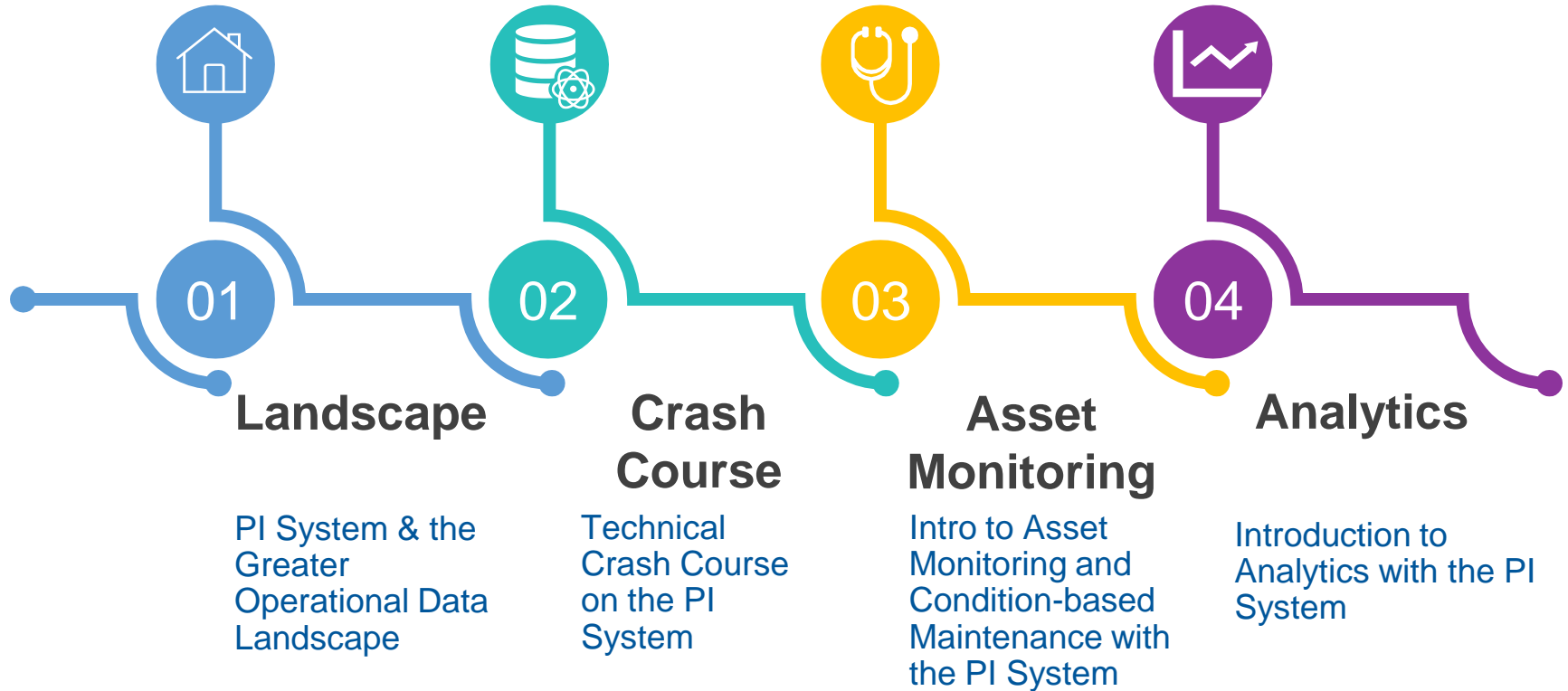


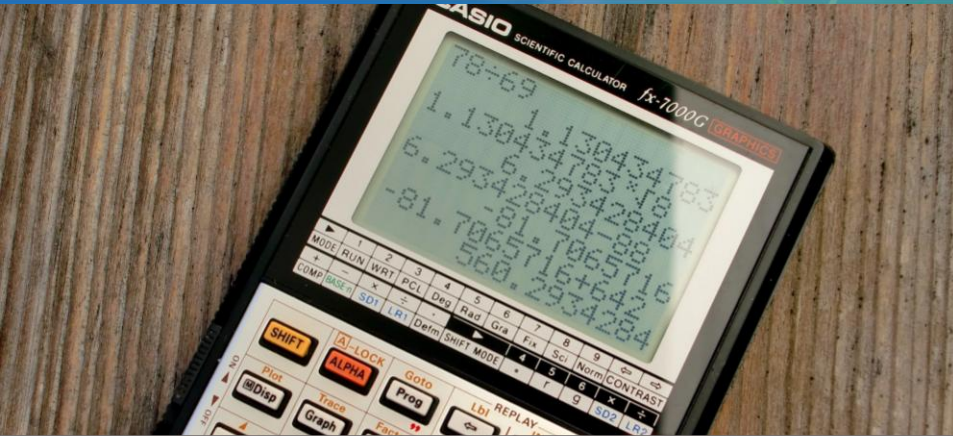
Introduction to Analytics with the PI System

Omar Siddiq, Systems Engineer
Landry Khounlavong, Product Marketing Manager



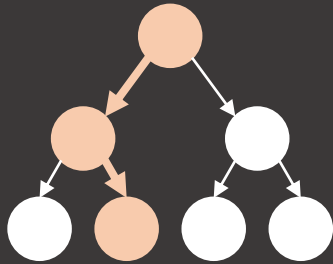
Where are we in the PI System Introduction





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

“Analytics” offer many choices...

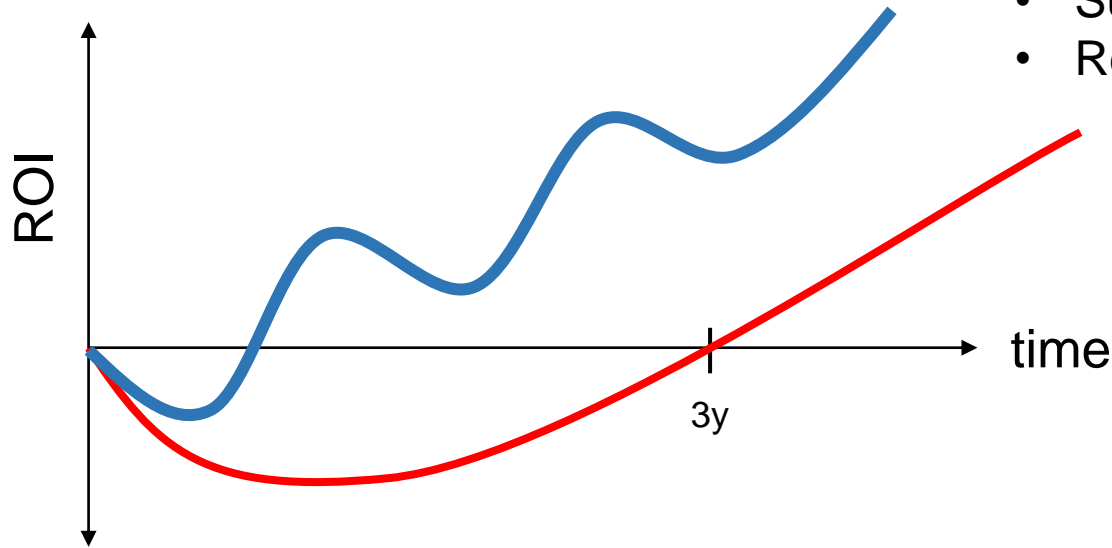


Where do I start?
or
Where are the quick wins?

Small projects propel success for a large project

Must-have project characteristics

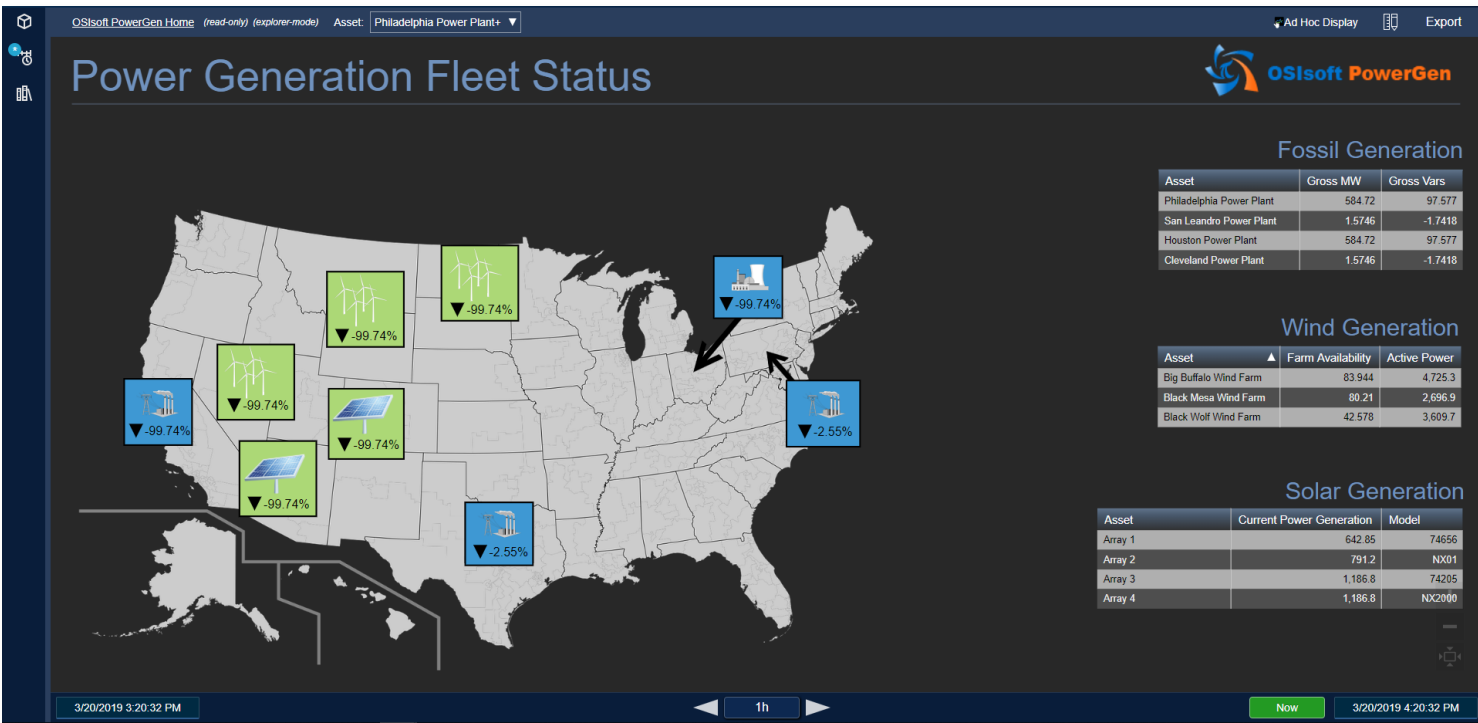
- Subject matter expert included
- Sufficient business value
- Related to larger initiative





Plant Manager

“What is our current capacity factor?”

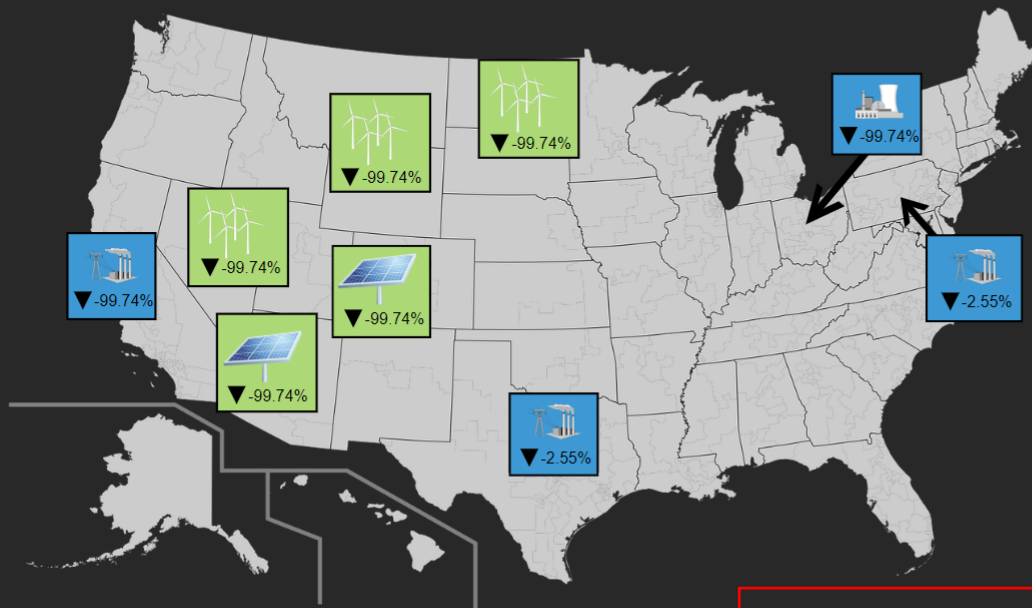


Live KPIs for quick decisions
Know availability for the grid

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

Navigation controls: left arrow, 1h, right arrow

Now 3/20/2019 4:20:32 PM

Wind Farm Overview (explorer-mode) Asset: Black Mesa Wind Farm

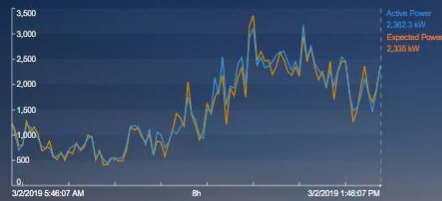
Ad Hoc Display [List Icon] Export

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

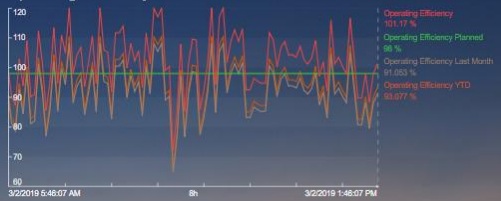


Capacity Factor	62.166 %
Farm Availability	66.667 %
Turbines Installed	3
Turbines in Production	3

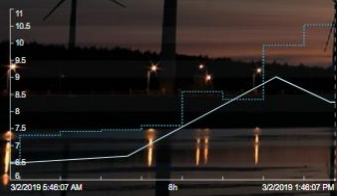
Power vs Forecast



Operating Efficiency



Windspeed vs Forecast



Turbines

<p>● GE05 Availability 5.0776 %</p> <p>Capacity (%) 24.662</p>	<p>● GE06 Availability 100 %</p> <p>Capacity (%) 34.631</p>	<p>● GE07 Availability 100 %</p> <p>Capacity (%) 34.483</p>
--	---	---

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



The screenshot displays the OSIsoft PI Vision interface. On the left, there are panels for 'Events' and 'Attributes'. The main area contains two line charts comparing 'Production Delta (kW)' for two different time periods. The top chart is for GE05 2019-02-20 07:17:05, and the bottom chart is for GE05 2019-02-19 07:35:49. A semi-transparent grey cone highlights the comparison area. On the right, an 'Edit Search Criteria' dialog is open, showing filters for 'Event Type' (Wind Curtailment) and 'Asset Type' (Wind Turbine).

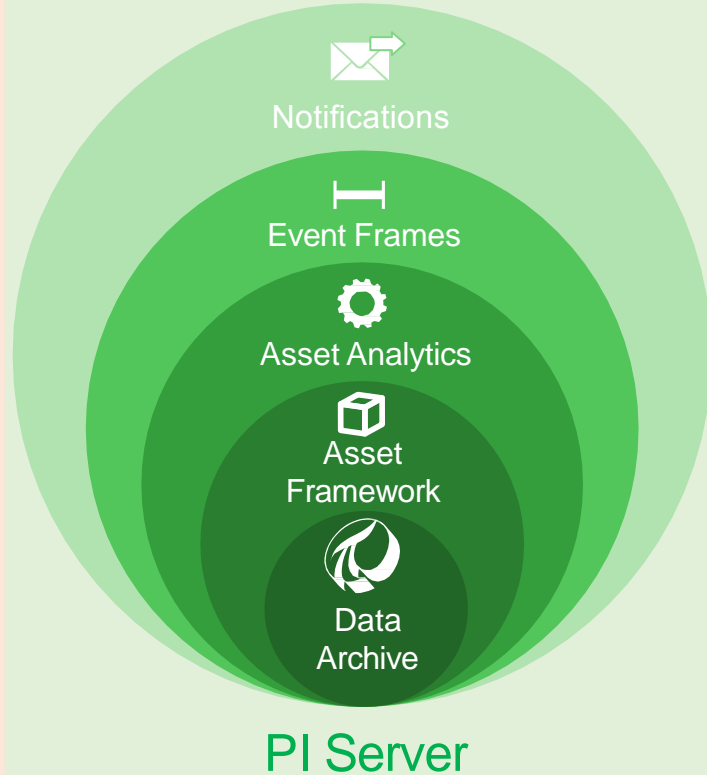
Ad hoc event comparison inherits event & asset structure
enabling easy event comparison

Collect

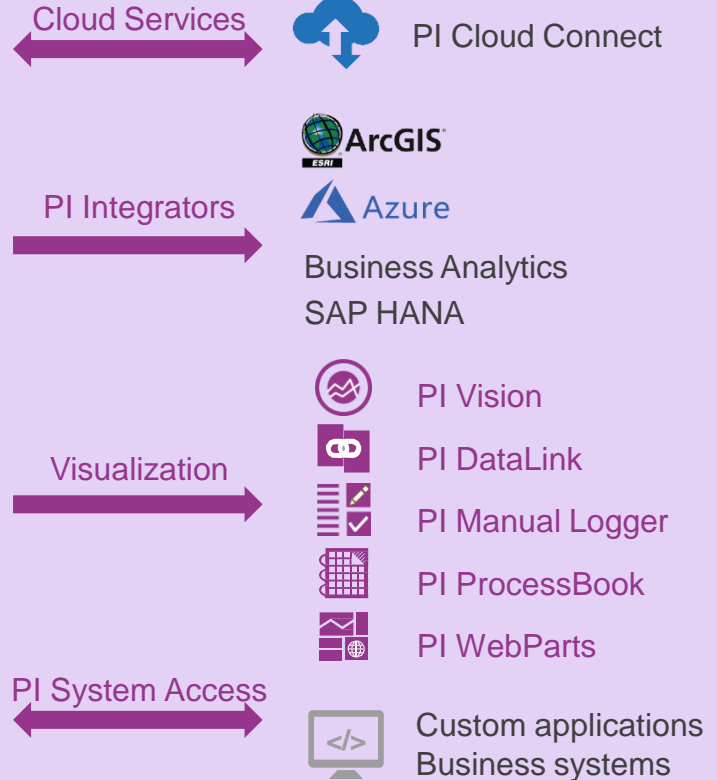


PI Interfaces
&
PI Connectors

Store & Enhance



Deliver



PI System Infrastructure

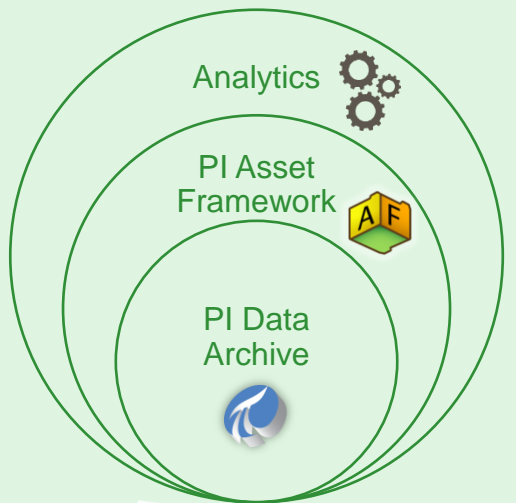


Collect



PI System Infrastructure

Enhance & Contextualize



PI Server

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
 s **QI-122** FI-151 eTLoad.PR FT9001 Problems B210_FG005.KPIExcursion **B737 FG117** DC.TimeLoad
 02F102.1HRAVG BGT001 403511195_Wind Speed 4-36.NetVolume **AC04.Air Flow** **FI-101** bf5e1d1d-39c9-
 PI-111 facility_output 0_ENG_MODE_STS F151 02T100 03LBB02CT001-2 4b5b-b3d3-c2ce05fa3a26
 GE04_DT **QI-121** GE03_V_WIN
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_E590 T1-121 FT9001
 FI-101 bf5e1d1d-39c9-4b5b-b3d3-c2ce05f GE01_DT **409510395_Wind Speed** **QI-109**
 GE01_DT **Cooling Fan-711.Feed Rate** Global
 BGE003 **FI-111** 02T100 GE01_DT **DC.Srv01R Boiler-209.Fuel Gas** DC.Srv01R
 AF_FLOW3 02T103 AT401 AQUA2-SI005.PV GE02_Energy DC.Srv01R
 ACEDemo.Unit1.Output 0_ENG_MODE_STS 125.Fuel Gas 94:GRDIDX.Tr
TI-178 B352_W778 0_CMP_SVLV_PCT DC.Z1R **FI-151** **D-110.Tank**
 02F104 CD:F161 0_CMP_HDR 02T103.Q **Pressure.P**
 80-13.Net 1-13.Net **DY-131** DC.Srv01R **Boiler-209.Fuel Gas** DC.Srv01R
 F723_E889 Volume B045_FG978 DC.SJ.PUE **QI-111** FinalProductBin.On **Boiler-209.Fuel** DC.Srv01R
 Compressor-439.Feed Rate fic1001.C GE02_OT **% CO2** **Pump #1**
 DC.CH.DCE **FIC-172:210** GE01_DT c2ce05fa3a26 **1-16.Net Volume** **Volume**
FI-121 AF_FLOW3 DM-05.BW.R AT401 **CB1992_MS** 03LBA32CT0
 0_ENG_MODE_STS 0_CLR_FINAL_OUT_B 0_CMP_FLOW_TOTAL 01-2
 GE03_Q 33951775_Clear Sky F506_E590 DC.SJ.ITLoad.P
 Horiz GE01_DT WR
DY-131:166 GE01_TD **FI-101** FT9001 **TI-145**
 Boiler-334.Feed Rate Volume fasttag FR2001
 02F102.1HR BGE003 **FI-111** 02T100 **TI-178**
 AVG AF_FLOW3 02T100 403511195_Wind DC.Zone1.Number GE04_OS
 BGT001 ACEDemo.Unit1.Output Speed DailyTrigger FrqPrbCost_ER FT9001
PI-111 0_CMP_SVLV_PCT **TI-178** B352_W778 **45-2.Net Volume** FT9001
 facility_output 02F104 CD:F161 FT9001 DC.C2Z1.Pwr.RippI FR5001
 AT401 02F104 CD:F161 FT9001 GE01_CON e GE01_A_DT **AF_NOISE**
FIC-144 GE04_Status **FI-101** AlarmTest.Input. Float32.1 DC.SJ.SiteRealTim
 02F100 fasttag 02:F101.C 02T103.Q T1-178 eTLoad.PR FT9001
 AQUA2-SI005.PV GE02_Energy 409510395_Wind Speed DM-05.BW.R
 0_ENG_MODE_STS 02T103.Q DC.SJ.C1.Z1.R1.R DC.SJ.C1.Z1.R1.R
 FI-151 02T103.Q TI-178 k06.S2.003.PWR
 DC.Z1R 0_CMP_HDR_SUC_P asset1 output **QI-111** FinalProductBin.On **94:GRDIDX.Pr**
 Active Meters GE01_A_DT aso 02:F101.C odID Boiler-
 FI-111 AF_NOISE **PI-115** **DY-101** FR2001 TIC-121 209.Fuel Gas
 DM-05.BW.R 0 Flow

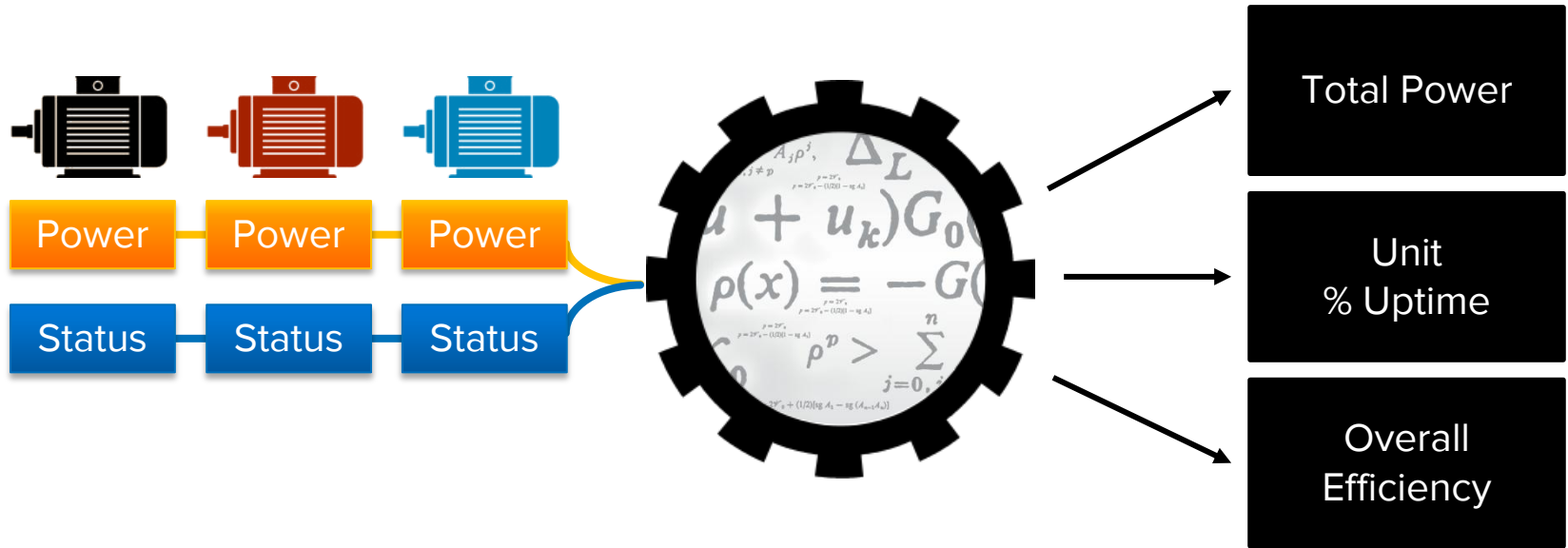
Map raw data to the physical world and normalize it across the enterprise

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

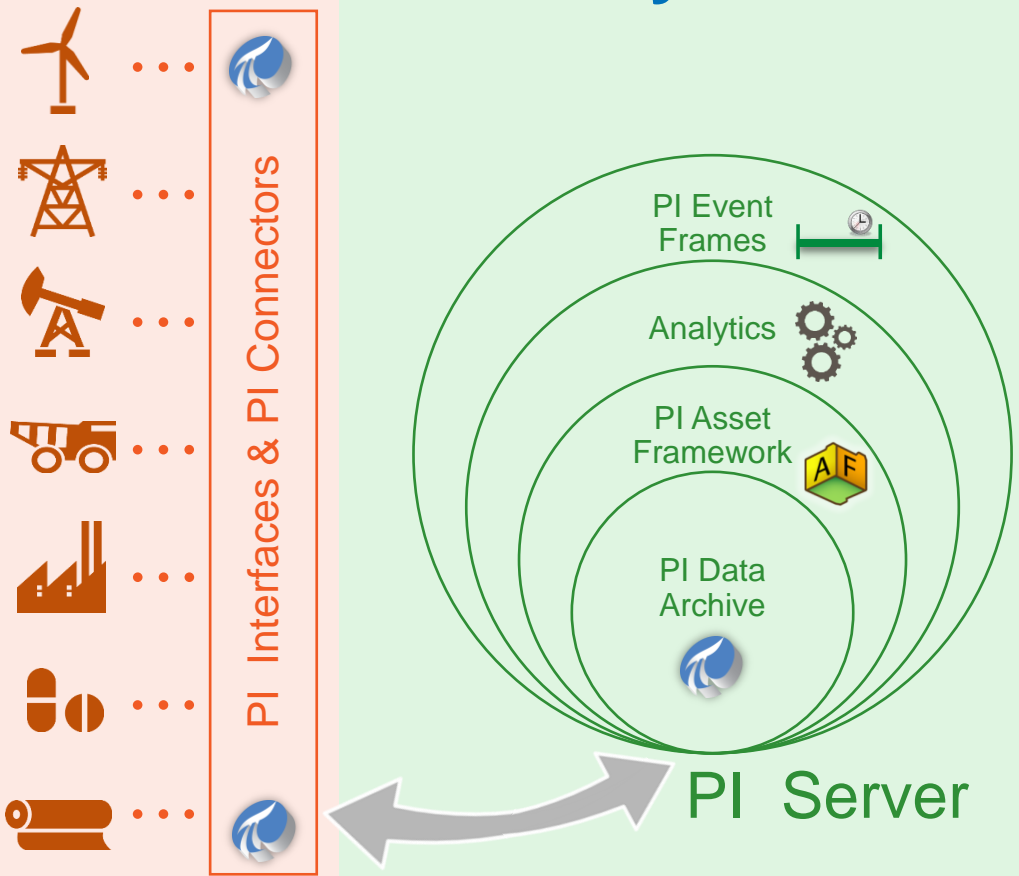
Weather Conditions
 Relative Humidity: 34%
 Current Temp: 85 F
 High: 92
 Low: 57 F
 Wind: 8 mph/N

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

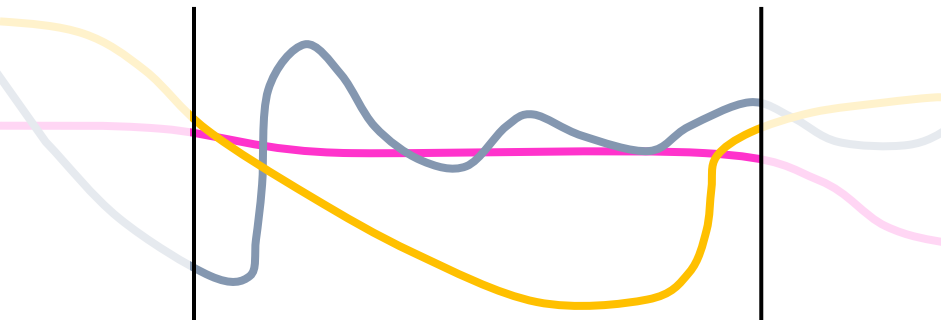


PI System Infrastructure

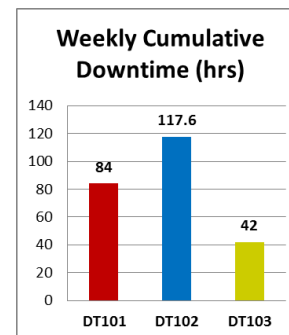
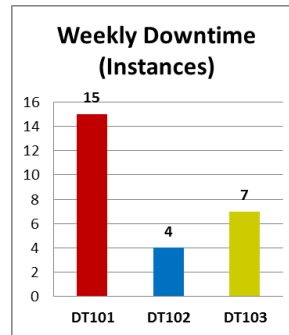


Identify discrete events within continuous data streams

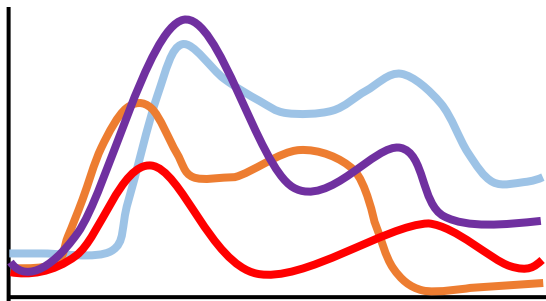
Simplify Data Analysis



Compare Assets



Compare Events

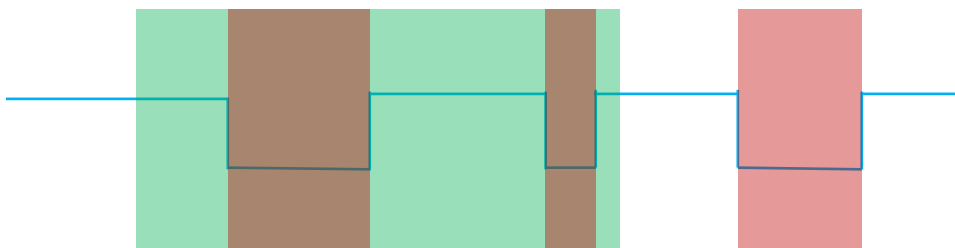


Name	Max
EF1	122.47
EF2	112.73
EF3	98.61
EF4	125.24

Discover Event Interrelationships

Running XYZ

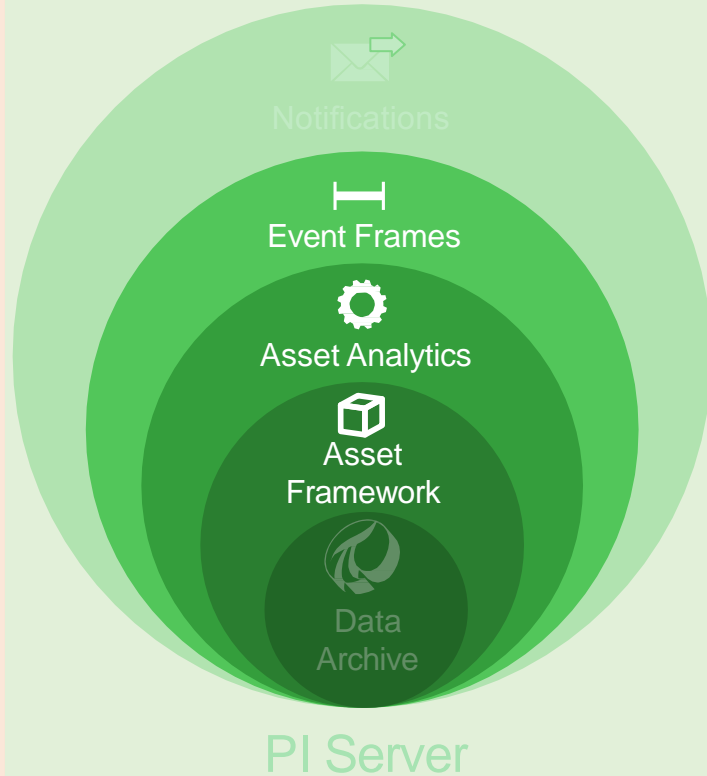
Downtime



Collect



PI Interfaces & PI Connectors



Deliver

Cloud Services



PI Cloud Connect

PI Integrators



Business Analytics
SAP HANA

Visualization



PI Vision



PI DataLink



PI Manual Logger



PI ProcessBook



PI WebParts

PI System Access



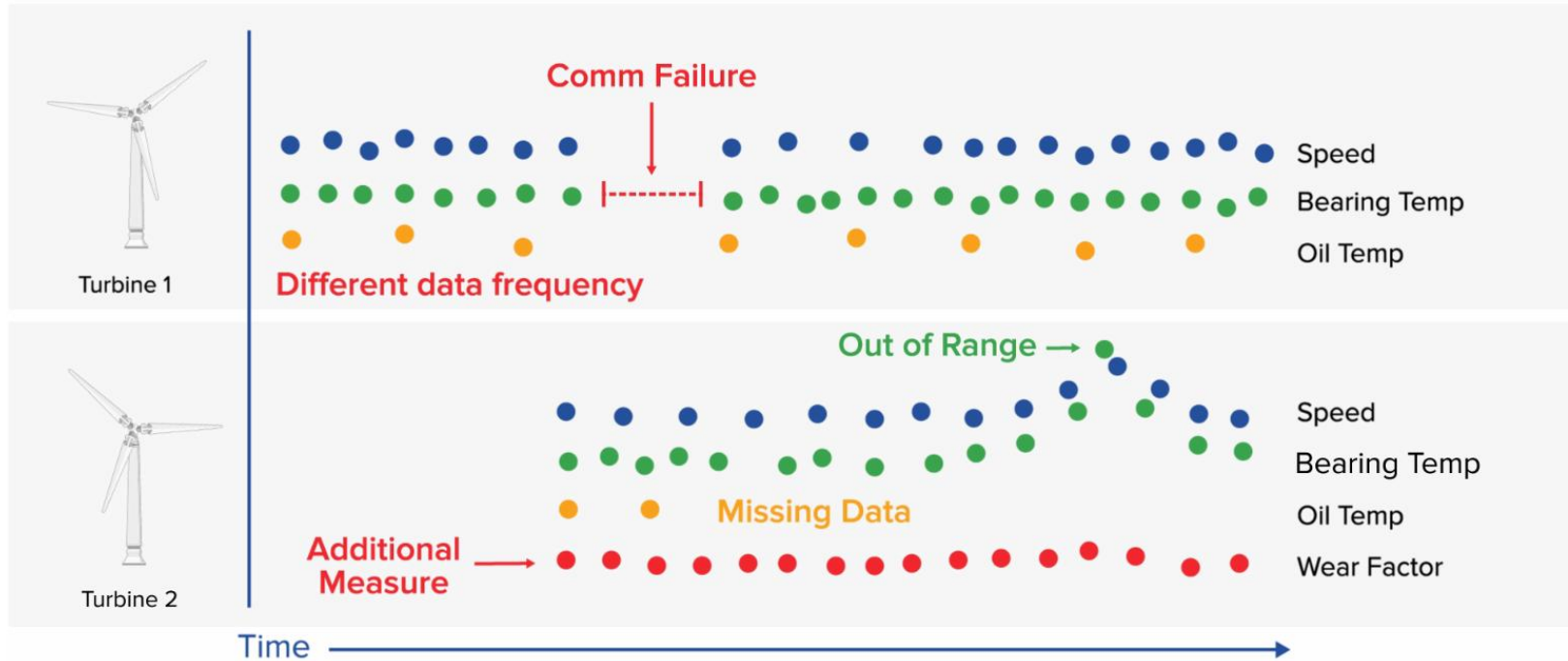
Custom applications
Business systems

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

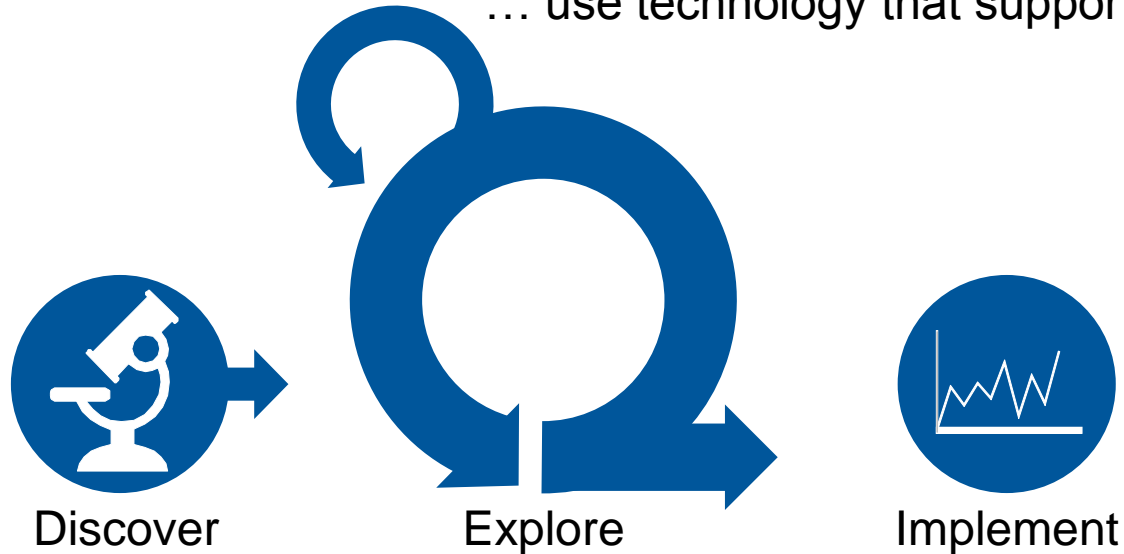
Data Scientists & Business Analysts
need that data contextualized

Time-series Data is Not Naturally Aligned or Contextualized



Advanced Analytics Workflows are Iterative and Need SMEs

... use technology that support this approach





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

~-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
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GE01	3/18/2019 10:54:57.477 AM	Monday	1,528.438	1,527.098	42.507	62.924	19.877	90.44
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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

Data preparation capabilities that accelerate training algorithms or creating views for BI Tools:

- Common nomenclature
- Aligned data
- Normalized measurements across assets
- Complex filtering by
 - Asset type
 - Event type

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
 - 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
- Blade3, Set Value
- Capacity
- Circuit Breaker Cut-In

Begin from common nomenclature & hierarchy



Discover

Pick from measurements that shape the model or view

Edit Filters

Asset Name: GE05

Asset Template: Wind Turbine

Asset Category: Wind Turbine

Buttons: 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

Row Filters

Event Row Filter 1

Criteria: Event Related

Bearing A Temperature > -273.15

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

Include multiple filters to clean data



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

~-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
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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

Select where you want to publish

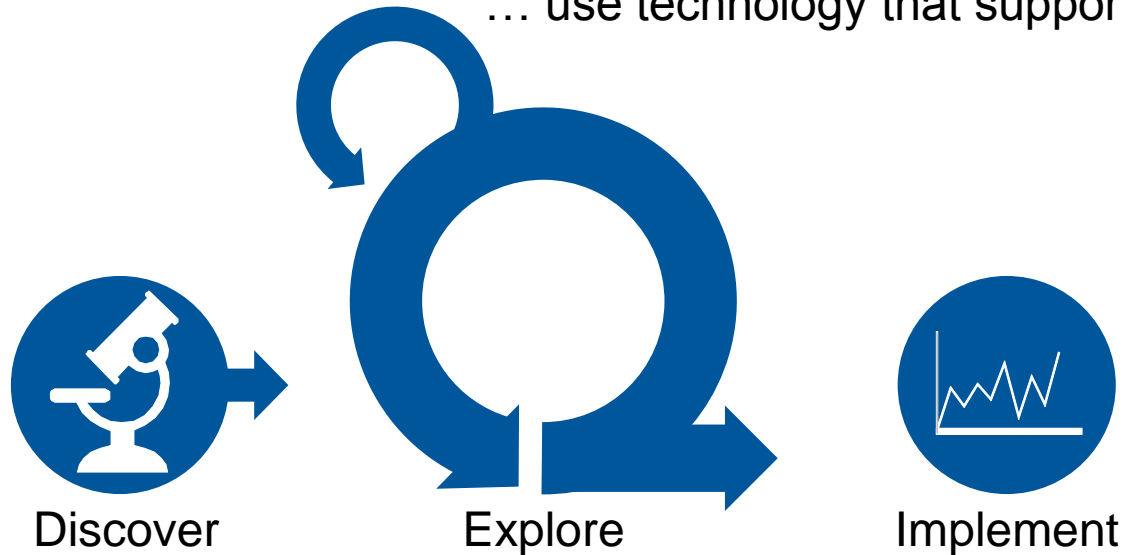
One-time bulk or incrementally push

The screenshot shows the Discover interface for a target named 'Westeros'. The 'Target Configuration' section has a dropdown menu set to 'Westeros'. The 'Run Mode' section has two options: 'Run Once' (unselected) and 'Run on a Schedule' (selected). The 'First Run' field contains an asterisk (*). The 'Recur every' field is set to '5 minutes'. The 'Summary' section shows 'Shape and Matches' with 'There are 75 Matching Instances' and 'Timeframe and Interval' with 'Your Start Time is *-1d', 'Your End Time is *', and 'Your Time Interval gets an interpolated measurement Every 1 minute'. A blue 'Publish' button is at the bottom.

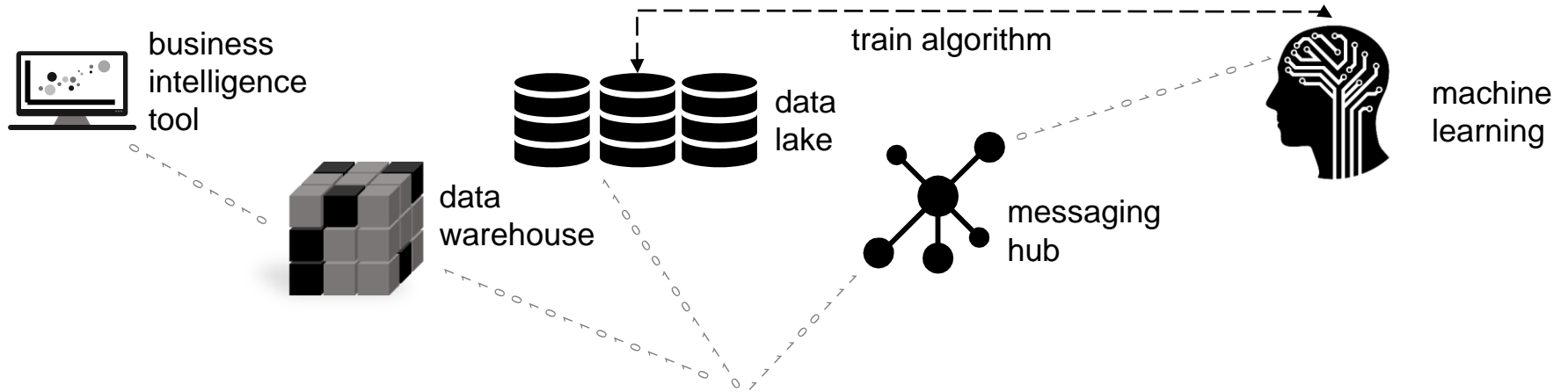
Benefit from native integration to
AWS, Azure, Hadoop, and SAP HANA

Advanced Analytics Workflows are Iterative and Need SMEs

... use technology that support this approach



PI System integrates to a variety of advanced analytics components



OSIsoft®

Enterprise Operations Infrastructure



Assets



Automation Systems



Edge Devices / Sensors



IoT solutions

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 on Wednesday

謝謝 KEA LEBOHA
 TAPADH LEIBH 고맙습니다
 БАЯРЛАЛАА MISAOTRA ANAO
 DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRACIES OBRIGADO شكرا SALAMAT
 DANKON TANK TAPADH LEAT
 KÖSZÖNÖM DANKIE TERIMA KASIH GRACIES
 СПАСИБО
 PAKMET CIZGE
 GO RAIBH MAITH AGAT
 БЛАГОДАРЯ GRACIAS MAHADSANID
 TI БЛАГОДАРАМ
 TAK DANKE MAHANSANID
 RAHMAT MERCI
 HATUR NUHUN
 GRACIAS TIBI
 DANK JE EΥΧΑΡΙΣΤΩ GRATIAS TIBI
 AČIŮ SALAMAT MAHALO IĀ 'ŌE TAKK SKALDU HA
 GRAZZI PAKKA PĒR ありがとうございます
 PAXMAT CAĢA SIPAS JI WERE TERIMA KASIH MATUR NUWUN
 CẢM ƠN BẠN
 WAZVIITA
 FALEMINDERIT UA TSAUG RAU KOJ
 TI БЛАГОДАРАМ СИПОС
 HVALA FAAFETAI
 ESKERRIK ASKO
 HVALA ХВАЛА ВАМ
 TEŞEKKÜR EDERIM
 GRAZIE
 DI OU MÈSI
 ĎAKUJEM
 MULŤUMESC
 HVALA



OSIsoft.

PIWorld

THANK YOU

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DOWNLOAD THE MOBILE APP

Search "OSIsoft" in your app store



PI ESRI User Group Meeting

Parc 55 – Market Street room

Refer to mobile app for exact location and timing

INDUSTRY TRACKS TOMORROW

Hilton and Parc 55

Refer to mobile app for timing and locations

TECHNICAL & DEVELOPER TRACKS

Tomorrow @ Parc 55

- PI Geek Track
 - Tech Talks

PARTNER & PRODUCT EXPO

Today's Expo Hours

12:30 – 6:00 PM

Golden Gate & Yosemite



OFFSITE DINNER TONIGHT SAN FRANCISCO BELLE

Buses & Walking Groups
Start Leaving Hilton Lobby at 6:30 PM