



## I D C   M A R K E T   S P O T L I G H T

---

# The New IP: Building the Foundation of Datacenter Network Automation

March 2015

Adapted from *Worldwide Enterprise Communications and Datacenter Network Infrastructure 2015 Top 10 Predictions* by Rohit Mehra, Brad Casemore, Rich Costello, et al., IDC #254030

Sponsored by Brocade

---

### **Introduction: The Need for a New IP Network Infrastructure to Support the 3rd Platform**

*The 3rd Platform has unleashed unprecedented dynamism and innovation in the datacenter, with new demands being placed on network infrastructure in the process. Indeed, the pillars of the 3rd Platform — enterprise mobility, virtualization and cloud computing, Big Data, and social business — have challenged enterprise IT departments to transform from custodians of disparate technologies into agile, cost-effective IT service organizations that can satisfy real-time business expectations and requirements.*

*Toward that end, enterprise IT has embraced server virtualization and cloud computing for their capacity to improve IT agility through inherent automation and efficiency. The underlying datacenter network infrastructure must adapt. Virtual machines (VMs) and cloud services, for example, can be spun up in mere minutes to support new application workloads, but configuring the network to support new workloads requires significant time and effort, impeding the agile delivery of services.*

*In response, the IT industry is looking at networking in new ways, and as a result, new datacenter network architectures and technologies, including Ethernet fabrics, software-defined networking (SDN), and network virtualization, have emerged. While some in the industry are starting to refer to this new approach to networking as "the New IP," this Market Spotlight considers how a datacenter network fabric can provide a foundation for the automated and programmatic provisioning, configuration, and ongoing management of network-based services in the era of the 3rd Platform (see Figure 1).*

FIGURE 1

## 3rd Platform Forms Foundation for Business Transformation

The 3rd Platform forms the foundation for business process transformation...and, increasingly, business model transformation:

- How businesses **engage** with customers
- The **speed** at which they deliver their products and services
- How they **innovate**
- Their **resiliency**
- The **reliability** of their operations

With such high stakes, business is increasingly driving technology initiatives.



**Inversion of business from  
make-sell to sense-and-respond**

Source: IDC, 2015

## The Impetus for Datacenter Automation

Datacenter automation can deliver numerous benefits, including increased operational efficiency, improved business agility, faster time to opportunity and time to value, and lower operational expenditures. Various IT constituencies — application, compute, virtualization, storage, and cloud architects — have invested in automation tools and technologies to achieve those results. Perhaps belatedly, networking professionals are joining their counterparts in reaping the value that automation can bestow.

IDC research consistently finds that the shift to private and public cloud causes many enterprises to view automation as a key element of success, both as an enabler and as a means of achieving improved business processes and considerable cost savings in operational expenditures. IDC also has found that cloud-oriented enterprises are working to better align their network infrastructure with business demands, new application workloads, and changing traffic patterns within datacenters.

As enterprises strive for enhanced business agility and the ability to roll out new applications in real time, the manual, labor-intensive nature of legacy network operations has become a well-recognized impediment, delaying the deployment of new services by days or weeks. Additionally, as traffic patterns in the datacenter shift — with the north-south traffic emblematic of client/server applications increasingly supplanted by the east-west (server-to-server) traffic associated with new application architectures and virtualization — the limitations of legacy network architectures have been exposed, revealed as inefficient and difficult to scale in the context of the 3rd Platform.

These factors have led to the emergence of a new network architecture — Ethernet fabric — designed specifically to support the automation, efficiency, and agility requirements of the 3rd Platform.

## Key Trends Impacting Datacenter Network Automation

The following industry and technology trends have converged to drive a compelling need for datacenter network automation:

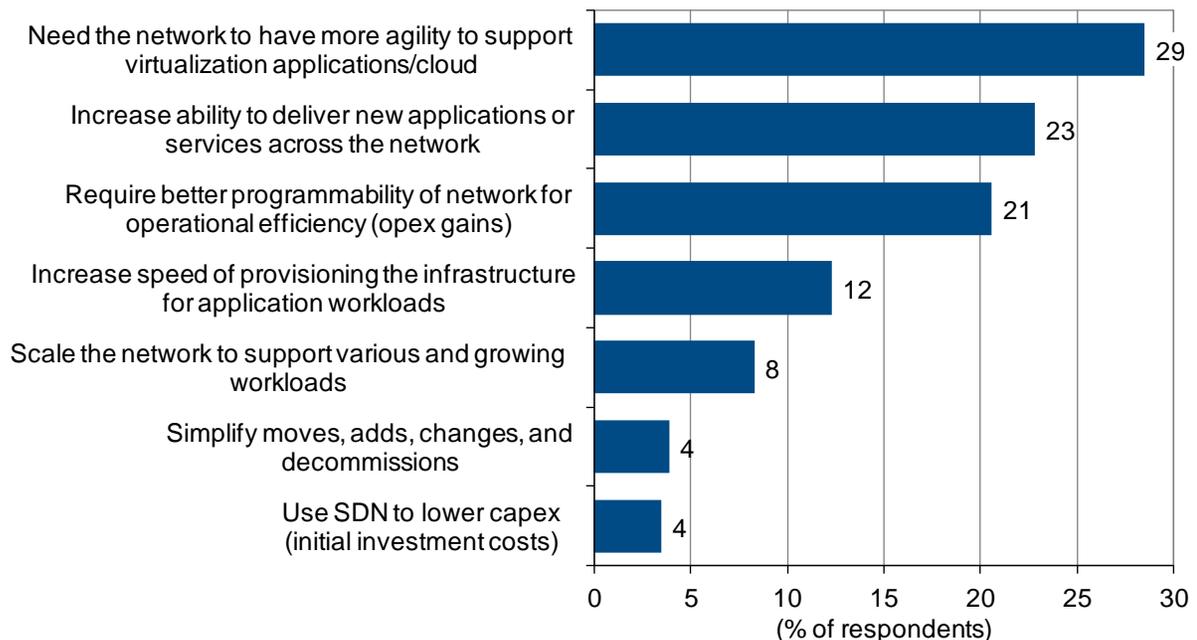
- **Growth of new and existing application workloads, physical and virtual.** Enterprise IT teams must support not only traditional client/server workloads, many of which will remain on physical servers, but also a growing percentage of virtualized applications, a trend accelerated by the transition to private and public cloud computing (see Figure 2). In recent surveys, IDC has found that the growth of virtualized logical servers increasingly outpaces the growth of physical servers on an annual basis, and the gap will continue to expand through 2018. At the same time, VM densities have doubled since 2008 and will continue to increase through 2018 and beyond.

This rapid and sustained growth in VMs, VM density, and VM mobility is forcing a significant reassessment of IT infrastructure. The network must become flatter and more responsive to the needs of burgeoning east-west traffic volumes, which flow within, between, and among servers and overwhelm traditional three-tier switching architectures. In this regard, fabric-based approaches to multipathing — optimized for east-west traffic — boost scalability, minimize latency, improve network efficiency, and facilitate VM mobility.

FIGURE 2

### What's Driving Today's SDN Deployments?

Q. Which of the following factors is the primary motivation for considering or implementing SDN?



n = 228

Source: IDC's *SDN Survey*, April 2014

- **The rise of SDN and network virtualization responds to the need for agile network infrastructure.** Initially deployed in hyperscale datacenter environments, SDN has arisen as a belated response from network infrastructure to the increasingly urgent requirements of virtualized applications, evolving traffic patterns, and operational agility. Whether exemplified by network virtualization overlays or OpenFlow-based SDN, this development is all about injecting the network with the agility, flexibility, responsiveness, and visibility required to support the needs of the next-generation cloud datacenter. While these technologies are just now emerging, the right network fabric provides a bedrock foundation for SDN-ready infrastructure.
- **Focus on agility and automation in other datacenter disciplines (compute/virtualization, storage, etc.).** Virtualization of compute and storage necessitated increased automation to achieve simpler, more effective management models. Similarly, as network infrastructure, after a long period of comparatively modest innovation, finally has risen to the challenge of datacenter virtualization and private cloud, it is providing not only new fabrics and architectural models but also a more automated and software-driven approach to provisioning, management, and orchestration.

## **Datacenter Network Automation Challenges and Key Considerations**

As IT professionals acknowledge the need for automation throughout the datacenter, including the network, they have to consider several factors.

One critical factor involves how the network infrastructure can be designed and architected to be more agile and flexible so that it can satisfy the requirements of virtualization and cloud. In this respect, the path to operational agility is paved with automation. Manual processes will not scale, and they cannot meet the new operational needs, in terms of both agility and flexibility, that increasingly virtualized workloads and business requirements demand. IT departments, especially those embracing the pillars of the 3rd Platform, acutely feel the workload-driven need for faster provisioning and deployment. Only through automation can IT departments reduce their provisioning times from weeks to minutes. The result, of course, is faster IT "time to value" and improved utilization of staff and technology resources.

As enterprises adopt the 3rd Platform and contemplate how they can evolve their datacenter network to support higher levels of automation and better alignment with other datacenter IT resources, they should consider the following:

- **Time to provision new network devices.** Enterprise I T departments should consider solutions that minimize deployment time through mechanisms such as zero-touch provisioning. Manual switch configurations, which consume valuable time and personnel resources, are no longer tolerable for Spanning Tree Protocol (STP), link aggregation groups (LAGs), and quality of service (QoS).
- **Ongoing management and operations.** Enterprises should consider solutions that allow them to manage multiple switches in an enterprise fabric as one logical switch. This provides a single point of management for fabricwide configuration, software maintenance, and troubleshooting, significantly reducing management time and costs. It also delivers a simplified architecture with a single IP interface for interconnecting with higher-level orchestration, thus offering greater scalability and IT agility.
- **Alignment with other IT resources:**
  - **VM intelligence.** The network should be VM aware to ensure proper alignment between applications and relevant network services. When a new VM is created, the network fabric should automatically detect it, and appropriate network policies should be applied. Moreover, as a VM moves from one server to another, the network policies associated with the application should dynamically and transparently move with it.

- **IP storage awareness.** IT departments should be able to automatically provision QoS for IP storage traffic, thereby eliminating the complexity and operational overhead traditionally associated with configuring QoS. Typically, this challenge has been addressed through network overprovisioning, which basically sidestepped the question of QoS entirely.
- **Application service availability.** When network nodes are added to or removed from service, the fabric should automatically reform without causing service disruption to application workloads.
- **Cloud orchestration.** In addition to an optimized physical infrastructure designed to support 3rd Platform workloads and increased service deployment velocity, customers migrating to cloud models are considering new orchestration frameworks such as OpenStack to automate the provisioning of compute, storage, and network resources and OpenDaylight-based SDN controllers to improve ongoing monitoring and management — eliminating the IT bottleneck. As customers evaluate next-generation datacenter networking solutions, they should also ensure that the solutions offer open APIs and are SDN ready to enable integration with current and future orchestration systems.

## Conclusion

Increasing business agility demands and application workloads, including 3rd Platform workloads and their associated traffic patterns, have placed new stresses on datacenter infrastructure. While server and storage teams adapted relatively quickly to the needs of the 3rd Platform, the datacenter network was slower to adjust. In response, a modern approach to networking known as the New IP, is combining new technologies — such as SDN and network virtualization (including network functions virtualization [NFV] for telcos) — with proven architectures such as Ethernet fabrics to better align with the application and service requirements of the next-generation datacenter.

The benefits of having the right architectural approach to automating the datacenter network are clear:

- Increased operational efficiency
- Improved business agility
- Faster time to value
- Better resource utilization (infrastructure and personnel)

All these benefits can result in reduced operational expenditures. Nevertheless, despite industry trends that bolster the case for increased automation of the datacenter network, the aforementioned key considerations should be carefully assessed. In the final analysis, an adaptable and robust network fabric, combined with an automation strategy that expedites and simplifies network provisioning and configuration, provides a New IP foundation for 3rd Platform datacenter agility.

---

### ABOUT THIS PUBLICATION

This publication was produced by IDC Custom Solutions. The opinion, analysis, and research results presented herein are drawn from more detailed research and analysis independently conducted and published by IDC, unless specific vendor sponsorship is noted. IDC Custom Solutions makes IDC content available in a wide range of formats for distribution by various companies. A license to distribute IDC content does not imply endorsement of or opinion about the licensee.

### COPYRIGHT AND RESTRICTIONS

Any IDC information or reference to IDC that is to be used in advertising, press releases, or promotional materials requires prior written approval from IDC. For permission requests, contact the IDC Custom Solutions information line at 508-988-7610 or [gms@idc.com](mailto:gms@idc.com). Translation and/or localization of this document requires an additional license from IDC.

For more information on IDC, visit [www.idc.com](http://www.idc.com). For more information on IDC Custom Solutions, visit [http://www.idc.com/prodserv/custom\\_solutions/index.jsp](http://www.idc.com/prodserv/custom_solutions/index.jsp).

Global Headquarters: 5 Speen Street Framingham, MA 01701 USA P.508.872.8200 F.508.935.4015 [www.idc.com](http://www.idc.com)