2020 July 8 - Technical Architecture Workshop

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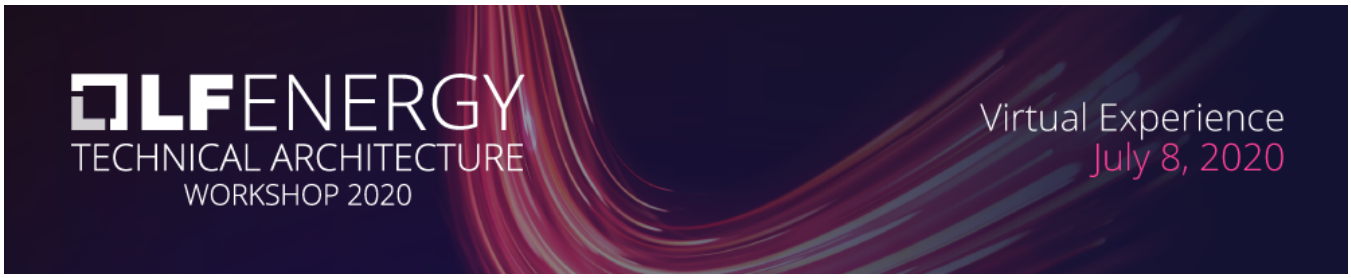

Welcome to the Technical Architecture Workshop page where you can find and contribute elements to the workshop.

General Topics

General Session - Community

- **Short Description:** One line description of topic
- **Detailed Description**: Detailed description of topic
- **Topic Leader(s):** Jono Bacon
- **Moderator (Monitor Chat, organize questions, manage time):** name1
- **Host (Manage/Control Bridge functions):** You can appoint an alternate host, but we recommend that the Moderator and the Host be the same person.
- **Expected duration:** TBD

General Session - Overview of Functional Architecture

- **Short Description:** Overview of Functional Architecture
- **Detailed Description**: LF Energy members have collaborated to create a concept of a functional architecture for the power grid of the future. The architecture starts with a top-level view and progresses to a finer granularity showing areas of focus. The final image shows how each of the existing – and some future – LF Energy projects and use-cases fits into this architecture.
- **Goal/Desired Tangible Outcome(s):** Provide everyone a basis understanding of the functional architecture and how the LF Energy project and use-cases relate to it.
- **Topic Leader(s):** Jonas van den Bogaard, Benoit Jeanson
- **Expected duration:** 20 mins

Breakout Sessions

Please add any relevant information pertaining to your use case/working group area - this includes reference documents, pre-read, etc.

Each breakout session needs to incorporate an activity to engage the attendees that supports the tangible outcomes each use case goal.
Here is a suggested activity for use case methodology.

- Use Case - VPP / Microgrids

Track - LF Energy Data Architecture

- **Short Description:** Learn about LF Energy's data architecture framework and principles, learn from Alliander about their approach to semantic harmonization.
- **Detailed Description**: How to apply the LF energy data architecture to your project.
- The LF energy created guidelines for data architecture. This workshop will go into detail about the why and how of the data architecture.
- **Goal/Desired Tangible Outcome(s):** Basic understanding motivation of a data architecture and how to apply it in projects.
- **Topic Leader(s):** Sander Jansen Eric Houmes (TenneT)
- **Moderator (Monitor Chat, organize questions, manage time):** Ashish
- **Activity;**
  - Alliander history on semantics
  - How to build interfaces/integration
  - Questions on the current state of semantics
  - Next steps
- **Pre-reading Resources:**

Track - LF Energy Security Framework

- **Short Description:** Learn about a common approach how to address the security challenges of open source projects of LF Energy.
- **Detailed Description**: We have selected one the most interesting projects, GXF. In the first break out session we will perform together a (security) impact assessment for GXF and next do a threat modeling of one of the important risks. In the second break out session we will discuss and select appropriate security countermeasures and strategies based on the risks identified during the first session.
- **Goal/Desired Tangible Outcome(s):** Basic understanding of a security impact assessment, threat modeling and security countermeasures that can mitigate risks.
- **Topic Leader(s):** Florent Carli, Bart Luijkx, David Wheeler.
- **Moderator (Monitor Chat, organize questions, manage time):** Florent Carli, Bart Luijkx.
- **Activity:**

  Introduction security working group LF

  Introduction of project GXF (analysis scope)

  Security risk analysis: discuss and review a prepared impact assessment and do threat modeling for one of the key risks

  Security strategy x (TBD)

  Security strategy y (TBD)

- **Pre-reading Resources:**

  https://www.cgerisk.com/knowledgebase/The_bowtie_method

  https://youtu.be/zH9CdMH0tUM

Track - Infrastructure

- **Short Description:** Defining a guideline for critical infrastructures for the energy world.
- **Detailed Description**: In times of high demands like 100% availability, redundancy and low latency in combination with serious security aspects, the energy world is facing critical challenges. Especially the requirements to have a multi-cloud in combination with a hybrid-cloud approach including the limitation of running critical workloads only in your data center have to be solved. This UseCase is trying to establish a guideline on how to have the flexibility of a public cloud provider and the security of an on-premise environment.
- **Goal/Desired Tangible Outcome(s):** Working document for cloud strategies in the energy sector.
- **Topic Leader(s):** Sven Leiss
- **Moderator (Monitor Chat, organize questions, manage time):** name1
- **Expected duration:** all Breakout Sessions
- **Activity:** Define a high level infrastructure architecture for the energy world which will focus on the criticality of the workloads based on the following requirements:
  - KRITIS for critical infrastructure (national)
  - BAIT and VAIT (Supervisory Requirements for IT in Financial Institutions/Insurance Undertakings) (national by the BaFin)
  - ISO/IEEC 2700x (international by the International Organization for Standardization and the International Electrotechnical Commission)
- **Pre-reading Resources:**
  - **https://www.meshcloud.io/2020/05/13/multi-cloud-security-and-compliance/**
  - **https://hub.packtpub.com/designing-a-multi-cloud-environment-with-iaas-paas-and-saas-tutorial/**
  - **https://www.simform.com/multi-cloud-architecture/**
  -

Use Case - Asset Monitoring

- **Short Description:** An open source based architecture for asset monitoring and asset management
- **Detailed Description**:

background : RTE initiated an internal project aiming at replacing an aging asset monitoring system and paving the way for a shift from preventive maintenance to predictive maintenance.

- Actual state of the project : Presentation of the project goal and its architecture that is mainly based on open source components :
    - Discussion / challenge of the architecture with regards to its goals
    - Discussion of possible extensions / other use cases that could be developed on top of this architecture
- Toward a Community : Opening the project: currently RTE is investigating open source collaboration opportunities as a motivation for opening the code
    - Discussion : what does the community expect when opening an internal code? What are the key elements to take into account to ease onboarding of contributors to build a community?
    - It is not only a matter of code: working in parallel on the business design and software design.
        - before the code: Transitioning from preventive to predictive maintenance requires new softwares to support activities that are not yet well defined. How to define them on a communautary way?
        - Beyond the code: analytics will be trained on physical assets? Should the Community share fitted models? How?
- **Goal/Desired Tangible Outcome(s):** Key actions to be implemented when opening the code to ensure success of Community building.

- **Topic Leader(s):** Benoit Jeanson
- **Moderator (Monitor Chat, organize questions, manage time):**
- **Activity**
- **Pre-reading Resources:**

Use Case - CoMPAS

- **Short Description:** Develop open source software components related to IEC 61850 model implementation (profile management) and configuration of a power industry Protection Automation and Control System (PACS).
- **Detailed Description**:

The mission of LF Energy's CoMPAS project is to develop open source software components related to IEC 61850 model implementation (profile management) and configuration of a power industry Protection Automation and Control System (PACS). The initial roadmap of the project was drafted by a design team involving several grid operators and T&D automation vendors (see resources below).

The CoMPAS project is currently focusing on two short term goals:

1. detailing the overall technical architecture for the project, based on the initial principles mentioned in the initial roadmap document (microservices, scripting capabilities, API to external tools, etc.);
2. developing the user story mapping for a Minimum Viable Product, based on the high-level description of use cases outlined in the initial roadmap document.

This track will provide an opportunity for community brainstorming on the above-mentioned topics.

- **Goal/Desired Tangible Outcome(s):**

- **Topic Leader(s):** Mital Kanabar, Frederic Fousseret
- **Moderator (Monitor Chat, organize questions, manage time):** Mital Kanabar
- **Host (Manage/Control Bridge functions):** Mital Kanabar
- **Activity:**
- **Pre-reading Resources:**

Initial roadmap of the CoMPAS project: https://github.com/com-pas/contributing/blob/master/roadmap-docs/CoMPAS%20Initial%20Roadmap%20-%20final%20version.pptx?raw=true

Glossary and high-level diagrams: https://github.com/com-pas/compas-architecture

Use Case - Digital Twins

- **Short Description:** Validate how a digital twin oriented “system-of-systems” approach could be useful in designing the technical architecture of smart energy systems.
- **Detailed Description**:

  The ambition of the Digital Twin project is to validate an IoT approach that is compatible with a Blockchain architecture and running on the edge of a distributed cloud environment for a smart energy “System of Systems” (integration of different categories of Intelligent energy devices -IEDs – and energy management platforms).

  The major benefits of building a Digital Twin representation of an energy system is in creating a symbiosis between entities representing real and digital world objects connected via standard APIs and characterized by properties, describing the context in which they operate and use assumptions to simulate their behaviors for different purposes.

  The integration of the different data sources to design the representation of the virtual twin is the result of a System of Systems architecture, leveraging on Extensibility (new systems can be added easily), Replaceability (systems can be replaced), Loose coupling (systems can evolve independently), Low intrusiveness (systems do not need to change) and Recursiveness (systems of systems at different levels)

  The Digital Twin project will leverage on the NGSI-LD API, a public, royalty-free standard API for Context Information Management standardized by ETSI and already deployed in multiple Open Source implementations available in the FIWARE Foundation’s catalogue.
- **Goal/Desired Tangible Outcome(s):** identification of main goals, challenges and risks in a system of systems' approach and use them to break down architectural complexity. Drafting of the initial mapping between NGSI-LD and other LFE project components.
- **Topic Leader(s):** Juanjo Hierro, Antonello Monti, Markus Mirz, Gianluca Dianese, Alberto Abella
- **Moderator (Monitor Chat, organize questions, manage time):** Juanjo Hierro
- **Activity:**
    - General Introduction
    - Description of possible use cases
    - Breakout discussions

    - Report to Main Group
- **Pre-reading Resources:**
    - Data Oriented System of Systems Architecture for Energy link
    - FIWARE smart-data-models space on GitHub

Use Case - VPP / Microgrids

- **Short Description:** Discuss requirements for VPP and Microgrid functionality
- **Detailed Description**: Development of open source software components for Virtual Power Plant (VPP) and Neighborhood Microgrids to provide network resilience, power quality, efficiency, stability, reliability and investment optimization. This use case will also cover interface between RIAPS, FLEDGE, and other open source platforms.

- **Goal/Desired Tangible Outcome(s):** Increased understanding for all participants of the problem scope, Sharing best practices for connecting platforms
- **Topic Leader(s):** Teff Reed, Greg Thompson
- **Moderator:** Ken Dulaney
- **Activity:**
    - General Introduction
    - Description of 3 NMG/VPP use cases
    - Breakout discussion
    - Report to Main Group

- **Pre-reading Resources:**
    - https://riaps.github.io/
    - https://riaps.isis.vanderbilt.edu/
    - https://www.lfedge.org/projects/fledge/