Generating API clients with OpenAPI 2.0 (Swagger) specification

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Before we begin …

- This is a Tech Talk – NOT a traditional lab or lecture

- You are welcome to follow along with the demos – this presentation material will be made available to you

- We will have a Q&A session at the end to discuss about the presented content and related topics

Why – guides the what and how.

- Delivering APIs which share common behaviors, patterns and a consistent RESTful interface will greatly ease the work of the people who build them and the consumers who want to use them

https://swagger.io/solutions/api-design/

Agenda

- Interacting with REST endpoints - PI Web API

- OpenAPI 2.0 specification & Swagger.io

- Generating client libraries using OAS 2.0

- Configuring the client libraries to access PI Web API

- Features that can enhance your libraries

- Additional resources to explore & contributing to the community

PI Web API - REST endpoints

✓ The PI Web API is a **RESTful** interface to the PI system. It gives client applications read and write access to their AF and PI data over hypertext (HTTPS).

✓ REST stands for '**re**presentational **s**tate **t**ransfer.' In the context of the PI Web API, this means that the API is
  ✓ Stateless, Resource-oriented, Navigable by links

✓ Enables **cross-platform** development of web, desktop, and mobile applications across **many different programming languages**

DEMO

PI Web API: Interacting with the endpoints

PI Web API demo: Takeaways

✓ Controllers are responsible for responding to requests. Action is a method on a controller that gets called when you enter a particular URI

✓ Most PI Web API methods accept URL query parameters. In general, these specify options or serve as filters on the response

✓ **URIs can get long and complex** with multiple parameters and different controllers

✓ Using a web browser is "an option", many other tools and techniques are available

✓ Programmatic access is preferable for the flexibility it offers but custom solutions may lead to having **unstructured** and **repetitive code**

OpenAPI (Swagger) specification

- ✓ OpenAPI Specification (formerly Swagger Specification) is an **API description format** document for REST APIs
  - ✓ API specifications can be written in YAML or JSON

- ✓ Swagger is a set of **open-source tools** built around the OpenAPI Specification that can help you design, build, document and consume REST APIs
  - ✓ Swagger Editor, Swagger UI, Swagger Codegen

- ✓ Swagger Codegen can be used to generate client libraries in over 40 languages!

- ✓ The OpenAPI Specification was donated to the Linux Foundation under the OpenAPI Initiative in 2015

https://swagger.io/docs/specification/about/

DEMO

Swagger.io

OpenAPI (Swagger) demo: Takeaways

✓ The OpenAPI Specification (OAS) defines a standard, language-agnostic interface to RESTful APIs to discover and understand the capabilities of a REST service
  ✓ The complete OpenAPI Specification can be found on GitHub

✓ PI Web API specification is already made available to you in JSON format. The spec format is easy to learn and readable

✓ https://generator.swagger.io/ - online codegen tool provided by Swagger

https://swagger.io/resources/articles/documenting-apis-with-swagger/
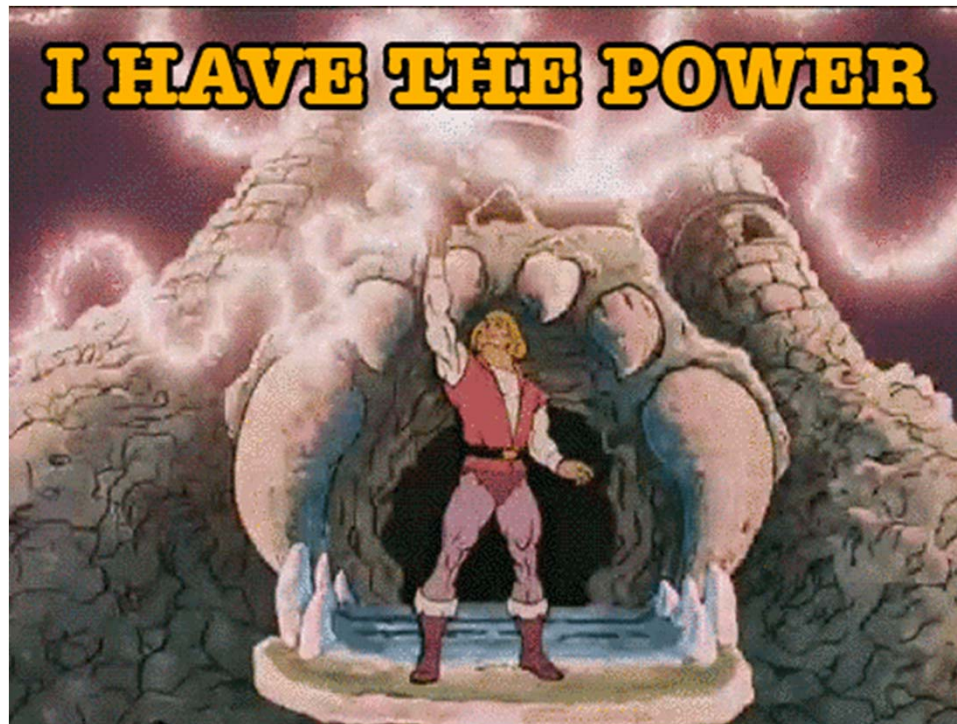
DEMO

Custom library generation

Client Generation demo:
generate, configure and extend

- ✓ Clients can be generated in multiple languages, each requiring language specific customizations (ReadMe!)

- ✓ When properly defined, a consumer can understand and interact with the remote service with a minimal amount of implementation logic.

- ✓ Build your own functions on top of your library that suits your business needs

- ✓ Use a friendly IDE – with good IntelliSense

Extending the features

✓ selectedFields parameter – reduce work on the client, filter on the server

✓ Web Id 2.0: WebID type gives you options for reducing WebID sizes (for URL length limitations) and for identifying ambiguous paths/names.
   ✓ Can be generated from the client side

✓ Pay attention to Authentication from the client

✓ Getting data real time: Implement Channels or StreamUpdates controllers

✓ Extending the library for data science (R library, Python pandas dataframes)

Additional Resources

- Using Web ID 2.0 to Optimize your Applications

- Feedback or enhancements to PI Web API - Swagger spec

- Share with PI Developers Club community

- Contributing to OSIsoft Open Source Projects

- Getting Started With PI Web API using Postman
  - (Day 3: Developer Lab, Parc 55: Hearst, Level 4)

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Questions?

Please wait for the **microphone**

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name & company

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