

How to Pick the Right PI Developer Technology for your Project

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Regional Services Lead, France



Why talking about picking the right PI Developer Technology?

To provide a starting point to address common challenges

Common challenges

- Avoiding reinventing the wheel
- Knowing what tools exist
- Integration with other systems



Plan for this presentation

- Overview of the PI Developer Technologies
- How to Pick the right technology
- Usage Scenarios
- Useful Resources
- Conclusion

Overview of PI Developer Technologies

What are PI Developer Technologies?

- Powerful set of tools
 - **To Extend** your possibilities
 - Or to enable **Integration**
- Allows to have your PI System data anywhere you need



PI Developer Technologies Overview

AF SDK

- Library for **.NET** Framework

PI Web API

- **RESTful** Web Service

PI SQL Products

- **SQL access** to PI System Data

PI OPC Servers

- Access Data from **OPC Clients**

Other useful PI System technologies

PowerShell Tools for the PI System

- A **PowerShell** library to administer and manipulate data for the PI System

PI Vision Extensibility

- To extend PI Vision client through **JavaScript** and **HTML5**

Command line

- Many OSIsoft products have **command line utilities**

How to pick the right Developer Technology?



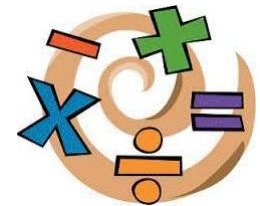
**Do you really need a
custom development?**

Many options already exist within the PI System

Options to consider before jumping into custom development

- Data Collection
 - PI Connectors & PI Interfaces
 - PI Connector for UFL
(supports a REST endpoint)

- Calculations
 - AF: Analytics, Event Frames,
 - **Statistical Quality Control**



Many options already exist within the PI System

Options to consider before jumping into custom development

- Sharing Data
 - Notifications: SOAP, REST
 - PI Integrators: Azure, BA, etc.

- Data Visualization
 - PI Vision URL parameters
 - Use a URL to open displays programmatically





**What type of application
are you building?**

Types of applications and possible options to interact with the PI System



Windows
Desktop
App



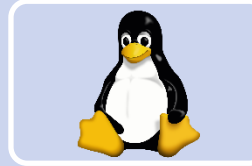
Tablet,
Phone



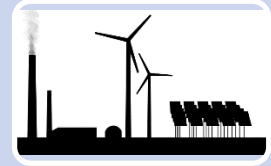
Browser
App



Integration
/Reporting



Linux /
Other OS



Industrial
Systems,
Process
Control

Examples of Potential Candidates:

AF SDK,
PI Web
API,
PI SQL

PI Web
API

PI Web
API

AF SDK,
PI SQL,
PI Web
API

PI Web
API,
PI JDBC

PI OPC
Servers



**What are the things to
know about the different
technologies?**

AF SDK

AF SDK Highlights



- .NET Framework
- High performance
- Rich set of functions: used in many OSIssoft products
- Microsoft Windows only

Things to Know about AF SDK



- Single-threaded applications are straightforward
- Multi-user, multi-threaded applications require some consideration
- Consider using the guidelines
 - [“PI AF SDK Guidelines”](#) on PI Developers Club

PI Web API

PI Web API Highlights

- Accessible from any device (HTTP)
- Contains internal optimizations such as:
 - Multi-user, multi-threaded
 - Cache
 - Multiple authentication options
 - Anonymous, Basic and Kerberos
 - Claims ([OpenID Connect](#))
 - *(everything ultimately maps to a Windows Identity)*



Things to know about PI Web API



- **Secured** using an **SSL certificate**
- Can execute many calls in a single query with **Batch**
- **Real time** updates through **Channels** (web sockets)
- **gzip** compression
- OpenAPI (Swagger) specification 2017
 - Generate your client

PI Web API 2017 implements OpenAPI specification

With Swagger you can generate a PI Web API client in many languages

1 Goto <https://editor.swagger.io/>

The screenshot shows the Swagger Editor interface. The top navigation bar is green and contains a 'Generate Client' dropdown menu. Below this, a grid of programming languages is displayed, with several languages highlighted in yellow: csharp, java, javascript, powershell, typescript-angular, typescript-angular2, javascript-closure-angular, python, and typescript-fetch. To the right, the 'PI Web API 2017 Swagger Spec' page is visible, showing the title, version (1.9.0.266), and a base URL: [Base URL: devdata.osisoft.com/piwebapi]. A red arrow points from the 'Generate Client' dropdown to the 'PI Web API 2017 Swagger Spec' page. A blue box with a white background and a blue border contains the following text: '*Check our Public PI Web API EndPoint! https://devdata.osisoft.com/piwebapi more info here'.

2 Import <https://your-server/piwebapi/help/specification>

PI SQL Family

PI OLEDB Provider, PI OLEDB Enterprise, PI ODBC Driver, PI JDBC Driver

PI SQL Family Highlights

PI OLEDB Provider, PI OLEDB Enterprise, PI ODBC Driver, PI JDBC Driver

- Contains internal optimizations such as:
 - Multi-user, multi-threaded
 - Authentication
- Common use cases
 - Reporting
 - SQL-based clients
 - Business System Integration
 - SQL Server Linked Server, Oracle Database Gateway



Things to know about PI SQL Technologies

PI OLEDB Provider, PI OLEDB Enterprise, PI ODBC Driver, PI JDBC Driver

- Convenient way to view your elements as tables (TransposeFunctions)
- There are better queries than others: care is needed.
- Read the user manuals and the whitepapers



PI OPC Servers

PI OPC Servers Highlights

- PI OPC DA Server
- PI OPC HDA Server

- Usage Scenarios
 - Industrial visualization clients
 - OPC Clients



Usage Scenarios

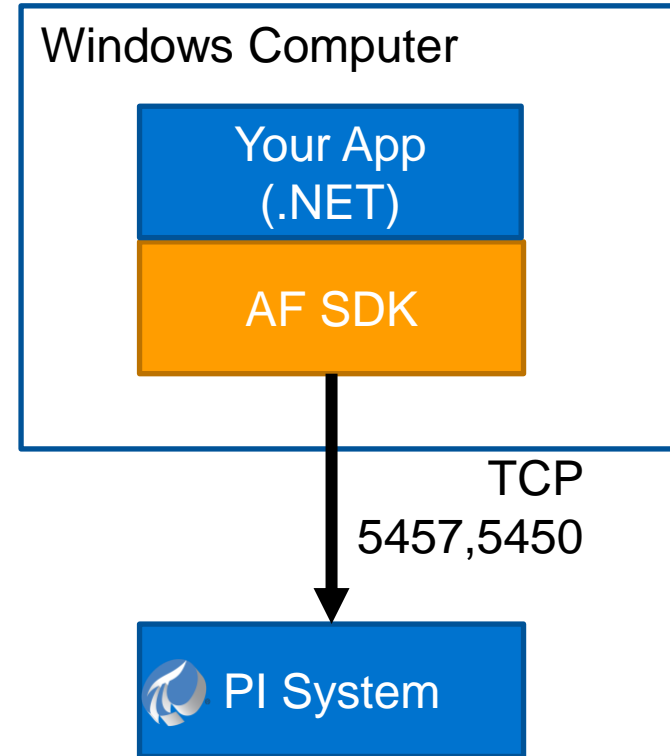
Remarks about scenarios

- Presented diagrams are very high level
- The PI System on the diagrams may represent several server boxes



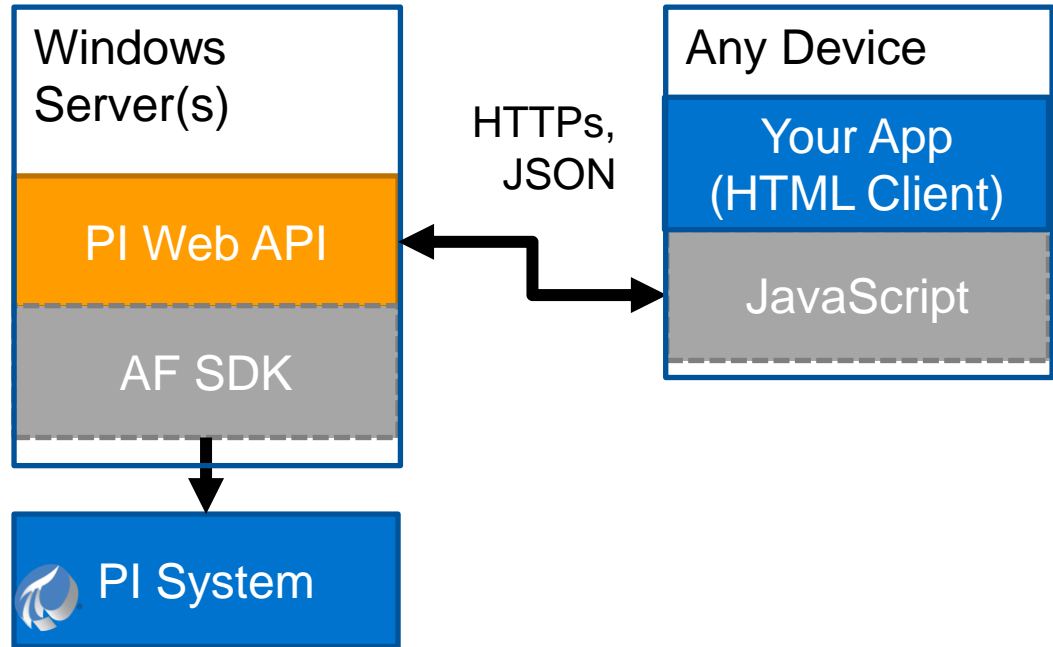
Windows Application (Desktop, Service)

- Requires installation on client
- AF SDK is installed with the AF Client



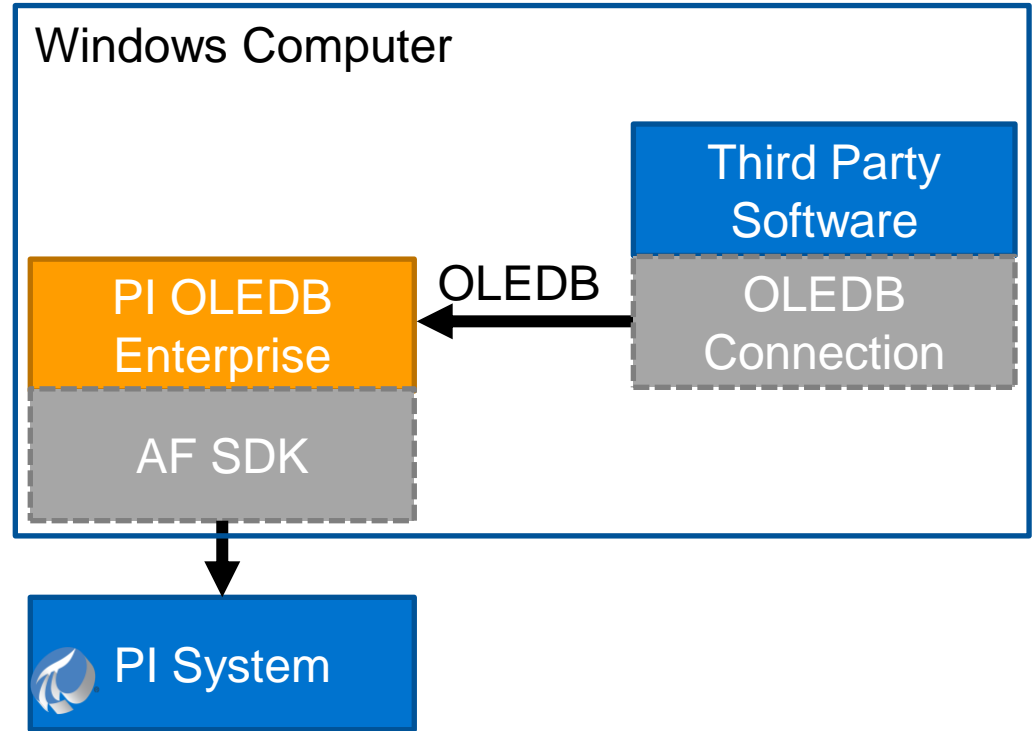
Simple Web Application (Single Page App)

- No installation required on client
- PI Web API is installed with AF Services (2017)
- Works with any operating system: Windows, Linux, Phones, etc.



Third Party Software OLEDB-compatible

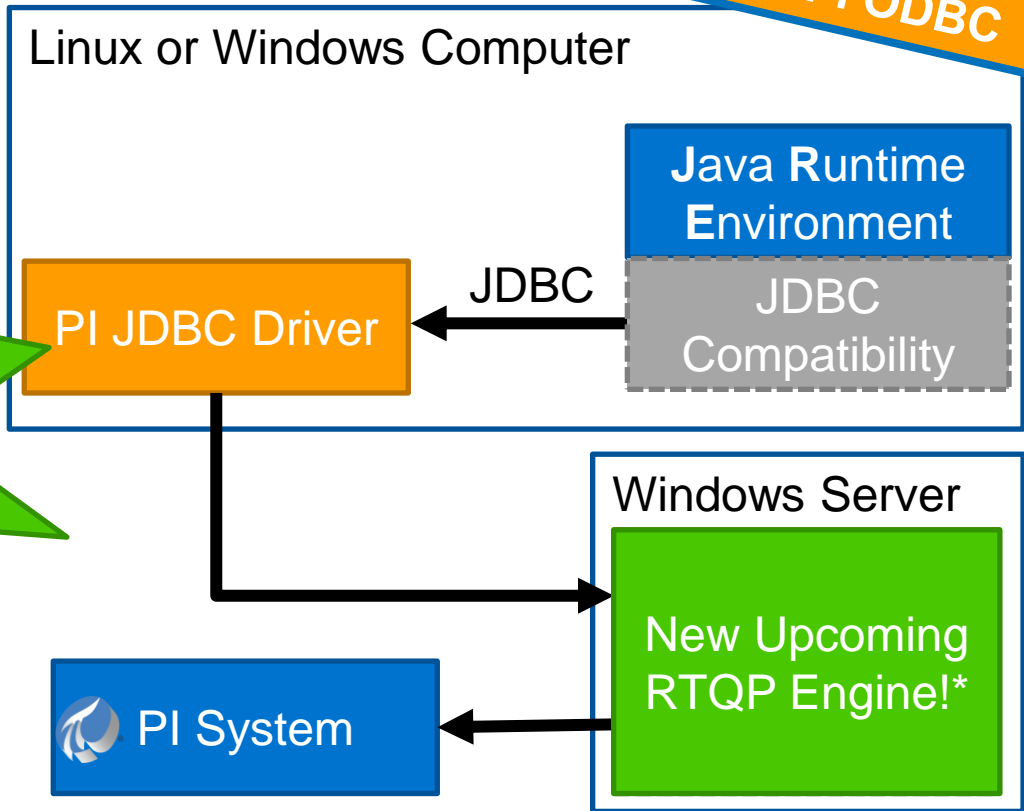
- Requires installation on client
- This scenario applies to SQL Server Linked Server



Third Party Software JDBC-compatible

Same concept for PI ODBC

NEW CTP
Real Time Query Processor Engine



Summary

When to use PI Developer Technologies?

- To solve a unique business problem
- To extend your possibilities with the PI System



Types of applications and possible options to interact with the PI System



Windows
Desktop
App



Tablet,
Phone



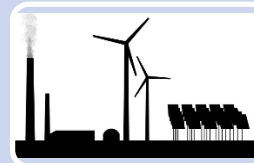
Browser
App



Integration
/Reporting



Linux
/Other
OS



Industrial
Systems,
Process
Control

Examples of Potential Candidates:

AF SDK,
PI Web
API,
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PI Web
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PI Web
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AF SDK,
PI SQL,
PI Web
API

PI Web
API,
PI JDBC

PI OPC
Servers

Summary of Developer Technologies by features

	AF SDK	PI Web API	PI SQL Family
Dependencies	.NET Framework	AF SDK, .NET Framework	AF SDK, .NET Framework
Requires installation on client	X		X*
Supports a multi-user application	Yes, with considerations	Yes	Yes
Supports multithreading	Yes, with considerations	Yes	Yes
Many Operating Systems	Windows Only	Yes	Yes, with JDBC
Available Authentication	Windows Integrated	Multiple	Multiple
Default Data Caching	No	Yes	Yes
Signup for data updates	Yes	Yes	No

* The future RTQP architecture will remove the need of AF SDK on the client.

Summary of Developer Technologies capabilities

Name	Type	PI Data Archive?	PI Asset Framework?	Event Frames?	Example Use
PI AF SDK	.NET SDK	RW	RW	RW	Custom development
PI Web API	REST Services	RW	RW	RW	<ul style="list-style-type: none"> • Custom development, including mobile and non-Windows • REST clients
PI OLEDB Enterprise	Standard OLEDB COM	R	R	R	<ul style="list-style-type: none"> • SQL clients • Microsoft SQL Server Linked Server
PI OLEDB Provider	Standard OLEDB COM	RW	-	-	Same as PI OLEDB Enterprise
PI JDBC	Standard JDBC	RW	RW	RW	Java clients on Windows and Linux
PI ODBC	Standard ODBC	RW	RW	RW	ODBC clients on Windows
PI OPC DA Server PI OPC HDA Server	Standard OPC DA and HDA	RW	-	-	OPC clients on Windows

More details: <https://techsupport.osisoft.com/Troubleshooting/KB/KB01046>

Other Useful Information

Licensing

- OK to use PI Developer Technologies to *build* applications at no charge
- OK to blog about (your) code
- OK to post open-source projects that use PI Developer Technologies
- *Licensing should not affect your technology choice!*

Technical Support



- Talks with us if you have any question
- You can contact support:
 - Via [Phone](#)
 - Via email techsupport@osisoft.com
 - Via [Technical support web site \(web-form\)](#)

Technical Support Web Site

<https://techsupport.osisoft.com/Products/Developer-Technologies/>



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Find

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 - Install kits
 - White Papers
 - User Manuals



PI Server



Visualization



Interfaces and Connectors



Integrators



Developer Technologies



Managed PI



Other Products

Developer Technologies

Developer Technologies are designed to support the development of custom applications on top of the PI System, as well as the integration of PI System data with other applications and business systems such as Microsoft Office or SQL Server, Enterprise Resource Planning systems (ERPs), reporting and analytics platforms, web portals, or geospatial and maintenance systems among other things.

The Developer Technologies cover a wide range of use cases in various environments, programming languages, operating systems and infrastructures. To learn more, get support, and connect with the developers community please refer to [PI Developers Club](#)*

For licensing information on Developer Technologies, please refer to this [product alert](#).

PI SQL Framework

The products in this category expose PI structures and time series data as if the PI System were a relational database. This is particularly useful where the PI System has a role to play in Reporting or Business Intelligence (BI) scenarios, where it must interact with other products or systems that communicate using the Structured Query Language (SQL).

PI OLEDB Enterprise

PI OLEDB Enterprise is an OLE DB data provider you can use to access asset metadata and time series data stored in the PI Asset Framework (AF).

PI Live Library - <https://livelibrary.osisoft.com>

The source for the web documentation of our products

Developer Technologies

PI AF SDK Reference

Programmer reference for PI AF SDK

[View Documentation](#)

PI Web API Reference

Programmer reference for PI Web API

[View Documentation](#)

- [View Less](#)

PI ODBC Driver

Use SQL to access PI System data with an ODBC driver

[View Documentation](#)

PI OPC DA Server

Use OPC DA clients to access PI Data Archive

[View Documentation](#)

PI SDK

Access PI Data Archive through a programming library

[View Documentation](#)

AF SDK Getting Started Guide

Explore AF SDK entry-level concepts and examples

[View Documentation](#)

PI OLEDB Enterprise

Use SQL to access PI System data with an OLEDB provider

[View Documentation](#)

PI JDBC Driver

Use SQL to access PI System data with a JDBC driver

[View Documentation](#)

PI SQL Commander

Develop and test SQL queries for PI System data

[View Documentation](#)

PI Web Services

Connect to the PI System using SOAP services

[View Documentation](#)

PI Web API

Connect to the PI System using REST services

[View Documentation](#)

PI OLEDB Provider

Use SQL to access PI Data Archive with an OLEDB provider

[View Documentation](#)

PI SQL Data Access Server (OLE DB)

Middleware component to support PI ODBC and PI JDBC

[View Documentation](#)

PI SQL Commander Lite

Develop and test SQL queries for PI System data

[View Documentation](#)

PI Square - <https://pisquare.osisoft.com>

OSIsoft Community for PI Users and Developers



[OSIsoft Home](#) • [Worldwide Locations](#) • [Tech Support](#) • [Learning](#)

- PI Developers Club
 - White Papers
 - Blogs
 - Webinars
 - Questions
- Training

CONTENU À LA UNE

- Announcing PI Web API client libraries for .NET Framework and .NET Core dans PI Developers Club
- Join us at UC EMEA Programming Hackathon 2017 - Innovation for better drinking water

Tweets by @PIDevClub

PI Developers Cl...
@PIDevClub

EMEA #OSIsoftUC 2017
#London kicks off a week from

GOT SOMETHING TO ASK PI GEEKS ABOUT?

Ask it

BROWSE, ASK A QUESTION, FOLLOW A TOPIC

C# C++ PHP
Visual Basic .NET
JavaScript JAVA PYTHON
Windows PowerShell SQL

General Programming L...
(341 élément(s))

AF SDK

PI .NET Framework (PI A...
(2220 élément(s))

SQL

PI SQL Data Access Tec...
(491 élément(s))


Membership Status:
Not signed in

QUICK LINKS

- FAQ** Frequently Asked Questions
- Webinar Series
- Programming Documentation
- Virtual Learning Environment
- OSIsoft on GitHub

GitHub - <https://github.com/osisoft>

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San Leandro, CA and Worldwide <http://www.osisoft.com>

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Pinned repositories

- contributing**
How to participate and contribute to OSISOFT Open Source Projects
- PI-Vision-Custom-Symbols**
Learn how to add a custom symbol, created with JavaScript and HTML, to PI Vision 3
JavaScript ★ 27 🍴 37
- PI-Security-Audit-Tools**
A framework to baseline the security configuration of your PI System.
PowerShell ★ 14 🍴 16
- PI-Connector-for-UFL-Samples**
Documentation and supporting files to demonstrate usage of the PI Connector for UFL REST endpoint
Python ★ 11 🍴 10
- PI-AF-SDK-Basic-Samples**
Self-contained and reproducible samples of basic operations using PI AF SDK.
C# ★ 14 🍴 9
- PI-Web-API-White-Paper**
Supporting files for White Paper - Developing with PI Web API
C# ★ 5 🍴 5

Code Samples

- AF SDK
- PI Web API
- OMF
- Connectors
- And More...

Contact Information

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OSIsoft France SARL



Questions

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

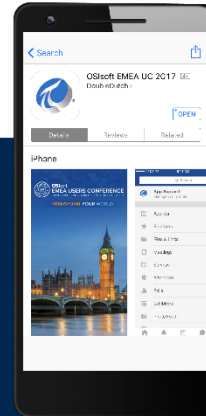


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Danke

谢谢

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado