

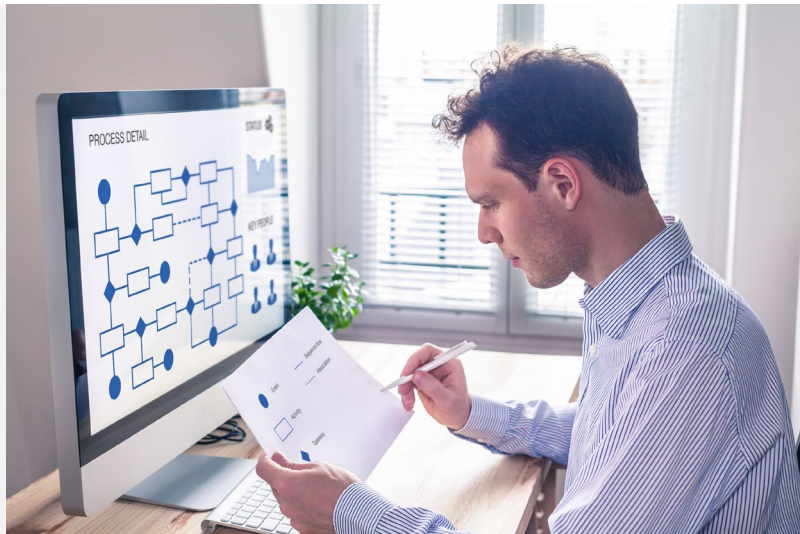
SUCCESS STORY

Pro²Future Products and Production Systems of the Future

Programme: COMET – Competence
Centres for Excellent Technologies

Programme line: COMET-Centre K1

Type of project: CEPS (Cognitive
Engineering Project Support)
3 years, multi-firm



EMPOWERING ENGINEERS IN LARGE DEVELOPMENT PROCESSES TO PRECISELY FOCUS ON THE TASK

A MODEL-BASED APPROACH TO MANAGE PROJECT-SPECIFIC WORKFLOWS IN DOCUMENT-CENTRIC ENGINEERING PROJECTS

The goal of concurrent designs is to have engineering teams—and especially interdisciplinary teams—working in tight interaction on many aspects of the system under design to create **product innovations** in **shorter development cycles**.

To carry out such a development process, dozens of engineers from many domains perform tasks on parts of the **final products**, so-called **artifacts**. Artifacts range from user requirements to design, over hardware and software, to tests; thus, products potentially involve thousands of artifacts. After a task is finished, the resulting artifacts can be passed on to another engineer for the next task. In order to have smooth progress on the development, it has to be clear who is able to work when on which artifact and what needs to be done. Furthermore, the engineers need to know, from which person to receive the necessary inputs, when the **quality of their task** is

fulfilling the requirements, and to whom to forward the results. The exact rules change over time and differ based on context, resulting in hundreds of variations resulting in complexity that needs to be managed.

The **development of changing products** will require different engineers, and not all engineers will be available at all times. Thus, each project will follow a different path to achieve its goal. Requiring each engineer to be aware of each project plan draws a lot of focus to boring and **avoidable topics**, draining their energy. Also, it is prone to **human errors**, which then lead to unnecessary iterations and the need for rework.

For these scenarios, **Pro²Future**, together with partners from the industry, namely the **Robert Bosch AG** and **MethodPark** by UL, as well as the **Institute of**

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Software Systems Engineering at JKU Linz, developed an approach and **tool support** to (i) **model the engineering process for a specific project**, and then (ii) **provide the engineers** the reminders, information, artifacts, and **quality criteria** for their given task.

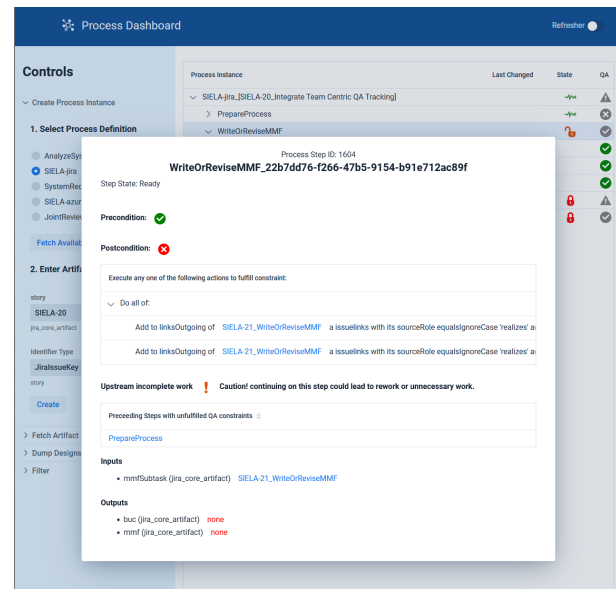
This newly developed approach uses information from artifacts to decide on the readiness of an artifact to be passed to the next engineering step. The information is directly accessed in the engineers' tools; thus, each engineer stays in his/her **favored tool environment**.

The approach has been implemented in a **first prototype** and is **integrated** with an **engineering tool** and the **process models** used in the STAGES software by Method Park. This **first experiment** with users at Robert Bosch AG has shown that **engineers** using the prototype find it **easier and less frustrating** to follow the process and **quality assurance** regulations compared to just using typical engineering tools.

Impact and effects

The approach has been integrated with one major engineering tool so far and shows **great potential benefits** to the users. The integration enables users to **access the relevant tasks and readiness criteria** without lengthy navigation across multiple artifacts.

The possibility to integrate the approach with a variety of engineering tools works well with the seamless workflows required in concurrent engineering.



Repair suggestions as process guidance in an example process

Another benefit is the **availability of the used processes in the form of models** that can be analyzed, refined, and optimized to improve the engineering team's performance in future development projects.

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