

GENESYS

GENERIC Embedded SYStem Platform
[FP7/2007-2013] n°213322



WORKPACKAGE 6 Composability, Integration and Four Prototypes



STARTING POINT

- ✎ Composition of a system out of subsystems without unintended interference is considered one of the most important challenges in many application domains
- ✎ GENESYS uses as a baseline
 - Results of composable architectures from previous research projects (e.g., DECOS)
 - Results on formalization of composability (e.g., BIP)
 - Existing architectures in the industrial and consumer electronic domains (e.g., AUTOSAR, MIPI)

APPROACH

- ✎ Development of construction principles for embedded system architectures enabling composability:
 - Strict component orientation
 - Interaction solely via message-based linking interfaces
 - Encapsulation to achieve non-interfering interactions
 - Availability of a common time base
 - Fault containment and error containment
- ✎ Devise solution for capturing system structure and interface specifications

OBJECTIVES

- ✎ Develop solutions to solve the ARTEMIS challenge of composability:
"Architecture instantiations that are derived from a generic platform must support the constructive composition of large systems out of components and subsystems without uncontrolled emerging behavior or side effect." [ARTEMIS SRA, p. 9]
- ✎ Integration of technologies developed in the project
- ✎ Prototypical evaluation of the architecture

CURRENT STATUS

- ✎ Requirements for composability from multiple application domains are available
- ✎ Fundamental architectural principles facilitating composability have been defined and published at www.genesys-platform.eu
- ✎ An approach for the precise specification of linking interfaces and the system structure using UML/MARTE and BIP has been devised

BENEFITS

- ✎ smooth integration and reuse of independently developed components
- ✎ increase the level of abstraction in the design process
- ✎ reduce development time and cost
- ✎ facilitate management of the complexity of embedded systems
- ✎ suppress developmental faults induced by unintended interference of subsystems

WP CONTEXT

- ✎ The requirements for composability have been collected using input from the industrial work packages (WP1, WP2)
- ✎ The architectural principles for composability have been an important input for the definition of architectural services in the other work packages (WP1, WP2, WP4, WP5)
- ✎ The development methodology (WP3) supports the definition of interfaces and the capturing of the system structure as required for achieving composability

WORKPACKAGE PARTNERS

- ✎ Vienna University of Technology
- ✎ Thalesgroup
- ✎ STMicroelectronics

- ✎ Commissariat à l'Énergie Atomique
- ✎ Nokia Research Center
- ✎ Embedded Systems Institute
- ✎ IMEC
- ✎ TU Darmstadt

- ✎ European Software Institute
- ✎ Technical Research Centre of Finland (VTT)
- ✎ Infineon
- ✎ Universidad Politecnica de Madrid
- ✎ UJF/Verimag