Information Diffusion Annotated Bibliography

April 18, 2014

References

[1] Matthew Brown, Seth Gilbert, Nancy Lynch, Calvin Newport, Tina Nolte, and Michael Spindel. The virtual node layer: A programming abstraction for wireless sensor networks. In *Proceedings of the 12th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, pages 1–6, Cambridge, MA, USA, 2007. MIT Computer Science and Artificial Intelligence Lab.

This paper addresses the problems around reliable coordination in dynamic, wireless networks. The paper proposes creating a static and reliable abstract layer composed of virtual nodes on top of the unpredictable and unreliable client or physical nodes. The architecture of the emulator is well thought-out and perhaps should be emulated. One key weakness of this approach is the requirement that the locations of the virtual nodes be decided before the start of program execution. This weakness results necessarily from the attempt to model an underlying dynamic network with a perfectly static network.

[2] Gregory Chockler, Seth Gilbert, and Nancy Lynch. Virtual infrastructure for collision-prone wireless networks. In *ACM Symposium on Principles of Distributed Computing*, pages 1–20. ACM Symposium on Principles of Distributed Computing.

This paper addresses the challenges of wireless ad hoc networks, which include unreliable nodes and communication. This paper,

much like Brown 2007, proposes a reliable virtual layer or abstraction to sit above the unreliable client nodes. As a result, it shares the same weakness of the requirement that the locations of the virtual nodes be fixed before the start of program execution. The value of this paper includes the introduction of virtual infrastructure emulation and convergent history agreement. Convergent history agreement is a weaker version of the requirements of a replicated state machine approach, which has been proven to be impossible under the conditions of a wireless ad hoc network. This approach is less relevant to my thesis because it deals with many of the lower level issues of wireless communication that we are taking for granted in our approach.

[3] Alexey Friedman, Roy Vaysburd. Fast replicated state machines over partitionable networks. pages 1–8. Department of Computer Science Cornell University.

This paper lays out a faster and more reliable approach to implementing a replicated state machine in a partitionable network. The approaches that deal with partitions in replicated state machines can be described as either optimistic or pessimistic. The optimistic approaches don't guarantee progress even after the reconciliation of a partition. The pessimistic approaches involve too much additional storage or rounds of execution to be practical for many applications. This approach guarantees progress will be made whenever more than half of the nodes are connected and requires very minimal storage overhead. The real relevance for my thesis is how this approach deals with the partitioning of the network, which is be very important in the dynamic case. The approach won't be directly relatable because the goal of this paper is different from the goal of my thesis, which would be okay with one network partitioning into two distinct and fully functioning networks.

[4] Fred B. Schneider. Implementing fault-tolerant services using the state machine approach: A tutorial. In *ACM Computing Surveys*, Vol. 22, No. 4, pages 299–319. ACM, 1990.

Schneider lays out the replicated state machine approach to achieving fault-tolerance in a distributed system in this tutorial paper. This paper examines two types of faults: Byzantine failures and Fail-stop failures. The paper lays out the core requirements of reliable replica coordination, agreement and order, and techniques for meeting them including a "logical clock" and a synchronized real-time clock. This paper is a recap of much of my distributed systems class.