



REQUIREMENTS FOR **EFFECTIVE** **WORKLOAD OPTIMIZATION**

A Workload Automation Expert Series by Broadcom

The Snapshot

Why Workload Optimization is Critical

Across industries and around the world, automation workloads power an extensive and growing range of business-critical services. As organizations continue to pursue their strategic digital transformation and cloud-first initiatives, these workloads are more strategic than ever, and more complex to track and manage.

Today, automation workloads run in environments spanning from the mainframe to microservices, from on-premises data centers to the cloud. In this new era of workload complexity, it is more important than ever to have the right tools in place, so teams have the insights and control they need to ensure workloads, and the environments they run in, remain optimized.

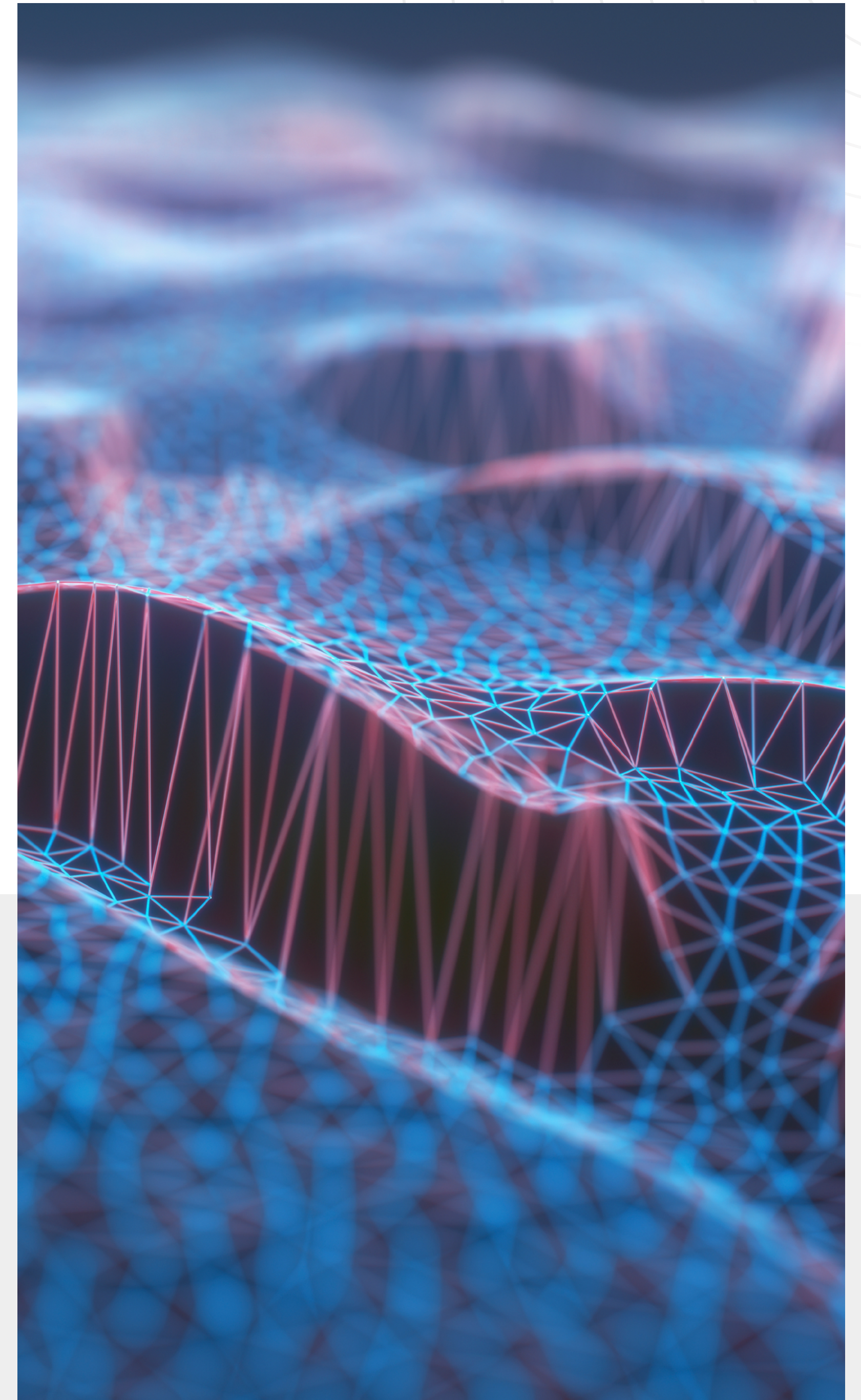
How This eBook Will Help

In this Workload Automation Expert Series edition, we provide an overview of the capabilities you need to establish effective workload optimization practices, so you can improve service levels. The series is based on in-depth conversations with Broadcom Automation experts and features spotlights on our most successful customers.

Our Expert

SHAWN ROBERTS | Automation Solution Architect, Broadcom

Shawn Roberts is an Automation Solution Architect at Broadcom with over 25 years of experience in workload automation. Shawn's experience with Autosystems Labs, Terma Software, and large banks informs his approach to assisting customers with workload performance and optimization strategy.



Increasing Complexity, Eroding Visibility

As enterprises seek to accelerate digital transformation and shift to the cloud, workload automation keeps getting more complex. There are now more integrations, more tools, and less visibility. Many organizations have multiple workload automation platforms, ranging from on-premises schedulers to tools from cloud and ERP providers. The result is fragmented views that leave teams struggling with suboptimal workloads and supporting infrastructures.

98%

report automation issues lead to SLA breaches.

80%

use three or more automation platforms.

69%

lack the data they need to optimize their workloads.

74%

of companies do not have end-to-end visibility for their automated processes.

88%

state that SLA breaches have a significant impact on customer satisfaction.

Without the ability to visualize the end-to-end automated process and deep historical monitoring data, it can be hard to gain a clear picture of the environment and optimize it. Jobs will be viewed independently, sometimes only at the object level, without insights into dependencies and business context.

While the demands on workload automation teams continue to grow, the time of automation experts remains constrained. Too often, experts need to choose between addressing potentially critical alert storms or optimizing workloads.

¹ Dimensional Research, *How Too Many Tools Obscure Automation Issues*, December 2023.

The High Cost of Latency

These issues leave businesses increasingly exposed to production issues—and the possibility of service level agreement (SLA) breaches, decreased customer satisfaction, loss of revenue, fines, and many other negative ramifications. For a retailer, this may mean missing pricing updates for a critical sales period like Black Friday. For an investment bank, a workload delay could result in a failure of a service that updates asset values, stalling their ability to sell mutual funds. If a pharmaceutical company can't update inventory due to workload latency, it could delay the production of life-saving drugs.

Missing Analytics and Long-Term Data Store

Workload scheduler optimization can take many forms, from adjusting specific job execution time frames to scaling hardware resources for added capacity during peak processing periods.

Most scheduler engines just run and churn through events, hour after hour. Typically, teams simply monitor their workload system to ensure that it is running. Effectively, they can tell if objects are running, or if they aren't. For most administrators, delving into millions of events to analyze micro-patterns and trends is viewed as far too big of an undertaking for far too little benefit.

Another issue is that workload optimization is only as good as the underlying data store. To perform accurate analysis and discover meaningful trends, users need comprehensive monitoring data, including long-term, definitional, and metadata. As a case in point, in a recent survey of automation teams, 69% said they lack the data they need to optimize workloads properly.¹

¹ Dimensional Research, *How Too Many Tools Obscure Automation Issues*, December 2023.

The Workaround

When teams don't have strong workload optimization capabilities driven by a long-term data store, they typically try to work around this gap in various ways:

- Some only measure workload performance against system performance.
- Some use tools that provide aggregated statistics for latency and throughput at the scheduler level. However, they still lack visualization or methods to measure and optimize performance at both the job level and the business process level.
- Some load aggregated statistics reports into third-party analytics tools. However, this requires the time and expertise of people that are often spread across multiple teams—and this still delivers only system performance analytics, rather than job and business process analytics.

Required Workload Optimization Capabilities

Today automation solutions require intelligent analytics to provide visibility across workloads, regardless of whether they are running on premises, in the cloud, or across a mix of environments. These solutions need to address some key requirements:

Consistent Monitoring and Collection of Data

Workload optimization efforts are only as good as the monitoring capabilities of the workload solution in place. If the solution is not consistently monitoring and calculating key performance metrics, there won't be enough data available to support optimization efforts.

Long-Term Historical Data Archive

A long-term data repository is key to establishing more accurate trending and analysis of workload performance, helping reveal scheduler component issues as well as application-specific inefficiencies. Maintaining a long-term historical repository of workload event data with an efficient, easy-to-use analysis and reporting engine is paramount for reducing risk.

Business Process Visualization and SLAs

To achieve end-to-end visibility of business processes, users need to be able to start with a specific job, and then create a chronological view of the business process that is based on all of that job's related associations and dependencies.

Associated SLAs represent both job linkages and event information over time. A composite history of multiple runs should be aggregated to show where specific jobs are impeding performance. Over time, SLA performance should be compared to determine real-time cases in which breaches occur or threaten to occur.

Users need solutions that can provide high-level SLA views, enabling them to drill down and pinpoint which jobs contributed to delays. Teams need to access intuitive visuals that can reveal the execution of each SLA, its historic and forecast performance, and details in terms of how execution time plots against the SLA deadline.

More Must-Have Capabilities

Capacity Optimization

Resource utilization represents a key focus area for optimization. Infrastructure performance is directly related to workload performance. More often than not, a slow-running agent or network issue can introduce immediate, cascading performance degradation.

Workload teams need to focus on component latencies, design and operational delays, and impingement on shorter, critical-path durations. With the right visualization of this data, they can refine the optimization strategy and remove inefficiencies.

Trending Analytics

The workload platform needs tools that provide real-time alerting for SLAs, variance in process executions over time, system delays, and even simulations. When teams have this advanced visibility, they can visualize and identify performance and latency issues. Further, they can objectively measure the impact of any remedial actions they may apply.

System and Workload Performance Analytics

To achieve ongoing optimization, it is important to recognize cases in which workload engine performance contributes to system-level delays. Workload engines may exhibit hourly, daily, or even quarterly trends, which are impossible to compare without a repository of long-term workload data.

Workload engines can be performing acceptably at the server level but have connections to slow server agents that are executing jobs. A historical, long-term view of performance data provides insight into cyclic or seasonal spikes and enables more trending accuracy.

If the load for specific agents is revealed, users can get the insight needed to correlate overall slowdowns with a given set of poorly performing servers. With granular monitoring and reporting on scheduler component performance, teams can better identify when issues arise, and respond more rapidly during outages.

Best Practices for Workload Optimization

Workload optimization is an ongoing process. Implementing a few best practices will make it more efficient and effective over time. Here are a few key places to start:

- Routinely schedule, execute, and review workload system performance reports to maintain confidence in performance. Investigate spikes, anomalies, and problematic trends.
- Ensure that benchmarks are established when making changes to workloads or associated systems. These benchmarks help ensure that any resulting performance improvement or degradation is measurable and can be illustrated.
- Leverage a top-down observability and notification framework. This framework should correlate discrete job-level detail with high-level component performance and enable users to uncover trends against historical baselines.
- Document causes of issues and remedial actions for future reference and to gain insights for increasing resilience.



The Broadcom Advantage: Automation Analytics & Intelligence

In today's increasingly complex IT environments, workload and application teams lack the optimization tools they need, and struggle to gain an end-to-end view of business processes. Without effective optimization, environments become over-resourced and more costly. The risk of SLA breaches leaves businesses increasingly exposed to lost revenue, fines for non-compliance, and decreased customer satisfaction.

With Automation by Broadcom's Automation Analytics & Intelligence (AAI) capabilities, teams can optimize workload automation and service delivery. AAI delivers advanced analytics and visualization with:

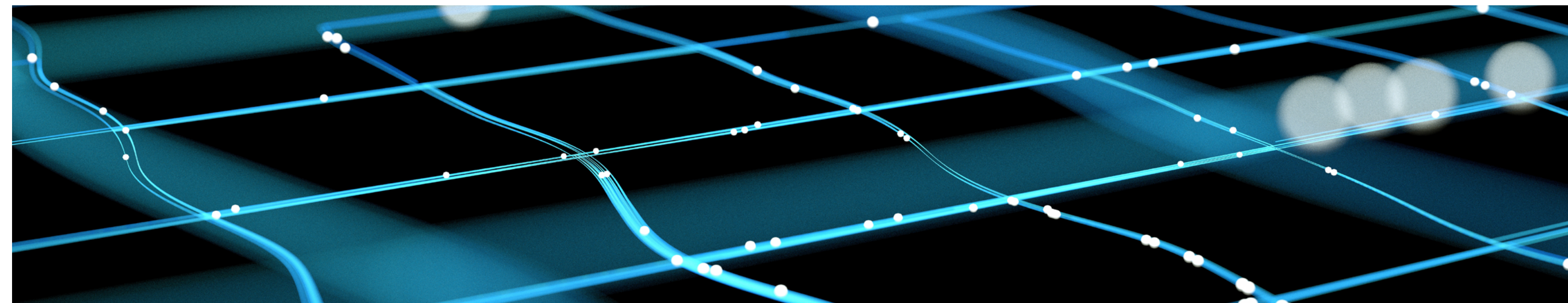
- **True automated business process insight.** AAI delivers dynamic and automated critical path visualization, process dependency insight, SLA awareness, and unified visibility across scheduling engines, platforms, and hybrid cloud environments.
- **Workload optimization.** Teams can harness consistent monitoring data, a long-term historical data archive, capacity analytics, trending analytics, business process visibility, system and workload performance analytics, and integration readiness insights.

Benefits

AAI enables organizations to realize these gains:

- **Improve service delivery.** AAI helps teams get a better understanding of how workloads affect business services and how to optimize SLA performance. AAI provides the capability to spot problems more effectively, establish a more holistic understanding of performance, and more accurately measure improvements.
- **Maximize operational and cost efficiency.** With AAI, automation groups minimize their time monitoring jobs and addressing alerts. Operations and business users can shift from monitoring objects in isolation to monitoring full business processes. Users can begin to shift from a reactive monitoring model to a predictive and proactive approach.

AAI capabilities are included with AutoSys Workload Automation, Automic Automation, CA 7 and ESP. AAI is also available for Tidal, IWS (distributed and mainframe), Control-M (distributed and mainframe) and cloud-native tools, Apache Airflow and Google Cloud Composer.



AAI in Action: Investment Firm Optimizes Batch Processing

The Problem

For one of the largest investment firms in the world, with trillions of dollars in assets under management, delays in batches can cost the business millions of dollars in lost revenues and fines.

The firm had amassed over 150 applications, and jobs had grown to 65,000. It had become increasingly difficult to keep up with the demands of this large-scale environment. Batches were completing late, sometimes up to three hours past their deadline, and they were experiencing a 10% failure rate.

Every three to five years, they assembled large teams of 30 people or more to make a dedicated effort to improve critical batch processes. This was a massive, labor-intensive effort; people had to dedicate several months of their time to this process.

The Requirement

To overcome these challenges, the workload team needed to establish a more holistic view of how batches were performing, with improved troubleshooting and operational insight.

The Solution

The organization changed course and assigned a dedicated team to batch optimization. Their charter was to optimize workload automation and get the most out of their tools. With AAI, the team gained the visibility they needed to preempt potential issues and boost service levels. With dashboards and insightful trending analytics driven by long-term historical monitoring data, they could optimize workloads. Consequently, they were able to reduce the nightly failure rate from 10% to less than .002%. Resolution time was also reduced from 15-30 minutes down to two to three minutes. Further, they ultimately shaved one to one-and-a-half hours off their nightly batch processes.

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nightly batch processing



Conclusion

Across the enterprise, workload automation underpins the services that are critical to business' fortunes. However, increasing complexity and interdependencies can expose the business to an increased risk of production issues. AAI provides the intelligent workload observability needed to mitigate these risks. With the solution, teams can view workload automation performance holistically and proactively identify issues and optimization opportunities.

To see these capabilities in action, [request a Demo today.](#)

About Broadcom

Broadcom Inc. (NASDAQ: AVGO) is a global technology leader that designs, develops, and supplies a broad range of semiconductor, enterprise software, and security solutions. Broadcom's category-leading product portfolio serves critical markets including cloud, data center, networking, broadband, wireless, storage, industrial, and enterprise software. Our solutions include service provider and enterprise networking and storage, mobile device and broadband connectivity, mainframe, cybersecurity, and private and hybrid cloud infrastructure. For more information, go to www.broadcom.com.

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