EXAMINATION

Course: 5DV131/Cloud Computing
Teacher in charge: Yvonne Löwstedt/Johan Tordsson

Semester: Spring 2012
Date: 2012-08-31
Time: 9:00–13:00

Name: ________________________________

Personal ID number: ____________________________

Unique code for this examination: 1

Note!
This examination will be graded anonymously. This sheet will be removed before the teacher receives the rest of the examination. The above code must therefore be on all other pages when you submit the examination to the examination supervisory staff. Memorize your code since it will be used as reference when the results are published.
Furthermore,

- Write the answers on the answers on the same paper as the question (the back of the paper may also be used).

- Mark the questions you have solved with a cross on the next page.

- The solutions should be neatly written. The train of thought should be easy to follow. All non-obvious assumptions must be explicitly stated.

Till skrivningsbevakaren: Avskilj detta försättsblad och stoppa i kuvert som skickas till Yvonne Löwstedt, Datavetenskap.
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Question 1  (3 + 4 points)

a. Explain the following roles in a cloud computing scenario: end user, service provider, and infrastructure provider.

b. Describe how service providers and infrastructure providers interact in the following cloud architectures: public cloud, private cloud, federated cloud, and cloud bursting.
Extra page
Question 2  (3 + 3 points)

a. What is the main motivation for the MapReduce programming model?

b. Outline the main steps in the MapReduce model.
Extra page
Question 3 (6 points)

Describe in overview how the various services available in AWS (Amazon Web Services), e.g., EC2 and S3, could be used to create a content streaming system such as Youtube or Spotify. Include an architecture sketch and discuss the scalability and reliability (redundancy) of your proposed system.
Extra page
Question 4 (3 + 4 points)

a. Explain the following concepts related to virtualization and use of virtual machines in data centers: multi-tenancy, server consolidation, and live migration.

b. Based on the overhead caused by hardware virtualization and its implications on performance, describe two example applications: one suitable to run inside a virtual machine and one less suitable for such environments.
Question 5 (4 + 4 points)

a. According to “The VISION of autonomic computing” what are the four self-management (self*) abilities of autonomic systems?

b. Which are the main steps/actions in an autonomic management feedback loop (MAPE loop)?
Extra page
Question 6  (6 points)

Discuss the following considerations for data center design: *hardware performance, power, cooling,* and *power efficiency* with particular focus on their impact on total operation cost for a data center.
Extra page