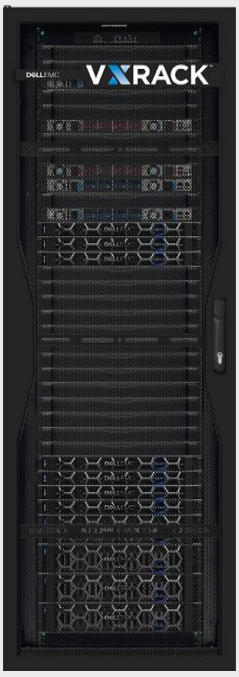
PRODUCT OVERVIEW

DELL EMC VXRACK™ SYSTEM FLEX

VXRACK™ FLEX



Modular hyper-converged infrastructure system that delivers extreme scalability and flexibility

- Start small and grow to data center scale in flexible discrete increments.
- Add compute and storage linearly or independently to scale to hundreds or thousands of nodes.
- Easy to manage and provision new resources.
- Software-defined architecture provides workload flexibility.

Dell EMC has expanded the industry's broadest converged and hyper-converged infrastructure system portfolio to include VxRack FLEX, a rack-scale hyper-converged system. VxRack FLEX is a Dell EMC engineered and manufactured system with industry-best life cycle management and assurance, adding rack-scale capabilities to the Dell EMC hyper-converged portfolio. In addition, VxRack FLEX connects through Vscale™ Architecture, enabling additional Enterprise and Service Provider use cases and consumption models.

Only Dell EMC converged systems provides standardization, modular scale, tightly integrated converged solutions, life cycle management, and industry-best customer experience—enabling on-demand IT services that further accelerate business outcomes and time-to-value.

POWERED BY DELL EMC SCALEIO, SOFTWARE-DEFINED STORAGE SOFTWARE

Dell EMC ScaleIO is software that creates a server-based SAN from integrated Dell EMC PowerEdge servers to deliver flexible and scalable performance and capacity on demand. ScaleIO combines storage resources to create a virtual pool of block storage with varying performance tiers. Its design enables you to scale from four nodes to over a thousand nodes. ScaleIO also uses significantly lower CPU and memory resources. This makes it a far more efficient solution for hyper-converged deployments such as VxRack FLEX, as it reduces the need to add more hardware resources to the cluster, enabling you to better manage your CAPEX. In addition, it provides enterprise-grade data protection, multi-tenant capabilities, and add-on enterprise features such as QoS, thin provisioning, and snapshots. ScaleIO delivers the scalability, elasticity, flexibility and performance needed to meet the demands for whatever comes next.

DELL POWEREDGE SERVERS

Business applications and workloads vary greatly, and Dell EMC strongly believes that one size does not fit all when it comes to hyper-converged infrastructure. With an unmatched hyper-converged infrastructure portfolio, Dell EMC enables IT organizations to accelerate their modernization initiatives by making it easy to deploy infrastructure platforms on which they can build and run both traditional and cloud-native applications. Integrating the latest generation of industry-leading Dell EMC PowerEdge Servers with Dell EMC's HCI offerings is another example of the power of the combined companies. Dell EMC's ability to deliver the entire hyper-converged infrastructure stack (from software through servers to storage) provides even more customer value, enabling faster innovation while leveraging Dell's world-class supply chain to drive down costs. IT organizations can now partner with a single vendor for end-to-end technology solutions that will modernize their data center.

THE SIGNIFICANCE OF NETWORKING AT SCALE:

- Plan for growth – Expand your environment easily without the worry of network or operational complexity.
- Integrated networking – Turnkey networking is a critical part of the hyper-converged infrastructure. Don't treat it as a separate technology silo.
- Performance at scale – Policy management prevents oversubscription and spine density best practices ensure performance at scale.
- Simplify the complexity – A multi-rack architecture can be built at scale. Manage logical planning and physical connections as needed.

VXRACK FLEX NETWORKING BENEFITS:

- Standardized and repeatable
- Easily extensible
- Greatly simplifies operations
- Lowers risk
- Superior application performance at scale

VXRACK FLEX AND SCALEIO PROVIDE ESSENTIAL FEATURES FOR ENTERPRISES AND SERVICE PROVIDERS:

- Partitioning / protection domains
- Tiering
- Multi-tenancy
- Snapshots
- Fault set domains
- Two-way mesh mirroring
- Storage QoS
- In-flight checksum
- Five-node MDM cluster
- Read flash cache
- EMC Secure Remote Services (ESRS)
- Instant maintenance mode

VxRack FLEX built on PowerEdge servers provides better all-flash economics, improved performance and workload flexibility to address new customer use cases for both traditional and cloud-native workloads running in mixed environments.

For VxRack FLEX, two new PowerEdge-based options are available (1U/1N based on PowerEdge R630; 2U/1N based on PowerEdge R730xd), both of which can be configured with SSD (all-flash), or HDD options. VxRack FLEX on the latest PowerEdge servers provide:

- Better all-flash economics: New Dell PowerEdge based nodes for VxRack System with latest Intel processors offer 2.5X more usable flash capacity for a similar price versus previous generation nodes.

START SMALL AND GROW TO WEB-SCALE

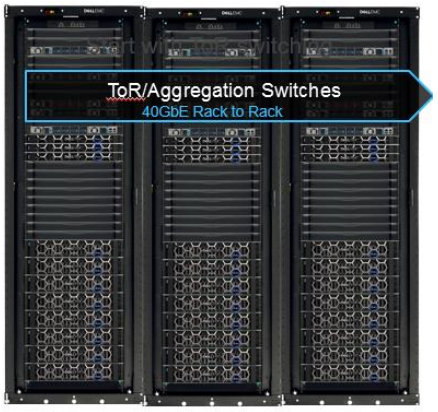
VxRack FLEX enables scale-out capabilities to your data center. Start small with as little as four nodes and grow to web scale. Add nodes one by one within a single rack or scale out with additional racks as compute and storage resources are consumed. This provides your infrastructure with elastic sizing and efficient scalability, allowing you to start small with your proof of concept or new application and grow to web-scale size as your requirements evolve.

Networking

A hyper-converged network can be complex to design, build and scale and many solutions simply exclude it. Ignoring the network makes it very difficult to plan for growth and as the environment scales, performance degrades.

VxRack FLEX encompasses complete support for the unique requirements of hyper-converged networking. Integrated Top of Rack (ToR), Aggregation and Out of Band Management switches provide optimal network traffic flow. As the VxRack FLEX scales, the east-west traffic is fully contained within the system, reducing the need for network expertise and changes outside of the solution.

When designing a network, oversubscription, spine density, switch ports, high density, low density, wire rates, are just a few of the many technical details that need to be considered. VxRack FLEX is designed with industry best practices already applied. Best-in-class Cisco Nexus Aggregation switches provide 10/40 GbE IP uplink connectivity to the external network for superior performance. Unlike other solutions in the market, where network bottlenecks limit the scale of hyper-converged infrastructures, the 10/25 GbE ToR switches within the VxRack FLEX eliminate these restrictions and provide a path for future growth.



Extreme Application Performance

Every node in the VxRack FLEX/ScaleIO cluster is used in the processing of I/O operations, making all I/O and throughput accessible to any application within the cluster. Such massive I/O parallelism eliminates bottlenecks. Throughput and IOPS scale in direct proportion to the number of nodes added to the system, improving cost/performance rates with growth. Performance optimization is automatic; whenever rebuilds and rebalances are needed, they occur in the background with minimal or no impact to applications and users. The VxRack FLEX system autonomously manages performance hot spots and data layout. Dell EMC lab testing results demonstrate

WORKLOAD	iops (3 nodes)	iops (128 nodes)
100% read	~875,000	~31,000,000
70%read/30%write	~650,000	~23,750,000
100% write	~375,000	~12,500,000

Specifications

VxRack FLEX makes the transition to a hyper-converged and software-defined storage simple by removing complexities, such as designing and integrating a build-it-yourself solution.

Base system configuration for VxRack FLEX

Components	Configuration
Compute	Dell PowerEdge Servers
Storage	DAS storage attached to the x86 servers
Networking	Cisco Nexus switches
Server Virtualization	VMware vSphere 6.0 or higher VMware ESXi, VMware vSphere Server Enterprise Plus, VMware vCenter Server
Storage Virtualization	Dell EMC ScaleIO
Management Infrastructure	Vision™ Intelligent Operations, ScaleIO, vCenter, VxRack FLEX alerting and monitoring
Environmental	Intelligent Physical Infrastructure consisting of Cabinet 2.0—fully welded and dynamically load-rated Smart Power Deliver Units (PDU) Hid Reader and Thermal Sensors

VxRack FLEX has many enclosure options.

Table 1. Dell PowerEdge R630

Type	CPU	Total Cores	Total Memory	SSD	HDD	Total Storage
R630 HCI	2xE5-2697v4	36	512	10x1.6TB	None	16 TB
R630 HCI	2xE5-2680v4	28	512	10x3.84TB	None	38.4 TB
R630 HCI	2xE5-2680v4	28	512	10x1.92TB	None	19.2 TB
R630 HCI	2xE5-2680v4	28	768	10x1.92TB	None	19.2TB
R630 HCI	2xE5-2680v4	28	1536	10x3.84TB	None	38.4 TB
R630 HCI	2xE5-2680v4	28	768	10x3.84TB	None	38.4TB
R630 HCI	2xE5-2698v4	40	1536	10x1.92TB	None	19.2TB
R630 HCI	2xE5-2680v4	28	512	10x960GB	None	9.6T
R630 HCI	2xE5-2680v4	28	256	10x3.84TB	None	38.4TB

R630 HCI	2xE5-2698v4	40	768	10x1.92TB	None	19.2TB
R630 HCI	2xE5-2680v4	28	768	10x960GB	None	9.6TB
R630 HCI	2xE5-2680v4	28	1536	10x960GB	None	9.6TB
R630 HCI	2xE5-2699Av4	44	512	10x1.92TB	None	19.2TB
R630 HCI	2xE5-2699v4	44	768	10x1.92TB	None	19.2TB
R630 HCI	2xE5-2650v4	24	512	5x960GB	None	4.8TB
R630 Storage Only	2xE5-2620v4	16	64	10x1.6TB	None	16 TB
R630 Storage Only	2xE5-2620v4	16	64	None	10x1.2TB	12 TB
R630 Storage Only	2xE5-2620v4	16	64	10x3.84TB	None	38.4 TB
R630 Storage Only	2xE5-2620v4	16	64	10x1.92TB	None	19.2 TB
R630 Compute Only	2xE5-2698v4	40	512	None	2x1.2TB	2.4TB
R630 Compute Only	2xE5-2698v4	40	1536	2x800GB	None	1.6TB
R630 Compute Only	2xE5-2680v4	28	768	2x800GB	None	1.6TB
R630 Compute Only	2xE5-2650v4	24	768	2x800GB	None	1.6TB
R630 Compute Only	2xE5-2620v4	16	768	2x800GB	None	1.6TB

Table 2. Dell PowerEdge R730XD

Type	CPU	Total Cores	Total Memory	SSD	HDD	Total Storage
R730XD HCI	2xE5-2680v4	28	512	24x1.92TB	None	46 TB
R730XD Storage Only	1xE5-2620v4	8	64	None	24x1.2TB	28.8 TB
R730XD Storage Only	1xE5-2650v4	12	64	24x1.92TB	None	46 TB
R730XD Storage Only	1xE5-2620v4	8	64	24x3.84TB	None	92.16TB

Management Layer

Vision™ Intelligent Operations for VxRack FLEX

Vision is a unified UI for the management of the VxRack FLEX system. It provides system administrators a direct and complete way to deploy, monitor, sustain, and support the VxRack FLEX system.

- Deploy. Go from power-on servers to a fully provisioned system. Allow for configuring network, installing base OS, and installing ScaleIO.
- Monitor. Monitor the overall system performance, health, and metrics. Report on current state of infrastructure server, switch, storage, and smart cabinet. Provide basic system health and performance data.
- Sustain. Keep the system updated with the latest versions and fixes. Provide RCM guidance. Update VxRack Management Software.
- Support. Report all system issues affecting operations and performance. Aggregate log and configuration data. Provide knowledge base, support contact, and process information.
- Manage. Integrated with Vision software to easily manage multiple systems from Dell EMC, including VxRack Systems, Vblock Systems, VxBlock Systems, and Technology Extensions, with a multisystem view via Vision software.

Vision™ Intelligent Operations for the data center

The Vision software suite provides an integrated set of software products for managing a data center, not just individual systems. Vision software is the first software suite to provide an intelligent solution to the problem of managing operations in a converged infrastructure environment. These tools enable and simplify converged operations by dynamically providing a high level of intelligence into a customer's existing management toolset.

Vision software enables Dell EMC customers and third-party consumers to know that the VxRack Systems exist, where they are located, and what components they contain. It reports on the health or operating status of the VxRack Systems. It also reports on how compliant the VxRack Systems are with a Release Certification Matrix and the Dell EMC Security Standards.

Vision software effectively acts as a mediation layer between your system and the management tools that are already in place. The software allows for intelligent discovery by providing a continuous, near real-time perspective of your compute, network, storage, and virtualization resources as a single object—ensuring that your management tools reflect the most current state of your VxRack System.

Alerting, monitoring and reporting

VxRack FLEX provides alerting and monitoring on node hardware (Dell PowerEdge Servers). These monitoring capabilities proactively detect errors and when connected to Dell EMC Secure Remote Support (ESRS), provide remote alerting and protection for system nodes. Remote monitoring enables you to easily establish a stateless compute environment so you can achieve greater agility and control of your server node resources. When node maintenance operations are required, or in the case of a disaster recovery incident, failures are quickly identified and Dell EMC support informed for quick response. This proactive alerting and automated technical support makes it so less time is spent troubleshooting and more time can be spent addressing business priorities.

Customized reports are also available leveraging a powerful reporting engine and easy access to specific node information as needed.

DELL EMC EXPERIENCE

Dell EMC is a leading innovator of intelligent converged and hyper-converged infrastructure systems. Dell EMC Systems are engineered to deliver the highest performance, operational simplicity, and scalability for the lowest TCO. Every system is a true converged infrastructure—each is engineered, manufactured, managed, supported, and sustained as ONE product.

- Dell EMC Systems are standardized architectures based on best-in-breed technologies.
- Dell EMC manufacturing completes integration, testing, and validation of every VxRack System. This ensures that it is delivered within 60 days and is operational within hours of arrival
- Every VxRack System includes Vision software, to enable standardized, more efficient, continuous processes for system provisioning, health management, and life cycle management.
- Every VxRack System is sustained by a Release Certification Matrix (RCM), a documented set of firmware and software releases for all VxRack System components, pre-tested and certified for interoperability, and regularly delivered to customers to simplify upgrades and keep systems stabilized and optimized.

Learn more about DELL EMC VxRack™ system FLEX

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