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Expanding VxRail Dynamic Node Storage Options with PowerFlex



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Tony Foster

It was recently announced that Dell VxRail dynamic nodes now supports Dell PowerFlex. This announcement expands the storage possibilities for VxRail dynamic nodes, providing a powerful and complimentary option for hyperconverged data centers. A white paper (<https://infohub.delltechnologies.com/t/dell-emc-powerflex-storage-with-vxrail-dynamic-nodes-1/>) published by the Dell Technologies Solutions Engineering team

by providing an overview for the dynamic nodes and PowerFlex, then describe why this duo is beneficial, and finally we will look at some of the exciting aspects of the white paper.

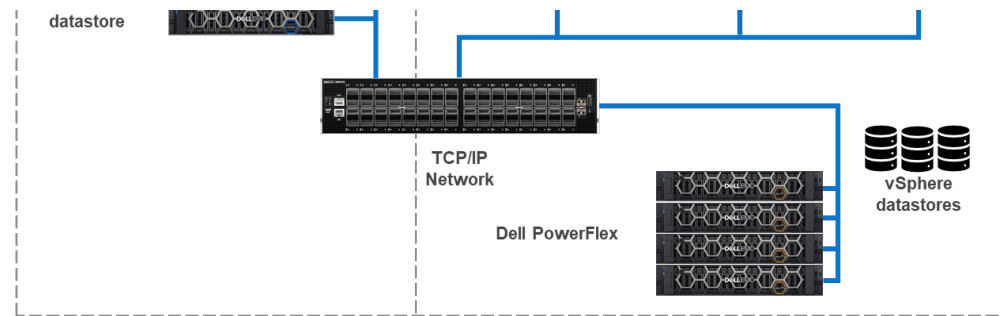


VxRail dynamic nodes and PowerFlex

VxRail

VxRail (<https://www.dell.com/en-us/dt/converged-infrastructure/vxrail/index.htm#tab0=0&tab1=0>) dynamic nodes are compute-only nodes, meaning these nodes don't provide vSAN storage. They are available in the E, P, and V Series (<https://www.delltechnologies.com/asset/en-us/products/converged-infrastructure/technical-support/h16763-vxrail-spec-sheet.pdf>) and accommodate a large variety of use cases. VxRail dynamic nodes rely on an external storage resource as their primary storage, which in this case is PowerFlex.

The following diagram shows a traditional VxRail environment is on the left. This environment uses VMware vSAN datastore for storage. The right side of the diagram is a VxRail dynamic node cluster. The VxRail dynamic nodes are compute only nodes, and, in this case rely on PowerFlex for storage. In this diagram the VxRail cluster, the VxRail dynamic node cluster, and the PowerFlex storage can all be scaled independently of one another for certain workloads. For example, some may want to adjust resources for Oracle environments to reduce license costs.



To learn more about VxRail dynamic nodes, see my colleague Daniel Chiu's blog on the VxRail 7.0.240 release (<https://infohub.delltechnologies.com/p/learn-more-about-the-latest-major-vxrail-software-update-vxrail-7-0-240/>).



PowerFlex

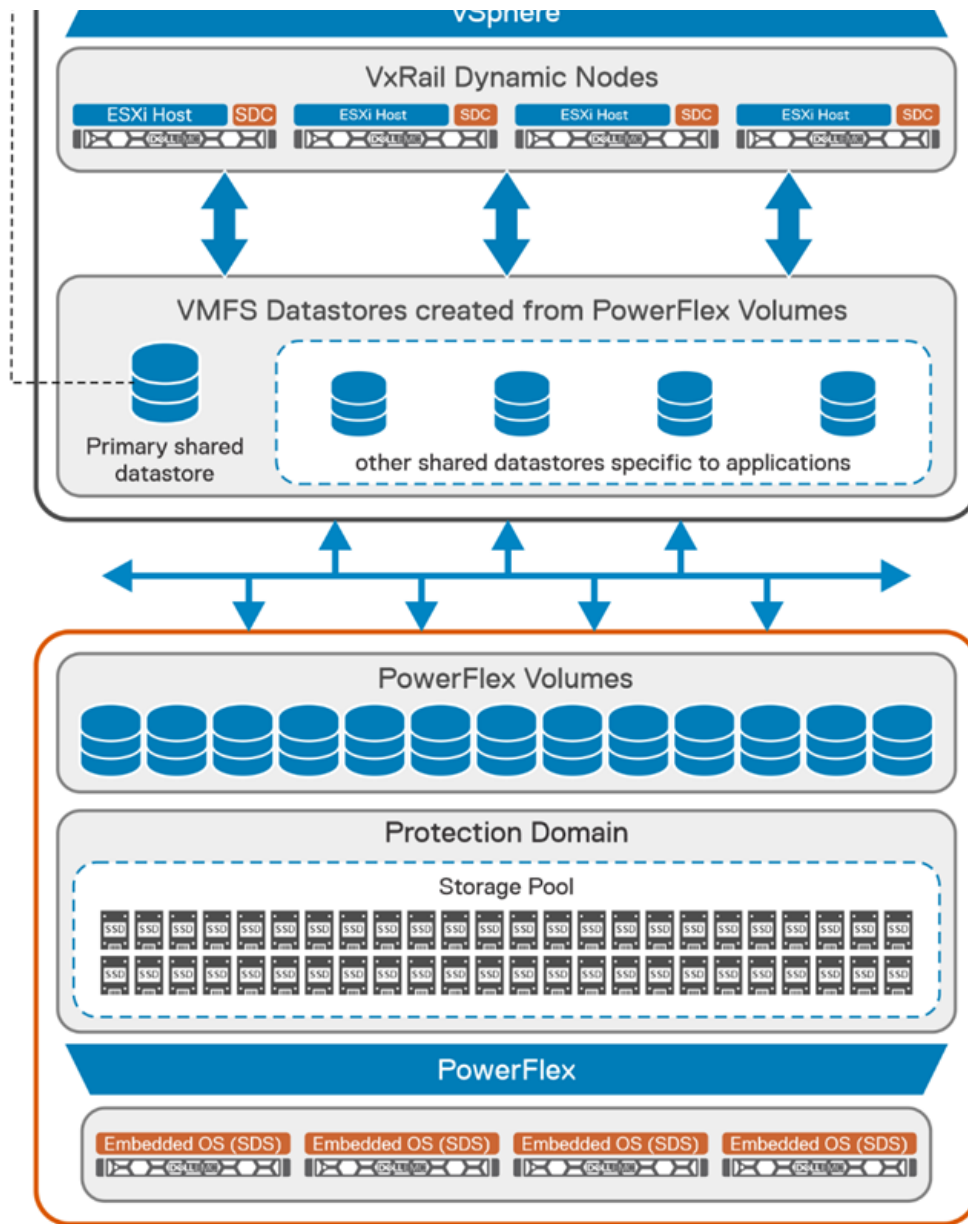
PowerFlex is a software defined infrastructure that delivers linear scaling of performance and resources. PowerFlex is built on top of PowerEdge servers and aggregates the storage of four or more PowerFlex nodes to create a high-performance software defined storage system. PowerFlex uses a traditional TCP/IP network to connect nodes and deliver storage to environments. This is the only storage platform for VxRail dynamic nodes that uses an IP network. Both of these attributes are analogous to how VxRail delivers storage.

PowerFlex-VxRail benefits

If it seems confusing because VxRail and PowerFlex seem to share many of the same characteristics, it is they do share many of the same characteristics.

The following diagram shows the logical configuration of PowerFlex and VxRail combined. Starting at the top of the diagram, you will see the VxRail cluster, consisting of four dynamic nodes. These dynamic nodes are running the PowerFlex Storage Data Client (SDC), a software-based storage adapter, which runs in the ESXi kernel. The SDC enables the VxRail dynamic nodes to consume volumes provisioned from the storage on the PowerFlex nodes.

In the lower half of the diagram, we see the PowerFlex nodes and the storage they present. The cluster contains four PowerFlex storage-only nodes. In these nodes, the internal drives are aggregated into a storage pool that spans across all four nodes. The storage pool capacity can then be provisioned as PowerFlex volumes to the VxRail dynamic nodes.



AI workloads offer a great example of where it makes perfect sense to bring these two technologies together. There has been a lot of buzz around virtualizing AI, ML, and HPC workloads. Dell, NVIDIA, and VMware have done amazing things in this area, including NVIDIA AI Enterprise (<https://www.nvidia.com/en-us/data-center/products/ai-enterprise-suite/>) on VxRail (<https://www.delltechnologies.com/en-us/blog/simplify-ai-infrastructure-and-operations-with-nvidia-and-vxrail/>). Now you may think this does not matter to your organization, as there are no uses for AI, ML, or HPC in your organizations, but uses for AI are constantly evolving. For example, AI is even being used extensively in agriculture (<https://www.dell.com>

systems processing benefit from quick access to it and VxRail is awesome for that. There are exceptions, what if your data set is too large for VxRail, or what if you have multiple AI models that need to be shared amongst multiple clusters?

The typical response in this scenario is to get a storage array for the environment. That would work, except you've just added complexity to the environment. Many users move to HCI to drive complexity out of their environment. Fibre channel is a great example of this complexity.

To reduce complexity, there's another option, just use PowerFlex. PowerFlex can support hundreds of nodes, enabling highly-performant storage needed for modern, data hungry applications. Additionally, it operates on standard TCP/IP networks, eliminating the need for a dedicated storage switch fabric. This makes it an ideal choice for virtualized AI workloads.

The idea of a standard network may be important to some organizations, due to the complexity aspects or they may not have the in-house talent to administer a Fibre channel network. This is particularly true in areas where administrators are hard to find. Leveraging the skills and resources already available within an organization, now more than ever, is extremely important.

Another area where PowerFlex backed VxRail dynamic nodes can be beneficial is with data services like data at rest encryption (D@RE). Both vSAN (<https://core.vmware.com/blog/performance-when-using-vsan-encryption-services>) and PowerFlex (<https://infohub.delltechnologies.com/p/powerflex-and-cloudlink-a-powerful-data-security-combination/>) support D@RE technology. When encryption is run on a host, the encryption/decryption process consumes resources. This impact can vary depending on the workload. If the workload has a lot of I/O, the resource utilization (CPU and RAM) could be more than a workload with lower I/O. When D@RE is offloaded, those resources needed for D@RE can be used for other tasks, such as workloads.

Beyond D@RE, PowerFlex has many other built in data resiliency and protection mechanisms. These include a distributed mesh mirroring system and native asynchronous replication. These functions help deliver fast data access and a consistent data protection strategy.

The impact of storage processing, like encryption, can impact the number of hosts

cause a performance degradation if there aren't enough resources to handle both the encryption processing and the CPU/RAM demands of the database environment and can lead to needing additional hosts to support the database environment.

In such a scenario, it can be advantageous to use VxRail dynamic nodes with PowerFlex. This offloads the encryption to PowerFlex allowing all the compute performance to be delivered to the VMs.

Dell PowerFlex with VxRail Dynamic Nodes – White Paper

The Solutions Engineering team has included many graphics detailing both the logical and physical design of how VxRail dynamic nodes can be configured with PowerFlex.

It highlights several important prerequisites, including that you will need to be using VxRail system software version 7.0.300 or above. This is important as this release is when support for PowerFlex was added to VxRail dynamic nodes. If the VxRail environment is not at the correct version, it could cause delays while the environment is upgraded to a compatible version.

Beyond just building an environment, the white paper also details administrating the environment. While administration is a relatively straight forward for seasoned administrators, it's always good to have instructions in case an administrator is sick or other members of the team are gaining experience.

All of this and so much more are outlined in the white paper. If you are interested in all the details, be sure to read through it. This applies if your team is currently using VxRail and looking to add dynamic nodes or if you have both PowerFlex and VxRail in your environment and you want to expand the capabilities of each.

Summary

This blog provided an overview of VxRail dynamic nodes and how they can take advantage of PowerFlex software defined storage when needed. This includes reducing licensing costs and keeping complexity, like fiber channel, to a minimum in your environment. To find out more, read the white paper or talk with your Dell

Author Information

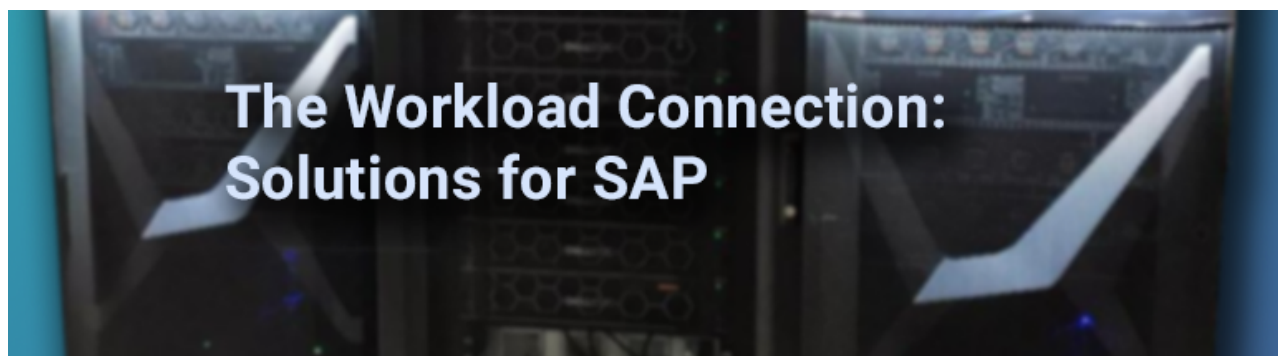
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 **Aighne Kearney**

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TF Tony Foster

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Welcome to your destination. Today Dell Technologies is pleased to share that Amazon Elastic Kubernetes Service (Amazon EKS) Anywhere has been validated (<https://aws.amazon.com/eks/eks-anywhere/partners>) on Dell PowerFlex (<https://www.delltechnologies.com/en-us/infrastructure/solutions/PowerFlex>)

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