

# Literature Review for Two-phase-commit

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The project is to implement a classic protocol in distributed world - two phases commit. The protocol is widely used to maintain consistency among a cluster of cohorts. I have read several papers with regards to basic concepts in distributed manner: Remote procedure call, Logical clocks and Two-phase-commit protocol.

The paper Implementing Remote Procedure Calls written by Xerox Research Centre gives me the fundamental knowledge of communication mechanism in distributed manner. The paper describes the overall structure of RPC mechanism and methods used to bind multiple clients. It also addresses the transport level communicate protocol and some of performance measurements. It is fair to say that based on this paper I am able to grasp a general idea of how remote procedure call works and its differences from local procedure call.

Later on, I read more papers related to the mechanism for capturing chronological and causal relationships in a distributed system. The logical clock written by Leslie Lamport proposed the concept of happen before, which is shown to define a partial order of an event. This relates the two-phase-commit project especially in the cases where coordinator have to deal with multiple replicas. Although I didn't implement the synchronization mechanism for logical clock, the paper enriches my understanding of the topic and prepares me knowledge to handle simultaneous requests. If the concept of logical clock proposed by Leslie were out-dated, Consistent Global States of Distributed Systems written by University of Bologna introduces relatively new mechanisms that are useful in coping with uncertainty in distributed computations. The paper is an easy read since they illustrate and explain the concepts through a set of diagrams. This gives me a in-dept look into developed techniques that come in play in distributed world.

With much understanding of fundamental framework and concepts about how to order events, I starts taking a look into papers that give details in helping a cluster of nodes in distributed system make consensus. There are a few consensus protocol that has been put forward before, such as raft. They are all stemmed from two-phase-commit, and improve from there.

There are a few paper online related to the topic of two-phase-commit protocol. The first one was a sole chapter from a book written by Phil Bernstein. It discusses the reliability issues that arise when transactions are processed in a distributed database system. Then it introduces the simplest and most popular ACP: two phase commit. It is in this book that I first learnt the basic execution steps of two-phase-commit assuming no failures occurred during transaction. With the combination of information from wikipedia, I am able to grasp the normal execution of a single distributed transaction. The implementation in final project is based on protocol outlines illustrated in those sources.

All these paper give me guidance and reference in a way or another. Paper like Logical Clock and Global State of Distributed System describe how to keep track of event ordering; The work elaborates on remote procedure call gives an overview of how it works and what differentiate it from local procedure call. It prepares me with the high probability of failure, which does happen all the time throughout system developing process. The paper related to Two-phase-commit, without question, guides me into building the framework and teaches me how coordinator and replicas interact with each other.