5NINE SOFTWARE | Manage and Protect the Microsoft Cloud Platform

How to Build an Enterprise-Grade Hyper-V Infrastructure on an SMB Budget

By David Davis

Microsoft Partner
Gold Datacenter

Contents

With Microsoft's continued enhancements to Hyper-V, the number of companies, small and large, that are using Hyper-V in their datacenter continues to increase. While a few companies have opted to build a completely free Hyper-V infrastructure, the lack of centralized graphical management and other advanced options usually pushes them to spend much more money than they need to. What a lot of companies don't know is that the price of running an enterprise-grade Hyper-V infrastructure has come down (while the tools have gotten even better). Do you want to build an enterprise-grade Hyper-V infrastructure but keep the costs to a minimum? Today, it's easier and more affordable than ever before. Let's find out how.

What Makes a Hyper-V Infrastructure "Enterprise-Grade"?

The term enterprise-grade, when applied to a Hyper-V infrastructure, is worthy of defining, as what may be enterprise-grade to one company may be enterprise-inadequate to another. After all, every company will have different needs and expectations from their virtual infrastructure.

Minimally, an enterprise-grade virtual infrastructure, should possess the following characteristics:

1. A bullet-proof hypervisor with advanced functionality
2. Centralized management
3. Data protection
4. Highly-available shared storage
5. Security

While SMBs may not need all this functionality, medium and large enterprises will require it.

Traditionally, the software licenses for such a virtual infrastructure could cost tens or hundreds of thousands of dollars, depending on the number of hosts. With more affordable and more feature-rich Hyper-V solutions available today, I wondered if it would be possible to create such a powerful virtual infrastructure on a “SMB budget"?

Building an Affordable Hyper-V Infrastructure

While there may be doubters, a Hyper-V infrastructure can be affordable AND enterprise-grade at the same time (the two aren't mutually exclusive). To be more specific on what enterprise-grade features this Hyper-V infrastructure would offer, let's list them out.

Hyper-V Virtual Infrastructure Enterprise-Grade Features

- Live migration of virtual machines and virtual disks
- High availability for virtual machines
- Centralized management for the entire Hyper-V infrastructure
- Automated virtual machine provisioning from templates
- Centralized Hyper-V cluster management
- Image-level backup and recovery
- Virtual machine replication with centralized management
- Agentless anti-virus scanning with centralized management
- Converged virtual storage with advanced storage functionality

Traditionally, a Hyper-V infrastructure would be built using Windows Server with the Hyper-V role, the System Center Suite, a shared storage array, and other third-party tools such as backup/recovery, and security. The pieces of that traditional Hyper-V infrastructure can be costly. For example, based on the System Center 2016 Licensing Datasheet, just to obtain centralized Hyper-V infrastructure management, you would have to purchase the System Center Suite, which would cost you $3,607 for every 2 CPU sockets. Because of how System Center is licensed, companies are forced to purchase the System Center Suite even if all they really wanted was Virtual Machine Manager (SCVMM). If that is all that they need, it's a high cost to pay if you only use the suite for centralized virtual infrastructure management.

Recently, a number of new tools have become available, have updated their feature-set, and have reduced their price tag, making it less expensive to build a Hyper-V infrastructure than before, while still obtaining all the critical enterprise-grade features that you require (and maybe even some that you didn't expect).

5 Pieces Needed to Build Your Affordable Hyper-V Infrastructure

Let's break the pieces down, one by one.

#1 Hypervisor

The first piece of any Hyper-V infrastructure is going to be Hyper-V. There are many admins out there who still don't know that Hyper-V, with all the advanced enterprise-grade features, is completely free. No, you don't need to purchase Windows Server to run Hyper-V. The free edition of Hyper-V is called "Microsoft Hyper-V Server" and you can download it here.

The free Hyper-V Server 2016 will provide you with all the same advanced Hyper-V features and scalability as Windows Server with the Hyper-V role enabled. For example, live migration of virtual machines and virtual machine storage, replication, and even high availability. However, the limitation with the free edition is that there is no local GUI and guest virtual machines must be licensed individually. While you can install the Windows remote server administration tools on another Windows system (like your local desktop), you will have to manage each Hyper-V host, individually. In other words, there is no centralized management for Hyper-V Server.

#2 Centralized Management

Instead of spending a small fortune for the complete System Center suite (most of which you don't need just to create your enterprise-grade Hyper-V infrastructure) the best alternative is to use the new 5nine Manger for Hyper-V. With the new edition, you'll gain that centralized graphic management for Hyper-V at a tiny fraction of the cost you would pay for System Center. 5nine Manager can do most everything that System Center Virtual Machine Manager can do, and a number of things, it does even better.

Here are the Hyper-V centralized management features offered by 5nine Manager:

- "Shared nothing" live migration and storage migration
- VMs Guest connection views through FreeRDP or Microsoft controls
- Integrated event and task logging
- Hyper-V high availability cluster administration and configuration
- Live Migration between Cluster nodes

- Hyper-V Replica support for disaster recovery protection
- Capacity planning
- Best practices analyzer
- Multiple Hyper-V Versions Support - option to run different Hyper-V versions in the same infrastructure but still gain centralized management and advanced feature compatibility

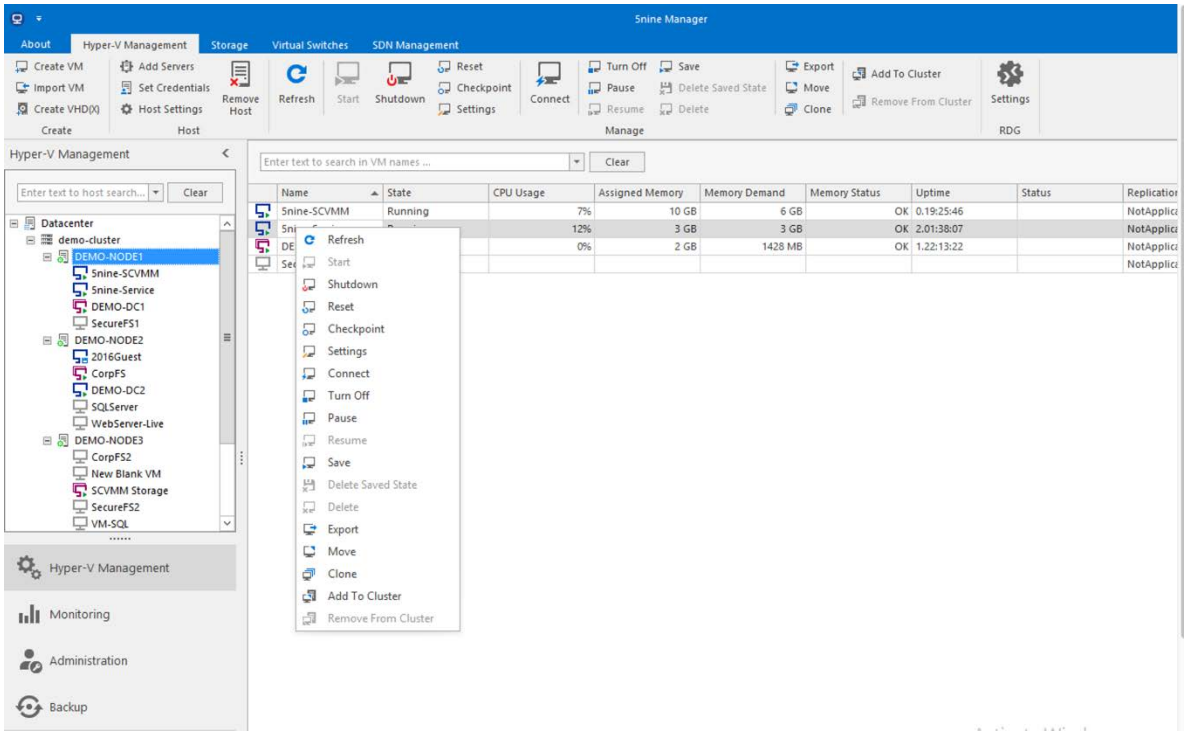

Figure 1 – Centralized Management of Your Hyper-V Infrastructure with 5nine Manager

What 5nine Manager does better than Hyper-V manager is that it gives you a single centralized management interface for managing the free Hyper-V infrastructure and Hyper-V clusters (Figure 1). For example, no longer do you have to use the Windows Failover Cluster Manager to check cluster status. Additionally, with 5nine Manager you'll gain the following (over SCVMM) -

Centralized management – administration of Hyper-V events and tasks for all hosts, resulting in faster troubleshooting and less downtime

Real-time monitoring – monitoring of cluster, Hyper-V host and virtual machine performance with alerts to ensure that you can fix issues before they happen (shown in Figure 2, below)

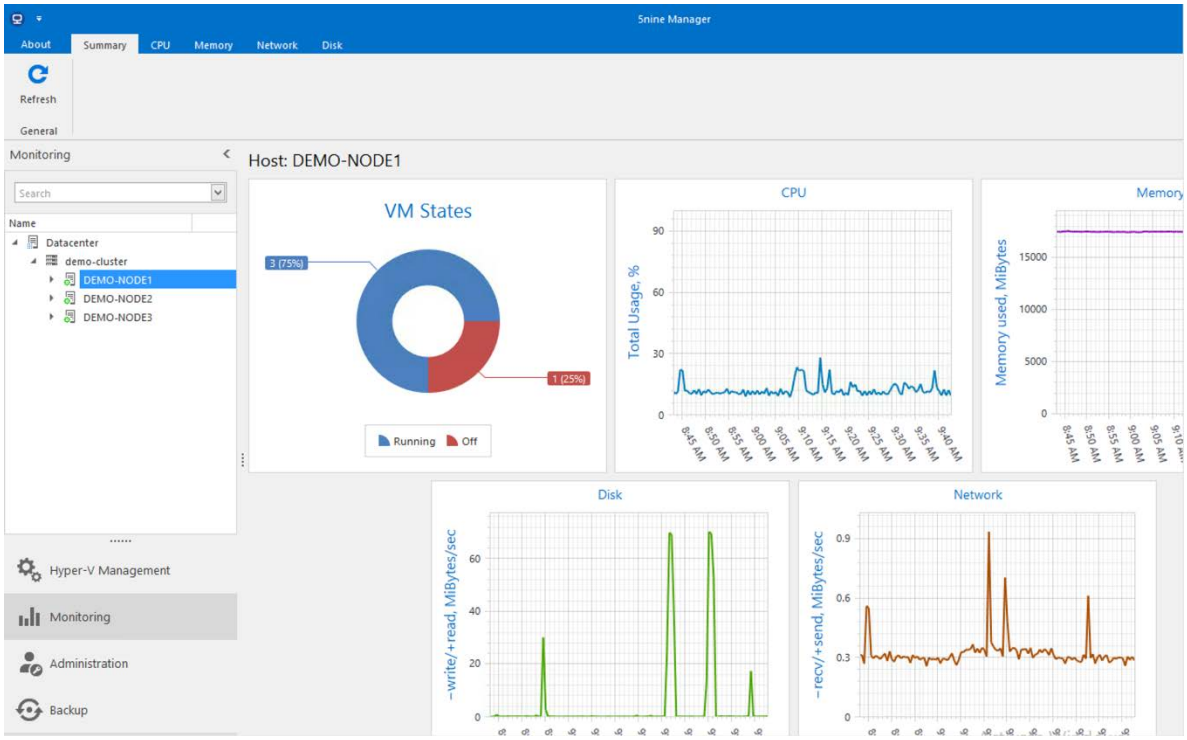

Figure 2 – Real-time Monitoring of Hyper-V Hosts and Clusters

Integrated best practices analyzer - a graphical interface for running the popular best practices analyzer for Hyper-V across all Hyper-V hosts, to ensure compliance and configuration standards

Role-based access control – to define who in your organization will have the ability to do what in the Hyper-V infrastructure, which is very useful for allowing access to power users, application owners, and support groups (shown in Figure 3, below)

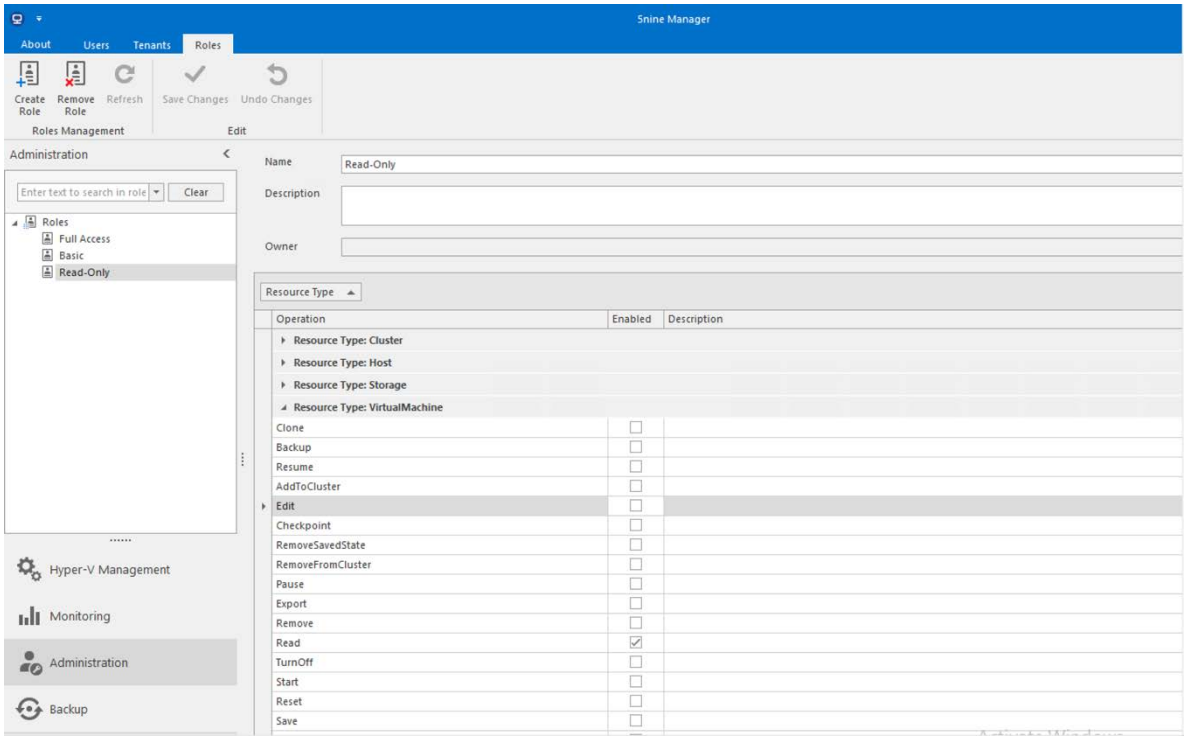

Figure 3 – Role-Based Access Control for Hyper-V Infrastructure Administration

Set VM's IP from the management console - ability to configure IP addresses for guest operating systems running inside Hyper-V

Software-defined network (SDN) management – 5nine manager includes the ability to manage Hyper-V software-defined networks (shown in Figure 4 below)

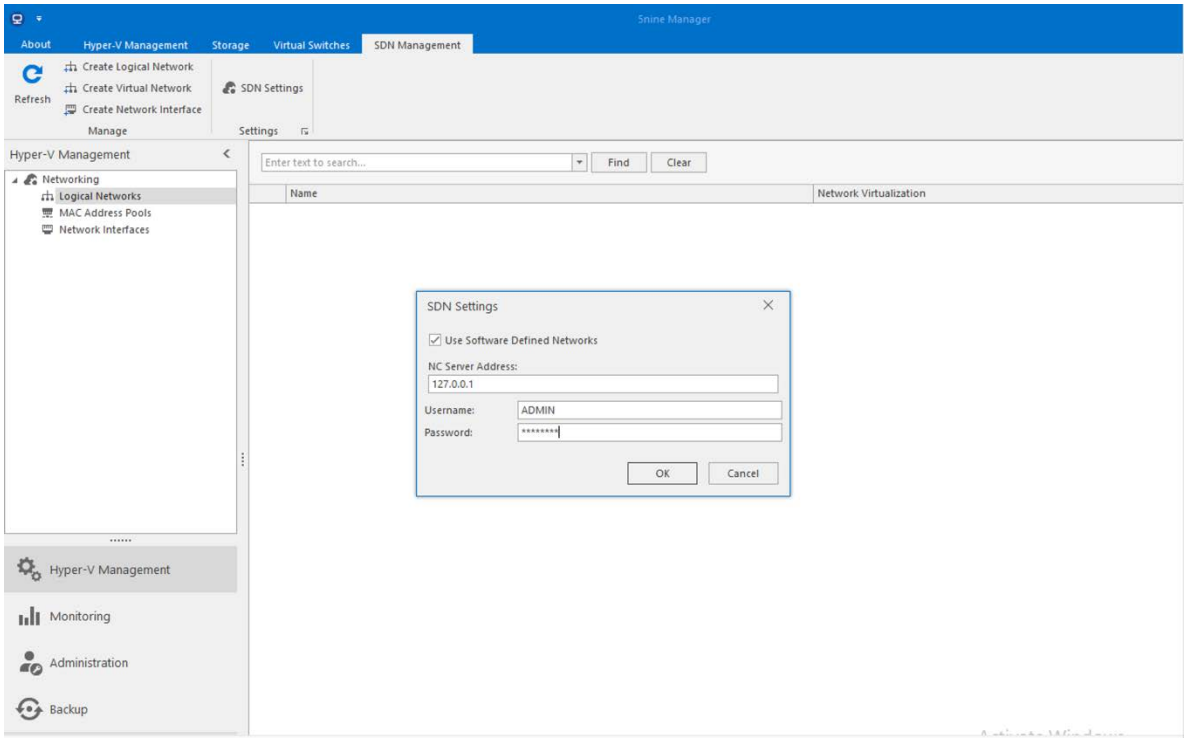

Figure 4 – Managing Hyper-V Software-Defined Networking with 5nine

Ability to run a local GUI on Windows Server Core host or free Hyper-V Server host - option to run additional instances of 5nine Manager locally on Free Hyper-V hosts (or Windows Server core hosts), as needed, for local host configuration

To implement centralized management for the Hyper-V infrastructure, the cost is only $749 per host for 5nine Manager. Thus, for a 3 host Hyper-V cluster with 4 sockets per host, the cost would be $2,247 (compared to roughly $21,642 for the alternative).

Enterprises also need performance graphing, monitoring, and capacity planning for their Hyper-V infrastructure. Thankfully, 5nine Manager includes all of that functionality for your Hyper-V infrastructure – even with much more functionality than System Center (see this comparison for more information).

#3 Data Protection

Enterprise-grade infrastructures need enterprise-grade data protection that recognizes Hyper-V, knows how to intelligently backup virtual machines, and recover virtual machines, quickly. Several backup vendors support Hyper-V so you may already have a tool available but, if not, 5nine Manager now includes Hyper-V backup in every edition.

With 5nine Manager (shown in Figure 5 below), you'll be able to ensure availability with built-in, easy-to-use functionality for disaster recovery and replication. Backups are encrypted and compressed for secure and simple restoration of data.

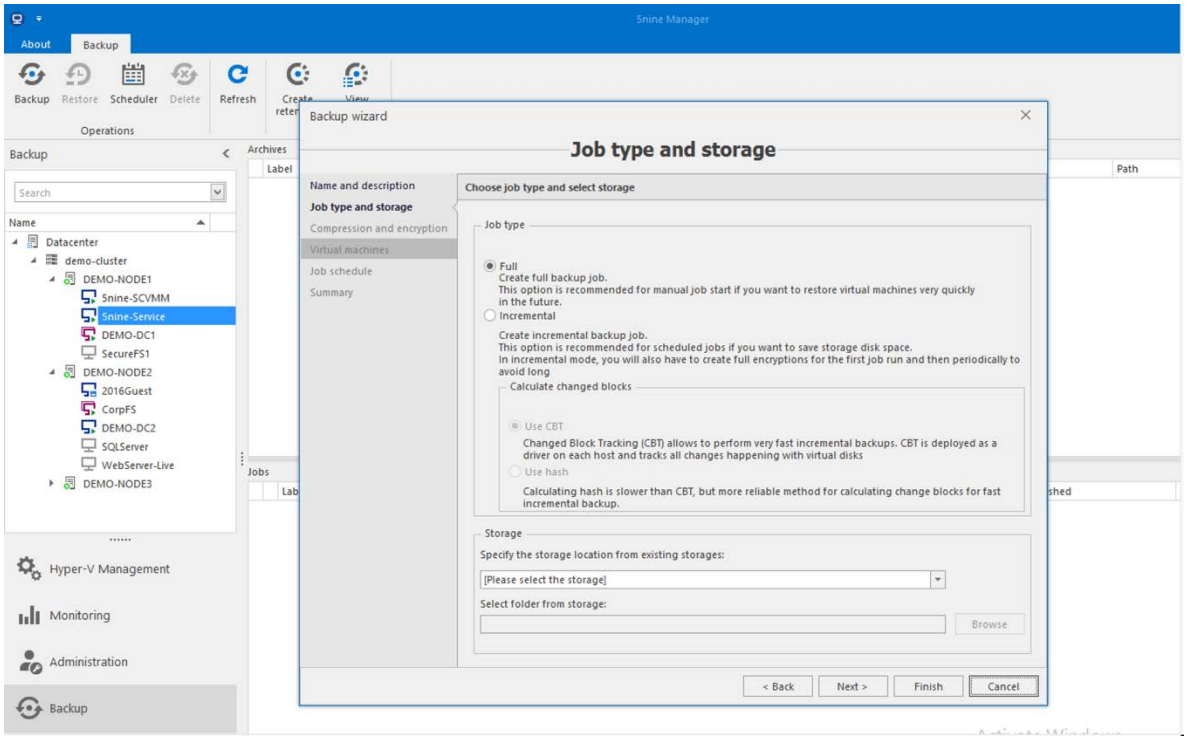

Figure 5 – 5nine Manager Backup and Recovery for Hyper-V

#4 Shared Enterprise-Grade Storage

Enterprise-grade virtual infrastructures need high availability so that if a single virtualization host fails, another host will power up and run the virtual machines from the failed host, getting applications back up in minutes. To create a Hyper-V high availability cluster, you must have shared storage. The least expensive way to do this is to use a separate physical server and make a shared directory structure to house the virtual machines running in the cluster. While this may

not cost a lot, a single host isn't going to be "enterprise grade" because if that host fails, the Hyper-V cluster is down.

While there are ways to use multiple Windows Servers to provide highly available shared storage the best way, in my opinion, is to converge the storage with the compute layer. With converged storage, you can leverage idle server disks and hosts to provide storage within your existing hosts.

You can create an enterprise-grade shared storage solution that is also affordable, I recommend a couple of options:

1. Use Windows Server 2016 Storage Spaces, shown in Figure 6 below, to turn a minimum of two Windows hosts into a shared storage cluster, with virtual machines running on top.

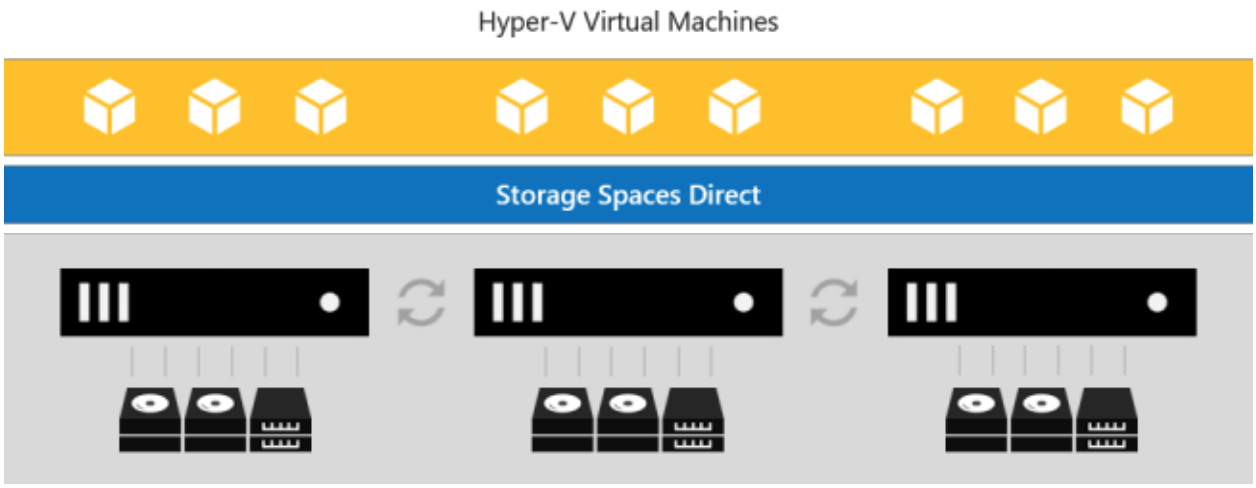

Figure 6 – Using Windows Server 2016 with Storage Spaces Direct to Create a Hyper-V Hyper-Converged Cluster

2. Use Starwind Virtual SAN to create a virtual shared storage array across your existing hosts. Not only does it provide the shared storage that Hyper-V needs but it offers advanced SAN features like caching, storage-level snapshots, thin provisioning, deduplication, and replication. Most importantly, Virtual SAN provides high availability for your data (such as you Hyper-V virtual machines) such that if one host fails or one disk is lost on a host, your Hyper-V virtual machines keep on running. Virtual SAN comes in a free edition (with a few limitations) and a supported commercial edition.

#5 Security

Finally, the last piece of building a Hyper-V enterprise-grade infrastructure is security. One piece of the "security in layers" approach that you should implement is the scanning of the virtual machine disk files for viruses and malware. This is especially important if you are running any virtualized desktops in your environment.

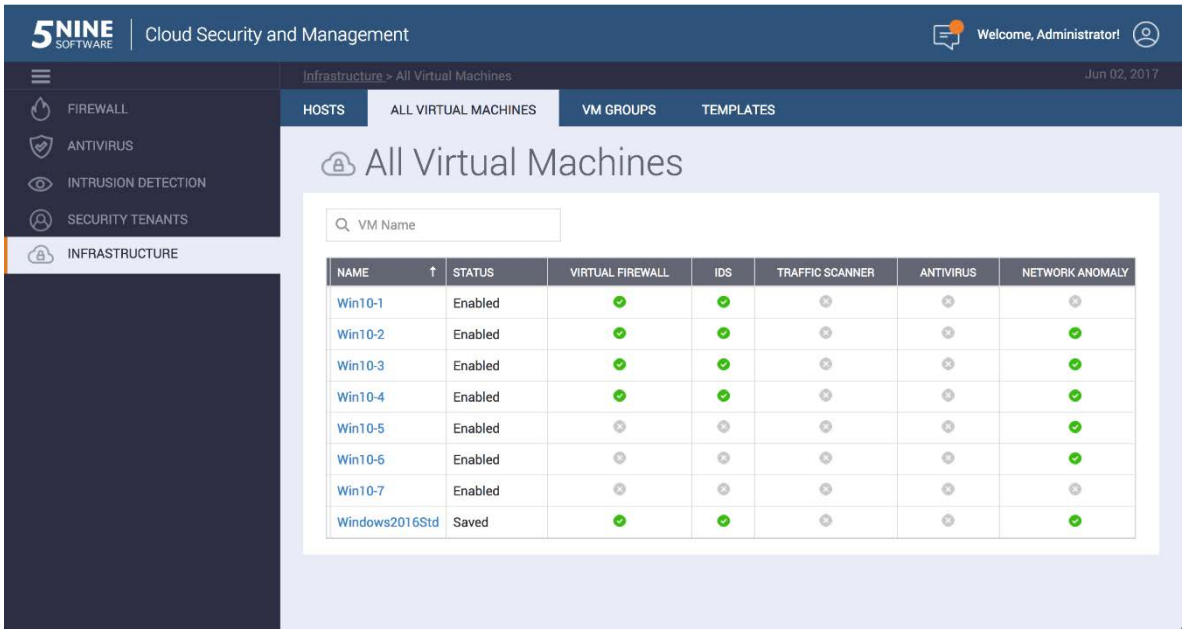

Figure 7 – Agentless Firewall, Antivirus, Intrusion Detection and More from a Single Access Point

As with data protection covered above, 5nine offers another affordable enterprise-grade solution for the security challenge – 5nine Cloud Security.

5nine Cloud Security is host based so it doesn't cause VM / application performance degradations like agent-based anti-virus software does. It can scan and security virtual machines running in your local Hyper-V cluster as well as any VMs you might choose to run in Microsoft Azure. It supports multi-tenant environments and provides VM isolation. 5nine Cloud Security starts at $399.

Challenge: Build Your Own Affordable Hyper-V Enterprise-Grade Infrastructure

After reading this guide, do you think that you can build a Hyper-V enterprise-grade infrastructure for your company on a "SMB price tag"? I encourage you to give it a shot! Start with Hyper-V Server 2016, add 5nine Manager for Hyper-V, layer on shared (but highly available) storage, then add data protection, and 5nine Cloud Security. The costs for a real-world, enterprise-grade cluster with 5nine and the other tools mentioned could be around $1000 per host, making enterprise-grade virtualization affordable for every company, small and large.

About The Author

David Davis is a video training author and evangelist at Pluralsight.com, the global leader in video training for IT pros.

He holds several certifications including VCP5, VCAP-DCA, CCIE #9369, and has been awarded the VMware vExpert award 5 years running.

Additionally, David has spoken at major conferences like VMworld and authored hundreds of articles for websites and print publications, mostly around virtualization.

David's personal blog is VirtualizationSoftware.com and he is the co-owner of ActualTechMedia.com.

About 5nine Software

5nine Software is the leading global Hyper-V virtualization security and management provider. We offer the first and only agentless security and management solutions for Microsoft Hyper-V. Our innovative, powerful and easy-to-use software is designed to reduce costs, increase productivity and mitigate security risks. Over 100,000 users trust 5nine Software to migrate, manage and secure their virtual infrastructure.

To learn more, visit http://www.5nine.com/

Sales:
Phone US: + 1 561-898-1100
Phone EU: + 44 (20) 7048-2021
Email: sales@5nine.com
Fax: + 1 732 203 1665

Technical Support:
Phone US/Canada Toll Free: + 1 877 275 5232
Email: support@5nine.com