

Deliverable D5.1: *Scalability Guidelines for Semantic SWIM-based Applications*

What is the contribution of this deliverable to the overall goals of BEST?

This deliverable describes how the following three operations are essential, i.e., must be present in order to productively employ a semantic container management system: Make a subsumption hierarchy, extend the subsumption hierarchy, and find individual semantic containers. For the first operation, “make a subsumption hierarchy”, experiments and results are described. Based on these experiments, scalability guidelines are outline. This deliverable addresses the following BEST project objective: “How can we ensure that ATM solutions developed using semantic technologies have good scalability characteristics?”

Current Status of the Deliverable

Completed and approved by funding authority (SJU).

What items does the deliverable contain?

When we talk about a “Deliverable” in BEST, we mean not only the formal document describing the work done, but also any associated technical artefacts such as software, models, ontologies, diagrams etc. However, for this particular deliverable, there are no accompanying technical artefacts - all information is provided in the document itself.

Item#	Brief Description	What it can be used for
1	Background in scalability (Section 2)	Understand scalability in general, starting with the basic concepts like work and load.
2	State of the art (Section 3)	Understand previous research in this field.
3	Scalability in container management (Section 4)	Understand how scalability will be specified in the context of container management.
4	Experiments (Section 5)	Understand how scalability experiments were set up and also describe the results of these experiments.
5	Scalability guidelines (Section 6)	To reduce scalability risks, understand scalability guidelines when designing semantic containers

What details can I find in the deliverable document?

- Scalability is described in Section 2 based on basic concepts of work, load, quality metrics and thresholds, complemented by more complex concepts like consistency.
- The state of the art in scalability evaluation of semantic container management is described in Section 3.
- Scalability for ontology matching is described in Section 4.
 - In particular, we describe relevant parameters for work, which is rich in this area. We also define scalability.
- Scalability for container management is described in Section 4.
 - In particular, we describe relevant parameters for work, which is rich for semantic container management. On the one side, we have ontology representativeness and on the other we have several dimensions of ontology size like number of containers, number of facets, depth of facet hierarchy and the number of axioms.
 - We also describe the critical operations of ontology matching, from a scalability point of view, to be make/extent subsumption hierarchy and find containers fulfilling information needs.
 - For semantic container management, the following three operations are essential, i.e., must be present in order to productively employ a semantic container management system: Make a subsumption hierarchy, extend the subsumption hierarchy, and find individual semantic containers.
- Experiments in Section 5
 - The hardware and software set up for the experiments.
 - How we conducted the experiments.
 - The results and the justifications for the experiments.
- Guidelines in Section 6
 - Two guidelines derived from the experiments in Section 5.
 - Five additional scalability guidelines derived from D2.1.