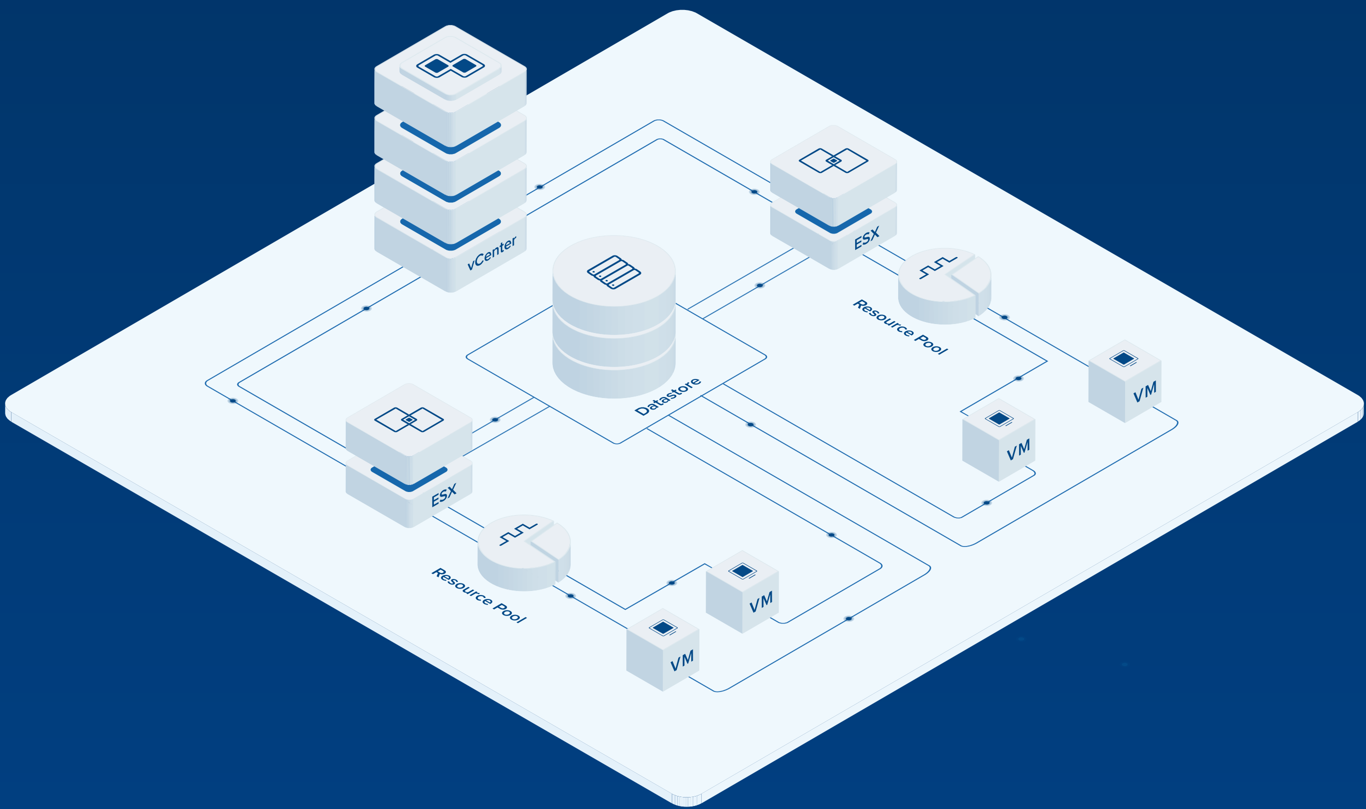
Site24x7

VMware performance and storage monitoring

A single-pane view into your entire virtual infrastructure



WHITEPAPER

Abstract

VMware virtualizes servers and consolidates resource allocation and usage. However, to reap the full benefits of this technology, it's important to understand the challenges surrounding VMware to overcome them and fully optimize their use. For this, it is necessary to understand the architecture of VMware resources, their usage, and performance at every step.

To build a successful virtual environment, you have to first observe, understand, and evaluate the current trends and performance of your IT infrastructure, and then plan resource allocation for the future based on this analysis.

This whitepaper illustrates the need to monitor different CPU, memory, disk, and network metrics and explains how these metrics provide visibility to your virtual environment. It will also discuss how each of them is important to eliminate over-commitment and under-provisioning.

Synopsis

Introduction

Virtualization has increased the flexibility, agility, and scalability of the infrastructure of organizations across sectors and is no longer restricted to the IT sector. VMware, a pioneer in virtualization technology, has proved to minimize costs and maximize productivity by cutting down the number of physical servers and datacenters organizations need.

However to ensure operational efficiency, every component of the VMware infrastructure needs to be thoroughly monitored. Ensuring the availability, health, and performance of every resource is the key to successful monitoring. This whitepaper offers the insights you need to discover what needs to be monitored and how to effectively monitor it all to stay on top of your VMware environment.

The what and why of virtualization

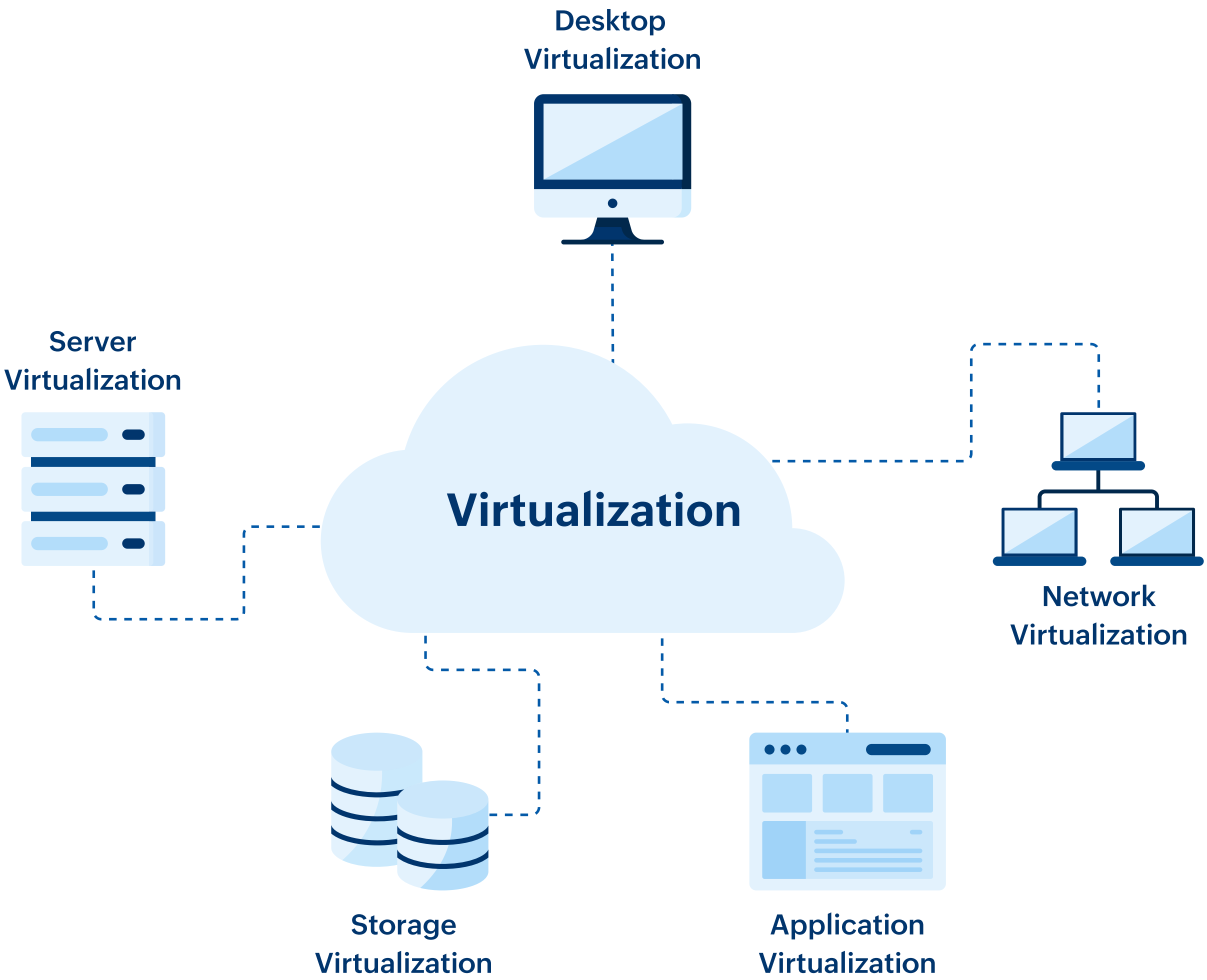
Virtualization is the process of creating a software-based instance or virtual instance of applications, servers, storage, and networks. It is simply the process of running a virtual instance of a computer in a hypervisor, which is an abstracted virtual layer of physical hardware. Its common use case is the running of multiple operating systems (OSs) on a single computer. The OS, libraries, and programs are unique to individual machines, called virtual machines (VMs).

Virtualization is aimed at reducing the expenses on IT while simultaneously improving the efficiency of every system. Admins won't need to switch between systems for applications running on different OSs, and can host more applications on a single system.

There are quite a few players in the virtualization industry, including VMware, Hyper-V, Oracle, Citrix, and Red Hat. In this whitepaper we'll focus on VMware, and how to stay on top of VMware virtualization.

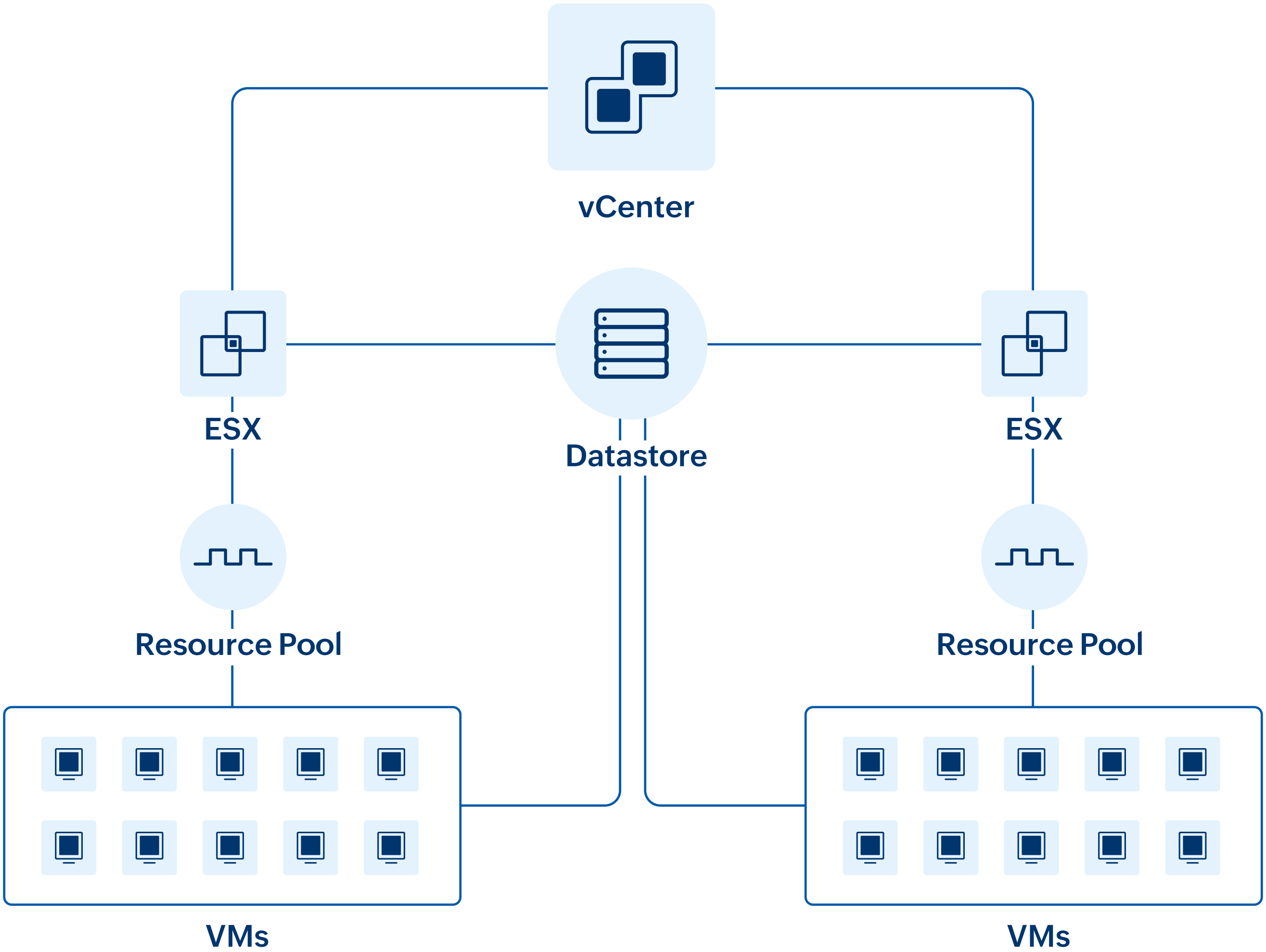
VMware has its own hierarchy of datacenters, clusters, servers, hypervisors, VMs. vCenter acts as the server while ESX/ESXi, a type-1 hypervisor, acts as the host. Every host houses multiple VMs. vSphere is VMware's management console. Though vSphere provides metrics, monitoring your VMware environment using a third-party solution is a more viable option.

VMware offers vSphere as a native management solution; however, sticking with this solution simply because it's free may end up hurting your organization in the long run. By looking beyond vSphere, you can gain visual aids like graphs and dashboards as well as additional information like guest disk details for a better, more streamlined VMware monitoring experience.



What is VMware monitoring?

VMware monitoring is keeping track of the health of every VMware resource such as CPU, memory, storage, network, and disk usage to ensure proper resource allocation and avoid resource contention. To get a better picture of the VMware infrastructure and track issues quickly, it's important to monitor every hypervisor and VM aligned to the VMware vSphere hierarchy.



Why monitor VMware?

VMware offers an enterprise-level virtualization and cloud computing tool that enables organizations to manage data centers and desktop applications at different levels of their hierarchy. Any amount of unavailability or performance degradation in a VMware environment can be costly, taking a toll on the entire business.

Monitoring VMware is essential to:

• Assess resource usage at the granular level for each guest VM so that you know the resource utilization per guest VM. Based on resource utilization in datastores and resource pools, make decisions on resource requirements for the future.

• Avoid resource contention at the parent and child level by effectively managing and allocating resources across hosts and VMs.

• Obtain a tier-to-tier understanding of the associated resources so that you can fix issues quickly.

• Know which ESX/ESXi host is running low on resources, as this could affect all its associated VMs.

• Track every VM activity to follow changes due to vMotion and workload shifts.

• Monitor the disk input-output, throughput, and latency, and optimize VM performance.

• Troubleshoot problems with hardware health by monitoring the hardware sensors so that your VMware environment works uninterrupted.

• Set thresholds to avoid resource exhaustion. Receive timely alerts to avert failures.

VMware monitoring scenarios

The biggest challenge with VMware monitoring is how difficult it is to diagnose performance issues. You need a clear understanding of the resource hierarchy in a vSphere environment. Every ESX/ESXi host contains multiple VMs for which datastores act as storage spaces and resource pools define resource allocation.

The following are the common challenges that can be tackled through comprehensive VMware monitoring:

VM sprawl

VM sprawl is a phenomenon that occurs when the number of VMs on a network reaches a point where the administrator can no longer manage them effectively. VM sprawl generally results from admins and developers creating more and more VMs to house processes on the same hypervisor. The VMs slowly multiply over time until all the resources are exhausted. If not properly monitored and managed, admins end up buying more hardware to maintain these VMs, leading to unnecessary expenses.

These sprawled VMs could be over-provisioned and unnecessarily eating up resources. Moreover, without proper tracking, it's difficult to identify which of the sprawled VMs are productive and which are not in use over time.

Capacity planning

Capacity planning is the base for server virtualization. Insights on IT resource utilization are crucial to develop a virtualization road map for server containment. An essential aspect of resource planning is ensuring resources are optimized so that each resource is utilized to the fullest.

Capacity planning is also essential to effectively scale VMware resources as businesses grow. For proper planning, the performance of resources has to be estimated and calculated for future use.

Storage management

Storage is one of the most critical resources in a virtual environment. Storage systems define the capacity of any virtual environment. Storage is also the most costly aspect among other resources like compute and network. This highlights the importance of planning and using storage effectively.

If storage resources do not work as efficiently as intended, space will be unnecessarily wasted, taking a toll on the storage budget. This is why virtualizing disk volumes and file systems is important—almost as important as monitoring of all these resources.

Memory overhead

VMs generally incur memory overhead, which is the additional time to access memory within a virtual machine. This could be the extra space needed by the ESXi host for its own code and data structures. VMs also require a certain amount of available overhead memory to power on. All these should be measured and taken into consideration while designing and scaling a virtual environment.

Resource over-commitment

Over-commitment is allocating more resources for VMs than the host physically has. Over-commitment happens in most resource types like CPU, memory, power, storage, and network resources. This has to be properly monitored and optimized based on resource requirements and usage.

Performance monitoring for VMware resources

Performance monitoring should encompass the monitoring for all compute and network resources. This can be classified as any type of CPU, memory, network, or underlying hardware metric. It is important to understand which metric has to be monitored for what resources, and to arrive at a conclusion after correlating multiple metrics.

CPU metrics

As we all know, the CPU (or processor) is the component that performs the tasks required for all system applications to run. The CPU is the primary element that consists of CPU sockets, cores, corelets, and threads. CPU virtualization involves a single CPU acting as if it were multiple separate CPUs. Doing this allows multiple operating systems to run on a single machine.

Below are some essential metrics that weigh the CPU performance, which can be used to plan resource allocation.

CPU utilization and usage

CPU utilization is the amount of CPU actively being used by each virtual machine on the host while CPU usage is the average CPU utilization over all available virtual CPUs (vCPUs) in the VM.

CPU idle time

CPU idle time, measured in percentage or milliseconds, is the amount of time the CPU was not busy. In other words, it's a measure of unused CPU capacity. This can be interpreted in two ways. One is that the CPU has the capacity to support more processes. The other could be that the CPU is over-provisioned for the designated task. This can be interpreted using performance graphs and can be fixed by allocating or under-provisioning more processes so that the CPU isn't wasted.

CPU wait time

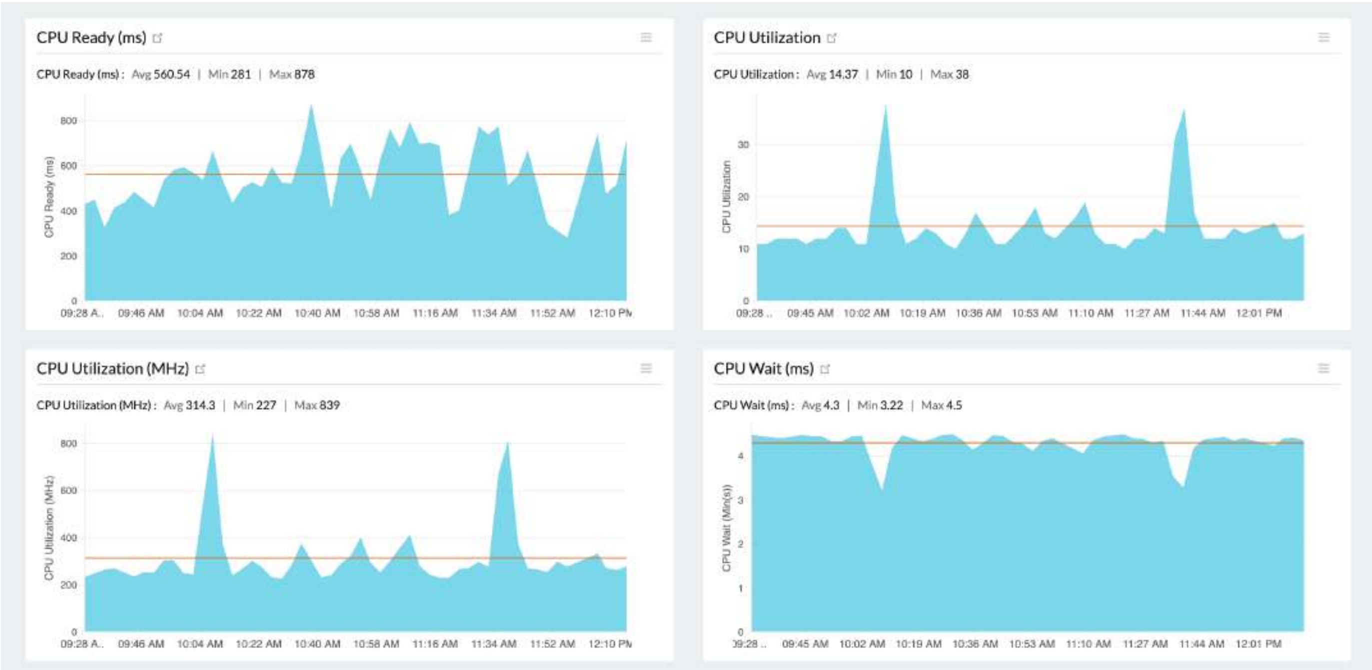
This is the amount of time the CPU resource for a VM is idle. It is measured in percentage or milliseconds. Though the idle time and wait time sound synonymous, they differ due to the fact that outstanding requests are waiting for the CPU to carry out processes, but the CPU is idle. In the case of idle time, CPUs are idle when they have no job to perform.

Measuring both these will help you gain a thorough understanding on CPU performance, whether it has been over-provisioned or it has remained idle without responding. Viewing this information in the form of graphs and charts can make it easy to interpret spikes and average duration times based on which CPU wait time can be assessed.

CPU ready time

CPU ready time, measured in percentage or milliseconds, is the amount of time a VM is ready but unable to use the CPU, as all the ESXi host CPU resources are busy. CPU ready time is dependent on the number of VMs on the host and their CPU loads.

So, the CPU ready time in every VM has to be calculated and compared to analyze why CPU resources are busy. If the CPU ready time constantly shows spikes over a period of time, then it is time to analyze the existing resources and invest in additional ones to match the increasing demand.



CPU demand

This is the amount of CPU requested by the VM for its consumption and optimal functioning. Measured in MHz, CPU demand depends on other metrics like CPU usage and CPU ready, and is estimated based on these values. This metric helps to allocate the amount of CPU required for a particular VM.

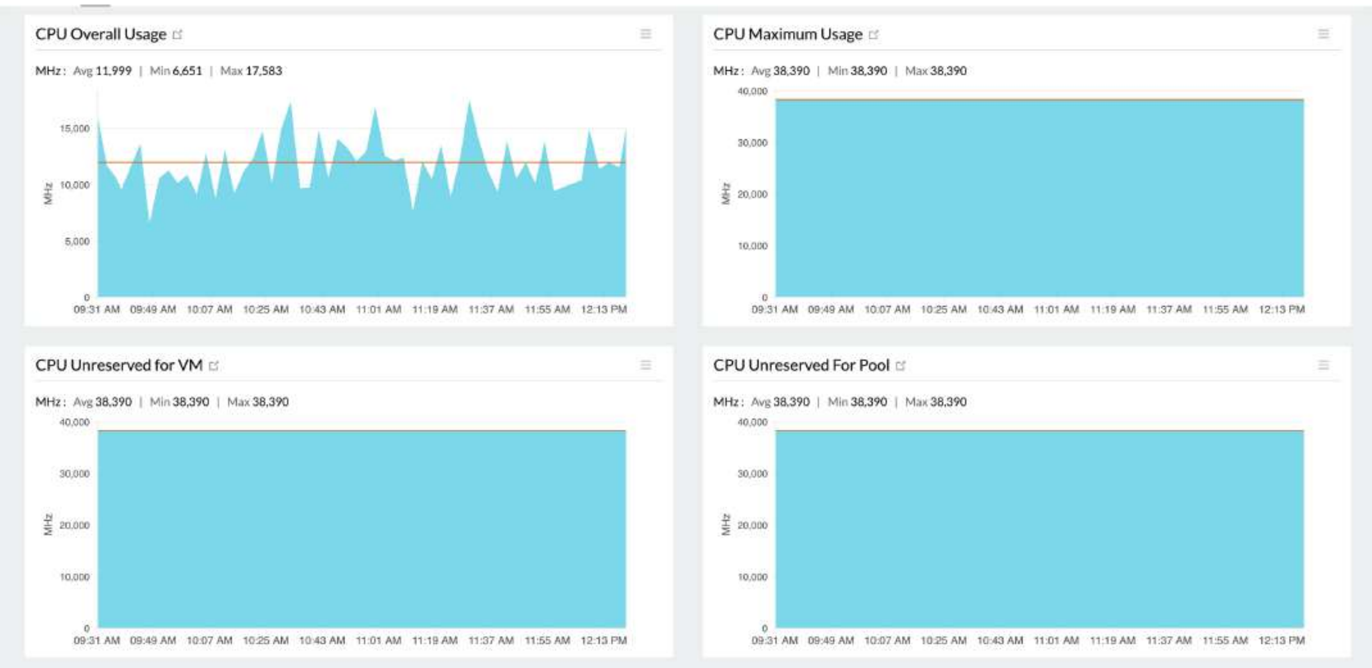
At times, it is possible for demand to exceed usage, indicating resource contention. By contrast, when a VM rarely uses all the CPU that has been configured to it, that indicates over-commitment. This is why it's important to keep both of these in mind before allocating resources based on demand.

Reserved CPU usage

A reservation is the guaranteed amount of CPU provided for the VM to function. Other activities can take only the remaining amount of CPU available and not what's reserved. This metric helps to plan and allocate reservations for the future based on this data.

Unreserved CPU usage

The amount of CPU that is not reserved is termed unreserved and the amount of CPU used from this part is the unreserved CPU usage. This also helps in planning resource allocations.



Memory metrics

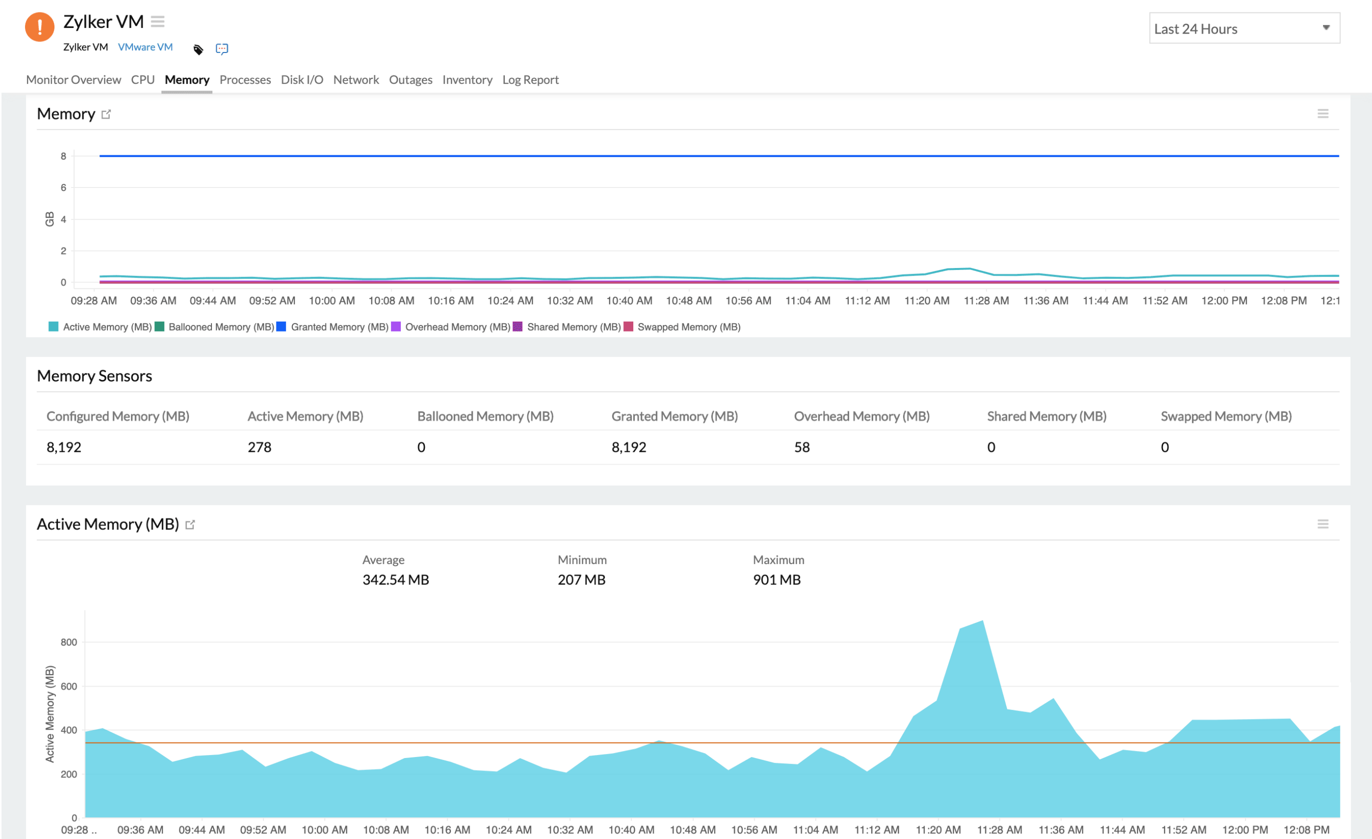
Every VMware component consumes memory based on its configured size and additional overhead memory for virtualization. The configured size is the amount of memory dedicated to the guest OS and is independent of the amount of physical RAM allocated to the VM, as it depends on shares, limits, and reservations.

The VMkernel manages all physical RAM on the host. The VMkernel dedicates part of this managed physical RAM for its own use. The rest are available for use by VMs. Memory is generally measured in MB. Metrics that track memory performance vary with resource types and are explained in detail below.

Memory utilization and usage

The amount of RAM used by a particular resource for a certain unit of time is its memory utilization. ESX uses high-level resource management policies to compute a target memory allocation for each VM.

A VM's memory size must be slightly larger than the average guest memory usage. This enables the host to accommodate workload spikes without swapping memory among guests. Memory usage is similar to memory utilization and is the average memory utilization over all available memory usage in the VM.



Configured memory

A VM's memory resource settings defines how much of the host's memory is allocated to it for the applications that run on that VM. A VM is restricted to use only its configured virtual hardware memory size and nothing more. This is the configured memory. The configured memory should be considered every time you analyze the active memory and check the VM performance. Rightsize the VM based on these two attributes.

Host memory

This is the amount of host memory allocated to the VM. There is also a chance that the host memory is over-committed, which can be identified when the total amount of guest physical memory of the running VMs is larger than the amount of actual host memory. This has to be monitored and reclaimed.

Guest memory

This is the amount of memory used by the guest operating system and its applications. This metric is an indication of active memory usage on the guest. For business-critical VMs, carefully allocate guest memory resources so that they aren't lost during ballooning or swapping.

Active memory

Active memory is the amount of memory that is actively used as estimated by the VMkernel based on recent usage. It is simply the amount of memory resources currently being used by a VM or a host. Monitoring the active memory over a period of time can help you understand the active usage trend and take decisive actions.

Consumed memory

Consumed memory is defined as the amount of host memory allocated to a virtual machine. It is also the amount of host memory used by the virtual machine for its guest operating system's physical memory.

Granted memory

Granted memory is the total RAM available to a VM. Basically, it's what's configured for the VM. It is always recommended to compare the granted memory and consumed memory to analyze optimal utilization of the RAM.

Overhead memory

As mentioned above, VMs require a certain amount of available overhead memory to power on, which is static overhead. After the VM has started up, the hypervisor can request additional memory space, which is dynamic overhead. This dynamic overhead is either granted or rejected by the VMkernel. The summed up total overhead is the overhead memory.

Reserved memory

The reserved memory specifies the maximum amount of RAM a host is allowed to reserve for all running VMs. If the reserved memory of a VM is set to a value higher than its active memory, it is recommended to decrease the reservation so that the VMkernel can reclaim the idle memory for other VMs on the host. For this, it's important to continuously monitor the active memory and then derive a conclusion.

Unreserved memory

The amount of memory that is not reserved is termed unreserved, and the amount of memory used from this part is unreserved memory usage. This memory is free to use for swapping and other requirements. Once a VM hits its full reservation, the VMkernel will not reclaim this memory, and will use memory from the unreserved memory pool. It is important to analyze how much memory in MBs is used from the unreserved part so that the future reservations can be planned accordingly.

Shared memory

VMs running instances of the same guest OS may contain common applications or data. With their proprietary page-sharing technique, ESXi hosts securely eliminate redundant copies to free up memory. This memory obtained from clearing shared data is referred to as shared memory. As a result, the VM can handle more resources. Allocating this memory space can be made possible only if the shared memory is closely watched and monitored.

Swap memory

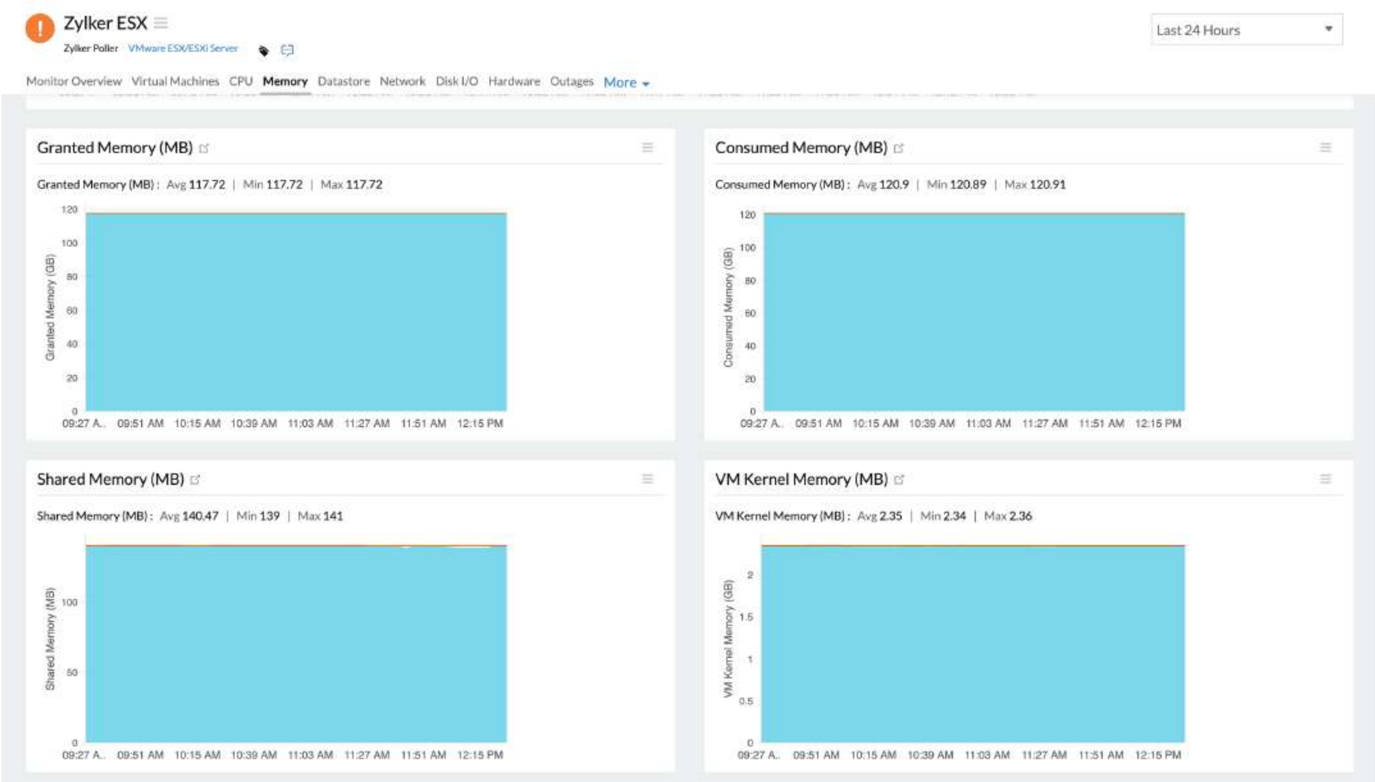
When you set the host OS to swap VM memory to the disk, you can run more VMs with more memory. This is a memory management technique, but performance may take a hit, since the VM memory is shifted between RAM and disk. The amount of memory swapped is the swap memory, and this should be monitored alongside the disk metrics to analyze the performance degradation at both ends.

Balloon memory

Ballooning is a memory reclamation technique used by the hypervisor when running low on memory. The ESX reclaims unused memory from certain guest VMs when the host system runs low on physical RAM resources. Ballooned memory is the sum of the guest physical memory reclaimed by the balloon driver for all powered on VMs on the host.

VMkernel memory

The VMkernel regularly reclaims unused VM memory by ballooning and swapping. The amount of reclaimed memory is the VMkernel memory. This is a measure of how much unused memory is effectively used.



Network metrics

Network metrics provide insights about the network performance across hosts and VMs. Network performance depends on the application workload and network configurations. Here's a list of critical metrics that summarize a network's performance.

Network usage

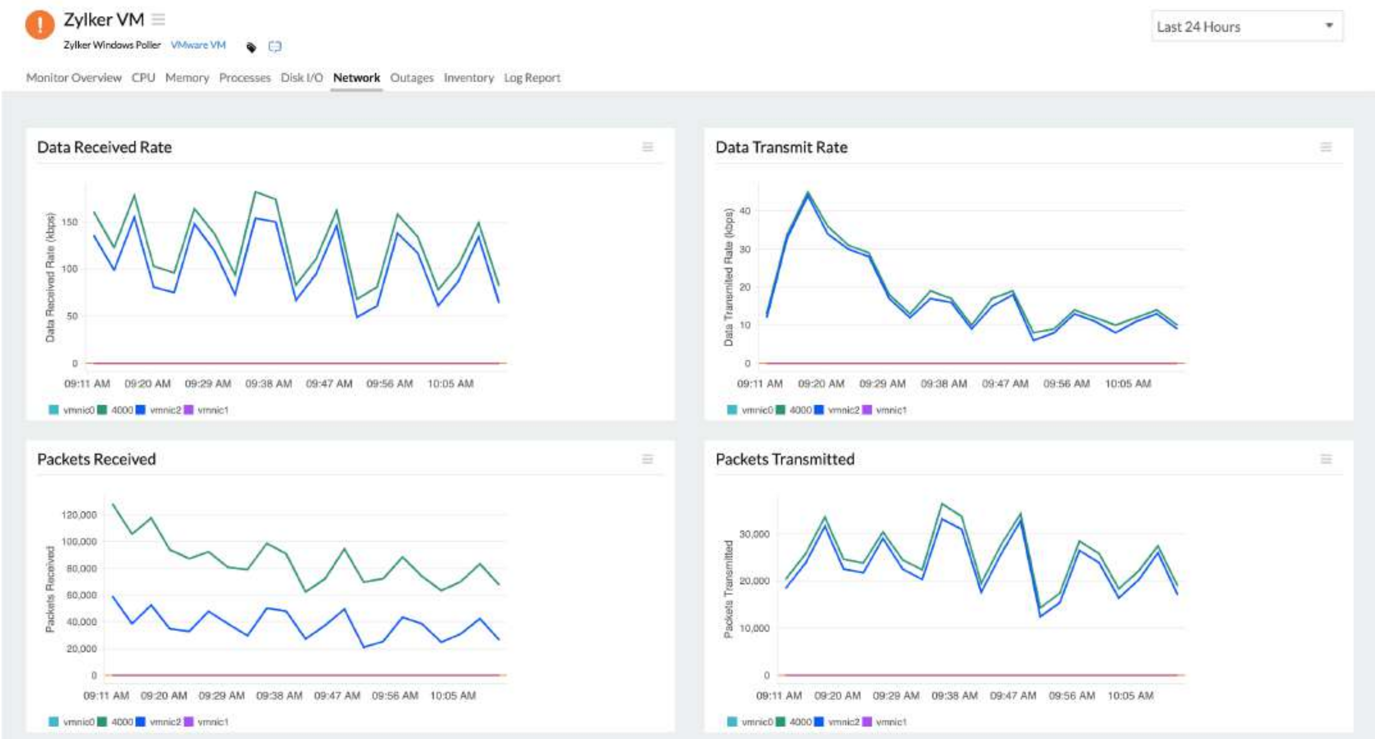
Analyze the network bandwidth (Mbps) at both the ESX and VM level. Monitoring the traffic moving in and out of every VM is important to ensure optimal performance. On top of this, network connectivity errors can cripple the entire VMware environment. This is why looking at the network usage graph is an easy way to troubleshoot when there is a significant error.

Rate of data transfer and receipt

The rate at which a network interface card (NIC) receives and transfers data (kbps) has to be monitored to understand the data throughput in a ESX host. Plotting periodic graphs will help to assess the variation over time.

Packets

Since dropped network packets can indicate a bottleneck in the network, it's important to monitor the packets received and transmitted by a virtual NIC. When the packet size is large, fewer packets are transferred, which reduces the amount of CPU required to process the data. When network packets are small, more packets are transferred, and the network speed is slower because more CPU is required to process the data. These factors are important to keep in mind while monitoring packet stats.



ESX host hardware

Properly functioning hardware is crucial to ensure a flawless VMware infrastructure. Any malfunction in an individual component can lead to issues like problematic VM behavior, corrupted hard disks, and faulty processors, each of which could cripple the entire VMware environment.

Hardware sensors check the functioning of VMware hardware. Different sensors are mounted on various hardware components, and all of these sensors periodically collect data.

The follow are sensors that you should monitor to avert shortcomings due to hardware:

Power: The power supply may not always be uniform. It may be turned off at times, there may be fluctuations, or it may run at full capacity.

Fan: “Fan Transition to Critical from less severe” and “Fan Transition to Off Line” are common errors when it comes to host fan health.

Temperature: Hardware performance depends on systems running at an optimum temperature. Temperature sensors will frequently identify errors like “Temperature Lower Critical going low,” “Temperature Transition to Critical from less severe,” “Temperature Transition to Non-recoverable from less severe,” and “Temperature Upper Critical going high.” IT teams must control the temperature before it goes beyond the appropriate limits.

Processor: Processors are prone to errors like thermal trip errors, configuration errors, machine check exceptions, correctable machine check exceptions, and internal errors (IERR), all of which can affect the performance of the CPU.

Voltage: Voltage has to be monitored at the power supply input and output. Technicians generally keep an eye on errors like “Voltage Limit Exceeded” and “Voltage Transition to Critical from less severe.”

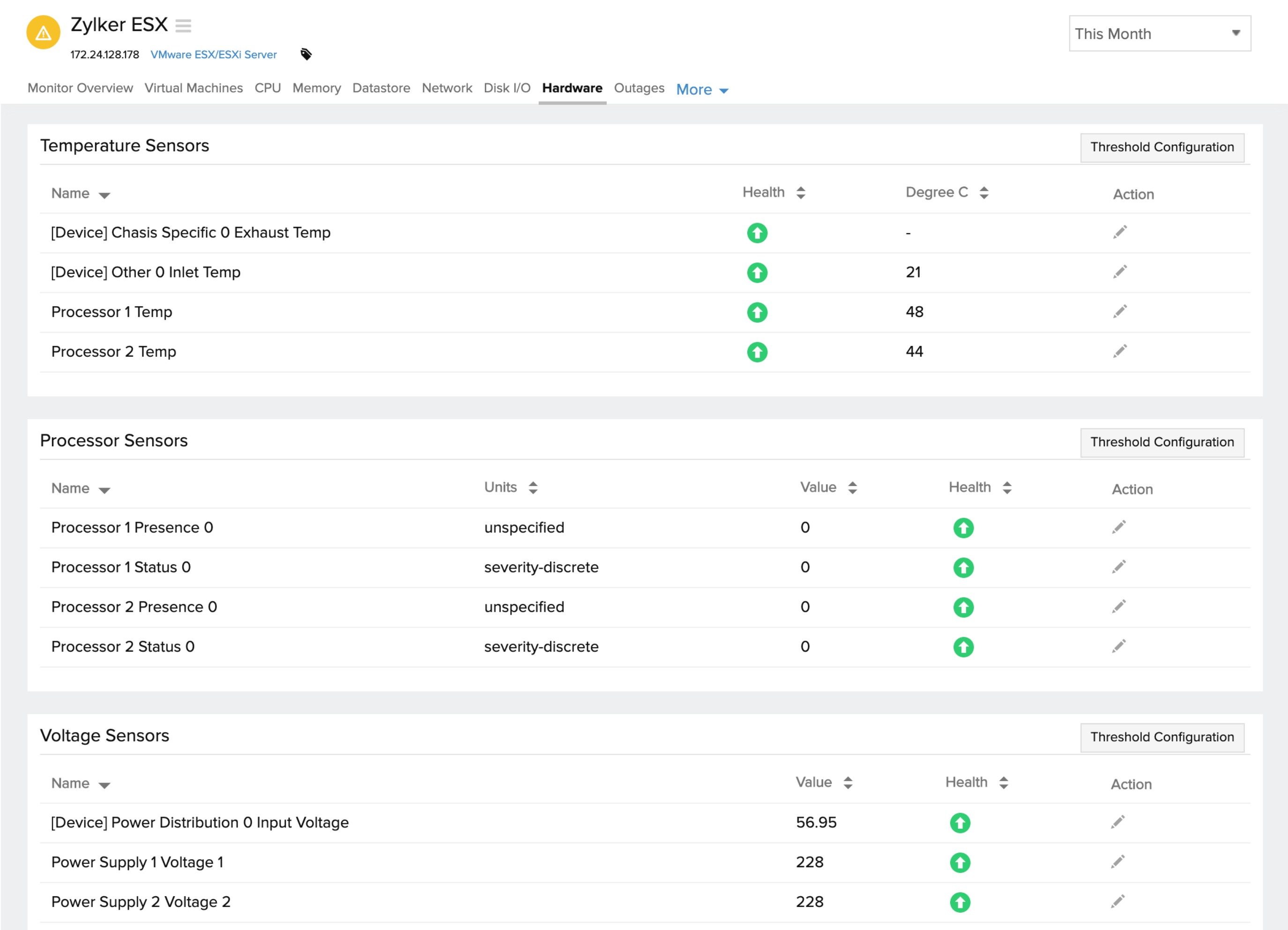
Storage: Storage sensors differ by storage type, and information on disk storage is required for capacity planning.

Watchdog: Since the Watchdog sensor monitors the system board, it’s important to monitor it.

Memory: Memory has a great impact on resource allocation and is prone to errors like configuration errors, uncorrectable error-correcting code (ECC) errors, “Memory Transition to Critical,” and “Memory Critical Over temperature.”

Battery: The status of the battery, battery on array, and battery on controller have to be closely watched. The color code depicts the battery health, which should never be red.

Other: Any hardware outside of the above categories is grouped as “other” sensors in VMware.


Zylker ESX
172.24.128.178 VMware ESX/ESXi Server
This Month
Monitor Overview Virtual Machines CPU Memory Datastore Network Disk I/O **Hardware** Outages More

Temperature Sensors — Threshold Configuration

Name	Health	Degree C	Action
[Device] Chasis Specific 0 Exhaust Temp		-	
[Device] Other 0 Inlet Temp		21	
Processor 1 Temp		48	
Processor 2 Temp		44	

Processor Sensors — Threshold Configuration

Name	Units	Value	Health	Action
Processor 1 Presence 0	unspecified	0		
Processor 1 Status 0	severity-discrete	0		
Processor 2 Presence 0	unspecified	0		
Processor 2 Status 0	severity-discrete	0		

Voltage Sensors — Threshold Configuration

Name	Value	Health	Action
[Device] Power Distribution 0 Input Voltage	56.95		
Power Supply 1 Voltage 1	228		
Power Supply 2 Voltage 2	228		

Storage monitoring for VMware resources

Virtual disks are the chief storage elements in a vSphere environment. Besides, VMware datastores act as virtual storage for VMs. Generally datastores are classified into two types—virtual machine file storage (VMFS) and network file system (NFS). Here is an exhaustive list of storage metrics to be monitored for effective resource allocation and management.

Disk metrics

All the space required for a virtual disk is allocated in advance. This space starts small but can be expanded as needed. This is where the concept of right sizing to allocate optimum resources to the disk comes into play. Monitor the following key metrics to better understand disk performance.

Disk usage

This denotes the total disk space used by all the VMs in kbps. Disk usage is generally monitored with certain threshold levels, as a full disk will halt other processes. This is why it's important to track disk usage closely and clear snapshots once in while to ensure that disk space is always available.

Disk I/O

Disk I/O encompasses input/output operations on a disk. Input/output operations per second (IOPS) is a rate of the I/O operations measured in 1 second. It is a ratio of the number of operations executed by the disk within a period to the duration of this period in seconds. The following metrics decide the performance of disk I/O.

Read latency: The average time taken during the collection interval to process a small computer system interface (SCSI) read command issued from the guest OS to the virtual machine in milliseconds.

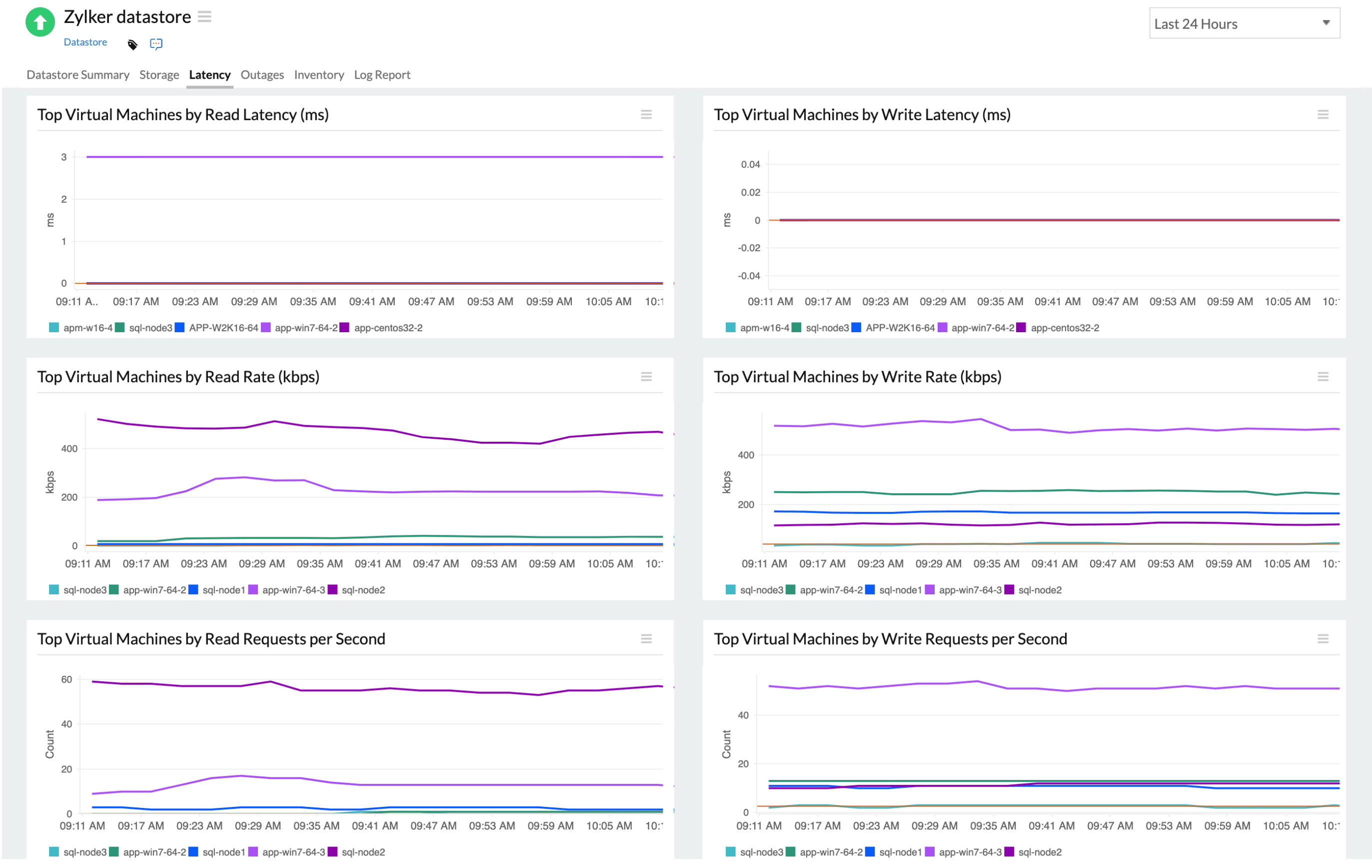
Write latency: The average time taken during the collection interval to process a SCSI write command issued by the guest OS to the virtual machine in milliseconds.

Reads: The number of disk read commands completed on each disk on the host per second.

Writes: The number of disk write commands completed on each disk on the host per second.

Read rate: The rate at which a disk reads data, i.e., the amount of data read from the disk in one second. It is measured in kbps.

Write rate: The rate at which data is written on a disk, i.e., the amount of data written on a disk in one second. It is measured in kbps.



Datastore metrics

Since datastores are the major storage entities in a VMware environment, understanding the different types of files and storage in a datastore is crucial to evaluate its performance and manage resource allocation. Datastore space attributes are generally measured in GB.

Free space

It is the space available in a datastore to allocate to VMs. It is recommended that datastores should run with at least 20 percent free space. The best way to manage a datastore is to set thresholds and clear the space before it is exhausted. Apart from the space used by the VMs, there are many others like snapshots and swap files, which have to be cleared so that space is available.

Provisioned space

This is the space allocated to a VM for it to use. Many VMs can use a single datastore for their space requirements. Therefore, the amount of datastore space allocated to a particular VM is its provisioned space, and the VM cannot use more space. Every VM should be provided sufficient space to run its OS and other applications. This metric is useful to analyze a VM's performance to compare the provisioned space against the used space.

Used space

The space that a VM uses in the datastore is the used space. It is also the amount of provisioned space that a VM uses. Monitoring the space used by every application and guest OS in the VM will provide better insights on space usage.

Capacity

This is the total amount of files and VMs a datastore can store. You can dynamically increase the capacity of a VMFS datastore to consume unused space on a logical unit number (LUN) when VMs require more space. Knowing a datastore's capacity can help you when you plan resource allocation.

Snapshots

A copy of the VM disk file (VMDK) is stored from time to time to help in backup and recovery. These backup files are called snapshots. Snapshots provide a change log for the virtual disk and are used to restore a VM to a particular point in time when a failure or system error occurs.

Snapshots alone are not a full backup, but they are a critical part of the backup process. It is recommended to clear the old snapshots and retain only the latest ones for space constraints. When a datastore is full, snapshots are the first place to look for opportunities to clear space. Monitoring the frequency and the amount of snapshot files being stored helps to plan resource allocation.

Swap file space

As mentioned previously, unreserved memory is swapped when the VMs run low on memory. Swap files contain memory retrieved from the disk. Swap files are used when the VM is unable to allocate physical memory from the ESXi host. Estimating the swap files used will help with understanding the resource contention in the datastore and the need for the swap memory.

Disk file space

Virtual disk files store the contents of a VM's hard disk drive, including the information on OS, program files, and data files. Disk file space is the amount of disk space in the datastore currently used by the VMs. The datastore is at full capacity when the space used in a datastore is equal to its capacity.

Log file size

Every ESX host stores its log files in datastores. Log file size in KB should be kept under control, as they may consume the available datastore space. Too many files in the datastore can cause slowdowns of directory content enumeration or reading as well as service failures in ESX components. Track the log file size, its growth, and spikes, and delete them if not needed to increase datastore efficiency.

VM space metrics in a datastore

The following metrics provide insights on space allocations for VMs and help to understand which VM uses up a datastore. Optimizing space at the VM level optimizes datastore space usage.

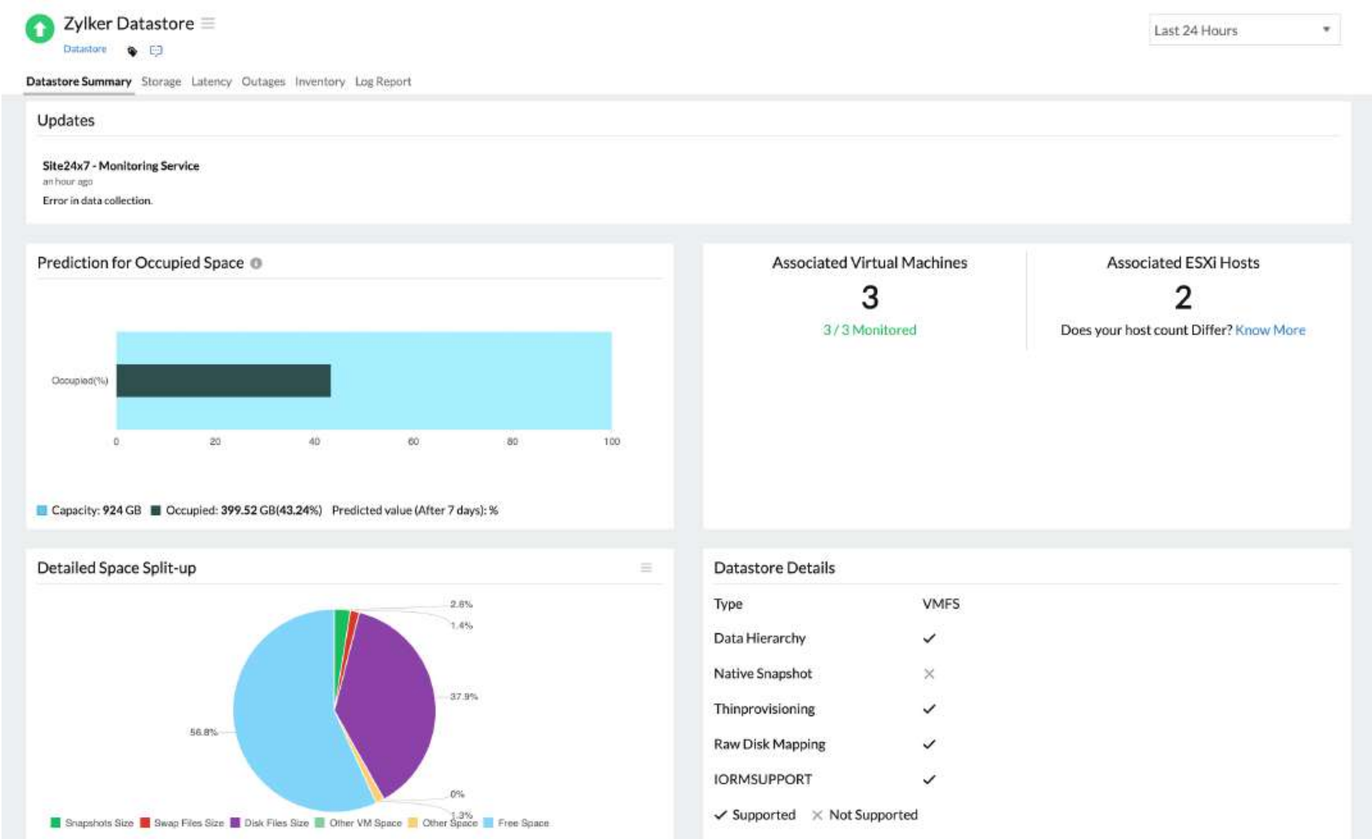
Space occupied: The amount of space a VM occupies in a datastore.

Space allocated: The amount of space a VM is entitled to use in a datastore. This is preconfigured.

Space available: The space available for VM in the datastore.

Average read requests per second: This is the number of disk read commands completed on each VM disk per second.

Average write requests per second: This is the number of disk write commands completed on each VM disk per second.



VMware management solutions

Enhance CPU performance

To enhance the CPU performance and keep utilization under control, VMware recommends to set CPU reservations for all high-priority VMs to guarantee that they receive the CPU cycles required. Also, reduce the number of vCPUs on a VM to the number required to execute the workload, and no more. You can obtain these values by closely watching the usage trends. This can save your investment and allocation of vCPUs, which can be used in other hypervisors.

CPU reservation for vMotion

During vMotion, the ESXi host reserves CPU resources on both the source and destination hosts so that network bandwidth can be fully utilized. Irrespective of the number of vMotions performed, the ESXi host will attempt to use all the network's bandwidth. This means the amount of CPU reservation depends on the number of vMotion NICs and their speeds. It is recommended to leave some unreserved CPU capacity so that vMotion gets the required resources.

Storage vMotion performance

The performance of VMware storage vMotion is greatly dependent on the available storage infrastructure bandwidth and the back-end storage configuration. This, in turn, is decided by factors like workload, hardware, vendor, RAID level, cache size, and stripe size. The workloads are affected by the latency of I/O operations, which is why it's important to correctly configure storage devices.

Guest OS-level optimizations

Since guest OSs occupy a major part of VMs, it is important to optimize them to save VMs from issues. Schedule backups, OS updates, and virus scanning only during non-peak hours. Do not schedule them to run simultaneously in multiple VMs on an ESX host and ensure adequate intervals between each scan. Since these are predictable and controllable, it is recommended to schedule them in advance, considering the above factors.

Attributes that compliment monitoring and provide better visibility

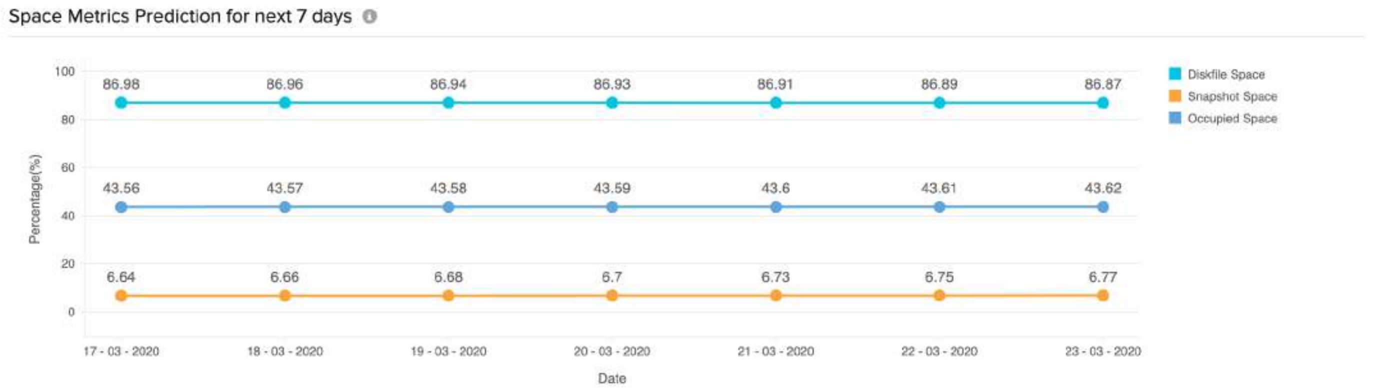
While metrics provide insights to monitor the performance, analysis and interpretation of data is impossible with mere numbers. Graphs, charts, and dashboards are visual aids that help with interpreting data. Identifying performance spikes is a cake walk when there's a graph illustrating performance, especially with custom period ranges. To analyze the space split up in a datastore, a pie chart works best.

To visualize the key metrics of the entire VMware environment in one glance, dashboards are the best choice, letting IT admins manage all resources from one screen. Reports provide stats from a resource perspective. You can view the space usage by all VMs in a datastore and all VMs in a ESX host when you view resource-wise reports. Comparing data based on time ranges is also possible with reports, which is why using such visual aids makes monitoring simple and easy.

Site24x7 is a cloud-based, agentless VMware monitoring solution, which helps to locate the source of potential issues using various performance metrics. With Site24x7, you can also monitor VMs from different private and public clouds.

View AI-based predictions for datastore space metrics like disk file space, snapshot space, and occupied space. You can view predictions for the next seven days based on historical data. These predictions allow you to plan and take remedial actions well before issues arise. You can predict when a disk will likely fill up a week in advance, and clear disk files as needed.

Similarly, you can clear the snapshots, and know what the occupied space will be after seven days. On top of this, you can configure threshold limits for all the above metrics, so that you can diagnose and fix issues before they take a toll on the organization.



Conclusion

In addition to vSphere, monitoring every metric is essential to ensure proper functioning and optimal resource allocation for every VMware resource. While giving priority to monitoring the CPU is important from an ESX/ESXi host perspective, optimizing the associated VM space is key to successful datastore management. Configuring threshold limits and averting resource contentment issues is the ideal solution to effective storage management.

About Site24x7

Site24x7 is a full stack monitoring solution that empowers IT operations and DevOps with AI-powered performance monitoring and cloud spend optimization. Its broad capabilities help quickly troubleshoot problems with end-user experience, applications, servers, public clouds, and network infrastructure. Site24x7 is a cloud offering from Zoho Corporation, which has offices worldwide, including the Netherlands, United States, India, Singapore, Japan, and China. For more information about Site24x7, please visit https://www.site24x7.com/