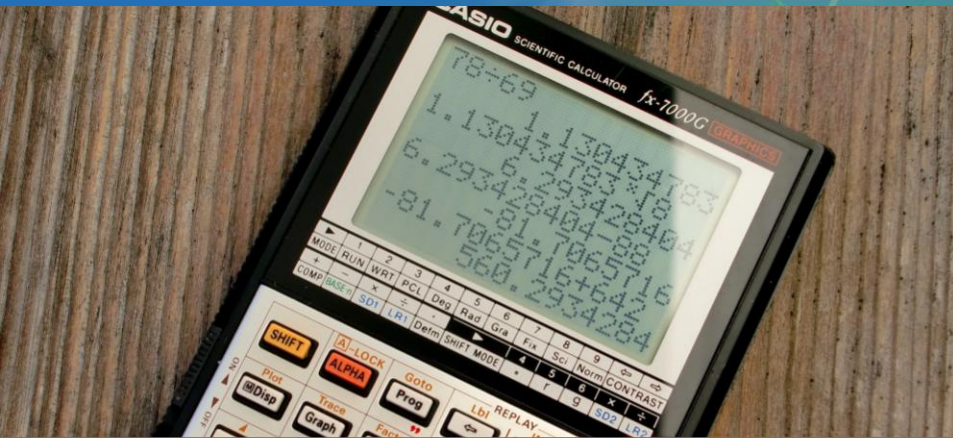


Introduction to Analytics with the PI System

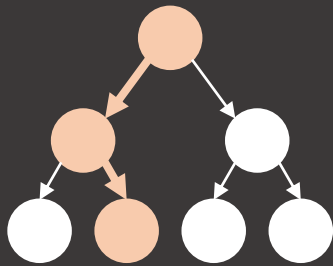
Landry Khounlavong, Product Marketing Manager





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

“Analytics” offer many choices...



Five considerations before starting with big data

1. Gaps in data collection
2. Poor data quality
3. Low # of modes
4. Unknown relationships
5. Natural skepticism



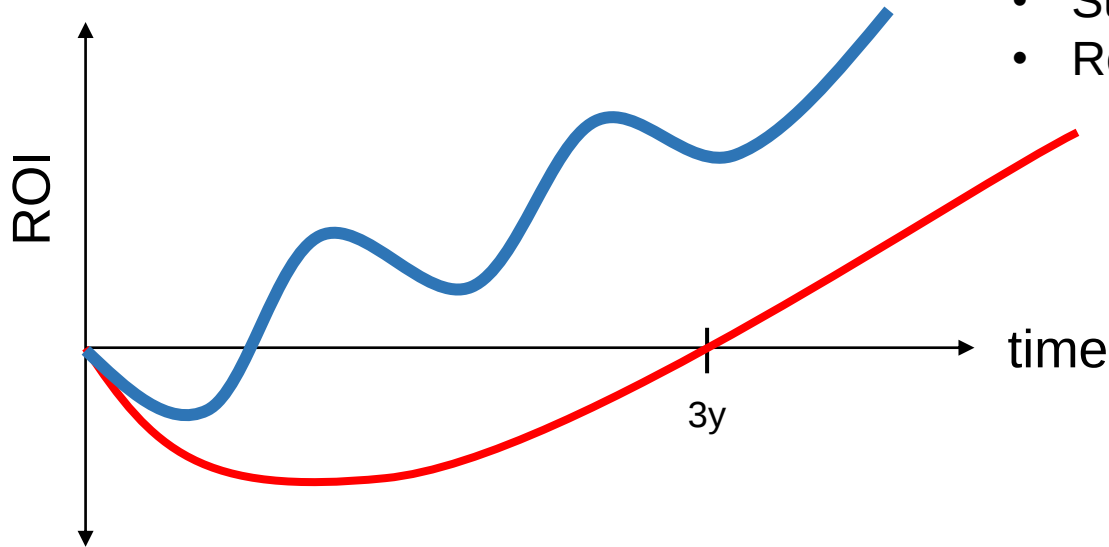
MIND THE GAP

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



Deliver value during your analytics journey



Collect – Access measurements from one place



Calculate – Make real-time decisions based on physics



Contextualize – Analyze relative to a process or event



Model – Compare performance across enterprise

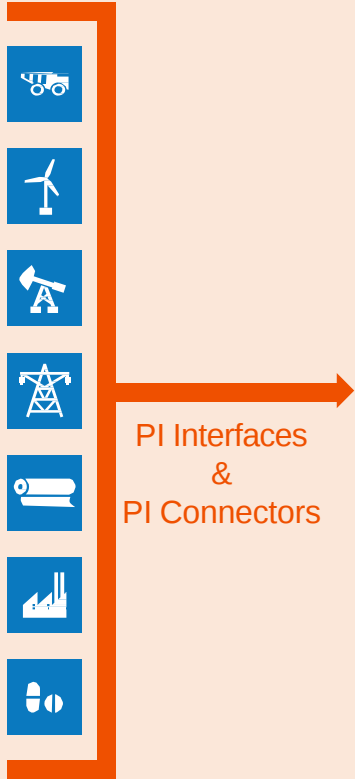


Combine – Assess production relative to cost and revenue

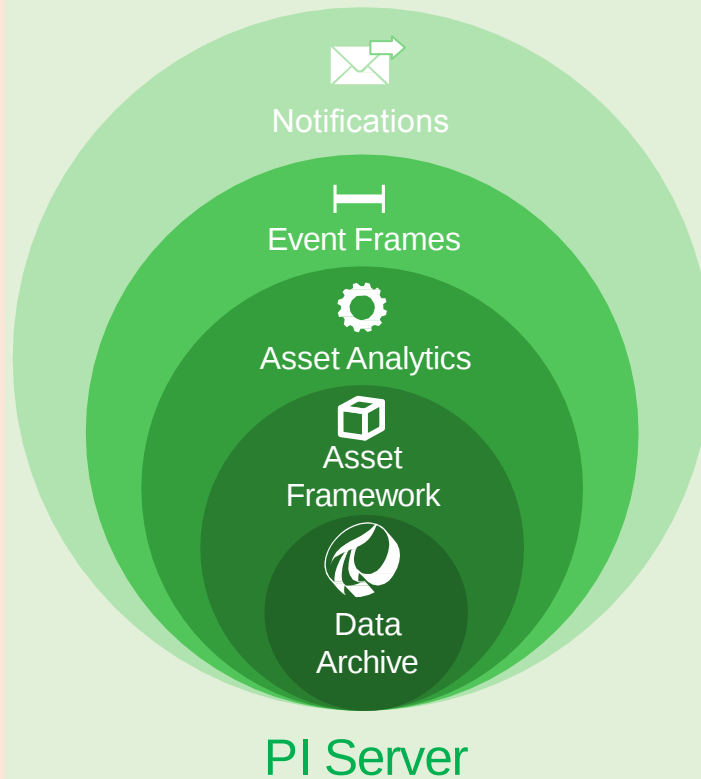


Apply algorithms – Predict events to augment decisions

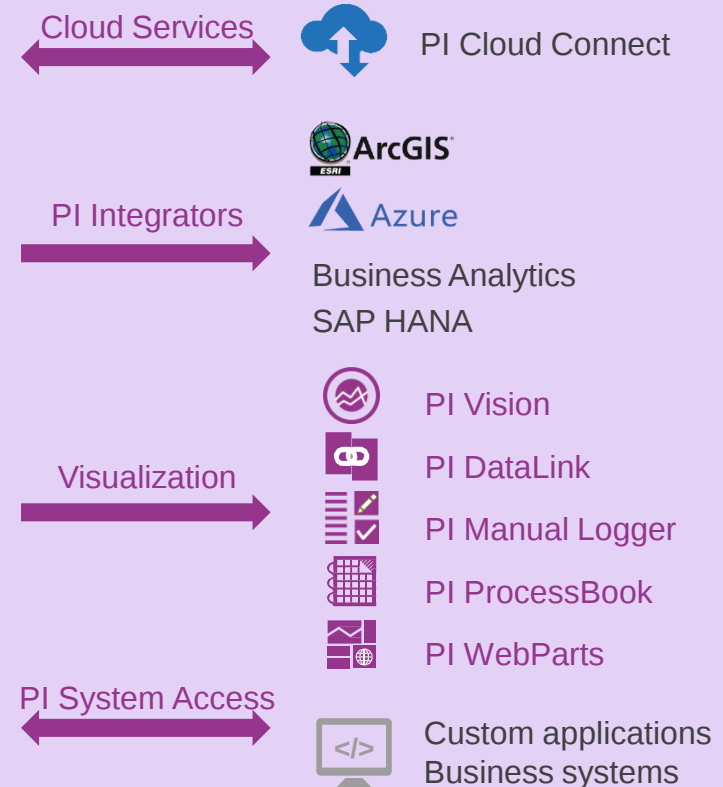
Collect



Store & Enhance



Deliver



80-5.Net Volume
GE01_A_DT

DC.SJ.PUE
DC.SJ.C1.Z3.R3.PDU1.PF GE01_A_DT

TI-102

DC.Zero
DY-108 trigger

AC09.Power

GE05_Energy C1:14AT5 AC03.Air Flow

FeedBin.CmtBoiler Cold Reheat Pressure

GE04_OSAsset1.Problem

DC.SJ.SiteRealTim Anacortes Refinery.Alkylation.Asset B737 FG117 DC.TimeLoad

QI-122 FI-151

elTLoad.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-39c9-4b5b-b3d3-c2ce05fa3a26

GE04_DT QI-121 GE03_V_WIN

PI-111 facility_output

0_ENG_MODE_STS F141

02T100

03LBB02CT001-2

DM-05:BW.R AT401

DC.Rk07R

AQUA2-TI-201.PV

DC.NY.Actual.PWR.day.Tot

0 CLR_FINAL_OUT_B T.Dc.Srv06R GE04_Energy

AlarmTest.Input.Float32.1

364511575-AC Power

MP F506_F590

TI-121 FT9001

FI-101 bf5e1d1d-39c9-4b5b-b3d3-c2ce05fa3a26

GE01_DT 409510395_Wind Speed QI-109

Global Horiz GE01_DT FAC.OAK.Power-Kh-Val.PV

BGE003 FI-111 02T100

AF_FLOW3 02T103 AT401

AQUA2-SI005.PV GE02_Energy

0_ENG_MODE_STS

FI-151 02T103.Q

ACEDemo.Unit1.Output

TI-178 B352_W778 0_CMP_SVLV_PCT

DC.Z1R

0_CMP_HDR

02F104 CD:F161

80-13.Net

1-13.Net

Volume

DY-131

369512185-Temp

B045_FG978

DC.SJ.PUE

Compressor-439.Feed Rate

fic1001.C GE02_OT

FI-101 bf5e1d1d-39c9-4b5b-b3d3-c2ce05fa3a26

DM-05:BW.R AT401

DC.CH.DCE FIC-172:210

GE01_DT c2ce05fa3a26

FI-121 AF_FLOW3

0 CLR_FINAL_OUT_B

0_ENG_MODE_STS

GE03_Q

339511775_Clear Sky Global Horiz GE01_DT

DY-131:166

GE01_TD

FI-101

Boiler-334.Feed Rate

Volume

02F102.1HR

BGE003 FI-111 02T100

AF_FLOW3 02T103

AVG

BGT001

ACEDemo.Unit1.Output

TI-178 B352_W778

PI-111 facility_output

0_CMP_SVLV_PCT

AT401

02F104 CD:F161

FI-144

GE04_Status

02F100 fasttag 02:F101.C

AQUA2-SI005.PV GE02_Energy

0_ENG_MODE_STS

FI-151 02T103.Q

DC.Z1R 0_CMP_HDR_SUC_PRC

asset1 output

Active Meters

GE01_A_DT a50

FI-111

AF_NOISE

PI-115

DY-101

DM-05:BW.R

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%

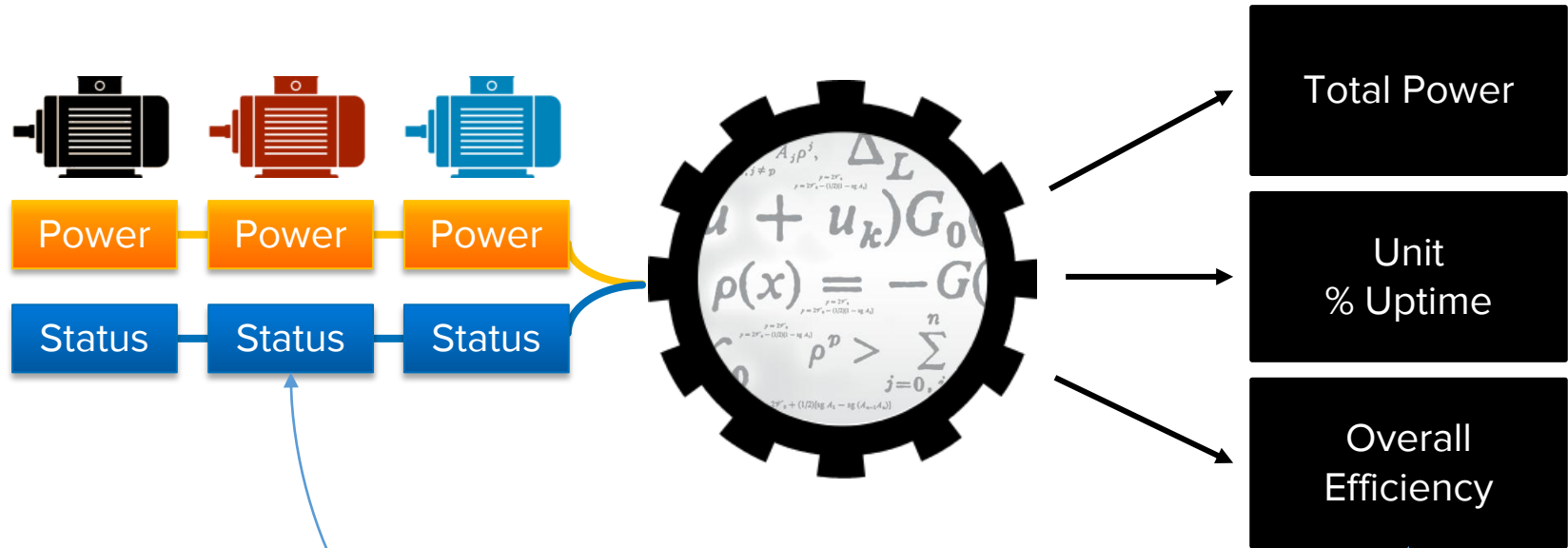
Weather Conditions

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

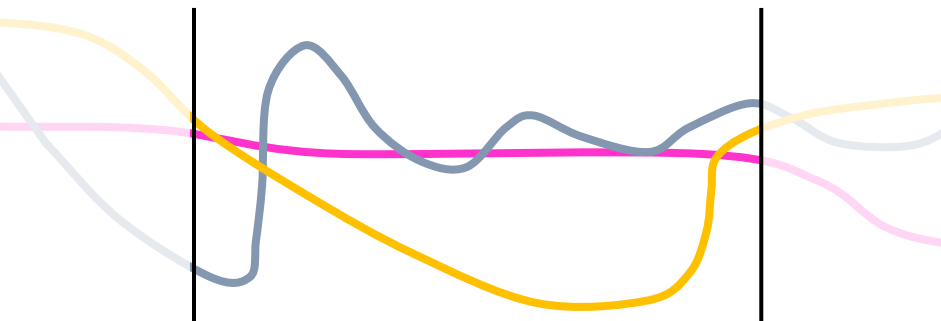
Make raw data decision-ready



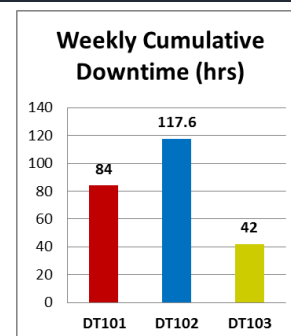
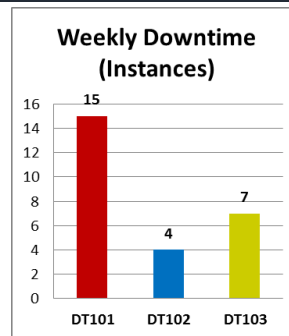
Both variables are potential features for training algorithms

Identify discrete events within continuous data streams

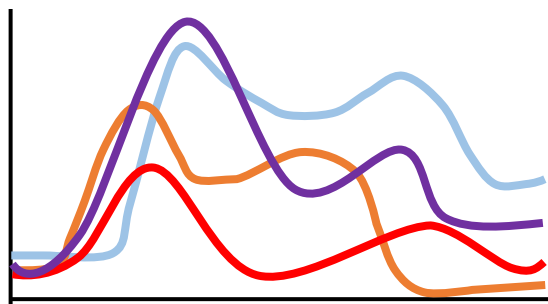
Simplify Data Analysis



Compare Assets



Compare Events

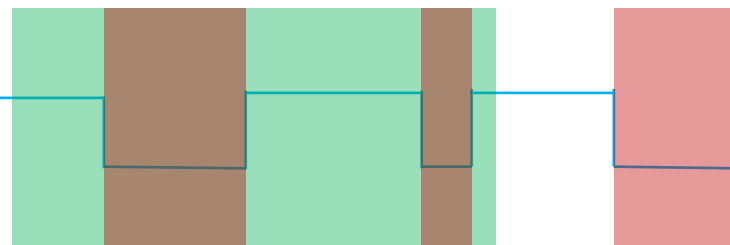


Name	Max
EF1	122.47
EF2	112.73
EF3	98.61
EF4	125.24

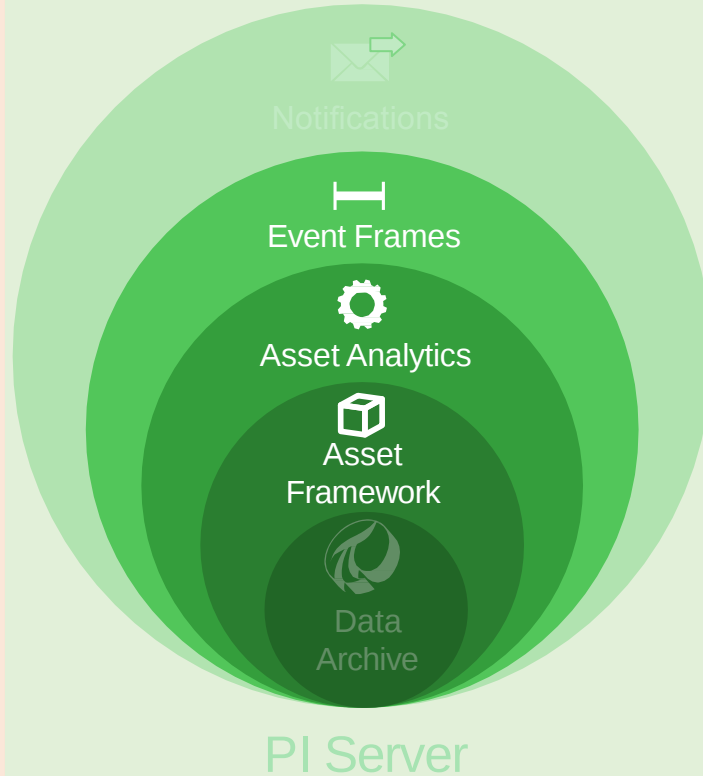
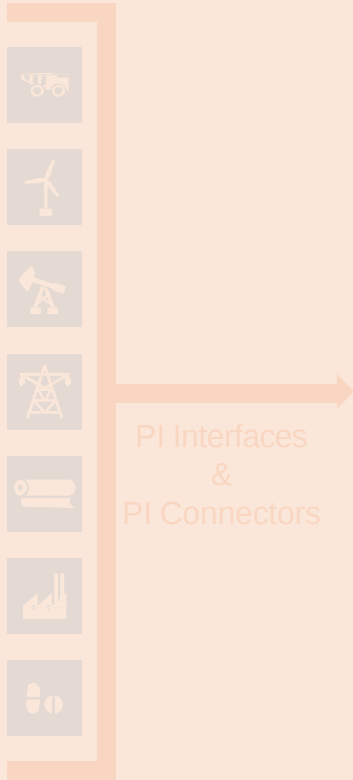
Discover Event Interrelationships

Running XYZ

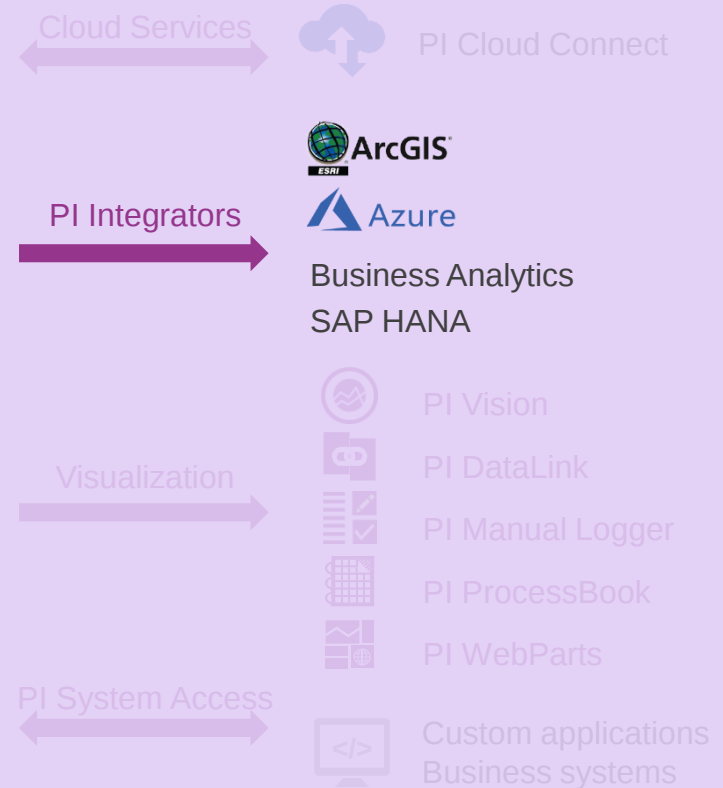
Downtime



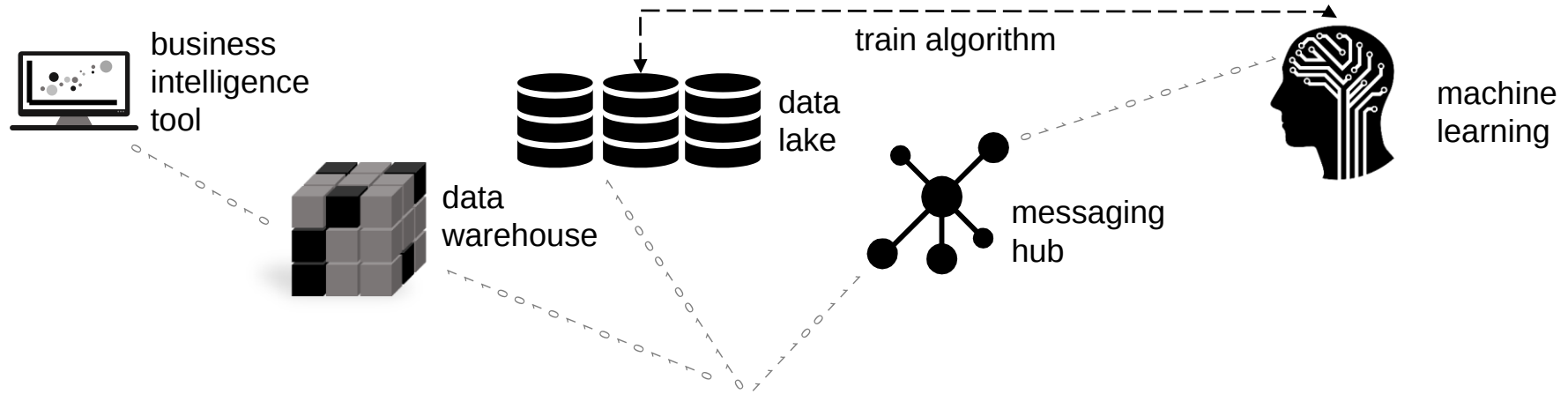
Collect



Deliver



PI System integrates to a variety of advanced analytics components



OSIsoft®

Enterprise Operations Infrastructure



Assets



Automation Systems



Edge Devices / Sensors



IoT solutions

PI Integrators simplify preparing data for advanced analytics

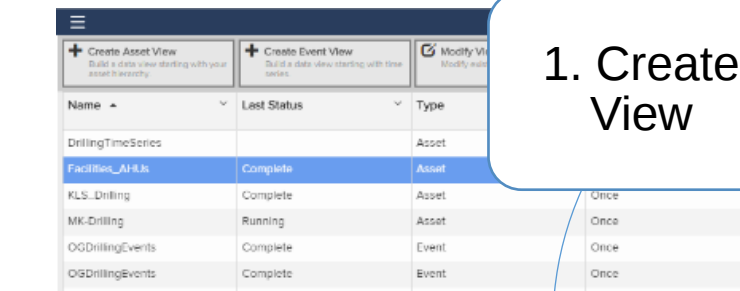
1. Create View

2. Select Data

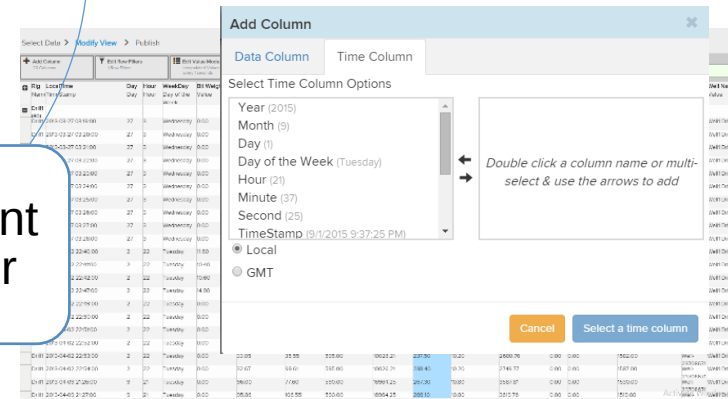
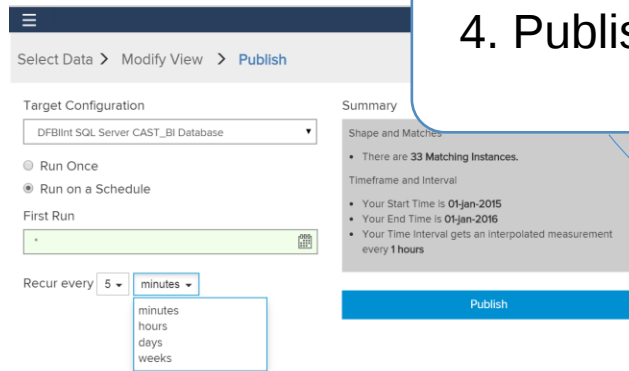
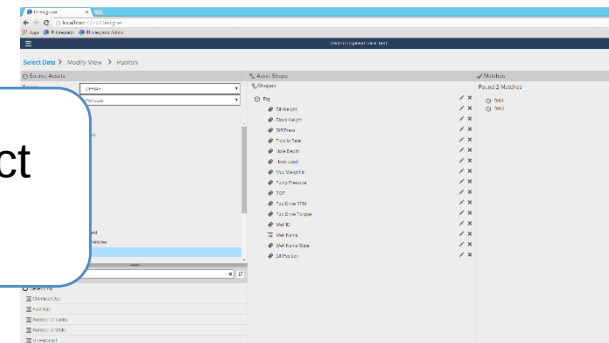
No code required!

4. Publish

3. Augment and Filter



Name	Last Status	Type
DrillingTimeSeries		Asset
Facilities_AHubs	Complete	Asset
KLS_Drilling	Complete	Asset
MK-Drilling	Running	Asset
OGDrillingEvents	Complete	Event
OGDrillingEvents	Complete	Event



My Views

DEMO\demo

+ Create Asset View
Build a data view starting with your asset hierarchy

+ Create Event View
Build a data view starting with time series

Modify View
Modify existing data view

Remove View
Remove selected view

Name	Run Status	Type	Run Mode	Start Time	End Time	Last Run Time
OG-Compressors GasFl...	Published	Asset	Once	8/1/15 12:00 AM	8/1/16 12:00 AM	1/9/16 11:08 AM

Deliver value during your analytics journey



Collect

PI Interfaces & PI Connectors



Calculate



Contextualize

PI Server



Model

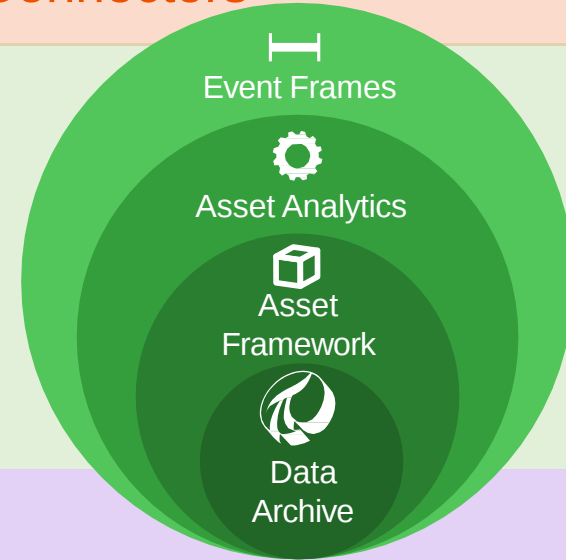


Combine

PI DataLink
PI Integrators



Apply algorithms



Takeaways

- Start small to de-risk analytics projects
- **PI System** enables you to **contextualize, normalize, and mark events in raw operational data** to accelerate your analytics

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

Contact us for more information...



Landry Khounlavong

lkhounlavong@osisoft.com

Product Marketing Manager

OSIsoft, LLC

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