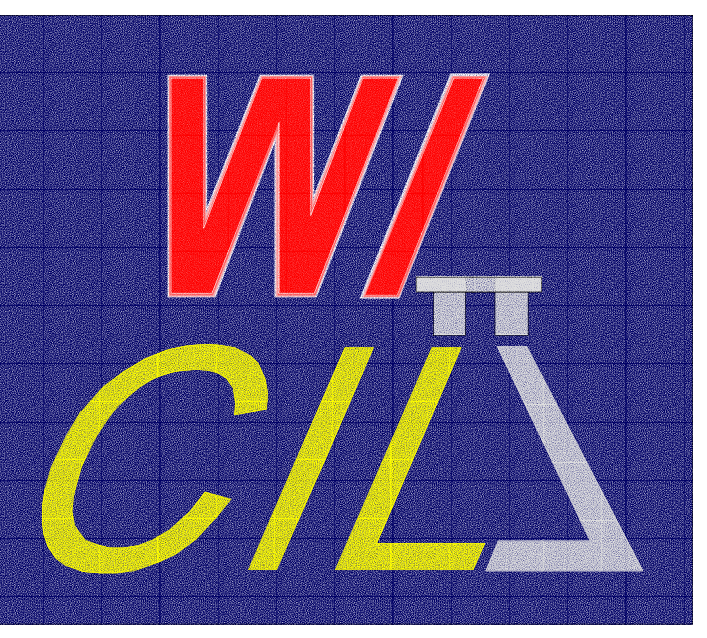


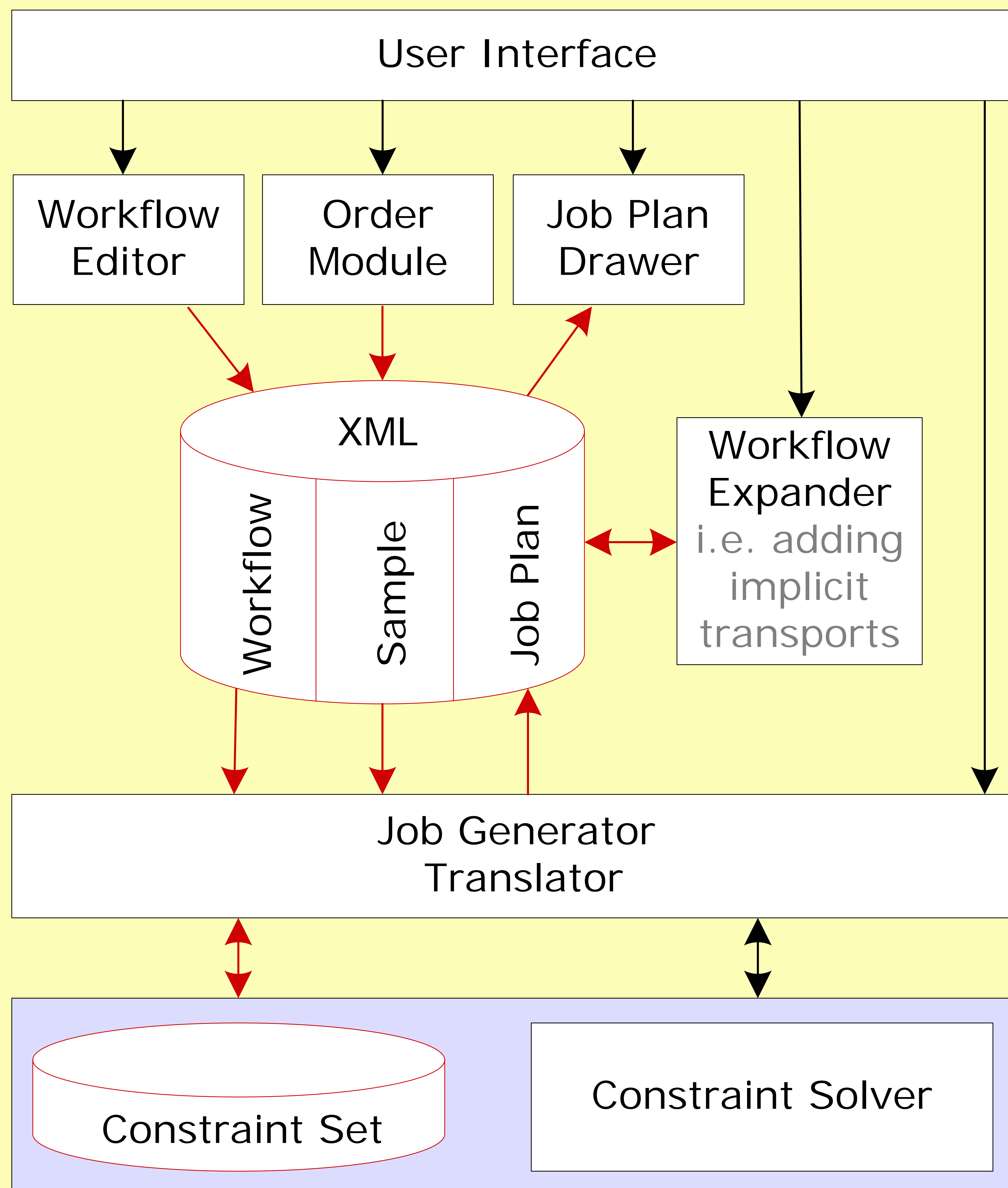
Constrained Solving Based Scheduler In Laboratory Automation

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The result of scheduling is a well-elaborated plan, which allocates the limited resources to the activities of a workflow. This is essential to initiate and coordinate workflow activities automatically.

Application Architecture



CSCEDULER

Objectives:

- Construct a scheduling application for laboratory automation.
- Make use of an elaborated constraint solving system to handle complexity.
- Cover overall workflows in a laboratory.

Method:

- Translate a given workflow into a set of constraints.
- Include optimization constraints.
- Search for a solution satisfying the constraint set.

Cscheduler constraints (Excerpt):

Include constraints about actions, samples and workflow, i.g.

- Start time/end time of a sample and first action/last action are identical.
- End time of an action is start time plus duration.
- Start time of a successor action is end time of its predecessor plus necessary and potential delay time.
- A single use resource can only be allocated by one action each point of time.

Advantages:

- Hide complexity by the declarative description of the problem.
- Benefit from high performance constraint solvers.
- Separate scheduling and workflow management.