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THE NEW TERRITORY OF GENERALIZED BYZANTINE AGREEMENT IN A VIRTUAL SUBNET OF MOBILE AD-HOC NETWORK

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Abstract. *A Mobile Ad-hoc Network (MANET) is a system that is demonstrating a trend towards a fully distributed system and provides mobile computing capabilities. In order to increase the capability of the fault-tolerance and reliability of MANET, the Byzantine Agreement problem is revisited. A protocol for achieving the task of agreement between processors in a MANET is proposed in this paper. The proposed protocol is referred to as the Generalized Byzantine Agreement Protocol (GBAP) and is demonstrated to make each correct mobile processor reach an agreement value to cope with the influence from faulty components in the virtual subnet of MANET.*
Keywords: Byzantine agreement, Distributed system, Fault tolerant, Virtual subnet network, Mobile ad-hoc network

1. **Introduction.** The MANET has attracted significant attention recently primarily because of its infrastructure less and quick deployment features and its automatic adaptation to changes in topology. In the real world, the military, as well as emergency disaster rescue operations, and law enforcement [1] takes advantage of the high mobility of MANET to communicate quickly and efficiently.

The reliability of the mobile processor is one of the most important requirements of a successful MANET. In order to provide a reliable environment in MANET, a mechanism to allow a set of mobile processors to agree on an agreement value is required [7]. The Byzantine Agreement (BA) problem [3,5,6] is one of the most fundamental problems in which an agreement value is reached in a distributed system.

The traditional BA problem first defined by Lamport et al. [5] makes the following assumptions.

(1) There are n processors in a synchronous distributed system where n is a constant and $n \geq 4$.

(2) Each processor can communicate with each other through a reliable fully connected network.

(3) One or more of the processors might fail, so the faulty processors may transmit incorrect message(s) to other processors.