DREAMS Overview

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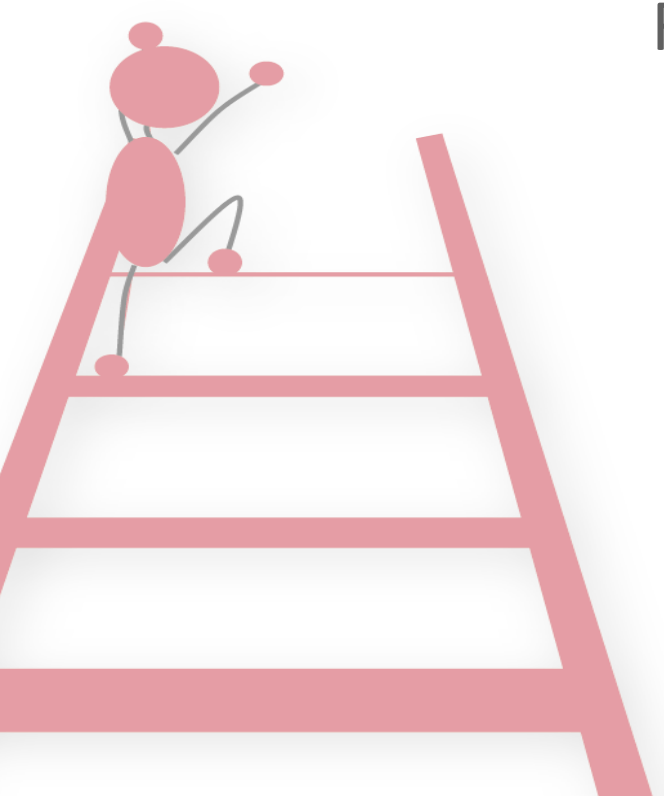


SEVENTH FRAMEWORK PROGRAMME

Project General Information

- Project full title: Distributed REal-time Architecture for Mixed criticality Systems
- Project duration: October 1, 2013 – Sept. 30, 2017
- Type of project: Integrated Project (IP)
- Budget Total: 15.5 mill. EUR
- Coordinator: Roman Obermaisser (Univ. of Siegen)

Industry	Thales SA	France
	Alstom Wind S.L.	Spain
	STMicroelectronics	France
	TÜV Rheinland	Germany
SME	TTTech	Austria
	RealTime-At-Work	France
	Virtual Open Systems	France
	FENTISS	Spain

Research Org.	ONERA	France
	Ikerlan	Spain
	SINTEF	Norway
	Fortiss	Germany
Univ.	Universität Siegen	Germany
	TU Kaiserslautern	Germany
	UPV	Spain
	TEI	Greece

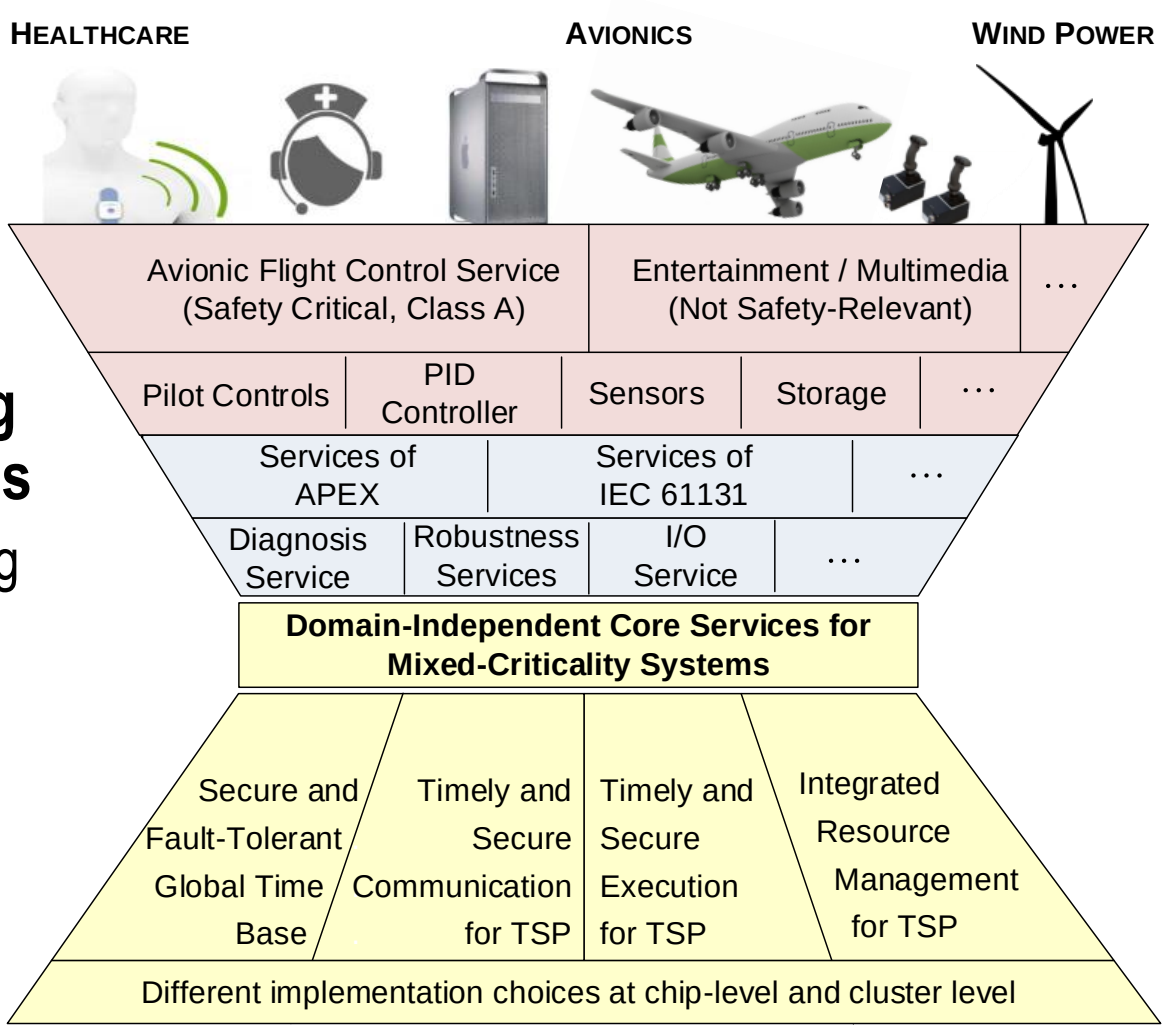
Project Description

Mixed-criticality architecture based on networked multi-core chips

1. Architectural style and modelling methods
2. Virtualization technologies for security, safety, real-time performance, integrity in networked multi-core chips
3. Adaptation strategies for mixed-criticality systems
4. Development methodology and tools based on model-driven engineering
5. Certification and mixed-criticality product lines
6. Feasibility of DREAMS architecture in real-world scenarios
7. Promoting widespread adoption and community building

DREAMS Architecture

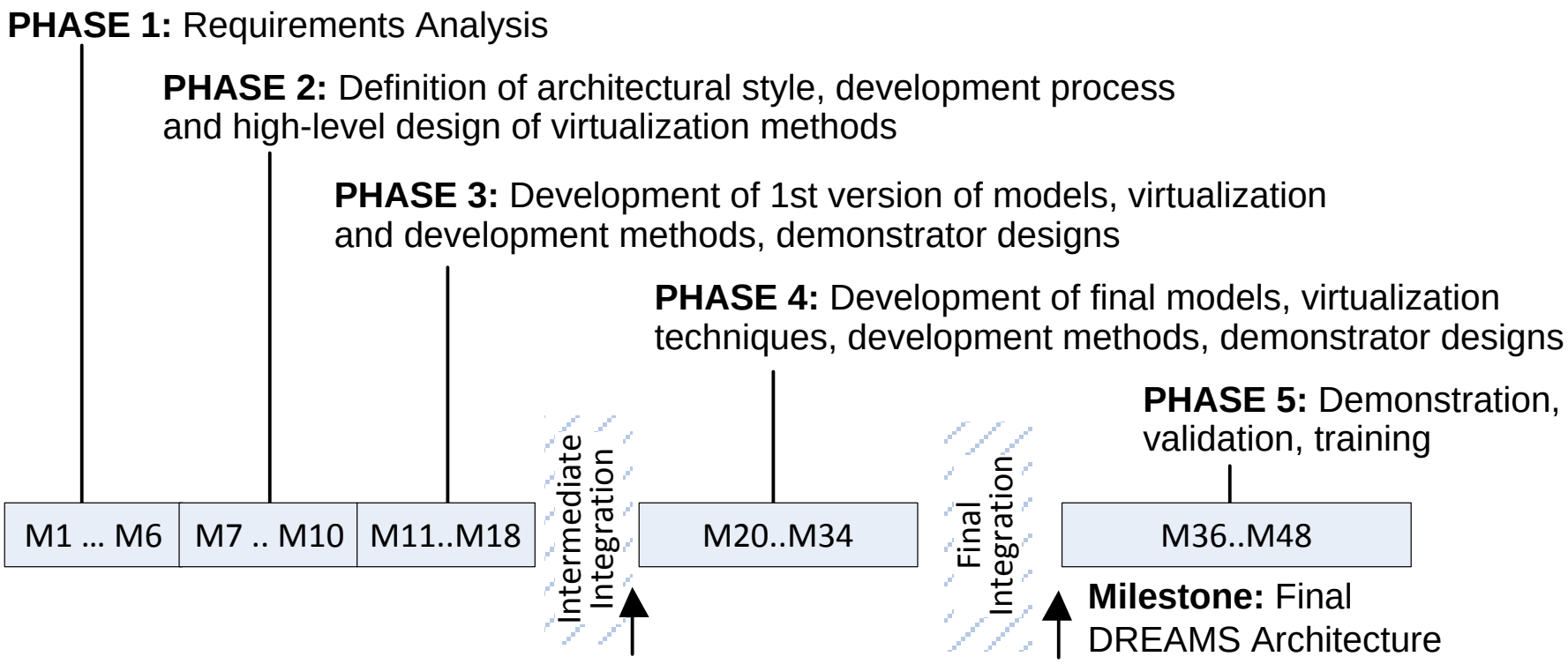
- **Hierarchical system with multiple integration levels**
- **Cross-domain component-based architecture for MCS**
- **Basis for implement-ing and integrating components**
- **Platform architecture with minimal set of core services ensuring architectural properties**
  - Time & space partitioning
  - Real-time support
  - Security
  - …



Main Outcome and Results

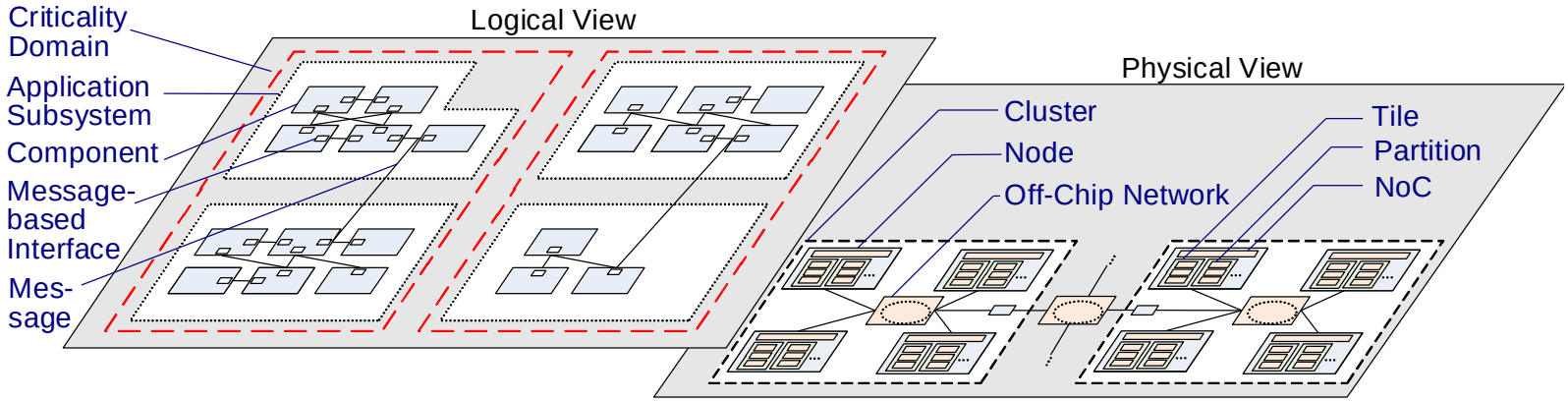
- Reduced development cost and time-to-market for mixed-criticality applications
- Exploitation of economies of scale through cross-domain components and tools
- Consolidation and integration of virtualization solutions and development methods from previous projects
- Significant advances in virtualization techniques leading to higher reliability, security and safety
- Higher flexibility, adaptability and energy efficiency through integrated resource management
- Leverage multi-core platforms for a system perspective of mixed-criticality applications combining the chip-level and network-level

Overall Timing of Project

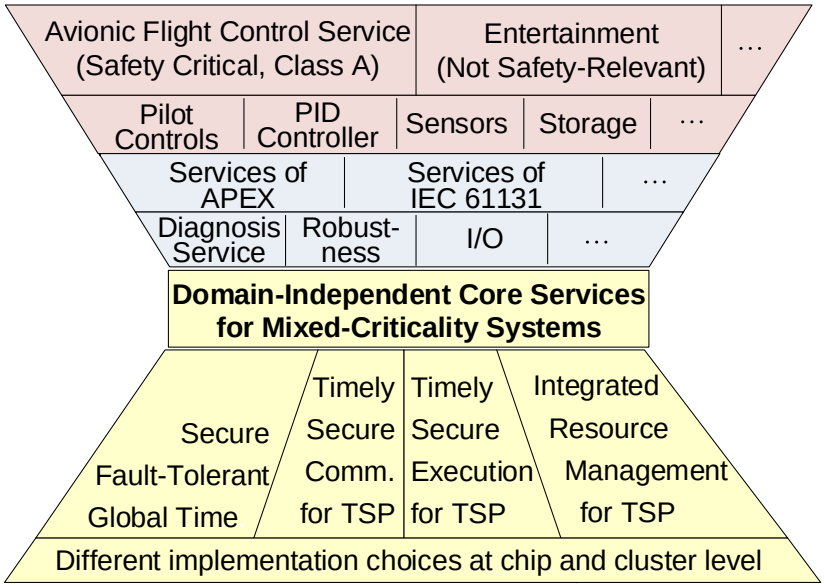


Ongoing Work and Upcoming Deliverables:
D1.2.1 Architectural Style

- System Model of a Mixed-Criticality System

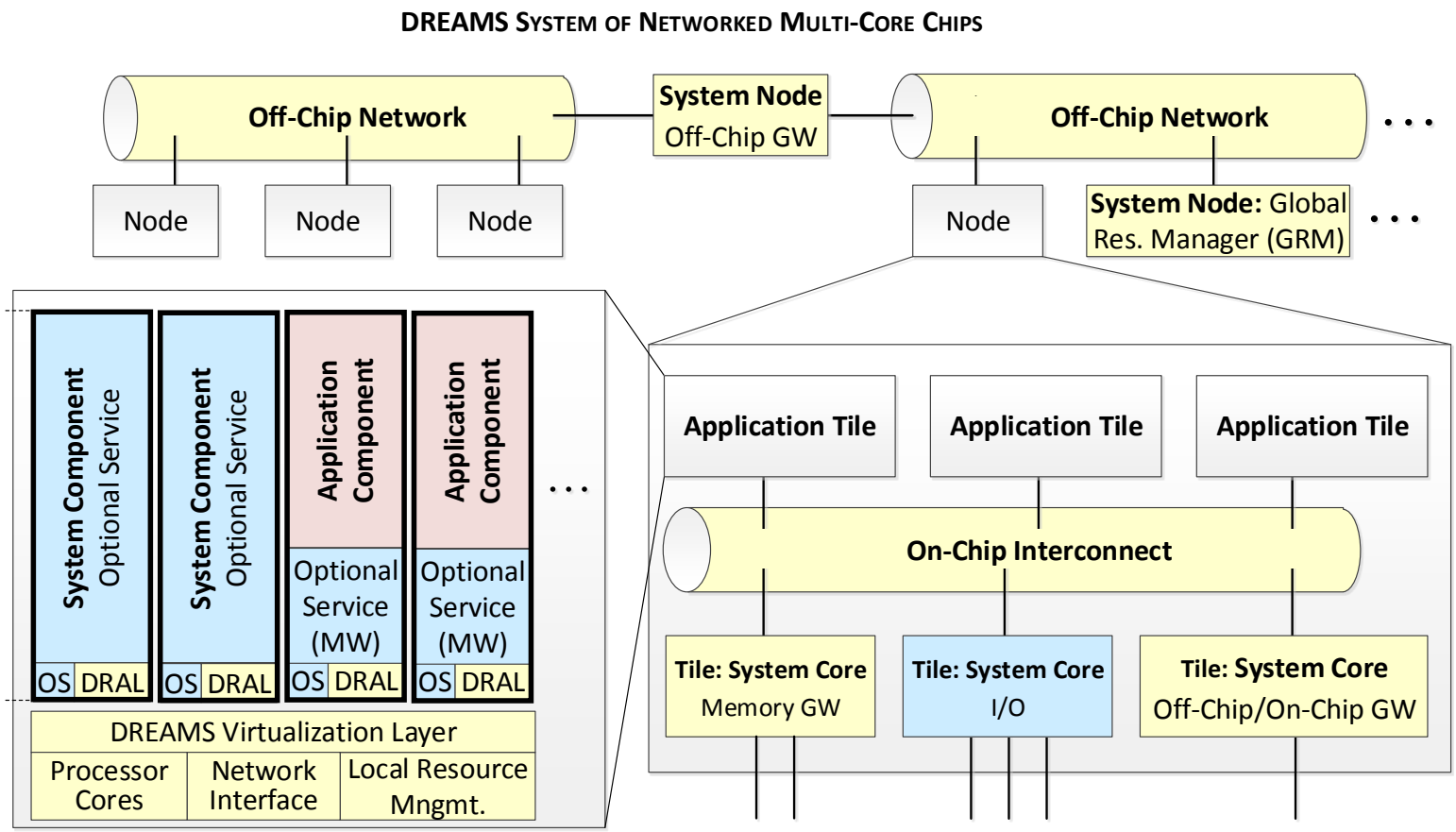


- Logical Architectural Structure with Platform Services

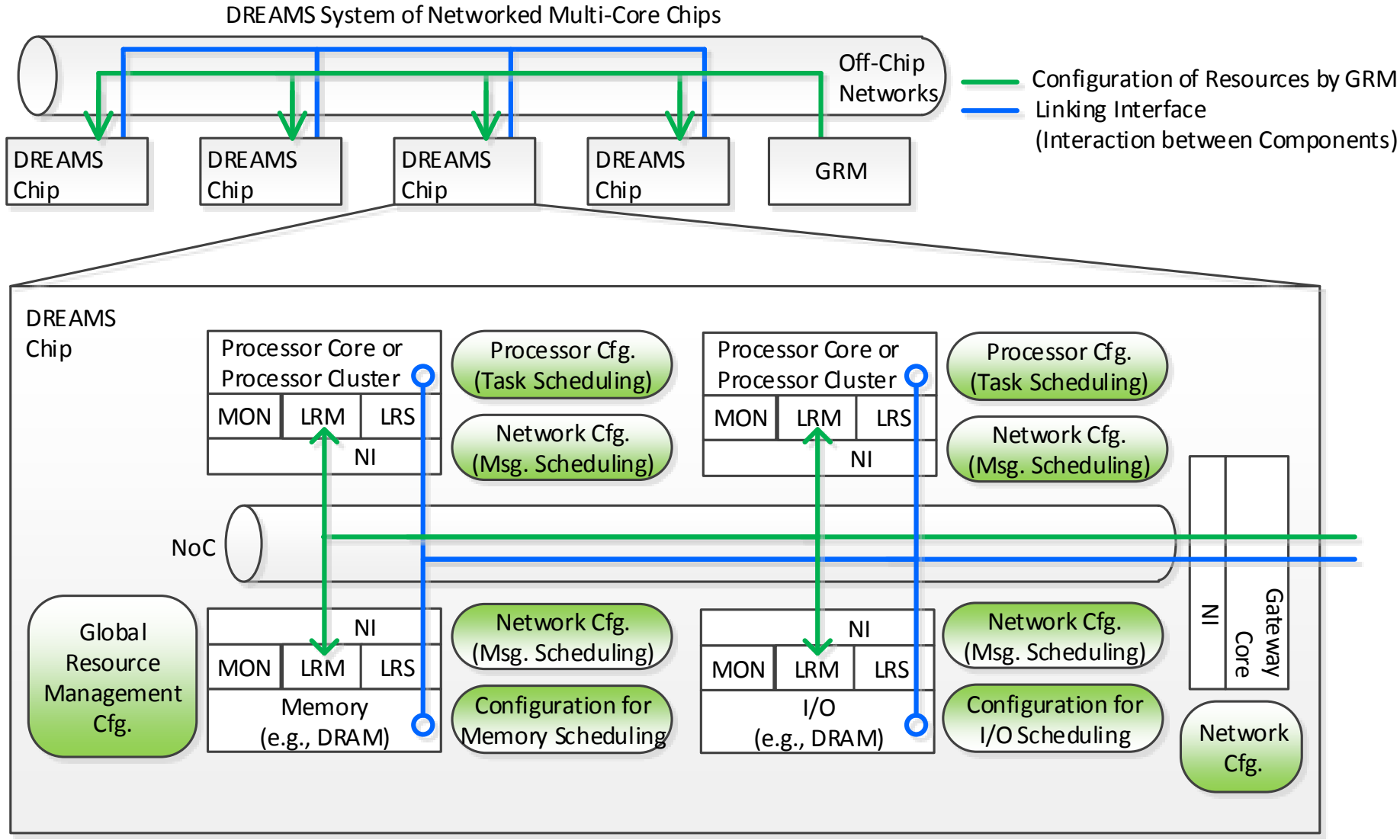


Ongoing Work and Upcoming Deliverables:
D1.2.1 Architectural Style

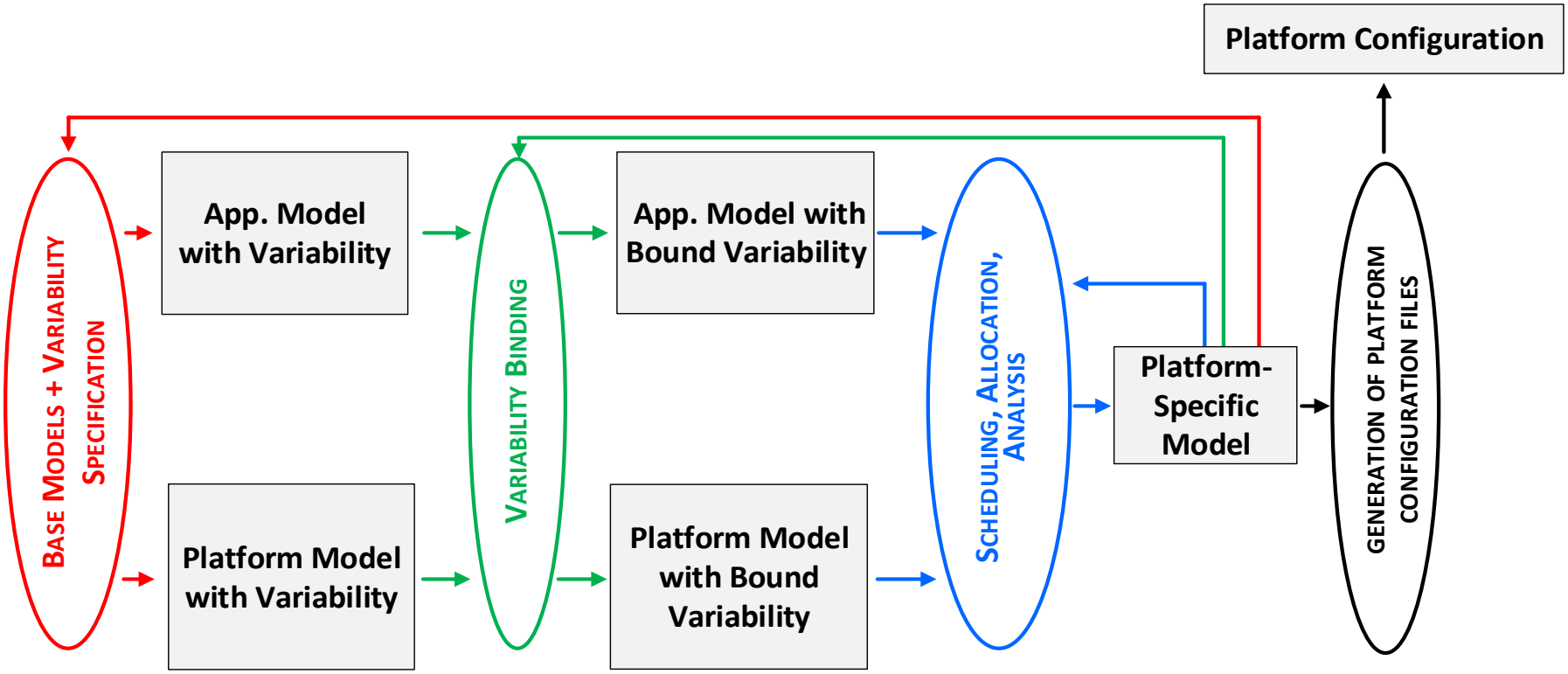
- Realization of Platform Services in Networked Multi-Core Chips



Adaptation Strategies for MCS

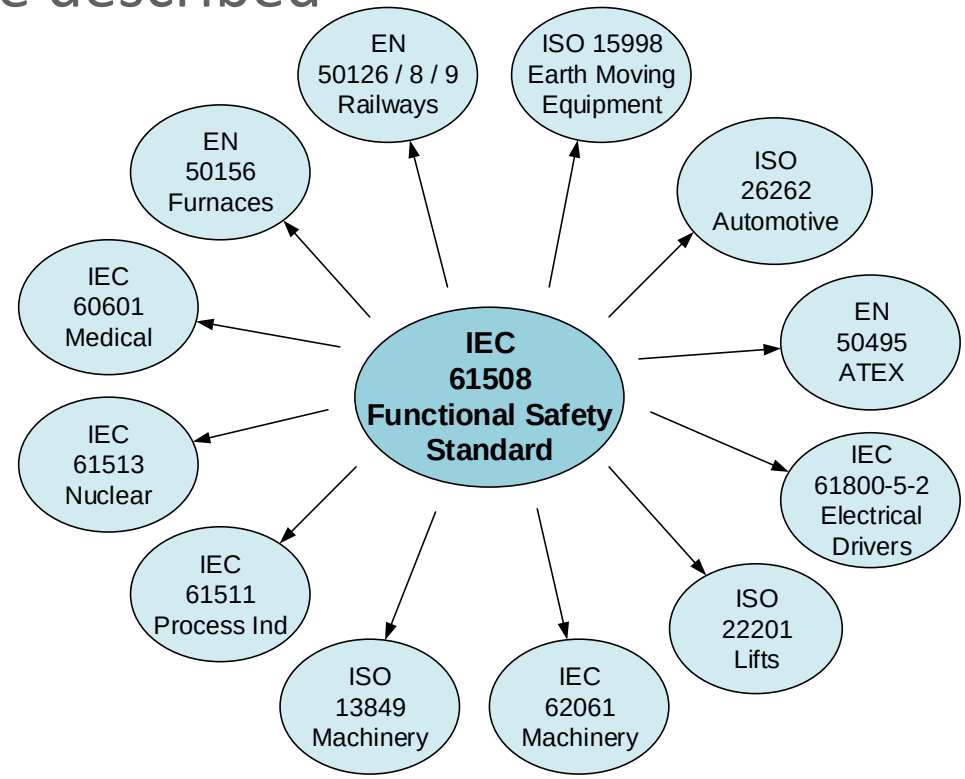


Development Methodology and Tools based on Model-Driven Engineering



Certification and Mixed-Criticality Product Lines

- Modular safety-case addressing hypervisor, multicore and mixed-criticality network solutions
- V&V strategies and processes based on IEC 61508
- Tool integration in industrial (safety) engineering process
- Configurability will partly be described through variability models
- Coverage array testing with enhanced general empirics for mixed-criticality systems
- Architectural exploration driven by EFP



Demonstrators for Real-World Scenarios

- Avionic demonstrator: avionics display with different levels of criticality
- Wind power demonstrator: Wind turbine control system combining safety-critical application for the pitch control with non safety-criticals services
- Healthcare demonstrator: body gateway for a remote patient monitoring application

DREAMS Mixed-Criticality Community

Involve (parts of) existing communities under the umbrella of the DREAMS community

1. Establishment of infrastructure
2. Organization of community building events
3. Joint standardization activities
4. Facilitate information flow and interfaces between projects
5. Training of community
6. Innovation roadmap

Mixed-Criticality Community