SYMTA VISION

SymTA/S - Roadmap

Future of standards and tools for schedulability analysis

ArtistDesign Workshop on Real-Time System Models for Schedulability Analysis

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Santander, February 7-8, 2011

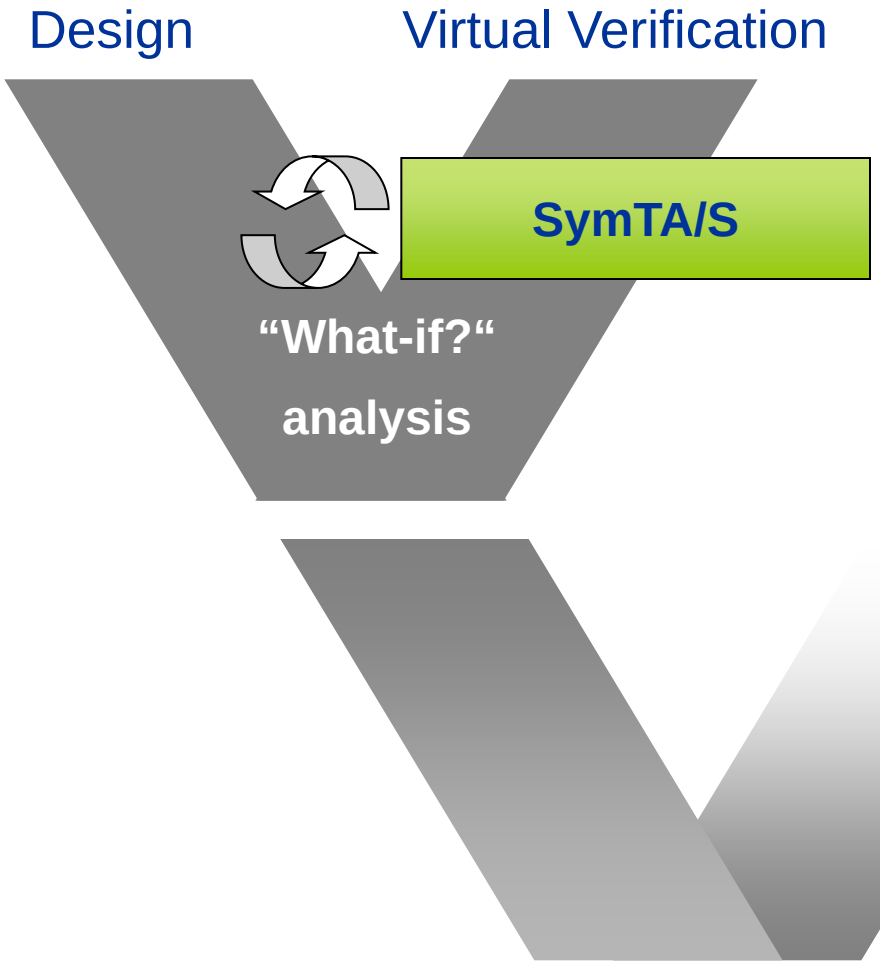
TECHNOLOGIE TRANSFERPREIS
IHK Braunschweig
Winners 2008

Future work

- Full integration of SymTA/S in design and development processes in automotive
  - Interfaces, tool chains, etc.

- Upcoming anaylsis topics:
  - Gateway analysis
  - Multi-Core
  - Aerospace
  - Ethernet

Early-Phase: Virtual Timing Verification



Network:

- network topology options
- bus configuration rules

ECU:

- initial task layout & software architecture
- execution time budgets / estimates

- virtual timing verification
- avoid late timing problems
- system optimization

Late-Stage: Integration Verification

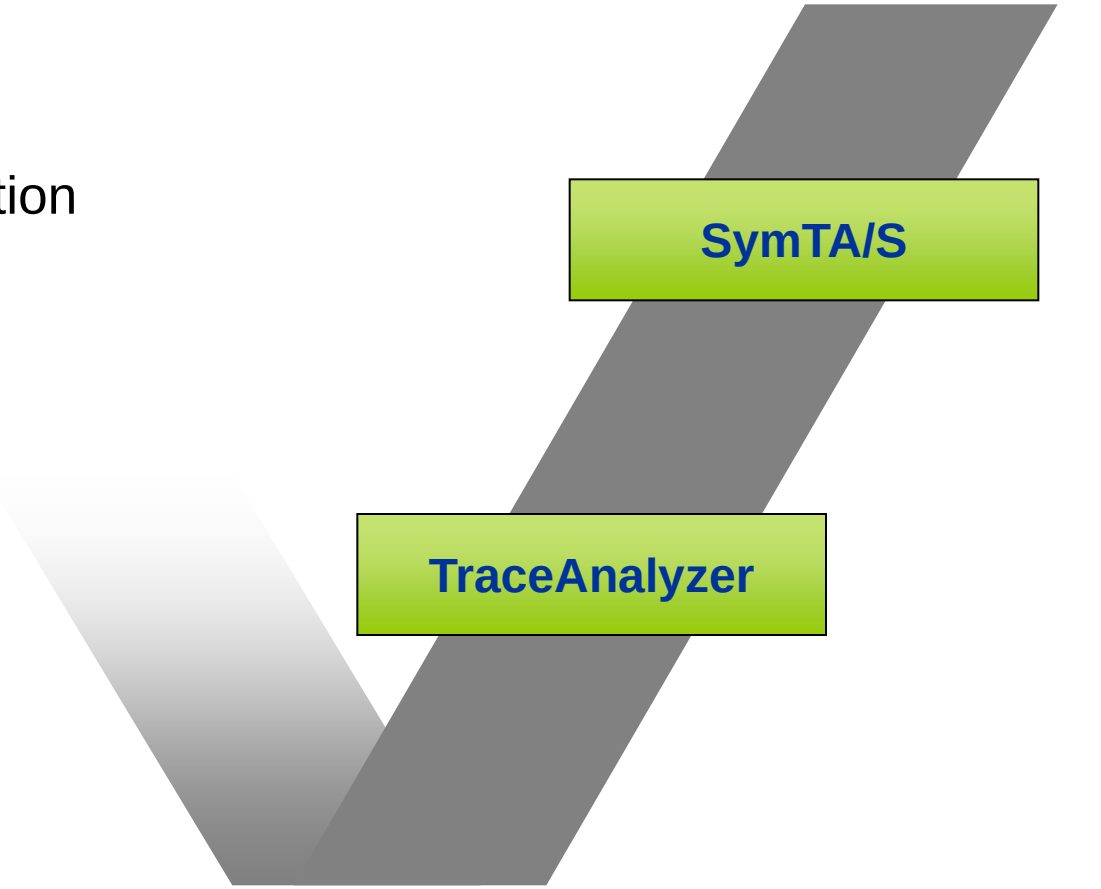
Network:

- fixed topology
- detailed network configuration

ECU:

- detailed OS configuration
- measured execution times

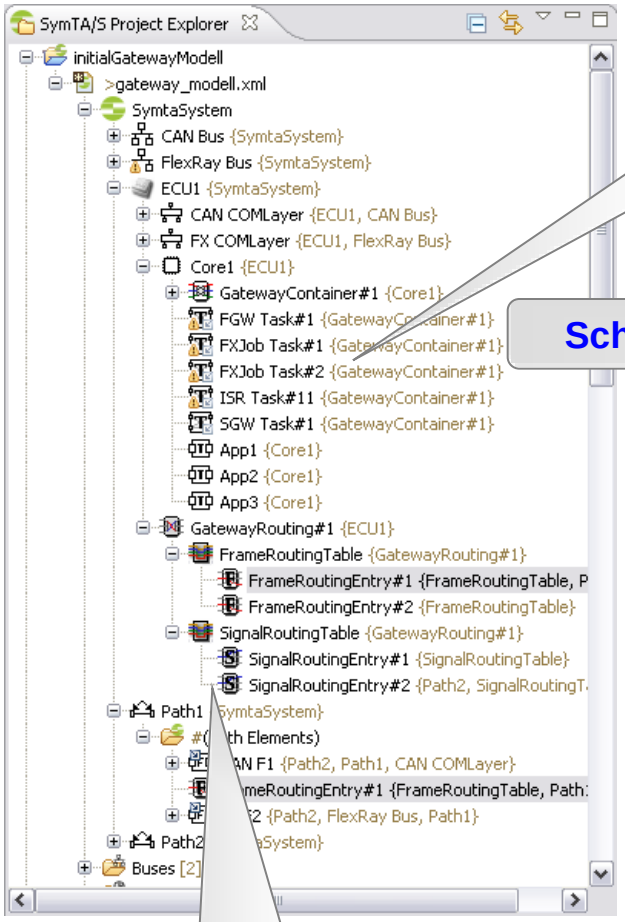
- “real” timing verification
- system fine-tuning
- safety guarantees



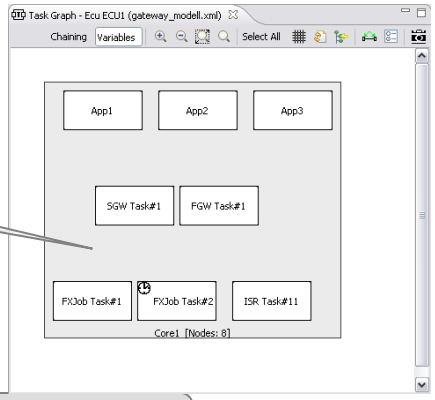
Gateway Analysis Library

- Modeling of gateway timing:
  - COM BSW components: CAN ISRs, FlexRay jobs, gateway tasks
  - configuration data: signal & frame routing tables
  - combination with application software tasks
  - scheduling analysis of BSW execution & routing delay
- Design support:
  - GW SW architecture optimization
  - GW delay minimization
  - avoidance of critical ASW disturbance
- interface: ARXML and SymTA/S XML

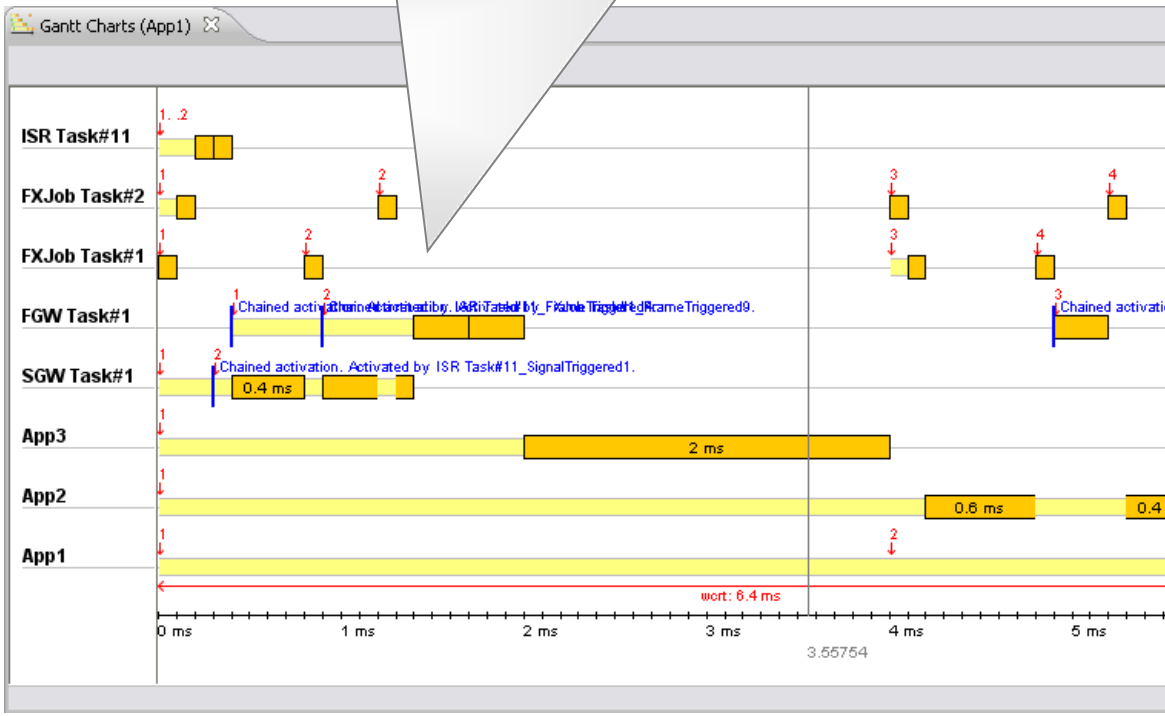
Gateway Analysis Prototype Preview



COM BSW Elements



Scheduling Analysis of COM BSW and user Tasks



Routing Tables for Signals and Frames

Multicore Feature Roadmap in SymTA/S

- waiting effects due to runnable chains across cores
- Communication cost analysis
  - different memory imply different data access time
  - work done at Symtavision (together with Infineon, publication imminent)
  - prototype exists
- Consideration of timing implication of locking semaphore across cores
  - critical sections can contain also memory accesses
  - work performed at TUBS
  - current goal is to enable prototype in SymTA/S
- Automatic SW-mapping in multicore environment
  - Runnable remapping and task schedule sysnthesis

Symtavision Aerospace Roadmap

- Status: Available prototypes for
  - ARINC 653 (IMA)
  - CAN
  - ARINC 664 (AFDX)
  - TTP

- Next:
  - Productization of ARINC 653 (IMA) and CAN for aerospace
  - Collaboration with lead customers

SYMTA VISION

Thank You !

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