eBOOK

Prove It! Using PerfStack to Find the Real Performance Killers

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With introduction and commentary by SolarWinds Head Geeks™ Leon Adato & Thomas LaRock
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Introduction

PROOF THAT DATA IS SEXY

We’ve all heard the phrase, ‘Data is the new oil.’ The analogy is remarkably apt. Oil certainly is the substance that drove much of the growth—both industrially and financially—over the last 200 years. But in point of fact, oil has been excavated and used for thousands of years. Humankind’s earliest uses were simplistic and required little refinement of the crude oil skimmed, dug, or siphoned near the surface of the earth. As society and technology grew, so too did the need for oil and the need for ever more sophisticated means of both extracting and refining it.

Data has also been around for thousands of years. It was also initially used in relatively simplistic ways, and was collected from the surface of human intelligence with relative ease. As our society and technology grew, so did our need for ever greater volumes of data, and the need for it to be more refined.

Like oil, our current state is such that raw data has value, but left unrefined, data cannot be used in a reasonable manner.

Data isn’t just the new oil. Data is sexy. And we can prove it.

Let’s consider another person from the U.K. that knows a thing or two about data: Sherlock Holmes. Here’s but one quote from Holmes regarding data:

“Data, data, data. I cannot make brick without clay.”

~Source: Arthur Conan Doyle, The Adventure of Copper Beeches

Sherlock Holmes has been portrayed by many actors through the years. The most recent, Benedict Cumberbatch, has previously been voted the “sexiest man alive.” So, armed with syllogistic logic that would make Socrates proud, we propose the following:

1. Sherlock Holmes (as portrayed by Benedict Cumberbatch) likes data.
2. Benedict Cumberbatch is sexy.
3. Therefore, data is sexy.

QED.

In the following pages, we’re going show you just how sexy your data can be. Like Benedict Cumberbatch, the raw data you start with has to be refined, put in the correct context, and dressed appropriately.
Because, when refined and made presentable, small details jump to the fore. Or as another sexy portrayer of Sherlock Holmes once said, when told that making assumptions from tiny details was a little far-fetched:

“Mary Morstan: It does seem a little far-fetched, though. Making all these grand assumptions based on such tiny details...

Sherlock Holmes: Mm, that’s not quite right, is it? In fact, the little details are by far the most important.”

~Source: Sherlock Holmes, Warner Bros., 2009

We told you: Data is sexy. Now let us prove it.

“The game is afoot!”

~Source: Arthur Conan Doyle, The Adventure of Abbey Grange

IS THIS BOOK FOR YOU?

This is designed to provide insight into the Performance Analytics (“PerfStack”) capability built into the SolarWinds’ Orion Platform, which makes data from many of our modules available for display on a time-synchronized graph.

It is geared for IT professionals, people who create, maintain, and support computer systems and their users, who know what monitoring is capable of. Whether you’ve had actual hands-on experience with monitoring software matters not.

If you are interested in this topic, but feel a bit behind on monitoring concepts, we can recommend several free guides:

- Monitoring 101
- Monitoring 201
- Automation, Not Art
What is PerfStack and Why is it Relevant to the Conversation?

In an IT world rife with complex environments, monitoring can no longer be an afterthought. By establishing monitoring as a core IT function—aka monitoring as a discipline—organizations can benefit from a much more proactive IT management strategy, while also streamlining infrastructure performance, cost, and security. But once a complete monitoring solution is implemented, it can feel a little bit like you’re drowning in a sea of information. Or to put it another way:

“Data, data, all around and not a drop helps me think.”

Finding the true source of service delivery problems across both on-prem and cloud resources, however, requires a tightly integrated tool set that surfaces a single point of truth across those platforms. The normalization of metrics, alerts, and other collected data from applications and workloads, regardless of their location, enables a more efficient approach to troubleshooting, remediation, and optimization, while minimizing friction across silos.

That’s where PerfStack™ comes in. It takes the data you already have and lets you display it in multiple time-synchronized graphs, so that spikes, drops, and events are shown together, and you can begin to assemble your clues and find the culprit.
Before You Even Look: The Adventure of the Three Use Cases

The PerfStack dashboard is so powerful, so comprehensive, and so wide-ranging in what it can show that many folks feel a sense of “data overload” in their first forays into the tool. This is natural. Every piece of data your monitoring solution collects is now at your fingertips and can be placed side-by-side with any OTHER piece of data. Where on earth should you begin?

“It is a capital mistake to theorize before one has data. Inevitably, one begins to twist facts to suit theories, instead of theories to suit facts.”

Sherlock Holmes, “A Scandal in Bohemia”

CONTEXT 1: SOMETHING IS DEFINITELY BROKEN, BUT YOU CAN’T PROVE WHAT OR WHERE.

Everyone is running around as if their hair is on fire, emergency meetings are called, people are frantically pounding on keyboards, managers are making threats, executives are frowning in the corner.

In other words, a regular day in IT when something breaks.

First, it’s important to say that, here at SolarWinds, we hope it never comes to this. The whole point of monitoring, automation, and alerting is to detect wobbles in the system, pinpoint the root cause, and get the right people working to fix the right problem while it’s small.

But it’s equally important to reassure you that, here at SolarWinds, we’ve been in the trenches too, and we know life (and severity 1 critical outages) happens. That’s why we created PerfStack.

First, you throw the issue you know about. Usually, it’s that an “application”—the front end representing a cluster of servers and services—is not responding. You start there, so that you have a clearly delineated start time.

Then you add all the related services. And databases. Maybe you keep delving deeper, going to the hardware layer with servers, memory, and storage. Or maybe you take a sidestep, adding other elements of “observability”—logging, tracing, and the like.

The point isn’t that “in just three clicks, you’ve solved the issue!” That works for “L337 h4xx0rz” on TV, but not in real life. The point is that the PerfStack dashboard makes it easier to keep working the problem, adding and removing data until you build a picture of the failure cascade.

The ability to save and share PerfStack configurations means teams can collaborate on the issue without the need to congregate in a single war room, or to use “swivel chair integration” to view multiple screens from multiple tools simultaneously and track clues in their head.
CONTEXT 2: SOMETHING IS BROKEN, YOU MADE A CHANGE, BUT YOU CAN’T PROVE IT ACTUALLY FIXED THE PROBLEM.

Let’s follow the chain of events just a little further down the rabbit hole, shall we? Like the first context, you know something is broken. Unlike the first context, you’ve got a fairly good idea what the root cause is. So you make a change.

Did it work? Well, the application starts responding, so that’s good. But did you actually fix the problem?

This is one of the most frustrating scenarios in IT. When something truly critical is broken, people rapidly arrive at the “just do anything if you think it will fix it” mentality. And when service is restored, the last thing you tried is credited. But there’s no actual evidence that that’s what fixed the problem. Or that the original problem was solved as opposed to changing the threshold on the amount of stress the system can take.

Using the PerfStack dashboard, it’s easier to prove the true source of the problem, and then it’s utter simplicity to determine when the source has been resolved, regardless of what other variables you throw into the mix.

“Elementary, my dear Watson”

CONTEXT 3: YOU’VE MADE A SCHEDULED CHANGE, AND YOU WANT TO PROVE YOUR CHANGE DIDN’T BREAK ANYTHING.

Mission-critical failures are exhausting, even for us to write about. Let’s focus on something more pleasant: proving that a completely innocuous change didn’t break anything.

During a normal change control event, one of the key steps is to validate that all services came back up, and that all processes and data are flowing normally (or better). But how do you prove that?

If you’ve built a PerfStack view ahead of time, showing all the key components and their normal values, then it’s as simple as glancing at the screen to ensure everything is still running the way it was an hour ago.

What’s more, many metrics that appear in the PerfStack dashboard can be displayed in “real-time mode,” allowing you to avoid lengthy polling cycles and see how those elements are performing right now.
A Quick Tour of PerfStack

Let’s take a moment to walk through the steps it takes for PERFStack to detect issue symptoms. PERFStack (the Performance Analysis dashboard) can be accessed from the home menu of any of your deployed Orion Platform products. You start with a blank canvas—a new analysis project—to explore your data. Begin by adding one or more entities of an active investigation—typically the one showing the symptom. This could be the switch, router, virtual machine, host (or node), or something more specific, such as the application, LUN, array, or web transaction. You can add as many entities as you wish to your analysis project.

Once you’ve added your entities to the PERFStack dashboard, hover your mouse over any of those entities in the list and you will notice two icons to the right of the entity name. When clicked, the first icon brings in all other entities related to that object by leveraging existing relationship data. This is great for virtualized applications, where you can start with an application and automatically discover related entities, such as the virtual server, virtual host, cluster, LUN, and physical array. Automatically discovering relationship information within the PERFStack dashboard helps you to dramatically accelerate the troubleshooting process and focus exclusively on what’s likely related to the issue at hand.
All available metrics for an entity are shown by clicking on an entity name. A list of all available metrics associated with that entity are shown in the adjacent column. These metrics are categorized into collapsed groupings based on their type, any of which can be expanded to reveal individual metric tiles.

You can easily drag metric tiles and drop them onto the chart area on the right where the metric data is plotted. Add as many metrics to the chart area as you like. You can add multiple metrics to the same chart, and stack multiple charts on top of each other.

The PerfStack dashboard can easily combine data from disparate data sources into the same chart. For example, combine Server & Application Monitor’s Server’s Average CPU and Storage Resource Monitor’s Array’s IOPS total into the chart to help troubleshoot performance issues. Until now, this has been difficult with full-stack monitoring solutions.

PerfStack also allows you to combine disparate metrics, such as integer-based metrics with percentage-based metrics, while maintaining the appropriate scale. This is accomplished by maintaining two separate Y-axes when metrics of dissimilar types are combined within the same chart.

Data for all metrics displayed within the chart area are automatically aligned across the same time period. Hovering your mouse over any chart area adds a vertical marker that tracks your mouse movement to visually align all data points across the series. It also displays the date and time that data point was collected. As you move your mouse horizontally across the time period of the chart area, the values within the legend update to reflect the values aligned to the vertical marker.
The result is a dynamic chart that you can save for future reference. Charted metrics, the entities they’re derived from, and the custom or relative timeframe are all included as part of your saved project. Saved PerfStack projects can be loaded easily, making juggling between projects a snap. Each individual Orion user can create, save, load, update, and delete their own works of art within the PerfStack dashboard. Any Orion user can also create and save as many PerfStack dashboards as they like and manage them independently.
What Are the Practical Implications?

Monitoring networks, systems, virtualization, infrastructure, and storage environments involves collecting and analyzing millions of different metrics. With this amount of data to parse through, while the clock is ticking and pressure is mounting, your SLA is left hanging in the balance. This also doesn’t factor in the inevitable finger-pointing regularly engaged in by storage admins, DBAs, cloud architects, application engineers, and systems engineers.

Even when a tightly integrated monitoring platform has been implemented, comparing data from different sources with dissimilar units and variable timeline makes troubleshooting harder than it needs to be. You can approach this challenge by creating elaborate, purpose-built, custom summary dashboards. But there are a few problems with this attempt at a solution.

First, depending upon the complexity of the custom dashboard, the creation process can be tedious, resource-intensive, and highly iterative.

Second, only those with administrative rights have the necessary permissions required to build or modify these custom summary dashboards. And gaining permission requires specialized knowledge of the systems and elements that are being displayed. This places a significant burden on the monitoring admin, making that person the bottleneck that holds up efficient troubleshooting.

Third, there’s the issue of maintaining these custom dashboards. Some larger organizations may have dozens or even hundreds of these for various business services, and if not properly maintained to reflect changes made throughout the organization, these dashboards become less useful.

IT teams have to be able to sort through the noise created by millions of metrics being collected by monitoring tools. This is where cross-stack data correlation comes in, because it’s no longer acceptable to simply rule out your own silo and kick the issue over the wall to the next team.

In a perfect world, you could correlate data across your application delivery stack to compare collected metrics, regardless of their physical location or their location within the delivery path. Further, you need to be able to overlay the metrics of differing units of measurement on a common timeline within a single view. And, the whole process needs to be simple enough to allow you to create ad hoc dashboards on the fly.

The Orion Platform allows you to visualize and correlate data across the IT stack. The PerfStack dashboard allows you to quickly sift through the massive amounts of data that SolarWinds Orion Platform products collect, filtering out the noise and focusing on what’s truly relevant to the issue at hand. Drag and drop any entity’s performance metrics into a PerfStack project to quickly see time series and relationship data in one easy-to-view graph. With this kind of transparency, IT professionals are able to troubleshoot issues faster and pinpoint root cause in a flash.
Real-World Systems Management Example

Let’s take this example: You receive an alert that your SharePoint® website is down. You can quickly use your intranet PerfStack dashboard to confirm that SharePoint availability is down.

You then move to check the Windows Server® and SQL Server® to see if CPU or memory may have spiked or changed.

In this example, the memory usage is high, but running memory usage around 90% is normal for these servers. So, what is your next step? Check the ESX® host, because these servers are virtual servers.

Again, you see that memory utilization is high, but that is expected, since you run a dense virtual environment, and nothing appears to be abnormal.

Once you drill deeper into the storage layer, you notice a spike to the IOPS in the datastore, and you conclude that it was a “noisy neighbor.” You begin troubleshooting the other VMs on that storage to see which one may have caused the spike. Curiosity leads you to look up the other VMs on the datastore. Sure enough, you see high utilization on one of the other VMs.

Problem solved typically in just a few minutes.
The Mostly Un-Necessary Summary

As we prepared this eBook, we dug through many detective stories, quotes, and comparisons to both keep you interested and also illustrate our points. But one point kept coming to the fore: that PerfStack worked less like the hero of Arthur Conan Doyle stories, and more like an Agatha Christie character.

Christie more than Doyle embodied the ideal that the facts of the case are already there, staring you in the face. When the mystery is solved, you sit both incredulous and embarrassed that you didn’t see it yourself earlier.

Be that as it may, every good detective story, from Doyle to Christie and so on, has a traditional ending. Of course, there’s the reveal of “who done it” and the recitation of all the clues; there’s a satisfying capture of the culprit with much gnashing of teeth; the quirky dénouement back at 221B Baker St. or similar locale; and often the punch-line, which sets up the next adventure.

Monitoring (in general) and PerfStack (in particular) offers much the same pattern. Having methodically gathered all the data points, the culprit (i.e., the root cause) is exposed. While incarceration is generally not an option for a wayward line of code or a failing piece of hardware, it is still fair to say that the problem is dispatched, hopefully never to rear its head in polite computing society again.

And then there’s a moment—we swear that we’re not making this up—when we watch customers linger with that PerfStack screen for just a few extra moments. THIS is the tool that helped them arrive at a solution. THIS is the key to proving what was wrong. Which makes it better than a Christie novel. You aren’t left with a sense of embarrassment, rather you have a sense of accomplishment.

As satisfying as it is to reflect and bask in that feeling, it’s almost as rewarding when we see our customers able to do so. To know that our tools were part of that process.
About the Authors

JARED HENSLE

Jared Hensle is Senior Production Marketing Manager in charge of the Systems Portfolio at SolarWinds. He has over 15 years of hands-on experience in the IT industry, including working for several Fortune 100® companies and running an MSP company managing the IT needs of SMBs. While managing the MSP company, he interfaced with customers, and was responsible for guiding their company’s technical direction. In that capacity, he introduced many to cloud and hybrid IT environments.

LEON ADATO

In a career spanning three decades and four countries, Leon Adato has been an actor, electrician, carpenter, stage combat instructor, pest control technician, Sunday school teacher, and ASL interpreter. He also occasionally has worked on computers.

A SolarWinds software user since 2003, Leon attracted the attention of SolarWinds staff via his impressive participation in THWACK® forums, including providing helpful posts, attending UX sessions, taking part in beta and RC testing, and whining.

It was around that time that Head Geek™ Patrick Hubbard noticed that Leon was long-winded to a fault, and that he lacked any semblance of self-restraint or basic common sense when it came to speaking in front of large audiences. That led to his being offered a position as Head Geek in 2014. Leon has not looked back since, mostly because he’s incredibly uncoordinated and would surely run into something.

THOMAS LAROCK

Thomas LaRock has over 20 years of IT experience holding roles such as programmer, developer, analyst, and database administrator. He is a Microsoft® Certified Master, VMware® vExpert™, Microsoft Certified Trainer, and a ten-time Microsoft Data Platform MVP.

He has spent much of his career focused on data and database administration, which led to his election as a Technical Evangelist for Confio Software in 2010, where his research and experience helped create the initial versions of the software now known as SolarWinds® Database Performance Analyzer (DPA).

He has also served on the board of directors for the Professional Association for SQL Server (PASS), and is an avid blogger, author, and technical reviewer for numerous books about SQL Server management. He now focuses on working with customers to help resolve problems and answer questions regarding database performance tuning and virtualization for SQL Server, Oracle®, MySQL®, SAP®, and DB2®. He’s made it his mission to give IT and data professionals longer weekends.
Dedications

From Jared

To my dad: For inspiring me at a young age to always work hard, and to never quit. Modeling that when life gets tough, to keep going.

To my family: For the daily support and love, for the laughter and tears, for always being “Team Hensle.”

To my SolarWinds family: For the support and willingness to help me learn and grow, and to those I am in the “trenches” with every day that make this a great place to work.

From Leon

To Debbie: Your quiet confidence and simple grace in all things are a constant inspiration to me. Your ability to balance your roles in life, and also be open to the wonder and beauty around you are incomprehensible, but at the same time awe-inspiring. I could not do this—any of this, from my job to the simple act of getting up in the morning—without you, and my last thought each night is the hope that I somehow, in some way, measured up to be the person you deserve. I love you F. E. & A.

From Thomas

To my wife, Suzanne, thank you for your love and patience through many years.

To my children, Isabelle and Elliot, thank you for teaching me the meaning of the word “joy,” and for all the laughs we’ve shared.

To my fellow Head Geeks, thank you for showing me what the word “team” means.

To Jenne, thank you for giving me the opportunity to become more than just “the database guy.”

To God, thank you for the bacon.
Addendum

LEGAL DISCLAIMER

This document is provided for informational purposes only. Information and views expressed in this document may change and/or may not be applicable to you. SolarWinds makes no warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information contained herein.

ABOUT SOLARWINDS

There are some things you probably should know about the company we work for.

First, SolarWinds solutions are geekbuilt.® In other words, our solutions are made by geeks (SysAdmins, engineers, IT professionals, and even Head Geeks) for geeks, to solve real problems in the workplace right now. We spend copious amounts of time in the trenches, talking to people, discovering their pain points, and asking how they would like to see them solved. We take that feedback and turn it into the list of features we build into the next version.

Second, SolarWinds solutions are modular. You don't need to get a whole suite in one monolithic installation. You can determine which functionality you need and apply only the modules that meet that need. Each module is flexible, and each tool comes with a variety of actions to help you get almost any job done.

You can also download a demo of any or all of the SolarWinds modules and kick the tires before you buy. Or you can check out the online demo: demo.solarwinds.com.

Pro tip: There’s also about two dozen downloadable free tools over at solarwinds.com/free-tools/.

ADDITIONAL RESOURCES

SolarWinds Lab® Bits: Drag-and-Drop Data Correlation: An In-Depth Look Into PerfStack
An Integrated Approach to IT Troubleshooting
Server & Application Monitor