PI System Resources

San Diego Smart City Hackathon

The PI System is an enterprise data infrastructure for real time process data. In that role, it provides software tools for collecting, storing, analyzing, querying, and visualizing time series data. The PI System is built to collect data from any source, including SCADA, building management, and industrial control systems, as well as web services, intelligent IoT devices, and countless other sources. It also includes many technologies for programmatically accessing that data, including SQL queries, RESTful web services, .NET SDKs, and more. As such, it is perfectly suited to collecting and serving up data from entities and systems in the San Diego Smart City ecosystem. The PI System is thus one of the primary software systems in use for the San Diego Smart City Hackathon.

During the hackathon, a central PI System with a repository of historical and real-time data collected from the City of San Diego will be available to your team. Each team will receive read-only access to that data, to allow that data to be included and referenced in custom applications. In addition, your team will have access to your own private virtual machine which will come preinstalled with all of the PI System components. On this machine you can use PI System tools and technologies to store your own data, perform calculations, and customize an asset model in any way that suits your efforts. To assist with this, the following resources will help you learn about the PI System and help you get the most out of the data access technologies available to you during the hackathon.

Reference Links

Both during and prior to the hackathon, we encourage you to take advantage of the many free online resources available from OSIsoft. The following links are examples of helpful reference material for guiding your work as you delve into the PI System:

OSIsoft YouTube Learning Channel	**https://www.youtube.com/user/OSIsoftLearning**
OSIsoft Live Library (product documentation)	**https://livelibrary.osisoft.com**
OSIsoft PI Square Community	**https://pisquare.osisoft.com/welcome**
OSIsoft Developers Club	**https://pisquare.osisoft.com/community/developers-club**
OSIsoft on GitHub	**https://github.com/osisoft**

Learning About the PI System

We furthermore recommend that you spend some time on the OSIsoft YouTube learning channel to familiarize yourself with the basic components and concepts of the PI System. Below are some especially relevant playlist links to help get you started:

PI System Basics	https://www.youtube.com/playlist?list=PLMcG1Hs2JbcsGGJ84BtG2fClp7SF7K9jU
PI System Installation	https://www.youtube.com/playlist?list=PLMcG1Hs2Jbct0EHchLIiJTegzXSv3XVWF
Performing Data Analysis	https://www.youtube.com/user/OSIsoftLearning/playlists?sort=dd&view=50&shelf_id=10

How to Download your Development PI System

As part of the San Diego Smart City Hackathon, we're providing you with a full suite of PI System software, available with a free subscription to the OSIsoft PI Square community. When you're ready to try installing and using your own PI System, you can install the components on your own computer or a virtual machine and begin learning how to use PI System access technologies. This software is made available to you through the OSIsoft PI Square community.

Membership in the community is free, and within the community you'll find a wealth of information on developing applications using the PI System.

More details on how to sign up, and how to download your own development system, can be found here: https://pisquare.osisoft.com/docs/DOC-1298

When prompted for a Discount Code, you can use code **PIDevClub_SDHack_2016**

PI System Access Technologies

The PI System includes a number of ways to programmatically access data for use in your applications. Below are links to learn more about those specific resources.

PI WebAPI

The PI WebAPI is a RESTful HTTP-based interface to the PI System. Because it can make real-time data available through simple HTTP GET and POST requests, it's inherently platform-independent and thus ideal for developing mobile applications.

PI Square online course on PI WebAPI	https://pisquare.osisoft.com/community/Master-PI/programming-in-pi-web-api
PI WebAPI forum in PI Square	https://pisquare.osisoft.com/community/developers-club/restful-pi-system-access
GitHub code samples for the PI WebAPI	https://github.com/osisoft/PI-Web-API-Samples
Documentation for PI WebAPI	https://techsupport.osisoft.com/Documentation/PI-Web-API/help.html

PI AF SDK

The PI AF SDK is a full-featured native .NET library for accessing and administering the PI System. Because it requires a local, server-side installation of the SDK, it is best suited for Windows Forms/WPF applications that are designed to run on a PI client node (for example, on your team's individual hackathon virtual machine).

PI Square online course on the AF SDK	https://pisquare.osisoft.com/community/Master-PI/developing-applications-with-PI-AF-SDK
Tutorials available on the OSIsoft YouTube channel	https://www.youtube.com/playlist?list=PLUP0yqGI3U-8_PEEkv9JVUHmFFTHyWfwQ
AF SDK forum in PI Square	https://pisquare.osisoft.com/community/developers-club/pi-net-framework-pi-af-sdk
GitHub code samples for the AF SDK	https://github.com/osisoft/PI-AF-SDK-Basic-Samples
Documentation for PI AF SDK	https://techsupport.osisoft.com/Documentation/PI-AF-SDK/html/1a02af4c-1bec-4804-a9ef-3c7300f5e2fc.htm

SQL-Based Data Access (PI OLEDB and PI JDBC Driver)

The PI System provides a number of SQL-compliant access methods, such as through OLEDB and JDBC.

Documentation for PI OLEDB	https://livelibrary.osisoft.com/PIOLEDB
Documentation for PI JDBC	https://livelibrary.osisoft.com/JDBC
SQL access technology forum in PI Square	https://pisquare.osisoft.com/community/developers-club/pi-sql-data-access-technologies

Other Resources

RESTful Data Ingress to the PI System

The PI System provides the means to ingest data into the PI Data Archive through a RESTful endpoint. Your hackathon virtual machine will be equipped with the PI Connector for UFL, which enables this restful ingress method. Any service or device that is internet connected and capable of making a POST or PUT can thus be a data source for the PI System.

PI Square Forum on UFL Connector	https://pisquare.osisoft.com/message/59123#comment-59123
GitHub code samples for UFL	https://github.com/osisoft/PI-Connector-for-UFL-Samples

PI System Client Tools

The PI System also comes with several built-in client tools for visualization, analysis, and reporting. PI Coresight, for example, is a web-based thin client for visualizing PI System data, and an installation of PI Coresight will be available for hackathon teams. PI DataLink is an Excel add-in for querying PI System data within Excel.

YouTube Playlist on PI Coresight	https://www.youtube.com/playlist?list=PL8E513C8ABCC29AF7
YouTube Playlist on PI DataLink	https://www.youtube.com/playlist?list=PLMcG1Hs2Jbcs_qbRKOvGo9T5xWc0oBlF_
PI Square course on creating DataLink reports	https://pisquare.osisoft.com/community/Master-PI/creating-basic-reports-with-PI-DataLink