Title: Towards a Universal Approach for Monotonic Searchability in Self-Stabilizing Overlay Networks
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For overlay networks, the ability to recover from a variety of problems like membership changes or faults is a key element to preserve their functionality. In recent years, various self-stabilizing overlay networks have been proposed that have the advantage of being able to recover from *any* illegal state. However, the vast majority of these networks cannot give any guarantees on its functionality while the recovery process is going on. We are especially interested in *searchability*, i.e., the functionality that search messages for a specific identifier are answered successfully if a node with that identifier exists in the network. We investigate overlay networks that are not only self-stabilizing but that also ensure that *monotonic* searchability is maintained while the recovery process is going on, as long as there are no corrupted messages in the system. More precisely, once a search message from node u to another node v is successfully delivered, all future search messages from u to v succeed as well.

Monotonic searchability was recently introduced in OPODIS 2015, in which the authors provide a solution for a simple line topology. We present the first *universal* approach to maintain monotonic searchability that is applicable to a wide range of topologies. As the base for our approach, we introduce a set of primitives for manipulating overlay networks that allows us to maintain searchability and show how existing protocols can be transformed to use theses primitives. We complement this result with a generic search protocol that together with the use of our primitives guarantees monotonic searchability. As an additional feature, searching existing nodes with the generic search protocol is as fast as searching a node with any other fixed routing protocol once the topology has stabilized.