Implementing Community Cloud to Overcome the Problems of Complexity and Security in Business Environment

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ABSTRACT In the last few years, the cloud computing model has moved from hype to reality, as witnessed by the increasing number of commercial providers offering their cloud computing solutions. Cloud services available so far mainly focus on horizontal solutions and rarely consider industry-specific requirements in terms of functionality or security.

While in this way the cost benefits of cloud-based services can be achieved (by maximizing economies-of-scale effects), it is at the same time a major disadvantage in many potential application areas.

In this work we analyze some problems regarding security and complexity in business environment. These problems are overcome by community cloud. In which area, community cloud is used that is also mention in this paper. There are various benefits of community cloud are define for service. This paper also outline the Case studies used to show that community cloud is a current, not just future.

1. What is Community Cloud?

- Community clouds are distributed systems created by integrating the services of different clouds to address the specific needs of an industry, a community, or a business sector.
- The National Institute of Standards and Technologies (NIST) characterizes community clouds as follows:

"The infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy). It may be managed by the organizations or a third party and may exist on premise or off premise. "

2. Introduction of Cloud Computing
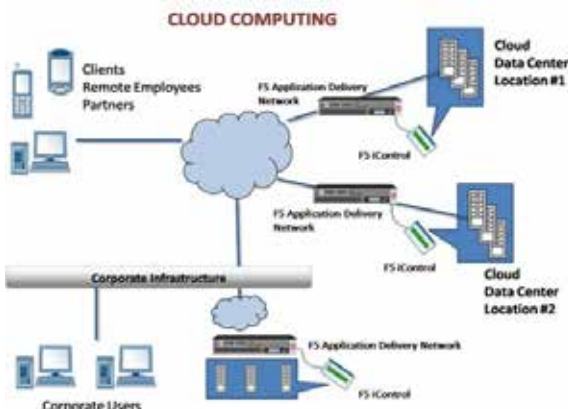
Cloud computing is computing that involves a large number of computers connected through a communication network. The technical foundations of Cloud Computing include Service-Oriented Architecture (SOA) and Virtualizations of hardware and software. The goal of Cloud Computing is to share resources among the cloud service consumers, cloud partners, and cloud vendors in the cloud value chain. The resource sharing at various levels results in various cloud offerings such as infrastructure cloud (e.g. hardware, IT infrastructure management), software cloud (e.g. SaaS focusing on middleware as a service), application cloud (e.g. Application as a Service, social network as a service), and business cloud (e.g. business process as a service).

3. Cloud Computing Architecture

Cloud computing can describe services being provided at any of the traditional layers from hardware to applications. Cloud service providers tend to offer services that can be grouped into three categories are as follows.
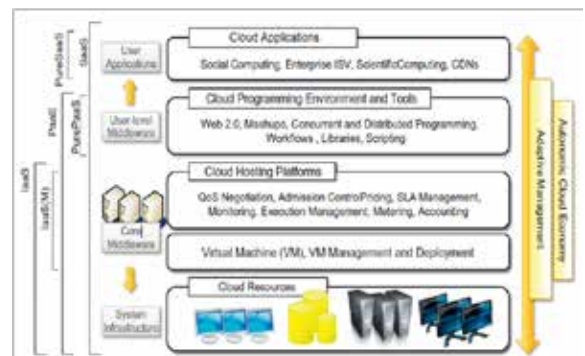

Figure 1: Cloud Computing Architecture

(I) Infrastructure as a Service (IAAS): It is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The IAAS provider takes responsibility for the hardware and performs all the maintenance to ensure the servers run correctly. Because an infinite number of custom applications can be developed and deployed and run on IAAS.

(II) Platform as a Service (PAAS): The service provided to users is to deploy onto the cloud infrastructure their own applications developed using languages, libraries, and tools supported by the provider. Users have control over the deployed applications and possibly con- figuration settings.

(III)Software as a Service (SAAS): The service provided to users is to employ the provider's applications running on a cloud infrastructure. The applications are accessible from different client devices through web browser. Users can at most manage limited user- specific application configuration.

4. Benefits of Cloud Computing
- Cloud computing provides the tools and technologies to build data/compute intensive parallel applications with much more affordable prices compared to traditional parallel computing techniques
- Cloud resources are usually not only shared by multiple users but are also dynamically reallocated per demand. This can work for allocating resources to users.
- People worldwide can access the cloud, provided they have an Internet connection. you have access anytime, anywhere, making your life so much easier!
- Stretch and grow without the need to buy expensive software licenses or programs. This flexibility positively affects knowledge workers' work-life balance and productivity

5. Types of Cloud deployment Model
(I) Public Cloud: This model of Cloud computing is provided by an off-site third-party service provider who shares resources in a multitenant operating environment, and bills on a utility computing basis. The physical infrastructure is generally owned and managed by the service provider.

(II) Private Cloud: This model of Cloud computing is provided by an organization or its designated service provider and offers a single-tenant operating environment with all the benefits and functionality of elasticity and the accountability/utility model of Cloud computing.

(III)Hybrid cloud: This model of Cloud computing is a composition of two or more Clouds (public or private) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability.

6. Key questions for Cloud Computing adoption
Companies will have to decide which part of the IT support for the business should be sourced using which delivery and deployment model, while taking cost, risk and agility factors into consideration.

The major benefits of this strategy are cost savings. In the next evolutionary step, however, the focus of cloud computing will be on business innovation. Customers will want to leverage the flexibility which IT Services delivered through the Cloud provide in order to increase their agility and the possibility of interacting better with business partners and customers. This implies a shift focus from cost cutting to driving business growth.

Growing number of cloud services to choose from at all layers of the Cloud stack (SaaS, PaaS and IaaS) and the tendency towards hybrid models result in customers facing an ever larger number of options and tradeoffs which need to be dealt with appropriately to reap the optimal results from an adoption of the cloud. These centers are around managing complexity, ensuring security, and supporting industry-specific requirements.

How can companies manage the increased sourcing complexity?
Complexity comprises several aspects that have to be considered, namely management complexity, complexity of integration and complexity of choice.

How can companies ensure (federated) security?
Security is a major inhibitor of cloud computing today. It is regularly ranked as the number one concern of companies that want to adopt cloud services. Therefore, hybrid models will be preferred where sensitive data is still stored in a secure private environment (the customer's or a trusted provider's environment). However, managing security in a hybrid environment is challenging. Different providers and services have to be included in one comprehensive security concept. Security policies need to be enforced in a federated manner.

7. Implement cloud as Community Cloud is given the solution of above key questions:
- Community clouds are clouds that are tailored to the shared needs of a business community, which in general is a concrete industry such as healthcare, media or public sector.
- The community cloud can be a good option if participation is based on the institution's needs and culture and reflects the institution's requirements for infrastructure, business processes, and data management.

Figure provides a general view of the usage scenario of community clouds, together with reference architecture.

Figure 2: Community Cloud Architecture

8. Candidate sectors for community clouds are as follows:
Media industry :
- In the media industry, companies are looking for low-cost, agile, and simple solutions to improve the efficiency of content production.
- The creation of digital content is the outcome of a collaborative process that includes   movement of large data, massive compute-intensive rendering tasks, and complex workflow executions.
- Community clouds can provide a shared environment where services can facilitate business-to-business collaboration and offer the horsepower in terms of aggregate bandwidth , CPU, and storage required to efficiently support media production.

B. Healthcare industry :
- Community clouds can provide a global platform on which to share information and knowledge without revealing sensitive data maintained within the private infrastructure.
- The naturally hybrid deployment model of community clouds can easily support the storing of patient-related data in a private cloud while using the shared infrastructure for noncritical services and automating processes within hospitals.

C. Energy and other core industries :
- In these sectors, community clouds can bundle the comprehensive set of solutions that together vertically address management, deployment, and services and operations.
- Since these industries involve different providers, vendors, and organizations, a community cloud can provide the right type of infrastructure to create an open and fair market.

D. Public sector :
- Legal and political restrictions in the public sector can limit the adoption of public cloud offerings.
- Moreover, governmental processes involve several institutions and agencies and are aimed at providing strategic solutions at local, national, and international administrative levels.
- They involve business-to-administration, citizen-to-administration, and possibly business-to-business processes.
- Some examples include invoice approval, infrastructure planning, and public hearings.

- A community cloud can constitute the optimal venue to provide a distributed environment in which to create a communication platform for performing such operations.

E. Scientific research :
- Science clouds are an interesting example of community clouds. In this case, the common interest driving different organizations sharing a large distributed infrastructure is scientific computing.

9. The benefits of these community clouds are the following:
- **Openness:** By removing the dependency on cloud vendors, community clouds are open systems in which fair competition between different solutions can happen.
- **Community:** Being based on a collective that provides resources and services, the infrastructure turns out to be more scalable because the system can grow simply by expanding its user base.
- **Graceful failures:** Since there is no single provider or vendor in control of the infrastructure, there is no single point of failure.
- **Convenience and control :** Within a community cloud there is no conflict between convenience and control because the cloud is shared and owned by the community, which makes all the decisions through a collective democratic process.
- **Environmental sustainability:** The community cloud is supposed to have a smaller carbon footprint because it harnesses underutilized resources.

10. Community cloud Providers:
Google, Amazon Web Services, WindowAzure, Salse Force.com, IBM, Xen, Aneka etc.

11. Case Studies:
A. Northgate Community Cloud
Northgate Public Services has recognised for some time the potential to develop both physical and organisational structures and specialist business centres to enable the operation of shared services involving local authorities who use NPS applications – a Northgate Community Cloud.

Our Community Cloud approach enables members of a NPS application user community on a local, regional or national basis to reap the benefits of shared ICT systems and business services, without complex inter-organisational Governance arrangements.

B. City council uses Cisco FlexPod to offer community cloud services to staff and for small and medium sized businesses.
Customer Name: Salford City Council
Industry: Public Sector
Location: United Kingdom
Number of Employees: 11,000

Challenge
- Support growth of small and medium-sized businesses
- Overcome infrastructure capacity constraints
- Transform IT from cost base to revenue stream

Solution
- Community cloud based on FlexPod

Results
- Up to 99 percent server virtualization,helping provision private cloud services to local businesses. Server capacity increased by 50 percent, improving delivery and responsiveness of applications.

C. Canada Cloud Roadmap
The 'Canada Cloud Roadmap' plan developed by the Canadian Federal Government provides a best practice blueprint for such a requirement. It provides a framework which builds on the NIST foundation and identifies how it can be applied to the Canadian IT estate, based on a design model with three main sections:

- **Community Cloud Service Offering** - A multi-tenant application environment for their breadth of enterprise applications, like Oracle, SAP and Microsoft, used for their core business processes like PAY, and also their common IT requirements, like email and collaboration. This is underpinned by a Cloud OSS to handle the automation of provisioning, delivery and cross-department billing.
- **A Cloud Security Model** - A logical architecture for segregating 'Cloud Security Zones', linking each Cloud area (IaaS, PaaS, SaaS) to a security infrastructure component, and describing how the computing environments will be integrated with their wide area networks and access control systems, through a Cloud Services Access Layer and a Cloud Peering Layer.
- **An Enterprise 2.0 Collaboration framework** - This technology platform enables staff to utilize a set of Web 2.0 collaboration tools and enable more interaction with the public.

This provides a complete blueprint for an Enterprise Cloud strategy, and specifically for the public sector a complete platform for Open Government Cloud Computing.

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