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# SCHEDULING THE ACCESS TO MULTI-LEVEL SECURE DATABASES IN A WIRELESS NETWORK ENVIRONMENT

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Abstract. *To enhance scheduling efficiency and data security, we propose a Priority/MLS/AL framework for supporting transaction scheduling in wireless environments. In this framework, we divide users into three priority levels and data objects into four security levels. Mobile stations used in the experiments are cellular phones, personal digital assistants, laptops and personal computers. Altruistic locking is used as a mechanism for reserving data objects. We adopt an algorithmic approach to implement the system. The system behavior is simulated, showing that the framework proposed will enhance scheduling performance and data security. Better access control is achieved and deadlocks are avoided.*

**Keywords:** Wireless communication, Database security, Scheduling, Altruistic locking, Priority

1. **Introduction.** Nowadays, with the help of mobile communication, we enjoy convenient services of ubiquitous computing. Despite the rapid development of wireless hardware, the utilization of wireless technologies is still unsatisfactory. Often used mobile applications are, for example, emails, short message services, accesses to web pages, etc. which have recourse lower computational capability and convey little amount of data. Maybe, this is because that wireless communication is characterized by narrow bandwidth, small coverage, short connection cycle, prone to disruption, and subject to noise. But, complex applications often involve access to large databases or transmission of large quantities of data. This problem becomes more difficult to solve in the wireless network environment because of the aforementioned nature of wireless communication. Many researchers address this issue. For example, Nakano et al. (2009) proposed an efficient data gathering scheme for wireless sensor networks with multiple sink nodes [1]. In this paper, we propose an efficient scheduling mechanism to speed up processing and avoid long waiting duration or long waiting queue.

In addition, there are many kinds of attacks on information systems in the cyber world [2]. Various controls are adopted to protect information assets: some attach importance to authentication [3], some to anti-virus [4], some to network flow control [5], some to key management [6] and many others. For details, please refer to textbooks on information security [2,7]. Among various threats, unauthorized access is an attack difficult to protect against. It is more dangerous in the wireless environment. When data are transmitted through air as electromagnetic waves, they are subject to interception, interference and interruption, making information security a primary concern. Many controls are suggested to enhance information security. Among the various controls, multi-leveled secure