

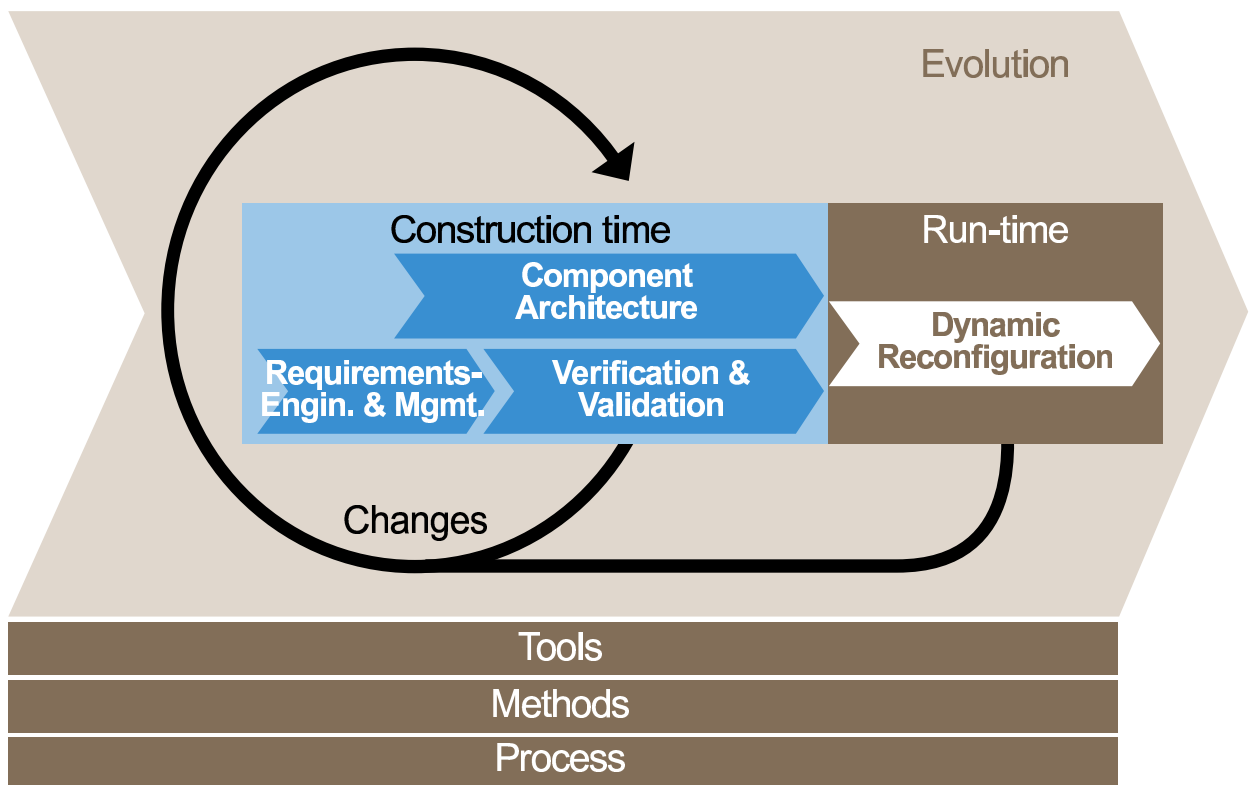


EMPRESS

Evolution Management and Process for Real-time Embedded Software Systems

Evolution of

- requirements
- systems and system families
- system architectures
- individual components
- resource constraints (timing & memory requirements)
- underlying hardware



Start of Project: January 1st, 2002
End of Project: December 31st, 2003
Effort: 146 PersonYears

Contact:

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EMPRESS Consortium Partners

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Czech Republic: Unis
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Evolution Management and Process for Real-time Embedded Software Systems

Goal

- Develop a **methodology** and **process** for real-time embedded software development that supports management of **evolution** in a flexible and dynamic way

Problem

- The **software's role** in embedded systems becomes more and more important (distinguishing features of systems are more and more implemented by software)
- Embedded systems are no longer pure closed, stand-alone systems, but have **to interact with** all kinds of devices in a changing environment (each environment needs customized versions of the embedded software; live updates needed for uninterrupted operation at low cost)
- **High quality** of embedded systems becomes crucial while the complexity increases (systematic approaches for software development and quality assurance required)
- **Shorter time-to-market** necessary to be economically successful (reduce time and effort to adapt or evolve software)

Benefits

For the embedded domain

- Accelerated and very efficient **development** of evolutionary systems (versions/product lines)
- Reduced effort for **updating running systems**

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EMPRESS Approach

Component Architecture

- Use of components in early development phases
- Impact of resource constraints evolution
- Correct component compositions/compatibility
- Component versioning and product lines

Dynamic Reconfiguration

- Live updates of components
- Run-time system support for live updates
- Adaptive scheduling & self-reconfiguration

Requirements engineering & management

- Quantification of (non-functional) requirements
- Systematic reuse of requirements
- Traceability of requirements
- Integration of requirements management with configuration management
- Certification of components

Verification & Validation

- Quantitative verification & validation
- Effective & efficient reverification & revalidation

... based on a solid formal base

... empirically validated by case studies & prototypical applications

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