

Designing Secure Architectures for Cyber-physical Systems Using Security Patterns and Reference Architectures



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Abstract. Patterns combine experience and good practices to develop models to build new systems and to evaluate existing systems. Security patterns encapsulate the extensive knowledge accumulated about security to provide guidelines for secure system design and evaluation. The speaker considers the structure and purpose of security patterns, and shows a variety of security patterns including authentication, authorization, Web services security, and cloud security. He integrates patterns in the form of security reference architectures. This tutorial introduces patterns in a conceptual way, relating them to their purposes and to the functional parts of the architecture. The use of patterns can provide a holistic view of security, which is a fundamental principle to build secure systems. The speaker uses patterns and reference architectures to build cyber-physical systems and other cloud/IoT ecosystems. The patterns are shown using UML models and examples are taken from his two books on security patterns as well as from his recent publications.

Biography. Eduardo B. Fernandez (Eduardo Fernandez-Buglioni) is a professor in the Department of Computer Science and Engineering at Florida Atlantic University in Boca Raton, FL, USA. He has published numerous papers on authorization models, object-oriented analysis and design, and security patterns. He has written four books on these subjects, the most recent being a book on security patterns. He has lectured all over the world at both academic and industrial meetings. He has created and taught several graduate and undergraduate courses and industrial tutorials. His current interests include security patterns, cloud computing security, and software architecture. He holds a MS degree in Electrical Engineering from Purdue University and a PhD in Computer Science from UCLA. He is a Senior Member of the IEEE, and a Member of ACM. He is an active consultant for industry, including assignments with IBM, Allied Signal, Motorola, Lucent, Huawei, and others.