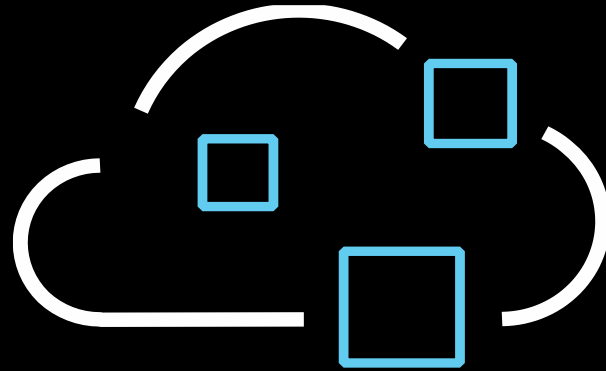


Dell EMC Cloud



Microsoft Azure Stack

Sirisak T.
Phinit L.
System Engineer -DellEMC

Microsoft Azure Stack is ready to order now

Posted on July 10, 2017



 **Mike Neil**, Corporate Vice President, Azure Infrastructure and Management

Throughout the Technical Previews, we've seen tremendous customer and partner excitement around Microsoft Azure Stack. In fact, we're speaking with thousands of partners this week at our [Microsoft Inspire](#) event. Our partners are excited about the new business opportunities opened up by our 'One Azure Ecosystem' approach, which helps them extend their Azure investments to Azure Stack, to unlock new possibilities for [hybrid cloud](#) environments. In that vein, today we are announcing:

- **Orderable Azure Stack integrated systems:** We have delivered Azure Stack software to our hardware partners, enabling us to begin the [certification](#) process for their integrated systems, with the first systems to begin shipping in September. You can now order integrated systems from Dell EMC, HPE, and Lenovo.
- **Azure Stack software pricing and availability:** We have released [pricing](#) for the pay-as-you-use and capacity-based models today, you can use that information to plan your purchases.
- **Azure Stack Development Kit (ASDK) availability:** ASDK, the free single-server deployment option for trial purposes, is available for [web download](#) today. You can use it to build and validate your applications for integrated systems deployments.



Cloud Infrastructure Models

Public



All services exist in the Internet
Multi-tenancy
Azure

Private



All services exist in the private network
Complex
System Center,
Azure Stack

Hybrid



Secure, private connection between public and private clouds

Cloud Delivery Models

SaaS



Software-as-a-service
Target: customer
Office 365

PaaS



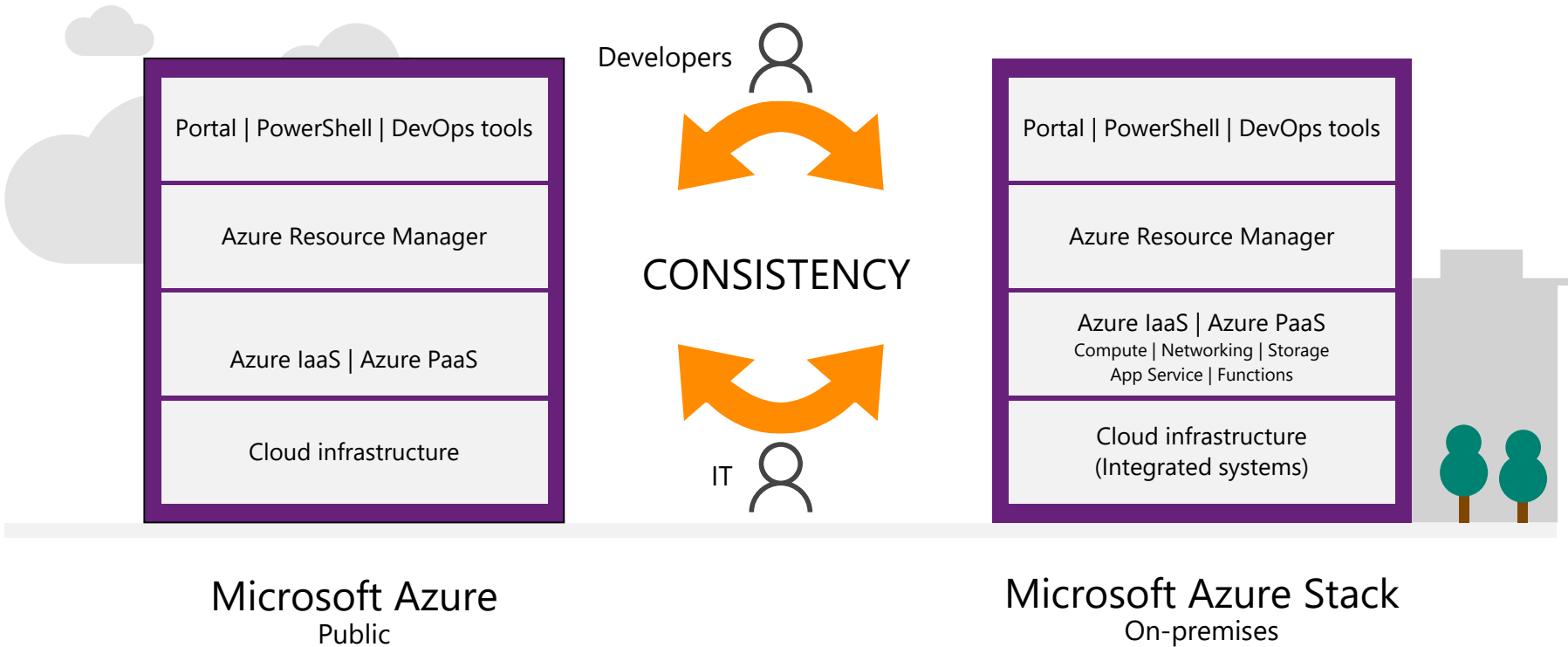
Platform-as-a-service
Target: developer
Azure App Service

IaaS



Infrastructure-as-a-
service
Target: sysadmin
Azure Virtual
Machines

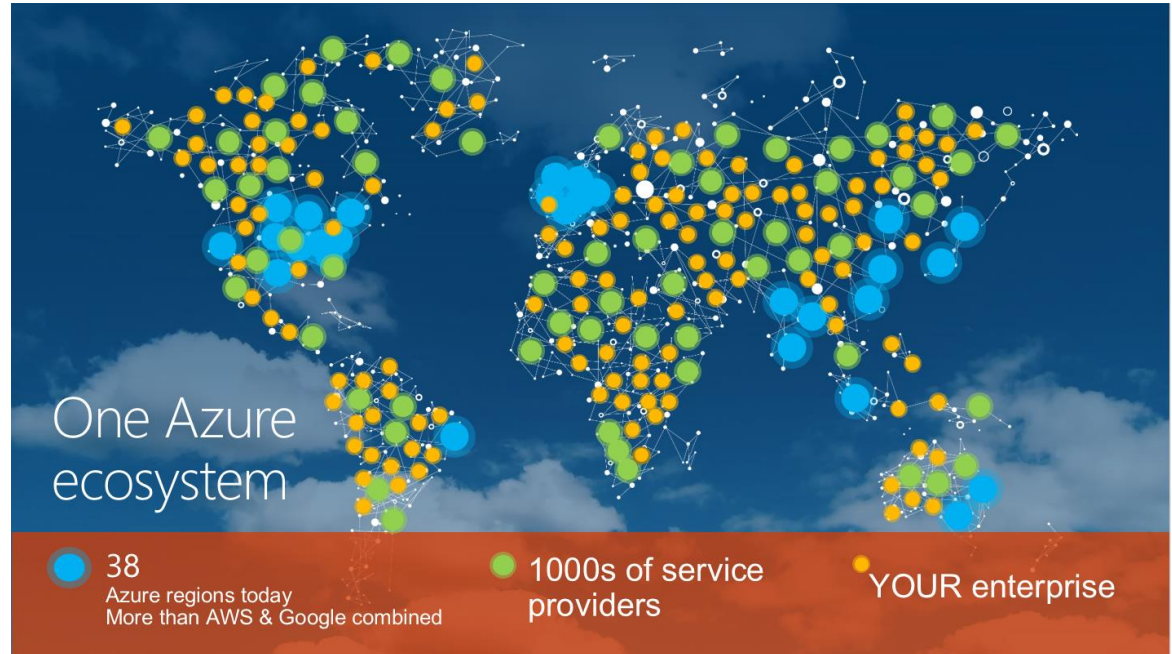
Introducing Microsoft Hybrid Cloud



One Azure Ecosystem

Azure services on-premises use cases:

- Regulatory compliance
- Data sovereignty
- Data proximity
- Edge and disconnected scenarios



- +
- New
- All resources
- Resource groups
- Virtual machines
- App Services
- Storage accounts
- Virtual networks
- Network interfaces
- Public IP addresses
- Network security groups
- Load balancers

Dashboard

+ New dashboard Edit dashboard Share Fullscreen Clone Delete

vm-azure-train1



wa-azuretraining
WEB APP

Running



PowerEdge server security: Built-in, not bolted on

User conversations, the trade press, and market research all indicate that IT security is a key and growing area of concern among customers ranging from IT Administrators to the C-suite. The potential for system downtime, lost productivity, lost revenue, corrupted data and damaged corporate reputation are all reasons for the increased concern. However, while cybersecurity is increasingly top of mind for many IT managers, most of the focus is on protecting the OS and applications from malicious attacks; little thought or planning is given to how secure the underlying server infrastructure is including the hardware and the firmware as shown in Figure 1:

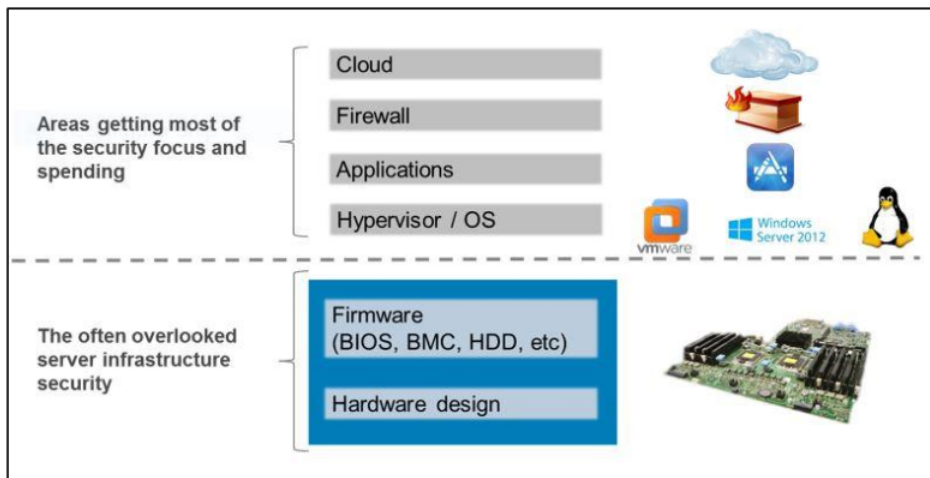


Figure 1: Server Infrastructure is Critical to Data Center Security

Cyber Resilient Architecture

Protect

A deep layer of defense built-in

Detect

Identify breaches quickly

Recover

Return to a trusted base rapidly

Retire

Remove sensitive data instantly

Protect

Cyber Resilient Architecture



Secure from Factory to OS boot

Chain of trust rooted in silicon only allows authenticated code to run. Prevent inadvertent or malicious changes to configuration or firmware settings.

Detect

Cyber Resilient Architecture



Detect drifts

Monitors for configuration or firmware drifts away from baseline and provides remediation with one click.

Recover

Cyber Resilient Architecture



Fix corrupted or damaged BIOS

BIOS image is recovered automatically during the host boot process after the BIOS corruption is detected.

Retire

Cyber Resilient Architecture



Erase storage securely

Retire or repurpose NVMe, SSD, and HDD storage by securely erasing the data in minutes rather than hours.

Innovative New Security Features in 14G



System Lockdown

- Virtual lock for preventing configuration or firmware changes
- Alerts when configuration or firmware deviates from baselines



Hardware Root of Trust

- An immutable silicon-based root of trust to securely boot iDRAC and BIOS firmware
- Rapid recovery to a trusted image when authentication fails

Secure Default Password

- Prevents against inadvertent exposure of new iDRAC's on unprotected networks
- Encourages stronger password policies (rather than the tendency to use generic default passwords)



Dynamic USB Port Enable

- Allows USB port disable for normal operation in secure environments
- Dynamically can be unlocked via iDRAC authentication when needed without rebooting the server



OS Image Rapid Recovery

- Allows booting of a trusted backup OS image stored in hidden, protected storage



System Erase

- Quickly and securely erase internal server storage devices including HDD, SSD, and NVMe drives
- Wipe all user configuration and log file information

with security standards such as NIST SP800-147B and UEFI Secure Boot. Dell EMC 14th Generation PowerEdge servers feature an enhanced **Cyber Resilient Architecture** that provides a hardened server design to protect, detect and recover from cyber attacks. Some of the key aspects of this architecture are:

Effective Protection	<ul style="list-style-type: none">○ Silicon-based Hardware Root of Trust○ Signed Firmware Updates○ System Lockdown○ Secure Default Passwords
Reliable Detection	<ul style="list-style-type: none">○ Configuration and Firmware Drift Detection○ Persistent Event Logging including user activity○ Secure Alerting
Rapid Recovery	<ul style="list-style-type: none">○ Automatic BIOS Recovery○ Rapid OS Recovery○ System Erase

Figure 2: Key aspects of the PowerEdge 14G Cyber Resilient Architecture

OpenManage Enterprise

Empowering IT with simplicity and intelligent automation

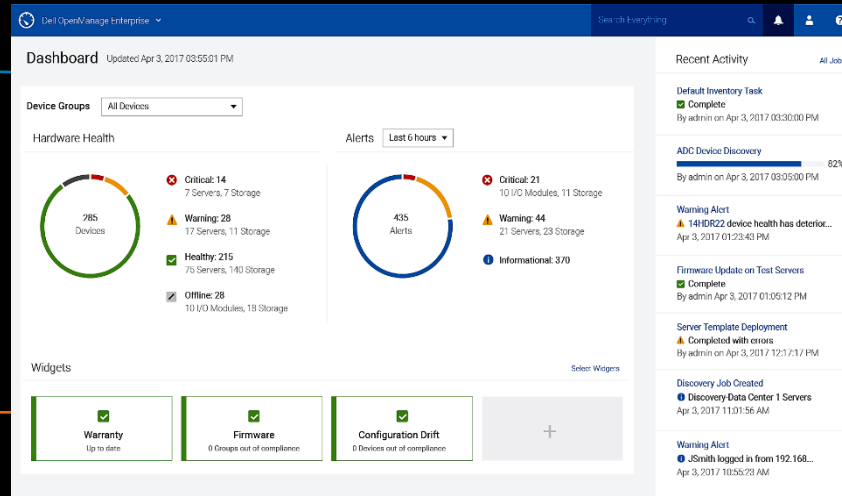


Intrinsic Simplicity

Intuitive dashboard and search engine enable IT optimization with minimal training or effort

Unifying Experience

Provides a single management layer for tower, rack and modular platforms



Ubiquitous Extensibility

Packaged as a virtual machine supporting Microsoft Hyper-V, VMware ESXi and Linux KVM

Intuitive Automation

Reduces the time and effort needed to manage large scale environments

Tablet/Smartphone integration via OpenManage Mobile

Based on Dell Internal Analyses 03/01/2017.

Deployment Scenarios

Disconnected Scenarios

I can run completely disconnected from the internet where required.

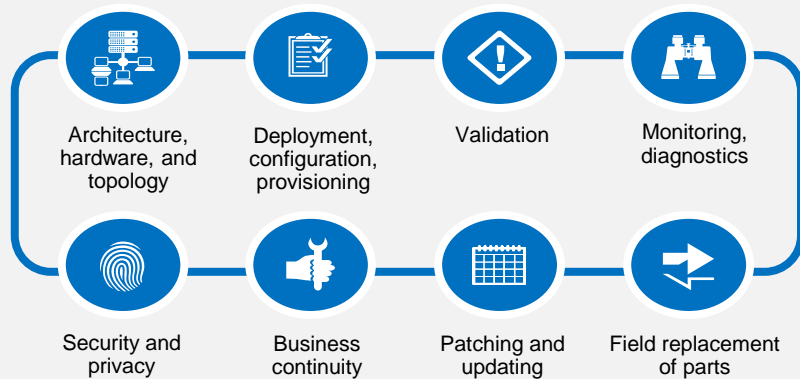


Azure Stack

Technical Overview

Dell EMC Ready System for Microsoft Azure Stack

Key design principles



Integrated system

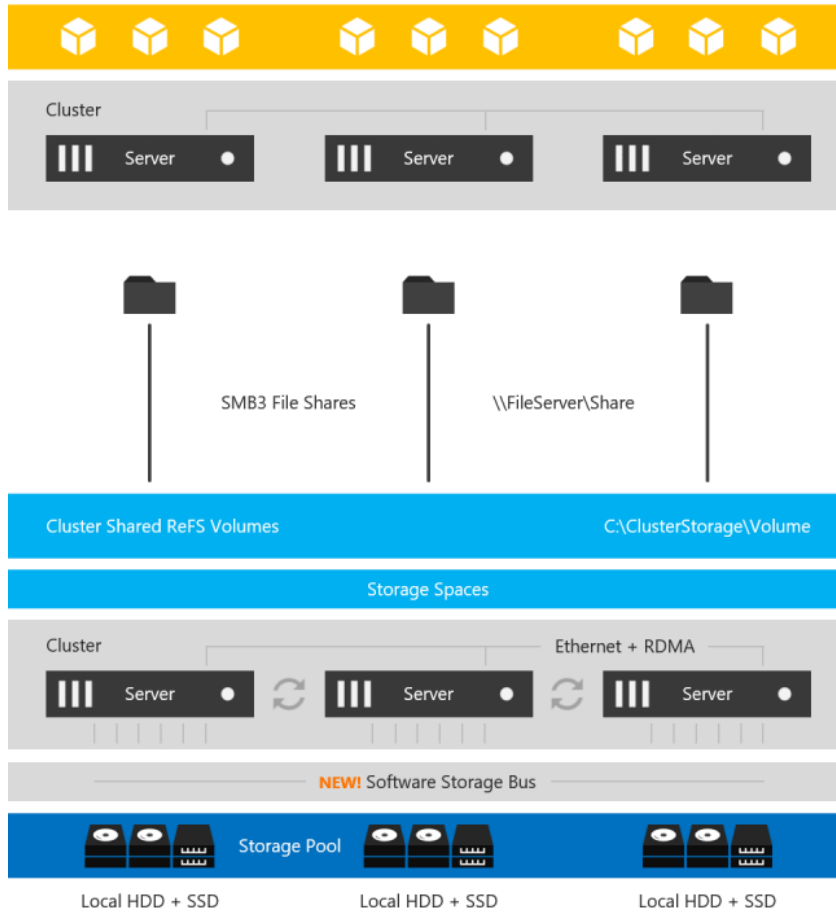
Closed system

Hyper-converged vs converged

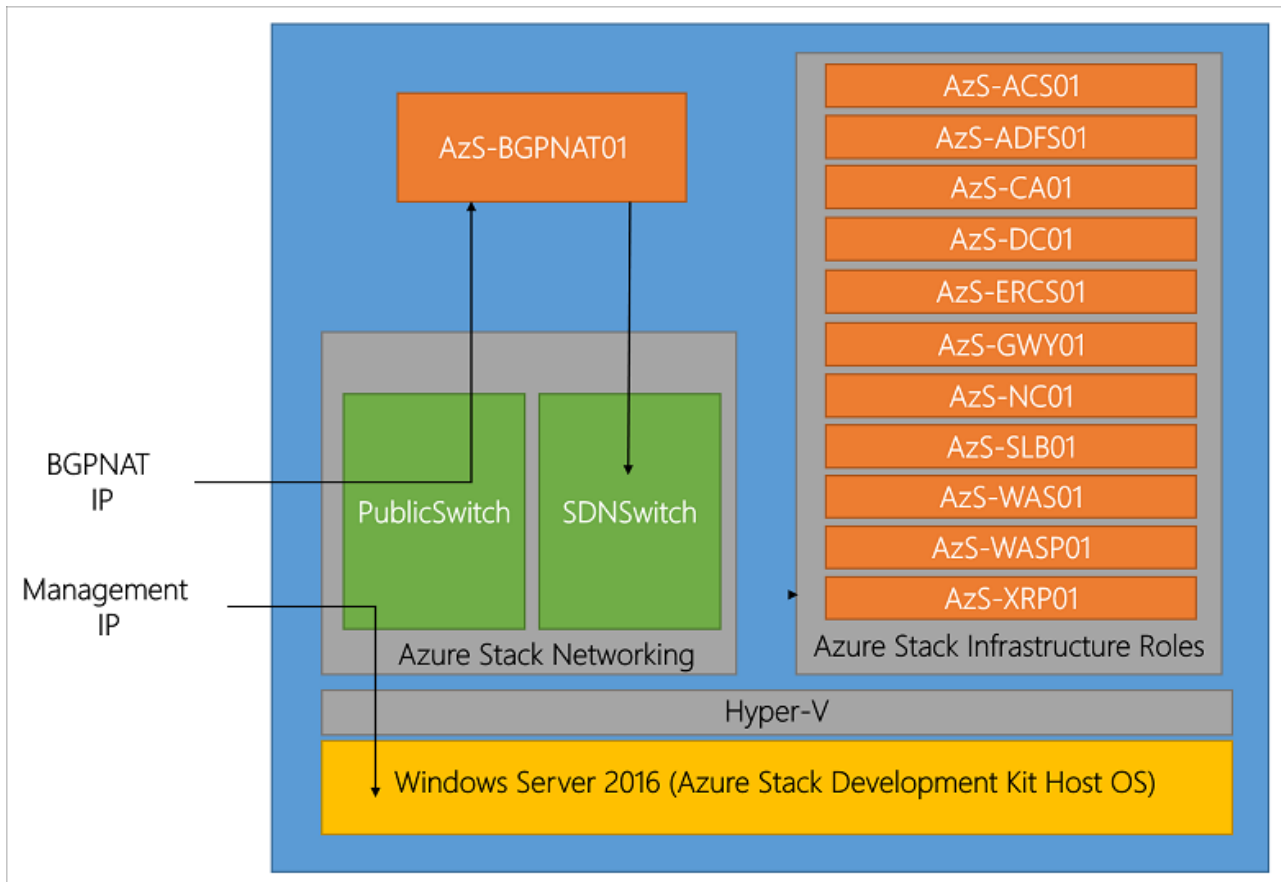
Scale out building blocks

Azure consistent management – No System Center

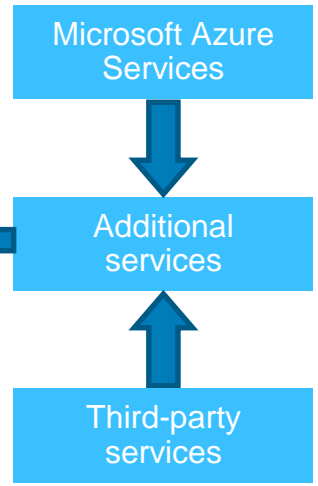
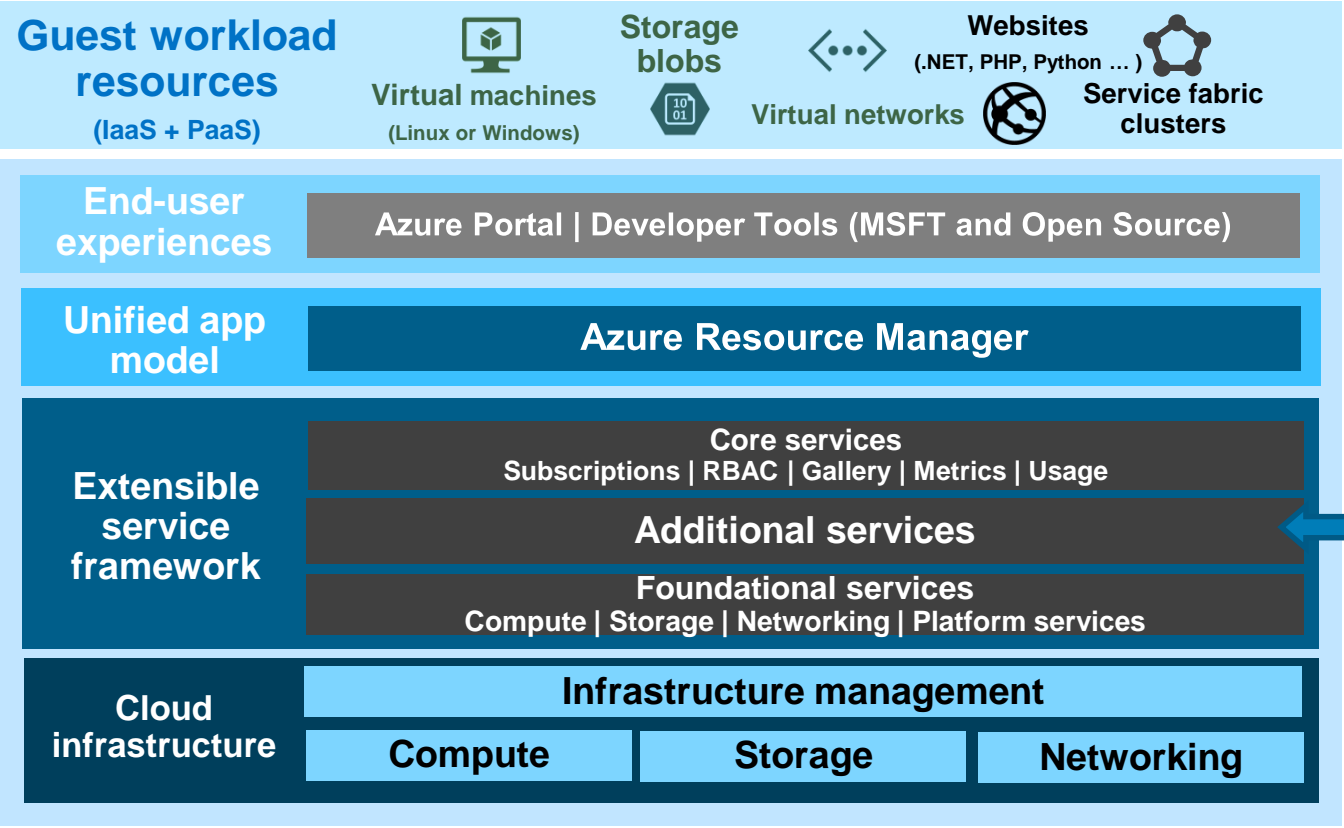
Hyper-V Virtual Machines



Logical architecture diagram



Azure Stack Architecture



Single node dev/test for Microsoft Azure Stack

Dell EMC PowerEdge R640



The Dell EMC single-node Azure Stack is open to all customers.

It will continue to be offered through the life of the program to provide customers a way to purchase a Azure Stack for the purposes of development and testing.

It is not intended for use with production workloads.



Azure Stack admin & tenant experiences



DevOps/Infrastructure-as-Code with ARM templates



Try Web/Service Fabric services and others coming at GA



Visual Studio and PowerShell experience



Infrastructure-as-a-Service

Get started today with Azure Stack for PoCs and dev/test

Single-Node Dev/Test Configuration Options



Starter Edition

Cloud Operator Experience
Infrastructure Management
Tenant IaaS Experience

Cores: 8C, 16T
Memory: 96GB
SSD: 3 x 480GB SATA
HDD: 6 x 1TB SATA

PaaS Edition

Deploy PaaS Resource Providers
DevOps Tool Integration
Prototype ARM Templates

Cores: 10C, 20T
Memory: 192GB
SSD: 3 x 480GB SATA
HDD: 6 x 1TB SATA

Developer Edition

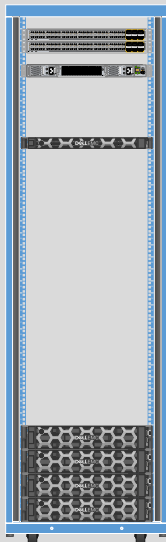
Develop with PaaS Services
Apply DevOps Practices
Prototype Applications

Cores: 12C, 24T
Memory: 384GB
SSD: 3 x 480GB SATA
HDD: 6 x 1TB SATA

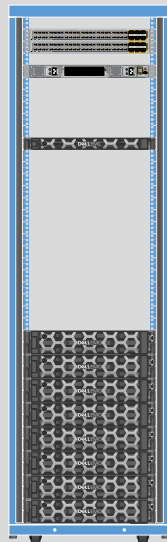
14g Scale Units

SIML Scale Units

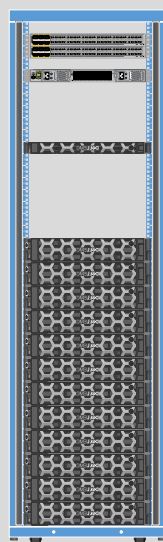
Small: ~475 VMs



Medium: ~1100 VMs



Large: ~1750 VMs



Developer Edition



1xHCI node

- Cores: 20-24
- Mem: 96-384GB
- Cache: 1440 GB
- Data: 6TB

3 Available Configs

- ✓ Starter Edition
- ✓ PaaS Edition
- ✓ Developer Edition

4xHCI nodes

- Cores: 96-192
- Mem: 1.5TB – 3TB
- Cache: 23 TB- 46TB
- Data: 160TB – 400TB

2x10GbE TOR

- 1x 1GbE Mgmt
- 1x R640 Mgmt Node
- N+2 Redundancy

8xHCI nodes

- Cores: 192 – 384
- Mem: 3TB – 6TB
- Cache: 46 TB- 92TB
- Data: 320TB – 800TB

2x10GbE TOR

- 1x 1GbE Mgmt
- 1x R640 Mgmt Node
- N+2 Redundancy

12xHCI nodes

- Cores: 288 – 576
- Mem: 4.6TB – 9.2TB
- Cache: 68 TB- 138TB
- Data: 320TB – 1200TB

2x10GbE TOR

- 1x 1GbE Mgmt
- 1x R640 Mgmt Node
- N+2 Redundancy

Flexible (capacity and perf) options per scale unit

HCI Node: Capacity configuration options

Low: 12C/24T, 384G Mem, 5.7TB Cache, 40TB Data

Mid: 16C/38T, 576G Mem, 11.5TB Cache, 80TB Data

High: 24C/48T, 768G Mem, 11.5TB Cache, 100TB Data

Available Professional Services



Accelerator Services

Workshops and Implementation

Deployment
Integration and Implementation

Support

Included: Services (Integration and Implementation), Software

Note: VM sizes based on Azure D1 V2 VMs assuming 4:1 VCPU:CPU ratio

Note: Capacities based on Raw

14G Server Node Config

Configurations	Low Capacity	Mid Capacity	High Capacity
Processor	Model 5118 - 12 core/socket 2.3Ghz	Model 6130- 16 core/socket 2.1Ghz	Model 8160 - 24 core/socket 2.1Ghz
Memory	384 GB	576GB	768GB
Cache	6 x 960/800GB SSD = ~5.7TB SAS	6x.1.6/1.92TB SSD = ~11.5TB SAS	6x1.6/1.92TB SSD= ~11.5TB SAS
Storage (HDD)	10 x 4TB = 40TB	10x8TB=80TB	10X10TB=100TB
TORs	2x Dell Networking S4048 10GbE/1x Dell Networking S3048 1GbE		
Network Adapter	Mellanox Connectx-4 Dual Port NDC		
Border Switch	NA		
Management Node	Dell PE R640 (At least 16C, 128GB Mem, OS+ Data 2 x 1920GB 2.5" MU SSD)		

14G SOLUTION-LEVEL POWER THERMAL & ACOUSTIC SUMMARY

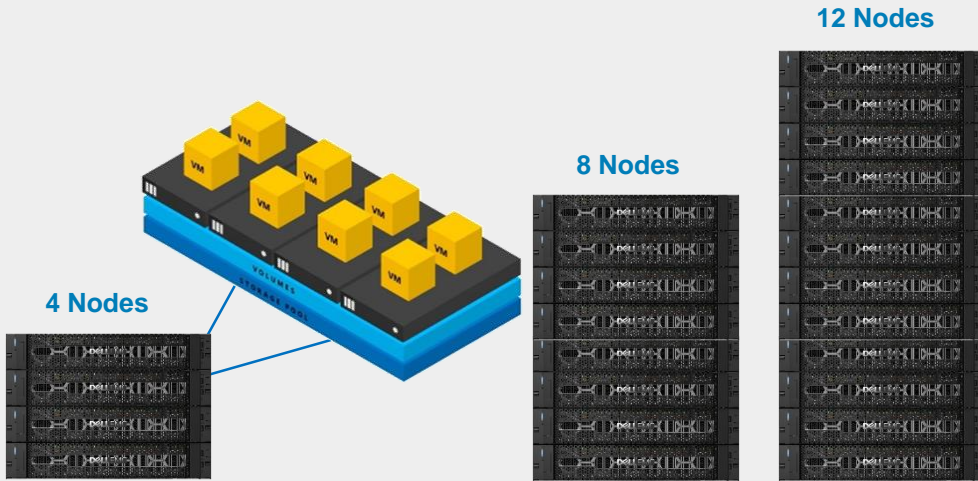
SCALE UNIT CONFIGURATION		4 NODE	8 NODE	12 NODE	16 NODE*
Configuration Totals for 220 AC Input Voltages and 25 °C					
INPUT POWER	LOW	3267.6 watts (11149.5 btu/h)	5307.6 watts (18110.3 btu/h)	7347.6 watts (25071.1 btu/h)	9387.6 watts (32031.8 btu/h)
	MID	3507.6 watts (11968.4 btu/h)	5787.6 watts (19748.1 btu/h)	8067.6 watts (27527.8 btu/h)	10347.6 watts (35307.5 btu/h)
	HIGH	3735.6 watts (12746.4 btu/h)	6243.6 watts (21304.0 btu/h)	8751.6 watts (29861.7 btu/h)	11259.6 watts (38419.3 btu/h)
AIRFLOW RATE	LOW	75.9 l/s (160.9 CFM)	135.8 l/s (287.7 CFM)	195.6 l/s (414.5 CFM)	255.5 l/s (541.3 CFM)
	MID	78.6 l/s (166.5 CFM)	141.1 l/s (298.9 CFM)	203.6 l/s (431.3 CFM)	266.0 l/s (563.7 CFM)
	HIGH	81.2 l/s (172.1 CFM)	146.4 l/s (310.1 CFM)	211.5 l/s (448.1 CFM)	276.6 l/s (586.1 CFM)
INPUT CURRENT	LOW	14.7 amps	23.9 amps	33.1 amps	42.3 amps
	MID	15.9 amps	26.3 amps	36.7 amps	47.1 amps
	HIGH	16.7 amps	27.9 amps	39.1 amps	50.3 amps
SOUND POWER LEVEL	LOW	7.6 bels	7.6 bels	7.7 bels	7.8 bels
	MED	7.6 bels	7.7 bels	7.7 bels	7.8 bels
	HIGH	7.6 bels	7.7 bels	7.8 bels	7.9 bels
WEIGHT		154.3 kg (340.2 lbs.)	286.7 kg (632.1 lbs.)	419.1 kg (924.0 lbs.)	551.5 kg (1215.8 lbs.)

*Denotes future configuration option (not available at GA)

Hyper-converged scale units

MINIMUM

MAXIMUM



The current available sizing is in scale units of 4, 8, 12 nodes.

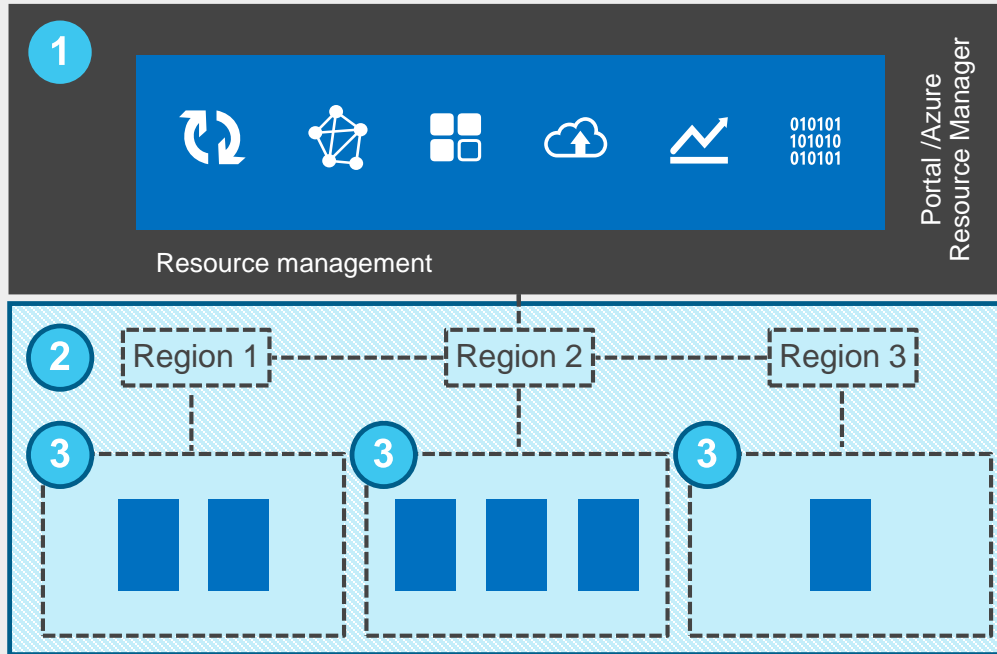
Customers should plan for 12 months of resources to meet their workload needs.

Azure Stack upgrades must be upgraded homogenous in 4 node increments.

The fundamental building block for Azure Stack

Understanding how Azure Stack scales

Example: Global enterprise or service provider



1 One cloud "endpoint"

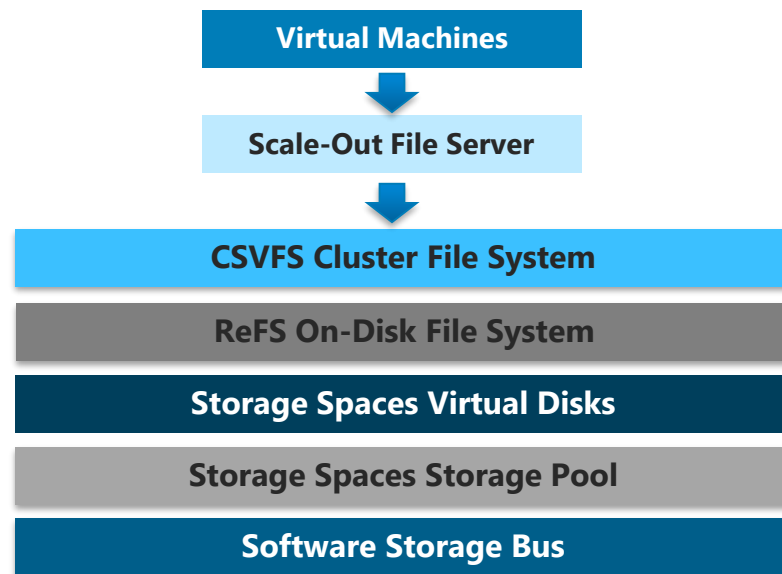
2 Multiple regions (Future)

3 Multiple scale units per region (Future)

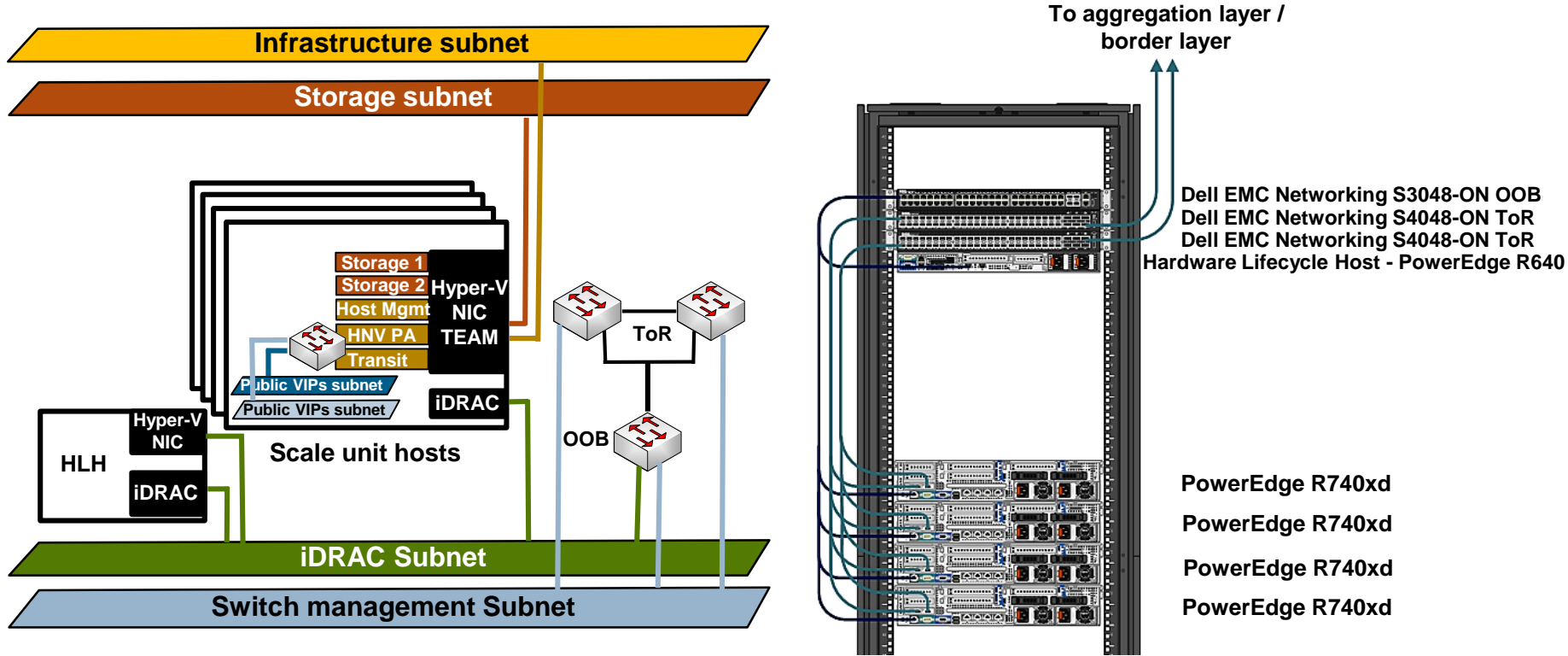
*Initially one region and one scale unit per region, future will support multiples

Software defined storage architecture

- Storage Spaces Direct
 - Single scalable pool with all disk devices (except boot)
 - Multiple virtual disks per pool (3-way Mirror)
- Software Storage Bus
 - Storage Bus Cache (Cache ratio target is 6 – 10% for WI SSDs and greater than 10% for MU SSDs)
 - Leverages SMB3 and SMB Direct
- Servers with local disks
 - Dell HBA330 Mini Integrated Storage Controller
 - Samsung or Intel SSDs



Software defined and physical network architecture



Key networking design considerations

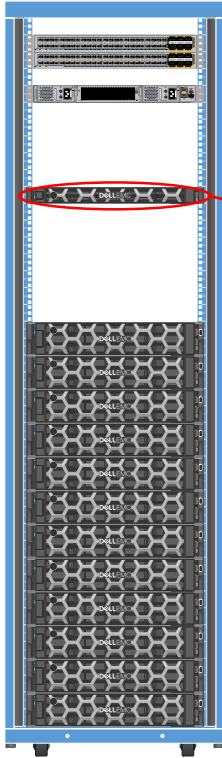
Dell EMC networking supports Azure Stack configurations

- Mellanox PCIe Ethernet Adapter in Host
 - Dual-port 10 GbE
 - RDMA for storage performance
 - Offload and converged capabilities on the adapter
- Dell EMC Networking S4048-ON and S3048-ON support for Azure Stack requirements:
 - Use **BGP** to discover SLB subnets on the physical network (or static routes can be employed)
 - Data Center Bridging (DCB) to ensure QoS on converged fabric
 - › Enhanced Transmission Selection (ETS)
 - › Priority-based Flow Control (PFC)
 - Segment OOB management traffic



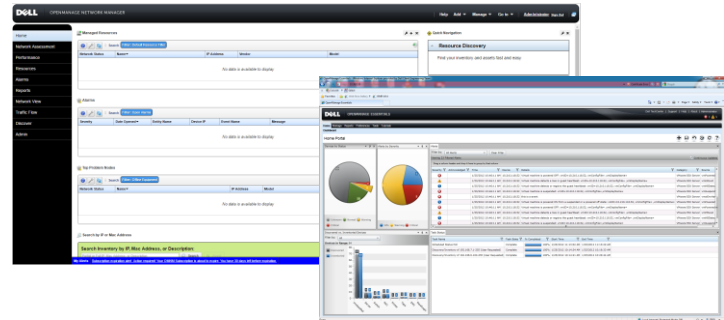
3 Connections - BGP, Syslog and SNMP

Hardware Lifecycle Host



Serves 3 Functions

- Initial software deployment of Azure Stack cluster
- Subsequent patch and update orchestration and deployment
- Hardware monitoring via Dell EMC Open Manage Essentials and Network Manager



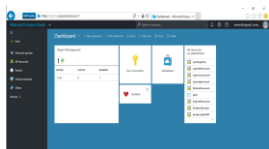
***Includes Windows 2016 Data Center**

Hardware monitoring and alerting

Azure Stack Health and Alerts

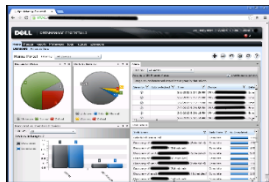
Alerts generated from:

- Internal Health Services
- System Health Tests



Compute and Storage Health and Alerts

- Out of Band monitoring
- Devices and Components

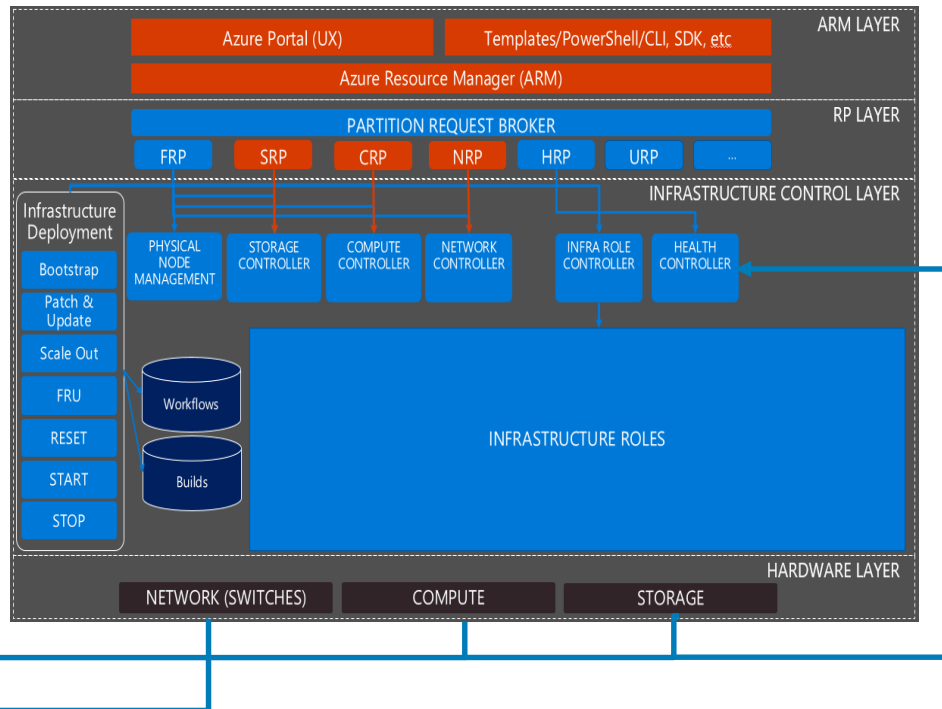


Open Manage Essentials

Networking Health and Alerts



Open Manage Network Manager





Agentless monitoring of hyper-converged hardware using BMC Solution dependent on hardware vendor.

Maintainability: Patch & Update

- Pre-validated updates for software and firmware by Microsoft and partners.
- Rapid cadence of delivery, customer chooses when to apply. (3 months window)
- Automated application of updates across entire infrastructure.

UPDATES - Seattle

 **Update available**
3 updates are available
Checked today at 9:38am 

i Update Rollup for Jan 2016 in progress: 5 out of 42 completed. See details →

UPDATES


Available updates

NAME	STATE	VERSION	PACKAGE SIZE
Update Rollup for Apr 2016	1602 required	1604.2	4.2 MB
Update Rollup for Apr 2016	1602 required	1604	2.3 MB
Update Rollup for Mar 2016	1602 required	1603	5.6 MB
Update Rollup for Feb 2016	Available	1602	2.8 MB
Update Rollup for Jan 2016	In progress	1601	5.2 MB

OPERATIONS

Updates

Current Version: 1512
Last checked: 2015-12-24
Update in progress



Update Details

Update rollup for Jan 2016

Update Now View Log View KB Article

VERSION 1601
DATE AVAILABLE 2016-01-02
DATE STARTED 2016-01-11
STARTED BY MAS_ADMIN
DURATION (HH:MM) 01:03 (in progress)
PACKAGE SIZE 5.2 MB
DETAILS For more info see [HTTP://support.MAS.com/KB/3014412](http://support.MAS.com/KB/3014412)

NAME	PROGRESS	STATUS	DURATION
NC	58% completed	In progress	00:43
SLB	12% completed	In progress	00:12
Gateway	5% completed	In progress	00:08
Console	Not started	-	-
WISS	Not started	-	-
WSUS	Not started	-	-

Security & Compliance

Security Principles: Hardened by Default

- Data at rest encryption
- Network encryption
- Strong authentication between infrastructure components
- Security OS baseline
- Disabled legacy protocols (e.g. NTLM)
- HW security features (e.g. TPM, secure boot, UEFI)
- Windows Server 2016 security features
 - Credential Protection (Credential Guard)
 - Code Integrity (Device Guard)
 - Antimalware (Windows Defender)



D  **LEMC**