The Problem: Fixed Resource Bundles

Cloud clients rent the resources to sustain their highest workload. But they do not use the resources all the time.

Solution Approach

Incentivizing clients to reduce their fixed reserved resource requirements might solve the problem by allowing more clients per physical machine.

Existing Solution: Burstable (BP)

Introducing Amazon EC2 T3 Instances

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Amazon Web Services (AWS) is introducing the next generation Amazon Elastic Compute Cloud (EC2) burstable general-purpose instances, T3. T3 instances offer a balance of compute, memory, and network resources and are designed to provide a baseline level of CPU performance with the ability to burst above the baseline when needed. T3 instances are powered by the AWS Nitro System which includes a lightweight hypervisor, delivering practically virtual execution environments (VEE) '19, April 14, 2019, Providence, RI, USA.

BP limits the client to a certain average resource consumption, instead of maximal consumption.

BP disadvantages:

• Hidden information regarding resource availability
• Coupling of reserved resources and average usage

Our Solution: Stochastic Allocation (SA)

Under the SA mechanism, the provider:

• Offers clients a combination:
  – an amount of reserved resources
  – and/or a choice of a SA class in the form of shares
• Posts fixed unit-prices for both goods
• Publishes statistics periodically on resource availability for each SA class

Evaluation Methodology

BP 2
BP 3
BP 4
SA .15
SA .5
SA .6
SA .7
SA .9
SA/BP
0.2
0.4
0.6
0.8
Normalized Profit
$47 $39 $31 Break Even

Shares' Statistical Information

Iterations

Conclusions

Compared to BP, SA increases:

• the number of clients per server by more than 70%
• the profits of the public cloud provider by over 28%
• the value each server generates for the corporation by over 55%

https://bitbucket.org/funaro/stochastic-allocation

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