

Today's enterprise networks struggle to keep up with the speed of business, which is impacted by the number of users and devices on the network; bandwidth-intensive voice, video, and cloud applications; and new Wi-Fi standards that will only continue to strain enterprise core and aggregation infrastructure. A new switch is needed for this new era, and increasingly, enterprises are looking toward 100GbE.

# Switching to a New Era: Why Enterprise Networks Are Moving Toward 100GbE

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## Introduction

Enterprise networks are under pressure. The past decade has seen the rise and mainstream adoption of what IDC calls 3rd Platform technologies, including demands for ubiquitous mobile connectivity, increased reliance on cloud-based applications for mission-critical services, and the Internet of Things. Enterprises are looking to digitally transform themselves to embrace these new technologies, but too often legacy networks struggle to meet the demands of the technologies. Digital transformation therefore is spurring enterprise network transformation and accelerated adoption of new infrastructure platforms.

### AT A GLANCE

#### WHAT'S IMPORTANT

Enterprises are looking to upgrade their Ethernet switching infrastructure to ensure the network does not become an inhibitor to digital transformation. Increasingly, they'll look to 100GbE platforms.

As enterprises upgrade their networks, they are looking for a set of core features. These features include simplicity of management, extensibility, flexibility, integrated security, and the ability to future proof investments to meet the demands of the business today and prepare the network for the next decade of use cases.

These factors are pushing enterprises to consider ever-higher Gigabit Ethernet switching speeds. Whereas many enterprises may have standardized on 10GbE or 40GbE core and 1GbE aggregation networks, today's network devices and applications increasingly require speeds of up to 100GbE. Meanwhile, enterprises are seeking simplified management platforms, the ability to centrally manage wired and wireless policies, as well as fine-grained security controls and advanced analytics. The combination of enterprise network pain points is reaching a tipping point to spur investments, and new infrastructure platforms are expected to prompt a wide-scale refresh of enterprise networks in the coming years.

## Enterprise Network Pain Points

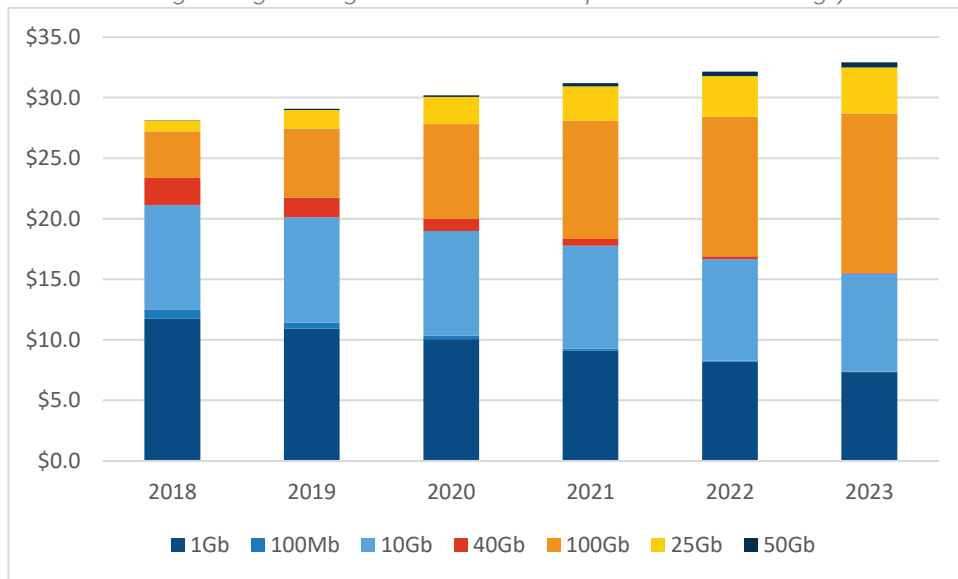
Myriad factors are converging to strain today's enterprise networks. These factors fall into a handful of buckets, but perhaps the most prominent is scale. More users and devices are on the network than ever before — a trend that will continue to expand rapidly. It's not uncommon for workers and guests to connect multiple devices to the enterprise network, all utilizing network resources simultaneously. In addition to the ever-expanding number of devices taxing network resources, applications are becoming more challenging to support. For example, the increased use of

bandwidth-intensive applications, such as video collaboration platforms, continues to load the network with data-intensive traffic, which then must be supported with wired infrastructure. New advancements in technology standards will only exacerbate this issue. The introduction of Wi-Fi 6 (802.11ax) is set to further increase the speed and efficiency of wireless traffic within the enterprise, enabling myriad new use cases but simultaneously placing further strain on the network.

To keep pace with these advancements, enterprises have been on a multiyear journey transitioning from Gigabit to multi-Gigabit Ethernet at the access layers and to 40GbE and 100GbE at the aggregation and core layers. This trend is forecast to continue for the coming years (see Figure 1). Even as investment in new switching platforms has taken hold, enterprises still want to support their legacy networking environments, including existing cabling infrastructure. However, the current challenges are pushing a new wave of investment in enterprise network refreshes to keep up with the connectivity demands of the business. As enterprises plan these investments, they're looking not only to support the immediate use cases of today but also to build an enterprise network that will power their business' digital transformation for the coming decade.

FIGURE 1: **Worldwide Ethernet Switch Spending Forecast by Speed, 2018–2023 (\$B)**

*100GbE is set to become the highest-grossing Ethernet switch speed in the coming years.*



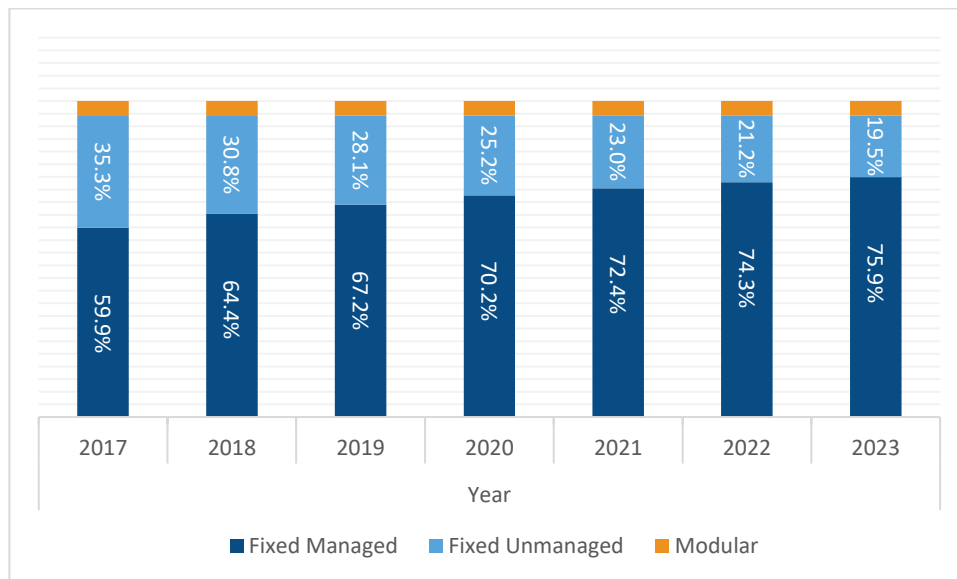
Source: IDC's Datacenter Network QView, 4Q18

## Priorities for a Next-Generation Network

To address the challenges posed by modern business demands, enterprise network transformation is underway. The transition from Gigabit to multi-Gigabit infrastructure continues, and a macro shift toward standardizing on fixed form factor switches is taking hold (see Figure 2). Networks are collapsing from three-tier to two-tier, datacenter-like leaf and spine architectures, which allow for linear scaling while providing the ability to reuse existing fiber.

FIGURE 2: **Ethernet Switch Port Forecast by Product Type, 2017–2023**

Fixed managed switches are expected to become the predominant Ethernet switch deployment type in the coming years.



Source: IDC's Ethernet Switch Forecast, 3Q18

Enterprises have a handful of priorities as they explore network transformation efforts. Important elements of this next-generation infrastructure stack include the following:

- » Organizations need support for the latest speeds and feeds. Often, 10GbE core switches are insufficient for many enterprise networks, leading organizations to consider 25GbE, 40GbE, and 100GbE platforms.
- » As new infrastructure platforms are deployed, security is a top-of-mind concern. Modern switching platforms should support 128- or 256-bit MACsec encryption and have fine-grained security controls related to DHCP snooping, dynamic ARP inspection, protection against denial-of-service attacks, and MAC address locking, offering multiple layers of security.
- » Availability and extensibility are important traits. Highly resilient designs with hitless failover, in-service software upgrades (ISSUs), and redundant, hot-swappable power supplies and fans are increasingly important for enterprise buyers.

- » Enterprise buyers are increasingly looking for management platforms that integrate wired and wireless controls for onboarding, authentication, user and device access and usage policies, as well as centralized visibility, monitoring, and analytics.
- » Enterprises are looking to tailor networks to meet their specific needs. Modern enterprise network infrastructure components should therefore be stackable, scalable, and flexible. Stackable core and aggregation switches increase capacity and facilitate centralized management and do not have to be located in the same place.
- » Data has become the currency of modern business, and modern network infrastructure platforms can play a vital role in helping organizations collect analytics on what is happening in their environments. This aids in reviewing historical trends and predicting future use as well as gaining insights into the types of applications that users and devices are currently using on the network and what they're using the network for. Gaining insights into customers and guests on the network has the potential to create new revenue opportunities. These use cases all require an advanced analytics collection and analysis platform.
- » In recent years, there's been a rise in cloud-based network management platforms that enable organizations to centrally control, monitor, and analyze their enterprise networks from a cloud-based platform. This option is typically used by organizations that have a lean IT staff or a widely distributed set of campus environments that need to be centrally managed.
- » One of the advantages of a cloud-based network management platform is the ability to migrate from a capex to an opex purchasing model, paying only for the amount of network management capacity required. Increasingly, vendors are offering this pay-as-you-go model for on-premises-managed platforms as well.

## ***New Design Models for Enterprise Networks***

Organizations today have a choice of how they architect their enterprise networks. While the features mentioned previously make up the criteria of what most enterprises are looking for in a modern network, there are a variety of emerging architecture models for how enterprise networks are designed.

In the past, a typical three-tier hierarchical design inclusive of core, aggregation, and access layers would have been standard. However, new models have emerged that are more customized to an enterprise's specific priorities, whether to accommodate massive scalability or geographic flexibility. The goals of these various architectural styles typically revolve around increasing resiliency to ensure 100% availability and uptime; enabling the network to automatically protect against a constantly evolving set of undefined security threats; the ability of the network to easily scale and evolve as future requirements change; and support for an increasing array of traffic types — all while maintaining consistent application response times and quality user experiences.

Increased demands on networks have caused enterprises to reconsider how their networks are designed.

Examples of some of these modern enterprise network architectural designs include:

- » **Multi-chassis trunking (MCT):** In this architecture, two separate switches are connected to create a single logical cluster unit, with a spine-leaf design stemming to the aggregation and access layers. This active-active setup is cost effective, yet highly scalable for large-scale networks.
- » **Stacking:** This architecture design connects up to a dozen similar switches, which can be centrally managed by a single IP address, creating an active-standby architecture. One key to this architecture is that the switches do not have to be physically stacked together; they can be up to 10km apart, yet still be virtually connected and centrally managed. This setup is ideal for a variety of networks, from small scale to large scale.
- » **Creating a campus fabric:** In this scenario, up to 36 switches can be virtually connected to form a midsize network with different models of connected switches.

A handful of criteria can be used to help determine the most appropriate enterprise network architecture. Organizations should identify the network requirements that are most important to them, such as security, uptime/availability, scalability, and ease of management. Another important point to consider is how network design meets the needs of the business today and in the future.

## Considering Ruckus Networks

Ruckus has released the ICX 7850, a next-generation high-density core and aggregation switch, supporting 10/25/40/100GbE. Each switch has up to 6.4Tbps capacity, and with the ability to stack up to 12 switches, there is up to 76.8Tbps combined capacity, with up to 288x 100GbE or 576x 10/25GbE ports per 12-unit stacks. Stacked switches can be up to 10km apart. The ICX 7850 includes hitless failover, MCT, and ISSUs. The ICX 7850 fits in squarely with Ruckus' family of ICX switches, all of which run the same FastIron software and are managed by the Ruckus SmartZone Network Controller, giving enterprises flexibility and choice in managing their unified wired and wireless networks and providing enterprises with flexibility in how their networks are architected. The ICX 7850 supports MACsec 256 and redundant power options and uses standard (nonproprietary) Ethernet cables.

The Ruckus ICX 7850 switch is managed by the SmartZone Network Controller, providing integrated wired and wireless management with advanced analytics.

Available models for the ICX 7850 include:

- » 32Q: high-density core, 40/100GbE
- » 48FS: secure aggregation, 1/10GbE aggregation, MACsec 256, LRM optics
- » 48F: 1/10/25GbE aggregation for medium core

Available port configurations include:

- » Up to 32 40/100GbE QSFP28 ports per unit on the 32Q, 8 on the 48FS and 48F
- » Up to 128 10/25GbE SFP28 ports per unit with breakout cables on the 32Q
- » Up to 48 1/10GbE SFP+ ports per unit

## Challenges

The enterprise network market is a competitive landscape. Many enterprises have not standardized on a single infrastructure vendor for all layers of their enterprise network. Consequently, there is often a heterogeneous environment of access, aggregation, and core switching technologies. The ability of Ruckus ICX 7850 to support heterogeneous infrastructure environments is beneficial to enterprises, but Ruckus will be challenged by legacy networking vendors that have existing footprints in the enterprise. This presents both an opportunity and a challenge for Ruckus as the company has the necessary components to compete with other vendors and offer enterprises a full-scale portfolio of enterprise network infrastructure.

## Conclusion

Ruckus brings the ICX 7850 to market at an important time, as a confluence of trends are aligning to create significant demand for new enterprise network infrastructure. Demands on the network are greater than ever with more users, devices, and applications straining network resources. Meanwhile, there have been significant advancements in network infrastructure development to alleviate these issues. Ethernet switching speeds have increased to support bandwidth demands, while management and security features atop those switches continue to advance. Meanwhile, enterprises are increasingly exploring new ways of architecting their networks that cater to their specific requirements and goals for the network. The ICX 7850 is a robust, yet flexible, high-capacity switch that joins the Ruckus family of Ethernet switches to meet the demanding needs of businesses today and power the next decade worth of enterprise network use cases.

### About the analyst:

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Brandon's work in IDC's Network Infrastructure group includes monitoring market and technology trends, building forecasts, and providing competitive analysis in Ethernet switching, routing, wireless LAN, SDN, and SD-WAN.



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