

**Computer Systems Lab**  
**Project Proposal in Concurrent and Distributed Systems 236371**  
Spring 2014

**Putting elastic memory applications to work in a  
Resource-as-a-Service (RaaS) cloud**

Description:

Current trends in the Infrastructure-as-a-Service (IaaS) clouds are likely to result in a new cloud model: the Resource-as-a-Service (RaaS) cloud[1]. In the RaaS cloud resources such as bandwidth, CPU and RAM may change hands every second, on the basis of economic considerations. However, only few applications are ready for this dynamic world. In particular, elastic-memory applications are hard to find: applications that can efficiently utilize RAM when its size changes over time.

In this project, the student will create an elastic memory application that will serve as a benchmark to this emerging platform. The student will evaluate the application in a RaaS cloud machine.

Prerequisites:

Operating systems course (or equivalent knowledge).

Platform:

There is a choice of implementation platforms for this project, for example:

1. Elastic-memory Java [2] (e.g., using the DaCapo benchmarks[3])
2. Elastic-memory mysql [2].
3. The Automatically Tuned Linear Algebra Software (ATLAS) [4]

Advisors: Assaf Schuster, Orna Agmon Ben-Yehuda {assaf,ladypine} at cs.technon.ac.il

Number of students: 1 or 2 students for each sub-projects.

References:

[1] "The Resource-as-a-Service (RaaS) cloud", Orna Agmon Ben-Yehuda, Muli Ben-Yehuda, Assaf Schuster, Dan Tsafir. In proceedings of the 4th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud) 2012.

[2]"Application Level Ballooning for Efficient Server Consolidation", Tudor-Ioan Salomie, Gustavo Alonso, Timothy Roscoe, Kevin Elphinstone. Proceedings of the ACM European Systems Conference (Eurosys), April 2013.

[3] DaCapo <http://www.dacapobench.org/>

[4] ATLAS <http://sourceforge.net/projects/math-atlas/>