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A New Method for Fault Detection

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Abstract : Consider a distributed system that delivers messages from a process to another. Such a system is often required to deliver each message to its destination regardless of whether or not the system components experience arbitrary forms of faults. In addition, each message received by the destination must be a message sent by a system process. In this paper, we first identify the necessary and sufficient conditions to detect some restricted form of Byzantine faults referred to as modifying Byzantine faults. An observable form of a Byzantine fault whose effect is limited to the modification of a message metadata or content, timing and omission faults, and message replay is referred to as a modifying Byzantine fault. We then present a distributed protocol to detect modifying Byzantine faults using optimal number of messages over node-disjoint paths.

Keywords : Byzantine faults, distributed systems, fault detection, network protocols, node-disjoint paths
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