Integrating Transaction and Replication Techniques in CORBA from Replica Consistency Point of View

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Abstract

The FT-CORBA standard that has recently been adopted by OMG uses replication in order to bring a high degree of availability to constructed systems. One of the main concerns that replication-based systems, like FT-CORBA are faced with, is the problem of replica consistency. In the FT-CORBA standard, the consistency of replicated objects is guaranteed by using total-order multicast protocols. But the so-called protocols cannot guarantee system safety when issuing an atomic operation across multiple object groups. In this paper we investigate the challenges that can arise when transactional techniques are used to keep replica objects consistent. We also explain how the CORBA Object Transaction Service (OTS) can be modified in order to support a replica-specific transaction model. Implementation results of our approach shows better transaction throughput compared to the known methods. At the end of this paper, the role of several parameters that can affect the performance of this model are described.