Distributed editing of experiment programs at Wendelstein 7-X

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BACKGROUND - MOTIVATION

Wendelstein 7-X – as the world's largest stellarator-type fusion device – is equipped with an outstanding number of technical systems and diagnostic facilities compared to other fusion experiments.

Today, W7-X comprises more than 40 systems integrated into the Segment Control framework with far more than 200 ControlStations.

W7-X SEGMENT CONTROL

W7-X has been going successfully through its first operation phases showing reliable operation assisted by the W7-X Segment Control and experiment-planning framework.

Integrated components and diagnostics at W7-X benefit from

- pre-checking for reasonability of program parameter settings
- complete program description of all component parameters in a "planned program"
- central event-based segment switching
- continuous data streaming and monitoring, standardized parameter logging
- … and the use of common CoDaC applications for experiment preparation, execution, monitoring, and data access

EXPERIMENT PLANNING AT W7-X

CHALLENGE: COMPLEXITY

- demand of complete overview of the involved components
- need for validating potential constraints and dependencies
- amount of parameters and required expert knowledge
- compliance of component tasks with the experiment program timing

SOLUTION

Distributed editing by

- overlay component parameters into the planned sequence of the central experiment program using a common reference for the segment structure
- linking component Tasks (as aggregation of parameters) to ranges in experiment programs

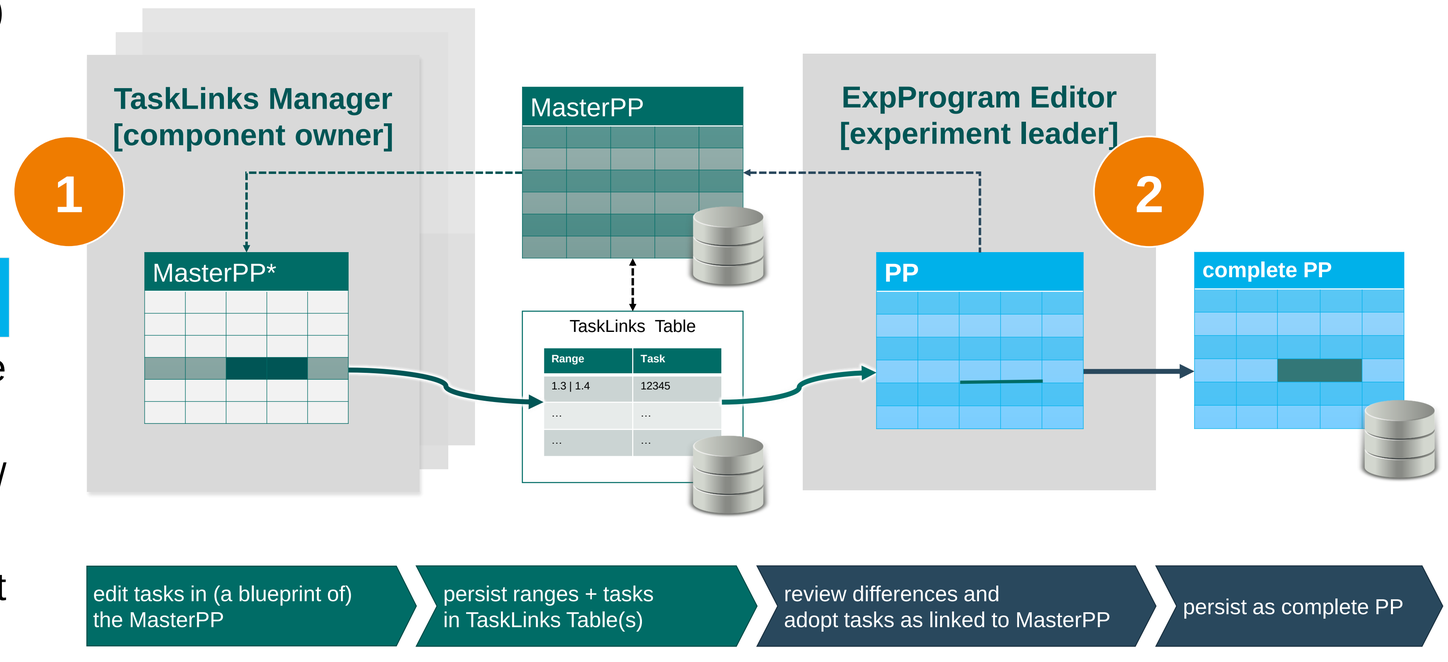
IMPLEMENTATION OF TASK LINKS

TaskLink = **Task** + range in a Planned Program (PP) sequence to be **linked** in

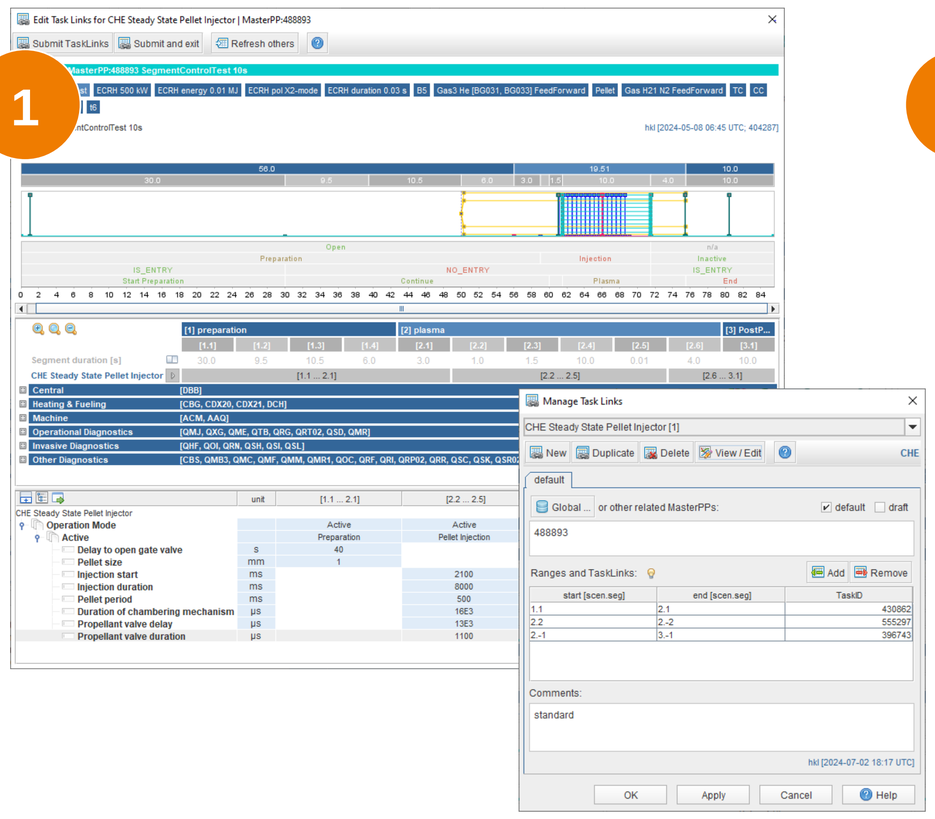
- refers to a MasterProgram
- persistent in programs database

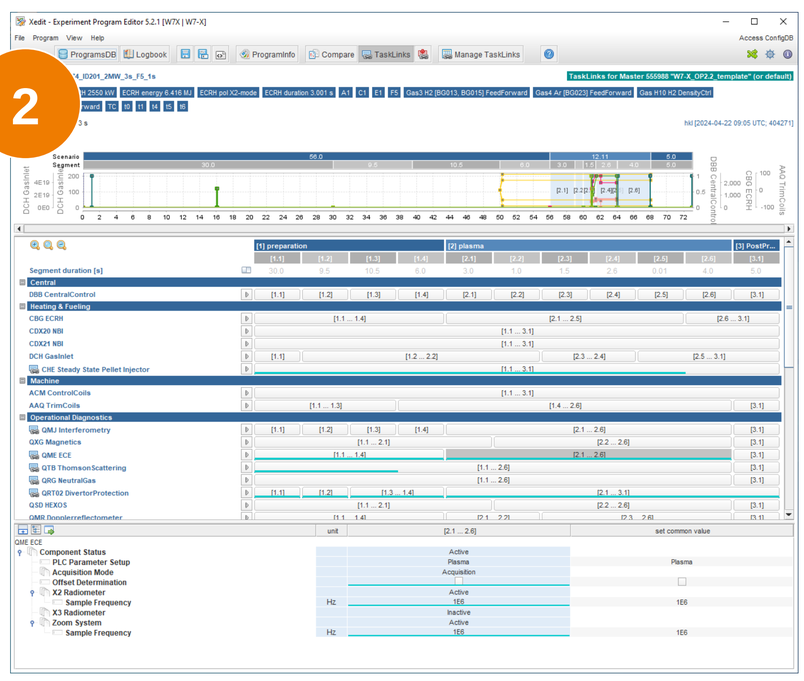
CHALLENGE: TEAM WORK

- focus on the users requirements – both the experiment leaders and component owners
- define workflow for joint editing: announce / visualize / apply parameter changes
- sufficiently flexible framework to handle different timing structures in planned experiment programs



INTEGRATION IN W7-X PROGRAM EDITOR XEDIT





USER EXPERIENCE

Successful deployment at W7-X in the recent operating phase with great user acceptance.

Users work in their well-known environment for parameter editing, equivalent to stand-alone operation and even have other components' settings as reference.

The adoption of the TaskLinks by the experiment leaders is visually apparent for the component owners at program's runtime.

The experiment leaders are still in charge to decide whether to adopt TaskLinks.

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