
بسم الله الرحمن الرحیم
قریشی

Course: Polytechnic University

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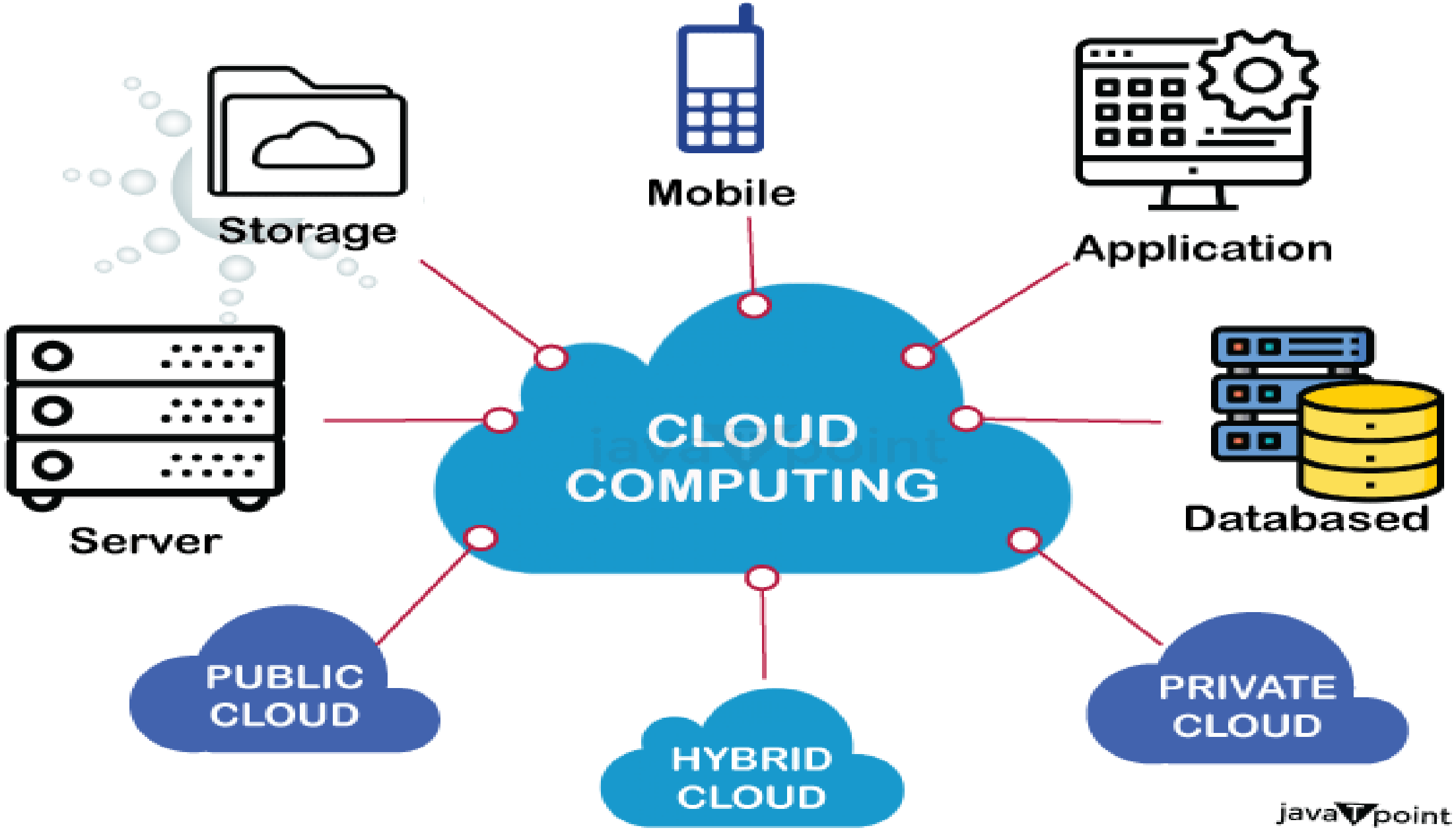
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Types of Virtualization's

1- Server Virtualizations: Server Virtualization is most important part of Cloud Computing. So, Talking about Cloud Computing, it is composed of two words, cloud and computing. Cloud means Internet and computing means to solve problems with help of computers. Computing is related to CPU & RAM in digital world. Now Consider situation, You are using Mac OS on your machine but particular application for your project can be operated only on Windows.

Server Virtualizations

You can either buy new machine running windows or create virtual environment in which windows can be installed and used. Second option is better because of less cost and easy implementation. This scenario is called Virtualization. In it, virtual CPU, RAM, NIC and other resources are provided to OS which it needed to run. This resources is virtually provided and controlled by an application called Hypervisor. The new OS running on virtual hardware resources is collectively called Virtual Machine (VM).

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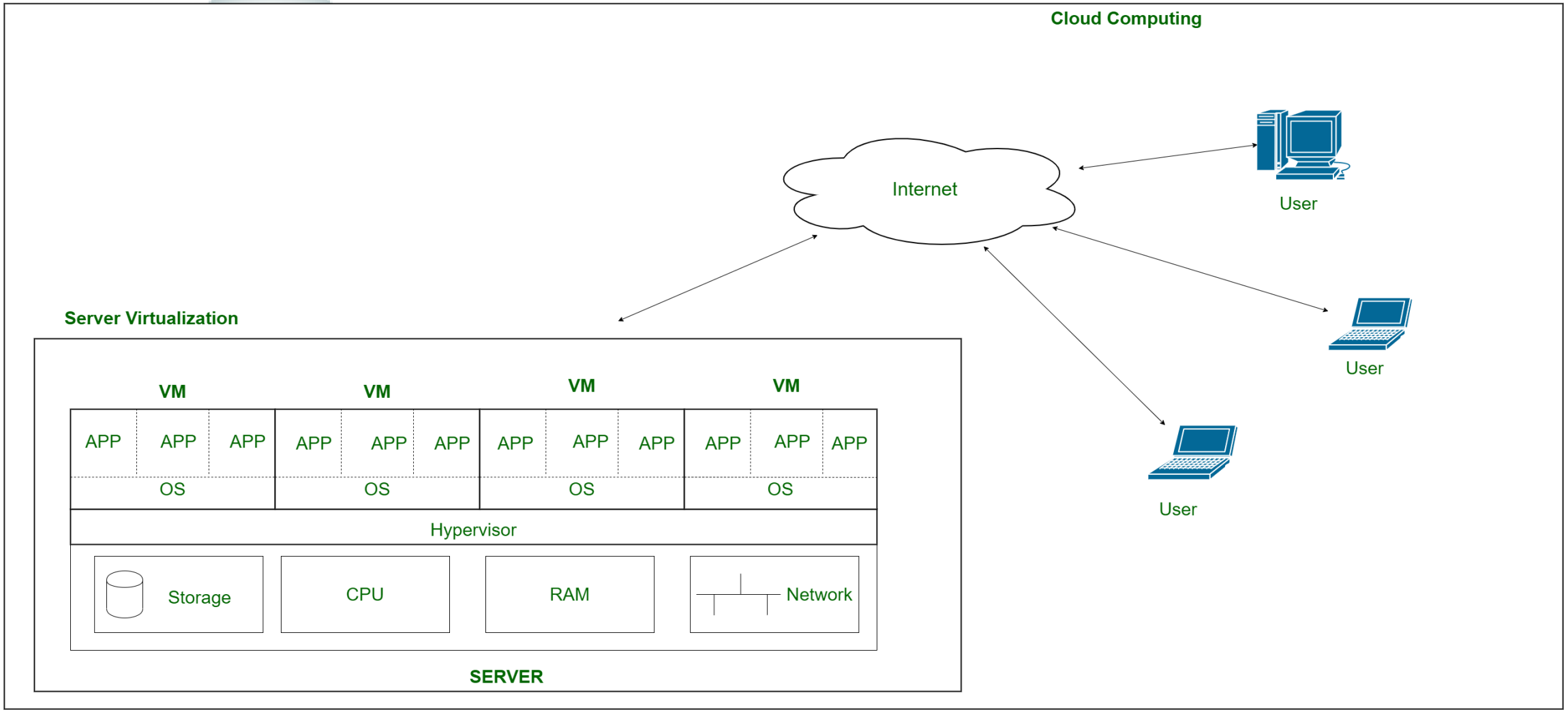
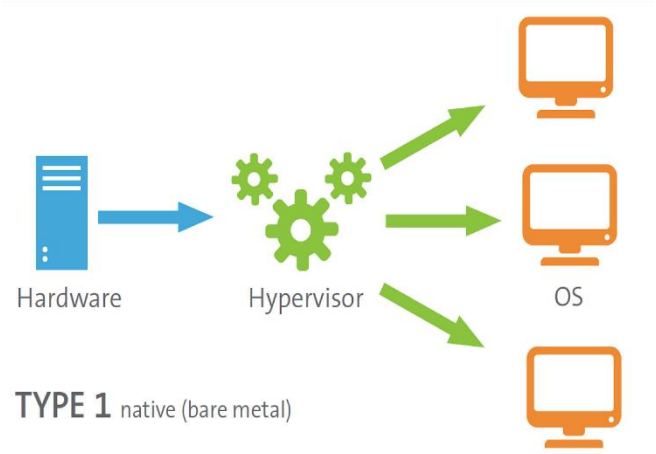
Now migrate this concept to data centers where lot of servers (machines with fast CPU, large RAM and enormous storage) are available. Enterprise owning data centre provide resources requested by customers as per their need. Data centers have all resources and on user request, particular amount of CPU, RAM, NIC and storage with preferred OS is provided to users. This concept of virtualization in which services are requested and provided over Internet is called Server Virtualization.

Server Virtualizations



Hypervisor

To implement Server Virtualization, the hypervisor is installed on the server which manages and allocates host hardware requirements to each virtual machine. This hypervisor sits over server hardware and regulates the resources of each VM. A user can increase or decrease resources or can delete an entire VM as per his/her need. This servers with VM created on them is called server virtualization.



Advantages of Server Virtualization

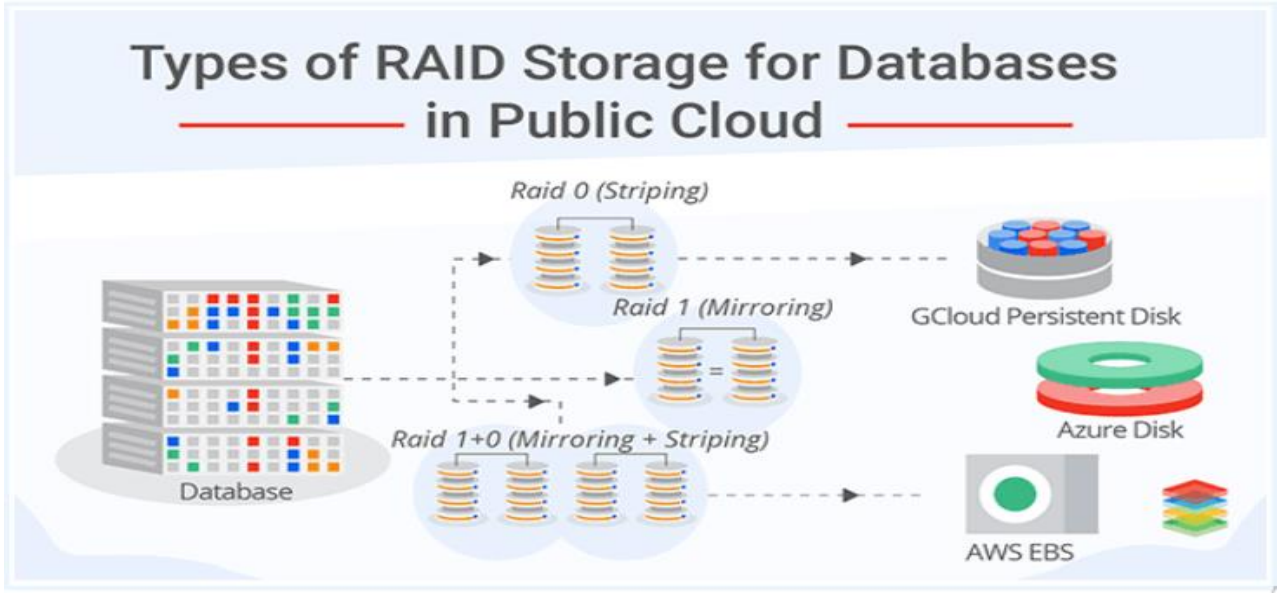
- Each server in server virtualization can be restarted separately without affecting the operation of other virtual servers.
- Server virtualization lowers the cost of hardware by dividing a single server into several virtual private servers.
- One of the major benefits of server virtualization is disaster recovery. In server virtualization, data may be stored and retrieved from any location and moved rapidly and simply from one server to another.
- It enables users to keep their private information in the data centers.

Storage Virtualization

Storage virtualization is a major component for storage servers, in the form of functional RAID levels and controllers. Operating systems and applications with device can access the disks directly by themselves for writing. The controllers configure the local storage in RAID groups and present the storage to the operating system depending upon the configuration. However, the storage is abstracted and the controller is determining how to write the data or retrieve the requested data for the operating system.

Redundant Array of Independent Disks

RAID: is a way of storing the same data in different places on multiple hard disks or solid-state drives (SSDs) to protect data in the case of a drive failure. There are different RAID levels, however, and not all have the goal of providing redundancy.



Advantages of Storage Virtualization

- Data is stored in more convenient locations away from the specific host. In the case of a host failure, the data is not compromised necessarily.
- The storage devices can perform advanced functions like replication, reduplication, and disaster recovery functionality.
- By doing abstraction of the storage level, IT operations become more flexible in how storage is provided, partitioned, and protected.

What Is Desktop Virtualization

- That being said, desktop virtualization is simply the concept of replacing traditional physical desktop environments with remotely controlled computing environments.

- The main advantages of desktop virtualization is that user do not need to bring their work computer everywhere, they can work and access all their personal files, application and documents from anywhere.

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By definition, desktop virtualization is a method of creating a workstation with all the apps and widgets your employees normally use so that they can access their desktop from any device or location. The technology allows creating and storing multiple user workstations on a single host, residing in a data center or the cloud. The only condition is a stable Internet or network connection.

What Is Desktop Virtualization

How Does Desktop Virtualization Work

In most cases, a user connects to a virtual machine via the Internet using the **Remote Desktop Protocol (RDP).** Once he enters the login credentials and the connection is established, the remote desktop session starts with this user's personal virtual machine.

The process of virtualization involves many hardware and software abstraction layers, enabling the virtual machine to function like a real, physical computer having a CPU, storage, network resources, and RAM of its own.

The different layers are

- **Hypervisor Layer:** This is a software layer used to create and manage VMs. It communicates with the physical machine's hardware resources in order to allocate memory, storage, network resources, and CPU to the VMs.

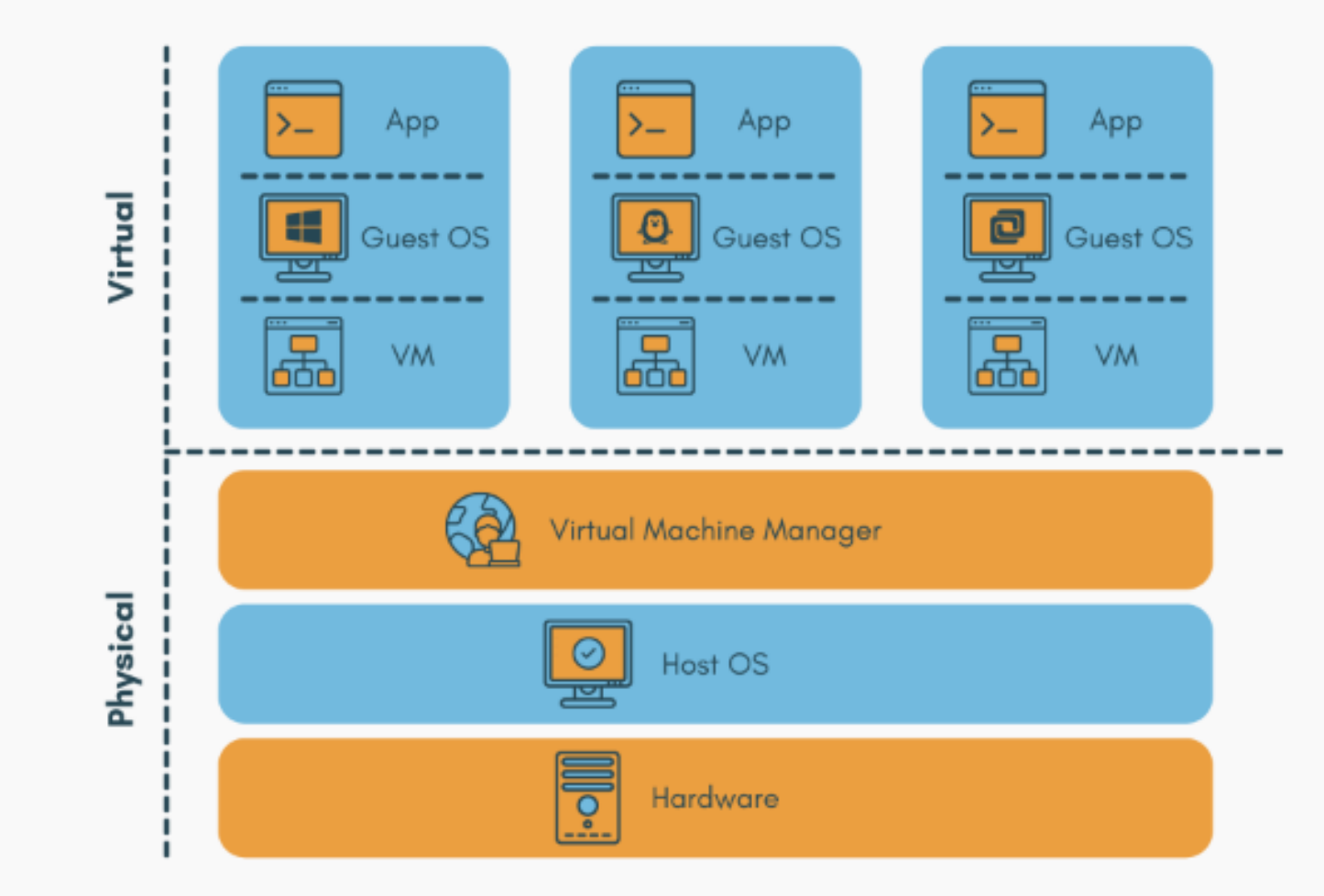
- **Guest OS Layer:** Every VM will have a guest operating system of its own, installed on the hypervisor. It communicates with all the hardware resources that the hypervisor has allocated. It behaves as if it's running on a physical device.

The different layers are

- **Application Layer:** On top of the guest OS, applications are installed and run within the VM. and users can remotely access applications from their systems via a remote display protocol.

- **Client Layer:** It consists of a software solution installed on the user's system. It connects to the VM via an RDP. Next, the client software will send mouse and keyboard inputs to the VM to receive screen updates.

The different layers are



Types of Desktop Virtualization

Let’s take a look at the three most popular deployment models for desktop virtualization so you can decide which type of virtualization you should choose to provide the best virtual desktop experience for your users and team.

1. Virtual Desktop Infrastructure (VDI):

Here, the operating system (OS) operates a virtual machine that contains desktop images on a server. Consequently, a hypervisor is employed to split the server into disparate desktop images that users can remotely access through their endpoint devices.

Types of Desktop Virtualization

2. Remote Desktop Services (RDS):

This variation of hosted desktop virtualization provides users remote access via shared desktops and applications on Microsoft Windows Server OS.

3. Desktop-as-a-Service (DaaS):

This variation operates in a manner similar to that of VDI, as end-users can access their desktops and computer applications from any endpoint device or platform. However, the key difference with DaaS is that one has to purchase, deploy, and manage all the hardware components themselves.

Desktop Virtualization Benefits

1. Flexibility
2. Cost efficiency
3. Enhanced security
4. Environmentally Friendly
5. Centralized management
6. Disaster recovery
7. Increase Employee Productivity and Onboarding

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Top 5 virtualization tools for Developers

1- Vagrant:

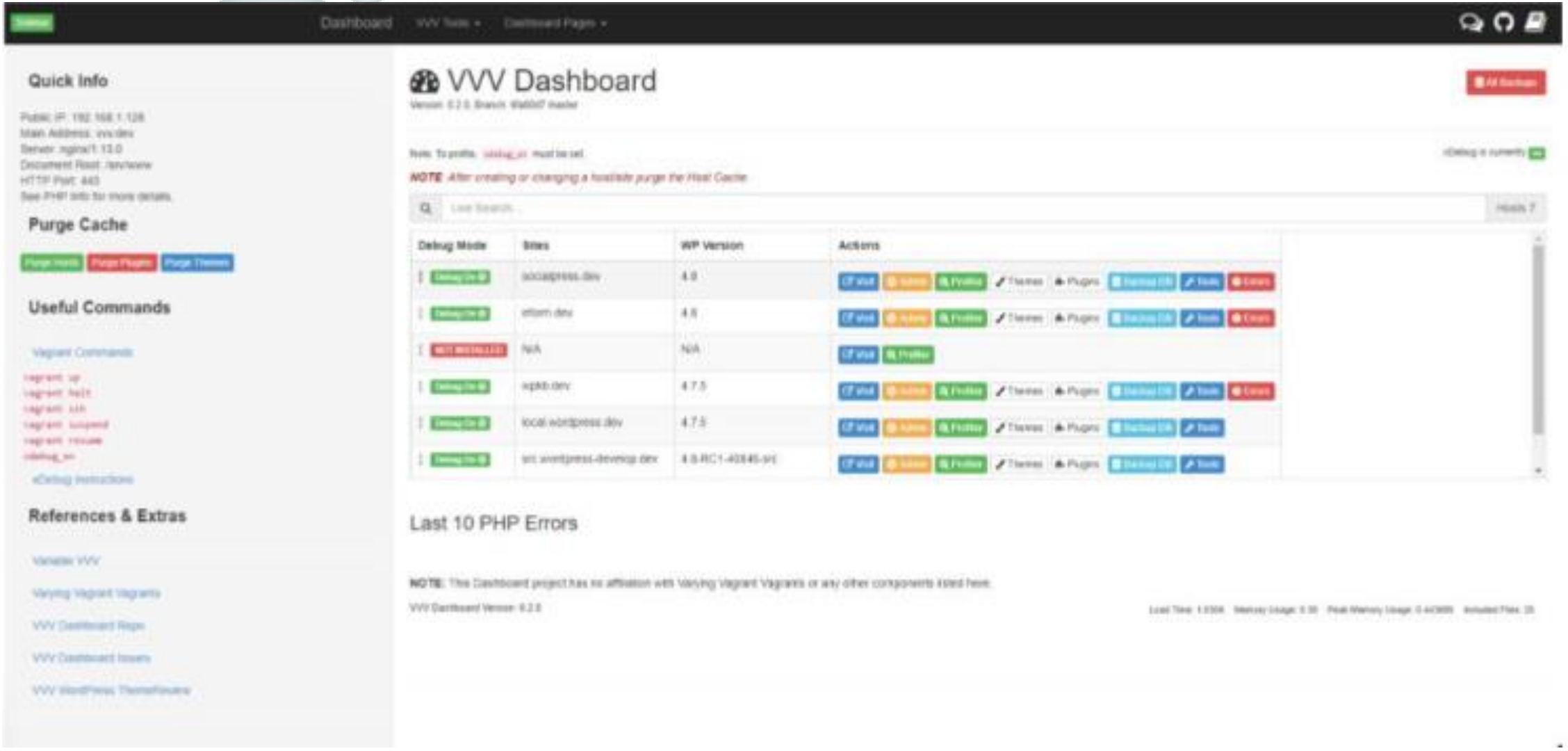
Vagrant is an open-source virtualization tool which developed by Hashicorp and written in Ruby, but it can be used in projects written in other programming languages such as PHP, Python, Java, C#, and JavaScript. This tool which works on command-line that provides a framework and configuration format for creating, managing and distributing virtualized development environments. These environments can live on your computer or in the cloud, and are portable between Linux, Mac OS X, and Windows.

Top 5 virtualization tools for Developers

Vagrant has a differentiating feature – Vagrant Share that enables users to share their running Vagrant environment via the internet. This makes it easy to collaborate and share on development environments thus creating consistent working environments for teams of software developers using a virtual machine. Vagrant can also work alongside configuration management tools like Puppet and Chef.

HashiCorp
Vagrant

Top 5 virtualization tools for Developers



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Vagrant Features

- Creates a virtual machine for you based on an operating system of your choice.
- Modifies the physical properties of this virtual machine (e.g., RAM, number of CPUs, etc.).
- Establishes network interfaces so that you can access your virtual machine from your own computer, another device on the same network, or even from another virtual machine.

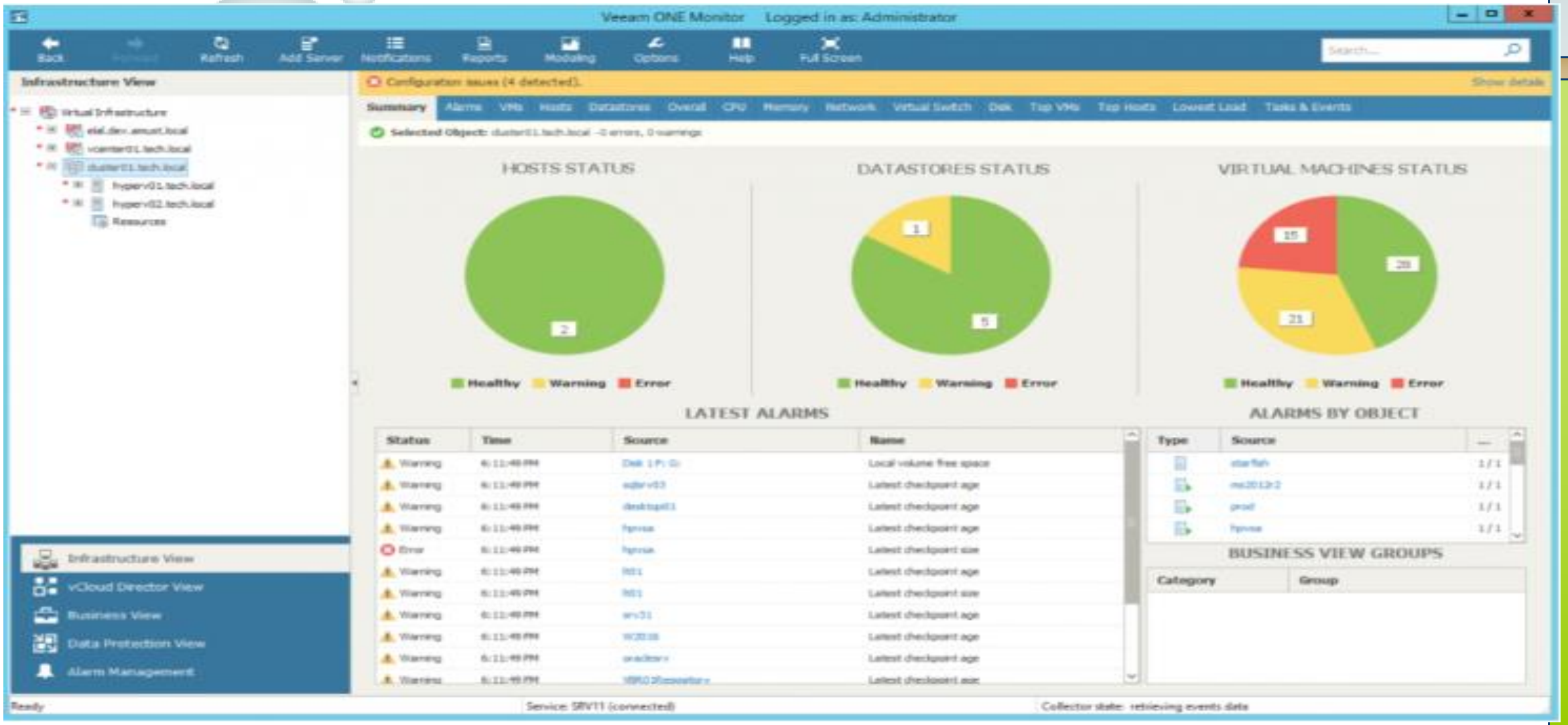
Vagrant Features

- Sets up shared folders so that you can continue editing files on your own machine and have those modifications mirror over to the guest machine.
- Boots the virtual machine so that it is running.
- Sets the hostname of the machine, since a lot of software depends on this being properly set.

2-Microsoft Hyper-V

Microsoft released Hyper-V in 2016. Hyper-V is virtualization software that, well, virtualizes software. It can not only virtualize operating systems but also entire hardware components, such as hard drives and network switches. Unlike other virtualization tools, Hyper-V is not limited to the user's device. You can use it for server virtualization, too.

2-Microsoft Hyper-V



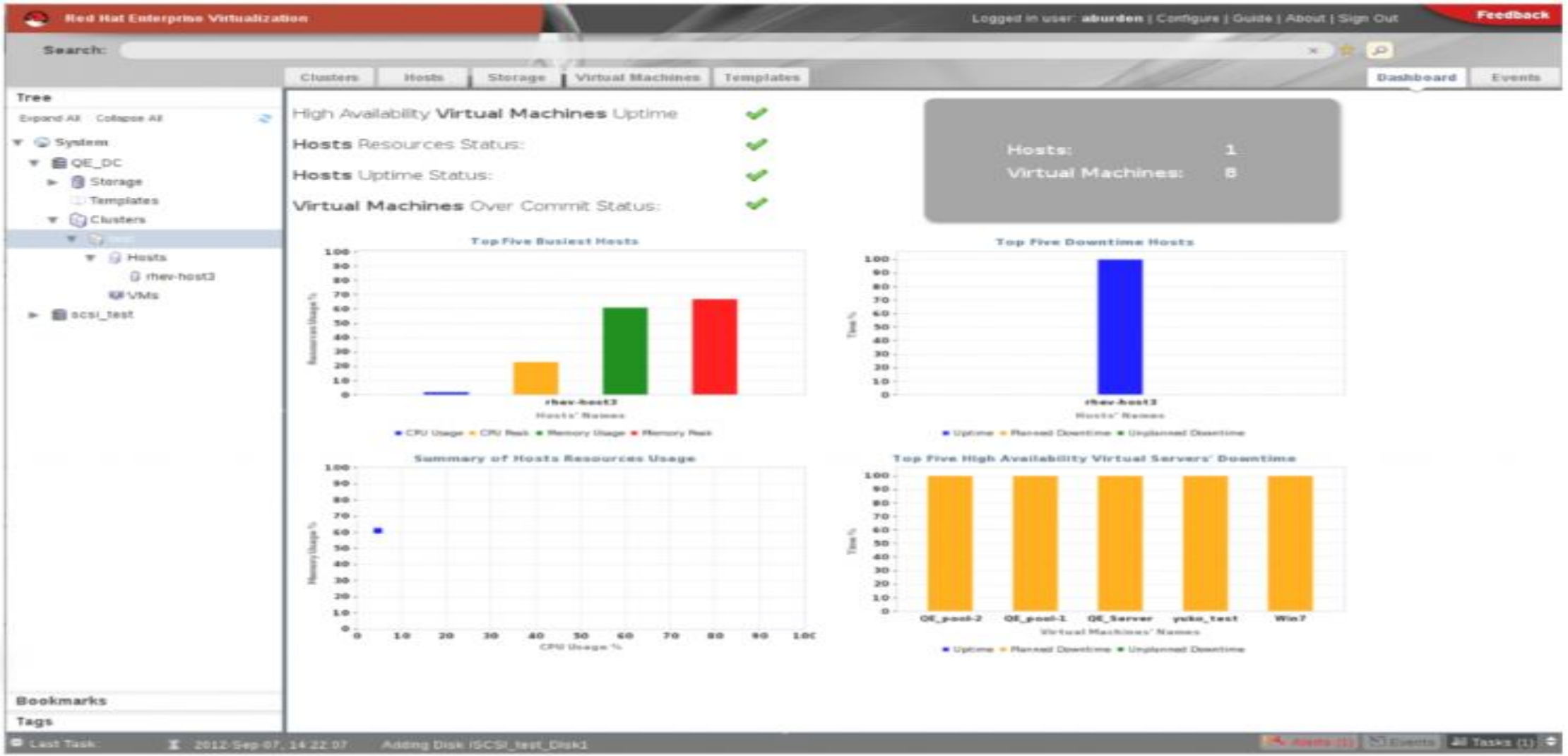
Features

- Hardware virtualization.
- It can run multiple virtual machines.
- These virtual machines can be used with Azure. Thus, we can say that Microsoft Hyper-V supports a cloud-based platform.

3- RedHat Virtualization

This system was developed by Red Hat Software. It is written in Java. Its first version was released in June 2010. Red Hat Enterprise Virtualization, or RHEV, provides an RHEL-based centralized management server with a web-based interface for managing virtual machines (VMs) called the RHEV Manager. Red Hat Enterprise Virtualization is based on open standards and works with Linux and Windows, as well as enterprise applications like SAP, SAS, and Oracle.

RedHat Virtualization



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RedHat Virtualization

Features:

- Applications run fast in virtualization as well. Hence in the top features, they promise improved performance.
- It is an open-source system. So you can make it, to integrate with the systems as per your requirement.
- It is easy to use, setup and manage.

4- VMware Workstation

With the help of this system, you can run multiple OS. This system is for Linux or Windows OS users. This system is specially developed for IT professionals and developers. It will help developers to develop the software to be compatible for multiple OS/platform.

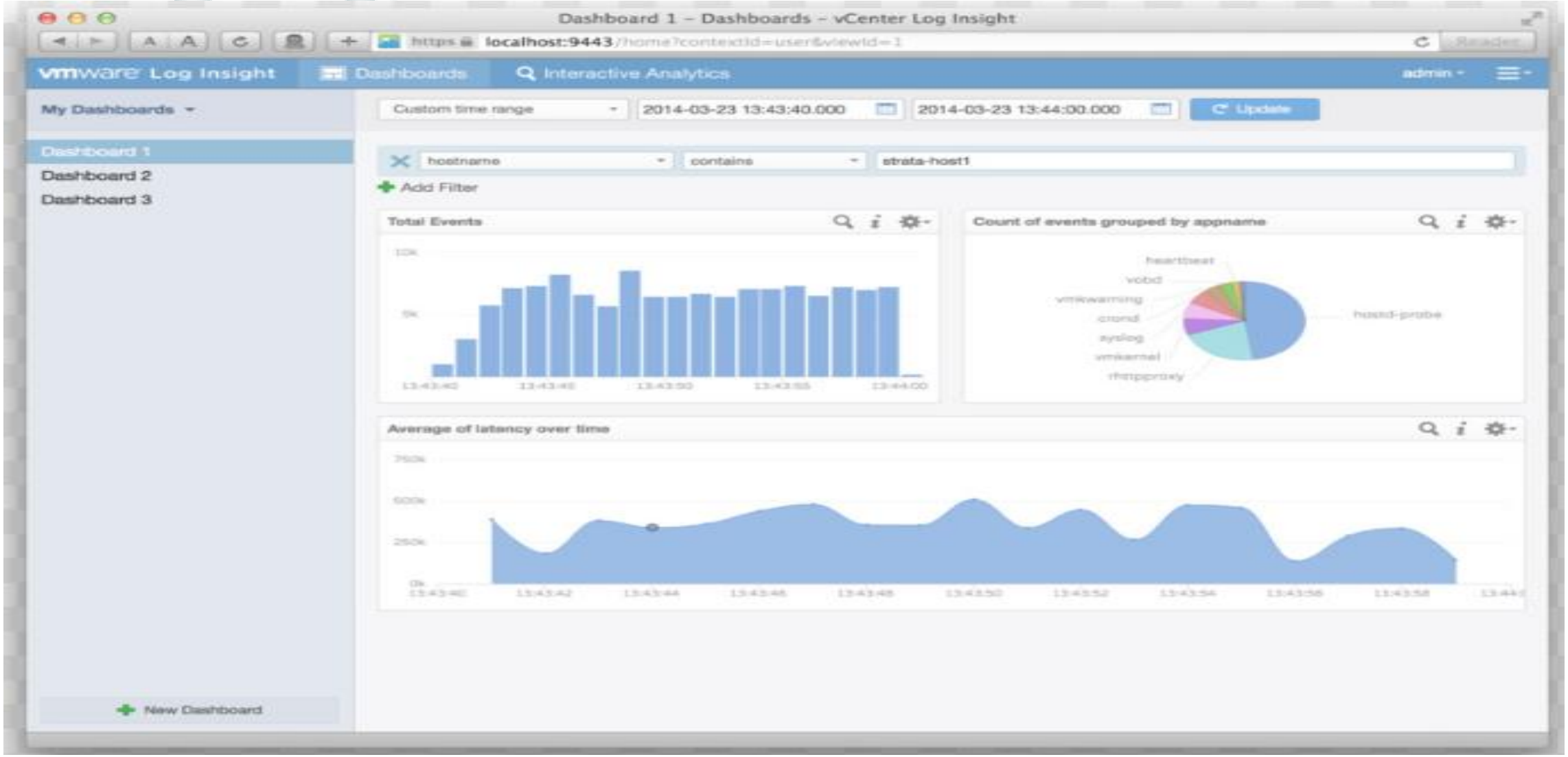
4- VMware Features

- It supports multiple OS that can be run on Linux or Windows PC.
- This system can work with the cloud. This feature is ‘vSphere Connectivity’. VMware vSphere is a cloud-based platform for virtualization.
- It will allow you to keep different privacy settings and network configurations for another PC that is virtual.
- Transferring data to and from the virtual machine to your PC is easier.
- ‘Helpful Snapshot’ feature helps in software testing.

5- VMware Fusion

VMware Fusion is an easy-to-use application that gives you the possibility to set up and use a virtual machine of the Windows operating system on your Intel-based Mac. In addition to Windows, you can install Linux, NetWare, or Solaris. VMware Fusion gives Mac users the power to run Windows on Mac along with hundreds of other operating systems side by side with Mac applications, without rebooting. Fusion is simple enough for home users and powerful enough for IT professionals, developers and businesses.

5- VMware Fusion



5- Fusion Features

- It provides solutions for IT professionals, developers, and businesses.
- You can use multiple applications on different OS at the same time. There will be no need to reboot.
- Fusion Pro provides the facility of integration with many development tools.
- VMware Fusion can be connected with **VMware vSphere**. vSphere provides a cloud-based platform for virtualization.
- It can be integrated with third-party software for data center topologies. This feature is available with Fusion Pro.

Thank You !

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