



GAME-THEORETIC ANALYSES AND SIMULATIONS OF ADOPTIONS OF SECURITY POLICIES FOR DRM IN CONTENTS SHARING SCENARIO

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ABSTRACT—A legitimate contents sharing is an essential functionality of DRM (Digital Rights Management)-enabling contents industry and its value chain extension. In order to effectively choose and deploy some typical security policies in a contents sharing scenario, we introduced game theory to analysis the mutual influence of adoptions of trusted computing enabling enhanced security policies on benefits of two stakeholders, which are DRM *Providers* and contents *Sharer* who is a category of consumers. A dynamic and mixed game and its algorithm were proposed, where *Sharer's* strategies were whether to employ the trusted computing enabling devices and related components or not, as well as *Providers' strategies* included entirely general security, entirely enhanced security and dynamic security policies. We concluded from both game-theoretic analyses and Swarm simulation experiments that the number of acquired sharable digital rights and security cost have a direct effect on *Sharer's* choices of the enhanced security policy, and also their different basic sharing modes including partial, modest and extensive sharing, further influence the choice of *Providers*. Besides, with respect to the mixed sharing mode far more similar to a real contents sharing scenario, Dynamic security strategy is superior to the entirely enhanced security in the context of limited sharable rights and higher security costs, but with the acquisition of much more rights and the decrease of enhanced security overhead, the latter strategy would be optimal and stable as a Nash Equilibrium for stakeholders, in combination with the exploitation of effective business models of contents industry.

Key Words: Digital Rights Management; Game Theory; Trusted Computing; Algorithm; Simulation