

BUILDING ANALYTICS

More than just a "trend"

Learning Objectives

- Define What Building Analytics are.
- Understand what's Driving the Market for Building Analytics
- Identify the Current Landscape of the Building Analytics Marketplace
- Understand the Future of Building Analytics

Presentation Outline

- Why Now?
- Market Drivers for Building Analytics
- What Building Analytics are (and what they aren't)
- How Building Analytics systems work.
- The Current Landscape of the Building Analytics Marketplace
- Lessons Learned in applying Building Analytics
- The Future of Building Analytics and why it's here to stay
- Demonstration of an Analytics Interface
- Questions

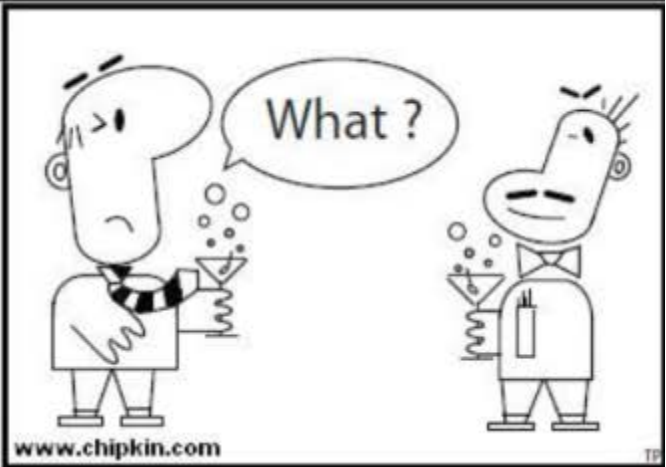
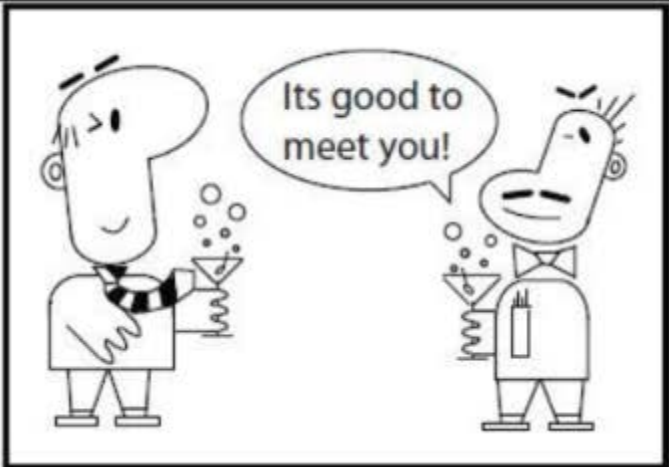
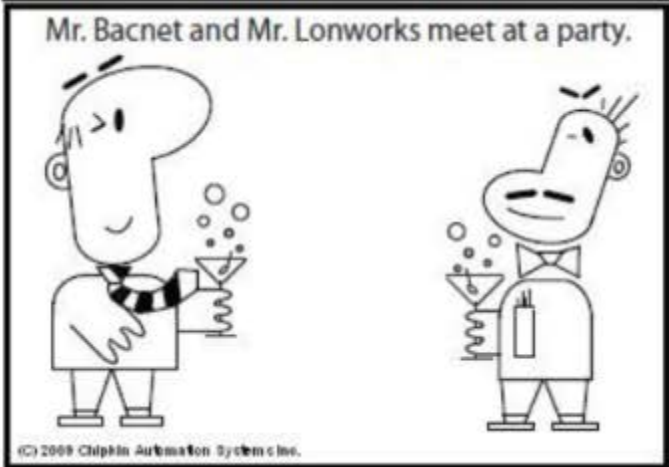
Why Now?



Technology Barriers

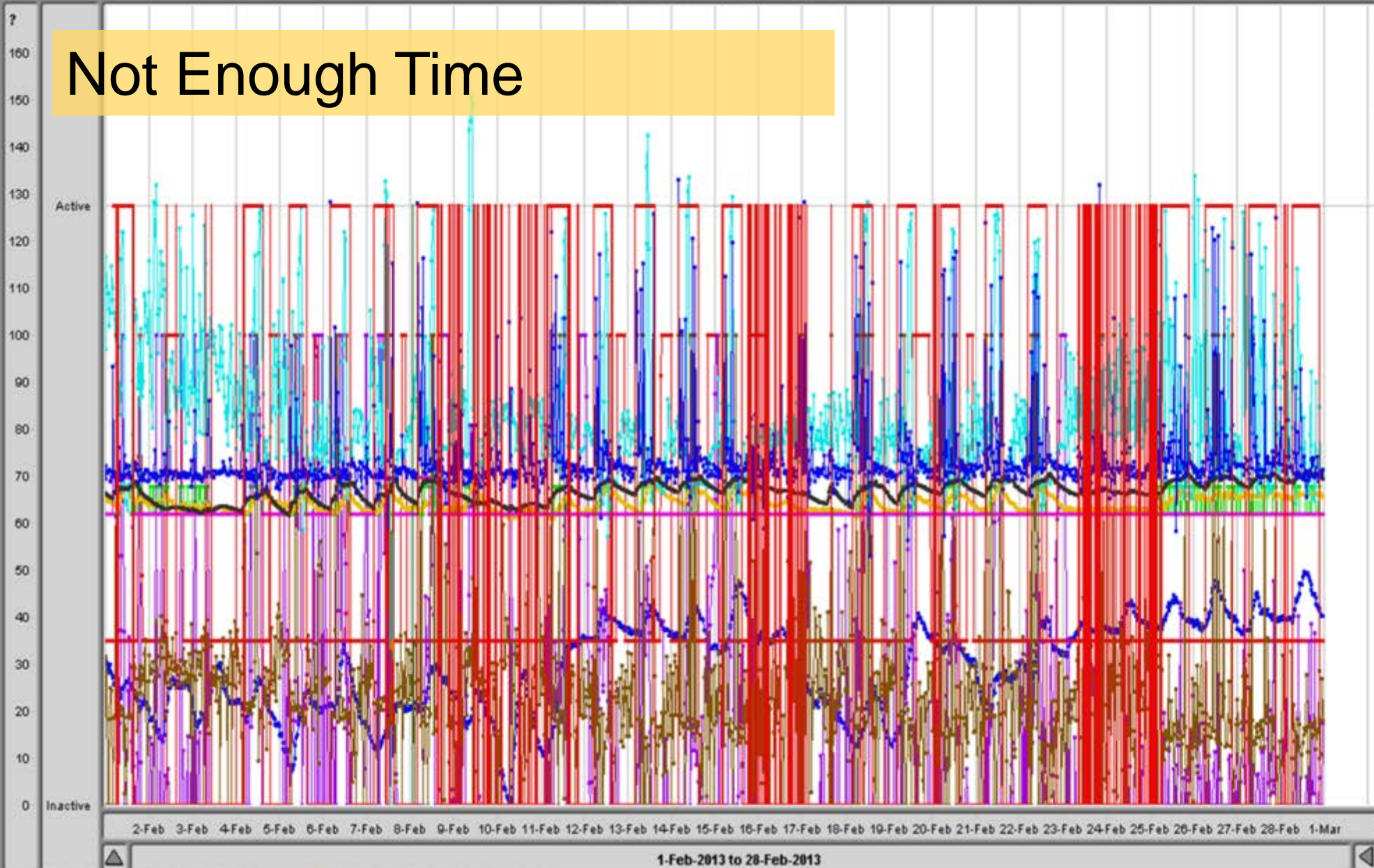


Communications Barriers



- OATEMP (?)
- FANSPEED (?)
- HEATINGSP (?)
- HEATINGVALVE (?)
- NORTHROOMTEMP (?)
- SATEMP (?)
- HEATINGSP (?)
- HEATINGVALVE (?)
- RFSTAT
- ROOMTEMP (?)
- SATEMP (?)
- SFCMD

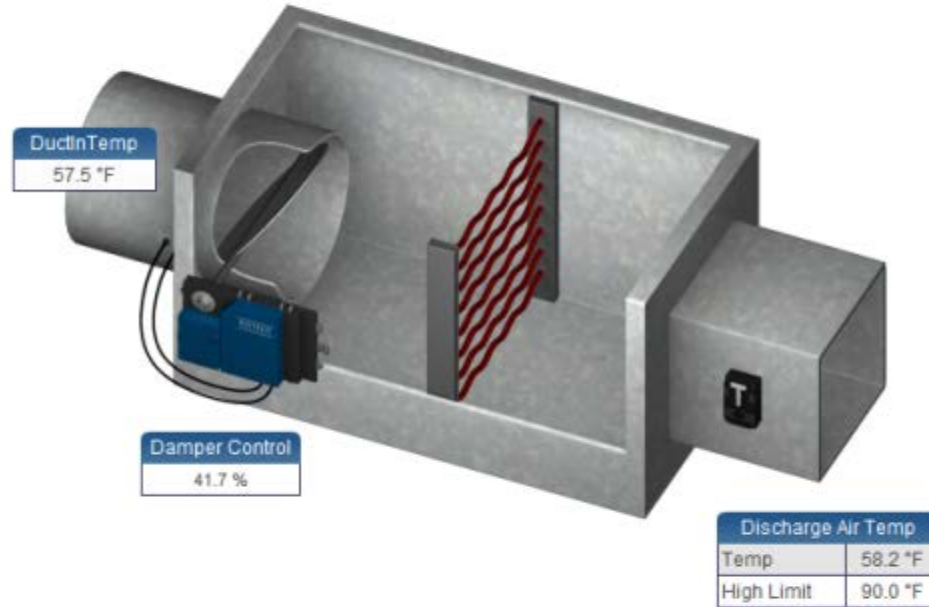
Not Enough Time



System Information	
HVAC Mode	Cool
Occupancy	Occupied
Terminal Load	0.0 %
Flow	599 cfm
Flow Setpoint	599 cfm

Reheat Information	
Heat 1 - Duct	0.0 %
Heat 2 - Duct	0.0 %

CO2 Information	
CO2 Level	810 ppm
CO2 Setpoint	700 ppm





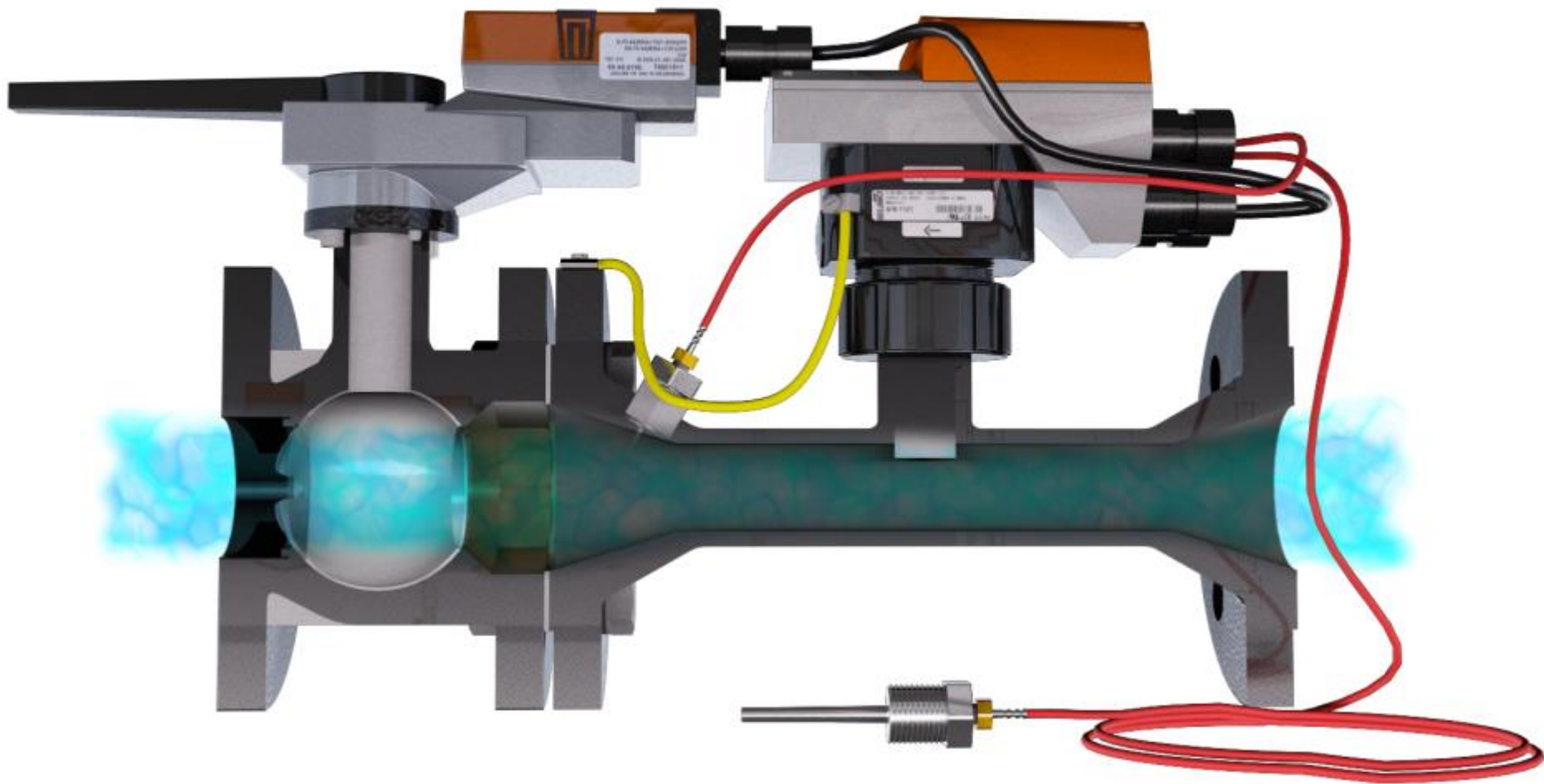
Temperature Information
 Cooling Setpoint 72.0 °F
 Space Temp 69.0 °F
 Heating Setpoint 68.0 °F

*This VAV has a window contact: Close

A close-up, slightly angled view of a US dollar bill. The focus is on the intricate security patterns and the green ink used for the serial number and the 'USA' watermark. A yellow rectangular box is overlaid in the upper right corner, containing the text 'Cost Prohibitive'.

Cost Prohibitive

More Data



Open Systems



Data Standardization

Project Haystack



vav

Kind: Marker

Used With: [equip](#)

Variable Volume Volume supply duct [equip](#).

Points

The following lists points commonly used with a VAV:

- [zone air temp sensor](#)
- [zone air temp effective sp](#)
- [zone air temp cooling sp](#)
- [zone air temp heating sp](#)
- [zone air humidity sensor](#)
- [zone air co2 sensor](#)
- [discharge air temp sensor](#)
- [discharge air pressure sensor](#)
- [discharge air flow sensor](#)
- [discharge air fan cmd](#)
- [discharge air fan sensor](#)
- [discharge air damper cmd](#)
- [entering air temp sensor](#)

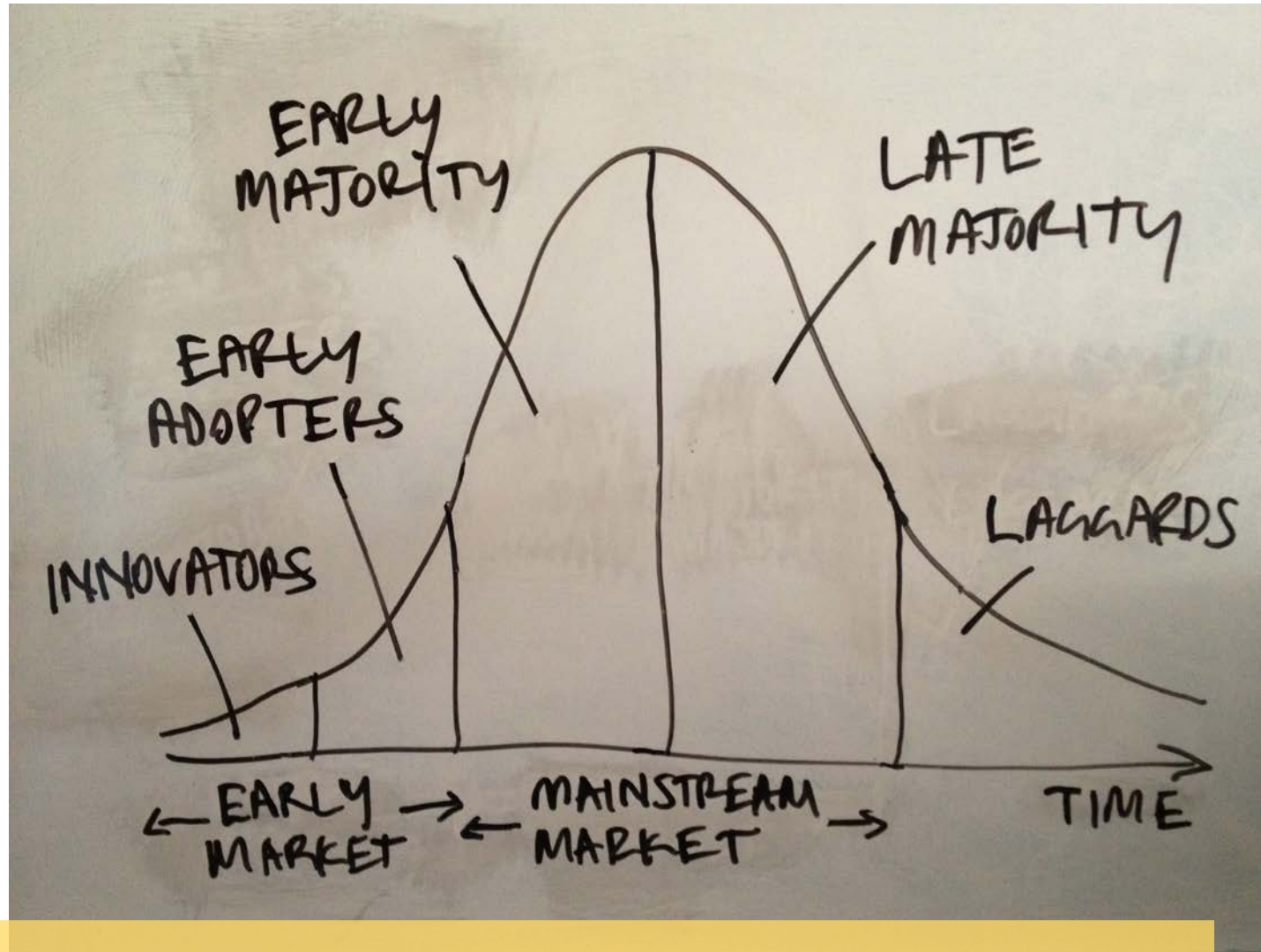


IoT

THE INTERNET OF THINGS

Cloud Computing





What is Driving Customer Interest?

Energy Savings



Maintenance Savings



Commissioning Needs



HVAC
commissioning
and testing



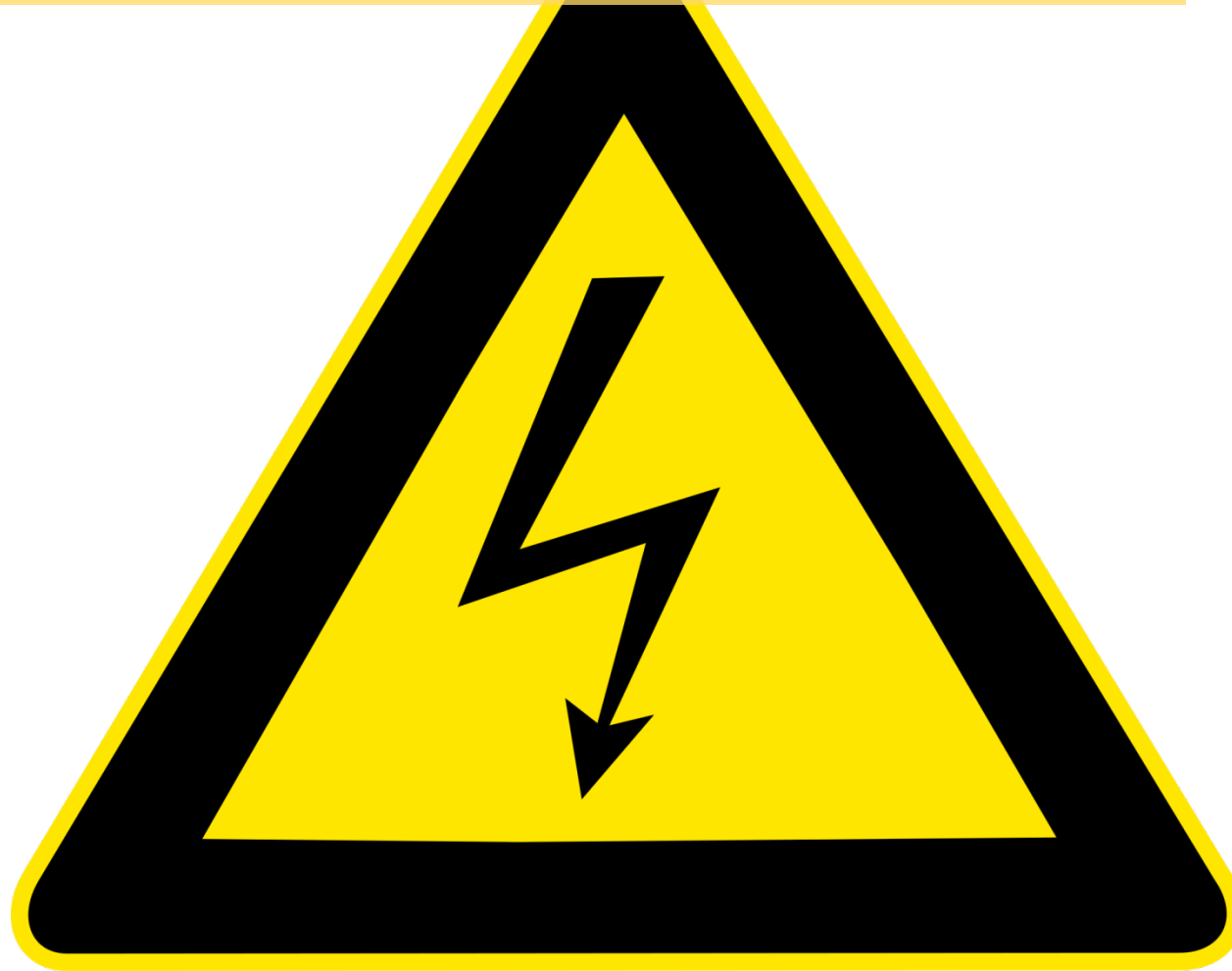
WIKIPEDIA
The Free Encyclopedia

Analytics is the discovery and communication of meaningful patterns in data. Especially valuable in areas rich with recorded information, analytics relies on the simultaneous application of statistics, computer programming and operations research to quantify performance. Analytics often favors data visualization to communicate insight.

Alarms



Fault Detection & Diagnostics



Targets

Today

View Timeline Rules Select

All

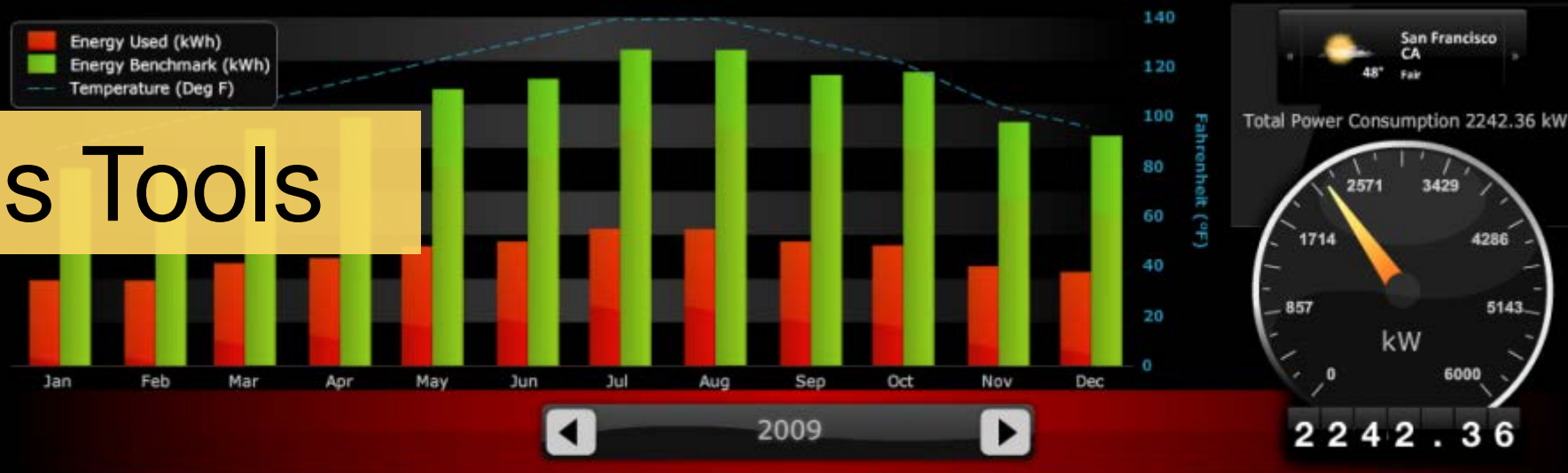
Group	Rules	dur	Timelines	Targets
cvmc chillerPlant coolingTower1 2 sparks	Compare Sensors Steam Valve Leaking	10.82hr		
cvmc AF-10				
cvmc AF-11				
cvmc AF-12				
cvmc AF-14				
cvmc AF-15				
cvmc AF-16				
cvmc AF-17				
cvmc AF-3				

Steam Valve Leaking

Finds all the steam valves that are leaking by. Parameters are condensate temp > 110F for 3hrs when valve is closed.

Actuator may be failed, Valve seat may be failed, Bypass valve may be open.

Analysis Tools



Electricity Consumption from the Grid & Solar PV

Middlebury

Kilowatt-hours of electricity last week

Solar Production

14

Kilowatt-hours



Grid Consumption

1,219

Kilowatt-hours



28%

PERFORMANCE NOW

Select a Timescale

Select a Location



Introduction



Grid & Solar Electric



Water



Steam



Weather

Features

Building Dashboard

Kiosks

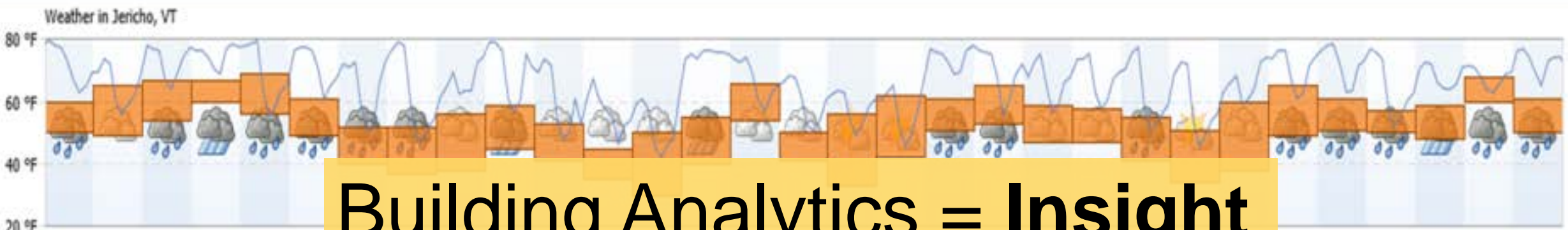
Sites

◀ Oct-2012 ▶

Rules Select Info

Sites MMU HS UV88

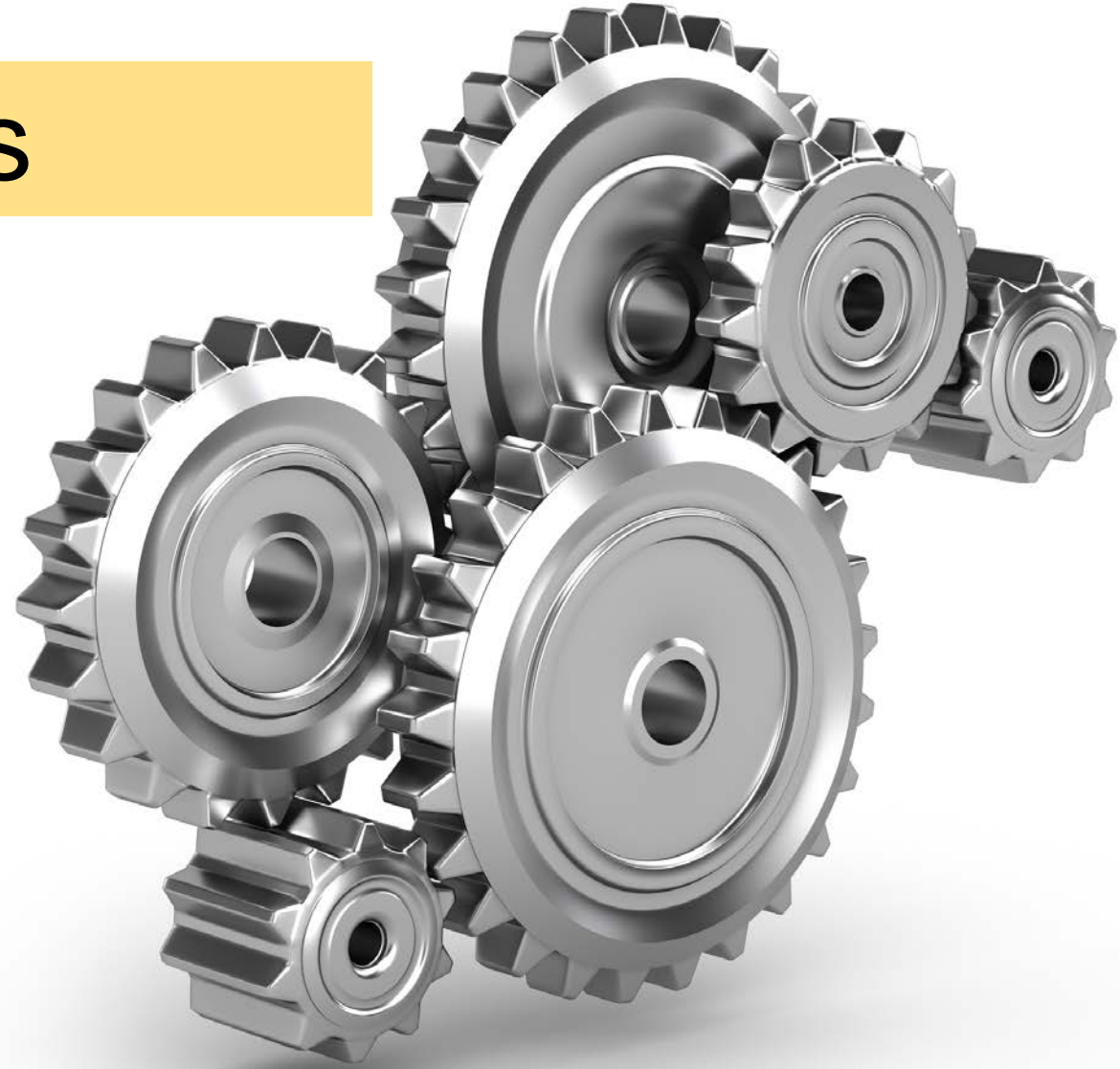
Add Points Sparks (33) Notes (0)

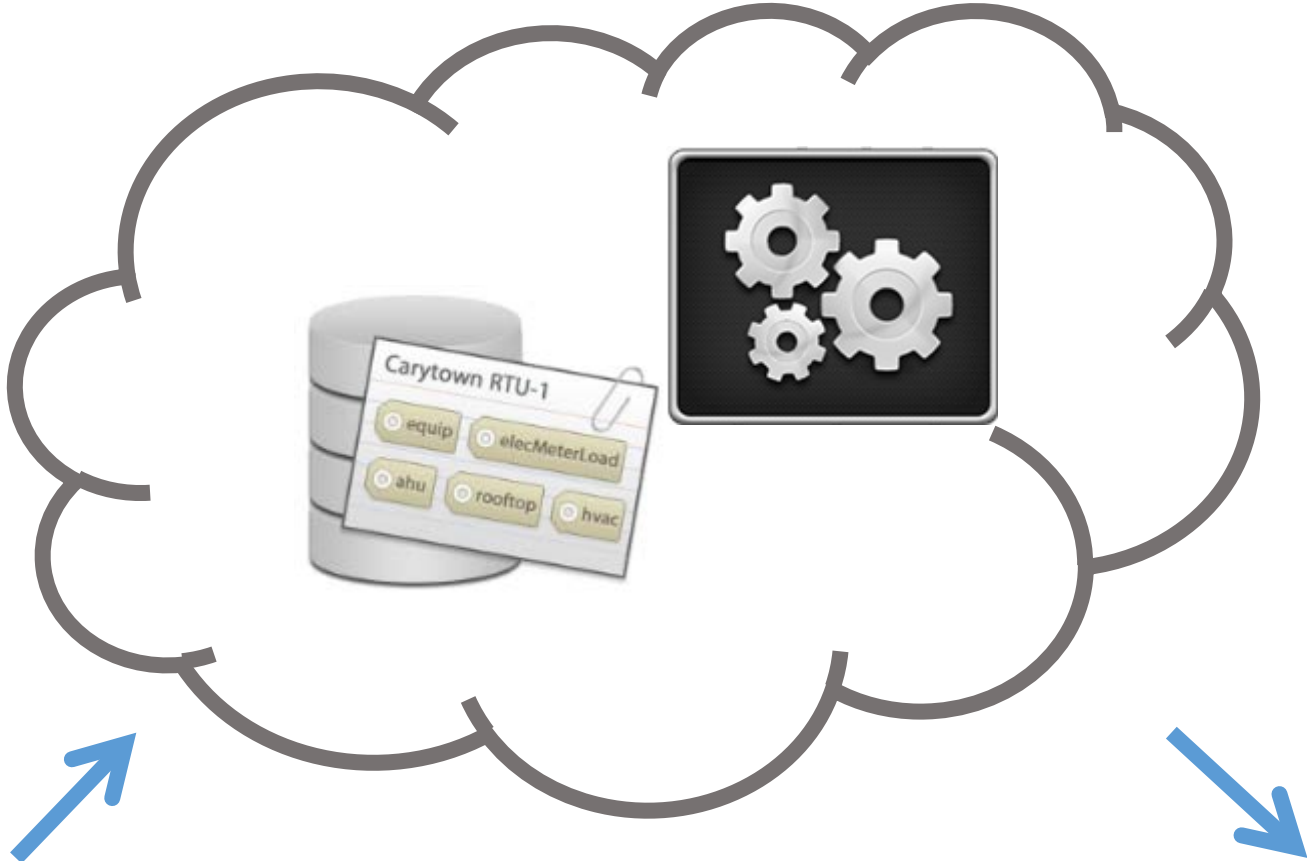


Building Analytics = Insight



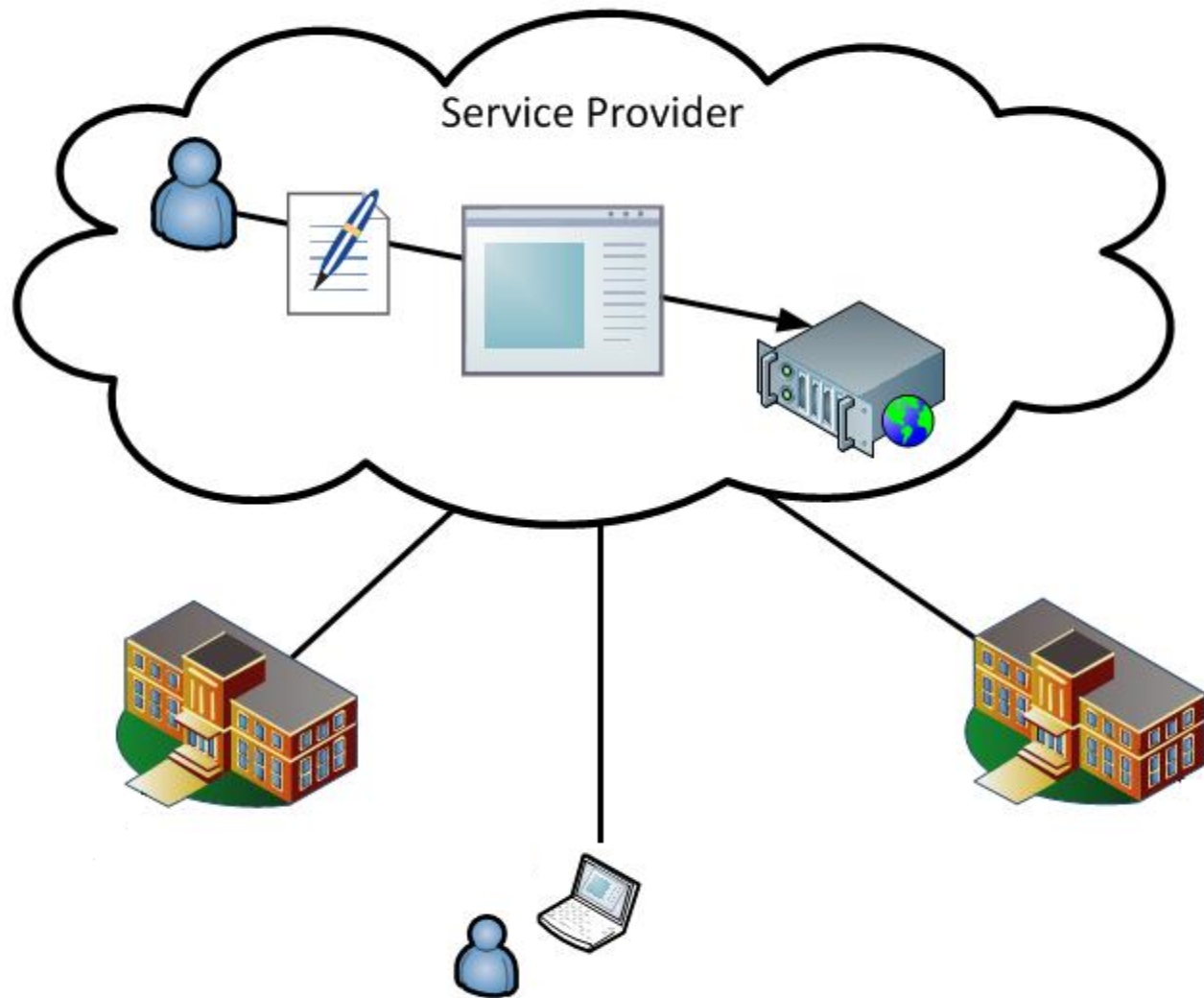
How it Works







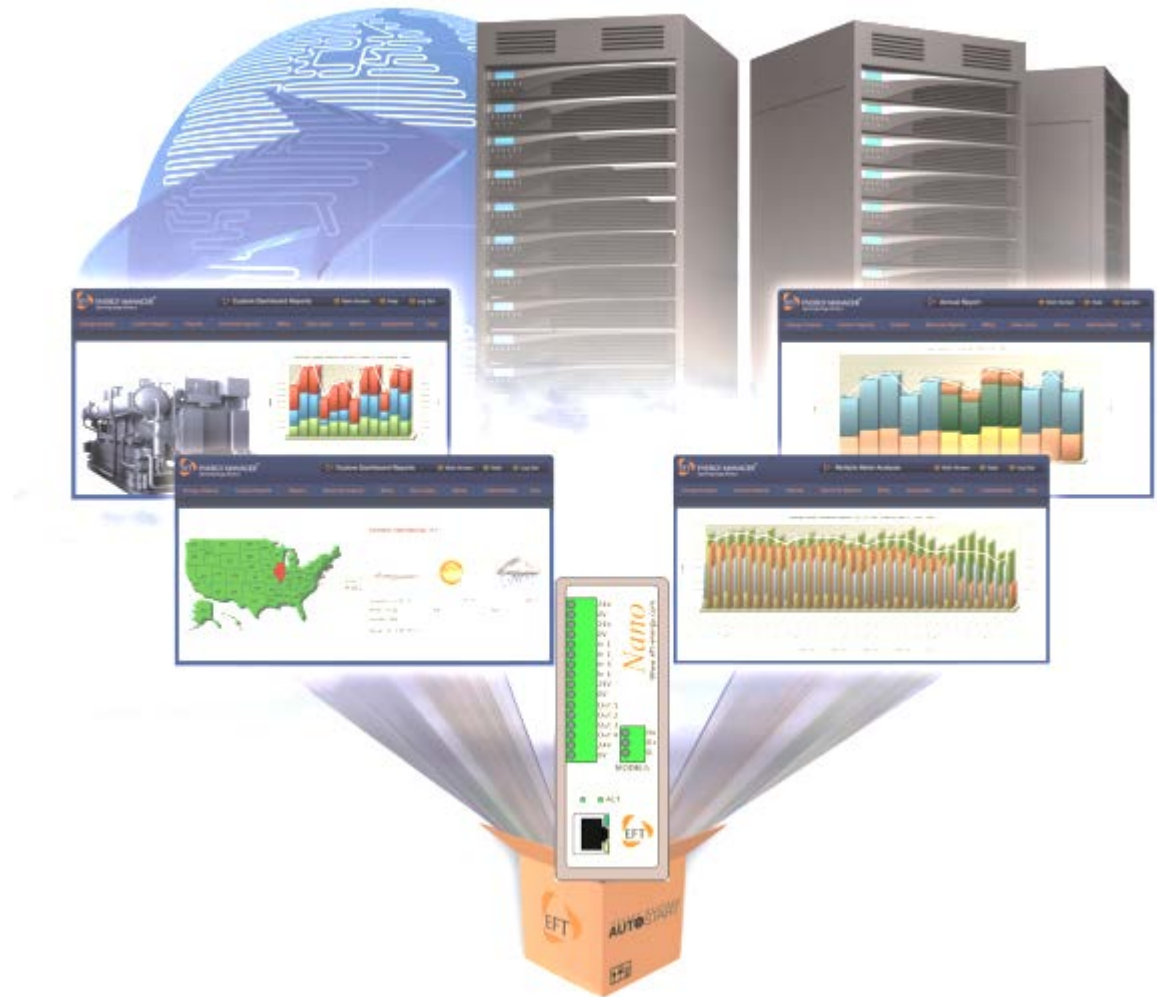
The Current Landscape



- **Cimetrics Analytika**
- **Ezenics**
- **CopperTree Analytics**
- **KGS Buildings**
- **Siemens “Advantage Navigator”**

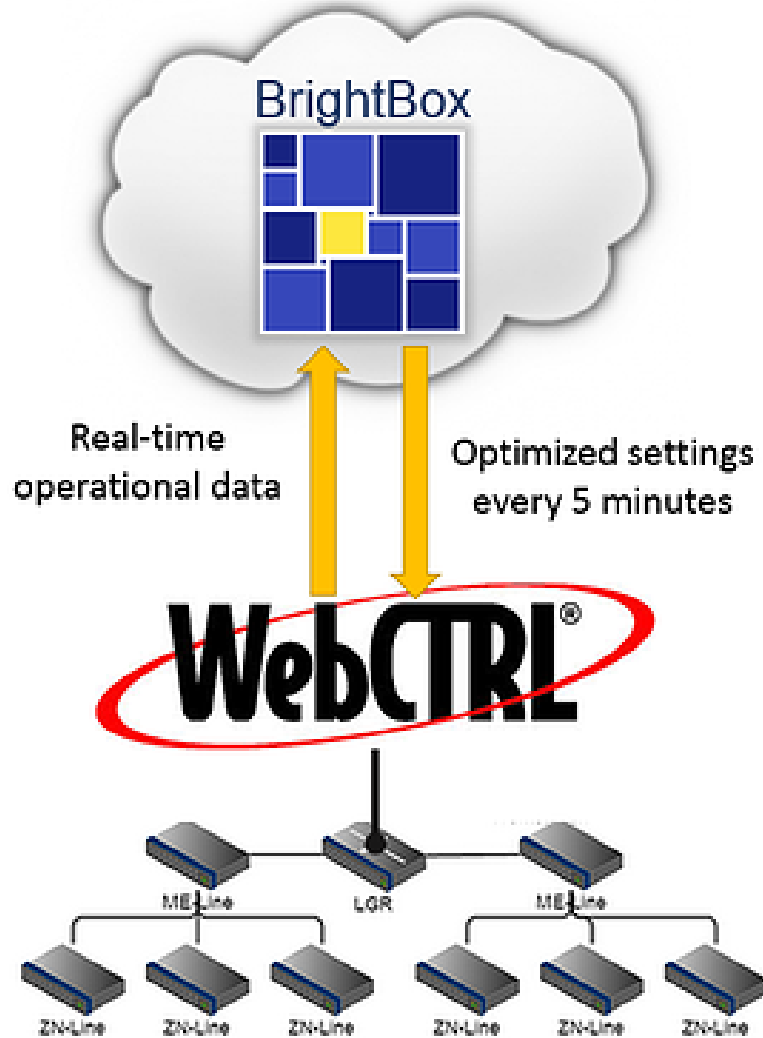
Analytics as a Service

- **eSight**
- **Mach Energy**
- **Pulse Energy**
- **ION (Schneider)**
- **Energy ICT**
- **EFT Energy**



Energy Analysis Software

The Optimizers



- **Switch Automation**
- **Building IQ**
- **Optimum Energy**
- **InScope by Enfuse**
- **BrightBox**
- **Enerliance**

- **Iconics**
- **Tridium**
- **OSI Soft**



Software products offering bolt-on analytic capabilities



- **Retroefficiency**
- **First Fuel**
- **Ecorithm**
- **Energy Print**

Utility focused energy analytics



- **Skyspark by Skyfoundry**

Open Platform Analytics

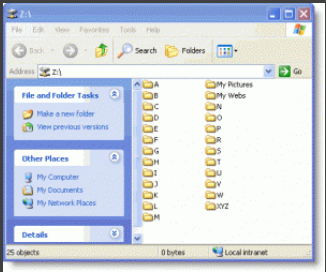
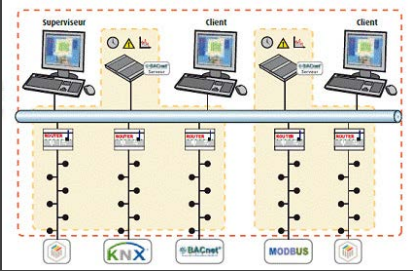
Lessons Learned
recognise mistakes
observe what works
document them
share them



Lesson #1

Understand your customer's data
maturity early

Customer Electronic Data Maturity



Lesson #2

Facilities staff and IT staff are rarely natural partners.



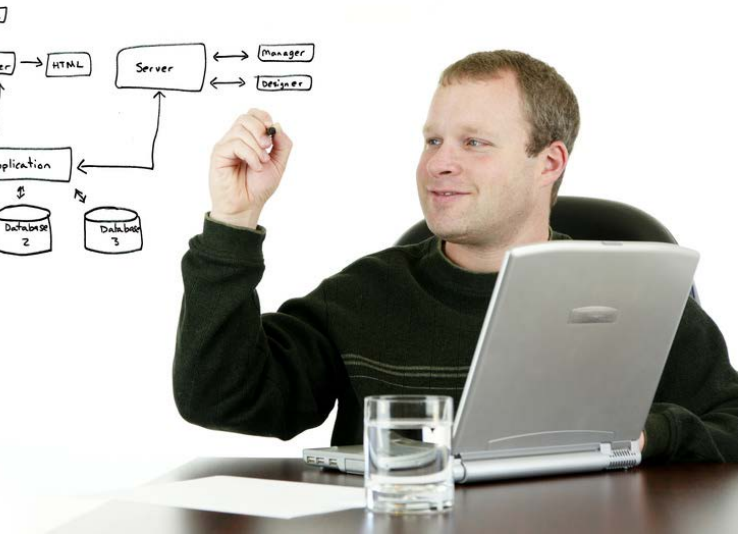
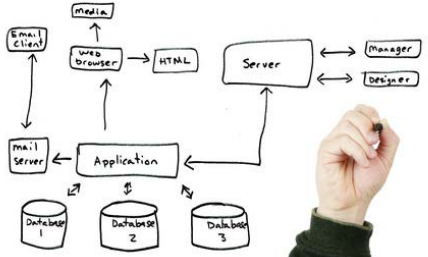
Lesson #3

Connecting to the data can quickly become the most significant project cost



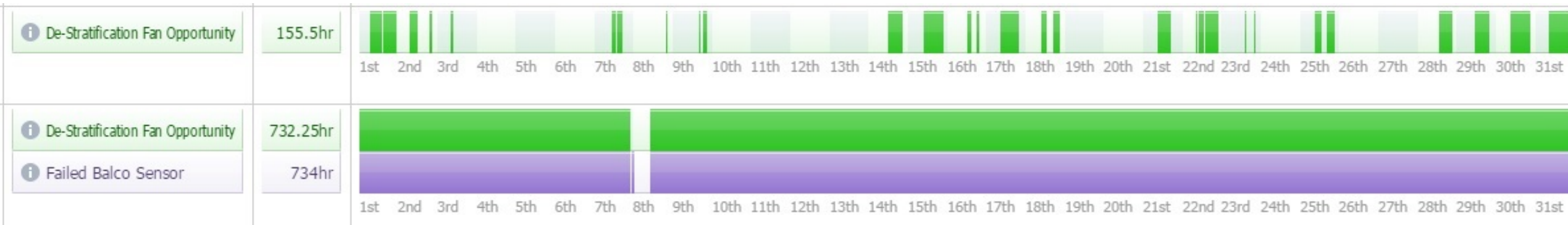
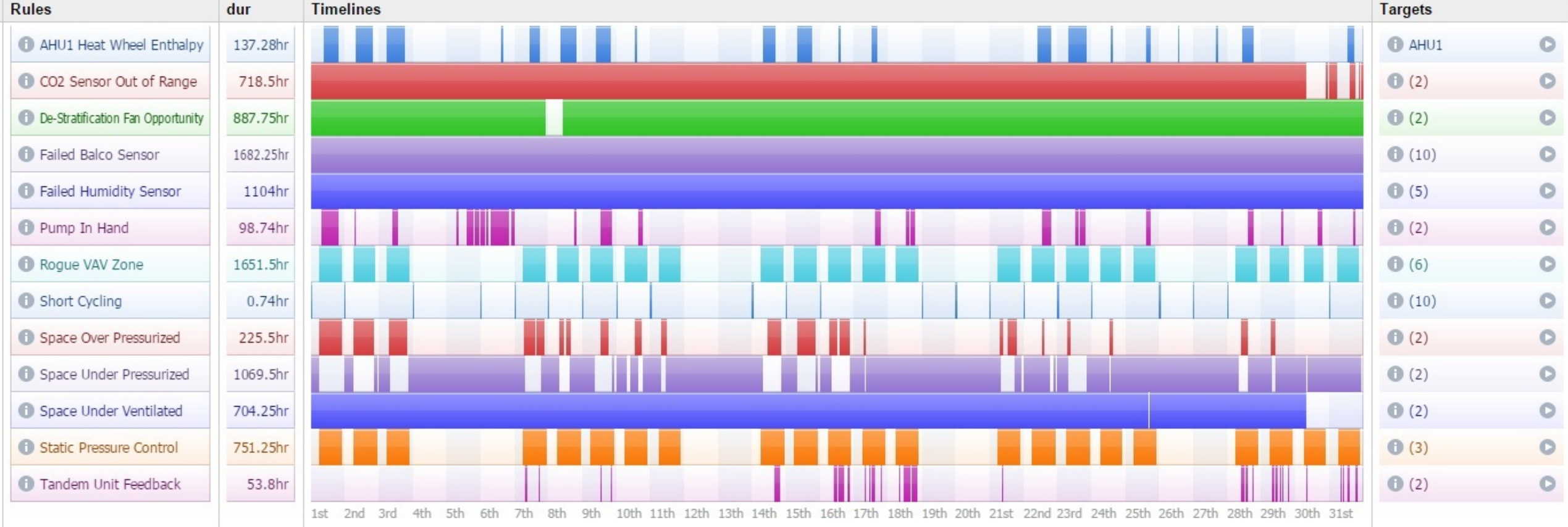
Lesson #4

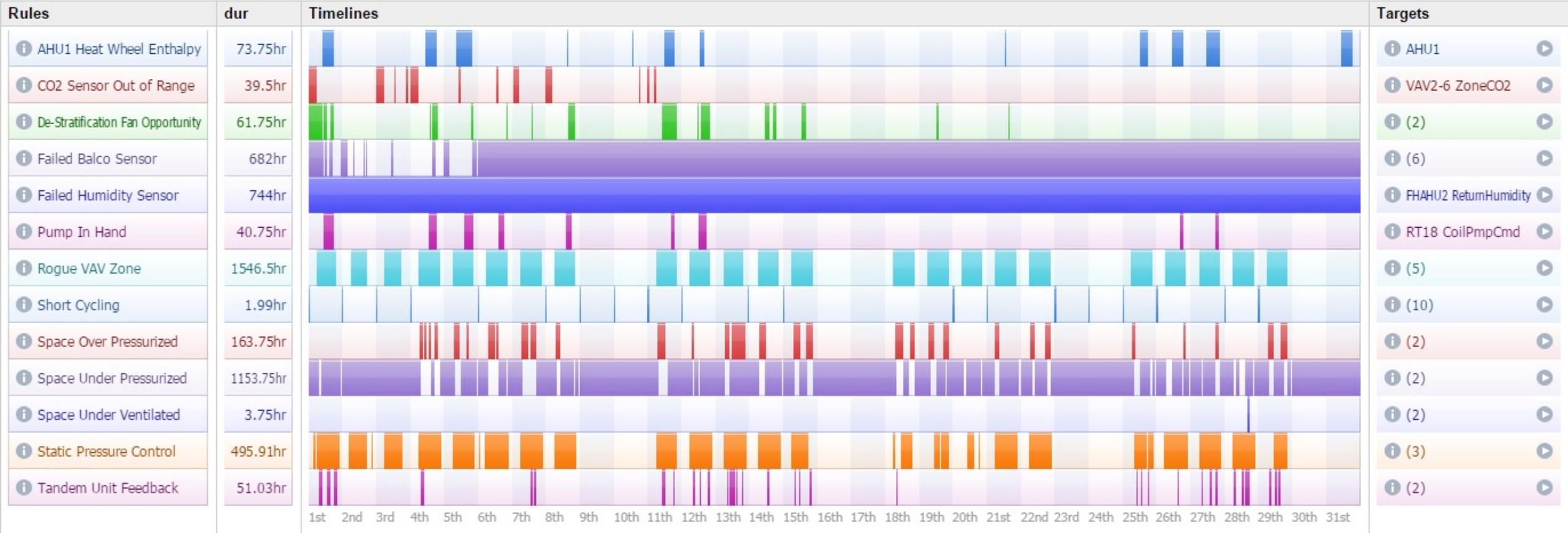
Multiple domain expertise is required



Lesson #5

Deal with the faults first





Lesson #6

How much savings can be expected from analytics?



Lets you investigate areas for improvement and energy efficiency upgrades

Lesson #7

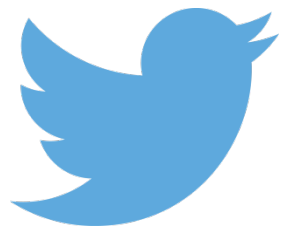
Proving savings may be challenging

Lesson #8

Starting small is easier



Why Analytics is more than just a Trend

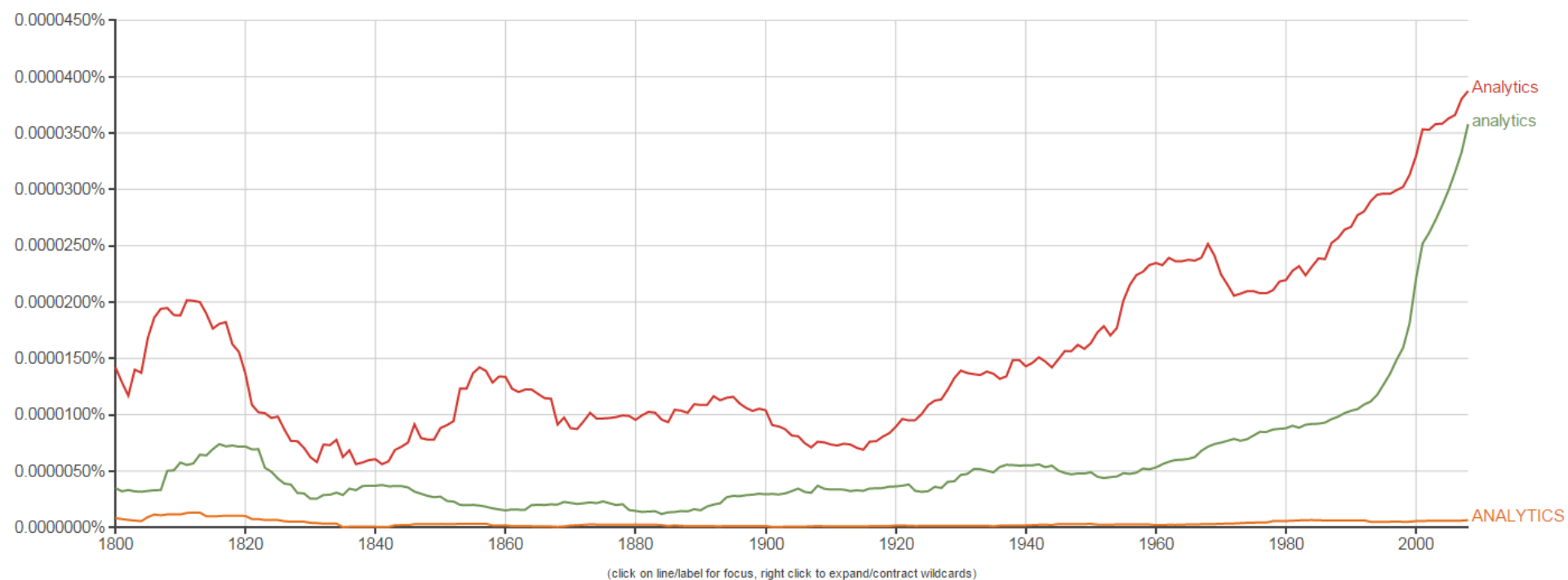


#AnalyticsIsNotGoingAway

Google books Ngram Viewer

Graph these comma-separated phrases: case-insensitive

between and from the corpus with smoothing of [Search lots of books](#)





Automated Diagnostics and Analytics

for Buildings

Barney D. Capehart, Ph.D., C.E.M. &
Michael G. Brambley, Ph.D., Editors



October 2014

Editorial

[AutomatedBuildings.com](#)

Comments by Ken Sinclair
[Publisher - AutomatedBuildings.com](#)



Automated Diagnostics & Analytics

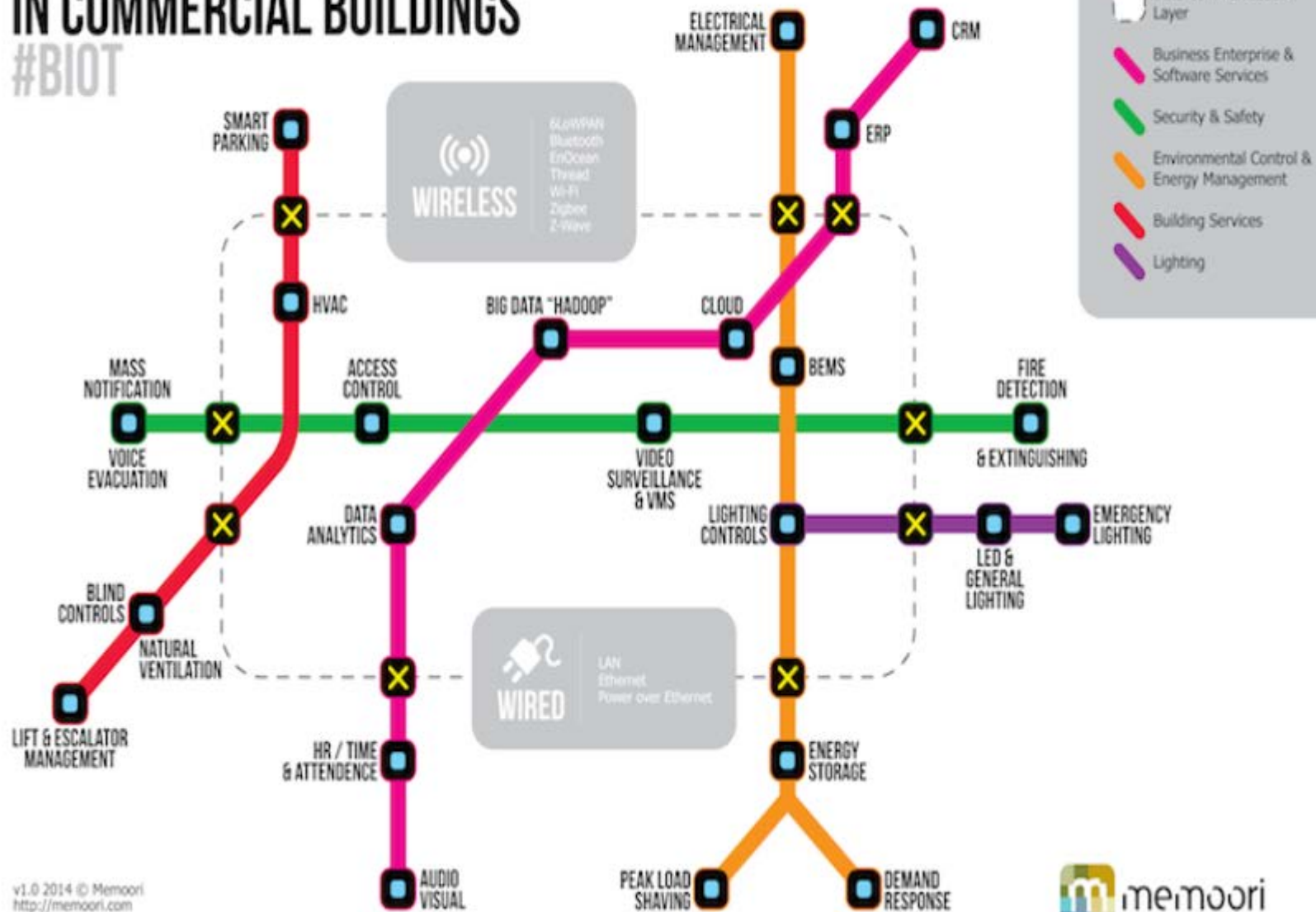
[Articles](#)
[Interviews](#)
[Releases](#)
[New Products](#)
[Reviews](#)
Controls
Power

We were looking for a theme for our October issue and we polled the industry about articles featuring occupant productivity and how our industry has an amazing interaction with productivity within a building. Although all agreed that this was very true and a very powerful relationship, the general feeling was we need to keep working on how to shape occupant productivity into a real measured variable for our industry before we can include it in our ROI payback calculation. It was also noted that we need to educate the "C" suite about the important connections between our industry and employee productivity.

But then October's theme arrived at the door, with a knock, and the delivery of a very large book called [Automated Diagnostics & Analytics for Buildings](#) that Barney and Mike had asked me to write a foreword for.

THE INTERNET OF THINGS IN COMMERCIAL BUILDINGS

#BIOT



Nov. 4, 2014: Market for Internet of Things in Smart Buildings to Rise to over \$85 Billion by 2020





Survey: More than Half of U.S. Companies Project Increased Energy Efficiency Investment in 2015

Driver: Convergence of IT and OT



Schneider
Electric

KGS BUILDINGS



ECLYPSE™

Demonstration