Dell Hybrid Cloud System for Microsoft Cloud Platform System (CPS) Standard

Version 1.4.1 Concepts Guide

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Notes, cautions, and warnings

ⓘ| **NOTE: A NOTE indicates important information that helps you make better use of your product.**

△| **CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.**

⚠| **WARNING: A WARNING indicates a potential for property damage, personal injury, or death.**

Contents

Overview

> ⓘ IMPORTANT: The recommendations and guidelines in this document are based on industry best practices, CPS Standard architecture requirements, and Dell EMC lab testing. If not followed, the functionality and or management of the solution may not work as designed or expected, and problem resolution may be limited, delayed, or not viable.

This guide provides a high-level overview of the components of the Dell Hybrid Cloud System for Microsoft Cloud Platform System (CPS) Standard (the Dell Hybrid Cloud System for Microsoft). For more information of specific items in this document, see the *Dell Hybrid Cloud System for Microsoft Cloud Platform System Standard Administrators Guide.* To locate this guide, see Dell Hybrid Cloud System for Microsoft support site.

The Dell Hybrid Cloud System for Microsoft is an infrastructure-as-a-service (IaaS) solution that enables you to quickly get a hybrid cloud solution up and running in your data center. Built on Dell hardware and a foundation of Windows Server 2012 R2 and System Center 2012 R2, the solution enables easy extension to Microsoft Azure. The Dell Hybrid Cloud System for Microsoft provides a streamlined experience to onboard to the following services:

- Azure Operational Insights
- Azure Backup
- Azure Site Recovery, for disaster recovery

Introduction

The Dell Hybrid Cloud System for Microsoft solution provides a scalable building-block approach for private and hybrid cloud infrastructure. The solution combines compute, storage, and networking hardware from Dell with management and operational software, providing for a complete private cloud solution experience. This experience includes a self-service portal enabling a template-based virtual machine deployment.

Through a close partnership with Microsoft, the following software is installed at the factory and configured during the deployment of the solution:

- Windows Server
- Hyper-V
- System Center Virtual Machine Manager
- System Center Operations Manager
- Windows Azure Pack

In addition, this solution is designed to easily integrate with three key services in the Azure public cloud:

- Azure Operational Insights is an analytical tool that compiles and analyzes data from data centers and clouds.
- Azure Backup retains data, files, folders, and applications in case data recovery is needed.
- Azure Site Recovery allows you to recover services in the event of a data center outage.

Solution components

All of the hardware and software components that make up the solution have been designed and tested to operate together. As a result, the Dell Hybrid Cloud System for Microsoft gives you interoperability and supportability in a single building block for your cloud solution. The "time-to value" benefit is immense: the process of setting up a comparable system, determining hardware configuration and software requirements, and implementing all of the best practices can consume weeks of IT resources. The Dell Hybrid Cloud System solution is up and running quickly, ready for use.

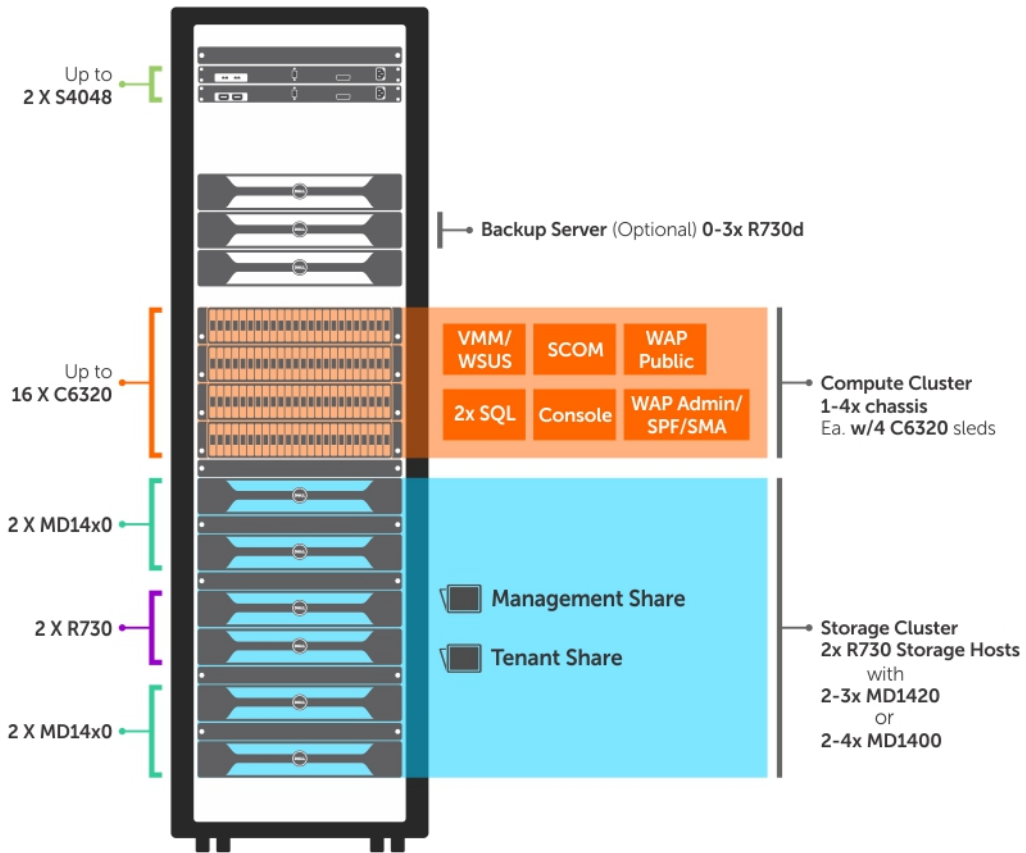The following figure shows the primary components of the solution.

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Figure 1. Primary Components

Prerequisites

The Dell Hybrid Cloud System for Microsoft (DHCS) solution requires an existing **Windows Server 2012 Active Directory (AD) with integrated DNS and all software updates**.

The *Solution Integration Document* (*SID*) requests details that ensure the DHCS solution can integrate into your existing AD environment. The *SID* survey is conducted before the scheduled deployment of your Dell Hybrid Cloud System for Microsoft solution.

To use Azure Cloud Services, both internet connectivity and a valid Azure subscription are required.

ⓘ **IMPORTANT: Disjointed namespaces:**

- **Your domain name must be the same as the DNS zone in which your DHCS stamp resides**. For example, if your domain name is `mycompany.local`, and you are using a DNS zone other than `mycompany.local`, you have a disjointed namespace. **Dell EMC has only validated and tested contiguous namespace use case with identical domain name and the DNS zone.**
- **Your NetBIOS name for the domain must be the same as the prefix of your FQDN**. For example, if your FQDN is `mycompany.local`, and you are using a NetBIOS name of anything other than `mycompany`, you have a disjointed namespace. **Dell EMC has only validated and tested contiguous namespace where the NetBIOS name is set to the same name as the FQDN prefix. In the above example, the NetBIOS name would be "`mycompany`."**

Topics:

- Directory services
- Network infrastructure

Directory services

When Dell Hybrid Cloud System for Microsoft is deployed, a new Organizational Unit (OU) is created within an existing AD Services infrastructure. The deployment can accept Domain Administrator credentials, or can employ a preparation operation (ADPreCreationTool) that creates an AD user with delegated rights that only apply to this new OU. The physical compute nodes, storage head nodes, and management virtual machines are added to a child OU when the solution is deployed. The child OU is designated by the customer's company prefix. This prefix is also used for the automatic naming of the physical nodes and management virtual machines in the Dell Hybrid Cloud System for Microsoft infrastructure.
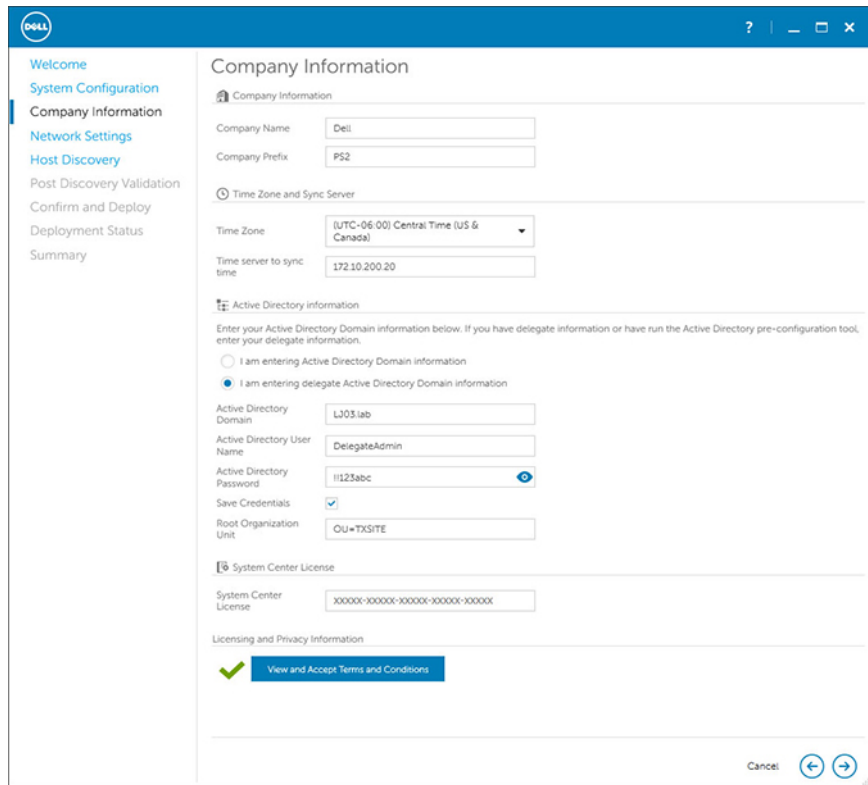
Figure 2. Active Directory Information in Deployment UI

Network infrastructure

The Dell Hybrid Cloud System for Microsoft solution includes either one or two Dell Networking S4048-ON switches to provide connectivity between the compute and storage nodes in the solution. You can order a second switch to provide redundancy so that connectivity to the solution hardware is highly available. The *Solution Integration Document* (*SID*) survey specifies the networks and IP addressing schemes used in your environment.

The Dell Hybrid Cloud System for Microsoft solution infrastructure defines three network subnets for its internal connectivity: one Management network and two Storage networks. The physical compute nodes and the management virtual machines (VMs) are configured on the management network. The physical compute nodes are configured to access the Storage Spaces head nodes through the storage networks.

To enable the Dell Hybrid Cloud System for Microsoft solution to scale to its maximum design footprint, these subnets must meet or exceed the following specifications:

Table 1. Subnet Specifications

Network	Minimum Subnet Mask	Number of Hosts Provided by the Mask
Management	`/26(255.255.255.192)`	62
Storage1	`/27(255.255.255.224)`	30
Storage2	`/27(255.255.255.224)`	30

In addition to these infrastructure networks, Dell recommends that you configure the Dell Hybrid Cloud System for Microsoft solution to deploy VMs to one or more tenant networks. Depending on the size of your deployed solution and the number of VMs that you want to deploy in each tenant network, the specifications for the tenant networks may vary greatly. A fully populated Dell Hybrid Cloud System for

Microsoft solution can accommodate up to 400 general enterprise VMs. Therefore, it may be necessary to plan for a tenant subnet with a /23 (255.255.254) or greater mask value.

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Several 10 GbE and 40 GbE ports on the Dell Networking S4048-ON switch are intended for the purposes of providing uplinks for connectivity to the existing network infrastructure in your environment. To ensure that the Dell Hybrid Cloud System for Microsoft solution can operate within your infrastructure, provide relevant details about your environment in the *SID* survey.

Hardware infrastructure

The building blocks for the hardware are:

- Networking Infrastructure
- Backup Server (Optional)
- Compute Cluster
- Storage Cluster

Networking (up to 2 x Dell Networking S4048)

Backup Server (Optional)
(0 to 3 x Dell PowerEdge R730XD)

Compute Cluster
(up to 16 x Dell Networking C6320)

Storage Cluster
(2 x Dell PowerEdge R730 + up to 4 x Dell PowerVault MD14x0)
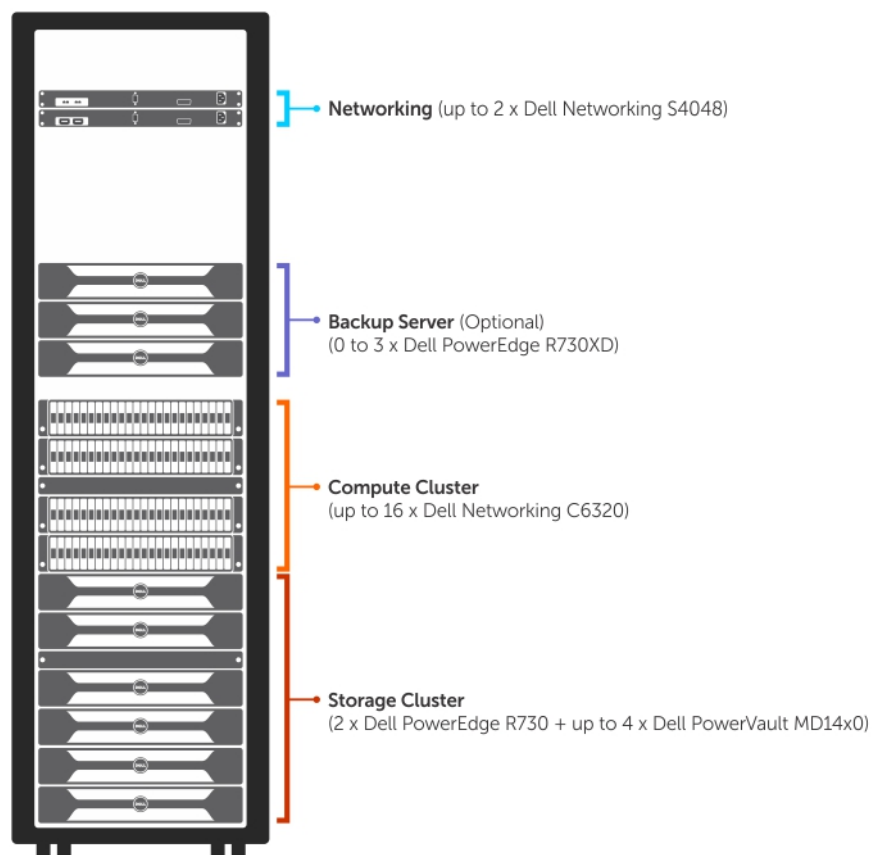
Figure 3. Dell Hybrid Cloud System Hardware Infrastructure

Topics:

- Compute cluster
- Storage cluster
- Network switches
- Backup server nodes (optional)

Compute cluster

All of the physical compute nodes in a Dell Hybrid Cloud System for Microsoft stamp form a single compute cluster. The compute cluster consists of the physical Hyper-V nodes that host the VMs for the management infrastructure and the tenant compute workloads. All of these physical nodes run Windows Server 2012 R2 Datacenter edition—Server Core configuration.

The name of the compute cluster is *<prefix>*CCL, where *<prefix>* is the user-specified prefix for the Dell Hybrid Cloud System for Microsoft stamp.
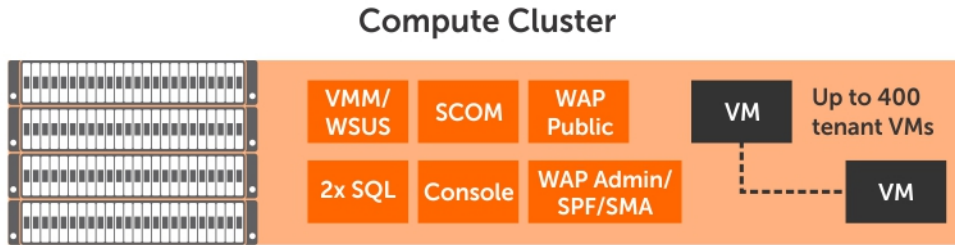

Figure 4. Dell Hybrid Cloud System Compute Cluster

Table 2. Compute Cluster Specifications

Component	Configuration
Server model	C6320
Number of servers	Up to 16 x C6320 (CSU)

Compute nodes

Dell PowerEdge C6320 provides an optimized compute and storage platform for private cloud and scale-out workloads. The C6320 holds up to four independent 2-socket servers with flexible 24 x 2.5" or 12 x 3.5" high-capacity storage in a compact 2U shared infrastructure platform. Each shared chassis can host up to 4 x C6320 server modules.
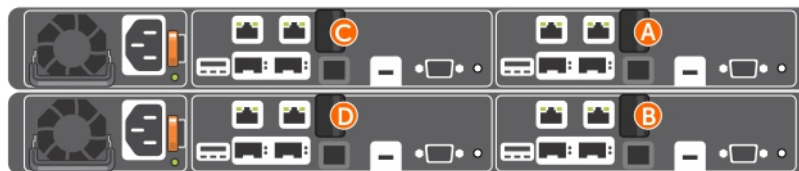

Figure 5. Dell Hybrid Cloud System Compute Nodes

The Dell PowerEdge C6320 server allows for flexible configuration.

Table 3. Compute Node Specifications

Component	Configuration
Server model	Dell PowerEdge C6320 rack server
Number of chassis	Up to 4
Number of servers per chassis	4 (2.5" HDD bay)
Number of compute nodes supported	Up to 16

The following specifications are specific to the Dell Hybrid Cloud System for Microsoft solution:

Table 4. Dell PowerEdge C6320 Server Specifications

Component	Configuration
Processor	2 x Intel E5 2620/30/40/50/60 (must be same family)
Memory	128/256/512 GB
Internal Storage	2 x 600 GB SAS 10K (OS drives) or 1 x 400 GB SATA SSD
Storage Controller	PERC H330
Network LOM	Intel 82599ES (Niantic), dual port, 10 GbE, SFP+
Network Mezzanine	Intel I350, dual port 1 GbE

Storage cluster

The Dell Hybrid Cloud System for Microsoft uses Dell Storage with Microsoft Storage Spaces as the storage cluster. Microsoft Storage Spaces enables you to virtualize storage by grouping industry-standard disks into storage pools, then creating virtual disks called *Storage Spaces* from the available capacity in the storage pools. Storage Spaces in Windows Server 2012 R2 allow sophisticated virtualization of the storage stack, creating storage pools with advanced features such as storage aggregation, elastic capacity expansion, and delegated administration.

There are two building blocks of the storage cluster:

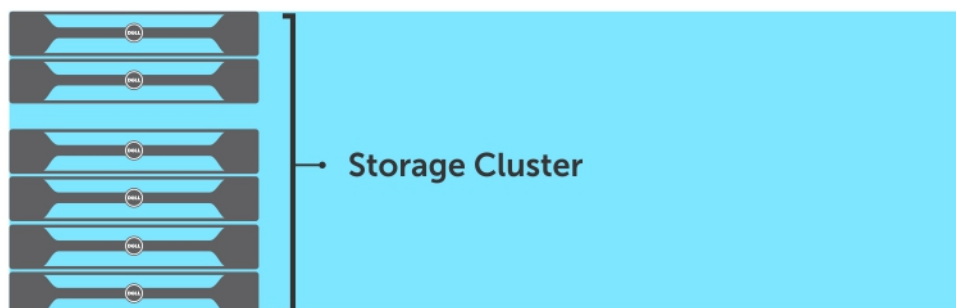- R730 Storage Server
- MD14x0 Storage Enclosure

Figure 6. Dell Hybrid Cloud System Storage Cluster

Storage nodes

The Dell PowerEdge R730 is a highly versatile, two-socket 2U rack server with a large memory footprint, extensive I/O options, and a choice of dense, high-performance storage or low-cost, high-capacity storage.

The Dell PowerEdge R730 is a general-purpose platform with highly expandable memory (up to 768 GB) and impressive I/O capabilities to match. The R730 can readily handle very demanding workloads such as data warehouses, e-commerce, virtual desktop infrastructure (VDI), databases, and high-performance computing (HPC). In addition to the R730's capabilities, the R730xd offers extraordinary storage capacity, making it well-suited for data-intensive applications that require storage and I/O performance, such as medical imaging and e-mail servers.

Figure 7. R730 Front

Figure 8. R730 Back

Table 5. Storage Server Specifications

Component	Configuration
Storage server model	Dell PowerEdge R730
Number of servers	2 x PowerEdge R730s
Processor	2 x Intel E5-2630 (default)/60
Memory	48/64 (default)/96 GB
Internal Storage	2 x SAS 10K via PERC H330
Storage Adapter	4 x Dell SAS HBA
Network Daughter Card	10GbE SFP+

Table 6. Head Node Specifications

Component	Configuration
MD1400-based	(Storage head node x storage enclosure) 2 x 2, 2 x 3, and 2 x 4
MD1420-based	2 x 2 and 2 x 3

Storage enclosures

The Dell Storage MD Series offers storage expansion for Dell PowerEdge servers. The Dell MD1400 and MD1420 are direct-attached storage enclosures designed to maximize your server storage capacity.

Choose the MD1400 for increased capacity or the MD1420 for workloads that demand higher I/O performance.

MD1400

The MD1400 supports 3.5" hard drives in a 2U, 12-drive enclosure.

The Dell Hybrid Cloud System for Microsoft solution supports up to 4 MD1400 enclosures (or 48 x 3.5" HDDs) behind the PowerEdge server.

Figure 9. MD1400 Storage Enclosure

MD1420

The MD1420 supports 24 2.5" hard drives in a 2U form-factor.

The solution supports up to 3 MD1420 enclosures (or 72 x 2.5" HDDs) behind the PowerEdge server.

Figure 10. MD1420 Storage Enclosure

Table 7. Storage Enclosure Specifications

Component	Configuration
Storage enclosure model	MD1400 or MD1420
Number of storage enclosures	Up to 4 x MD1400 (48 x 3.5" HDD) or 3 x MD1420 (72 x 2.5" HDD)
Drives supported	• SSD for caching • 3.5" Drives for data storage (MD 1400) • 2.5" Drives for data storage (MD 1420)

Figure 11. Back of the Storage Enclosure (MD1400 and MD1420)

Network switches

The Dell Hybrid Cloud System for Microsoft uses Dell Networking S4048-ON, which is a 10/40GbE top-of-rack open networking switch. It is a high-density, 1RU 48-port 10GbE switch with six 40GbE uplinks and ultra-low latency, nonblocking performance to ensure line-rate performance.

For the networks, there are two types of network configurations to this solution:

Table 8. Network Switch Configurations

Switch Configuration	Description
Single switch	In this configuration, ports have been reserved to address the maximum configuration for all of the hardware.
Dual switch	This configuration has reserved ports as well, but they are spread between a VLT switch configuration.

Table 9. Network Switch Specifications

Component	Configuration
Switch model	Dell Networking S4048-ON (Open Networking)
Number of switches	1 or 2 S4048-ON switches

Backup server nodes (optional)

In the Dell Hybrid Cloud System for Microsoft, it is important to protect all of the infrastructure VMs and the tenant VMs. The Dell Hybrid Cloud System for Microsoft uses Microsoft Data Protection Manager (MS DPM) for that protection, with the option to provide additional protection through offsite backup from MS DPM to Microsoft Azure.

Out of the box, the MS DPM solution for the Dell Hybrid Cloud System for Microsoft provides protection for the management cluster and tenant virtual machines. You can back up to the 1-3 servers or to the Azure cloud.

The hardware building block used for the backup server is the Dell PowerEdge R730xd.

The Dell PowerEdge R730xd is an exceptionally flexible and scalable, two-socket 2U rack server that delivers high-performance processing and a broad range of workload-optimized local storage possibilities, including hybrid tiering.

Designed with an incredible range of configurability, the PowerEdge R730xd meets the needs of many different workloads. It includes the Intel Xeon processor E5-2600 v4 product family, 24 DIMMs of high-performance DDR4 memory and a broad range of local storage options. The R730xd server configuration used as the backup server in the solution consists of up to 16 x 3.5" internal drives for data and 2 x 2.5" drive for the operating system. Details for this configuration are listed in the Backup Server Host Specifications table.
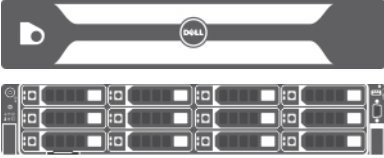

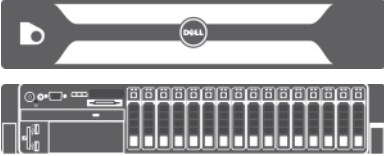**Figure 12. R730xd Server**

Table 10. Backup Server Host Specifications

Component	Configuration
Backup server (backup host)	Up to 3 x PE-R730XD 12 + 4 Internal, 3.5" hard drives and 2, 2.5" flex bay hard drives
CPU	E5-2630 v4 (2.4 Ghz, 8C) 85W
Memory	128GB (8 x 16 GB RDIMM, 2400Mhz, x8)
Internal Storage	Flex Bay: 2 x 600 GB 10K 2.5in SAS HDD (boot)

Component	Configuration
	12+4 Internal: 4 TB 7.2K RPM NL-SAS 6Gbps 3.5in hot-plug HDD
Storage Controller	PERC H730P
Network LOM	Intel X520 10GbE SFP+

Hardware specifications

Table 11. DHCS Hardware

Component Illustration	Component Specification
	Dell Networking S4048 48x 10GbE + 4x 40GbE Ports • Up to 2 x S4048 high-density 48–port 10GbE switches for LAN and SMB traffic (Default is 1 switch) • Default factory setting is shared NIC for iDRAC traffic • 40GbE or 80GbE ISL between the switches

	Data Protection Backup Server (DPM) (Optional) — Dell PowerEdge R730xd
	
	• Up to 3 x Dell PowerEdge R730xd with 12 front + 4 Internal 3.5" HDD and 2 x 2.5" HDD in Flex bay.
	• **CPU**: Default processor 2 x Intel Xeon E5-2630 v4 (10 cores/processors) [More options are available.]
	• **Memory**: Default memory 128 GB (16 x 8 GB) 2133 MT/s [More options are available.]
	• **Storage Controller**: PERC H730P
	• **Internal Disks**:
	  • **OS** — 2 x 600 GB SAS 10K
	  • **Data** — 16 drives x 4 TB NL SAS 7.2K
	• **Network Daughter Card**: Intel X520 10GbE SFP+

	Compute Node — Dell PowerEdge C6320 • Up to 4 x 2U rack-based chassis Dell PowerEdge C6000 • Up to 4 x Dell PowerEdge C6320 server nodes per chassis for a total of 16 compute nodes • **CPU**: Default: Processor 2 x Intel Xeon E5-2630 v4 (10 cores/processors) [More options are available.] • **Memory**: Default: 128 GB (8 x 16 GB) 2133 MT/s [More options are available.] • **Network**: Intel 82599ES (2 x 10GbE 10GBASE-SFP+), Intel I350 (2 x 1 GbE 10GBASE-T) • **Storage Controller**: PERC H330 • **Internal Disks**: 2 x 600 GB SAS 10K HDD, or 1 x 400 GB SATA SSD • iDRAC8 Enterprise
	Storage Server Nodes (SoFS) — Dell PowerEdge R730 • 2 x 2U Dell PowerEdge R730 server nodes • **CPU**: Default Processor 2 x Intel Xeon E5-2630 v4 (10 cores/processors) [More options are available.] • **Memory**: Default memory 64 GB (8 x 8 GB) 2133 MT/s [More options are available.] • **Storage Controller**: H330 (internal), 4 x Dell 12Gbps SAS HBA (external)

Component Illustration	Component Specification
	· **Internal Disks**: 2 x 600 GB SAS 10K

	JBOD — Dell PowerVault
	
	· 2-4 x PowerVault **MD1400** or **MD1420**
	· Drives:
	   · **3.5"** — 2 TB, 4 TB, 6 TB, or 8 TB 7.2K, NL-SAS HDD
	   · **2.5"** — 1.6 TB 10K SAS HDD
	   · **2.5"** — 400 GB, 800 GB, or 1.6 TB SSD

Operations and management software

The Dell Hybrid Cloud System for Microsoft includes the following on-premises software components.

Topics:

- Microsoft-provided software
- Dell-provided software
- Windows Server 2012 R2 with Hyper-V
- Infrastructure Virtual Machines
- System Center Data Protection Manager (optional)
- Integrated Azure services (optional)
- Dell preinstalled system management software
- More Dell management software (optional)
- Software summary

Microsoft-provided software

Table 12. Software

Product/Software Name	Purpose	TechNet Library Reference
Windows Server 2012 R2 Datacenter Edition	The operating system on all physical hosts and VMs.	Windows Server 2012 R2
System Center Virtual Machine Manager (VMM) 2012 R2	Used to manage the virtualization hosts, networking, and storage resources.	Virtual Machine Manager
System Center Operations Manager 2012 R2	Used to monitor the infrastructure.	Operations Manager
SQL Server 2014	Hosts the databases for infrastructure VMs that require SQL Server.	SQL Server 2014 Product Documentation
Windows Azure Pack	Enables you to offer IaaS services to your users through a self-service cloud.	Windows Azure Pack for Windows Server
System Center Data Protection Manager DPM 2012 R2*	Used to back up both management infrastructure and tenant VMs.	Data Protection Manager
System Center Endpoint Protection	Provides anti-malware services to the physical hosts and infrastructure VMs.	Endpoint Protection Client Help
Service Management Automation (SMA)	Enables you to automate the creation, monitoring, and deployment of resources in your Windows Azure Pack environment.	Service Management Automation
Service Provider Foundation (SPF)	Exposes a web service that interacts with VMM. This web service enables the Windows Azure Pack portals to interact with	Service Provider Foundation

Product/Software Name	Purpose	TechNet Library Reference
	VMM to enable IaaS capabilities in System Center 2012 R2.	

* DPM is installed and integrated with the Dell Hybrid Cloud System for Microsoft when at least one Dell PowerEdge R730xd backup host is ordered with the solution. You can add more backup hosts after the initial deployment.

Dell-provided software

Table 13. Software

Product/Software Name	Purpose	More Information
User interface and middle layer	• Guides deployment workflow • Gathers data and generates manifest • Adds compute chassis (4 sleds per chassis)	Provided in the *Dell Hybrid Cloud System for Microsoft Cloud Platform System Standard Administrators Guide*
Dell Server Management Pack Suite (DSMPS)	Provides hardware health information to the System Center Operations Manager	Dell Server Management Pack Suite
Storage Enclosure CLI (SECLI)	• Updates the Dell PowerVault MD storage enclosure firmware • Monitors the modular disk (MD)	Staged on local disk; see Dell Storage Enclosure Administrator's Guide
BMC Utility	• Sets firmware • Debugs (mostly BMC/iDRAC)	Staged on local disk: see Dell Storage Enclosure Administrator's Guide
OpenManage Deployment Toolkit	• Sets firmware • Debugs (firmware beyond BMC/iDRAC)	Staged on local disk; see Dell Open Manage Deployment Toolkit
SupportAssist	Gathers hardware and software information for support group	Staged on local disk; see SupportAssist
OpenManage Server Administrator (OMSA)	OS level hardware health monitoring agent	Staged on local disk; see OpenManage Server Administrator—OMSA
OpenManage Essential (OME)	Support Assist Console	Staged on local disk; see OpenManage Essentials
Repository Manager (RM)	• Compiles bundle, a collection of server firmware • Can use out of band path to update firmware	Staged on local disk; see Dell OpenManage Repository Manager

Windows Server 2012 R2 with Hyper-V

Windows Server is the platform for building an infrastructure of connected applications, networks, and web services, from the workgroup to the data center.

For more information, see What's New in Hyper-V for Windows Server 2012 R2.

Infrastructure Virtual Machines

The compute cluster hosts the following infrastructure VMs. These VMs host the resources for Dell Hybrid Cloud System for Microsoft fabric and service management:

- All VMs run Windows Server 2012 R2 Datacenter edition.
- With the exception of the Console VM, all VMs on the compute cluster run Server Core.
- All VMs are highly available. This means that a live migration of the VM occurs if there is a host issue.

Table 14. Infrastructure VMs

VM Name	Role/Component Name
*<Prefix>*CON01	Console VM
*<Prefix>*VMM01	VMM Server (Also runs Windows Server Update Services (WSUS) and is the VMM library server.)
*<Prefix>*APA01	• Windows Azure Pack management portal for administrators (and other administrator components) • Service Provider Foundation (SPF) • Service Management Automation (SMA)
*<Prefix>*APT01	Windows Azure Pack management portal for tenants (and other tenant components)
*<Prefix>*OM01	Operations Manager
*<Prefix>*SQL01 *<Prefix>*SQL02	SQL Server guest cluster

System Center Virtual Machine Manager 2012 R2

Virtual Machine Manager (VMM) is a management solution for the virtualized datacenter, enabling you to configure and manage your virtualization host, networking, and storage resources in order to create and deploy virtual machines and services to private clouds that you have created.

For more information, see Virtual Machine Manager.

System Center Operations Manager 2012 R2

System Center 2012 — Operations Manager provides infrastructure monitoring that is flexible and helps ensure the predictable performance and availability of vital applications. Operations Manager offers comprehensive monitoring for your data center and cloud, both private and public.

For more information, see Operations Manager.

Microsoft management packs

By default, the Dell Hybrid Cloud System for Microsoft setup automatically imports several management packs that apply to your cloud infrastructure. To view the management packs, in the Operations console, open the **Administration** workspace, and then click **Management Packs**.

SQL Server

The management infrastructure components require SQL Server databases. These databases are partitioned into two instances of SQL Server 2014 that run on a two-node guest failover cluster (the *<Prefix>*SQL01 and *<Prefix>*SQL02 VMs).

The guest cluster name is *<Prefix>*SQLCL.

The following table shows the instance of SQL Server names and the databases on each instance.

Table 15. Instance of SQL Server Names

Instance Name	Databases
*<Prefix>*SQLIN01\SQLIN01	Windows Azure Pack databases: • Microsoft.MgmtSvc.Config • Microsoft.MgmtSvc.PortalConfigStore • Microsoft.MgmtSvc.Store • Microsoft.MgmtSvc.Usage • Microsoft.MgmtSvc.WebAppGallery Operations Manager databases: • OperationsManager (operational database) • OperationsManagerDW (data warehouse)
*<Prefix>*SQLIN02\SQLIN02	• SCSPFDB (for SPF) • SMA (for SMA) • SUSDB (for WSUS) • VirtualManagerDB (for VMM)

Dell Server Management Pack Suite for System Center

The Dell Server Management Pack Suite offers monitoring of Dell server hardware through System Center Operations Manager and integration with various Dell tools. This hardware includes:

• Dell PowerEdge Servers
• Dell Remote Access Controllers (DRAC)
• iDRAC

The Management Pack Suite provides Dell-specific views that you can use to observe and drill-down to view the system inventory, status, and performance in a network. The Management Pack Suite also offers key correlation capabilities that enable users to view the complex interconnections and status rollups that are enabled from Dell hardware. The suite includes agent-free, out-of-band monitoring that

leverages the embedded server management features, using iDRAC with Lifecycle Controller to enable monitoring of a server without the need for an OS agent.

For more information, see Dell Server Management Pack Suite on Dell TechCenter.

Dell Hybrid Cloud System for Microsoft Management Console

Dell Hybrid Cloud System for Microsoft includes a Console virtual machine (VM) that you can use for management purposes (*<Prefix>*CON01). The most commonly used management tools that are available on the Console VM include the following:

- VMM console
- Operations Manager console
- DPM Administrator console

The following tools are also available:

- SQL Server Management Studio
- Hyper-V Manager
- Failover Cluster Manager
- Windows Server Update Services (WSUS) console

By default, Remote Desktop is enabled on the Console VM.

To manage Windows Azure Pack, you can connect from a web browser on the Console VM.

For more information on managing the Dell Hybrid Cloud System for Microsoft, see the *Dell Hybrid Cloud System for Microsoft Cloud Platform System Standard Administrators Guide.* To locate this guide, see Dell Hybrid Cloud System for Microsoft support site.

Windows Azure Pack

With Windows Azure Pack (WAP), you can offer rich, self-service cloud IaaS services. With the Dell Hybrid Cloud System for Microsoft solution, you can easily provision and offer virtual machines and VM roles for your users. All components needed for IaaS through the Virtual Machine Cloud resource provider are already installed, with the required integration already configured.

WAP enables you to offer IaaS services to your users through a self-service cloud. For more information, see Windows Azure Pack for Windows Server on Microsoft TechNet.

To read about how to manage and administer Windows Azure Pack, see Administer Windows Azure Pack for Windows Server on Microsoft TechNet.

Runbooks

Runbooks are Windows PowerShell scripts that provide automation. You can run them either through the Windows Azure Pack management portal for administrators, or from an elevated Windows PowerShell session on the Console VM.

System Center Data Protection Manager (optional)

The Dell Hybrid Cloud System for Microsoft uses System Center Data Protection Manager (MS DPM) for protection, with the option to also back up from MS DPM to Microsoft Azure.

For more information, see:

- Backup Server Nodes (Optional)
- Data Protection Manager on Microsoft TechNet

Integrated Azure services (optional)

This section details the optional integrated Azure services available.

Connecting to Azure services

When you deploy the Dell Hybrid Cloud System for Microsoft, you are given the option to register for the following Microsoft Azure services:

- Azure Operational Insights
- Azure Backup
- Azure Site Recovery

You can opt in to these services after you have deployed Dell Hybrid Cloud System for Microsoft. Instructions for how to opt in are included in the *Dell Hybrid Cloud System for Microsoft Cloud Platform System Standard Administrators Guide*.

Azure Site Recovery

In the Dell Hybrid Cloud System for Microsoft, you can provide disaster recovery protection for tenant VMs with Azure Site Recovery. You can set up protection between a Dell Hybrid Cloud System for Microsoft stamp and Microsoft Azure.

With this configuration, VMs that are on an on-premises Dell Hybrid Cloud System for Microsoft stamp replicate and failover to Azure VMs. Azure Site Recovery orchestrates replication and failover. Data is stored in an Azure storage account.

You can opt in to Azure Site Recovery during the Dell Hybrid Cloud System for Microsoft deployment, or at any time afterward by using the Dell Hybrid Cloud System for Microsoft wizard.

If you already opted in to Azure Site Recovery during the Dell Hybrid Cloud System for Microsoft deployment, protection is already enabled for the default plan (TenantPlan) in Windows Azure Pack.

For instructions on onboarding Azure Site Recovery after the initial deployment, see the *Dell Hybrid Cloud System for Microsoft Cloud Platform System Standard Administrators Guide*. To locate this guide, see Dell Hybrid Cloud System for Microsoft support site.

For more information, see Azure Site Recovery.

Azure Backup

Azure Backup is a multi-tenant, hybrid, platform-as-a-service (PaaS) built into Azure to provide reliable, secure, offsite backups in Azure. It can back up on-premises data in Azure coming either from Windows-based servers or from DPM servers, and provide backups for IaaS or PaaS applications running in Azure.

Azure Backup is a cloud-based, scalable solution that protects your application data. It is an extension of the local backup server, which uses Azure Backup as a storage vault and copies the data from the local backup server to the cloud. This cloud backup provides an archived copy of the data.

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Azure Operational Insights

Microsoft Azure Operational Insights is a SaaS solution for IT operations teams. Azure Operational Insights uses the power of Azure to collect, store, and analyze log data from virtually any Windows Server and Linux source from any data center or cloud. This service then turns the log data into real-time operational intelligence to enable you to make better-informed decisions.

Dell preinstalled system management software

The following Dell software packages are preinstalled:

- Dell Server Management Pack Suite
- Dell Storage Enclosure CLI (SECLI)
- Dell Drivers and Firmware
- Dell Installer UI

For more information on Dell software, see Dell-provided software.

More Dell management software (optional)

For ease of access, Dell stages the **Dell_Software.zip** file, which contains an array of different software applications that can be used for additional system management and support.

The zip file is in two locations:

- Host — **D:\VHD\Dell_Software.zip**
- Console VM (DVM) — **C:\Program Files\Dell\Dell_Software.zip**

Dell_Software.zip contains a collection of binaries that are not preinstalled, including:

- Dell SupportAssist
- Dell Repository Manager
- Dell OpenManage Essentials
- Dell Deployment Toolkit (DTK)
- BMC Utility
- Dell OpenManage Server Administrator (OMSA)
- OpenManage iDRAC tools

The following screen shot shows sample zip file contents:

OpenManageEssentials_2_1_A00.exe	9/23/2015 4:01 PM	Application	1,037,503 KB
DTK5.2.0-WINPE-1757_A00.exe	9/25/2015 9:40 AM	Application	208,254 KB
OM-SrvAdmin-Dell-Web-WINX64-8.2.0-1739_A00.exe	9/23/2015 4:03 PM	Application	205,154 KB
SupportAssist_1.0.1.exe	7/24/2015 3:18 PM	Application	89,689 KB
DTK5.2.0-CAB-1757_A00.exe	9/25/2015 9:40 AM	Application	81,506 KB
SupportAssistSCOM-plugin-1.1.exe	7/23/2015 5:03 PM	Application	36,080 KB
Dell_Repository_Manager_2.1.0.451.exe	9/25/2015 9:56 AM	Application	15,539 KB
SupportAssist-plugin-2.1.0.exe	9/23/2015 4:25 PM	Application	12,884 KB
ServerHardwareManager-1.5.0.1682-windows-installer.zip	8/26/2015 11:11 AM	Compressed (zipp...	8,295 KB
Dell_Server_Management_Pack_Suite_v6.1.1_A00.exe	8/26/2015 11:07 AM	Application	6,852 KB
OM-DRAC-Dell-Web-WINX64-8.2.0-1739_A00.exe	9/23/2015 4:37 PM	Application	5,335 KB
OM-BMC-Dell-Web-WIN-8.2.0-1739_A00.exe	9/25/2015 10:02 AM	Application	5,184 KB

Figure 13. Sample .zip File Contents

For more information on software provided by Dell, see Dell-provided software.
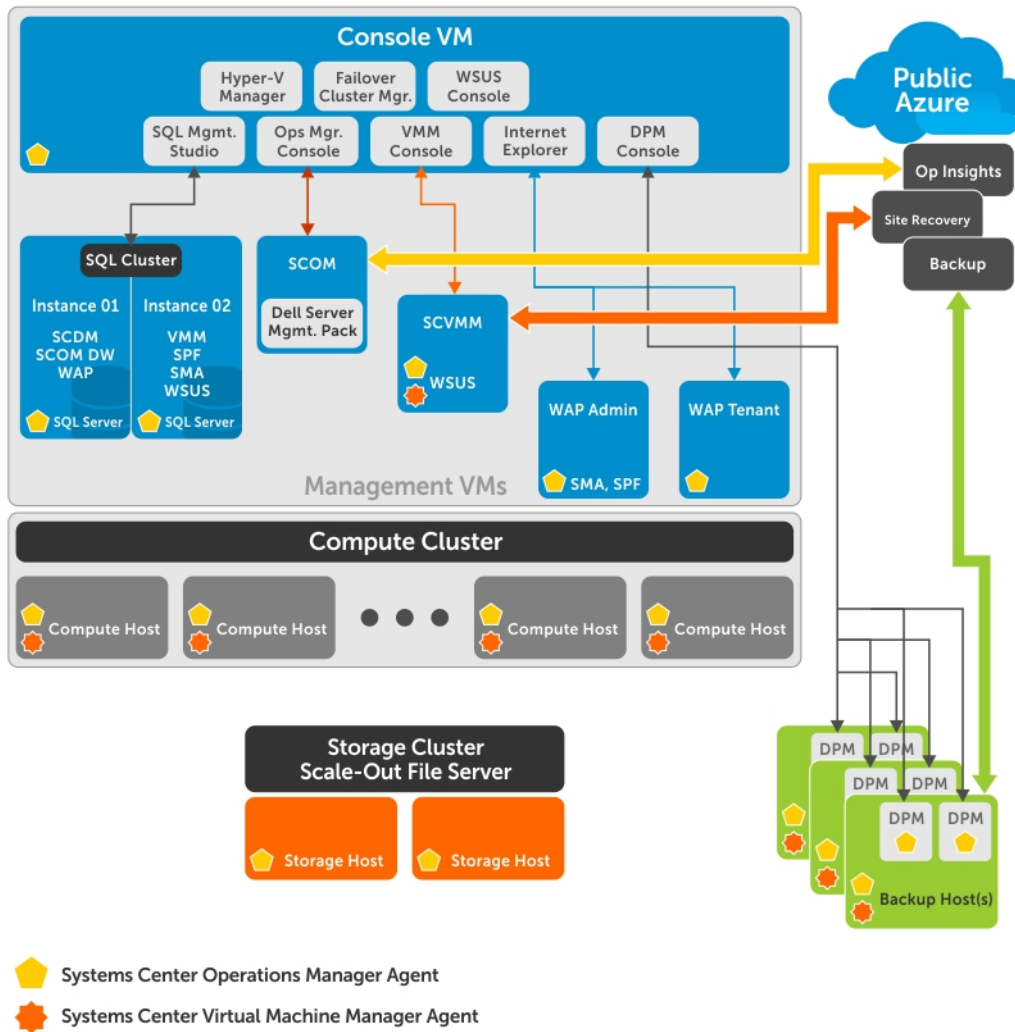
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Software summary

Figure 14. Software

Dell Hybrid Cloud System for Microsoft expansion scenarios

When you initially deploy the Dell Hybrid Cloud System for Microsoft, the solution may be configured with fewer than the maximum number of compute nodes, storage JBODs, network switches, or backup hosts. The following figure outlines the components that may be ordered to expand the scale and/or functionality of the solution after it has already been deployed. Expansion scenarios for DPM, Compute, and Storage will be available after the initial release. Contact your Dell sales representative for more information.
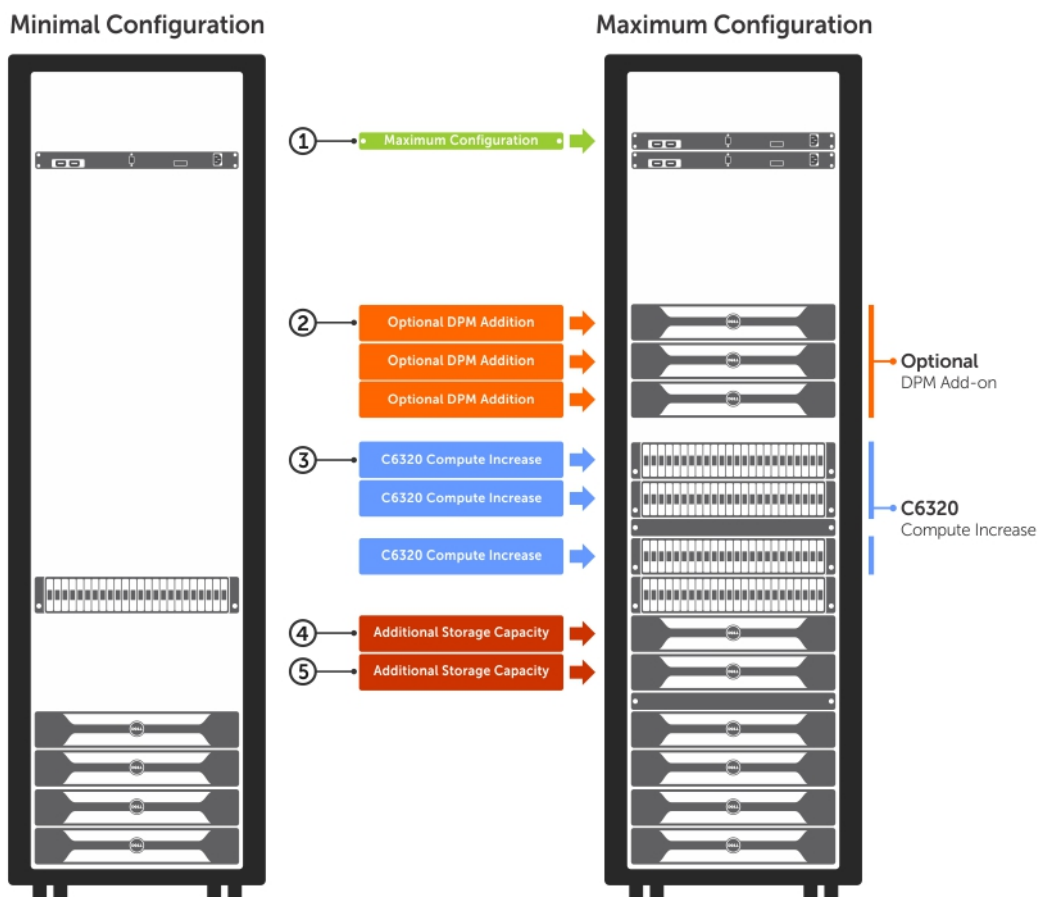

Figure 15. Configurations

For more information, see the "Expanding the Stamp" appendix of the *Dell Hybrid Cloud System for Microsoft Cloud Platform System Standard Administrators Guide*.

Topics:

•   Adding compute nodes

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Adding compute nodes

The Dell Hybrid Cloud System for Microsoft solution allows for compute expansion. The solution can be expanded to up to 16 compute nodes in increments of a chassis (4 compute nodes). The user interface drives the expansion. For more information, see the "Expanding the Stamp" appendix of the *Dell Hybrid Cloud System for Microsoft Cloud Platform System Standard Administrators Guide*.

Dell Hybrid Cloud System for Microsoft Deployment and Expansion user interface

Expansion is the ability to add new nodes as needed (to a maximum of 16) any time after the initial deployment process. You can expand a solution to a maximum configuration as desired. After initial deployment is complete, the Dell Hybrid Cloud System for Microsoft Deployment user interface (UI) displays windows where you can configure expansion. Any time after the initial deployment, when the Deployment UI is opened, the expansion screen appears.
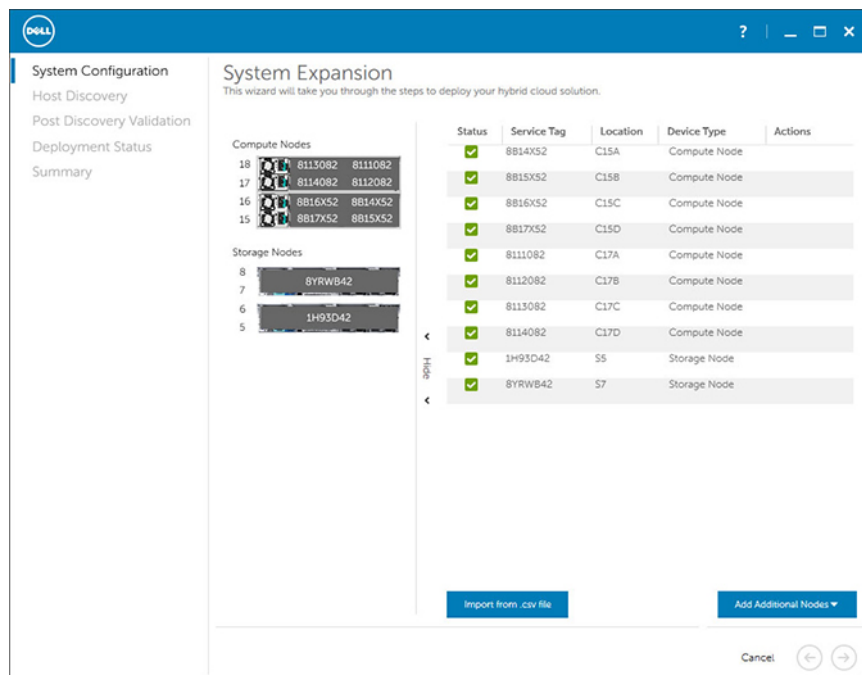

Figure 16. Expansion User Interface

For more information, see the "Expanding the Stamp" appendix of the *Dell Hybrid Cloud System for Microsoft Cloud Platform System Standard Administrators Guide*.

Adding storage enclosures

As system performance and capacity needs grow, you can expand the Dell Storage with Microsoft Storage Spaces (DSMS) solution. To increase the usable capacity or performance of the solution, add a storage enclosure. You can complete this expansion scenario while the existing cluster and storage remains online, as long as data paths remain available to all enclosures throughout the procedure. For more information, see the *Dell Hybrid Cloud System for Microsoft Cloud Platform System Standard Administrators Guide*. To locate this guide, see Dell Hybrid Cloud System for Microsoft support site.

Maintaining the Dell Hybrid Cloud System for Microsoft

This section describes overviews of the procedures for maintaining the solution.

Topics:

Patch and Update overview

Throughout the lifecycle of the Dell Hybrid Cloud System for Microsoft, there are software, driver, and firmware updates that either address issues or provide for enhanced operations. Dell releases Patch and Update (P&U) bundles to make it easier to maintain the cloud solution. These bundles ensure that the process of applying updates is minimally disruptive to the solution and the virtual machines that it is hosting. The bundles are available from support.dell.com, and combine the relevant software, driver, and firmware updates from both Dell and Microsoft into a single package. This package is extracted and run from within the Dell Hybrid Cloud System for Microsoft, and takes advantage of technologies that enable you to apply the updates in an orchestrated manner. Individual nodes or functions within the cloud solution may be unavailable during the update process, but the virtual machines that the solution is hosting remain operational. When these bundles are released, there are Release Notes to describe their contents and instructions that outline how to extract and apply the Patch and Update bundle within the cloud solution.

(i) **IMPORTANT: Do NOT install Windows Server, Windows Azure Pack, System Center, and SQL Server updates by using any method other than the P&U framework. Install only update packages that Microsoft and Dell have tested and approved for the Dell Hybrid Cloud System for Microsoft.**

Note the following:

- **The P&U update process is the only supported process to apply updates to DHCS.**
- **Applying updates obtained directly from Microsoft, and not via the Dell P&U package, is known to cause technical issues.**
- **To be fully supported, the customer must apply all P&U updates on a regular basis.**

⚠ **CAUTION: The addition of any non-DHCS hardware to your system will cause the Patch and Update process to fail.**

Field-replaceable unit overview

The Dell Hybrid Cloud System for Microsoft has been designed with resiliency in mind. As a result, many component-level failures are not disruptive to the cloud solution or any virtual machines that it is hosting. However, certain component failures can result in the need to reconfigure software, either on the replaced component or elsewhere within the solution. This reconfiguration is to ensure that the cloud solution is restored to its original state.

Dell services and support

Table 16. Support Packages

Support Package	Service
Dell Support	• Dell ProSupport Plus, 3–year support on hardware and software • Dell Deployment and Installation
Dell Professional Services	• Dell Cloud Assessment • Data Center Transformation Workshop • Dell Cloud Transformation Services • Dell Managed Cloud Services • Dell Hybrid Cloud Consulting • Dell Application Migration Services

Dell Hybrid Cloud System for Microsoft support site

To access documentation and support materials, go to the Dell support website (support.dell.com). Click **Choose from all Products** > **Servers, Storage, & Networking** > **Engineered Solutions** > **Microsoft Cloud Solutions** > **Dell Hybrid Cloud System for Microsoft**. To access the documentation, click **Manuals & documents**.

License requirements for the Dell Hybrid Cloud System for Microsoft infrastructure

You need the following licenses for your Dell Hybrid Cloud System for Microsoft installation.

- For Windows Server 2012 R2, and for Microsoft System Center 2012 R2, you need either of the following:
  - A Microsoft volume license for Windows Server 2012 R2 Datacenter edition, and a Microsoft volume license for Microsoft System Center 2012 R2. For more information, see http://www.microsoft.com/en-us/Licensing/product-licensing/windows-server-2012-r2.aspx and http://www.microsoft.com/en-us/Licensing/product-licensing/system-center-2012-r2.aspx.
  - If you do not have an existing volume license agreement, Dell recommends that you use Core Infrastructure Server Suite Datacenter licenses. This license combines both Windows Server 2012 R2 and System Center 2012 R2. It requires one license per physical node (compute and storage nodes).
- A Microsoft Azure subscription, if you want to opt in to Azure services. Acquire an Azure subscription from Microsoft or an authorized reseller. For more information, see https://azure.microsoft.com/en-us/pricing/purchase-options/.

ⓘ IMPORTANT: **The recommendations and guidelines in this document are based on industry best practices, CPS Standard architecture requirements, and Dell EMC lab testing. If not followed, the functionality and or management of the solution may not work as designed or expected, and problem resolution may be limited, delayed, or not viable.**

ⓘ NOTE: **Windows Azure Pack does not require a license.**