System design workshop

Realizing key performance parameters by balancing trade-offs and creating insight in critical design parameters.

COMPETENCE DEVELOPMENT

The system design challenge

Target group lead desingers and architects
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SYSTEM DESIGN WORKSHOP

The System Design Challenge

System design bridges the gap between architecting and engineering. During this phase the design space has to be reduced while the level of confidence must be increased. Furthermore, the project organization has to scale up from typical 1 order of magnitude towards 2 or 3 orders of magnitude. In such setting, which is also multi-disciplinary, there is a need for keeping the design decisions available and accessible to all members of the development project. Especially in complex and multi-site or multi-stakeholder environments the transition from architecting to engineering can be chaotic and time consuming. In such setting there is a strong need for keeping design decisions, available and accessible so all member of the development project.

The DAARIUS system design methodology

The "DAARIUS System Design Methodology (DSD-M) approaches the System Design challenge by offering a qualitative structure as starting point that will be extended towards a quantitative model-based, parametric reasoning structure, which is intended to be used by architects and designers. Furthermore, in combination with the DAARIUS System Design Tool (DSD-T), it provides a scalable and team-based way of working by providing traceable underpinning for key design decisions and leveraging the abundance of simple executable models in systems engineering. This transparent and lightweight approach improves the quality of team and stakeholder communication and design decision making.

Workshop

To get acquainted with the DSD-M, ESI offers an interactive two-day workshop where participants apply the methodology on their own project. The workshop is composed of a number of team exercises. Each exercise starts with a brief explanation and will be concluded by a plenary session in which groups present and reflect on their work.

Content

In the workshop the following subjects will be addressed.

Systems Engineering

System design is part of the broader systems engineering process. Where to position System Design in the overall product development cycle and the product life cycle. What are the characteristics of systems architecting, design, and engineering and how do they relate.

The System Design

- The handover from the System Architecting to the System Design phase will be addressed. The system architecting phase can be handled by a CAFCR Quick Scan. The DSD-M will continue with the results of this CAFCR scan in the design phase, using:
- A qualitative reasoning structure, with dilemma thinking and decision making. This is a very natural start after informal and creative white board sessions. This reasoning will be practiced on flip-overs.
- An elaboration of the qualitative reasoning by quantifying, using parameters and models, resulting in a quantitative reasoning structure. We practice with quantitative dilemma thinking and decision making on flip-overs.
- Study and practicing of the DAARIUS System Design Tool (DSD-T). In this tool the more informal knowledge of the flip-overs will be covered in a digitized way, making it accessible for all group members.
- Practicing larger scale team cooperation, using the DSD-T. The selected case will be studied, as a single project by the whole group. The group will be split into small teams, where each team represents a particular role in the system of interest. Balancing tensions and dealing with dilemmas will be practiced in a dynamic multi parallel game like case.

Practical

The workshop has 4 blocks, spread over two days. On request a selected subset can be addressed. It is recommended that the participant has some basic understanding of CAFCR reasoning framework, see:
https://www.gaudisite.nl/ArchitectingMethodOverviewPaper.pdf.
Students are expected to bring their own laptops to the workshop.
The DSD-T is web based, such that it only requires a current web browser, preferably Google Chrome.