Technical aspects of digital integrated decommissioning support systems and prospects with ISDC based costing

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Dusan Daniska, AquilaCosting, WAI
Virtual conference presentation

What is ISDC?

- ◦ International Structure for Decommissioning Costing of Nuclear Installations (IAEA/OECD, 2012)
- ◦ Standardised **checklist of decommissioning activities**
- ◦ **Benchmarking platform** for nuclear decommissioning costs
- ◦ 3-level deep & **extendable WBS** for nuclear decommissioning projects
- ◦ Can be used also for project management (not only for costing)

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ISDC Top-level activity groups

1. Pre-decommissioning actions
2. Facility shutdown activities
3. Additional activities for safe enclosure or entombment
4. Dismantling activities within the controlled area
5. Waste processing, storage and disposal
6. Site infrastructure and operation
7. Conventional dismantling and demolition and site restoration
8. Project management, engineering and support
9. Research and development
10. Fuel and nuclear material
11. Miscellaneous costs

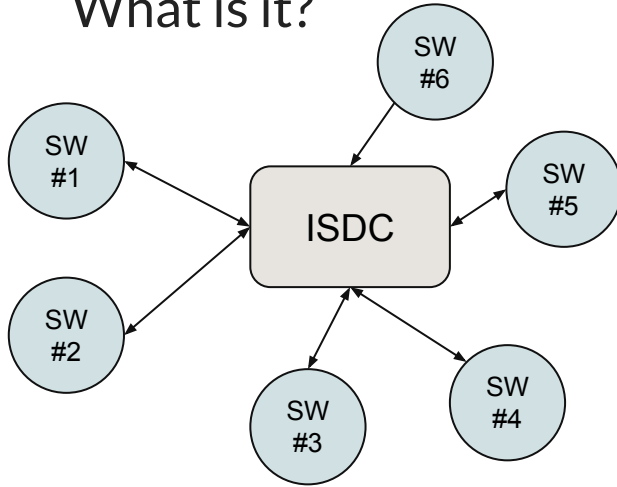Technical aspects of digital integrated decommissioning support systems and prospects with ISDC based costing
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ISDC Cost categories

- ○ Labour costs
- ○ Investments
- ○ Expenses
- ○ Contingency

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ISDC Costs - the principle in brief

- ◦ Activity cost = Labour Costs + Investments + Expenses + Contingency
- ◦ Bottom-up approach - costs of lower-leveled activities are aggregated at the upper level
- ◦ Costs of top-level activities are the sum of costs all activities below
- ◦ The most tricky part of cost estimates = Costs of waste management (Top-level activity #5)

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ISDC based integration for support of decommissioning projects

What is it?

Why it is important?

- ◦ Common project activity schedule across all decom-support SW tools
- ◦ Cost benchmarking and standardised presentation of cost estimations
- ◦ Common WBS structure for project management

AquilaCosting - ISDC-based SW for estimating overall decommissioning costs

Site structure & inventory database is a "BIM part" of the software

ISDC-based configuration of calculation inputs is linked to the BIM, too

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AquilaCosting - ISDC-based SW for estimating overall decommissioning costs

Configuration of waste management streams and cost factors is comprehensive

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PLEIADES

Smarter Plant Decommissioning

- Project aiming to create BIM-based integrated decommissioning support system
- Standardization efforts in terms of decommissioning ontology and software integration principles
- First prototype will validate the idea by simulating small decommissioning activities (e.g. dismantling the valve in the primary circuit or similar)

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PLEIADES vs. ISDC

PLEIADES	ISDC
First prototype is only for small portion of decom projects	**Covers all decom activities**
Costing only for simulated work orders / scenarios	**Costing covers also project management, waste management, research etc.**
Defines standardized API interface for compatible softwares	**Defines standardized list of decommissioning activities**

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Messages - a way to communicate

1) A "message" is a basic communication entity with relatively small payload. Analogy: an email without any attachment.
2) Messages are of different types, are transferred using API (potentially REST API) and can link to a file in a Shared Folder (e.g. to a point cloud file) for accessing large payloads.
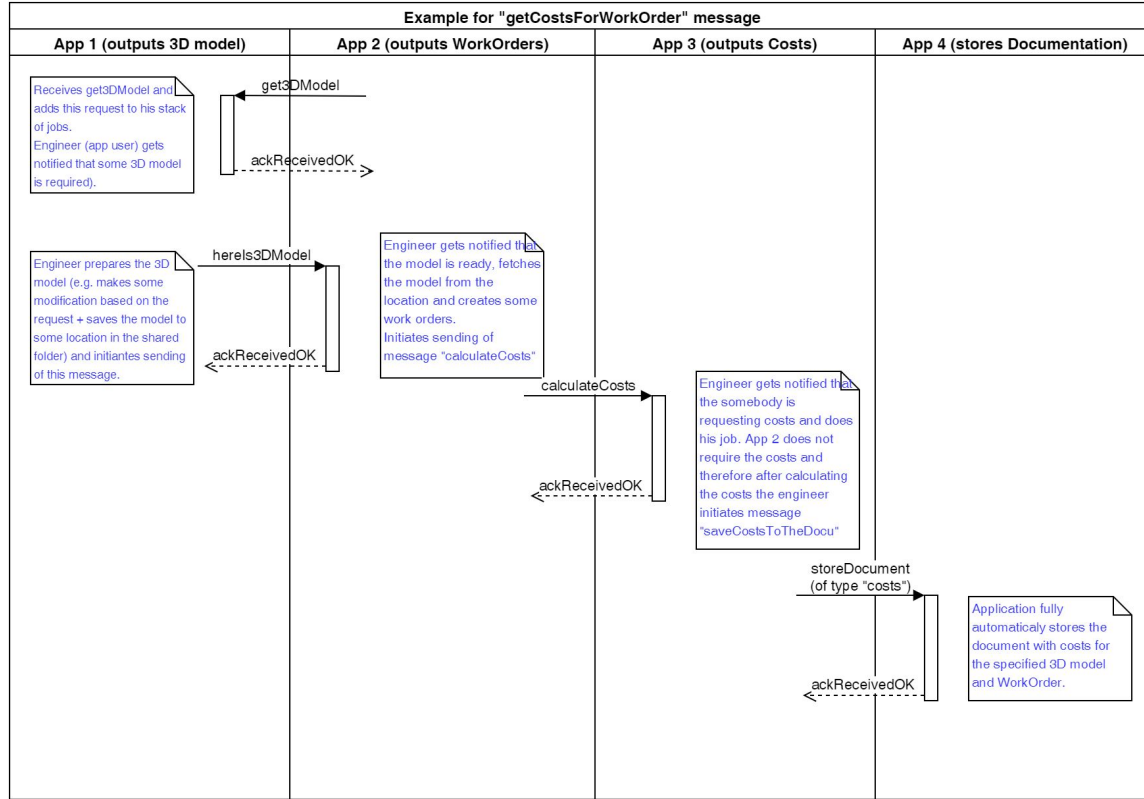3) Message has its structure defined by its type.
4) Each message has a sender and
   a) one recipient (= app),
   b) can be broadcasted to all apps.
5) Asynchronous communication is necessary while not all actions can be done automatically (require human interaction)

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Messaging network alternatives

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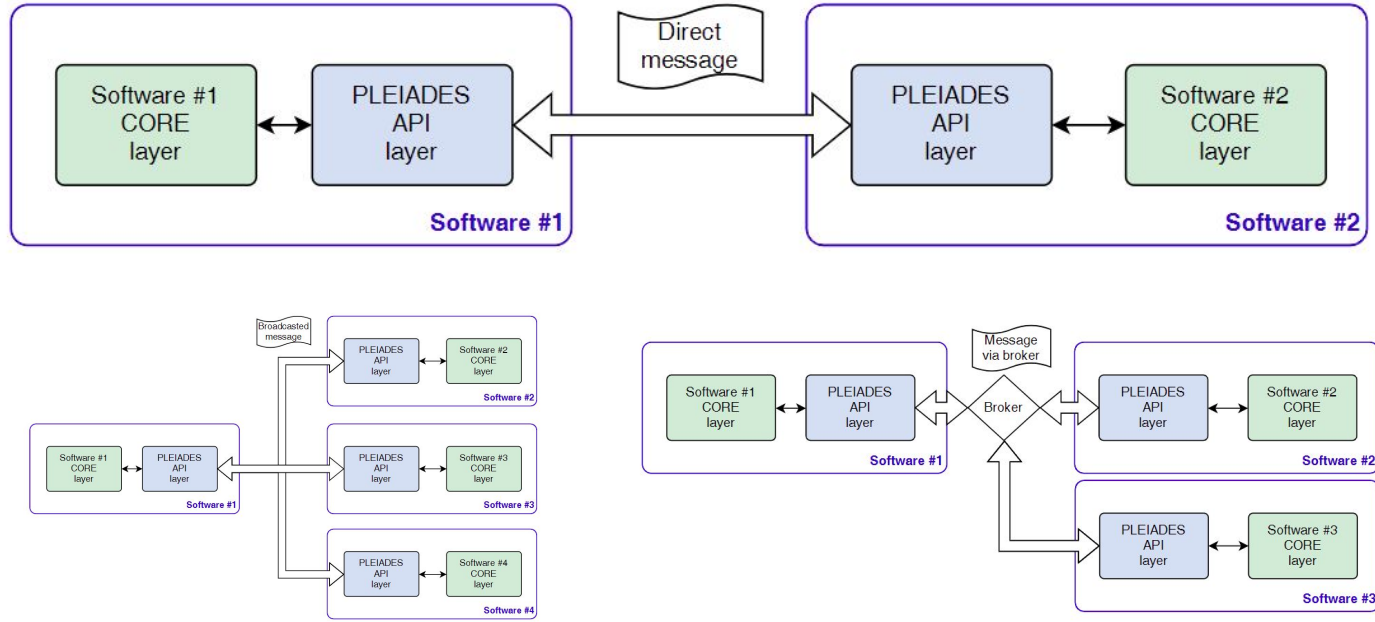
Example of message flow

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Technical aspects

Barriers

- Hard to specify the common API
- Variety of software tools
- End-user adoption
- …

Enablers

- Common ontology
- More efficient planning
- Single source of truth (both for inputs and for documentation)
- …

✓ **Barriers and Enablers will be discussed at the discussion Group #2.**

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Thank you

Let's meet at the discussion Group #2.

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