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USERS CONFERENCE 2016

April 4-8, 2016 | San Francisco

TRANSFORM YOUR WORLD

Advanced Programming with PI AF SDK

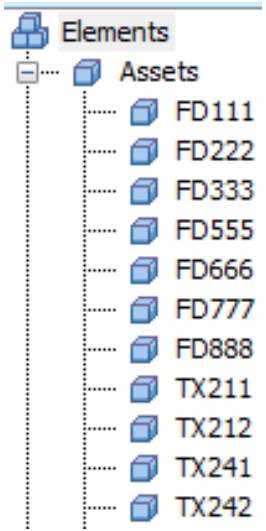
Presented by **Speaker Names**

Hands-On Lab – Plan for Today

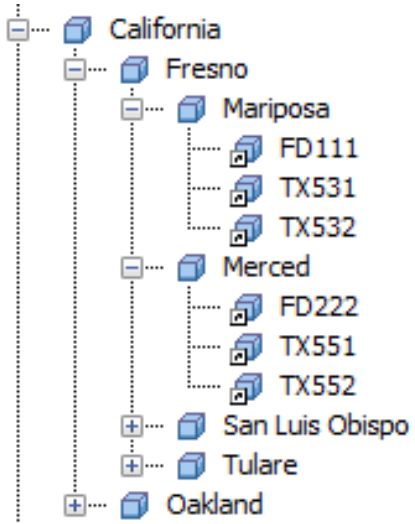
- Overview of exercises
- Work on exercises (~1hr)

Exercises use AF Database: Feeder Voltage Monitoring

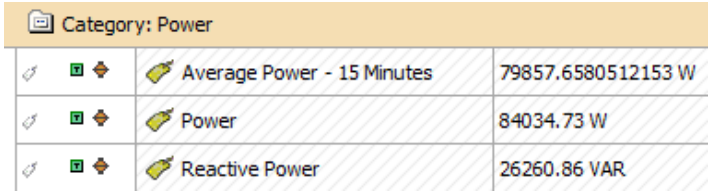
Feeders and Transformers



Organized by Region

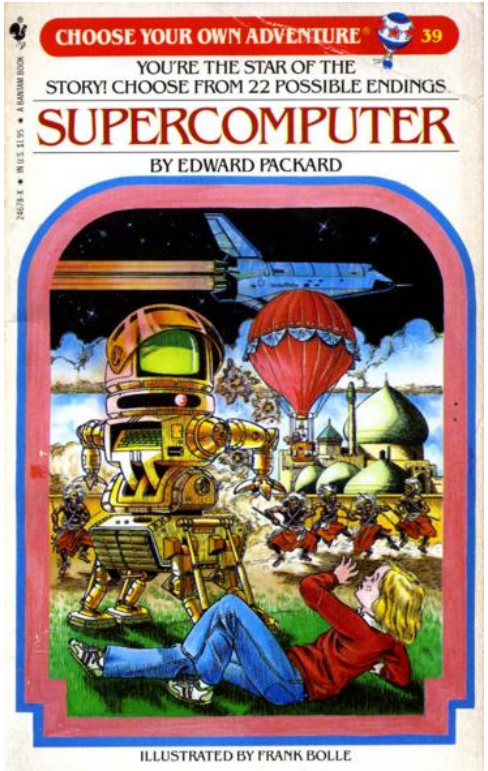


Measuring energy usage



Choose Your Own Adventure

- Five exercises
- Cannot complete them all
- Choose the exercise(s) relevant to your goals and interests



Exercises Overview

Exercise	Difficulty (4 = Easier)
1. Finding and Loading Assets	5
2. Measuring AF Server RPCs	5
3. Using Typed AF Value	4
4. Asynchronous Data Access	6
5. Real-Time Analytics	6

Exercises Format

- Each exercise is a Visual Studio Project
- Each exercise contains an corresponding “solutions” project with suffix “-Sln”

Exercise 1: Finding and Loading Assets

- Challenge:
  - Optimize memory usage of PI AF SDK
  - Partially load a list of `AFElement` objects and keep memory below 260 KB.
- Takeaways
  - Understand the difference between “finding” and “loading” assets

Exercise 2: Measuring AF Server RPCs

- Challenge:
  - Measure the RPC durations of AF Server calls
  - Get the attribute counts for a list of `AFElement` objects and keep the RPC count below 10
- Takeaways
  - Learn how to interpret RPC metrics reported by PI AF SDK and identify bottlenecks

Exercise 3: Using Typed AF Value

- Challenge:
  - Understand how to work with `AFValue` without boxing/unboxing overhead
  - Sort a list of `AFValue` objects by their primitive values using typed `AFValue` methods
- Takeaways
  - Learn how to use `AFValue` objects more efficiently

Exercise 4: Asynchronous Data Access

- Challenge:
  - Use the new asynchronous PI AF SDK calls to retrieve data
- Takeaways
  - Understand the differences between asynchronous and bulk calls
  - Understand when to use asynchronous calls

Exercise 5: Real-Time Analytics

- Challenge:
  - Find the “trending” top N elements using `AFDataPipe`
- Takeaways
  - Understand how to subscribe for real-time events
  - Understand how to use the Observer pattern with `AFDataPipe`

Getting Help during the Lab

- Lab instructors
- PI AF SDK Online Reference
- Search on PI Square
- Local AFSDK.chm, version 2.8
- Look at the answers. It's not an exam. ☺

Near the End of the Lab

- Take the Workbook and Visual Studio exercises for future reference
- The Azure VM is available for 30 days.

Getting Started

Access Lab Development Environment

- Credentials
  - Domain account: PISCHOOL\student01
  - Password: student

Each Machine has a Local PI System

- PI Data Archive 2016
- PI AF 2016
- Visual Studio Enterprise 2015

Open the Exercises Workbook

- Open Workbook
  - Desktop>Advanced Programming with PI AF SDK>
  - Open **Advanced-Programming-with-PI-AF-SDK-Workbook.pdf**
- Follow directions in **Getting Started**

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