Bachelor Thesis
Service-based Workload Generation for Cloud Applications

Beginning: immediately

Background
Benchmarking techniques are often used by means of quantitatively measuring the performance of different systems under distinct scenarios, in order to compare best practices and multiple solutions. Nowadays distinct benchmarks target the evaluation of systems at different levels, e.g. CPU, Memory, OS, etc., leading to the existence of a wide range of solutions. However, there are few benchmarks that aim to evaluate monolithic or composite applications, as the workload (and its behavior) used for such evaluations are application or vendor specific. Furthermore, workload generation tools are often not flexible enough to emulate real application loads. For this purpose, the Rain Workload Generation Toolkit for Cloud Computing applications is proposed as an approach to address the previously described challenges [1], as it supports a flexible generation of RESTful application workloads.

In this student thesis we focus on extending and integrating the previously presented workload generation toolkit towards enabling a service-based workload generation for RESTful and Web services based applications.

Tasks
- Architectural and Realization analysis and investigation of the Rain toolkit.
- Research on existing approaches to generate Web services based application workloads.
- Define and investigate the initial and alternative topologies of the Olio Application [2] focusing of available Cloud services.
- Based on evaluation results from the previous task, make a requirement’s analysis, specification, design, and realization for:
  1. Accessing existing Rain functionalities through a WS interface (API definition and realization).
  2. Incorporating Web service based application workload generation.
  3. Enabling storage & retrieval of generated workload specifications.
- Validation and Evaluation of the implemented approach using the Olio Application and a provided WS based application.
Required previous knowledge and experiences

- Java programming skills and expertise
- Web Services [6]
- Topology specification and modeling, e.g. TOSCA [6].
- ...or the declared intention to deeply dive into these topics in advance

The lectures of Service and Service Composition and Message-based Application Integration, and the literature attached, such as [1], [3], [4], and [6] are recommended for preparation. The student has to manage his schedule including this work packages and milestones for himself. A helpful guide for planning and writing a thesis can be found in [7] and [8]. The preferred language of the work is English.

Literature


[3] Weerawarana, Sanjiva; Curbera, Francisco; Leymann, Frank; Storey, Tony; Ferguson, Donald F.: Web Services Platform Architecture, Prentice Hall, 2005


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