

Cloud Computing at large: overall cloud view

Description:

In future clouds, resources such as bandwidth, CPU and RAM are likely to change hands every second using auctions [1]. Auctions are the main selling mechanism in electronic markets such as eBay and Google AdWords. Intuitively, auctions can be regarded as a general tool for modeling resource allocation problems among strategic clients.

In a RaaS machine, memory is auctioned internally, such that social welfare is maximized. This means that when memory pressure is high, some guests are deprived of memory. However, other machines might be less stressed at the same moment. Furthermore, it seems that a good mixture of clients with high and low valuation for memory is key to virtual elasticity and low prices on the one hand, and to supplying ecomizing guests on the other.

In this project, the student will devise an algorithm for live migration and/or allocation of guest machine to physical machines in a RaaS cloud, such that the host revenue and/or social welfare are maximized. The student may define intermediate goals, and prove that heuristically, they lead to the optimization of the required goals.

Prerequisites:

Operating systems course (or equivalent knowledge). Python.

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Number of students: 1/2 students.

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] "Efficient, Non-Cooperative Sharing of Computing Resources", Orna Agmon ben-Yehuda, PhD thesis. <http://www.cs.technion.ac.il/users/wwwb/cgi-bin/tr-info.cgi/2013/PHD/PHD-2013-11>, chapters 6-7.