

PI System Roadmap

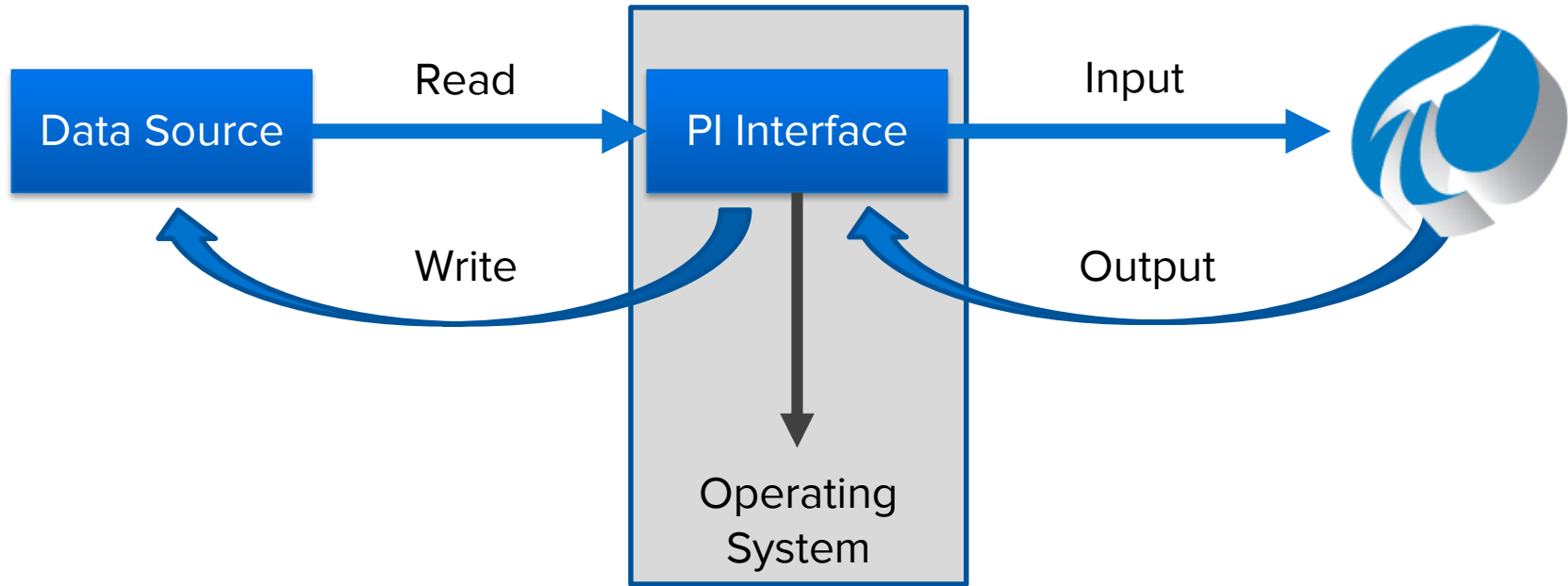
Stephen Kwan, Product Manager

September 14th, 2016

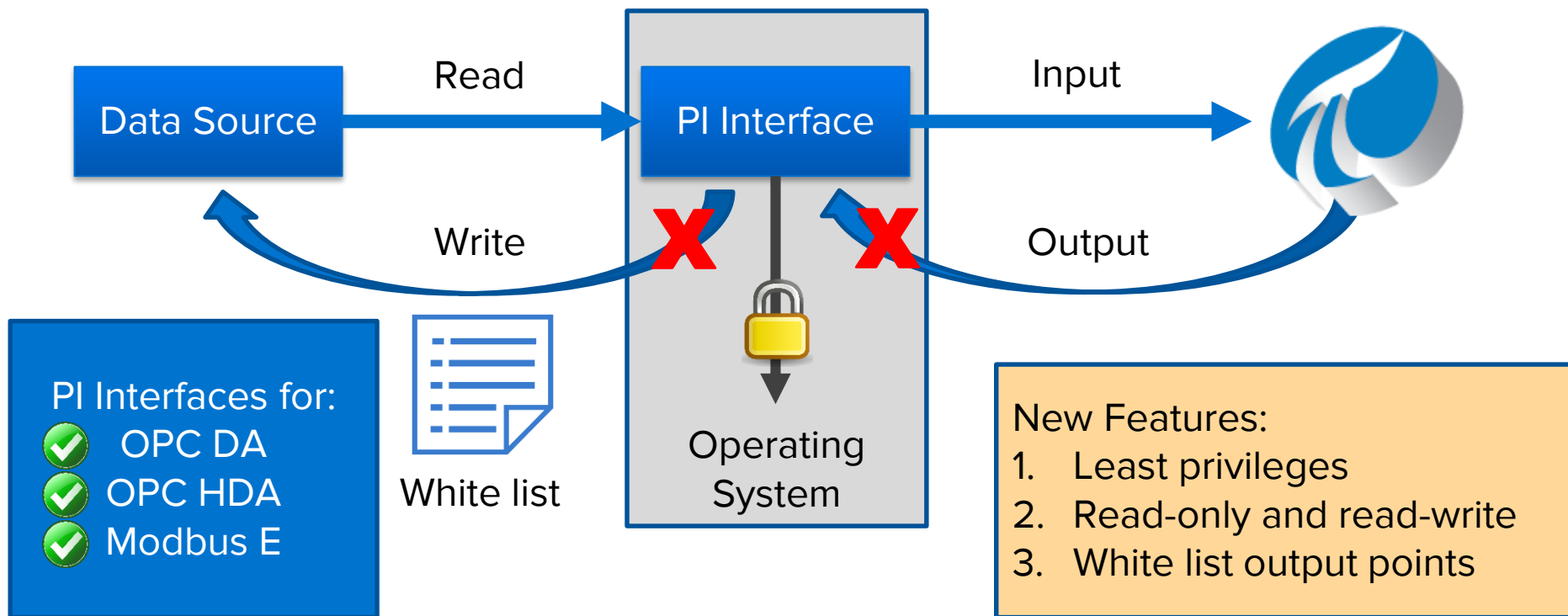


PI Interfaces PI Connectors

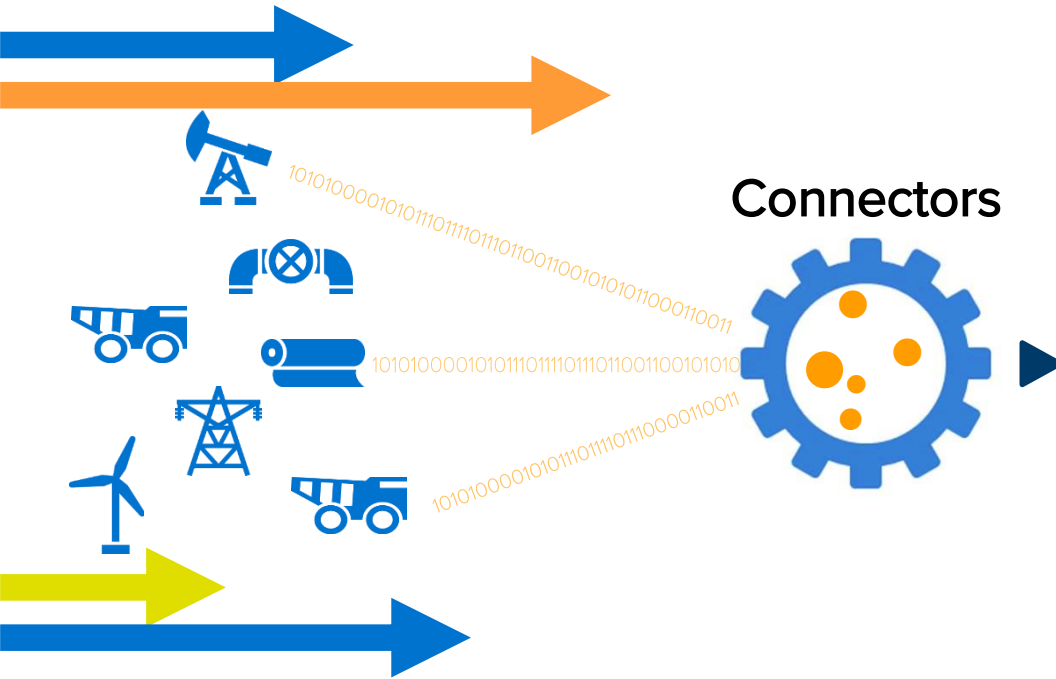
PI Interfaces – New options for securing



PI Interfaces – New options for securing



PI Connectors



- Auto-discovers data source
- User selects data to collect
- Creates reference model based on assets in data source
- Auto-creates:
 - Elements
 - Points
 - Event Frames
- Updates automatically with data source changes
- Collects real-time data
- Easy to configure

Advancing the PI Connector technology

Enhancing and improving

- Performance, scalability and stability improvements
- Version 1.1 and 1.2 enhancements



Adding new PI Connectors

- 13 with general availability now
- Adding more

User experience

- Data selection
- Configuration and management



Available today

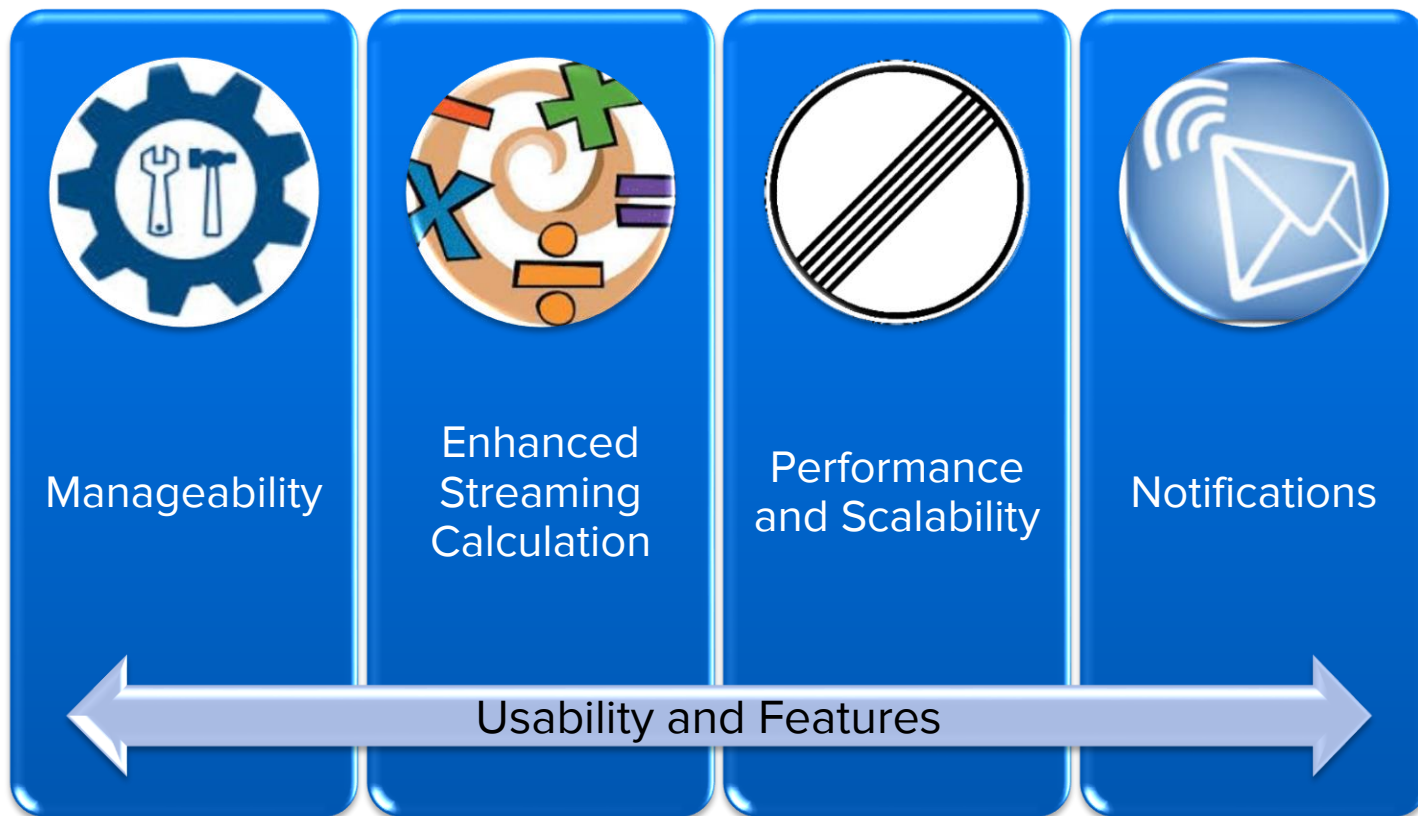
PI Connector	Market
BACnet	Facilities
CygNet	Upstream Oil and Gas
▶ DC Systems RTscada	T&D
EtherNet/IP	High-speed PLC data
HART-IP	Many. Wireless sensors
▶ IEC 60870-5-104	T&D Substations
IPMI	Datacenters
NOV WITSML	Upstream, drilling
▶ OPC UA	Many
Ping	IT infrastructure
PI System Health	IT infrastructure
Siemens SIMATIC PCS 7	Many
▶ UFL	Many
Wonderware Historian	Many

PI Connectors in development

	PI Connector	Market	Status
▶	PI System	All	Beta Q3
	Redfish	Datacenter	Development
▶	Modbus for embedded systems	All	Development
▶	DNP3 for embedded systems	T&D	Development
▶	IEC 61850	T&D	Development

PI Server

Themes



PI Data Archive

What's new in PI Data Archive?

Improved Archive Management



Detect when archive is corrupt



Online reprocessing of archives via PI SMT



Auto recovery of corrupt queues in Data Archive and BufSS



Connection history

PI Asset Framework

Richer Context for your Data and Events

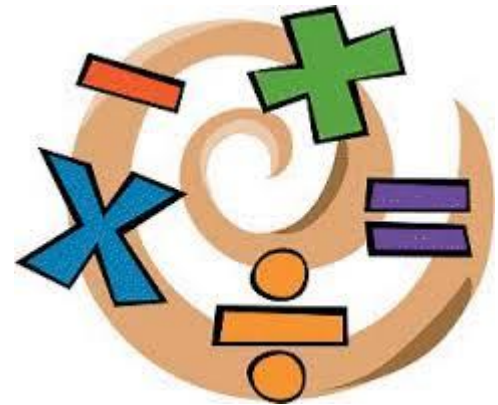
- Well defined traits for attributes
 - Limits
 - Forecasts
 - Geolocation
- Event frames enhancements
 - Severity
 - Acknowledgements
 - Annotations



Enhanced Streaming Calculations

Analytics

- Manual recalculation via PI System Explorer
 - Programmatic access via AF SDK
- Windows Clustering support for PI Analysis Service
- Additional functions
 - Compare with deadband
 - Rate of change
- SQC
 - Output to attribute
 - Generate event frame



Performance and Scalability

Faster and Better

New search methods in AF SDK

- Elements, event frames, analyses, notification rules, cases and transfers
- Backwards compatible with existing search methods
- Data Access
 - Asynchronous data access calls in AF SDK
 - Replace/Delete events over a time range
 - Bulk retrieval for an array of timestamps and a mode
- Event Frame and FindChangedItems Performance Improvements
- Reduced Memory usage in client



Notifications

Notifications 2016 R2 in the PI System

- Leverage analysis service to identify important events

Detect



- Use event frames as a natural container for the event

Containerize



- Content
- Delivery
- Escalation
- Acknowledgement

Notify



Goals

Scalability and Performance

- Target: 1M configured notifications

Migration

- Migration tool for legacy notifications

Integration

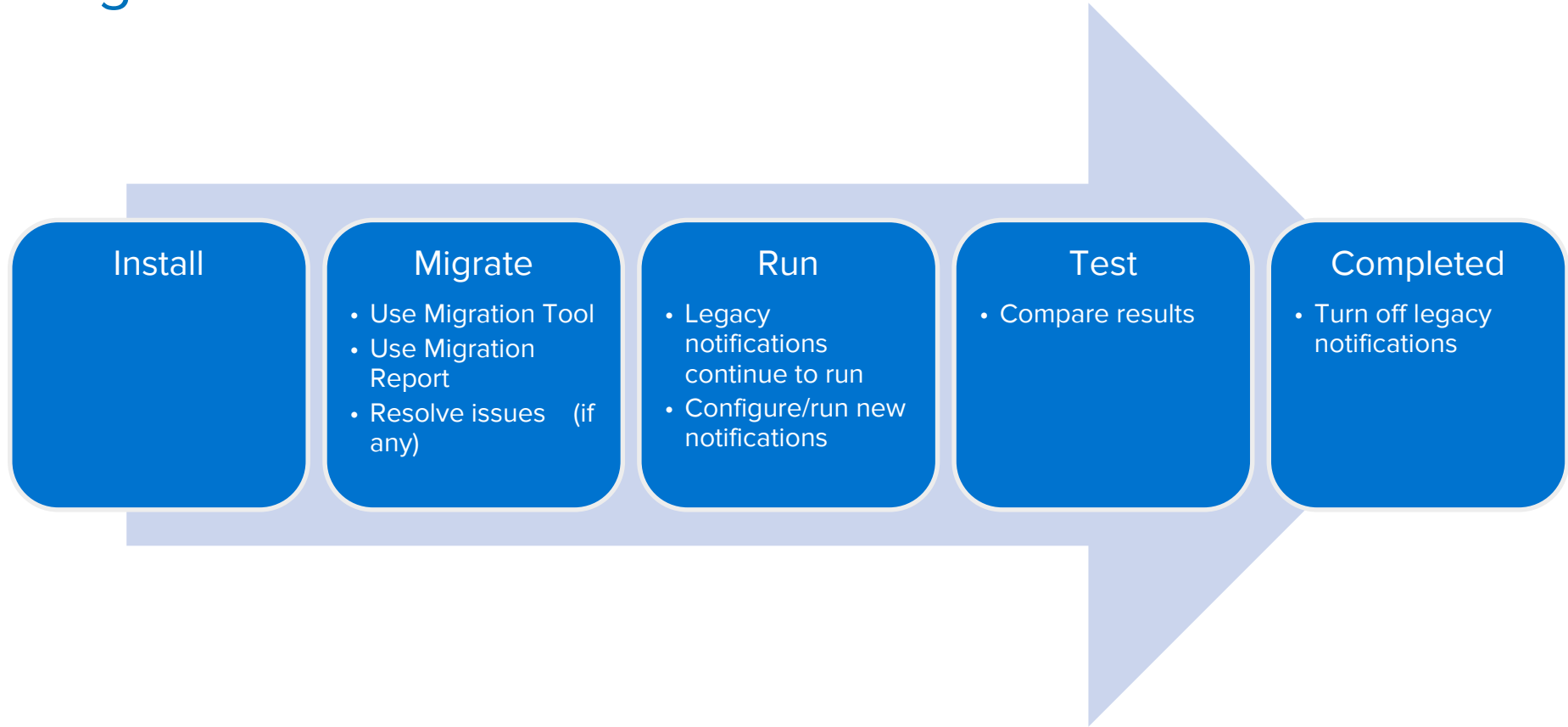
- Tight integration with PI AF
- First class citizen in PI client tools – PI DataLink, PI Coresight, etc.

Comparison (Highlights)

	Legacy Notifications	Notifications 2016 R2
Installation	Separate install	Client installed with AF, separate install for Notifications Service
Configuration	PI System Explorer	PI System Explorer, PI Builder*
Triggers	Separate configuration	Event frame – Analyses, programmatic, EFGGen, manual, etc.
Customizable content	Yes	Yes
Subscribers, Groups	Yes	Yes
Email delivery channel	Yes	Yes
Web service delivery channel	Yes	Yes
Escalation	Yes	Yes
Acknowledgement and Visualization	Various	PI Coresight 2016+, PI DataLink 2016+**, PI Builder
Custom delivery channel	Yes	Not in this version
Notifications History	Stored in PI Points	Event frame annotations

* = limited, ** = read only

Migration Flow



2017 and Beyond

PI Server 2017+ Focus

Manageability

- Integrated installer
- PI Directory Service
- PI System Dashboard
- Configuration portal
- Improve archive management
- Actionable error messages

Performance and Scalability

- Data access
- Event frames
- Searches and queries
- Analyses
- Caching and multi-user enhancements

Analytics

- Auto recalculation
- Extensible analytics with 3rd party integration

Usability and Features

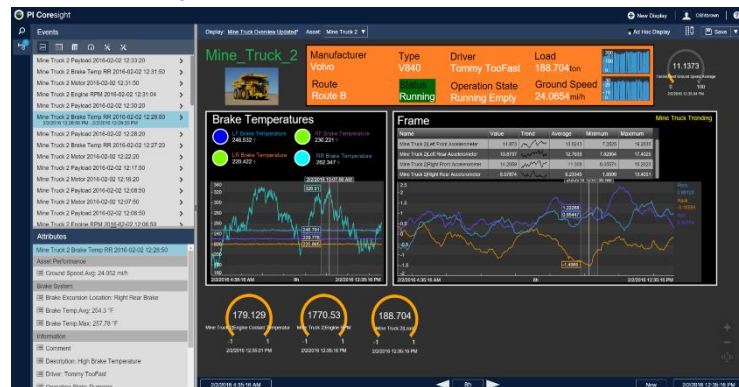
- Localized attribute names
- UOM grouping
- Delivery channels

PI Coresight

PI Coresight 2016

- New Display Editor: Author high fidelity displays
- Still Quick & Easy to find and visualize data
- Process Monitoring: Visual alerts with multistate behaviors
- Ad Hoc Analysis: Synchronized trend cursors, & basic time manipulation
- Event Enabled: Discover related events on your assets
- Event Comparison: Easily compare and analyze data from similar events using overlay trends.
- Event Details & Comments: View details to quickly assess the situation, acknowledge the event, and view and add comments so your colleagues always have the latest information.
- PI Notifications Beta Support: View Event Details and acknowledge events.

New Display Editor



Event Comparison



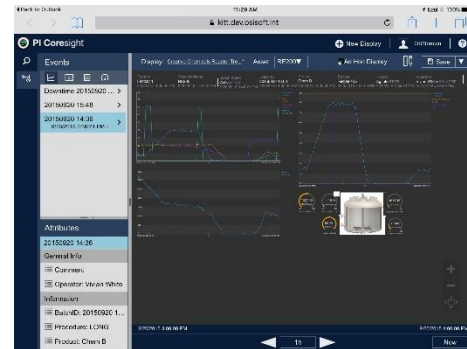
PI Coresight 2016

- Mobile: Take your data anywhere on any device.
- Extensibility CTP (technology preview): Customers & Partners can add symbols and pallets to the application, extending the functionality.
- No Customer Left Behind: Previous PI Coresight displays are brought forward & ProcessBook displays are still viewable through PI Coresight.
- Integrated with PI AF 2016: PI Coresight leverages new capabilities like AF Attribute Trait Limits and Event Severity within the application.
- Visualization Rebooted: Completely redesigned user experience with a new look and feel.
- Customer Feedback Integrated: Customers can suggest enhancements directly from the PI Coresight application.

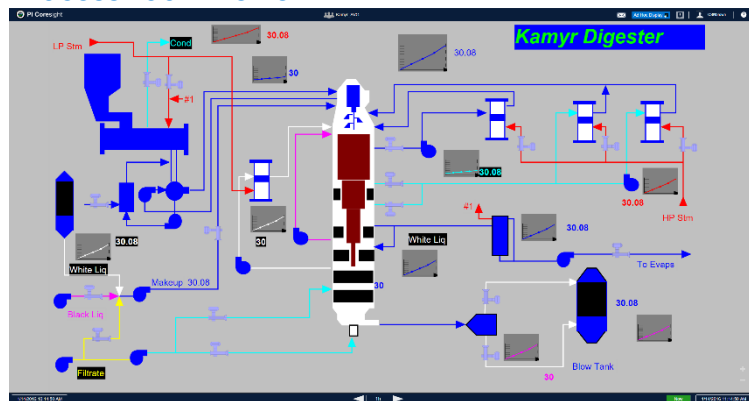
Phone



Tablet



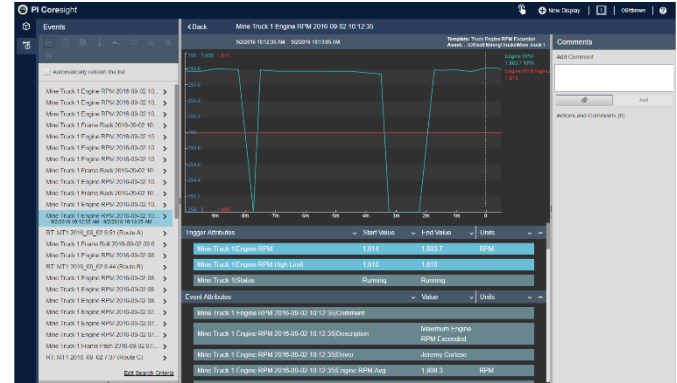
ProcessBook Viewer



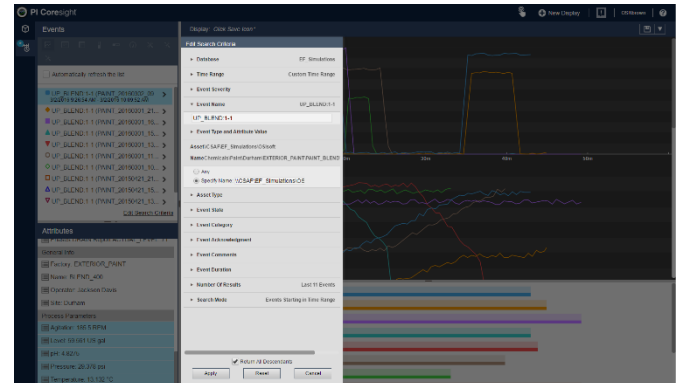
PI Coresight 2016 R2

- Analyze Events with Notifications Support: Investigate an event after receiving a Notification email link.
- Advanced Search for Events: Search and filter events on your display from a plethora of criteria.
- Editor Enhancements: symbol switcher, radial gauge, trend configuration (trace colors, scales), etc.
- PI BatchView replacement / Batch to EF migration support: Advanced EF search, Save Event Comparison display, Align and zoom to child events.

Investigate Events from a notification



Advanced Event Search



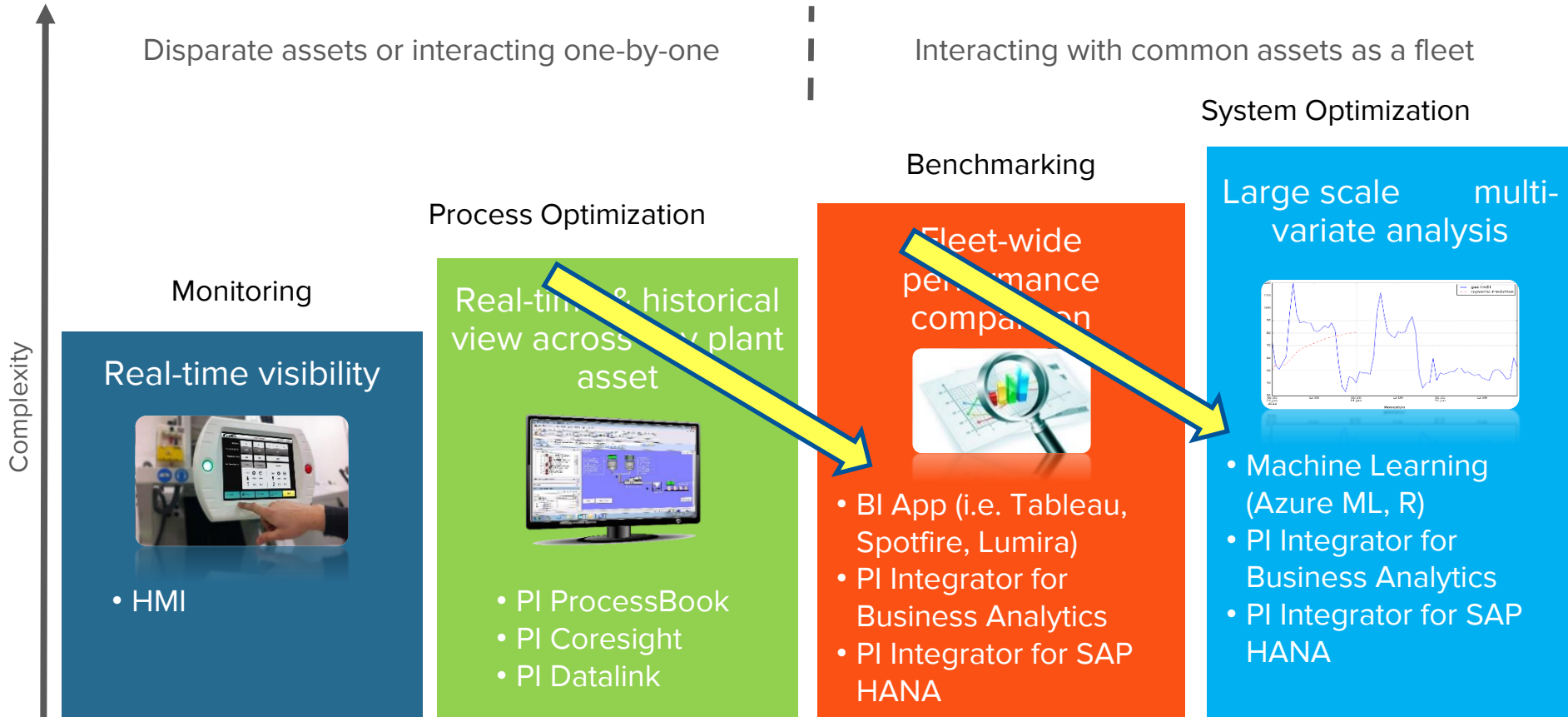
PI Coresight 2017 (tentative, TBD)

- Role Based User Access: support for Viewer users and Contributor users.
- Initial Dashboards Support: Events Dashboard table symbol, Collections, Drill in Navigation, TBD
- Editor Enhancements: symbol library, display background config, TBD
- PI BatchView replacement / Batch to EF migration support: Golden events / Golden Batch support

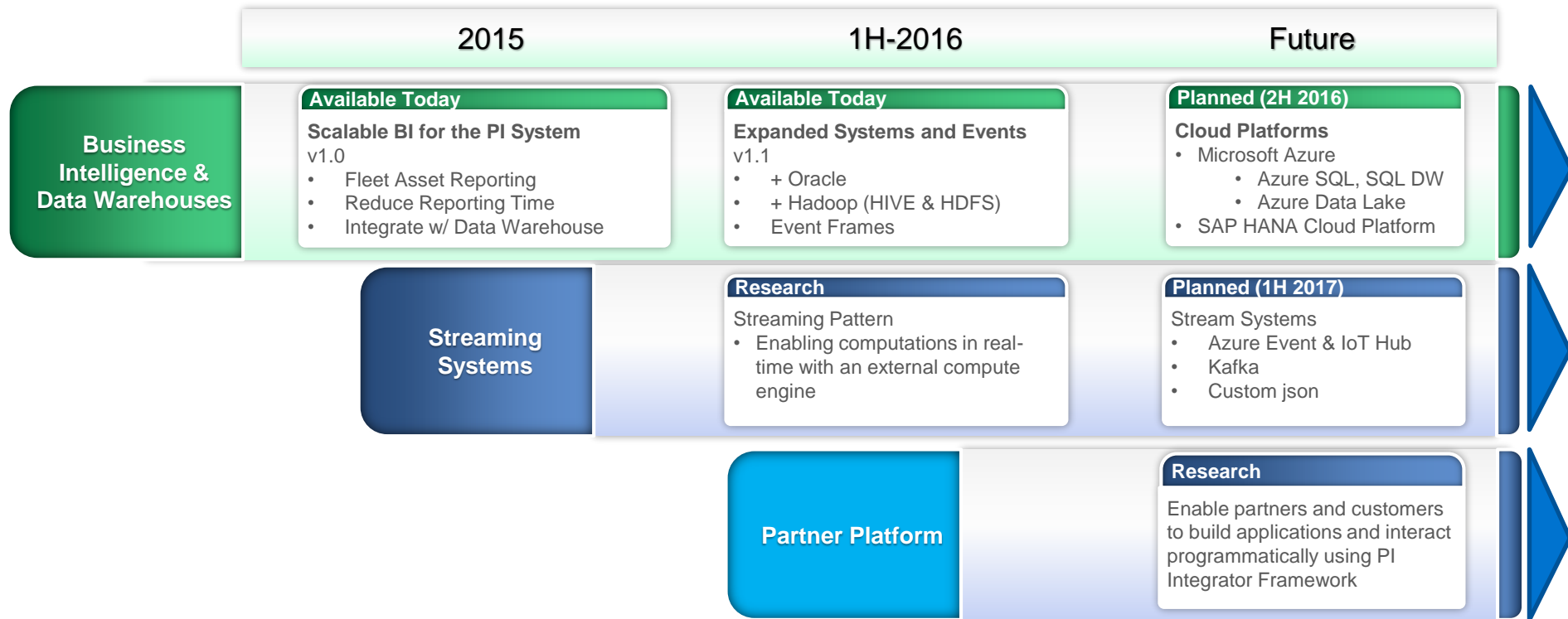
Event Name	Asset	Priority	Status	Start Date/Time	End Date/Time	Duration	ACK
Priority: Critical (5)							
Overheat-GB	.../Wind Farm 3 /Turbine 2/Gearbox	Critical	Active	2015-04-10 08:35 AM	In-Progress	5m	No
Downtime-WT	Wind Farms/Wind Farm 1/Turbine 2	Critical	Active	2015-04-10 08:05 AM	In-Progress	30m	No
Downtime-WT	Wind Farms/Wind Farm 3/Turbine 1	Critical	Active	2015-04-10 08:05 AM	In-Progress	30m	No
Overheat-GB	.../Wind Farm 5 /Turbine 2/Gearbox	Critical	Active	2015-04-10 07:55 AM	In-Progress	40m	No
Downtime-WT	Wind Farms/Wind Farm 1/Turbine 1	Critical	Active	2015-04-10 07:50 AM	In-Progress	45m	Yes
Priority: Major (3)							
Error-Sensor	.../Wind Farm 3/Turbine 5/Turbine Tower	Major	Active	2015-04-10 07:55 AM	In-Progress	40m	Yes
Error-Sensor	.../Wind Farm 3/Turbine 5/Nacelle	Major	Active	2015-04-10 07:55 AM	In-Progress	40m	Yes
Error-Sensor	.../Wind Farm 3/Turbine 5/Blade	Major	Active	2015-04-10 07:55 AM	In-Progress	40m	Yes
Priority: Minor (1)							
Maintenance	...Wind Farm 2/Wind Turbine 3/Shaft	Minor	Active	2015-04-10 07:57 AM	In-Progress	38m	Yes

PI Integrators for Business Analytics

Problem Complexity Drives the Need for Integrators



More integration options, more systems



PI Integrator for ESRI ArcGIS

What's next for the PI Integrator for Esri ArcGIS?

New Features

- Asset Sync
- Architecture
- Related Feature Service
- Rewindable Maps!

Widgets

- Ops Dashboard
- WebApp Builder

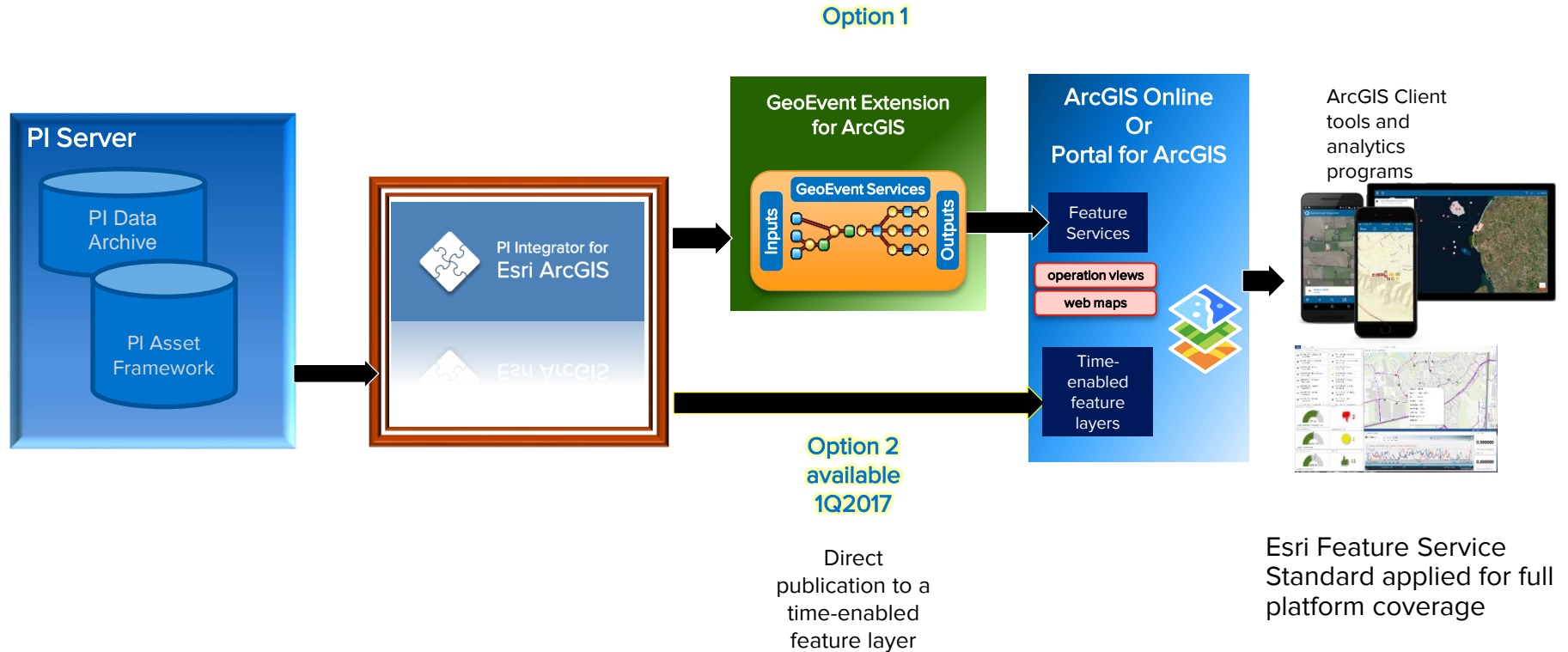
Product Enhancements

- Stream identification
- ArcGIS environment manageability

Research Event Frames



How it Works



New architecture – what does it mean for you?

- Self-Hosted Web Server
 - No longer uses IIS
- Time-enabled feature layer
 - Does not require GeoEvent Extension for ArcGIS
 - ArcGIS 10.2.2 or later supported



WE WANT YOU



BetaIntegratorforEsri@OSIsoft.com

PI Cloud Services

Market Landscape is evolving



Plant Enterprise Operations

- Small number of Assets
- Mostly static
- Long Lifetime
- Diverse and Complex
- Optimization/Performance



Distributed Asset Monitoring

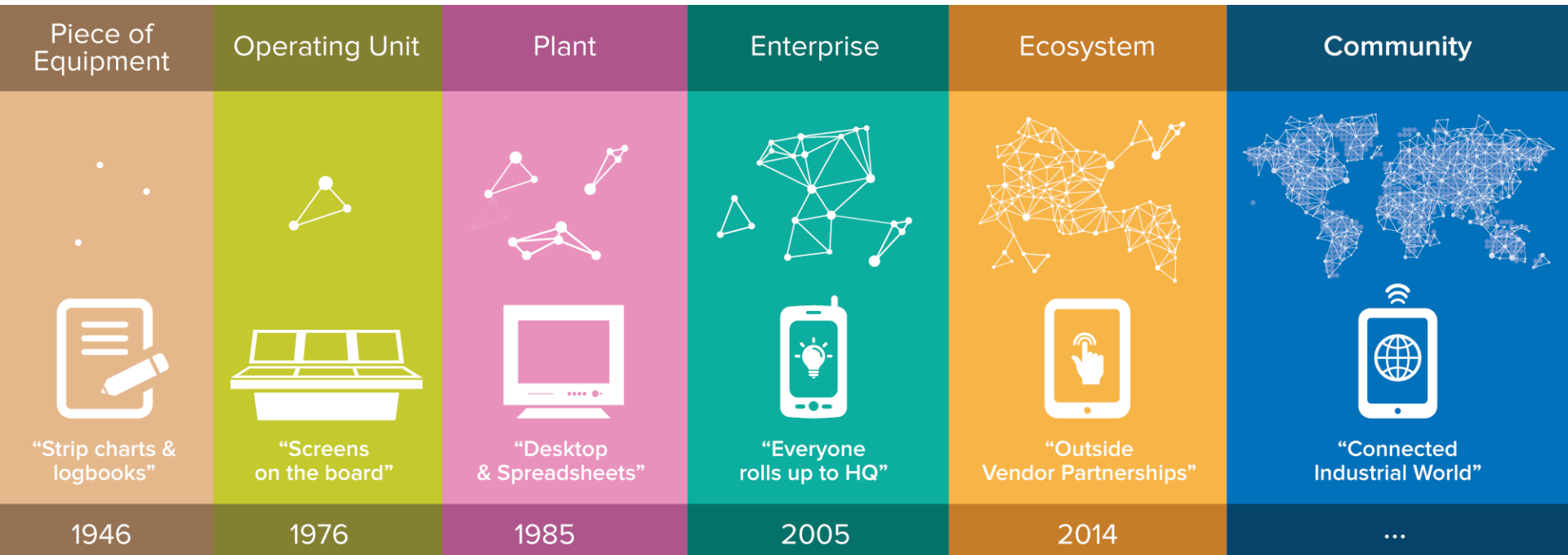
- Medium number of Assets
- Some moving
- Medium lifetime
- Quite Similar but Dispersed
- Remote Monitoring



Internet of Things & M2M

- Massive number Assets
- Dynamic provisioning
- Short lifetime
- Relatively Simple
- Analytics/Big Data

A Journey to a more connected world



Cloud Services – Market requirements

Quick Deployment
“Zero” Admin.

IoT/IIoT and
Community Scale

Data Collection
from Devices

Data Collection
Across
Companies

Data Sharing
within
Communities

Other Needs
for Communities

First Delivery Target



Quick Deployment
“Zero” Admin.



IoT/IIoT and
Community Scale



Data Collection
from Devices

Data Collection
Across
Companies

Data Sharing
within
Communities

Other Needs
for Communities

Cloud Services Target Audiences

- Industrial operators (traditional customers)
- Service Providers (CSAs)
- Application providers (Partners)

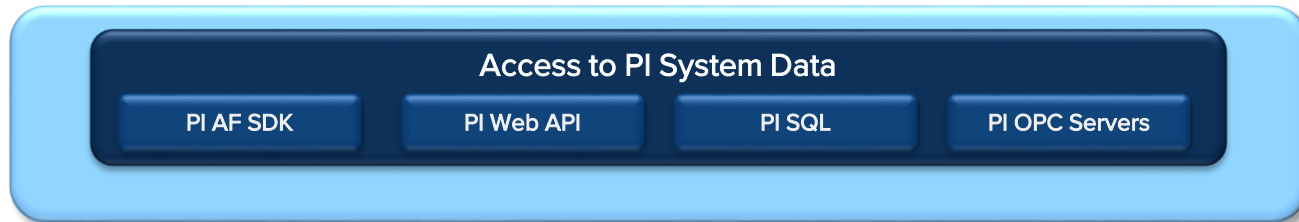
Qi – Features & Capabilities

- Multi-tenant design
- Highly available
- Accessible via REST API
 - Ingress & Egress
- Supported on several development platforms
 - .Net, JavaScript, Python
- Support complex data types
- Support multiple indexes
- Lossless compression
- Handles any timestamps

Developer's Technology

What are PI Developer Technologies?

- Programmatic access to the PI System
- PI System's "surface area"



PI AF SDK	.NET Framework Toolset
PI Web API	REST-based Service Layer
PI SQL Framework	SQL Data Access Products
PI OPC Servers	OPC DA/HDA Standard

SQL Family

PI SQL Family

- Standards-based access to PI System using SQL
- Products:
 - PI OLEDB “Classic”
 - PI OLEDB Enterprise
 - PI ODBC
 - PI JDBC
- In 2017, moving to common architecture with SQL processing taking place on a PI SQL Data Access Server

PI SQL Initiatives

- Performance
 - Begin streaming data to clients before query is done on the server
- Scalability
 - Support for large AF models and Event Frame databases
- Investigate simpler data model
 - Reduce complexity of common queries

PI Web API

PI Web API 2016 R2 – Current

Schedule

- EMEA UC (Berlin) timeframe

Feature: AF Security Artifacts

- Operations of managing AF security artifacts
- Operations of managing AF objects permissions

Feature: Time zone

- Ability to specify time zone when retrieving stream values

Focus: Configuration experience

- Improve PI Web API Admin Utility to help system managers

PI Web API Initiatives

- Performance and Scalability
 - Support OSIsoft visualization
 - Caching schemas
 - Horizontal scaling
 - Creating and publishing performance metrics
- Feature Parity with AF SDK
- Merge deployment with PI AF Server
- Investigate additional Security models (such as Claims)

PI OPC Servers

PI OPC Servers

- We continue to support both the OPC DA and HDA standards
- Upcoming releases:
 - PI OPC DA Server 2016
 - PI OPC HDA Server 2016
- OPC UA Server
 - Insufficient market demand at this time
 - Continue to research

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Product Manager

OSIsoft, LLC

Thank You



OSIsoft®

감사합니다

谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado