

The VHGs as Appropriate Platforms for Clouds in GVSRM Framework

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Abstract— Cloud computing is a paradigm for access services on demand, anywhere in the world. Nowadays in an effort to adopt cloud computing to the governments in order to meet the objectives of E-Governments, many investigations have been conducted. Global Village Service Reference Model as a global framework based on Service Oriented Strategies and Virtual Holding Governances manage Architectures ontology. Virtual Holding Governances as a basic part of the global village can logically accommodate clouds in themselves and manage service delivery on demand. Obtaining the prerequisites of Global Village Grid entry, would rise to the challenges of adopting cloud computing into the governments.

Keywords— Cloud computing; service; Global Village Service Reference Model (GVSRM); Virtual Holding Governance (VHG)

I. INTRODUCTION

Cloud computing is almost a new hot keyword for delivering services often through the internet. It is a computing paradigm for access services anywhere in the world on demand. The cloud model promotes availability. The Model of Cloud is consist of five essential characteristics: On-demand self-service, Broad network access, Resource pooling, Rapid elasticity, Measured Service and it has also three service models: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS) and it has four deployment models: Private Cloud, Community Cloud, Public Cloud, Hybrid Cloud [1].

Nowadays the adoption of cloud computing into the governments is going on in order to meet objectives of E-Governments.

Some researches discuss about E-Government and cloud computing and the impacts of clouds on E-Governments [2]. Cloud computing creates new business opportunities and improves the e-government execution [3].

The Global Village Reference Model (GVSRM) with Service Oriented Strategies and Architectures (SOSA) ontology is a creative reference model that has three major layers include: infrastructure for Global Village Services, Global Village Services Provisioning and Using Global Village Services. GVSRM streamlines the Global Village

Services instead of E-Government, E-Business and E-Commerce services [4].

GVSRM is based on Global Village Services (GVS). “A Global Village Service is the full-grown and fine-grained repeatable-sharable function encompasses the Grid Resources, which would be realized through a collection of the Global Village Service Actions to satisfy some Global Village Service Actors” [4]. The end-to-end electronic processes contain a hierarchical composition of global village services that are well defined. In GVSRM the transactions between government and their organizations can be done in Virtual Holding Governances (VHG). A government in GVSRM is part of a VHG. In global village grid using services is defined through VHGs.

The purpose of this paper is indicating that VHGs in GVSRM are appropriate platforms for clouds. We claim that service deployment models in cloud computing systems support in VHGs.

We describe cloud computing and its service deployment models and usage of clouds in E-Governments in section 2. In section 3 we introduce global village service reference model and its parts. Then we show that these two concepts have the same policy in constructing and distributing of the services through the internet and VHGs could be an appropriate platform for clouds.

II. CLOUD COMPUTING SYSTEMS

Cloud computing is a new buzzword after Web 2.0 [5]. Cloud computing as a new computing paradigm and can provide reliable and also customized and QoS guaranteed dynamic computing environments for a large number of end-users [6].

Although cloud computing is not a quite new technology but many definitions have been provided for it so far. These definitions have been presented from different points of view like IT companies, academic experts, industry practitioners and so on. It is remarkable that all of these definitions are the same as each other in some characteristics.

Cloud computing based on National Institute of Standards and Technology (NIST) definition is “a model for enabling

ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” [7].

A. Classification of Clouds

According to the owner of the cloud data centers, clouds can generally be classified in some groups [8]. As NIST classification of clouds for deploying services in cloud systems there are four deployment models with the following descriptions:

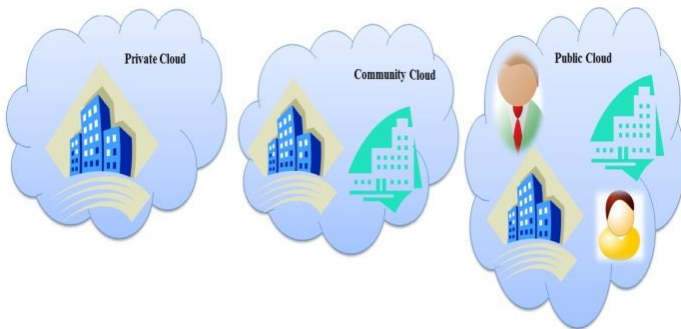


Figure1- Cloud Deployment Options

Private cloud: in private clouds the infrastructure is operated solely for one organization. Organization or a third party may manage private clouds. These clouds may exist on premise or off premise [7].

Community cloud: The cloud infrastructure in this deployment model is shared by more than one organization and supports a community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). The organizations or a third party may manage community cloud and it may exist on premise or off premise [7].

Public cloud: The public cloud infrastructure is available for the general public or a large industry groups. These clouds are belong to an organization that selling cloud services [7].

Hybrid cloud: The infrastructure of cloud in a hybrid cloud is composed of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds) [7].

B. Clouds and Governments

Cloud computing developments lead us to think about the usage of cloud computing in government in addition to business. [9]. Many discussion performed about the problems of E-Governments and their disabilities to meet requirements of on demand services. Some of them claim that these problems of E-Governments could be solved by applying cloud computing in E-Governments [10-12].

We show that the adoption of cloud computing into the governments is realized through VHGs of GVSRM. VHGs in

GVSRM for the governments are appropriate platforms for realization of delivering services in E-Governments through the clouds.

So if the governments gain the prerequisites for entry into the global village grid they would easily deliver their services through the clouds.

III. GLOBAL VILLAGE SERVICE REFERENCE MODEL(GVSRM)

Global Village Service Reference Model (GVSRM) is the next framework generation based on SOSA ontology that facilitates working of service requester, service provider and service broker on a global grid. SOSA ontology is classified in three UML packages as Global Village Services, Global Village Actors and to Global Village Service Actions [4].

GVSRM used SOSA instead of SOA. IN the global village grid, the SOSA is not only one instance of the architectures and also it is more than the architectural styles. Although SOSA is a strategy, but it is not adopted with the term "service oriented architecture" [13].

GVSRM has three layer: Infrastructure for Global Village Services, Using Global Village Services and Global Village Services Provisioning.

GVSRM has some independent network-node in a mesh structure in its infrastructure. To have a better situation some software applications is needed in global village grid. The yield of this new situation is well-defined global village services. This challenge would be resolved in software projects that are responsible for global village services provisioning. Using of services in global village grid could be defined. For example some services in some countries could be free and in some countries could not be free and therefore they would be used under some controls [4].

The end-to-end electronic processes consist of a hierarchical composition of global village services. These GVSs are well defined. The transactions between government and their organizations could be done in Virtual Holding Governances (VHG) In GVSRM. The government in GVSRM is a part of a VHG. In this global grid using services is defined through VHGs [4].

A. VHGs in GVSRM

In general the governments and their organizations can be communicated in three kinds of models technical wise GVSRM's relationships follow from third model that show in "fig. 2".

As reference 4 mentioned, this technical view is more collaborative than Government as a big Business (G as a big B) or Government as a Direct Supervisor in Business transactions. In GVSRM each government is part of a Virtual Holding Governance (VHG). In grid of GVSRM as its infrastructure layer there are some independent nodes with different geographic location. These nodes based on their locations can be national, international, state, or shared in one or more VHGs.

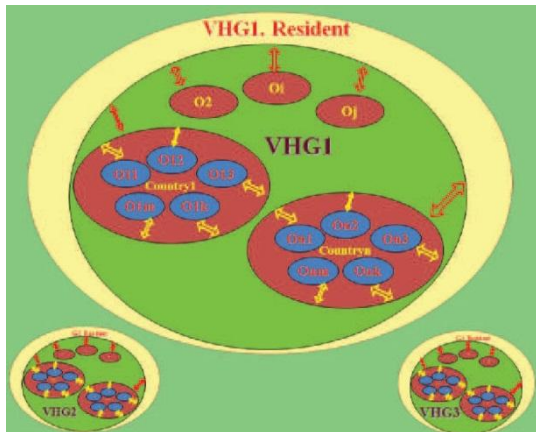


Figure 2: A Government as a part of a Virtual Holding Governance in GVSRM [2].

We can check the rules of accounting and billing through VHGs. In the global village grid of GVSRM different mechanisms of control and access could be developed. For instance using services for some citizen of global village grid would be free whereas in other countries (Governances) using services is under the control and limitation. GVSRM is based on global village services.

The citizens of global village grid could use the services through VHGs. in GVSRM each governance (country) will choice its VHG based on geographical region, cultural borders and so on. With this point of view the citizens would be residents of VHGs in global village grid. Some services are shared with residents of all VHGs and some services are private for a VHG.

Each VHG has some rules, SLAs, standards and some special services that are defined for delivering to residents. With the process of construct and distribution of global village services delivering of each favorite service is possible for VHGs residents and global village citizens.

IV. VHGS THE APPROPRIATE PLATFORMS FOR CLOUDS

A. Private clouds in VHGs

Consider a scenario in which the cloud infrastructure is operated solely for an organization and all the services that defined in this cloud are consumed with the members of this organization not with the people out of this limited area. So as NIST classification there is a virtual organization with a private cloud.

In global village grid there is a perfect platform for realizing private clouds. This is a VHG with an organization in a specific country. As mentioned before each VHG has some rules and standards. In this case a VHG sets some resources and defines some services under its rules and standards to meet the requirements of users of this private cloud. For delivering special services this is VHG that must guarantees expected security and quality of service based on SLA because the main owner of this cloud is VHG. So the challenges of security and quality control are proven in VHGs of GVSRM global grid. A VHG has the list of its

organizations with different SLAs. So similarly, a VHG can support all the private clouds in countries under defined and accepted rules and standards. Each organization receives services based on its accepted SLA for using private cloud services. "Fig.3" illustrates the positioning of private clouds in a VHG.



Figure3: private clouds in VHG1

B. Community and public clouds in VHGs

In the same scenario for private clouds in a global village grid the cloud infrastructure could be shared by more than one organization. As NIST classification this is community cloud. In the more general case the cloud infrastructure could be available to the general public or a large industry group. Both public and community clouds could be some parts of a VHG. The users of the clouds are VHG members too. VHG is responsible for delivering services based on accepted SLA and the rules and standards of VHG.

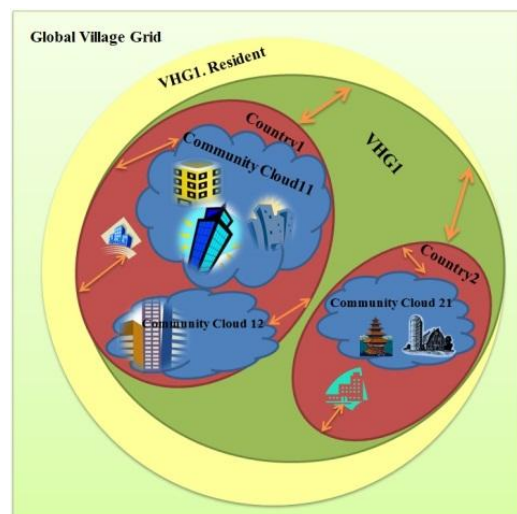


Figure4: community clouds in VHG1

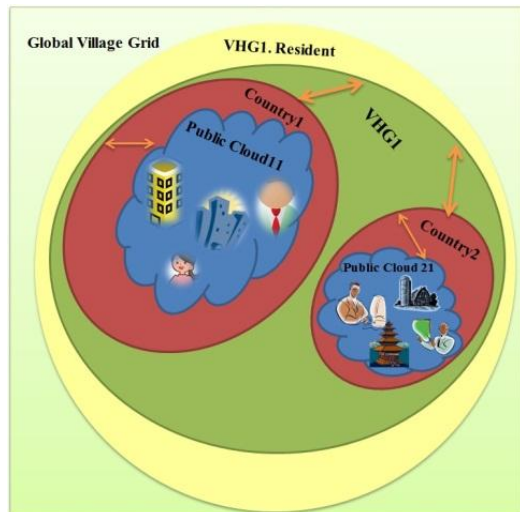


Figure 5: public clouds in VHG1

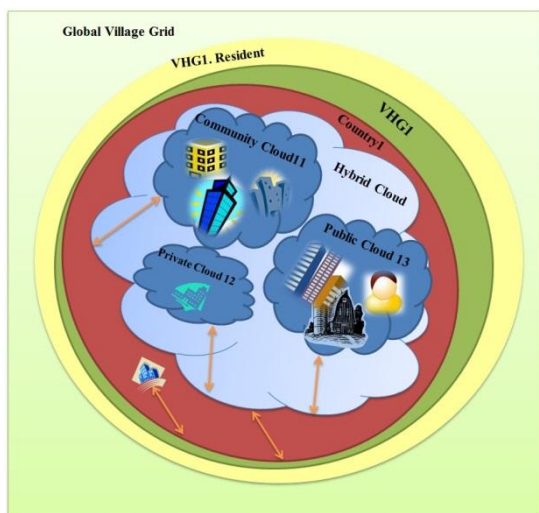


Figure 6: a hybrid cloud in a VHG

C. Hybrid clouds in VHGs

Based on NIST classification and description, the cloud infrastructure of hybrid clouds is composed of two or more clouds. In global village grid VHGs could realize the hybrid clouds in GVSRRM framework. So if there is a hybrid cloud in a VHG this VHG is the main owner of all its clouds. All of delivering models in the clouds (private, public and community clouds) are under the rules and standards of VHG. A VHG could use its resources and constructing services in the way that all member requirements would be met.

V. CONCLUSION

Cloud computing are supported in GVSRRM framework. In the global village grid as the infrastructure of GVSRRM there are some independent nodes with different geographic locations. These nodes based on their locations can be national, international, state, or shared in one or more Virtual Holding Governances (VHG). In GVSRRM the transactions between government and their organizations can be done in VHGs.

GVSRRM has perfect platforms for place clouds and realization of cloud computing service delivery models. VHGs could support every four deployment models of cloud computing simultaneously. The owners of the clouds in GVSRRM are VHGs. So the security challenges of cloud users are proven by control and monitoring VHG mechanisms. By obtaining the prerequisites of global village grid entry the problems and challenges of adoption of cloud computing into the governments might be solved.

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