

Reference: Knowledge Engineering – SES (QSE: SES)

Topics: Semantic (Exploratory) Search

LVA-Type: Praktikum, Bakk, Dipl

Start: Ab sofort

End: Nach Vereinbarung

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Background

[Context] A large software-intensive organization typically possesses a big and constantly increasing collection of software architectural knowledge. Software architectural knowledge (SAK) refers to a wide range of information about best practices in creating complex software products. Examples include non-functional requirements, architectural methods, or software design patterns. This knowledge may be stored and managed differently across departments with approaches including internal Wikis, libraries or other knowledge management systems.

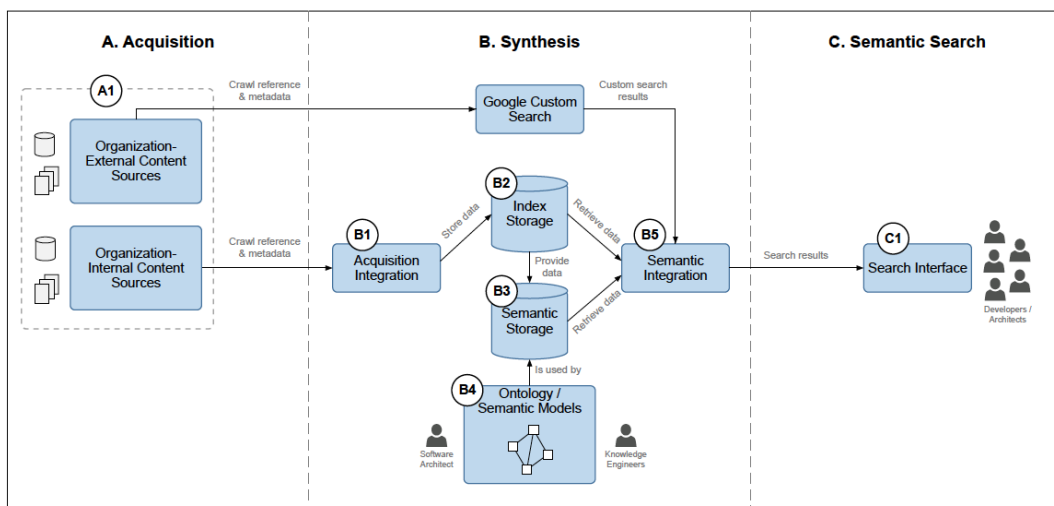


Figure 1 STAR Overview

To support an easier access by end-users towards SAK, a Semantic Web-based approach called **STAR** (SemanTic search for ArchitectuRAl knowledge) have been developed. STAR integrates SAK from internal (e.g., Wiki repositories) and external (e.g., Google custom search) data sources. SAK provides an exploratory search user interface to facilitate end-users to in conducting SAK search. The overview and screenshot of the current STAR prototype architecture and is shown in Figure 1 and Figure 2 respectively.

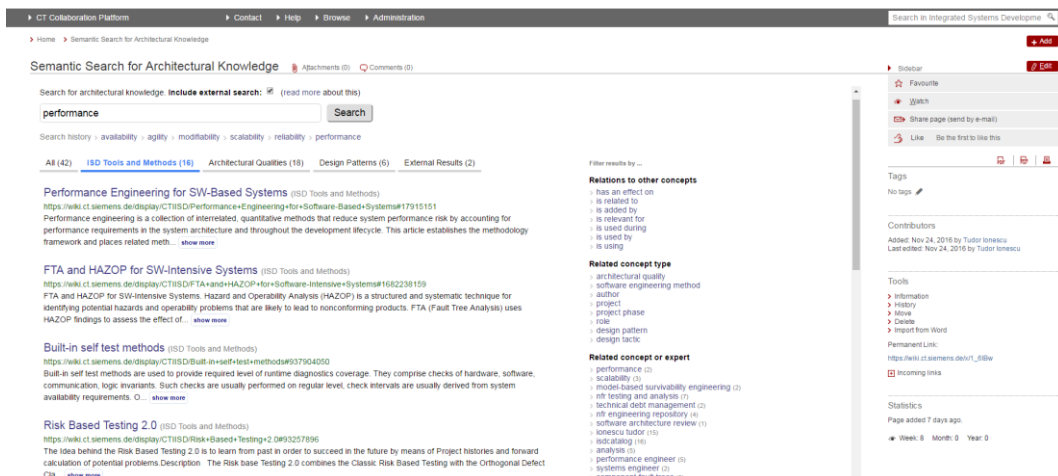


Figure 2 A screenshot of the STAR prototype

[Research Topics] Due to a successful development of the initial STAR prototype, we plan for further improvements together with our industry partner. A number of research and development topics related to the STAR prototype are currently available, including but not limited to:

- **A literature study of exploratory search in the Semantic Web context.**
The research topic of exploratory search is a well-researched area, mainly in the information retrieval and human-computer interaction. The goal of this research topic is to provide a comprehensive literature study on the adaptation of exploratory search in the semantic web research community.
- **Evaluation of the system.**
In order to sufficiently evaluate the effectiveness of the STAR system, a thorough evaluation is currently needed. Two types of evaluation are required: (1) ex-situ evaluation with students in the university setting, and (2) in-situ evaluation within our industry partner systems. The goal of this topic is to design, conduct and report evaluations of the system.
- **Development of generic systems.**
STAR is currently designed to support disseminations of Software Architectural Knowledge (SAK). However, a similar approach can be applied in a different domain and/or type of knowledge. To support such functionality, a generic variant of the STAR system should be designed and developed. The goal of this topic is to generalize the STAR system to allow easier adaptation of the system for a different domain and/or type of knowledge.

Experience and skills needed

- Good communication skills in English (Oral & Written).
- Good programming skills (e.g., OOP, Java, database)
- Basic understanding and interest in Semantic Web.
- Prior knowledge of the following technologies would be helpful:
 - o Semantic Web Technology stack (e.g., RDF/S, OWL, Jena, RDF4J, Protégé)
 - o NoSQL technologies (e.g., MongoDB)
 - o REST API / Framework (e.g., SparkJAVA)
 - o Web server (e.g., Apache, Nginx)