AN EFFICIENT APPROACH FOR SOCIALLY MOTIVATED RESOURCE SHARING

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Abstract : To understand the level of trust between users, we are using the Social networks of online relationship which is based on real world relationships. Now a day's Digital relationships between individuals are as important as them of real-world counterparts. For many people Social Network provides a primary means of communication between friends, family members and co-workers. Social Network platform is evidenced by their rapid and ongoing growth increasingly. For this purpose, we projected these relationships to form a "Dynamic Social Cloud", so that users can share heterogeneous resources within the context of social network. Here we can also use some mechanisms for enabling a cloud-based framework to provide long term sharing and overcome all privacy and security overheads. The social market place for regulate sharing due to its unique nature of social cloud. In this study, we can design advertisements to the page and people can easily approach with friends if advertisements are designed in Facebook. Here we express the social cloud computing by considering the approach of "SOCIAL STORAGE CLOUD" and this can be implemented over Facebook. Based on this, further added one incentive protocol to our cloud-based framework, with that it can maintain feasibility through economic protocols. By developing this protocol in trading system, it acts as ads on web page and shows how those are getting displayed on user webpage.

Index Terms: Social Storage Cloud, Social Networks, Cloud Computing, provision Computing.

I. INTRODUCTION

Cloud computing refers to a model of processing information, storing it as well as delivery wherein physical resources are provided to clients on demand. Instead of purchasing actual physical devices servers, storage, or any networking equipment, clients lease these resources from a cloud provider as an outsourced service. [9] We have observed a significant growth of Social-computing communities, online services for sharing the information between individuals are most essential as their real-world equivalents with the help of digital connection in various forms. As it is a Multidimensional Perspective these systems are characterized by different forms of participation, including the sharing of information artefacts (e.g., photos and videos), sharing of meta information and pointers (e.g., tags, bookmarks). As there are some social community sites like Flicker and YouTube, by working based on these sites there are some privacy tribulations. So, we thought that by using Face book application we may shrink some privacy issues to some extent. Every day 500 million active users & 50% of users logging in Facebook. By this we can say Social Network platform is evidenced with rapid and ongoing growth increasingly. If the digital relationship between the two is based on real world relationship, then users are more likely to trust information and infer level of trust that underpins and transcends the online community in which they exist from "friends" rather than purely online relationship. This implicit trust along with the application of socially corrective mechanisms (incentives, disincentives, capital) inherent in social networks can also be applied to other domains.

II. APPLICATION SCENARIOS

The potential application scenarios that benefit from Cloud models are immense (from scalable web servers through to data intensive scientific applications). Cloud Computing refers to applications delivered as services over the internet [19]. The point of difference of a Social Cloud is that applications can also leverage the relationships between users to deliver shared asymmetric services – leading to several potential Social Cloud application scenarios: Social Computation Cloud, Social Storage Cloud, Social Collaborative Cloud, Social Cloud for Public Science, and Enterprise Social Cloud

2.1. The Social Storage Cloud

To demonstrate the feasibility of the Social Cloud a Web Service based Social Storage Cloud has been developed and deployed as a Facebook application. In the Social Storage Cloud, three economic markets have been created; all three operate independently and are designed to work simultaneously. All three markets result in the establishment of a Service Level Agreement between users. The Service Level Agreement is redeemed through the appropriate storage service to create a storage instance. In such a social market, participating users know the corresponding user's identity and can directly interact with the provider to identify why a particular capability was not delivered. However, where no such prior relationships exist, a Service

Level Agreement provides a more appropriate mechanism, requiring reward and penalty clauses to limit risk for the user and liability for the provider. The general architecture of the Social Storage Cloud is shown in Fig. 2.1.

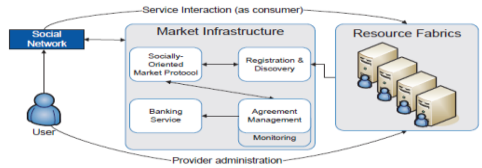

Figure 2.1: Social Cloud Architecture. In this shared resource are register by users & friends can able to provision and also use them in Social Storage Cloud application. Allocation is conducted by market Infrastructures.

2.1.1 Facebook Applications

Facebook exposes access to their social graph through the Open Graph API; through the Representational State Transfer (REST) service interface applications can access all objects (friends, events, groups, application users, profile information, and photos) and the connections between them. To access the Open Graph API both the user and the application must be authenticated, in Facebook this process uses the OAuth protocol [14].

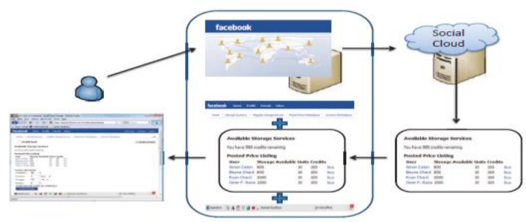

Figure 2.2: Facebook application hosting environment. By Social Cloud Web application generates page content which is parsed by Facebook that creates the page delivered to the user.

2.2 Storage as a Service

There are two generic requirements of the shared storage service: firstly, the interface needs to provide a mechanism to create a stateful instance for a reservation. In our model the Social Storage Cloud application passes a Web Service-Agreement [3] based Service Level Agreement to the service which is parsed and used to instantiate the required state. Secondly, in order to be discovered the service needs to advertise capacity so that it can be included in the market. In the Social Storage Cloud this advertised capacity is encoded using XML (Extensible Mark-up Language) based metadata which is periodically refreshed and stored in a Globus Monitoring and Discovery System (MDS) [8]. The Social Storage Cloud is based on a generic Web Services Resource Framework [7] (WSRF). Users create storage by passing an agreement to the storage service; this creates a mapping between a user, agreement, and the storage instance. Instances are identified by a user and agreement allowing individual users to have multiple storage instances in the same storage service. The storage service creates a representative WSRF- (Web Service Resource Framework) resource and an associated working directory for each instance.

2.3 Currency regulation

The Social Storage Cloud includes a credit-based system that rewards users for contributing resources and charges users for consuming resources [10]. A Banking service registers every member of the Cloud by storing their credit balance and all agreements they are participating or have participated in. Credits are exchanged between users when an agreement is made, prior to the service being used. To bootstrap participation in the Social Cloud, users are given an initial number of credits when joining the Cloud. While suitable for testing, this initial credit policy is susceptible to inflation and cheating (if fake users are created and the initial credits are transferred). Currently there is no mapping between Social Cloud credits and real currencies or Facebook credits. The Banking service is composed of two associated context services each representing different instance data. The first context service manages user resources while the second manages storage agreements. The user resource stores the user's Facebook ID, current credits, agreement IDs the user has participated in, and auction references. The agreement resource contains any agreements created in the system which is used to manage provision information and act as a receipt.

2.4 Registration

The registration process is shown in Fig. 2.3. Upon joining the Cloud users first need to register themselves, and then specify the Cloud services they are willing to trade. As users are pre-authenticated through Facebook, user instances can be transparently created in the Banking service using the user's Facebook ID. Having registered, the user is presented with a Monitoring and Discovery System End Point Reference (EPR) and Cloud ID which they use to configure their Cloud services for registration (and refreshment) of resource capacity. Market services utilize the Monitoring and Discovery System XPath interface to discover suitable services based on user IDs and real time capacity. The service updates its metadata whenever a resource state change, this update is reflected in Monitoring and Discovery System according to the application policies.

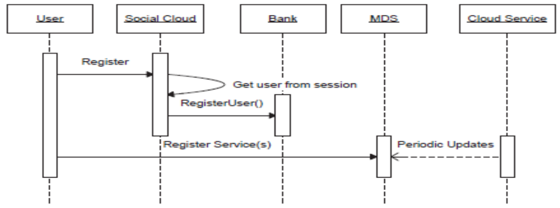

Figure 2.3: Registration in Social Cloud for user's authentication

III. ENHANCEMENT OF SOCIAL CLOUD

Social networking platforms have provided a multitude of integrated applications that deliver particular functionality to users, and more significantly, social network credentials provide authentication in many diverse domains, for example many sites support Facebook Connect as a trusted authentication mechanism. We at the moment term a SOCIAL CLOUD openly as: "A Social Cloud is a resource and service sharing framework utilizing relationship established between members of social network". The resources can represent vastly different capabilities and the exchange need not be symmetric. A cloud-based usage model is used to enable virtualized resource sharing through service-based interface. First, we look at the Fig. 1.1 beneath shows the aspects of the Social Cloud model that was explored in this article perspective.

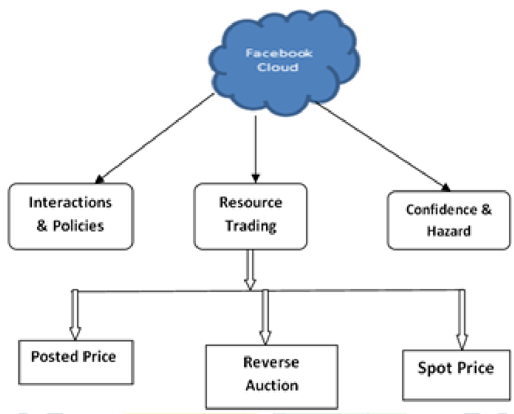

Figure 3.1 Features of a Social Cloud

3.1 Features of Social Cloud Computing

Facebook has recently recognized the need for the creation of such groups and allows users to differentiate between, for example, close friends and colleagues. In a Social Cloud, this provides the basis for defining different levels of trust based on the group concept supported by the infrastructure. For example, a user could limit sharing with close friends only, friends in the same country, network or group, all friends, or even friends of friends. Such connectivity between individuals can be used to infer that a trust relationship exists between them. However, it does not describe the level of trust or the context of the relationship. For instance, a "friend" can be a member of the family, a work colleague, a college affiliate, a member of the same sports club etc.

This figure 3.2 also highlights that Social Clouds are not reciprocally exclusive, that is, users may be simultaneously members of multiple Social Clouds. Whereas a VO (Virtual Organisations) [13] is often associated with a particular application or activity, and is often disbanded once this activity completes, a group is longer lasting and may be used in the context of multiple applications or activities. We take this latter view, and use the formation of social groups to support multiple activities. In addition, different sharing policies or market metaphors can be defined depending on the group, for illustration a user may be more likely to share resources openly with family members without requiring a high degree of reciprocation.

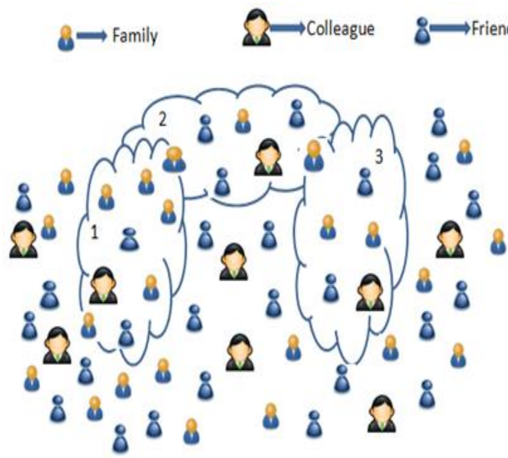

Figure 3.2 Social Cloud Overlay in a Social Network With three different Social Clouds.

3.2 Trust & Risk

For the individuals sharing resources within a social cloud for commercial cloud providers this approach is not feasible, and therefore it is important to use social incentives and the underlying real-world relationships as a substitute foundation for trust. At present, none of the major social networks are able to provide guarantees about the real-world identity associated with a user profile. To do so, explicit identification processes, such as those used in Safe book [6] are required to ensure profiles are mapped to a real person or organization.

3.3 Resource Trading

A Social Cloud resource represents a physical or virtual entity of limited availability. A resource could therefore encompass people, information, computing capacity, or software licenses – hence, a resource provides a particular capability that is of use to other members of a group or community. example, a user may back up photos from their digital camera to the hard disk of another member in the social network.

3.3.1 Motivation for Contribution

The essential social incentives present in a Social Cloud motivate users to participate in, and contribute to, their community in different ways. Motivation has been studied in a number of other online domains [20], for example sharing information and photos in social networks, sharing metadata and tags in online communities, and collaborative knowledge building through online content projects (e.g. Wikipedia) or open source software projects [14].

3.3.2 Social Capital

Social capital represents an investment in social relationships with expected returns [15]. From an individual standpoint social capital is similar to human capital in that users of a social network may gain individual returns for specific actions (for example selling goods or finding a new job). From a group perspective, social capital represents the intrinsic (intangible) value of the social community, that is, the community as a whole generates returns by the actions of its members. With the growth of online relationships there is potential to create new forms of social capital due to the ease with which online social networks allow users to create and maintain large, distributed networks of relationships [11].

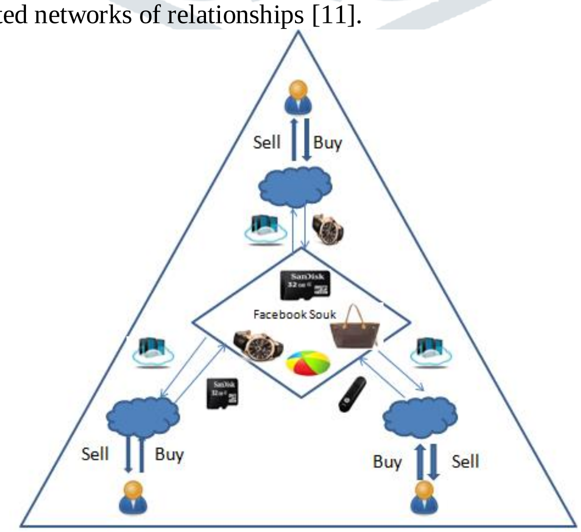

Figure 3.3: Resource Capabilities Sharing in Social Cloud

3.3.3 Social Market

The Social Marketplace is at the core of the Social Cloud and is used to regulate sharing within a group. Each group is associated with a separate instance of the market. The market is shown in Fig. 1.3. The marketplace is tasked with allocating resources between peers according to pre-defined economic or non-economic protocols.

3.3.4 Social Market Metaphors and Protocols

A Social Marketplace contains a set of market protocols tasked with determining the most appropriate allocation given to a particular user request. The choice of protocol is dependent on the Social Cloud and the requirements of its members. Examples of common protocols include:

- **Volunteer:** an idealistic sharing model in which users contribute resources for no personal gain, but do so without accountability for their actions [12].
- **Trophy:** a non-monetary model in which users are rewarded with non-tangible credits or prizes (fame) for achieving contribution goals [5]. Trophy systems have been successfully used as an add-on by Volunteer computing projects as a means of encouraging participation.
- **Reciprocation:** a sharing model in which users that contribute the most to the Cloud are proportionally favoured when requesting resources.
- **Reputation:** a model based entirely on a measure of individual reputation. Reputation is established through interactions in the community.
- **Posted Price:** A model in which market resources are offered at a set posted price [17]. A Posted Price model is the predominant economic model employed by commercial Cloud providers.
- **Auction/Tender:** a dynamic multi-participant mechanism designed to establish the market price for a particular resource [22], & [4] Auctions are used extensively for online sales of goods through sites such as eBay.
- **Spot price:** a dynamic pricing protocol in which a commodity is offered at a price given at a particular time and location [1], & [16]. Amazon EC2(Elastic Cloud Computing) offers a competitive hybrid Spot price market to facilitate dynamic pricing, if the bid is greater than the current spot price the instance is provisioned.

3.3.5 Provision of the Trading Infrastructure

The host infrastructure for a Social Cloud could be provisioned in multiple ways, for example it could be provided externally (i.e. outsourced to an external vendor) or internally by the members themselves. Using an external provider is potentially easier, however it may be expensive and might not scale if a single market instance vendor is used for all groups. Supplying the infrastructure internally can more easily scale with the size of the group and it maps to the philosophy of social contribution inherent in a Social Cloud, however it requires a high degree of trust and cooperation between users.

3.4 Social Marketplace

The Social Storage Cloud implementation includes three concurrent economic markets posted price and reverses auctions and spot prices.

3.4.1 Posted Price

In the posted price marketplace, a user can select any advertised service and define specific requirements (storage amount, duration, availability, and penalties) of the provision. Fig. 3.4 shows the flow of events for a posted price trade in the Social Storage Cloud. After logging on, the Social Storage Cloud application transparently validates the Facebook user ID through the Banking service to ensure the user is registered and to also retrieve their current number of credits. A list of all the users' friends is generated using the Facebook Representational State Transfer (REST) Application Program Interface; this list is used to compose a query to discover friends' storage services from Monitoring and Discovery System. The result of this query is used to populate the posted price offer list that describes availability and pricing information. When the user selects a service, they also specify their required service levels, a Service Level Agreement (SLA) is created using the SLA creation component of SORMA [18]. To do this the storage requirements are encoded into an EJSDL- Extension Job Submission Description Language; JSDL with economic extensions document describing the storage request.

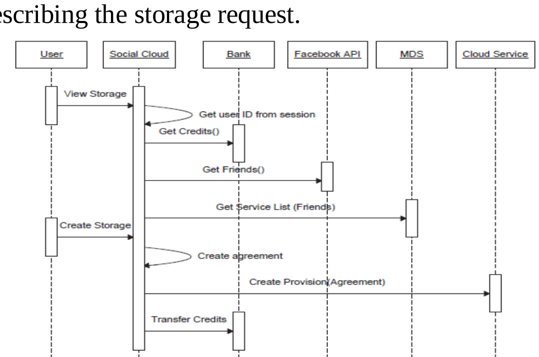

Figure 3.4 Posted price marketplace in a Social Cloud for Users Authentication

3.4.2 Auctions

In the reverse auction (tender) market, a user can specify their storage requirements and then submit an auction request to the Social Storage Cloud. The user's friends then bid to provide the requested storage. The auction mechanisms used are based on the DRIVE meta-scheduler [4]. Fig. 3.5 illustrates the auction process. In a reverse auction Cloud services compete (bid) for the right to host the user's task. The auctioneer uses the list of Facebook friends to locate a group of suitable storage services based on user specified requirements; these are termed the bidders in the auction. Each bidder then computes a bid based on the requirements expressed by the consumer. The auctioneer determines the auction winner and creates a Service Level Agreement between the auction initiator and the winning bidder.

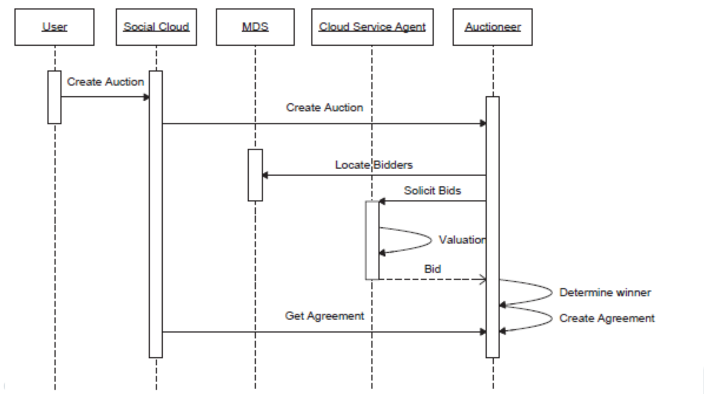

Figure 3.5 Auction price marketplace in a Social Cloud

3.4.3 Spot Price

Spot price is a dynamic pricing protocol in which commodity is offered at a price given by particular time and location. If the bid is greater than the current spot price the instance is provisioned. In the spot price marketplace, a user can request for any service and delineate with specific requirements of provision. After logging on the social storage cloud application transparently validates the Facebook user id through the banking service to ensure user is registered and also requesting for services. Based on Monitoring and Discovery System a list of all user's friends can be generated using Facebook Application Program Interface, then this list is used to compose a query to discover friends in a storage service and the result is used to populate spot price offered services to describe availability and pricing information. After receiving the service by service provider then the user selects the service by specifying their required service levels for that Service Level Agreement is created based on SORMA tool.

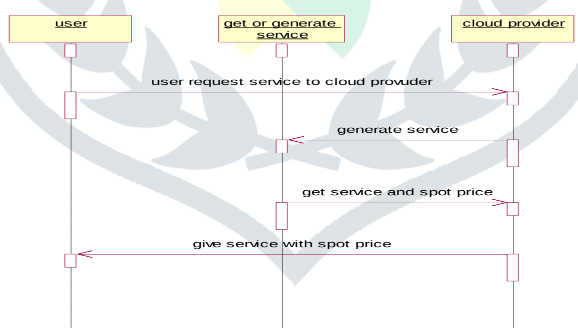

Figure 3.6 Spot Price market place in Social Cloud

IV. EVALUATION

Based on Social Storage Cloud the measurements can be obtained for deployment. This experiment focus on the scalability and performance of two social marketplaces, and feasibility of their cooperative infrastructure.

4.1 Posted Price Allocation

Posted price trading requires several steps: identification of storage requirements, generation of a Service Level Agreement, instantiation of a storage service, and registration of the transaction with the Banking service. The time taken to perform these operations is constant and generally small compared to the time taken to discover storage offers, which is dependent on the Monitoring and Discovery System service. Fig.4.1 shows the time taken to query Monitoring and Discovery System for an increasing number of registered entries. The time includes the cost of converting the Extensible Mark-up Language (XML) result into a Java object. Registration performance is shown to be dependent on the amount of memory given to the container and the number of registered entries. With 1GB of memory over 2000 offers can be retrieved in less than 2 seconds. Therefore, Monitoring and Discovery System can be run even on a low specification server yet still support a Social Cloud and its market.

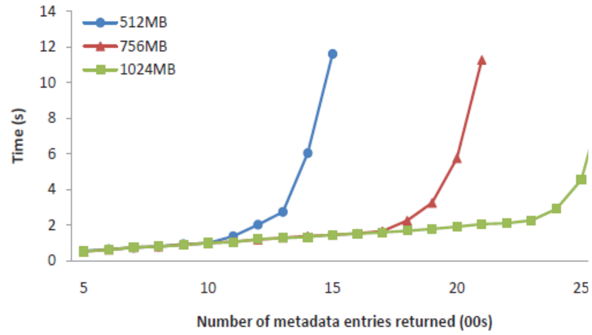

Figure 4.1Time taken to retrieve service metadata from Monitoring and Discovery System

4.2 Auction Allocation

The Social Storage Cloud auction mechanism relies on a collection of Web services representing the parties involved in the marketplace. A single Auction Manager conducts the auction and a single Agreement Manager creates Service Level Agreements as a result of the auction. Each storage service is represented by a Bidding Agent which consults local policy to determine a price based on pre-defined metrics. The major point of stress in this system is the Auction Manager and Agreement Manager. The Auction Manager is responsible for creating an auction, advertising the auction to suitable bidders, soliciting bids, and determining the result of the auction. Agreement creation is simpler as it only involves creation of a Web Service-Agreement and one call to the winning bidder to verify the agreement. Fig. 4.3 shows the auction throughput with an increasing number of bidders in each auction. The number of auctions per minute is calculated based on the time taken for 500 auctions to complete; this time is measured on the client side starting when the client submits the first task through to the creation of the final agreement by the Agreement Manager. It is important to remember that in a typical scenario auctions are created with a predefined deadline and users expect some latency between submission and agreement creation.

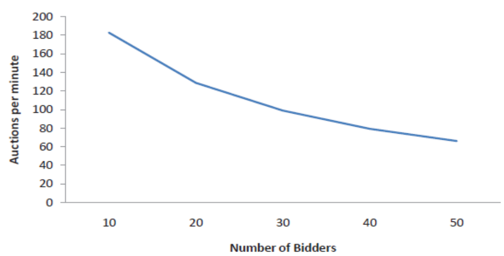

Figure 4.3 Auction throughputs. Number of auctions completed per minute for an increasing number of bidders.

4.3 Spot Price Allocation

To use the spot instance service, a customer submits a request that specifies the type, the number of instances, the region desired and the biding price per instance-hour. If the bidding price exceeds the current spot price, the request is fulfilled and each spot instance will run until it finishes or spot price exceeds the current bid. In the former case, the customer is charged for the partial-hour usage before it finishes. In the latter case, it will terminate without notice, and the customer is not charged for his usage during the partial hour. A common strategy for handling spot instance termination is to periodically save the work using progress checkpoints. Notice that if a user submits a request that asks for many instances of the same type, it is possible that only a fraction of them is satisfied. Hence, it is helpful to think of a multi-instance request as a set of independent single-instance requests. In addition, Amazon provides the price history to help customers decide their bids. Amazon's spot instance mechanism can be described as a continuous seal-bid uniform price auction, where identical goods are sold at identical price. It is known that a single round seal-bid uniform price auction is a truthful mechanism if the supply level is adjustable [2].

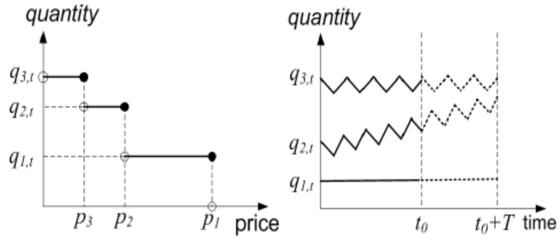

Figure 4.4 Spot price Graph demand/quantity vs time

V. FUTURE WORK

The Social Cloud presents a rich upbringing for future research. One major area of future work is adapting the market protocols discussed in section 3.3.4 to a Social context and also looking at other ways to define and exploit social incentives (and disincentives) in a resource sharing scenario. This may involve altering existing protocols or defining new socially oriented trading protocols. We explore the idea of using reputation to measure social compliance in the context of the social cloud to ease the 'Social Accounting' that will be incurred as groups grow in size and role. The business models that could be realized in the Social Cloud, in parallel to these efforts we plan to deploy the Social Storage Cloud to provide a platform for further experimentation. With this we can explore system performance and user interactions on much larger scale. This deployment could also be used to examine storage and replication algorithms, and address potential security implications. All these will be implemented in virtual environment.

VI. CONCLUSION

This article presents the main idea of social cloud computing. A Social cloud is unique and it builds upon social incentives and external real-world relationships that were inherent in social network to provide heterogeneous resource trading. This work represents a novel view new approach to collaborative computing utilizing socially corrective mechanism to motivate the contribution without requiring extensive enforcement architectures.

In this article facebook based social storage cloud has been developed and deployed and it supports and trading with three socially economic market protocols which is present in market place. The integrated social storage facebook application allows users to discover and trade storage contribution by their friends, taking advantage of pre-existing trusted relationships. A market place used empirically trading services could be hosted using small scale resources based on the observation of individual groups we decide the size of small group may be average 130 individuals but the protocols would satisfy the requirements moderately in a social network based on these requirements the model can be enable scalability of a social cloud so that users can view the particular advertisement in the user's page.

VII. REFERENCES

1. Abramsonet, D al., 2000. "High performance parametric modelling with nimrod/g: Killer application for the global grid?" in Proceedings of the 14th International Symposium on Parallel and Distributed Processing (IPDPS '00). Washington, DC, USA: IEEE Computer Society, p. 520.
2. Amir Danak, S. M., 2010. Resource allocation with supply adjustment in distributed computing systems in International Conference on Distributed Computing Systems (ICDCS).
3. Andrieuxet. Aal, 2007. "Web services agreement specification (WSAgreement)".
4. Chard, K and Bubendorfer, K., 2009. "Using secure auctions to build a distributed meta scheduler for the grid," in Market Oriented Grid and Utility Computing, ser. Wiley Series on Parallel and Distributed Computing, Buyya, R and Bubendorfer, K., 2009 Eds.New York, USA: Wiley Press, pp. 569–588.
5. Cooper S F. et al., Leaver-Fay A, Baker D, Popovic Z, and Players F, 2010. "Predicting Protein structures with a multiplayer online game." Nature, vol. 466, no. 7307, pp. 756– 760.
6. Cutillo L, et.al, 2009. "Safe book: A privacy preserving online social network leveraging on real- life trust," IEEE Communications Magazine, vol. 47, no. 12, pp. 94–101.
7. Czajkowskiet, K al., 2010. "The ws-resource framework," Globus, Tech. Rep., 2004, http://www.globus.org/ws rf/specs/ws-wsrf.pdf [Accessed Dec].
8. Czajkowski, K Set al., 2001. "Grid information services for distributed resource sharing," in Proceedings of the 10th IEEE Symposium on High Performance Distributed Computing (HPDC).
9. Sumathi and Poongodi, 'Scheduling Based on Hybrid Particle swarm Optimization with Cuckoo Search Algorithm in cloud environemnt', The IIOAB Jorunal, Vol. 7, no. 9 pp.358-366
10. Deelman.E et al., 2008. The cost of doing science on the Cloud: The montage example. In 2008 ACM/IEEE Conference on Supercomputing (SC 2008), pages 1–12, Piscataway, NJ USA, IEEE Press.
11. Ellisonet N.B al., 2007. "The benefits of facebook friends: social capital and college students use of online social network sites," Journal of Computer-Mediated Communication, vol. 12, no. 4, pp. 1143–1168.
12. ET, D.P al., 2002. "Seti@home: an experiment in public-resource computing," Communications of the ACM, vol. 45, no. 11, pp. 56–61.
13. Fosteret, I al., 2001. "The anatomy of the grid: Enabling scalable virtual organizations,"International Journal of High Performance Computing Applications, vol. 15, pp. 200– 222.
14. Hammer-Lahav, E et al., 2011. 2.0 Authorization Protocol, IETF Std.Lakhani, K.R and Wolf R.G, 2005. Perspectives in Free and Open- Source Software.MIT Press, ch, why hackers do what they do, pp. 3–22.
15. Li N, 2002. Social Capital: A Theory of Social Structure and Action. Cambridge University Press.
16. Mattesset, M al., 2010. "Managing peak loads by leasing cloud infrastructure services from a spot market," in Proceedings of the 12th IEEE International Conference on High Performance Computing and Communications, pp.180–188.
17. Mingbiaoet, L al., 2007. "Posted price model based on gross and its optimization using in grid resource allocation," in Proceedings of the International Conference on Wireless Communications, Networking and Mobile Computing, pp. 3172–3175.

18. Neumannet, D al., 2007. Building an open grid market for grid resource allocation," in the 4th International Workshop on Grid Economics and Business Models Lecture Notes in Computer Science: Rennes, France.
19. D Sumathi and P Poongodi, 2015, Int. J. Comput. Electr. Autom. Control Inf. Eng, vol.9, no.2, pp. 637-641.
20. Novet, O al., 2010. "Analysis of participation in an online photo-sharing community: A multidimensional perspective," Journal of the American Society for Information Science and Technology, vol. 61, no. 3, pp. 555–566.
21. Seifert S, 2006. Posted Price Offers in Internet Auction Markets, ser. Lecture Notes in Economics and Mathematical Systems. Springer, vol. 580.
22. Waldspurgeret, C al., 1992. "Spawn: a distributed computational economy," IEEE Transactions on Software Engineering, vol. 18, no. 2, pp. 103 –117.

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