

SelectAudit: A Secure and Efficient Audit Framework for Networked Virtual Environments

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Abstract. Networked virtual environments (NVE) refer to the category of distributed applications that allow a large number of distributed users to interact with one or more central servers in a virtual environment setting, e.g., Second Life and multi-player online games. Recent studies identify that malicious users may compromise the semantic integrity of NVE applications and violate the semantic rules of the virtual environments without being detected, e.g., going through a wall. This problem is partly due to the fact that the central server only maintains an abstract information of a player's state. In this paper, we propose an efficient audit framework to detect violations of semantic integrity through a probabilistic checking mechanism done by a third-party audit server. We present a secure audit protocol that periodically requests a NVE client to submit his or her state information to an audit server who then performs selective recomputation to verify the client's results. Because typically NVE has a large number of players, an audit protocol needs to be scalable.

Key words: networked virtual environments, algorithm, audit, integrity