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# COST-EFFECTIVE MAPPING USING MULTI-STAGE BARGAINING TECHNIQUE

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## ABSTRACT

In current paper, we present an approach to cost effective mapping between Cloud Service Providers (CSPs) and Wireless Body Area Networks (WBANs). This approach is mainly based on resource distribution technique & price agreement model in cloud assisted environments using Wireless Body Area Networks (WBANs). Earlier, instead of focusing on user expectations they predominantly focused on profits of CSPs. The traditional approach which we followed earlier led to an unregulated market, and many service provider enjoyed this situation. We will try to filter the biasness from pricing agreements. We use an interesting approach, known as bargaining which involves the cooperative game theory. In Cost effectiveness of WBANs, our proposed approach concludes mapping within CSPs and WBANs. Obtained result shows accuracy, efficiency and scalability of proposed mapping technique using algorithms.

**KEYWORDS:** Advanced Nash Bargaining Solution, Cloud Pricing Agreement and Schemes.

## INTRODUCTION

Cloud computing plays a vital role by addressing technological gap, promising advancements & fulfilling future growth. Large scale deployment of WBANs had bought advancements in field of wearable, and autonomous sensing,. Integration of corresponding technology along with internet & wireless has brought demand in secure storage and stronger processing infrastructure of pervasive health care domain.

Advancements in the field of cloud computing has established an architecture which automatically performs mapping between CSPs and WBANs. It works in a cost effective manner. To share real time physiological data to cloud, WBANs is widely used as part in electronic and mobile Health care application which are used monitor continuously the physiological details. The physio-logy monitoring services charges which they have consumed can paid to CSPs.

Due to increase in global population, researchers have introduced cloud-assisted WBANs which brings competition in pricing strategy. Instead providing different level of satisfaction to customer, CSPs will increase their own profits. All existing cloud service providers collaborate each other to form gang to influence market. They are called “price-makers”, they may dominate entire market by reducing prices, increase quantity, provide good quality of goods or services, etc.

Improper implementation of pricing cap and denying co-operation between other distributers/agents may results in negative outcomes for the public. “Laffont.et.al.” and “Tirole.et.al.” modified, age old aspects of market regulation and created situation considering industry-specific conditions. Hence, there is no need to monitor price agreement between CSPs and WBANs.

In current paper, price capping & negotiation is performed in multiple stages through bargaining mechanism which regulates price per unit resource till final agreement is established between WBANs and CSPs. In cloud assisted wbans environment, the proposed solution concludes pricing agreement between all probabilities of WBANs and CSPs pairing.

**Background & Related Work**

***Optimal Price Changing Scheme***

In optimal pricing scheme, CSPs helps cloud technology to thrive in "IT" markets. All traditional cloud service providers in market accompany pay per use model. Its most commonly used model. Pay per use model has full rights to set both static & constant price per unit resource of CSPs. Customer have the fliexibility to overpay or underpay for resources in subscription based models alone.

Co-operative negotiation solution confirms equivalent fairness among contributors, which is the best way for resource sharing. Desired level resource management cannot be achieved through '=' sharing policy. Some users don't share their resource to others which results in ideal state of resource. "Max-Min" fairness policy is provisioned to increase sharing of certain user by sacrificing other resource sharing with equal or smaller amount. "Max-Through-Put" resource sharing policy attempt increases through-put on the whole. Equivalent fairness policy acts as com-promise between "Max-Min" fairness. Proposed solution capable of managing tedious negotiation process between two different set of contributors, one the CSPs and the other WBANs, until they finalize price agreement.

***Advanced Nash Bargaining Solution***

Multistage bargaining problem is formulated by formulate pricing per-unit resource. Extending traditional bargaining approaches into multiple stages provides enormous space for negotiation process between two different set of entities. Converge multiple stages of bargaining price bid decides total number of stages followed negotiation process at run time. While auction CSPs will always place very high price bid for per unit resource to sell resources using proposed function. On the other side WBANs will always try to place minimum price bid to buy resources.

**Bargaining Problem Solution**

Bargaining solution obtained by optimization function is derived using "Advanced Lagrange Multiplier" approach.

***Advanced Negotiate Algorithm***

**Input:**
1. Initial bargaining bids - $CP^{max}_{j,t+\Delta t}$ and $WP^{min}_{i,t+\Delta t}$
2. Initial price caps - $C^{cp}_{t+\Delta t}$ and $C^{wp}_{t+\Delta t}$
3. Initial values of bargaining powers - $\alpha_{j,t}$ and $\beta_{i,t}$.
for all $j \in 1, n$, $i \in 1, m$.

**Output:**
1. Final negotiated bids after multi-stage bargaining - $PrevSolCP_j$ and $PrevSolWP_i$
for all $j \in 1, n$, $i \in 1, m$.

**Figure 1: Steps of Advanced Negotiate Algorithm**

***Advanced Function Map Algorithm***

**Input**:
1. Final negotiated bids for $n$ CSPs and $m$ WBANs - $PrevSolCP_j$ and $PrevSolWP_i$

**Output**: Mapping between WBANs and CSPs - array $UpdateMap$

**Figure 2: Example of Advanced Function Map Algorithm**

## RESULTS AND DISCUSSIONS

***Single-Run Analysis***

One of the Advanced Nash bargaining problems will decide price of single unit resource for both CSPs & WBANs. At this point of time negotiate function is not terminate because difference between average price of both CSPs and WBANs are significantly very high. It defines fresh max & min price bid for both CSP and WBAN. Figures 3, shows NBS decided new prices. Negotiation process will get completed when bid price of WBANs matches any one of published ask price of CSPs.

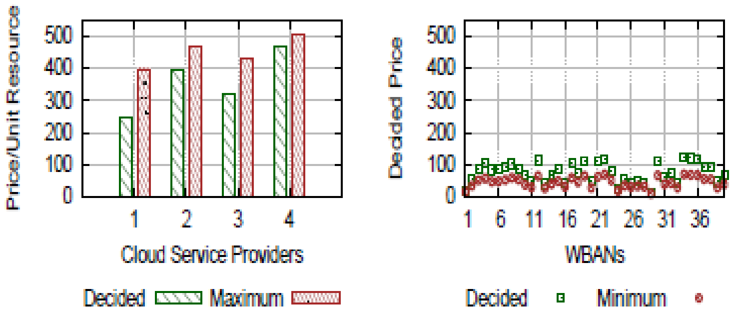


**Figure 3: Example of CSP's and WBAN's Price Bid After All Stages**

***Comparison with Random Mapping***

Based on finalized pricing agreements, the proposed advanced map function generates cost matrix for cloud assisted WBANs. This considers WBANs according to their severity of health. We hve experimented and verified mapping scheme with n number of random mapping. In case of random mapping without negotiation the WBANs are forced to pay price per single unit resource by CSPs. For experimental purpose we had considered only 20 numbers of both WBANs and CSPs and apply one-to-one mapping within them.

## CONCLUSIONS

Proposed novel approaches for resource sharing and mapping between a unique set of WBANs and CSPs. This has been implemented based on cooperative game theory. Nash bargaining solution is based on the extension of the proposed multistage bargaining method. Additionally based on social choice theory, we are implementing a stringent mapping protocol.

## REFERENCES


1. D. Qiao, S. Choi, and K. Shin, “Goodput analysis and link adaptation for ieee 802.11a wireless lans,” Mobile Computing, IEEE Transactions on, vol. 1, no. 4, pp. 278–292, Oct 2002.
2. A. Iozzi, “Strategic pricing and entry deterrence under price-cap regulation,” Journal of Economics, vol. 74, no. 3, pp. 283–300, October 2001.
3. A. Iozzi, J. A. Poritz, and E. Valentini, “Social preferences and price cap regulation,” Journal of Public Economic Theory, vol. 4, no. 1, pp. 95–114, January 2002.
4. A. K. Dixit and B. J. Nalebuff, Thinking Strategically: The Competitive Edge in Business, Politics, and Everyday Life. W. W. Norton & Company, 1993.
5. M. Al-roomi, S. Al-ebrahim, S. Buqrais, and I. Ahmad, “Cloud Computing Pricing Models : A Survey,” International Journal of Grid & Distributed Computing, vol. 6, no. 5, pp. 93–106, 2013.
6. F. Teng and F. Magoul`es, “Resource Pricing and Equilibrium Allocation Policy in Cloud Computing,” in IEEE International Conference on Computer and Information Technology. Bradford: IEEE, Jun. 2010, pp. 195–202.
7. S. Ullah, A. Vasilakos, H. C. Chao, and J. Suzuki, “Cloud-assisted wireless body area networks preface,” Information Sciences, vol. 284, pp. 81–83, November 2014.
8. K. Zhang, X. Liang, M. Barua, R. Lu, and X. Shen, “PHDA: A priority based health data aggregation with privacy preservation for cloud assisted WBANs,” Information Sciences, vol. 284, pp. 130–141, June 2014.
9. V. Kantere, D. Dash, G. Franc¸ois, S. Kyriakopoulou, and A. Ailamaki, “Optimal Service Pricing for A Cloud Cache,” IEEE Transactions on Knowledge and Data Engineering, vol. 23, no. 9, pp. 1345–1358, 2011.
10. H. Park and M. van der Schaar, “Bargaining Strategies for Networked Multimedia Resource Management,” IEEE Transactions on Signal Processing, vol. 55, no. 7, pp. 3496–3511, Jul. 2007.
11. G. Shrimali, A. Akella, and A. Mutapcic, “Cooperative Inter domain Traffic Engineering Using Nash Bargaining and Decomposition,” IEEE/ACM Transactions on Networking, vol. 18, no. 2, pp. 341–352, Apr. 2010.
12. R. Mazumdar, L. Mason, and C. Douligeris, “Fairness in Network Optimal Flow Control: Optimality of Product Forms,” IEEE Transactions on Communications, vol. 39, no. 5, pp. 775–782, May 1991.
13. Q. Cao, Y. Jing, and H. V. Zhao, “Power Allocation in Multi-User Wireless Relay Networks through Bargaining,” IEEE Transactions on Wireless Communications, vol. 12, no. 6, pp. 2870–2882, Jun. 2013.
14. G. Fortino, G. D. Fatta, M. Pathan, and A. V. Vasilakos, “Cloud-assisted body area networks: state-of-the-art and future challenges,” Wireless Networks, vol. 20, no. 7, pp. 1925–1938, October 2014.
15. Y. Feng, B. Li, and B. Li, “Price Competition in An Oligopoly Market with Multiple IaaS Cloud Providers,” IEEE Transactions on Computers, vol. 63, no. 1, pp. 59–73, 2014.
16. J.-J. Laffont, I. Gremaq, J. Tirole, and I. Geras, “Creating competition through interconnection: Theory and practice,” Journal of Regulatory Economics, vol. 10, no. 3, pp. 227–256, 1996.