Cop: Broad-Spectrum, Dependable, and Secure Protocol Enforcement Mechanism for Multi-Agent Systems

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Abstract

This work introduces Cop, a highly dependable and secure protocol enforcement mechanism for Multi-Agent Systems. Cop features high scalability, low latency, and controllable interoperability, making it applicable to a broad spectrum of systems including large-scale and complex systems, time-critical systems, and systems-of-systems. Cop enforces protocols via Law-Governed Interaction, coupled with a new protective mechanism that significantly enhances the dependability and security of the enforcement in a highly scalable and efficient manner. Cop is arguably superior to the currently popular Blockchain-based Smart Contract mechanisms in terms of its applicability to a wide range of systems, as the latter is inherently unscalable, has high latency, and lacks interoperability.

Defense Committee: Prof. Naftaly Minsky (Chair), Prof. Badri Nath, Prof. Wade Trappe, Dr. Victoria Ungureanu (S&P Global)