

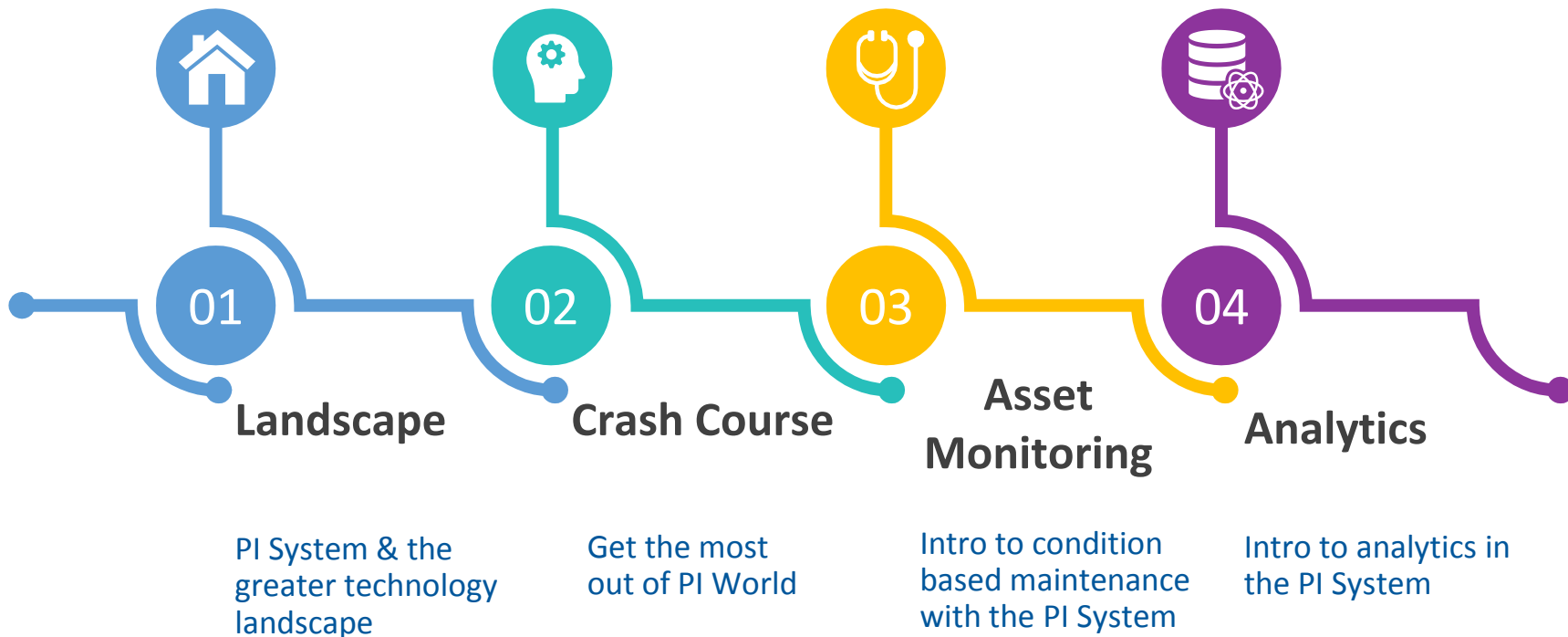
PI System & the Greater Technology Landscape

Andrew Nguyen
Product Marketing Manager



Intro to PI System Track:

New to PI System? We'll get you up to speed!





OSIsoft®

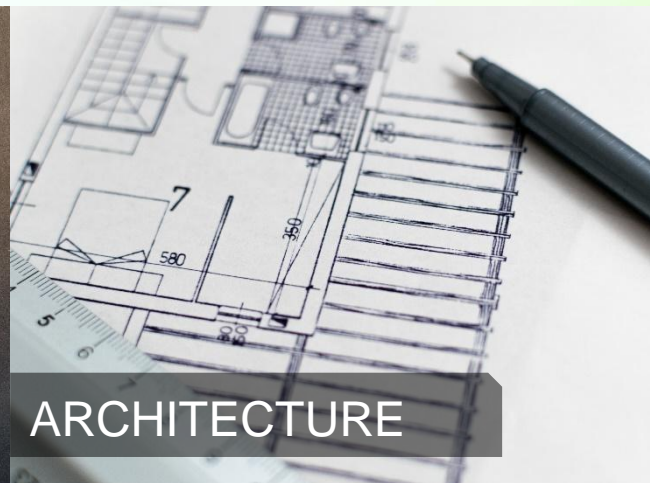
Questions we will address in this talk



PI SYSTEM



LANDSCAPE



ARCHITECTURE

What is PI System?

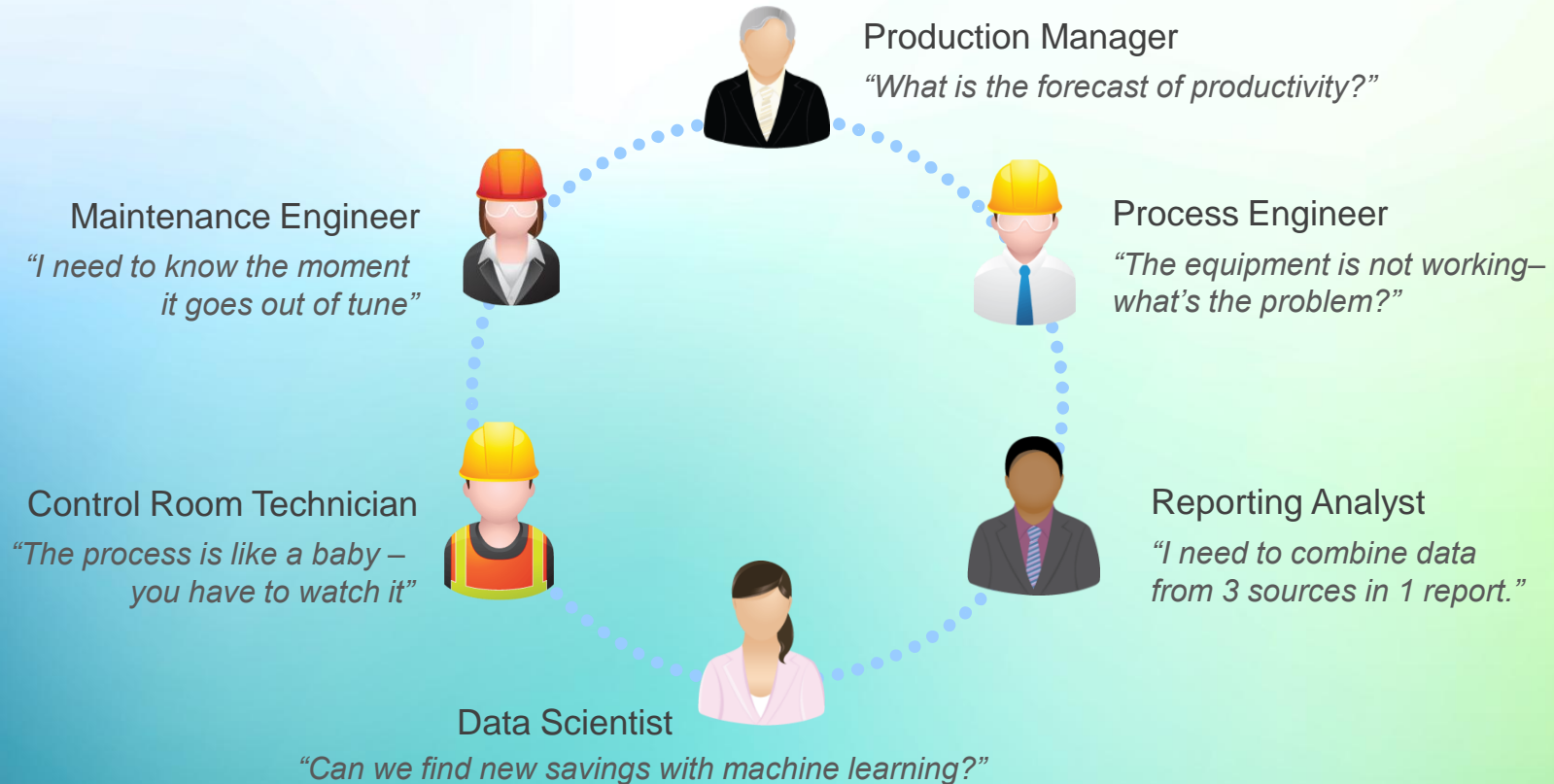
What's different about operational data?

What does a basic deployment look like?

What is PI System?



Different business groups have different needs



Answers are in the data, but it's surprisingly hard to get to



Remote Locations



Secure Environments

```
attachEvent("onreadystatechange",H),e.attachE
boolean Number String Function Array Date RegE
_={};function F(e){var t=_[e]={};return b.ea
t[1])===!1&&e.stopOnFalse){r=!1;break}n=!1,u&
?o=u.length:r&&(s=t,c(r))}return this},remove
nction(){return u=[],this},disable:function()
re:function(){return p.fireWith(this,argument
ending",r={state:function(){return n},always:
romise)?e.promise().done(n.resolve).fail(n.re
e,t[2][2].
i=!==r|e&
unction(p,t
```

Requires Coding

Answers are in the data, but it's often hard to understand

What is this?

Temperature
Speed
Batch ID
Distance



What units?



°F or °C
mi/hr
psi

From what?

Boiler
Pump
Truck
Transformer



Where is it?



HQ
Off-shore
Springfield

37

Raw data needs context to make it consumable information

Goal of PI System is to connect people with data & information



- One-stop-shop
- Viewing layer
- User configured



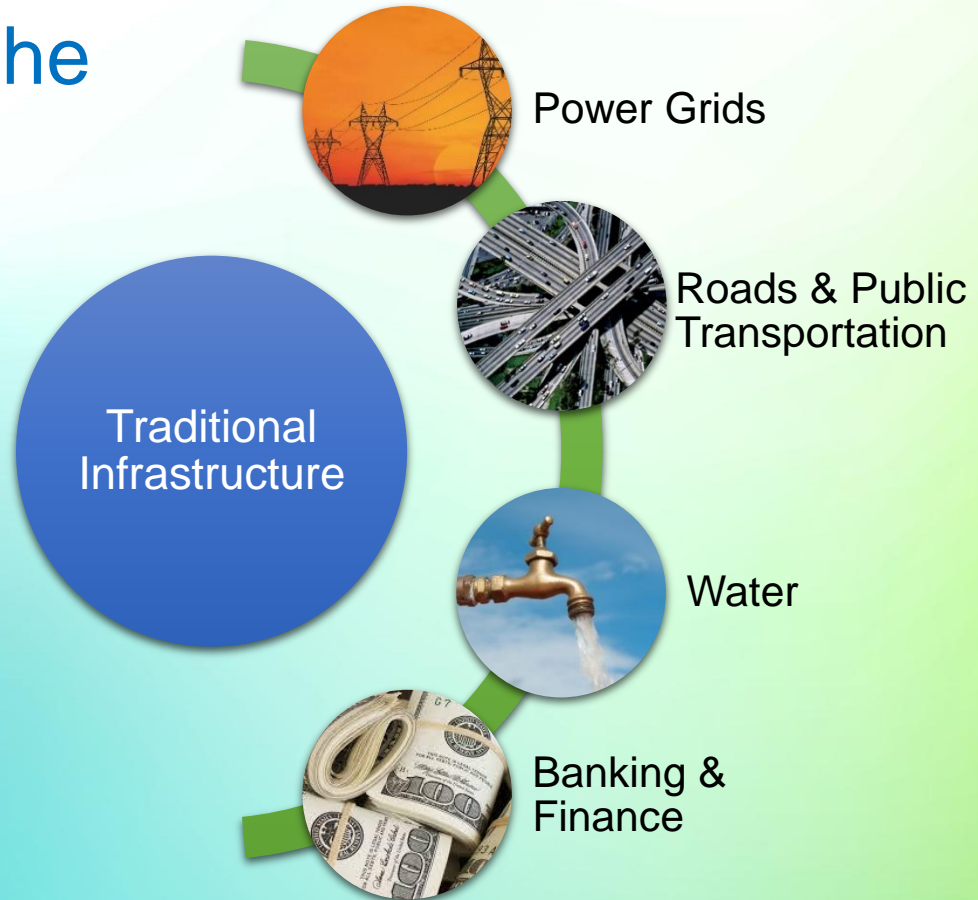
Why do I keep hearing the word “infrastructure?”

Systems & organizations that move something of value from:

Point A – Where it is

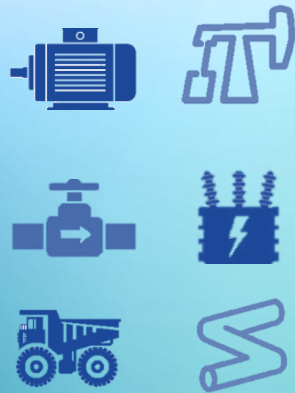


Point B – Where it needs to go

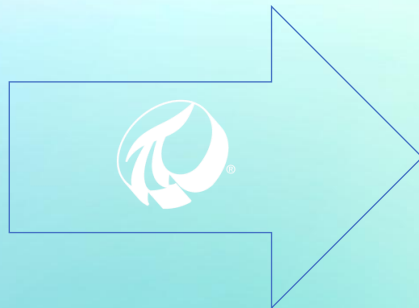


PI System is a digital infrastructure for sensor-based data

POINT A Data Sources



POINT B



Infrastructure is ever-present, additive, & supports multiple uses

Data Landscape





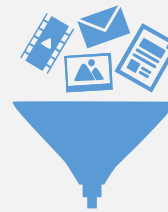
ENGINE
ROOM



PORT



CORPORATE



Everyone uses data
Not all data is the same



Real-time
Decision Support

Retrospective
Analysis



Time Series



Relational



Geospatial



Unstructured



Time Series



- Sensor data
- Historian

Comes from

SCADA, systems that typically run 24/7
(Near) continuous stream of data



Used for

Process monitoring
Critical systems needing real-time action

Used by

Control-network operators, engineers. **OT**

Relational



- SQL
- CRM

Comes from
Transactions, records



Used for
Enterprise resource planning (ERP)
Finance
Customer relationship management (CRM)

Used by
Business users, planners, maintenance. **IT**

Geospatial



- Data viewed on maps

Comes from

Combination of time series data and relational data

Used for

Tracking transactions and locations on a map

Used by

Anyone monitoring logistics, business users, administrators

Unstructured



- Hadoop

Comes from

Documents

Images

Social media



Used for

Correlation analysis, pattern recognition

Used by

Statisticians, data scientists



Real-time
Decision Support

Retrospective
Analysis



Time Series



Relational



Geospatial



Unstructured



PI Server

Data Archive + AF

PI Integrators

Wind Turbine Detail Asset: GE06

Ad Hoc Display

← GE06

Capacity
48,93 %Operating State
Load OperationEfficiency
14,401 %

Overheat Alarm

Turbine Availability
31,875 %

Links

[Thermal Details](#)
[High Turbine Temp](#)

About

| Name ▲ | Value |
|----------------------------|----------------|
| GE06(Gearbox Serial Number | 4800000-0000-0 |
| GE06(Gearbox Type | WindEnergy |
| GE06(Manufacturer | Truvale |
| GE06(Model | T95-2MW |
| GE06(Power Rated | 1 500 |
| GE06(Serial Number | M000000 |

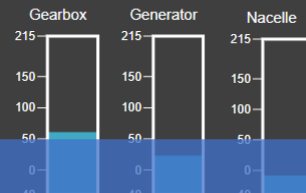
Nacelle

Blade Total Error
0,076527 °

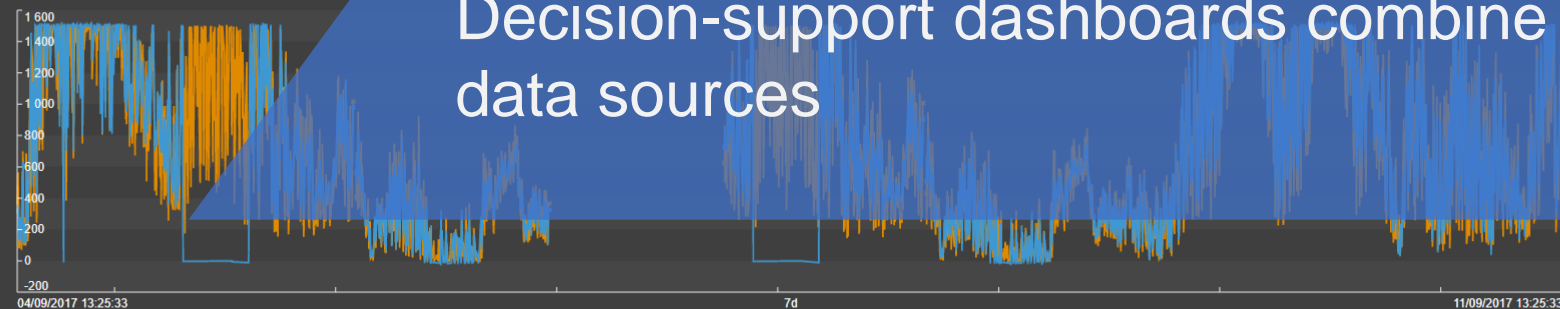
Hydraulic Pressure



Temperatures

Current L1
668,9 ACurrent L2
661,9 ACurrent L3
1 337 AL1-N Voltage
320,6 VL2-N Voltage
318 VL3-N Voltage
322,4 V

Decision-support dashboards combine many data sources



04/09/2017 13:25:33

7d

Now

11/09/2017 13:25:33

Wind Turbine Details Asset: GE06

Ad Hoc Display

← GE06

Capacity
48,93 %Operating State
Load OperationEfficiency
14,401 %

Overheat Alarm

Turbine Availability
99,99 %

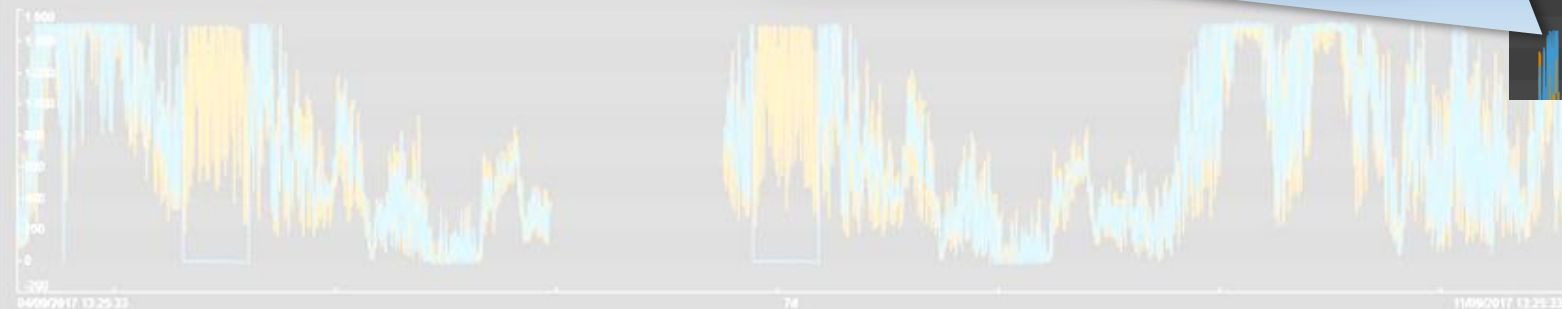
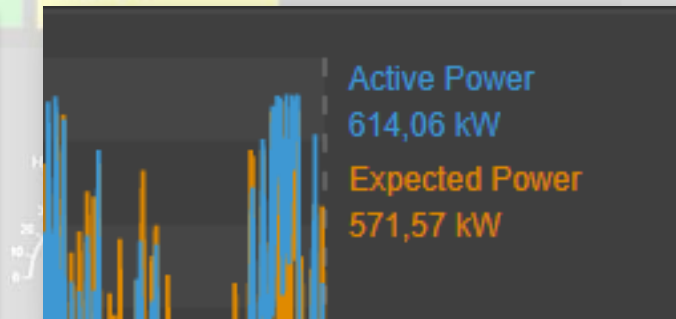
Links

[Thermal Details](#)
[High Turbine Temp](#)

About

Name: A
GE06/Geared Drive
GE06/Variable Type
GE06/Manufacture
GE06/Model
GE06/Power Rated
GE06/Serial Number

- Real-time readings
- Predictive models



Wind Turbine Details Asset: GE06 ▾

Ad Hoc Display

← GE06

Capacity
48,93 %Operating State
Load OperationEfficiency
14,401 %

Overheat Alarm

Turbine Availability
91,075 %[Links](#)
[Thermal Details](#)
[High Turbine Temp](#)

About

| Name ▲ | Value |
|----------------------------|----------------|
| GE06 Gearbox Serial Number | 4800000-0000-0 |
| GE06 Gearbox Type | WindEnergy |
| GE06 Manufacturer | Truvalle |
| GE06 Model | T95-2MW |
| GE06 Power Rated | 1 500 |
| GE06 Serial Number | M000000 |

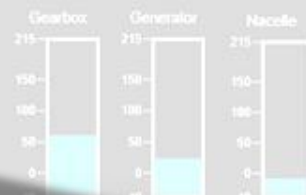
Nacelle

Blade Total Error
0,076527 °

Hydraulic Pressure



Temperatures



About

| Name ▲ | Value |
|----------------------------|----------------|
| GE06 Gearbox Serial Number | 4800000-0000-0 |
| GE06 Gearbox Type | WindEnergy |
| GE06 Manufacturer | Truvalle |
| GE06 Model | T95-2MW |
| GE06 Power Rated | 1 500 |
| GE06 Serial Number | M000000 |

Contextual information

- Manufacturer
- Rating
- Last maintenance date

Wind Turbine Details

Asset:

GE06

Ad Hoc Display

10

v

← GE06

Capacity
48,93 %Operating State
Load OperationEfficiency
14,401 %

Overheat Alarm

Turbine Availability
31,875 %

Links

[Thermal Details](#)
[High Turbine Tempo](#)

About

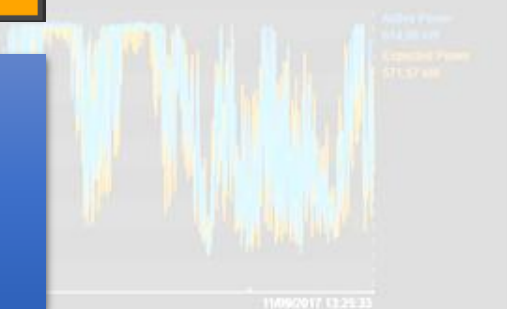
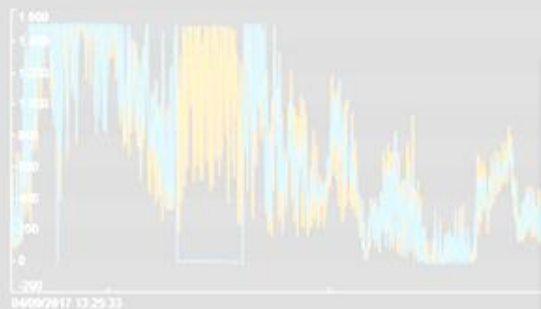
| Name & | Value |
|----------------------------|----------------|
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| GE06/Gearbox Type | WindEnergy |
| GE06/Manufacturer | Trane |
| GE06/Model | T105-2MW |
| GE06/Power Rated | 1.530 |
| GE06/Serial Number | 4800000 |

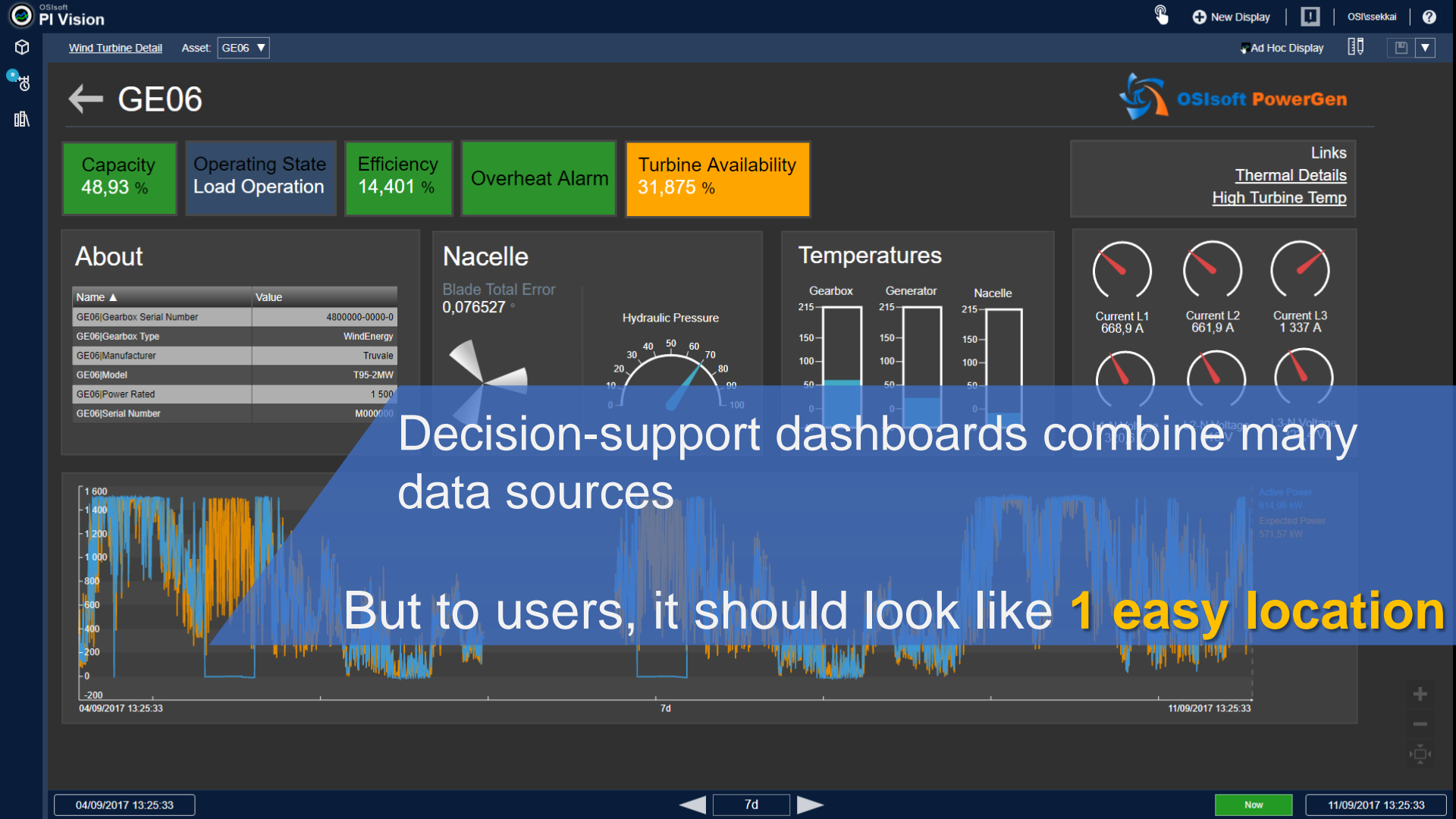
Data
0,07652

Temperatures

Current L1
666,9 ACurrent L2
661,9 ACurrent L3
1.337 AL1-N Voltage
320,6 VL2-N Voltage
311,1 VL3-N Voltage
322,4 VEfficiency
14,401 %Turbine Availability
31,875 %

- Summary Calculations
- KPI's

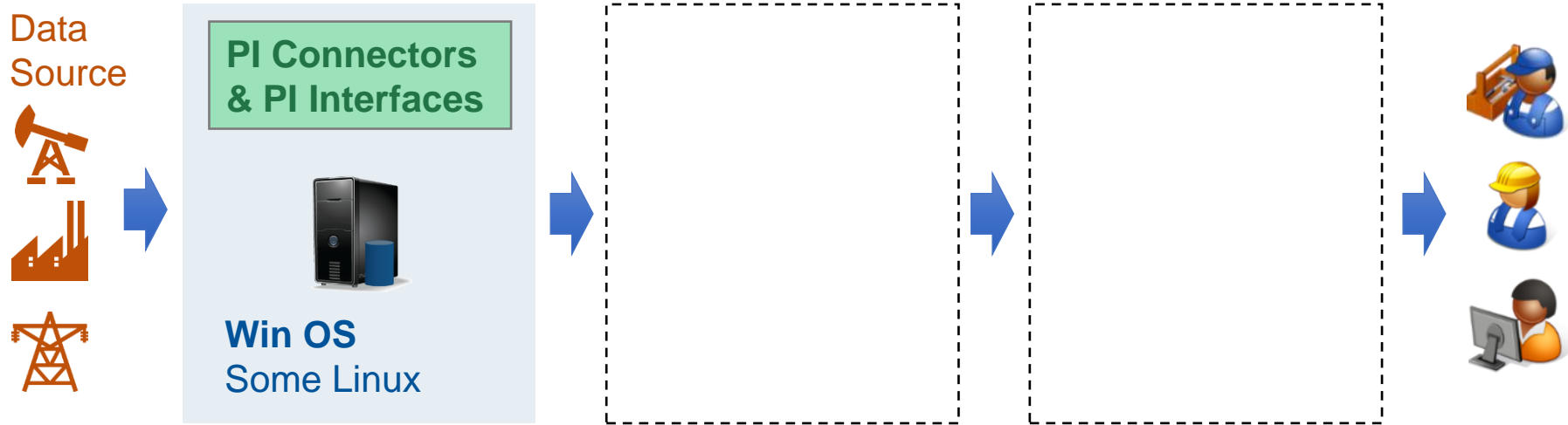




A close-up photograph of an architectural drawing on a white sheet of paper. The drawing features various geometric shapes, lines, and numerical annotations such as '7', '580', '350', '150', and '200'. A black pen with a gold-colored tip lies diagonally across the upper right portion of the drawing. In the bottom left corner, a portion of a white ruler with black markings is visible. A semi-transparent dark grey rectangular box is overlaid on the left side of the image, containing the text 'Basic Architecture' in white.

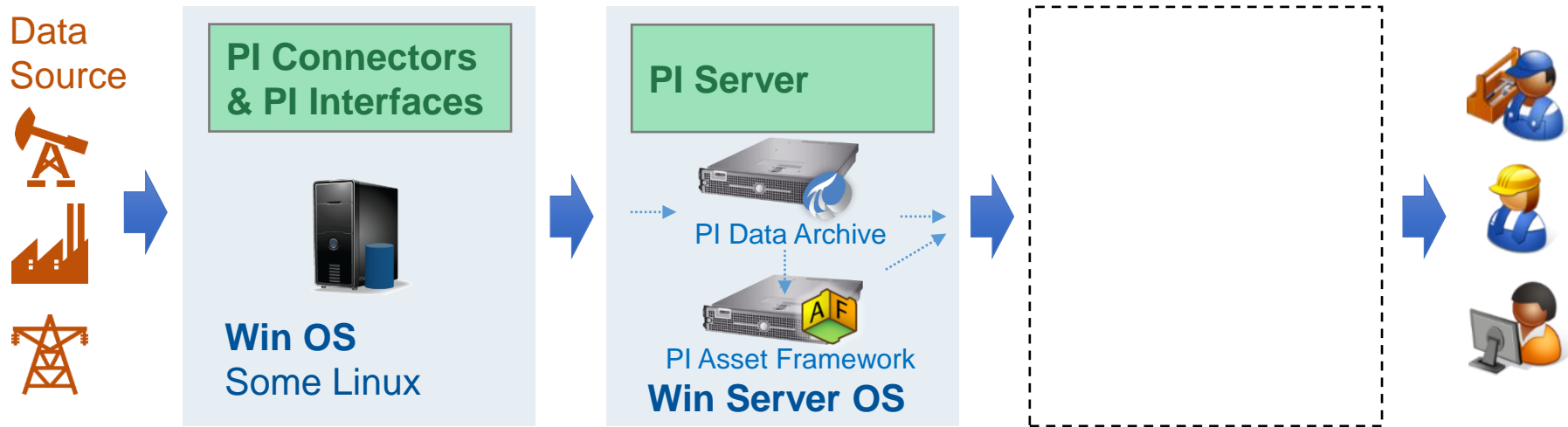
Basic Architecture

Layer 1: Data collection



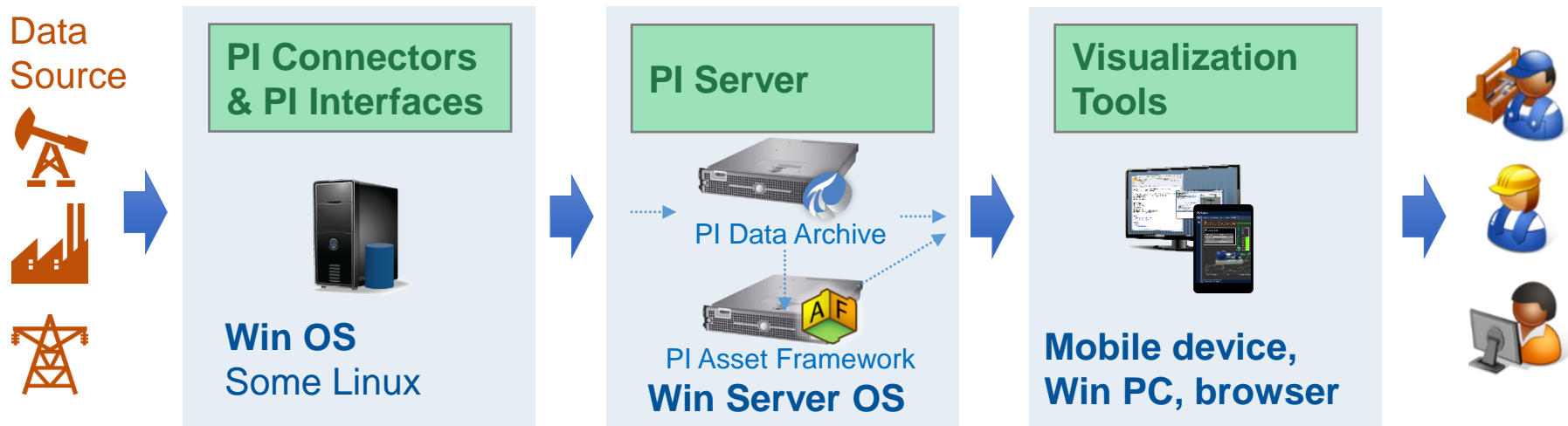
- Put close to data source
- Use buffering

Layer 2: Store & Enhance



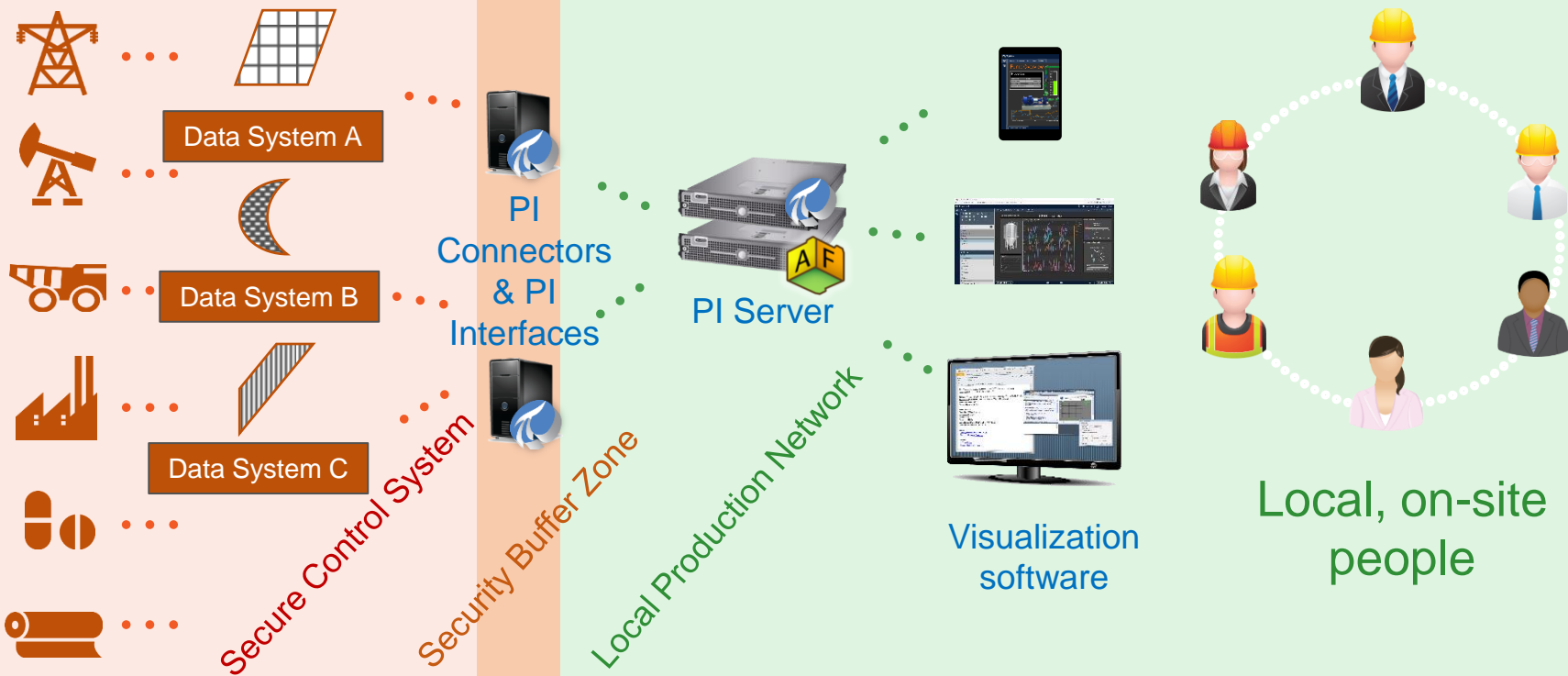
- Can run a personal system on laptop
- Go bigger for production

Layer 3: Deliver



← Typical installation from nothing to seeing data is 3~5 days →

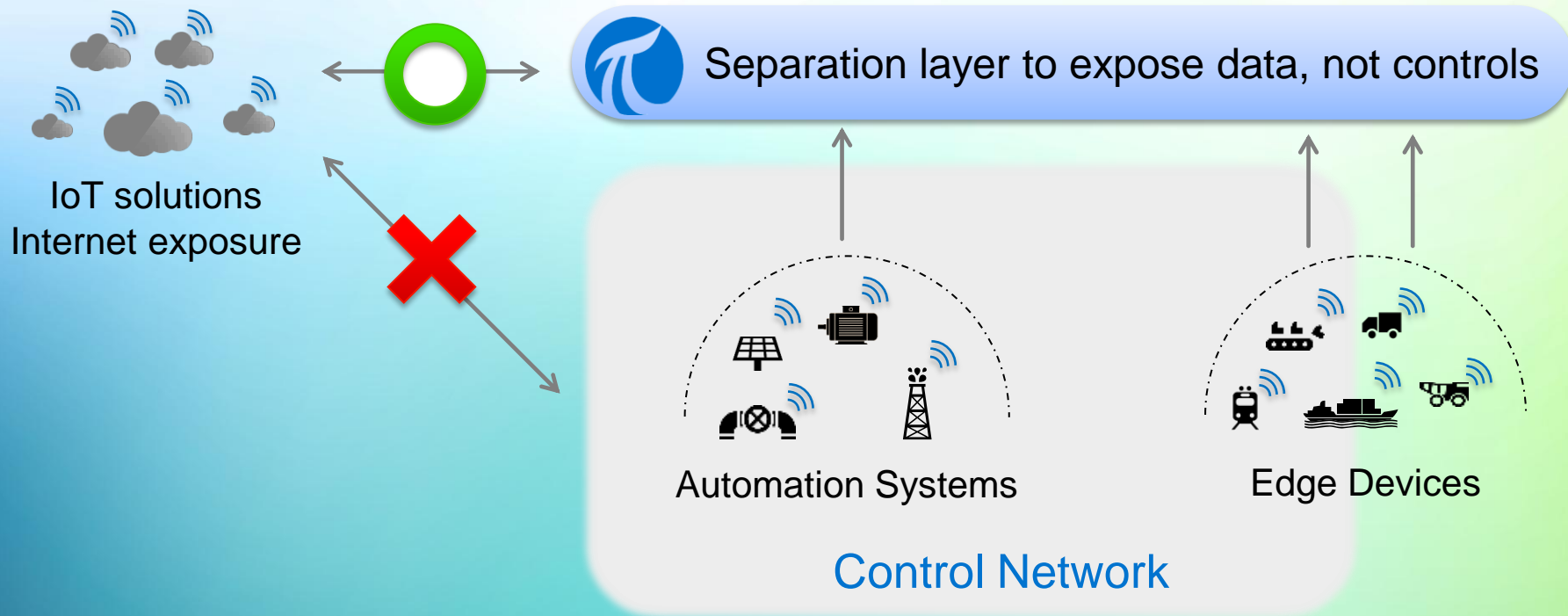
Basic Architecture



Enterprise Architecture



Protecting control layer is especially critical in IoT era



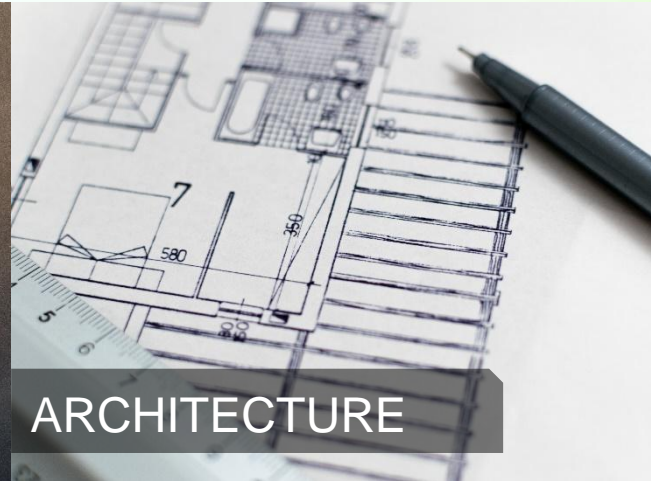
What We Covered



PI SYSTEM



LANDSCAPE



ARCHITECTURE

Digital data infrastructure
for sensor-based data.

Today's operations blends
multiple types of data. But to
a user, it should be seamless.

Create a safe viewing layer.
Allow people to build
intelligence back into system.

Listen for themes: Easy to get to & easy to understand



- Doing so
- Securely
 - At-scale

Contact Information



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Questions?

Please wait for
the **microphone**

State your
name & company



Please rate this session in the mobile app!



THANK YOU

OSIsoft.
PIWorld

謝謝 KEA LEBONA
TAPADH LEIBH 고맙습니다
БАЯРЛАЛАА MISAOTRA ANAO
DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRACIES
OBRIGADO شڪرا
DANKON TANK TAPADH LEAT SALAMAT
DANKIE TERIMA KASIH
KÖSZÖNÖM
СПАСИБО
PAKMET CIZGE
GO RAIBH MAITH AGAT
БЛАГОДАРЯ GRACIAS
ТИ БЛАГОДАРАМ
MAHADSANID
TAK DANKE
RAHMAT
HATUR NUHUN
MERCİ
CẢM ƠN BẠN
WAZVIITA
FALEMINDERIT
DANK JE ΕΥΧΑΡΙΣΤΩ GRATIAS TIBI
AČIŲ SALAMAT MAHALO IĀ 'OE TAKK SKALDU HA
GRAZZI PAKKA PĒR PAXMAT CAĞA
SIPAS JI WERE TERIMA KASIH
UA TSAUG RAU KOJ
ТИ БЛАГОДАРАМ
СИПОС
MULTUMESC
FAAFETAİ
ESKERRIK ASKO
HVALA ХВАЛА ВАМ
TEŞEKKÜR EDERIM
HVALA
DZЯКУЙ
DI OU MÈSI
ĐAKUJEM
MATUR NUWUN
GRAZIE