CLEEN
Cluster for Energy and Environment

sgem
Smart Grids and Energy Markets

Task 6.6
Active network management and microgrids
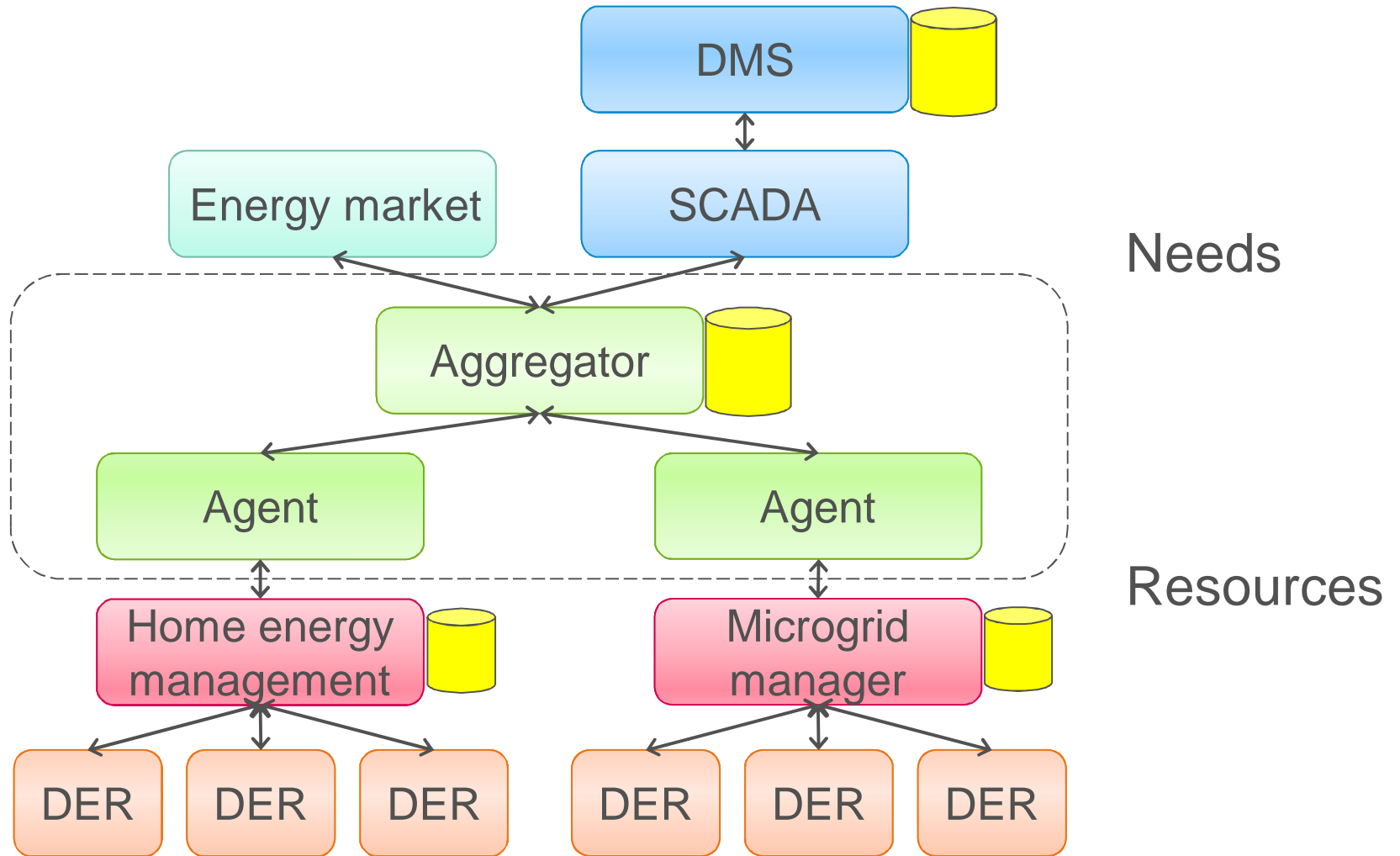
Sami Repo

Workshop agenda

- Coffee and tea
- Presentations of WP 6.6
  - Total Site Management concept, Mervi Suni, NSN
  - Energy centre microgrid model, Riku Pasonen, VTT
  - LVDC microgrid, Henri Makkonen, LUT
  - Co-ordinated voltage control, Anna Kulmala, TUT
  - Discussion about WP6.6 highlight
- Introduction to user story and use case

- Lunch at 12.15
- Workshop
  - Background scenario from SGEM vision
  - User scenario for active network management
  - User story
  - Use case
- Coffee and tea at 14
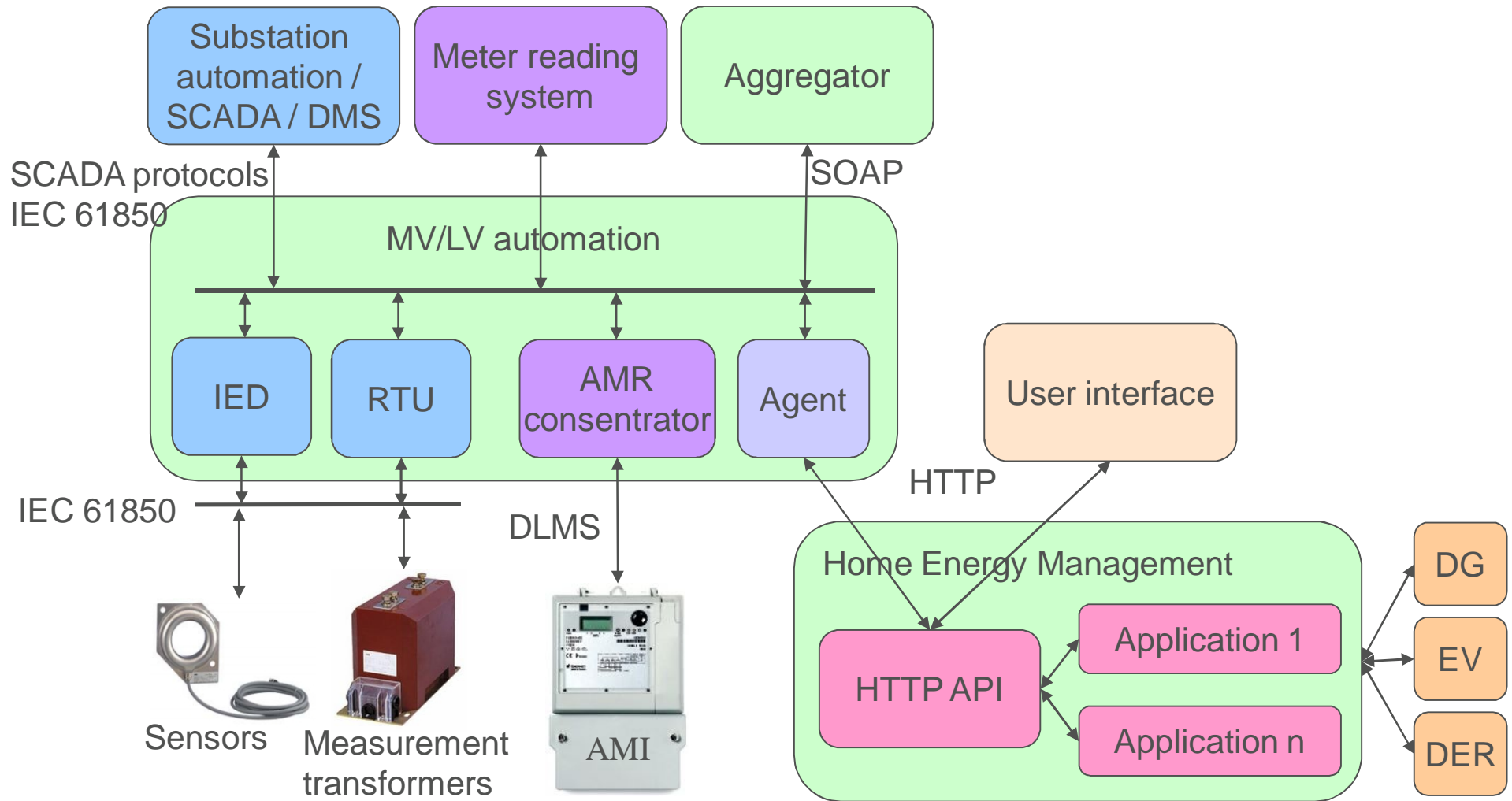- Workshop continues
- Summary and further actions

Virtualization of resources and needs

Another option to integrate automation systems

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Substation automation / SCADA / DMS

Meter reading system

Aggregator

SCADA protocols IEC 61850

SOAP

MV/LV automation

IED

RTU

AMR consentrator

Agent

User interface

IEC 61850

DLMS

HTTP

Home Energy Management

Sensors

Measurement transformers

AMI

HTTP API

Application 1

Application n

DG

EV

DER

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Key research questions

Reseach themes

- Island operation: protection, control, self-healing network operation concepts
- Microgrids: Electrification of villages, microgrid management, technical questions
- Network management (Co-ordinated voltage control)
- ICT for distribution network and microgrid management
- Business models and ecosystems

Two concepts for electricity network management

- Active network (MV network management)
- Microgrid (self-support utilizing internal DER)

SGEM vision as a starting point

- Vision tells on general level what kind of the smart grid environment is generally in the future.

- Vision is created by WP1 and we use it as a background.

- The vision will be studied and complemented in the workshop.

Scenario

- Scenario describes some options in the future. E.g. what is the penetration of EVs and DG in the future?

- From use case modelling point of view all the use cases, user scenarios and user stories share the same Future Scenario.

- Format for the future scenario text is totally free.

User scenario

- User scenario is concrete description of a very specific interaction, but one that is typically chosen for some specific reason
  - e.g. to describe what can totally go wrong with business (worst case scenario).

- Scenarios are typically narrative versus the bulleted / numbered form of a use case.
  - They incorporate individual user characteristics (i.e. a persona) while outlining the tasks undertaken to achieve goals.
  - Essentially, you tell a short story about your persona interacting with a product.

- A person by the name of <John Doe> is <xx> years old and lives in a Helsinki area. <John> works for a <employer>, and has <level of education>. <John> is married with <Mary Doe> and they …
  <John> wants to <accomplish a task> because of <motivations>, …

User story

- User Story is one or two sentences in the everyday or business language that captures what the user wants to achieve and benefit.

- The user stories are written together with software customers and/or users. Focus in customer interviews is in functional requirements. Software developers can also write user stories, but then the focus is in non-functional requirements.

- User story format: **As a \<role\> I want to \<goal/desire\> so that \<benefit\>**

Use case

- Use Case is a step-by-step account of system behavior associated with one or more actors.
- Use cases are very detailed and typically define
  - actors
  - a brief description
  - pre-conditions
  - the main flow (i.e. happy path)
  - any alternate flows
  - sub-flows
  - exception flows
  - the state of the system at the end of each flow (post-condition)
- It is very important to keep use cases implementation technology agnostic. The detailed means here the details of the actor actions and coverage.

Workshop

- Aims
  - Describe use cases in formal and short way
  - Create mutual understanding of complex system
  - Increase the level of cooperation
  - Distribute ideas and knowledge
  - Create SGEM use case library
- Today
  - Introduce ourselves for working method
  - Agree about future vision and scenario
  - Select use cases
  - Practice
- "Homework"
  - Describe first draft of your use case

| Future Scenario | → | User Scenario + User stories | → | Use Case |