

# Preface

The main goal of this book is to cover a wide spectrum of software architecture modeling techniques using viewpoints to describe the structure, the behavior, and the execution of a software architecture. It is a textbook that covers fundamental approaches of software architecture description, reconciling theory and practice with well-established learning outcomes. The book includes additional resources available at [www.sysadl.org](http://www.sysadl.org) such as lecture slides that will be helpful to broader learning and an open-source software tool to support practical exercises.

Indeed, in the last two decades, software architecture has become a major discipline in the intersection of Computer Science and Software Engineering in its own (like civil architecture compared to civil engineering). Besides, software architecture plays a key role for enabling the next generation of software-intensive systems.

The recognized importance of software architecture led a number of universities to include regular course on software architecture at both graduate and undergraduate levels. However, there is still a lack of textbooks focusing on software architecture modeling based on explicit learning outcomes. This book aims to cover this gap, presenting a systematic approach supported by a software tool to model software architectures from different viewpoints and execute the resulting model for validation purposes, therefore covering the essence of software architecture design.

This book is designed for teaching software architecture modeling techniques to both graduate and undergraduate students, in order to prepare them to architecting complex software-intensive systems. It is also appealing for practitioners and members of a software development team such as architects, designers, programmers, project managers, since it is structured around practical modeling approaches spanning different roles in software development.

This book defines an architecture description language, named SysADL, as a specialization of the OMG SysML standard to software architecture description. SysADL brings together the expressive power of software architecture description languages (ADLs) for architecture description, with a standard language used by the industry (SysML). SysADL is used in all the chapters of this book.

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## Outline

This book is structured into four parts. Part I covers the fundamentals including the main concepts for modeling software architecture and presents SysADL, derived from the OMG SysML standard. The concepts follow the ISO 42010 reference model. The chapters present the concept of viewpoints and views, and how to describe, using SysADL, the structure, the behavior and the execution of a software architecture.

Part II focuses on how to design a software architecture for achieving quality attributes. Each chapter covers a specific quality attribute and presents well-defined approaches to achieve it.

Part III presents how to apply software architecture style to design architectures that meet the quality attributes. Each chapter covers a specific architectural style.

Part IV presents how to textually represent software architecture models in complement to the visual notation.

Software Architecture in Action

Designing and Executing Architectural Models with  
SysADL Grounded on the OMG SysML Standard

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2016, XVII, 236 p. 249 illus., 46 illus. in color., Softcover

ISBN: 978-3-319-44337-9