DynReAct PDP Newsletter #3

Open-Source Production Planning Software

Within the DynReActPDP project an advanced production planning software for the steel sector is developed. It allows for the automated scheduling of steel coils, taking into account different types of constraints and enabling fast reaction to changes in the production, such as a plant breakdown or other unexpected constraints that arise. Whereas the project demonstrator is implemented in a specific cold rolling mill, the core of the software is kept generic, so that it can be applied at other plants, as well.

The DynReAct software has been published under an open-source license on Github (https://github.com/DynReAct/OSS_Platform), so that interested users can experiment with it and get acquainted with the concepts. Since every plant has its own specific constraints and requirements, it is necessary to write a custom plugin against the Python programming interface of the platform for each use case, specifying for instance the cost function associated to a schedule. The open-source framework already comes with a sample scenario that can serve as a template for this customization process.

While the software is still under heavy development, a somewhat stable beta release is planned for mid 2025. Towards the end of the project, in 2026, the publication of a technical specification is foreseen, which will present in detail the interfaces between the different components of the system and facilitate the integration into existing production planning software.
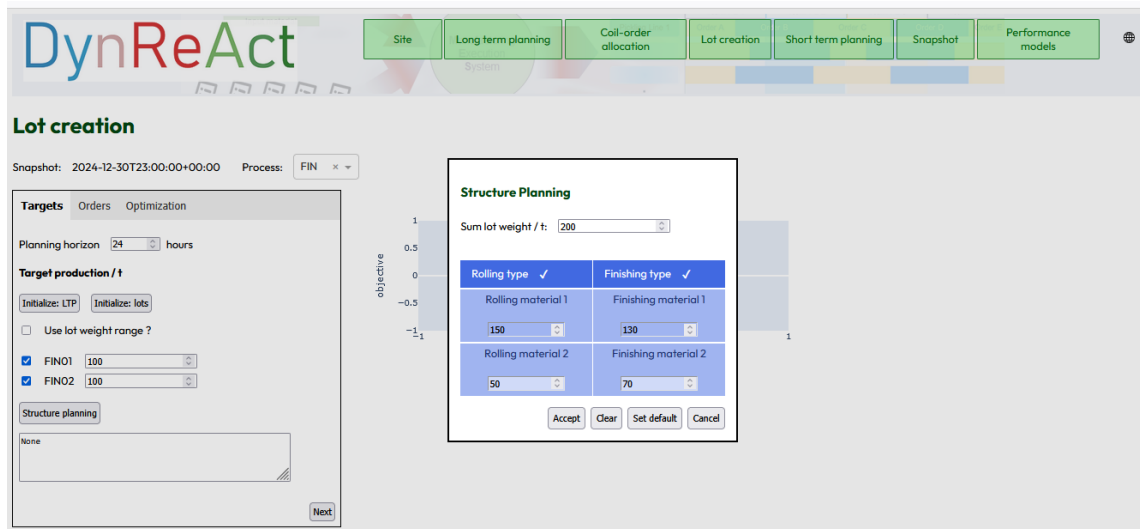
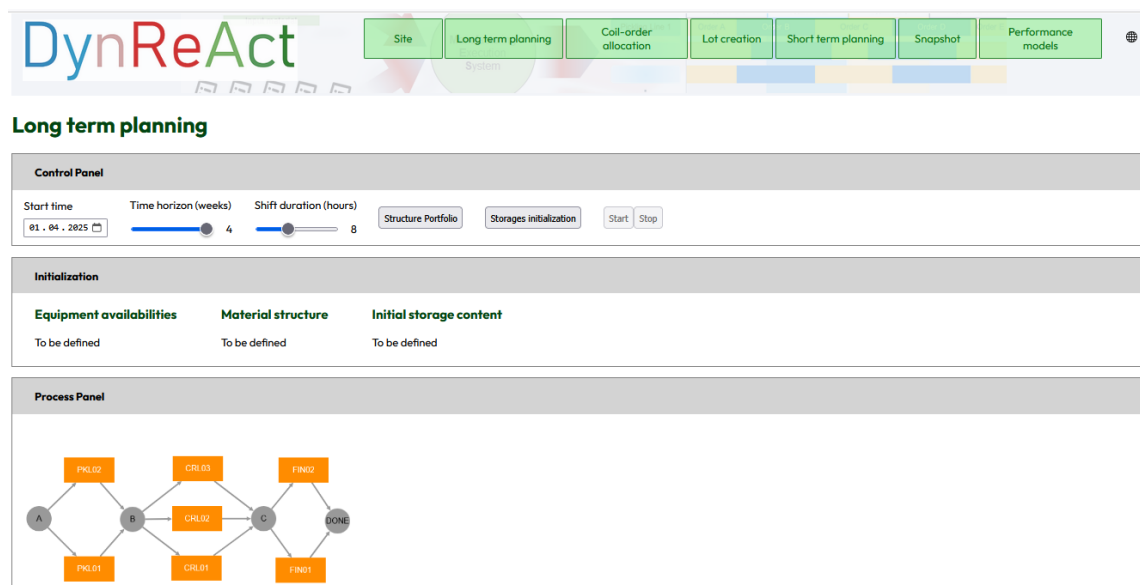**Figure 1 : Screenshot of the DynReAct mid-term planning user frontend.**

Figure 2 : screenshot of the DynReAct long-term planning user frontend.

Three hierarchical planning levels

The core of the DynReAct platform consists of the hierarchical planning system: long-term planning (LTP) covers a time horizon of a month and is order-less, the mid-term planning (MTP) is responsible for the lot creation, i.e., the scheduling of production orders to plants/resources, usually addressing a time-horizon in the order of a day, and the short-term planning (STP) deals with intra-day deviations.

In addition, the system incorporates so-called plant performance models (PPMs), which are independent services dedicated to specific processes. By specifying a standard interface for these models, the integration of various kinds of individual constraints for specific plants is made possible. The short-term planning system queries the plant performance models about the feasibility of producing certain orders at a given plant and can thus inform the user about issues with the current planning and propose alternative schedules.

Again, the open-source platform comes with a sample performance model that can serve as a template for customized PPMs.