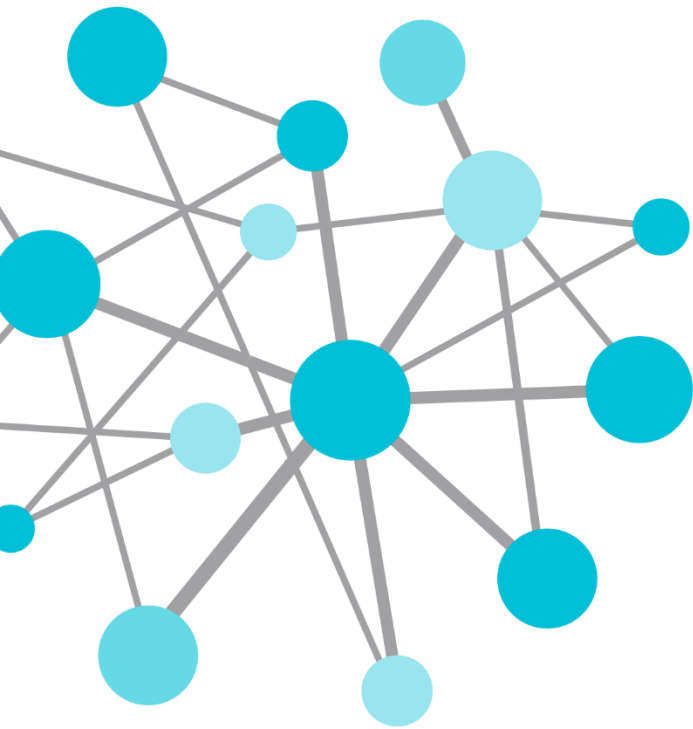


OSIsoft®

REGIONAL SEMINAR 2014

The **Power** of **Data**

DECISION READY IN REAL-TIME



The Power of Connection

Presented by **John Maytum, Sr. Support Sales Engineer**

jmaytum@osisoft.com



Why is Connectivity Important?



Context

More data sources available

Advanced analyses require information from multiple systems

Expanding ecosystem of mobile devices

Need

Imperative need to access all operational data and analyses, any time, any where

Solution

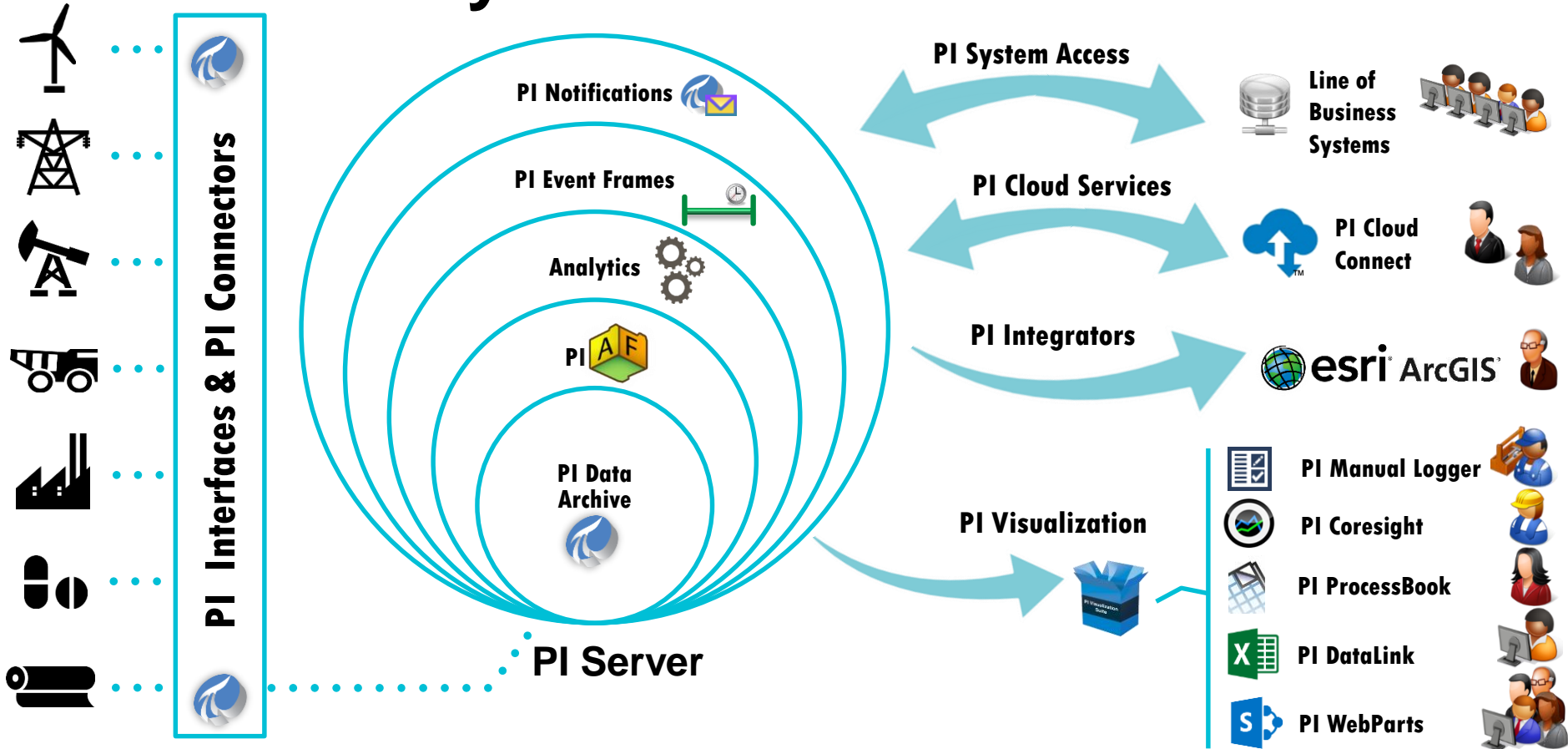
Implement a modern, **connected** PI System

*What
can this
look like?*

Solution

Implement a modern,
connected PI System

PI System Infrastructure



How
can all of this
be done at
your organization?

Key Steps



STEP 1

Connect
Your
PI System to
Your Data



STEP 2

Connect
Your
PI System to
Your Users



STEP 3

Connect
Your
PI System
Across
Boundaries

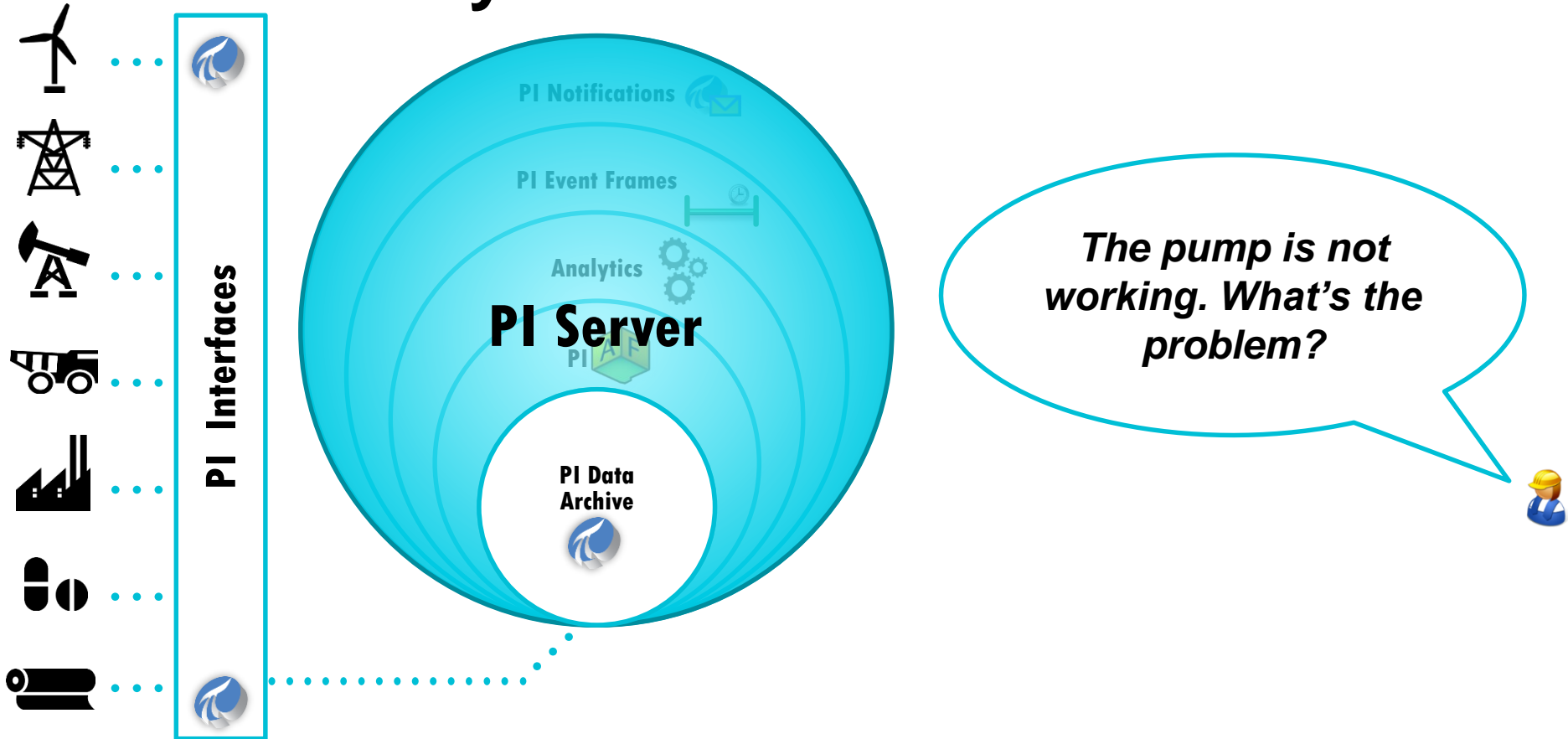
A network diagram background consisting of light blue circles of various sizes connected by thin grey lines, forming a complex web-like structure.

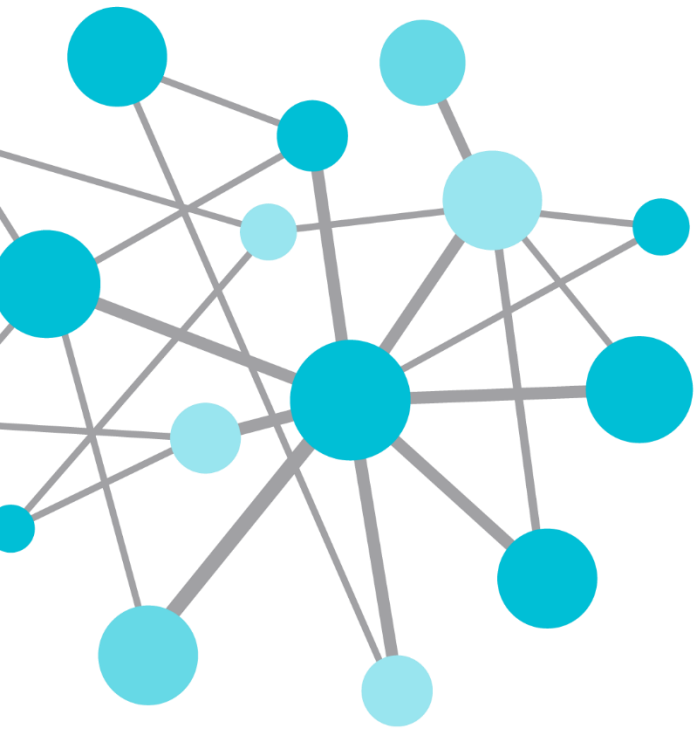
Step

1

Connect Your PI System to Your Data

PI System Infrastructure





Connect Data Sources Into the PI Data Archive

PI Interfaces – Bringing the Data in

Vendor Specific (PLC, DCS, SCADA)

- ABB
- Bailey
- Fisher
- Foxboro
- Allen-Bradley
- Honeywell

Generic (Protocols and Standards)

- OPC
- Modbus
- BACnet
- DNP 3.0
- ODBC
- Text Files

✓ More than 450 PI Interfaces developed!

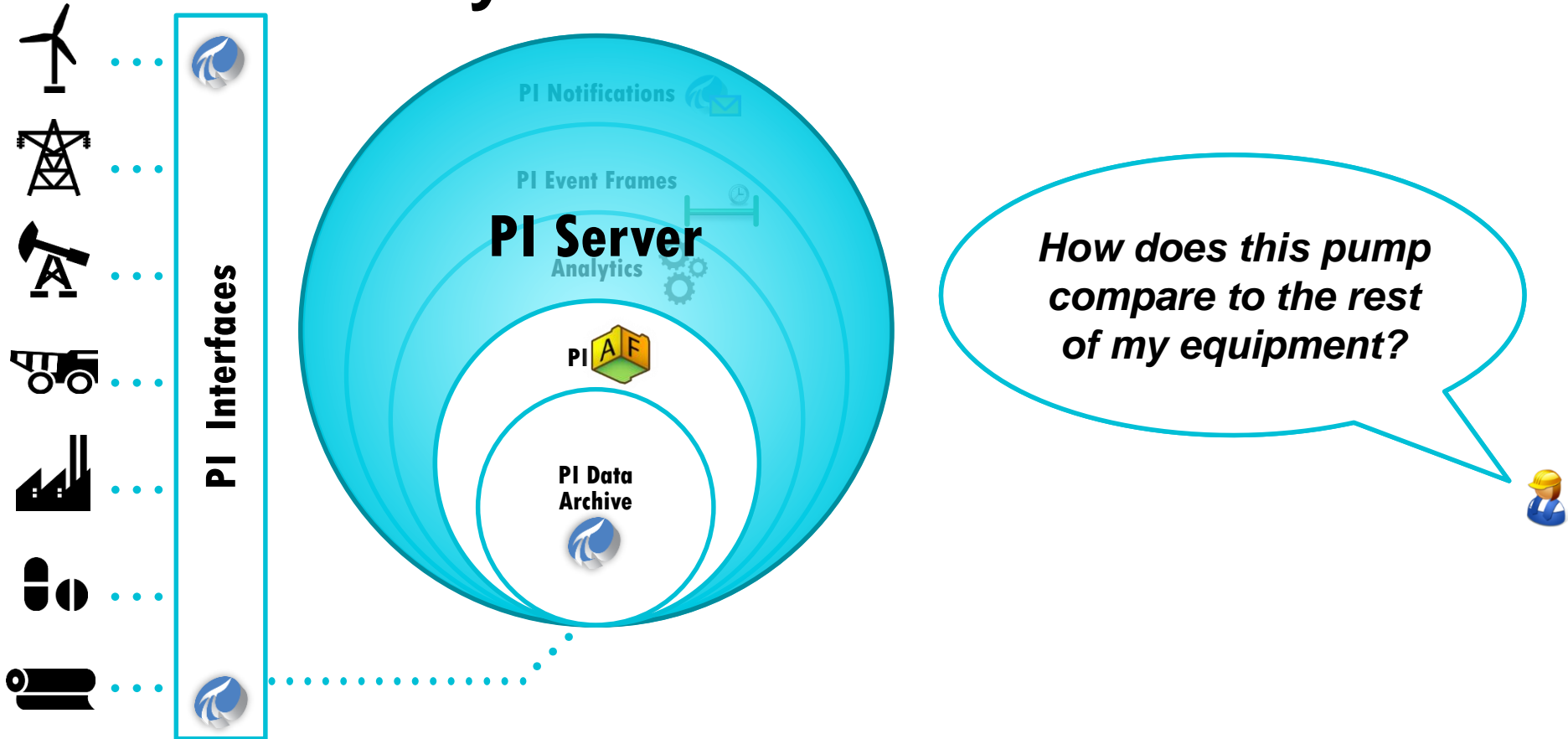
PI Data Archive and PI Tags

Tag-Centric



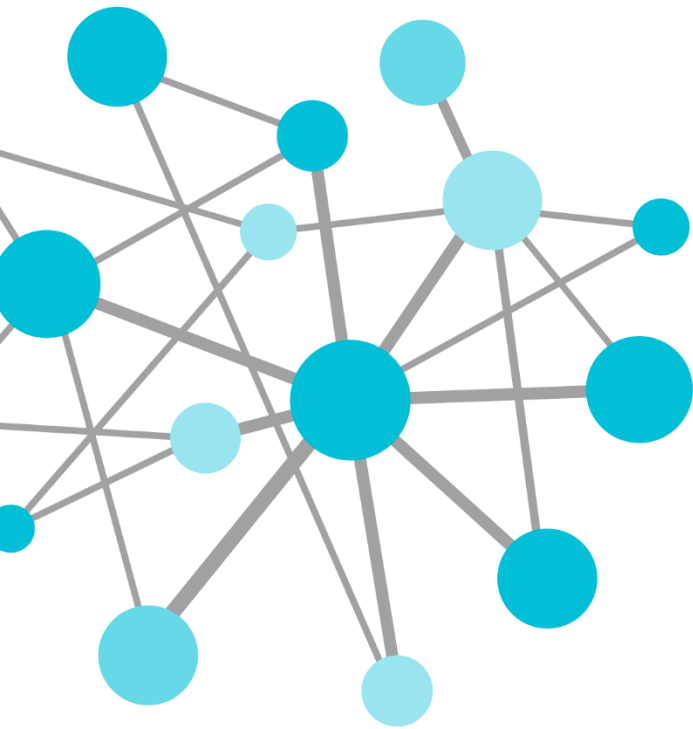
- Based on **Control System point names**
- **Traditional** method of data storage
- Leverage **historical knowledge** built around tags
- **Simple** deployment

PI System Infrastructure



How does this pump compare to the rest of my equipment?





Connect Data Sources Into the PI Data Archive and PI AF

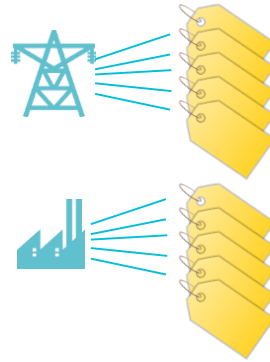
PI Tags and PI AF Assets: Both Approaches Add Value

Tag-Centric



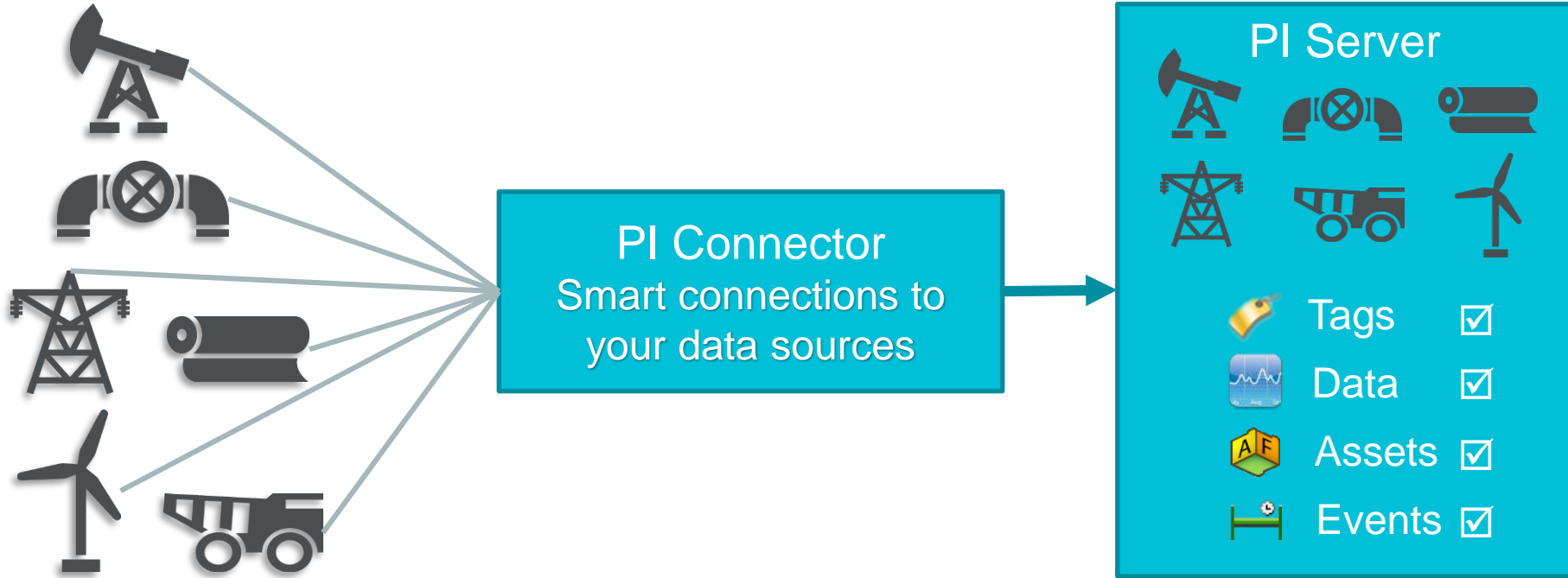
- Based on **Control System point names**
- **Traditional** method of data storage
- Leverage **historical knowledge** built around tags
- **Simple** deployment

Asset-Centric



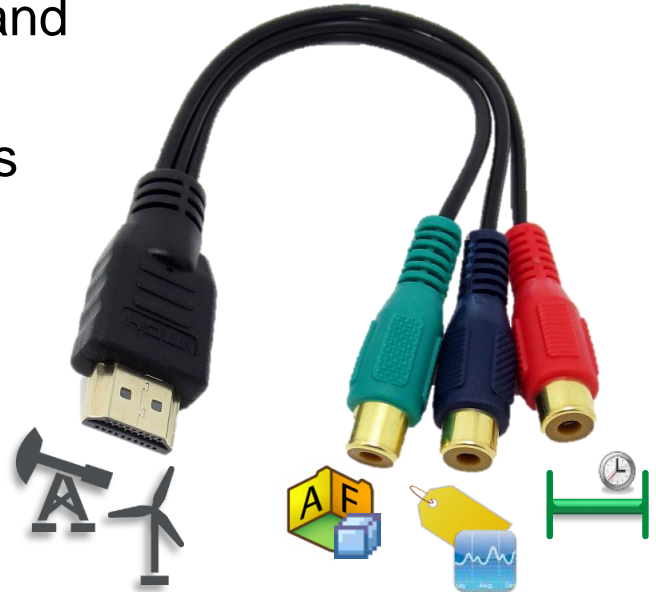
- Named by **asset and property**
- Organize your assets **hierarchically** and **logically**
- Build **templates** to standardize and compare assets
- **Scale** your system

Introducing PI Connectors, the Next Generation of Data Acquisition



Advantages of PI Connectors

- Automatically **discover and create** assets and tags
- Future versions will **collect event** data types (PI Event Frames)
- **Simple configuration**
- Accommodate **higher data rates**
- Enhanced **security**
- **Linux** operating systems supported



Elements

- Elements
 - Connectors

CygNet Connector Administration Site

- Overview
- Data Source List
- Server List
- Diagnostics

Overview

CygNet connector details

Version 1.0.0.10

Status of the connector

Connector running as OSI\bandersen

 Connector is stopped - [Start connector](#)

Data sources for the CygNet connector

 CygNet Data Source (Connector stopped)

[Add or modify data sources](#)

Servers configured to receive data from the connector

 PI Data server : IntOne (Connector stopped)

 PI Asset server : IntOne (Connector stopped)

[Add or modify servers](#)

PI Connectors Have Arrived



Released

- PI Connector for IPMI



Beta

- PI Connector for CygNet
- PI Connector for Ethernet/IP
- PI Connector for Kongsberg

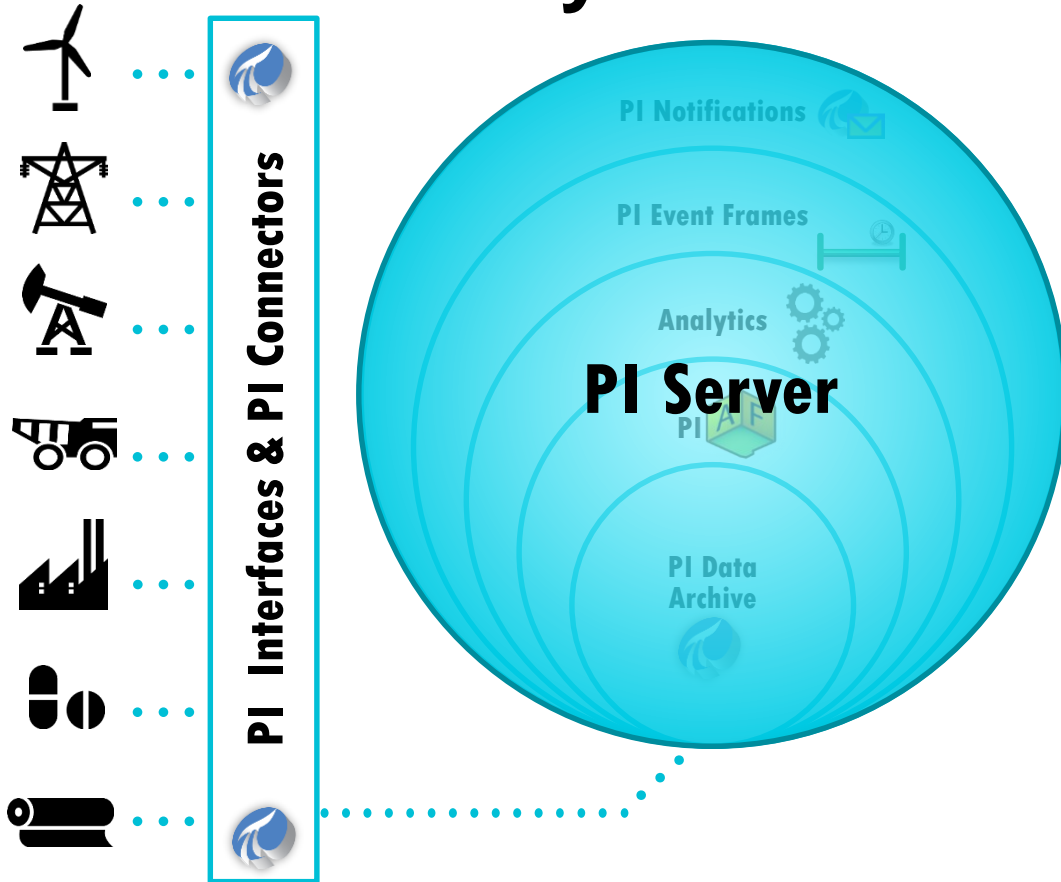


Under
development

- PI Connector for Wonderware Historian
- PI Connector for IEC 60870-5-104

Much more to come!

PI System Infrastructure



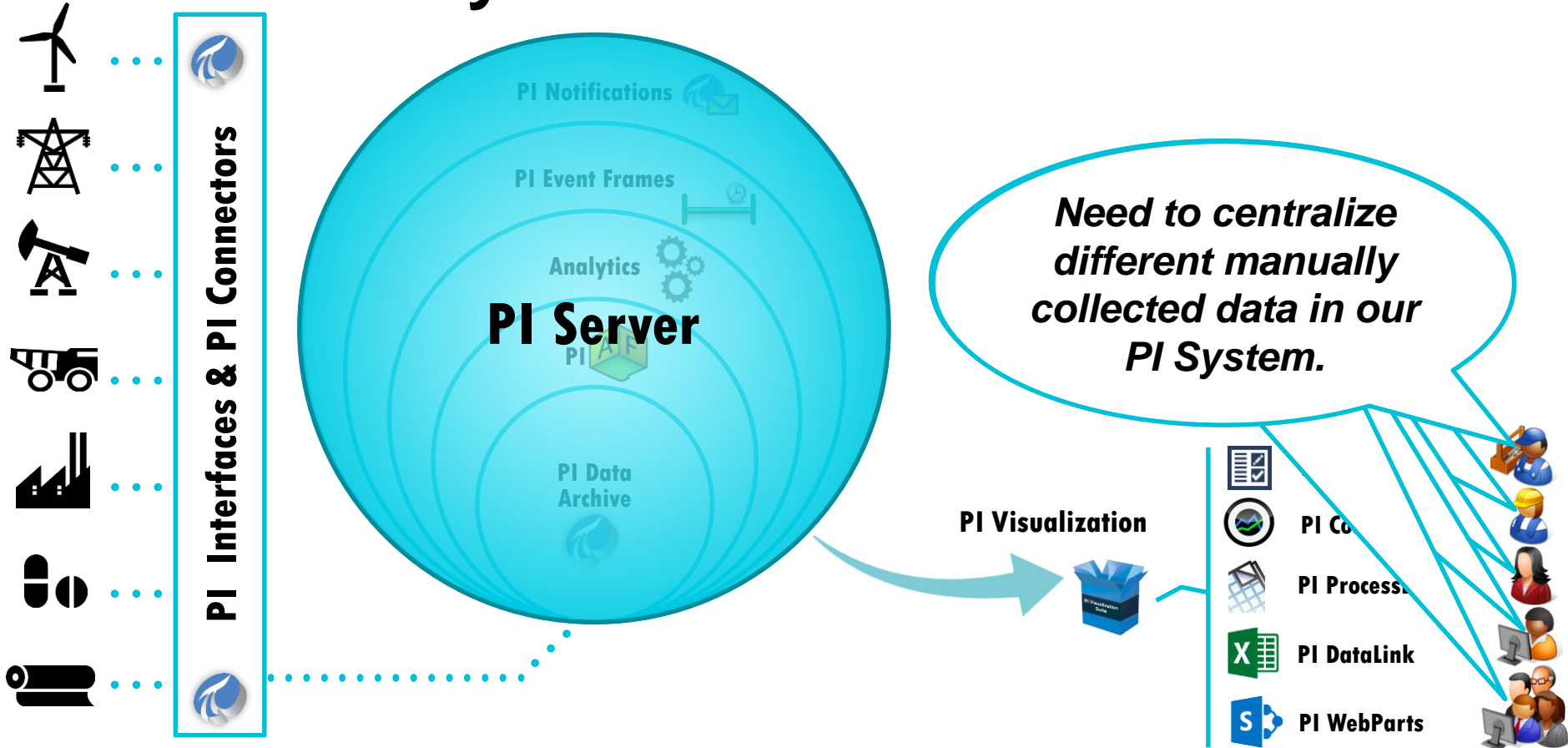
A network diagram background consisting of light blue circles of various sizes connected by thin grey lines, forming a complex web-like structure.

Step

2

Connect Your PI System to Your Users

PI System Infrastructure



Visualization Landscape



PI Coresight

Ad hoc analysis and collaboration



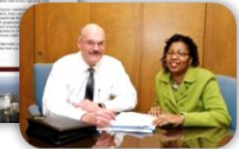
PI Manual Logger

Manual entries, fast and secure from anywhere



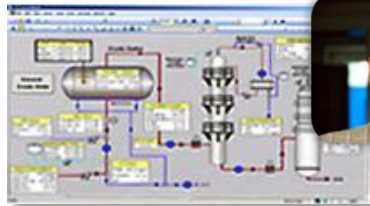
PI WebParts

Composite apps, shared broadly



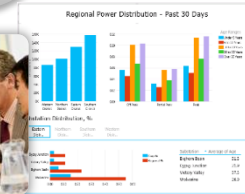
PI ProcessBook

Display authoring and process monitoring



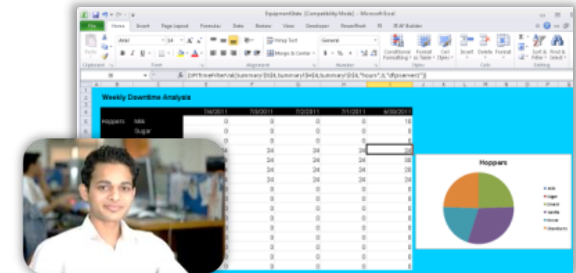
PI System Access

Business analytics for the enterprise



PI DataLink

Reporting and Analytics in Microsoft Excel





Recycle Bin



PetroLux.piw



PetroLux
Oil Wells
Daily.xlsx



Desktop Files



24

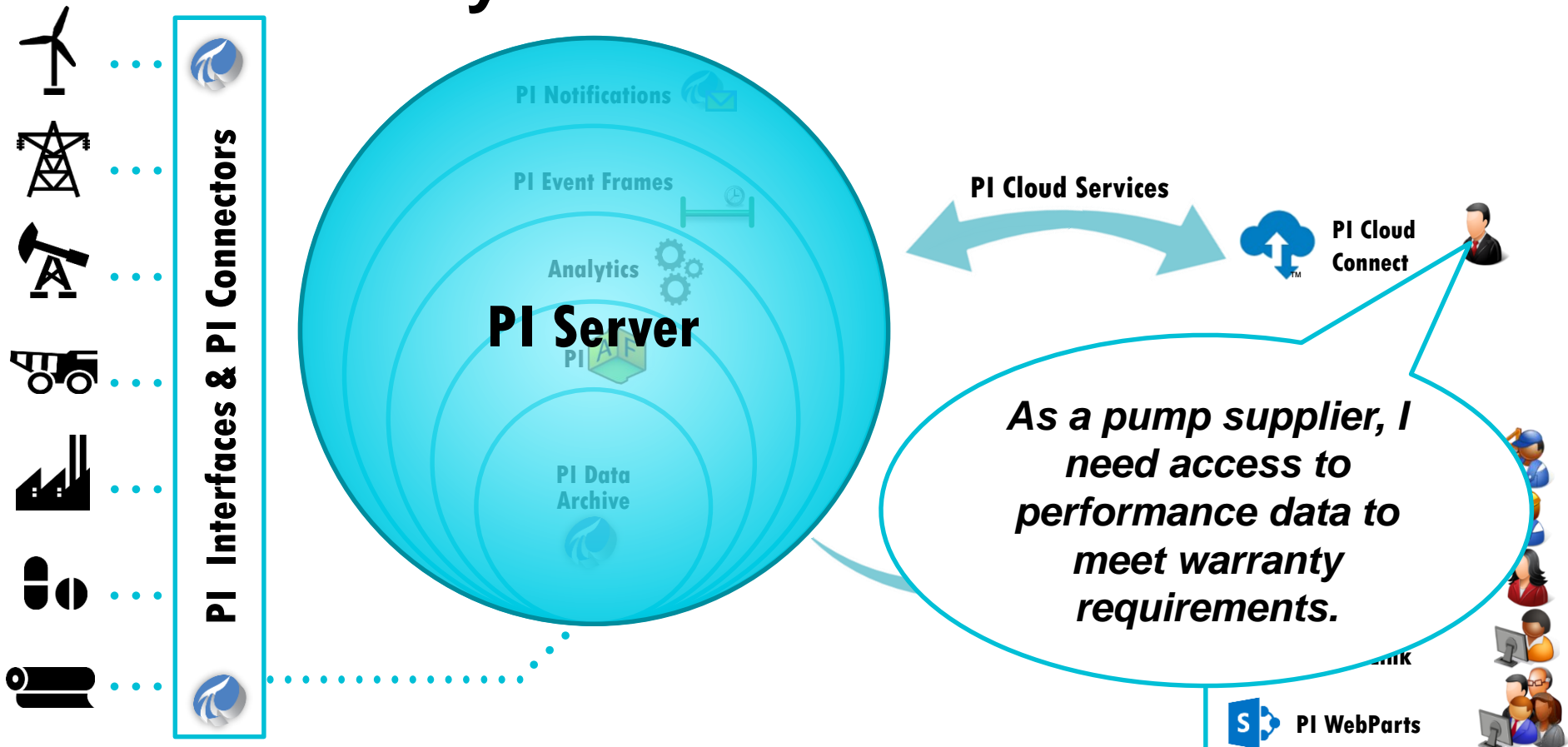


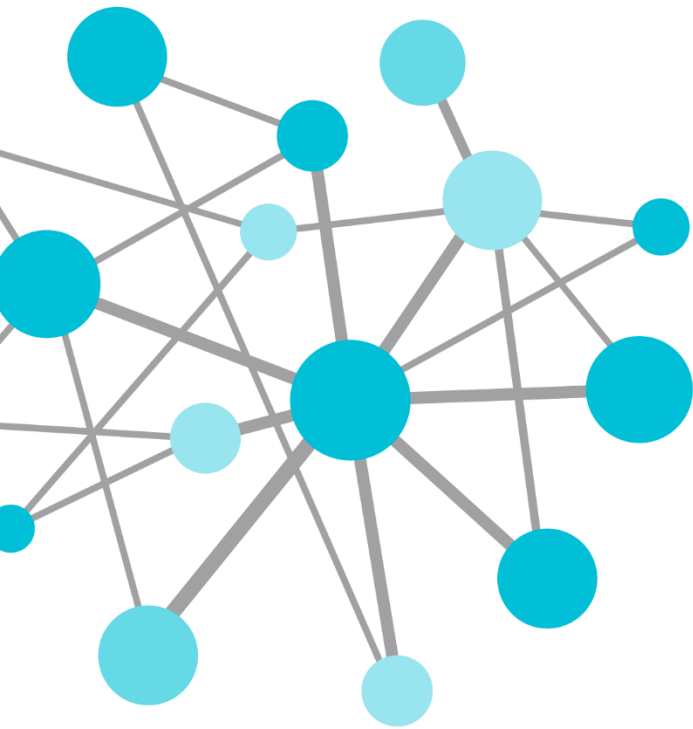
Step

3

Connect Your PI System Across Boundaries

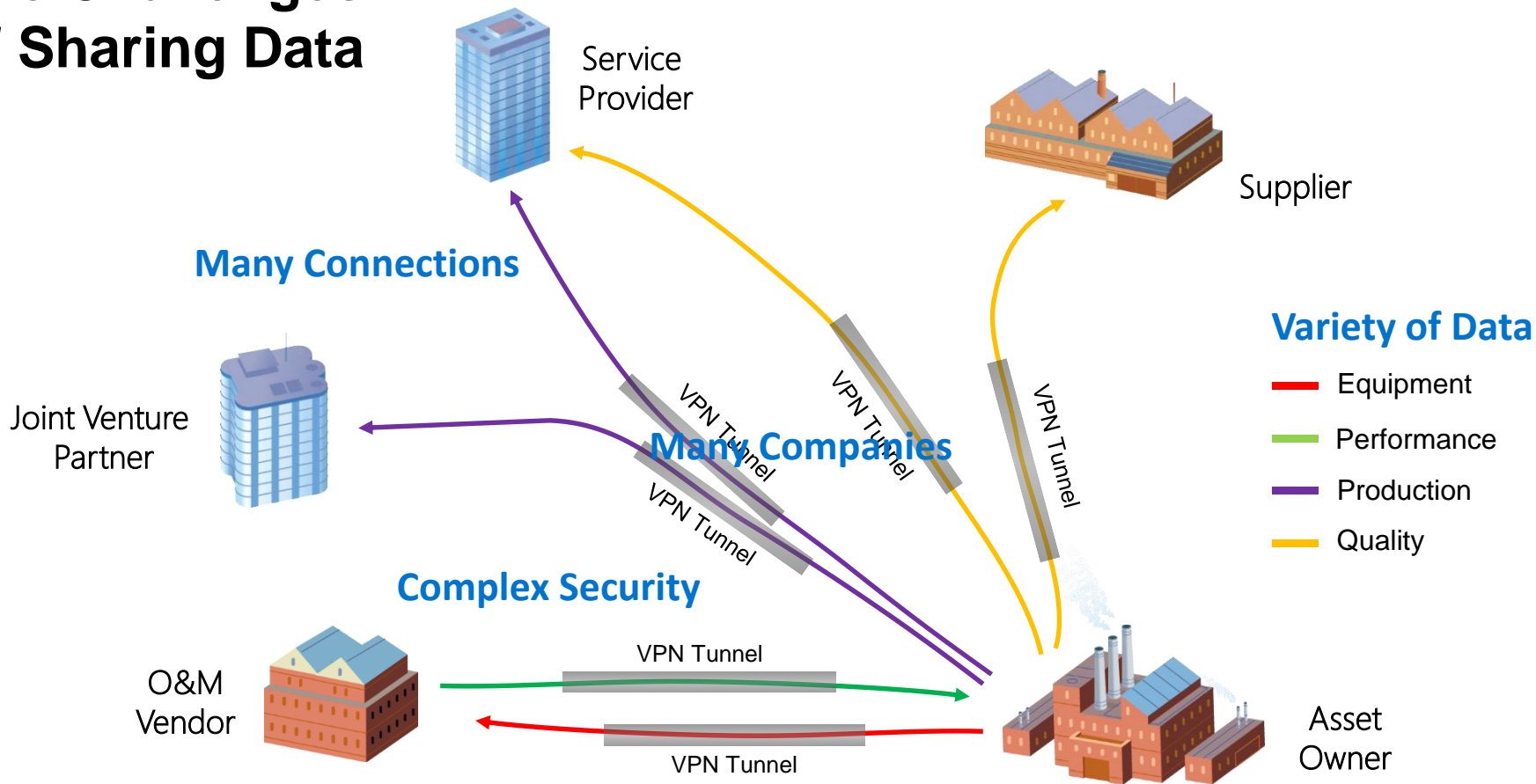
PI System Infrastructure



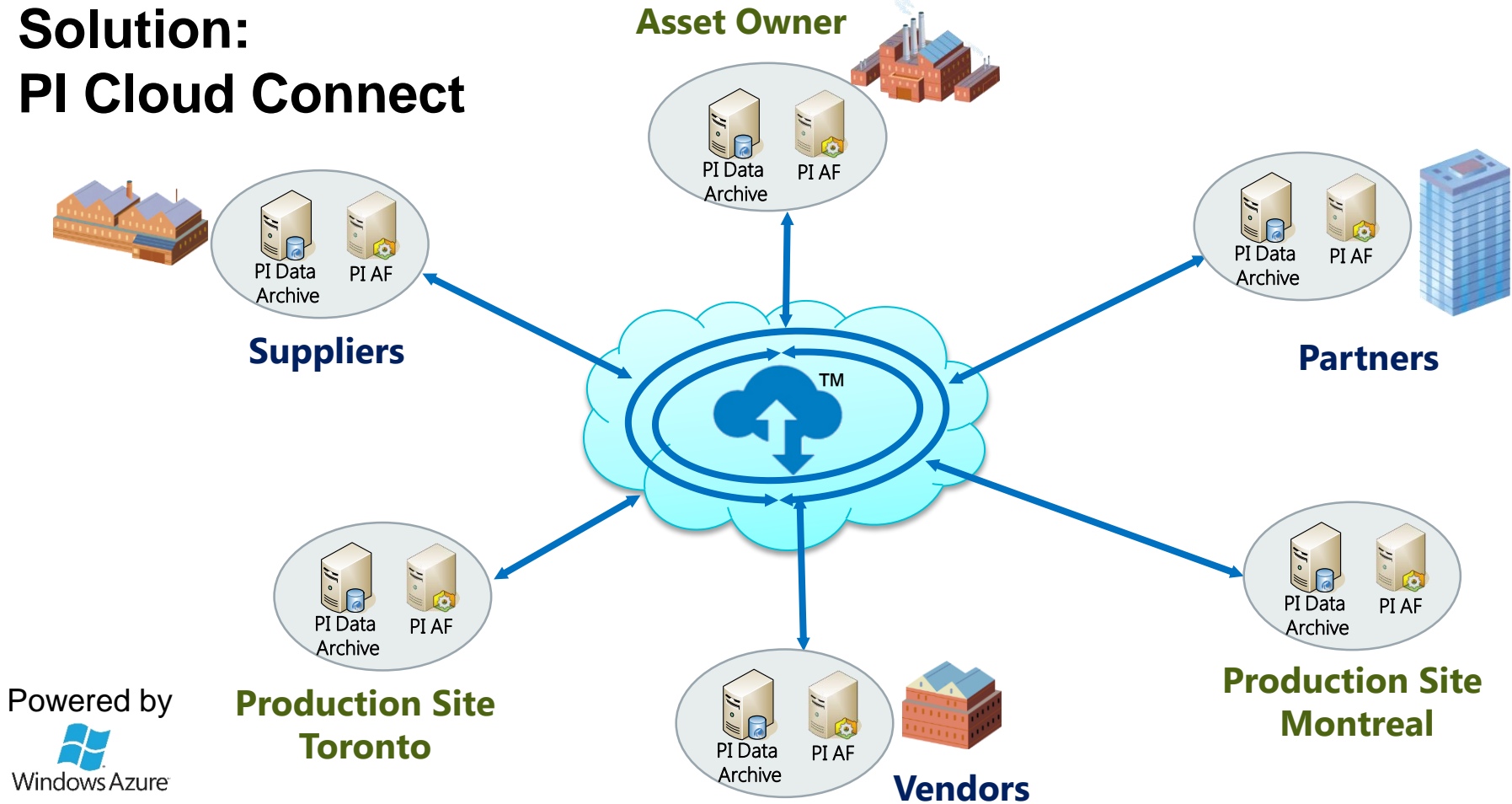


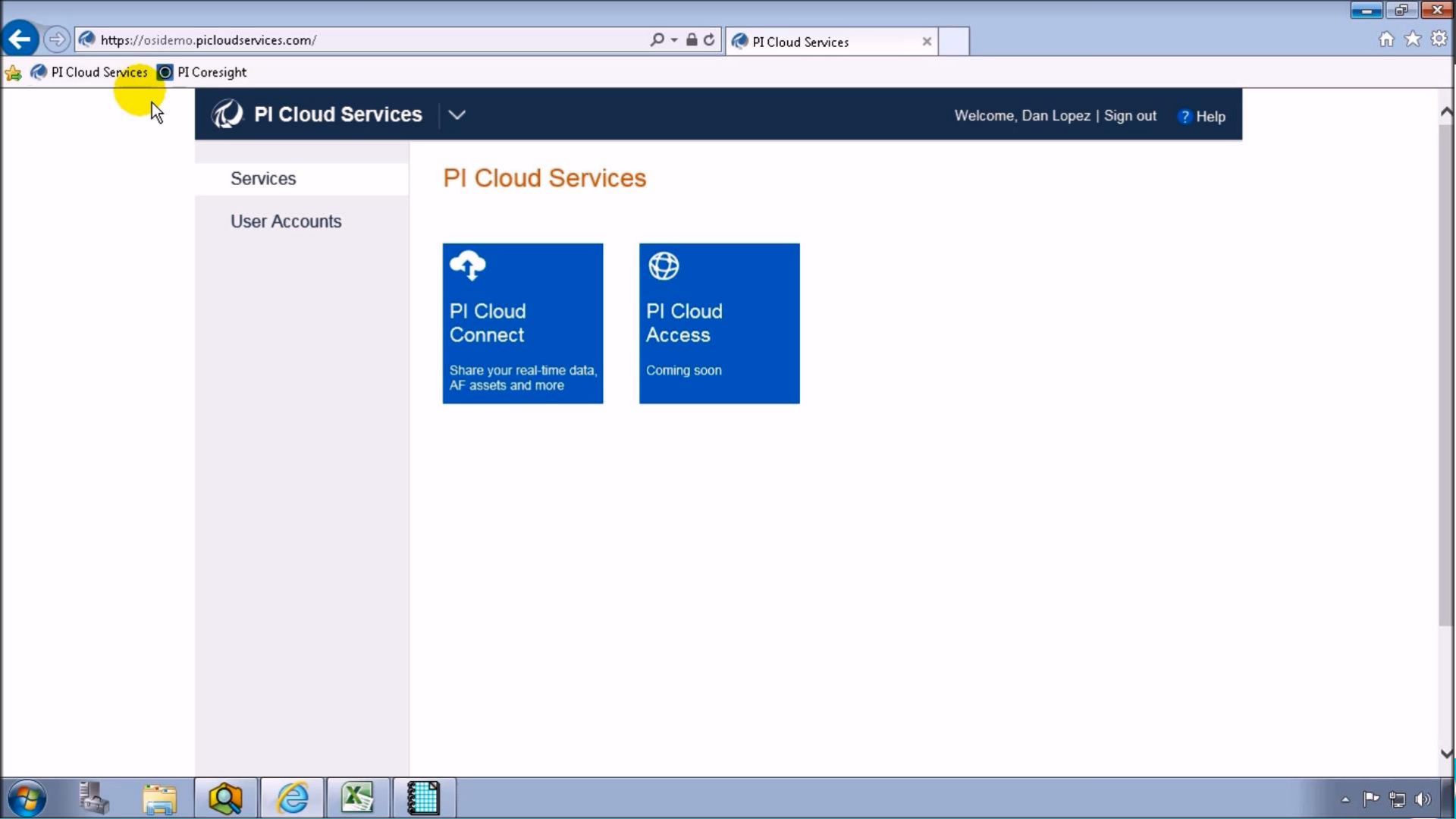
Securely Connect PI System Enterprises via the Cloud

The Challenges of Sharing Data



Solution: PI Cloud Connect





https://osidemo.picloudservices.com/

PI Cloud Services

PI Cloud Services PI Coresight

PI Cloud Services

Welcome, Dan Lopez | Sign out ? Help

Services

User Accounts

PI Cloud Services



PI Cloud Connect

Share your real-time data, AF assets and more

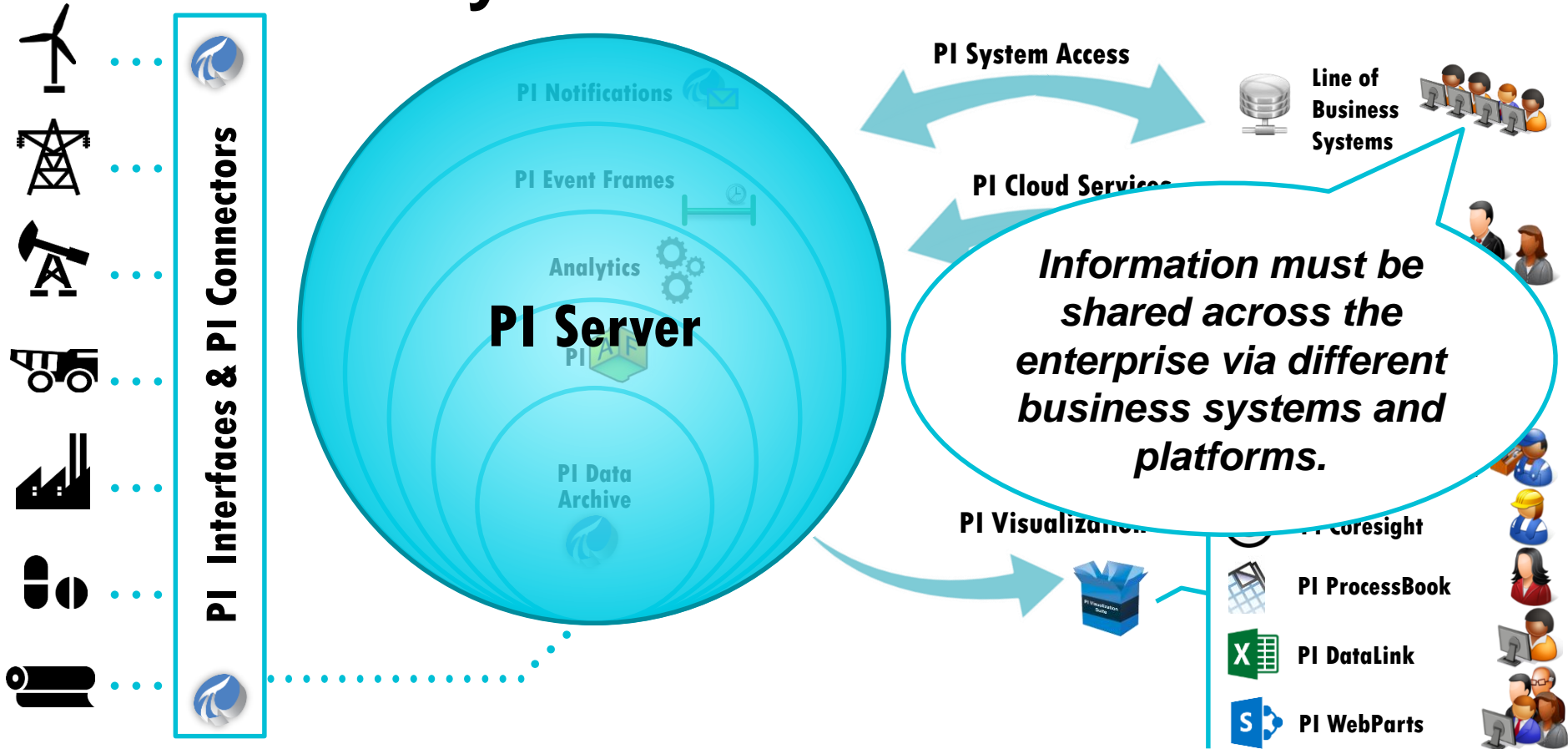


PI Cloud Access

Coming soon



PI System Infrastructure



PI Interfaces & PI Connectors

PI Server

Information must be shared across the enterprise via different business systems and platforms.

PI System Access

Line of Business Systems

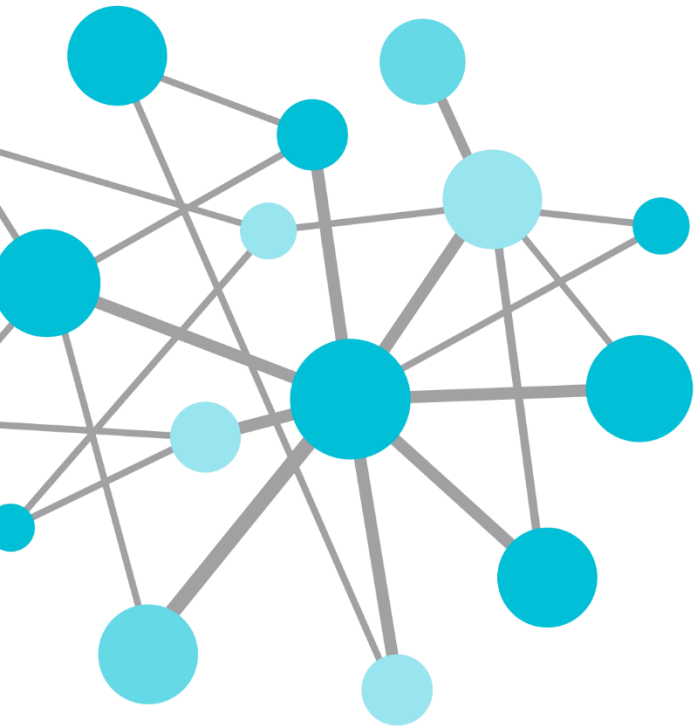
PI Cloud Services

PI Visualization

PI ProcessBook

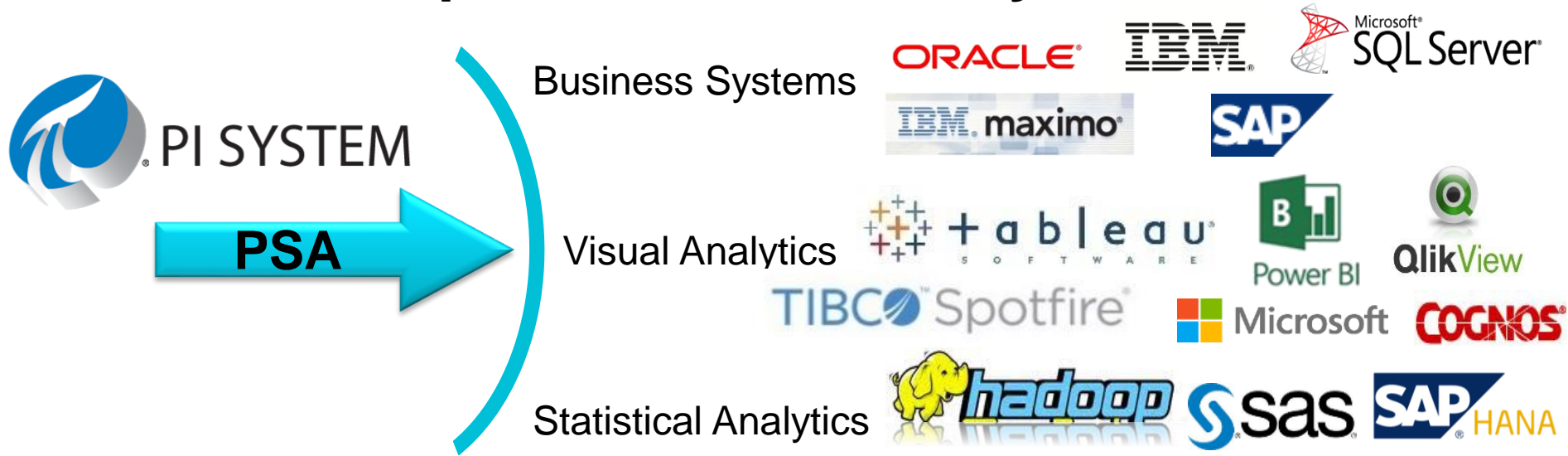
PI DataLink

PI WebParts



Connect Your PI Systems to Any System and Any Device

Solution: Expose Data with PI System Access



SQL Family

PI OLEDB Enterprise
PI JDBC Driver
PI ODBC Client

Web Services

PI Web API
(REST/OData)
PI Web Services

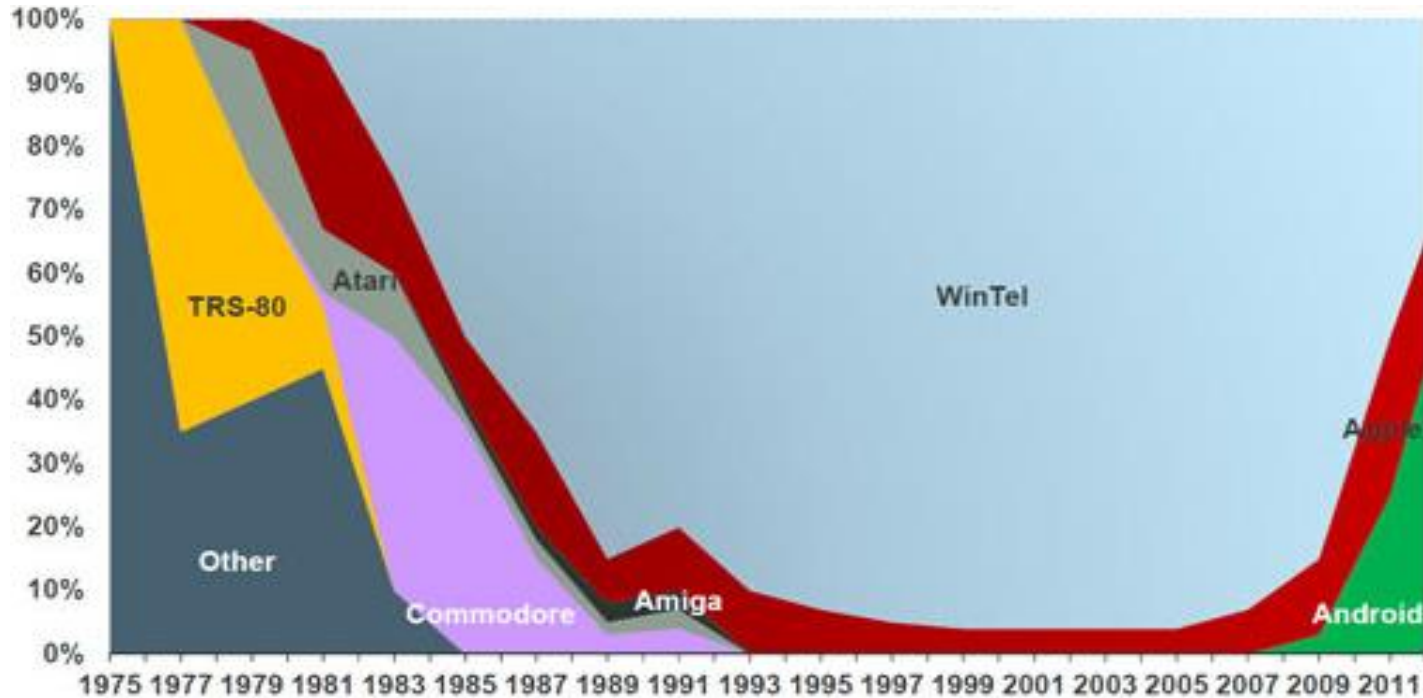
OSIsoft SDK

AF SDK

OPC Servers

PI OPC DA Server
PI OPC HDA Server

Why From Any Device?



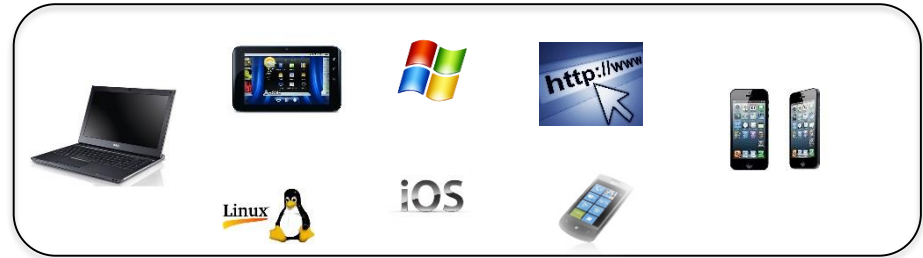
Pre-PC

PC

Devices

Business Challenge Rephrased...

We need to connect applications running on these devices and platforms ...



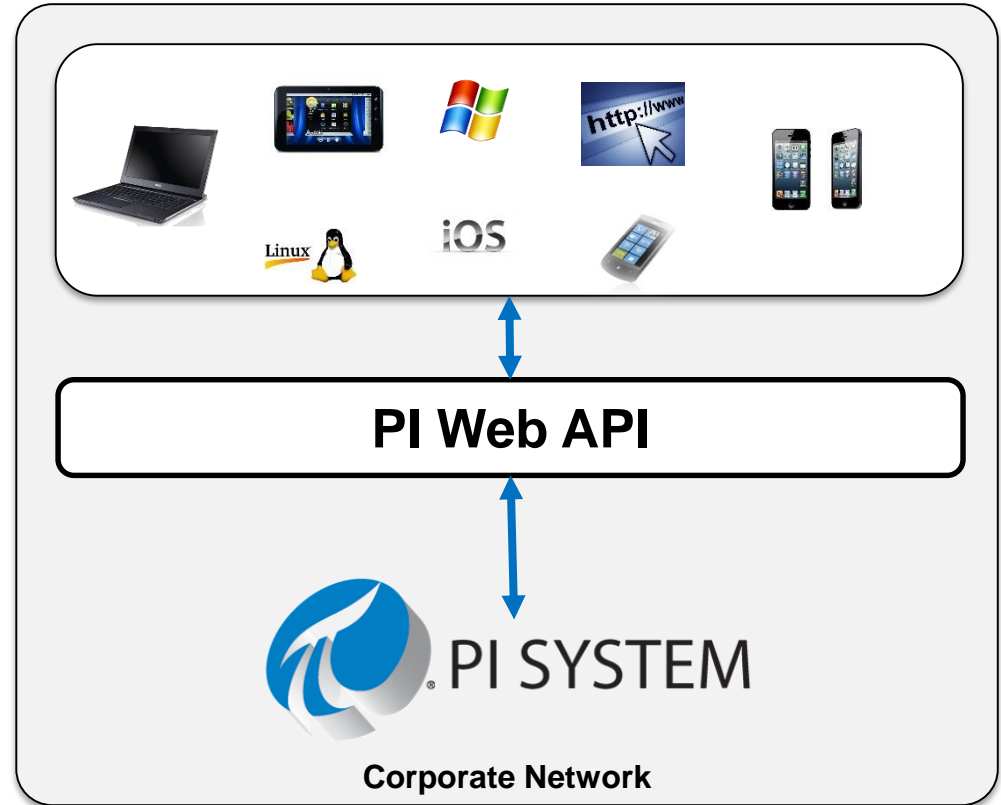
with this ...



Enter the PI Web API

Developers build applications:

- Platform independent
- Device and OS independent
- Programming language agnostic
- Supports **REST/OData**



Demonstration

- PI Web API as an OData feed
- Expose PI System data to Microsoft Power BI tools
- Monitoring of Oil & Gas assets



Connecting to the PI System via OData

The screenshot shows the Microsoft Excel interface with a Power View display titled "My New Power View Display". The display contains two charts:

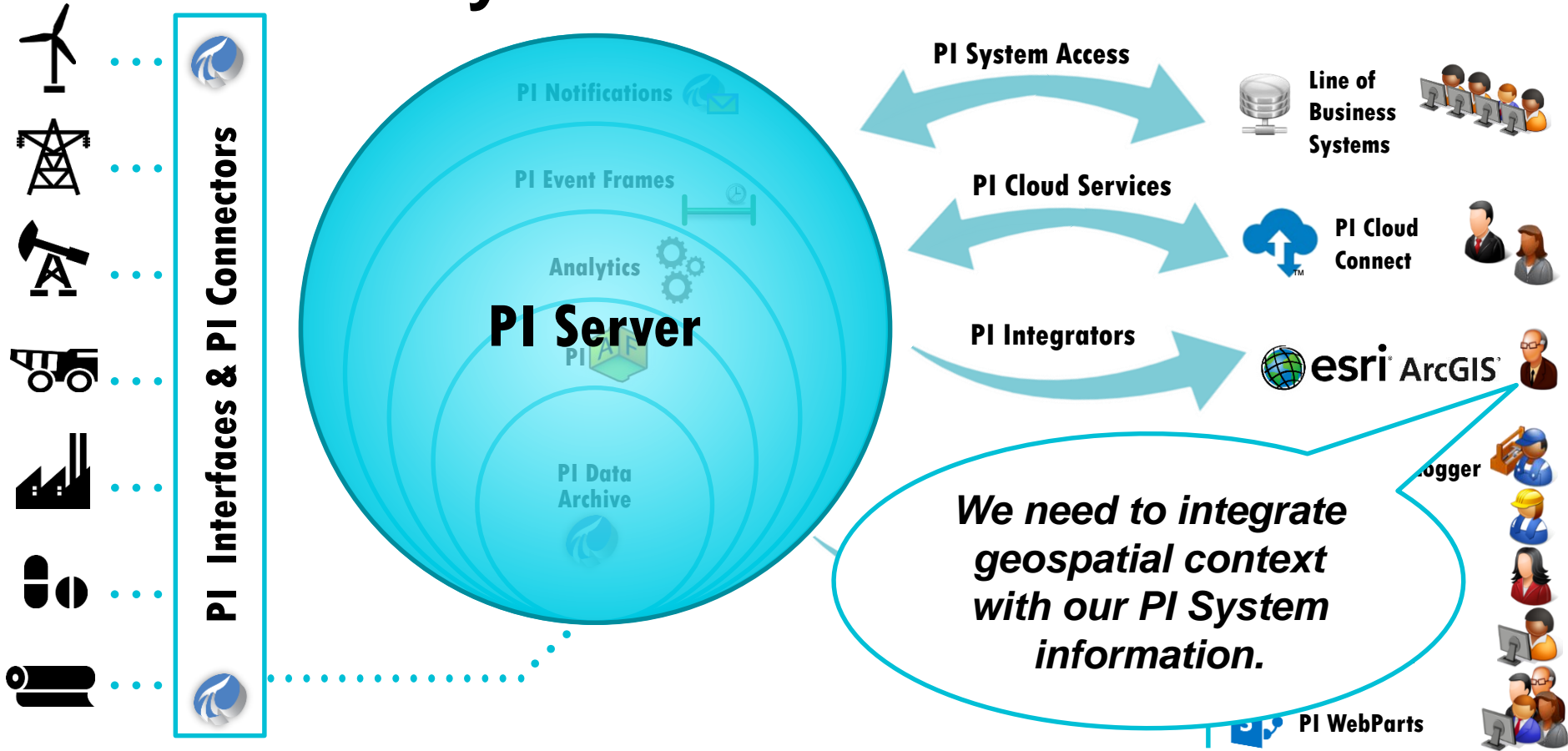
- Top Chart:** "Average of Make_UpWaterFlow by Model, Time, and Plant". The y-axis ranges from 60 to 160. The x-axis shows time intervals from 12:00 AM to 12:00 AM. Two data series are shown: "Houston" (blue line) and "Wichita" (orange line). The Houston series is constant at approximately 150. The Wichita series starts at approximately 75, dips to 65, and then rises to 75.
- Bottom Chart:** "Max of SteamFlow by Time". The y-axis ranges from 1,012 to 1,017. The x-axis shows time intervals from 12:00 AM to 12:00 AM. A single data series (blue line) shows a peak of approximately 1,016.5 at 06:00 PM.

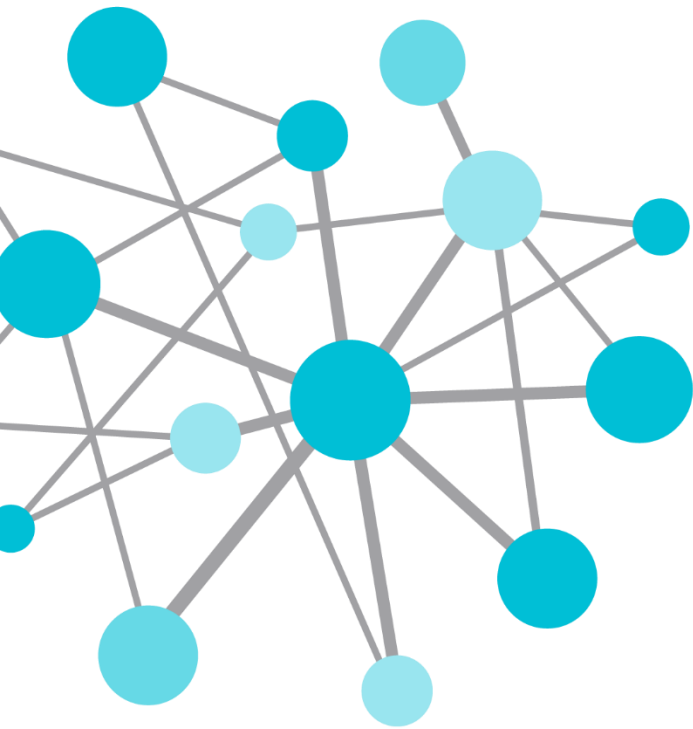
On the right side of the Power View, there is a "Power View Fields" pane with the following settings:

- ACTIVE:** ALL
- Model:** Selected (highlighted in yellow)
- Plant:** Selected (highlighted in yellow)
- Process:** Unchecked
- StartTime:** Unchecked
- Steam:** Unchecked
- SteamFlow:** Checked
- SteamFlowTag:** Unchecked
- Time:** Checked
- TimeStep:** Unchecked

Below the field list, the "Max of SteamFlow" aggregation is selected, and the "Time" axis is set. The "LEGEND" and "MULTIPLES" sections are empty.

PI System Infrastructure





Connect Your PI System to Esri ArcGIS

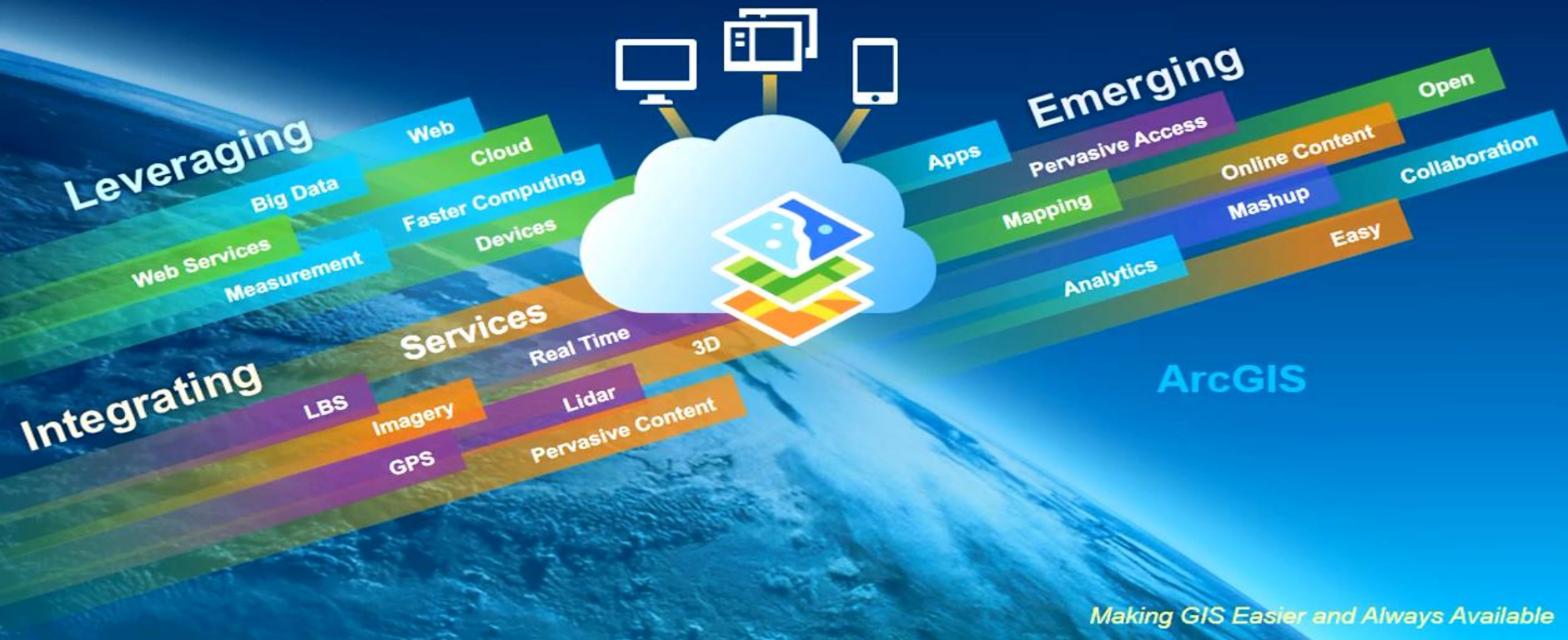
(Connect Space and Time)

Why OSIsoft. + esri® ?

Context	Need	Solution
<p>OSIsoft is the global leader in real-time data and event infrastructure</p> <p>Esri is the global leader in Geographic Information Systems (GIS)</p>	<p>Link operational data to geographical and location data</p>	<p>Visualize real-time PI System information within Esri ArcGIS maps and PI Coresight</p>

Put Yourself on the Map: The Fusion of the PI System and Esri ArcGIS

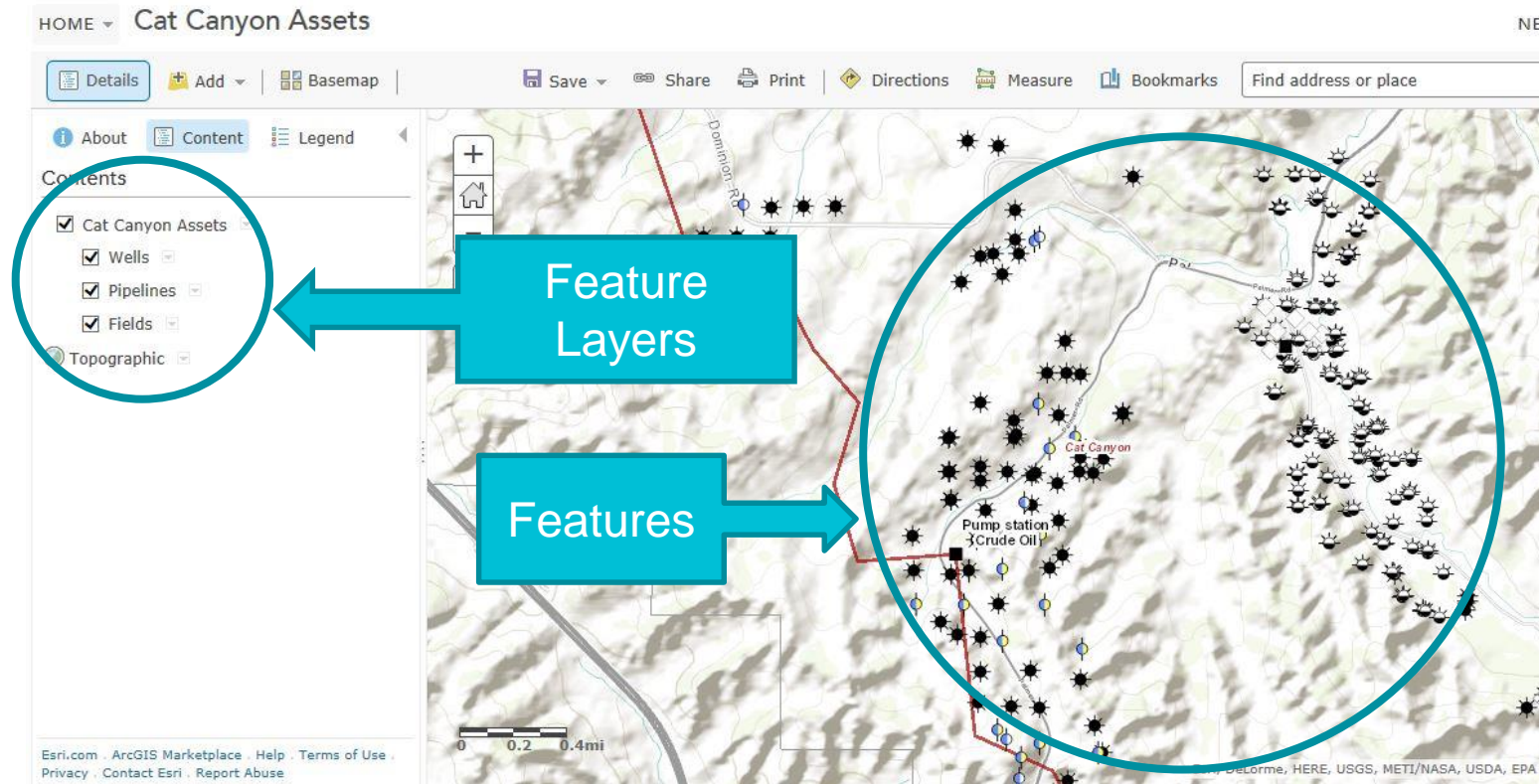
GIS Is Being Transformed Into a Web GIS Platform



ArcGIS

Making GIS Easier and Always Available

What is on an Esri Map?



What Data is in the PI System?

File View Go Tools Help
Database Query Date Back Check In Refresh New Template New Attribute Template

Library
PUG Well Data
Categories
Analysis Categories
Attribute Categories
Element Categories
Reference Type Categories
Table Categories
Templates
Element Templates
Cat Canyon template
Maintenance/Vehide
Event Frame Templates
Model Templates
Transfer Templates
Enumeration Sets
Reference Types
Tables
Table Connections

Cat Canyon template
General Attribute Templates Ports Analysis Templates

Filter
Name Description
ActiveWell
APINumber
AssetName
Bottom Hole Press
CountyName
FieldName
Flow Rate
Flow Tubing Pressure
GeometryLatitude
GeometryLongitude
Hydrostatic Head
LeaseName
OBJECTID
OperatorNa
TypeText
Well_Type

Group by: Category Template
Name: ActiveWell
Description:
Configuration Item: Indexed:
Categories: configuration

PI AF Templates

File Edit View Go Tools Help
Database Query Date Back Check In Refresh New Element New Attribute

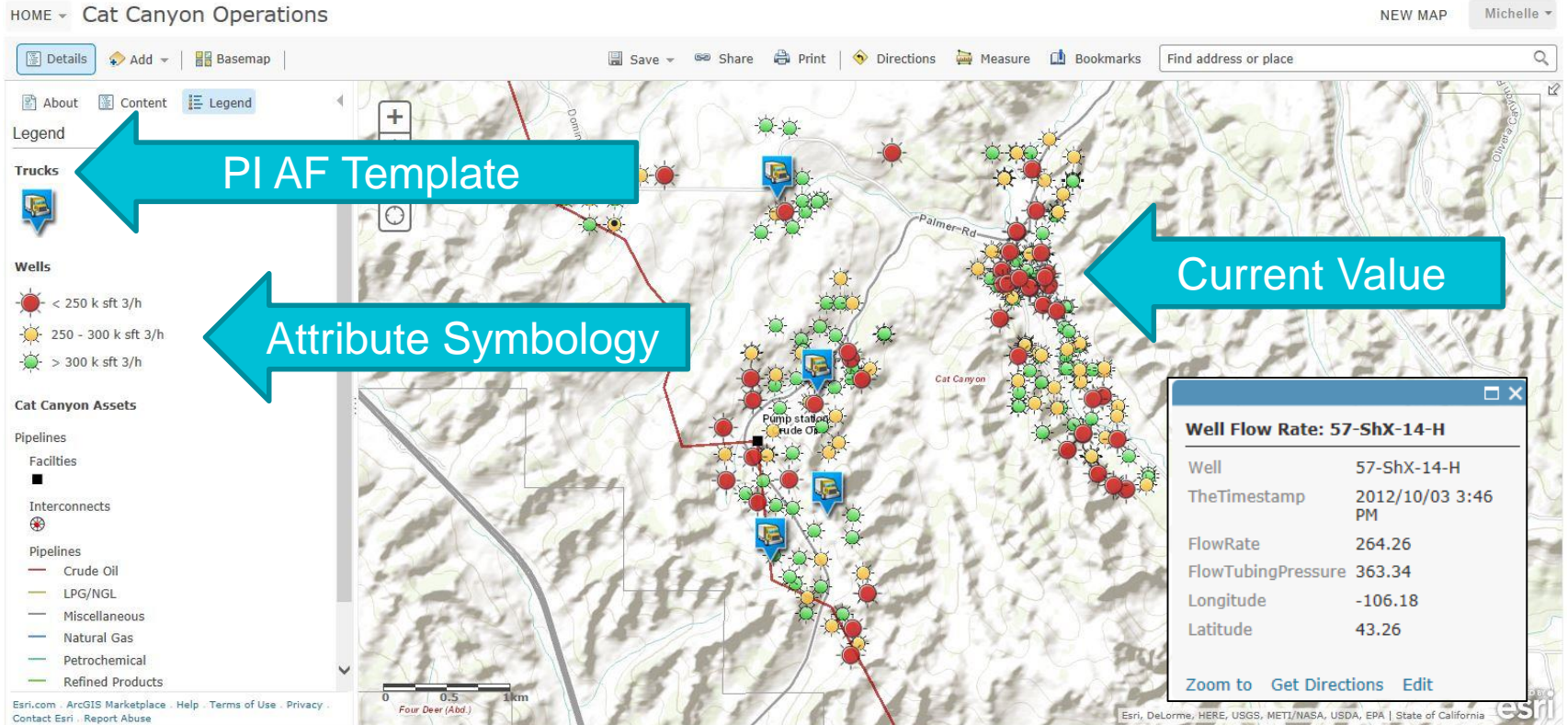
Elements
Canyon
Bell
CE-08300101
CE-08300109
CE-08300303
CE-08300324
CE-08300683
CE-08300778
CE-08300804
CE-08301509
CE-08301516
CE-08301517
CE-08301523
CE-08301524
CE-08301525
CE-08301526
CE-08301531
CE-08301532
CE-08301533
CE-08301540
CE-08301542
CE-08301544
CE-08301546
CE-08301547
CE-08301551
CE-08301552
CF-08301556

CE-08300101
General Child Elements Attributes Ports Analyses Version

Filter
Name Value
ActiveWell Y
APINumber 08300101
AssetName CE-08300101
Bottom H... 304.04745483398437
Bottom H... 263.12661743164062
CountyNa... Santa Barbara
FieldName Cat Canyon
Flow Rate 416.95938110351562
Flow Tubi... 287.76724243164062
Geometry... 4140376.09317385
Geometry... -13394080.3099847
Hydrostat... 333.31280517578125
LeaseName Bell
OBJECTID 4
OperatorNa Clancy Energy
TypeText Oil & Gas
Well_Type OG

PI AF Elements

PI System Data Animates the Map



The PI System Enhances ArcGIS

- Change **color, size or icon** based on value
- Live PI AF **Attribute values** in ArcGIS Pop-ups
- **Track locations** of movable assets in real time
- Launch **PI Coresight** in context
 - Ad hoc trending
 - PI ProcessBook display viewing

Esri Operations Dashboard

OSIsoft | Esri | Oil and Gas Dashboard

FILE TOOLS VIEW

Wells

Search

- CE-08300011
Flow Rate: 250.92 k sft3/h
Flow Tubing Pressure: 181.21 psig
1/6/2014 12:19 PM
- CE-08300073
Flow Rate: 362.30 k sft3/h
Flow Tubing Pressure: 99.26 psig
1/6/2014 12:19 PM
- CE-08300083
Flow Rate: 302.46 k sft3/h
Flow Tubing Pressure: 167.81 psig
1/6/2014 12:19 PM
- CE-08300101
Flow Rate: 247.43 k sft3/h
Flow Tubing Pressure: 247.27 psig
1/6/2014 12:19 PM

Flow Rate

250.92

Flow Tubing Pressure

181.21

psi

Production KPI

295.17 k sft3/h

Cat Canyon Operations Dashboard Map

GeoFences

(2) Add Search...

GeoFenceId	Category	Name
Danger Zone 1 Items		
	DangerousArea/Danger Zone	DangerousArea Danger Zone
Drilling Activity 1 Items		
	DangerousArea/Drilling Activity	DangerousArea Drilling Activity

PI CoreSight

PI CoreSight homepage

New Undo Redo Messages (Read Only) Help

Bottom Hole Pressure

Alerts

Alerts (8)

Incident Name	Resource	Resource Name	Description	As
Cumulative 8 Items				
DangerousArea	Roustabout Miguel		Ongoing for last 54 seconds.	
DangerousArea	Roustabout Miguel		Ended at Mon Jan 06 17:18:05 UTC 2014 and lasted for 36 seconds.	
DangerousArea	Roustabout Carol		Ongoing for last 3 minutes and 40 seconds.	

Trucks

- Roustabout Miguel
Fuel: 0.00 gal
Speed: 2.92 mph
- Electrician Bob
Fuel: 0.00 gal
Speed: 2.69 mph
- Welder Joe
Fuel: 68.22 gal
Speed: 10.84 mph
- Supervisor Lauren
Fuel: 16.52 gal
Speed: 26.13 mph

Truck Detail

Roustabout Miguel

This truck has consumed 0.00 gallons and has driven 316,019.69 miles

Roustabout Miguel

Fleet Average Speed

10.68 mph

Fleet Average Speed

Connecting PI System Data to Esri ArcGIS

FILE TOOLS VIEW
Rail Co Operation View
?

Description

On this map you can see live electric locomotives moving throughout the greater London area. Select any locomotive to see live telemetry for that particular engine, and additionally, scroll down through the Pop-Up to find the "PI Coresight" button, which, when clicked, will take you to a live PI Coresight display, which you can edit on-the-fly to investigate the real-time data streams from that locomotive.

Engine Torque

14005	19.7
14004	19.5
14003	19.9
14002	19.7
14001	19.9

Avg. Vibration

19.96

of selected locomotives

Locomotives

- #14001
Model: BX1200 | Speed: 56 kph
- #14002
Model: BBX1200 | Speed: 56 kph
- #14003
Model: BBX5200 | Speed: 56 kph
- #14004
Model: BBX5200 | Speed: 56 kph
- #14005
Model: BBX1200 | Speed: 56 kph

Rail Co

Live Locomotives: #14002
 Model number: BBX1200
 Speed: 56
 Coolant temperature: -3.92
 RPM: 20.27
 Vibration: 19.71
 Torque: 19.66
 Commissioning date: -62135596800000
 Latitude: 51.14
 Longitude: 0.88

PI Coresight

Locomotive Vibration (Read Only)

9/4/2014 1:04:54 PM 5m 23s 9/4/2014 1:10:17 PM

Rail Transformers

- Transformer TR0606
Energy: 20.56 kWh
- Transformer TR0842
Energy: 19.73 kWh
- Transformer TR1123
Energy: 20.74 kWh
- Transformer TR1171
Energy: 20.56 kWh
- Transformer TR2003
Energy: 21.22 kWh
- Transformer TR2822
Energy: 20.17 kWh
- Transformer TR3045
Energy: 21.21 kWh
- Transformer TR3450
Energy: 20.56 kWh
- Transformer TR4085
Energy: 19.37 kWh
- Transformer TR4522
Energy: 19.85 kWh
- Transformer TR4559
Energy: 20.56 kWh
- Transformer TR4967
Energy: 20.74 kWh
- Transformer TR5493
Energy: 20.17 kWh
- Transformer TR5620
Energy: 19.73 kWh
- Transformer TR6676
Energy: 20.56 kWh
- Transformer TR7785
Energy: 21.22 kWh
- Transformer TR8243

Legend

- Live Locomotives
- Live Transformers
- UK Railroads
 - <all other values>
 - Chiltern Railways

Avg. Speed

56

Threshold: 30

of selected locomotives

Engine RPM

Locomotive	Engine RPM
14001	19.6
14002	20.3
14003	20.5
14004	20.2
14005	20.6

Benefits of the PI Integrator for Esri ArcGIS

- Real-time **PI AF Data** can update new or existing **Esri Feature Layers**
 - Configuration of Esri software is done automatically (no custom Esri objects are created)
 - PI AF databases can be jump-started using Esri Feature Layers
- **Visualize** the operational data using standard Esri clients
- Natively integrate **PI Coresight** with Esri clients

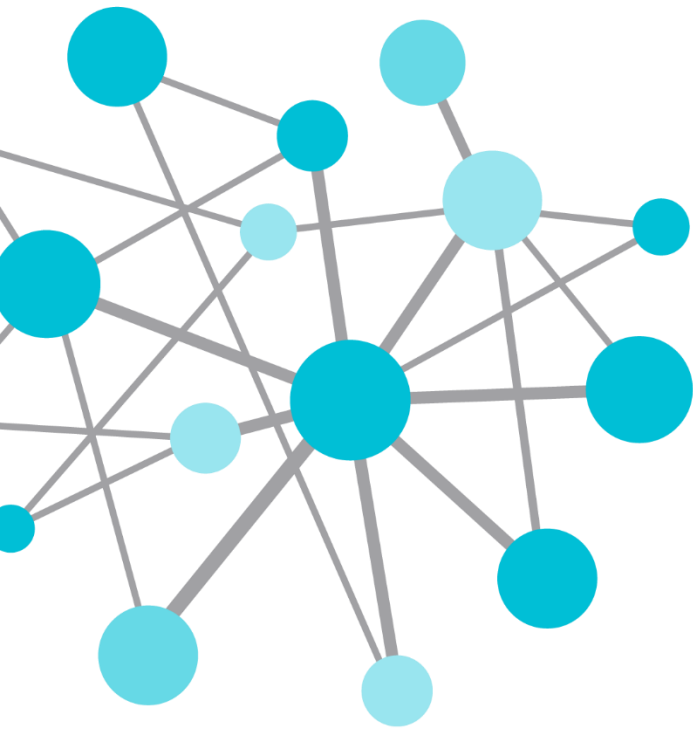
Key Points to Take Home



- The modern PI System contains **many new technologies**
 - PI Connectors
 - PI Integrators
 - PI Web API
- These all ultimately **facilitate access to all of your operational data and to analyses** made upon it, at any time any where

Bring us your questions about how you can get started with these technologies



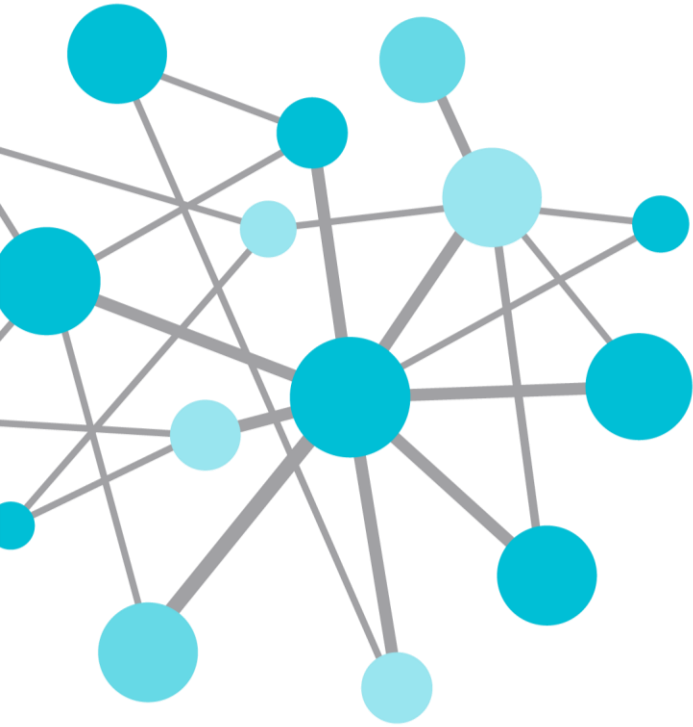


Questions

Please wait for the microphone before asking your question



Please state your name
and your company



THANK
YOU

Brought to you by  **OSIsoft.**

John Maytum

Sr. Support Sales Engineer

jmaytum@osisoft.com

OSIsoft, ULC