Developing a Conceptual Relationship between Web Service Supply Chain Entities

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Abstract - Globalization has led to a new class of service apart from the services that are offered offline and semi-online (in which case part of the service transactions are online and part of it offline) as a result of collaboration of static entities resulting in static service supply chains. The advent of enablers like Service Oriented Architecture and development of web service applications has enabled online / dynamic service supply chain networks (SSCNs) formed by dynamic collaboration of many serving entities. The entities in web SSCNs are interdependent and the performance of one entity impacts the performance of other entities as well as overall performance of service network. It is important to study the relationship and dependency between each entity of web SSCNs. Once the relationship is identified, it will help in devising some composite performance indicator for the entire service supply chain considering the interests of service providers and clients. We take a scenario based illustration of such online service supply chains to show the feasibility of the concept.

Keywords, service supply chains, service quality, Web service

I. INTRODUCTION

The dynamism in the online service supply chain, need for quality of service (QoS) and the effect of collective performance characteristics makes it necessary to investigate, define, and study the characteristics and the need for such online services supply chains which will be the objective of this research paper.

II. WHY ONLINE SERVICE SUPPLY CHAINS AND THEIR NFPS?

Online services' have increased presence in all sectors. Exponential growth in online services is needed for global reach of service providers. NFPs in service act as differentiators in services provider selection. The need to look beyond mere dynamic service composition and need to understand effect of dynamism on quality and need of quality as order winner

III. LITERATURE REVIEW

The research contributions considering the online service supply chains apart from the static service supply chains, non functional properties (NFPs) and consideration of multiple NFPs is very limited to the best of our knowledge. The basis how ever started with the web ecosystem concept [1]. The collaboration of supply chain was studied [13][14]. The need and design for NFPs was researched [15][16].The attributes that have been researched thus far include accessibility[4][11], availability[3][4][11], reliability[3][4][6][7][11][16], performance[2][5], time[3][4][9]. The attributes are considered in isolation and attempt to group them and study the grouping effect seems to be scarce. How ever relationships among various NFPs are highlighted [2][5][11].

IV. PROPOSED WORK

The through study of literature pointed out that services in the web environment collaborate to form a virtual graph [10] reliability and time are complex NFPs which in corporate several other NFPs [2],[3],[4],[5]

A. Consolidation of NFPs

Reliability sub parameters considered for consolidation are Availability, Mean Time Before Failure, Stability, usability, accessibility, and success

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of completion. [2],[3],[4],[6],[7]. Time sub parameters considered for consolidation are response time / latency, Mean Tine To Recover [3],[4],[5],[8],[9].

B. Proposed model

The existing works consider NFPs in isolation. In our model we consider NFPs in a consolidated manner as shown in fig 1.

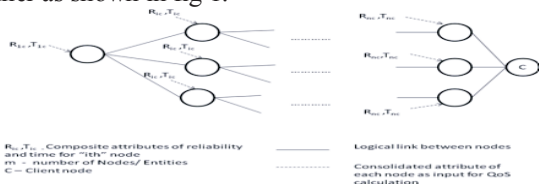

Fig 1 Consolidated NFPs applied to the graph

C. Scenarios:

We consider a scenario inspired from real world cases to show the scenario where our concept can be applied.

Master service provider (Amazon) provides storage service to slave service provider. The slave service provider in turn splits the resource and distributes to multiple intermediates. The intermediates/value added resellers (VA) deliver the service to the clients as shown fig 2

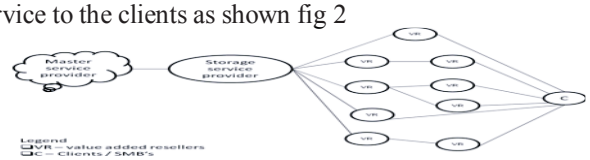

Fig 2 – Service supply chain for an online data backup service

CONCLUSION

The service providing entity if chosen based on NFPs rather than just functional properties that would ensure good quality end service. The processes show that these supply chains are stage wise. The literature points out gaps in consolidation of multiple QoS parameters into single composite parameter though there are such possibilities. The consolidation of reliability and time and an attempt to get bi criteria solution based on view points of providers and clients and inferences based on what kind of QoS parameter is dominant and what choices of the service provider and/or the client affect the QoS of the service will be our future work.

V. REFERENCES

1. Munindar.P.Singh; Michael . N. Huhns, "Service oriented computing : Key concepts and principles" , Journal on internet computing, 2005, Vol : 9; issue : 1, pp 75 – 81
2. Shuping Ran, "A Model for Web Service Discovery with QoS", ACM SIGecom Exchanges Volume 4 Issue 1,2003, pp 1 – 10
3. M. Tian, A. Gramm, H. Ritter, J. Schiller, R. Winter, "A Survey of current Approaches towards Specification and Management of Quality of Service for Web Services", PIK vol 27 no 3, 2004, pp 132 – 140
4. Galster ,M; Eva ,B, "A Taxonomy for Identifying and Specifying Non-functional Requirements in Service-oriented Development", IEEE Congress on Services, 2008, pp 345 – 352
5. Kalepu, S.; Krishnaswamy, S.; Seng Wai Loke, "Reputation = f(User Ranking, Compliance, Verity)", IEEE International Conference on Web Services, 2004, Proceedings pp 200 – 207
6. N. Sato, K. Trivedi, "Accurate and efficient stochastic reliability of composite services", IEEE International conference on services computing, pp 114 – 121, 2007
7. S. Hariri, C. S. Raghavendra, and V. K. Prasanna Kumar, "Reliability measures for distributed processing systems," in Proc. 6th Int. Conf. Distributed Comput. Syst., May 1986, pp. 564-571.
8. D.A. Menasce, "Automatic QoS Control", IEEE Computer society,2003, pp 92 – 96
9. Del Val, E; Navarro ,M; Julian ,V;Rebollo ,M , "Ensuring time in service composition", IEEE computer society Congress on Services 2009
10. Chan, A.T.S.; Jiannong Cao; Chan, C.K , " WEBGOP: collaborative web services based on graph-oriented programming", IEEE Transactions on Systems, Man and Cybernetics, Part A: Systems and Humans, 2005, vol 35 , issue 6, pp 811 – 830
11. Yeom ,G; Yun ,T; Min ,D ,"A QoS Model and Testing Mechanism for Quality-driven Web Services Selection", International Workshop on Collaborative Computing, Integration, and Assurance (SEUS-WCCIA'06) pp 199 - 204
12. Erradi ,A; Maheshwari ,P,"A Broker-based Approach for Improving Web Services Reliability", IEEE International Conference on Web Services (ICWS'05)
13. Hu ,H; Hu ,D,"Study on Intelligent Collaboration Mode of Supply Chain", IEEE International Conference on Service Operations and Logistics and Informatics (SOLI), pp 205 - 207
14. Jizi ,L; Ling ,Y; Jun ,G, "Business Integrated Architecture for Dynamic Supply Chain Management with Web Service", IEEE International Conference on New Trends in Information and Service Science pp 356 - 361
15. Jughans ,M; Sudhir ,A, "Web Service Discovery Based on Unified View on Functional and Non-Functional Properties", 2010 IEEE Fourth International Conference on Semantic Computing pp 224 - 227
16. Pathak, J., Basu, S., Honavar, V,"Modeling Web Services by Iterative Reformulation of Functional and Non-functional Requirements", International conference on service oriented computing ICSOC, LNCS 4294, pp. 314–326, 2006