

# Cloud Based Online Software Architecture Evaluation System

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## Outline

- Importance of Software Architecture and its evaluation in Software Engineering
- Distributed Collaborative Evaluation
- Cloud Computing and Social Networking for Software Architecture Evaluation
- Cloud based collaboration tool to support the process of CMU/SEI's Architectural Trade-off Analysis Method (ATAM)

## Motivation

Software architecture evaluation is an important activity that ensures whether an architecture fulfills the concerns of stakeholders in early stages of the life cycle software-intensive systems, or not. So far, the available methods for software architecture evaluation have certain limitations. So as an alternative approach, I proposed a Cloud Collaboration Tools for the same. We can't deny the fact that computing on both the sides i.e. client and server is important. So as an affordable way we can simply make a combination of the both of them as per the convenience. We can make both the models interact with each other using some paradigm or middle ware. This possibility can widen the scope of cloud computing in the software architecture evaluation area.

Current face-to-face architectural evaluation processes do not scale up to the needs of geographically dispersed stakeholders. Hence, new processes and support mechanism are necessary. Moreover, proposed groupware systems that enables geographically dispersed stakeholders to participate in the software architecture evaluation process also comes with certain limitations.

ATAM (a renowned face-to-face evaluation method) is most beneficial when done early in the software development life-cycle, when the cost of changing architectures is minimal and features of cloud computing motivate me the most for pursuing the proposed research.

## Background

The Architecture Trade-off Analysis Method (ATAM), an accurate and complete way to evaluate software architecture. It is an architecture evaluation methodology developed by the Software Engineering Institute (SEI) and has been tested in real-life software development projects. Based on the results drawn from these real-life ATAM projects, it seems that the ATAM is an effective method for guiding a software architecture evaluation phase.

ATAM's main purpose is to guide ATAM session participants through an evaluation process via series of nine steps. These steps can be bifurcated into two phases. Phase 1 consists of six steps and is more architecture-centric, involving architecture, evaluators and

other system developers. Phase 2 makes up steps 7-9, which are more stakeholder-centric as it relies on stakeholder input.

As stated previously, this tool will be implemented on a Google cloud platform as platform as a service. A platform as a service (PaaS) cloud computing platform for developing and hosting web applications in Google-managed data centers is known as Google App Engine. Throughout this project, I will be using the same.

## Proposed Research

- The primary objective of this project is to implement a cloud based collaboration tool to support the process of CMU/SEI's Architectural Trade-off Analysis Method (ATAM). This will be an online application deployed on Google's platform as a service called Google App Engine (GAE). Distributed members of an ATAM team can use this online tool to evaluate software architecture by following the ATAM process.
- Specifically, in order to support the activities of all three phases following functionalities will be implemented. For phase 0, evaluation team leader will be adding the project and appropriate participants. The tool will enable project representatives to brief the evaluators about the software system to be evaluated.
- Similarly for phase 1, the tool will enable the participants to get down to the business of analysis. During this phase, a team leader will present the ATAM and the expected outputs to the assembled project representatives. Along with that, the tool will facilitate project decision makers to present a system overview from a business perspective and lead architect to present architecture. Evaluation team will be working with the project decision makers for generating a quality attribute utility tree with scenarios as leaves and priority associated with each one through this platform. The evaluation team will examine each scenario and discuss about possible risks, non-risks, sensitivity points and trade-off points through the service of this platform.
- In phase 2, with all stakeholders present, scenarios generated so far will be brainstormed and re-prioritized. After this, with this tool the evaluation tool guides the architect in the process of carrying out and explaining the highest ranked scenarios. Finally, through this platform as a service, the collected information will be summarized and presented to the stakeholders and risk themes will be identified.
- Apart from this, after each step of ATAM, findings can be recorded and accumulated at last. The final report will be made available to all the participants containing list of risks and risk themes, sensitivity and trade-off points, a list of architectural approaches used, utility tree and brainstormed scenarios and their analysis. Hence, the final report can indicate which business drivers are jeopardized by each one.
- This research is currently being extended for the architectural evaluation of an open source project by its creator(s). They will be provided three options namely, inviting everyone to suggest something on the architecture, selecting experts from the given list and manually selecting and inviting experts for the same.