



DEFESA DE PROPOSTA DE TESE

Programa de Pós-Graduação em Ciência da Computação

GENERALIZED CONSENSUS FOR HIGH-THROUGHPUT STATE MACHINE REPLICATION

ALUNO: Tarcisio Ceolin Junior

ORIENTADOR: Dr. Fernando Luís Dotti

BANCA EXAMINADORA: Dr. Eduardo Adilio Pelinson Alchieri (CIC/UnB), Dr. Luiz Gustavo Leão Fernandes (PPGCC/PUCRS)

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RESUMO:

High-throughput dependable distributed systems are increasingly needed to support applications from different natures. State Machine Replication (SMR) supports the strong consistency model (linearizability) and has been widely used to allow ease of use and construction of replicated services. However, SMR scales poorly because the need of determinism across replicas typically leads to sequential implementations. Based on the fact that non-conflicting requests issued to an SMR can be processed concurrently, several approaches to scale the throughput of SMR emerged, the vast majority of which using typical consensus protocols to provide a total order across replicas and, with scheduling decisions or verifications that relax this order, allowing concurrency while assuring replica consistency. However, there are consensus protocols (such as Generalized Paxos, Generic Broadcast and Egalitarian Paxos that use the notion of partial order of non-conflicting commands, according to their semantics. Although internal techniques in such protocols (such as conflict detection, representation, and partial ordering) share important aspects in common with scheduling commands for concurrent execution in parallel SMR, there are no studies relating generalized consensus and request scheduling in parallel SMRs. This proposal puts a light in this yet non-addressed aspect in the literature, suggesting a different approach with the potential to bring new results to scalable dependable systems.