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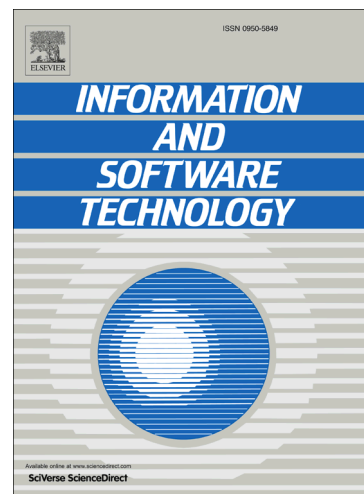
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A Comprehensive Pattern-Oriented Approach to Engineering Security Methodologies

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Abstract:

Context. Developing secure software systems is an issue of ever-growing importance. Researchers have generally come to acknowledge that to develop such systems successfully, their security features must be incorporated in the context of a systematic approach: a security methodology. There are a number of such methodologies in the literature, but no single security methodology is adequate for every situation, requiring the construction of “fit-to-purpose” methodologies or the tailoring of existing methodologies to the project specifics at hand. While a large body of research exists addressing the same requirement for development methodologies – constituting the field of Method Engineering – there is nothing comparable for security methodologies as such; in fact, the topic has never been studied before in such a context.

Objective. In this paper we draw inspiration from a number of Method Engineering ideas and fill the latter gap by proposing a comprehensive approach to engineering security methodologies.

Method. Our approach is embodied in three interconnected parts: a framework of interrelated security process patterns; a security-specific meta-model; and a meta-methodology to guide engineers in using the latter artefacts in a step-wise fashion. A UML-inspired notation is used for representing all pattern-based methodology models during design and construction. The approach is illustrated and evaluated by tailoring an existing, real-life security methodology to a distributed-system-specific project situation.

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