A Lightweight and Practical RFID Grouping Authentication Protocol in Multiple-Tag Arrangements

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Abstract—Radio Frequency Identification (RFID) is a potential technology with the purpose of replacing the barcodes. The authentication towards multiple tags and tag groups has become the research hotspot considering of practical prospects of low-cost RFID tags. However, there are many concerns about the security risks and privacy issues due to the lightweight authentication property of the RFID tags. Many researches achievements have been made focusing on the existence of single tag in an object, while the arrangement that multiple tags attached to one object is out of consideration. In this paper, we propose a lightweight and practical RFID grouping authentication protocol in multiple-tag arrangement. In our assumption, one object to be authenticated is attached with a group of RFID tags. The backend process system (BPS) is able to take full control of the entire authentication process. The feedback towards various cases of the RFID tags is timely provided, which is available for practical situations. Additionally, the accurate position and status of the object can be ascertained with a number of tags combined with the object. Moreover, the protocol is proved to offer enough security assurances and have resistance to various attacks under the security analysis. The regular operation of RFID system will not be affected or damaged by the incidents occurred during the authentication process.

Keywords—RFID, lightweight, grouping authentication, multiple tag, security.

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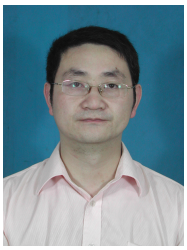

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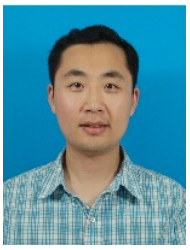

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