National College of Ireland

MSc in Cloud Computing, Full Time, Year 1 - MSCLOUDDNCI1

Semester One Examinations – 2012/2013

Wednesday, 9th January 2013
10.00am – 12.00pm

_____

Cloud Architecture - H9CAMSCLOUDDNCI12012

External Examiner: Dr. Daniel Doolan
Internal Examiner: Dr. Horacio González - Vélez

Answer all Questions

Duration of exam: 2 hours
Attachments: None

1. Define (a) High-performance computing (HPC) system and (b) High-throughput computing (HTC) system, (c) providing an example of when to use HPC and HTC at an enterprise setting **(16 marks)**.

2. Define (a) Public Cloud and (b) Private Cloud. Provide an example on how a Private Cloud can be converted into a Public one. **(14 marks)**

3. Consider the multicore processor with 4 heterogeneous cores labelled C1, C2, C3, and C4. Assume cores C1 and C4 have the same speed. C2 runs twice as fast as C1 and core C3 runs 3 times faster than C1. Assume all four cores start executing the application SQUARE-X at the time and no cache misses are encountered in all core operations. Suppose the SQUARE-X application computes the square of each element in an array of 256 elements. Assume 1 unit of time for C1 (or C4) to compute the square of an element.
Given the following division of labour in four cores:

C1	32 elements
C2	128 elements
C3	64 elements
C4	32 elements

Compute the total execution time (in time units) for the four-core processor to compute the square of 256 elements in parallel. Remember elements may finish before other but the time to complete should be defined by the last core to complete. **(20 marks)**

4. Enumerate 5 major issues addressed by virtual machines and virtual clusters in cloud computing. Justify your answer **(20 marks- 4 marks per advantage/disadvantage)**.

5. Define and critically contrast (a) full virtualisation and (b) para virtualisation. Justify your answer via pros-cons of each mode and/or an example of a product for each one. **(30 marks)**.