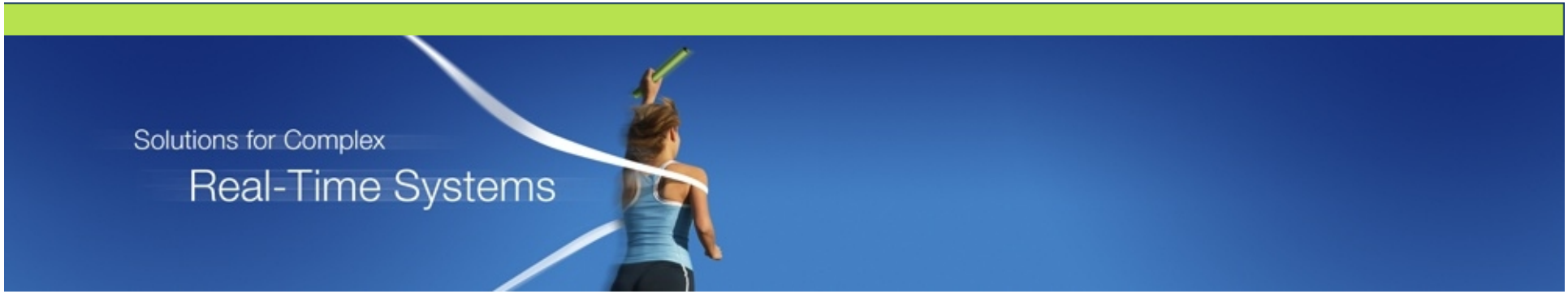
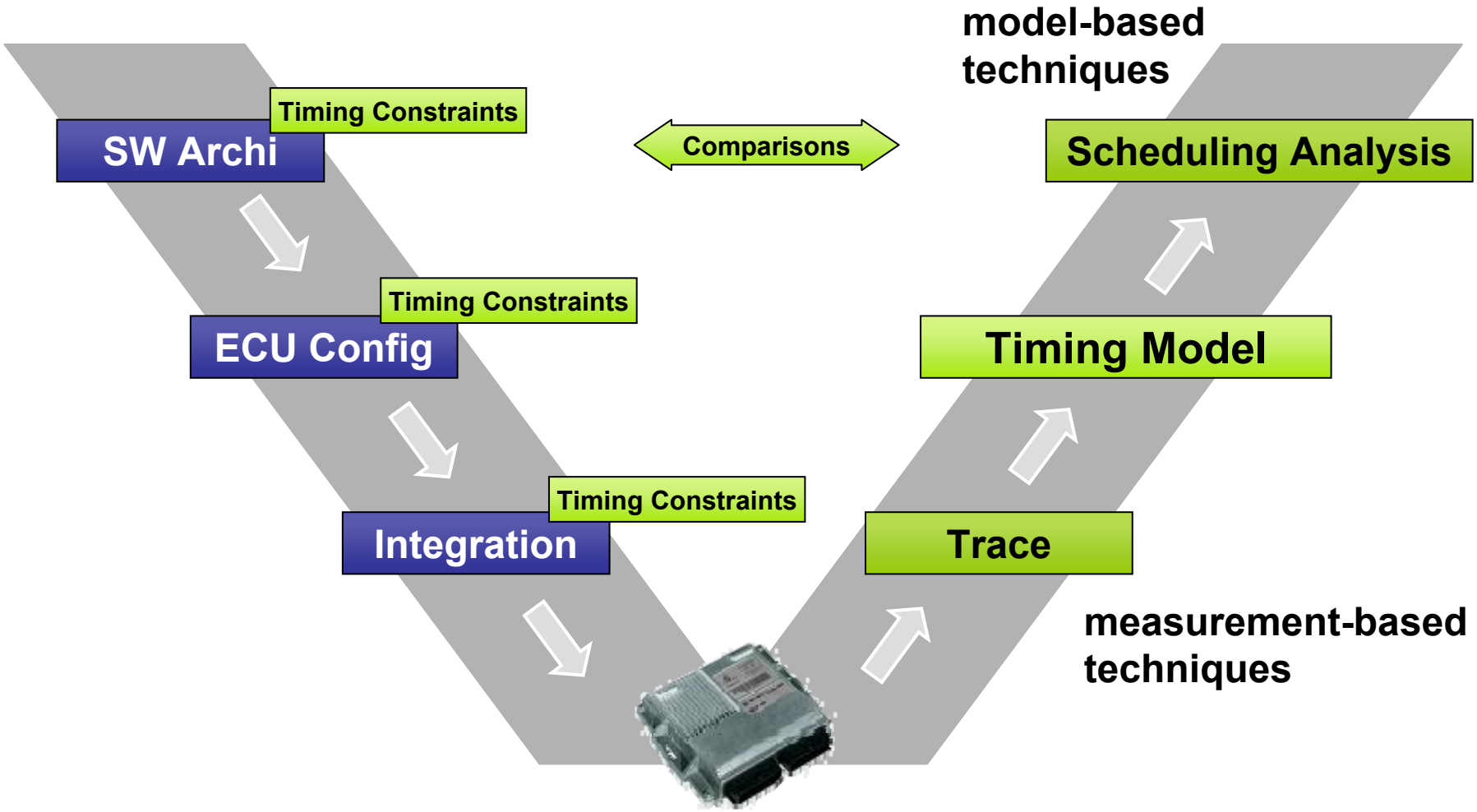
SYMTA VISION

System- / software-architecture exploration & virtual timing verification

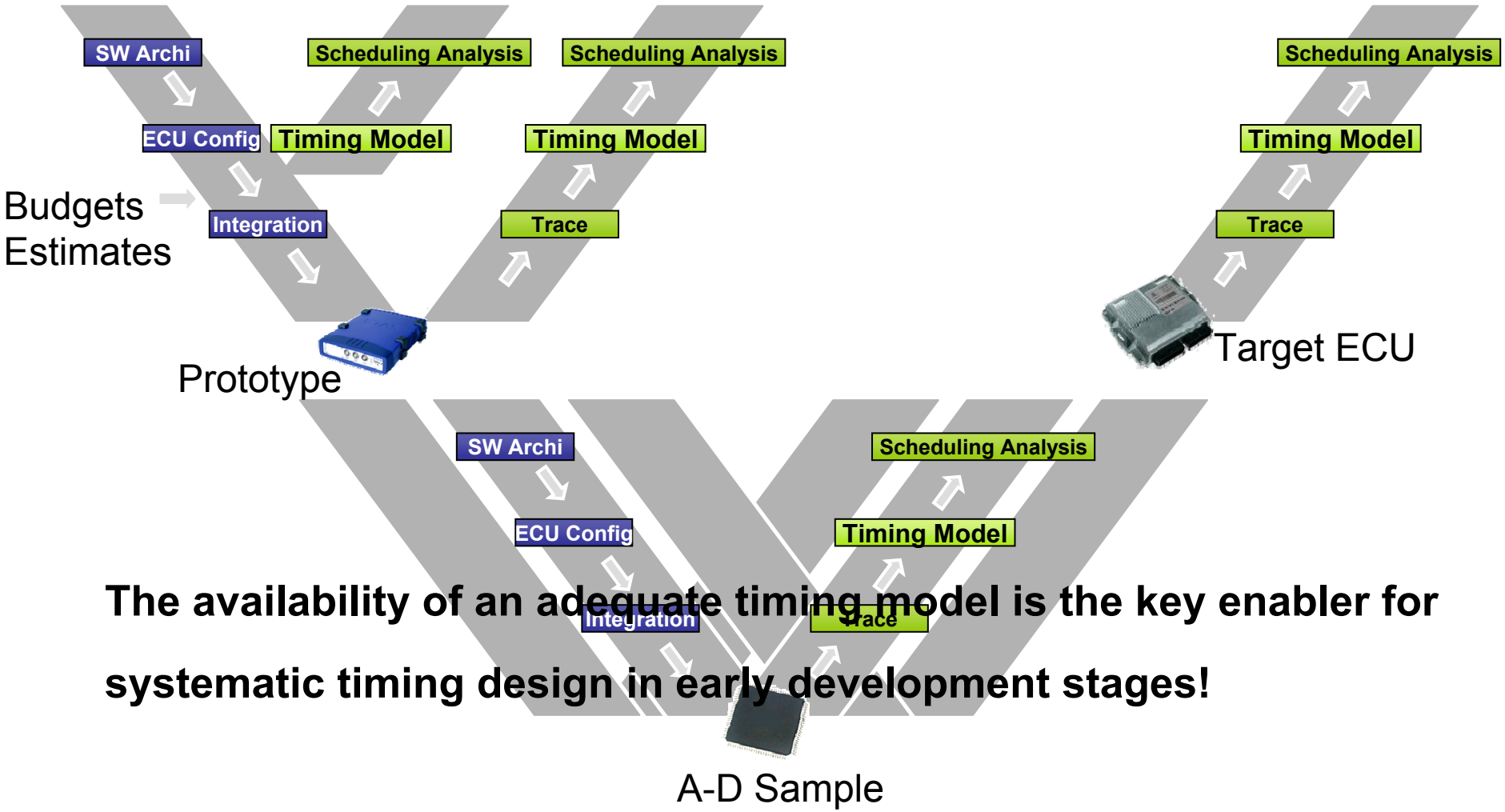
Torino
June 09, 2011



Timing Analysis Techniques and Flows

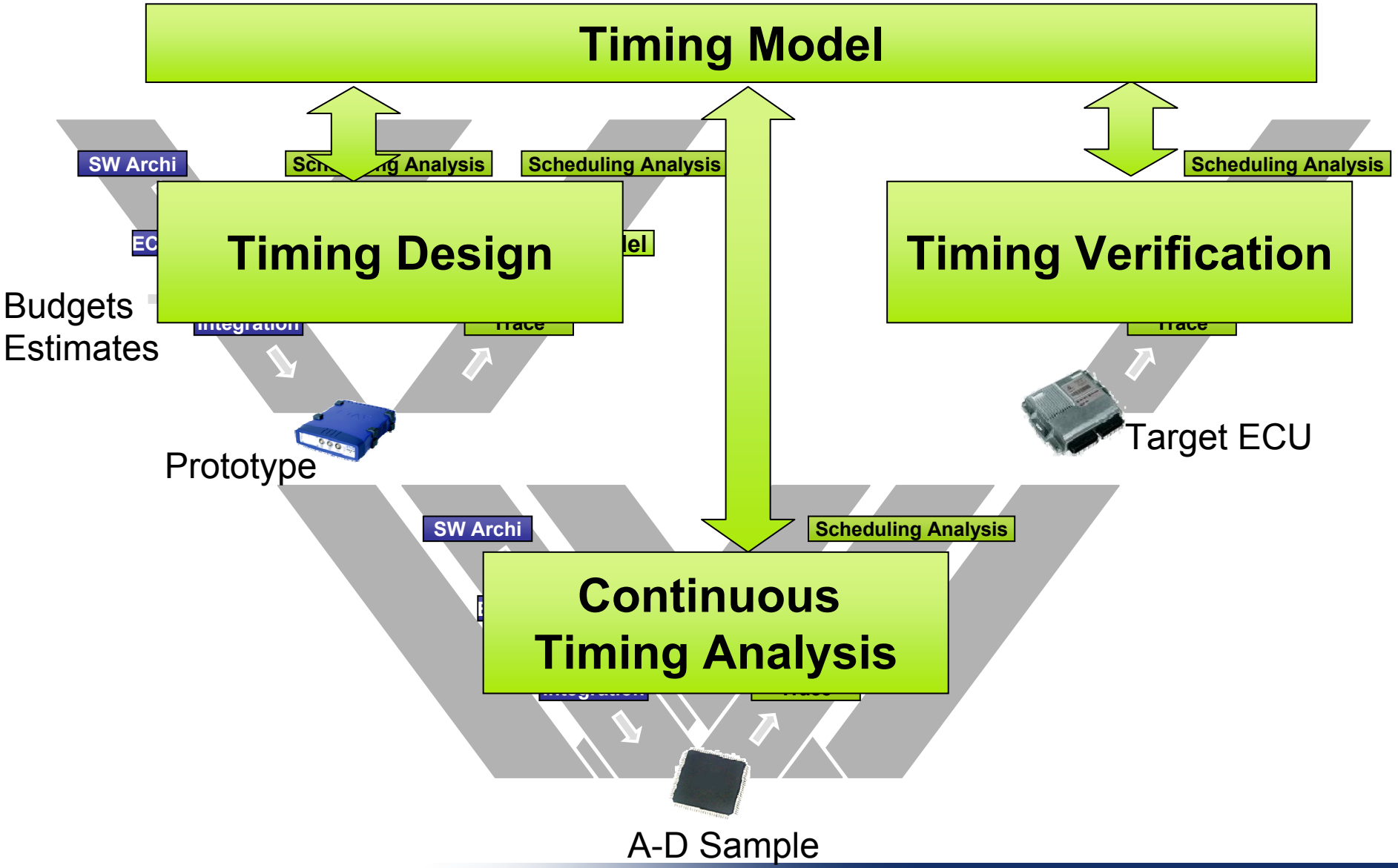


Timing Analysis Early and Late

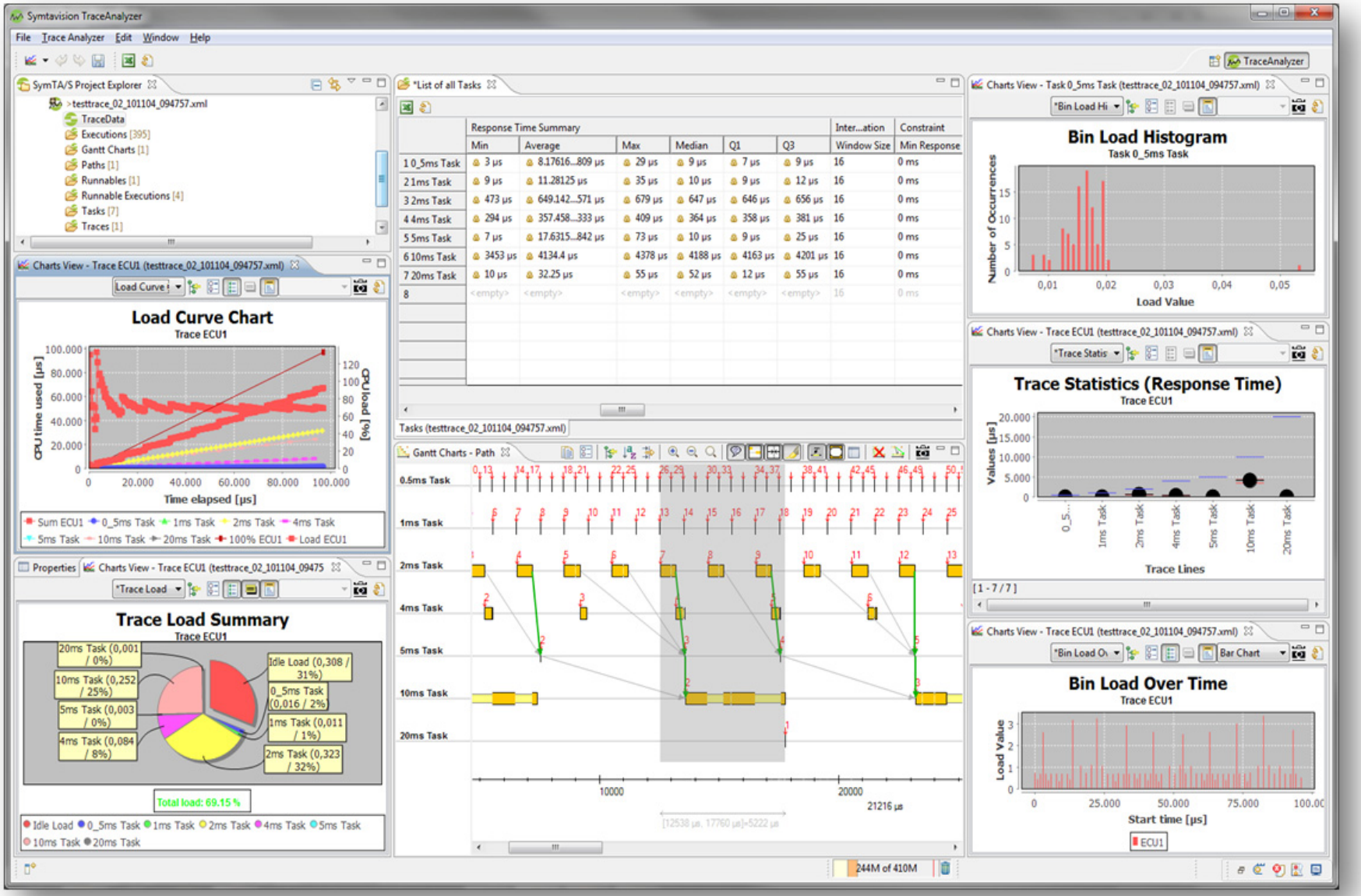


The availability of an adequate timing model is the key enabler for systematic timing design in early development stages!

Consistent Timing Methodology



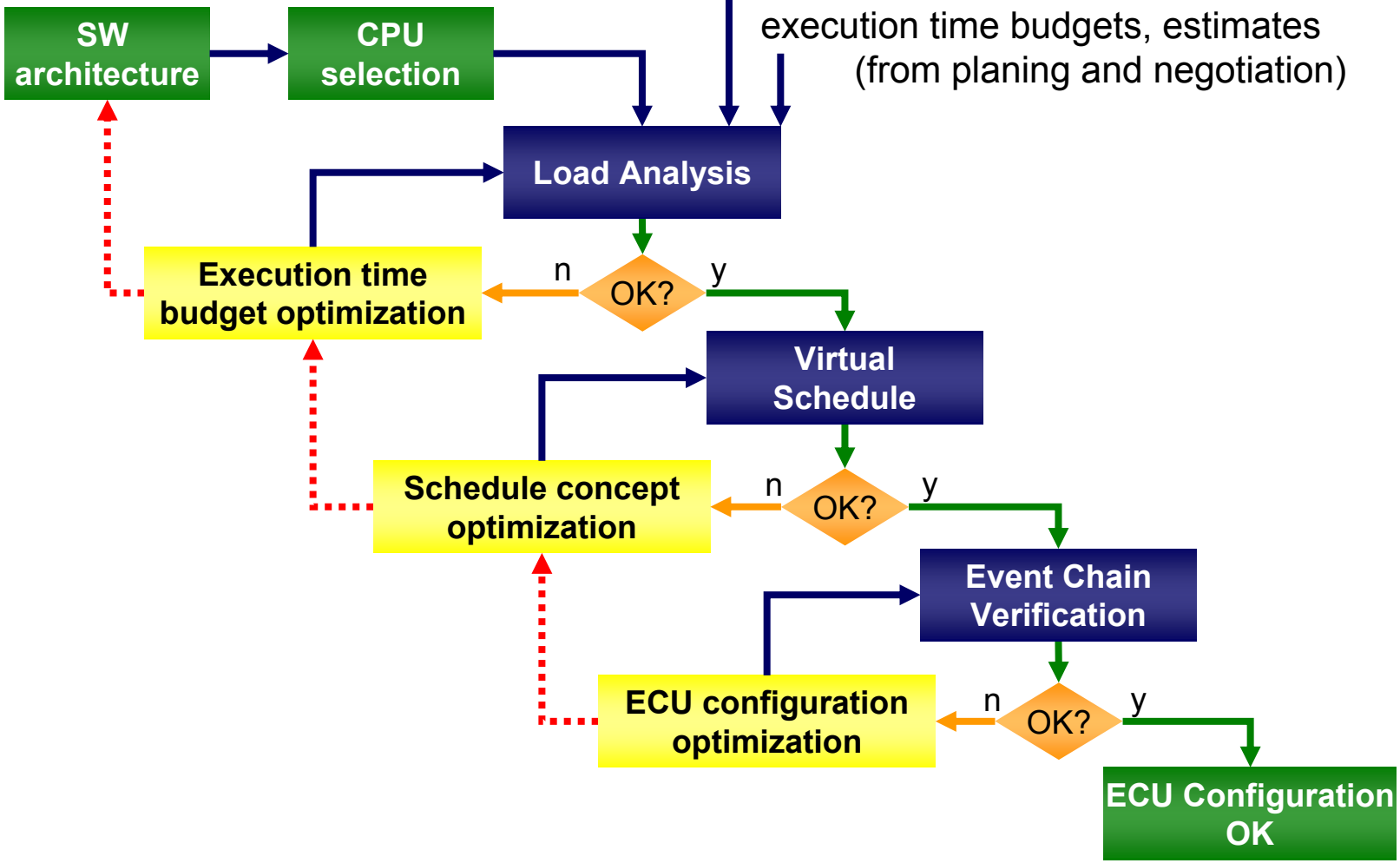
TraceAnalyzer – Measure & Interpret Timing Data



ECU Timing Design

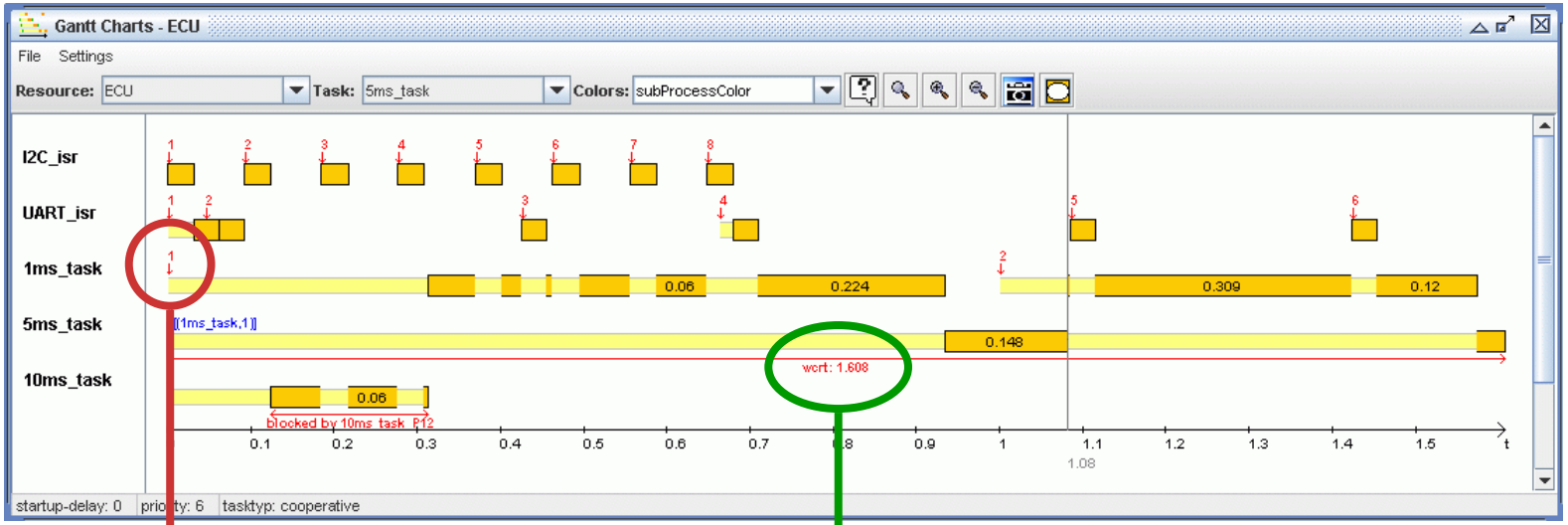
execution times (from prototype trace)

execution time budgets, estimates
(from planing and negotiation)

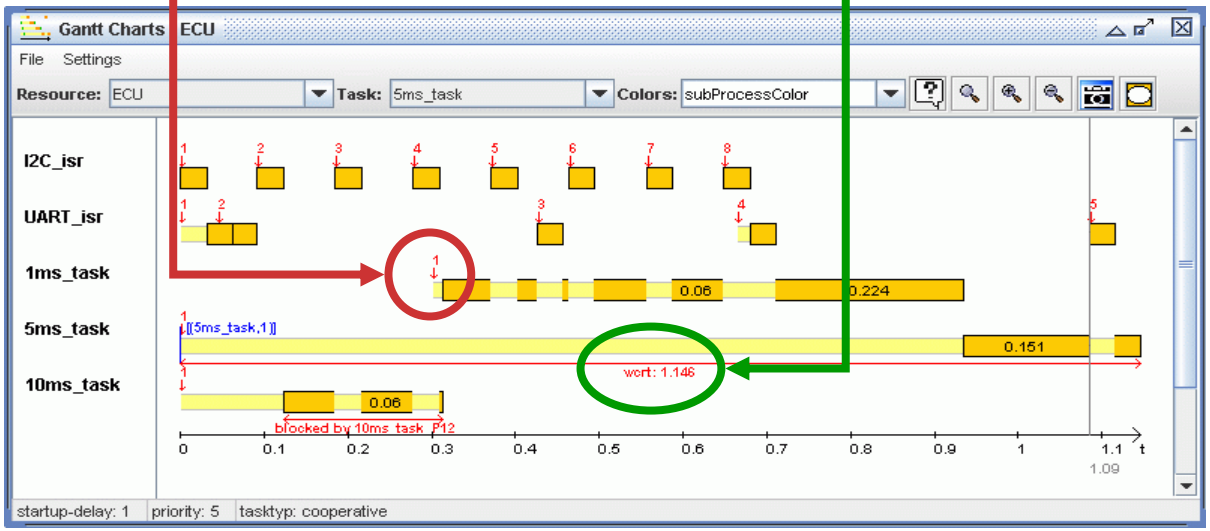


Control Unit Schedule Optimization Example

Before

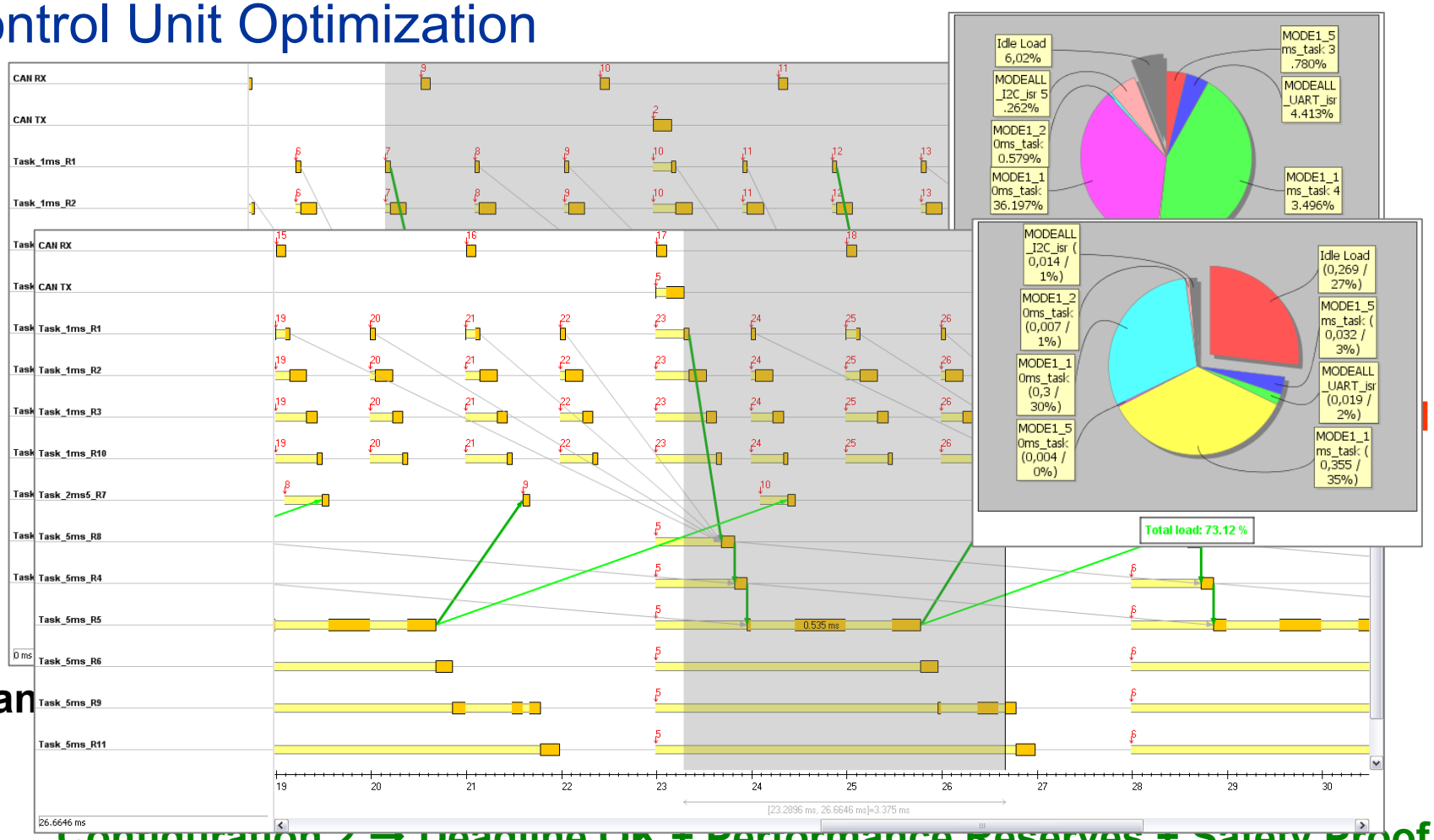


After



By increasing startup delay for 1ms task, the response time of 5ms task decreases from 1.608 ms to 1.146 ms

Control Unit Optimization

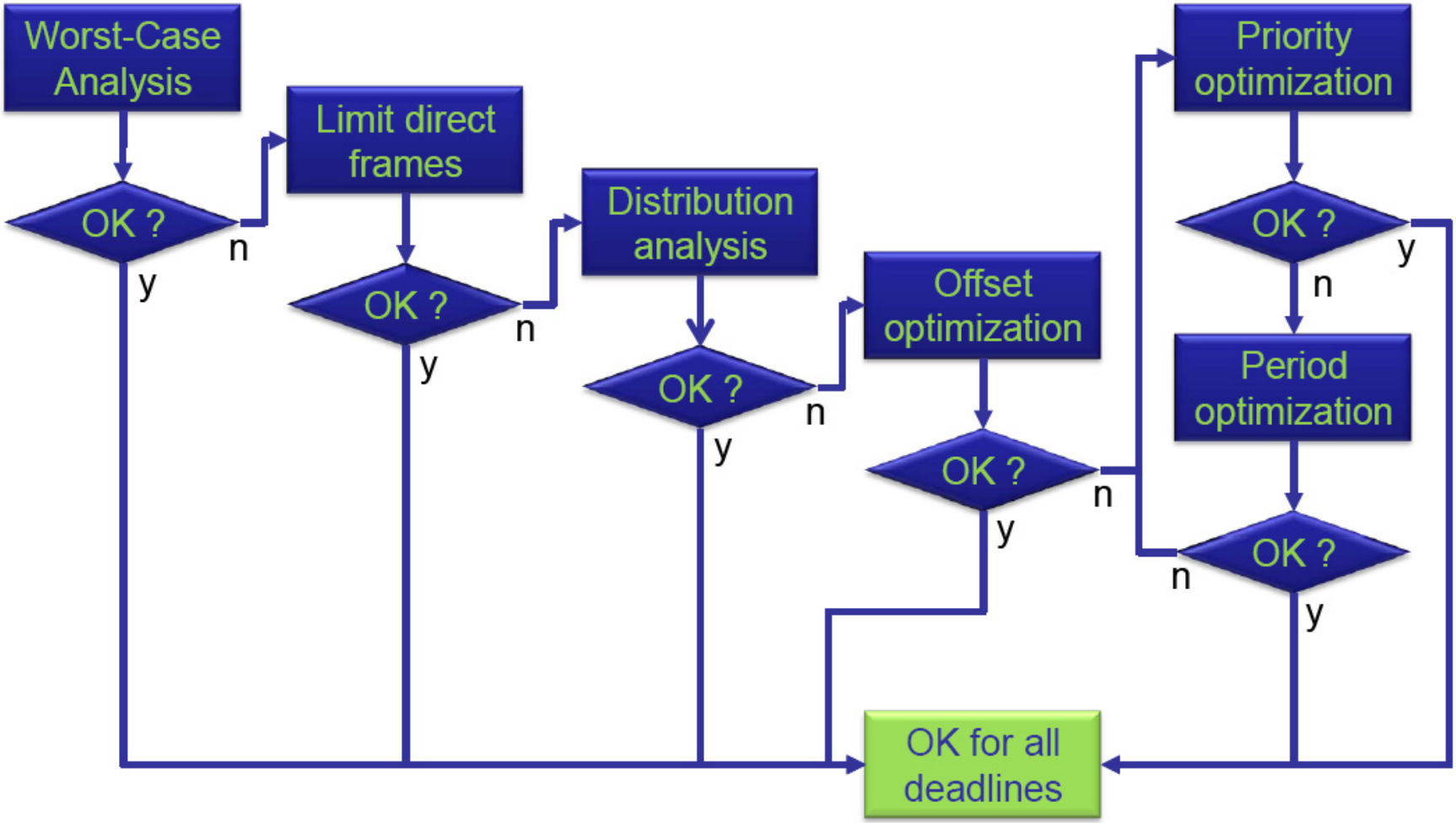


Can

Configuration 2 → Deadline OK + Performance Reserves + Safety Proof

Modeling tools let you specify SW architecture & ECU configuration !
Scheduling Analysis lets you distinguish good from bad designs !

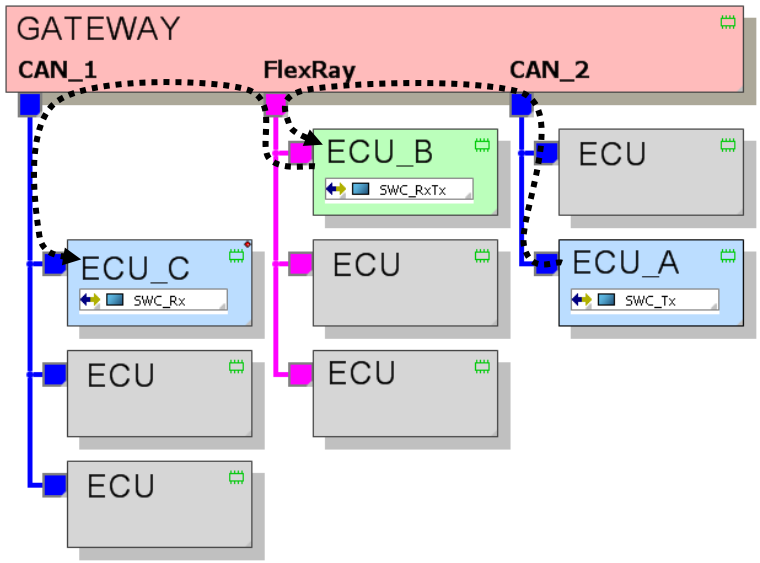
Typical Network Timing Design Flow



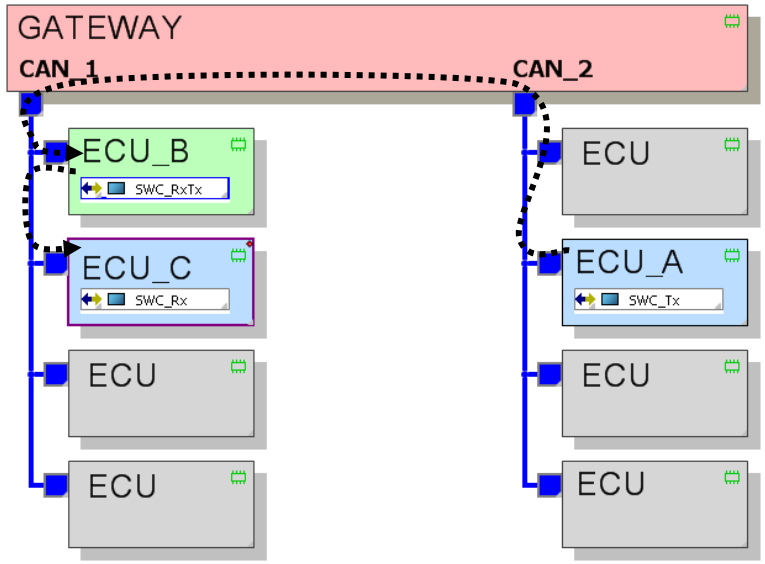
Evaluation Example (1/2)

Decision between CAN and FlexRay

Architecture Alternative (1)



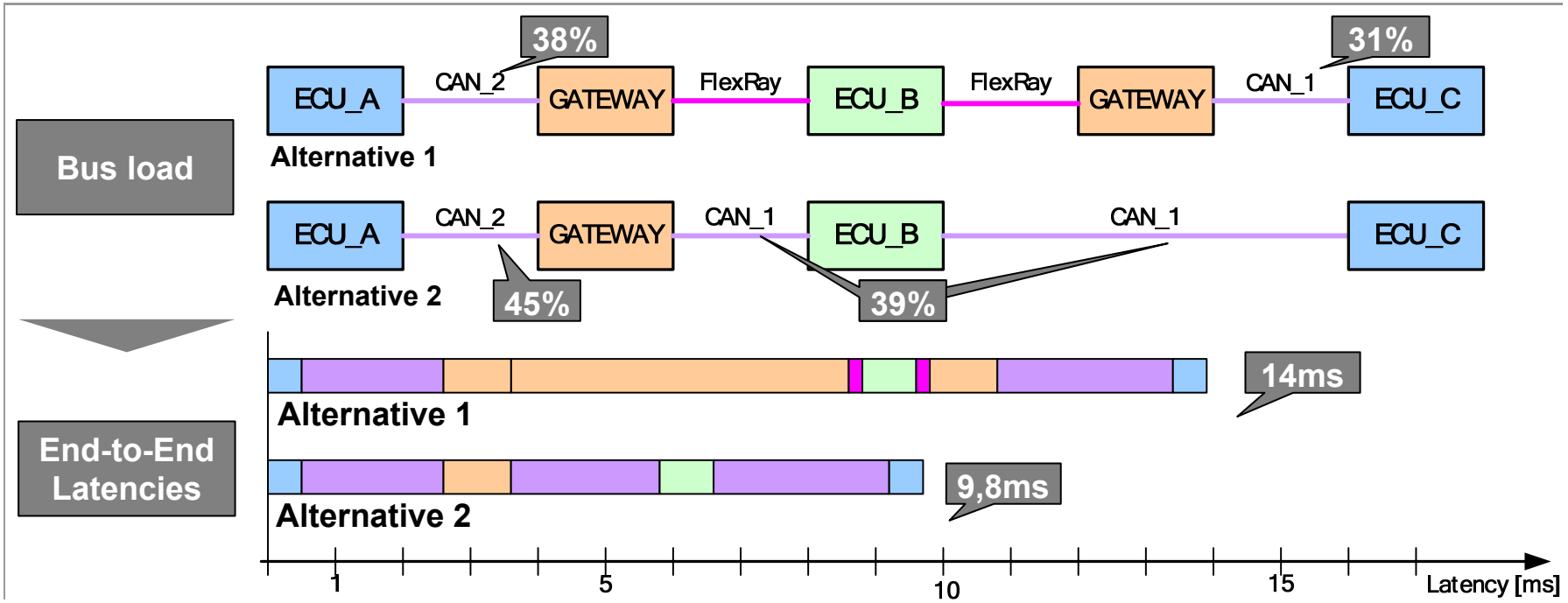
Architecture Alternative (2)



Goal:
Get a more complete decision base for the choice between architecture alternatives.

Source: Daimler AG; GR/PSA; Matthias Traub – FlexRay Product Day 2009

Evaluation Example (2/2)



Result

⇨ **Alternative 1 better in terms of CAN busload**

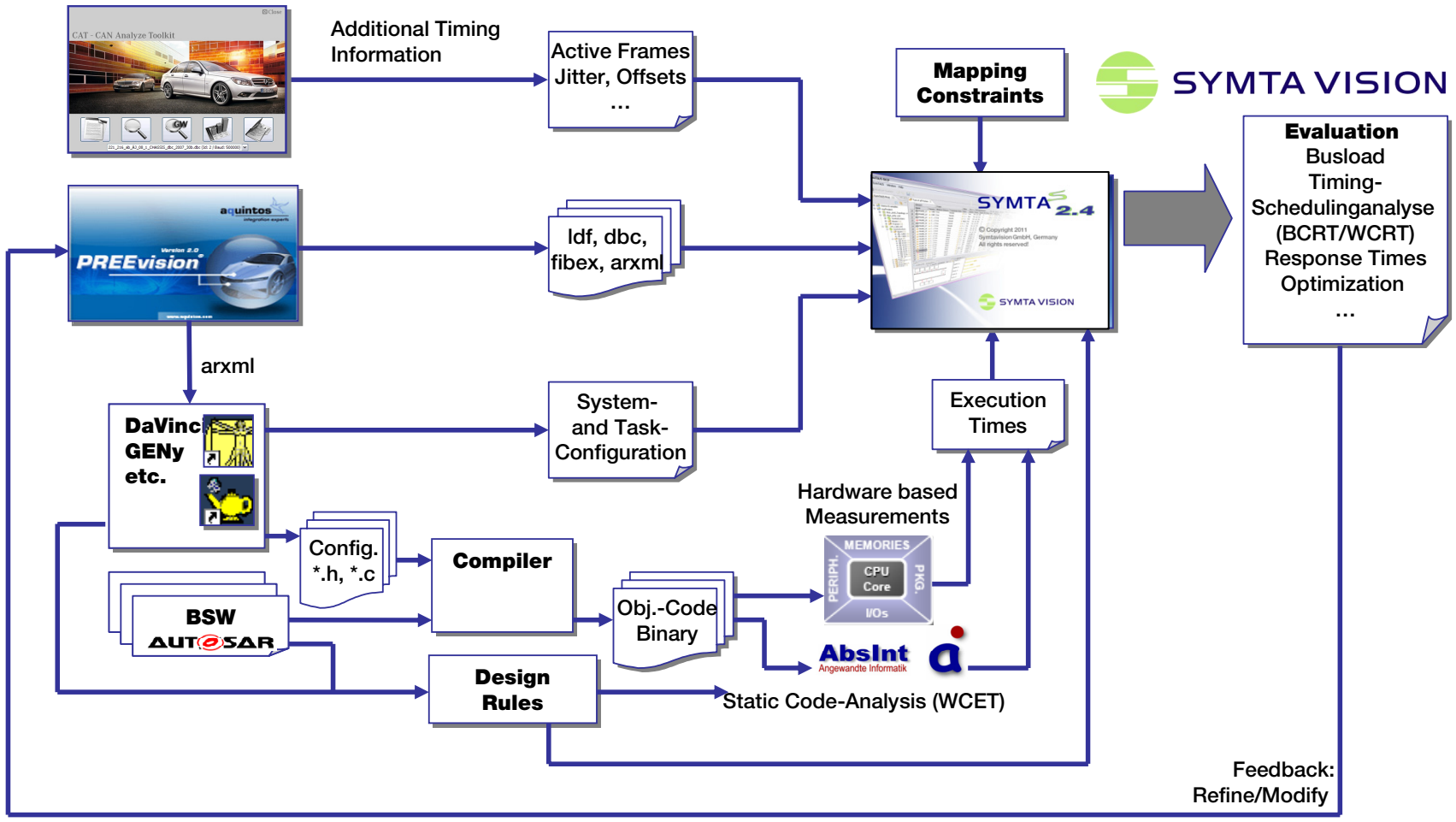
⇨ **Alternative 2 better in terms of End-to-End Latencies**

Conclusion

⇨ **Timing & Performance are complex metrics: Systematic evaluation required**

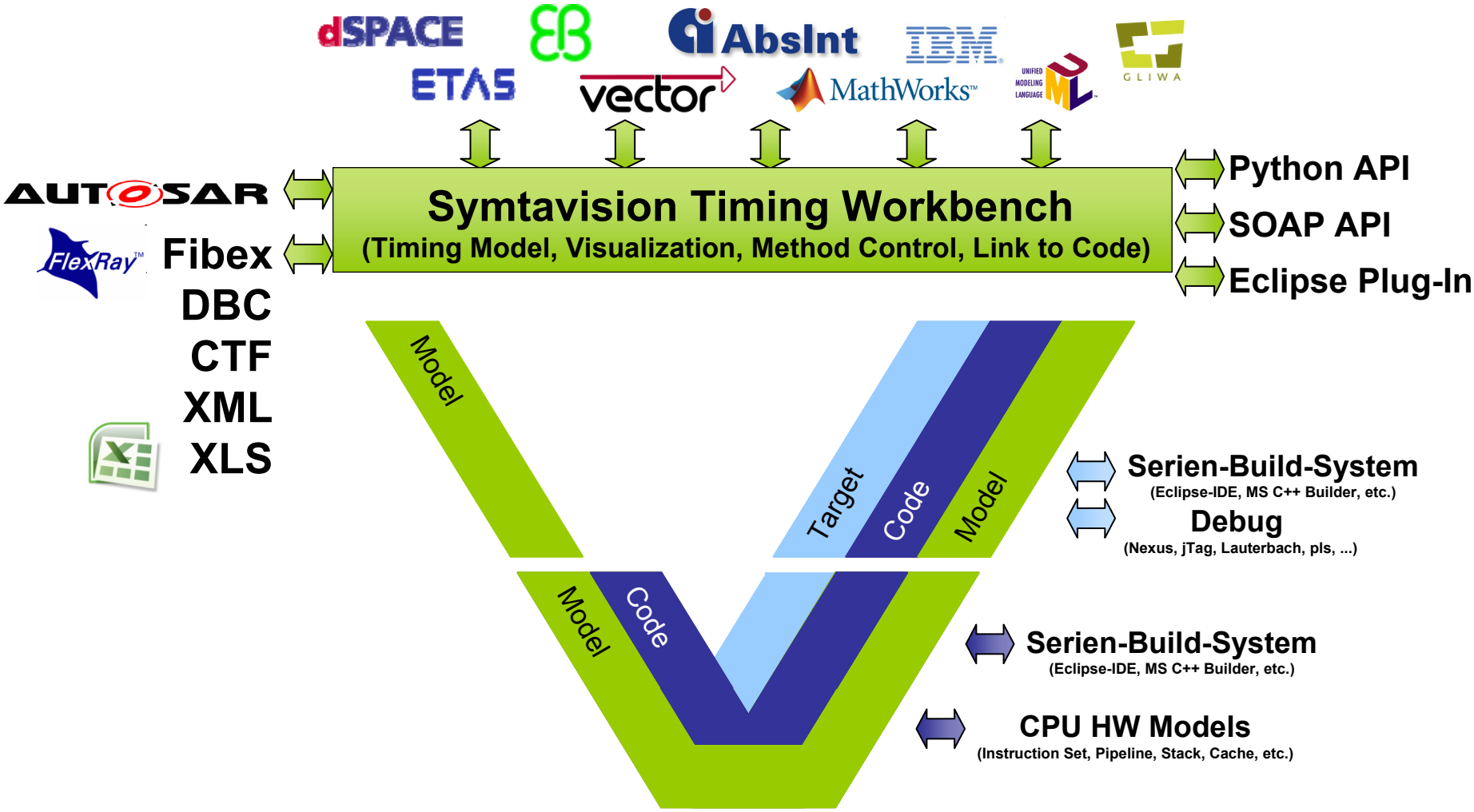
Source: Daimler AG; GR/PSA; Matthias Traub – FlexRay Product Day 2009

Example Tool-flow



Source: Daimler AG; GR/PSA; Matthias Traub – FlexRay Product Day 2009

Symtavision Timing Workbench



Thank You!

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