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A Component based unified Architecture for Utility Service in Cloud

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Abstract—**the world is moving into a new era, Internet of Things (IoT) that means everything surrounding us will have their corresponding virtual image in the cloud and they will communicate with each other. In this research, a component based unified architecture for utility service in the cloud has been proposed for deploying service and use of the application in an optimum way to make the maximum availability of service within the limited duration of time and minimum configuration overhead. Our proposed architecture is divided into several layers and each layer is designed based on several components. Experimentally we observe through IBM Bluemix [29]proposed utility service system along with its working procedure and corresponding performance evaluation, which is promising. Therefore, we found proposed architecture is also capable to protect utility service and corresponding resources from external threats.**

Keywords: *Utility Computing, Utility Service System, Cloud.*

I. INTRODUCTION

Ubiquitous computing is the current trend and this is being considered as the link between cloud computing and Internet of Things (IoT). Researchers of all over the world are trying to connect each object surrounding us to a general platform where they can talk to each other and people can make maximum use of a single system in order to access a maximum number of utility systems. Most common utilities of our everyday life such as electricity, gas, and water also need to be present as a cloud service. However, currently, the cloud is not efficient enough to provide a single utility service system, which can be used for most of the common utilities from a single platform. Moreover, due to the immense use of social networking and the establishment of social cloud, the cloud computing landscape has been changed as well as expanded a lot. Nowadays it is inevitable that social networking system is going to become the most suitable choice that can be used as a target single platform that will be connected to several other utility service systems and cooperate with each other. Similarly, some other target platforms can be defined to use as much as possible utility system from a single platform. In order to achieve this goal, these single target platforms need to be specially designed. In this regard, in the typical utility system, the main challenge is to design service specific cloud architecture. Each different utility service has a different design as well as goal specification. For example, sometimes service providers emphasize on Service Level Agreement (SLA), other times they emphasize on availability or scalability. As a result, the architecture needs to be designed either SLA–driven or Scalability-driven. Each case requires redundant and additional effort, which ultimately turns the system expensive and complex. In order to overcome all the limitations and challenges of existing architectures, utility computing needs a target cloud platform that can increase the velocity of applications deployment and configuration with the lower cost and higher business agility. This platform will be efficient enough to access a maximum number of utility services from a single point. So Utility Service System (USS) needs a unified architecture that can be configured heterogeneously. The main motivation of this work is to design a unified architecture of cloud platform for utility service systems that can be used for different utility service systems with the minimum configuration as well as capable of protecting utility service and corresponding resources from external threats.

The contribution of this paper is to introduce a generic component based unified architecture which can be easily configurable by adding or removing different components in order to deploy one or more utility services on cloud based on the requirement. For example, in order to introduce an e-government infrastructure for any country or to establish e-health care system or e-classroom system for the next generation, existing infrastructure is not efficient enough. In the era of IoT, so many different devices, components or system infrastructure are interrelated. Such as, in case of e-government, it needs to communicate transport, governing body, police system, newspapers, media and so many different utilities need to communicate with each other. Due to the heterogeneous nature of different systems under a government, it is very complex to establish a complete and self- organized dynamic e-government system with the system architecture. In our paper, we have