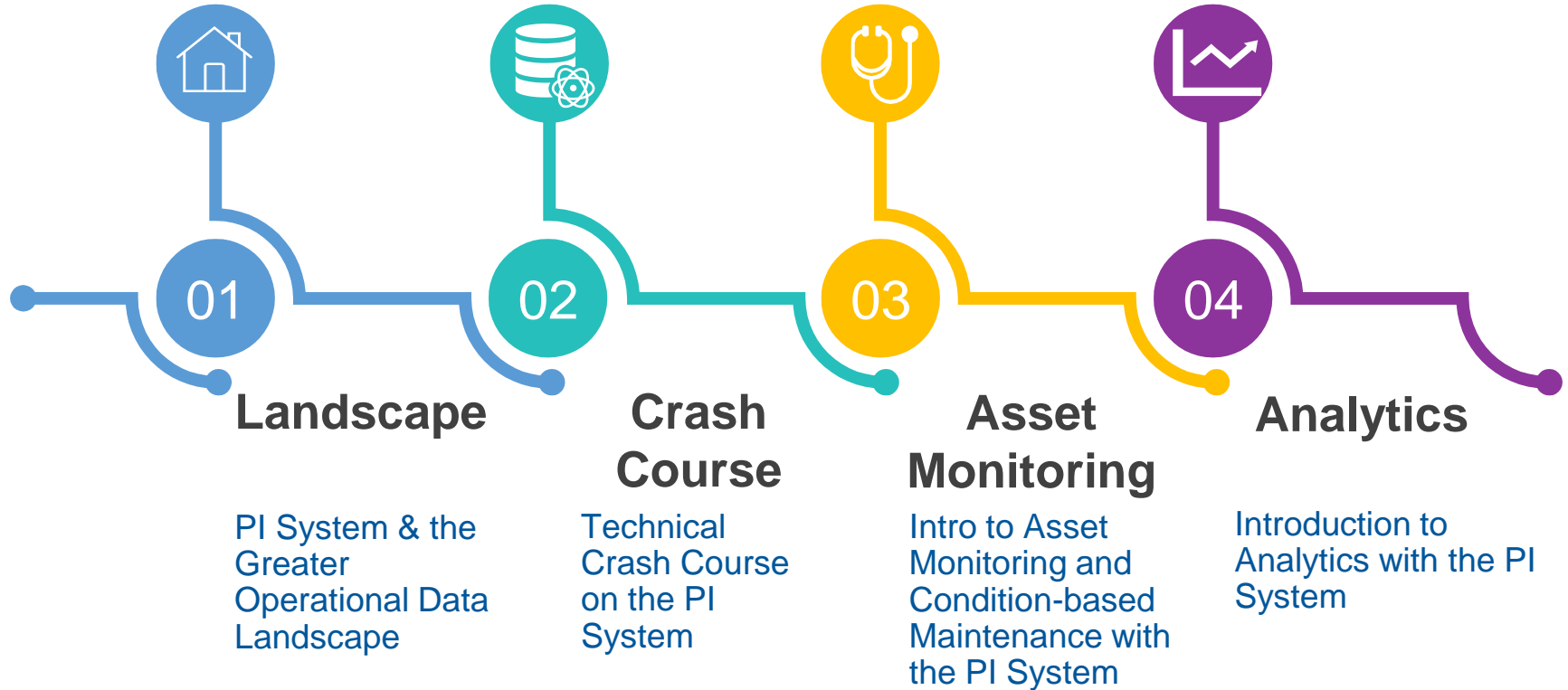


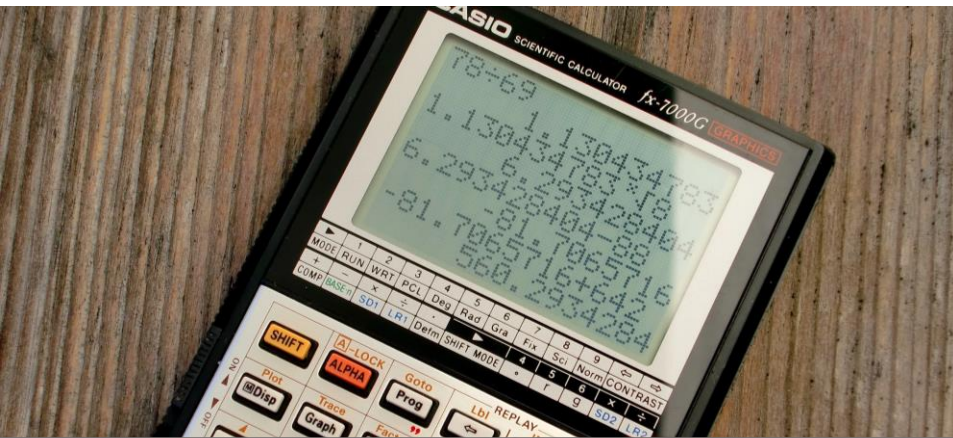
Introduction to Analytics with the PI System

Carlos Villanúa Fernández
Systems Engineer



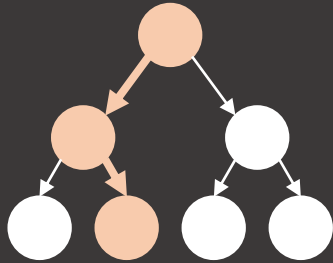
Where are we in the PI System Introduction





$$\frac{d[P]}{dt} = k(T)[A]^n[B]^m$$

“Analytics” offer many choices...

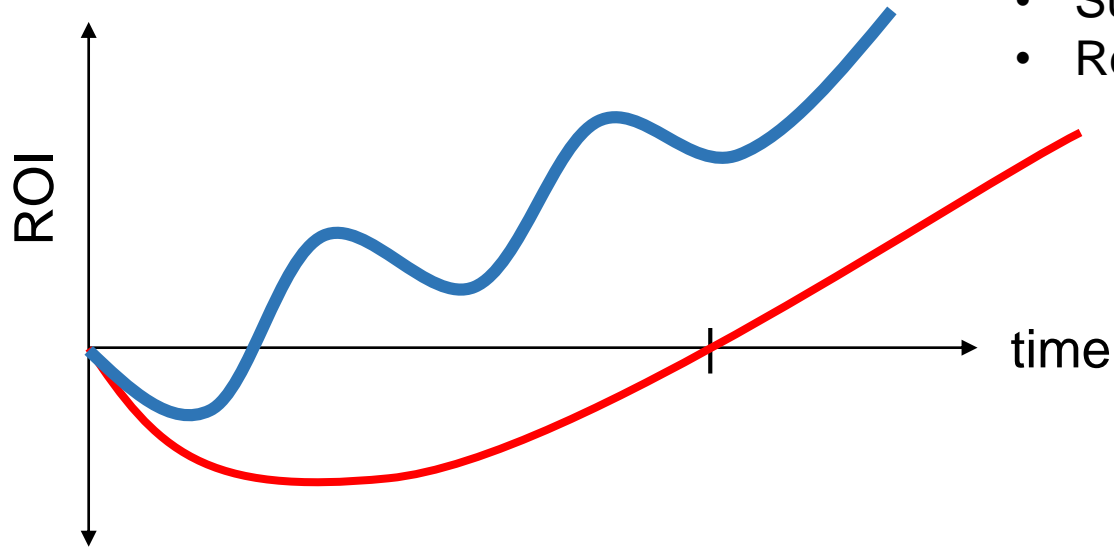


Where do I start?
or
Where are the quick wins?

Small projects propel success for a large project

Must-have project characteristics

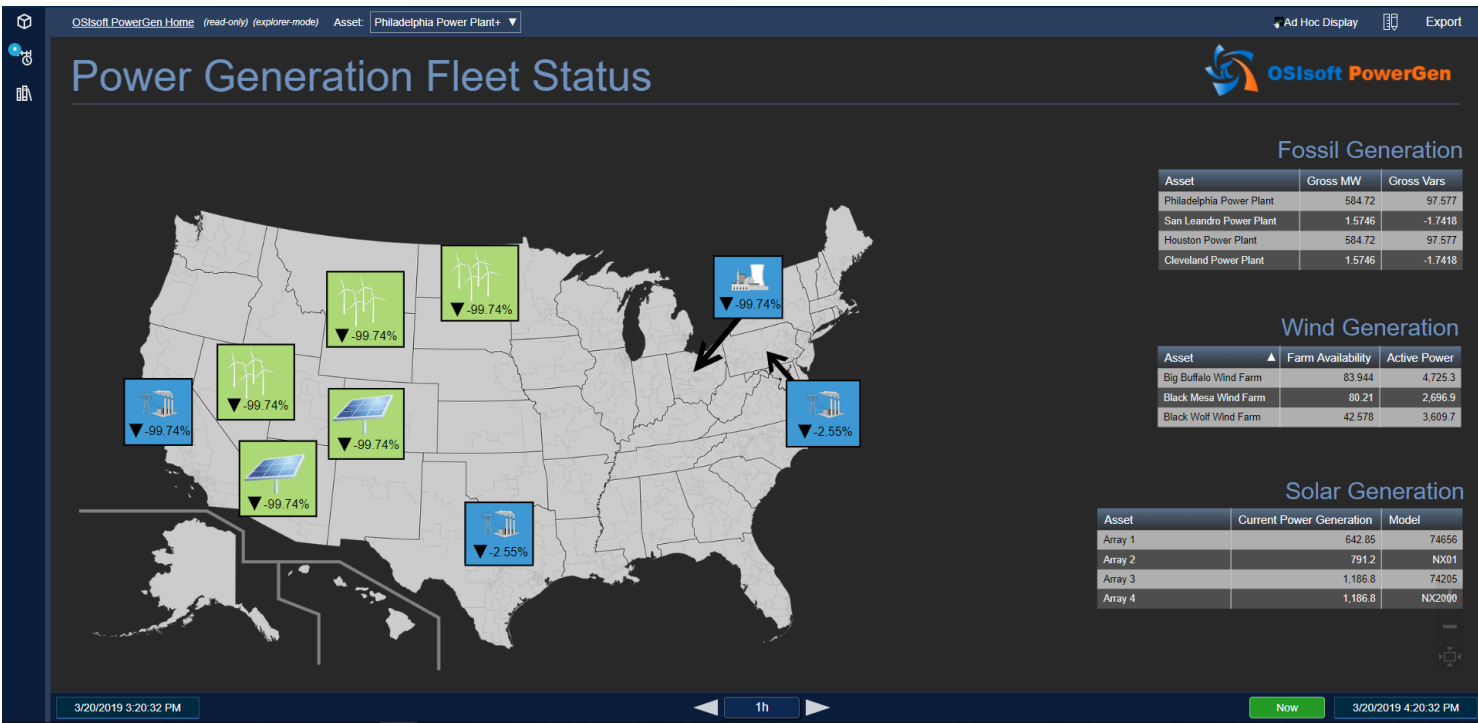
- Subject matter expert included
- Sufficient business value
- Related to larger initiative





Plant Manager

“What is our current capacity factor?”

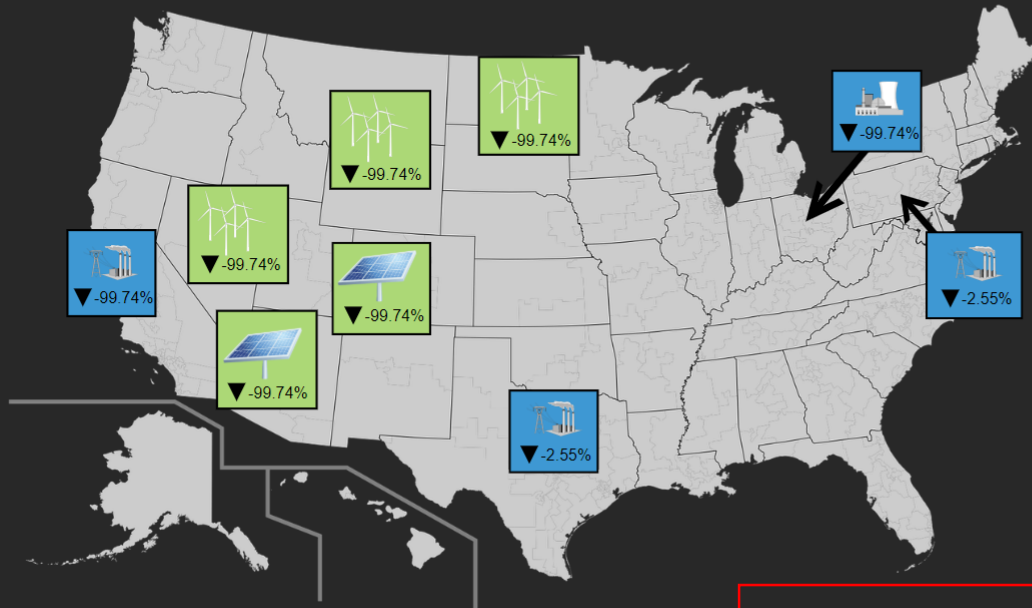


Live KPIs for quick decisions
Know availability for the grid

Additional supporting data
Asset-based data object

Drill down for granularity
Equipment-level visibility

Power Generation Fleet Status



Fossil Generation

Asset	Gross MW	Gross Vars
Philadelphia Power Plant	584.72	97.577
San Leandro Power Plant	1,5746	-1.7418
Houston Power Plant	584.72	97.577
Cleveland Power Plant	1,5746	-1.7418

Wind Generation

Asset	Farm Availability	Active Power
Big Buffalo Wind Farm	83,944	4,725.3
Black Mesa Wind Farm	80.21	2,696.9
Black Wolf Wind Farm	42,578	3,609.7

Solar Generation

Asset	Current Power Generation	Model
Array 1	642.85	74656
Array 2	791.2	NX01
Array 3	1,186.8	74205
Array 4	1,186.8	NX2000

3/20/2019 3:20:32 PM

◀ 1h ▶

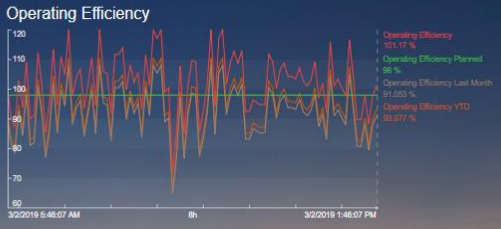
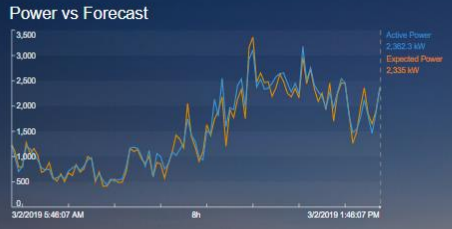
Now

3/20/2019 4:20:32 PM

Black Mesa Big Buffalo Wind Farm Black Mesa Wind Farm Black Wolf Wind Farm



Capacity Factor	62.166 %
Farm Availability	66.667 %
Turbines Installed	3
Turbines in Production	3



Turbines

● GE05 Availability 5.0776 %	● GE06 Availability 100 %	● GE07 Availability 100 %
Capacity (%) 24.662	Capacity (%) 34.631	Capacity (%) 34.483

3/2/2019 5:46:07 AM

8h

Now

3/2/2019 1:46:07 PM



Plant Operator

“What is occurring during turbine curtailments?”

Self-service event comparison

No waiting on a central team

Quick event comparisons

Find longest curtailment

Insights without coding

Just learn to drag-and-drop



OSisoft
PI Vision

Events

- Automatically refresh the list
- GE05 2019-02-22 02:53:35
- GE05 2019-02-21 23:28:19
- GE05 2019-02-20 07:17:05
- GE05 2019-02-19 20:55:05
- GE05 2019-02-19 19:18:35
- GE05 2019-02-19 06:11:35
- GE05 2019-02-11 07:35:49

Attributes

GE05 2019-02-10 00:50:19

Information

- Manufacturer: GE
- Turbine: GE05
- Wind Farm: Wild River Wind Farm

Power

- Active Power: -2.0179 kW
- Avg Active Power: -8.1255 kW
- Avg Expected Power: 1,372.9 kW
- Expected Power: 1,494.3 kW

Production

- Operating State: Feathering Position
- Production Delta: -1,496.3 kW
- Production Loss: -40,016 kWh
- Wind Speed: 13.217 m/s

GE05

(explorer-mode)

Production Delta (kW)

GE05 2019-02-20 07:17:05

GE05 2019-02-19 20:55:05

GE05 2019-02-19 19:18:35

GE05 2019-02-19 06:11:35

GE05 2019-02-11 07:35:49

GE05 2019-02-11 06:00:19

GE05 2019-02-09 07:42:34

GE05 2019-02-09 07:28:04

Edit Search Criteria

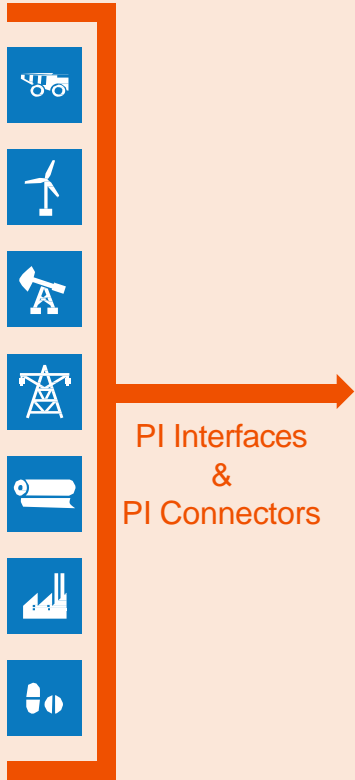
- Database: Power Generation
- Time Range: Last 30 Days
- Event Severity
- Event Name
- Event Type and Attribute Value: Selected
 - Event Type: Wind Curtailment
 - Event Attribute: +
- Asset Name: Any
- Asset Type: Wind Turbine
 - Wind Turbine
- Event State
- Event Category
- Event Acknowledgment
- Event Comments
- Event Duration
- Number of Results: Number of Most Recent Events 50
- Search Mode: Events Starting in Time Range

Return All Descendants

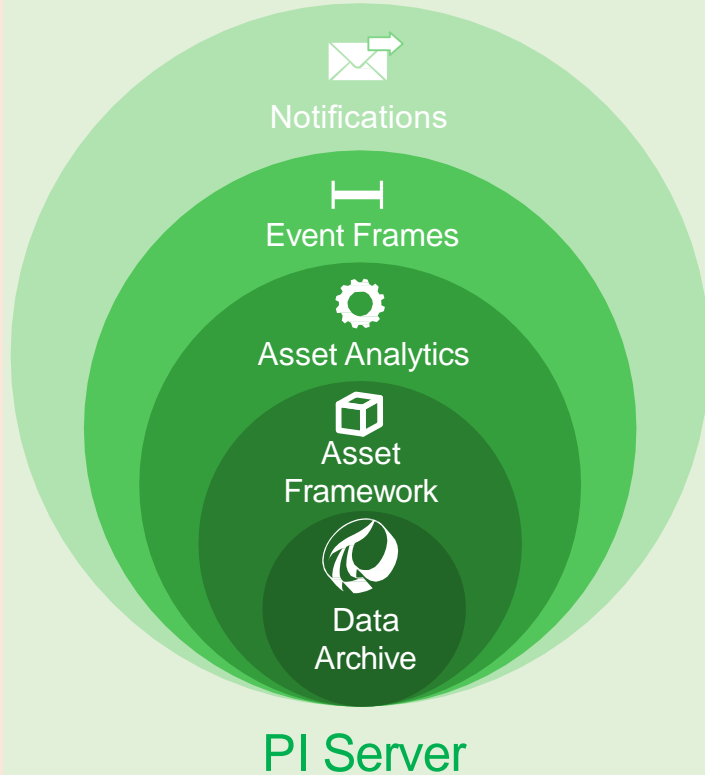
Apply Reset Cancel

Ad hoc event comparison inherits event & asset structure enabling easy event comparison

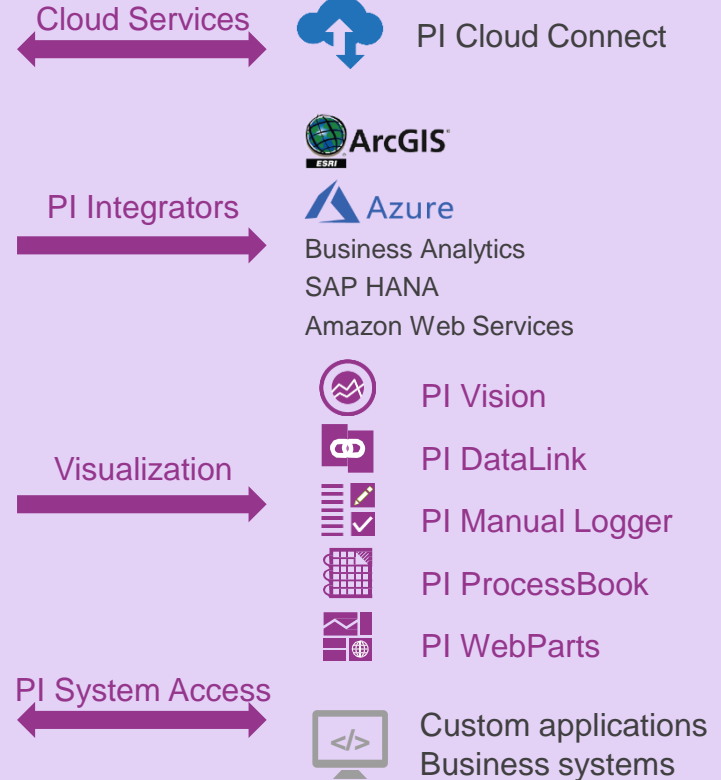
Collect



Store & Enhance



Deliver



PI System Infrastructure

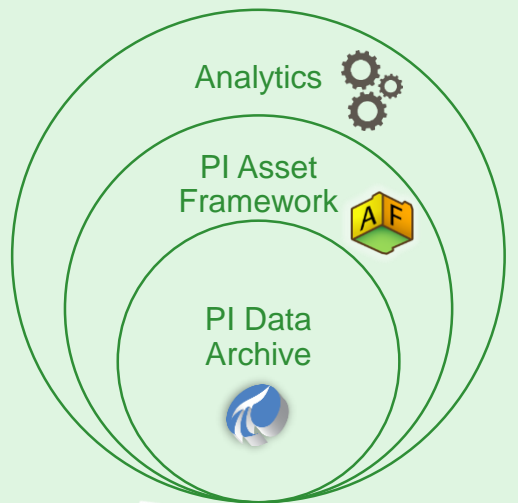


Collect



PI System Infrastructure

Enhance & Contextualize



80-5.Net Volume DC.SJ.PUE **TI-102** DC.Zero **DY-108** trigger
 GE01_A_DT DC.SJ.C1.Z3.R3.PDU1.PF GE01_A_DT AC09.Power
 GE04_OS Asset1 Problem DC.SJ.SiteRealTim Anacortes Refinery.Alkylation.Asset **B737 FG117** DC.TimeLoad
 s **QI-122 FI-151** eTLoad.PR FT9001 Problems B210_FG005.KPIExcursion **D-110.Tank Pressure.PV**
 02F102.1HRAVG BGT001 AQUA2-SI005.PV GE02_Energy 4-36.Net Volume **AC04.Air Flow FI-101** bf5e1d1d-39c9-
 PI-111 facility_output 0_ENG_MODE_STS F111 02T100 03LBB02CT001-2 4b5b-b3d3-c2ce05fa3a26 DC.Rk07R
 AQUA2-TI-201.PV DC.NY.Actual.PWR.day.Tot 0_CLR_FINAL_OUT_B TDC.Srv06R GE04_Energy
 AlarmTest.Input.Float32.1 **364511575-AC Power** MP F506_E000 Sky **TI-121** FT9001
 FI-101 bf5e1d1d-39c9-4b5b-b3d3-c2ce05F GE01_DT **409510395_Wind Speed QI-109** Global
 BGE003 **FI-111** 02T100 GE01_DT **Cooling Fan-711.Feed Rate** GE01_DT FAC.OAK.Power-Kh-Val.PV
 AF_FLOW3 02T103 AT401 AQUA2-SI005.PV GE02_Energy **Boiler-209.Fuel Gas** DC.Srv01R
 ACEDemo.Unit1.Output 0_ENG_MODE_STS 125.Fuel Gas **Flow** DC.Srv01R
TI-178 B352_W778 0_CMP_SVLV_PCT DC.Z1R **D-110.Tank**
 02F104 CD:F161 0_CMP_HDR 02T103.Q **Pressure.P**
 80-13.Net 1-13.Net **DY-131** DC.SJ.PUE **TI-102** Pump #1
 94:BW.R **TI-101** 03LBB02CT001-2 DM-05:BW.R **0_ENG_AUX_STS** DC.SJ.C1.Z1.R1.Rk06.S2
 F723_E889 Volume **DY-131** Q03.PWR **TIC-181** V Boiler Feed
369512185-Temp B045_FG978 DC.SJ.PUE **QI-111** FinalProductBin.On AT401 **Boiler-209.Fuel**
 Compressor-439.Feed Rate fic1001.C GE02_OT **Boiler-209.Fuel** AF_NOISE GE05_ES T **% CO2** 1-8.Net
DC.CH.DCE **FIC-172:210** GE01_DT c2ce05fa3a26 Gas Flow 0_CMP_FLOW_TOTAL 03LBA32CT0
FI-121 AF_FLOW3 DM-05:BW.R AT401 1-16.Net Volume **CB1992_MS** 01-2
 0_ENG_MODE_STS 0_CLR_FINAL_OUT_B TDC.SJ.ITLoad.P WR
 GE03_Q 339511775_Clear Sky Global Horiz GE01_DT FT9001 **TI-145**
DY-131:166 GE01_TD **FI-101** FT9001 **TI-145** fasttag FR2001
 Boiler-334.Feed Rate Volume FeedBin.Cmt **TI-178**
 02F102.1HR BGE003 **FI-111** 02T100 403511195_Wind DC.Zone1.Number GE04_OS
 AVG AF_FLOW3 02T100 Speed DailyTrigger FrqPrbCost_ER FT9001
 BGT001 ACEDemo.Unit1.Output **45-2.Net Volume** FT9001
PI-111 facility_output 0_CMP_SVLV_PCT FT9001 DC.C2Z1.Pwr.Rippi AF_NOISE
 AT401 02F104 CD:F161 AlarmTest.Input. Float32.1 DC.SJ.SiteRealTim eTLoad.PR FT9001
FIC-144 GE04_Status 02F100 fasttag 02:F101.C QI-109 GE01_DT Cooling Fan DM-05:BW.R
 AQUA2-SI005.PV GE02_Energy DC.SJ.C1.Z1.R1.R k06.S2.003.PWR
 0_ENG_MODE_STS TI-178 DC.Z1R 0_CMP_HDR_SUC_PRC Asset1 Output **QI-111** FinalProductBin.On
 FI-151 02T103.Q DC.Z1R 0_CMP_HDR_SUC_PRC Active Meters GE01_A_DT aso **FI-101** 02:F101.C **94:GRDIDX.Pr**
FI-111 AF_NOISE **PI-115** **DY-101** FR2001 TIC-121 209.Fuel Gas Flow
 DM-05:BW.R Aso AT401 DC.Srv01R

Map raw data to the physical world and normalize it across the enterprise

Crude Desalter

- Operating Pressure: 110 psi
- Charge Rate: 14 gph
- Mix Valve Pressure: 8 psi
- Water Rate: 8%

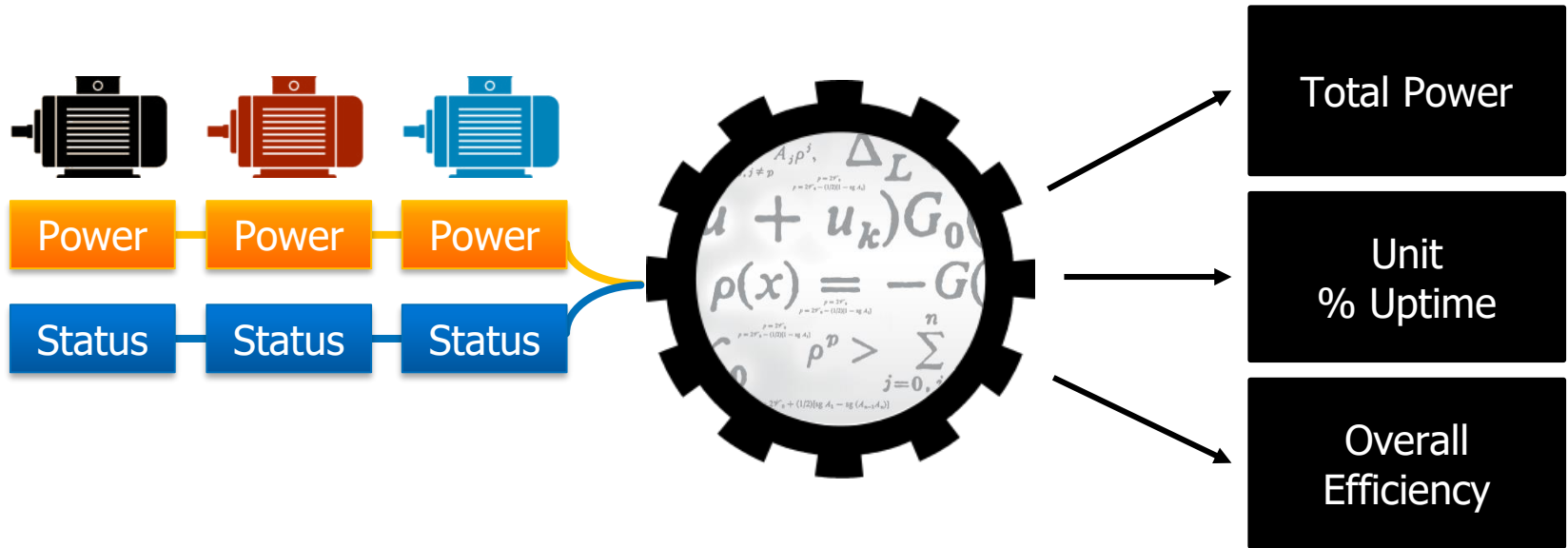
Weather Conditions

- Relative Humidity: 34%
- Current Temp: 85 F
- High: 92
- Low: 57 F
- Wind: 8 mph/N

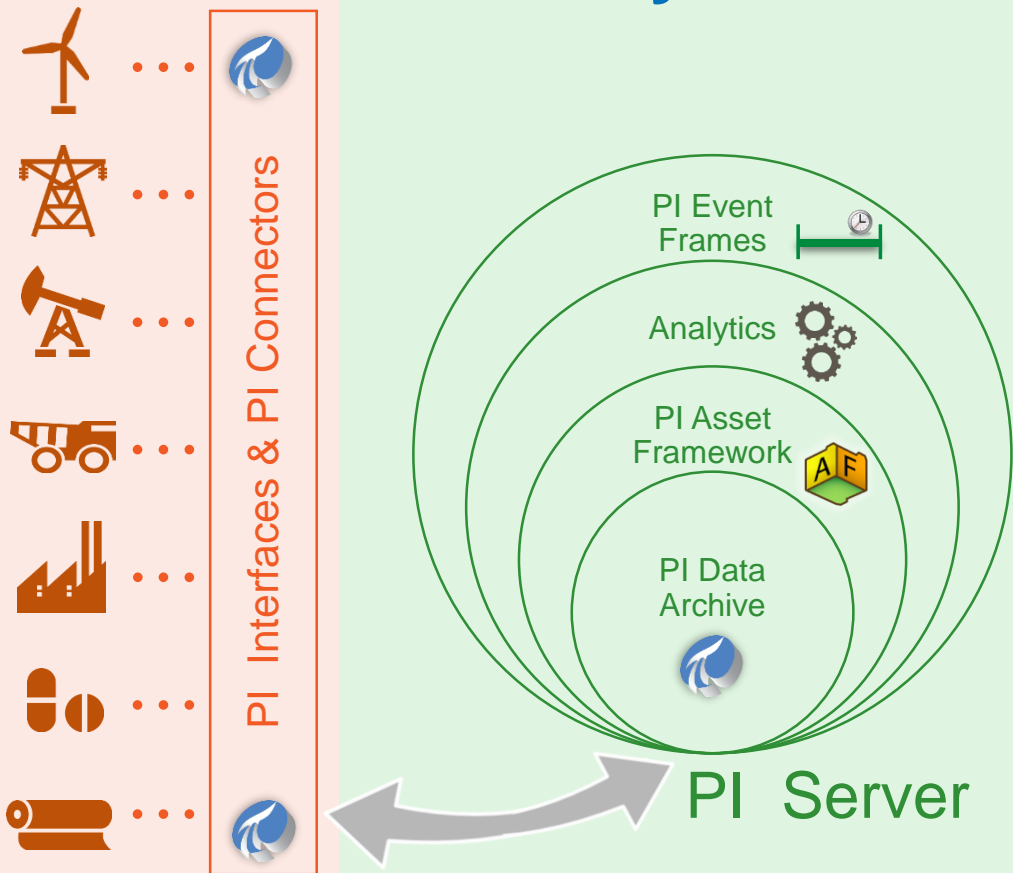
Crude Furnace

- Draft Pressure: -0.5 WC
- Stack Temp: 316 F
- Oxygen: 2.5%
- Outlet Temp: 840 F
- Cold Oil Velocity: 6 ft/sec

Make raw data decision-ready

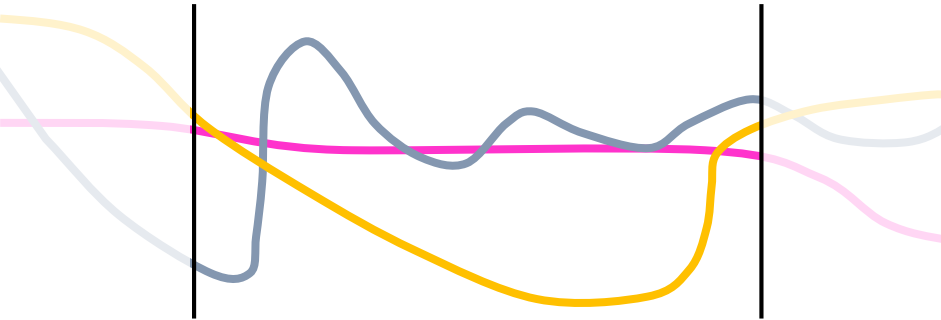


PI System Infrastructure

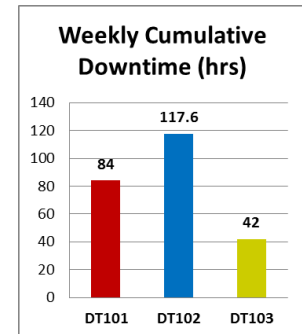
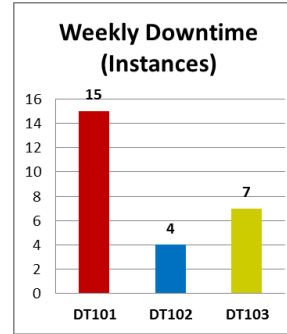


Identify discrete events within continuous data streams

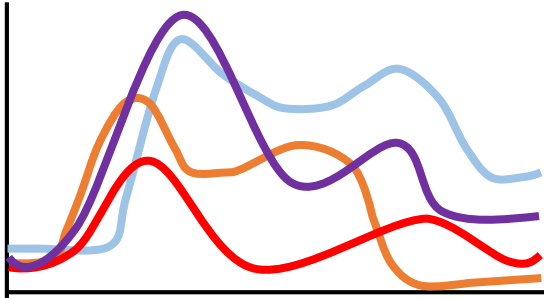
Simplify Data Analysis



Compare Assets



Compare Events

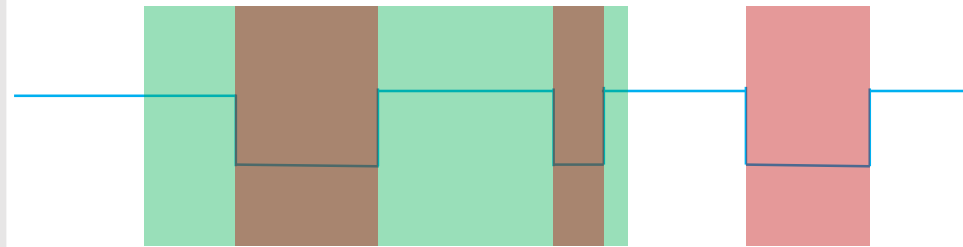


Name	Max
EF1	122.47
EF2	112.73
EF3	98.61
EF4	125.24

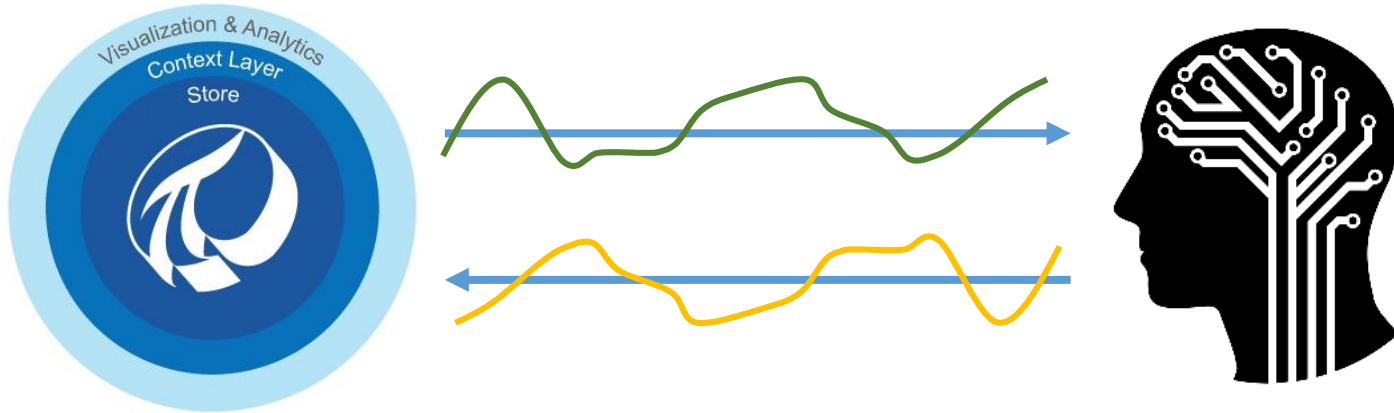
Discover Event Interrelationships

Running XYZ

Downtime

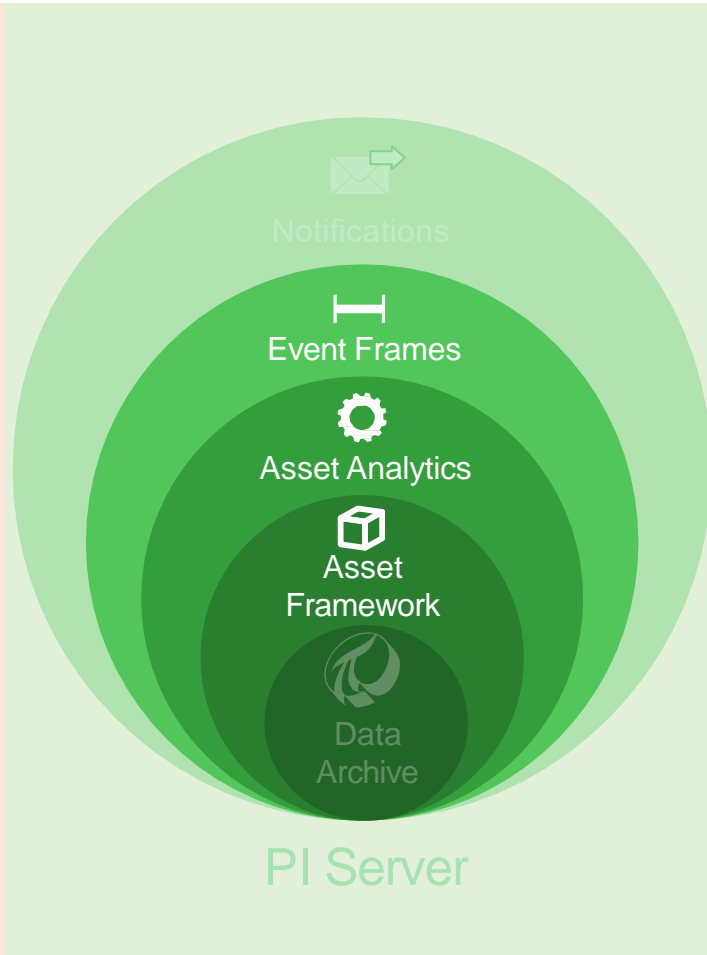
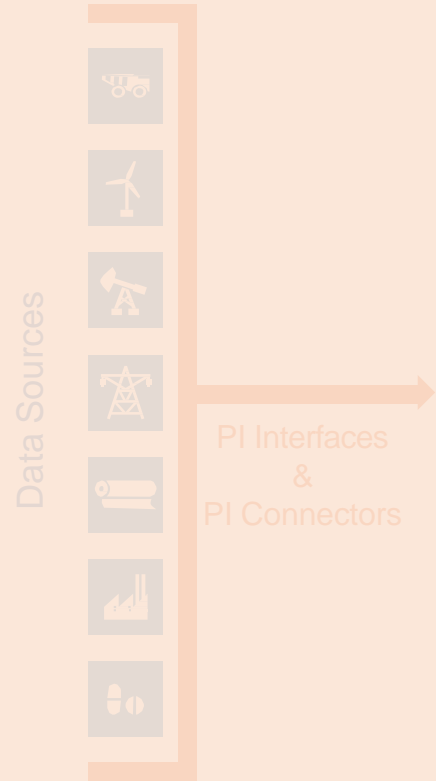


Integrate with other systems



Send data back to the PI System

Collect



Deliver

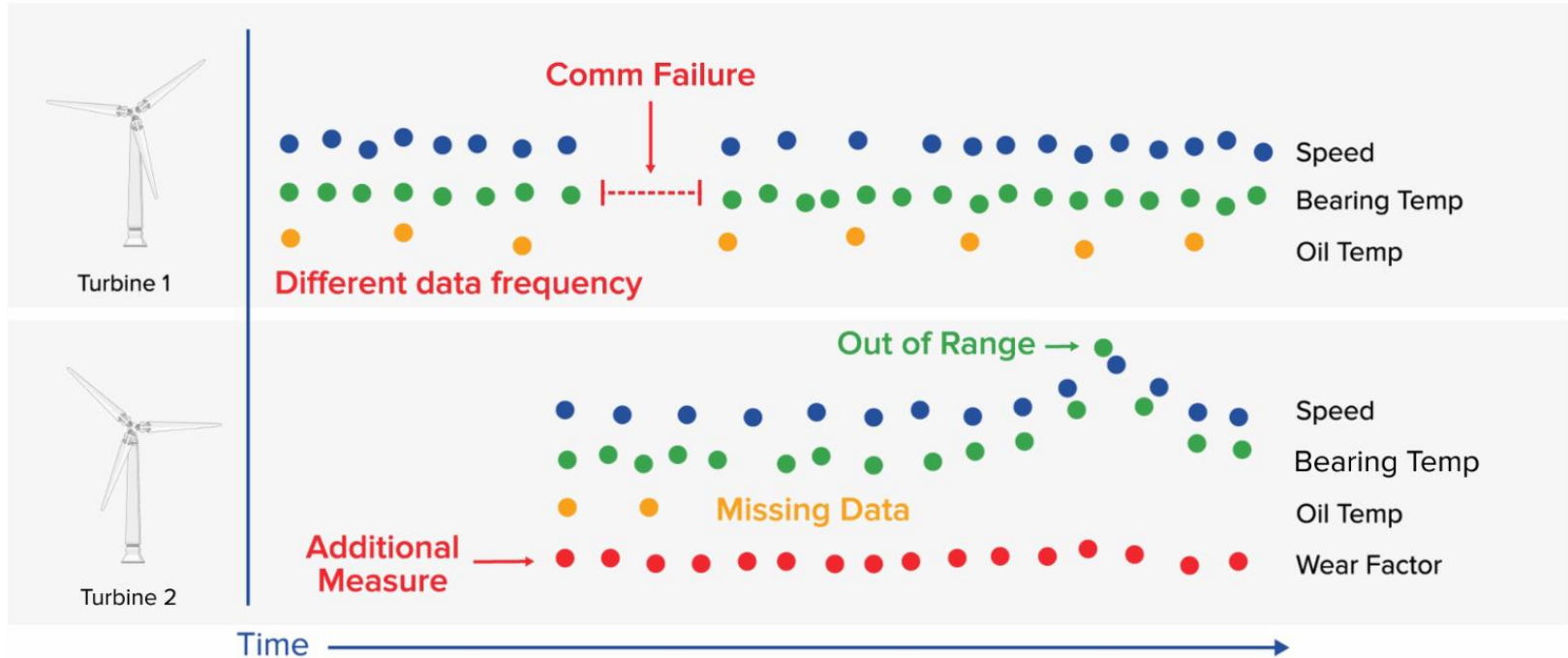


Wind Turbine	TimeStamp	Day of the Week	Active Power	Apparent Power	Bearing A Temperature	Capacity	Rotor Speed	Operati
GE01	3/18/2019 10:52:57.477 AM	Monday	1,517.787	1,523.764	42.523	62.831	19.927	90.403
GE01	3/18/2019 10:53:57.477 AM	Monday	1,518.78	1,517.996	42.515	62.877	20.39	90.421
GE01	3/18/2019 10:54:57.477 AM	Monday	1,528.438	1,527.098	42.507	62.924	19.877	90.44
GE01	3/18/2019 10:55:57.477 AM	Monday	1,524.599	1,525.12	42.498	62.97	20.002	90.459
GE01	3/18/2019 10:56:57.477 AM	Monday	1,521.875	1,521.751	42.49	63.016	19.913	90.478
GE01	3/18/2019 10:57:57.477 AM	Monday	1,525.674	1,531.629	42.481	63.063	19.726	90.497
GE01	3/18/2019 10:58:57.477 AM	Monday	1,535.935	1,536.558	42.473	63.109	20.013	90.516
GE01	3/18/2019 10:59:57.477 AM	Monday	1,517.37	1,519.13	42.465	63.155	20.232	90.535
GE01	3/18/2019 11:00:57.477 AM	Monday	1,528.547	1,529.658	42.456	63.202	20.065	90.554
GE01	3/18/2019 11:01:57.477 AM	Monday	1,529.736	1,524.135	42.448	63.248	19.922	90.573
GE01	3/18/2019 11:02:57.477 AM	Monday	1,517.794	1,525.652	42.439	63.294	19.955	90.592
GE01	3/18/2019 11:03:57.477 AM	Monday	1,505.852	1,512.247	42.431	63.341	19.708	90.61
GE01	3/18/2019 11:04:57.477 AM	Monday	1,519.556	1,521.107	42.423	63.387	20.054	90.627
GE01	3/18/2019 11:05:57.477 AM	Monday	1,519.952	1,523.781	42.414	63.433	20.173	90.644
GE01	3/18/2019 11:06:57.477 AM	Monday	1,523.877	1,508.615	42.406	63.48	19.949	90.662
GE01	3/18/2019 11:07:57.477 AM	Monday	1,533.151	1,532.751	42.397	63.526	19.94	90.68
GE01	3/18/2019 11:08:57.477 AM	Monday	1,525.437	1,526.634	42.389	63.572	19.999	90.698
GE01	3/18/2019 11:09:57.477 AM	Monday	1,523.269	1,518.825	42.381	63.619	19.862	90.716
GE01	3/18/2019 11:10:57.477 AM	Monday	1,522.443	1,522.936	42.372	63.665	20.009	90.733
GE01	3/18/2019 11:11:57.477 AM	Monday	1,509.033	1,522.19	42.364	63.712	19.63	90.75
GE01	3/18/2019 11:12:57.477 AM	Monday	1,524.965	1,525.264	42.355	63.758	20.008	90.767
GE01	3/18/2019 11:13:57.477 AM	Monday	1,511.918	1,508.629	42.347	63.804	19.621	90.784
GE01	3/18/2019 11:14:57.477 AM	Monday	1,519.61	1,523.788	42.339	63.851	19.749	90.801
GE01	3/18/2019 11:15:57.477 AM	Monday	1,526.237	1,524.405	42.33	63.897	19.949	90.818
GE01	3/18/2019 11:16:57.477 AM	Monday	1,532.863	1,525.036	42.322	63.943	19.886	90.835
GE01	3/18/2019 11:17:57.477 AM	Monday	1,509.635	1,515.866	42.313	63.99	19.921	90.855
GE01	3/18/2019 11:18:57.477 AM	Monday	1,522.636	1,525.022	42.305	64.036	19.992	90.876
GE01	3/18/2019 11:19:57.477 AM	Monday	1,518.829	1,519.512	42.296	64.082	20.067	90.893
GE01	3/18/2019 11:20:57.477 AM	Monday	1,527.32	1,526.332	42.288	64.129	20.043	90.91
GE01	3/18/2019 11:21:57.477 AM	Monday	1,515.018	1,516.249	42.28	64.175	19.828	90.926
GE01	3/18/2019 11:22:57.477 AM	Monday	1,506.233	1,506.149	42.271	64.221	19.684	90.943

BI Tools & Algorithms
expect time-aligned data

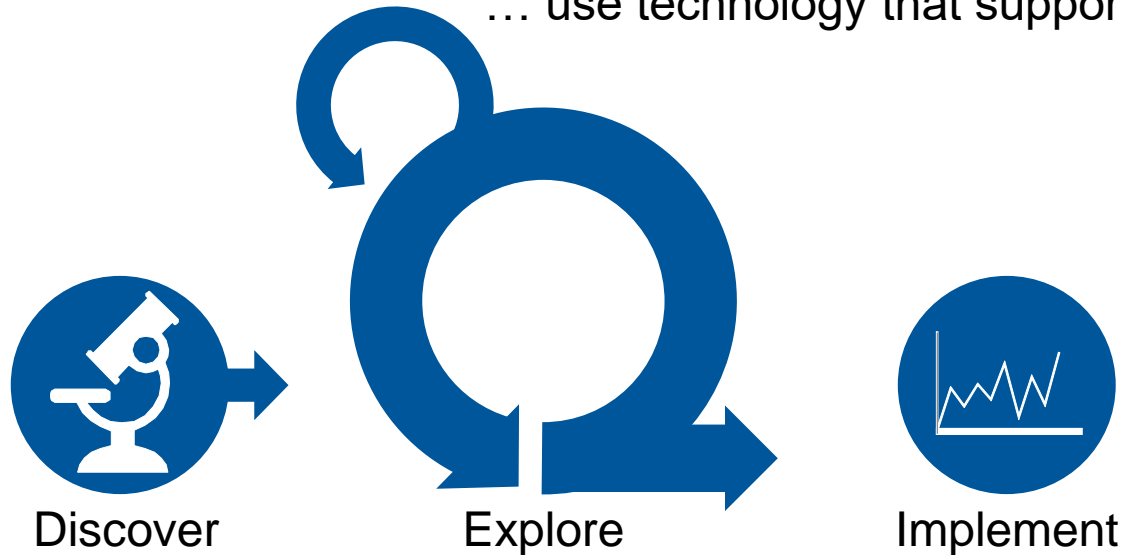
Data Scientists & Business Analysts
need that data contextualized

Time-series Data is Not Naturally Aligned or Contextualized



Advanced Analytics Workflows are Iterative and Need SMEs

... use technology that support this approach



Source Assets

Server: DFPIAFSERVERPRD

Database: Power Generation

Assets

- Generation
 - Equipment List
 - Fossil Generating Station
 - Matador 1 CCGT
 - OSIsoft Power
 - PowerCo
 - Solar Power Generation Fleet
 - Wind Power Generation Fleet
 - Big Buffalo Wind Farm
 - Black Mesa Wind Farm
 - GE01
 - GE02
 - GE03
 - GE04
 - GE05
 - GE06
 - GE07

Attributes: Filter

Select All

- Active Power
- Apparent Power
- Apparent Power (calc)
- BatchWindBinFilter

Search Shape

Asset Shape

- Wind Turbine
 - Active Power
 - Apparent Power
 - Bearing A Temperature
 - Capacity
 - Operating Efficiency
 - Rotor Speed

Select Data > Modify View > Publish

Source Assets

Server: DFPIAFSERVERPRD

Database: Power Generation

Assets

- Generation
 - Equipment List
 - Fossil Generating Station
 - Matador 1 CCGT
 - OSIsoft Power
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 - GE01
 - GE02
 - GE03
 - GE04
 - GE05
 - GE06
 - GE07

Attributes: Filter

Select All

- Active Power
- Apparent Power
- Apparent Power (calc)
- BatchWindBinFilter
- Blade3, Set Value
- Capacity
- Circuit Breaker Cut-Ins

Begin from common nomenclature & hierarchy



Discover

Pick from measurements that shape the model or view

Attributes: Filter

Select All

- Active Power
- Apparent Power
- Apparent Power (calc)
- BatchWindBinFilter
- Blade3, Set Value
- Capacity
- Circuit Breaker Cut-Ins

Edit Filters

- Asset Name
 - GE05
- Asset Template Search Derived Templates
 - Wind Turbine
- Asset Category
 - Wind Turbine

+ Add Filter

Cancel Save

Filter based on similar assets

Add Column
 9 columns

Edit Row Filters
 1 Row Filter

Edit Value Mode
 Interpolated Values
 Every 1 minute

Start Time: *..1d

End Time: *

Apply

Wind Turbine	TimeStamp	Day of the Week	Active Power	Apparent Power	Bearing A Temperature	Capacity	Rotor Speed	Operati
GE01	3/18/2019 10:52:57.477 AM	Monday	1,517.787	1,523.764	42.523	62.831	19.927	90.403
GE01	3/18/2019 10:53:57.477 AM	Monday	1,518.78	1,517.996	42.515	62.877	20.39	90.421
GE01	3/18/2019 10:54:57.477 AM	Monday	1,528.438	1,527.098	42.507	62.924	19.877	90.44
GE01	3/18/2019 10:55:57.477 AM	Monday	1,524.599	1,525.12	42.498	62.97	20.002	90.459
GE01	3/18/2019 10:56:57.477 AM	Monday	1,521.875	1,521.751	42.49	62.915	19.813	90.478
GE01	3/18/2019 10:57:57.477 AM	Monday	1,525.674	1,531.629	42.481	62.915	19.813	90.478
GE01	3/18/2019 10:58:57.477 AM	Monday	1,535.935	1,536.558	42.473	62.915	19.813	90.478
GE01	3/18/2019 10:59:57.477 AM	Monday	1,517.37	1,519.13	42.465	62.915	19.813	90.478
GE01	3/18/2019 11:00:57.477 AM	Monday	1,528.547	1,529.658	42.456	62.915	19.813	90.478
GE01	3/18/2019 11:01:57.477 AM	Monday	1,529.736	1,524.135	42.448	62.915	19.813	90.478
GE01	3/18/2019 11:02:57.477 AM	Monday	1,517.794	1,525.652	42.439	62.915	19.813	90.478
GE01	3/18/2019 11:03:57.477 AM	Monday	1,505.852	1,512.247	42.431	62.915	19.813	90.478
GE01	3/18/2019 11:04:57.477 AM	Monday	1,519.556	1,521.107	42.423	62.915	19.813	90.478
GE01	3/18/2019 11:05:57.477 AM	Monday	1,519.952	1,523.781	42.414	62.915	19.813	90.478
GE01	3/18/2019 11:06:57.477 AM	Monday	1,523.877	1,508.615	42.406	62.915	19.813	90.478
GE01	3/18/2019 11:07:57.477 AM	Monday	1,533.151	1,532.751	42.397	62.915	19.813	90.478
GE01	3/18/2019 11:08:57.477 AM	Monday	1,525.437	1,526.634	42.389	62.915	19.813	90.478
GE01	3/18/2019 11:09:57.477 AM	Monday	1,523.269	1,518.825	42.381	62.915	19.813	90.478
GE01	3/18/2019 11:10:57.477 AM	Monday	1,522.443	1,522.936	42.372	62.915	19.813	90.478
GE01	3/18/2019 11:11:57.477 AM	Monday	1,509.033	1,522.19	42.364	62.915	19.813	90.478
GE01	3/18/2019 11:12:57.477 AM	Monday	1,524.965	1,525.264	42.355	62.915	19.813	90.478
GE01	3/18/2019 11:13:57.477 AM	Monday	1,511.918	1,508.629	42.347	62.915	19.813	90.478
GE01	3/18/2019 11:14:57.477 AM	Monday	1,519.61	1,523.788	42.339	62.915	19.813	90.478
GE01	3/18/2019 11:15:57.477 AM	Monday	1,526.237	1,524.405	42.33	62.915	19.813	90.478
GE01	3/18/2019 11:16:57.477 AM	Monday	1,532.863	1,525.036	42.322	62.915	19.813	90.478
GE01	3/18/2019 11:17:57.477 AM	Monday	1,509.635	1,515.866	42.313	62.915	19.813	90.478
GE01	3/18/2019 11:18:57.477 AM	Monday	1,522.636	1,525.022	42.305	62.915	19.813	90.478
GE01	3/18/2019 11:19:57.477 AM	Monday	1,518.829	1,519.512	42.296	64.082	20.067	90.893
GE01	3/18/2019 11:20:57.477 AM	Monday	1,527.32	1,526.332	42.288	64.129	20.043	90.91
GE01	3/18/2019 11:21:57.477 AM	Monday	1,515.018	1,516.249	42.28	64.175	19.828	90.926
GE01	3/18/2019 11:22:57.477 AM	Monday	1,506.233	1,506.149	42.271	64.221	19.684	90.943

Row Filters

Add New Row Filter

- String: Include rows based on whether the contents of a column match a string pattern
- Digital: Include rows based on whether the contents of a column contain certain digital values
- Numeric: Include rows based on whether the contents of a column contain certain numeric values
- Null Values: Include rows where the contents of a column contain a value
- Event Frame**: Include rows where certain Event Frames are active

Close



Discover

Various ways to clean the data



Discover

Include multiple filters to clean data

Row Filters

Event Row Filter 1

Criteria: Event Related

Bearing A Temperature > -273.15

Event Row Filter 1

Criteria 1: Match Event Frames where Event Template = Wind Curtailment Related Shape Asset is any

Add New Row Filter

- String: Include rows based on whether the contents of a column match a string pattern
- Digital: Include rows based on whether the contents of a column contain certain digital values
- Numeric: Include rows based on whether the contents of a column contain certain numeric values
- Null Values: Include rows where the contents of a column contain a value
- Event Frame: Include rows where certain Event Frames are active

Close



Discover

Select Data > **Modify View** > Publish

Back Next

+ Add Column 9 columns
▼ Edit Row Filters 1 Row Filters
≡ Edit Value Mode Interpolated Values Every 1 minute

Start Time End Time
~-1d * Apply

Wind Turbine	TimeStamp	Day of the Week	Active Power	Apparent Power	Bearing A Temperature	Capacity	Rotor Speed	Operati
GE01	3/18/2019 10:52:57.477 AM	Monday	1,517.787	1,523.764	42.523	62.831	19.927	90.403
GE01	3/18/2019 10:53:57.477 AM	Monday	1,518.78	1,517.996	42.515	62.877	20.39	90.421
GE01	3/18/2019 10:54:57.477 AM	Monday	1,528.438	1,527.098	42.507	62.924	19.877	90.44
GE01	3/18/2019 10:55:57.477 AM	Monday	1,524.599	1,525.12	42.498	62.97	20.002	90.459
GE01	3/18/2019 10:56:57.477 AM	Monday	1,521.875	1,521.751	42.49	63.016	19.913	90.478
GE01	3/18/2019 10:57:57.477 AM	Monday	1,525.674	1,531.629	42.481	63.063	19.726	90.497
GE01	3/18/2019 10:58:57.477 AM	Monday	1,535.935	1,536.558	42.473	63.109	20.013	90.516
GE01	3/18/2019 10:59:57.477 AM	Monday	1,517.37	1,519.13	42.465	63.155	20.232	90.535
GE01	3/18/2019 11:00:57.477 AM	Monday	1,528.547	1,529.658	42.456	63.202	20.065	90.554
GE01	3/18/2019 11:01:57.477 AM	Monday	1,529.736	1,524.135	42.448	63.248	19.922	90.573
GE01	3/18/2019 11:02:57.477 AM	Monday	1,517.794	1,525.652	42.439	63.294	19.955	90.592
GE01	3/18/2019 11:03:57.477 AM	Monday	1,505.852	1,512.247	42.431	63.341	19.708	90.61
GE01	3/18/2019 11:04:57.477 AM	Monday	1,519.556	1,521.107	42.423	63.387	20.054	90.627
GE01	3/18/2019 11:05:57.477 AM	Monday	1,519.952	1,523.781	42.414	63.433	20.173	90.644
GE01	3/18/2019 11:06:57.477 AM	Monday	1,523.877	1,508.615	42.406	63.48	19.949	90.662
GE01	3/18/2019 11:07:57.477 AM	Monday	1,533.151	1,532.751	42.397	63.526	19.94	90.68
GE01	3/18/2019 11:08:57.477 AM	Monday	1,525.437	1,526.634	42.389	63.572	19.999	90.698
GE01	3/18/2019 11:09:57.477 AM	Monday	1,523.269	1,518.825	42.381	63.619	19.862	90.716
GE01	3/18/2019 11:10:57.477 AM	Monday	1,522.443	1,522.936	42.372	63.665	20.009	90.733
GE01	3/18/2019 11:11:57.477 AM	Monday	1,509.033	1,522.19	42.364	63.712	19.63	90.75
GE01	3/18/2019 11:12:57.477 AM	Monday	1,524.965	1,525.264	42.355	63.758	20.008	90.767
GE01	3/18/2019 11:13:57.477 AM	Monday	1,511.918	1,508.629	42.347	63.804	19.621	90.784
GE01	3/18/2019 11:14:57.477 AM	Monday	1,519.61	1,523.788	42.339	63.851	19.749	90.801
GE01	3/18/2019 11:15:57.477 AM	Monday	1,526.237	1,524.405	42.33	63.897	19.949	90.818
GE01	3/18/2019 11:16:57.477 AM	Monday	1,532.863	1,525.036	42.322	63.943	19.886	90.835
GE01	3/18/2019 11:17:57.477 AM	Monday	1,509.635	1,515.866	42.313	63.99	19.921	90.855
GE01	3/18/2019 11:18:57.477 AM	Monday	1,522.636	1,525.022	42.305	64.036	19.992	90.876
GE01	3/18/2019 11:19:57.477 AM	Monday	1,518.829	1,519.512	42.296	64.082	20.067	90.893
GE01	3/18/2019 11:20:57.477 AM	Monday	1,527.32	1,526.332	42.288	64.129	20.043	90.91
GE01	3/18/2019 11:21:57.477 AM	Monday	1,515.018	1,516.249	42.28	64.175	19.828	90.926
GE01	3/18/2019 11:22:57.477 AM	Monday	1,506.233	1,506.149	42.271	64.221	19.684	90.943

Operational data of an asset that is usable by algorithms or BI Tools!!



- Asset Context
- Data Alignment
- Asset Normalization
- Filtered on a Curtailment Event Type
- Filtered for $T > -273.15\text{ C}$



Discover

Menu icon | LK_WindFarm

Select Data > Modify View > Publish

Target Configuration

Westeros

Run Mode

Run Once

Run on a Schedule

First Run

* [Calendar icon]

Recur every 5 minutes

Summary

Shape and Matches

- There are 75 Matching Instances

Timeframe and Interval

- Your Start Time is *-1d
- Your End Time is *
- Your Time Interval gets an interpolated measurement Every 1 minute

Publish

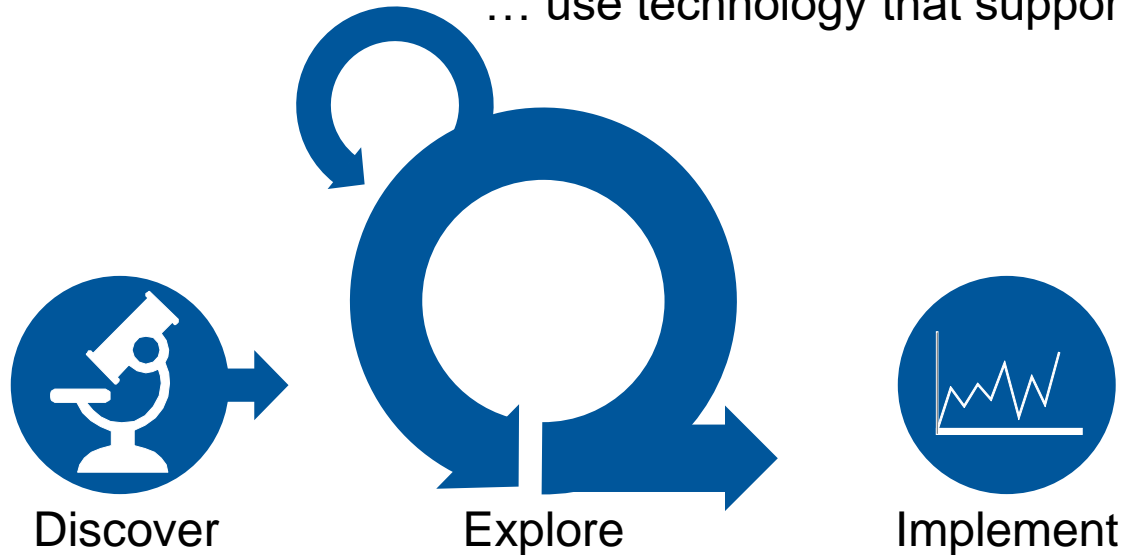
Select where you want to publish

One-time bulk or incrementally push

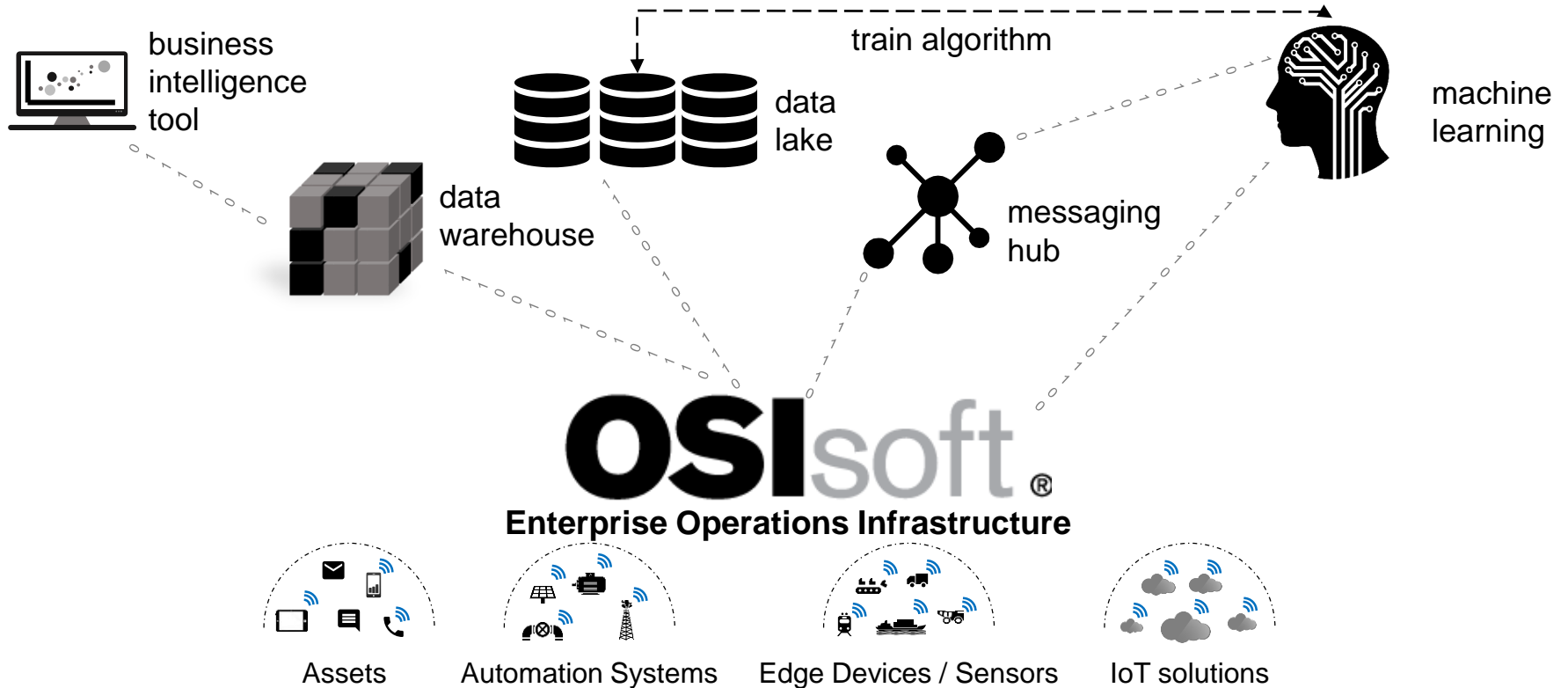
Benefit from native integration to AWS, Azure, Hadoop, and SAP HANA

Advanced Analytics Workflows are Iterative and Need SMEs

... use technology that support this approach



PI System integrates to a variety of advanced analytics components



Takeaways

- Obtain quick value by providing data to experts
- Start small to de-risk advanced analytics projects
- **PI System** enables you to accelerate your analytics with **context** and **normalization** layered on top of raw operational data

Data Scientist

Investigate how
PI Integrators can
save you time
preparing data

Engineer/Operator

See how **PI Vision** can
give a full view of your
processes and systems

General Manager

Speak to our customers
about the value they
gain from **PI System**
and checkout industry
tracks

Contact us for more information...



Carlos Villanúa Fernández

cvillanua@osisoft.com

Systems Engineer

OSIsoft España SL

Questions?

Please wait for
the **microphone**

State your
name & company



Please remember to...

Complete Survey!

Navigate to this session in
mobile agenda for survey

An advertisement for the OSISOFT PIWorld app. The background is a dark blue gradient with a subtle pattern. On the left, the text "TO DOWNLOAD APP, SEARCH OSISOFT" is written in white, bold, sans-serif font. Below this text are two black buttons: "Download on the App Store" with the Apple logo and "GET IT ON Google Play" with the Google Play logo. On the right, a smartphone is shown vertically, displaying the OSISOFT PIWorld app logo on its screen. The logo consists of a white stylized atom symbol above the text "OSISOFT PIWorld".

Day 1 AFTERNOON TRACKS



- Enterprise Infrastructure
- Product Updates
- Best Practices



DOWNLOAD THE MOBILE APP

Search "OSIsoft" in your app store



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 DANKIE TERIMA KASIH DANKON TANK TAPADH LEAT
 KÖSZÖNÖM SPASIBO MULTUMESC
 PAKMET CIZGE OSIssoft.
 GO RAIBH MAITH AGAT PIWorld
 БЛАГОДАРЯ GRACIAS HVALA FAAFETAI
 ТИ БЛАГОДАРАМ MAHADSANID HVALA ESKERRIK ASKO
 TAK DANKE MAHALO IĀ 'ŌE HVALA ХВАЛА ВАМ
 RAHMAT MERCI TEŞEKKÜR EDERIM
 HATUR NUHUN DANK JE EΥΧΑΡΙΣΤΩ GRATIAS TIBI GRAZIE
 GRAZZI ПAKKA PĒR ДЯКУЙ DI OU MÈSI
 PAXMAT САГА FALEMINDERIT ありがとうございます ŏAKUJEM
 SIPAS JI WERE TERIMA KASIH MATUR NUWUN
 CẢM ƠN BẠN UA TSAUG RAU KOJ
 WAZVIITA ТИ БЛАГОДАРАМ
 СИПОС