CAMPUS NETWORKING TRANSFORMATION

WHILE MANY FOCUS ON DATACENTERS, CAMPUSES ARE UNTAPPED OPPORTUNITIES

EXECUTIVE SUMMARY

Every business today, small to large, is compelled to be more agile and flexible in order to respond to business changes. Mid-market businesses—the medium-sized part of the market that is both large and fast growing—face a particular challenge in the campus networks that connect all of the end users in their workspaces throughout the organization, due to the complexity of rapidly scaling workforces, locations, and resources. While much of today's network transformation focuses on the datacenter, there are also significant opportunities to drive better management efficiency and gain more flexibility in dealing with the campus network through a strategy that combines both the wired and wireless layers. By allowing these two network layers to be managed together, a more seamless and efficient view of the whole campus can be achieved. Mid-market businesses have an opportunity to address campus network modernization by focusing on better utilization of their networking assets and budgets as they refocus on employee productivity. Employees can enjoy better collaboration and increased mobility through a more robust campus network, and companies can realize better visibility, more manageability, and lower costs by taking a proactive approach to consolidating campus networks.

TODAY'S CUSTOMER CHALLENGES

Mid-market companies are working to keep up with the growth of employees while at the same time trying to drive better collaboration and productivity to get the most of their workforce investments. Changing technology is also presenting these companies with a challenge through the proliferation of employee devices—both those that are company-issued and those that are individually owned but still connect to the company's Wi-Fi network.

The fast-growing mix of devices, applications, and access rules is creating a campus management nightmare, which is further complicated by the typical separation of wired and wireless infrastructures. Businesses spend a disproportionate amount of time trying to enable the next generation of technology in the datacenter, but applications are often being enabled for users who are still struggling with limitations while accessing them via the last generation of campus technology. Mid-market companies are typically the fastest growing businesses, and this means much of their focus is spent on

improvements within the datacenter or launching new applications and services to help the business capture new revenue streams. But those that are sprawled out across the campus locations need attention as well; they need new capabilities to help them maximize their productivity.

When deploying campus networks, companies have traditionally underserved the needs of the knowledge workers who sometimes push the limit on infrastructure. This is mainly because the overall campus needs were broader than the budgets, and most of the IT investment landed in the datacenter.

When dealing with networking, either in the datacenter or out in the campus, companies are not interested in "forklift" upgrades. In the past, they upgraded campus networks primarily as new buildings opened or new departments had spun up, but once the network services were initiated, companies were less interested in any type of change. In a perfect world, they would never have to touch the infrastructure after deployment. This impacts the campus networks disproportionately, as the growth of new employees is met with a static campus infrastructure. One reason businesses often cite for not modernizing their campus networking is the concern that anything deployed today will just need to be ripped up and replaced in the future. This is why many organizations are turning more to Wi-Fi, which removes some of the elements of infrastructure from the equation. But even with Wi-Fi, new capabilities can drive more productivity—but only if businesses actually deploy the latest Wi-Fi generations. Wi-Fi can become just as congested and bottlenecked as static wired networks with rapid user base increases.

Connectivity as a service is a new way for companies to look at how they are delivering capabilities to the distributed campus. Instead of looking at campus networking as ports, cabling, and IP addresses, more businesses should view campus networking as the enablement of end user productivity and the gateway to all of the critical data being stored and processed in the datacenter.

Virtualization brings an added level of complexity to the equation across multiple levels. Virtualization of client systems is finally beginning to bear fruit as network infrastructure and virtualization software have both matured, becoming more robust. However, virtualization stresses the campus network pipes, putting more pressure on an already burdened environment. Server virtualization brings greater proliferation of networked applications and services, again driving up traffic to the campus. Additionally, network virtualization can push some control functionality out in a distributed manner to the campus, which can simplify the network in some ways while making it more complex in others. Most importantly, virtualization can cloud the waters and reduce the visibility that

administrators have regarding what is happening in the campus and how traffic flows can be optimized. When problems arise, there are now extra steps involved, as performance problems need to be correlated across both the physical and virtual layers.

Campus networks should not be ignored as IT plans the budgets and strategies for driving end user productivity. There are opportunities to maximize productivity while also driving down operational and management costs by taking advantage of some of the new capabilities available in the market. With the right foresight, network engineers can deploy predictable technologies, anticipate predictable growth patterns, and move the campus towards a more manageable and optimized state.

HOW MID-MARKET CUSTOMERS STAY COMPETITIVE

Mid-market customers have always been stuck between the proverbial rock and hard place—managing the chaos of a rapidly growing business while battling larger and better-funded competitors that already have the massive scale that these companies aspire to achieve. In this world, mid-market companies need to think smart and take decisive actions to stay on their growth trajectories. Their strategies rely on maximizing productivity from their knowledge workers; ensuring that these employees have access to the tools and capabilities delivered from the network is critical to that goal.

Two of the best strategies for mid-market companies to better grapple with the challenges of their campus networks focus on integration and management. By bringing together the different layers, administrators can have better visibility into their networks. Better visibility in turn leads to better manageability.

INTEGRATED NETWORKS

All of the choices and capabilities within campus networking are now leading customers to take a more active role in determining the infrastructure that is required. Viewing the campus network as an entity unto itself—instead of merely an extension of the datacenter—is paying dividends for mid-market businesses. Previously, campus network decisions simply mimicked what was already chosen as the corporate datacenter standard. However, when it came to the campus, the decision was amended with "and make it the cheapest version that the vendor has" because of the large number of campus devices that needed to be acquired with the smaller campus budget. New capabilities in the campus—including the ability to integrate wired and wireless at a much greater level—are changing the decision dynamics while also enabling better productivity for employees.

Integrating the network layers helps to reduce administrative tasks, especially where Linux-based tools are being used. With a single point of contact for hardware, management, and support, costs can be reduced, and the campus can more easily scale or change to meet business needs. By treating the wired and wireless networks as a holistic entity, troubleshooting is accelerated and less administrator specialization is required. Network simplicity better suits IT admins across skill levels / market segments once they realize that automation and reduction of complexity means they can focus on other higher-value activities without worrying that their jobs are at risk.

In selecting the right solutions for an integrated campus network, customers should assess the following areas:

- **Wireless migration**: How quickly has the company stayed up to date with the latest Wi-Fi standards, and what is the mix of Wi-Fi capabilities in the campus devices? Additionally, consideration should be given to the coverage areas and application saturation.
- **Wired bandwidth**: How are users utilizing higher-bandwidth applications in the client workspaces? Can better traffic optimization help lessen oversubscription of campus networks?
- **Management tools / integration**: Is there an opportunity to select products that can consolidate management features or consoles, reducing the learning curve and making administrators more productive?
- **Open equipment**: Can standards-based equipment be deployed that enables more flexibility? For instance, wireless controllers that can work with a variety of access points or wired switches that can run Linux-based applications right on the switch can prevent lock-in and provide extra flexibility.

By integrating both the wired and wireless networks together in the campus, businesses can optimize both their traffic and their end user productivity.

MANAGEMENT

The holy grail of a "single pane of glass" to manage all network features is a reality that we may never see in our lifetime…and for good reason. Because of their complexity, today's products do not lend themselves well to a single screen for managing all of the capabilities; there are typically too many functions to fit on a single page. Additionally, because most network devices can be managed through a standard web browser, the "single pane of glass" is actually already there—though not in the form of a single proprietary management application but instead using a browser as that single pane,

with different tabs for each device. Administrators have come to prefer browser-based management because of the simplicity and faster access that browser-based tools bring, boosting productivity versus proprietary console applications. But just making management browser-based does not solve the primary problem. Overlapping functionality, such as traffic analysis or user access, can be optimized when multiple management tools integrate these functions, enabling multiple aspects of the network to be viewed and managed together.

The key to efficient management is extensible tools that can enable more integration between products and functional areas, empowering administrators to do more with fewer clicks. For instance, being able to view and shape campus wired and wireless traffic from a single tool can make it easier for administrators to deliver better QoS when multiple physical adapters (wired and wireless) exist for client devices. Visibility to both layers enables an administrator to quickly identify where one may be negatively impacting the traffic of the other.

To drive the best productivity for administrators, automation is key. The ability to automate management tasks frees administrators up from constant interaction with devices or repetition of steps as common scenarios arise. As more management tools are integrated and functions are shared, administrators have the ability to automate, removing manual processes and accelerating time to resolution.

Dell's One Network Vision

In a market full of products that have been designed around maintaining the status quo, there are some vendors who are challenging the norm and bringing products to market that reduce lock-in and provide more flexibility. Dell Networking is one of these, targeting the needs of the mid-market campus through a lineup of scalable, future-ready, converged wired + wireless solutions, all of which can be managed on-premise or in the cloud. Together, all of these capabilities create an open network environment that Dell refers to as "One Network".

With a focus on building out simplified solutions for different customer sets, Dell has helped reduce campus network cost and complexity without having to trade off functionality / capability of the solutions. Through Dell Networking N-Series switching, a partnership with Aerohive for Wi-Fi and integrated campus network management, Dell is enabling mid-market companies to take more control of their campus networks. Together these pieces help drive cost efficiency, increased visibility, and management efficiency.

Too often, the cost of campus networking exceeds the budgets, with businesses paying more per port than they need to, simply because they want to maintain vendor consistency with their datacenter switching products. But it does not need to be that way. A strong case can be made for selecting a campus network vendor based not on consistency of the datacenter vendor but instead based on which vendor can deliver the best functionality and value. By viewing the campus network as its own entity and choosing based on those needs, companies can get the most for their budget—without having to give up on capabilities. For instance, Dell N-Series network switches can interoperate easily with Cisco datacenter switches, even supporting some of Cisco's proprietary features like RPVST+. This gives a business the ability to bring more horsepower to the campus network by driving down the per-port cost, enabling the deployment of better overall capability at the same (or even lower) cost.

All Dell N-Series switches share the same management interface for efficiency and have the ability to support layer 3 routing between networks. The N2000 Series are cost effective and power efficient. The dense N3000 Series delivers up to 48 ports of 1Gb Ethernet in a 1U space, whilst running on load balancing redundant power supplies. The N4000 Series are stackable, scaling up to 672 10GbE copper or fiber ports that can be managed as one logical device. The common management features across all of the N-Series switches, combined with the integrated wired / wireless management enables more efficient operations, helping to bring down the ongoing management costs as well.

With increased visibility, administrators can be more efficient, driving to resolution faster by being able to piece together more of the puzzle. Dell's One Network strategy brings the campus network together as a whole, enabling administrators to have better visibility into the components, connections, and traffic, enabling them to more quickly pinpoint problems that need to be addressed. Through their relationship with Aerohive, Dell can help customers seamlessly integrate both wired and wireless layers of the network.

HiveManager NG is a next generation network management solution that is targeted at optimizing the management tasks for campus networks through a single cloud interface. But not every customer wants to (or can) put their management plane in the cloud, so the HiveManager virtual appliance can be deployed on VMware vCenter 5.5 or later. HiveManager NG delivers in-depth mapping, deployment, management, and control through its easy-to-use GUI. The intuitive interface enables any administrator to immediately analyze and manage devices without having to first learn all the intricacies of Wi-Fi management. For customers who are finding more of their business focused on mobility, HiveManager NG can shape the management of systems to better reflect the changing workloads and workplaces.

Today we see the capability of Dell's One Network being primarily ingrained into Dell products and their close partners (like Aerohive), but there is no reason to believe that this strategy could not be expanded in the future to include other vendors. The fact that Dell focuses heavily on standards-based environments leaves the door open for the potential inclusion of other vendors down the road. By driving a solution that is less vendor-specific, Dell hopes to drive out much of the proprietary lock-in that we have seen in networking.

CALL TO ACTION

As mid-market businesses struggle with staying ahead of the curve, it makes sense to look at the campus networking architecture and capabilities as an opportunity to boost end user productivity and better leverage the changes that are also happening in the datacenter. We recommend these businesses take a look at their campus networks to understand whether they have the right infrastructure to handle the needs of today as well as the future and whether campus network modernization can help boost the bottom line. The ability to simultaneously drive a lower cost model while also increasing the visibility and management capabilities brings a compelling reason for customers to more seriously consider Dell's One Network strategy for their campus networks.

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