EC2 Performance Analysis for Resource Provisioning of Service-Oriented Applications

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What does that mean?

Can we profile Amazon EC2 instances so we can more efficiently deploy applications?
Roadmap

• What are we dealing with here?
• Experiment setup
• Results
• Conclusion
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What about cloud?

• Pay as you go
• On demand scaling
• VM on a shared hardware node
Why do we want to do this?

- Scientific applications
- Time critical applications
- Multi tiered applications
Why current system don't work on clouds

• Ressource provisioning systems exist, but...
  – Assume pre defined numbers of nodes
  – Assume ressources are stable
  – Assume ressources are homogeneous
Why current system don't work on clouds

• Ressource provisioning systems exist, but…
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  – Assume ressources are homogeneous

They are just not made for clouds.
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Experiment 1/3

- Amazon EC2
- Small instances
- Different locations
Experiment 2/3

- T1 - CPU
- T2 - Database reads
- T3 - Database writes
Experiment 3/3

• Stability - (24h)

• Homogeneity - (5 x 6h with a new instance)

• Correlation - (6h concurrent)
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Results - Stability

- T1 (CPU)
  - Fairly reliable performance
  - Std dev. 1.9% and 6.8%

(a) Hour 5
Results - Stability

- **T2 (Reads)**
  - Also mostly reliable performance
  - Std dev. 1.7% and 8.0%
Results - Stability

• T3 (Writes)
  – INSERT : Pretty fast, std dev. 0,9% max.
  – UPDATE : Still fast, std dev. 2,3% max.
Results - Stability

• T3 (Writes)
  – INSERT : Pretty fast, std dev. 0,9% max.
  – UPDATE : Still fast, std dev. 2,3% max.
  – DELETE : Just terrible, std dev. up to 71.1%
    and ~10x slower than UPDATE
Results - Homogeneity

- Up to 4x difference

(a) CPU performance homogeneity  
(b) Disk I/O performance homogeneity
Results - Correlation

- There isn't any
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In conclusion

• Instances of the same type do not guarantee the same performance
• Not all instances are created equally

• Profile your virtual machine instances before deploying applications!