

A SECURE AND UNDENIABLE BILLING PROTOCOL AMONG CHARGED PARTIES FOR GRID COMPUTING ENVIRONMENTS

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ABSTRACT. *Grid computing has contributed to advances in computational and communication technologies - making economically feasible the conglomeration of multiple clusters of heterogeneous networked resources and services which, in turn, has lead to the development of large-scale distributed systems. It is in this context that available resources are allocated to where a company, research center, or industry needs them most. However, available resources may be limited. We propose a secure delivery and billing protocol between service provider and service requester designed not only to ensure that the communication protocol be subject to no malicious attacks but also to provide billing authentication for business transactions. Our approach can be used within a wide variety of applications with relatively few modifications to the super-peer protocol while only causing slight, readily ignorable increases in traffic.*

Keywords: Billing protocols, Grid computing, Information security, One-time signature, Peer-to-peer networks

1. **Introduction.** Grid computing [53] is the act of sharing tasks over multiple networked computers usually via the Internet. This network concept utilizes the resources of multiple computers to solve a single problem such as CPU storage, equipment upgrading, data compilation, and various software-related issues. The Grid [17] system not only supports the heterogeneous computing resources of different research centers, industries and companies from scattered communities, but possesses many advantages, namely the improvement of microprocessor speeds, optical communications, and raw storage capacity. Therefore, much research [4, 8, 9, 11, 20, 25, 52] is currently focusing on the grid concept. This research includes many types of applications [16]: distributed supercomputing,