ABSTRACT

This white paper provides an overview of Dell EMC® data protection solutions that highlight the combined power of Data Domain Virtual Edition®, Data Protection Suite for VMware®, and Dell EMC VxRAIL™ for efficient protection of VMware® environments leveraging proven Dell EMC data protection solutions.

October, 2016
# TABLE OF CONTENTS

## EXECUTIVE SUMMARY
- Introduction ................................................................. 4
- Audience........................................................................... 4

## VxRAIL TECHNOLOGY
- VxRAIL appliances overview........................................... 4
- VxRAIL Node options......................................................... 5
  - VxRAIL All Flash Nodes feature set................................ 6
- VxRAIL included data protection....................................... 6
  - vSphere Data Protection................................................ 6
  - RecoverPoint for Virtual Machines................................. 7

## DATA DOMAIN OVERVIEW
- The Data Domain Operating System................................. 7
  - High speed deduplication................................................ 7
  - Seamless integration..................................................... 7
  - Network-efficient replication........................................ 7
  - Reliability and security.................................................. 8
- Cloud-Enabled .................................................................. 8
  - Data Domain Cloud Tier................................................. 8
  - Data Domain Secure Multi-tenancy................................. 8
- Additional Data Domain software..................................... 8
  - Data Domain Boost......................................................... 8
  - Data Domain Replicator.................................................. 8

## DATA DOMAIN VIRTUAL EDITION
- DD VE feature set............................................................ 9
- DD VE use cases.............................................................. 10

## DATA PROTECTION SUITE FOR VMWARE

## VXRAIL + DP SUITE FOR VMWARE + DD VE: ADVANTAGES

## CONCLUSION

## ADDITIONAL RESOURCES
EXECUTIVE SUMMARY
This white paper provides the reader with background information about the technical differentiation of Data Domain, Data Domain Virtual Edition, Data Protection Suite for VMware and proven data protection solutions that demonstrate the combined power and customer benefits of Dell EMC data protection solutions for efficient protection of Hyper-Converged Infrastructure environments.

INTRODUCTION
Data Domain protection storage has been a technology leader for many years providing industry first features and cost effective data protection for the masses. Dell EMC Data Domain Virtual Edition (DD VE) gives customers the benefits of the world’s most trusted protection storage and the simplicity, flexibility and agility of a software-defined solution. Dell has provided industry leading server technology for many years. The combined power of Dell EMC and VMware gives customers tested and proven solutions where the customer end result value is truly more than 1 + 1.

This white paper provides background information, configuration options, and highlights the customer benefits of Dell EMC data protection solutions for VMware.

AUDIENCE
This white paper is intended for is intended for presales engineers, technical architects, implementation specialists, technical consultants, Dell EMC Partners, and individuals interested in leveraging Dell EMC products and emerging technologies.

VXRAIL TECHNOLOGY

VXRAIL APPLIANCES OVERVIEW
Dell EMC VxRail, powered by Intel® Xeon® processors, is the only fully integrated, preconfigured, and pre-tested VMware hyper-converged infrastructure appliance family on the market. Based on VMware’s vSphere and Virtual SAN, and Dell EMC software, VxRail delivers an all-in-one IT infrastructure transformation by leveraging a known and proven building block for the Software Defined Data Center (SDDC).

With the power of a whole SAN in just two rack units, they provide a simple, cost effective hyper-converged solution for a wide variety of applications and workloads. VxRail appliances deliver resiliency, QoS, and centralized management functionality enabling faster, better, and simpler management of consolidated workloads, virtual desktops, business-critical applications, and remote office infrastructure.

Figure 1: VxRAIL appliance (front)

Built on the foundation of VMware Hyper-Converged Software and managed through the familiar VMware vCenter Server, VxRail appliances provide existing VMware customers an experience they are familiar with while allowing them to take advantage of the hallmark benefits of Dell EMC converged solutions - increased agility, simplified operations and lower risk. VxRail appliances are fully loaded with integrated Dell EMC mission-critical data services including replication, backup and cloud tiering at no additional charge. As a VMware-based solution, the appliances also integrate with VMware’s cloud management platform and end-user computing solutions. VxRail is also a platform for introducing advanced SDDC offerings like NSX, vRealize Automation and HorizonAir Hybrid Mode.

Additionally, VxRail appliances are discoverable and visible in Intelligent Operations for a comprehensive IT core-to-edge management ecosystem.
The VxRail appliance family delivers a known and proven building block for the SDDC that delivers up to 5x the performance of other hyper-converged appliances. All-Flash configurations deliver a transformative 8X boost in performance. Scale capacity and performance easily and non-disruptively up to 64 nodes (16 appliances) per cluster, allowing you to start small and grow incrementally without up-front planning.

Available in multiple configurations, VxRail allows you to start small with as little as 20 virtual machines (VMs) and scale to thousands. VxRail’s architecture enables a predictable pay-as-you-grow approach that aligns to your business goals and user demand.

The VxRail appliance is fully loaded with integrated mission-critical data services including replication, backup, and cloud tiering—all at no additional charge. The VxRail appliance incorporates data protection technology, including EMC RecoverPoint for VMs and VMware vSphere Data Protection. Integrated EMC CloudArray seamlessly extends the VxRail appliance to public and private clouds to securely expand storage capacity without limits, providing an additional 10 TB of on-demand cloud tiering included per appliance.

The VxRail appliance architecture is a distributed system consisting of common modular building blocks that scale linearly from 1 to 16 2U/4 node appliances, up to 64 nodes in a cluster. Multiple compute, memory, and storage options deliver configurations to match any use case. A fully populated all-flash appliance supports up to 112 cores and up to 76 TB of raw storage. A 64-node all-flash cluster delivers 1,792 cores and 1,216 TB of raw storage, making it the industry’s most powerful HCIA to date to maximize performance and scale for applications that demand low latency.

The VxRail appliance is backed by a single point of world-class support for both hardware and software. The VxRail appliance is available with EMC Enhanced and Premium support options, both of which include EMC ESRS for call home and proactive two-way remote connection for remote monitoring, diagnosis, and repair to ensure maximum availability.

**VxRail Node Options**

VxRail nodes come in two options. One is a Hybrid configuration and the other is All Flash. The feature set of both of these options is provided in the tables below.

### VxRail Hybrid Nodes Feature Set

The table below illustrates the VxRail Hybrid Node component feature set.

<table>
<thead>
<tr>
<th>VxRail Hybrid Node Components</th>
<th>VxRail Appliance 60</th>
<th>VxRail Appliance 120</th>
<th>VxRail Appliance 160</th>
<th>VxRail Appliance 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Cores</td>
<td>6</td>
<td>12</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Processor (Per Node)</td>
<td>1 Intel® Xeon® Processor E5-2603 v3 1.6 GHz</td>
<td>2 Intel® Xeon® Processor E5-2620 v3 2.4 GHz</td>
<td>2 Intel® Xeon® Processor E5-2630 v3 2.4 GHz</td>
<td>2 Intel® Xeon® Processor E5-2660 v3 2.6 GHz</td>
</tr>
<tr>
<td>Memory/RAM (Per Node)</td>
<td>64 GB (4 x 16 GB) 128 GB (8 x 16 GB) or 192 GB (12 x 16 GB) or 256 GB (16 x 16 GB)</td>
<td>256 GB (16 x 16 GB) or 512 GB (16 x 32 GB)</td>
<td>256 GB (16 x 16 GB) or 512 GB (16 x 32 GB)</td>
<td></td>
</tr>
<tr>
<td>Caching SSD (Per Node)</td>
<td>200 GB</td>
<td>400 GB or 800 GB</td>
<td>400 GB or 800 GB</td>
<td>400 GB or 800 GB</td>
</tr>
<tr>
<td>Storage RAW (Per Node)</td>
<td>3.6 - 10 TB</td>
<td>3.6 – 10 TB</td>
<td>4.8 – 10 TB</td>
<td>4.8 – 10 TB</td>
</tr>
<tr>
<td>Min Nodes per Cluster</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Max Nodes per Cluster</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Chassis</td>
<td>2U, 19’ rack-mounted</td>
<td>2U, 19’ rack-mounted</td>
<td>2U, 19’ rack-mounted</td>
<td>2U, 19’ rack-mounted</td>
</tr>
<tr>
<td>Power Supplies</td>
<td>2 x 1200W high-efficiency redundant PSU, 110/220V AC, 50/60Hz</td>
<td>2 x 1600W high-efficiency redundant PSU, 220V AC, 50/60Hz</td>
<td>2 x 1600W high-efficiency redundant PSU, 220V AC, 50/60Hz</td>
<td>2 x 1600W high-efficiency redundant PSU, 220V AC, 50/60Hz</td>
</tr>
<tr>
<td>Max Power consumption (Fully Loaded Appliance)</td>
<td>1003 VA</td>
<td>1337 VA</td>
<td>1337 VA</td>
<td>1486 VA</td>
</tr>
<tr>
<td>Max Heat Dissipation (Fully Loaded Appliance)</td>
<td>3422.236 BTU/HR</td>
<td>4561.844 BTU/HR</td>
<td>4561.844 BTU/HR</td>
<td>5070.232 BTU/HR</td>
</tr>
<tr>
<td>Network Connection</td>
<td>4 x 1 GbE RJ45</td>
<td>2 x 10 GbE SFP+ or 2 x RJ45 ports</td>
<td>2 x 10 GbE SFP+ or 2 x RJ45 ports</td>
<td>2 x 10 GbE SFP+ or 2 x RJ45 ports</td>
</tr>
<tr>
<td>Management Port (Optional, Per node)</td>
<td>1 x 100 Mbps RJ45 port</td>
<td>1 x 100 Mbps RJ45 port</td>
<td>1 x 100 Mbps RJ45 port</td>
<td>1 x 100 Mbps RJ45 port</td>
</tr>
</tbody>
</table>
VXRAIL ALL FLASH NODES FEATURE SET

The table below illustrates the VxRAIL All Flash Node component feature set.

<table>
<thead>
<tr>
<th>VXRAIL All Flash Node Components</th>
<th>VxRAIL 120F</th>
<th>VxRAIL 160F</th>
<th>VxRAIL 200F</th>
<th>VxRAIL 240F</th>
<th>VxRAIL 280F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Cores</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>24</td>
<td>28</td>
</tr>
<tr>
<td>Processor (Per Node)</td>
<td>2 Intel Xeon® Processor E5-2620 v3 2.4GHz / 15M Cache</td>
<td>2 Intel Xeon® Processor E5-2630 v3 2.6GHz / 20M Cache</td>
<td>2 Intel Xeon® Processor E5-2660 v3 2.5GHz / 35M Cache</td>
<td>2 Intel Xeon® Processor E5-2683 v3 2.0GHz / 35M Cache</td>
<td>2 Intel Xeon® Processor E5-2683 v3 2.0GHz / 35M Cache</td>
</tr>
<tr>
<td>Memory/RAM (Per Node)</td>
<td>256 GB (16 x 16GB)</td>
<td>256 GB (16 x 16GB) or 512 GB (16 x 32GB)</td>
<td>256 GB (16 x 16GB) or 512 GB (16 x 32GB)</td>
<td>256 GB (16 x 16GB) or 512 GB (16 x 32GB)</td>
<td>256 GB (16 x 16GB) or 512 GB (16 x 32GB)</td>
</tr>
<tr>
<td>Caching SSD (Per Node)</td>
<td>400 GB or 800 GB</td>
<td>400 GB or 800 GB</td>
<td>400 GB or 800 GB</td>
<td>400 GB or 800 GB</td>
<td>400 GB or 800 GB</td>
</tr>
<tr>
<td>Storage RAW (Per Node)</td>
<td>3.8 – 19 TB</td>
<td>3.8 – 19 TB</td>
<td>3.8 – 19 TB</td>
<td>3.8 – 19 TB</td>
<td>3.8 – 19 TB</td>
</tr>
<tr>
<td>Min Nodes per Cluster</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Max Nodes per Cluster</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Chassis</td>
<td>2U, 19’ rack-mounted</td>
<td>2U, 19’ rack-mounted</td>
<td>2U, 19’ rack-mounted</td>
<td>2U, 19’ rack-mounted</td>
<td>2U, 19’ rack-mounted</td>
</tr>
<tr>
<td>Power Supplies</td>
<td>2 x 1600W high-efficiency redundant PSUs, 220VAC, 50/60Hz</td>
<td>2 x 1600W high-efficiency redundant PSUs, 220VAC, 50/60Hz</td>
<td>2 x 1600W high-efficiency redundant PSUs, 220VAC, 50/60Hz</td>
<td>2 x 1600W high-efficiency redundant PSUs, 220VAC, 50/60Hz</td>
<td>2 x 1600W high-efficiency redundant PSUs, 220VAC, 50/60Hz</td>
</tr>
<tr>
<td>Max Power consumption (Fully Loaded Appliance)</td>
<td>1240 VA</td>
<td>1240 VA</td>
<td>1389 VA</td>
<td>1500 VA</td>
<td>1500 VA</td>
</tr>
<tr>
<td>Max Heat Dissipation (Fully Loaded Appliance)</td>
<td>4230.88 BTU/HR</td>
<td>4230.88 BTU/HR</td>
<td>4739.26 BTU/HR</td>
<td>5118 BTU/HR</td>
<td>5118 BTU/HR</td>
</tr>
<tr>
<td>Network Connection</td>
<td>2x 10 GbE SFP+ or 2x RJ45 ports</td>
<td>2x 10 GbE SFP+ or 2x RJ45 ports</td>
<td>2x 10 GbE SFP+ or 2x RJ45 ports</td>
<td>2x 10 GbE SFP+</td>
<td>2x 10 GbE SFP+</td>
</tr>
<tr>
<td>Management Port (Optional, Per node)</td>
<td>1 x 100 Mbps RJ45 port</td>
<td>1 x 100 Mbps RJ45 port</td>
<td>1 x 100 Mbps RJ45 port</td>
<td>1 x 100 Mbps RJ45 port</td>
<td>1 x 100 Mbps RJ45 port</td>
</tr>
</tbody>
</table>

VXRAIL INCLUDED DATA PROTECTION

VxRail comes with backup and replication capabilities built into every appliance. The goal of the built-in data protection is to address basic data backup requirements, as well as to provide access to replication or continuous data protection capabilities. Let’s take a closer look at what’s included:

- **RecoverPoint for VMs** provides replication, continuous data protection, and any point in time recovery. 15 licenses of RecoverPoint for VMs comes with each appliance.

- **VMware vSphere Data Protection** and optional Data Domain for centralized de-duplicated backup and recovery.

- **Dell EMC CloudArray** allowing for storage capacity expansion from the appliance with scalable cloud-based storage to the public cloud (our own or others). 1TB appliance storage comes with each appliance.

VSPHERE DATA PROTECTION

VMware vSphere Data Protection provides deduplicated backup and recovery, and offers single-step image recovery in case of an issue. It also offers automatic verification of backups, saving time and effort. VMware vSphere Data Protection is based on Dell EMC’s flagship Enterprise Deduplication Backup & Recovery Software – Avamar. VMware vSphere Data Protection provides enterprise deduplication so your backups only backup unique data within in your backup windows. With VMware vSphere Data Protection you’ll realize 30x faster image recovery that are simple and from disk rather than antiquated and slow tapes. vSphere Data Protection:

- Includes built-in deduplication for rapid backups

- Is powered by Dell EMC Avamar

- Is deployed as a virtual appliance with up to 8TB capacity

- Provides 1 step recovery with verification

- Can be combined with Data Domain for fast reliable disk-based restores
RECOVERPOINT FOR VIRTUAL MACHINES

Dell EMC RecoverPoint for Virtual Machines (VMs) is a business continuity solution that gives you the peace of mind by protecting your virtual machines at a granular level. A 15-VM license for RecoverPoint for Virtual Machines is included with each VxRAIL appliance to offer any point-in-time recovery, local or remote replication, and Disaster Recovery for VMware. RecoverPoint for VMs is integrated with VMware vCenter: Enables a software-only, easy to install and easy to manage hypervisor-based replication solution with highly automated disaster recovery workflows that empower VMware administrators and application owners to manage their own policies and recovery, ensuring that VM service levels are met. RecoverPoint for Virtual Machines provides continuous data protection at a VM level granularity with the ability to recover to any point-in-time with built-in orchestration and automation which is designed with simplicity in mind.

RecoverPoint for VMs is IT trusted and proven leveraging the RecoverPoint for VMs replication engine with hundreds of millions of run hours, extends the data protection continuum for VMware environments, and it’s all backed by the world’s largest data protection company, Dell EMC.

DATA DOMAIN OVERVIEW

Dell EMC Data Domain systems reduce the amount of disk storage needed to retain and protect data by ratios of 10-30x and greater. Data Domain systems can scale up to 150 PB of logical capacity managed by a single system to protect data for longer retention periods. With throughput up to 68 TB/hour, Data Domain systems make it possible to complete more backups in less time and provide faster, more reliable restores.

THE DATA DOMAIN OPERATING SYSTEM

The Data Domain Operating System (DD OS) is the intelligence that powers EMC Data Domain. It provides the agility, security and reliability that enables the Data Domain platform to deliver scalable, high-speed, and cloud-enabled protection storage for backup, archive and disaster recovery.

DD OS powers Data Domain to deduplicate data during either the backup or archive process, which maximizes performance while minimizing disk storage requirements. Deduplicated data can be stored onsite for immediate restores and longer term retention on disk or in the cloud. The deduplicated data can also be replicated over the WAN to a remote site or a service provider site in the cloud for disaster recovery operations, eliminating the need for tape-based backups, or for consolidating tape backups to a central location. Data Domain provides the capability to consolidate both backup and archive data on the same infrastructure allowing greater consolidation by eliminating silos of backup and archive storage and associated overhead.

The key that enables DD OS to provide industry-leading performance while minimizing disk requirements is the Dell EMC Data Domain Stream-Informed Segment Layout (SISL™) scaling architecture. Specifically, SISL leverages the continued advancement of CPU performance to continuously increase Data Domain system performance by minimizing disk accesses required to deduplicate data. SISL deduplicates data by identifying duplicate data segments in memory, which minimizes disk usage. This enables Data Domain throughput to be CPU-centric, not “spindle bound.”

HIGH SPEED DEDUPLICATION

The Data Domain Operating System delivers industry-leading speed and efficiency through variable-length deduplication. With performance up to 68 terabytes per hour, organizations can meet the most challenging backup windows while reducing backup and archive storage requirements by 10 to 30 times, making disk a cost-effective alternative to tape.

SEAMLESS INTEGRATION

DD OS enables Data Domain to integrate seamlessly with existing infrastructures including leading backup, archive, and enterprise applications. A Data Domain system can protect the entire enterprise including backup for Oracle, Microsoft, VMware, IBMi, open systems, big data and mainframe environments as well as file and email, database, enterprise content management, and virtual machine archiving.

NETWORK-EFFICIENT REPLICAITION

With DD OS, organizations can replicate backup and archive data off-site faster, with minimal bandwidth for safe, tape-free disaster recovery. Data Domain systems provide flexible replication topologies to optimize your backups such as full-system mirroring, selective, bidirectional, many-to-one, one-to-many, and cascaded.
RELIABILITY AND SECURITY

The Data Domain Data Invulnerability Architecture is core to DD OS and is built into every system, providing the industry’s best defense against data integrity issues. Inline write-and-read verification, continuous fault detection, and self-healing ensure that backup and archive data is accurately stored, retained, and recoverable or accessible throughout its lifecycle on a Data Domain system. Combined with the ability to meet compliance regulations and security requirements, no other storage system provides this level of protection.

Data Domain is designed as the storage of last resort – built to ensure you can reliably recover your data with confidence. Inline write and read verification protects against and automatically recovers from data integrity issues during data ingest and retrieval. Capturing and correcting I/O errors inline during the backup process eliminates the need to repeat backup jobs, ensuring backups complete on time and satisfy service level agreements. In addition, unlike other enterprise arrays or file systems, continuous fault detection and self-healing ensures data remains recoverable throughout its lifecycle on Data Domain.

CLOUD-ENABLED

DATA DOMAIN CLOUD TIER

With Data Domain Cloud Tier, DD OS can natively tier data to a public, private or hybrid cloud for long-term retention. Only unique data is sent directly from Data Domain to the cloud and data lands on the cloud object storage already deduplicated. With deduplication ratios of 10 – 30x, storage footprint is greatly reduced lowering overall TCO. DD Cloud Tier can scale up to 2x the max capacity of the active tier enabling up to 100 PB of logical capacity to be protected in the cloud, and up to 150 PB of logical capacity protected across a single system. With DD Encryption, data in the cloud remains secure. A broad ecosystem of backup and enterprise applications and a variety of public and private clouds are supported with DD Cloud Tier including EMC Elastic Cloud Storage (ECS) and Virtustream Storage Cloud.

DATA DOMAIN SECURE MULTI-TENANCY

DD OS also provides secure multi-tenancy, which enables large enterprises and service providers to deliver data protection as a service with Data Domain in a private or hybrid cloud. With secure multi-tenancy, Data Domain will logically isolate tenant data, ensuring that each tenant’s data is only visible and accessible to them. Secure multi-tenancy allows for tenant self-service by allowing tenants visibility only to the resources they are privileged to and catering to their needs for monitoring their resources. Physical capacity measurement allows you to capture how much physical capacity is being consumed at a file, directory, MTree, tenant, or tenant-unit level. This serves as an effective mechanism for managing shared Data Domain protection storage capacity between individual departments or tenants.

ADDITIONAL DATA DOMAIN SOFTWARE

Data Domain software components enhance the value of a Data Domain system allowing customers to benefit from advanced integration with backup and enterprise applications, simple and cost-effective tiering to the cloud, network-efficient replication, inline encryption, long-term backup retention, governance and compliance, and the ability to easily and efficiently replace physical tape.

DATA DOMAIN BOOST

Data Domain Boost software delivers an advanced level of integration with backup applications and database utilities, enhancing performance and ease of use. Rather than sending all data to the Data Domain system for deduplication processes, DD Boost enables the backup server or application client to send only unique data segments across the network to the Data Domain system. This reduces the amount of data transferred over the network by 80 to 99 percent. The Data Domain Boost software provides:

- **Faster more efficient backups**: Distributes parts of the deduplication process to backup server or application client to achieve 50% faster backups and up to 99% less network bandwidth required.
- **Simplified Disaster Recovery**: Enables application to control Data Domain replication process with full catalog awareness.
- **Advanced Load Balancing and Failover**: Aggregates transport links for transparent load balancing and automatic link failover.

DATA DOMAIN REPLICATOR

Data Domain Replicator software can replicate at 52 TB/hr over a 10 Gb network connection. DD OS replicates only unique compressed data across the network, requiring a fraction of the time, bandwidth and cost of traditional replication methods. With cross-site deduplication only unique data is transferred across any of the WAN segments. This can reduce WAN bandwidth requirements up
to 99%, making network-based replication fast, reliable and cost-effective. For the highest level of security, data being replicated between Data Domain instances can be encrypted using the standard Secure Socket Layer (SSL) protocol. Data Domain provides flexible replication topologies including full system mirroring, bi-directional, many-to-one, one-to-many, and cascaded. In a many-to-one deployment, data from up to 540 remote offices can be replicated to a single DD9800.

DATA DOMAIN VIRTUAL EDITION

Data Domain Virtual Edition (DD VE) leverages the power of DD OS to deliver software-defined protection storage. DD VE is fast and simple to download, deploy and configure - and can be up and running in minutes. DD VE runs in VMware on vSphere ESXi 5.1, 5.5 and 6.0 and supports VMware vSphere High Availability and Fault Tolerance to meet the availability needs of customers. It also supports VMware Distributed Resource Scheduler (DRS), allowing VMware to balance workloads for optimal performance. DD VE also runs on Microsoft Hyper-V (Windows Server 2012 R2). With DD VE customers gain the benefits of the world’s most trusted protection storage and the simplicity, flexibility and efficiency of a software-defined solution highlighted in Figure 2 below.

![Data Domain Virtual Edition](image)

Figure 2: Data Domain Virtual Edition (DD VE)

DD VE can run on standard hardware. So existing infrastructure can be utilized to deploy virtual protection storage. An assessment tool can be run during deployment to check the underlying infrastructure and ensure it meets recommended requirements. A single DD VE instance can scale from .5 TB to 96 TBs. Capacity can be easily be moved between virtual systems and/or locations and can be purchased in 1 TB increments allowing you to grow capacity as the business demands it. Configure and manage a DD VE instance using DD System Manager and centrally manage multiple DD VE instances through DD Management Center.

DD VE maintains the core Data Domain features that differentiates it as the industry-leading protection storage. This includes high-speed, variable length deduplication for a 10 – 30x reduction in storage requirements, unparalleled data integrity to ensure reliable recovery, and seamless integration with leading backup and archiving applications. DD VE also comes with DD Boost, which speeds backups by up to 50%, DD Encryption for enhanced security of data, and DD Replicator, which enables network efficient replication for faster time-to-DR readiness.

**DD VE FEATURE SET**

Data Domain Virtual Edition (DD VE) features include:

- **Scalability:** Up to 96TBs per instance, licensed in 1TB increments
- **Hypervisors:** VMware ESXi, Microsoft Hyper-V
- **Protocols supported:** NFS, CIFS, DD Boost, BoostFS
- **Manageability:** DD System Manager, DD Management Center
- **Replication:** DD VE to physical, DD VE to DD VE, physical to DD VE (Restore)
- **Security:** Data Domain in-flight encryption, Data-At-Rest Encryption (DARE), Data Domain Invulnerability Architecture
• **Supportability:** Call home support to Dell EMC

• **Data Domain advanced features supported:** Data Domain Cloud Tier, Secure Multi-tenancy

**DD VE USE CASES**

As you can see, DD VE is flexible in size and very scalable, and powerful in its capabilities. Here are 4 example use cases where the DD VE solution can be a perfect fit.

1. Remote offices
2. Small or Medium data centers
3. Backup as a service (BaaS)
4. Replication as a service (RaaS)

Data Domain Virtual Edition (DD VE) enables customers to gain the benefits of the world’s most trusted protection storage plus the agility, flexibility and efficiency of a software-defined solution.

**Data Protection Suite for VMware**

Data Protection Suite for VMware includes the software you need to simplify and scale the data protection of your VMware environments. With Data Protection Suite for VMware you have a comprehensive deduplication backup and recovery solution that provides the assurance that you can recover your systems to any point-in-time. Root cause analysis and reporting provides you with the information you need to quickly identify potential issues with your data protection sources. Metadata and full content index-based search makes it easy to quickly find and restore filesystem backup data, and being able to filter the search provides a more accurate set of results.

Data Protection Suite for VMware provides a software only solution that is easy to manage, deploy and upgrade making it scalable across all application landscapes. With Data Domain Virtual Edition (DD VE), customers gain the benefits of the world’s most trusted protection storage and the simplicity, flexibility and efficiency of a software-defined solution.

Data Protection Suite for VMware provides fast reliable backup and recovery. Many advantages are gained when deploying the Data Protection Suite for VMware with Data Domain such as source-side deduplication reducing the network traffic by up to 99%, reducing backup times by up to 50%, and reducing backup storage utilization by up to 30x.

Recovery is made simple while providing fast access to backup data. Instant access to a VM image from Data Domain allows for the quick deployment of production images into test and development, as well full image recovery for disaster recovery.

The Data protection Suite for VMware is the only data protection solution with tight integration into all VMware interfaces. Backup and vAdmins manage data protection leveraging the VMware interfaces they already know. vSphere Data Protection includes the ability to easily upgrade the backup jobs and configurations into Avamar - without leaving vSphere. Automated replication of backup data ensures that you have reliable off-site recovery, including long term retention. No other data protection solution on the market offers this tight of integration into VMware.

Dell EMC is one of the only vendors offering data protection natively as part of vRealize Automation Advanced Services. All data protection tasks occur right from within the vRA UI so the admins do not need to learn a new interface. With vRA Data Protection Extension you can easily manage backup & restore, monitor and report on the data protection tasks, and define topologies.

Being able to recover data is the goal with all data protection solutions. With Data Protection Suite for VMware your recovery options are flexible and reliable. Application consistent backups ensure you can restore you mission critical applications. Fast file-level restore ensures business continuity with minimal latency and image recoveries are up to 30x faster than traditional backups. To help prepare for disaster recovery, you also have the option to perform automated restore rehearsals to validate your DR readiness. Data is encrypted during backup and replication making sure your data is secure. With Data Protection Suite for VMware you never backup the same data twice and you can rest assured that your SLAs are covered.

The Data Protection Suite for VMware brings fast, efficient and scalable protection for your VMware environments.
VxRAIL + DP SUITE FOR VMWARE + DD VE: ADVANTAGES

The combination of Data Protection Suite for VMware and DD VE provides the following advantages for VxRAIL:

- **SIMPLE**
  - vAdmins use their native VMware interfaces
  - Simplified management
  - One vendor for complete data protection
  - Centralized monitoring, reporting, and search

- **FAST**
  - Get up and running within minutes
  - Reduce virtual environment backup times by up to 50%
  - Up to 30x faster recoveries than traditional image backups
  - Data protection automatically applied to VM's during provisioning
  - Instant Access to VMs on Data Domain

- **EFFICIENT**
  - Flexible protection storage capacity from 0.5TB – 96TB per instance, licensed in 1 TB increments
  - Natively tier deduplicated data to the cloud for long-term retention
  - Up to 30x reduction in backup storage utilization
  - Up to 99% less network traffic
The chart below provides a comparison of customer benefits for the included VxRAIL data protection (VMware vSphere Data Protection & RecoverPoint) and the DP Suite for VMware + DD VE protection option which includes DD Boost, DD Replicator, and DD encryption software.

<table>
<thead>
<tr>
<th>Capability</th>
<th>Benefit</th>
<th>VxRAIL Data Protection</th>
<th>DP Suite for VMware + DD VE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Software-Only Data Protection</strong></td>
<td>Simplified deployment of backup and replication. Protect data and applications with VM granularity for any point-in-time disaster and operational recovery.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Integration With Cloud Orchestration Platforms</strong></td>
<td>Automatically apply backup &amp; recovery when provisioning applications through vRA (vRealize Automation).</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Full VM And File-Level Recovery</strong></td>
<td>Recovery flexibility and control for complete VM or partial VM restores at the file level.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Application Consistency</strong></td>
<td>Support for Exchange, SAP, SQL, SharePoint, Oracle, DB2, Sybase, and IBM Domino for backup, as well as for replication.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><strong>Flexible Protection Storage Capacity</strong></td>
<td>Scale from .5 – 96 TB per instance and grow as needed in as little as 1 TB increments.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Cloud for LTR</strong></td>
<td>Natively tier deduplicated data to the cloud for long-term retention</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Secure Multi-tenancy</strong></td>
<td>Enable data protection as a service with Data Domain systems in private or public cloud</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Local &amp; Remote Protection Of VM’s</strong></td>
<td>Protect single or multiple VM’s locally or remotely to target site. Scale business continuity data protection to match your VM growth up to 1000 VM’s.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Unified Data Protection Management</strong></td>
<td>Ensure data protection via proactive, cross-domain monitoring and alerting, reporting, chargeback, and automatic notification of unprotected VM’s.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Real-Time Analytics</strong></td>
<td>Performance and utilization optimization, plus capacity planning.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Unified Search</strong></td>
<td>Enterprise-wide data protection search with web-based recovery.</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**CONCLUSION**

The Dell EMC VxRail hyper-converged appliance represents an exclusive partnership between Dell EMC and VMware to deliver the ultimate appliance that provides virtualization, compute, storage, networking and data protection in an agile, scalable, easy to manage 2U, 4-Node, SDDC Building Block. Dell EMC data protection, including Data Protection Suite for VMware and Data Domain Virtual Edition, offer software-defined, end-to-end protection for Dell EMC VxRail environments, including backup and recovery, continuous data protection for any point-in-time recovery, proactive monitoring and analysis, and search capabilities. Dell EMC solutions are proven and #1 in the data protection software and storage market. More people choose – and trust – Dell EMC data protection to protect their data than anyone else.
ADDITIONAL RESOURCES

For more information please refer to the following additional resources.

VxRAIL appliance with EMC Data Protection Solution Overview

Optimize Data Protection for VxRAIL Handout

Optimize Data Protection for VxRAIL appliance Lightboard Video

VxRAIL appliance specifications sheet

VxRAIL Solution Overview

Back to Basics: EMC Data Domain Systems overview Video with slides

Data Domain SISL Scaling Architecture – A Detailed Review white paper

Data Domain Replicator – A Detailed Review white paper

Data Domain Data Invulnerability Architecture – A Detailed Review white paper

Data Domain Virtual Edition Overview – Lightboard Video

Why you Should be Looking at EMC Data Domain Virtual Edition – ESG Analyst Video

Data Domain Data Invulnerability Architecture – Lightboard Video

A Hands On Look at EMC Data Domain Virtual Edition - ESG Analyst Video

Why Data Domain – Business Value paper

Why DD Boost – Business Value paper

Data Protection Suite for VMware - Data Sheet

Data Protection Suite for VMware – Lightboard Video