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Integrating CODAC in ITER Plant Simulator

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The use of Digital Control Systems (DCS) with process simulators for engineering purpose, control system validation, virtual commissioning, or operator training is increasingly demanded in large and increasingly complex industrial projects.
Coupling a DCS with a process simulator requires to support specific functionalities: ability to operate on a simulated time basis and to save/restore states to load different scenarios starting point, or to jump back in time, which is traditionally achieved by emulating or simulating the DCS.
The ITER Control, Data Access and Communication (CODAC) system uses EPICS at its core, which is not designed to operate with such constraints. In the frame of the ITER Plant Simulator project, we leveraged advanced Linux features (libfaketime, namespaces, and CRIU) combined with a custom interface between CODAC and the simulator to meet these requirements. This approach allows integration of a wide range of CODAC tools (HMI, Archive, Alarms, Logbook, Operations Sequencer), synchronized with the simulator, with a lightweight and efficient solution.

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Footnotes

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