



OVERVIEW OF DATA CENTRE IN CLOUD BASED ENVIRONMENT

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ABSTRACT

For past one decade, Cloud computing is one of the most optimistic topic for thoughts and debate. In Cloud Computing, Data centres play an important role in producing uninterrupted computing over the network. In data centre, three layered network topology is used to establish the connection of clients with the data centre from anywhere in the world. Inside the data centre, redundant array of independent schemes technology is implemented for storage hardware to keep the data safe and secure even in case of disaster. Modularity and flexibility should come up with today's data centre to makeup with the need of the people. They should come with fast computing, enhanced network hardware and huge data storage capacity. Virtualization is the key process in the data centre and it is the backbone of cloud computing. It virtualizes the hardware apparatus with the assist of hypervisor mechanism.

Keywords: *Cloud Computing, Data Centre, Rack Mounted Server, Virtualization, IT (Information Technology) Resources*

I. INTRODUCTION

In cloud computing, data centre is a location where all the data resides behind the wall and is protected and accessed with various techniques. Data centre is essentially the assortment of hardware like computing, storage, and communication & networking. Data centre in cloud computing consumes less power than the geographically dispersed hardware and requires undersized management panel. Computing in the data centre is done with the help of huge numbers of servers and these servers are linked to the storage devices with the help of a dedicated network. Data centres must always be around the network for backup and disaster recovery.

In Data centres, huge quantity of homogeneous servers that have computing power and storage space capacity, make the majority of heavy processing/computing. In addition, immense amount of storage capacity is used to keep backup in the disaster case with the help of gigantic network.

A typical Data centre deploys various technologies and has the following components:

A. Computing Hardware

In data centres, huge quantity of homogeneous and heterogeneous servers (working together) that have large computing power and storage space capacity, make the majority of heavy processing/computing. Mechanism

and technology are used within the data centre for house modular servers. One is rack-mounted server which is poised of identical shelf. In each one shelf one server diskette is inserted. In attendance, it may possibly be 20-25 server diskette inserted in every rack-mounted server [Fig 1]. The entire racks are interconnected with power, network and internal cooling. It is continuously cooled by water cooling system. It supports the different hardware handling out architectures of microprocessors. It supports elimination of hot swappable components. It in addition supports scaling alternate components such as hard disks [1],[4].

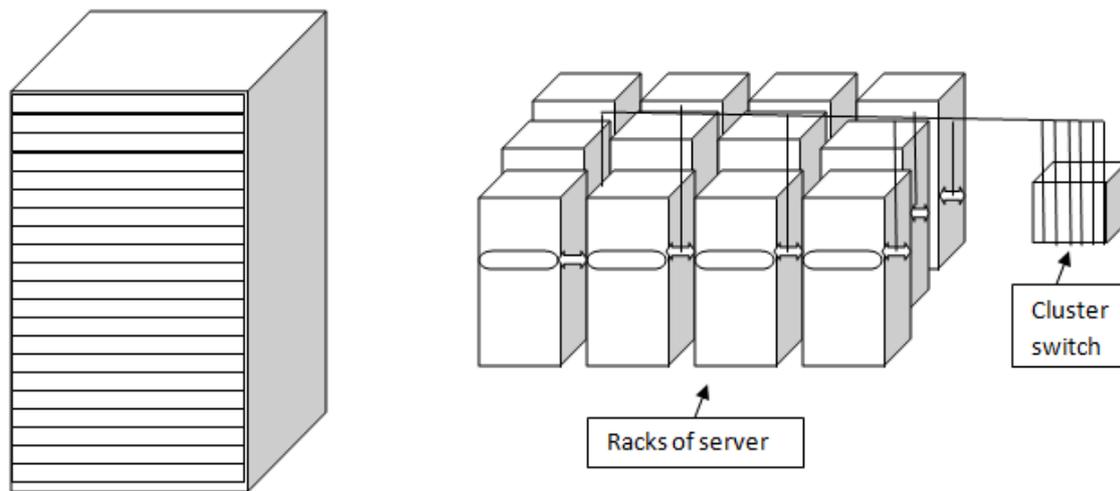


Fig. 1: Racks of server scaled by using switches

B. Storage Hardware

An enormous quantity of data is stored within the data centre. Cloud storage is a sort of data storage in which the data is stored in form of digital in reasonable pools, the multiple servers are spanned by physical storage, and the third party/hosting company own and manage the physical background. There should be uninterruptable accessibility and availability of data by these cloud storage providers and also responsible for keeping the data protected. These storage facilities are purchased or leased by large business companies and organization from the providers to store user, clients, organization, or application data. Companies have to pay only for the storage that they actually use, and it reduces the expensive. Portable and semi-portable devices are used to store cloud data. Hard disks, tape libraries and magnetic tapes are basically the main components of storage hardware [7].

Hard disks arrays, made up of array of hard disks drives, looks like a storage containers that store huge amount of digital data. RAID (Redundant Array of Independent Disk) Schemes are used to implement these kind of containers. For removing or replacing the hot swappable components from storage containers it takes no any need to shut down the power. Natural disaster proof backup and recovery system are used at two or three different locations across the globe.

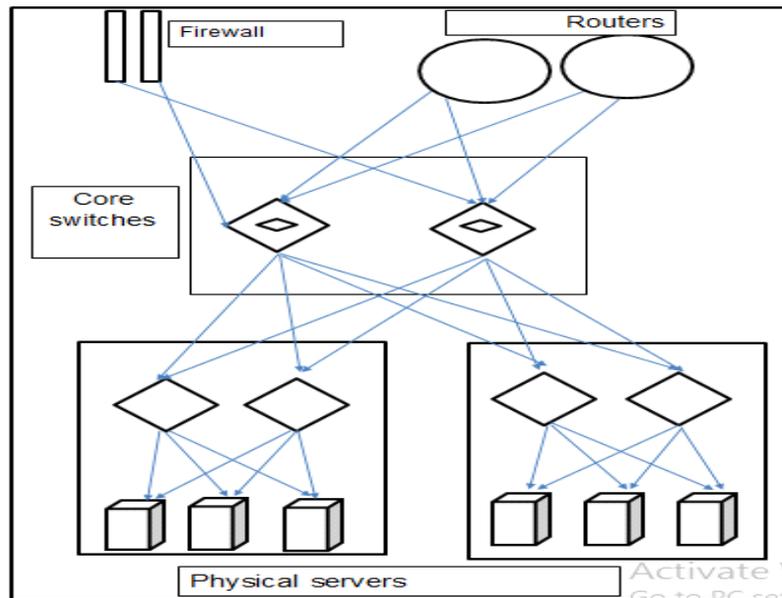


Fig. 2: Storage-network connections inside the data centre

C. Network Hardware

In the recent years of technology, companies might require 10 times their current network capacity – but without 10 times the budget in their networked hardware. Anything and everything that profit from being connected will be connected. Networking hardware is one of the most important hardware. The cloud is mainly formed by networking hardware for the intention of remotely provisioning scalable and precise IT resources. Networking hardware includes hybrid network devices such as Protocol converters, Proxy servers, firewalls, translators, multiplexers, network interface controllers, wireless network interface controllers. Routers, switches, bridges, and gateways are devices mainly used for connectivity of network.

The network topology used in favor of data centre is hierarchal Topology. It is made up of connectivity of three tiers: core, aggregation and access [Fig 3],[2],[4]

Network sub-system which is used for the data centre networking infrastructure is composed of:

- Exterior network interconnection: It is the inter connection between the Data Centre’s LAN (Local Area Network) and external WAN (Wide Area Network) with the help of routers that provide routing. Internal LAN provides connectivity for the entire network enabled IT resources devices inside the data centre [Fig2].
- Storage Area Network (SAN): It provides connectivity between servers and storage systems and habitually implemented with Fiber channel (FC).It facilities data transmission between servers and storage devices through protocol conversion with the help of SAN fabric.

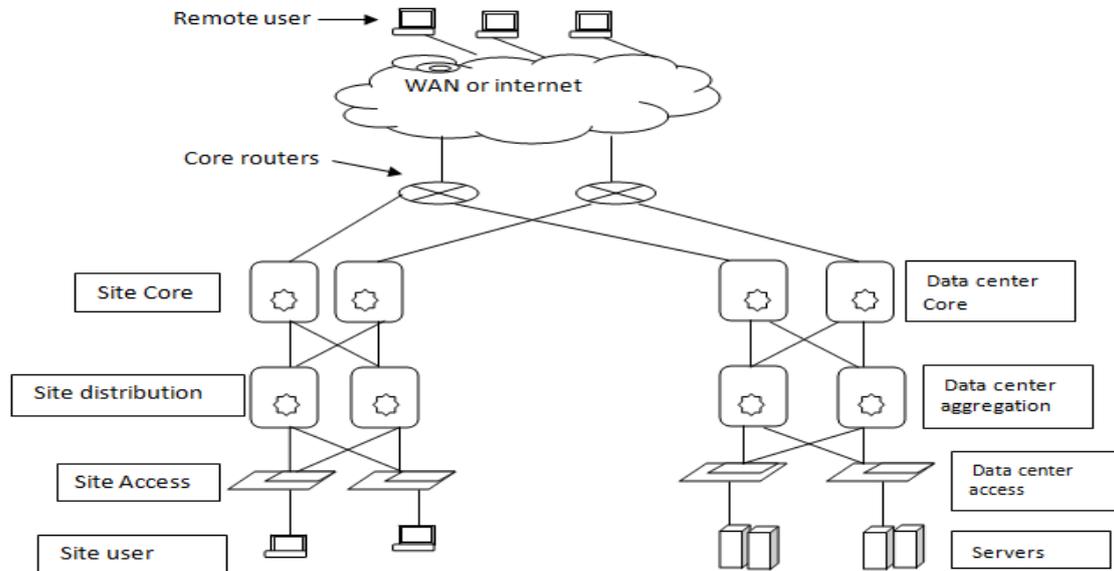


Fig. 3: Data centre Topologies

D. Virtualization

Both Physical and virtualized IT resources are amalgamated into the data centre. It is the procedure of abstracting physical IT resources into virtual IT resources. Servers, storage and network, each and every one of them can be virtualized. Virtualization can be done in two ways –Operating System based and Hardware based [Fig. 4],[3],[5]

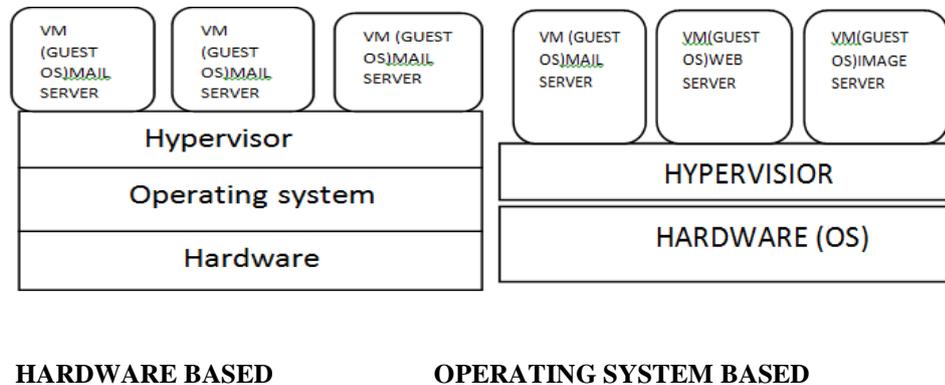


Fig. 4: Virtualization Types

II. CONCLUSION

Data centre are built upon uniform commodity hardware and planned with modular architectures, aggregating numerous indistinguishable building blocks of capacity infrastructure. Excessive amount of data is stored in numerous amounts of storage containers. These storage containers are connected through a high speed dedicated network. Disaster proof backup and recovery system are used at two or three different locations across the



globe. Virtualization is an extensive IT initiative, of which abstracting of resources is just the beginning. Other settlements include hardware-independence, server consolidation and isolation. Virtualization enlarges the server utilization rates from 5-15% to 60-80% [1].

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