DELL EMC VXRACK FLEX
FOR HIGH PERFORMANCE DATABASES AND APPLICATIONS, MULTI-HYPERVISOR AND TWO-LAYER ENVIRONMENTS

Dell EMC VxRack FLEX is a Dell EMC engineered and manufactured rack-scale hyper-converged system that delivers an unmatched combination of performance, resiliency and flexibility to address enterprise data center needs.

Only Dell EMC hyper-converged systems provide standardization, modular scale, tightly integrated converged solutions, life cycle management, and industry-best customer experience.

VxRack FLEX creates a server-based SAN by combining virtualization software, known as VxFlex OS, with Dell EMC PowerEdge servers to deliver flexible, scalable performance, and capacity on demand. Local storage resources are combined to create a virtual pool of block storage with varying performance tiers. The architecture enables you to scale from as few as four nodes to over a thousand nodes. In addition, it provides enterprise-grade data protection, multi-tenant capabilities, and add-on enterprise features such as QoS, thin provisioning, and snapshots. VxRack FLEX delivers the scalability, flexibility, performance, and time-to-value required to meet the demands of the modern enterprise data center.

HIGH PERFORMANCE APPLICATIONS AND DATABASES

Organizations moving to hyper-converged are often worried that it will not deliver the performance they need. VxRack FLEX with VxFlex OS can deliver millions of IOPS at consistent submillisecond response times. Every node in the VxRack FLEX 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 performance bottlenecks. Throughput and IOPS scale in direct proportion to the number of nodes added to the system, improving cost/performance rates with growth. The high performance is desired for databases and applications but also is a key factor if rebuilds and rebalances are needed. These all occur in the background with minimal or no impact to applications and users. The VxRack FLEX system automatically manages and optimizes data layout, preventing performance hot spots. These are the special VxFlex OS features that make enterprises rely on VxRack FLEX without worrying about transitioning to HCI for their mission critical databases and applications.

Dell EMC lab testing results demonstrate:

<table>
<thead>
<tr>
<th>WORKLOAD</th>
<th>IOPs (3 nodes)</th>
<th>IOPs (128 nodes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% read</td>
<td>~875,000</td>
<td>~31,000,000</td>
</tr>
<tr>
<td>70%read/30%write</td>
<td>~650,000</td>
<td>~23,750,000</td>
</tr>
<tr>
<td>100% write</td>
<td>~375,000</td>
<td>~12,500,000</td>
</tr>
</tbody>
</table>
MULTI-HYPERVERSOR AND BARE METAL OPTIONS

VxRack FLEX offers VMware® vSphere and Red Hat Virtualization integration as an engineered system, alongside the ability to support other hypervisors through bare-metal configurations*. This unique ability provides workload flexibility and gives organizations choice if requirements change as new projects and workloads arise.

Enabling different nodes to run different hypervisors, all while sharing the same storage pool, allows independent upgrades and shifting to different virtual environments as needed.

FLEXIBLE DEPLOYMENT OPTIONS

VxRack FLEX offers flexibility in deployment options:

- **HCI/single-layer architecture**: An HCI model, where compute and storage reside within the same server, creates a single-layer architecture and offers the best TCO savings while allowing you to modernize your data center with greater efficiency.

- **Two-layer model**: Redesign your storage environment using a traditional two-layer model to resemble a traditional SAN architecture (unlike the HCI model where application and storage reside on same nodes). A two-layer model provides efficient parallelism and no single points of failure. Additionally, storage and compute nodes remain separate operationally, giving teams the flexibility to manage each infrastructure component independently. And if an organization is compute heavy or storage heavy, two-layer allows them to scale each component independently, avoiding the worry of unused resources.

START SMALL AND GROW AS BIG AS YOU NEED

VxRack FLEX enables superbly flexible scale-out capabilities for your data center. As compute and storage resources are consumed, add nodes one by one within a single rack, or scale by adding entire racks. VxRack FLEX provides your infrastructure with unparalleled elasticity and scalability. Start with a few nodes for your proof of concept or new application and grow as your requirements evolve – even to web-scale size.

INTEGRATED NETWORKING

A hyper-converged network can be complex to design, build, and scale, and many solutions simply exclude it, placing the burden on customers. 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 system 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, and wire rates are just a few of the many technical details that need to be considered. VxRack FLEX is designed with industry best practices and best-in-class Cisco Nexus Aggregation switches that 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.

*Other hypervisors supported through bare-metal and require preapproval
**VXRACK FLEX NETWORKING BENEFITS**

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

**DELL EMC POWEREDGE SERVERS**

Because business applications and workloads vary greatly, Dell EMC strongly believes that one size does not fit all when it comes to hyper-converged infrastructure (HCI). With an unmatched HCI 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 14th generation PowerEdge servers with Dell EMC 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 technology solutions that will modernize their data center.

VxRack FLEX, built on 14th generation 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 PowerEdge-based options are available (1U/1N based on PowerEdge R640; 2U/1N based on PowerEdge R740xd), both of which can be configured with SSD (all-flash) options. VxRack FLEX on the latest PowerEdge servers provide:

- 2.5x more IOPS per node
- 250% more bandwidth
- More storage speed with NVMe
- 4x memory per node using LRDIMMs
- Up to 20% more cores per node
- 34% more virtual machines per node

**Specifications**

**Table 1: System components**

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compute</td>
<td>Dell EMC PowerEdge servers</td>
</tr>
<tr>
<td>Storage</td>
<td>DAS</td>
</tr>
<tr>
<td>Networking</td>
<td>Cisco Nexus switches</td>
</tr>
<tr>
<td>Hypervisor support</td>
<td>VMware vSphere, Red Hat Virtualization</td>
</tr>
<tr>
<td>Bare metal support</td>
<td>Yes and other hypervisors such as Hyper-V supported through bare metal.*</td>
</tr>
<tr>
<td>Management infrastructure</td>
<td>VxFlex Manager, VxFlex OS, Vision, vCenter</td>
</tr>
<tr>
<td>Environmental</td>
<td>Intelligent physical infrastructure consisting of Cabinet 2.0—fully welded and dynamically load-rated Smart Power Deliver Units (PDU) HID reader and thermal sensors</td>
</tr>
</tbody>
</table>

*Other hypervisors supported through bare-metal and require preapproval*
**MANAGEMENT AND OPERATIONS**

**VxFlex Manager**

VxFlex Manager is a comprehensive IT Operations Management (ITOM) software purpose built for VxRack FLEX to automate and simplify implementation, expansion and lifecycle management.

VxFlex Manager brings together multiple management consoles, workflow automation and an intuitive interface that allows customers to monitor, manage, deploy and maintain physical and virtual resources with the click of a button. Key tenets of the new VxFlex Manager architecture include:

- System assurance: RCM updates and non-disruptive remediation
- Insights: Monitoring, alerting, and health checks
- Simplification of implementation: Simplified and automated system deployment and workflows
- Deploy and scale two-layer deployments on RHEL based storage nodes

VxFlex Manager provides alerting and monitoring on node hardware (Dell EMC PowerEdge servers). These monitoring capabilities proactively detect errors and when connected to Dell EMC Secure Remote Support (SRS), 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 is informed immediately for speedy resolutions. This proactive alerting and automated technical support means less time is spent troubleshooting so more time can be spent addressing business priorities.

By leveraging a powerful reporting engine, customized reports are also available and provide easy access to specific node information as needed.

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*Nodes continue to be added over time, please check with your sales team for the latest configurations*
The VxFlex Manager architecture delivers a wide range of services to support VxRack FLEX including nodes, switches, VxFlex OS, and other hypervisors. It also supports the latest 14th generation node configurations. With VxRack FLEX, it has never been easier to help your customers advance their HCI strategy.

**SUMMARY**

VxRack FLEX is an HCI offering that can replace an enterprise grade SAN using Dell EMC PowerEdge servers and intelligent software. VxRack FLEX exhibits balanced and predictable behavior, allows for varying performance and capacity ratios, decouples the scalability of compute and storage resources, and can scale enormously and non-disruptively.

VxRack FLEX provides a completely distributed pool of storage capacity and performance. It delivers consistent IOPS and latency, eliminating hotspots—no matter the workload.

**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 Dell EMC VxRack FLEX. This ensures that it is delivered within 90 days and is operational within hours of arrival.
- Dell EMC uses a process known as the Logical Configuration Survey (LCS) to customize integration and deployment. All system elements are pre-integrated, pre-configured, then tested and validated before shipping. Turnkey integration allows you to operate and manage your system as a single engineered product, rather than as individual, siloed components. Ongoing, component-level testing, and qualification result in a drastically simplified update process. The result is significant time and resource savings throughout the system life cycle, allowing you to focus your resources on business innovation.
- Every VxRack FLEX is sustained by a Release Certification Matrix (RCM), a documented set of firmware and software releases for all VxRack System components that are pre-tested and certified for interoperability, and regularly delivered to customers to simplify upgrades and keep systems stabilized and optimized.

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Learn more about DELL EMC VxRack™ FLEX  
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