



OSIsoft®

Regional Summit 2017

May 2-4, 2017 | West Palm Beach, FL



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IloT Data Preparation with the PI System

Presented by **Scott Grubbs, Systems Engineer**

You've collected all that IIoT data



...Now what?

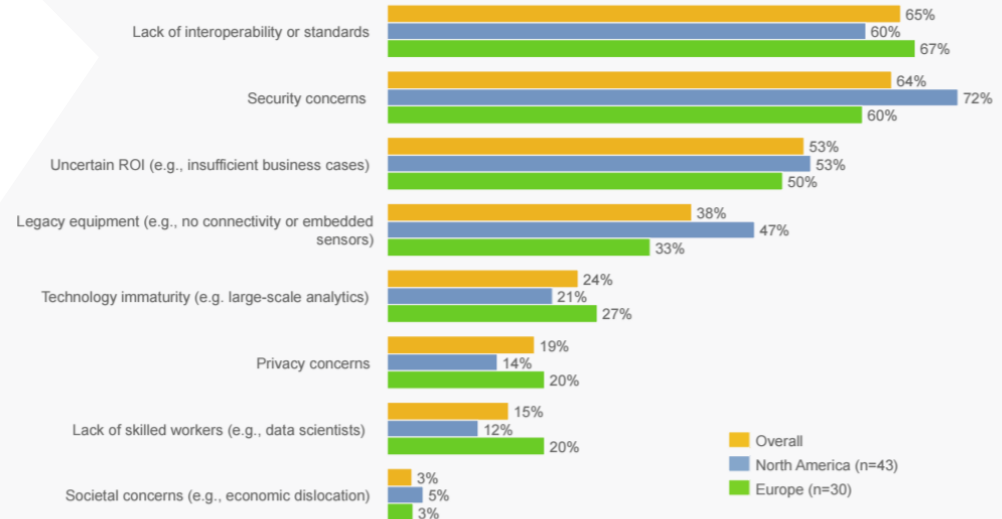
3 biggest barriers to adopting IoT

Lack of interoperability or standards

Security concerns

Uncertain ROI

Q: What are the greatest barriers inhibiting business from adopting the industrial Internet?



In this talk, we will show how to **beat the barriers**

Lack of interoperability or standards

- Asset Framework

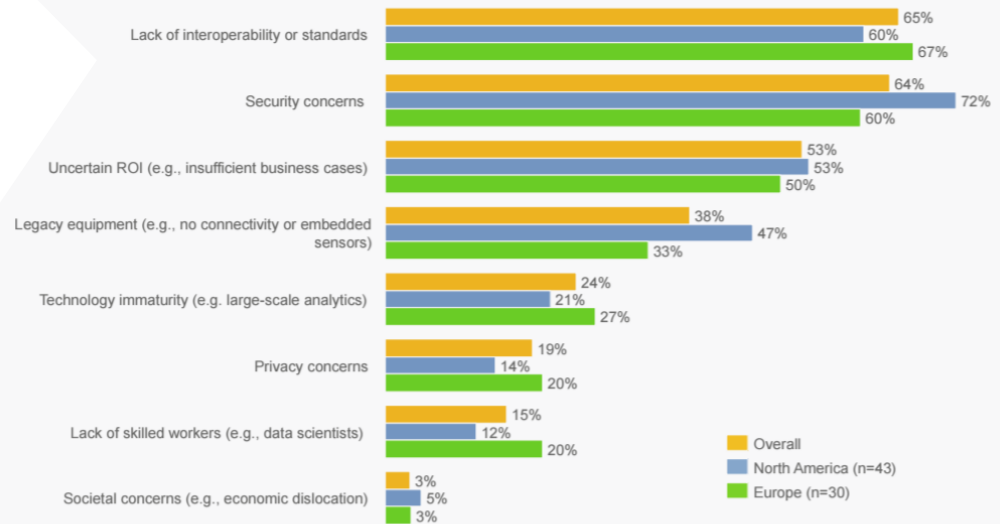
Security concerns

- Mitigation and best practices

Uncertain ROI

- Asset analytics, event frames, infrastructure approach

Q: What are the greatest barriers inhibiting business from adopting the industrial Internet?



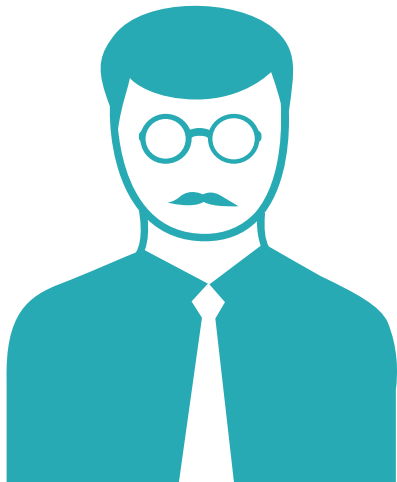
10 Industrial Internet of Things

Source: World Economic Forum Industrial Internet Survey, 2014



Symptoms of poor interoperability or standards

I have to visit 5 groups just to get what I need



That team reports in a completely different way



Just ignore it. It's outdated



Asset framework: Bridge the physical & digital world

Time-series

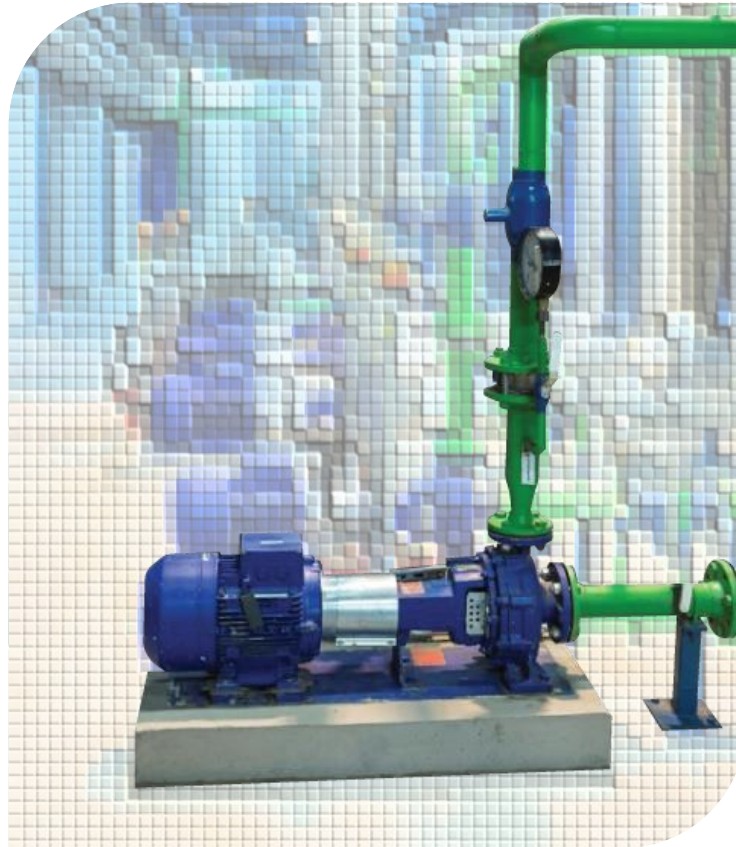
- In-Flow
- Pressure
- Vibration data

Asset details

- Name
- Model
- Manufacturer

External data

- Performance curves
- Last maintenance



Analyses

- Efficiency Analysis
- Key Performance Indicators (KPI)

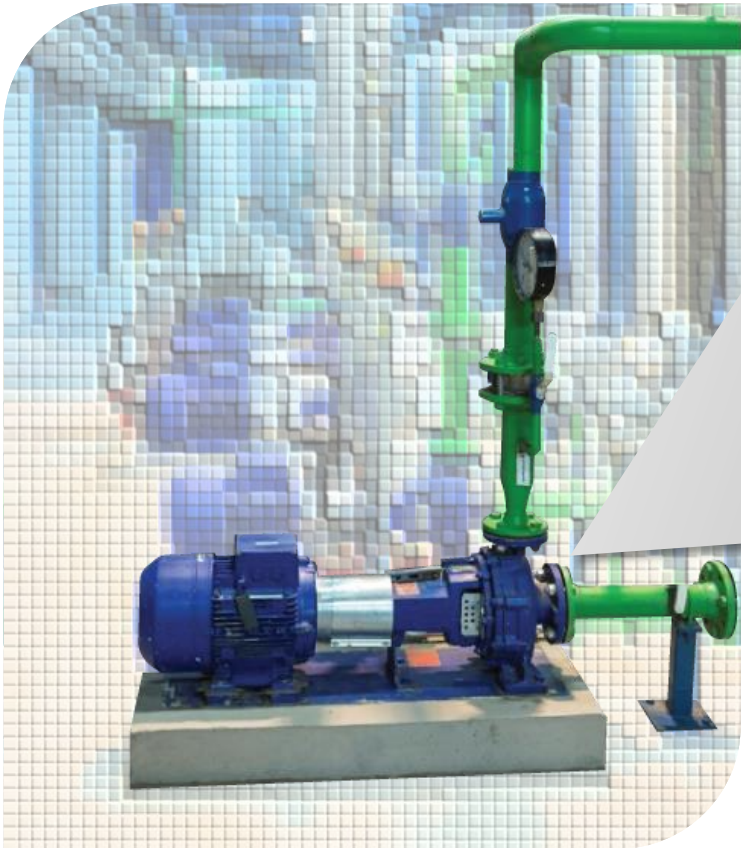
Events

- Downtime
- Startup
- Failures

Notifications

- High Speed
- Rotor Failure

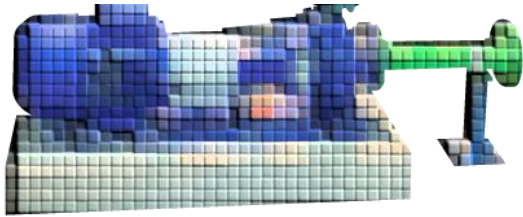
Capture asset information in configurable templates



Discharge Pressure	539.342651367188 psi
Electricity Cost Factor	0.162879550235334 US\$
Flow Rate	141.52 gpm
Impeler Size	3
LCL	92.5
Liquid Gravity	1 SG
Minimum Efficiency	90 %
Model Number	G11
Pump Curve Head	0.616988159999998 psi
Pump Downtime During Last Shift %	0.346886343426175 %

- Reference data (without replicating) from **external databases** with **AF linked tables**

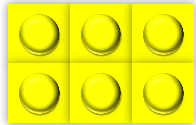
Create flexible views with asset building blocks



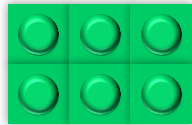
Pump



Heat Exch.

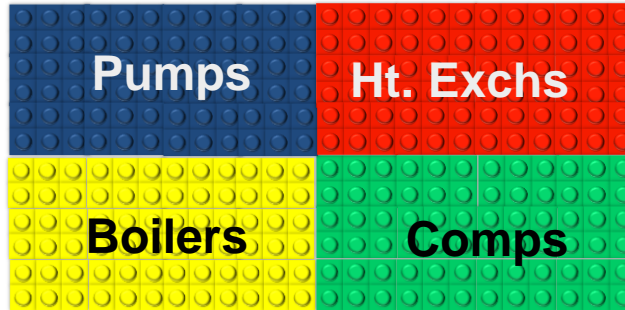


Boiler

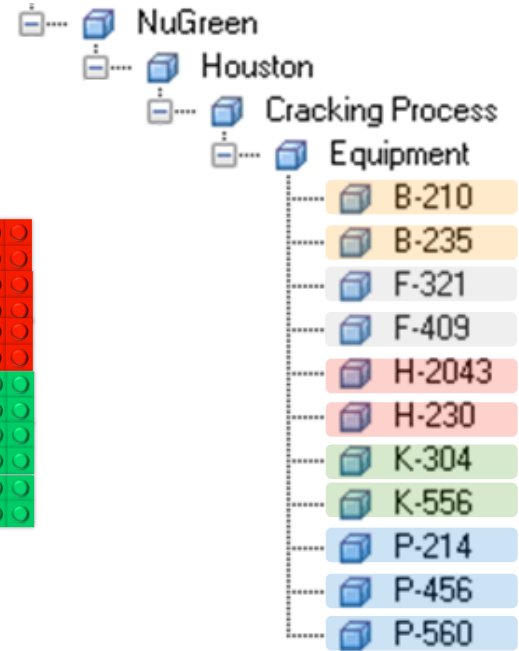


Compressor

Asset View



Process View



Support ongoing standardization with Asset Framework

Update templates over time

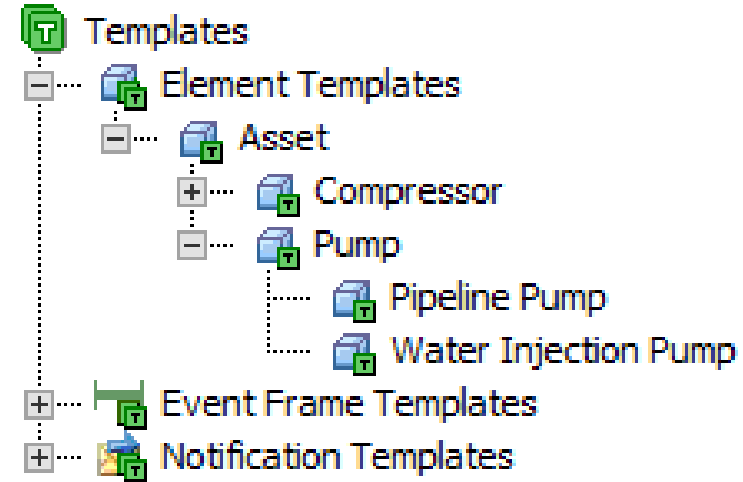
Start simple, add attributes as needed

Facilitate asset management

Centrally push updates to all assets

Available to visualization tools

Consistent displays for similar assets

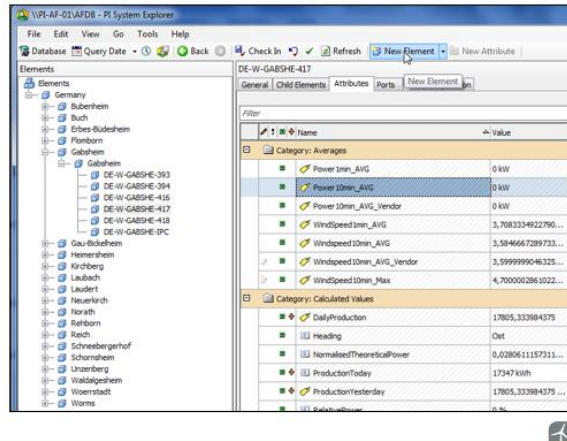


Renewable power company uses Asset Framework in strategy to save 2.6M euros

“Look and Feel” – Asset view in PI Asset Framework



- “Copy/paste” tree structure
- Standardization of Assets using Templates
 - generic (90%)
 - specific (5%)
 - analytics (5%)
- Triple structure views
 - Assets by location
 - Assets by owner
 - Assets by energy flow
- Benefits of using PI AF
 - Big time savings
 - No errors when adding new assets



“Before, it took us **1 week** to connect, **2 weeks** to find mistakes.”

“[With AF] You pick **templates**, apply the template, and you can be quite sure that the values will be **correct**.”



Dr. Thomas Weiss, JUWI

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Lack of interoperability or standards

- Asset Framework

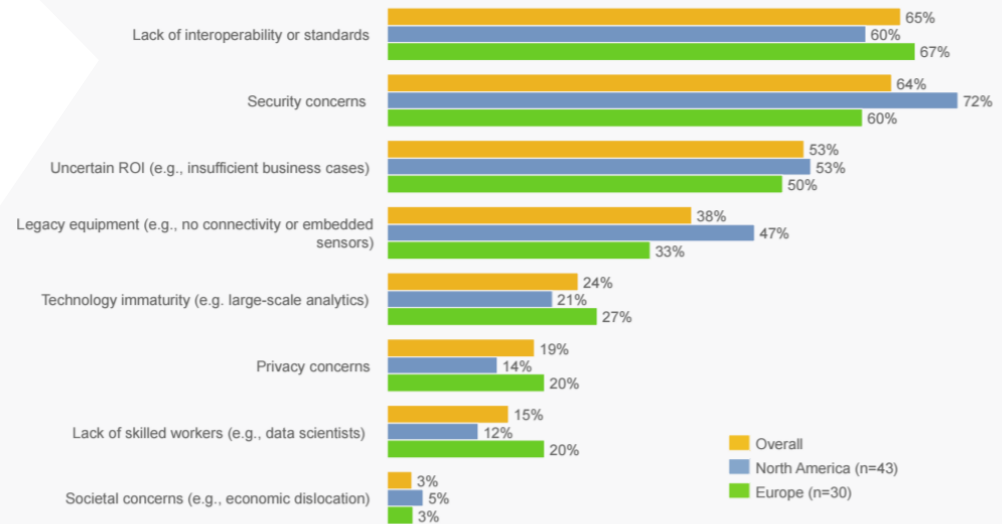
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- Mitigation and best practices

Uncertain ROI

- AF, event frames, infrastructure

Q: What are the greatest barriers inhibiting business from adopting the industrial Internet?



10 Industrial Internet of Things

Source: World Economic Forum Industrial Internet Survey, 2014



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Internet of things...

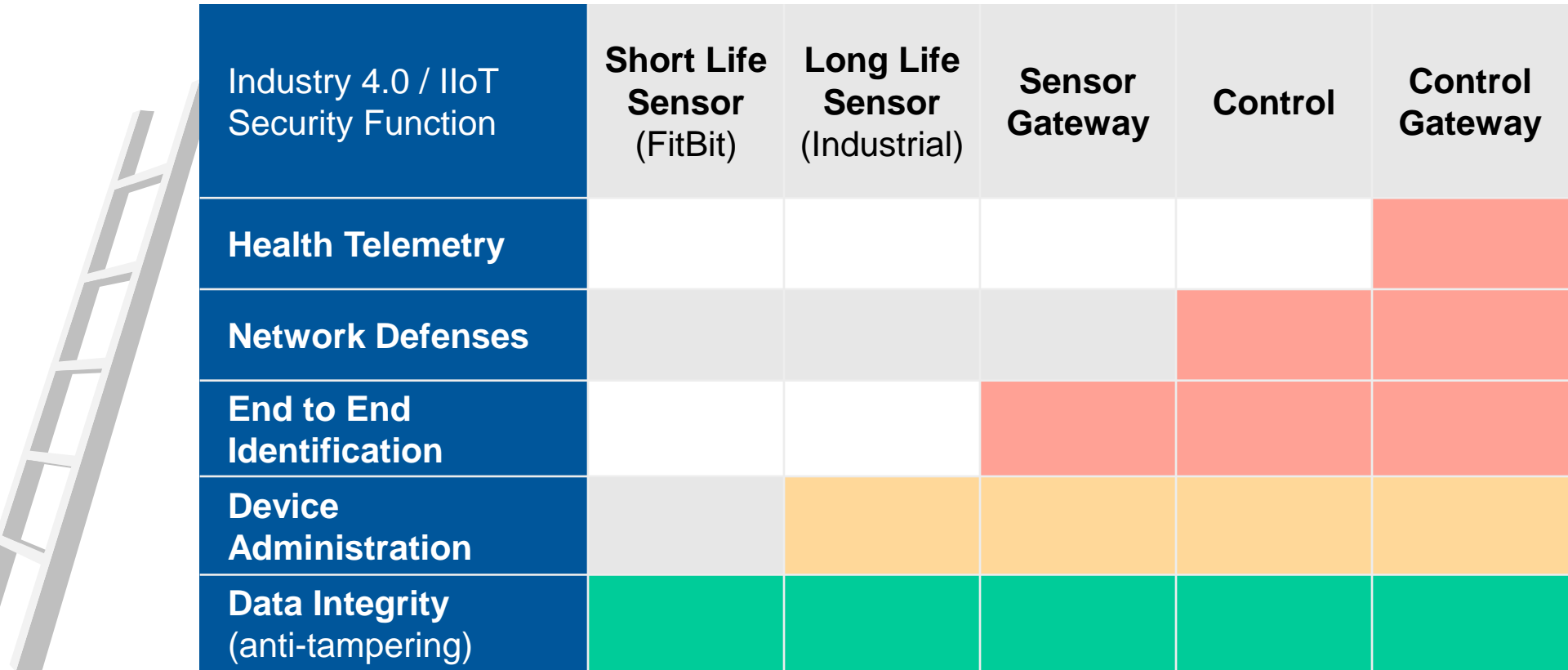


Or threats?

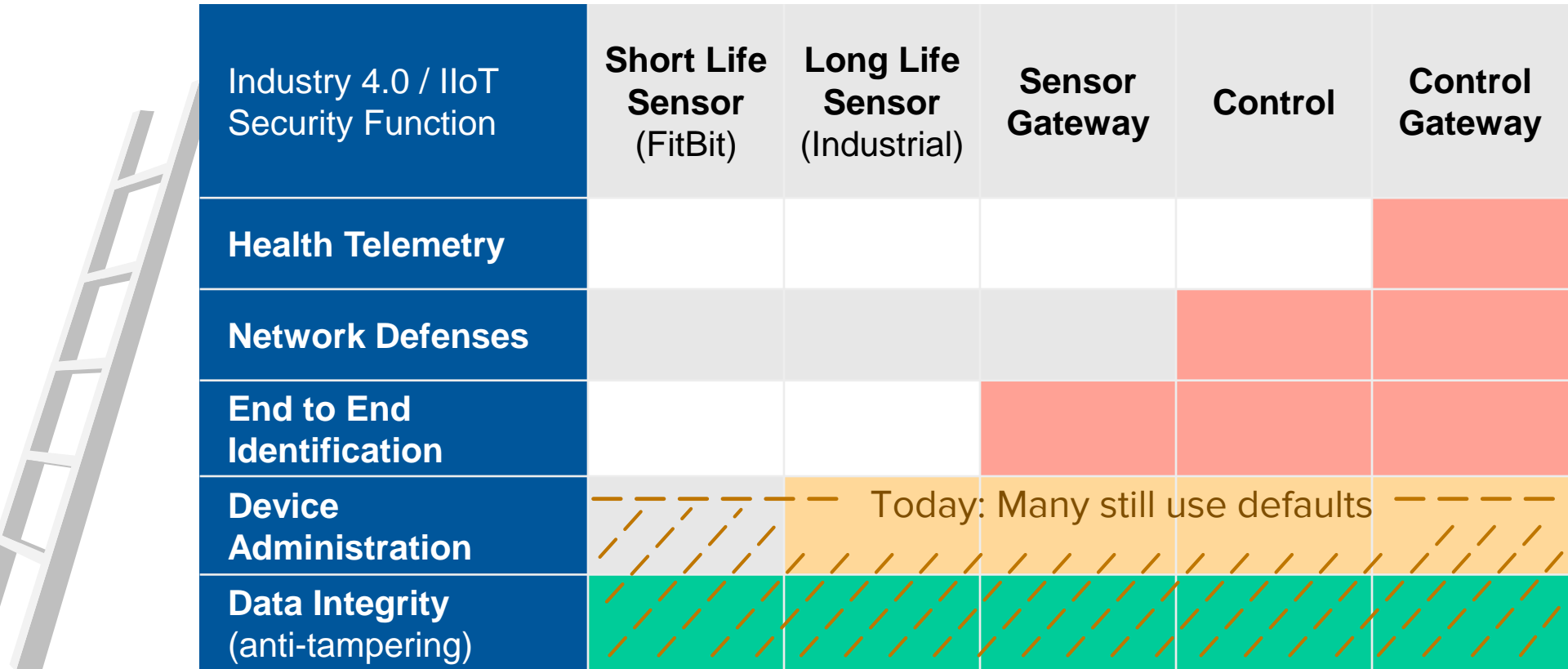


- Ex. Mirai malware scans IP addresses that use **default names & passwords**
- **Controlled remotely**
- High-profile 2016 attacks:
Twitter, Netflix, Reddit, & others

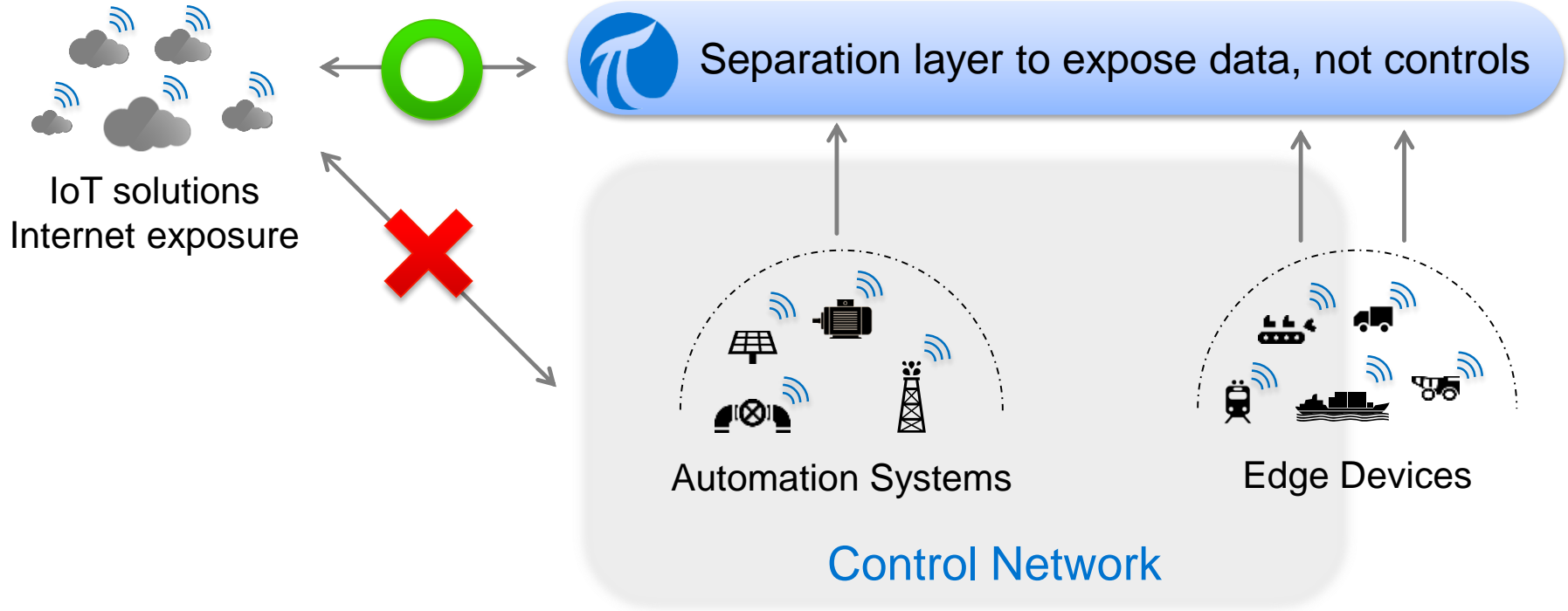
Many IIoT devices still climbing the internet security ladder



Many IIoT devices still climbing the internet security ladder



Protecting the control network is as important as ever



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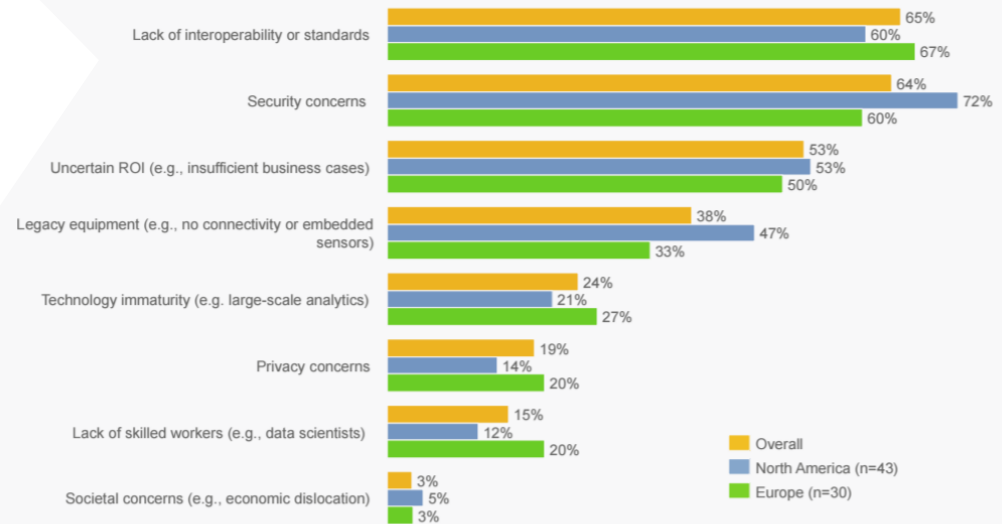
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80% of investment lost to data-prep that **could be automated**

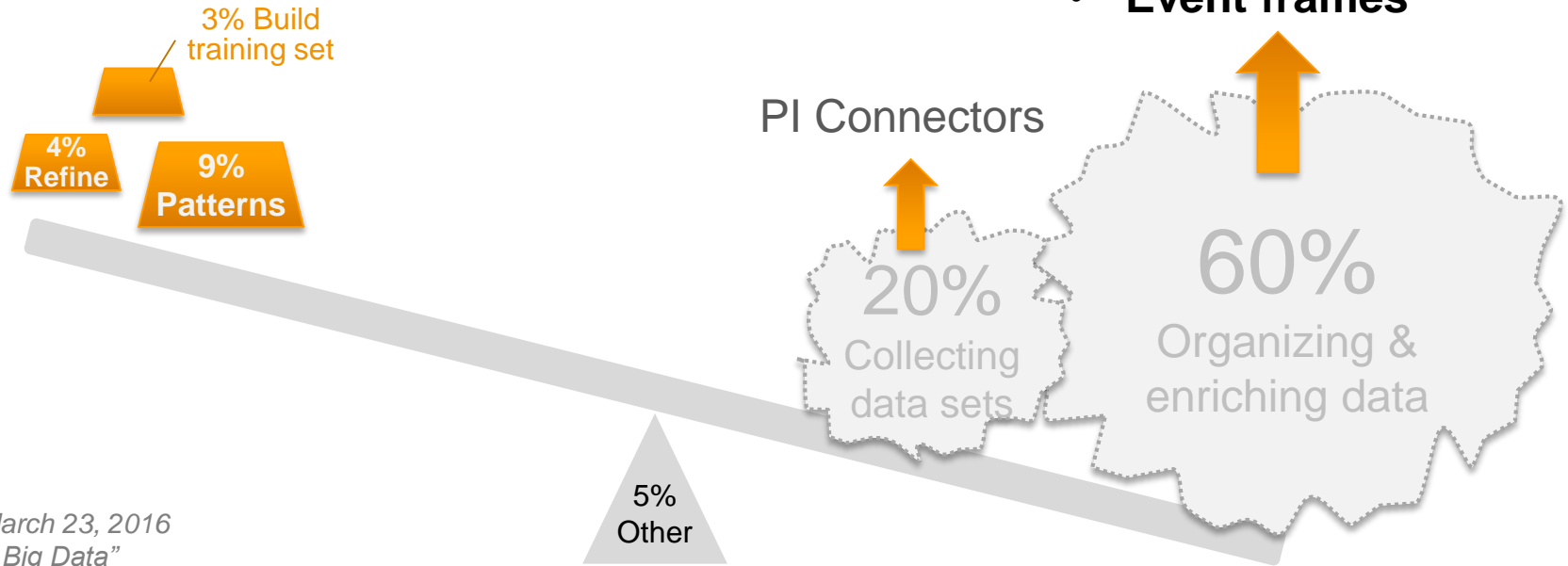


Forbes, March 23, 2016
"Cleaning Big Data"



80% of investment lost to data-prep that **could be automated**

- **AF templates, analytics**
- **Event frames**

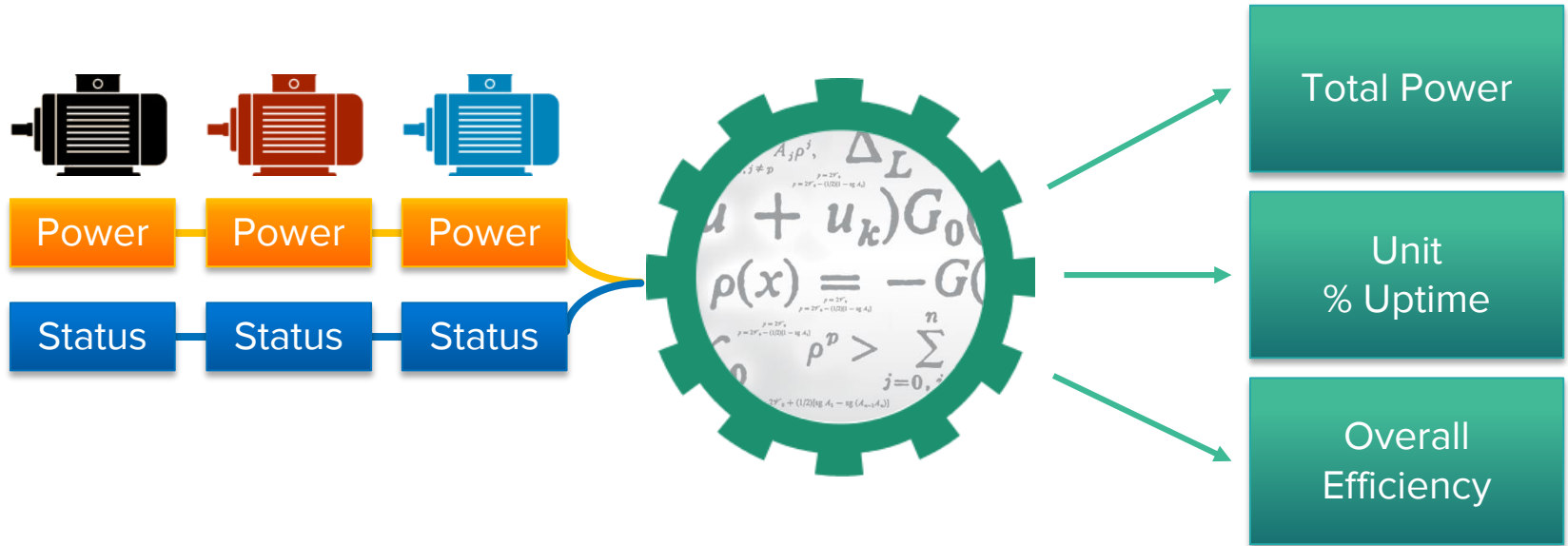


Forbes, March 23, 2016
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AF templates put data into a standard, consistent format

Asset analytics turns data into KPIs



Easily track **site-level** metrics with **rollup** capabilities

Well Pad 035

General Child Elements Attributes Ports Analyses Version

Name Backfilling

✓	Oil Flow Rate Rollup
⊗	Well Pad Volume Flow Rate Rollup

Name: Oil Flow Rate Rollup

Description:

Categories:

Analysis Type: Expression Rollup

Rollup attributes from

Child elements of Well Pad 035

This element - Well Pad 035

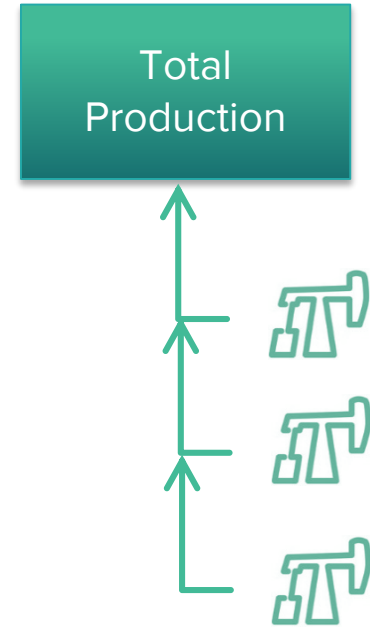
To select attributes set criteria below

Attribute Name: Oil Flow Rate

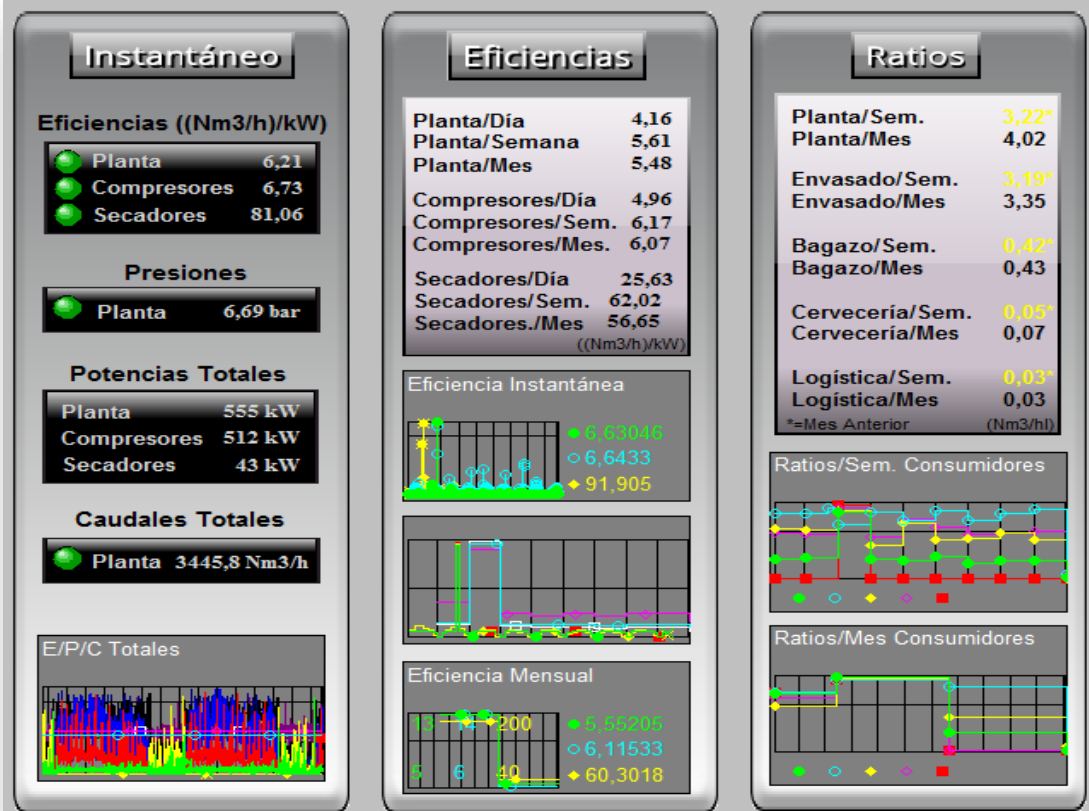
Attribute Category:

Attributes

Name	Parent Element
✓ Oil Flow Rate	OW-259
✓ Oil Flow Rate	OW-262
✓ Oil Flow Rate	OW-258
✓ Oil Flow Rate	OW-261
✓ Oil Flow Rate	OW-260



Heineken uses KPIs to save water, energy, and reduce costs



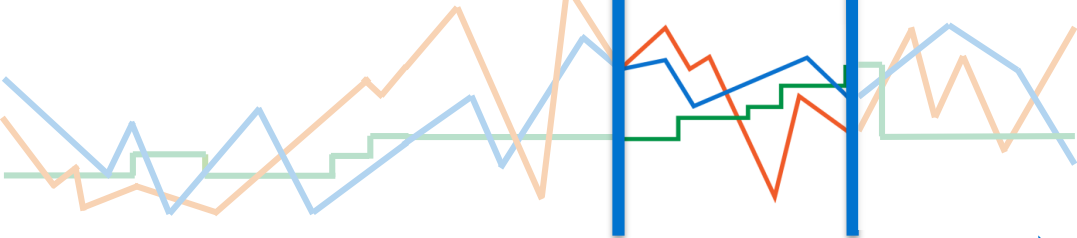
We can check in real time the efficiency, pressure, power, and flow. Also we check efficiency values for the last 24 hours, last week, and last month.



Consuelo Carmona Miura

Event Frames: Out of **years** of data, Get the **minute** that matters

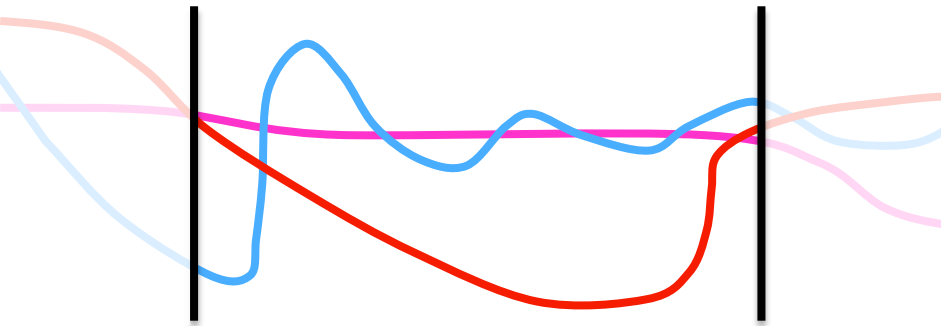
Downtime
Excursion
Batch



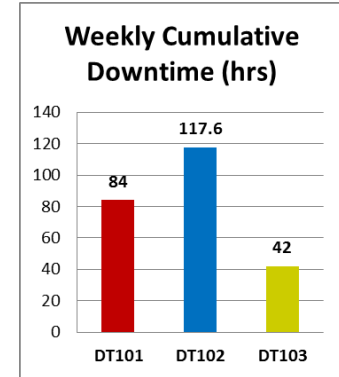
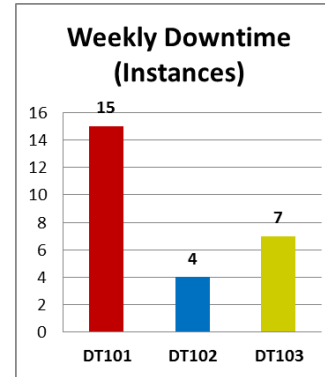
Auto event summary

Event Attribute	Value
Name	Excur 1215-0002
Start	15-Dec-2013 10:35:02
End	15-Dec-2015 10:47:26
Asset	Boiler-352
Excursion Type	High Violation
Fuel Gas Flow.Avg	37.12 k sft3/h
myKPI.Max	47.19 bbl/d

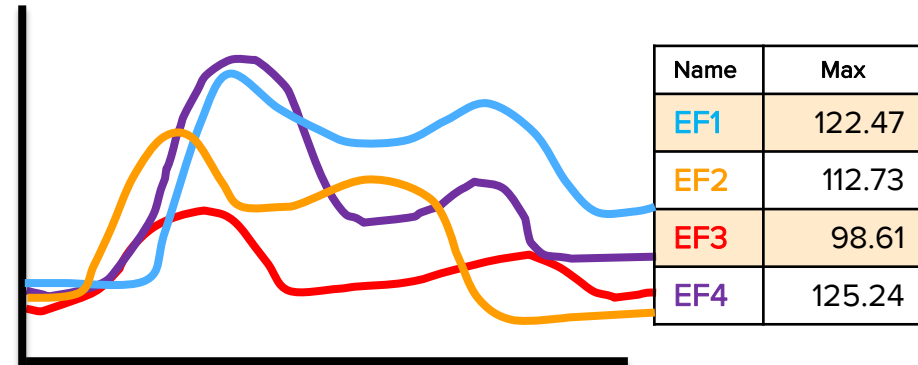
Simplify Data Analysis



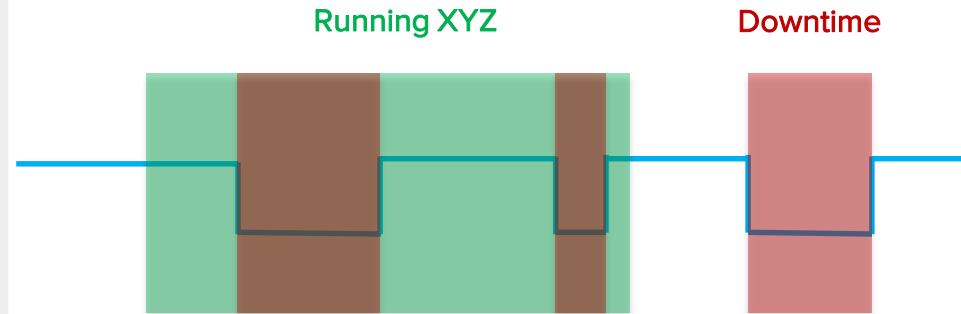
Compare Assets



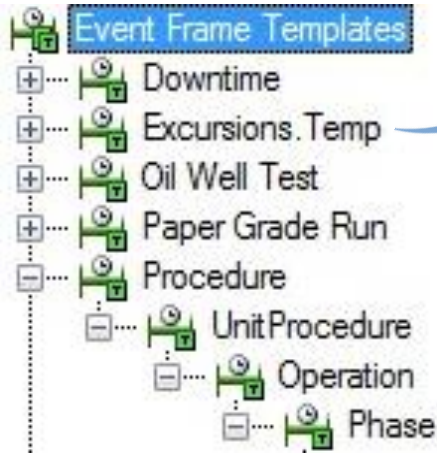
Compare Events



Discover Event Interrelationships



EF templates populate consistent summaries, automatically



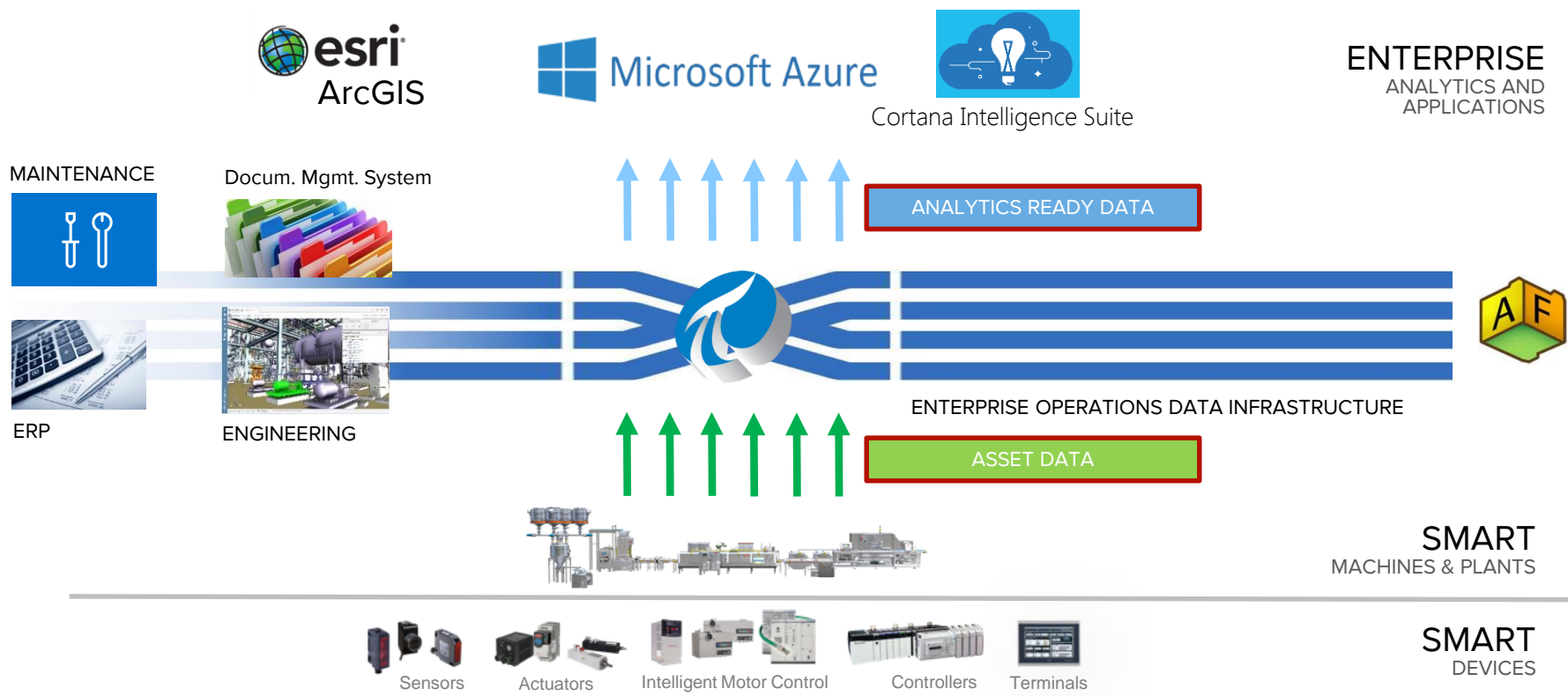
Name	Value
Category: General Info	
Comment	
Operator	Bobby Wolf
Phase	Dwell
Type	LOW TEMP
Category: Limits	
Temp.Limit.High	88 deg C
Temp.Limit.Low	70 deg C
Category: Manual Logger	
Comment	
Category: Process Parameters	
Level.Start	42.7438011169434 L
Temp.End	71.1539001464844 deg C
Temp.Max	71.1538998921712 deg C
Temp.Min	62.1662445068359 deg C
Temp.Range	8.98765538533529 deg C

Text entries for filtering or grouping

Fields for comments

Calculated summaries like average, max, min

Infrastructure improves ROI by making data available for multiple projects



Beat the barriers with the PI System

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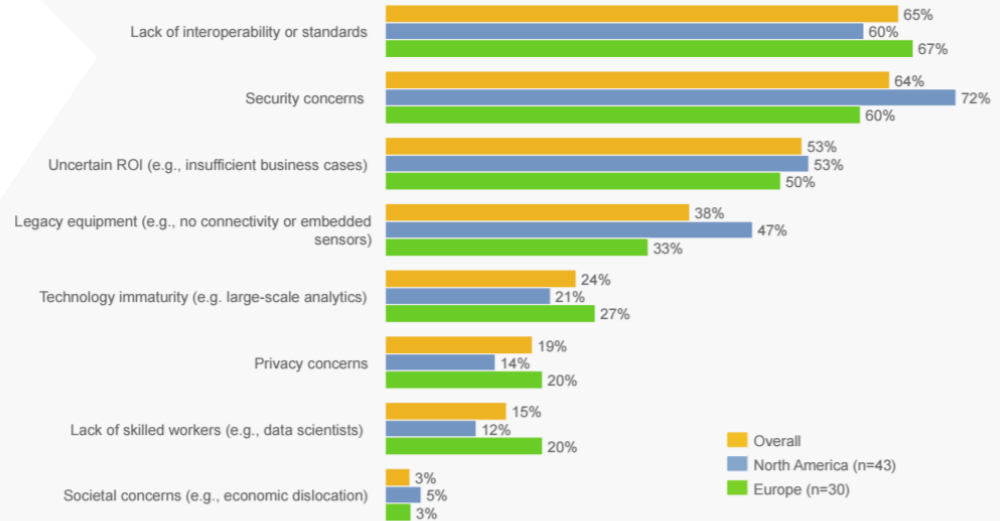
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Thank You



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