

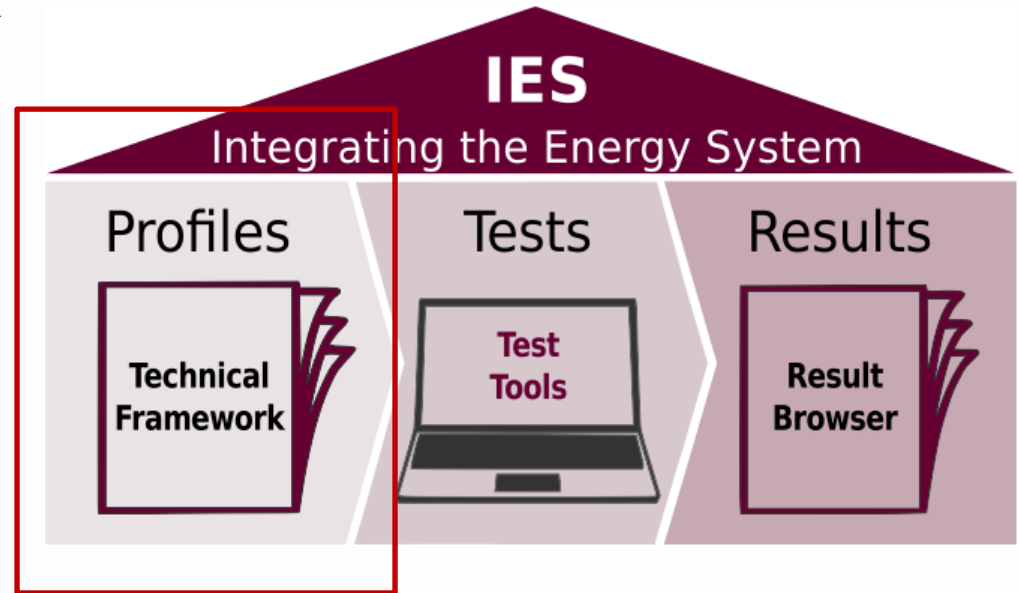
## Concept from Use Cases to Integration Profiles

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2nd Connectathon Energy Vienna

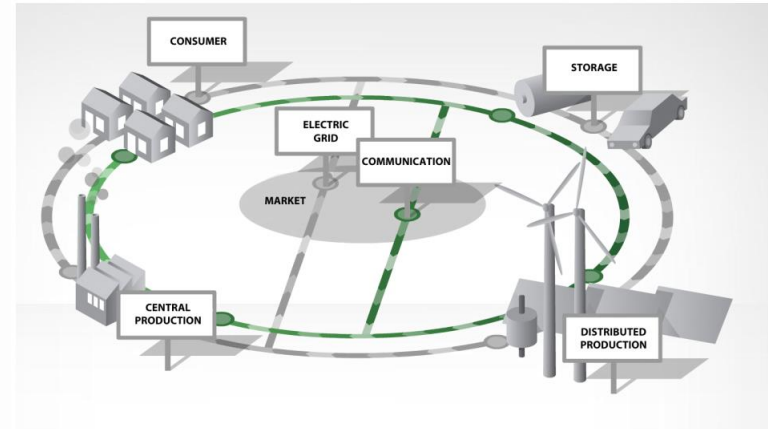
# Where are we now?

- Process for developing a technical framework
- specification for programmers and test engineers



# Why common specifications are needed?

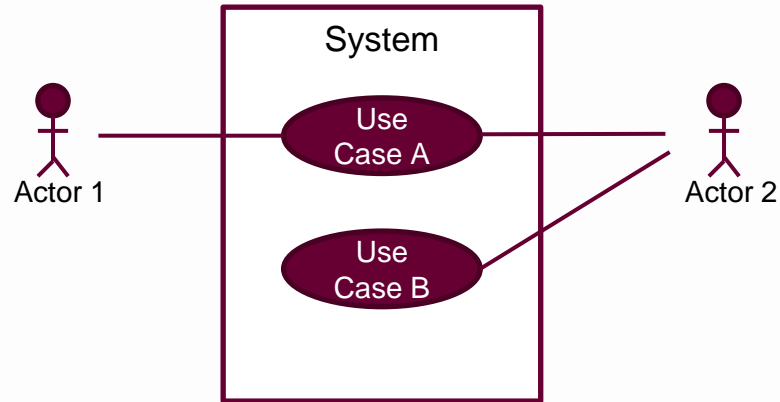
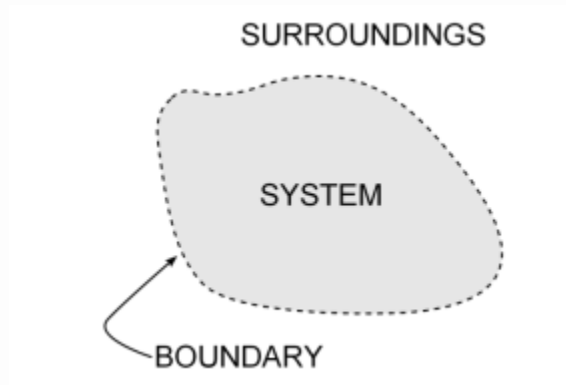
- Requirements and architecture engineering are essential steps for developing complex systems
- Interfaces have to be specified for a smooth connectivity
- More and more complex systems occur like Smart Grids, IoT, etc.



*Smart Grid environment*

# Use Cases for the Requirements Engineering

*A use case is the specification of a set of actions performed by a system, which yields an observable result that is, typically, of value for one or more actors or other stakeholders of the system. – ISO/IEC 19505-2:2012*



*Example of a UML Use Case Diagram*

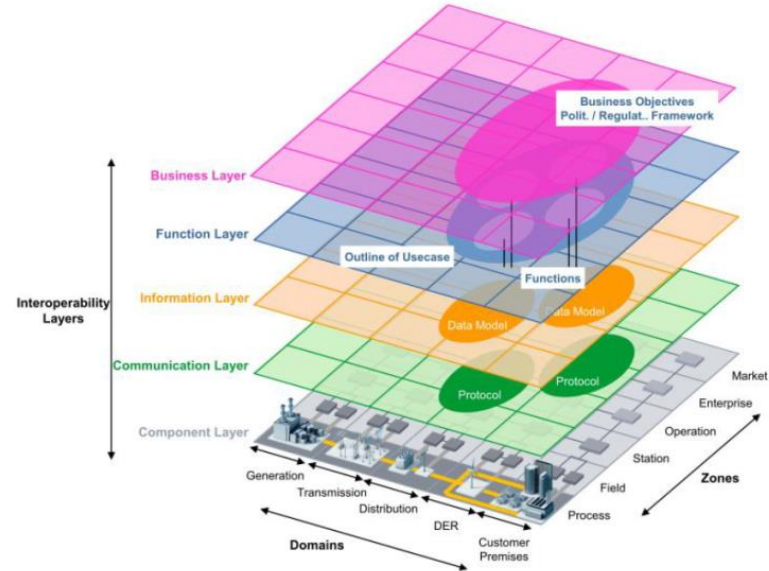
# The IEC 62559 Use Case Methodology



- Provides a template for a structure specification of Use Cases
- Additionally, a manual to fill out the template, an XML exchange format and best practices are given
- The template helps to describe different viewpoints of a Use Case - management and technical perspective
- A complete, textual description supports the managers to understand the Use Case
- The specification of actors and steps supports the engineers to register all technical aspects and to design an architecture

# Visualization of the Use Cases with SGAM

- The Smart Grid Architecture Model (SGAM) is a result from the European mandate M/490.
- It maps the Use Case in a three-dimensional view with 5 interoperability layer, the energy conversion chain and the energy information management.



## SGAM - Smart Grid Architecture Model

Reference: SG-CG/M490 (2014), *Overview of SG-CG Methodologies*, available at:

[ftp://ftp.cenelec.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SGCG\\_Methodology\\_Overview.pdf](ftp://ftp.cenelec.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/SGCG_Methodology_Overview.pdf)

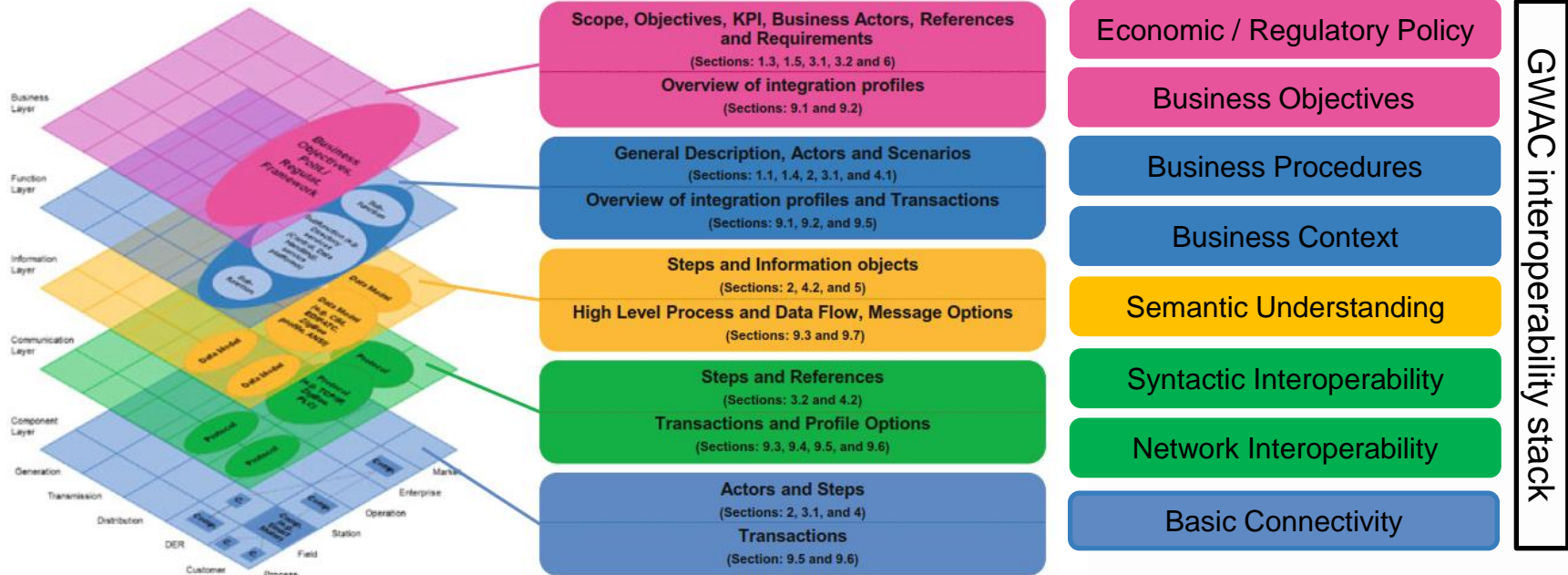
# Integration Profiles

- Actors and transactions are specified
- General information flow is shown
- Communication and security requirements are mentioned
- Data models and sequences are described in the transactions

3	Integration Profile: <title> .....
3.1	General information .....
3.1.1	Actors & Transactions .....
3.1.2	Actor Options .....
3.1.3	Information Flow Process .....
3.1.4	Communication Requirements .....
3.1.5	Security Considerations .....
4	Transactions .....
4.1	Transaction: <title> .....
4.1.1	Scope .....
4.1.2	Actor Roles .....
4.1.3	Referenced Standards .....
4.1.4	Interaction Diagrams .....
4.1.5	Security Considerations .....

*Content of Integration Profiles*

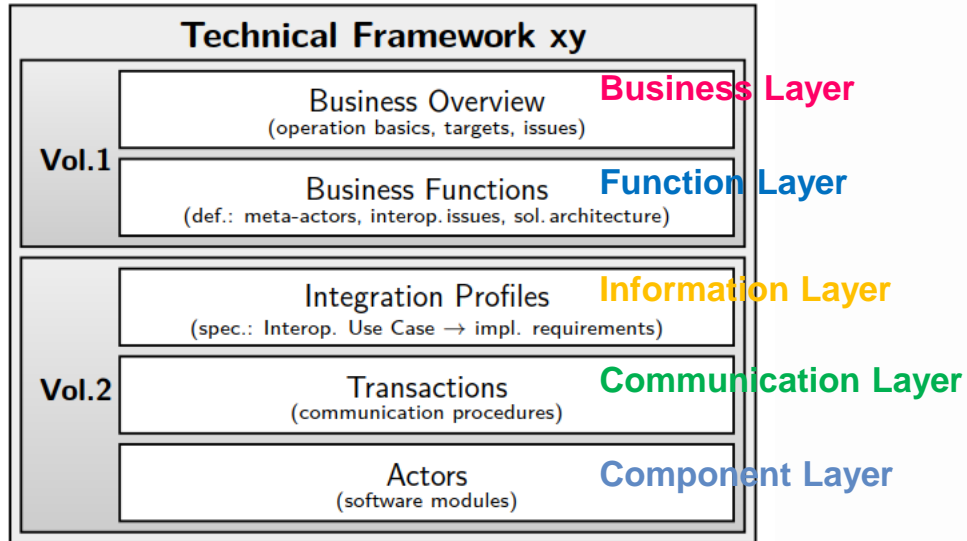
# Documentation for Interoperability





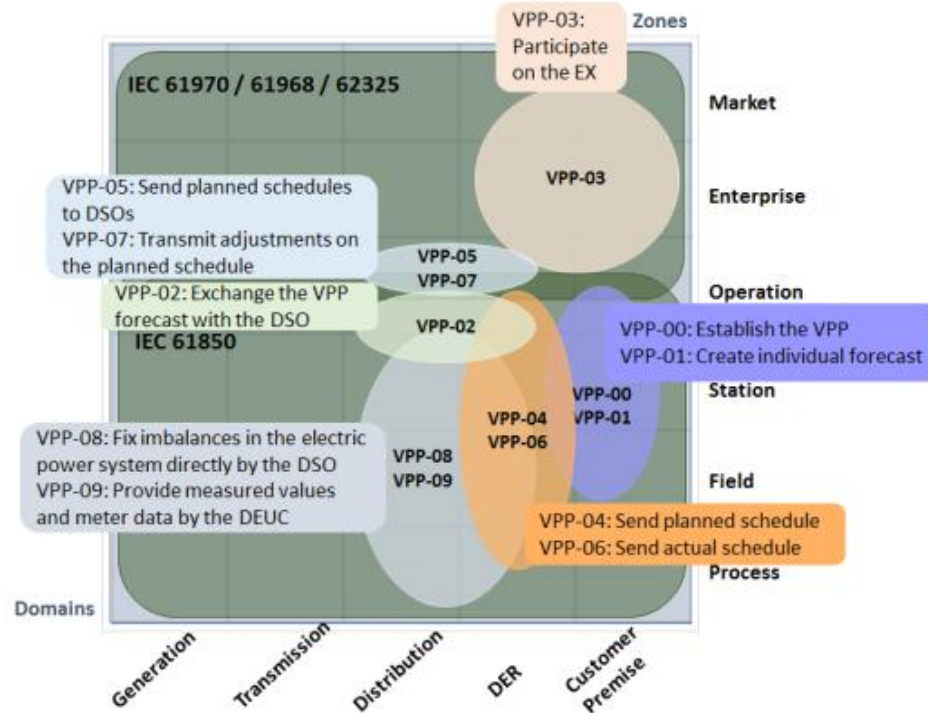
# IES Document Structure

## Domain Overview



- Volume 1 describes the normative view with an introductory text and the Use Cases
- Volume 2 is the informative view with all technical specifications (e.g. data models, sequence diagrams)

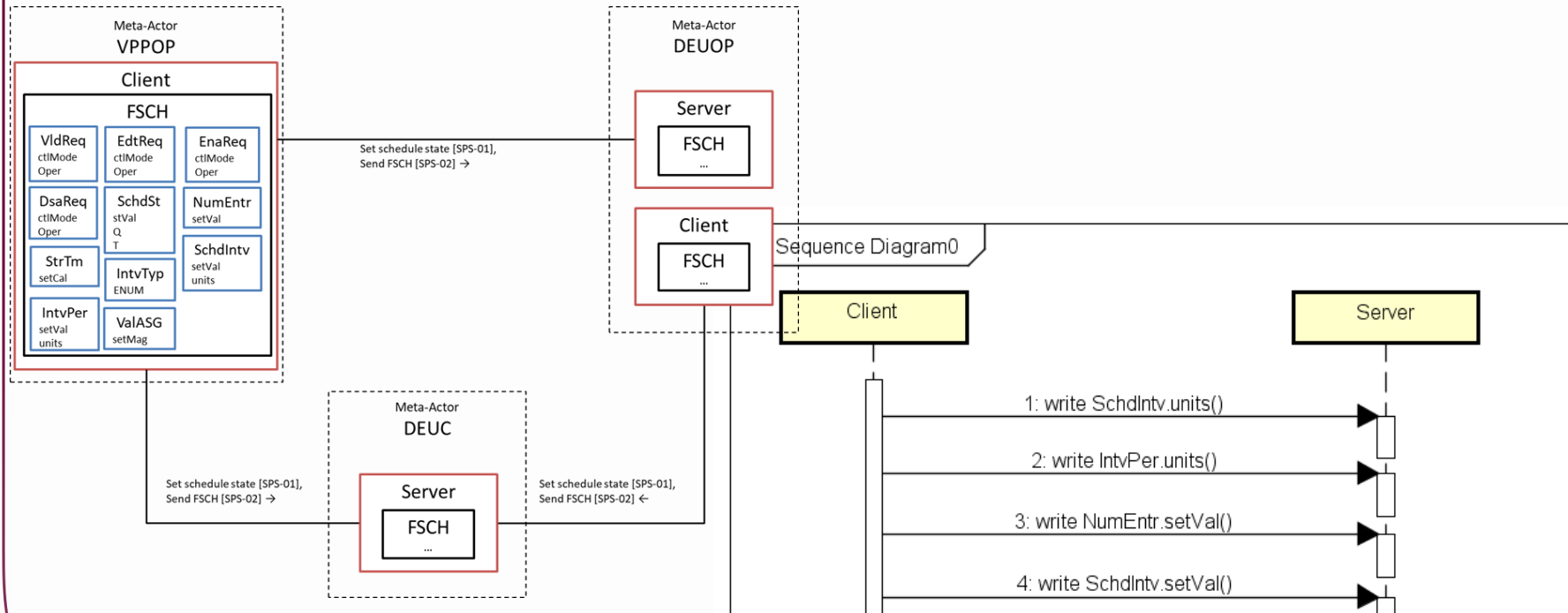
# IES Use Cases



*IES Use Cases mapped onto a SGAM plane*

- VPP as application example
- Implementation with IEC 61850 and IEC 60870
  - Measured Values
  - Send planned schedule

# Example: Send planned schedule



Actors-Transactions Diagram for "Send planned schedule"

UML Sequence Diagram for the Transaction "Send FSCH"

# Thanks for your Attention!

## Questions?

→ Now we go on with Interoperability Testing.

# Get in Contact

**IES** | Integrating  
the  
Energy System



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# Get in Contact

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