

# Networked Clouds

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**Abstract—** Advances in cloud technologies and on-demand network circuits have given opportunities to enable complex data intensive scientific applications to run on dynamic, networked cloud infrastructure. Cloud based networking is an increasing part of how companies do business. Cloud is central and essential. Companies retain private clouds for business critical or sensitive data but many companies use combination of public and private clouds as a hybrid approach of cloud services. Desktop virtualization enables data security, employee flexibility and mobility by enabling administration of all desktops centrally from a secure data centre environment. End users need not physically store sensitive data hence there is no threat of data leakage from loss or theft. The network sees all data, connected resources and user interactions over public internet as well as within and between clouds. Network can be used to monitor and meter usage and performance of distributed cloud services and infrastructure. Network is critical to advanced cloud services. In cloud information technology from infrastructure to applications is delivered and consumed as a service over network.

**Index Terms—** Cloud, infrastructure, networking, technologies.

## I. INTRODUCTION

The widespread adoption of cloud computing implies companies have to balance how they upgrade their network infrastructure. Networks need upgrading to keep systems updated and responsive. Corporate managers and employees depend on company networking professionals to keep to ensure infrastructure is up and responsive. Choosing a strategy and managing the cloud is crucial. Enterprise network managers are beginning to move networking out to the cloud to meet the organization's evolving infrastructure needs.

## II. NETWORKS

Cloud computing offers elastic access to computing, storage and network resources. It allows network providers opportunities to improve their own operations as well as possibilities to generate revenue from new services. Optimised resource placement in distributed clouds requires information about the internal network topology and state in addition to data centre information. Evolution of cloud is realising the power of networking in the cloud computing paradigm and this is a manifestation of telecom and information technology (IT) convergence. The evolution of IT has taken us from running applications on standalone servers to applications running in the cloud with an on demand per pay use business model. There are limitations with the

localised cloud and integrating the networking aspects would bring clear benefits.

Networked cloud makes networking as a service integrated with infrastructure as a service. It provides opportunity for business collaboration between different datacentre and network providers. They would be able to chain their services outside their own boundaries to achieve greater market coverage together. Enterprise user will be able to enjoy rapid and on demand provisioning of compute, storage and network across multiple domains. It's too expensive for global companies to purchase new complex networking infrastructure at every remote branch or facility for access to cloud applications. Better to simplify the edge where users connect to the cloud and leverage the scalable networking infrastructure at cloud providers. By moving to the cloud, companies can use the latest networking technology and reduce overhead on maintenance costs. Companies use cloud based networking tools to run their operations more efficiently and deliver security that they could not provide in-house.

The network is critical to cloud computing. The network is most exposed in the IaaS model and least in the SaaS model. In a private cloud, the user and the provider are within the same trusted network boundary. In a public cloud, they are on different networks. In hybrid cloud, a secured connection may exist between the user's and the provider's networks. In a community cloud, the structure depends on the charter and architecture of the organizations operating the cloud. No network means no cloud. Without networks, applications, data and users cannot move between clouds and infrastructure components cannot work together to create a cloud. Everything is becoming virtualised. Infrastructure is becoming programmable and servers and applications have mobility. Data still needs to travel between the computing and storage components of an application and the user of the application. Network resource needs must be met across the entire network with (QoS) Quality-of-Service capabilities.

Network architecture needs to be flexible instead of being a static stumbling block. Network services need to be location independent, delivered wherever data, applications and users are and whenever the services are needed. The network is fundamental to cloud computing. Users should be able to move from one cloud to another while maintaining their credentials. Access to cloud should be accelerated, network security should be provided for virtual machines. There is an increase in proliferation of phones and other mobile devices that are being used to access applications and data from clouds across many different kinds of networks. With cloud infrastructure applications and servers have also become

mobile able to move from one part of the cloud to the other or from one cloud to another.

The basic concept of cloud networking in which fewer management devices are installed in the branch offices or client premises and more routing and management functions are pushed to the cloud is now pursued for wider range of networking products which include branch office routers, firewalls and WAN optimisation software. The use of cloud based networking to manage and deploy network functions across the WAN is described as software defined WAN or Cloud WAN. The main goal is to free up services from being attached to specific hardware so that services can be deployed more quickly using software over a networking connection.

## CONCLUSION

An important factor to have a network that facilitates optimum cloud performance is manageability. Enterprises are working on streamlining their networks to handle the environment in a better way. Not having a network optimised to support cloud traffic can impede performance and introduce instability. IT needs to consider design elements and strategies that hinder or help to get the maximum benefit from the cloud.

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Jyoti Madabhushi, B.E, M.S. has got more than 25 years of work experience in IT industry with more than one and a half decade experience in project management. She has worked in various capacities from being a hands on technical person to project manager, program manager, portfolio manager to strategic business unit head mapping her portfolio to the changing trends in IT.