Storage Exchange: A Global Platform for Trading Distributed Storage Services

by

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ABSTRACT

The Storage Exchange is a new platform allowing storage to be treated as a tradeable resource. Organisations with varying storage requirements can use the Storage Exchange platform to trade and exchange storage services. Organisations have the ability to federate their storage, be-it dedicated or scavenged and advertise it to a global storage market.

This thesis provides a detailed account of the Storage Exchange and presents three main contributions in the field of distributed storage and the process required to realise a global storage utility. The first is a taxonomy of distributed storage systems covering a wide array of topics from the past and present. The second contribution involves proposing and developing the Storage Exchange, a global trading platform for distributed storage services. The development of the Storage Exchange platform identifies challenges and the necessary work required to make the global trading and sharing of distributed storage services possible.

The third and final contribution consists of proposing and evaluating Double Auction clearing algorithms which allow goods with indivisible demand constraints to be allocated in polynomial time. The process of optimally clearing goods of this nature in a Double Auction normally requires solving an NP-hard problem and is thus considered computationally intractable.

This is to certify that

(i) the thesis comprises only my original work,

(ii) due acknowledgement has been made in the text to all other material used,

(iii) the thesis is less than 30,000 words in length, exclusive of tables, maps, bibliographies, appendices and footnotes.

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