Composing Ordered Sequential Consistency using Leading Updates

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Abstract

We define *ordered sequential consistency* (OSC), a correctness criterion for concurrent objects, which captures the typical behavior of many real-world services, e.g., ZooKeeper, etcd, Chubby, Doozer, and Consul. A straightforward composition of OSC objects is not necessarily OSC. To remedy this, we recently implemented a composition framework that injects dummy updates in specific scenarios. We prove that injecting such updates, which we call here *leading updates*, enables correct OSC composition.

We generalize OSC to define *G-OSC*, a generic criterion for concurrent objects, which encompasses a range of criteria, including sequential consistency and linearizability.