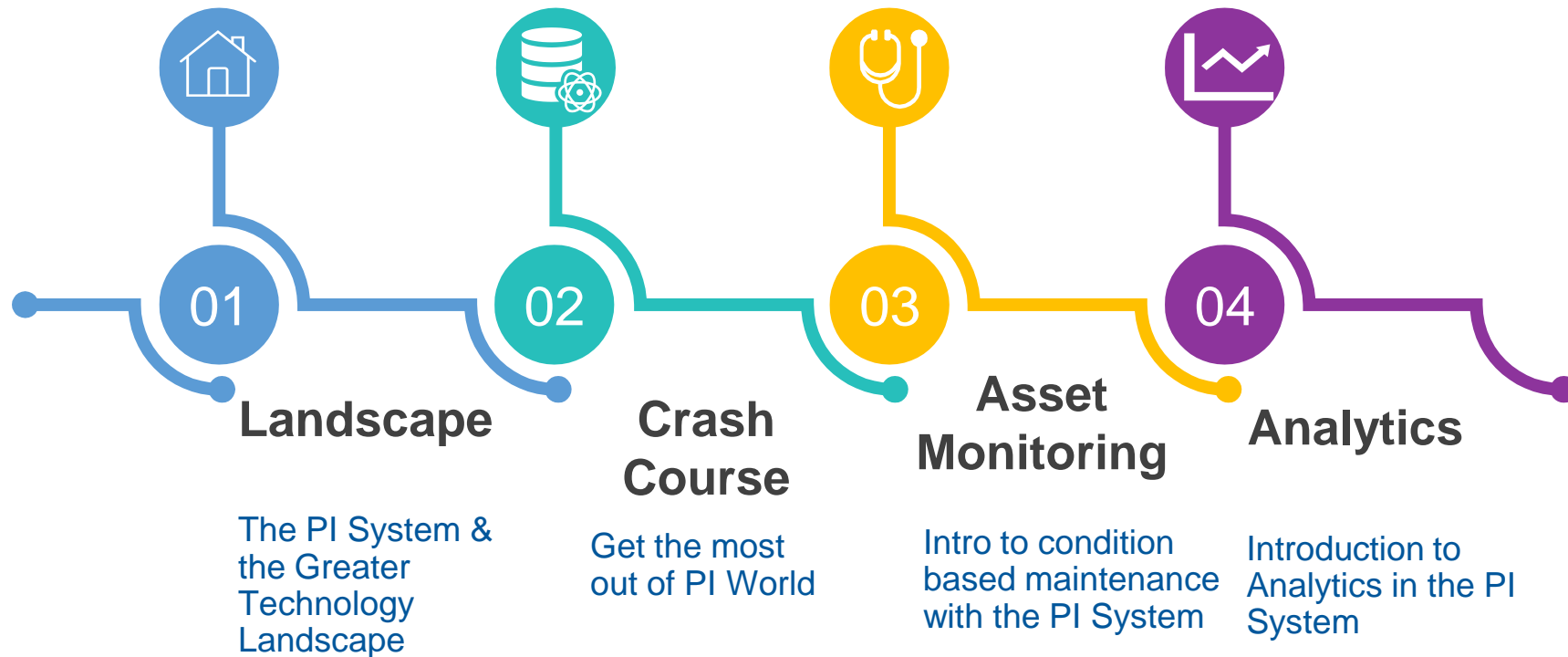


PI System Crash Course: Get the most out of PI World

Presented by: Nathaniel Adebayo – Systems Engineer

Where are we in our PI Basics Journey



You might be wondering...



What can I do with the PI System?



How to describe the PI System to my coworkers back at the office?



What PI System Tools should I focus on?



How to navigate PI World 2018?

What can I do with  ?

Asset Health



Process Optimization



Quality Tracking



Energy Efficiency



Regulatory Compliance



Safety & Security



Asset Health



Problem

Wind Farm can't meet generation targets

Why?

Wind Turbine availability is low due to curtailment and unplanned downtime

Target

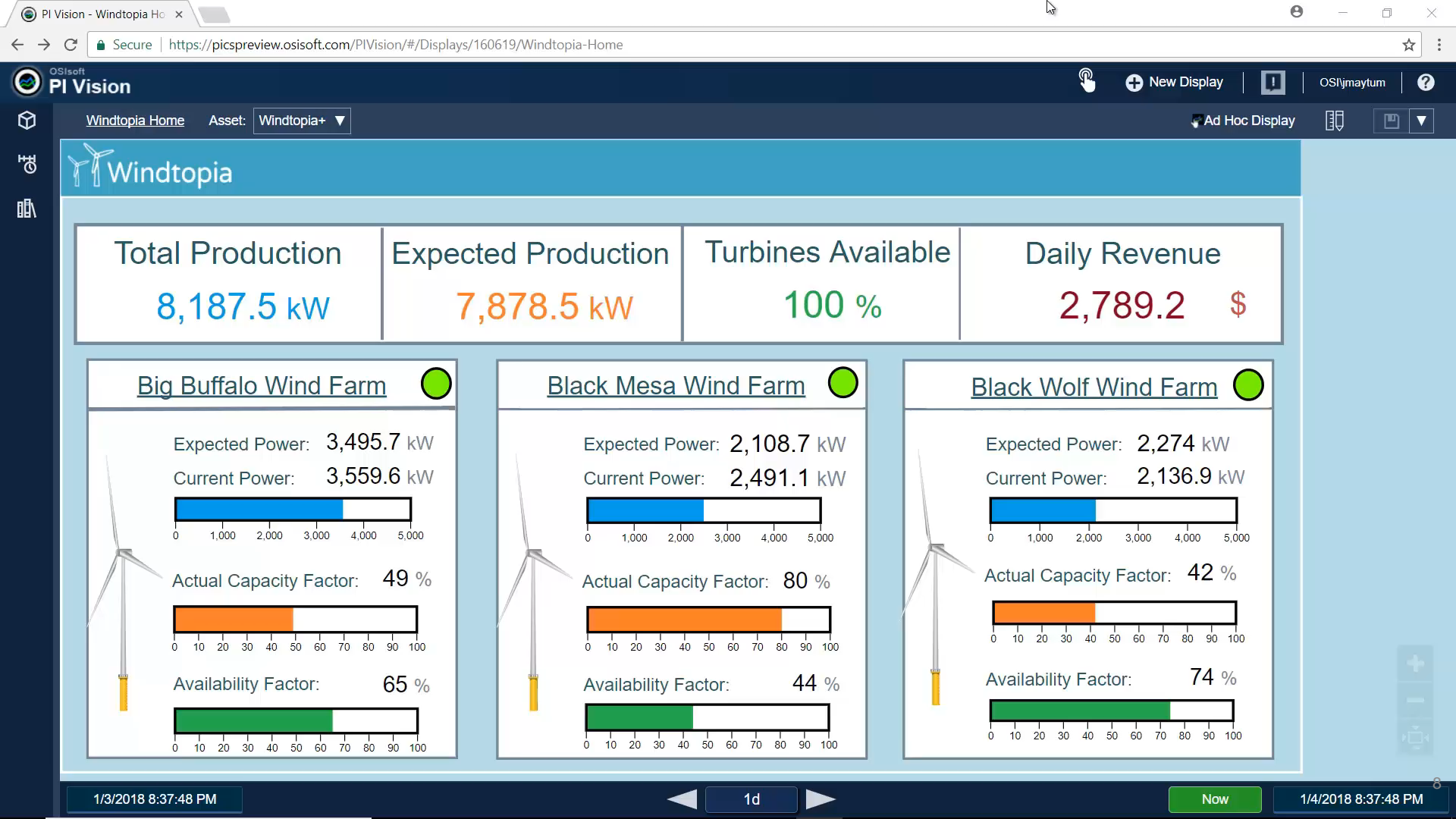
Increase Wind Turbine availability to 95%

How?

Find biggest cause of lost production



**Let's see the PI System
IN ACTION!**





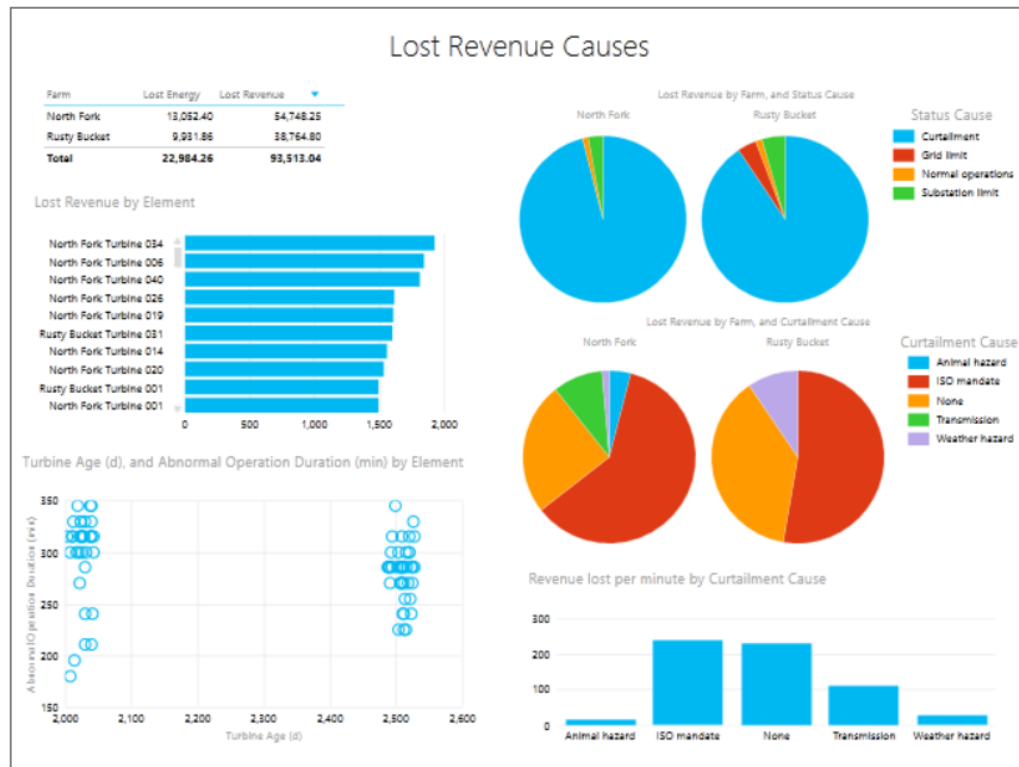
How to describe the PI System?

Let's compare creating this
report

Without the PI System

and

With the PI System



Without the PI System

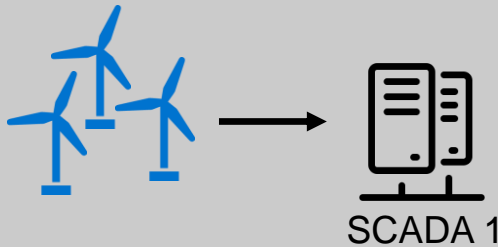
Corporate



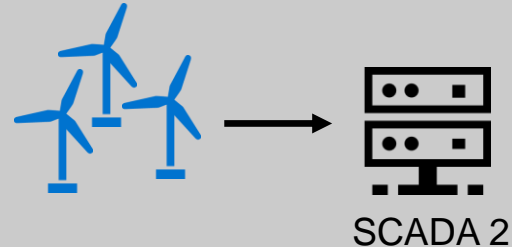
Lost Production



North Fork



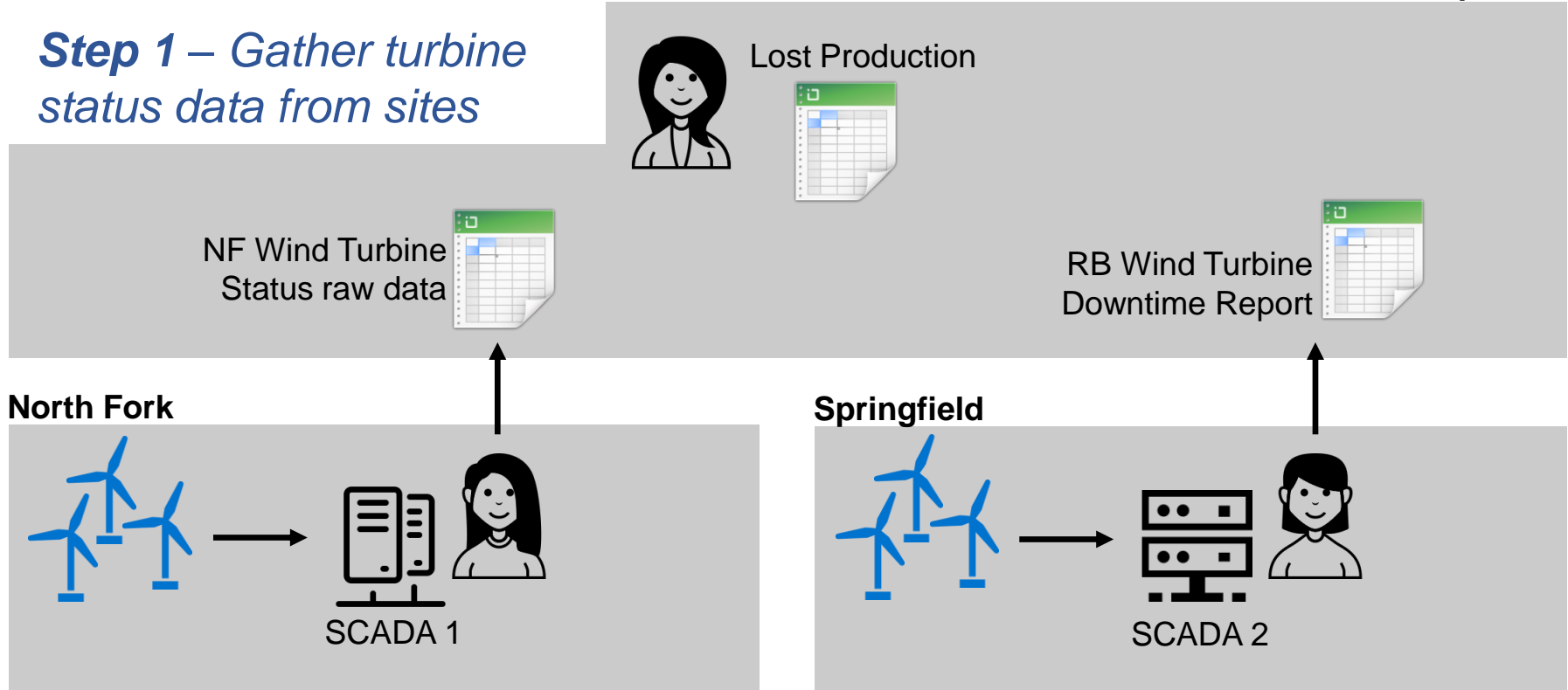
Springfield



Without the PI System

Corporate

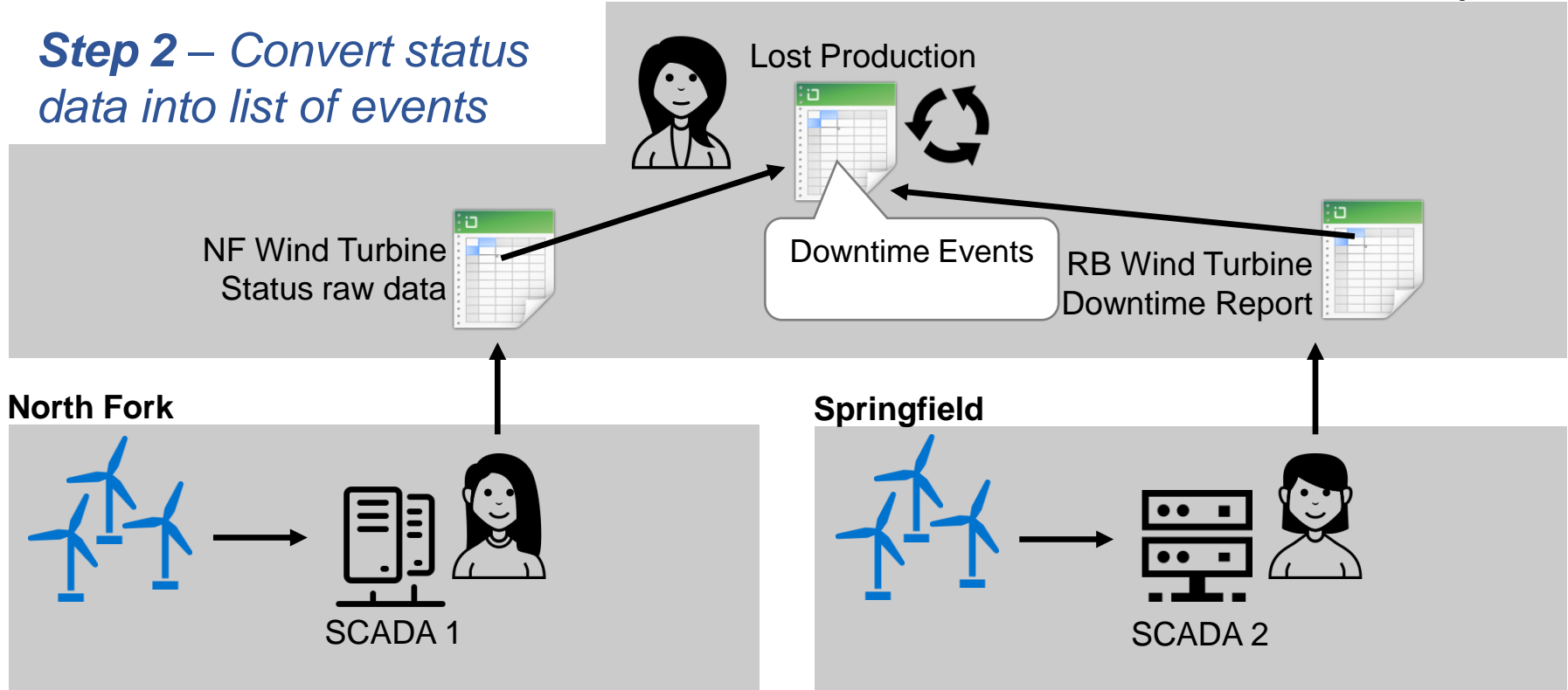
Step 1 – Gather turbine status data from sites



Without the PI System

Corporate

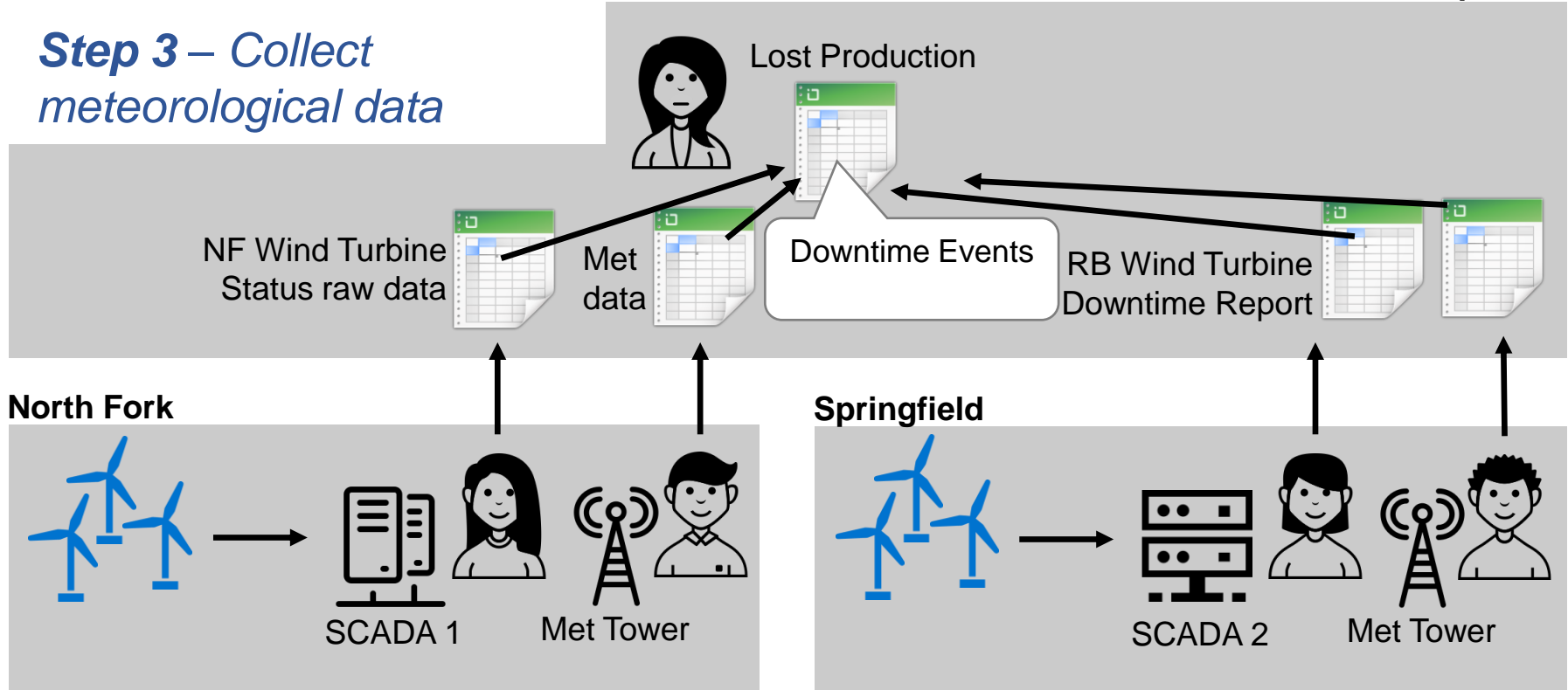
Step 2 – *Convert status data into list of events*



Without the PI System

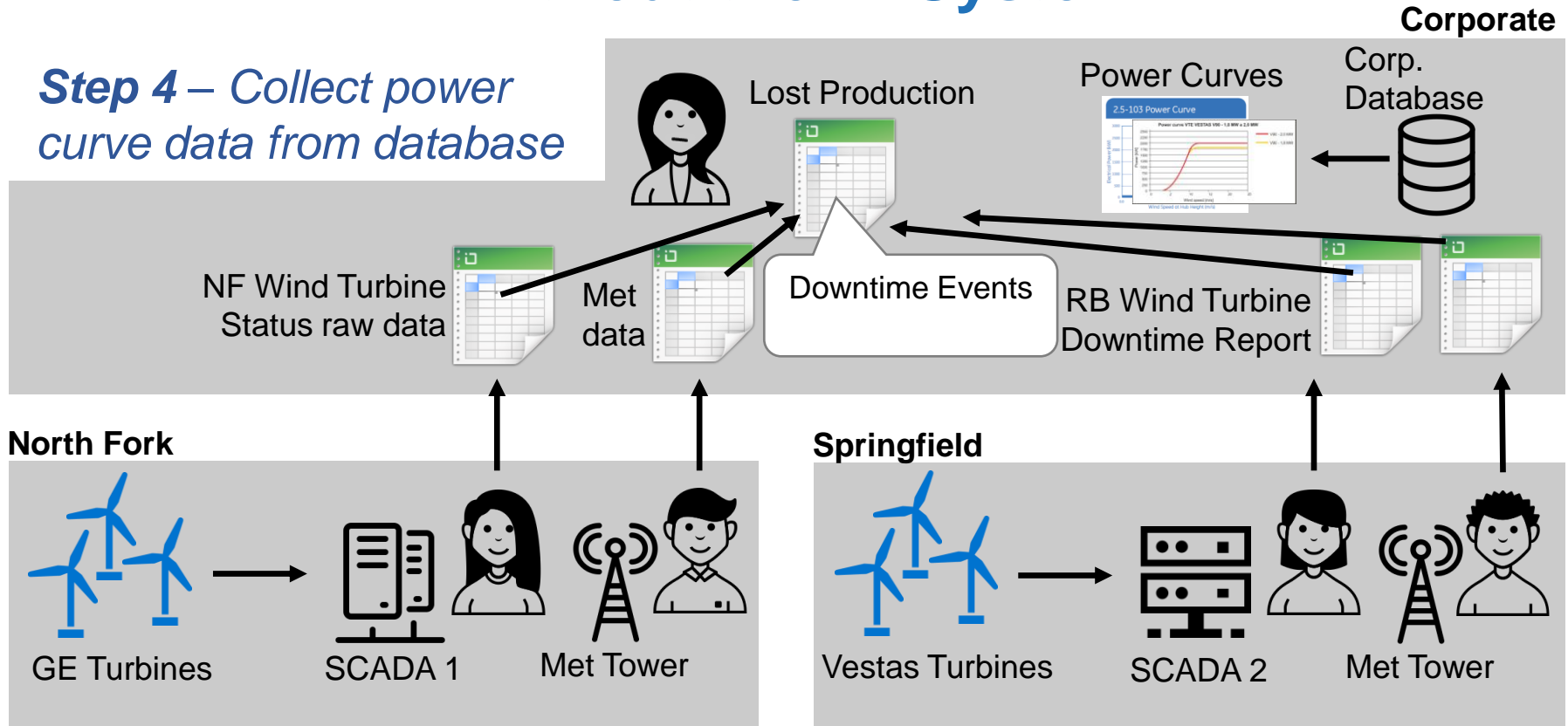
Corporate

Step 3 – Collect meteorological data



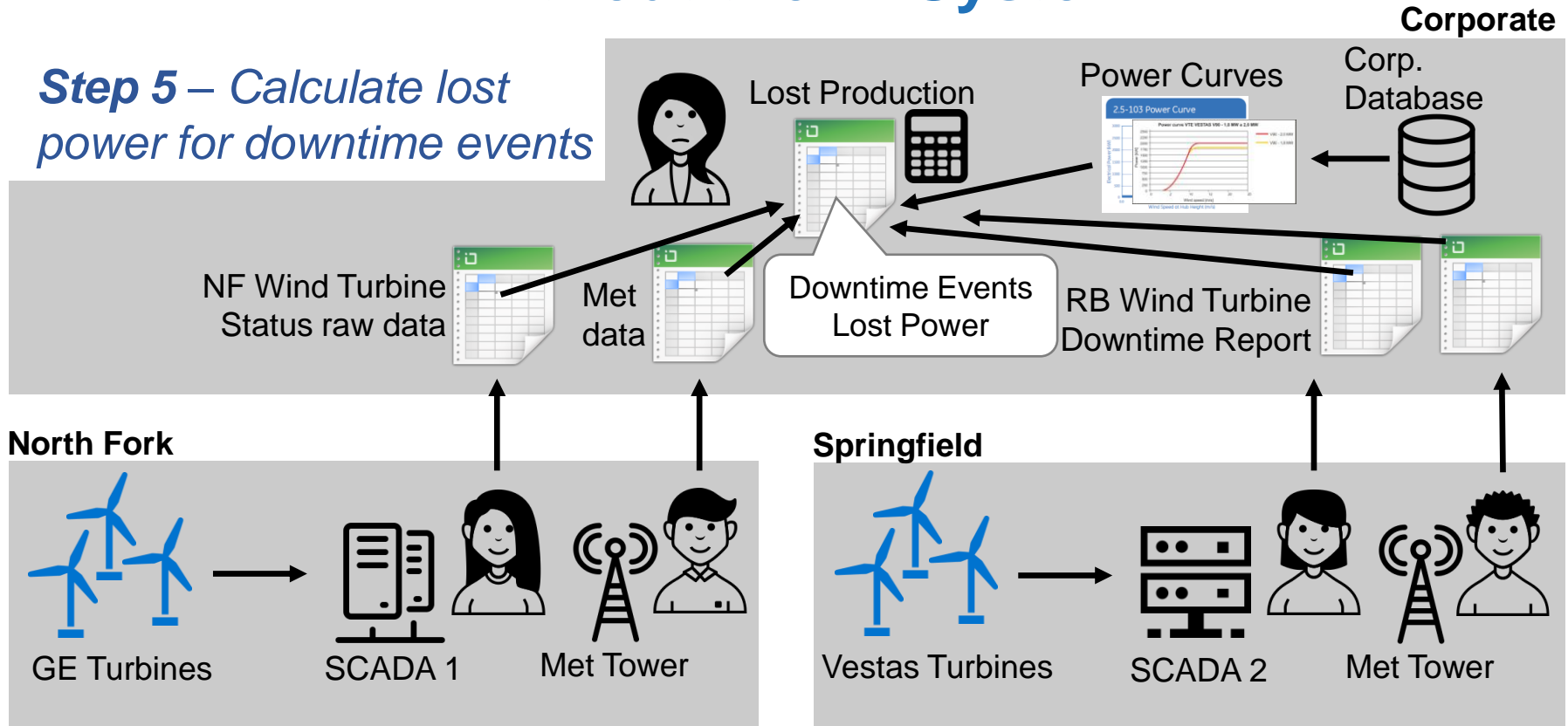
Without the PI System

Step 4 – Collect power curve data from database



Without the PI System

Step 5 – Calculate lost power for downtime events



Without the PI System

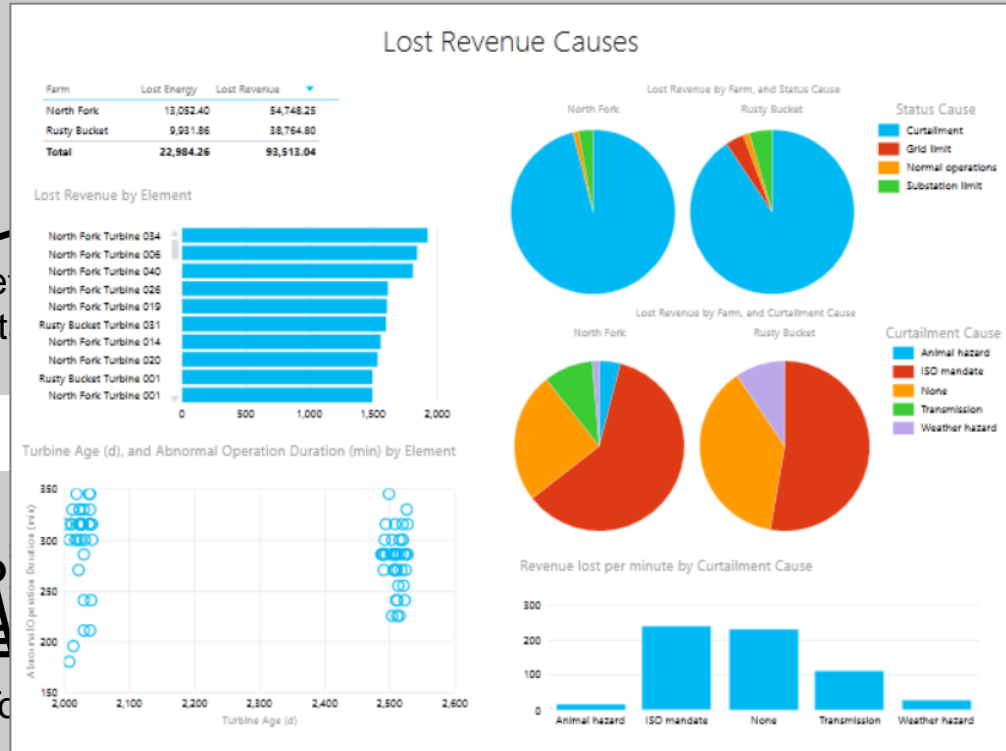
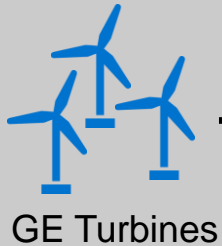
Corporate

Step 6 – Publish the report!

NF Wind Turbine
Status raw data

Metadata

North Fork



Without the PI System

Corporate

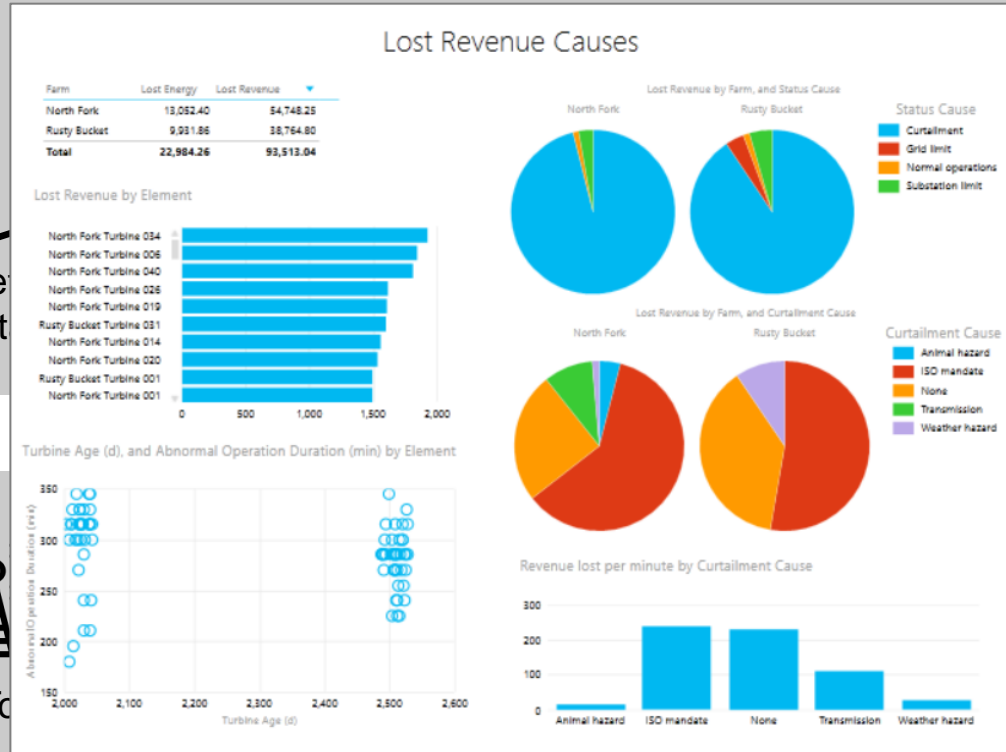
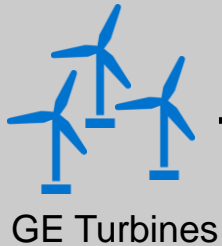
Step 6 – Publish the report!
... then start over next week

NF Wind Turbine
Status raw data



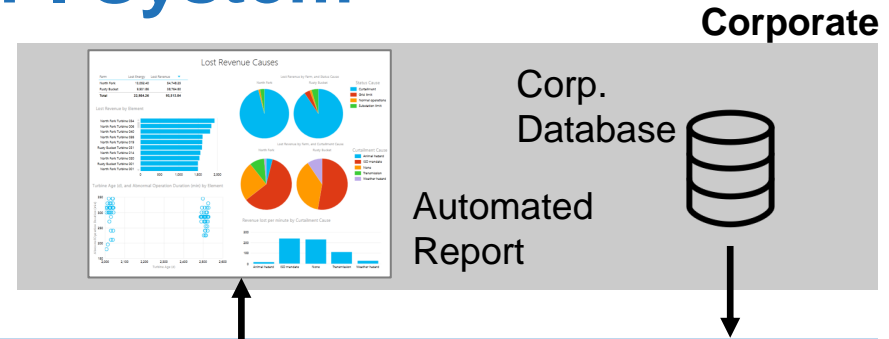
Me
dat

North Fork



With the PI System

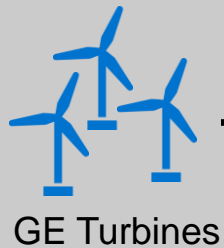
Site operations data collection
External database integration
Real-time analytics and events
Automated BI reporting



OSIsoft® PI System Infrastructure

Downtime
Lost Power

North Fork



Rusty Bucket





What PI System tools do I need?

What type of solution are you looking for?

- **Collect Data from Disparate Systems**
- **Create Calculations for Assets**
- **Identify and Capture Important Events**
- **Visualize and Share Data**
- **Deploy Business Intelligence (BI) & Machine Learning**

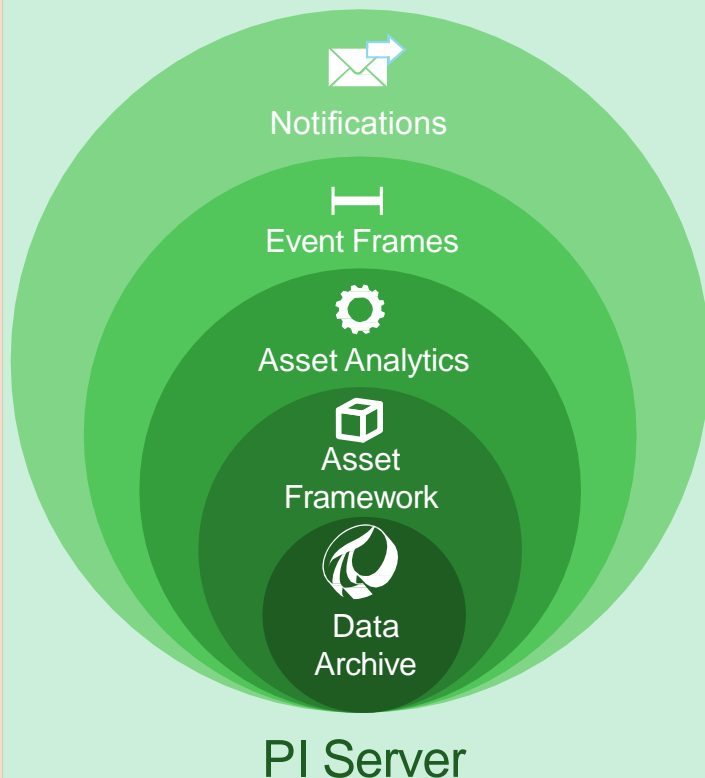
Collect

Data Sources

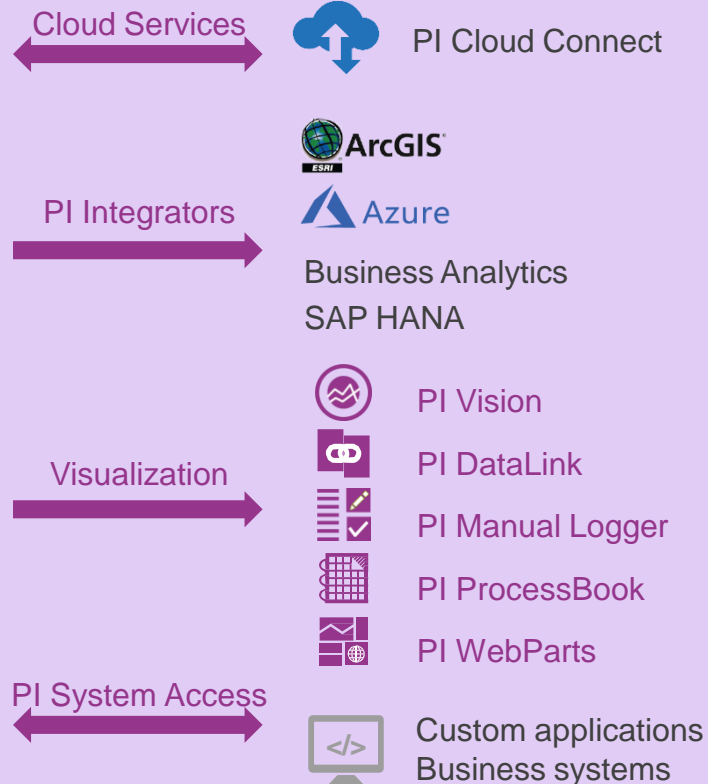


PI Interfaces
&
PI Connectors

Store & Enhance



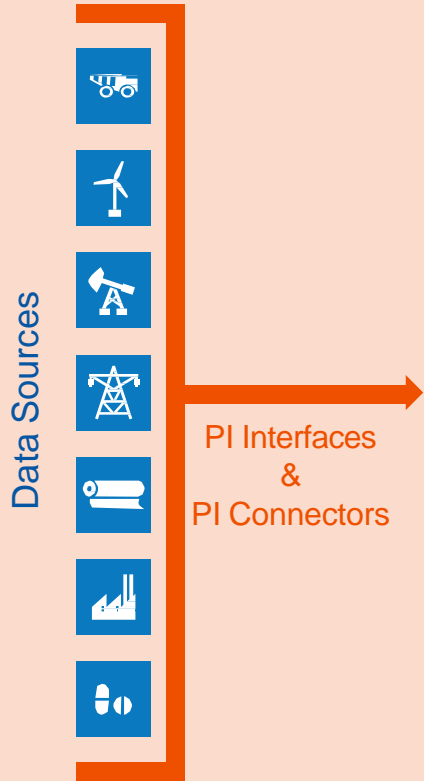
Deliver



Collect Data from Disparate Systems

“PI Connectors & PI Interfaces”

Collect



Collects **time-series** and **meta-data** from any source



IoT Sensors



Databases



We have developed over **450** PI Interfaces and PI Connectors

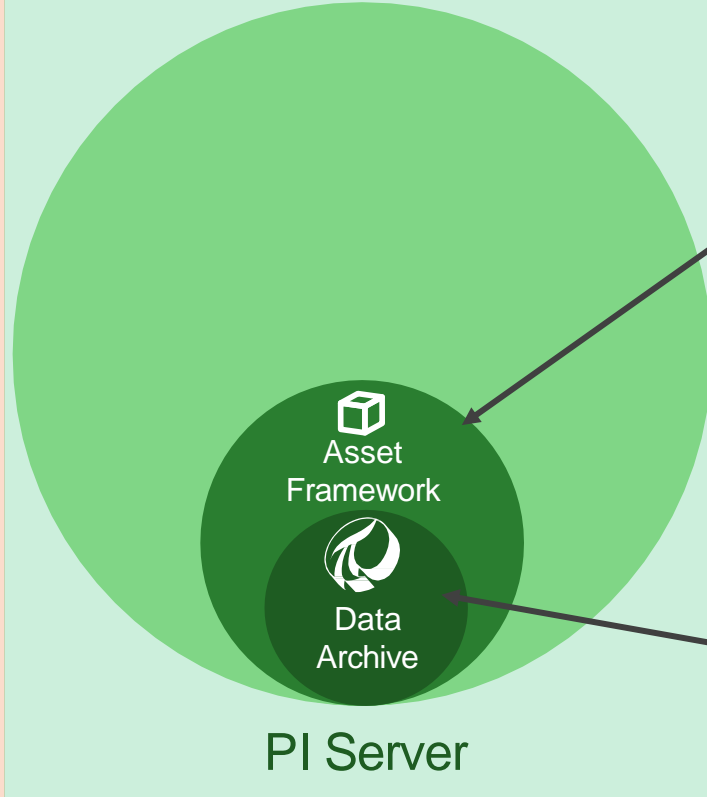
Collect

Data Sources





PI Interfaces
&
PI Connectors




Store & Enhance



Meta-data stored in the
Asset Framework

-  Manufacturer
-  Longitude
-  Latitude

Raw time-series data is stored
in the **Data Archive**

-  Turbine Status ON
-  Active Power 317
-  Nacelle Position 304

Collect

Data Sources

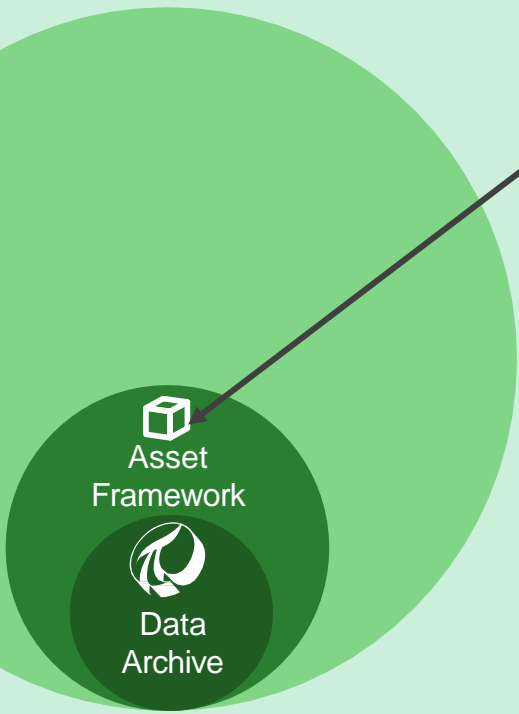


PI Interfaces
&
PI Connectors

Store & Enhance



Store & Enhance



PI Server



Windtopia



North Fork site



Rusty Bucket site



Wind Turbine 01



Wind Turbine 02



...



Wind Turbine 95



Status



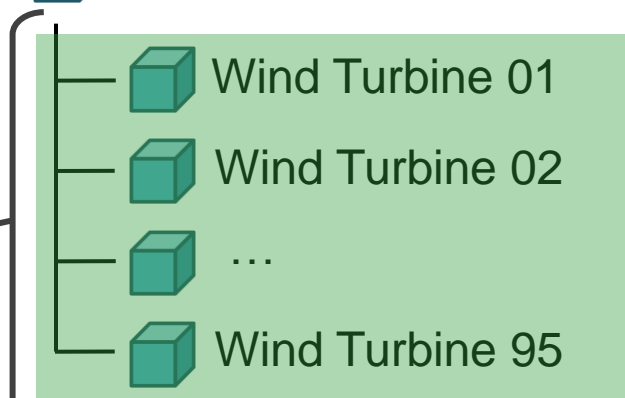
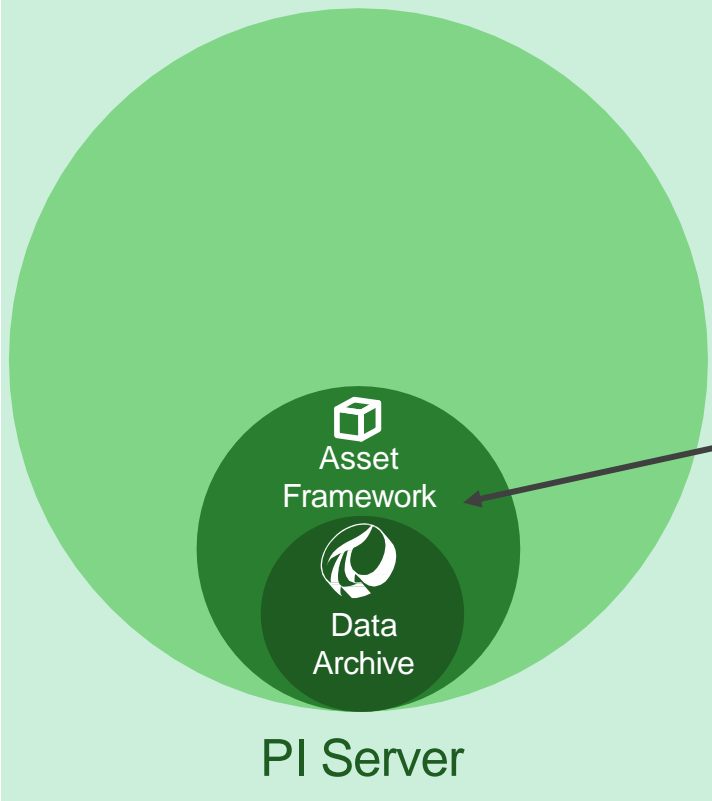
Active Power



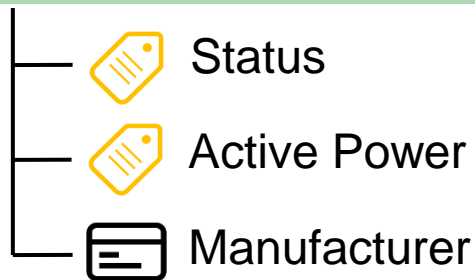
Manufacturer

Build
relationships
between assets

Store & Enhance



Build **templates** for common assets



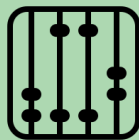
Create Calculations for Assets

“Asset Framework & Asset Analytics”

Store & Enhance



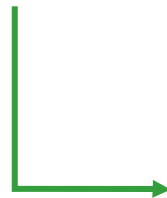
Wind Turbine Template



Hourly Energy Production
Power Factor

Build real-time
analytics on
templates...

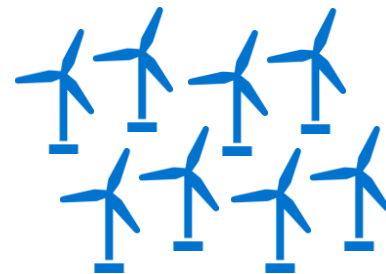
... deploy them
to your entire
fleet...



North Fork site



Total Energy Production
Average Power Factor



... and roll it
up to the site

Identify and Capture Important Events

“Asset Framework & Event Frames”

Store & Enhance

Event Frames

Asset Analytics

Asset Framework

Data Archive

PI Server

Store event context

┌──┐ Gearbox overheating

┌──┐ Downtime

┌──┐ Turbine Curtailment

User defined

Triggers:



External Systems



Rockwell Automation

ABB



FOXBORO

werum
SOFTWARE & SYSTEMS

SIEMENS

Wonderware

Honeywell

Store & Enhance


Notifications


Event Frames


Asset Analytics


Asset
Framework

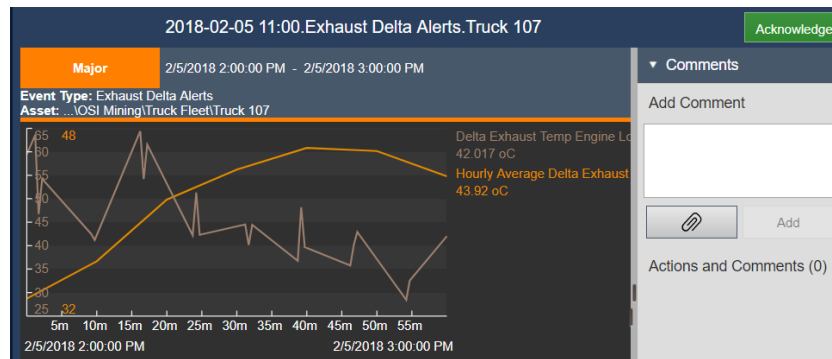

Data
Archive

PI Server

Notification on important events

 Gearbox overheating

 Notification

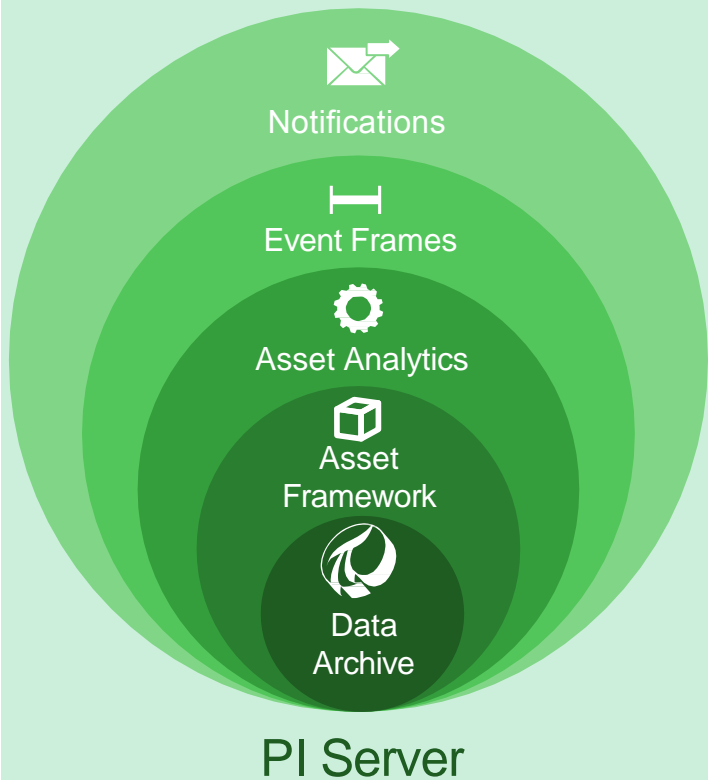


Operator can **view**, **acknowledge** and **comment** on event

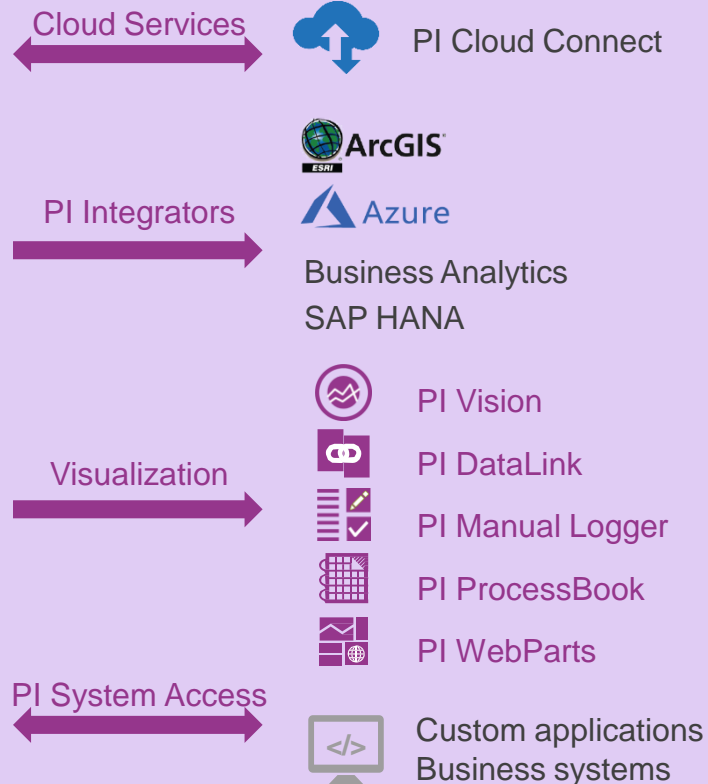
Visualize and Share Data

“PI Vision & PI DataLink”

Store & Enhance



Deliver





PI System's flagship visualization tool

Designed with collaboration in mind
Display editing and visualization
Use any device
Extensible



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

PI DataLink

	A	B	C	D	E	F
1	 company name					
2		Area		Line 1		
3	From	Unit		Injection Mold 1		
4	05/23/2017 00:00:00	Target	Production	Scrap	Scrap	Average Temperature
5	To	Count	Count	Count	%	F
6	05/24/2017 00:00:00					
7	0:00	580	560	40	7.14%	459.89
8	1:00	500	502	29	5.78%	459.77
9	2:00	580	578	27	4.71%	460.10
10	3:00	580	572	28	4.90%	460.54
11	4:00	580	571	29	5.08%	460.04
12	5:00	580	574	26	4.53%	460.08
13	6:00	500	466	40	8.58%	460.25
14	7:00	580	572	28	4.90%	460.08
15	8:00	500	490	22	4.49%	459.53
16	9:00	580	574	26	4.53%	460.58
17	10:00	500	250	132	50.97%	429.49
18	11:00	580	303	87	28.71%	429.61
19	12:00	580	312	87	27.88%	430.62
20	13:00	500	236	129	54.66%	430.14
21	14:00	580	290	93	32.07%	429.97
22	15:00	580	435	62	14.25%	444.72
23	16:00	580	578	25	4.35%	460.78
24	17:00	580	570	30	5.26%	459.75
25	18:00	580	574	26	4.53%	459.83
26	19:00	580	576	24	4.17%	459.84
27	20:00	500	437	20	4.58%	460.35
28	21:00	580	307	76	24.76%	429.87
29	22:00	580	572	28	4.90%	459.47
30	23:00	580	568	32	5.63%	459.73

PI System data in Microsoft Excel

Pull in raw data, calculations, events, filtered data
Leverage Excel functionalities
Automated reporting

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

Deploy Business Intelligence (BI) & Machine Learning

“PI Integrators”

PI Integrators

Prepare, clean and deliver PI System data to external systems



See your real-time data on a map



Develop machine learning models

SAP HANA

Combine with business data

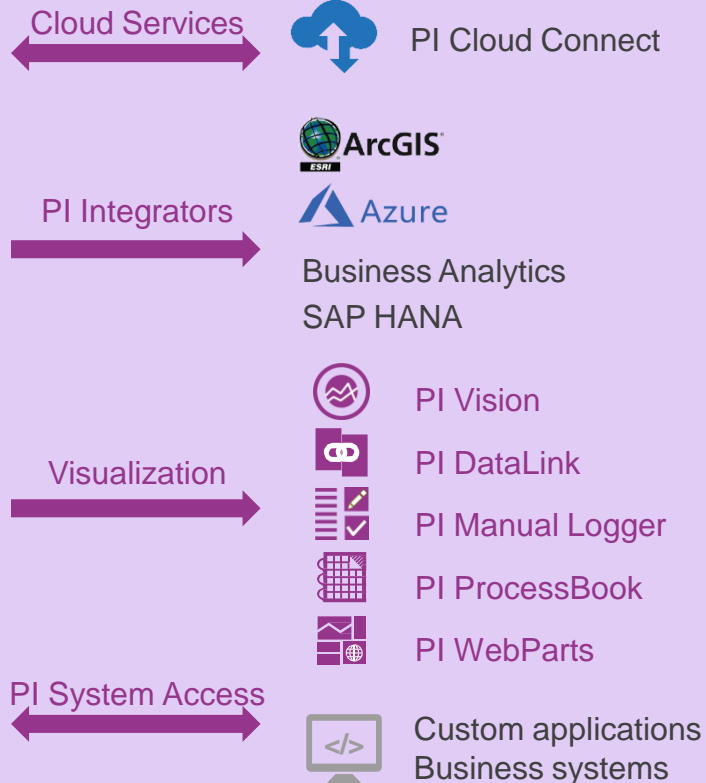


Tableau
Qlik
Tibco Spotfire

Business Analytics

Connect to any BI platform

Deliver

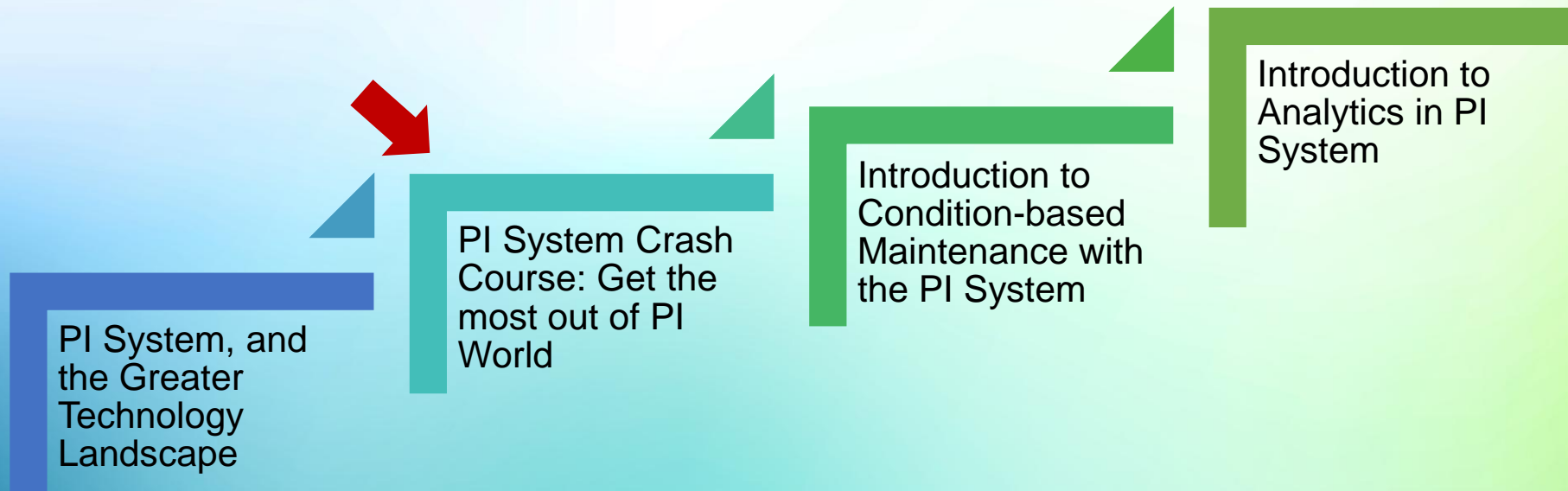




How to navigate PI World?

Day 1 - Introduction to the PI System Track

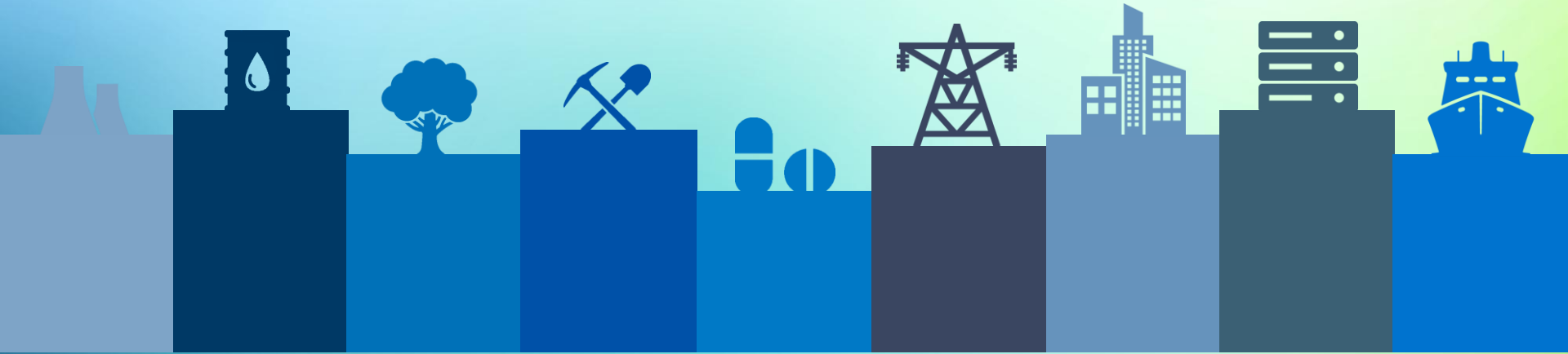
Quality Tracking



Day 2 – Industry Day: Get Inspired!

Quality Tracking

- ✓ Various Industry Tracks
- ✓ Industry User Group Meetings



Day 3 – Product Tracks & Labs

- ✓ Learn more about individual products
- ✓ Partner & product expo
- ✓ *Hands-on labs – registration required



Hands-On Labs

Register
Today



Questions?

Please wait for
the **microphone**

State your
name & company




Please remember to...

Complete the online survey
for this session

**DOWNLOAD
THE MOBILE APP**

- Rate sessions and provide feedback
- Meet and connect with other attendees

Join the conversation and SHARE
what you saw #osisoft #piworld

A smartphone displaying the OSiSoft PIWorld app logo, which features a stylized white atom-like symbol on a blue background.

謝謝 KEA LEBONA
 TAPADH LEIBH 고맙습니다
 БАЯРЛАЛАА MISAOTRA ANAO
 DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRACIES
 OBRIGADO شڪرا SALAMAT
 DANKON TANK TAPADH LEAT
 KÖSZÖNÖM DANKIE TERIMA KASIH GRACIES
 СПАСИБО MULTUMESC
 PAKMET CIZGE FAAFETA
 GO RAIBH MAITH AGAT ESKERRIK ASKO
 БЛАГОДАРЯ GRACIAS HVALA ХВАЛА ВАМ
 ТЕŞEKKÜR EDERIM
 TI БЛАГОДАРАМ MAHADSANID
 THANK YOU
 DANK JE EΥΧΑΡΙΣΤΩ GRATIAS TIBI
 AČIŪ SALAMAT MAHALO IĀ 'OE TAKK SKALDU HA
 RAHMAT MERCI DЗЯКУЙ
 HATUR NUHUN GRAZZI ПAKKA PĒR
 PAXMAT CAĞA ありがとうございます
 CẢM ƠN BẠN SIPAS JI WERE TERIMA KASIH
 WAZVIITA UA TSAUG RAU KOJ
 СИПОС
 TI БЛАГОДАРАМ
 СИПОС