

## **HPE 3PAR PERFORMANCE INSIGHTS: BRINGING INFOSIGHT ANALYTICS TO THE EDGE**

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In an era in which every tech company claims to have an AI offering, HPE InfoSight stands out as the genuine article. HPE InfoSight is a best-in-class AI solution that uses cloud-based machine learning to provide global insights into the status and health of infrastructure, removing much of the management burden and helping customers to solve some of their most challenging IT problems. In particular, HPE InfoSight delivers cross-stack insights into a storage array's health, configuration, capacity and performance based on near-real time analytics and the knowledge gained from a vast treasure trove of field data collected over many years.

Among a seemingly endless set of over-hyped AI solutions, HPE InfoSight is delivering remarkable results and significantly enriching the customer experience. The solution has reduced support incidents across more than 50,000 connected HPE 3PAR storage systems by 85%, while lowering operating expenses by nearly 80%. With its unmatched track record, HPE InfoSight has become the leader in AI-driven operations for the Hybrid Cloud and an essential asset for HPE 3PAR customers.

Now InfoSight technology is being incorporated into a new solution at the edge, which is enabling HPE 3PAR customers to better understand, anticipate and improve array performance. As we'll see, HPE Performance Insights for 3PAR Storage takes an innovative approach to helping IT managers track storage performance and deliver it when and where it's needed most, based on the power and intelligence of InfoSight's AI and machine learning technologies.

### **ADDRESSING PERFORMANCE CHALLENGES AT THE EDGE**

Storage performance is one of the most important, and yet difficult-to-achieve, deliverables in most IT organizations. Storage and application performance impacts business productivity and time-to-market for new initiatives, enabling a company to operate and compete in the marketplace at its full potential. And yet, performance has traditionally been one of the least understood and most poorly managed IT imperatives. Given its inherent complexity and dynamic nature, storage performance is difficult to track and manage, let alone anticipate and predict.

While storage or other IT administrators are generally charged with monitoring performance, they most often rely on anecdotal and incomplete data to measure and troubleshoot it. Attempts to understand and fix issues are reactive, aimed at problems that have already surfaced. Traditional performance management tools can help, but generally only provide an accurate view of what's happened in the past. The basic approach tends to be: wait until a problem has reared (or is just about to rear) its ugly head, and then throw IT staff and hardware at it to try to mitigate it as quickly as possible. In many cases, the administrator may decide he has no option but to overcommit system resources, in the hope that this approach will relieve pressure points and somehow restore performance to acceptable levels.

With so much at stake, there has to be a better way to assess and manage performance. It must begin with real-time intelligence based on vast amounts of system data collected over time. It must inform and empower an administrator to take actions based on AI-generated insights and recommendations. And very importantly, it must enable an administrator to troubleshoot performance issues without needing to understand every detail and nuance of performance, of which there are many.

That solution is HPE Performance Insights for 3PAR Storage, based on proven InfoSight technology and delivered on the HPE 3PAR StoreServ Management Console (SSMC) at the edge. As we'll see, the solution provides administrators with straightforward metrics and insights on the performance of their 3PAR systems, along with guidance and recommendations designed to help them diagnose and mitigate issues and meet performance objectives. Let's take a closer look at HPE Performance Insights and how it helps 3PAR Storage customers address some common performance challenges.

## INTRODUCING HPE PERFORMANCE INSIGHTS FOR 3PAR STORAGE

HPE 3PAR StoreServ is one of the leading AFAs on the market today. HPE 3PAR's timeless architecture has led to a continuous innovation of features available to old and new customers alike, providing the ultimate in investment protection unmatched by most vendors in the industry today. HPE recently added cross-stack analytics support for 3PAR via HPE's cloud-based InfoSight AI platform. Now, HPE has augmented the cloud-based AI approach by extending the capability to give HPE 3PAR arrays embedded AI technology. These new features provide a simpler and richer way to solve complex issues, extending HPE 3PAR's leadership in simplicity, efficiency and availability.

HPE's initial AI-driven analytics feature is called HPE Performance Insights. This feature is available free of charge with new arrays and is also free to any customer that updates to the latest version of HPE 3PAR StoreServ Management Console (SSMC 3.4). Initially, only arrays configured with all solid-state drives (SSD) are supported, with support for hybrid arrays following in subsequent releases. The following attributes are key differentiators of HPE's AI approach:

**Analyze Globally:** HPE Performance Insights analytics are based on years of globally acquired telemetry data across thousands of 3PAR devices operating in the field. HPE has designed a new analytical approach based on machine learning and advanced data mining to enable customers to better understand current and future performance issues.

**Act Locally:** The analytical engine is co-located with the array to ensure that real-time analysis can be performed locally without the need to continuously connect to the public cloud. This approach is similar to that in self-driving cars where global learning and algorithms are designed based on the entire installed base of cars. However, each car must act individually and autonomously, reacting to real-time traffic conditions. Likewise, HPE has integrated a real-time analytical engine local to the array with updated global learning information beamed down periodically as more systems are deployed and analyzed. This closed-loop global learning approach will become the foundation for more AI-driven features in the future.

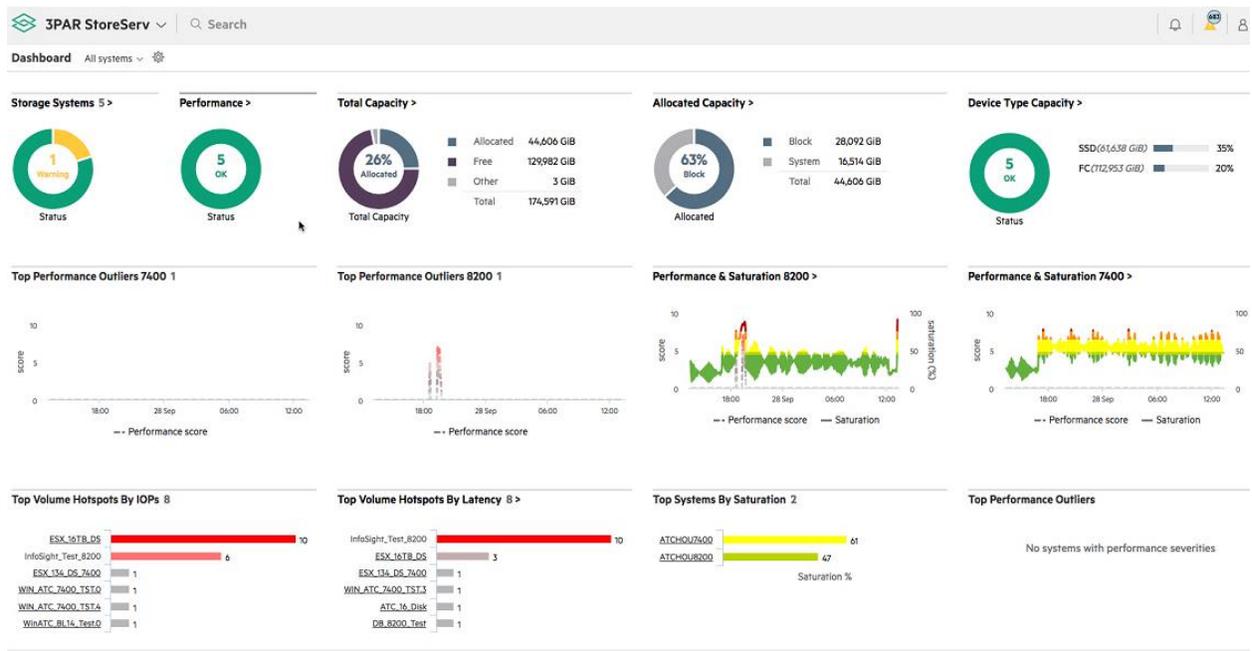
**Transform Complexity into Simplicity:** To make the actionable performance insight more meaningful HPE has simplified the way information is shared through enhanced dashboards within the SSMC user interface. After extensive research across many systems, HPE has come up with a utilization concept termed "Saturation". The Saturation percentage is based on the combination of throughput, IOPS, CPU utilization and other metrics that any given array should be able to handle for a variety of workload types. HPE tracks and graphs overall array saturation in real-time against a weighted score to flag any hotspot issues. These overarching performance dashboards help administrators understand whether the array is under stress and then through advanced analytics pinpoint the root cause and provide specific recommendations to remediate the issues.

Now let's dive a bit deeper into the main components of this new analytical feature:

### **Overarching New Dashboard**

The HPE 3PAR SSMC starts with a customizable dashboard where panels are added or removed based on the customer's preferences for what is most important to monitor at any given time. The dashboard components associated with HPE Performance Insights are Performance and Saturation, Top Systems by Saturation, Top Performance Outliers, and Top Volume Hotspots by either IOPS or Latency. Figure 1 below shows an example of the dashboard for HPE 3PAR SSMC with some of these new panels included.

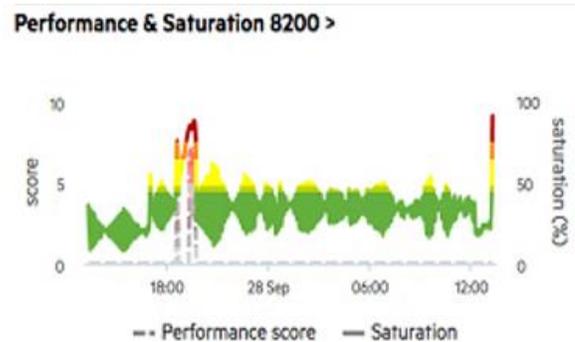
Figure 1: HPE 3PAR SSMC Dashboard Example



SOURCE: HPE

To demonstrate the power of the new dashboard, we will highlight a couple of examples. Figure 2 shows an example of the Performance and Saturation result for the last 24 hours. The saturation percentage for this HPE 3PAR 8200 array is based on a combination of the features that have been turned on versus the workload pattern the array is experiencing. The reason saturation is plotted against a performance score is because even though the array might experience high saturation, the performance may be perfectly acceptable given the workload pattern. Saturation can even go beyond 100% and still be operating within performance expectations. The performance score (based on latency thresholds) is always between zero and ten with zero meaning no performance impact for the workload. This score is where the knowledge of thousands of systems in the field correlated with this exact configuration and workload pattern brings analytical insight into the problem.

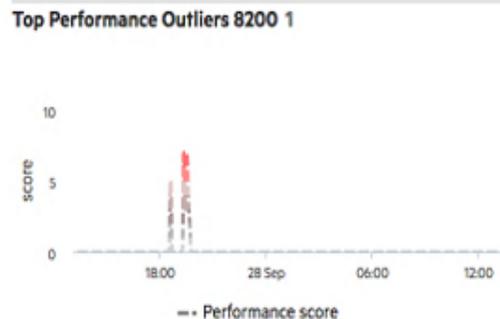
Figure 2: Performance and Saturation Chart



SOURCE: HPE

In the Figure 2 example, there are times when saturation is high with no performance impact and yet other times where higher saturation does cause some performance issues. Another chart called Top Performance Outliers isolates just the performance issues during the same period. Figure 3 is an example of that chart. Typically, a small blip in a performance anomaly is fine; however, to show you the power of analytical insight we will drill down into this performance outlier. If you right click you can drop into an analytics section of SSMC.

Figure 3: Performance Outliers Chart

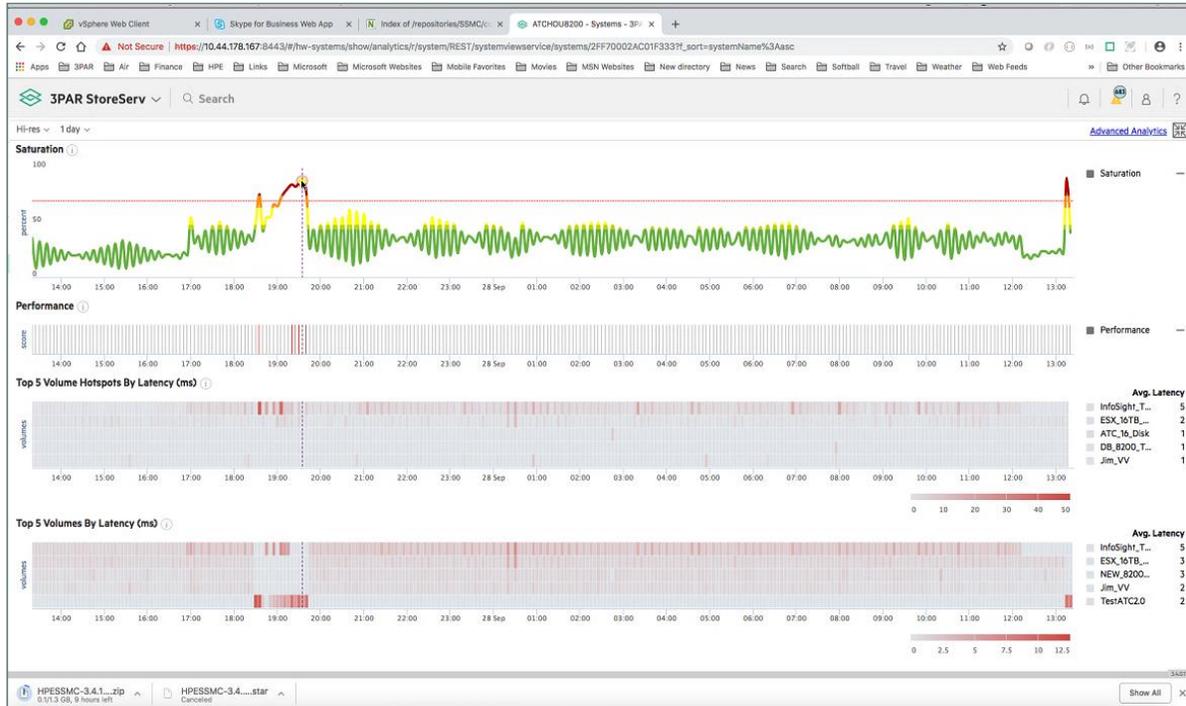


SOURCE: HPE

### Analytic Insight

Once in the analytical section of the SSMC interface, you can see even more detail around the performance anomaly. Figure 4 below gives you the screenshot that expands on the details around the performance hotspots.

Figure 4: Drill Down to Performance Analytical Section of SSMC



SOURCE: HPE

In the above screenshot, you see Saturation in more detail along with the top volumes causing the hotspot performance issues. The user can right click on any region of interest to get the top analytical reasons for the particular performance issue. Figure 5 demonstrates what you would see when evaluating a particular region. In this case, volume InfoSight\_Test\_8200 is experiencing an elevated latency. However, one of the key influencers of this latency issue is the change in workload patterns on adjacent volumes in the array. This information is critical to solving the performance issue since an administrator would typically only look at the hosts attached to InfoSight\_Test\_8200 and not changes in workloads on adjacent volumes.

Figure 5: Output of Analytic Insight



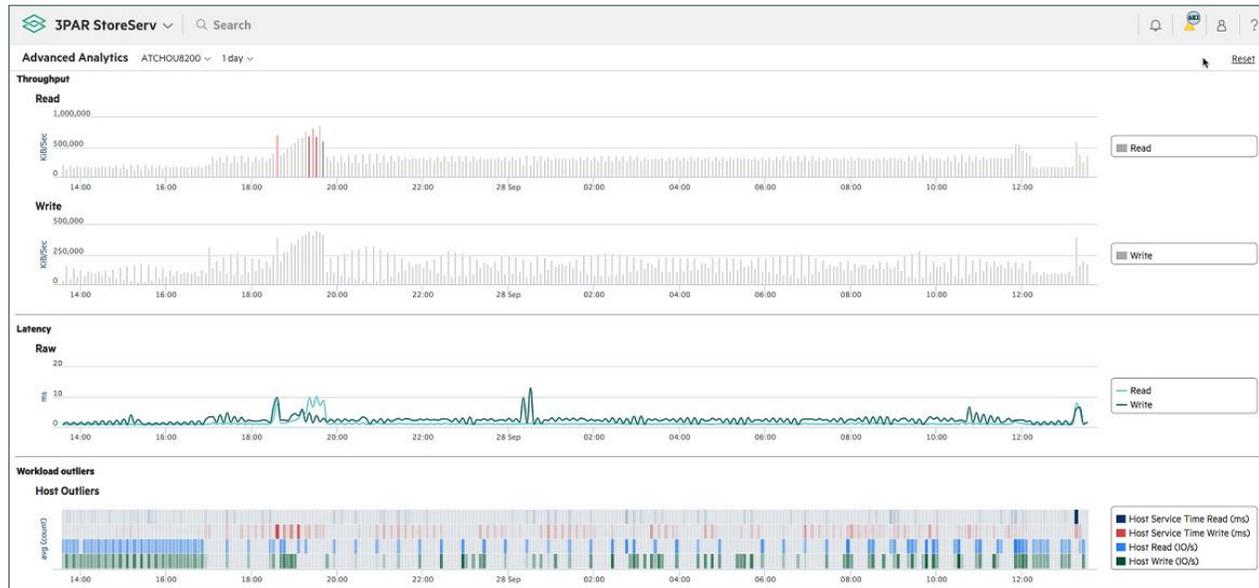
SOURCE: HPE

Administrators can dive even one level deeper into the detail around a performance issue by clicking on the Advanced Analytics section of the 3PAR SSMC.

## Advanced Analytics

Once in the Advanced Analytics section of the SSMC interface, you can gain even more performance insight on the array. Figure 6 below gives you the screenshot for that additional analytical information.

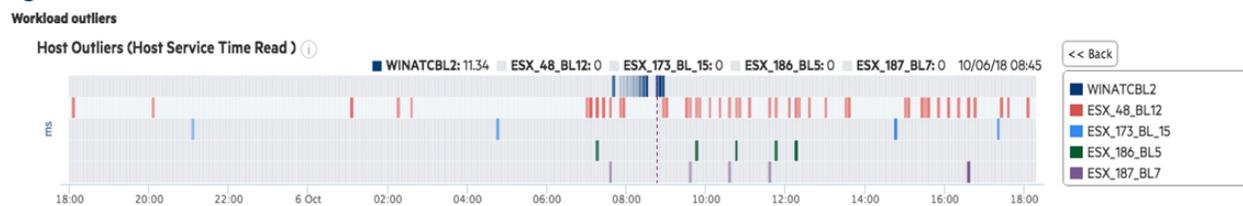
Figure 6: Drill Down to Advanced Analytics Section of SSMC



SOURCE: HPE

In the chart above, you can break down the performance impact based on host workload outliers and determine whether the impact is more throughput related or latency related. The performance impact of the Host Outliers is implied by the color intensity of the rectangles along the bottom section: the darker the color, the bigger the impact. Once you've identified the host issue that needs investigation, you can double-click on the rectangular cell, and the system will then expand to show the volumes associated with that performance issue. Figure 7 below shows an example of expanding host outliers related to read latency.

Figure 7: Drill Down to Host Workload Outliers with read service time issues.



SOURCE: HPE

The administrator can quickly identify what hosts are impacting the performance issue. This capability is extremely important as HPE 3PAR administrators can now navigate top to bottom from the host level down to each of the individual volumes to pinpoint the root cause of the performance anomaly.

Overall, the HPE 3PAR Performance Insights feature is very intuitive and easy to use. The initial dashboards give administrators an indicator as to whether an overall performance anomaly is even present. If needed, one can quickly navigate to determine whether the array generated the issue or whether a changing workload generated the issue. The administrator can also identify which hosts are involved even if the workloads are adjacent to the volume that is not meeting performance expectations. All of these analytical insights are driven by global learning across thousands of HPE 3PAR systems.

## TANEJA GROUP OPINION

With InfoSight technology, HPE is transforming the way companies track, assess and remediate storage performance. Administrators charged with monitoring and maintaining performance no longer have to rely on historical data or guesswork to anticipate and identify issues, nor blindly overcommit resources to try to address them. Instead, they can act confidently, taking guidance from AI-driven recommendations. HPE Performance Insights for 3PAR Storage takes the guesswork out of troubleshooting, allowing the administrator to successfully monitor and maintain performance without being a performance expert.

The goal of this technology brief was to review just a few of the many capabilities of HPE Performance Insights for 3PAR systems. We highly recommend that prospective customers evaluate all of the HPE 3PAR capabilities before making a purchase decision.

Looking forward, we see an opportunity for HPE to take the technology one step further, enabling autonomous, self-driving management of 3PAR performance, health and capacity, perhaps with analytics capabilities embedded in the array itself. Beyond that, we see HPE expanding the InfoSight portfolio to include servers as well. In the meantime, customers can continue to take advantage of HPE 3PAR Performance Insights to help keep their storage and application performance on track.

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