

Objective: The synchronous distributed processing of common source code in the software development process is supported by well proven methods. The planning process has similarities with the software development process. However, there are no consistent and similarly successful methods for applications in construction projects. A new approach is proposed in this contribution.

Distributed processing: The distributed processing of a shared product model instance is characterized by three iterative phases: a) the phase of loading subsets of the product model instance, b) the phase of the local and independent processing of this subset and c) the phase of discarding or storing the results. These three phases belong to a single long transaction that can take up to weeks. In this process the second phase generally governs the time demands for executing the long transaction.

Conflict management: It is proposed to provide copies of the selected product model objects to allow for synchronous parallel co-operation. If the processed copies are stored as new object versions, the history of the planning process is available and the evolution of the planning process may be traced. Processing copies of objects ensures the consistency of the existing product model instance. This procedure also guarantees that the work of the planners can be stored without violating data integrity. It is assumed that the merging of two or more versions is executed at a later stage: This has to be done interactively by the user.

Solution approach: The solution approach is based upon two elements: a shared project and a private workspace for each planner. The workspace is represented by available CAD systems that have to be augmented by operations for the distributed co-operation.

Project: The project manages the persistent versioned product model instance shared between all planners. However, objects can not be edited directly: Instead, new object versions must be derived and loaded in the workspace where they can be edited. The versioned product model instance is the basis for the parallel co-operation.

CAD system: Although available CAD systems only support the second phase of the distributed co-operation they are an ideal software environment for the implementation of a workspace. Object versions from the project are loaded as CAD components. The local data management of available CAD systems allows offline processing in the distributed planning process, e.g. on mobile devices and notebooks. The transaction ends by discarding or storing the changed object versions in the project. The requirements for the implementation of a workspace by a CAD system are described in the full paper.

Workspace: Objects to be edited are loaded from the project as new object versions in the planner's workspace. The workspace provides CAD functionality and additional operations for the distributed co-operation. This functionality is implemented within a specific CAD system: The CAD operations must be observed in order to support the distributed co-operation of the project.

The sets, relations and operations of the workspace are described in the full paper. The implementation effort for a specific CAD system has been proven to be relatively low.

Conclusion: The proposed solution approach supports all three phases of the distributed co-operation. Available CAD systems are appropriate software environments for the implementation of the workspace.