

FUTURE
INTERNET
SMART
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SERVICES



FINESCE API

European Utility Week 2014



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Outline

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- Problem presentation
- FINESCE as a solution provider
- The way of the API
- Full listing of offered API categories
- The FINESCE API Mediator
- The offer of FINESCE to the Utilities



The Problem

- Smart Grids need (real time) monitoring and (low latency) actuation
 - Existing technologies usually support updates every 15 minutes
- Utilities have their own, proprietary software to power their Smart Energy Systems.
 - Third parties are very difficult to integrate, increasing cost
 - Added value services hard to implement, decreasing sustainability and flexibility
- Access to third-party historical data and user consumption profiles is limited



FINESCE as a solution provider (1/2)

FINESCE comprises seven (7) trials, exhibiting the capabilities of Future Internet in a multitude of applications interesting to Utilities, including among others:

- Near-real time (only 5 minutes of delay) **Grid Status Monitoring**
 - Energy consumption/production per customer or sector
 - Power demand/supply per customer or sector
 - External events affecting Grid status
- Fine-grained **Smart Buildings monitoring**
 - Energy consumption per socket
 - Power demand
 - Miscellaneous (e.g. indoor temperature, heat pump flow/temperature etc)



FINESCE as a solution provider (2/2)

- **Electric Vehicles Monitoring**
 - Vehicle position tracking
 - Battery status
 - Charging points monitoring
- **Smart Factories Monitoring**
 - Energy consumption
 - Machinery status
- **Weather Information affecting RES efficacy**
 - Temperature, CloudCover, Wind speed/direction, Humidity etc.



The way of the API

FINESCE API provides easy to use programmable web interfaces to:

- Access FINESCE trial infrastructure
 - Get your hands on valuable historical data gathered over way more than a year (more than two after the project end) from more than five different EU countries
 - Get a glimpse on what leading Utilities in other EU countries are doing!
- Facilitate prototyping upon a well-defined set of programmable resources
- Allow for seamless integration of the FI-PPP Phase III energy-related projects



Full listing of the offered API categories* (1/3)

- Authentication
- Building monitoring and control
- Grid energy consumption/production
- Grid power demand/supply
- Customer profiling
- Customer contract management
- External events affecting grid status

* Not all of the are available right now, but will be by the end of Q4 2014



Full listing of the offered API categories* (2/3)

- Metering infrastructure presentation
- Pricing
- Regional information
- Simulations
- Smart Factories
- Weather forecast

* Not all of the are available right now, but will be by the end of Q4 2014



Full listing of the offered API categories (3/3)

- Over 40 distinct APIs are available in terms of specification
 - Expected over 60 until the end of the year
- Over 20 have been already configured and are directly linked to the FINESCE trial infrastructures.
 - Expected to have over 60 until the end of the year

We are moving fast, to get along with **your** Smart Energy Grid



FINESCE API Mediator (1/4)

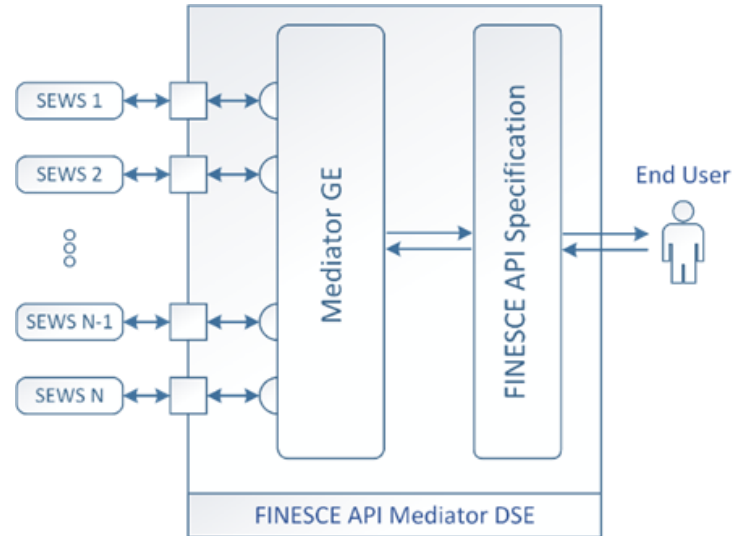
- FINESCE has consolidated the existing API functionality into a web server (mediator) acting as a **single entrance gateway to all** FINESCE trial infrastructures.
 - One should call the FINESCE API Mediator (FAM) and the mediator securely invokes the trial infrastructures
- API deployment with examples and indicative code generation available at <http://docs.fam.apiary.io/> (work in progress)

FINESCE API Mediator (2/4)

Simple, three step approach

1. Connect your Smart Energy Web Service (SEWS) to the FINESCE API Mediator
2. When a user wants to use this SEWS using the FINESCE API specification, the request is handled by FAM
3. FAM translates the response of the SEWS to the corresponding of FINESCE API.

No need to re-implement your software. Just provide FAM with an API translation!



- : SEWS endpoint
- ◐ : SEWS API Specification

FINESCE API Mediator (3/4)

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The screenshot displays the Finesce API Mediator interface. On the left, a navigation menu lists various API endpoints under categories like 'INTRODUCTION', 'REFERENCE', and 'Authentication'. The main content area shows documentation for 'Get the latest known social events', including a description and a 'Retrieve the list of upcoming social events' button. On the right, a REST client interface shows a GET request to 'https://130.206.82.22/finesce/ap1/v0.1/Tern1/social/1' with parameters: version=v0.1, trial=Tern1, and events_number=1. A 'Call Resource' button is highlighted with a mouse cursor. Below the REST client, the text 'Invoking FAM..' is visible, and the SYNELIX logo is in the bottom right corner.

not directly map to energy-related data.

Get the latest known social events

This service is meant to offer a list of social events that can temporarily influence the electricity consumption.

[Retrieve the list of upcoming social events](#)

Get a specific number of the latest known social events

This service is meant to offer a list containing a specific number of social events that can temporarily influence the electricity consumption.

[Retrieve a list of upcoming social events](#)

Language: Ruby | Host: Production | Example | Console

GET https://130.206.82.22/finesce/ap1/v0.1/Tern1/social/1

URI Parameters		Headers
version	v0.1	
trial	Tern1	
events_number	1	

Reset Values | **Call Resource**

Raw | Diff | Code Snippet

Request

Invoking FAM..

SYNELIX

FINESCE API Mediator (4/4)

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FINESCE

The screenshot displays the FINESCE API Mediator documentation interface. The top navigation bar includes the FINESCE logo, the text 'FINESCE API Artemis Voulikidis + fam', and links for 'Documentation' and 'Traffic Inspector'. On the right, it says 'Apiary Powered Documentation' with a 'Sign in with Apiary account' link. A sidebar on the left lists various API categories such as 'INTRODUCTION', 'REFERENCE', 'Authentication', 'Building control centre', 'Building information', 'Customer and contract', 'Energy demand / Power consumption', 'Energy supply / Power production', 'Electric Vehicles', 'Event and KPIs', and 'External information'. The main content area is titled 'not directly map to energy-related data.' and features two sections: 'Get the latest known social events' and 'Get a specific number of the latest known social events'. Each section includes a description and a button to retrieve data. The right-hand pane shows an XML response for the 'Get the latest known social events' endpoint, with a 'Language' dropdown set to 'Ruby' and a 'Host' dropdown set to 'Production'. The XML response is as follows:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<social_events>
  <metadata>
    <api_version>0.1</api_version>
    <trial>Terni</trial>
    <created>2014-10-29T16:58+0100</created>
    <updated>2014-10-29T16:58+0100</updated>
  </metadata>
  <event>
    <location>
      <name>Central Market</name>
      <address>
        <street_name>Piazza Giusti</street_name>
        <number>0</number>
        <zip_code>0</zip_code>
      </address>
      <latitude>42.558922</latitude>
      <longitude>12.63804</longitude>
    </location>
    <significance>1</significance>
    <time>1418668211</time>
    <type>Christmas Markets</type>
    <register_time>2014-10-27T15:29+0100</register_time>
  </event>
</social_events>
```



The offer of FINESCE to the Utilities

- Live, cost- and risk-free experimentation with the FINESCE trials and the FINESCE API
- A comprehensive Java Software Development Kit (SDK) to start developing your own added value services for your infrastructure.
- Client SDKs in 8 programming languages (Java, Scala, Flash, Obj. C, PHP, Python, Python3 and Ruby) to start interacting immediately with FINESCE API-compatible resources.
- Inherent compatibility with FI-PPP Phase III energy-related projects.



Thank you for your attention!

Questions?