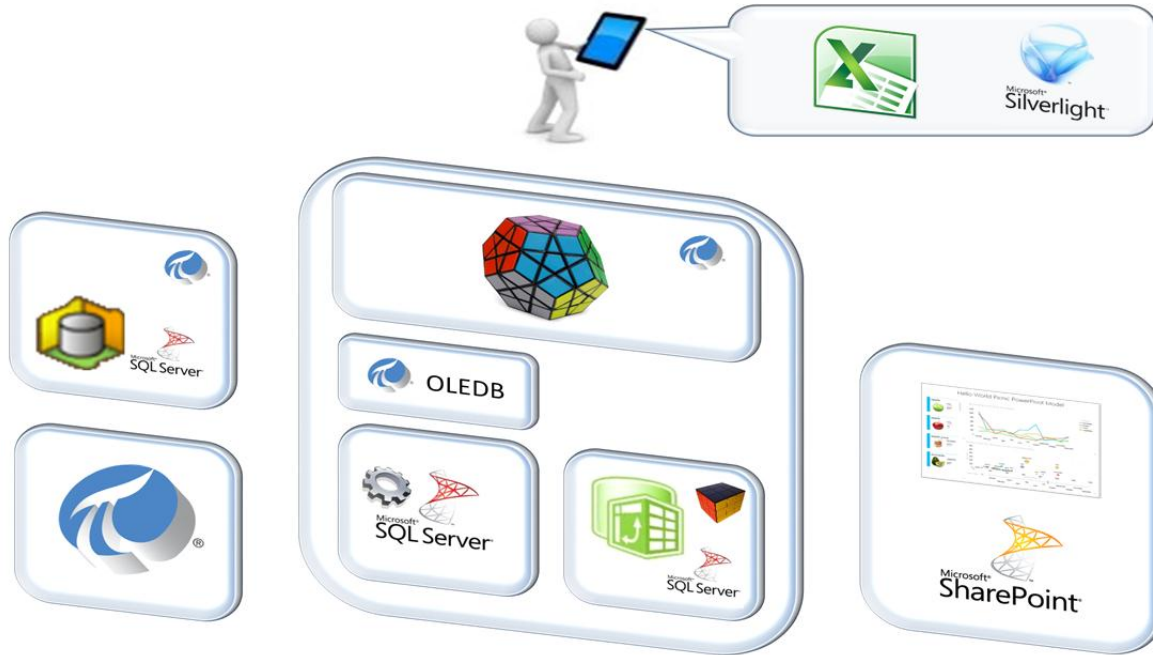
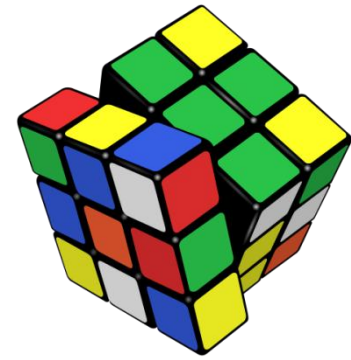
PowerPivot



Power View

OSIsoft: Project Rubik

Goal: Integrate PI System Data with Microsoft BI



- Bridge the Gap
- Auto-build BI models
- Proper data aggregation

Google™

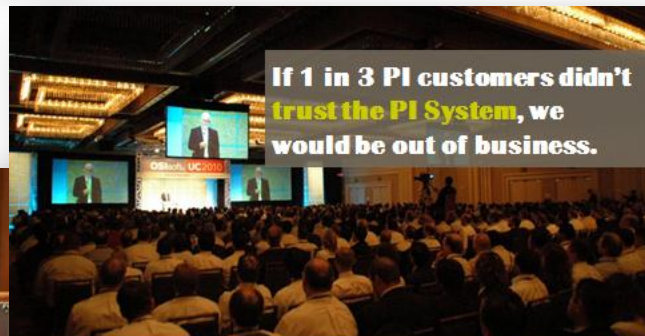
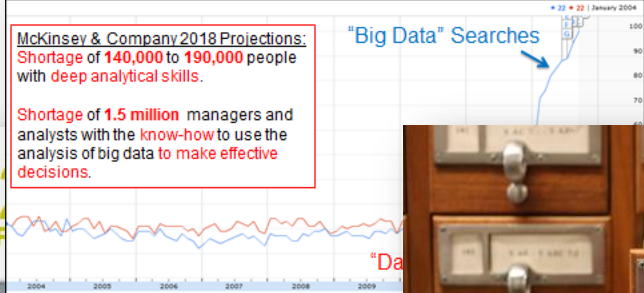
VISA **WAL-MART** **amazon.com.**
 ALWAYS LOW PRICES. *Always*

Companies that invest in the value that data provides will prosper.

NALCO **AEP** 



Big Data Skills Are Lacking



PI SERVER (SCALABILITY: 20+ MILLION P...

 Syncro Phasors 4.8K data streams, 120Hz 3 years online Unique Events: 55 Trillion Estimated Data: 430TB	 Data Center 100K cells, 2M breakers 10 years online Unique Events: 105 Trillion Estimated Data: 840TB	 Automated Metering 25M meters, 5-mv loads 7 years online Unique Events: 177 Trillion Estimated Data: 1,410TB	 Fleet Monitoring 1K assets, 1M points 10 years online Unique Events: 6,307 Trillion Estimated Data: 50,460TB
--	---	--	--



Metadata (Card Catalog)

Keys to Unlocking The Power of Data

- Understanding the problems at hand--what are you trying to solve; what questions are you trying to answer?
- Collecting ALL the data. Think beyond the obvious and especially consider data that may not last long.
- Utilize available technology and develop skills to do the analyses
- Your curiosity, ingenuity and insight will lead to discovery of solutions!



THANK YOU

Brought to you by  **OSIsoft.**