

## DEVELOPMENT OF PRIVATE CLOUD FOR EDUCATIONAL INSTITUTION USING VMWARE

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### ABSTRACT

Private cloud is a computing model that uses resources which are dedicated to our institution. A private cloud shares many of the characteristics of public cloud computing including resource pooling, self-service, elasticity and pay-by-use delivered in a standardized manner with the additional control and customization available from dedicated resources. While virtualization is an important technological component of private cloud, the key differentiator is the continued abstraction of computing resources from infrastructure and the machines (virtual or otherwise) used to deliver those resources. Lowering costs in computation is driving the focus from personal to Data Center-centric computing. Most of the Educational Firms in India are not having sophisticated Data-Centers & also they need more & more computing power for processing of information without investing more on infrastructure. Only by delivering this abstraction can customers achieve the benefits of private cloud – including improved agility and responsiveness, reduced TCO, and increased business alignment and focus. Most importantly, a private cloud promises to exceed the cost effectiveness of a virtualized infrastructure through higher workload density and greater resource utilization. We are using VMware Platform for achieving Distributed Computing to manage all incoming Request concurrently on Cloud Servers through Master-Slave Model.

**Keywords:** Cloud Computing; Private Cloud; VMware.

### I. INTRODUCTION

Cloud computing is a promising computing paradigm which recently has drawn extensive attention from both academia and industry. By combining a set of existing and new techniques from research areas such as Service-Oriented Architectures (SOA) and virtualization, cloud computing is regarded as such a computing paradigm in which resources in the computing infrastructure are provided as services over the Internet. Along with this new paradigm, various business models are developed, which can be described by terminology of “X as a service (XaaS)” where X could be software, hardware, data storage, and etc. Successful examples are Amazon’s EC2 and S3 [1], Google App Engine [3], and Microsoft Azure [4] which provide users with scalable resources in the pay-as-you use fashion at relatively low prices. For example, Amazon’s S3 data storage service just charges \$0.12 to \$0.15 per gigabyte month. As compared to building their own infrastructures, users are able to save their investments significantly by migrating businesses into the cloud. With the increasing development of cloud computing technologies, it is not

hard to imagine that in the near future more and more businesses will be moved into the cloud. As promising as it is, cloud computing is also facing many challenges that, if not well resolved, may impede its fast growth. Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Private Cloud uses groups of public or private server pools from an internal corporate data center. It has to be managed by Enterprise, and allows fine grain access to resources .Private Clouds are generally the solution considered by enterprises that do not want to outsource any part of IT infrastructure and services for security concerns. Amplify our datacenter’s efficiency and agility while enhancing security and control with a private cloud from VMware Consolidate datacenters and deploy workloads on infrastructure with built-in security and role-based access control. Migrate workloads between pools of

infrastructure and integrate existing management systems using customer extensions, APIs, and open cross-cloud standards. Deliver cloud infrastructure on-demand so end users can consume virtual resources with maximum agility.

## II. WHY CLOUD COMPUTING FOR EDUCATIONAL FIRM?

Most of the Educational institutes in India are having primitive Data-Centers which are not enough for processing huge number of request. Currently if we observe the Educational Sectors, all are having their own server for publishing the Website. Now the question is when maximum number of hits occurs on the Website, only during the time of results. Data centers are notoriously underutilized, often idle 85% of the time. This is due to improper understanding of

scalability requirements. Enterprise Cloud must be build for such institutes where set of computers can act as cloud servers with distributed computing environment.

## III. WHY VMWARE ESXI FOR EDUCATIONAL FIRM?

VMware [13] is the global leader in virtualization and cloud infrastructure. VMware offers a unique, evolutionary path to cloud computing that reduces IT complexity, significantly lowers costs and enables more flexible, agile service delivery. VMware vSphere leverages the power of virtualization to transform datacenters into simplified cloud computing infrastructures and enables educational institutions to deliver flexible and reliable IT services. VMware vSphere virtualizes and aggregates the underlying physical hardware resources across multiple systems

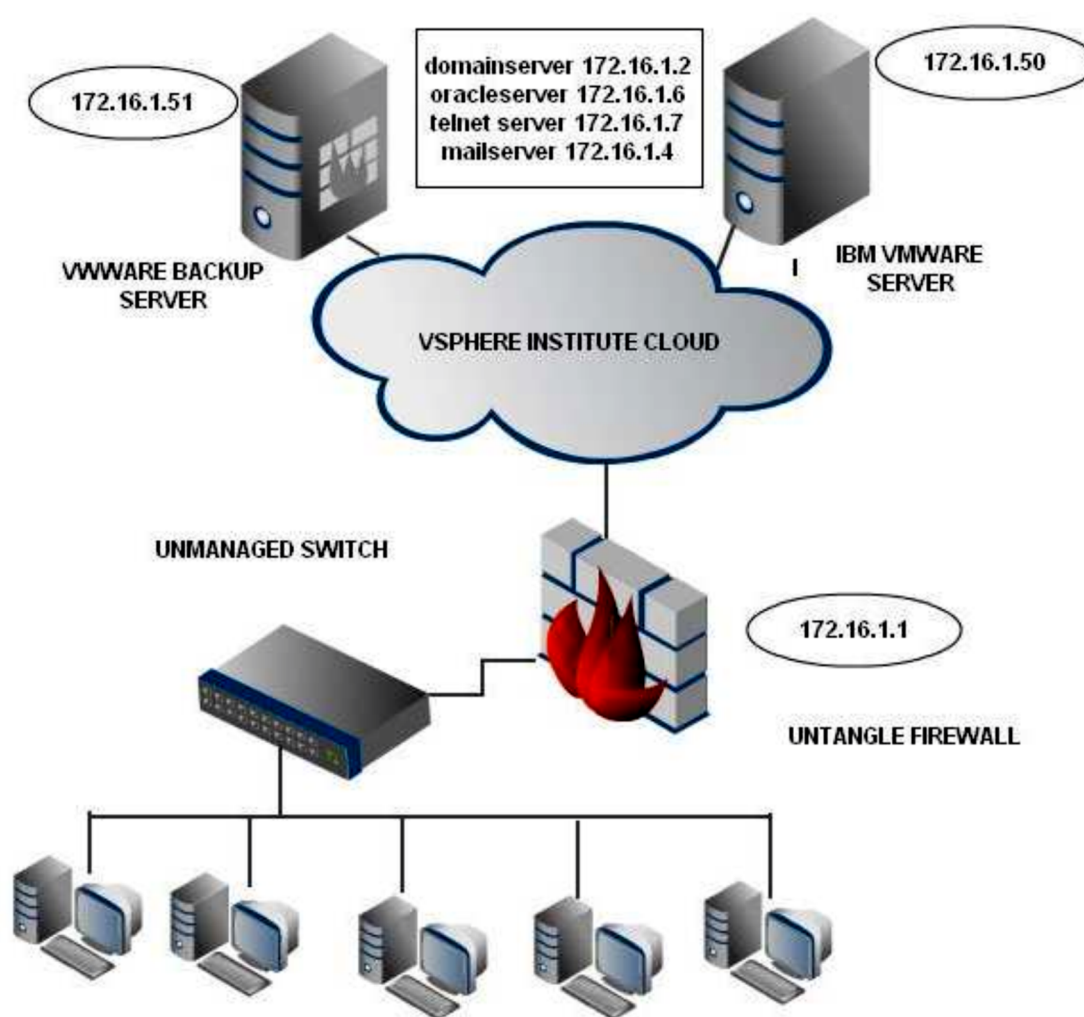


Fig. 3. End User Cloud

and provides pools of virtual resources to the datacenter. As a cloud operating system, VMware vSphere manages large collections of infrastructure (such as CPUs, storage, and networking) as a seamless and dynamic operating environment, and also manages the complexity of a datacenter. The following component layers make up VMware vSphere.

**Infrastructure Services:** Infrastructure Services are the set of services provided to abstract, aggregate, and allocate hardware or infrastructure resources. Infrastructure Services are categorized into several types.

- VMware vCompute, which includes the VMware capabilities that abstract away from underlying disparate server resources. Compute services aggregate these resources across many discrete servers and assign them to applications.
- VMware vStorage, which is the set of technologies that enables the most efficient use and management of storage in virtual environments.
- VMware vNetwork, which is the set of technologies that simplify and enhance networking in virtual environments.

**Application Services:** Application Services are the set of services provided to ensure availability, security,

and scalability for applications. Examples include High Availability and Fault Tolerance.

**VMware vCenter Server:** Provides a single point of control of the datacenter. It provides essential datacenter services such as access control, performance monitoring, and configuration.

**Clients:** Users can access the VMware vSphere datacenter through clients such as the vSphere Client or Web Access through a Web browser.

#### IV. METHODOLOGY

VMware has successfully implemented dozens of private cloud infrastructures. To help we leverage the experience and best practices we have accumulated from these deployments, we have developed the Vcloud and Vsphere of our institute architecture-a set of documents we can use to better understand both the principles upon which VMware's cloud strategy is executed, and the mechanics for us to implement our own cloud infrastructure.

**Comprehensive Solutions:**

- Enable the management of all project and institutional documents.

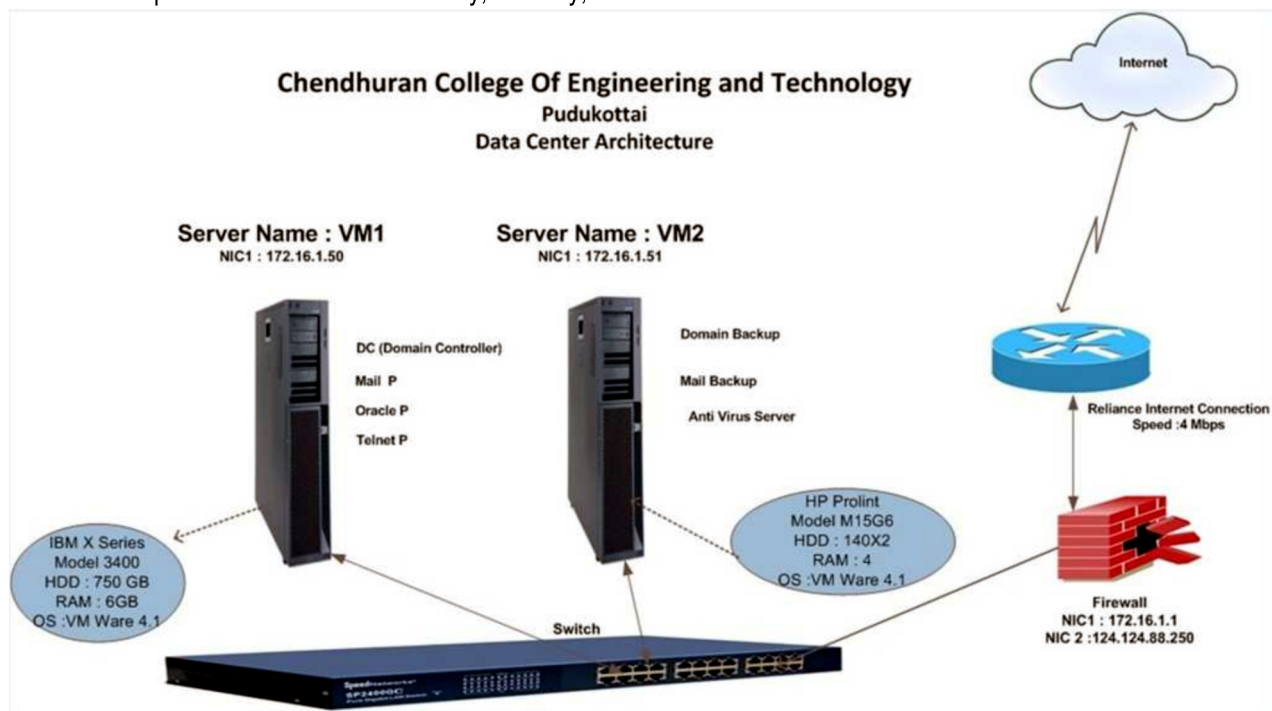


Fig. 4. Institute Cloud Architecture

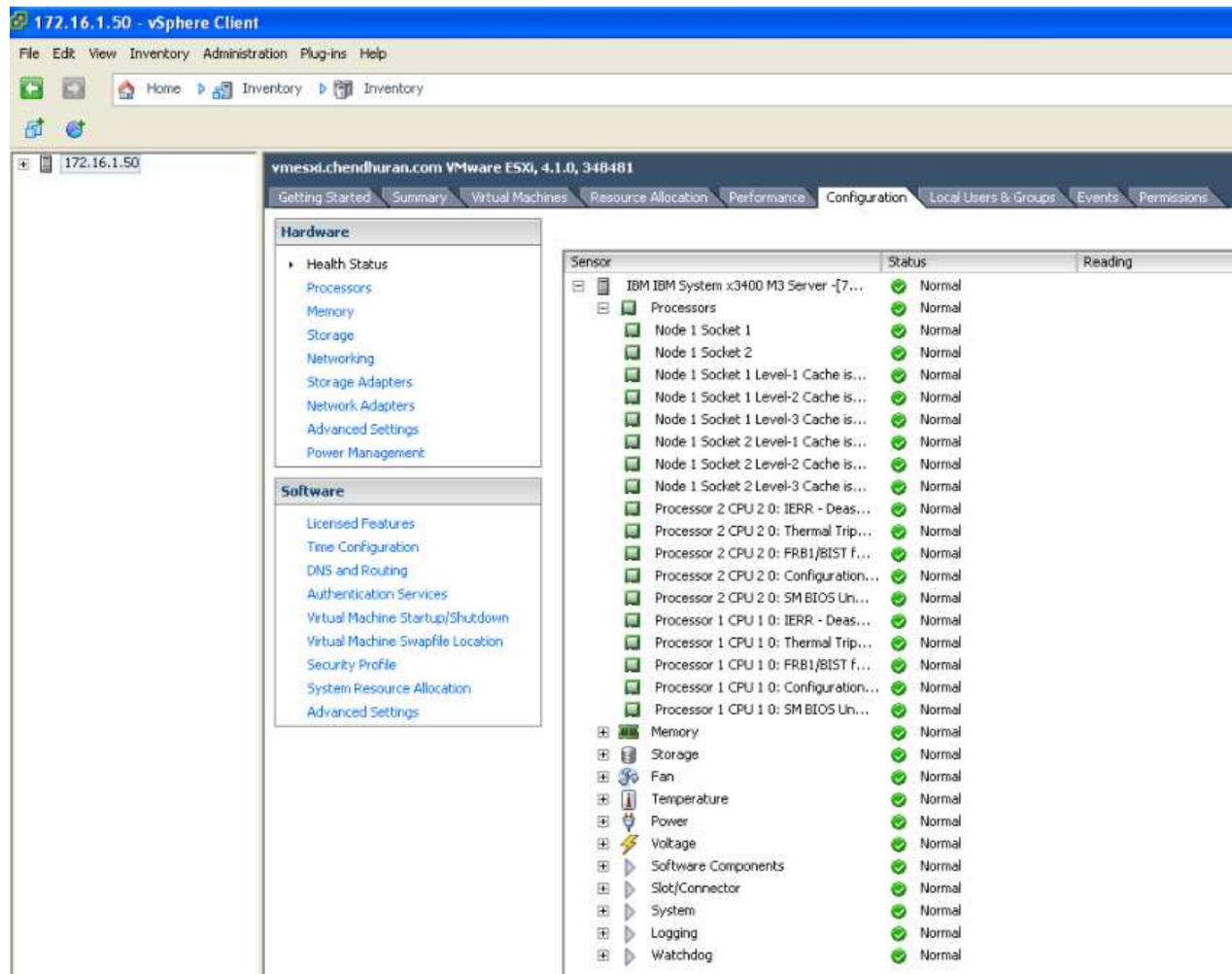


Fig. 4.1 Institute Vsphere Config

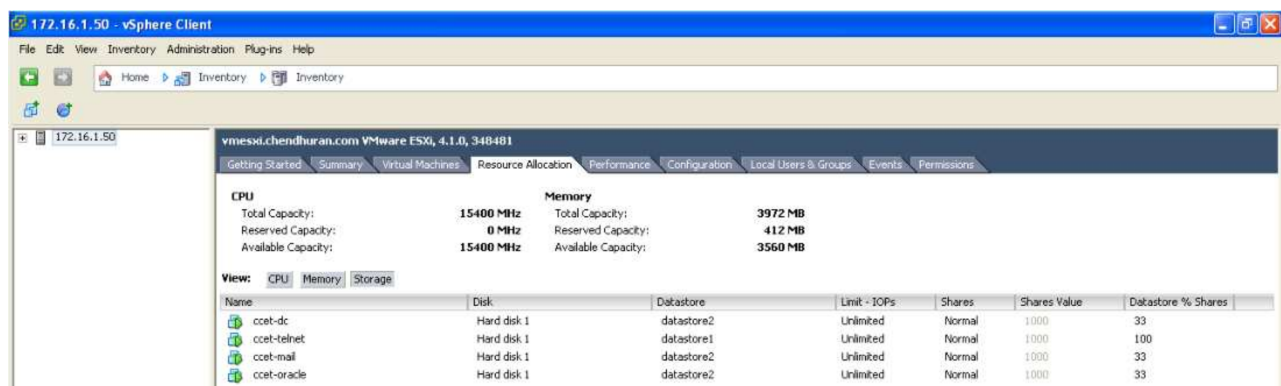


Fig. 4.2 Institute Data Storage

- Provides comprehensive, secured storage and backup facility of personal and work data.
- Facilitates the exchange of information within across educational institutions.

#### Flexibility, adapting to the way we work:

- Offers the flexibility of uploading unrestricted format types securely without much hassle.



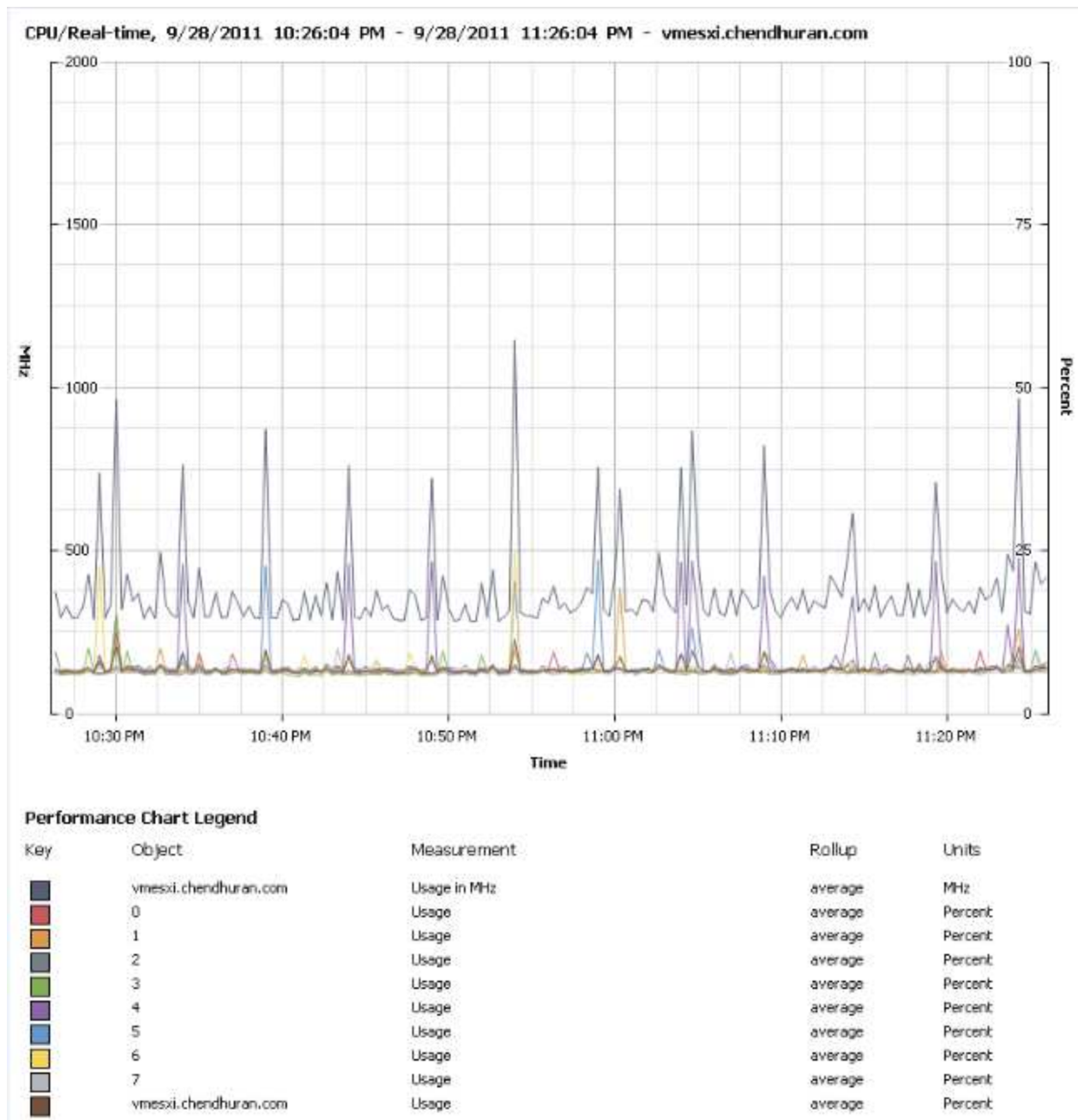


Fig. 4.3 Institute Hype

- Multi-level access control – adapt to an educational institution's hierarchy.
- Allows institution entities to host the entire application on our own servers.

#### Sharing information:

- Allows sharing of files internally.
- Able to control the permission to allow third party to view and download.

#### Manage files online:

- Able to organize files in different folders as desired and being able to do it online.
- Single storage and backup repository of all important files.
- Ease of use and user friendly interface.

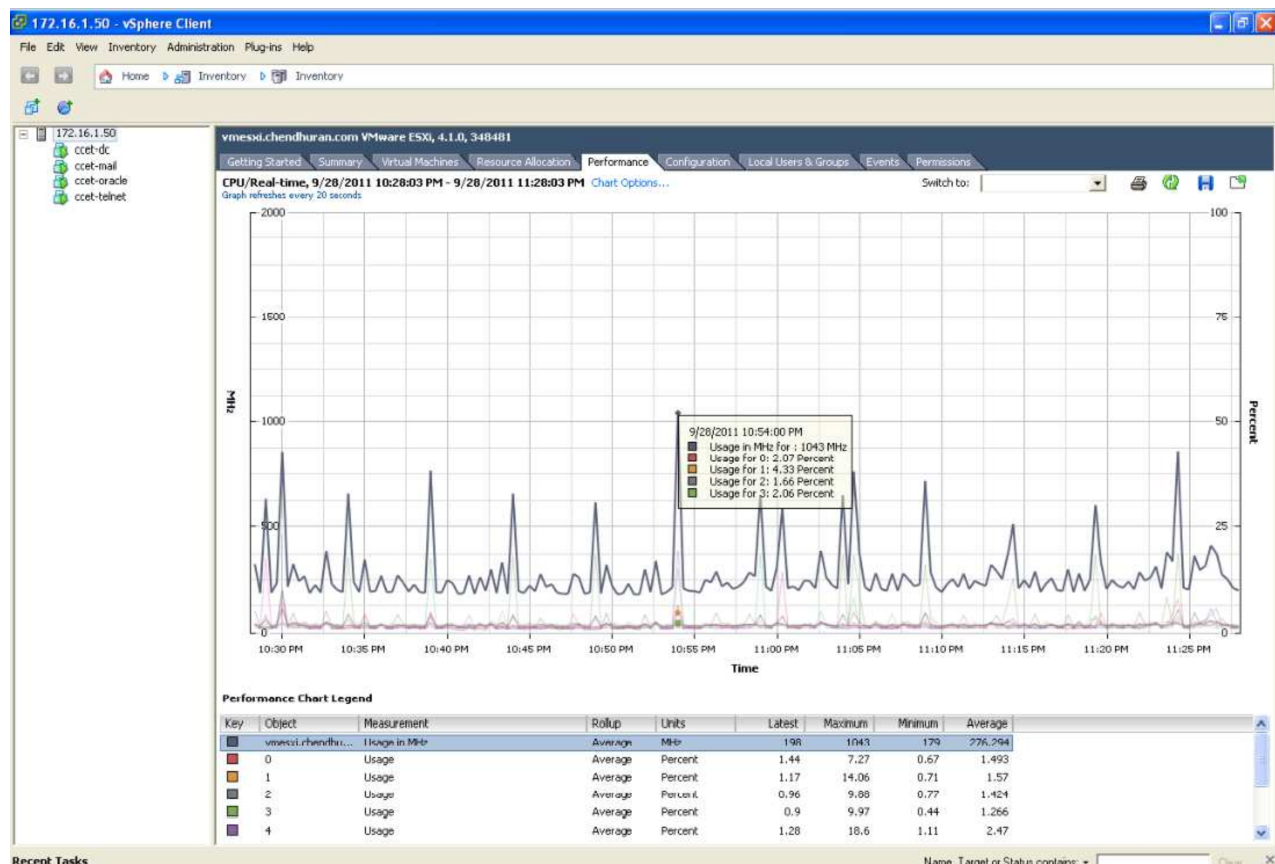


Fig. 4.4 Institute Hype

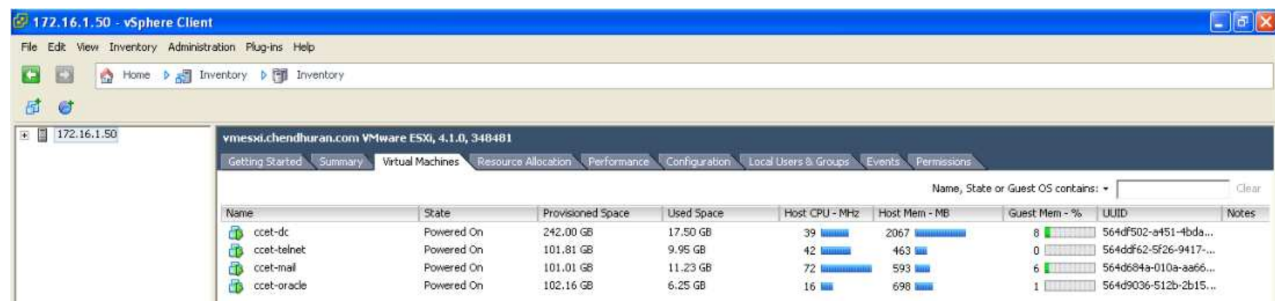


Fig. 4.5 Institute Virtual Servers

### Security and Accessibility:

- Able to access the file anywhere, anytime within the institution.
- It will be more secure data transmission while number of users accessing the data is scalable.

### V. CONCLUSION

The purpose of this paper is to develop a Private Cloud for Educational firm which would like to do their automation without spending lot on Infrastructure.

Forming an Enterprise Cloud where the entire request will reach at set of Server (IBM Cloud Servers) for computation & resource access and hence providing service over the Cloud. It means unnecessarily there is no need to have 300 computers for 1 hour of work, instead have 1 cloud for 300 different tasks. In such case since everything will be maintained by the institution firm security issues will be of less concern since Private Cloud Infrastructure is being formed internally by the firm. Using VMware ESXi Container,

we can improve Simple Network Framework to a Private Cloud for different institutes.

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