Questions

- **Who shall develop the networks in the future, the OEM or a 1st tier supplier? What would be the consequence for the design process?**
- **How will future car-to-car communication be included in the automotive network strategy if it shall be used for real-time applications, such as in driver assistance systems?**
- **Are the current protocols, architectures, design methods, and tools appropriate? What innovations are most urgently needed?**
- **Do we need interoperable network service standards, e.g. as a complement to AUTOSAR? Will there be a unified automotive "internet protocol" that eventually dominates all communication in a car?**

Challenge: Design Chain Integration
Automotive Industry

Automakers

GM, Ford, TOYOTA, Volkswagen, HONDA, DaimlerChrysler

- 2005 Revenue $1.1T
- CAGR 2.8% (2004-2010)

Tier 1 Suppliers

Visteon, DENSO, Johnson Controls, Bosch, Delphi

90%+ of revenue from automotive

- 2004 Revenue ~$200B
- CAGR 5.4% (2004-2010)

IC Vendors

freescale semiconductor, Renesas, ST, Infineon, NEC

~15% of revenue from automotive

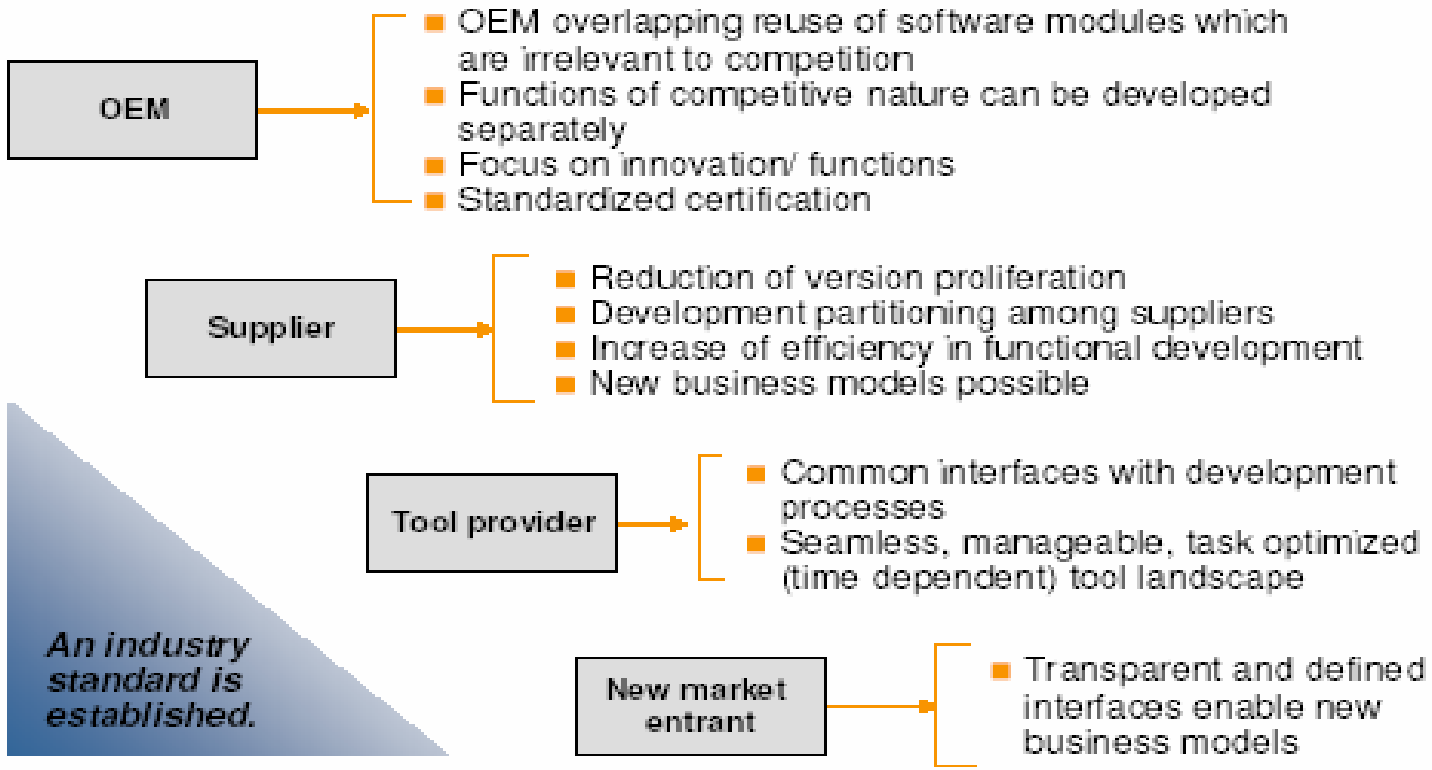
- 2005 revenue $17.4B
- CAGR 10% (2004-2010)

Source: Public financials, Gartner 2005

Are the Suppliers Taking Over?

Business Implications

The realization of an AUTOSAR industry standard will provide significant benefits for OEMs, leading suppliers as well as for tool providers and new market entrants.

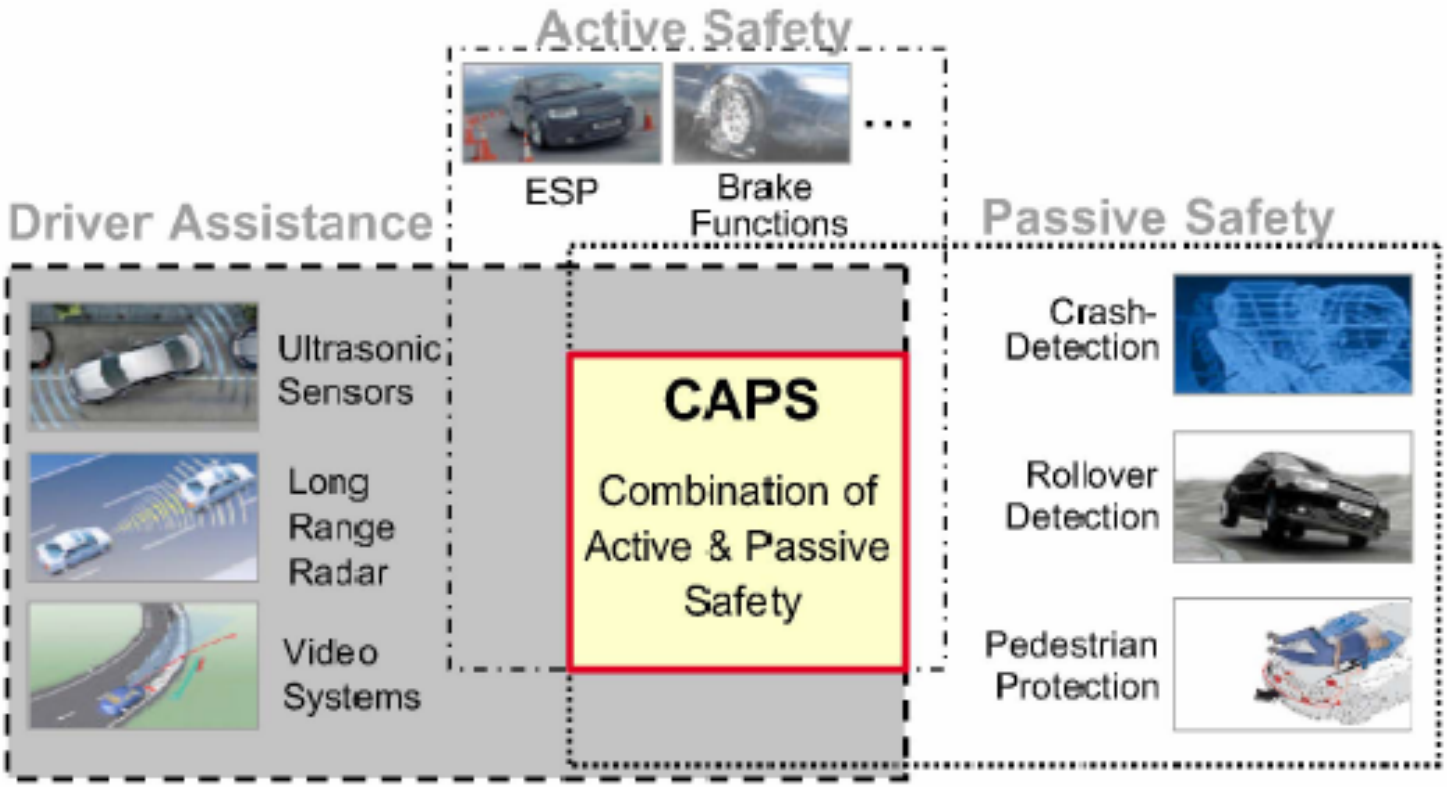


Implications?

The business and technical relationships among players in the automotive electronics chain are likely to change substantially as

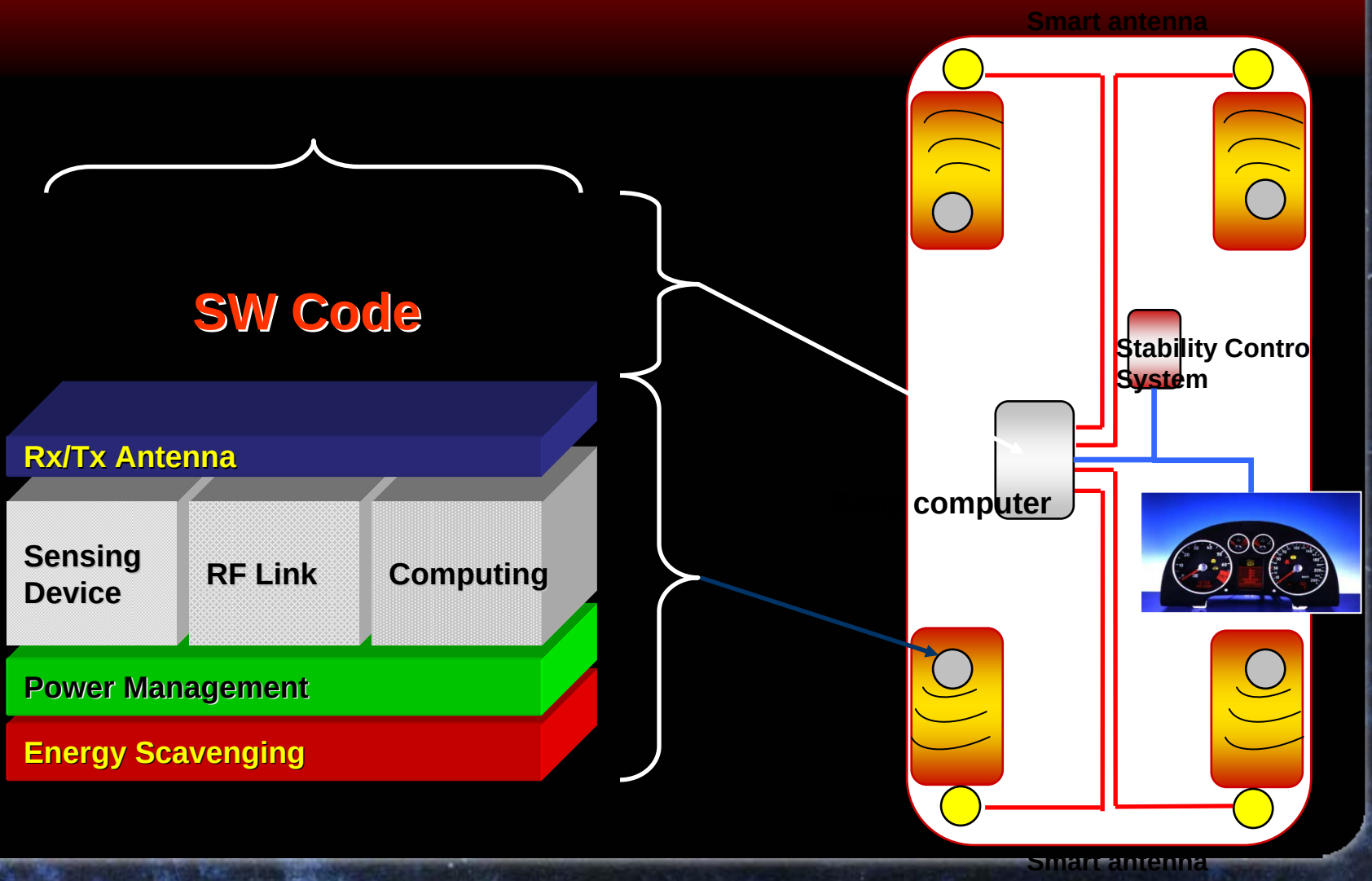
- **OEMs take more control of the electronics content of the car,**
- **Tier 1 suppliers will have to interact and exchange IPs with their peers,**
- **Tier 2 suppliers will have to interact more tightly with their customers.**
- **All suppliers will face commoditization of their business.**
- **EDA suppliers will have to integrate their offerings.**

Combined Active and Passive Safety Systems

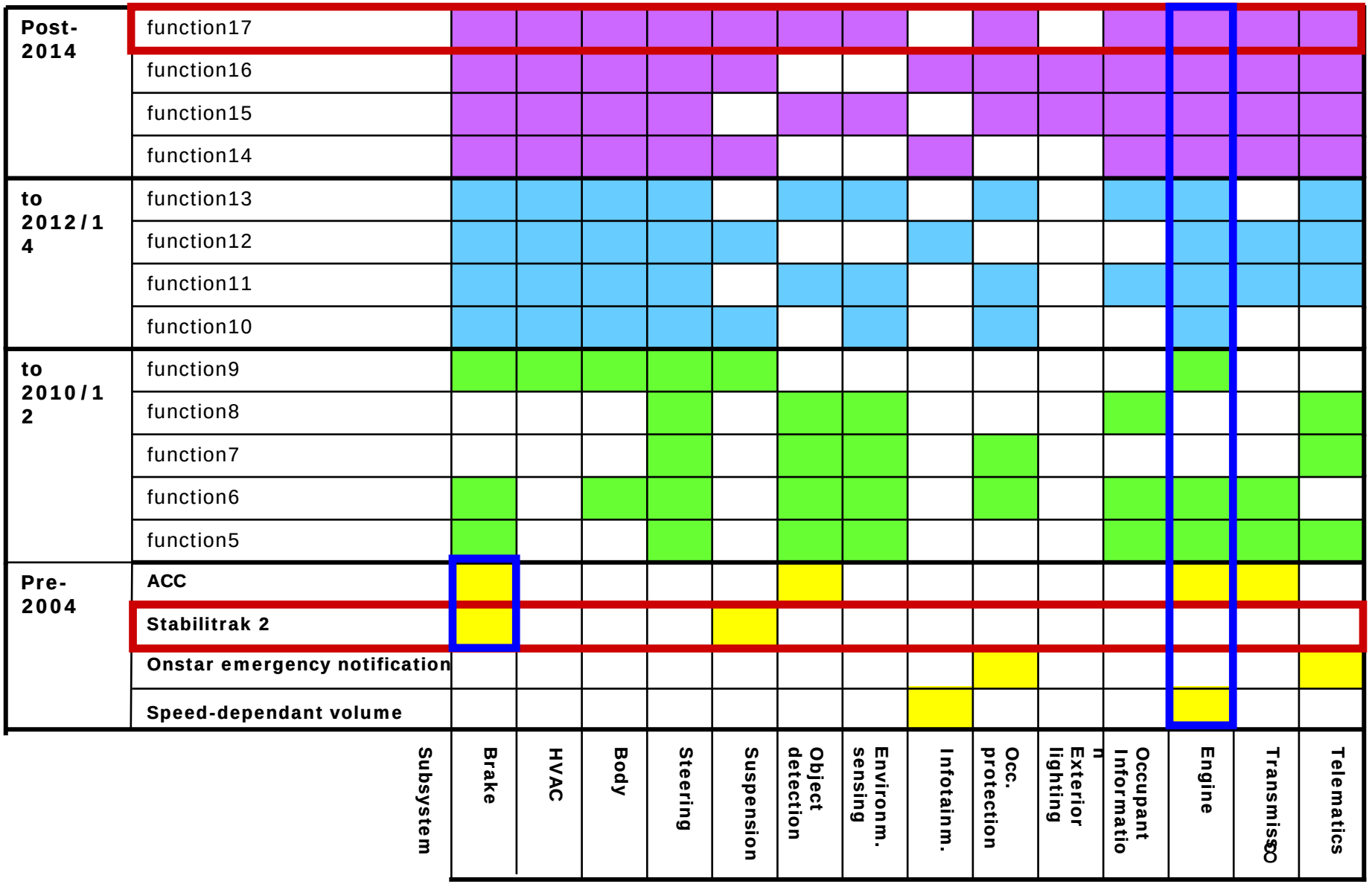


BOSCH

How about Tire to Vehicle?



Evolution of Integrated Functions



We Live in an Imperfect World!

PAGE 14 – SUNDAY, FEBRUARY 6, 2005 – THE NEW YORK TIMES (by Tim Moran)

What's Bugging the High-Tech Car?

On a hot summer trip to Cape Cod, the Mills family minivan did a peculiar thing. After an hour on the road, it began to bake the children. Mom and Dad were cool and comfortable up front, but heat was blasting into the rear of the van and it could not be turned off.

Fortunately for the Mills children, their father – W. Nathaniel Mills III, an expert on computer networking at I.B.M. – is persistent. When three dealership visits, days of waiting and the cumbersome replacement of mechanical parts failed to fix the problem, he took the van out and drove it until the ever fired up again. Then he rushed to the mechanic to look for a software error.

Additionally, the study found that although errors cannot be removed, more than a "It took two minutes for them to hook up their diagnostic box and find the fault," said Mr. Mills, senior technical staff member at I.B.M.'s T.J. Watson Research Center in Hawthorne, N.Y. "I can almost see the software code: a sensor was bad."

Indeed, the high-tech comfort [illegible] continues [illegible] the 2001 [illegible] sending [illegible] freezing [illegible] loyal van [illegible] us. Third [illegible] billion, [illegible]

MOTOR TREND

NHTSA To Probe Reports Of Sudden Engine Stalls In Prius Hybrids

The National Highway Traffic Safety Administration said yesterday it is investigating reports that a software problem can cause the engine of Toyota's Prius hybrid to stall without warning at highway speeds. No accidents have been reported thus far.

NHTSA has received 33 reports of stalling in Prius cars from model years 2004 and 2005, according to the agency's initial report. More than 85 percent of the cars that stalled did so at speeds between 35 and 65 miles per hour.

Automotive architecture trends

- Horizontally-integrated functions are becoming key differentiators and are gaining increasing authority
- An increasing number of functions will be distributed on a decreasing number of ECUs and enabled through an increasing number of smart sensors and actuators
- Transition from single-ECU Black-box based development processes to a system-level engineering process
  - System-level methodologies for quantitative exploration and selection,
  - From Hardware Emulation to Model Based Verification of the System
- Architectures need to be defined years ahead of production time, with incomplete information about (future) features
- Multiple non-functional requirements should be handled

Questions

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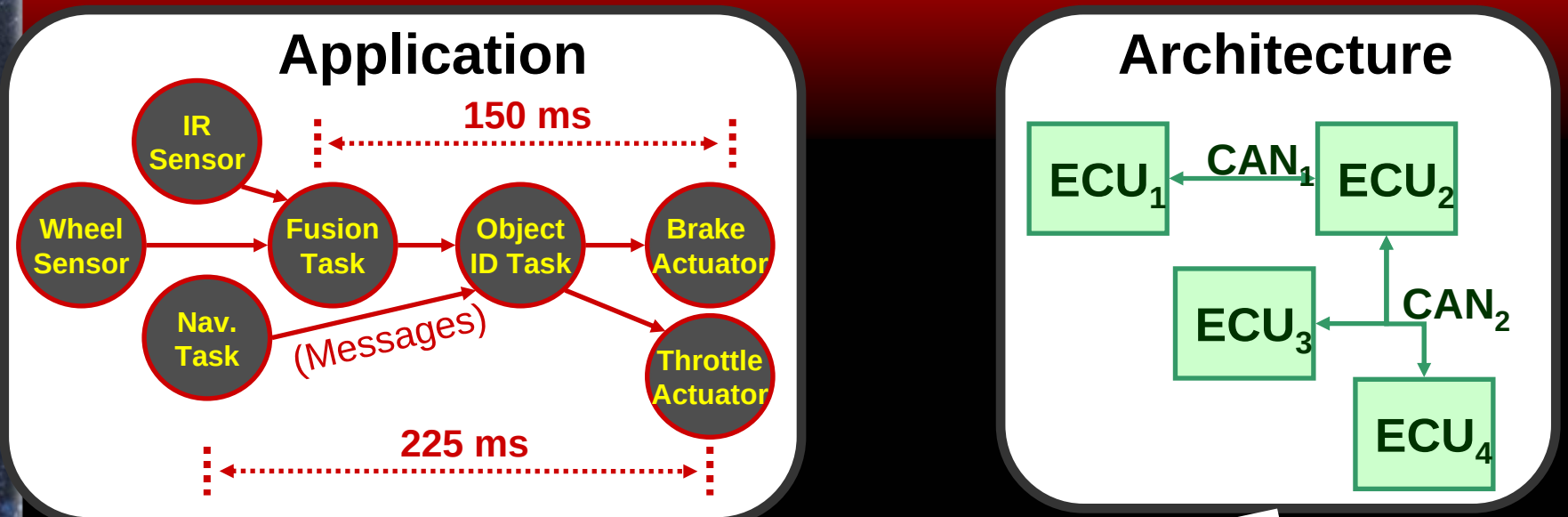
Design Flow



Mapping

Implementation

Allocation
Priorities
Periods
Activation Model

Design Space

Sep 20-21, 2007

Case study results

Before Optimization

- Worst case = 627ms found for paths with deadline 300ms
- Worst case = 302.83ms for paths with deadline 100ms

- 38 ECUs, 6 Buses
- 100 tasks, 322 messages
- 507 links in the functional dataflow
- 184 Paths between 10 pairs of functional nodes
- 1673 variables
- 313 binary variables
- 3989 linear constraints
- Time to solve is 0.25 s (1.4GHz PC)

- Bus utilization between 30% to 50%
- CPU utilization between 5% to 60%

After Optimization

- Max latency=265 for the paths with deadline 300
- Max latency=190 for the paths with deadline 200
- Max latency=97 for the paths with deadline 100

Siemens Acquires UGS

08/01/07

Siemens Aquires UGS

UGS PLM Software outlines its post-acquisition strategy for product- and production-management convergence (Headlines) Automation giant Siemens' acquisition of what is now called UGS PLM Software is being seen as a potential landmark in the evolution of manufacturing systems.

For Siemens, the opportunity, says Anton Huber, a Siemens Automation & Drives board member—and said to be architect of the deal—"is to deliver more value in manufacturing-system optimization. By the time automation components are chosen, that decision space is already restricted.

IBM Acquires Telelogic

06/11/07

IBM to Acquire Telelogic to Advance Global Software Delivery Strategy

Telelogic products help organizations define, model, build, test, deliver and govern the development of software used in complex systems such as aircraft radar or a car's anti-lock braking system. Together, IBM, Telelogic, and business partners, will accelerate a customer's ability to develop high-quality complex systems. Clients will benefit from the combined technologies and services of both companies, providing them a wider range of software and system development capabilities used to build complex systems.

Dassault and Microsoft

06/27/07

Dassault Systémes Strengthens Relationship with Microsoft

Dassault Systémes, a world leader in 3D and Product Lifecycle Management (PLM) solutions, today announced the availability of 3DLive on Windows Vista, high performance computing for Abaqus FEA software on Microsoft Windows Compute Cluster Server 2003 and ENOVIA MatrixOne's support of SQL Server 2005, that will enhance performance and enable DS customers to collaborate more efficiently on the development and management of new products.

Dassault Acquires Dynasim

06/27/06

Dassault Systémes Presents CATIA Systems

Dassault Systémes, a world leader in 3D and Product Lifecycle Management (PLM) solutions, today presents its CATIA Systems strategy, putting embedded systems modeling at the heart of CATIA. DS selected the open standard, Modelica, to be at the core of DS‘s open strategy. Hence, the announcement of DS’s acquisition of Dynasim, a Swedish company, leader in Modelica based modeling and simulation solutions, with the Dymola product suite.