

An Approach to Secure Mobile Agent Communication in Multi-Agent Systems

Authors : Olumide Simeon Ogunnusi, Shukor Abd Razak, Michael Kolade Adu

Abstract : Inter-agent communication manager facilitates communication among mobile agents via message passing mechanism. Until now, all Foundation for Intelligent Physical Agents (FIPA) compliant agent systems are capable of exchanging messages following the standard format of sending and receiving messages. Previous works tend to secure messages to be exchanged among a community of collaborative agents commissioned to perform specific tasks using cryptosystems. However, the approach is characterized by computational complexity due to the encryption and decryption processes required at the two ends. The proposed approach to secure agent communication allows only agents that are created by the host agent server to communicate via the agent communication channel provided by the host agent platform. These agents are assumed to be harmless. Therefore, to secure communication of legitimate agents from intrusion by external agents, a 2-phase policy enforcement system was developed. The first phase constrains the external agent to run only on the network server while the second phase confines the activities of the external agent to its execution environment. To implement the proposed policy, a controller agent was charged with the task of screening any external agent entering the local area network and preventing it from migrating to the agent execution host where the legitimate agents are running. On arrival of the external agent at the host network server, an introspector agent was charged to monitor and restrain its activities. This approach secures legitimate agent communication from Man-in-the Middle and Replay attacks.

Keywords : agent communication, introspective agent, isolation of agent, policy enforcement system

Conference Title : ICICS 2018 : International Conference on Information and Computer Security

Conference Location : Chicago, United States

Conference Dates : October 10-11, 2018