

PI Developer Technologies Roadmap

PI Developer Technologies



**PI OPC
Servers**

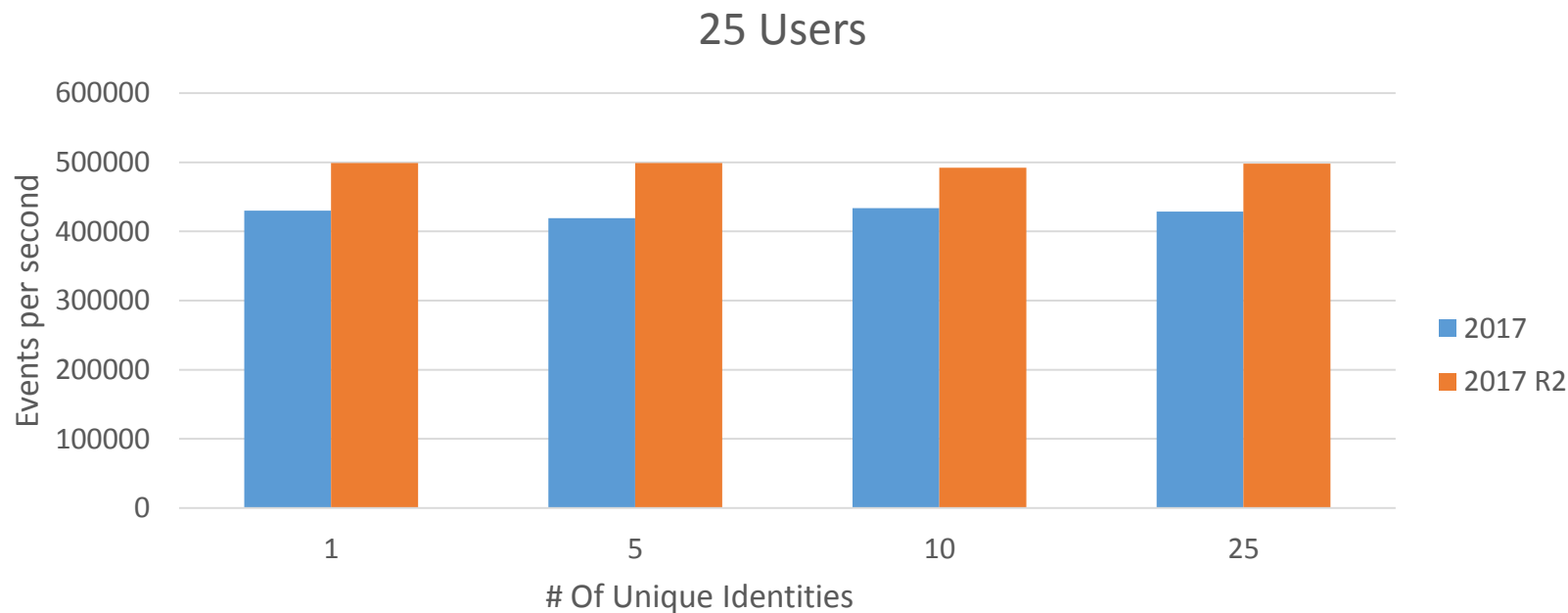
PI Web API

Presented by: Frank Garriel

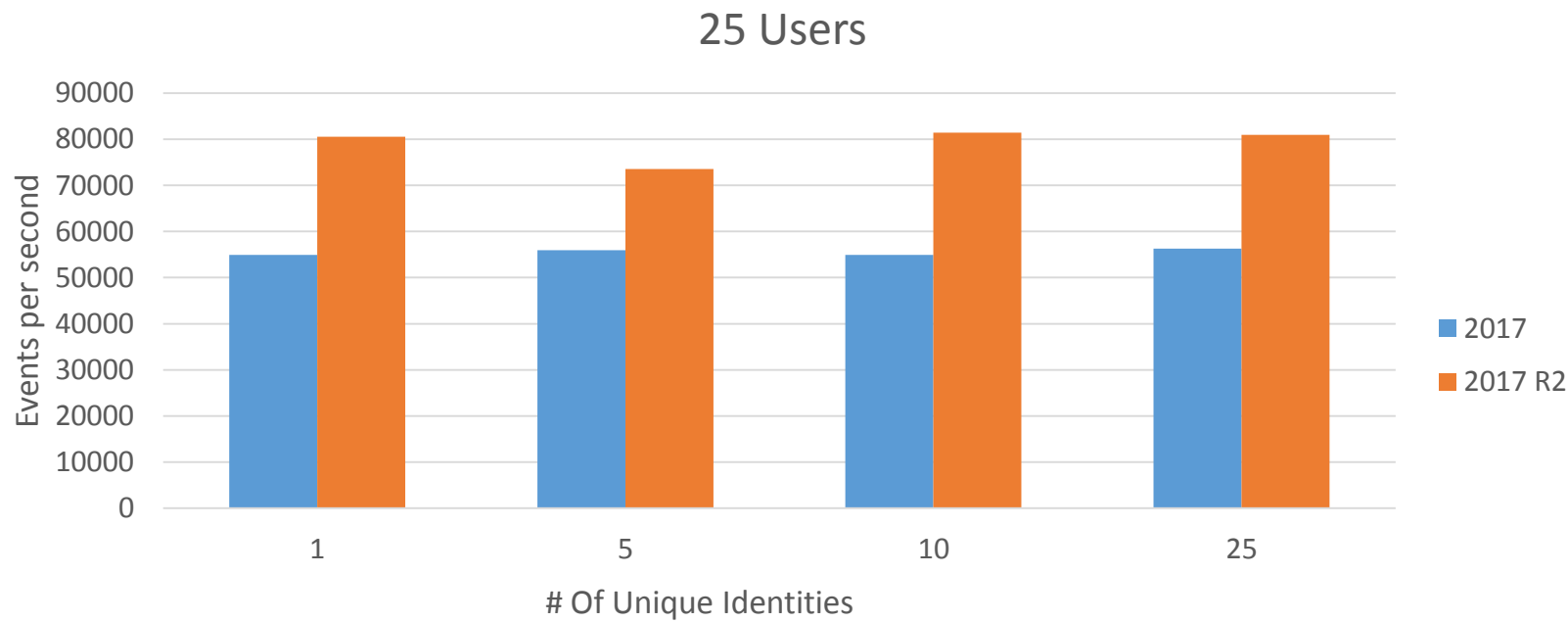
Performance & Scalability

- **PI Web API 2017 R2**
 - Channels Heartbeat
 - Raw Throughput Improvement
 - Web ID 2.0
- **PI Web API 2018**
 - Stream Updates CTP
- **PI Web API 2018 R2**
 - Stream Updates
 - Event Frame Query Updates

Raw Data Read Throughput



Raw Data Write Throughput



Your Thoughts on Web ID

“always need to do 2 queries to get the actual information you want”

“2 requests are required instead of 1”

“Easier ways of retrieving streaming data **by AF hierarchy or PI Tag** name instead of using a generated webid for everything”



Web ID 2.0

- Faster
 - Eliminate the first call – Generate directly in your applications!
- Flexible – Compose WebIDs with only Path information
- Shorter – Smaller payloads & More IDs in a single request

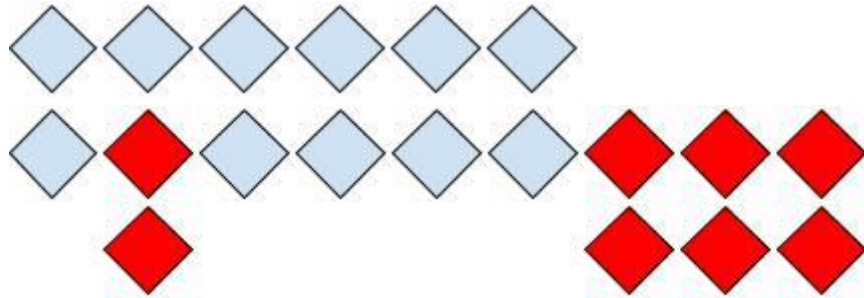


How to Use Web ID 2.0

Stream Updates CTP

- **PI Web API 2018**

- An HTTP alternative to WebSockets / Channels
- Eliminate large responses
- Get only the data you need



Stream Updates Roadmap

- **PI Web API 2018**
 - Stream Updates CTP
- **PI Web API 2018 R2**
 - Stream Updates
 - Event Frame Query Updates

Features & Enhancements

PI Web API 2017 R2

- Search Elements & Attributes with AF Query Strings
- Swagger Spec
- Batch in read-only mode
- Mixed Mode Authentication
- Recorded Values at Times

PI Web API 2018

- Stream Updates CTP
- Event Frame & PI Point Annotations
- Get Table with Parameters
- Partial support for Notifications
- Filter Child Attributes by AttributeTrait

PI Web API 2018 R2

- Stream Updates
- Event Frame Query Updates
- Find Changed Items in PI System
- More Notifications Support
- Batch enhancements
 - Use of Relative Paths
 - Variables in POST sub-request body
 - Conditional Logic
- Reduce Memory Footprint
- Reduce calls to PI Servers

Also of interest to PI Web API developers

Presentations

- Writing Highly Performant PI Web API Applications
 - Now – 12:15, Parc 55, Mason, Level 3
- Build PI Applications Faster with PI Web API Client Libraries
 - Today 11:30 - 12:15, Parc 55, Cyril Magnin II, Level 4

Hands-On Labs

- Getting Started with PI Web API using Postman
 - Today 1:30 - 4:30, Development Lab
- Configuring Claims-Based Authentication with PI Web API
 - Friday 9:00 – 12:00, Development Lab
- Developing Modern Web Sites with PI Web API and Angular 5
 - Friday 9:00 – 12:00, Development Lab

PI Web API

Tell me what's important!
<https://feedback.osisoft.com>



- **Frank Garriel**
- fgarriel@osisoft.com
- Technical Product Manager
- OSIsoft

AF SDK

Presented by: David Moler

AF SDK: What's new? What's coming?

- User-centric display of data
- Easier to manage
- Search enhancements
- Performance improvements

Displaying Data

- Identify UOM origin (2017 R2)
- UOM Groups (2017 R2)
 - Define groups of UOMs (Metric, US Customary)
 - Calls to convert data to appropriate group

Area	9.290304 m2
Categories:	
Default UOM:	square foot
Value Type:	Double
Value:	9.290304 m2

Unit of Measure Properties

General

Name: square foot

Abbreviation: ft2

Description:

Origin: System Defined

Canonical UOM: square meter

Reference UOM: square inch

Method:

Type

☒ Simple ☐ Formula

Factor: 144

Offset: 0

144 in2

UOM Group Mappings

Group	Mapping
Metric	square meter (m2)
US Customary	

OK Cancel Apply

Displaying Data

- Display Digits (2018)
 - Shows appropriate precision
 - Follows PI standard: -20 to -1 to specify sig figs, 0 to 10 for fixed point
- Reason trait (2017 R2)
 - Built-in way to identify reason code
 - Always an enumeration value
- Hierarchical Enumeration Values (2017 R2)

 CDT 158	118.975	Data Reference:	PI Point
		Display Digits:	-6

Properties:	Reason	
Categories:		
Default UOM:	<None>	
Value Type:	Fault Reason	
Value:	Electrical Fault	
Data Reference:	Electrical	
Display Digits:	Mechanical	Error
	Sort By	Fault

Manageability (2018)

- Retain IDs on import
 - More seamless migration between PI Systems
- Health traits
 - Built-in enumeration status
 - Understood natively by PI Vision and other clients
- Connection balancing and failback to PI Data Archive
- View connections to AF Server

Name:	HealthStatus		
Description:	System Health Status		
☐ Hexadecimal	Security		
	Value	Name	Description
	0	Healthy	Asset is functioning normally.
	1	Out of Service	Asset is not in use.
	2	In Maintenance	Asset is undergoing maintenance.
	3	Warning	Asset has a warning condition.
	4	Error	Asset has an error condition.

Search Enhancements

- Search Attribute, Contact Templates (2017 R2)
- New filters
 - 2017 R2: Parent, EventFrame, PlugIn, IsInternal
- Nested criteria (2017 R2)
 - Allows the result of one search to supply the filter for another
 - Filters supported: Element, EventFrame, Parent

Examples:

Elements of Template A whose parent is Template B
Event Frames over the last 7 days with primary element with Category A

Search Enhancements

- New fields
 - 2017 R2: Contact, IsInternal
 - 2018: Security, ConfigString, PlugIn, DisplayDigits, IsManualDataEntry, Trait, UOM
- Find by ID for all search types, use with IN operator (2018)

Examples:

Open Event Frames with primary element in {ID1, ID2, ID3, ID4}

Retrieve Start Time, End Time, Reason Attribute for Event Frames in {ID1, ..., ID50}

Performance Improvements

- Concurrent calls per-connection (2017 R2)
 - By default, up to 10 concurrent calls per AF Server connection
- Bulk annotation retrieval from PI Data Archive (2017 R2)
- Bulk check-out, delete (2018)
 - Takes list of IDs (can be retrieved from search without loading objects)
- Templated attributes not configured (2018)
 - Opt-in to missing PI Point caching
 - Avoids RPC to resolve name on every call
- General improvements to PI data access

Coming in AF SDK 2018 R2

- Event Frame search subscriptions
 - Observe changes search results
- Multi-user performance improvements
 - Support WebAPI scalability
- .NET Core version of AF SDK
 - Deployment via NuGet
- PI System Directory exposure

Also of interest for AF SDK developers

- Advances in PI System Streaming Analytics with MATLAB
(11:30AM, HILTON: Imperial Ballroom B)
- Getting the most out of AFSearch
(2:30PM, PARC 55: Market Street, Level 3)

AF SDK



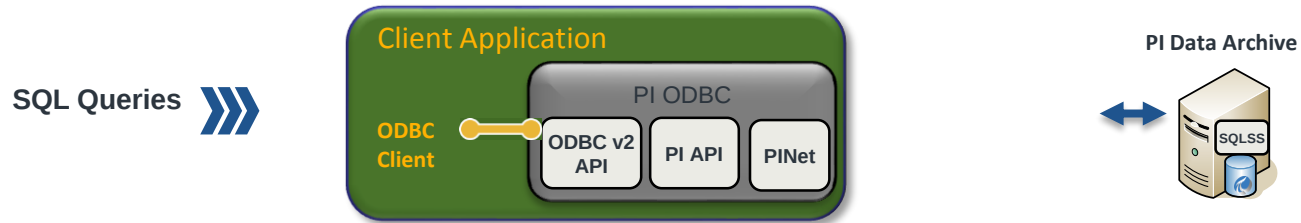
- **David Moler**
- dmoler@osisoft.com
- Development Lead
- OSIsoft

PI SQL Family

Presented By: Bodo Bachmann

PI SQL Family Evolution

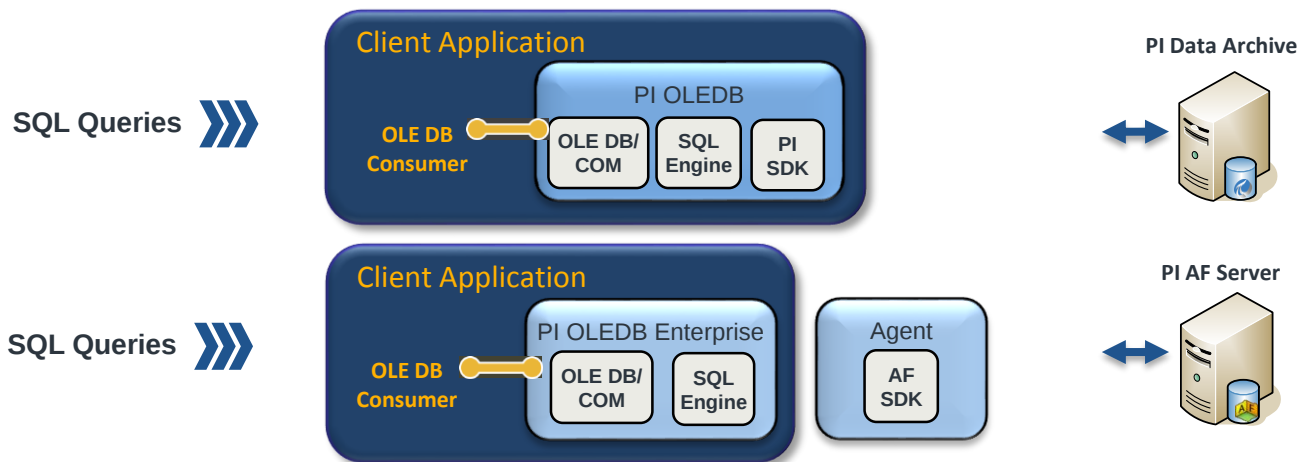
PI ODBC



2nd Generation

PI OLEDB Provider

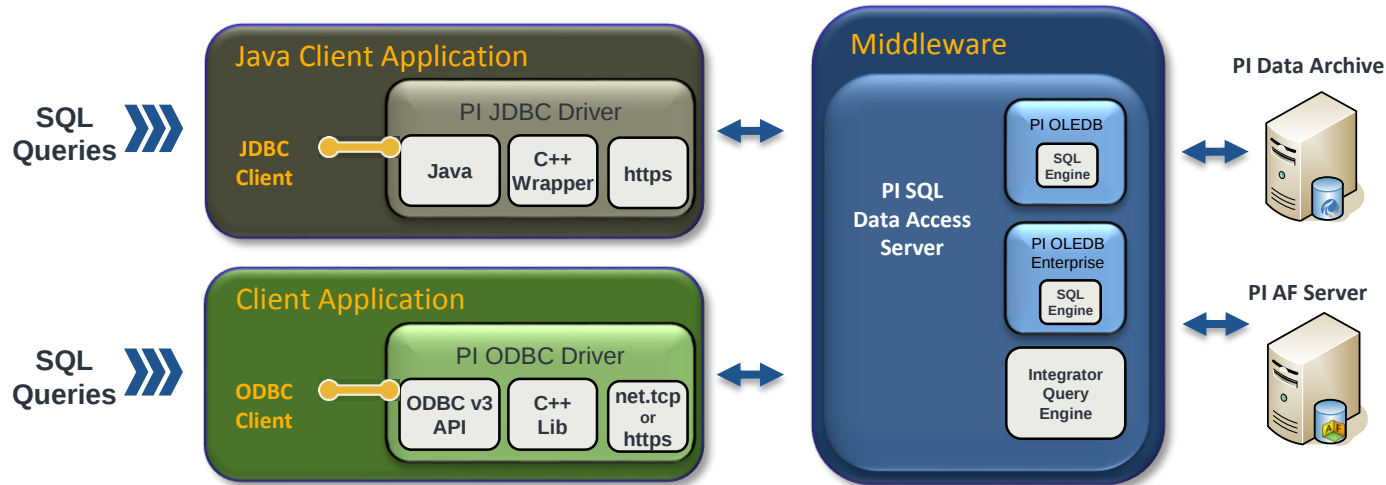
PI OLEDB Enterprise



3rd Generation

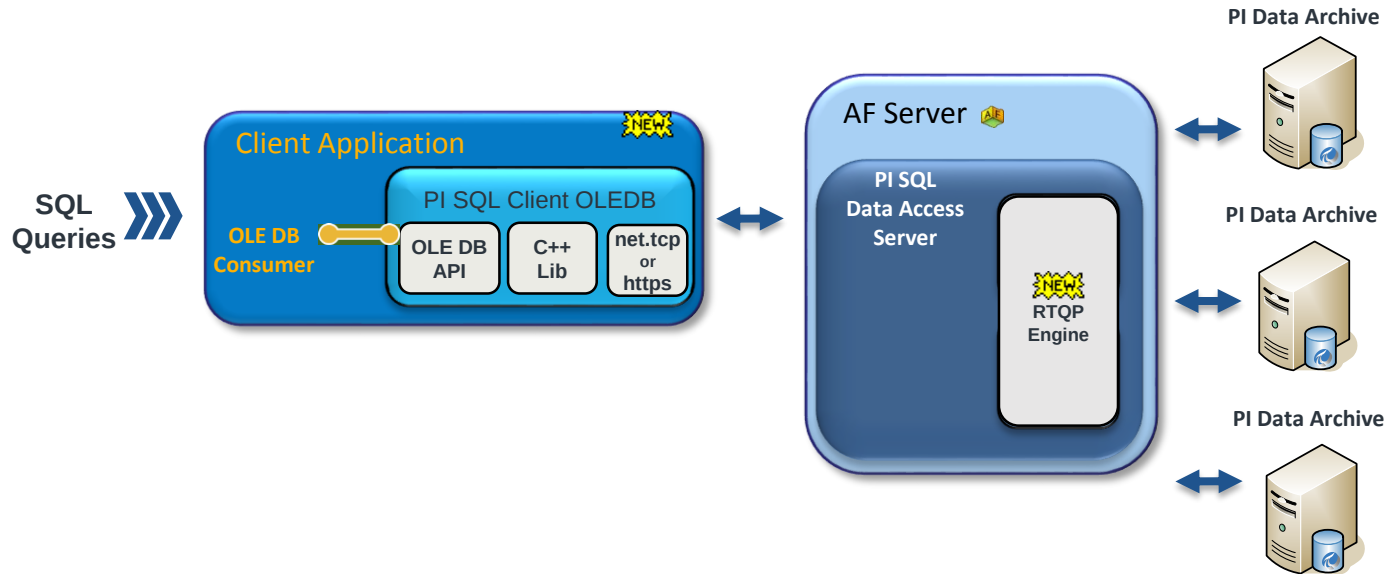
PI JDBC Driver

PI ODBC Driver



Next Generation

PI SQL Client

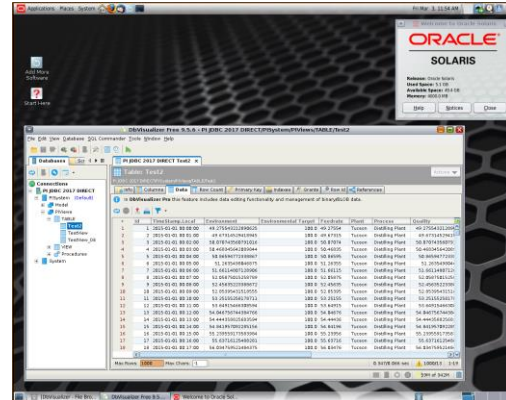
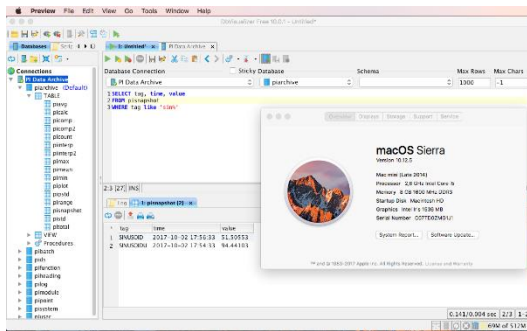


PI SQL Client / RTQP Engine Goals

- Performance
 - Scalability
 - Simplify E-R Model
-
- Community Technology Preview (CTP) program ends
 - RTQP Engine Beta is part of PI Server 2018 Beta

In Development

- PI JDBC
 - Pure Java version (more platforms)



- PI SQL Client - ODBC Driver
- PI SQL Client – JDBC Driver

Hands-On Labs and Product Presentation

Labs

- “Build High Performance Queries Using our New Real-Time Query Processing Engine”
 - Today, 10:30 AM – 12:30 PM
- “Develop a PI JDBC Project to Exchange Data with Raspberry PI Gadgets”
 - Today, 1:30 PM – 4:30 PM

Developer Track

- “Next Generation PI SQL”
 - Today, 3:30 PM – 4:15 PM

PI SQL Family



- **Bodo Bachmann**
- Bodo@osisoft.com
- Engineering Manager Europe
- OSIsoft



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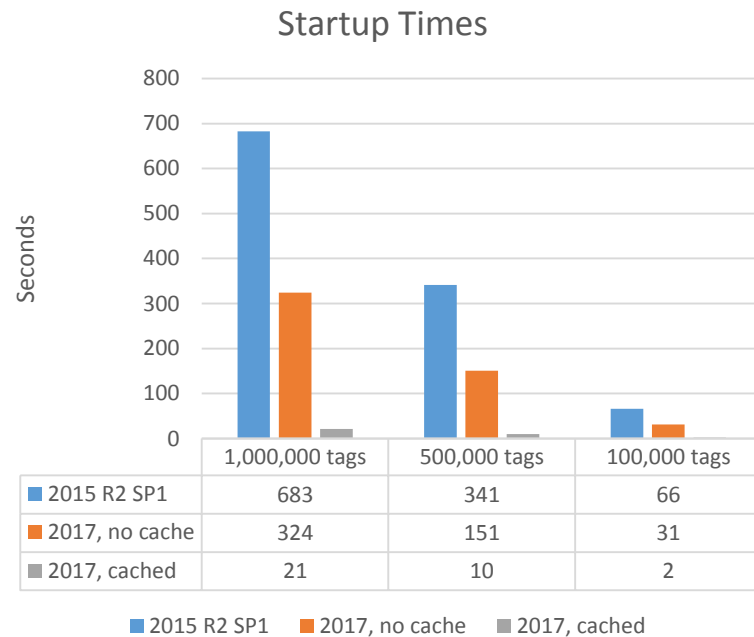


PI OPC Servers

Presented by: Ray Verhoeff

PI OPC DA Server 2017

- 50% faster initial startup time than 2015
- Namespace Data cached on shutdown leads to...
 - 95% faster startups!



PI OPC DA Server 2018

- Handle PI point edits and deletes while not running
- OPC Quality Codes:
 - Improved representation of Questionable and Substituted flags
- PI Data Archive Whitelist and Blacklist
- Improved debug logging and tracing support
- Include AF Client in Setup

PI OPC HDA Server 2016

- OPC HDA v1.2 compliance issue:
 - PercentGood is now defined as time-weighted
- Two memory leaks fixed:
 - TimeAverage reads
 - Repeated connection / disconnection
 - Fixed some null pointers, empty strings, ItemHandle release bug
- End of support of Module Database

PI OPC HDA Server vNext

- Continued Maintenance:
 - Windows operating system checks
 - Confirm operation with PI SDK upgrades
 - Bug fixes as necessary...



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OPC Unified Architecture

OPC UA

PI Connector for OPC UA

- Reads time series data and context from OPC UA servers
- Creates a model in AF to represent it

An OPC UA Server for PI

- Some experimental work under way
- *Please talk to us about your use cases!*

PI OPC Servers



- **Ray Verhoeff**
- ray@osisoft.com
- Principal Software Developer
- OSIsoft

Questions

Please wait for the **microphone** before asking your questions

State your **name & company**



Please remember to...

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Merci

谢谢

Спасибо

Danke

Gracias

Thank You

감사합니다

ありがとう

Grazie

Obrigado

Optional: Click to add a takeaway you
wish the audience to leave with.