Performance Monitoring for Better Management of Cloud Server using Virtualization in Cloud Computing

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Abstract: Any server performance can be improved when we understand the current usage of the machines working under it. The performance of the server according to each category can viewed by installing several tools in the server. we always have to analyze performance of server side machines because in cloud computing environment the client always scale resource need according his requirements. This paper proposes an analysis of how cloud servers are accessing/managing the performance of virtual machines running under them because the better we understand the current situation-the better we improve performance.

Index Terms---**Cloud server, Resource Monitoring, Windows Server, Virtualization, Hypervisor.**

I.   INTRODUCTION

A.   Cloud Server

Cloud servers are the virtual servers which run on cloud computing environment. In cloud hosting, a client takes rent the virtual space instead of buying the physical servers. They will pay to the server for which the amount of time they use the virtual server. By using cloud servers the clients can scaled up or scaled down. We access what we need, when we need it, and then only pay for what we've used [1].

Cloud servers can be run on a hypervisor. Hypervisor will control the capacity of operating systems so it is allocated where needed. With cloud computing multiple servers will be available to each particular client. If one server fails, others will take its place. The security is provided to each content in the cloud and the services offered on demand. The client has to pay as much as he used rather than paying for total equipment which can't beused always.

B.   Windows Server

Windows Server is a combination of operating systems. It can be used as a cloud at server side. Windows Server is upgraded with the windows operating system. The cloud environment also do virtualization. There are many servers like xen, but windows server has built in user interface.

The interface is almost same as the windows OS. We have a desktop and task manager to see performance and control panel for the assistance. Windows Server 2012 has robust recovery options to run the important workloads [2].

We can build, deploy, operate, and monitor applications on premises and in the cloud. The server provide any applications for the infrastructure they want.
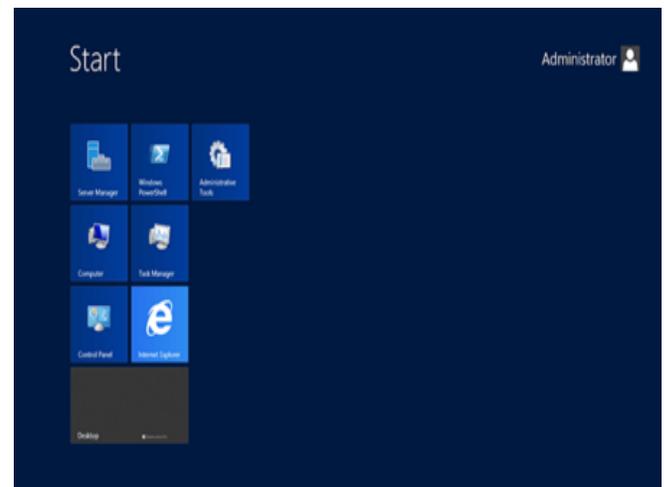

Fig 1: Windows Server 2012 Start Screen

We mainly have "server manager" and "windows power shell" for managing the windows server. The windows server can be installed either way with server core or with a GUI. Server manager is used to manage the multiple servers. The task manager in the windows server lists all details as in windows 8 system like application names and status,   as   well   as CPU, memory, hard disk andnetwork utilization.The Performance tab shows "CPU", "Memory", "Disk", "Wi-Fi" and "Ethernet" graphs. The windows server has only 64 bit version. Windows Server 2012 has an IP address management role for discovering, monitoring, auditing, and managing the IP address space used on a corporate network.

C. Citrix Xen Server

Xen is an open source, Type-I hypervisor. When Xen boots, it creates an initial virtual machine called Domain-0. It is a control domain through which other VMs can be created and managed.Xen follows the approach para-virtualization where the guest OS is modified to take advantage of the knowledge that it is running on top of a VMM to optimize certain operations. Xen server deliver high performance on usually expensive operations such as network I/O. The hardware support from both Intel and AMD allows Xen to support fully-virtualized VMs that can host unmodified guest OS images [3].

II. PROPOSED WORK

By analyzing the performance of the server side components we can take decisions about adding or removing the more virtual machines. We can also dynamically allocate the memory or CPU cycles to the virtual machines. But to know which machine has to be modified according to the client requirements is known by the performance monitoring. This paper proposes an analysis of how cloud servers are accessing/managing the performance of virtual machines running under them because the better we understand the current situation-the better we improve performance.

III. EXPERIMENTAL RESULTS

A. Comparison of Servers

There are many cloud service providers are available, everyone provides some resources and some feature oriented applications. They have their own way of using their resources, here we see some famous cloud server providers and compare their configurations.

Table 1: Comparing the different cloud providers according to Efficiency.

MOST EFFICIENT	VMWARE	MICROSOFT	CITRIX
Hardware scale out	64 logical cores 512 GB ram	24 Logical cores 1TB TAM	32 bit logical cores128GB RAM
CPU Efficiency	CPU HW-assist or BT virtual specific scheduler	Requires HW-assist	Requires HW-assist for Win
Memory Efficiency	Memory HW assist overcommit/sharing	Memory HW-assist	Memory HW-assist
Virtual Hardware Scale out	8 way vCPU 255GMvRAM	4 way on WIN08 64GBvRAM	8-way vCPU 32GBRAM

	VMWare	Microsoft	Citrix
Hot-add/remove virtual resources	Add:vCPU, VMem Add:Virtual disk	none	No hot-add CPU, memory
Power Efficiency	DPM: Cluster-leverl power management	No cluster level management	No cluster level management
Storage Usage Efficiency	Thin provisioning monitoring tools	Thin disk, but no monitoring tools	Only by way of third party storage vendor
Network Management Efficiency	Distribute switch Third-party virtual switch	none	none
Automated patching efficiency	Transparent host patch Auto guest Patching	Host patching causes VM downtime	Host patching, but no auto guest patching

By seeing the above table we can understand about their performance in several views. Three types of servers compared here *VMWare, Microsoft and Citrix*. The table shows that in all angles the VMWare shows good performance capabilities. The servers are compared according to their efficiency over a year period of time. We also compared xen and windows server in simple terms that are easily understandable. The details are described in a table below.

Table 2: Servers Comparison

	XEN	Windows Server
Cost	Open	190 days trial period
Support & Maintenance	Extra Purchase	Included in
Monitoring Tools	Third Party	Built-in
User Interaction	Moderate	Friendly
Updates and Patches	Extra Purchase	Immediate
Security Level	Vulnerable	Open Source

The above table describes the various significant differences between Xen server and windows server. Xen is available in open source, while the windows server is commercial but it offers a trial version. Even though the xen is open its usage and maintenance is hard. A novice can't use the xen server directly because it do not have a Graphical User Interaction. If any updates released in the xen server have to be known manually and added/ installed manually. To maintain the server in full conditional we have to buy the support. This is a free to use but pay to get patched strategy.For managing the xen server we need to

have an extra windows machine. For saving memory in the server the xen developers given the dashboard i.e., xen center has to be installed on another windows machine and it has to be connected to the server in LAN. Where as in windows server it has a built in monitoring system to view all its usage as the windows client had. The monitoring tools are provided by xen server are basic tools and these have to be installed on every virtual machine that we create. And for better monitoring tools we should have to install third party performance monitoring tools. Since xen server is open source any one can use may be in the wrong way. The windows server maintenance is fully protected and its source code.

Now we see the sample performance results in Xen server and Windows server.

B. Performance in Xen

The Xenserver handled by the xen center. In xen center we install xen tools which are available in xen server to monitor the server performance. Each virtual machine has to be installed these tools. The all machines and CPU's performance can viewed in a graph format as shown below.
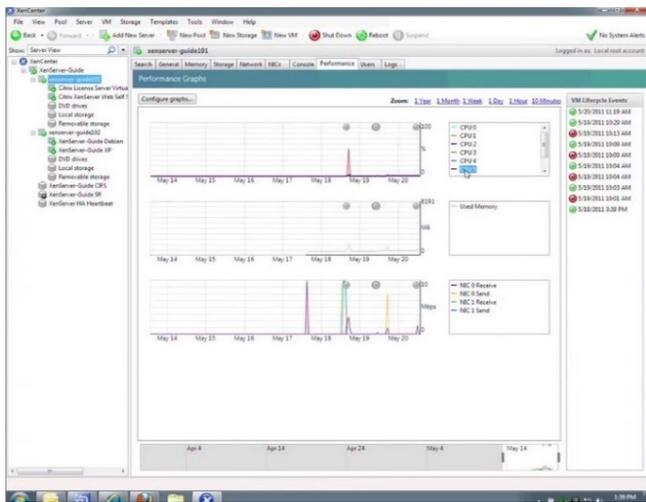

Fig 2: Performance in Xen server

The performance of each CPU and each NIC card can be viewed here. The resource changes made on server are viewed here. According to time all the fluctuations and CPU, memory modulations can be observed using this tools. We can select only specified CPUs and threads to identify the idle processes. This kind of view helps in achieving the Green Computing.

C. Performance in Windows Server

(i) Task Manager

Windows server has many new features regarding the server management. Using Hyper-V we can create any number of virtual machines in a server and able to connect to other servers. We can also create virtual machines in other servers. The performance can be monitored for a server or for a virtual machine. We can use the task manager to see the performance graphs of all virtual

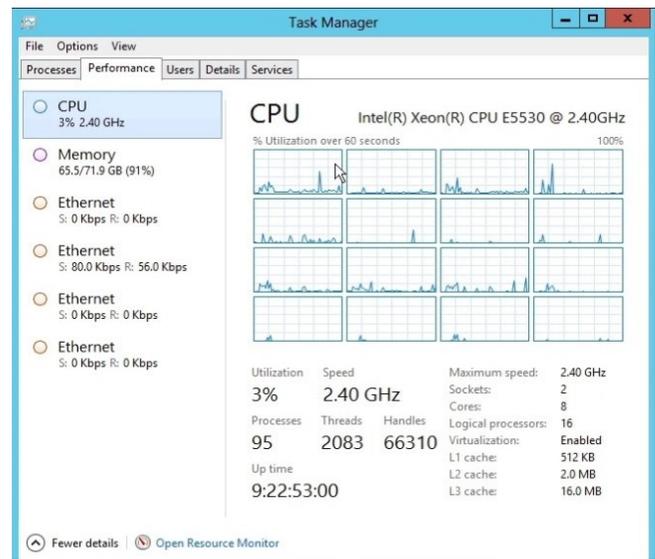machines running under a server. These graphs shows same information as the resource monitor.

Fig 3: CPU Performance in Task Manager

We can see the performance of memory and CPU and the network usage over a period of time. The above screen shot represent the CPU performance of 16 virtual machines of a server. Besides these details we can also see the percentage of utilization and the speed and also the number of processes, threads, and handles. It will also display all details about L1, L2, caches. How much time the server has been accessed can also be known here.

(ii) ServerHVHealth

We can see the performance of virtual machines by "ServerHVHealth" which is inbuilt component of windows server. Here the graph contain the colors to show the different memory utilizations.

Fig 4: ServerHVHealth Performance Monitor

Below the graph we have the options to select the specified components. For e.g. every time we may not need to compare all of the virtual machines usage, we can select some of them and generate a separate graph for them for clear understanding. And also we have the options for selecting, clearing, viewing in different aspects of a particular data. These kind of performance details useful for achieving better performance and to achieve green computing.

IV.   CONCLUSION

The performance of every virtual machine is viewed in different ways. We have compared the different types of performance monitors in different servers. By the current performance details we can take the decisions for better performance.

V.   REFERENCES

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