

Software Quality Attributes and Software Architecture Trade-offs

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Abstract

In this lecture we describe an emerging architecture trade-off analysis method (ATAM) developed at the Software Engineering Institute (SEI). The objective of ATAM is to understand a software architecture's fitness with respect to multiple software quality attributes. Since attributes can interact or conflict, improving one attribute often comes at the price of worsening one or more of the others, it is necessary to trade-off among multiple software quality attributes at the time the software architecture of a system is specified, before the system is developed. In the ATAM process, we identify sensitivity points, trade-offs, and risks. Sensitivity points are architectural decisions that have significant impact on a quality attribute; trade-off are sensitivity points that affect more than one attribute; risks are potential problem in achieving the desire attributes. It is important to point out that we do not aim at an absolute measure of "architecture quality"; rather our purpose is to identify scenarios from the point of view of a diverse group of stakeholders (e.g., the architect, developers, users, sponsors) and to identify risks (e.g., inadequate performance, successful denial-of-service attacks) and possible mitigation strategies (e.g., prototyping, modeling, simulation).