An Asynchronous Leader Election Algorithm for Dynamic Networks without Perfect Clocks

Rebecca Ingram               Tsvetomira Radeva               Patrick Shields
Trinity University           The College at Brockport          Vassar College

Jennifer E. Walter           Jennifer L. Welch
Vassar College               Texas A&M University

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Abstract

An algorithm for electing a leader in an asynchronous network with dynamically changing communication topology is presented. The algorithm ensures that, no matter what pattern of topology changes occur, if topology changes cease, then eventually every connected component contains a unique leader. The algorithm combines ideas from the Temporally Ordered Routing Algorithm (TORA) for mobile ad hoc networks [4] with a wave algorithm [5], all within the framework of a height-based mechanism for reversing the logical direction of communication links [1]. Moreover, an improvement from the algorithm in [2] is the introduction of logical clocks [3] as the nodes’ measure of time, instead of requiring them to have access to a common global time. This new feature makes the algorithm much more flexible and applicable to real situations, while still providing a correctness proof. It is also proved that in certain well-behaved situations, a new leader is not elected unnecessarily.

References

