Week 8 Progress

- Running Tests
  - With Multi-Cloud Environment fully set up, this week was dedicated to learning and running DOCK tests
  - Ran Tests for Flexible Docking, Rigid Docking, and Amber Score
  - Analysis was done based on observations regarding number of molecules processed and the time to process one molecule by DOCK program on each individual VM
• Test 1: Rigid Test Flexible Parameter off
  – Did a comparison between two tests with different levels of traffic on Clouds.
  • Traffic refers to amount of processes running simultaneously
  – Observed that higher levels of traffic result in slower processing rate per molecule.
Week 8 Progress

• Test 2: Rigid Comparison Test
  – Did a comparison of a Rigid Test on Multi-Cloud Environment with a published result from a Grid Computing Environment
  • Matched as many parameters as possible to standardize comparison.
    – Some variables could not be made identical like DOCK version
  – Result from Multi-Cloud Test in same order of magnitude as that from Grid Computing
  • Tells us Multi-Cloud Environment can perform at least at an equivalent level as Grid Computing while offer much more versatility and flexibility.
Week 8 Progress

• Test 3: Unbalanced Test
  – Change the Cloud Environment increasing the size of FutureGrid by 3 VMs while leaving the others unchanged.
    • 3 on NAIST, 3 on AIST, 6 on FG
  – Distribution of number of molecules processed per VM and the rates to process one molecule per VM were both evenly distributed and similar to balanced test
    • Shows that scaling up one VM does not result in any cloud preference for DOCK jobs.
Final Findings

• Research Results
  – Multi-Cloud environment is able to perform DOCK jobs at least as effectively as a Grid Computing environment (maybe more effectively)
  – While maintaining equivalent performance also has much more flexibility and versatility making it a better environment.
  – Increasing traffic on the cloud environment will naturally increase the rate at which DOCK jobs are performed.
  – Scaling up one cloud to make an unbalanced environment does create any cloud preference
    • Tasks still distributed evenly and processing rates remain roughly the same amongst all the VMs
Future Steps

• Tests
  – Try doing selective high traffic tests, increasing traffic on individual clouds, instead of increasing traffic on all
  – Test on a larger scale
• System Modifications
  – Incorporate Hadoop as a Job Distributor
  – Gain access to and use Commercial Clouds
Cultural Exploration
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