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SHOWCASE

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Storage Fabric Automation Becomes Essential

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Abstract: Faced with a recent surge in digital demands, IT administrators' time is more valuable than ever. Time wasted with basic configuration, issue isolation, and troubleshooting is more than a nuisance; it is a stumbling block for enterprises. Automation offers hope but is often an add-on that brings in added complexity and resources like a DevOps team. Automation needs to be simple for IT and built into the infrastructure. Brocades Autonomous SAN technology offers an impressive step to achieving this goal because it can help organizations understand, troubleshoot, and optimize their data centers without human intervention.

Overview

IT has long been filled with rigorous tasks, often daunting but typically manageable, fraught with 2:00 a.m. calls to resolve issues, weekend work for basic maintenance, and wasted personnel hours isolating issues to the right vendor or component. IT is a complex 24-hours, 7-days-a-week job, one that is quickly becoming even more complex as the rise of the digital economy changes the definition of success for IT.

The demands placed upon IT administrators continue to scale and evolve. In fact, 80% of storage administrators report that they have taken on additional or new responsibilities to support their organization's digital transformation goals and initiatives or are under pressure to do so.[1] As the volume and diversity of those responsibilities increase, the pace accelerates as well. Nearly three-quarters (74%) of storage administrators agree that their organization is under pressure to accelerate IT infrastructure provisioning or deployment to support developers and line-of-business teams.

IT is being judged by a new set of rules. Not only do IT services need to be reliable and predictable, but they are now also being judged on how quickly they are deployed. IT essentially needs to do the impossible: accelerate IT delivery, support increased investment in digital transformation, and keep pace with an ever-increasing number of digital demands from line-of-business teams and developers, while reducing cost with the same or fewer IT personnel as talent becomes scarcer. Automation seems like a perfect answer—able to expedite operations, free personnel cycles, and remove human errors, all of which enable maintenance tasks to be performed automatically during production hours or in nightly maintenance windows, removing the need to do basic maintenance on weekends. Integrating automation tools, however, often adds another layer of complexity, risk, and learning.

What if the infrastructure that your organization already has deployed could self-diagnose and resolve issues without intervention? What if the SAN could monitor application performance, identify network congestion, and prioritize bandwidth? What if the hardware could automatically isolate issues to a configuration error or a malfunctioning component in the data center, even if that component was from another vendor? Brocade Autonomous SAN technology is architected and designed to do this and more, offering an essential step in the

[1] Source: Enterprise Strategy Group Research Report, *Navigating the Cloud and AI Revolution: The State of Enterprise Storage and HCI*, March 2024. All Enterprise Strategy Group research references and charts in this showcase are from this research report unless otherwise noted.

direction IT infrastructure must go. The goal is to move to a time when infrastructure solves its own issues, tells users why it was misbehaving, and optimizes itself, freeing IT administrators to address the larger and more valuable concerns of the business.

Automation Is a Must, and Modern Businesses Are Embracing IT

As a larger percentage of business success depends on data, IT is forced to assume a larger burden. More than two-thirds of surveyed storage administrators (68%) believe the overall complexity of their IT infrastructure is slowing down IT operations and digital initiatives. The demands of a digital business exacerbate this problem. Ninety percent of organizations agree that IT is more complex today than it was two years ago.[2]

To address the rise in demand for data and IT services, businesses are often challenged with finding experts and, thus, switch their focus to hiring more generalist positions. IT organizations are nearly twice as likely to identify that the bulk of their expected staff openings will be IT generalist positions (63%) versus those that expect their staff openings will be filled by domain specialists, such as storage administrators (32%). As a result, the depth of knowledge in specific subject areas can be expected to diminish. Under these conditions, it is increasingly less likely that an IT admin will have the time, experience, or ability to delve into the nuances of data fabric technology—for example, to diagnose and troubleshoot complex issues. As a result, IT organizations are looking at automation to fill the gap.

One of the most commonly identified data center modernization investments planned for the next 12 to 18 months centers on monitoring and observability. Forty-two percent of IT organizations expect to make significant investments in IT monitoring and observability tools, and 30% expect to make significant investments in their use of IT management, orchestration, and automation tools.[3] While these statistics offer insight about organizations' automation goals, actual execution is often more complex.

Focusing specifically on infrastructure management technologies, investment in IT automation tools (37%) falls only behind security tools (50%) in terms of investment priority (see Figure 1).[4] Next-level intelligence and automation must be integrated into the infrastructure so that their benefits can be accessible via existing tools, processes, and skill sets. In this manner, an IT organization can reap the full benefits of automated technology.

[2] Source: Enterprise Strategy Group Research Report, *2024 Technology Spending Intentions Survey*, February 2024.
[3] Ibid.
[4] Ibid.

Figure 1. Top Data Center Infrastructure Management Investment Areas

Source: Enterprise Strategy Group, a division of TechTarget, Inc.

What Part of the Data Center Should Have Automation Integrated?

To answer the question of where to integrate automation, a case could, and probably should, be made that integration must be everywhere. With that in mind, one location, specifically IT infrastructure that comprises the storage network, presents a vital and valuable location for the collection of insight and the application of automation in the data center. Fibre Channel switches are well situated to collect telemetry data on data flows and movement. The storage network has visibility to a wealth of physical devices, including the network, the hosts, and the storage targets.

The SAN's position at the center of the data path offers a prime location to automatically configure topologies when provisioning new infrastructure. Its visibility into multiple components can help organizations intelligently diagnose issues. The fabric can also redirect traffic to automatically mitigate issues around poorly behaving components.

Brocade Autonomous SAN

Broadcom, a leader in storage networking technology, has introduced its Brocade Autonomous SAN technology, which captures rich telemetry data on the fabric infrastructure, connected endpoints, data traffic and flows, and

application environment. With this autonomous SAN technology, Brocade aligns with a broader trend in the IT infrastructure industry to offer more intelligent and self-optimizing systems but takes it a step or two forward.

Other technologies offer insight inside their network, server, or storage systems, which, while valuable, does not address issues derived from the interactions between different servers and storage devices from different vendors. Brocade's ability to automatically identify and resolve these typically more complex interoperation issues makes its technology so valuable. The Fibre Channel switches' position in the data path enables it to have visibility into the surrounding components and gather intelligence not only on Brocade's infrastructure but on the entire storage network and the surrounding components as well.

Brocade Autonomous SAN comprises three values: self-learning, self-optimizing, and self-healing. Combined, these three elements deliver a massive step forward in achieving autonomous infrastructure.

Self-learning

The Brocade technology analyzes millions of data points to create a real-time understanding of the data fabric environment. Through this insight, Brocade can identify individual applications and their performance characteristics across the fabric, as well as identify the performance of the various devices that comprise the fabric—the switches, hosts, and targets. Once the data fabric is understood, Brocade can automatically learn application flows. With this data, Brocade then creates health metrics on each component along with the applications and then presents this data to the administrator. Brocade automatically identifies and detects abnormal traffic behaviors and areas of degraded performance. Combined, these capabilities eliminate countless wasted personnel cycles doing manual analysis to capture, track, and maintain this detailed level of data traffic understanding. Even if the personnel cycles were available, this level of analysis is becoming nearly impossible to maintain manually given the massive scale of modern data center environments.

Self-optimizing

With its application-centric insights, Brocade enables IT administrators to apply priorities for specific application data traffic. These prioritizations can then help guarantee performance levels by automatically monitoring and shaping traffic as patterns shift, when congestion occurs, or when components misbehave or even fail. For example, Brocade will identify a misbehaving device that stops returning buffer credits to the switch. In a traditional environment, an issue would cause the switch to stop sending frames to the device, causing frames to back up in the fabric. With its Traffic Optimizer technology, Brocade can automatically group traffic flows with similar attributes (such as priority, performance, or protocols) as a dedicated performance group. In this way, Traffic Optimizer prevents slower-performing workloads from hindering high-performance or high-priority data traffic.

In addition, Brocade Autonomous SAN will isolate the port traffic for a misbehaving device to a virtual channel of the fabric and allow all other traffic to go around. Brocade can also automate manual activities such as those used for new infrastructure deployment and provisioning, which can expedite the deployment of IT services, something line-of-business executives are clamoring for, while minimizing the risk of human error.

Self-healing

Extending the value of Brocade's ability to self-learn and self-optimize, its Autonomous SAN technology can automatically identify and resolve issues. For example, Brocade can identify data traffic congestion and automatically failover or adjust traffic. If congestion occurs at the server due to abnormal or unexpected server behavior, Brocade technology will identify the congestion and notify the affected devices (host adapters or storage targets) to take action through an alert signal. Based on that alert, the device will take automatic corrective action to mitigate the impact of the congestion. This activity will generate an event notification that will be rolled up in the management tools to make the administrator aware the SAN had an issue and fixed it.

Imagine a scenario where this sort of issue occurs at 2:00 a.m. and the network mitigates the issue automatically and flags the trouble component for resolution, notifying the administrator to resolve it as soon as possible. Brocade's technology helps enable the infrastructure to manage itself, which, in turn, helps minimize the chances of working nights or weekends. In a similar fashion, Brocade can also detect and automatically reconfigure fabric configurations that fall outside best practices.

Brocade includes its autonomous SAN technology in its Brocade Gen 7 portfolio.

As application demands per host scale over time, the likelihood of port congestion increases. To mitigate the issues that arise due to port congestion, Brocade offers its Fabric Performance Impact Notification (FPIN) capability, which sends a port congestion notification to the end device. The end device can then take action to resolve the congestion by throttling down its I/O requests, thereby reducing the impact that the host has on other traffic in the storage network. The result helps mitigate congestion automatically and helps ensure better and more predictable performance.

Conclusion

Businesses can succeed or fail based on their ability to maximize the potential of their digital information and the infrastructure that supports it. As revenue opportunity and IT activity become more intertwined, a larger burden is placed on IT. This is the current state of affairs for modern business, with more than half of businesses (55%) agreeing that data is their business (i.e., they offer digital or information-based products or services).

IT needs automation for assistance. IT needs its infrastructure to address the tedious, time-consuming, labor-intensive, but ultimately lower-value tasks so that precious high-value IT resources can focus on driving the business. Data center infrastructure is adding intelligence to help. Organizations are investing in automation. To truly transform the data center, though, infrastructure must come with automation built-in throughout the platform and offer insights not just on itself, but on the surrounding ecosystem as well. Brocade Autonomous SAN presents a huge step in the right direction, automatically understanding, optimizing, and healing a major portion of the data center. This area is poised to return countless benefits to those organizations that leverage its capabilities.

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