VIVO-PROXY PROOF-OF-CONCEPT A Swagger/OpenAPI tool for VIVO Data-Ingestion process

Presentation · January 2021

DOI: 10.13140/RG.2.2.24103.06569

1 author:

Michel Héon
Université du Québec à Montréal
49 PUBLICATIONS **157** CITATIONS
SEE PROFILE

VIVO-PROXY Proof-Of-Concept

June 25, 2021

12th Annual VIVO Conference 2021

A Swagger/OpenAPI tool for VIVO Data-Ingestion process

Michel Héon
Enterprise Architect Advisor
Université du Québec à Montréal
heon.michel@uqam.ca

Toward VIVO-PROXY: A Web REST Mediation Service to Standardize Interoperate and Secure Sccess to VIVO's Data

The common way of accessing the data contained in VIVO is the SPARQL endpoint service. Although this service is a W3C recommendation for data exchange on the web, it has some drawbacks when it comes to using this service for processing (adding/modifying/deleting) data in VIVO. The difficulty lies in understanding the structure of the graph used to describe an entity in VIVO. Thus, each institution that wishes to automate the updating process of the VIVO data is faced with the task of retro-engineering the graph structure of the data and building SPARQL queries that allow the updating of these data. This is a repetitive work that can be standardized and replicated to make a reusable and interoperable solution.

With this in mind, we present the VIVO-PROXY proof-of-concept, a web-based REST API service that is interoperable and mediates data exchange with VIVO. VIVO-PROXY meets the OpenAPI standard and is designed with the Swagger API development environment. During the presentation, a demonstration scenario of adding data to VIVO with VIVO-PROXY will be presented. The remainder of the presentation will be devoted to the presentation of the VIVO-PROXY architecture as well as the model-driven methodological elements underlying the design of VIVO-PROXY.

Why This Talk?

- As evidenced by the multiple presentations at the conference, automated data addition in VIVO is a complex process that requires heavy data conversion efforts
- In order to make the process of automated data addition in VIVO accessible, we have started a reflection in order to create a solution allowing to better integrate VIVO in an enterprise architecture.
- This reflection led us to create a proof of concept that we named VIVO-PROXY and that we will present to you

Agenda

- VIVO-PROXY: Example Of Use
- What is a Proxy Design Pattern?
- VIVO-Proxy architecture
- Introduction to Swagger and OpenAPI
- Swagger component and its model-driven development process
- A few words about the communication between VIVO-PROXY and VIVO

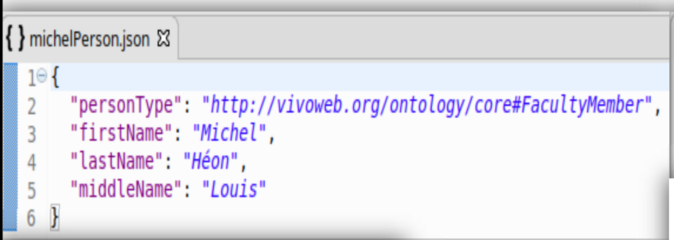
VIVO-Proxy: Example Of Use Scenario Description

The data ingestion scenario in VIVO is condensed into three steps

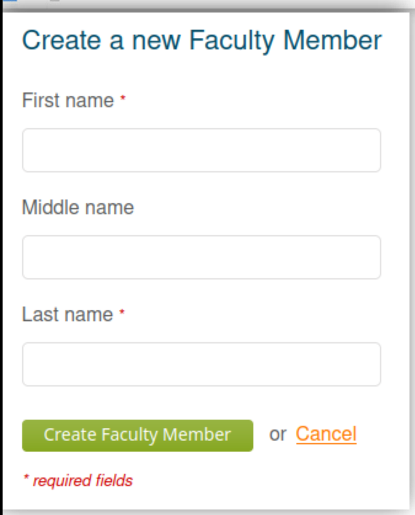
1. Creating a FacultyMember in VIVO
2. Creating a University in VIVO
3. Adding a position to a person in an organization

The addition of these data will be done from three commands and will use a simple JSON type data model well known by computer scientists

Data Model


{ } michelPerson.json

```
{
  "personType": "http://vivoweb.org/ontology/core#FacultyMember",
  "firstName": "Michel",
  "lastName": "Héon",
  "middleName": "Louis"
}
```


Create a new Faculty Member

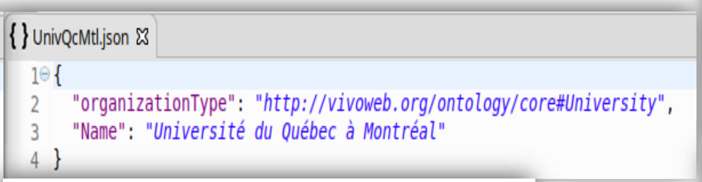
First name *

Middle name

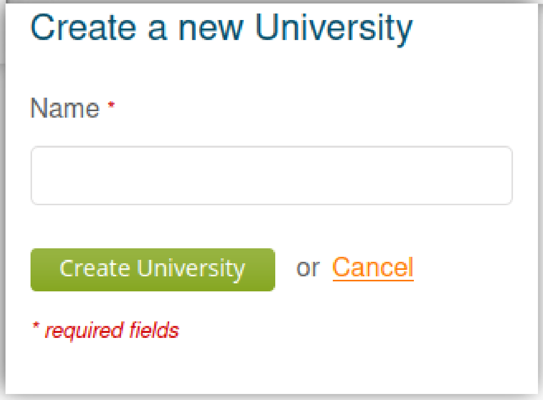
Last name *

Create Faculty Member or Cancel

* required fields


{ } UnivQcMtl.json

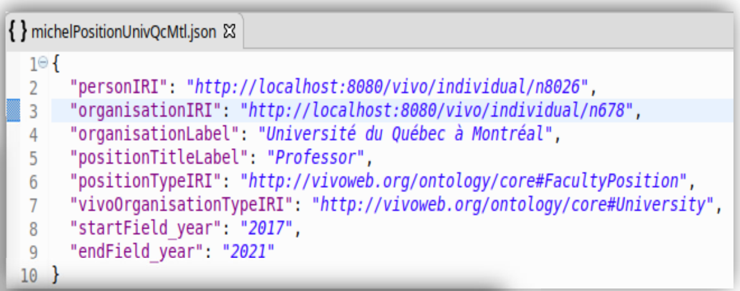
```
{
  "organizationType": "http://vivoweb.org/ontology/core#University",
  "Name": "Université du Québec à Montréal"
}
```


Create a new University

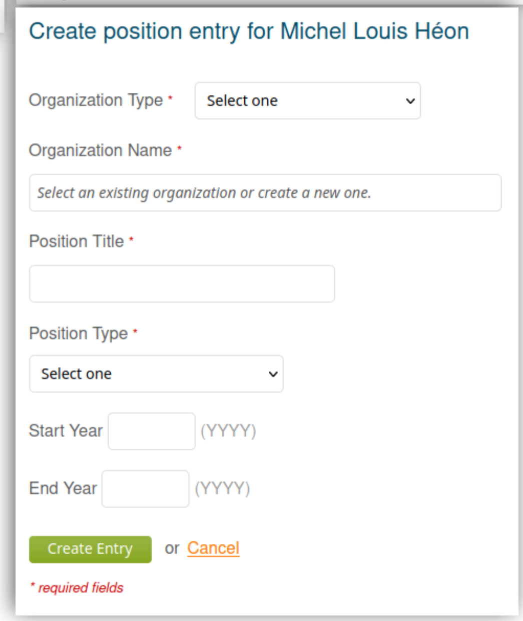
Name *

Create University or Cancel

* required fields


{ } michelPositionUnivQcMtl.json

```
{
  "personIRI": "http://localhost:8080/vivo/individual/n8026",
  "organisationIRI": "http://localhost:8080/vivo/individual/n678",
  "organisationLabel": "Université du Québec à Montréal",
  "positionTitleLabel": "Professor",
  "positionTypeIRI": "http://vivoweb.org/ontology/core#FacultyPosition",
  "vivoOrganisationTypeIRI": "http://vivoweb.org/ontology/core#University",
  "startField_year": "2017",
  "endField_year": "2021"
}
```


Create position entry for Michel Louis Héon

Organization Type * Select one

Organization Name *

Select an existing organization or create a new one.

Position Title *

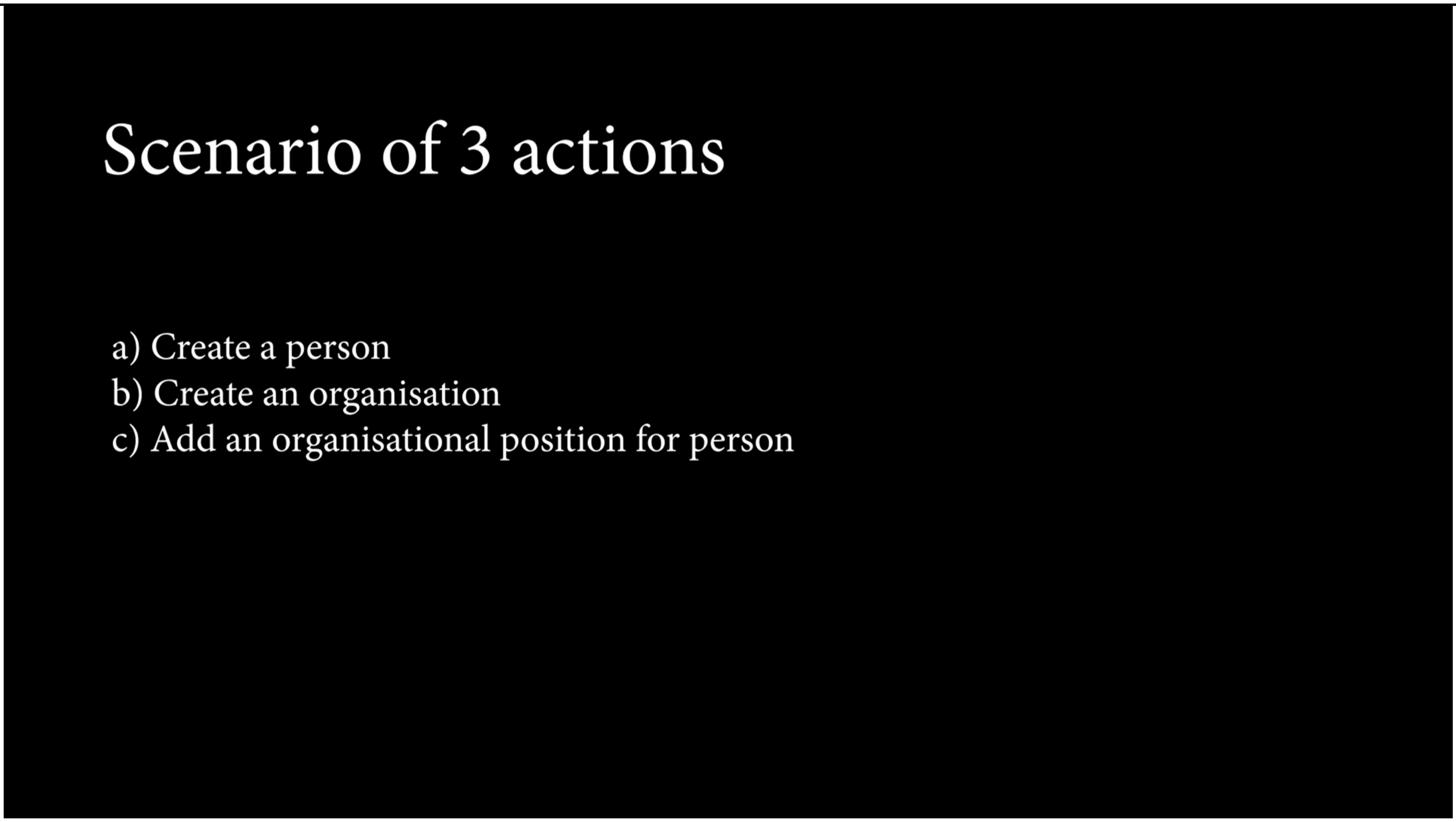
Position Type * Select one

Start Year (YYYY)

End Year (YYYY)

Create Entry or Cancel

* required fields



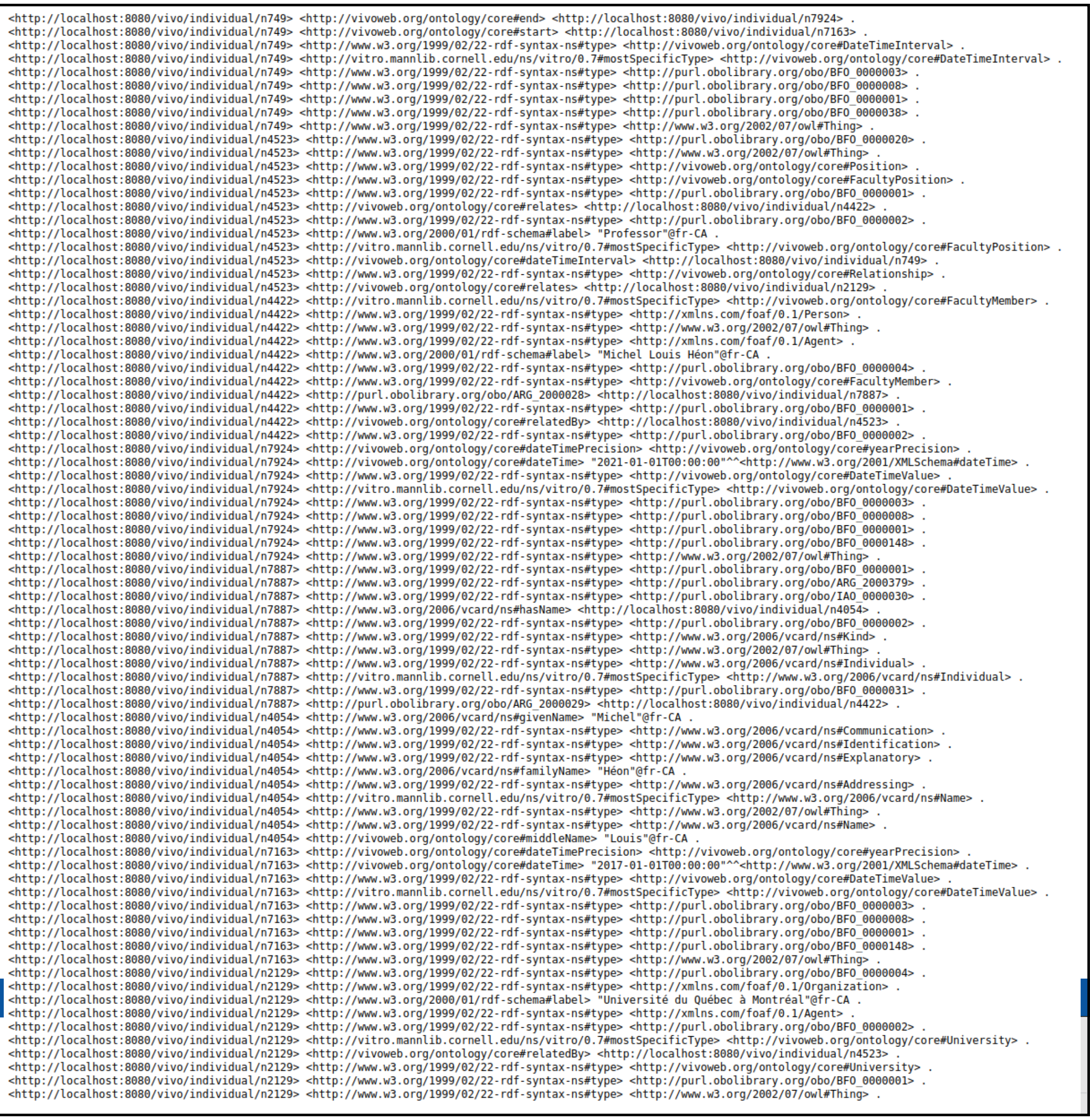
Scenario of 3 actions

a) Create a person
b) Create an organisation
c) Add an organisational position for person

https://youtu.be/alOBBHnIx14

Case 3 – Generated Statements and to be Reproduced to Build a SPARQL Update

- The three commands generate
  - 83 statements
  - 8 new ID's



```
<http://localhost:8080/vivo/individual/n749> <http://vivoweb.org/ontology/core#end> <http://localhost:8080/vivo/individual/n7924> .
<http://localhost:8080/vivo/individual/n749> <http://vivoweb.org/ontology/core#start> <http://localhost:8080/vivo/individual/n7163> .
<http://localhost:8080/vivo/individual/n749> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://vivoweb.org/ontology/core#DateTimeInterval> .
<http://localhost:8080/vivo/individual/n749> <http://vitro.mannlib.cornell.edu/ns/vitro/0.7#mostSpecificType> <http://vivoweb.org/ontology/core#DateTimeInterval> .
<http://localhost:8080/vivo/individual/n749> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000003> .
<http://localhost:8080/vivo/individual/n749> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000008> .
<http://localhost:8080/vivo/individual/n749> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000001> .
<http://localhost:8080/vivo/individual/n749> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000038> .
<http://localhost:8080/vivo/individual/n749> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2002/07/owl#Thing> .
<http://localhost:8080/vivo/individual/n4523> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000020> .
<http://localhost:8080/vivo/individual/n4523> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2002/07/owl#Thing> .
<http://localhost:8080/vivo/individual/n4523> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://vivoweb.org/ontology/core#Position> .
<http://localhost:8080/vivo/individual/n4523> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://vivoweb.org/ontology/core#FacultyPosition> .
<http://localhost:8080/vivo/individual/n4523> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000001> .
<http://localhost:8080/vivo/individual/n4523> <http://vivoweb.org/ontology/core#relates> <http://localhost:8080/vivo/individual/n4422> .
<http://localhost:8080/vivo/individual/n4523> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000002> .
<http://localhost:8080/vivo/individual/n4523> <http://www.w3.org/2000/01/rdf-schema#label> "Professor"@fr-CA .
<http://localhost:8080/vivo/individual/n4523> <http://vitro.mannlib.cornell.edu/ns/vitro/0.7#mostSpecificType> <http://vivoweb.org/ontology/core#FacultyPosition> .
<http://localhost:8080/vivo/individual/n4523> <http://vivoweb.org/ontology/core#dateTimeInterval> <http://localhost:8080/vivo/individual/n749> .
<http://localhost:8080/vivo/individual/n4523> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://vivoweb.org/ontology/core#Relationship> .
<http://localhost:8080/vivo/individual/n4523> <http://vivoweb.org/ontology/core#relates> <http://localhost:8080/vivo/individual/n2129> .
<http://localhost:8080/vivo/individual/n4422> <http://vitro.mannlib.cornell.edu/ns/vitro/0.7#mostSpecificType> <http://vivoweb.org/ontology/core#FacultyMember> .
<http://localhost:8080/vivo/individual/n4422> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://xmlns.com/foaf/0.1/Person> .
<http://localhost:8080/vivo/individual/n4422> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2002/07/owl#Thing> .
<http://localhost:8080/vivo/individual/n4422> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://xmlns.com/foaf/0.1/Agent> .
<http://localhost:8080/vivo/individual/n4422> <http://www.w3.org/2000/01/rdf-schema#label> "Michel Louis Héon"@fr-CA .
<http://localhost:8080/vivo/individual/n4422> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000004> .
<http://localhost:8080/vivo/individual/n4422> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://vivoweb.org/ontology/core#FacultyMember> .
<http://localhost:8080/vivo/individual/n4422> <http://purl.obolibrary.org/obo/ARG_2000028> <http://localhost:8080/vivo/individual/n7887> .
<http://localhost:8080/vivo/individual/n4422> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000001> .
<http://localhost:8080/vivo/individual/n4422> <http://vivoweb.org/ontology/core#relatedBy> <http://localhost:8080/vivo/individual/n4523> .
<http://localhost:8080/vivo/individual/n4422> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000002> .
<http://localhost:8080/vivo/individual/n7924> <http://vivoweb.org/ontology/core#dateTimePrecision> <http://vivoweb.org/ontology/core#yearPrecision> .
<http://localhost:8080/vivo/individual/n7924> <http://vivoweb.org/ontology/core#dateTime> "2021-01-01T00:00:00"^^<http://www.w3.org/2001/XMLSchema#dateTime> .
<http://localhost:8080/vivo/individual/n7924> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://vivoweb.org/ontology/core#DateTimeValue> .
<http://localhost:8080/vivo/individual/n7924> <http://vitro.mannlib.cornell.edu/ns/vitro/0.7#mostSpecificType> <http://vivoweb.org/ontology/core#DateTimeValue> .
<http://localhost:8080/vivo/individual/n7924> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000003> .
<http://localhost:8080/vivo/individual/n7924> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000008> .
<http://localhost:8080/vivo/individual/n7924> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000001> .
<http://localhost:8080/vivo/individual/n7924> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000148> .
<http://localhost:8080/vivo/individual/n7924> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2002/07/owl#Thing> .
<http://localhost:8080/vivo/individual/n7887> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000001> .
<http://localhost:8080/vivo/individual/n7887> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/ARG_2000379> .
<http://localhost:8080/vivo/individual/n7887> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/IAO_0000030> .
<http://localhost:8080/vivo/individual/n7887> <http://www.w3.org/2006/vcard/ns#hasName> <http://localhost:8080/vivo/individual/n4054> .
<http://localhost:8080/vivo/individual/n7887> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000002> .
<http://localhost:8080/vivo/individual/n7887> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2006/vcard/ns#Kind> .
<http://localhost:8080/vivo/individual/n7887> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2002/07/owl#Thing> .
<http://localhost:8080/vivo/individual/n7887> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2006/vcard/ns#Individual> .
<http://localhost:8080/vivo/individual/n7887> <http://vitro.mannlib.cornell.edu/ns/vitro/0.7#mostSpecificType> <http://www.w3.org/2006/vcard/ns#Individual> .
<http://localhost:8080/vivo/individual/n7887> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000031> .
<http://localhost:8080/vivo/individual/n7887> <http://purl.obolibrary.org/obo/ARG_2000029> <http://localhost:8080/vivo/individual/n4422> .
<http://localhost:8080/vivo/individual/n4054> <http://www.w3.org/2006/vcard/ns#givenName> "Michel"@fr-CA .
<http://localhost:8080/vivo/individual/n4054> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2006/vcard/ns#Communication> .
<http://localhost:8080/vivo/individual/n4054> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2006/vcard/ns#Identification> .
<http://localhost:8080/vivo/individual/n4054> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2006/vcard/ns#Explanatory> .
<http://localhost:8080/vivo/individual/n4054> <http://www.w3.org/2006/vcard/ns#familyName> "Héon"@fr-CA .
<http://localhost:8080/vivo/individual/n4054> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2006/vcard/ns#Addressing> .
<http://localhost:8080/vivo/individual/n4054> <http://vitro.mannlib.cornell.edu/ns/vitro/0.7#mostSpecificType> <http://www.w3.org/2006/vcard/ns#Name> .
<http://localhost:8080/vivo/individual/n4054> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2002/07/owl#Thing> .
<http://localhost:8080/vivo/individual/n4054> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2006/vcard/ns#Name> .
<http://localhost:8080/vivo/individual/n4054> <http://vivoweb.org/ontology/core#middleName> "Louis"@fr-CA .
<http://localhost:8080/vivo/individual/n7163> <http://vivoweb.org/ontology/core#dateTimePrecision> <http://vivoweb.org/ontology/core#yearPrecision> .
<http://localhost:8080/vivo/individual/n7163> <http://vivoweb.org/ontology/core#dateTime> "2017-01-01T00:00:00"^^<http://www.w3.org/2001/XMLSchema#dateTime> .
<http://localhost:8080/vivo/individual/n7163> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://vivoweb.org/ontology/core#DateTimeValue> .
<http://localhost:8080/vivo/individual/n7163> <http://vitro.mannlib.cornell.edu/ns/vitro/0.7#mostSpecificType> <http://vivoweb.org/ontology/core#DateTimeValue> .
<http://localhost:8080/vivo/individual/n7163> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000003> .
<http://localhost:8080/vivo/individual/n7163> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000008> .
<http://localhost:8080/vivo/individual/n7163> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000001> .
<http://localhost:8080/vivo/individual/n7163> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000148> .
<http://localhost:8080/vivo/individual/n7163> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2002/07/owl#Thing> .
<http://localhost:8080/vivo/individual/n2129> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000004> .
<http://localhost:8080/vivo/individual/n2129> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://xmlns.com/foaf/0.1/Organization> .
<http://localhost:8080/vivo/individual/n2129> <http://www.w3.org/2000/01/rdf-schema#label> "Université du Québec à Montréal"@fr-CA .
<http://localhost:8080/vivo/individual/n2129> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://xmlns.com/foaf/0.1/Agent> .
<http://localhost:8080/vivo/individual/n2129> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000002> .
<http://localhost:8080/vivo/individual/n2129> <http://vitro.mannlib.cornell.edu/ns/vitro/0.7#mostSpecificType> <http://vivoweb.org/ontology/core#University> .
<http://localhost:8080/vivo/individual/n2129> <http://vivoweb.org/ontology/core#relatedBy> <http://localhost:8080/vivo/individual/n4523> .
<http://localhost:8080/vivo/individual/n2129> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://vivoweb.org/ontology/core#University> .
<http://localhost:8080/vivo/individual/n2129> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://purl.obolibrary.org/obo/BFO_0000001> .
<http://localhost:8080/vivo/individual/n2129> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/2002/07/owl#Thing> .
```

VIVO-PROXY

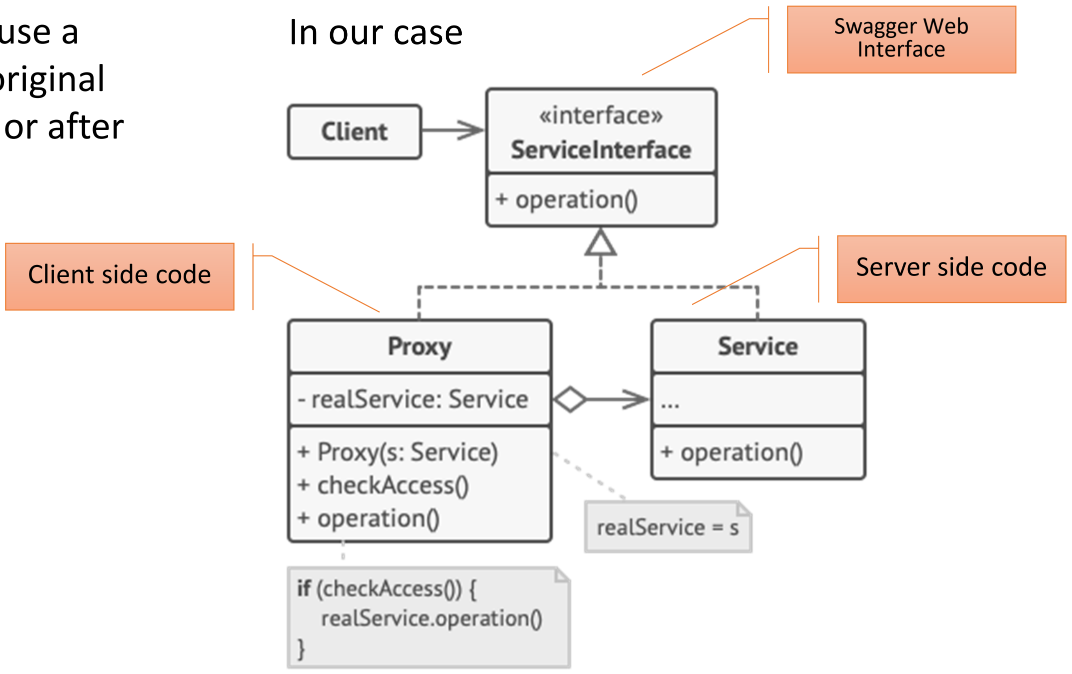
UNDER THE HOOD

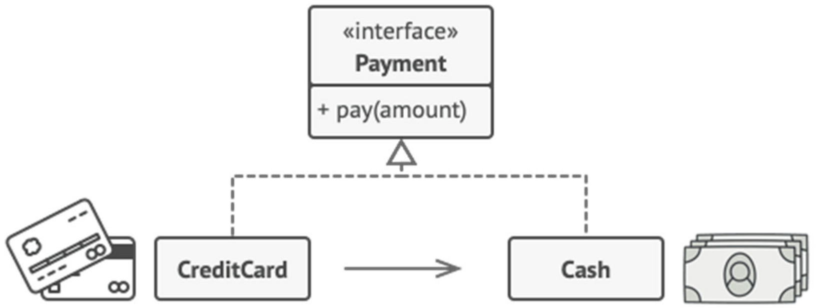
(A BRIEF OVERVIEW)

What is a Proxy Design Pattern?

Proxy is a structural design pattern that allows you to use a substitute for an object. It gives you control over the original object, allowing you to perform manipulations before or after the request reaches it.

In our case





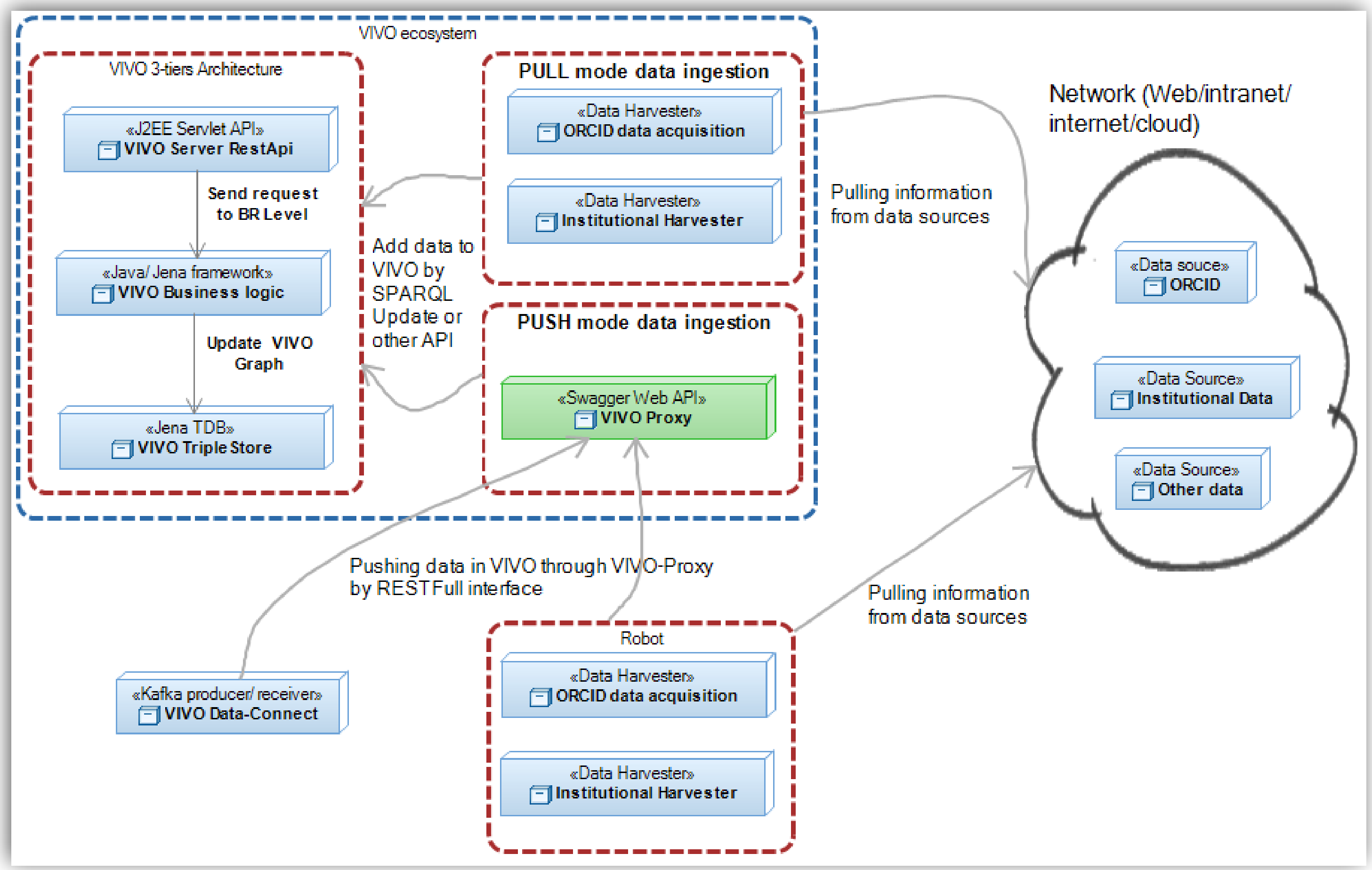
A credit card can be used in the same way as cash.

Ref: https://refactoring.guru/fr/design-patterns/proxy

VIVO-Proxy Architecture

Data ingestion mode

- **PULL**
  - The data serialization work towards VIVO must be redone for each harvester
  - No standardization of the data adding process in VIVO
  - Simplified architecture easy to segment
- **PUSH**
  - **Access** to VIVO's functionalities is now **standardized** and self-documented
  - Facilitates **security** management
  - Allows the deployment of a **heterogeneous** acquisition **architecture** (Harvesting/Messaging (Kafka))
  - **Standardize** the way data is added to VIVO by **RESTFull** interface
  - Can be **operated** by **a NON-expert** in **semantic-web** technologies
  - Client&Serveur – **agnostic codes** and web technologies (e.g. Spring, J2EE, etc.)


VIVO ecosystem
VIVO 3-tiers Architecture
«J2EE Servlet API» VIVO Server RestApi
Send request to BR Level
«Java/ Jena framework» VIVO Business logic
Update VIVO Graph
«Jena TDB» VIVO Triple Store
Add data to VIVO by SPARQL Update or other API
PULL mode data ingestion
«Data Harvester» ORCID data acquisition
«Data Harvester» Institutional Harvester
PUSH mode data ingestion
«Swagger Web API» VIVO Proxy
Pulling information from data sources
Network (Web/intranet/ internet/cloud)
«Data souce» ORCID
«Data Source» Institutional Data
«Data Source» Other data
Pushing data in VIVO through VIVO-Proxy by RESTFull interface
Pulling information from data sources
«Kafka producer/ receiver» VIVO Data-Connect
Robot
«Data Harvester» ORCID data acquisition
«Data Harvester» Institutional Harvester

Let's Start with Clarifying Swagger vs OpenAPI

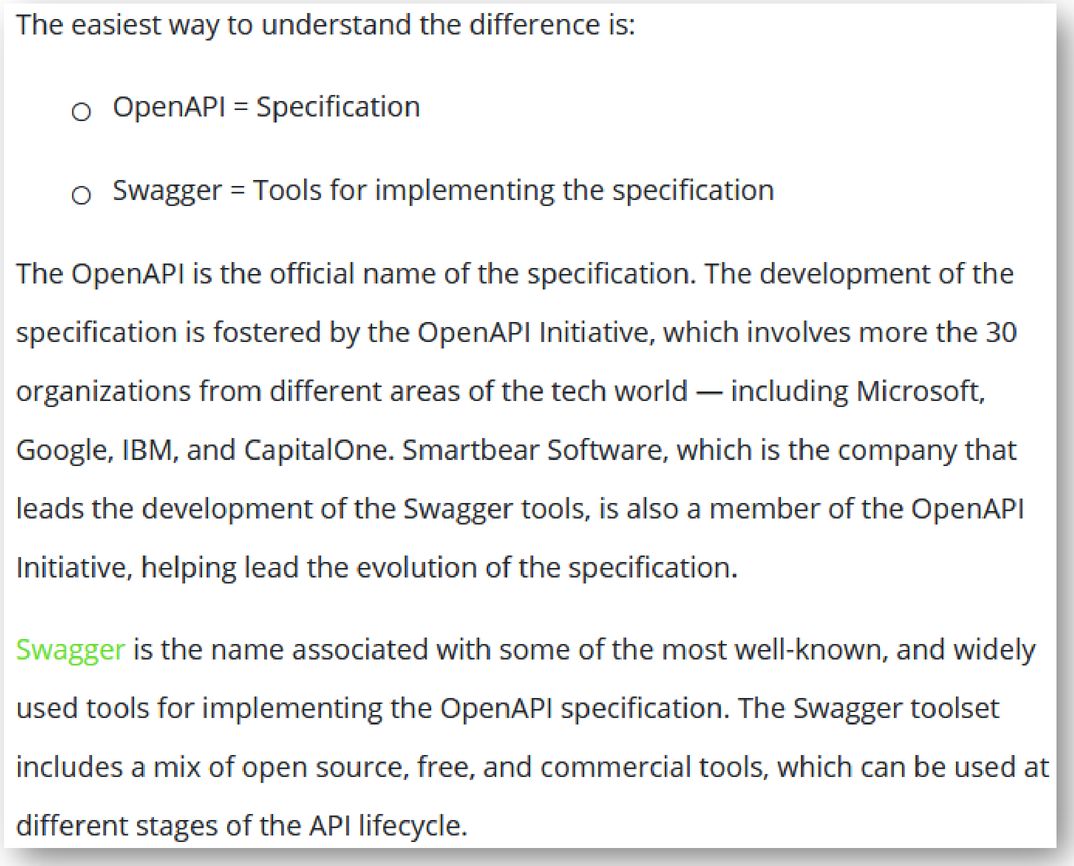
The OpenAPI Specification

validate-markdown passing code helpers 11

The OpenAPI Specification (OAS) defines a standard, **programming language-agnostic** interface description for HTTP APIs, which allows **both humans and computers** to discover and understand the capabilities of a service without requiring access to source code, additional documentation, or inspection of network traffic.

Swagger™

Supported by SMARTBEAR



The easiest way to understand the difference is:

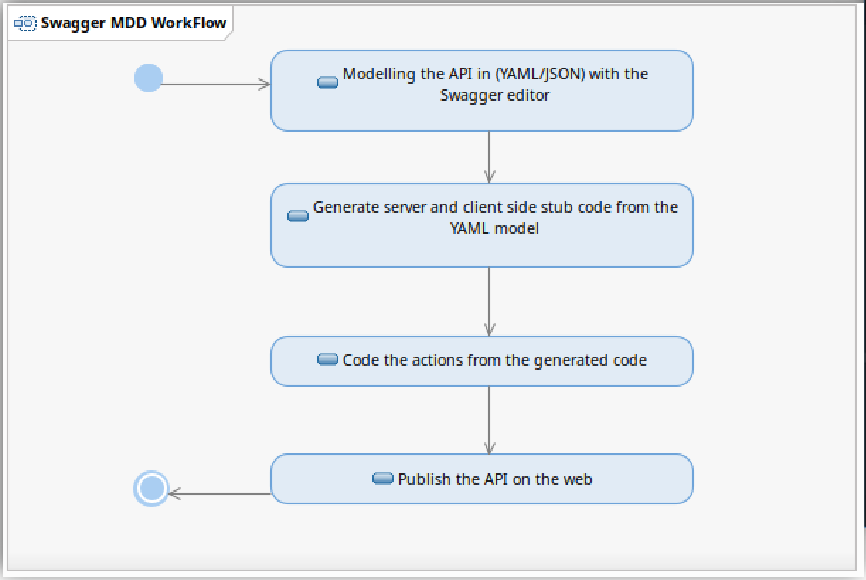
- OpenAPI = Specification
- Swagger = Tools for implementing the specification

The OpenAPI is the official name of the specification. The development of the specification is fostered by the OpenAPI Initiative, which involves more the 30 organizations from different areas of the tech world — including Microsoft, Google, IBM, and CapitalOne. Smartbear Software, which is the company that leads the development of the Swagger tools, is also a member of the OpenAPI Initiative, helping lead the evolution of the specification.

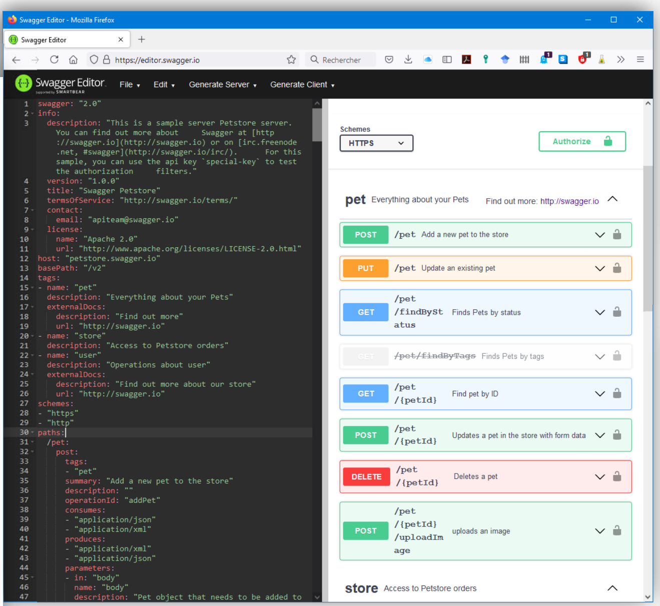
Swagger is the name associated with some of the most well-known, and widely used tools for implementing the OpenAPI specification. The Swagger toolset includes a mix of open source, free, and commercial tools, which can be used at different stages of the API lifecycle.

https://swagger.io/blog/api-strategy/difference-between-swagger-and-openapi/

Swagger Component and its Model-Driven Development (MDD) Process

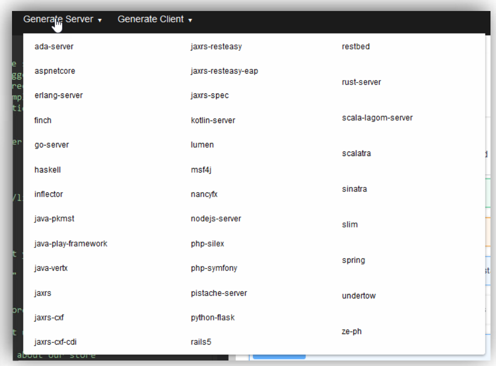

Swagger MDD WorkFlow
Modelling the API in (YAML/JSON) with the Swagger editor
Generate server and client side stub code from the YAML model
Code the actions from the generated code
Publish the API on the web

MDD Process

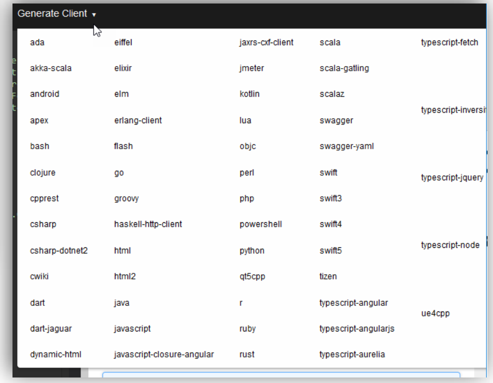

Swagger Editor - Mozilla Firefox
Swagger Editor
https://editor.swagger.io
Rechercher
Swagger Editor
File
Edit
Generate Server
Generate Client
Schemes
HTTPS
Authorize
pet Everything about your Pets
Find out more: http://swagger.io
POST /pet Add a new pet to the store
PUT /pet Update an existing pet
GET /pet/findByStatus Finds Pets by status
GET ~~/pet/findByTags~~ Finds Pets by tags
GET /pet/{petId} Find pet by ID
POST /pet/{petId} Updates a pet in the store with form data
DELETE /pet/{petId} Deletes a pet
POST /pet/{petId}/uploadImage uploads an image
store Access to Petstore orders

```
swagger: "2.0"
info:
  description: "This is a sample server Petstore server.
    You can find out more about     Swagger at [http
    ://swagger.io](http://swagger.io) or on [irc.freenode
    .net, #swagger](http://swagger.io/irc/).      For this
    sample, you can use the api key `special-key` to test
    the authorization     filters."
  version: "1.0.0"
  title: "Swagger Petstore"
  termsOfService: "http://swagger.io/terms/"
  contact:
    email: "apiteam@swagger.io"
  license:
    name: "Apache 2.0"
    url: "http://www.apache.org/licenses/LICENSE-2.0.html"
host: "petstore.swagger.io"
basePath: "/v2"
tags:
- name: "pet"
  description: "Everything about your Pets"
  externalDocs:
    description: "Find out more"
    url: "http://swagger.io"
- name: "store"
  description: "Access to Petstore orders"
- name: "user"
  description: "Operations about user"
  externalDocs:
    description: "Find out more about our store"
    url: "http://swagger.io"
schemes:
- "https"
- "http"
paths:
  /pet:
    post:
      tags:
      - "pet"
      summary: "Add a new pet to the store"
      description: ""
      operationId: "addPet"
      consumes:
      - "application/json"
      - "application/xml"
      produces:
      - "application/xml"
      - "application/json"
      parameters:
      - in: "body"
        name: "body"
        description: "Pet object that needs to be added to
```

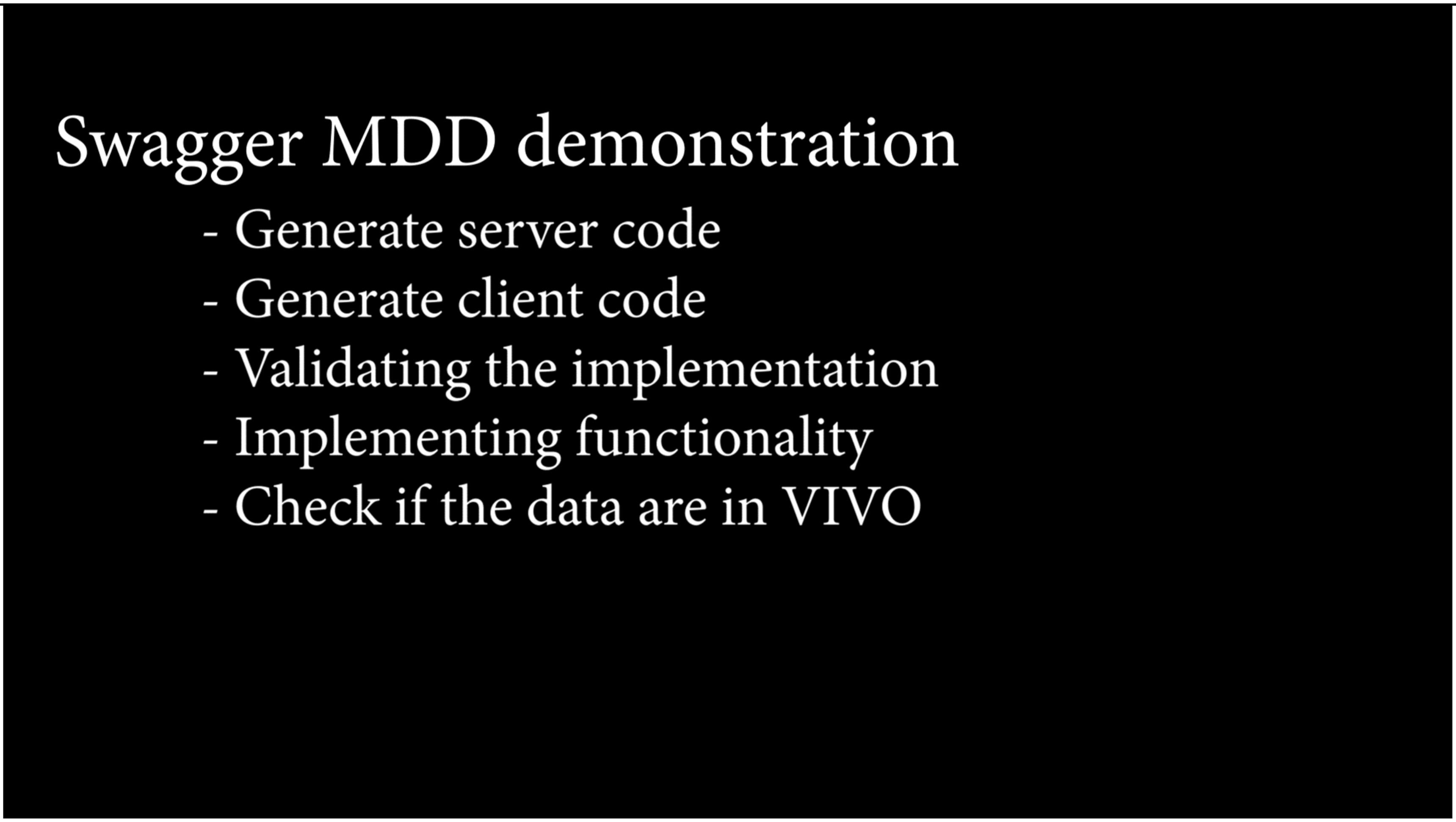
Swagger Editor



Swagger server-side agnostic code generator



Swagger client-side agnostic code generator



Swagger MDD demonstration

- Generate server code
- Generate client code
- Validating the implementation
- Implementing functionality
- Check if the data are in VIVO

https://youtu.be/jyz0WQuj9UU

A Few Words About the Communication Between VIVO-PROXY and VIVO

VIVO-PROXY uses two channels to communicate with VIVO:

- SPARQL endpoint
- HTTP/HTML endpoint

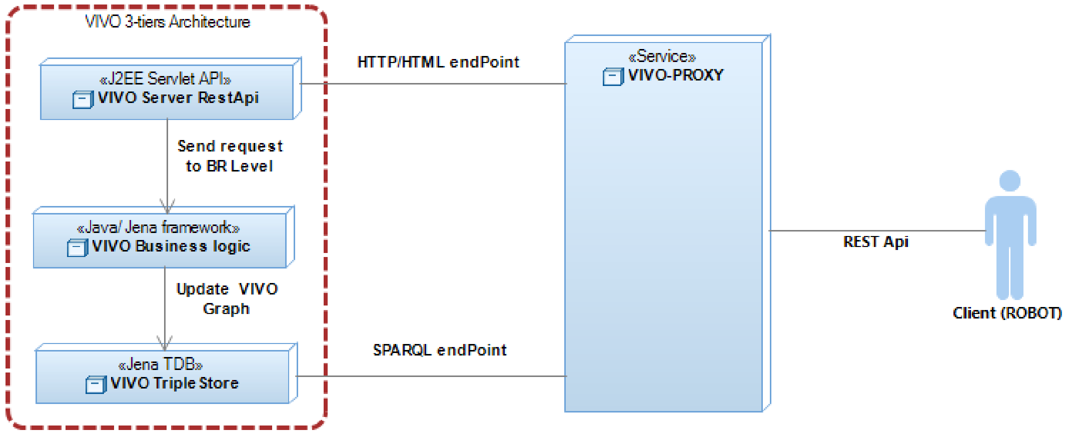
There is no communication API at the Business Logic layer

The advantages using HTML endpoint communication

- Use of HTTP primitives: (GET, POST, PUT, DELETE ... etc.)
- Access to VIVO FORMs to communicate data
- The addition of data in the TriplesStore is done by the Business Logic layer of VIVO
- It is not necessary to reverse engineering the RDF statements to be deposited in the triplestore

Disadvantages:

- Performance tests are to be carried out
- The communication is done in the HTML notation which is not a data transfer language



In summary

VIVO-Proxy provides:

- a **standardized**, self-documented, **code agnostic** front-end to VIVO data
- **extends access** to VIVO data to web (JSON) and semantic web technologies
- a design focused on **consensual** interface **modeling**
- an **easy reutilization of the code** developed to access and/or add-data in VIVO
- a scalable architecture allowing **heterogeneous data ingestion** mechanisms (harvesting, messaging, others)
- a **security management** mechanism compatible with the latest technical advances in the industry.
- Finally, VIVO-Proxy is a solution that simplifies access to APIs for adding data to VIVO without having to touch its architecture

Thank you!

Michel Héon
heon.michel@uqam.ca