Universität Zürich[UZH]

Communication Systems Group (CSG)

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Exercises in SSDS

Coordination in Distributed Systems

Handout: May 12, 2020
Discussion: May 14, 2020 08:15

1: Define the terms below in a sentence:

-Coordination in a distributed system, -Atomicity, -Liveness, and -Correctness.

2: What are the main aspects of Atomicity?

3: Explain the One-Phase Commit protocol and bring some examples of failures in this protocol.

4: Explain the Two-phase commit protocol.

5: How do you evaluate the liveness of 2PC protocol? If there are any problems with Liveness, what is your solution for them?

6: Explain the problem with coordinator time outs in the 2PC protocol.

7: What is the purpose of the Termination Protocol?

8: Introduce a problem of the Termination Protocol, what is a possible solution for that?

9: The Termination Protocol is implemented in a system with 5 processors, P1-P5. In response of a request from the Transaction Coordinator (TC) P1, P2, and P3 have sent “Yes”, P4 has sent “No” and p5 has not sent any answers to TC.

In this system the TC sends “Commit” to those processors with “Yes” acknowledges, as soon as it receives at least 80% of commitment interest from all the processors and it does not wait for slow processors. In cases with less than 80% positive acknowledges, the TC needs to wait for slow nodes, too.
Based on the information given, please answer the following questions:

(i) What is the action taken by TC and P2 after P2 had to reboot and came back to the system?

(ii) What would be the action of TC and P2, if after P2 rebooted, P5 sends “Yes” to the TC?

(iii) What would be the P2’s action if until it reboots, P5 sends “No” to the TC?