Traceable Ring Signature Schemes Based on SM2 Digital Signature Algorithm and Its Applications in the Data Sharing Scheme

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Problems & Ideas

- Problems of conventional data sharing approaches:
  - Strong privacy protections hinder regulation.
  - Conditional privacy protection relys on centralized trust.
- Ideas: An SM2-based traceable ring signature are employed in the data sharing model to enable the tracing without centralized trust.

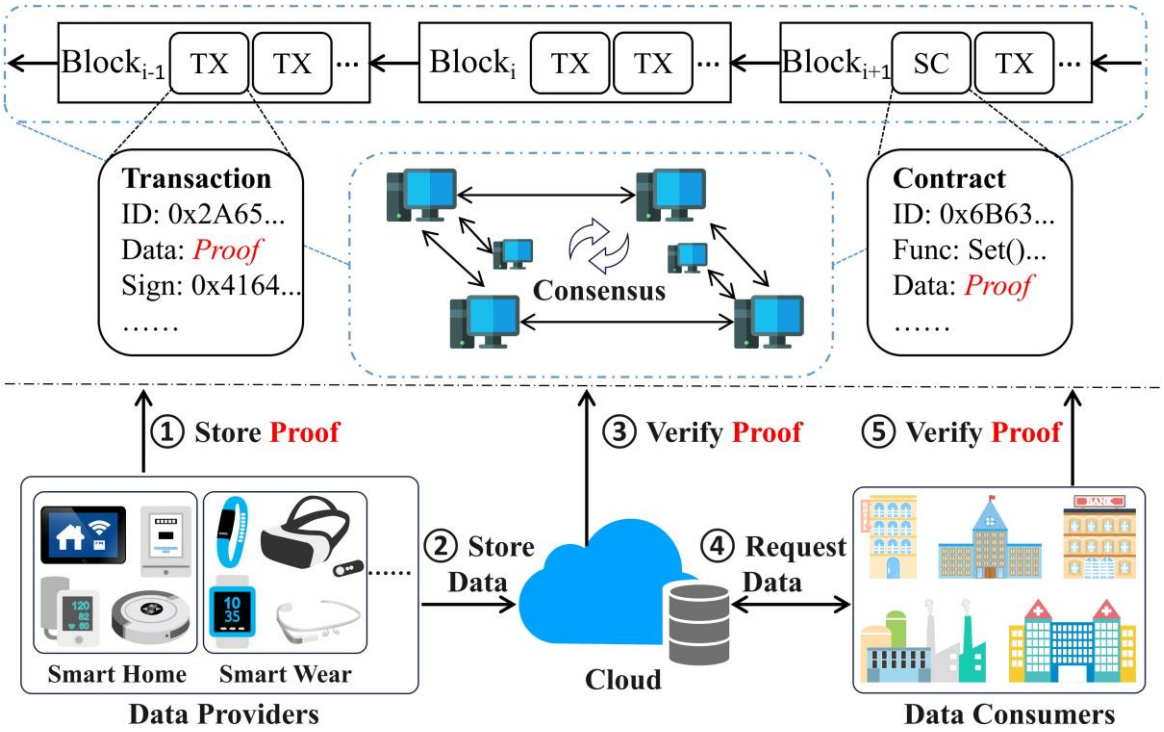
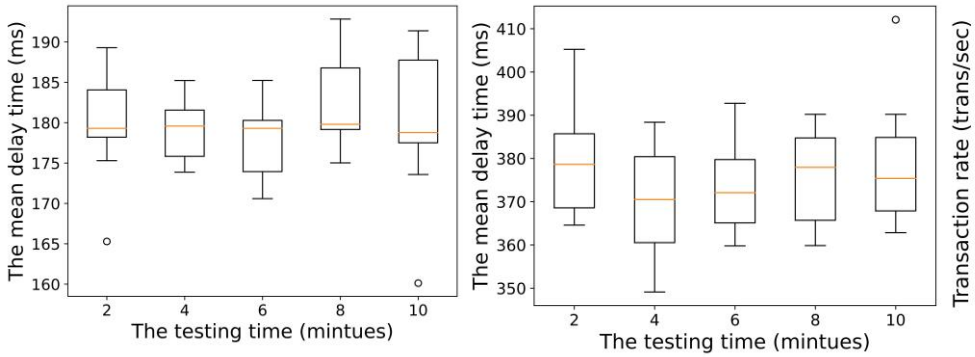


Fig.1 System model

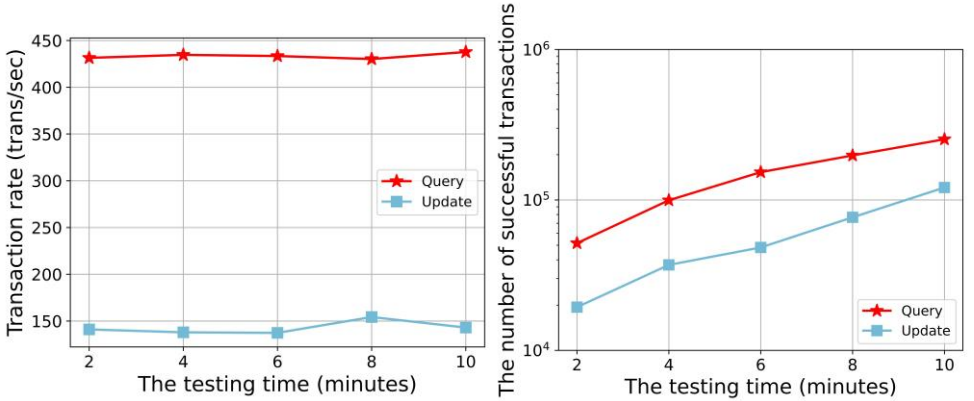
Main Contributions

- Contributions:
  - A traceable ring signature scheme utilizing the SM2 signature algorithm, facilitating traceability without the need for centralized trust;
  - A data sharing scheme that incorporates SM2-based traceable ring signature and blockchain technology;
  - Comprehensive security analysis and performance evaluation demonstrate effectiveness and efficiency.



(a) Query (b) Update

Fig. 2 The results of http_load



(a) The transaction rate (b) The successful transactions

Fig. 3 The results of siege

We employed the web testing tools http_load and siege to assess the query and update operations of our implementation with Hyperledger Fabric within a laptop enviorment. We achieved a satisfactory performance with a mean waiting time of less than 400 ms and a transaction throughput exceeding 100 per second.