

Keynote Talk

Software Architecture: Reflections on an Evolving Discipline

David Garlan and Mary Shaw
Carnegie Mellon University
Pittsburgh, PA, USA

garlan@cs.cmu.edu and mary.shaw@cs.cmu.edu

Abstract

Software Architecture emerged in the 1990's as an important sub-field of software engineering. While good architectural design had long been recognized as critical to the success of any complex software system, before then the practice of architecting had relied largely on ad hoc, uncodified, and idiosyncratic techniques and knowledge. By the 2000's the field had matured to the point where there were widely-recognized taxonomies of architectural patterns, techniques for formally representing and analyzing architectures, methods for reviewing an architectural design, widespread adoption of architectural product lines and composition frameworks, and techniques for ensuring conformance between an architecture and an implementation of it. In this talk we reflect on the key enablers of a discipline of software architecture that led to these advances, the central ideas that form its core, and its enduring principles that continue to shape the field of software engineering. We consider both the important concepts on which it builds, as well as those that have built on top of it. Finally, we examine some of the important new trends and challenges that are likely to have an impact on how software architecture will evolve in the future.

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Bios

David Garlan is a Professor of Computer Science and Director of Software Engineering Professional Programs in the School of Computer Science at Carnegie Mellon University. He received his Ph.D. from Carnegie Mellon in 1987 and worked as a software architect in industry between 1987 and 1990. His

interests include software architecture, self-adaptive systems, formal methods, and cyber-physical systems. He is considered to be one of the founders of the field of software architecture, and, in particular, formal representation and analysis of architectural designs. He is a co-author of two books on software architecture: "Software Architecture: Perspectives on an Emerging Discipline", and "Documenting Software Architecture: Views and Beyond." In 2005 he received a Stevens Award Citation for "fundamental contributions to the development and understanding of software architecture as a discipline in software engineering."

Mary Shaw is the Alan J. Perlis Professor of Computer Science, Co-Director of the Sloan Software Industry Center, and member of the Institute for Software Research International and the Human Computer Interaction Institute at Carnegie Mellon University. She has been a member of this faculty since completing the Ph.D. degree at Carnegie-Mellon in 1972. Her research interests lie primarily in the areas of programming systems and software engineering, particularly value-driven software design, software architecture, programming languages, specifications, and abstraction techniques. Dr. Shaw is an author or editor of seven books and more than one hundred forty papers and technical reports. In 1993 she received the Warnier prize for contributions to software engineering. She is a Fellow of the Association for Computing Machinery (ACM), the Institute for Electrical and Electronics Engineers (IEEE) and the American Association for the Advancement of Science (AAAS). She is also a member of the Society of the Sigma Xi, the New York Academy of Sciences, and a member emeritus of Working Group 2.4 (System Implementation Languages) of the International Federation of Information Processing Societies. In addition, she has served on a number of advisory and review panels, conference program committees, and editorial boards.

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