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A Study on Service Oriented Network Virtualization convergence of Cloud Computing

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Abstract - Networking plays vital role in cloud computing for holistic that allows control, management and optimization of both networking and cloud resources in a cloud environment leads to a convergence of networking and cloud computing. Virtualization is used in telecommunication and the internet as a key attribute for the networking as a potential enabler of changes in both communication and computing domains. Service oriented architecture applied in network virtualization knows as the Network-as-a-Service that may greatly convergence of networking and cloud computing. Our work presents the study in service oriented network virtualization for supporting cloud computing from a perspective of network. Survey overviews the cloud convergence virtualization focusing on art of network service discovery brought by network cloud convergence.

Ke**ywords –** Network Security, Cloud Computing, Virtualization, Service-Oriented Architecture

Introduction I

The developments in the field of information technology are cloud computing, significantly change the way of people do computing and manage information. Cloud computing is a large-scale distributed computing paradigm that is driven by economies of scale in which a pool of abstracted, virtualized, dynamically scalable computing functions and services are delivered on demand to external customers over the Internet [1]. Networking plays a crucial role in cloud computing. Cloud services normally represent remote delivery of computing resources, whether hardware or software, most often via the Internet. This is especially relevant in public cloud environments where customers obtain cloud services from a third-party cloud provider. Usually this means data crosses multiple networks before it is delivered to the end user. From a service-provisioning perspective, cloud services consist of not only computing functions provided by the cloud infrastructure, but also data communications functions offered by the

Internet. In addition, networking is also a key element of the cloud infrastructure that provides data communications both inside a cloud data center and among data centers distributed at different locations. Performance have indicated that networking performance has a significant impact on the quality of cloud services, and in many cases data communications become a bottleneck that limits clouds from supporting high-performance applications. Therefore networks with quality-of-service (QoS) capabilities become an indispensable ingredient for high-performance cloud computing.

The significant role that networking plays in cloud computing calls for a holistic vision of both Computing and networking resources in a cloud environment. Such a vision requires the underlying networking infrastructure to be opened and exposed to upper-layer applications in clouds, thus enabling combined control, management, and optimization of computing and networking resources for cloud service provisioning. This leads to a convergence of networking and cloud computing systems toward a composite network–cloud service provisioning system. Because of the complexity of networking technologies and protocols, exposure of network functionalities in a cloud environment is only feasible with appropriate abstraction and virtualization of networking resources.

On the other hand, telecommunication and networking systems are facing the challenge of rapidly developing and deploying new functions and services for supporting the diverse requirements of various computing applications. In addition, fundamental changes are also required in the Internet architecture to allow heterogeneous networking systems to coexist and cooperate for supporting the wide spectrum of applications. A promising approach that the networking research community takes for addressing these challenges lies in virtualization of networking resources, namely decoupling service provisioning from network infrastructure and exposing underlying network functionalities through resource abstraction. Such an approach, in general, is described by the term network virtualization, which is expected to become a fundamental attribute of the future networking paradigm and play a crucial role in next-generation networks. SOA provides effective architectural principles for heterogeneous system integration is essentially, service orientation facilitates virtualization of computing systems by encapsulating system resources and capabilities in the form of services and provides a loose-coupling interaction mechanism among these services. SOA has been widely applied in cloud computing via the paradigms of infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service and applying the SOA in the field of networking supports encapsulation and virtualization of networking resources in the form of SOA-compliant network services. Service-oriented network virtualization enables a network-as-a-service paradigm that allows network infrastructure to be exposed and

accessed as network services, which can be composed with computing services in a cloud computing environment. Therefore, the network-as-a-service paradigm may greatly facilitate a convergence of networking and cloud computing.

SECTION II

2. Related Work: Several essential characteristics of a high performing private cloud can automatically provision their own computing resources as needed and without requiring human intervention typically through an interactive portal that enables them to configure and manage services themselves. Resources are available via the network and can be accessed by multiple devices including smart phones tablets, laptops and desktops. Resources can be quickly and transparently expanded or contracted depending on demand and scaling is automatic to users and provisioning what they need is transparent. Usage is measured and can be monitored controlled and reported for transparency. Compute storage and networking resources are pooled to serve multiple user groups with different physical and virtual resources that can be dynamically assigned and reassigned according to user demand. Users generally have no control of the exact location of the resources there is a sense of location independence although location may be specified at a higher level abstraction.

Cloud infrastructure is the collection of hardware and software that enables the essential collection of hardware and software that enables the essential characteristics of the cloud to self-provision these resources in order to run platforms and applications. Platform as a service enables users to adapt legacy applications to a cloud environment or develop cloud aware applications using programming languages services libraries and other developer tools. User can run applications via multiple devices on cloud infrastructure.

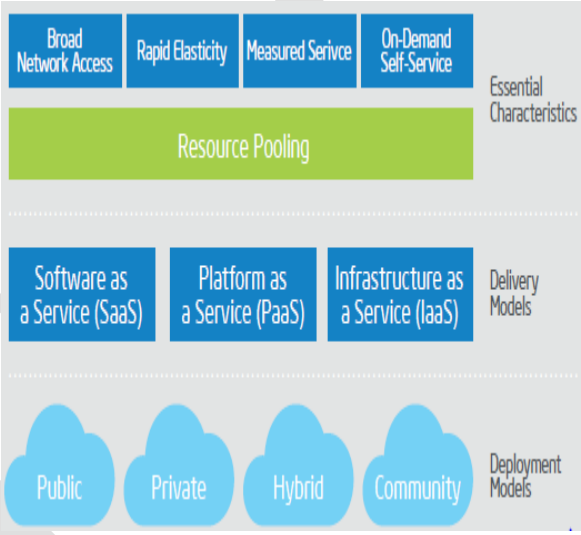

Figure 1 Cloud Computing Network Topology

Cloud infrastructure is provisioned for use by a single organization that comprises multiple tenants private clouds may be operated on or off premises and are behind the company firewall. A cloud service provider offers services to multiple businesses academic institutions government agencies and other organizations with access via the internet. Hybrid clouds combine two cloud delivery models for example private public that remain unique as entities but are bound together by technology that enables data and application portability. Cloud bursting is an example of one way enterprises use hybrid clouds to balance loads during peak demand periods, cloud infrastructure is provisioned for the exclusive use of a specific community of user organizations with shared computing requirements such as security policy and compliance.

SECTION III

3. Problem Definition: Todays technology grows very fast, developing a product with individuals needs make a success end product. Monitor all the software needs in as one input makes a efficient end product known as virtualization, this virtualization is a combination of software hardware that creates virtual machines which allows a single machine to act as many machines.

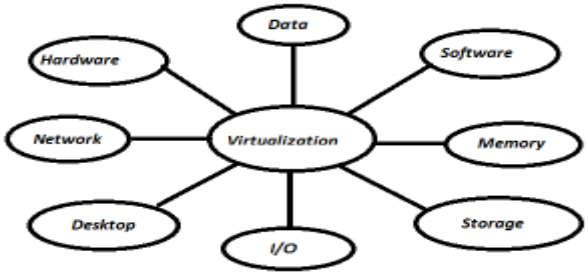

Figure 2 All in one Cloud Virtualization End product

Cloud icon represents background makes the network work, cloud computing is an architecture for storing data and accessing available anytime user friendly and scalable service models and deployment models. Users can take provision on demand services computing capabilities and network storage as needed automatically without requiring interaction with each service provider.

3.1. Cloud Virtualization Technology: Virtualization compute resources typically as virtual machines with associated storage and networking connectivity cloud determines how those virtualized resources are allocated delivered. Virtualization is not necessary to create a cloud environment but it enables rapid scaling of resources in a non-virtualized environment find hard to achieve.

Virtualization has been in data centers for several years as a successful information technology for consolidating servers used more broadly to pool infrastructure resources also provide the basic building blocks for you cloud environment to enhance agility and flexibility. Virtualization continues to be on servers storage and networks is emerging as a general strategy data center mangers worldwide reports that planned or in-process virtualization of infrastructure workloads will increase from 60 percent.

A cloud strategy clearly articulates the benefits approach and expected outcomes for technology investment across organization helps get senior management buy in and manage expectations. High-level business case describes the benefits to both information technology and the business and the expected return on investment. Implementation define short-term mid-term and long-term goals for delivering services with related benefits for example intel IT implemented infrastructure to enable broader enterprise use cases. Workloads identify the workloads plan to move to the cloud and the associated user groups, cloud architecture including the components of infrastructure platform and software as well as security and related systems such as backup and disaster recovery. Client devices define users will access the cloud and integrate with enterprise wide mobile strategy, monitoring determined how will manage cloud health and performance and define success. IT business relationships define how IT will partner effectively with the business to specify business process requirements and request services.

Business process changes are pervasive in a cloud implementation to succeed must collaborate with process owners to accurately document the processes and tasks affected and determine how to minimize the number of required human control points. Need management cooperation to implement any changes to existing processes that might benefit from the automation and developing new processes such as user's access and specify the cloud resources need. Cloud obviously affects IT- specific processes as well capacity management for instance becomes radically different in a cloud environment.

Many users in large companies are already familiar with the concept of consuming IT services around cloud service delivery options for organization from the IT perspective reduces organization risk improves resources utilization and monitors demand from the perspective of users they get the right solution to meet their needs made easy with self-provisioning and automation. Ultimately gain experience delivering cloud services that can be extended later to brokering public services in hybrid cloud model.

Right technology priorities based on the implementation phases and milestones described cloud strategy short-term priorities would typically include implementation pervasive virtualization to integrate compute storage network and physical resources and then offering infrastructure by implementing end-to-end on-demand self-service capabilities automation orchestration and security.

End-to-end health and performance monitoring of the environment is essential for cloud management without data collection and analytics have the information need to benefit from system efficiencies or measure success. Integrated operational analytics that encompass facilities network storage compute and applications can help assess whether meeting availability and performance goals inform decisions to add capacity troubleshoot problems and comply with security.

SECTION IV

4.1. Service Oriented Architecture: Cloud service oriented computing is facing various issues but combination can overcome issue they are facing individually provides on demand access and elasticity service oriented architecture provides low cost and reliable access consists of software applications which refers to the set of rules and methods that represents computing in service oriented architecture, model in an IT environment which provides loose coupling of services interoperability of current and emerging business

service. Network virtualization made significant progress to face various challenges solutions to these challenges can be overcome by service oriented architecture.

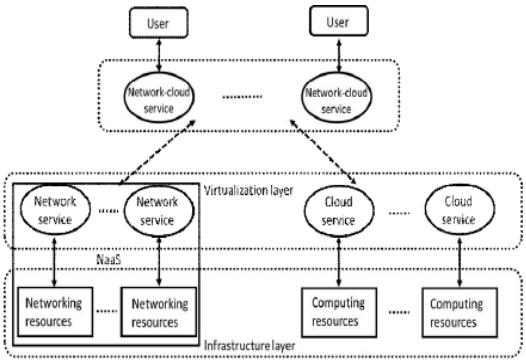

Figure 3 Service Oriented Architecture Virtualization

Network as service framework enabling the convergence of networking and cloud computing discovers the services required by the user and then enables matching cloud service requirements with networking capabilities, loose coupling feature of SOA provides flexibility in network cloud convergence.

4.2. Cloud/SOA Virtualization: Virtualization is a technology that allows resource to be viewed as logical and physical application are run on logical resource and assigned to an optimum physical resource based on a variety of cost performance and availability. Virtualization is a technology that allows a physical server to appear to applications as multiple logical servers, challenge of virtualization lies in the issue of utilization if a server truly has excess memory disk and CPU resources available then virtualization can provide for server consolidation.

Cloud is harmonization of SaaS and virtualization into a much broader and flexible model for IT infrastructure cloud computing provides a way for enterprises to structure their data centers to efficiently user server storage and network resources cloud computing can extend virtualization across a wide network to build a single virtual cloud data center. Public cloud can offer companies a way to host applications for back-up or as an overflow capacity resource in periods of peak demand, public cloud can host SaaS applications more cost effectively too, cloud computing architecture provides a way to link the public resources with private cloud resources to create a hybrid cloud enabling cloud computing to build a seamless applications across virtualized servers.

Service oriented architecture is software design and development that componentizes applications into modular services that are assembled in various ways to promote customization to worker needs and reuse of common software elements, service oriented architecture facilitates cloud computing by making software easier to distribute in the cloud alternative to virtualization in server sharing or it can use virtualization to improve performance and reliability. Finally service oriented architecture makes everything a service and thus supports the SaaS model not only for complete applications but also for components of applications. Service oriented architecture may be transforming but from the user's perspective cloud computing is harmonizing many would argue that cloud computing is the unification of virtualization and SaaS but its more complicated.

Conclusion V

Cloud virtualization enables converged infrastructure, this paper discuss survey on cloud virtualization and technique. Cloud is a transformative technology with significant potential to solve data problems. Virtualization flexible elastic and minimizes complexity user friendly and access of data offers integration of services Network-as-a-service in cloud based virtualization. This paper presents service oriented cloud virtualization combined together to form an end-product study of virtualization it can be concluded that by merging such clouds.

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