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SysML 2 API

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• Why does SysML 2 need an API?
• What would a SysML 2 API look like?
• Can I see a Hello World example?
What is an API?

• API = Application Programming Interface
• API = Interface for software to communicate with each other

• For any software, we will typically have
  • Graphical Interface = Interface for human users
  • Application Programming Interface = Interface for other software

• What is an API useful for?
  • If a software (X) provides an API, you can write your own software (Y) to communicate with that software (X)
Why does SysML 2 need an API?

• We have always needed to access system model and automate
  • Document generation
  • Model validation
  • Model generation/transformations
  • Analysis and reasoning

• Today
  • We write plugins / scripts for a specific SysML tool
  • Application logic subject to tool-specific implementation of SysML

• SysML 2 API will make it possible to
  • Write core application (business logic) using SysML 2 services, independent of a specific tool
  • Deploy the core application for each SME
  • No need to rewrite the whole application for each SME
What would SysML 2 API look like?

• Starting from **SysML 2 API Requirements (Dec 2016)**

Logical API Model

- Service Definition
  - Services and Operations

Platform-independent

- Mapping
- **Java API**
- **REST API**
- **.NET API**

Platform-dependent

- **SME 1**
  - File storage

- **SME 2**
  - Database storage

API implementation by SME vendor

- **Platform-specific API** (language/protocol)

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SysML 2 Services – Client & Provider (SME)

User of SysML 2 Services

SME = Provider of SysML 2 Services
SysML 2 Service Definitions

Analysis Services Example
What would SysML 2 API look like?

- Starting from **SysML 2 API Requirements (Dec 2016)**
Service Definition

*Services and Operations*

Java API for Services

*Java interface for each service*

```java
package services;
import java.util.Collection;
import domain.Analysis;
import domain.Expression;
import domain.System;

public interface AnalysisQueryService {
    public Collection<Analysis> getAnalyses();
    public Collection<Analysis> getAnalysesOfSystem(System soi);
    public Collection<Analysis> getChildAnalyses(Analysis analysis);
    public Collection<Expression> getAnalysisResult(Analysis analysis);
}
```
REST API for Services

Java interface for each service

Service Definition

*Services and Operations*

REST API

GET /sysml2/api/analyses
GET /sysml2/api/analyses/:soi
GET /sysml2/api/analyses/children/:id
GET /sysml2/api/analyses/result/:id
Can I see some Hello World examples?

• Example 1 – SME-independent application using SysML 2 API
  • SysML 2 Analysis Service as Java API
  • Two SMEs implement this Java API
  • Write a *simple app* using SysML 2 API and run with both SMEs

• Example 2 – REST API
  • SysML 2 Analysis Service as REST API
Example 1 – MyApp using SysML 2 Java API

• Starting from **SysML 2 API Requirements (Dec 2016)**

Logical API Model

- **Service Definition**
  - Services and Operations

Platform Independent

Platform-specific API (language/protocol)

- Java API
- REST API

Platform Dependent

My App uses

- SME 1
  - File storage

- SME 2
  - Database storage

API implementation by SME vendor

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Example 2 – SysML 2 REST API

• Starting from **SysML 2 API Requirements (Dec 2016)**

Logical API Model

Service Definition
*Services and Operations*

Platform-independent

Platform-specific API
*(language/protocol)*

API implementation by SME vendor

Java API

REST API

SME 1
*File storage*

SME 2
*Database storage*

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SysML 2 REST API

- Get all analyses

- GET <host>/api/sysml2/analyses
SysML 2 REST API (cont.)

- Get analysis by id

- **GET** <host>/api/sysml2/analyses/:id

```json
{
    "name": "Car Max Speed Analysis",
    "id": "f01bae55-b1ff-42d6-b9d2-5ff6910a8cda",
    "systemOfInterest": "Car",
    "objective": null,
    "childrenAnalyses": [
        ""
    ],
    "result": null
}
```
SysML 2 REST API (cont.)

- Get analysis by system

```
GET <host>/api/sysml2/analyses/system/:id
```
Questions / Comments

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