Removing the Last Linear Upper Bound of Causal Broadcast

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ABSTRACT

Causal broadcast constitutes the core communication primitive of many distributed systems. For decades, state-of-the-art approaches relied on maintaining and transmitting vector clocks. The size of vector clocks increases linearly with the number of processes that ever entered the system. Causal broadcast eventually became overcostly and inefficient in large and dynamic systems. A recent approach solved the issue about generated traffic by removing the need for transmitting vectors. However, it still maintains a vector locally. In this paper, we improve this causal broadcast by removing the need for such vector. The proposed protocol safely purges the local structure over time at cost of few control messages. As consequence, causal broadcast can run in large and dynamic systems even on most humble devices such as Raspberry Pi's.

Keywords: *Causal broadcast, local space complexity*

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