

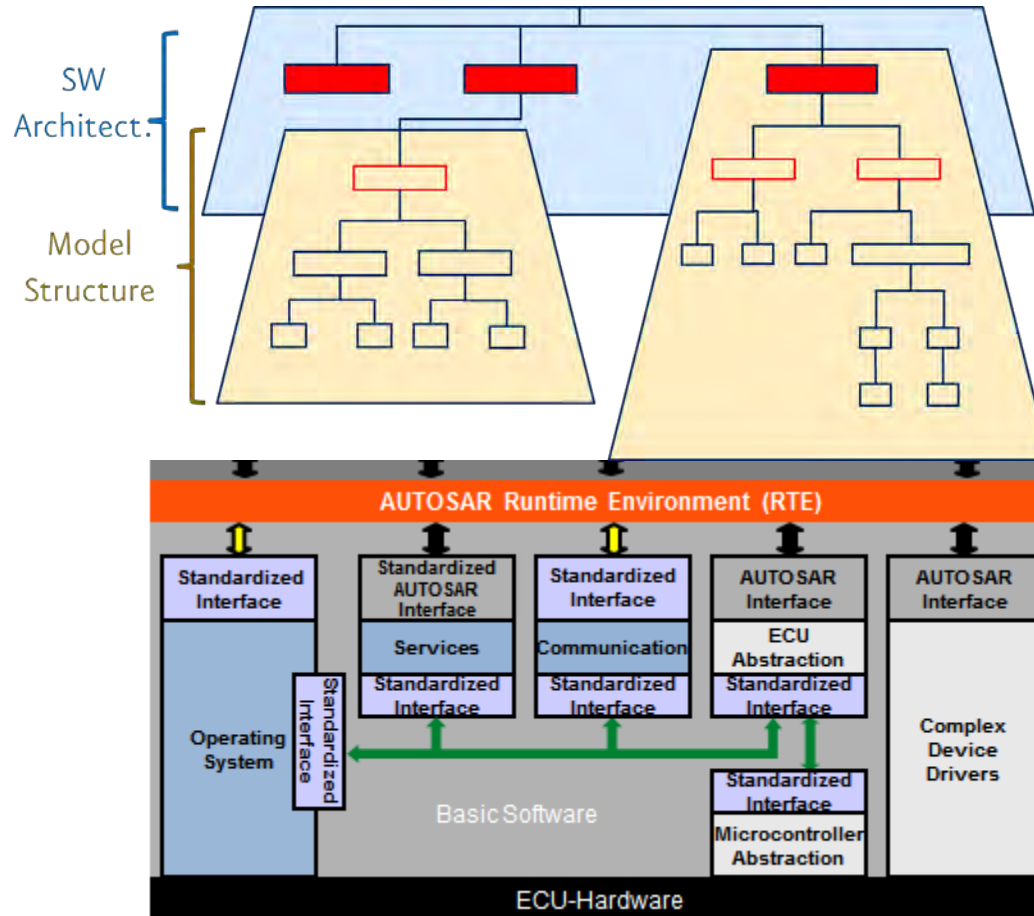
SCHEDULING TECHNIQUES

Multitasking in the Model

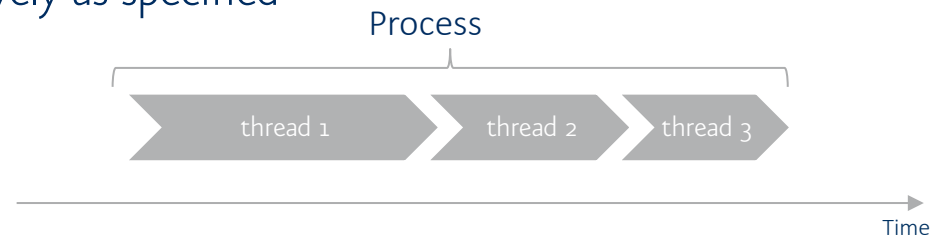
LÄUFT DIE SOFTWARE,
FÄHRT DAS AUTO.

LÖSUNGEN FÜR DIE INTEGRIERTE QUALITÄTSSICHERUNG
EINGEBETTETER SOFTWARE IM FAHRZEUG





- ❑ Mapping of logical units to run-time tasks
- ❑ Define threads within processes according to execution model of run time environment (e.g. statically scheduled OS, AUTOSAR RTE, ...)
 - Processes will be executed consecutively as specified



- ❑ Scheduling of tasks as smallest schedulable unit by operating system
- ❑ Safety constraints on schedule
 - Worst case estimates of task run-times
 - Alignment with constraints of system
- ❑ Analysis if all tasks meet their respective deadlines

- Properties of scheduling strategy need to be defined, e.g.
 - Preemptive
 - Static (time-driven)
 - Dynamic (Event-/priority driven)

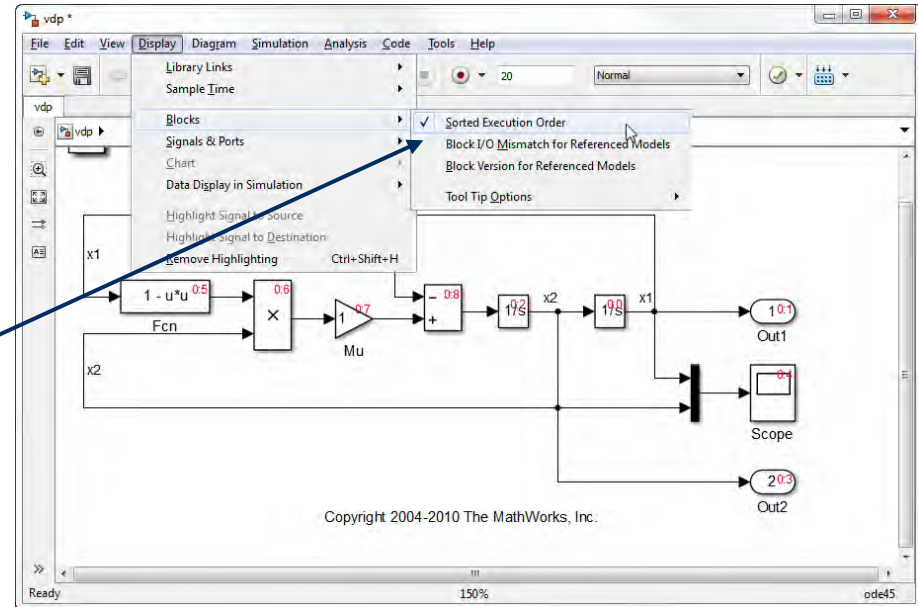
- Definition of tasks and their properties
 - Type of task: periodic, aperiodic
 - Period for cyclic activation
 - Activation events for acyclic tasks
 - Relative deadline (maximum permitted response time), incl. soft or hard deadlines
 - Priorities for tasks including meaning of priority numbering

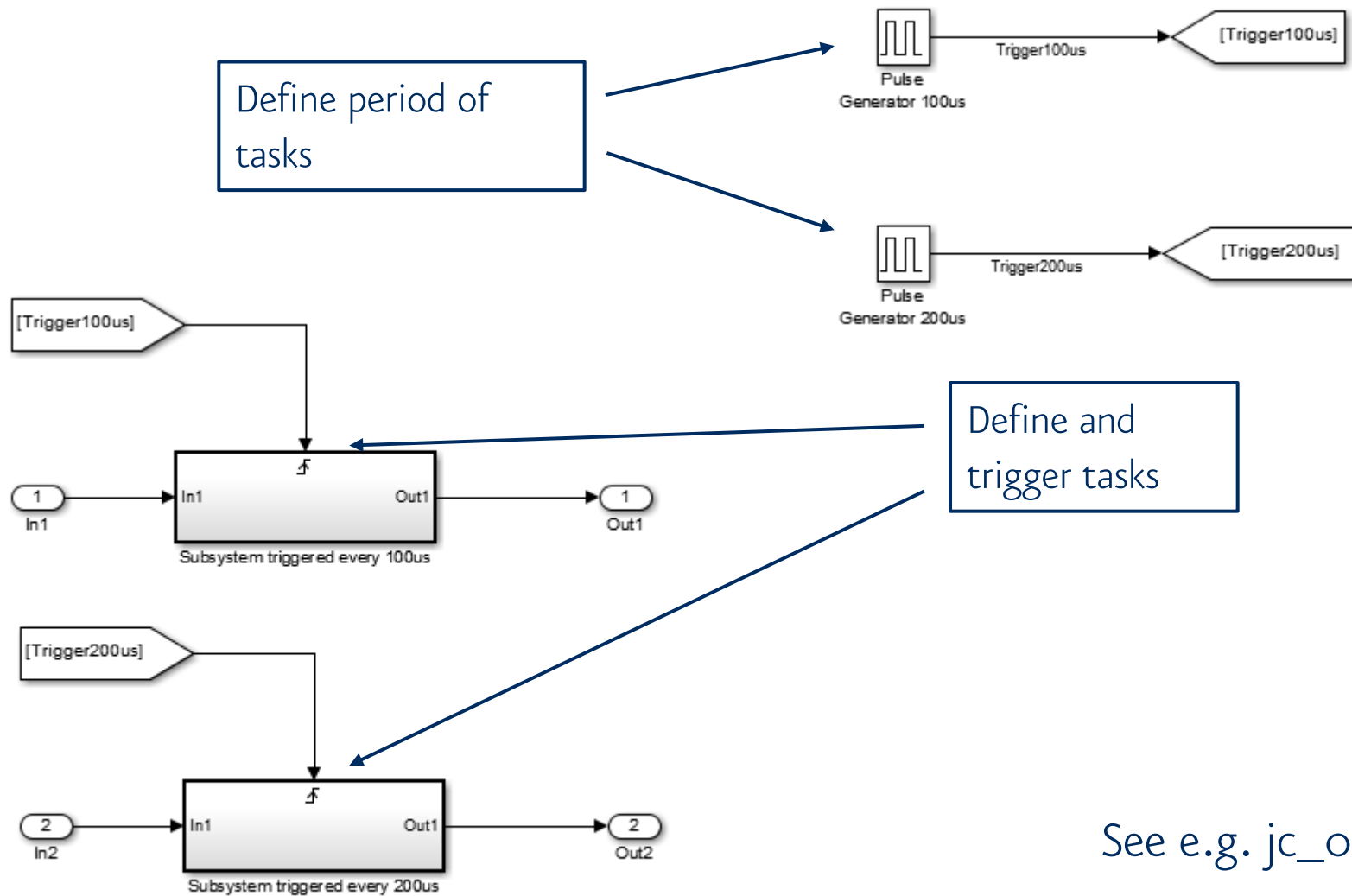
□ Which scheduling aspects can be handled in the model?

- Definition of tasks / processes
- When and how tasks will be triggered
 - Period for activation

□ Priorities

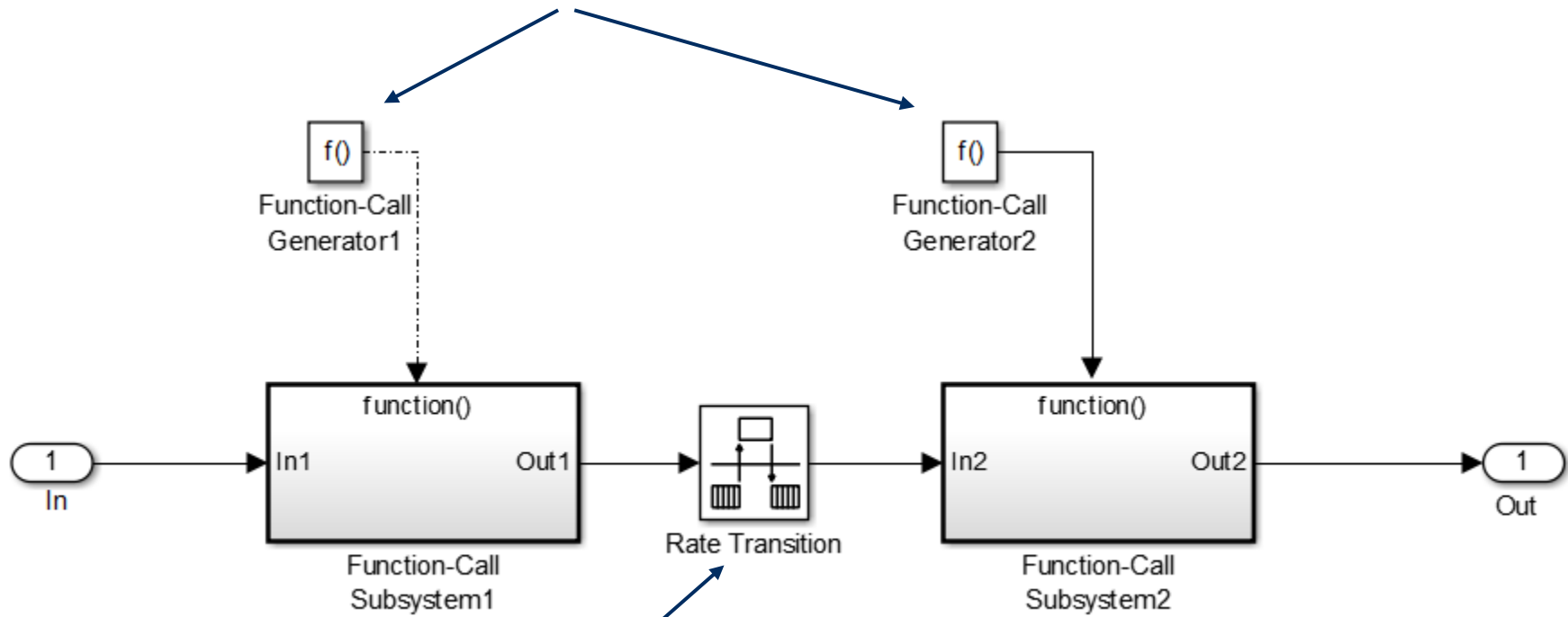
- Model priorities explicitly in Simulink
- See misra_slsf_oog_b:
You must not enforce explicit statement of execution order of blocks.
- misra_slsf_oog_c:
Block execution order must be specified by either data flow or function calls
- misra_slsf_oog_d:
Explicitly state sample times in the model





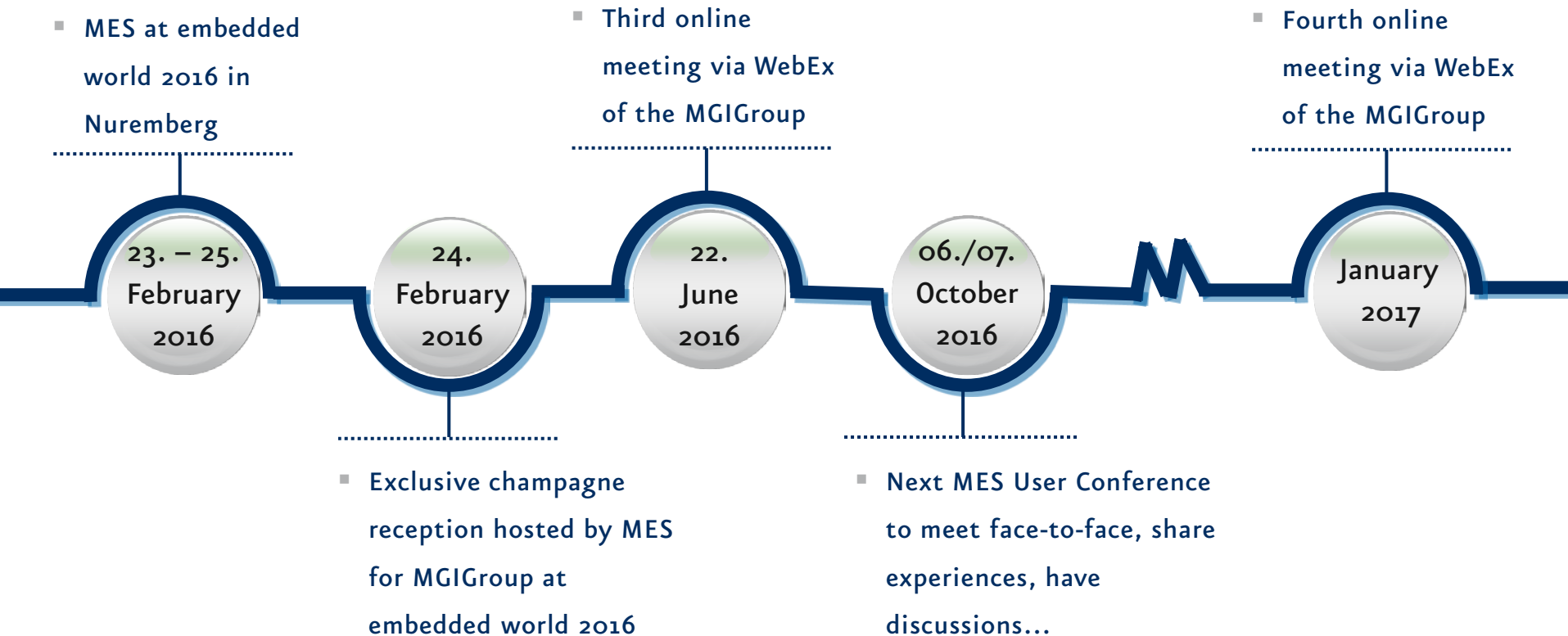
See e.g. jc_0331

You can specify different sample times for your tasks



You can transfer data between subsystems with different rates

- Further modelling styles established for multi-rate SW systems
- Further approaches to relate models / model entities to code



We look forward to welcoming you!

□ October 06-07, 2016

- **Venue:** Soho House, Torstraße 1, 10119, Berlin (Germany)
- **Registration fee:** € 220
- Limited number of participants, please register in advance by September 20, 2016



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