

HOMEWORK 1

Welcome to your homework, here are the following are the **rules** of submitting homework:

You have to submit the code/report in **PDF**, compiled from **Markdown**. Any report written in word document or so will be discarded and score 0.

You have to submit your homework via Email.

Your Email subject shall be **Course Z6110X0035 CC+Homework #+{Your Name}+{Your ID}**. For example, if I submit a homework, my Email subject is Course Z6110X0035 CC Homework 1 Zichen Xu 1234556678.

Assignment

Q1: Characterize the following three cloud computing models.

- (a) What is an IaaS cloud? Give one example system.
- (b) What is a PaaS cloud? Give one example system.
- (c) What is a SaaS cloud? Give one example system.

Q2: Basic Cloud Calculus

Consider the System Availability (A) of a server cluster in terms of three parameters:

- namely the mean time to failure (MTTF),
- the mean time to repair (MTTR), and
- a regular maintenance time (RMT).

The MTTF reflects the average uptime between two adjacent natural failures. The MTTR is the downtime due to natural failure. The RMT refers to scheduled down time for hardware/software maintenance or updates.

1. Given a cloud system with a demanded availability $A = 98\%$. If the MTTF is known to be two years (or $365 \times 24 \times 2 = 17,520$ hours) and the MTTR is known 24 hours, what is the value of RMT in hours per month that you can schedule for this cloud system?
2. Consider a cloud cluster of three servers. The cluster is considered available (or acceptable with a satisfactory performance level), if at least k servers are operating normally where $k \leq 3$. Assume that each server has an availability rate of p (or a failure rate of $1 - p$). Derive a formula to calculate the total cluster availability A (i.e., the probability that the cluster is available satisfactorily). Note that A is a function of k and p .
3. Given that each server has an availability $p = 0.985$, what is the largest minimum number of servers that must be available to achieve a total cluster availability A , which is higher than 95%? You have to check the effect of all possible values of k in part (2) in order to answer this question correctly.

Q3: Write after Read

Write me a review after reading:

Shvachko, Konstantin, Hairong Kuang, Sanjay Radia, and Robert Chansler.

"The hadoop distributed file system."

In 2010 IEEE 26th symposium on mass storage systems and technologies (MSST), pp. 1-10. Ieee, 2010.

<http://www.alexanderpokluda.ca/coursework/cs848/CS848%20Paper%20Presentation%20-%20Alexander%20Pohluda.pdf>
