A Multi-Domain Trust Framework for Autonomous Mobile Networks in Harsh Environments

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ABSTRACT

Trust Management Frameworks (TMFs) are being used to improve the efficiency, security, and reliability of decentralized and distributed autonomous systems. Techniques have been developed for high-speed, uncontended environments such as terrestrial 802.11 MANETs. However, these do not perform well in sparse / harsh environments such as those found in Underwater Acoustic Networks (UANs), where network nodes experience significant and variable delays, comparatively low data rates, large contention periods, and considerable multi-path artefacts.[**?**]

In such sparse networks, trust establishment based on statistical observations of success/failure events become unstable and ineffective in detecting or identifying misbehaviours. Additionally, these methodologies focus solely on the communications activities of entities and do not incorporate information from other domains, such as physical mobility.

In this paper we demonstrate the use and operation of a multi-domain trust management framework (MD-TMF) using UANs as an exemplar application. We present a methodology for assessing the performance of varying metric sets in detection and differentiation of a range of communications and physical misbehaviours, demonstrating that by utilising information from multiple domains, trust assessment is more accurate in identifying misbehaviour than in single-domain assessment.

Categories and Subject Descriptors

H.4 [**Information Systems Applications**]: Miscellaneous

General Terms

Algorithms Management Performance Reliability Security

Keywords

MANET, Underwater, Simulation, Trust