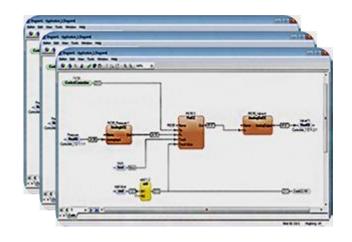


Michael Wahler, Aurélien Monot, Manuel Oriol, ABB Corporate Research, Baden-Dättwil, Switzerland

Extending 4DIAC with a Partitioning and Scheduling Tool

Motivation



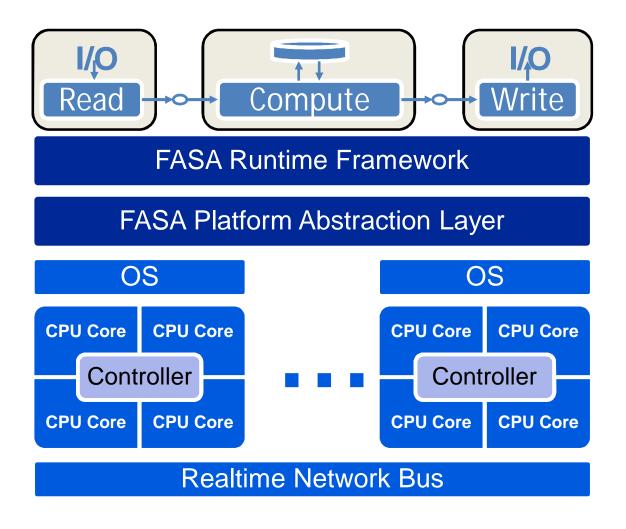


Operating System

CPU Core CPU Core **CPU** Core CPU Core

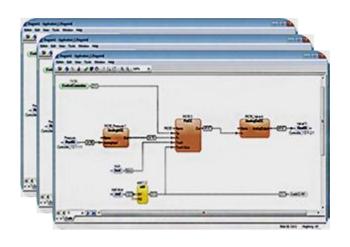


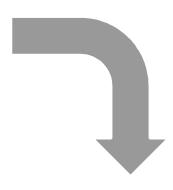
Target Future Automation System Architecture





Solution Static Allocation and Schedule





Function blocks → components

Implementation as C++ objects

Static allocation to **CPU** core

- Reduce cache misses
- Increase predictability

Static cyclic schedule per core

 Control flow determines execution order

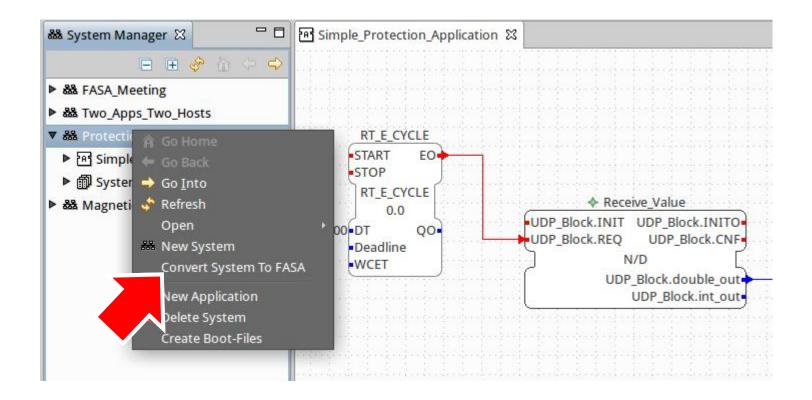


Details

System **Applications** Configuration in 4DIAC in 4DIAC ☐ Package Explorer 🖾 Partitioning and **DAG-based** ▶ ﷺ Boiler Scheduling Heuristics ▶ ☐ fasa_fordiac_integration.feature ▶ 😂 fasa_fordiac_integration.plugin ▶ (fasa_fordiac_update_site ▶ 📂 fordiac_to_fasa.jet.plugin ► S PASA ► (TestSystem **Code Generator JET** ▶ (Tool Library FASA Component Static Schedule (C++)(XML)



Extending 4DIAC Live Demo





Challenges

- JET sucks
 - But using other transformation engines (e.g., Acceleo) was not possible
- Inconsistencies between model and view in 4DIAC
 - We use the view to complement the model
- Different concepts in 4DIAC and FASA
 - E.g., subapplications vs. components
 - Home-made problem ☺



Summary

- FASA is a platform for trying out novel research ideas
- 4DIAC is an excellent engineering platform for FASA
 - Based on Eclipse/EMF
 - Mature model editors
 - Easily extensible
 - Friendly and competent support
- Related work at FTFA 2014
 - Partitioning and scheduling for multi-core
 - T3.3 (Thursday, Sept 18, 16:50)
 - Dynamic software updates with FASA
 - T1.6 (Thursday, Sept 18, 15:00)
 - Efficient M-out-of-N Fault Tolerance
 - SS03.1 (Wednesday, Sept 17, 16:50)



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