Impact of Juniper Training and Certification on Network Management Activities

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IDC OPINION

IDC believes sufficient training and appropriate certification can lead directly to improvement in network installation, management, and security performance. In a recent survey of Juniper Networks customers and partners, IDC found significant evidence of the specific and measurable benefits of sufficient training and certification. This research found:

- Many tasks performed by network engineers and network security engineers were positively impacted by sufficient training. For instance:

    - Router and switches were installed correctly the first time an average of 82% of the time when the engineer had more than a week of training compared with an average of 69% when the engineer had less than a day of training.

    - Engineers with about eight days of training consistently installed routers and switches in accordance with the project plan 80% of the time compared with only 67% when engineers had less than one day of training.

    - Network resources managed by network engineers with more than a week of training were available/reachable when needed 18% more often than network resources managed by network engineers with less than a day of training.

- Every additional team member certified improves key performance indicators.

- IT managers overwhelmingly believe that training and certification improve employees' performance. In fact, one in four IT managers believes having Juniper-trained and -certified staff allows him/her to operate with a smaller network management team than would be possible without certification.

This research concludes that every day of additional training and each additional team member certified meaningfully improve performance in key metrics in network management and security.

SITUATION OVERVIEW

With the continuing increase in the use of and demand on networking infrastructure, IT managers are constantly seeking ways to improve network performance, reliability, and scalability. IDC expects that enterprise-class organizations will continue to implement complex hybrid, public, private, and noncloud environments for many years to come. Mission-critical applications and workloads depend on multiple generations of technology and infrastructure that demand constant updating and maintenance of skills to leverage effectively.

Ultimately, network and IT managers need to create a more productive and efficient networking infrastructure. At the same time, staff costs have risen to nearly two-thirds of network management budgets.

To manage effectively in complex IT environments, organizations must transform the way they staff and manage their IT organizations while better optimizing the way they source and deploy their IT resources. In IDC's *IT Management QuickPoll Survey* conducted in January 2013, IT managers identified their top 3 IT management software priorities for the next three years. The poll found that IT managers will focus on:

- Improving IT staff productivity and operational efficiency (49% of respondents)

- Implementing common management software, services, and processes across cloud and noncloud environments (40% of respondents)

- Reducing the number of management software vendors and tools used across their environments (39% of respondents)

Meanwhile, IT executives are getting little in the way of new head count, and the expectations and need for very high service levels continue to escalate. As a result, network management teams and the whole IT organization must be prepared to work effectively across hybrid, complex environments. IT managers must help staff operate more productively by leveraging available training and certification across the range of roles and activities.

To manage complex IT networks, most organizations leverage a range of IT networking professionals across a broad range of activities. For simplicity, IDC grouped most network management activities into five roles:

- **Network engineer:** An internal role typically responsible for network design, installation and management of new networks, and protocol management of existing networks

- **Network security engineer:** An internal role typically responsible for firewall and security policy, management, and maintenance, including troubleshooting security devices

- **Network support engineer:** An internal role focused on troubleshooting and resolution of network-related issues

- **Professional network services consultant:** An external role held by network equipment and implementation providers typically involved in the design, planning, and integration of new devices into existing networks for clients; the installation and configuration of routers and switches; and the migration of clients from existing network infrastructure to new design

- **Presales network system engineer:** An external role held by network equipment and implementation providers typically responsible for developing sales proposals to design and integrate new networking devices into new or existing networks and the implementation, configuration, or troubleshooting of networking software upgrades (The role also requires the development of a proposed bill of materials [BOM] for the client that addresses the proposed approach/solution to the client's business requirements.)

This research was designed to isolate the potential for training and certification to improve performance in each of the key networking roles. It was further designed to identify "how much" training was appropriate to meaningfully impact the performance of an enterprise network. However, for the purposes of this white paper, we focus on the activities of and opportunities for *network engineers* and *network security engineers*.

Keys to Performance Improvement: Network Engineers and Network Security Engineers

The two key internal roles related to complex networking are network engineers and network security engineers.

Intuitively, IT managers believe that training and certification impact employees' ability to perform assigned tasks and activities at a high level. And while IT networking infrastructure can be complicated, IT managers overwhelmingly believe that training and certification improve employees' performance – in fact, this research found that more than 85% of IT managers say that training and certification moderately or significantly improve IT employees' ability to fully leverage Juniper products and technologies. In addition, almost 90% of IT managers say that Juniper certification moderately or significantly improves the overall performance of IT teams.

> **IT managers overwhelmingly believe that training and certification improve employees' performance.**

Impact of Training: Network Engineers

More specifically, when IDC examined key performance indicators and compared the performance of network engineers and network security engineers who had been provided a little training with the performance of those who had been provided more training, the results were impressive.

For network engineers, we observed the strong impact of training for most activities and metrics. For instance, network resources managed by network engineers with more than 40 hours of training were available/reachable when needed 18% more often than network resources managed by network engineers with less than 7 hours of training (see Table 1).

TABLE 1

Comparison of Network Engineers with Less than a Day of Training and More than a Week of Training (%)

Key Activity	Key Metric	<1 Day of Training	>1 Week of Training
Design and planning of networks and integration of devices	Percentage of time networked resources are available/reachable when needed	72	90
	Percentage of changes to network architecture complete, with stakeholder sign-off consistent with organizational policy	56	71
Installation and configuration of routers and switches	Average percentage of "uptime" of critical routers and switches	78	94
	Percentage of router and switch installations completed in accordance with project plan	67	80
Routing/switching protocol management	Percentage of changes to network architecture fully documented	57	68
Routing policy management	Percentage of router and switch installations correctly implemented the first time	69	82

Source: IDC's *Network Management Survey,* 2014

How Much Training Matters: Network Engineers

For this research, we did not distinguish between "classroom" instruction and other forms of formal instruction. Other IDC research has found that instructor-led classroom instruction, instructor-led instruction delivered over the Web, or even self-paced training is equally useful in improving individual competence. IDC believes that the key to the impact of training is targeting specific performance objectives, building training experiences that are appropriate for the content and the learners, and to the extent possible, leveraging training simulations or other opportunities to encourage practice.

While the detailed results suggested that, overall, about a week of training resulted in a material improvement, every day of additional training improved performance. In Figure 1, the impact of increased training days (y-axis) can be seen on the key metric performance (x-axis) – in this case, the performance indicator was the frequency at which a new router or switch installation was completed in accordance with the specific project plan. For this metric, individuals with about eight days of training consistently installed routers and switches in accordance with the project plan about 80% of the time.

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FIGURE 1

Impact of Training on Router and Switch Installation

Percentage of router and switch installations completed in accordance with project plan
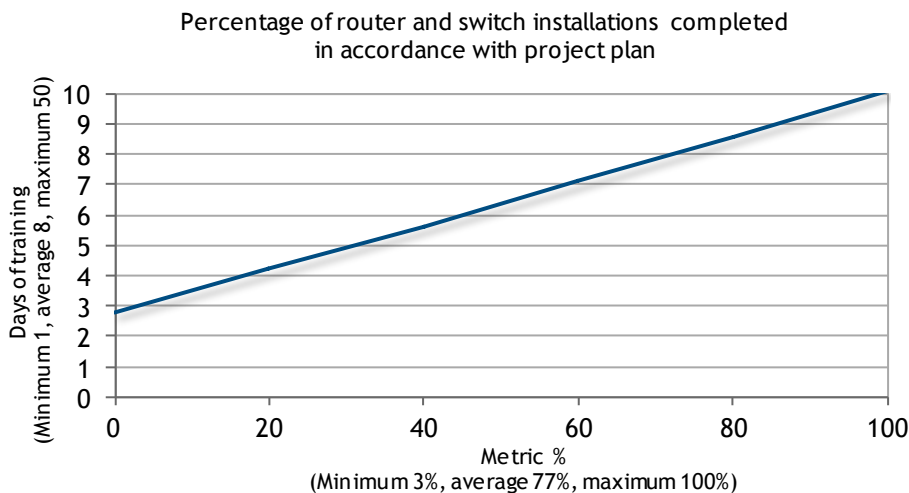
Source: IDC's Network Management Survey, 2014

Impact of Training: Network Security Engineers

For network security engineers, the story is much the same: Effective training improves performance on key security metrics.

Network security engineers with more than a week of training were able to patch firewall vulnerabilities within 24 hours of discovery 40% more often compared with network security engineers with less than a day of training. And network security issues were more often resolved within 24 hours when the security engineer had more training (see Table 2).

Effective training improves performance on key security metrics.

TABLE 2

Comparison of Network Security Engineers with Less than a Day of Training and More than a Week of Training (%)

Key Activity	Key Metric	<1 Day of Training	>1 Week of Training
Firewall policy management	Percentage of organization's firewalls examined daily for performance statistics	57	70
	Percentage of firewall vulnerabilities patched within 24 hours of detection	45	88
Security device maintenance	Percentage of network security hardware replaced in accordance with a device upgrade schedule	44	54
	Percentage of network security–related issues resolved within 24 hours	58	66

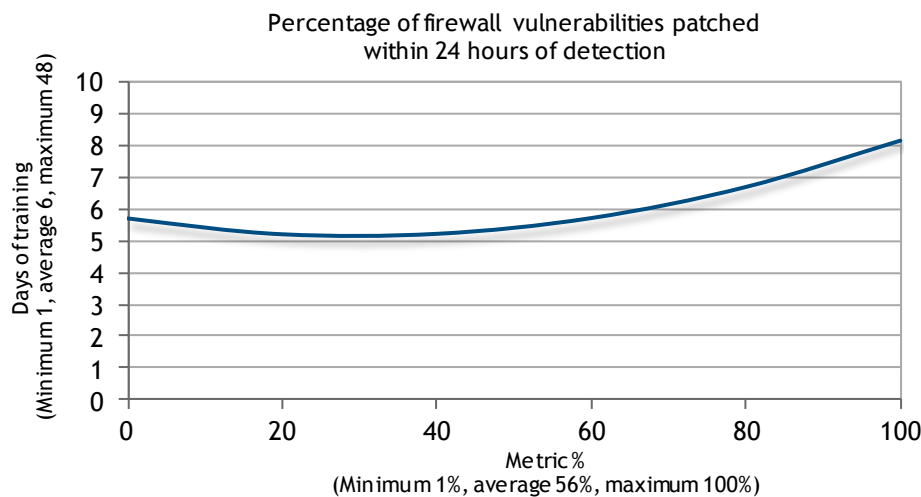Source: IDC's *Network Management Survey*, 2014

How Much Training Matters: Network Security Engineers

While the detailed results suggested that, overall, about a week of training resulted in a material improvement, every day of additional training improved performance for network engineers and network security engineers. In Figure 2, the impact of increased training days (y-axis) can be seen on the key metric performance (x-axis) – in this case, the performance indicator was the frequency at which router vulnerabilities were patched within 24 hours. For this metric, individuals with about 7 days of training consistently patched routers and switches within 24 hours about 90% of the time.

> **Every day of additional training improved performance.**

FIGURE 2

Impact of Training on Firewall Policy Management

Note: There were too few network security engineers with less than four days of training to register on this figure.

Source: IDC's *Network Management Survey,* 2014

Impact of Certification on Team Performance

Achieving a certification is a demonstration of a specific and high level of competence in a defined domain. Ensuring a sufficient number of team members achieve "certification" should result in additional network performance improvement beyond training individual members. IDC examined the key performance indicators for teams of network engineers and network security engineers with greater than 80% of the team certified compared with teams with less than 20% of the team holding a relevant certification. Illustrative of what we found, several metrics demonstrated important improvement.

We found that team certification is important to improved performance of mundane but important tasks such as monthly maintenance. Overall, it is difficult to complete monthly maintenance activities on time. The most competent teams complete only 55% of maintenance activities on time. But teams with no certification complete only 25% of those activities on time. Network engineering teams with 100% of

the team certified on average complete monthly maintenance activities on time more than twice as frequently as teams with no certified members (see Figure 3).

FIGURE 3

Impact of Team Certifications on Performance: Network Maintenance
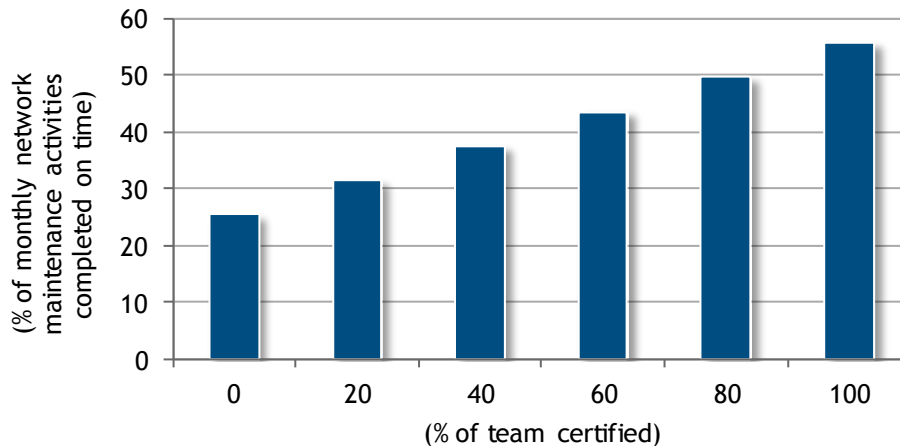
Source: IDC's *Network Management Survey,* 2014

We found a similar impact on network security teams. Teams with more than 80% of team members certified led to:

- Resolving network/connectivity-related support requests within 4 hours 16% more often

- Resolving network security-related issues within 4 hours 21% more often

- Fully documenting changes to network architecture 8% more often

- Patching firewall vulnerabilities within 24 hours of detection 10% more often

The impact of team certification on metrics can be dramatic. Reducing the resolution time for security-related issues is important, and it's clear that the competence of the team attempting the resolution is critical to a successful resolution. Additionally, we found that teams with 100% of team members certified are able to resolve an average of 60% of security-related issues within 4 hours. This compares with an average of 25% of issues resolved in 4 hours or less by teams without any certified team members. On average, network security teams with 100% of the team certified resolve security-related issues in less than 4 hours more than twice as often as teams with no certified members (see Figure 4).

But it is important to note that performance isn't all or nothing: This data shows that every new certified team member positively impacts performance.

FIGURE 4

Impact of Team Certifications on Performance: Network Security Issues
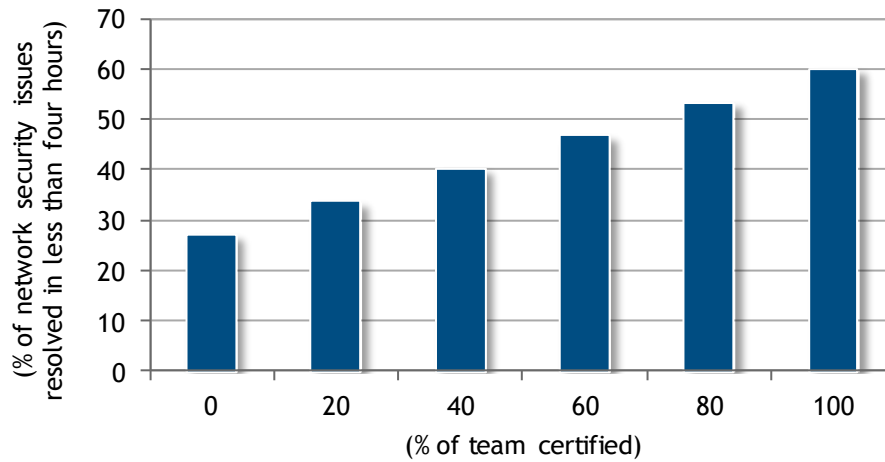
Source: IDC's *Network Management Survey,* 2014

Getting teams certified and maintaining certification as team members are promoted, or replaced, are challenges for IT managers. But our research shows that there are significant benefits to organizational performance as teams achieve greater penetration of relevant certifications. Every additional team member certified has a measurable impact on key network management and security performance indicators.

Perception of the Impact of Training and Certifications

Well-trained staff – especially those with validated training by achieving a certification – perform better than less well-trained staff in many ways. And though some of the improvements are difficult to isolate, key stakeholders have strong, positive feelings about the impact of training and certification. For instance, this research found that 90% of IT managers say that the Juniper certification moderately or significantly improves the overall performance of IT teams. In fact, IDC found that to ensure the best candidates are selected, hiring managers asked candidates about their Juniper certification in 75% of interviews.

Every additional team member certified has a measurable impact on key network management and security performance indicators.

Sometimes, the perception of the value of training and certification is quite specific. For instance:

- More than 85% of Juniper customers report that training and certification reduce the number and frequency of calls to the Juniper Technical Assistance Center (JTAC).

- About 45% of certified IT staff and more than 85% of IT managers believe certification results in better and more complete utilization of Juniper gear.

Ultimately, efficiency can even impact staff size: One in four IT managers believes that having Juniper-trained and -certified staff allows him/her to operate with a smaller network management team than would be possible without certification. In an era of high growth in the cost of staff and reluctance to grow staff size, that is a critical benefit.

Team competence clearly matters to IT managers and executives. And that competence impacts employees' careers: More than 80% of Juniper certification candidates choose to get certified for career development and to increase personal competence.

Finally, while the impact of training can be generalized to all training and most certifications, Juniper training and certifications appear to be particularly valued by IT managers and IT staff: Overall, 92% of Juniper customers believe Juniper certification is the same as or better than any other networking certification. And more than 94% of Juniper-trained or -certified IT workers would recommend Juniper training and certification.

CHALLENGES AND CONCLUSIONS

Networks continue to increase in complexity and importance. Through appropriate training and certification, IT managers have an opportunity to control costs, increase operational efficiency, and improve service levels. To do that, IT managers, executives, and hiring managers must evaluate which roles are the most important targets for increased training – and then they must decide which certifications to support.

Appropriately leveraged training and certification can speed implementations, reduce manual error, and improve security and compliance. In summary, this research found the following:

- **Network engineers:** Strong impact observed for most activities and metrics; more than eight days of training necessary to achieve the best results.

- **Network security engineers:** Strong impact for many activities and metrics; more than six days of training necessary to achieve the best results.

- **Resolution of issues:** Almost 60% of IT managers report that Juniper certification results in faster identification and resolution of issues by their teams.

- **Utilization of network equipment:** 45% of IT managers report that Juniper certification results in better and more complete utilization of Juniper gear.

Every day of additional training improves the individual performance of network engineers and network security engineers in key performance metrics. And every additional team member certified has a measurable impact on key performance indicators.

IDC also recommends that IT managers and IT training managers continually ensure that training programs focus on the following criteria to achieve the best results:

- **Achieve specific improvement in performance:** Begin by targeting specific areas of improvement and select sufficient training to achieve those objectives.

- **Encourage consumption:** It is not enough to identify courses; the courses must be conscientiously attended by the targeted learners. This suggests that courses must be of a convenient type, length, and frequency to ensure busy professionals will choose to take the class.

- **Leverage "practice" when available:** IT managers should demand live and simulated labs to support training opportunities.

Each of these recommendations should be constantly reviewed, evaluated, and reapplied in each significant IT training initiative.

IDC believes that combining high-performance expectations with appropriate training and certification can help ensure that complex networking environments operate effectively and maximize value for the enterprise.

METHODOLOGY

The goal of the research presented in this white paper is to understand and quantify the business impact of training and certification on network-oriented skills.

IDC conducted a global Web-based survey of both individuals and team managers/supervisors with responsibility for network-related functions. The survey captured information on 24 activities and an average of 2 metrics specific to each activity. The survey was deployed in English in late 2013 and utilized a Juniper-provided target list made up of individuals and managers/supervisors who work at organizations with Juniper technology deployed or work at partner organizations that use Juniper technology in some manner. The survey resulted in a data set with 3,147 respondents who were nearly equally distributed across the three macroregions of the Americas (1,078), EMEA (1,041), and Asia/Pacific (1,028).

IDC examined both the individual impact and the perspective of team managers. Additionally, in analyzing the results, IDC examined 5 roles, 24 activities, and 53 metrics. This white paper specifically focuses on the roles of network engineers and network security engineers working at enterprises that use Juniper equipment.

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