Secure Community Trust Stores for Peer-to-Peer e-Commerce Applications Using Cloud Services

Ahmad H. Fauzi, School of Mathematical and Computer Sciences, Heriot-Watt University, Edinburgh, UK

Hamish Taylor, School of Mathematical and Computer Sciences, Heriot-Watt University, Edinburgh, UK

ABSTRACT

P2P e-commerce applications have lower operational costs and inherently more scalable than conventional client-server online trading. Community Trust Stores (CTS) provide reliable and secure storage services for peers involved in P2P e-trading by storing trust data for the peers. Freely available cloud services can host the Community Trust Store and provide 24/7 availability to participating trading peers avoiding the need to pay for commercial trusted third party services. However, the community store must provide a certain level of assurance and support suitable security measures in order to support e-trading within the P2P application. It must also support community management of the store including jointly signed trading contract. The Community Trust Stores also stores reputation report and trading outcomes as future reference for others. New membership for P2P e-commerce group must be sponsored by current members.

Keywords: Cloud Computing, E-Trading, Inexpensive, Peer-to-Peer (P2P), Secure, Server-Less

INTRODUCTION

Ways of trading over the Internet have evolved over time resulting in varieties of trading schemes. Successful e-commerce providers such as eBay, Amazon and Alibaba.com use the client-server approach to provide centralized services to customers who wish to trade with each other. They provide the service globally through their dedicated servers. Users are charged accordingly when trading using their services. They act as a trusted third party in supporting security mechanisms and services and providing assurance to users that it is safe to trade within their environment.

A different approach to trading involves a group of parties who get together to establish a common trading framework and share responsi-
bility for providing supporting services. On this approach no single party or small minority of persons organise the market place. Organisation is decentralized and communally achieved. The trading model is supported by common use of the same software in a deployment configured to serve communal interests. This paper adopts this type of peer-to-peer approach and specifies a peer-to-peer design framework to achieve it.

Peer-to-peer technology is generally cheaper to run and should be more scalable compared to conventional client-server systems. However, the participation of peers in a peer-to-peer network is often unreliable, as each peer can be online at different times and delays can be expected with real time peer-to-peer transactions.

All e-commerce involves risk taking by participating parties. These risks are various but include being cheated, being taken unfair advantage of and being deprived of fair opportunities to trade advantageously. E-commerce traders need assurance that they can mitigate these risks to a sufficient degree otherwise it becomes unwise of them to engage in such e-commerce. Part of that assurance is provided in P2P e-commerce systems by their trading model. Another part is provided by its security services. The latter includes trustworthy means of identifying trading parties and reliable storage of all trust data needed during trading to evaluate transactions and judge the trustworthiness of trading parties. In this approach a Community Trust Store (CTS) stores all trust related data of the trading parties, including peer identity credentials, trading contracts, trading outcomes and reputation reports.

Due to the uncertain availability of peer computing platforms, the CTS need to be hosted by a means which is available whenever it is needed. A cloud provides one solution to this problem. It is able to host the CTS and support continuously accessible storage of trust data for trading activities for P2P e-commerce trading parties. A cloud provides a cheap solution for hosting the CTS compared to one or more conventional dedicated servers provided by a trusted third party e-commerce service provider. Typical cloud services offer to host applications with a small data footprint, modest throughput and moderate use of bandwidth for free.

This research confines its attention to the overall design and security issues for P2P e-commerce trading to support local trading for low valued goods. Low valued item includes second hand items gift such as clothes, books, electrical appliances, toys and DVDs. It is less problematic compared with e-commerce trading in general because the items which are being traded are low valued and the proximity of the trading parties means that the buyer can inspect the item before buying and the parties can exchange the money and goods directly at the same time. It avoids the problems of services like eBay of buying without inspecting at first hand, unsynchronised exchanges of money and goods, insecure remote payment, high charges for remote delivery of goods and the risks of suffering a large loss in a single transaction through fraud or mishap.

Existing online local trading sites such as Gumtree.com, which provide some level of free service for a local community to advertise items, lack features to report the outcomes of their trade and reputation reports of traders’ previous trading history.

A P2P-CTS provides a free service for the members of a trading community to trade in a P2P style by providing history of previous trades and reputation reports that is made available to the members via the publicly available CTS which is hosted in the cloud.

This paper is structured as follows: Scenario of P2P trading with CTS, security issues for the P2P trading system, implementation model for P2P local trading and Community Trust Stores, related works of the research, discussion, future works and conclusion.
Related Content

Low-Cost Methods for Generating Panoramic Views for a Mobile Virtual Heritage Application and its Application to the Heritage Zone of George Town Malaysia
[www.irma-international.org/article/low-cost-methods-generating-panoramic/62082/](http://www.irma-international.org/article/low-cost-methods-generating-panoramic/62082/)

Innovating Elite Undergraduate Education through Quality Continuous Improvement: A Learning Enterprise’s e-Transformation Perspective
Kam Hou Vat (2012). *SMEs and Open Innovation: Global Cases and Initiatives* (pp. 146-182).
[www.irma-international.org/chapter/innovating-elite-undergraduate-education-through/60509/](http://www.irma-international.org/chapter/innovating-elite-undergraduate-education-through/60509/)

Intelligent Agent for Modeling and Processing Decisional Workflows in Logistics
[www.irma-international.org/chapter/intelligent-agent-modeling-processing-decisional/74042/](http://www.irma-international.org/chapter/intelligent-agent-modeling-processing-decisional/74042/)

Academic Entrepreneurship as a Catalyst for Quality Higher Education
[www.irma-international.org/chapter/academic-entrepreneurship-as-a-catalyst-for-quality-higher-education/139874/](http://www.irma-international.org/chapter/academic-entrepreneurship-as-a-catalyst-for-quality-higher-education/139874/)
Managing Corporate Social Responsibility as an Innovation in China
www.irma-international.org/chapter/managing-corporate-social-responsibility-innovation/43096/