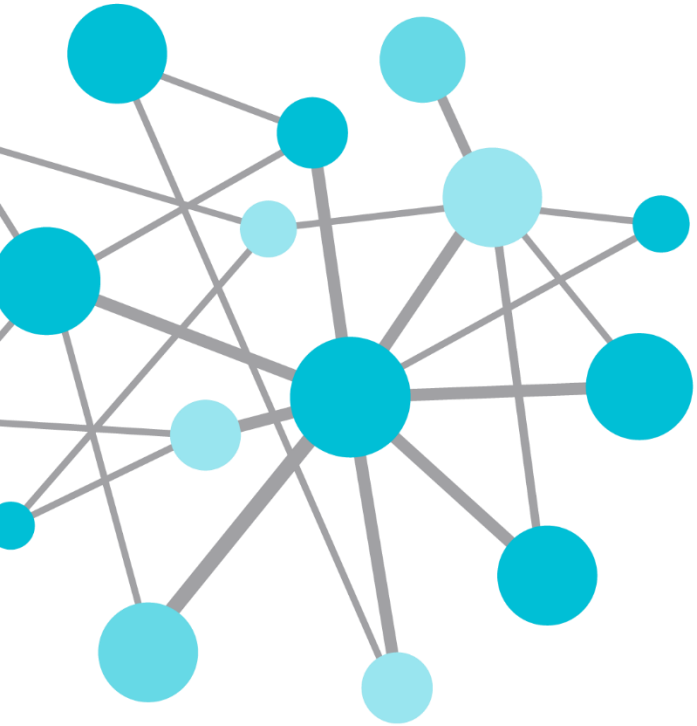

Value of Asset-based PI System in Power Generation

Presented by **Chris Nelson and Stephen Kwan**

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USERS CONFERENCE 2014

The Power of Data

DECISION READY IN REAL-TIME

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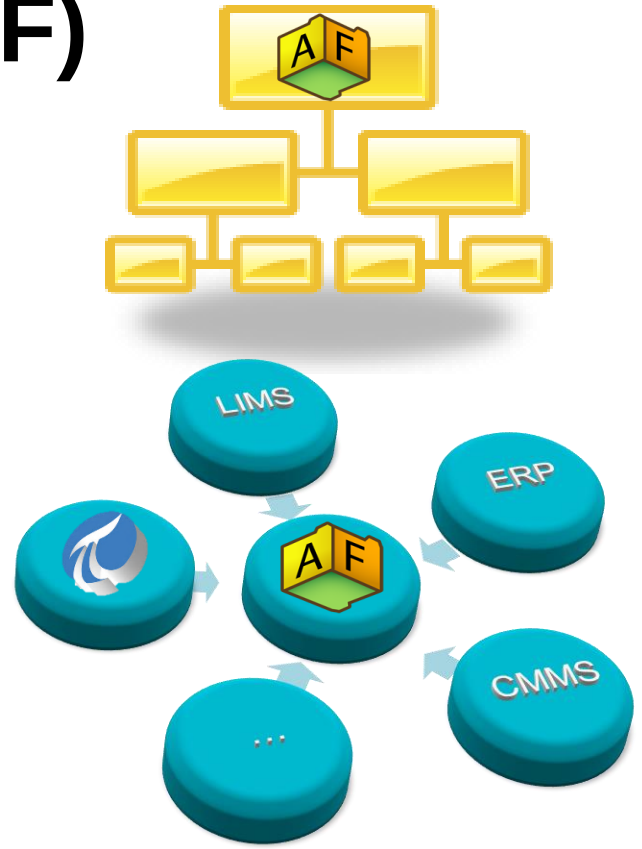
PI Asset Framework (PI AF)

- Organize your assets data in a **hierarchical**, **scalable**, **secure**, and **extensible** database
- Model data from **different PI Servers**
- Relate **non time-series** data sources
- Integrate with **analyses** and **notifications** tools



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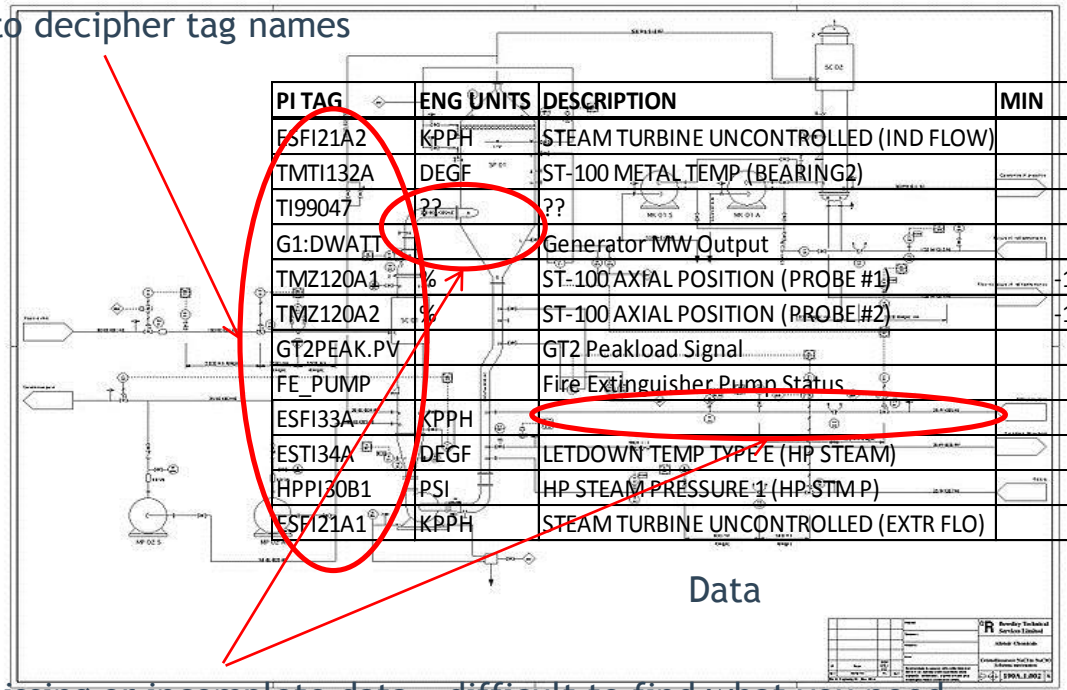
Add Context to Your Data

Difficult to decipher tag names



PI TAG	ENG UNITS	DESCRIPTION	MIN		MAX
ESFI21A2	KPPH	STEAM TURBINE UNCONTROLLED (IND FLOW)		0	100
TMTI132A	DEGF	ST-100 METAL TEMP (BEARING2)		0	400
TI99047	??	??			
G1:DWATT		Generator MW Output			
TMZ120A1	%	ST-100 AXIAL POSITION (PROBE #1)		-100	100
TMZ120A2	%	ST-100 AXIAL POSITION (PROBE #2)		-100	100
GT2PEAK.PV		GT2 Peakload Signal		0	1
FE_PUMP		Fire Extinguisher Pump Status			
ESFI33A	KPPH			0	425
ESTI34A	DEGF	LETDOWN TEMP TYPE E (HP STEAM)		0	1000
HPPI30B1	PSI	HP STEAM PRESSURE 1 (HP STM P)		-1	1550
ESFI21A1	KPPH	STEAM TURBINE UNCONTROLLED (EXTR FLO)		0	210

Data

Missing or incomplete data – difficult to find what you need

P&ID

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The Big Picture

- Elements
  - Boilers
  - Equipment
  - NuGreen
    - Houston
      - Cracking Process
        - Equipment
          - B-210
          - B-235
          - F-321
          - F-409
          - H-2043
          - H-230
          - K-304
          - K-556
          - P-214
          - P-456
          - P-560
      - Extruding Process
      - Milling Process
    - Little Rock
    - Tucson
    - Wichita
  - Pumps
    - P-007
    - P-009
    - P-020
    - P-099
    - P-101

Analyses
- Efficiency analysis
- Key Performance Indicators (KPI)

Time-series
- In-Flow
- Pressure
- Vibration data

Events
- Downtime
- Startup
- Failure

Asset details
- Name
- Model
- Manufacturer

Notifications
- High speed
- Rotor failure
- Low pressure

External data
- Performance curves
- Last maintenance date
- Design documents
- Best operating procedures

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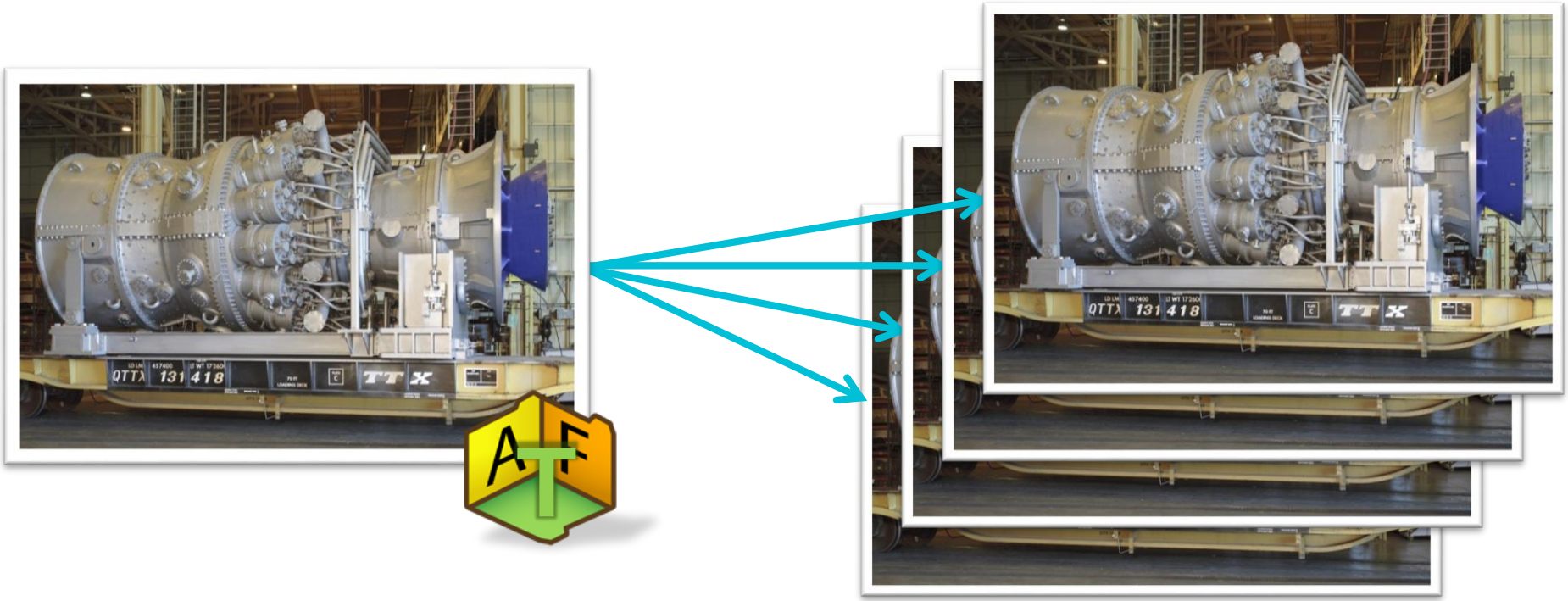
A Common View for Similar Assets



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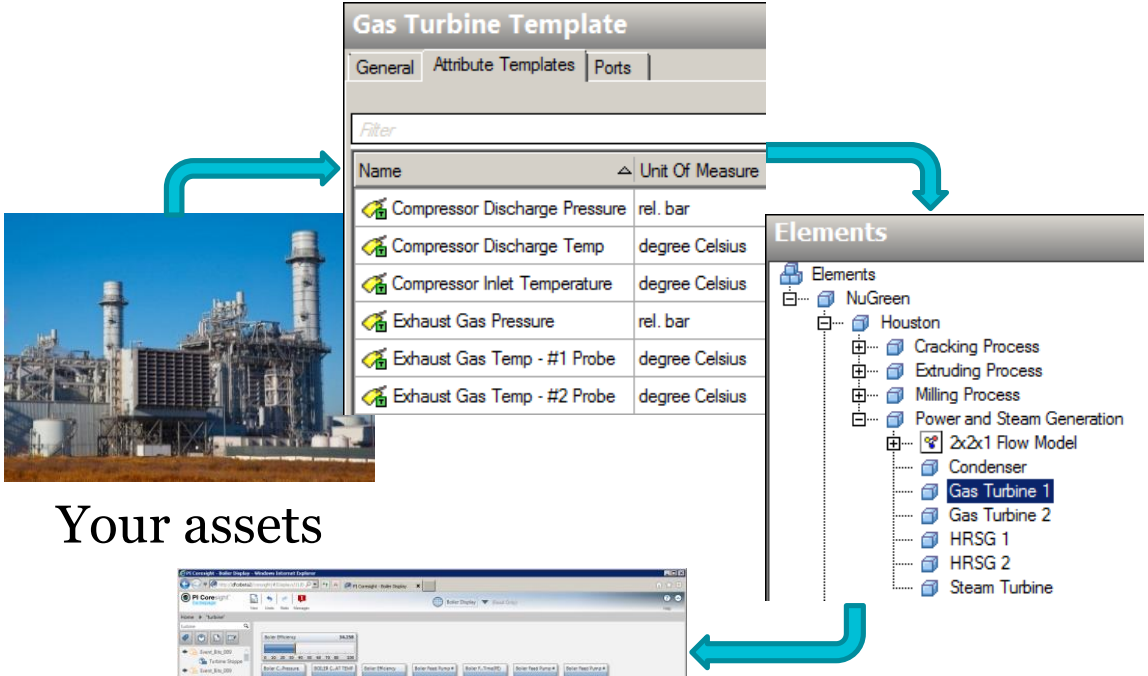
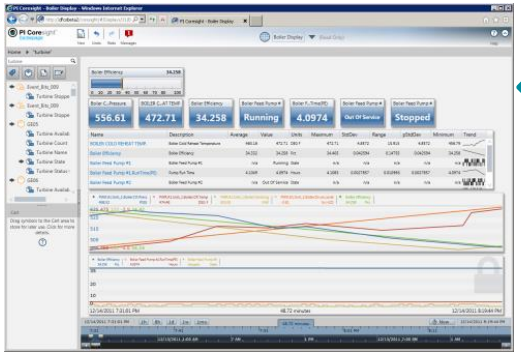
PI AF



Your assets



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Bookmarks for your Real-Time Data

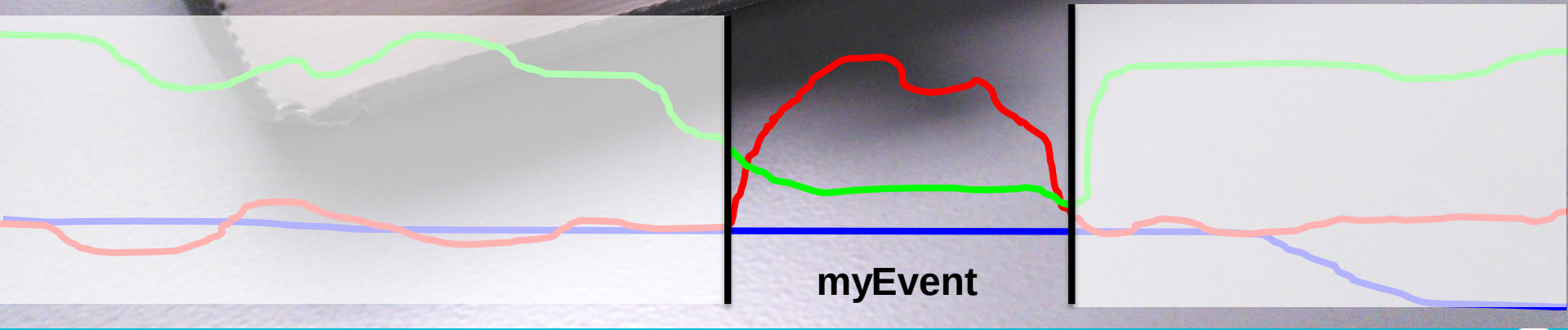
PI Event Frames

Info

Start

End

Your Data



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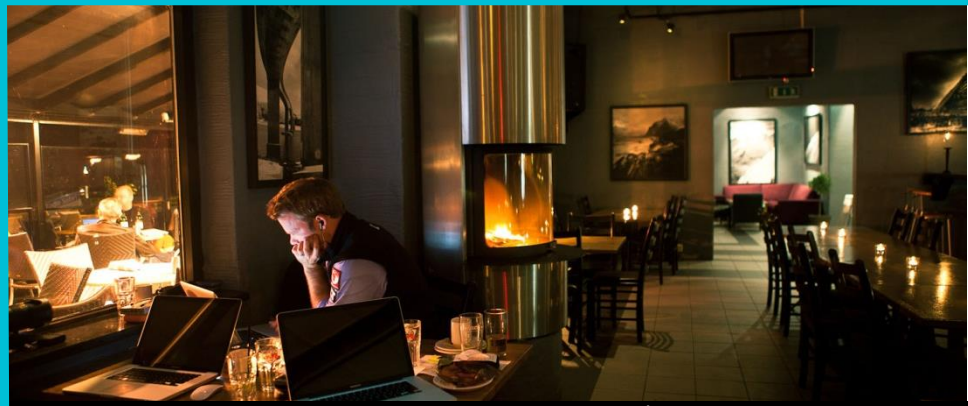
Over time it is difficult to remember when all your important events happened

When was the last time a downtime event occurred?

What happened in the run with the highest yield ever?



What was the root cause for the $200,000 process excursion event?

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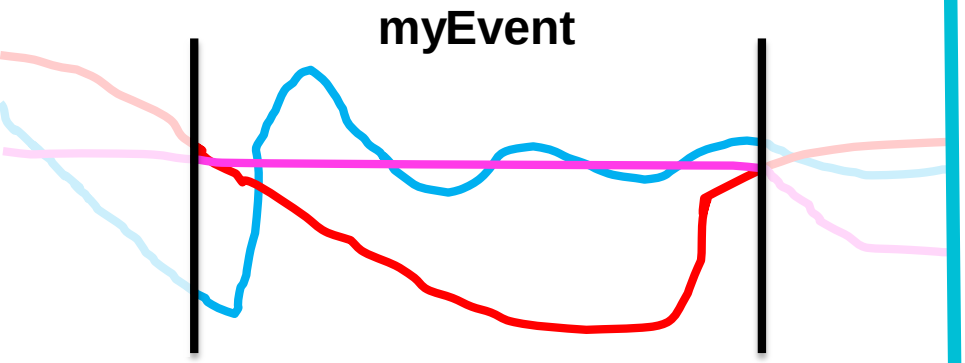
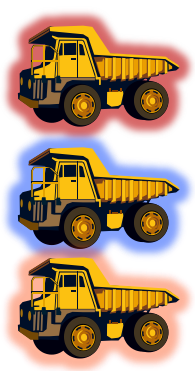
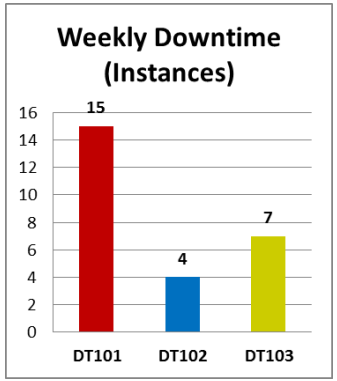
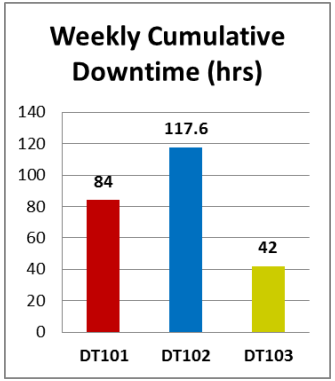
Simplify Data Analysis



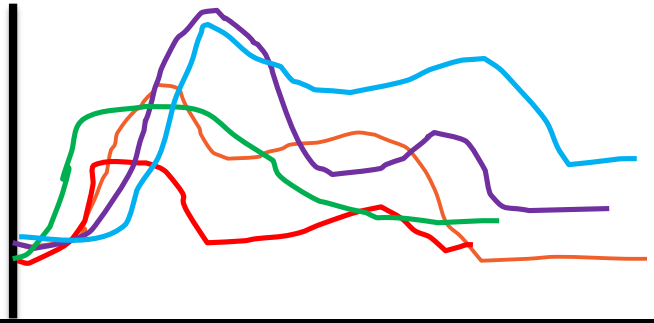
Perform Asset Comparisons





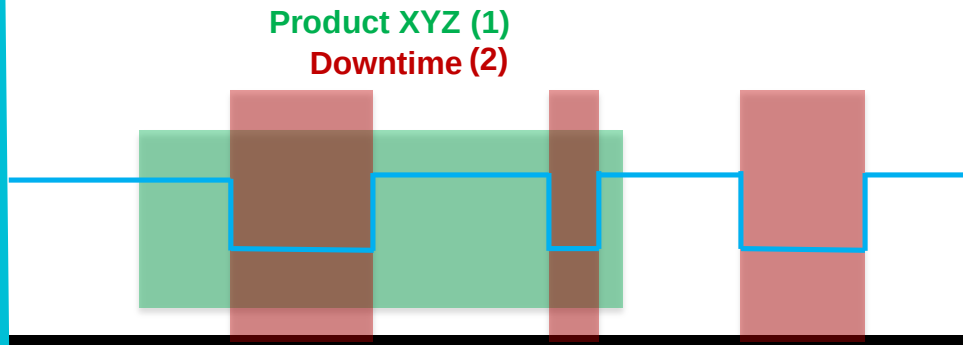


Event Overlay Trend



Name	Temp.Max
EF1	122.47
EF2	109.34
EF3	112.73
EF4	98.61
EF5	125.24

Downtime Events



Perform Comparisons

Discover Relationships

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PI Notifications

DELIVER

From: PINotAdmin
To: Mariana Sandin
Cc:
Subject: Transformer TR0842 Load is in hi

Instant PI WebParts Trend
Acknowledge With Comment
Acknowledge

Name:	Transformer Load - H
State:	High
Trigger Time:	7/29/2012 9:07:01 A
Start Time:	7/29/2012 9:07:01 A
End Time:	1/1/1970 12:00:00 AM
Triggering Condition:	Load > 22
Target:	TR0842

Wind Farm availability is under 70%
DF PI Notifications - Offline
IM Call Video Share
pinotifications@osidf.test.int 2:45 PM
Wind Farm availability is under 70%
Name: Wild River Wind Farm
Server: DFPIAF
Database: Windtopia
Start Time: 8/1/2012 2:30:00 PM Pacific Daylight Time (GMT-07:00:00)
Trigger Time: 8/1/2012 2:45:00 PM Pacific Daylight Time (GMT-07:00:00)
Target: Wind Power Generation Fleet\Wild River Wind Farm
State: OutsideControl
Priority: Normal
Link:
Wind Farm Overview
Actions:
Acknowledge
DF PI Notifications
Wind Farm availability is under 70%
Redirect Ignore

Web Service

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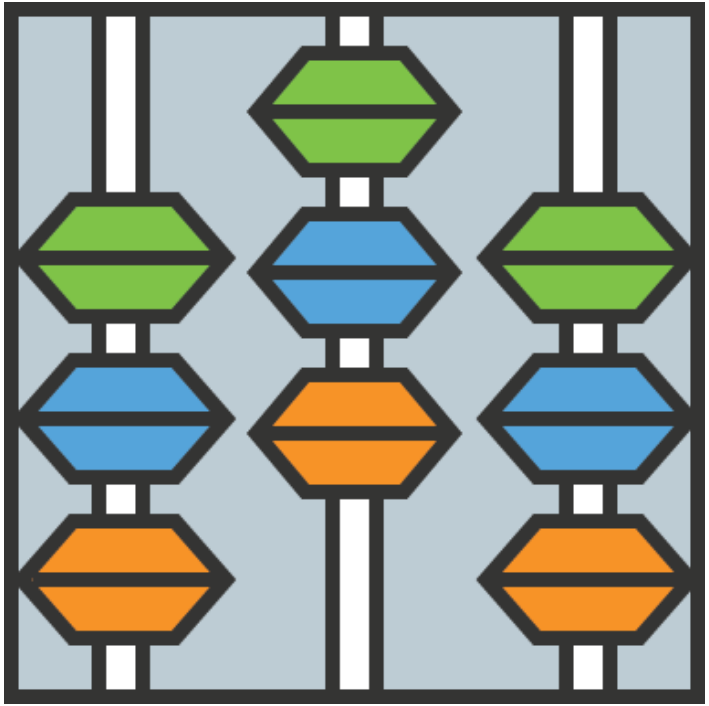
Asset-Based Analytics (Project Abacus)



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Asset Based Analytics

- Transform operational data into new data streams
- Create analyses based on AF
  - PE expressions
  - Rollups and aggregations
  - Generate event frames

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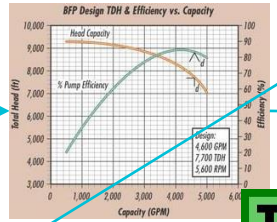
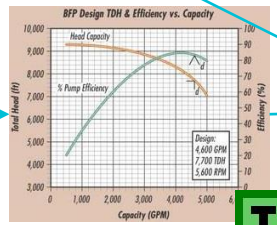
Use Case

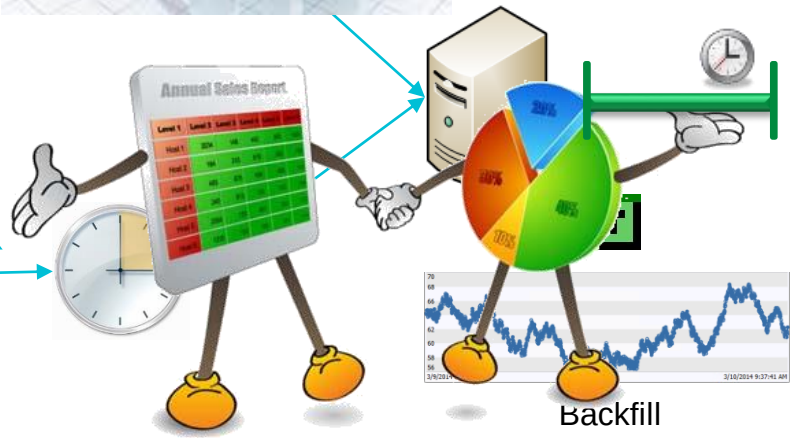


Calculations

Test



Calculations



Backfill

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DEMO

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Asset Based Analytics

- Easy – empower users to build their own calculations
- Reuse and standardize
  - Clarity and correctness
- Rollup and summarize
- Not just numbers, events too
- Performance and scalability

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Asset Based Analytics Timeline

- 300+ beta users

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PI Server 2014 with Asset Based Analytics

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Product Manager
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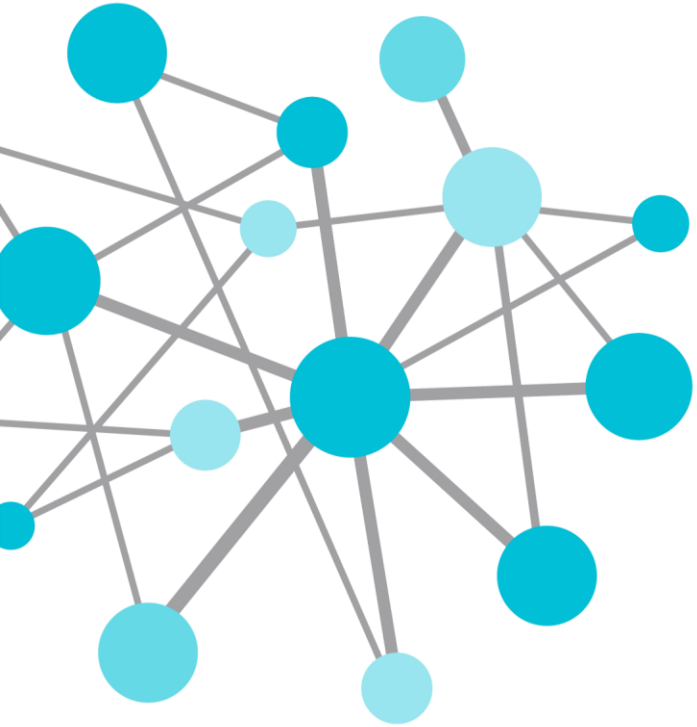

THANK YOU

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