Software Architecture Using Model-Based Engineering for Real-Time and Embedded Systems

Duration	3 days
Audience:	Software architects, development team managers, project managers, product managers
Pre-requisites:	Participants should be familiar with principles of software engineering and have some experience with programming
Brief Description:	This course teaches the essentials of modern model-based engineering techniques and technologies and how these can be used in the architectural design and specifications of complex systems, with a special focus on real-time and embedded systems.

Description:

Provide attendees with the foundations for specifying architectures (with special focus on embedded and real-time systems) by combining the most recent results from two convergent disciplines: software architecture design and model-based engineering methods. This includes both an understanding of the theoretical underpinnings as well as their practical application to industrial-scale problems.

Target Audience

Software architects, development team managers, project managers, product managers

Course Level

Intermediate

Course Pre-requisites

Participants should be familiar with principles of software engineering and have some experience with programming

Course Objectives

This is a hands on workshop intended to familiarize the participant with basic use of model-based methods and technologies to define and document the architecture of complex real-time and embedded systems:

- Understanding what constitutes a software architecture and why architecture is so important
- Understanding the basics of modern model-based methods
- Introduction to standard architectural description languages

- An introduction to the UML modeling language and its application as an architectural description language
- Architectures and architectural patterns for complex systems (with focus on real-time and embedded)
- Introduction to current trends in architectural specification

Course Outline:

- Introduction to the Course
- On Architecture
    - What is Software Architecture?
    - Why Architecture Matters
    - Why Platforms Matter to Architects
    - Key Problems of Software Architectures
    - The System of Systems Design Problem
    - The Process of Architectural Design
    - Key Architectural Design Patterns
    - Specifying Architectures – ADLs
- On Model-Based Software Engineering
    - General Introduction to MBSE
    - On Modeling Languages and Their Design
    - An Overview of the Unified Modeling Language – version 2
    - Using UML to design Modeling Languages – the Profile Mechanism
    - The UML MARTE Profile
    - UML-based ADLs and SysML
- Designing Architectures the Model Based Way
    - The Recursive Control Pattern
    - The Acceptable Platform Pattern
    - Model Transforms
- Trends and Research Issues