



# The Business Value of NVIDIA Ethernet Switch Solutions for Managing and Optimizing Network Performance

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**BUSINESS VALUE HIGHLIGHTS**

Click on highlights below to navigate to related content within this PDF.

**360%**  
five-year ROI

**41% reduced**  
total cost of operations

**11-month**  
payback period

**42% more**  
efficient network  
management staff

**2x more**  
staff time spent on  
innovation-related activities

**21% more**  
efficient network security

**\$7.6 million additional**  
revenue gained or protected

**64% reduction**  
in unplanned downtime

**18% lower**  
application latency

## Executive Summary

IDC conducted research that explored the value and benefits of using the NVIDIA Cumulus Linux network operating system (NOS) in conjunction with NVIDIA Spectrum Ethernet switches (formerly known as Mellanox Ethernet switches). As the name implies, Cumulus Linux is based on Debian Linux and supports cloud datacenter and enterprise use cases. The NVIDIA Spectrum Ethernet switch family includes a broad portfolio of top of rack (ToR), aggregation, leaf and spine, or core datacenter switches that can be deployed in Layer 2 and Layer 3 topologies, in overlay-based virtualized datacenter networks, or as part of high-performance Ethernet-based storage fabrics. The research included interviews with organizations that were using this combined solution set and had detailed knowledge about its benefits and costs.

**IDC calculates that study participants will realize value worth an annual average of \$2.78 million per organization (\$853,900 per 100 switching ports) by:**

- ▶ Helping network operations and management staff be more efficient while allowing them to spend more time on innovation and business-related projects
- ▶ Improving overall network performance including increasing the efficiency of network security and reducing application latency
- ▶ Leveraging improved network and application performance while lowering costs to bolster business operations and results
- ▶ Minimizing the effects of unplanned downtime, thereby lowering business risk and increasing productivity

## Situation Overview

The datacenter is the engine room of cloud-based organizations, where applications that drive employee productivity and customer engagement are hosted. The datacenter network provides critical support for those applications and must possess automated agility, flexibility, and programmability as well as more traditional attributes such as reliability and scalability. Increasingly, the datacenter network must possess both brains and brawn, delivering a robust and extensible foundation for the workloads and applications that are indispensable to digital transformation in the cloud era.

This means that the modern datacenter networks must combine stellar switching performance with software-based automation, flexibility, and programmability. For network operators, that means care must be given to select switching platforms that can scale with their bandwidth requirements, all the way up to 400GbE, while also offering low latency, reliability, and rich protocol support at Layer 2 and Layer 3. For example, Spectrum Ethernet switches provide a fully shared packet buffer to maximize burst absorption and provide consistent and deterministic performance. In addition, network operators must consider whether these switches are capable of running a modern Linux network operating system for full automation, programmability, visibility, and management with popular Linux-based infrastructure automation tools.

In bringing together the right combination of network hardware and software, datacenter and network operators can achieve operational and business outcomes that translate into business value in relation to not only the network and network operations, which becomes more cost-effective in terms of capex and opex, but also how quickly and successfully new products and services are brought to market by the organization as a whole.

## NVIDIA Ethernet Switching Overview

### NVIDIA Cumulus Linux and NVIDIA Cumulus NetQ

Designed to support network disaggregation—the decoupling of network hardware from network software for operator choice and flexibility—Cumulus Linux is an open network operating system that enables operators to automate and scale using web-scale cloud practices and principles.

Built on standardized Debian Linux, Cumulus Linux is designed to accommodate open architectures and facilitate simple automation. Capable of running native Linux applications, Cumulus Linux works with standardized automation and network tooling, which not only results in tool consolidation but also helps achieve greater operational efficiencies. Cumulus Linux also supports a wide range of Layer 2 and Layer 3 network protocols.

Offered in conjunction with Cumulus Linux, NVIDIA Cumulus NetQ is a network management toolset that provides actionable insights and operational intelligence relating to the datacenter network. NetQ utilizes real-time telemetry for troubleshooting, visibility, and support for

automated workflows from a single GUI interface. Featuring life-cycle management functionality, NetQ enables operators to simply upgrade, configure, and deploy network elements and monitor the network to address potential issues before they result in performance degradation and disruptions. The result is reduced operator time spent on network maintenance and troubleshooting.

NetQ is available as software that can be deployed on premises or as a secure cloud service that is intended to make it simpler to deploy and scale. NetQ as a cloud service also facilitates faster upgrades and zero maintenance and minimizes support for management of appliance hardware.

## NVIDIA Spectrum Ethernet Switches

Based on the NVIDIA Spectrum programmable application-specific integrated circuit (ASIC) network silicon, the NVIDIA Spectrum Ethernet switch portfolio offers bandwidths of 10/25/50/100/200/400GbE. The switches can also run modern Linux-based network operating systems such as Cumulus Linux and Software for Open Networking in the Cloud (SONiC), giving network buyers choice and flexibility in supporting datacenters running a wide range of applications.

Spectrum Ethernet switches feature extensive Layer 2 and Layer 3 protocol support and can be deployed as ToR, aggregation, or core switches; or in CLOS leaf-and-spine networks; or as underlays in overlay-based virtual networks. They also support high-performance Ethernet storage fabrics and converged Ethernet networks. Spectrum's Open SDK API also allows the Ethernet community to quickly build and contribute open source networking applications and protocols.

# The Business Value of Cumulus Linux and Spectrum

## Study Demographics

IDC conducted research that explored the value and benefits of using a solution set from NVIDIA to improve interviewed organizations network operations. The research included seven interviews with organizations that were using this solution and that had experience with or knowledge about its benefits and costs. During the interviews, companies were asked a variety of quantitative and qualitative questions about its impact on their IT and network operations, core businesses, and costs.

**Table 1** (next page) presents study demographics and profiles. The organizations interviewed had a base of 11,623 employees and annual revenue of \$18.1 billion, indicating the involvement of several large companies. This workforce was supported by an IT staff of 177, managing 82 business applications on behalf of 11,623 internal users and 50,500 customers. There was a good mix of vertical markets represented, including the professional services, information technology, government, healthcare, and manufacturing sectors. (Note: All numbers cited represent averages).

**TABLE 1**  
**Firmographics of Interviewed Organizations**

Firmographics	Average	Median	Range
Number of employees	11,623	6,500	160–33,000
Number of IT staff	177	60	3–500
Number of IT users	11,623	6,500	160–33,000
Number external customers	50,500	1,050	50–200,000
Number of business applications	82	20	1–300
Revenue per year	\$18.1B	\$12.0B	\$84.0M to \$50.0B
Industries	Professional services (2), information technology (2), government, healthcare, and manufacturing		

n = 7, Source: IDC In-depth Interviews, December 2020

## Choice and Use of NVIDIA Cumulus Linux and Spectrum

The companies that IDC surveyed described usage patterns for the Cumulus and Spectrum solution and provided relevant data about their overall IT, networking, and business environments. They also discussed the rationale behind their choice of NVIDIA, citing factors such as the platform’s overall cost-effectiveness and its ability to provide improved network scalability and security.

### Study participants commented on these benefits:

▶ **Better network features at predictable prices:**

*“NVIDIA Spectrum had advantages they bring to bear from a network perspective, like the RDMA over Converged Ethernet (RoCE). From a business perspective, the price is good, and power can optimize our network, which runs in North America, Europe, and Asia. We need a technology that can handle our very distributed worldwide requirements. For Cumulus, when we first saw the console, we could see that storage and portals were a one-stop shop and distributed like we are. Together, they are great from a budget standpoint with predictable annual operating statistics. We know what the big capital expenses are over the next two or three years ...”*

▶ **A cost-effective solution that provides scalability:**

*“One reason for selection was cost because Cumulus and Spectrum is a much more cost-effective solution. We could keep scaling as the business grows, and it grows the infrastructure very easily. It allowed us to get away from ‘rip and replace’ ... .Instead, it is ‘expand and grow.’”*

▶ **Good security and compatibility with current environment:**

*“Some of our security team had good experiences with Cumulus. They wanted to use it for some specific applications and servers that they wanted to spin up. The specific IT security use cases would operate with a VMware environment. The Cumulus/Spectrum environment works with VMware.”*

▶ **Wanted a solution that was easier to manage:**

*“The primary driver was to make network management hardware agnostic. The broader point is that with legacy switches, every CLI has its own command structure and syntax. If you have an eclectic mix of hardware, the network admin is forced to remember a myriad of syntaxes and so on.”*

Table 2 describes the organizational usage patterns associated with use of NVIDIA by interviewed companies. Across all companies, there was a substantial Cumulus and Spectrum footprint consisting of 3,255 Ethernet switching ports associated with platform use. Foundationally, the NVIDIA infrastructure played a strong role in the business operations of these companies by supporting 57% of all business applications and 72% of all revenue.

**TABLE 2**  
**Organizational Usage of Cumulus and Spectrum**

NVIDIA Use	Average	Median
Number of datacenters	17	2
Number of physical sites	3	1
Number of internal users	4,619	600
Number of Spectrum datacenter Ethernet switching ports	3,255	304
Number of interconnected routers	105	10
Number of business applications	47	20
Percentage of revenue	72	73

n = 7, Source: IDC In-depth Interviews, December 2020

## Business Value and Quantified Benefits

IDC’s Business Value model expresses the benefits for organizations of using the Cumulus and Spectrum solution to support their networking operations. Survey data obtained from Cumulus and Spectrum customers was applied to this model to arrive at an array of quantified post-deployment benefits. Using this methodology, IDC found that these customers realized significant value for their IT, networking, and business operations.



Interviewed organizations reported that use of the Cumulus and Spectrum platform created efficiencies for their IT and networking staff and that this benefit allowed them to shift the emphasis of these teams to innovation and business-related projects. Adoption of the platform also up-leveled network performance, enhanced network security, and reduced application latency. In turn, improved network performance coupled with minimizing the effects of unplanned downtime served to lower business risk and increase productivity, leading to better business results.

### Study participants described these benefits in detail:

#### ▶ Easier management for IT:

*“The biggest benefit is operational efficiencies—it’s easier to deploy and manage from an IT standpoint. Any time we need to make changes to the infrastructure, for whatever reason, we can do it more simply and quicker. And the raw IT budget has been reduced.”*

#### ▶ Cost savings from a business and IT standpoint:

*“We’re absolutely saving money with the network and the virtualization. There is no question about it. It’s a massive benefit and not just from a bottom-line perspective. There are also soft dollar savings on training time spent ... We have standardized and now we don’t have different technologies in the mix ...”*

#### ▶ Linux making the network easier to understand:

*“Price, management, and deployment are the biggest benefits. For example, the Linux-based NOS. Our team has lots of experience with Linux. Management is simplified and deployment is much quicker. The Linux environment is normal for our engineers, and deployment and configuration management are a more familiar domain.”*

#### ▶ Global scalability and improved virtualization:

*“The biggest benefits are network distribution, faster speeds, and lower power ... Overall, we are getting the ability to distribute our network from Tel Aviv to London, for example, in a seamless fashion. Virtualization is also a big one, and it allows us to consolidate apps and operating systems.”*

**Based on interviews with seven intensive users of the Cumulus and Spectrum solution and as shown in Figure 1, IDC quantified the value these interviewed organizations will receive over five years at an annual average of \$2.78 million per organization (\$853,900 per 100 switching ports) in the following areas:**

#### ▶ IT staff productivity benefits:

IT and networking teams benefit from increased efficiencies in their routine operations with the adoption and use of the Cumulus and Spectrum solution. IDC puts the value of these benefits at an annual average of \$1,459,000 per organization (\$448,000 per 100 switching ports).

#### ▶ Business productivity benefits:

The improved performance and efficiency offered by Cumulus and Spectrum environments enable interviewed organizations to run more reliable networks in support of their business-critical applications. This benefit contributes to better business results. IDC quantifies these benefits as worth an average of \$1,188,000 per organization (\$365,000 per 100 switching ports).



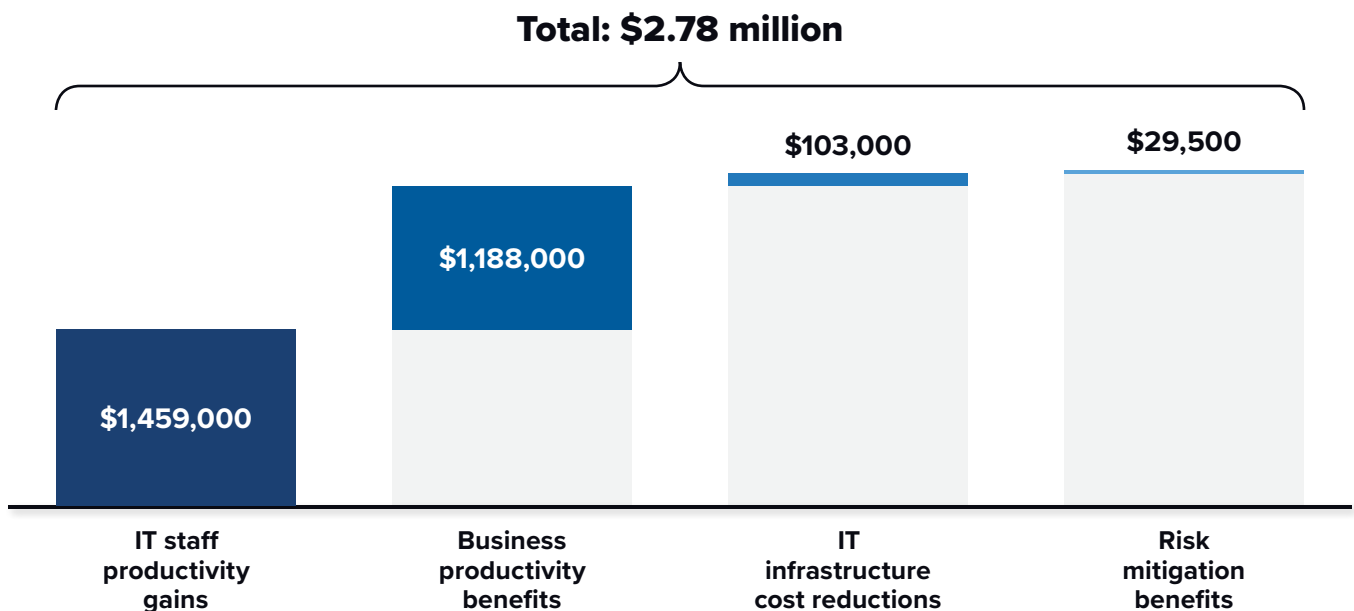
▶ **IT infrastructure cost reductions:**

Operating a more efficient IT and networking infrastructure serves to reduce ongoing operational costs for Cumulus and Spectrum customers. IDC projects that study participants will save an annual average of \$103,000 per organization (\$31,700 per 100 switching ports).

▶ **Risk mitigation — user productivity benefits:**

By having more reliable network operations, interviewed companies reduce the incidence of unplanned downtime, which serves to minimize their overall business risk. This benefit results in productivity and revenue gains that IDC calculates will be worth an annual average of \$29,500 per organization (\$9,100 per 100 switching ports).

**FIGURE 1**  
**Annual Average Benefits per Organization**  
 (cost by an annual average, \$)



n = 7, Source: IDC In-depth Interviews, December 2020

## Improvements in Network Operations and Management

Network administrators and teams face many challenges in working to ensure levels of networking performance and availability that can optimally support their business-critical applications. New solutions based on the software-defined datacenter can provide the basis for capabilities that optimize the entire networking stack. To that end, Cumulus provides a Linux-based network operating system for network infrastructure that supports large datacenter, cloud, and enterprise environments.

Study participants described how the Cumulus/Spectrum solution both improved overall network management and bolstered security and IT/network team productivity. They discussed how it helped their network teams spend less time on routine tasks and more time on projects and activities in direct support to the business.

**Study participants commented on these and other benefits:**

▶ **Cumulus and Spectrum make IT more productive:**

*“We appreciate the additional capabilities that Cumulus and Spectrum give us. We have not had to increase head count ... This is important with COVID-19 as a healthcare organization. We have been able to continue down this path of increasing our server footprint and still be able to handle it with the same staff. We can continue to improve our processes from start to finish building out our environment. That part of our productivity has improved a lot.”*

▶ **Easier integration means lighter management and training:**

*“It integrates very easily into our environment. So fewer people are needed to manage it, and less training is required. It is an easy way for people to manage the entire environment. Cumulus and Spectrum fit well with our long-term plan to become more software defined.”*

Because of the range of features that the Cumulus/Spectrum solution offers, such as Linux-based toolsets, network teams were more efficient in the process of managing their network infrastructure. As one study participant noted: *“There’s a 50% savings in time management including time to deploy and to make changes ... We make heavy use of the configuration management afforded by Cumulus. As an example, for a legacy switch, you would have to log in and run dozens and dozens of commands to complete tasks. With Cumulus, you prep the configuration and literally push it out. So the actual effort to make the change is greatly reduced.”* IDC quantified these improvements, and as shown in **Table 3**, network infrastructure productivity improved by 42% after adopting the platform. This resulted in an annual productivity-based business value of \$652,800.

**TABLE 3**  
**Network Management Impact**

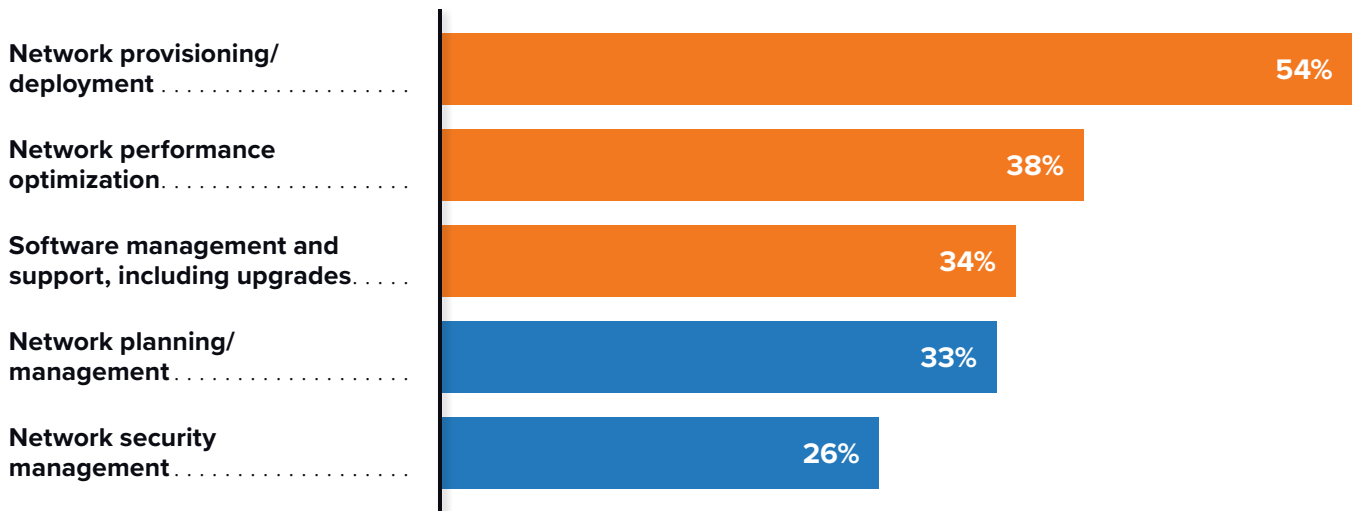
Impact	Before Cumulus and Spectrum	With Cumulus and Spectrum	Difference	Benefit
Management of network infrastructure productivity impact (equivalent FTEs)	15.6	9.1	6.5	42%
Salary cost per year per organization	\$1.56M	\$909,700	\$652,800	42%

n = 7, Source: IDC In-depth Interviews, December 2020

IDC drilled down on a series of typical network team tasks and functions that were optimized by the adoption of the Cumulus/Spectrum solution. As shown in **Figure 2**, the three greatest improvements were seen in network provisioning/deployment (54%), network performance optimization (38%), and software management and support, including upgrades (34%).

**FIGURE 2**  
**Network Function Impact**

(% improvement)



n = 7, Source: IDC In-depth Interviews, December 2020

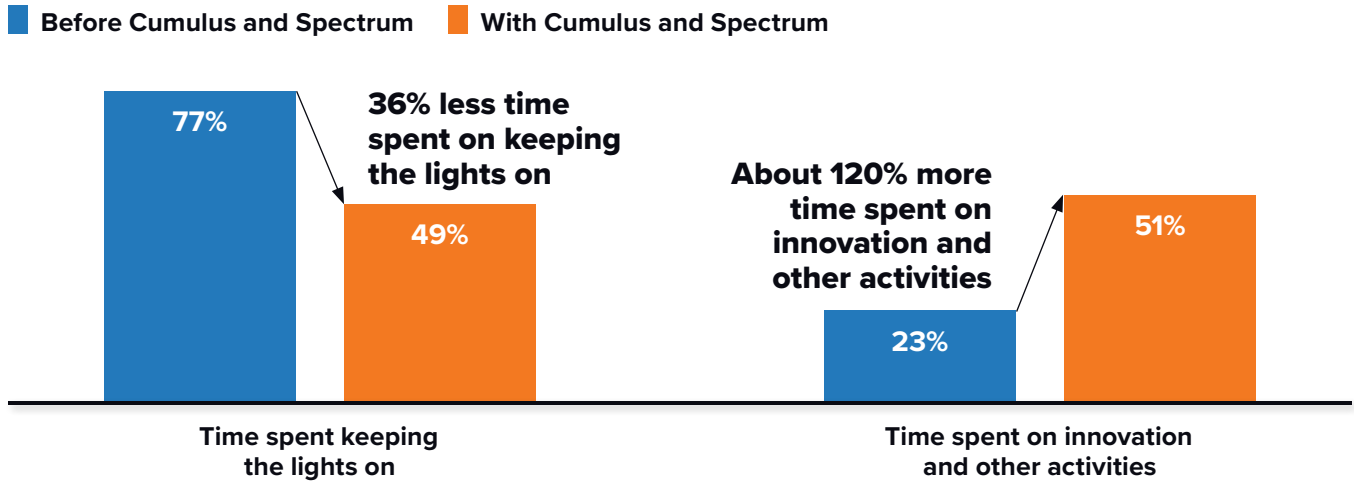
Study participants described how their network teams were able to focus less on “keeping the lights on” (i.e., the routinized tasks and operations that were necessary to manage and maintain basic network performance). Because this time was freed up, more staff time could be shifted to work that focused on IT and business innovation and other activities that supported business initiatives.

As one study participant noted: *“There are now more people to do more things. Everyone is now a high-level engineer. We no longer need to designate certain responsibilities across the team such as VMware, network, storage, and software updates. We have consolidated the roles, and anyone on the team can do everything. If something requires a more in-depth effort or engagement, we now have the time for it.”*

**Figure 3** (next page) quantifies these improvements showing that, after adoption, 36% less time was spent on “keeping the lights on.” This freed up network teams to spend approximately 120% more time on direct business support and innovation-related tasks and projects.

**FIGURE 3**  
**Impact on Network Team Activities**

(% improvement)



n = 7, Source: IDC In-depth Interviews, December 2020

The Cumulus/Spectrum solution set has improved the agility that IT organizations need for maintaining network infrastructure and deploying and updating new network resources. IDC identified four key network management tasks that were impacted by improvements in agility and quantified improvements for each of them (see **Figure 4**). After adoption, the process of upgrading Ethernet switches was able to be accomplished 59% faster. Similar levels of improvement were seen for the process of installing new Ethernet switches (59%) and installing new routers (43%).

**FIGURE 4**  
**IT Agility Impact**

(% improvement)



n = 7, Source: IDC In-depth Interviews, December 2020

Study participants also reported that use of the Cumulus/Spectrum platform resulted in more reliable network performance. As a result, end users experienced fewer problems with the availability of key network and computer resources that were reported to help desk teams. As shown in **Figure 5**, after adoption, there were 32% fewer trouble tickets and calls that required help desk attention. Further, when those calls did occur, they were remediated 35% faster.

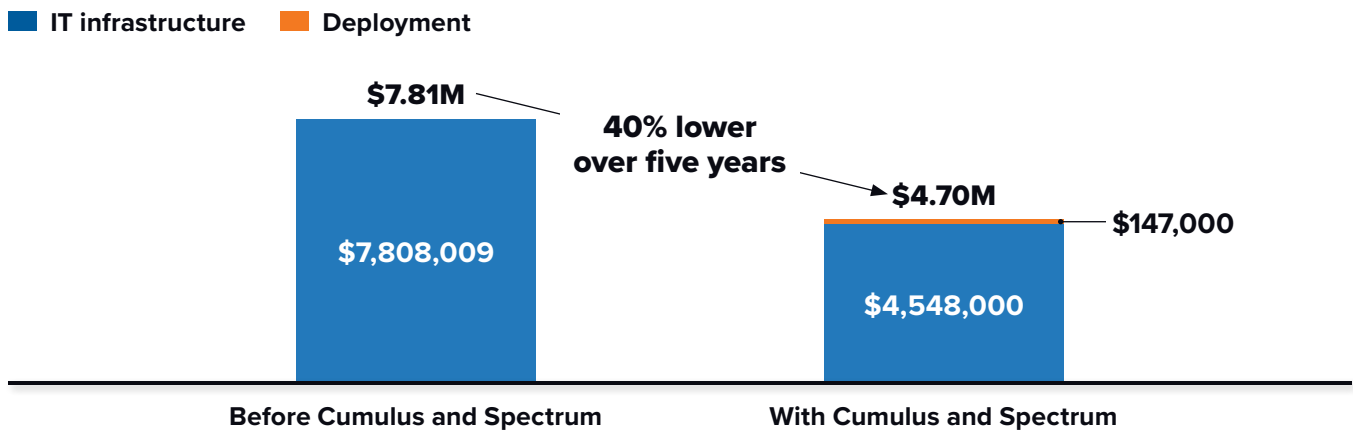
**FIGURE 5**  
**Help Desk Impact**  
 (% improvement)



n = 7, Source: IDC In-depth Interviews, December 2020

Interviewed companies reported that Cumulus/Spectrum served as a cost-effective solution for improving and refining their network management processes and infrastructure. They reported significant reductions in the amount of IT staff time required to maintain effective networking operations and corresponding cost savings. IDC calculated that IT staff required 40% less time to run and manage aspects of their network infrastructure projected over a five-year period (see **Figure 6**).

**FIGURE 6**  
**Total IT Staff Time Impact – Five Years**  
 (\$ over a five-year period)



n = 7, Source: IDC In-depth Interviews, December 2020

Having robust network security is essential in today’s IT and networking environments. Cumulus/Spectrum has tools to help make it easier to identify security issues. As one study participant noted: *“Cumulus and Spectrum have helped uncover potential issues in data security. The console ... clearly gives them better insight. For example, it removes a lot of guess work such as wondering what particular technology might be involved.”* Study participants indicated that the Cumulus/Spectrum solution improved the productivity of teams and individuals responsible for network security in their organizations. As shown in **Table 4**, staff productivity levels improved 21% after adoption, resulting in an annual business value of \$164,100.

**TABLE 4**  
**Network Security Impact**

Impact	Before Cumulus and Spectrum	With Cumulus and Spectrum	Difference	Benefit
Network-related security productivity impact (equivalent FTEs)	8.0	6.4	1.6	21%
Salary cost per year per organization	\$800,300	\$636,200	\$164,100	21%

n = 7, Source: IDC In-depth Interviews, December 2020

Interviewed companies reported having more network bandwidth availability for the applications and internal/external communications that their business end users and customers depended upon. As shown in **Figure 7**, after adoption, these companies experienced a 40% increase in available bandwidth.

**FIGURE 7**  
**Bandwidth Availability**  
(% improvement)

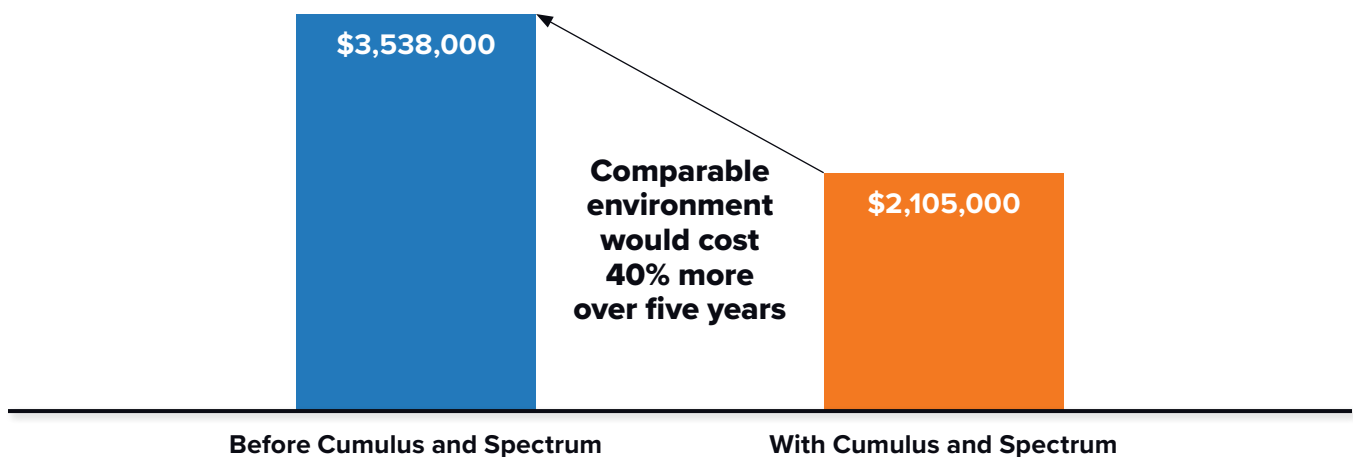


n = 7, Source: IDC In-depth Interviews, December 2020

In addition to the staff time cost savings described previously, study participants also reported that the Cumulus/Spectrum solution served as a cost-effective platform for their networking operations by reducing capex. **Figure 8** illustrates the infrastructure savings that IDC projects will be available to interviewed companies over a five-year period. As shown in Figure 8, infrastructure costs were 40% lower compared with the cost of alternative or legacy solutions over that same period.

**FIGURE 8**  
**Infrastructure Savings — Five Years**

(\$ over a five-year period)



n = 7, Source: IDC In-depth Interviews, December 2020

## Improved Business Operations and Results

Study participants told IDC that they have enabled more efficient business operations by improving their business operations and results. Maintaining improved network reliability and availability directly impacted line-of-business users and contributed to ensuring optimal performance for business-critical applications and communications both internally and externally. Study participants pointed out that having more agile network resources made a contribution to better business responsiveness and was also helpful to their application development teams.

### They commented on the following benefits:

► **Improved time to market and revenue opportunities:**

*“On the business side, it really has been about speed to market. Salespeople might say: ‘We need to do x, y, and z for a customer.’ We can be more agile and deal with almost anything that gets thrown at the IT teams. We are maybe 30–35% quicker to market with a 25–30% revenue bump either outmaneuvering competitors or simply satisfying customers. A lot of those improvements have to do with the infrastructure.”*



▶ **Better performance for business units:**

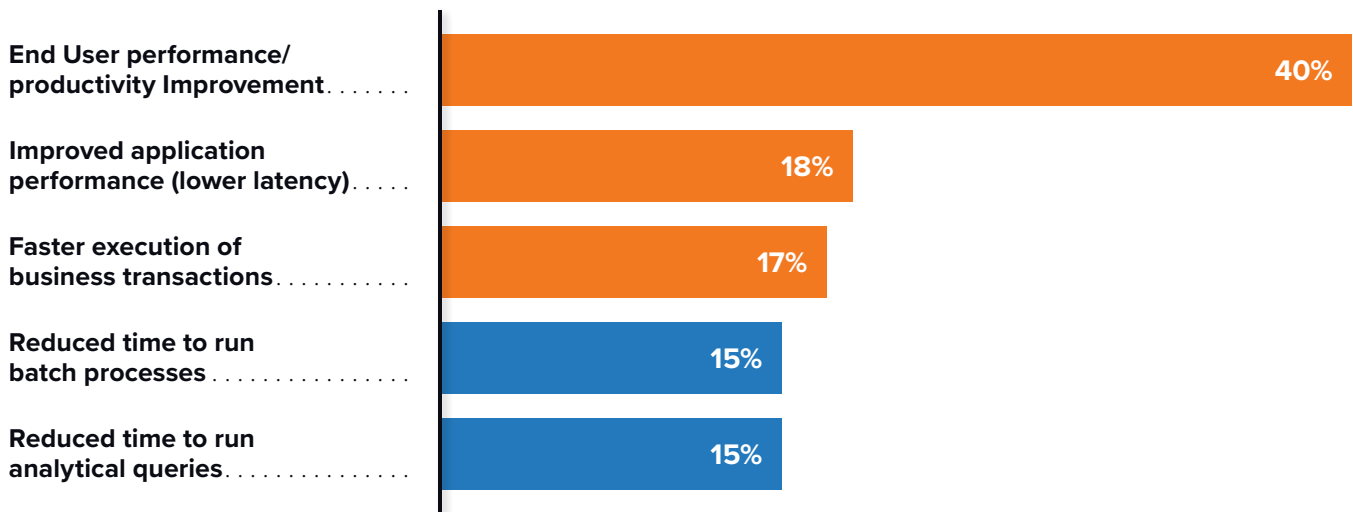
*“In all honesty, we have better reliability and flexibility for the business units. We are able to provide better HA, better throughput, and have fewer issues. We have better performance hands down. That means the business units call me less, which I like.”*

▶ **More productive users:**

*“The reduction in costs for both hardware and network administration is a benefit to the organization. It lets researchers spend more time on research, which for a scientific organization is essential. From a purely network perspective, what used to take longer to do with a legacy switch can be accomplished an estimated 50% faster.”*

Interviewed organizations consistently reported improvements in important business metrics. IDC quantified these results as shown in **Figure 9**. End-user performance and productivity were improved by 40%. Other important improvements were seen in application performance (18%), faster execution of business transactions (17%), and other areas as shown in Figure 9.

**FIGURE 9**  
**Key Business KPIs**  
(% improvement)



n = 7, Source: IDC In-depth Interviews, December 2020

Cumulus/Spectrum customers reported that they were able to minimize the frequency and impact of unplanned downtime using the platform. For end users and customers, this translated into an improved IT and communications experience while also lowering business and operational risk stemming from potential outages. As shown in **Table 5** (next page), on average, customers were able to reduce the impact of disruptive events by 24% and improve remediation time by 53%. This resulted in an annual productivity-based business value of \$29,500.

TABLE 5

## Unplanned Downtime — User Productivity Impact

Impact	Before Cumulus and Spectrum	With Cumulus and Spectrum	Difference	Benefit
Number of outages per year	3.0	2.3	0.7	24%
MTTR (hours)	2.8	1.3	1.5	53%
Lost productive time per organization per year (FTEs)	0.7	0.2	0.4	64%
Hours per user of lost productive time per year	0.11	0.04	0.07	64%
Equivalent value of lost productive time per organization per year (based on FTEs)	\$46,000	\$16,600	\$29,500	64%

n = 7, Source: IDC In-depth Interviews, December 2020

A less obvious benefit of the solution is related to application development. Better network performance and resilience helped their application development teams be more productive through the entire development life cycle. As one study participant noted: *“Application developers are 20% better throughout the QA, dev, and testing process. Developers always blame the network. So the 20% is a combination of real and perceived improvement.”*

Table 6 quantifies these benefits showing a 6% boost in application developer productivity. This translated into an annual business value of \$738,900.

TABLE 6

## Application Developer Impact

Impact	Before Cumulus and Spectrum	With Cumulus and Spectrum	Difference	Benefit
Application developer impact (equivalent FTEs)	130.3	137.7	7.4	6%
Salary cost per year per organization	\$13.0M	\$13.8M	\$738,900	6%

n = 7, Source: IDC In-depth Interviews, December 2020

Maintaining improved network reliability and availability directly impacted internal business end users and contributed to ensuring optimal performance for business-critical applications and communications taking place both internally and externally. Better network performance via better staff productivity helped these companies better address business opportunities. As shown in **Table 7**, the total average annual revenue that accrued after adoption of the Cumulus and Spectrum platform was \$7,615,000 (\$234,000 per 100 ports). The total annual reduction in operating expense is \$124,000 (see Table 7).

**TABLE 7**  
**Business Operations and User Impact**

Impact	Per Organization	Per 100 Ports
Total additional revenue per year	\$7.6M	\$234,000
Assumed operating margin	15%	15%
Total recognized revenue, IDC Business Value model, per year	\$1.1M	\$35,100
Total reduction in operating expense per year	\$124,000	

n = 7, Source: IDC In-depth Interviews, December 2020

## ROI Summary

IDC’s analysis of the financial and investment benefits related to study participants’ use of the Cumulus and Spectrum solution is presented in **Table 8** (next page). IDC calculates that, on a per-organization basis, interviewed organizations will achieve total discounted five-year benefits of \$9.86 million (\$303,000 per 100 ports) based on IT and network staff efficiencies, improved business results, and lower costs as described previously. These benefits compare with projected total discounted investment costs over five years of \$2.14 million (\$65,900 per 100 ports) on a per-organization basis. At these levels of benefits and investment costs, IDC calculates that these organizations will achieve a five-year ROI of 360% and break even on their investment in approximately 11 months.

**TABLE 8**  
**Five-Year ROI Analysis**

Analysis	Per Organization	Per 100 Ports
Benefit (discounted)	\$9.86M	\$303,000
Investment (discounted)	\$2.14M	\$65,900
Net present value	\$7.72M	\$237,200
ROI (NPV/investment)	360%	360%
Payback (months)	10.8	10.8
Discount factor	12%	12%

n = 7, Source: IDC In-depth Interviews, December 2020

## Challenges/Opportunities

Many organizations today strive to overhaul their datacenter networks to accommodate modern applications and workloads and to provide the network agility that is indispensable to business agility. While these organizations understand the need for automation and for greater flexibility to accompany performance and scalability, some struggle to adapt to the imperative of datacenter network automation, often because of existing investments in traditional network architectures and topologies but also because of operator familiarity with conventional approaches to network management, including manual operations using command-line interfaces (CLI). This cultural resistance to change has inhibited many enterprises, especially those that are relatively early on their cloud-building journeys, from fully embracing network automation and programmability.

Nonetheless, a compelling range of benefits can accrue from adoption of network hardware and software that is well aligned with the needs of the modern datacenter. What's more, organizations that embrace datacenter network modernization, involving no compromise between high performance and automated agility, will find that they can advance toward a proactive, cloud-centric operational model that transforms networking and network operations from being perceived as a cost center to being seen as a meaningful contributor to the array of value-based outcomes discussed in this white paper.

## Conclusion

Modern datacenter networking can be a significant contributor to qualitative and quantitative business value. To do so, however, datacenter switching must combine all the traditional attributes of network hardware — such as scalability, reliability, performance, and low latency— with a commensurate degree of software-based automation, programmability, flexibility, and actionable analytics and insights. These capabilities must be provided together for the datacenter switching to enable the network to take its rightful place as a critical facilitator of operational efficiency and business outcomes in the context of digital transformation and cloud-centric operating models.

In this white paper, IDC has documented the business value of Spectrum Ethernet switches in conjunction with the Cumulus Linux network operating system through the ease of overall network management of their organization's network operations. Interviewees also reported they were able to support their business with a more cost-effective and better performing network by reducing the costs of the network itself but still providing enough bandwidth for their organization's business users. This enables end users, such as application developers and others, to get to market faster because of the better network availability, which means more revenue opportunities.

## Appendix: Methodology

IDC's standard ROI methodology was utilized for this project. This methodology is based on gathering data from current users of the Cumulus and Spectrum solution.

**Based on interviews with these organizations, IDC performed a three-step process to calculate the ROI and payback period:**

- 1. Gathered quantitative benefit information during the interviews using a before-and-after assessment of the impact of Cumulus and Spectrum.** In this study, the benefits included IT cost reductions and avoidances, staff time savings and productivity benefits, and revenue gains.
- 2. Created a complete investment (five-year total cost analysis) profile based on the interviews.** Investments go beyond the initial and annual costs of using Cumulus and Spectrum and can include additional costs related to migrations, planning, consulting, and staff or user training.
- 3. Calculated the ROI and payback period.** IDC conducted a depreciated cash flow analysis of the benefits and investments for the organizations' use of Cumulus and Spectrum over a five-year period. ROI is the ratio of the net present value (NPV) and the discounted investment. The payback period is the point at which cumulative benefits equal the initial investment.

**IDC bases the payback period and ROI calculations on a number of assumptions, which are summarized as follows:**

- ▶ Time values are multiplied by burdened salary (salary + 28% for benefits and overhead) to quantify efficiency and productivity savings. For purposes of this analysis, IDC has used assumptions of an average fully loaded salary of \$100,000 per year for IT staff members and an average fully loaded salary of \$70,000 per year for non-IT staff members. IDC assumes that employees work 1,880 hours per year (47 weeks x 40 hours).
- ▶ The net present value of the five-year savings is calculated by subtracting the amount that would have been realized by investing the original sum in an instrument yielding a 12% return to allow for the missed opportunity cost. This accounts for both the assumed cost of money and the assumed rate of return.
- ▶ Because Cumulus and Spectrum require a deployment period, the full benefits of the solution are not available during deployment. To capture this reality, IDC prorates the benefits on a monthly basis and then subtracts the deployment time from the first-year savings.

Note: All numbers in this document may not be exact due to rounding.

## About the Analysts



### **Brad Casemore**

#### **Research Vice President, Datacenter Networks, IDC**

Brad Casemore is IDC's Research Vice President, Datacenter Networks. He covers networking products and related technologies and platforms typically deployed in the datacenter. Brad also works closely with IDC's Enterprise Networking, Server, Storage, Cloud and Security programs to assess the impact of emerging IT and converged and hyperconverged infrastructure. He researches technology areas such as Ethernet switching in the datacenter, Application Delivery Controllers (ADCs), SD-WAN, WAN Optimization, Network Virtualization, Network Programmability, and Software Defined Networks (SDN). In this capacity, Brad provides ongoing research for IDC's Continuous Information Service (CIS), market forecasts, custom consulting, and Go-To-Market services.

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#### **Senior Research Analyst, Business Value Strategy Practice, IDC**

Harsh Singh is a Senior Research Analyst for the Business Value Strategy Practice, responsible for developing return-on-investment (ROI) and cost-savings analysis on enterprise technological products. Harsh's work covers various solutions that include datacenter hardware, enterprise software, and cloud-based products and services. Harsh's research focuses on the financial and operational impact these products have on organizations that deploy and adopt them.

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