Reaction Paper - Synchronization using Transactions: Lower bounds and Algorithms

This talk was Srivatsan Ravi of ISI, USC. This talk focused on the distributed computing of the system. In today's time the synchronization between all the different distributed systems, plays a major role. It is the most difficult task to make different processors work simultaneously together without causing any issues.

The presenter talked about various different domains, which can be elastic cloud, multicore CPU's, sensor networks, permission-less peer-to-peer system, software defined controllers, internet of things, cryptocurrency networks and what not. These are some of the most common distributed systems. Although the presenter did not indulge in all of these explaining all of them, but rather gave an overall procedural system of how they work.

The presenter showed some light on the fundamental computing challenge which is the synchronization amongst the processes. I really liked the way how he presented the research contributions in a single slide and thus the overall step-by-step procedure was much easily understood in the form of a flow chart. From formalizing safety and progress properties for distributed computing, lower and upper bounds for transactional memory and concurrent data structures, elastic cloud programming models and provably safe distributed protocols to domain-specific permissions.

He also gave brief information about the Safe Hybrid Transactional memory/ shared-memory universal constructions. More insight was given on Coarse-grained locking, fine grain locking and lock-free synchronization. I really liked the way he gave the insight on these topics by explaining with a help of example and also the advantages and features of every type of the locking system. This helps in understanding as to which locks are better for which system to give the optimum results.

There is a huge complexity of implementing the safe in-memory transactions. He taught us about the 3 types of TM: hardware, software and hybrid TM. In this part again he gave us the overall understanding of how the system works rather than getting involved in individual aspects of the system. One example was shown to help us understand the process.

Overall I can say that this talk was very informative and the presenter possessed a great amount of information and in-depth knowledge of the system. He had a lot to talk about but had to rush through the topics due to the time constraints.

One thing, which I found was that the presenters expect the student attending to have prior knowledge of the topic, which is not always possible. They explain the things in a much higher level that if you don't have the prior information, the understanding of their research becomes of no use to that student. I believe that a smaller introduction of the topic should be provided

to have a better understanding. In this talk there were so many points which were unclear to me, like how are the lower bounds better or not from the other useful algorithms. An effort should be made to make sure that the point for the research is easily understood by a lay-man.