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Chapter 1

Introducing Hyper-converged Infrastructure

In This Chapter

- ▶ Introducing this book
 - ▶ Taking a look at hyper-convergence
-

Hyper-convergence is a hot topic today. You need to understand what hyper-convergence is and why it is important so that you can make the right choices for your organization. This chapter provides a quick introduction to hyper-convergence for people like you.

About This Book

Hyper-converged Appliances For Dummies, Dell EMC Special Edition, shows you what hyper-convergence is and where the future of the industry is heading. We're not going to waste your time by going deeply into a lot of technical detail; rather, this book is intended to give you the basic, 'executive summary' level of information you need to make your case about why hyper-convergence is something your organisation needs to understand and consider.

Icons Used in This Book

This book uses the following icons to call your attention to information you may find helpful in particular ways.



The information marked by this icon is important — the kind of stuff you may need to look up again. With this icon, you can easily spot the noteworthy information when you refer to the book later.



This icon points out extra-helpful information.

Understanding Hyper-convergence

In spite of the name, hyper-convergence isn't some science fiction method of travelling through space at speeds faster than light. Rather, hyper-convergence is a way to enable cloud-like economics and scale without compromising the performance, reliability and availability you expect in your own data centre.



Hyper-convergence is used most often to define a type of infrastructure. In Chapter 3, you can see how Dell EMC provides hyper-converged infrastructure appliances that package hyper-convergence into a turnkey solution so you can be up and running in a flash.

Hyper-convergence is the next generation in an overall trend of convergence that has hit the market in recent years. This trend towards convergence is intended to bring simplicity to increasingly complex and disperse data centres.

At its most basic, convergence simply brings together existing individual storage, compute and network switching products into pre-tested, pre-validated solutions sold as a single solution. This basic level of convergence is built to provide resiliency at the infrastructure layer; the network, compute and storage component layers through pre-integrated architecture design so that the hardware is available for the application regardless of the software.

Hyper-convergence, in contrast, is built using software-defined network, compute, and storage components, and is built to provide resiliency at the software layer so that the application is available regardless of the state of the hardware. All the elements of the hyper-converged infrastructure support the virtual machine or application workload from software abstraction pools, and resiliency for resources is moved out of the component layer and into the SW layer.

Hyper-converged infrastructure provides alternate benefits from converged infrastructure:

- ✔ **Data efficiency:** Hyper-converged infrastructure provides far more granular application specific storage (IOPS), processing and bandwidth requirements.
- ✔ **Elasticity:** Hyper-convergence makes it easy to scale out (more nodes in a cluster) or up (more resources per node), as specified by business demands.
- ✔ **VM-centricity:** This kind of infrastructure allows a focus on the virtual machine (VM) or workload as the cornerstone of IT, with everything revolving around individual VMs rather than the infrastructure itself.

- ✓ **Data protection:** Ensuring that data can be restored in the event of loss or corruption is a key IT requirement, made far easier by hyper-converged infrastructure.
- ✓ **VM mobility:** Hyper-convergence enables greater application and workload mobility, allowing you to seamlessly move workloads (vMotion) from appliance to appliance depending on the demands of the applications.
- ✓ **High availability:** Hyper-convergence enables higher levels of availability than possible in legacy systems through software-based resilience built into the application itself.
- ✓ **Cost efficiency:** Hyper-converged infrastructure brings to IT a sustainable granular step-based economic model that eliminates waste.



The results of implementing hyper-convergence are significant and include lower upfront prices for infrastructure, reductions in operational expenses and personnel, and faster time-to-value for new business needs.

People with broad knowledge of infrastructure and business needs can easily support hyper-converged infrastructure. Organisations don't need to maintain separate islands of resource engineers to manage each aspect of the data centre.



One of the greatest benefits of hyper-converged architecture is that it provides dramatic improvements to the application owners without increasing operational complexity for IT.

Chapter 2

Getting to Know the Basics

In This Chapter

- ▶ Seeing where your business infrastructure sits
- ▶ Understanding why change is needed
- ▶ Becoming more efficient
- ▶ Tackling costs

In order to understand how hyper-convergence can help your organisation, you need to know how hyper-convergence differs from the approach that's been applied in recent times. This chapter takes you through some of those differences.

Taking a Look at Infrastructure Today

Today, most IT services run inside virtual environments, with most administrators first considering this environment for running new applications rather than just building a new physical environment. Although virtualisation offers significant benefits, it also introduces challenges that IT must overcome to help propel the business forward.

Virtualisation helped organisations consolidate many of their servers to run on a common platform: the hypervisor software layer. In turn, this helped IT departments make much better use of their server resources. Before virtualisation, it was common for server utilisation to average just 15 per cent. Virtualisation has pushed that utilisation much higher, for a much better return on investments.



Storage devices, optimisers, hypervisors and load balancers all feature their own management interface. Using multiple components means you have an element manager for each component of network, compute, and storage. This silo effect produces operational challenges, including vendors blaming each other when something goes wrong, the inability to scale your data centre environment easily, and greater complexity due to management being tied to IT components versus workloads.

Seeing Why Change is Happening

IT change always happens to increase efficiency, increase simplicity, and increase the user experience. Think about what your IT staff really have to deal with on a day-to-day basis: servers, hypervisors, storage devices, network accelerators, backup software, backup appliances, replication technology and a whole lot more. Every one of these devices has a separate administrative console that operators have to learn.

When each device requires vastly different sets of skills to operate, each skill requires ongoing training. Even when you can get a few people in IT trained on

everything in the data centre, at some point those people may move on, and you may have trouble finding new employees who have the same set of skills.



You can make your IT budget more efficient and serve the business better by rethinking the way you provide data centre services. Don't think about each individual resource as its own island. Instead, think at a higher level. Rather than focusing on individual resources, focus on overall scale of all resources as your standard operating procedure.

Gaining Efficiency

Efficiency is starting to move out of hardware and into the software layer in the data centre, which has the potential to lead to very good things. A data file is managed by a massively distributed, software-based global file system. This file system doesn't care about the underlying hardware. It simply abides by the rules built into the software layer that ensures that the file is saved, with the right data protection levels.

In a legacy data centre environment, growing the environment can be expensive. The more diverse the environment, the more difficult it is to maintain. Companies such as Google and Facebook scale their environments without relying on expensive proprietary components. Instead, they leverage commodity hardware.



In a hyper-converged environment, commodity hardware takes a back seat to the software, and the software layer is built with the understanding that hardware can fail. The software-based architecture is designed to anticipate and handle any hardware failure that takes place.

A hyper-converged environment offers the following:

- ✓ Rapid time to value
- ✓ Operational simplicity, so you spend less time planning and managing growth
- ✓ Removal of traditional IT silos
- ✓ Predictability in hardware, software, performance, price, management and troubleshooting
- ✓ Delivery of the greatest value, allowing the application and software to provide resilience
- ✓ Ability for centralised IT staff to manage repeatable remote deployments

Reducing Costs

Hyper-converged infrastructure takes the economies to the software level by supplying infrastructure elements as services, which you can easily add or remove as your needs change. This has the potential effect of:

- ✓ Fewer IT staff needed to design, deploy and manage, meaning they can be repurposed for opportunity gain
- ✓ Much lower capital expenditure at entry point (\$50,000 versus traditional IT infrastructure starting cost of around \$500,000)
- ✓ Targeted capital expenditure for the right application workload at the right scale point, allowing you to start small and grow as your business needs dictate

Chapter 3

Eight Advantages of Dell EMC's Solutions

In This Chapter

- Eight important takeaways
-

A hyper-converged infrastructure appliance provides a perfect solution for many organisations, but you're still faced with choosing the best appliance to meet your needs. This chapter shows you why you'll want to consider the hyper-converged appliance solution from Dell EMC, called VxRail.

Application-Focused Investment

In today's competitive world, no organisation can afford to simply throw unlimited funds at a problem in the hope that enough capital expenditure will provide the needed solutions. Rather, you need to spend your money wisely and choose a hyper-converged appliance that meets your needs.

An option like VxRail offers you the opportunity to

- ✓ Start with a small, single appliance (at not just the minimal cost but also the smallest power and cooling footprint) and scale up to as many as 64 nodes

in a single cluster as your needs expand, and to connect multiple clusters together as required.

- ✓ Add just what you need when you need it — single node scaling is available in VxRail, so you aren't forced to overspend on capacity you don't need.
- ✓ Take advantage of two-node entry points to cater for remote office requirements (that's 1RU!).
- ✓ Choose appliances that both meet your application's performance and capacity requirements — multiple configuration options in compute and storage are available.
- ✓ Get the performance you need — with VxRail, all flash solutions are available for solutions that demand the fastest possible performance.
- ✓ Integrate your appliance into a the larger Dell EMC converged and hyper-converged platforms portfolio of Vblocks, VxRacks and appliances — which all work together seamlessly.

Predictability as You Scale

Unpredictability and unknowns are great when you're reading a mystery novel, but in the business world you need to be able to plan for the future — surprises aren't good for the bottom line.

VxRail offers you predictability as you scale through:

- ✓ Known scale points in storage, compute and network, which allow you to easily design multiple clusters as your applications needs grow
- ✓ Multiple configuration options, which allow you to scale up and out with performance and capacity as you require

- ✓ Ability to leverage the existing network fabric of Dell EMC converged platforms which provide the most comprehensive and pre-integrated network architecture in the industry
- ✓ No forklift upgrades — you can simply add a new appliance and seamlessly move workloads from one node to another (using vMotion)
- ✓ Non-disruptive SDDC scale out so that existing workloads and processes aren't adversely affected when you add new capacity to the system

Rapid Time to Value

You don't have a lot of time to waste. With Dell EMC's VxRail, the hardware, software, and the VMware based Software Defined Data Centre (SDDC) solution are preconfigured, so you go from opening the box to deploying apps in 15 minutes or less. That's hardly enough time to drink a cup of coffee!

That also means you are able to meet the demands of your development teams — who will go elsewhere (with a company credit card!) to source their infrastructure if you can't deliver on their timescales.

With VxRail, you can deliver critical solutions in minutes rather than the weeks it typically takes traditional IT to deliver.

Operational Simplicity

It's great to have an operational system online quickly, but you also need a solution that is simple to operate once it's up and running (and scaling out!). VxRail offers you operational simplicity through:

- ✓ A hyper-converged hardware and software stack that massively reduces operational

overhead — 15 minutes from opening the box to SDDC

- ✓ The VxRail Management software and Dell EMC's Vision Intelligent Operations software provide the tightest integration with the HW and SW layers, with technologies your IT teams will already be familiar with
- ✓ VxRail is so simple to deploy it can even be managed by remote teams through the same management interfaces they are using to manage other IT solutions
- ✓ A single button upgrade path for the entire VMware stack

Removal of Silos

Unlike traditional infrastructure, no separate storage or compute or networking teams are required to deploy and manage VxRail. Everything can be deployed and managed by a single, central team through automated processes that rely upon existing VMware teams and skill sets.



Many converged infrastructure solutions fall short when it comes to needing different teams to manage different parts of the solution (one team to manage the appliance, another team to manage the hypervisor). Each additional team creates barriers to efficient operation and increases your operating costs.

Reduced Total Cost of Ownership

The real total cost of ownership (TCO) of any system goes well beyond the initial capital investment.

To determine your true costs of a hyper-converged appliance, you need to consider many additional factors. VxRail helps reduce your TCO in several ways:

- ✔ VxRail Manager allows you to deploy and manage appliances through a single unified management interface.
- ✔ A known upgrade path means you can scale up and out as your needs grow without losing your existing investments as your appliances become clusters (adding single nodes and even single disk drives at a time).
- ✔ Seamless integration into the wider Dell EMC portfolio of hyper-converged and converged platforms solutions means you can simply map out your varying business requirements to platforms such as Vblocks, VxRack and VxRail, with complete integration via Vision Intelligent Operations.

Industry-Leading Data Services

Data services provide the technical functionality needed to help the applications run smoothly — and provide you with the confidence that they will do so 24/7, so you can sleep soundly at night. VxRail has the industry's most respected data services built in:

- ✔ **Disaster avoidance:** Achieve a zero recovery point objective (RPO) with VMware Metro Stretched Clusters.
- ✔ **Integrated replication technology:** Rewind data to any point in time seamlessly with RecoverPoint for VM.
- ✔ **Integrated data protection technology:** Easily restore VMs or even individual files with Replication engine for VMware Site Recovery

Manager Air™ and VMware vCloud Air™ Disaster Recovery.

- ✓ **Limitless cloud storage:** Share data across locations with Dell EMC CloudArray.
- ✓ **Support non-virtualised workloads:** Physical workloads can utilise the storage within VxRail appliances via iSCSI.
- ✓ **Protection against security threats:** Prevent unauthorised electronic or physical access to drives with Dell EMC Data At Rest Encryption.

Tightest VMware Integration in the Industry

Your hyper-converged appliance solution performs seamlessly with VMware, the industry virtualisation standard. VxRail provides the tight integration you need through:

- ✓ A joint strategy between Dell EMC, VCE and VMware
- ✓ The VMware ‘bring your own licenses’ option, which reduces initial costs and allows repurposing of existing licensing costs
- ✓ Integration between the data centre and remote office IT teams, leveraging existing VMware, Dell EMC and VCE converged platforms expertise
- ✓ Complete end-to-end support from a single vendor as a singular appliance for *everything* in the stack — compute, storage, network, hypervisor and the SDDC application too!

Build a modern data centre with hyper-converged appliances

Take advantage of cloud-like economics, efficiencies and scale without compromising the performance, reliability and availability you expect in your data centre.

- **Break down silos** — *unify your compute, storage, network, virtualisation and application products into a single solution*
- **Free up IT to enhance service delivery** — *shift IT focus towards delivering greater business value*
- **Reduce initial and ongoing costs** — *take advantage of lower capital outlays and reduced ongoing operational costs*



Open the book and find:

- How EMC's VxRail keeps your set-up and ongoing operations simple
- Tips on ensuring predictability as you scale
- Options for adding node entry points for remote or branch offices
- How to keep a tight integration with standard VMware

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