CS 441 HW1 CloudSim Analysis

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Overview

This cloudsim exercise includes 2 pairs of 2 cloudsim datacenter organisations each with comparable qualities as controls and a few different components to evaluate their performance on running similar tasks. The simulation files range from simulation1.conf to simulation4.conf.

Analysis

Simulation 1 and Simulation 2

These two simulations run completely identical specs except for their VMSchedulingPolicy.

For simulation 1 the policy is set to TimeShared and for 2 is it set to Space Shared.

Both of these are configured for a single Datacenter comprising of 2 hosts with 4 CPUs each, a single broker, 4 comparable VMs and 8 cloudlets.

The simulation 2 with its space shared model saw significant improvement in execution time over the time shared policy of sim 1.

```
#================================================================ OUTPUT ========================================
Cloudlet ID   STATUS    DataCenterID VMID      TIME      Start    Finish     Sub Time    CPU Util     Processing Cost
4             SUCCESS 2              1         8.1       0.1      8.2        0.1         0.7645073    0
1             SUCCESS 2              3         11.21     0.1      11.31      0.1         0.4680392    0
0             SUCCESS 2              1         11.6      0.1      11.7       0.1         0.3451179    0
6             SUCCESS 2              3         12.97     0.1      13.07      0.1         0.3629322    0
2             SUCCESS 2              1         17.38     0.1      17.48      0.1         0.706441     0
7             SUCCESS 2              3         17.58     0.1      17.68      0.1         0.5464579    0
5             SUCCESS 2              1         18.15     0.1      18.25      0.1         0.6326987    0
3             SUCCESS 2              3         18.8      0.1      18.9       0.1         0.6002457    0
```

Simulation 1 shown above.

```
- #============================================================== OUTPUT ===========================================
- Cloudlet ID  STATUS  DataCenterID VMID    TIME      Start   Finish      Sub Time    CPU Util      Processing Cost
- 0            SUCCESS 2            1       2.42      0.1     2.52        0.1         0.2432761     0
- 3            SUCCESS 2            0       6.88      0.1     6.98        0.1         0.3819976     0
- 7            SUCCESS 2            0       12.96     0.1     13.06       0.1         0.5713082     0
- 2            SUCCESS 2            0       15.62     0.1     15.72       0.1         0.3912199     0
- 1            SUCCESS 2            2       17.15     0.1     17.25       0.1         0.0814748     0
- 4            SUCCESS 2            2       18.96     0.1     19.06       0.1         0.2288309     0
- 5            SUCCESS 2            2       22.23     0.1     22.33       0.1         0.6329549     0
- 6            SUCCESS 2            2       23.35     0.1     23.45       0.1         0.6776571     0
```

Simulation 2 shown above.

Simulation 3 and Simulation 4

These two simulations differ in their number Vms as well as CPUs available.

Simulation 3 comprises of 2 hosts with 4 CPUs each and 8 VMs.

Simulation 4 comprises of 2 hosts with 8 CPUs each and 4 VMs.

Both datacenters work on 20 cloudlets each and both use a SpaceShared UtilizationModel.

```
#============================================================== OUTPUT ===========================================
Cloudlet ID  STATUS  DataCenterID VMID    TIME      Start   Finish      Sub Time    CPU Util      Processing Cost
17           SUCCESS 2            4       5.3       0.1     5.4         0.1         0.5496771     0
3            SUCCESS 2            5       6.42      0.1     6.52        0.1         0.352364      0
14           SUCCESS 2            1       7.49      0.1     7.59        0.1         0.7594666     0
16           SUCCESS 2            7       7.74      0.1     7.84        0.1         0.1889274     0
13           SUCCESS 2            1       8.32      0.1     8.42        0.1         0.5421386     0
8            SUCCESS 2            2       9.09      0.1     9.19        0.1         0.5208523     0
4            SUCCESS 2            3       9.22      0.1     9.32        0.1         0.7214174     0
19           SUCCESS 2            2       9.77      0.1     9.87        0.1         0.6968322     0
7            SUCCESS 2            3       10.33     0.1     10.43       0.1         0.391393      0
9            SUCCESS 2            4       10.44     0.1     10.54       0.1         0.2242766     0
1            SUCCESS 2            6       12.21     0.1     12.31       0.1         0.6519788     0
0            SUCCESS 2            6       12.83     0.1     12.93       0.1         0.5432539     0
10           SUCCESS 2            6       13.36     0.1     13.46       0.1         0.5573917     0
11           SUCCESS 2            6       13.59     0.1     13.69       0.1         0.2043431     0
18           SUCCESS 2            0       15.58     0.1     15.68       0.1         0.5404314     0
2            SUCCESS 2            0       16.37     0.1     16.47       0.1         0.1529615     0
15           SUCCESS 2            2       17.88     0.1     17.98       0.1         0.5286188     0
12           SUCCESS 2            0       18.76     0.1     18.86       0.1         0.4078004     0
5            SUCCESS 2            2       19.28     0.1     19.38       0.1         0.4031097     0
6            SUCCESS 2            0       21.25     0.1     21.35       0.1         0.4284267     0
```

Simulation 3 shown above.

```
#======================================================= OUTPUT ======================================:
Cloudlet ID  STATUS  DataCenterID VMID    TIME    Start   Finish    Sub Time    CPU Util    Processing Cost
6            SUCCESS 2            2       5.46    0.1     5.56      0.1         0.4623143   0
0            SUCCESS 2            2       7.17    0.1     7.27      0.1         0.4000438   0
10           SUCCESS 2            1       11.11   0.1     11.21     0.1         0.482891    0
16           SUCCESS 2            1       13.04   0.1     13.14     0.1         0.1482669   0
18           SUCCESS 2            1       14.21   0.1     14.31     0.1         0.3956964   0
19           SUCCESS 2            0       17.35   0.1     17.45     0.1         0.3270745   0
17           SUCCESS 2            3       19.55   0.1     19.65     0.1         0.5783666   0
14           SUCCESS 2            1       21.14   0.1     21.24     0.1         0.5425345   0
13           SUCCESS 2            1       22.42   0.1     22.52     0.1         0.4361536   0
8            SUCCESS 2            0       25.14   0.1     25.24     0.1         0.2279033   0
15           SUCCESS 2            3       26.58   0.1     26.68     0.1         0.7009848   0
7            SUCCESS 2            3       29.16   0.1     29.26     0.1         0.5021935   0
1            SUCCESS 2            3       31.69   0.1     31.79     0.1         0.8949382   0
9            SUCCESS 2            3       33.82   0.1     33.92     0.1         0.0499825   0
3            SUCCESS 2            3       33.93   0.1     34.03     0.1         0.3094575   0
5            SUCCESS 2            0       41.31   0.1     41.41     0.1         0.1955456   0
4            SUCCESS 2            0       41.47   0.1     41.57     0.1         0.2093927   0
2            SUCCESS 2            0       41.58   0.1     41.68     0.1         0.2653724   0
12           SUCCESS 2            0       41.69   0.1     41.79     0.1         0.6536193   0
11           SUCCESS 2            0       42.3    0.1     42.4      0.1         0.8287389   0
```

Simulation 4 shown above.

Simulation 3 had an easier time processing the tasks with its multiple VMs than sim 4 with more available processors per host. However, as the CPU requirement increases per cloudlet, sim 3's average CPU utilization is consistently higher than simulation 4 yet the time to completion between the two becomes even more comparable.