SOLARWINDS
TECH TIPS

Monitoring ESXi Performance Using Server & Application Monitor

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Unexpected Simplicity

What is VMware® ESXi?

ESXi is one of VMware's® hypervisors that does not require the vCenter™ management console. However, ESXi runs on VMkernel. VMware's operating system is designed to support and manage virtual servers, volumes, virtual machines (VM), and applications that run on the VMs.

Major components of the ESXi system include:

Virtualization Layer: This provides the hardware environment and virtualization of underlying physical resources to the virtual machines. This consists of the virtual machine monitor, which is responsible for virtualization and VMkernel.

- The VMkernel manages the physical resources on the hardware.
- The virtualization layer is used for scheduling VMs' operating system and the service console of the ESXi host.

Hardware Components: VMs use the hardware interface when they need to communicate with hardware such as the CPU, memory, disk, and network controllers.

ESXi Environment
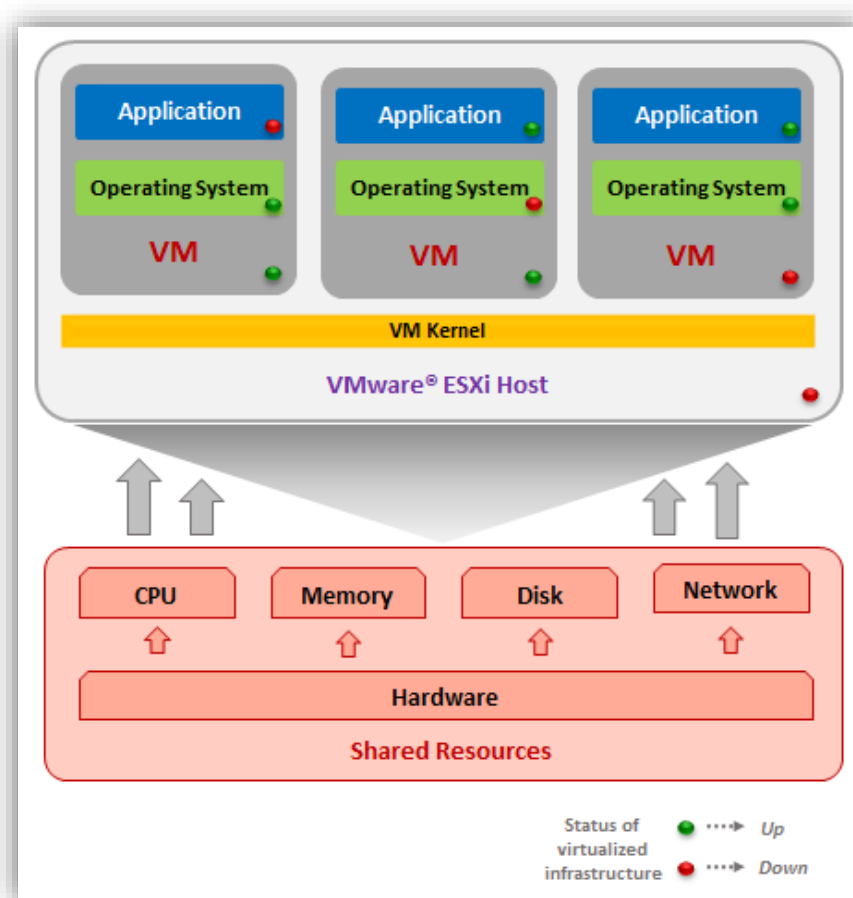
Why Do We Need To Monitor ESXi Server?

Because ESXi does not require VMware's vCenter management console, VMware admins have limited visibility into what is going on with ESXi virtual machines. A server monitoring software will give you more visibility and control over the ESXi virtual machines and their environment.

Usually a server monitoring software has plenty of performance counters for monitoring the performance of ESXi and its hosts. Monitoring these counters is an important part of maintaining your VMware environment. In order to gain insights into what is happening with critical applications in your VM, it's essential to monitor the VM and the ESXi server performance metrics. For example, your Exchange Server application running on a VMware ESXi host could experience performance issues. Here are some of the reasons why these issues might occur:

- Failure of the application itself
- Performance issues with the operating system
- Fault with the server hardware
- Performance bottlenecks in the VM or its resources
- Problem with the VM host

In order to know exactly what failed or had issues, it's important to monitor key metrics within the ESXi environment using a server monitoring software:

- CPU
  - CPU Reserved Capacity
  - CPU Usage
- Memory
  - Memory Balloon
  - Memory Heap
  - Memory Heap Free
  - Memory Reserved Capacity
  - Memory Shared
  - Memory Consumed
  - Memory Active
  - Memory Granted
  - Memory Usage
  - Memory Swap Used
  - Memory Sway In
  - Memory Swap Out
  - Memory Used by VMkernel
  - Memory Unreserved
  - Memory State
- Disk Volumes
  - Disk Usage
- Network Usage

How SolarWinds® Server & Application Monitor Monitors Your ESXi Servers

SolarWinds® Server & Application Monitor (SAM) is an agentless server and application monitoring tool. SAM monitors over 150 applications in your IT environment. With SAM you can discover applications and gain visibility into the performance of your applications and their underlying operating systems and servers.

SAM has Integrated Virtual Infrastructure Monitoring (IVIM), which allows you to monitor your virtual infrastructure as well as your servers and applications that are part of your environment. Using IVIM, you can monitor your virtual networks, virtualized data centers, and private clouds. This helps you ensure that the network performance does not affect your virtualization projects.
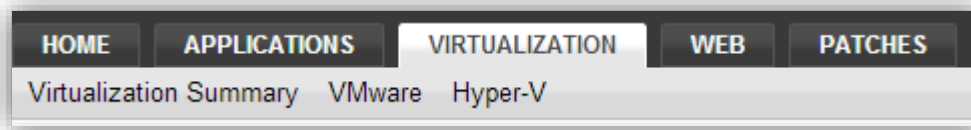
Monitor your entire VMware virtual infrastructure using SAM

SAM monitors your entire VMware virtual infrastructure, ESXi hosts, and VMs. If you already have a vCenter, you can also monitor Datacenter and Cluster layers.

In addition, using SAM, you can track availability and performance metrics within the VMware virtual environment. They are CPU load, memory, disk volumes, and network usage.

VMware Monitoring in SAM

Using SAM, you can automatically discover, identify, and monitor new virtual machines added to any VMware host server. SAM uses Simple Network Management Protocol (SNMP) in order to poll performance data from the VMware ESXi servers. You must ensure that SNMP credentials are enabled on your ESXi servers.

VMware	
Number of Virtual Centers	2
Number of Clusters	2
Resource Pools	55
ESX Hosts	4 clustered, 9 non-clustered
Number of VMs	91 running, 891 total
Total Number of Physical CPU Cores	63
Total RAM	295.9 GB
Last Poll	30 minutes ago

*Get information about hosts, clusters, and VMs in your environment*

Agentless Monitoring of Virtual Devices

You can use SAM's agentless technology to monitor VMware infrastructures on your network. You can discover nodes in SAM using the following:

Add a single node: You can add a single node by using the appropriate credentials, connecting the node, and then monitoring it.

Network Sonar Discovery: This method is recommended when you are adding new virtual servers in SAM. You can scan and discover hardware such as servers and volumes using Network Sonar Discovery. You can even create a profile and schedule auto-discovery to poll nodes based on the defined times.

Discovery Central: This will monitor virtual servers, volumes, interfaces, applications within SAM, and other virtual devices. Whether you are trying to poll nodes or want to scan existing nodes and devices for applications, using Network Discovery or Application Discovery you can automatically poll and start monitoring.
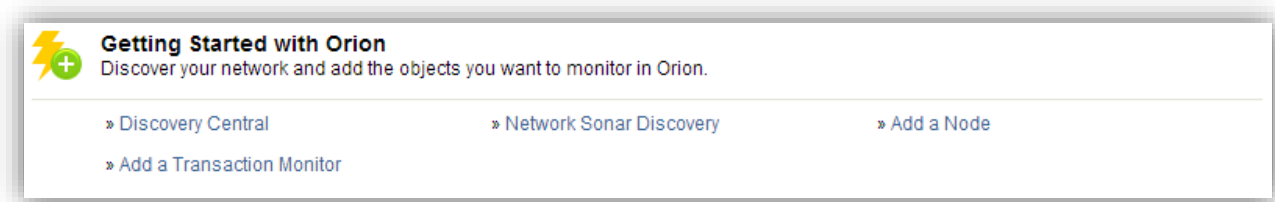
*Automatically discover nodes in SAM*

Virtualization Assets

Once the nodes are discovered and added for monitoring, you can look at all the virtualization assets monitored in SAM. You can drill down to any of the assets within your environment and identify what the issues are. A mouse-over on any asset shows you the availability for monitoring that asset even before you drill down.
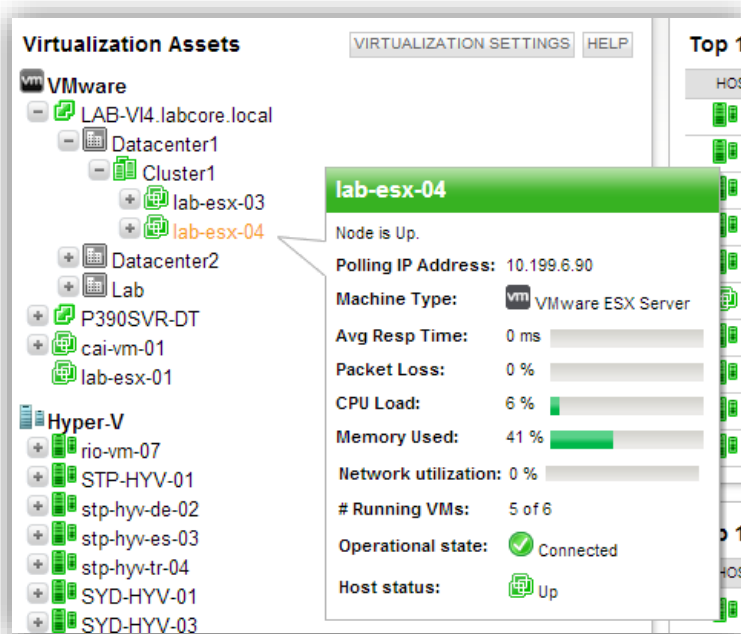
Obtain availability monitoring of your virtualization assets

SAM shows various intuitive charts and gauges that provide details about a particular host. You can look at the node details, ESXi details, VM memory consumption, CPU consumption, alerts within the particular host, VM network traffic, a list of all the VMs within that host, and more.
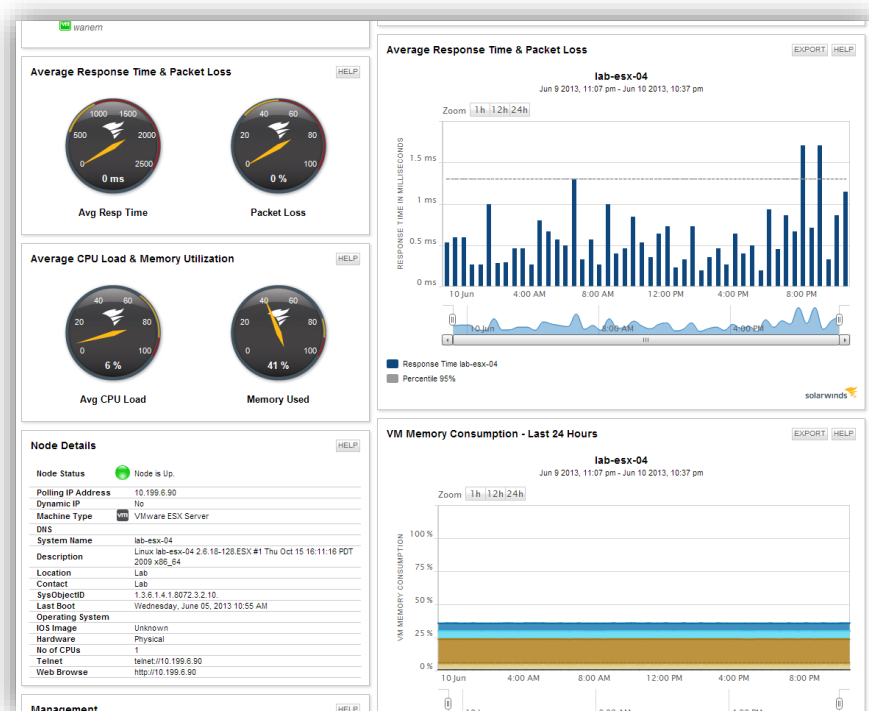
SAM's interactive dashboard gives a detailed summary of your virtual assets

Drill down to a VM to look at various metrics that SAM monitors in the VM. Obtain time-based charts on how certain metrics have performed over a period of time. SAM shows VM details such as ESXi host information, status of the VM, network, CPU, memory, and host network usages.
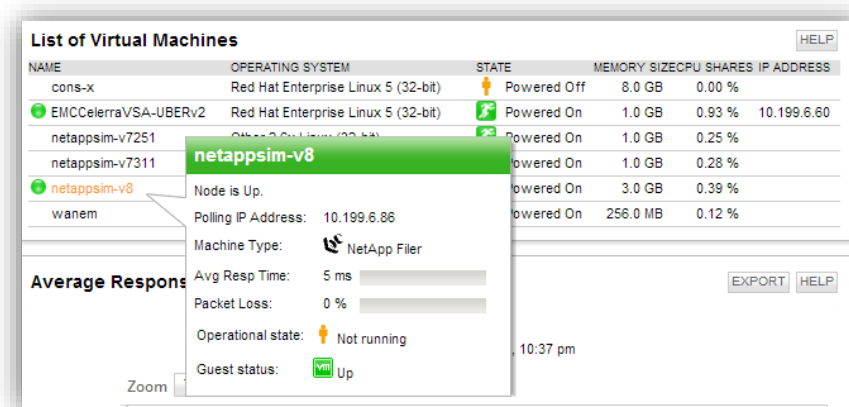
*You can access hundreds of VMs and get critical information*

Top 10 – Summary

SAM's Virtualization dashboard offers you a list of top 10 hosts based on performance. It gives you a high-level overview of performance issues and it is quite useful before drilling down. SAM shows Top 10 Virtualization Hosts for:

- Percentage Memory Used
- Network Utilization
- CPU Load
- Number of Running VMs

## Key Metrics that SAM Monitors in VMware ESXi Servers and Virtual Machines

Once the virtual servers are added to SAM, you can start monitoring key metrics in the VMware ESXi environment. Some of the key performance metrics that SAM monitors in the ESXi servers include:

CPU Utilization: Monitoring CPU utilization shows whether all the CPUs on the host are completely occupied.
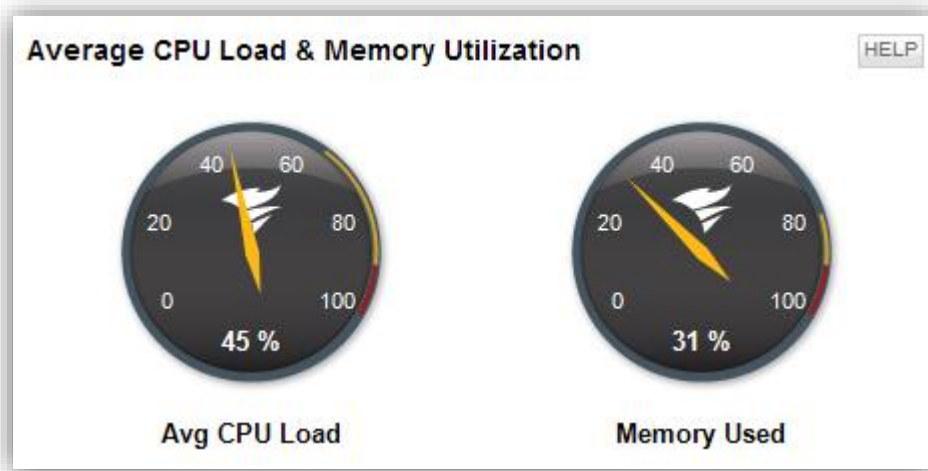
Look at key metrics within the ESXi servers

Memory Usage: Monitor the percentage of memory that is currently being used. You can consider this as active memory—a percentage of total configured or available memory in the server.
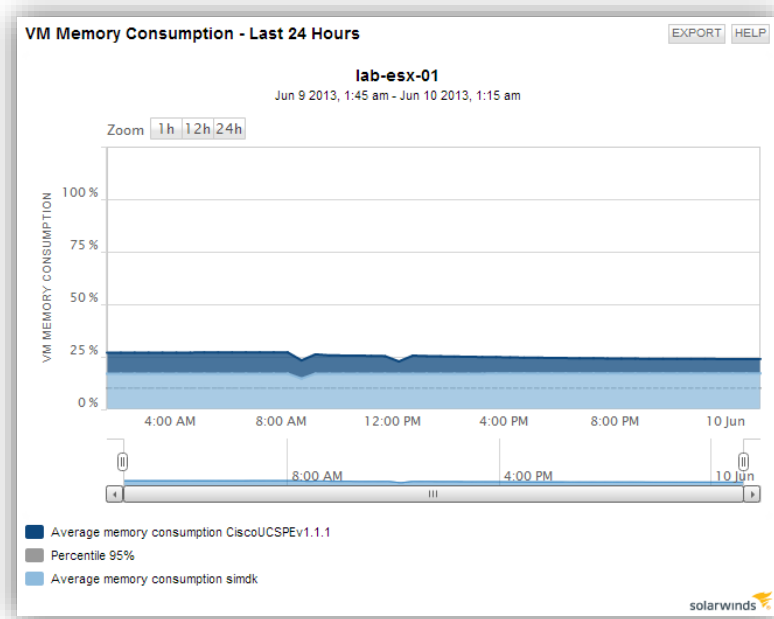
See how metrics have performed for a given time interval

Memory Ballooning: Monitor the memory usage of multiple VMs running in a host. This is essential to monitor because you will know if the hypervisors' host is running out of memory. This can happen when the guest operating system running inside a VM cannot detect the host's memory shortage.

Memory Heap: Monitoring memory heap ensures that you don't face issues like running out of memory heap space on the ESXi host, especially when a large quantity of virtual disk space is active.

Memory Active: By monitoring this counter, you will know the exact amount of memory needed by all the VMs running in a host.

Disk Volumes: Monitoring the disk volumes will show the size, space, and availability of the disk volumes that is currently used and available.

Monitor disk volumes based on current usage

Network Usage: Monitor the average rate at which the data is sent or received during a specific interval, like monitoring the rate at which the data is sent or received across each virtual network on the host.
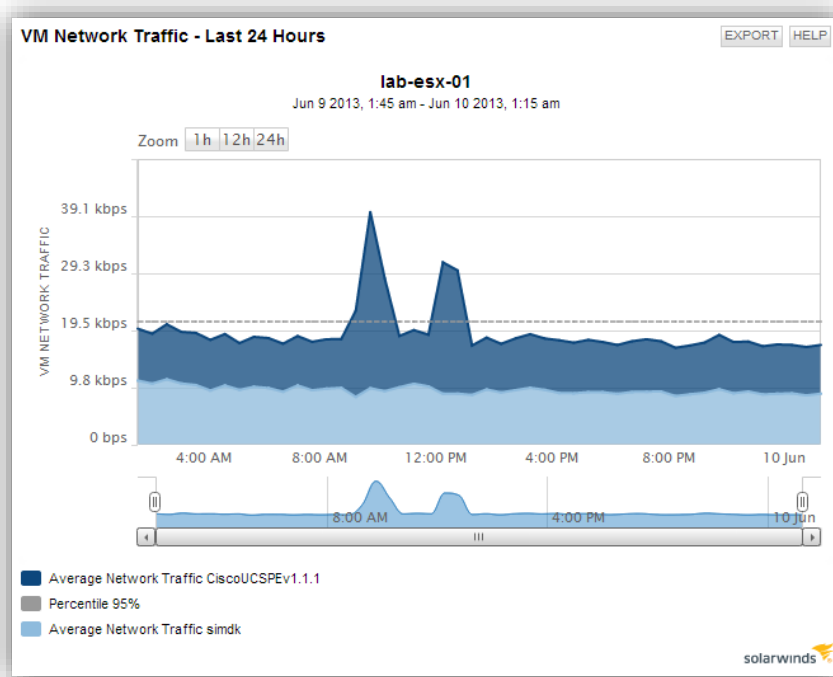
Monitor data that is sent/received across the virtual network

Virtualization Alerting and Reporting

Alert Manager

You can apply SolarWinds' native alerting and reporting capabilities seamlessly to your virtual infrastructure. Using SAM, you can generate alerts for your virtual components that are running in your virtual environment. Use Alert Manager to actively monitor and respond to user issues. SAM alert criteria are set based on the industry's best practice threshold values.

- Base your alert criteria depending on individual ESXi server components
- Obtain alerts if any ESXi component reaches critical, up, down, unknown, or warning stage
- Obtain alerts based on statistical data that are specific to the monitored virtual components
- Get alerts on the percentage of CPU that is in use including physical, total, and virtual memory
- View alerts in the SAM Web console or, depending on the priority of the alert, you can receive alerts via email or on your phone

Advanced Alert Manager

You use the Advanced Alert Manager to view component events and alerts. Also, using the Advanced Alert Manager you can:

- Configure alerts in a way that virtual components such as the ESXi servers can be monitored for a specific time period
- Look at recent component events with their description and other information from the events log
- Select actions that will occur when Advanced Alert is reset. This ensures that basic alerting still continues for the specific components you consider critical
- View active alerts, which display their description and information from the alerts log

Reporting Capabilities

SAM has a set of predefined reports that you can access anytime, such as:

- Current application and component status of your virtualized assets
- Current hardware and hardware sensor status
- Hardware health power consumption cost calculations
- Historical application CPU and memory reports
- Historical hardware sensor daily availability
- Historical hardware sensor statistic
- Other historical reports

In addition to pre-defined reports, you can create new reports and customize existing reports using SolarWinds Report Writer. These reports can give your IT management insights in the performance of the applications and nodes. They can also see how server management software has helped the organization keep their virtual infrastructure optimized.

Share: 10
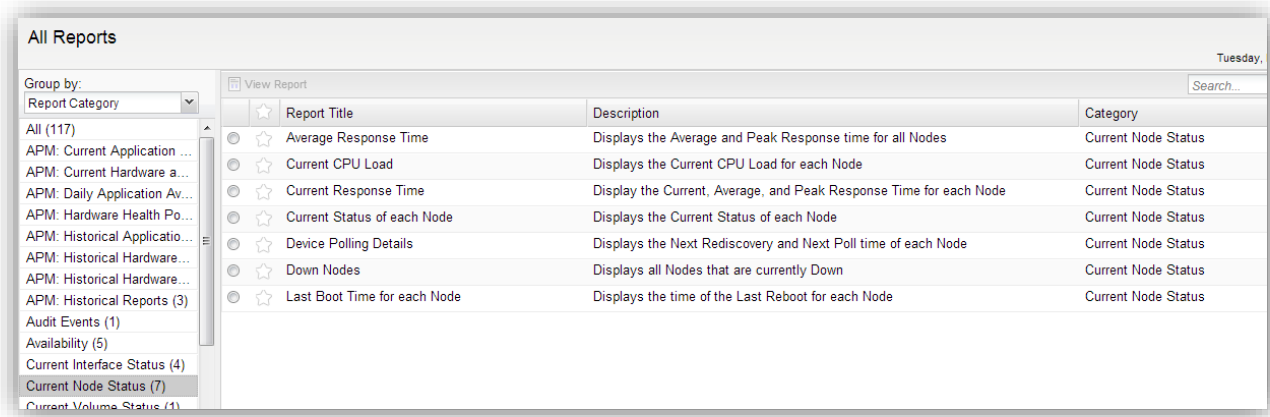
Create customized reports of your ESXi server performance

5 Reasons to Download Server & Application Monitor

- Employ SAM's Integrated Virtual Infrastructure Monitoring (IVIM) to monitor virtual networks, virtualized data centers, and your private cloud
- Automatically discover, identify, and monitor new VMs added to an ESXi host server
- Gain visibility into the ESXi VMs and inexpensively monitor ESXi environments
- SolarWinds' native alerting and reporting capabilities extend seamlessly to your virtual infrastructure
- SAM includes a Web-based and agentless monitoring platform

SolarWinds (NYSE: SWI) provides powerful and affordable IT management software to customers worldwide - from Fortune 500 enterprises to small businesses. The company works to put its users first and remove the obstacles that have become "status quo" in traditional enterprise software. SolarWinds products are downloadable, easy to use and maintain, and provide the power, scale, and flexibility needed to address users' management priorities. SolarWinds' online user community, http://thwack.com, is where tens of thousands of IT pros solve problems, share technology, and participate in product development for all of the company's products. Learn more today at http://www.solarwinds.com.

For additional information, please contact SolarWinds at 866.530.8100 or e-mail sales@solarwinds.com.

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