First Look

Decreasing Data Center Network Complexity with Dell PowerSwitch Z9664F-ON

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Challenges:[1]

54% The percentage of organizations stating that their *network environments are more or significantly more complex* than two years ago.

36% The percentage of organizations citing *complexity as a top data center networking challenge*.

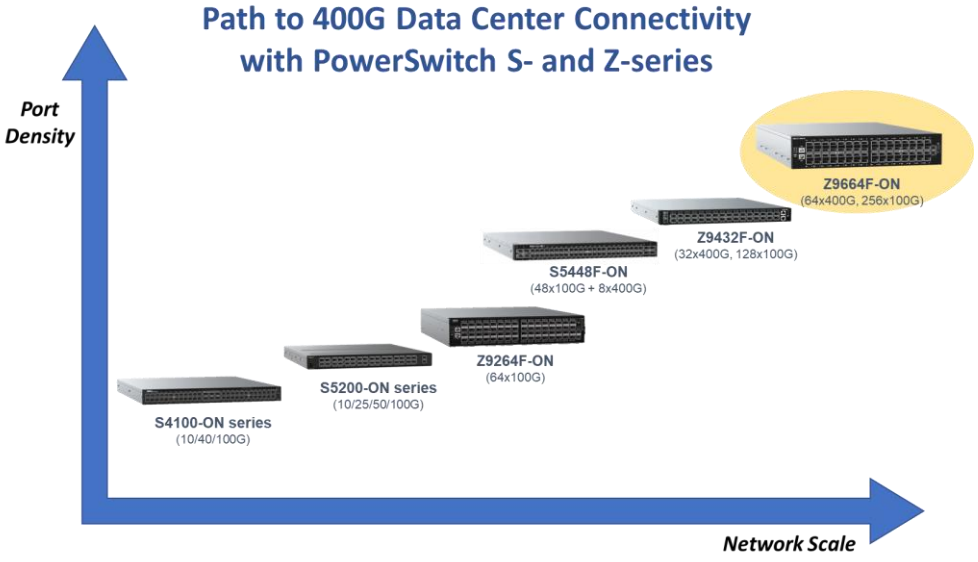
The amount of data and application traffic organizations must manage today drives the need to increase overall data center network throughput and capacity. To date, organizations continue to deploy higher capacity switches to deal with data and traffic growth, from on-premises, the public cloud, and edge locations. However, the pressure to deploy new technologies that accommodate more traffic in networks has been cited by ESG research respondents (36%) as one of the top three most-cited reasons that network complexity persists.

Until now, augmenting data center network throughput has involved deploying multiple module chassis switches as the data center spine. Organizations can deploy multiple 100G switches and aggregate port traffic, but the operational complexity increases to maintain overall performance as more traffic overhead is generated. The multiple chassis also occupy a larger footprint, leading to higher power consumption. Alternatively, organizations can use switches with dual 100G/400G support, but the supported number of 400G ports is insufficient to handle increasing network capacities. In either case, purchasing switches with lower high-speed port counts may not enable organizations to outpace the data growth they are experiencing today.

Migrating to 400G-capable networks, without adding network complexity and added expenses, requires a high-capacity switch with high densities of both 100G and 400G ports. High port density results in fewer switches to be purchased and managed.

Dell PowerSwitch Z9664F-ON

Dell Technologies has added the PowerSwitch Z9664F-ON model to its PowerSwitch Z-series to help organizations simplify their data center networks. As with other models in the PowerSwitch Z-series, the Dell PowerSwitch Z9664-ON is a fixed, open networking, high-density aggregation switch that can deliver higher overall network capacity within a small footprint. With its multirate support and increased higher-speed port count, organizations can leverage the PowerSwitch Z9664F-ON for cost-effective connectivity up to 400 GbE.



[1] Source: ESG Research Report, *Network Modernization in Highly Distributed Environments*, November 2021. All ESG research references and charts in this ESG First Look have been taken from this research report.

The primary use case for the Dell PowerSwitch Z9664F-ON is building out a 400GbE data center fabric, as this model supports 64 400GbE ports (QFSP56-DD)—twice the number of ports supported by previous models—enabling 51.2Tbps of non-blocking and full duplex switching capacity. This model also supports 256 ports of 100GbE for those that want to migrate their data center spines to 400 GbE speeds.

This PowerSwitch Z-series model can also be used to:

- Implement smaller data center fabrics with the Dell PowerSwitch S5448F-ON[2] as an aggregation switch in ToR deployments.
- Aggregate traffic in high-performance computing (HPC) environments as a leaf of ToR switch given its support for 100/400GbE.
- Function as a network switch within environments supporting multiple business needs given its multirate support, up to 256 ports of 10/25/40/50/100/200 GbE (via breakout cables).

Dell Technologies continues to help organizations pursue open networking strategies. As with other PowerSwitch S and Z models, the Dell PowerSwitch Z9664F-ON supports choice of networking OS via the Open Networking Install Environment (ONIE). With ONIE, enterprises can choose the networking OS and hardware that best meets their needs, such as Dell SmartFabric OS10 (for Linux-based data centers) and Enterprise SONiC Distribution by Dell Technologies.[3]

To simplify data infrastructure management, organizations can use Dell CloudIQ[4] for cloud-based monitoring, machine learning, and predictive analytics. Organizations that deploy PowerSwitch Z9664F-ON can also leverage Dell Technologies' global enterprise-level technical support for both hardware and software issue resolution.

ESG Highlights

After our initial evaluation of the Dell PowerSwitch Z9664F-ON, ESG noted:

- Scaling data center spines to 400 GbE is easier to accomplish when deploying this switch with its high port density and 2U footprint. With its 64 ports of 400GbE, Dell PowerSwitch Z9664F-ON enables organizations to implement fewer switches without sacrificing throughput and capacity.
- Relying on multiple lower-speed switches, specifically four 100GbE switches in parallel, to build out a 400GbE data center fabric is no longer an issue. Hardware costs and the associated costs of provisioning, installing, and managing such switches decrease.
- The switch model's footprint results in lower power and cooling requirements, further decreasing capital expenses.
- With PowerSwitch Z9664F-ON's multirate support, organizations can provision the appropriate port speeds as business needs require without adding additional switches and capital expenses. It also minimizes the need for hardware upgrades as the network scales and traffic patterns change. Thus, organizations can migrate up to 400G easily and more cost-effectively.
- PowerSwitch Z9664F-ON further enables flexible networking options and a clear migration path to 400G based on its current data center switch portfolio. While we view this switch to be ideal for 400G-enabled data center spines, its multirate support, along with its compatibility with other PowerSwitch S and Z-Series models, provides multiple migration options to upgrade and scale the data center network as the business demands.

[2] For more information about the Dell PowerSwitch S5448F-ON, please refer to the following ESG First Look: Transitioning Seamlessly to 400GbE Data Center Throughput with Dell PowerSwitch S5448F-ON.
[3] For more information about Enterprise SONiC Distribution by Dell Technologies, please refer to the following ESG First Look: Accelerating Innovation with Enterprise SONiC Distribution by Dell Technologies.
[4] For more information about Dell CloudIQ, please refer to the following ESG Showcase: Dell CloudIQ: AIOps for Intelligent IT Infrastructure Insights.

First Impressions

As organizations continue to grapple with increased network traffic and continuing data growth across on-premises, cloud, and edge environments, enterprise and cloud data centers must upgrade networks to handle higher capacities and throughput. However, the downside to this approach is using multiple switches capable of lower speeds and port density for such upgrades. Additional equipment to purchase, deploy, and manage translates into increased network complexity and higher capital and operational expenses.

ESG's initial review of the Dell PowerSwitch Z9664F-ON revealed that Dell Technologies can provide a cost-effective option for building out a 400G data center fabric occupying smaller footprints. Eliminating the need to use multiple 100G-capable switches in the data center eliminates unnecessary expenses while maximizing network performance, capacity, and throughput.