



2024 Critical
Environments Summit

Life of the Building — Construction's Complete, Now What?

Facility Management, Analytics, and Service Best Practices

Shawn Rucshner and Jonathan Grove / January 17th, 2024

THANK YOU SPONSORS!



Who are we?



Jonathan Grove



Shawn Rucshner

Why Service

From what do you want me to do time

To

“Preventative Maintenance” which is really scheduled what do you want me to do time

To

Structured services – FPT, “Belts and Filters” for controls, sensor verification and testing



**PREVENTATIVE
MAINTENANCE**

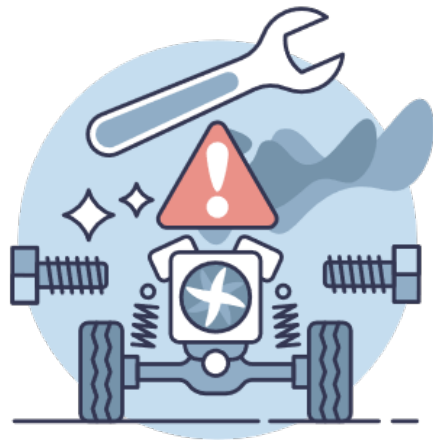
PM Best Practices

- Preventative Maintenance is less impactful than corrective maintenance.
- Corrective maintenance in the long run is more costly than preventative.
- You just spent the money to build it so let's maintain it rather than defer maintenance.
- “Belts and Filters” for the control system
- Functional performance test



Transition for PM to Analytics

PREDICTIVE MAINTENANCE



**REACTIVE
MAINTENANCE**

**CORRECTIVE MAINTENANCE
AFTER A BREAKDOWN**



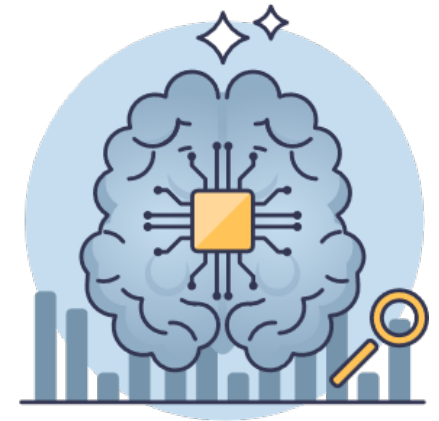
**PREVENTIVE
MAINTENANCE**

**REGULAR MAINTENANCE
TO REDUCE BREAKDOWN**



**PREDICTIVE
MAINTENANCE**

**USE OF SENSORS AND SOFTWARE
TO PREDICT BREAKDOWN**



**PERSPECTIVE
MAINTENANCE**

**MACHINE LEARNING
PREDICTS BREAKDOWNS
AND IDENTIFY SOLUTIONS**

ANALYTICS?

“The systematic computational analysis of data or statistics.”

- Oxford Dictionaries

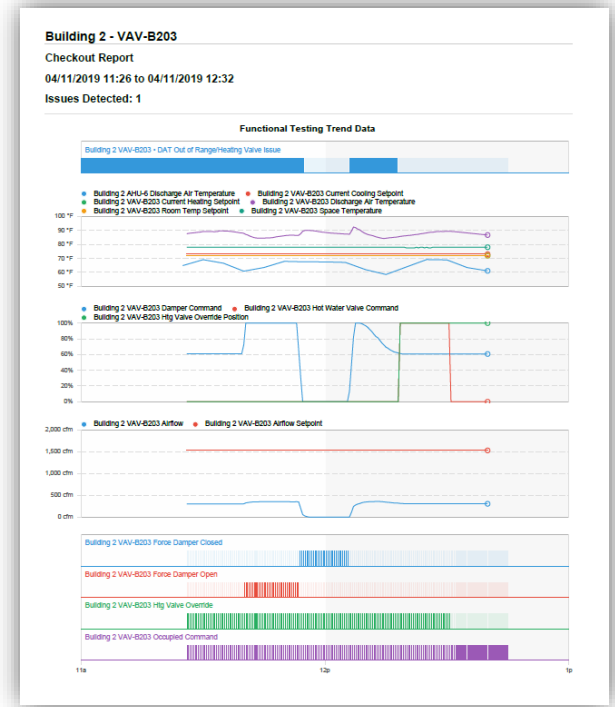
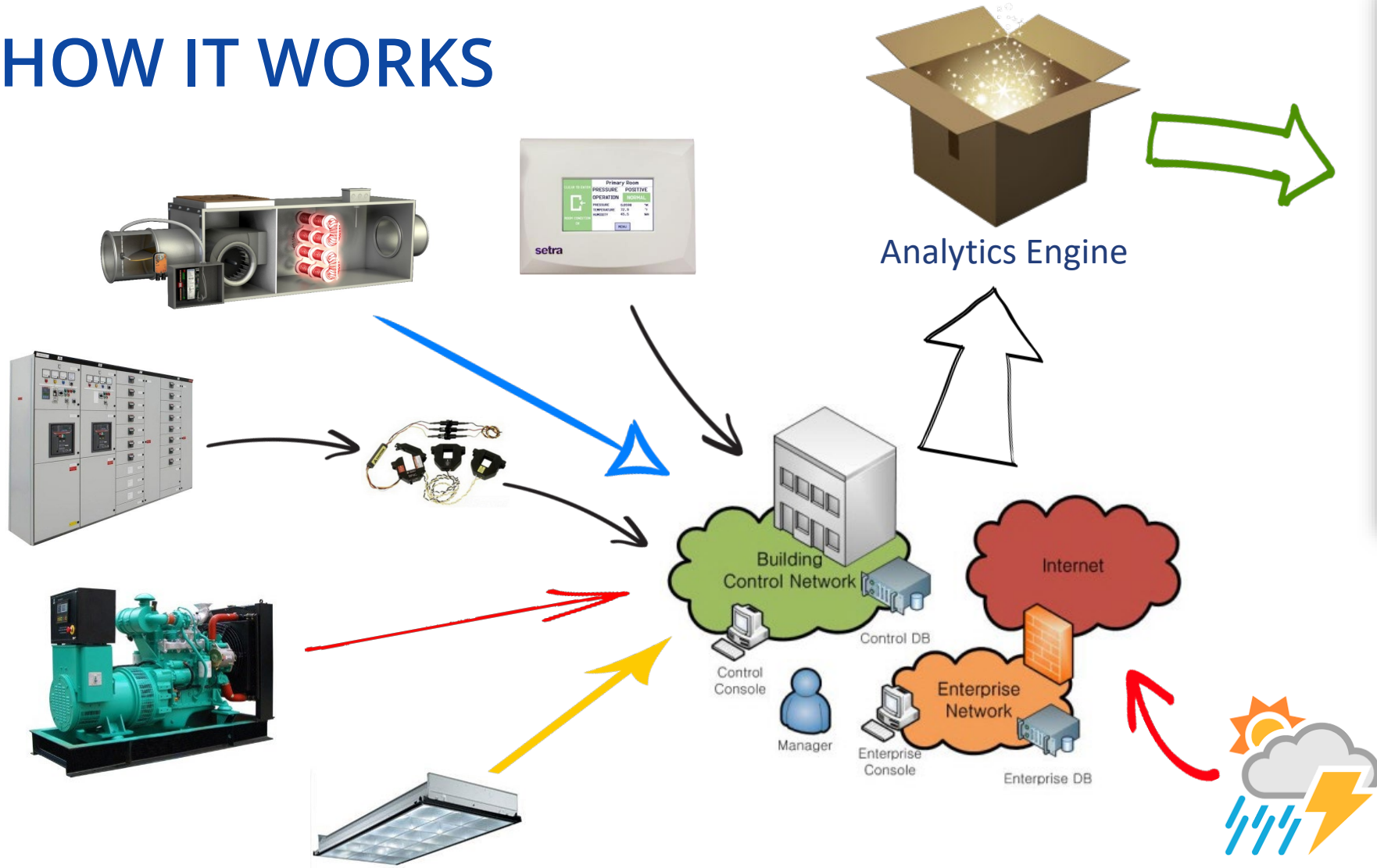
“Organizations may apply analytics to business data to describe, predict, and improve business performance.”

- Wikipedia

Using data to make decisions



HOW IT WORKS



Actionable Information

DATA ANALYTICS REPORTING SERVICES

- Critical Environment Reporting
Documentation for Safety and Accreditation

Pharmacy Temperature Monitoring

Freezer Temp Summary

Lowest: -26 °F
Highest: 7 °F
Average: -19 °F

Chemo Storage Refrigerator Summary

Highest: 39 °F
Lowest: 37 °F
Average: 37 °F

Large White Refrigerator Summary

Highest: 42 °F
Lowest: 36 °F
Average: 39 °F

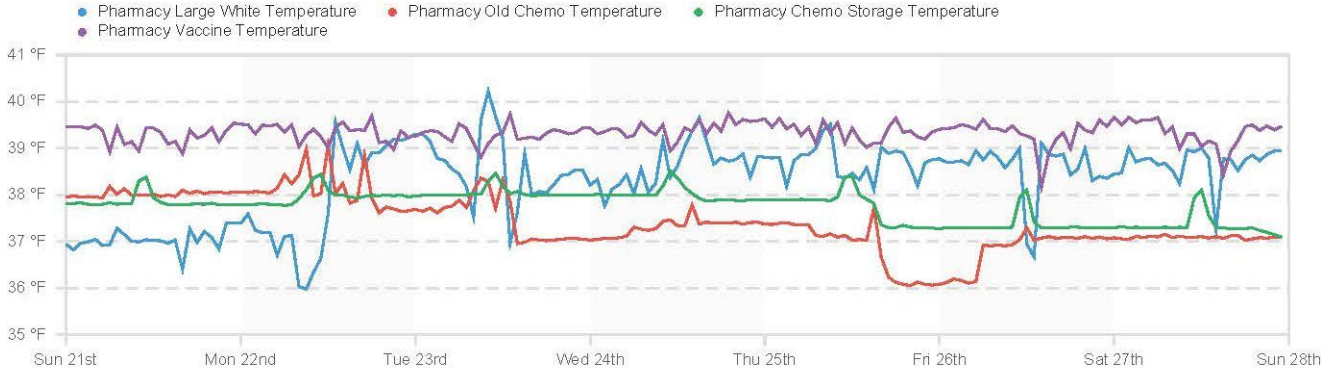
Old Chemo Refrigerator Summary

Highest: 43 °F
Lowest: 35 °F
Average: 36 °F

Vaccine Refrigerator Summary

Highest: 42 °F
Lowest: 37 °F
Average: 39 °F

Refrigerator Temperature Reporting





Facility Benchmarking

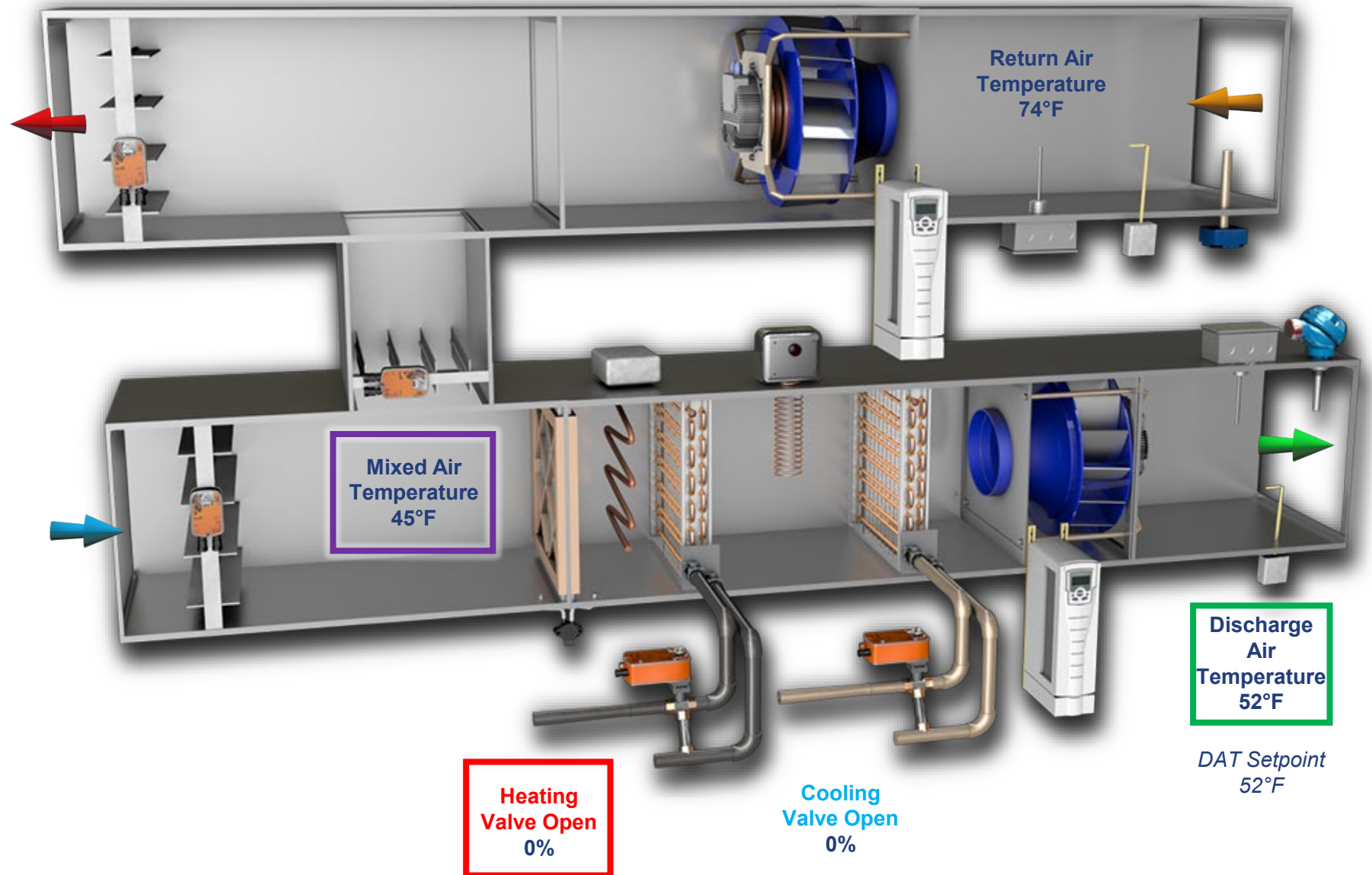
- Normalize data for simple comparisons
 - Degree Days
 - EUI – kbtu/sf
- Energy Star Scoring
- Tenant Billing
- Custom metrics around critical functions specific to your facility
 - PUE
 - KW/SF



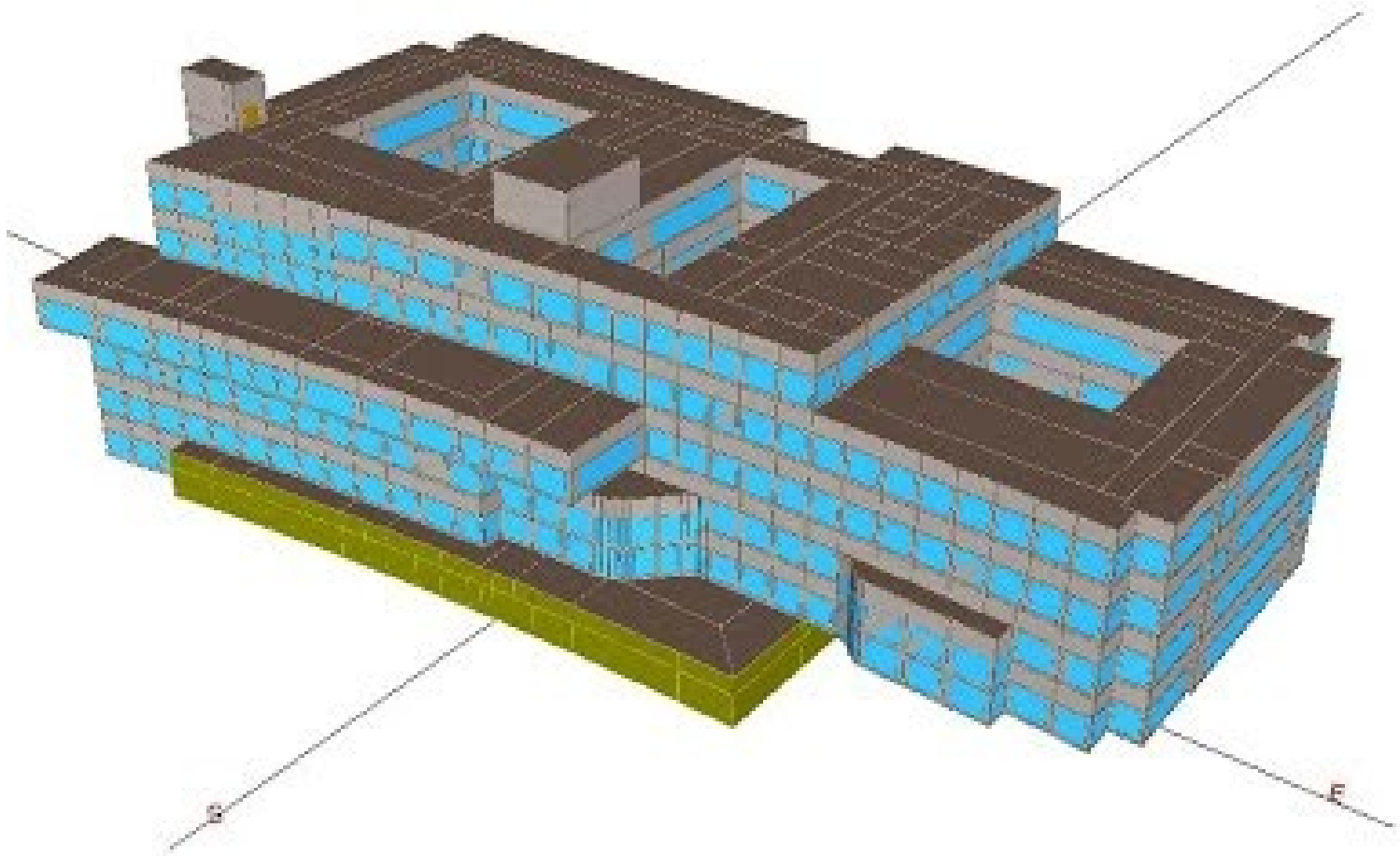
Relational Rule Based Analytics

RELATIONAL RULE ILLUSTRATION

- What is the DAT?
- What is the MAT?
- What is the Heating valve %?
- What is the problem?



AI and Energy Model Based Analytics



What do you want to Improve?

- Energy use
- Labor Efficiency
- Equipment Reliability
- Performance Confidence



FDD Impact Research

1. Analytics/FDD saves exactly \$0.
2. Utilizing FDD to identify and resolve issues saves a bunch.

Building Analytics Tool Deployment at Scale: Benefits, Costs, and Deployment Practices

<https://doi.org/10.3390/en15134858>

Median energy savings in the facilities studied after 2 years was 9% and ranged from 17% to 31% after 5 years



HVAC Analytics Business Models

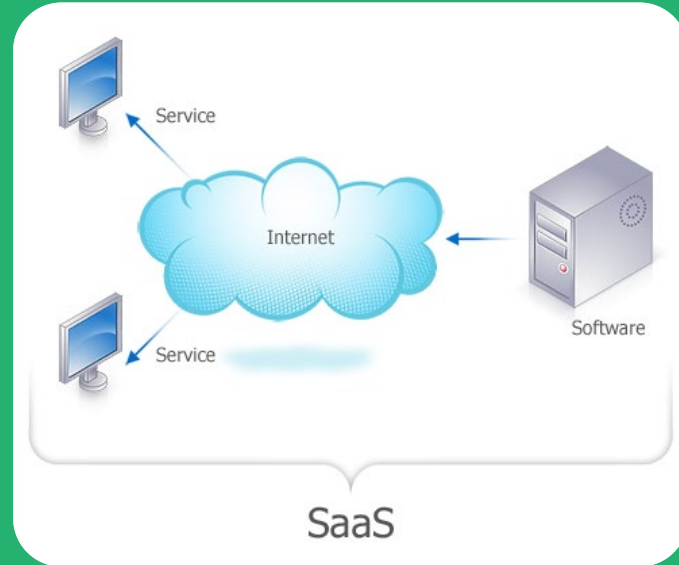
Product vs Service

Is consumable data the end goal?

Is a report of issues the end output?

Is there an issue resolution mechanism?

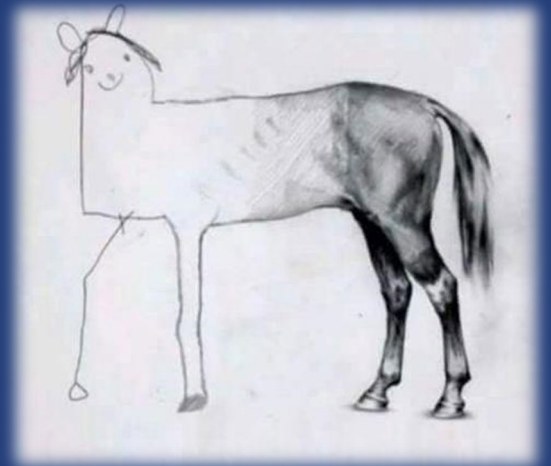
Who handles next steps?



There is NO industry defined “standard practice”, don’t leave it subject to interpretation!

- Prequalify Vendors
 - Local Support
- Team Experience Qualification Minimums
 - Previous Projects
 - PE on staff?
- Detailed Expectation of the Output
 - Web-based on-demand data visualization
 - PDF Reports of detected faults and sensor readings during FPT for each piece of equipment
 - Prioritized list of Remedial Actions
 - What fits with your facility management process?
- NOT part of the control's specification
 - (unless all vendors have been pre-qualified for analytics)

How to Ask for Analytics



Emergency response alarming – bulk data analysis and pattern recognition takes time and is not well suited to prompt immediate action.

An equipment uptime guarantee. Analytics can often identify issues in the early stages of failure providing the opportunity to limit downtime and emergency response efforts but cannot predict failures in many scenarios.

A replacement for onsite technician. Analytics are a tool to more efficiently identify issues but must be paired with corrective actions to have a meaningful impact.

What Analytics Isn't



Any Questions?

GIVEN THE PACE OF
TECHNOLOGY, I PROPOSE
WE LEAVE MATH TO THE
MACHINES AND GO PLAY
OUTSIDE.

