Azure Local
In the Trenches

Azure Local Node Scale

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Evolution of Microsoft Hyper-Converged Infrastructure

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2016

Windows Server 2016 HCI

Software Defined Data Center

- PowerShell Deploy
- MMC Management tools
- IaaS Solution
- Spaces Direct (Storage)
- Hyper-V (Compute)
- SDN
- 2-16 Node Clusters

2019

Windows Server 2019 HCI

Software Defined Data Center

- PowerShell Deploy
- Windows Admin Center
- IaaS Solution
- Spaces Direct (Storage)
- Hyper-V (Compute)
- SDN
- 2-16 Node Clusters

2020

Azure Stack HCI 20H2

- Unique Product
- Validated Solutions
- PowerShell Deploy
- Windows Admin Center
- Stretch Clusters
- 2-16 Node Clusters

2021

Azure Stack HCI 21H2

Windows Server 2022 HCI

- PowerShell Deploy
- Windows Admin Deploy
- AKS-HCI
- GPU Pool (Passthrough)
- Thin Provisioning
- Dynamic CPU Compat
- Network ATC
- Storage Repair Throttle

2022

Azure Stack HCI 22H2

- PowerShell Deploy
- Windows Admin Deploy
- Azure Arc Management
- AKS-HCI
- Arc Data Services
- SQL Managed Instances
- GPU-P
- Single Node
- Switchless Live Migration

2024

Azure Stack HCI 23H2

Azure Local 24H2

- Azure Cloud Deploy
- Azure Virtual Desktop
- Azure Resource Bridge
- Arc Virtual Machines
- Hybrid AKS
- Cloud Defender
- Azure Policies
- Fleet Management
- Refs Dedupe + Comp

M C 2

Azure Local Node Scale New Releases – 24H2

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Azure Migrate

Azure Migrate for VMware

STATUS: General Availability

Disaster recovery

ASR to ASR On-premises

STATUS: Under Dev

Networking

Azure Arc Gateway

STATUS: General Availability

Authentication

Local Identity without AD

STATUS: Public Preview

Virtualization

Rack Aware Cluster

STATUS: General Availability

Storage

SAN Support

STATUS: Public Preview

Isolation

Disconnected

STATUS: Public Preview

Level Set

Types of VMs on Azure Local

Azure Local VM Definitions

Un-Managed VM's

Created via local tools

Managed completely on-premises using local tools like Hyper-V Manager and/or Failover Cluster Manager.

Azure Arc-enabled Servers

Created via local tools

Azure Arc for Server Agent Installed

VMs projected to Azure with Connected Machine agent. Managed from Azure Portal and on-premises for life-cycle management.

Can add Arc Extensions

Azure Arc Local VM's

Created in Azure Portal

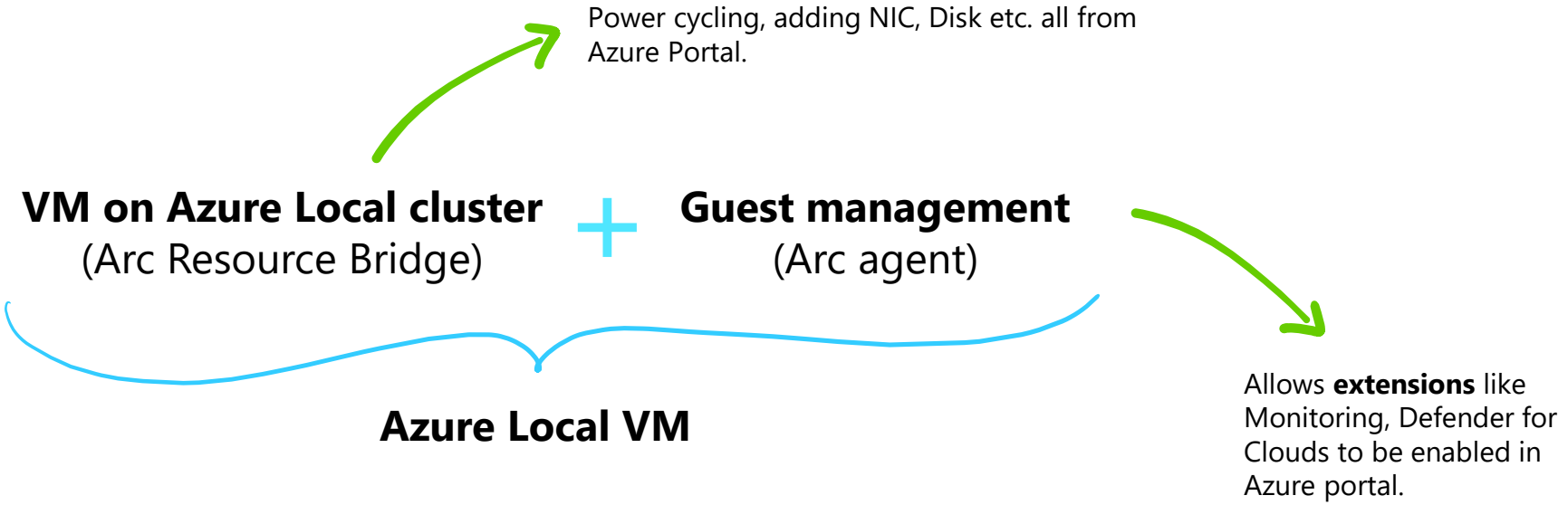
Or created by Azure Migrate

Managed mainly from Azure Portal with some operations allowed on-premises[1].

For Example, via ARB and Portal Can change VM memory or vCPU

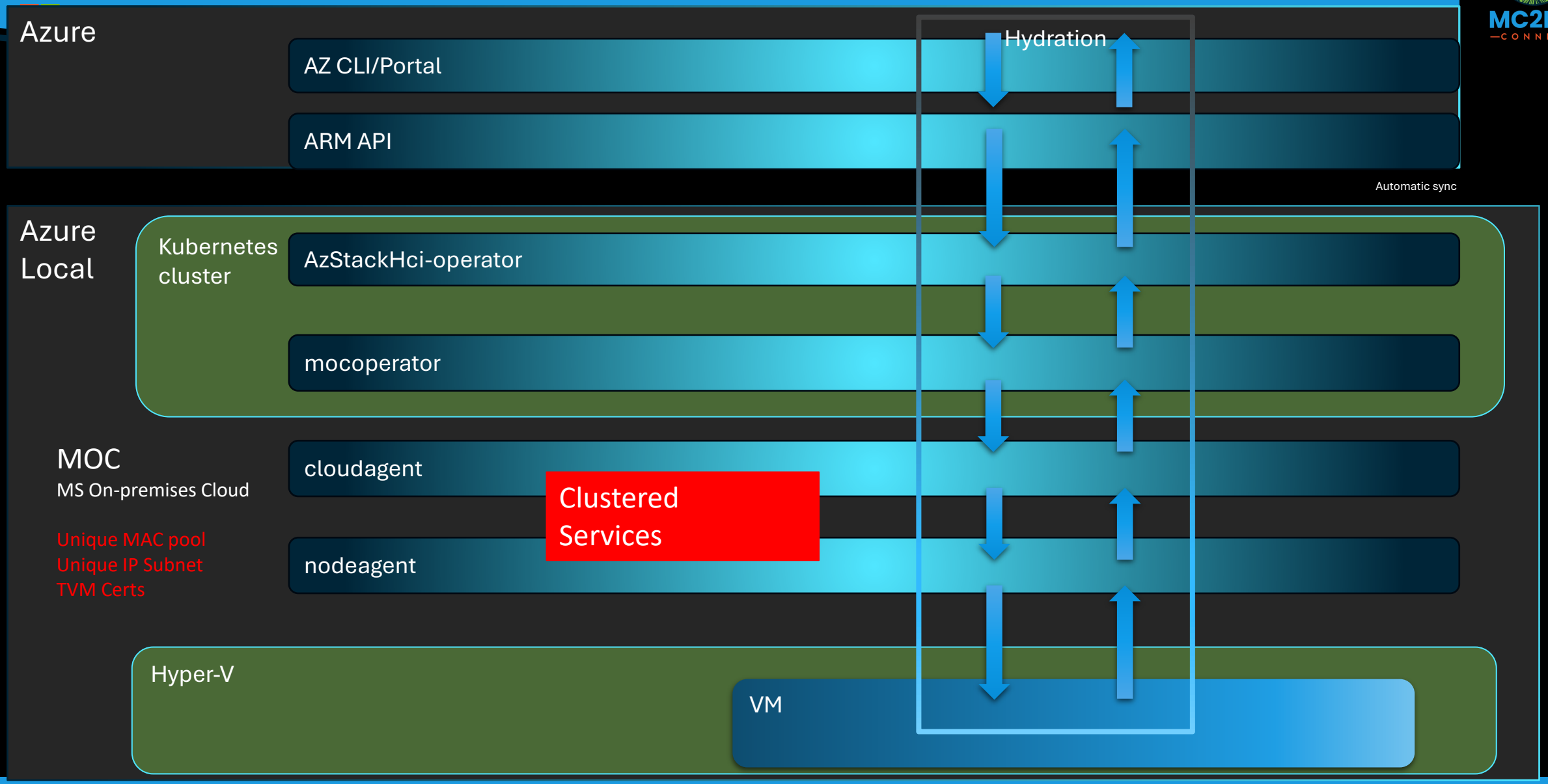
[Compare Management Capabilities of VMs on Azure Local - Azure Local | Microsoft Learn]

What is Hydration?



Hydration is registering VMs to all the "layers" of the stack starting from the cluster to appropriate resources in Azure.

Azure Arc Hydration



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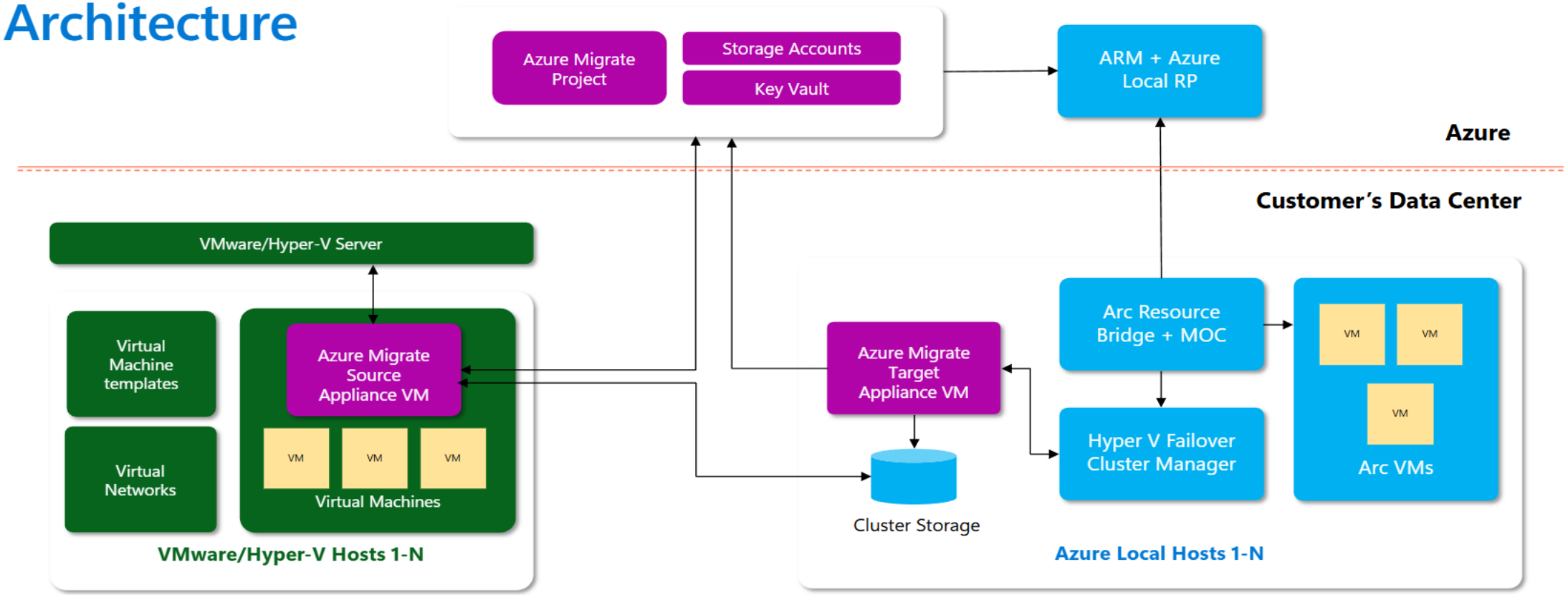
Why Important ?

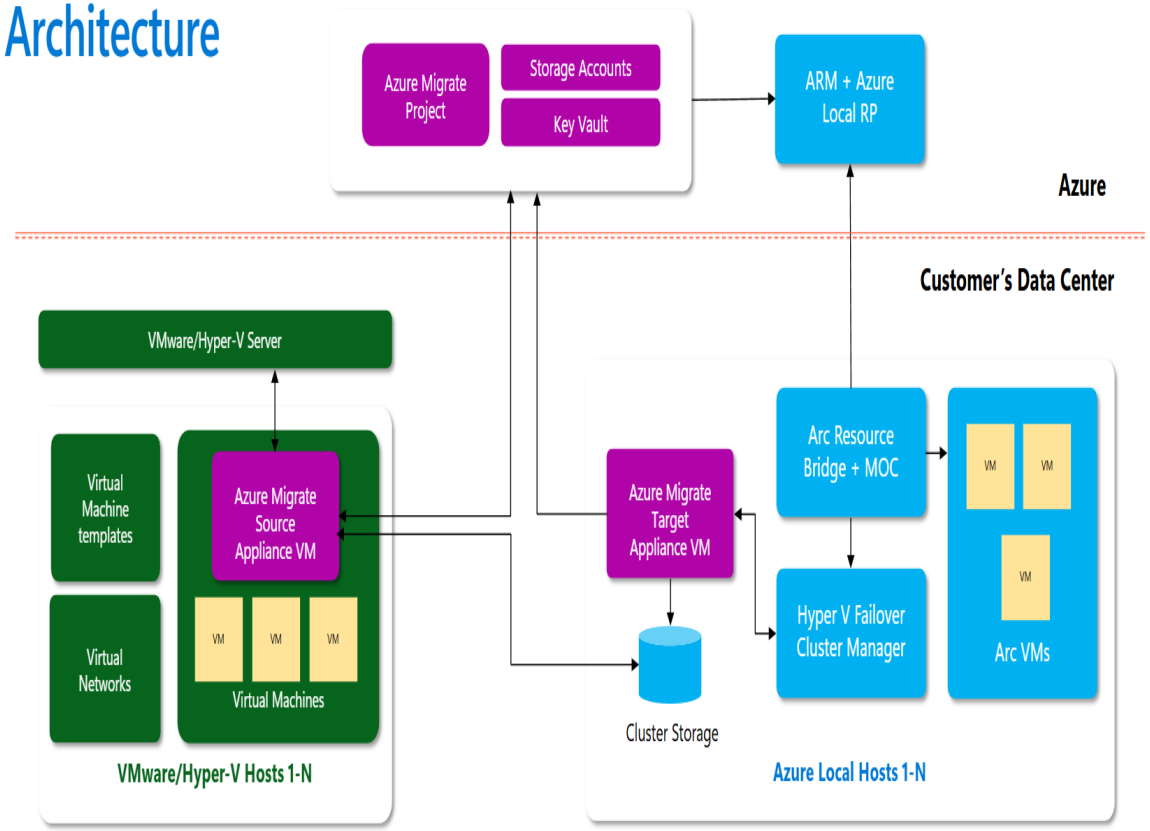
Azure Migrate – VMware Architecture

Architecture



Azure Migrate – VMware to Azure Local

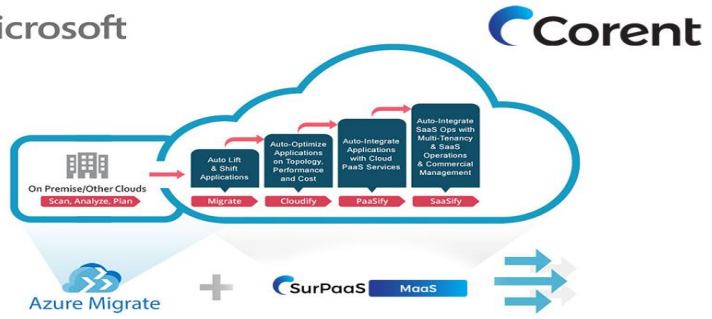
Architecture



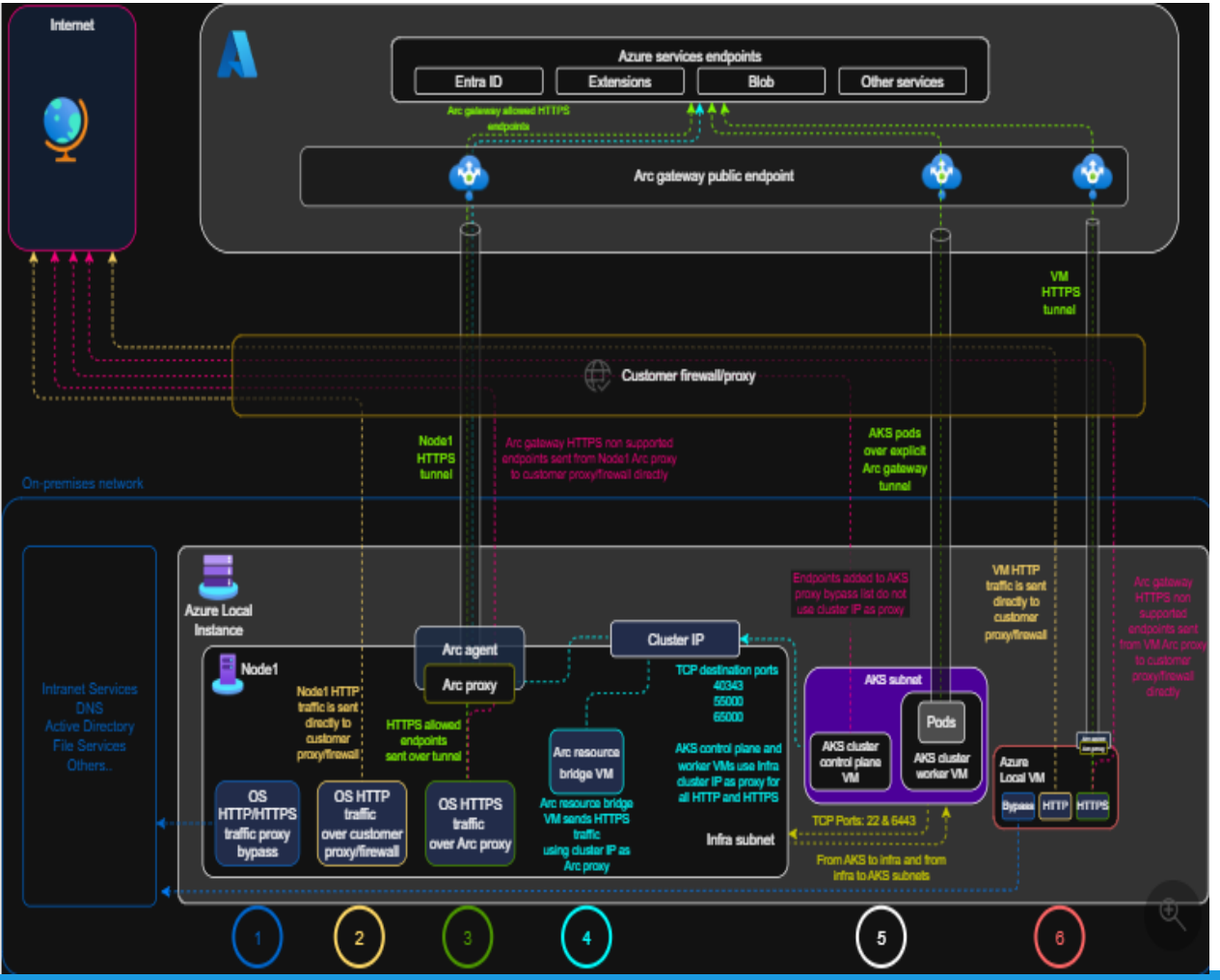
- ❑ Only Migration tool that creates an Azure Local Arc VM
- ❑ All VM's migrated are Arc Infra VM's under the Arc resource Bridge
  - ❑ Can Stop / Start / Save / Pause a VM (support VM life cycle actions)
- ❑ Convert from BIOS (Gen 1) to UEFI (Gen 2) VM on VMware
- ❑ Can choose 512b to 4k Sector size at replication time
  - ❑ Older storage supports 512e sector size
  - ❑ Modern NVMe storage supports 4k sector size
  - ❑ 4K is important for SQL Workloads / Performance
- ❑ Migrate of DNS server to Azlocal
  - ❑ If Azlocal refers to this server via Nodes or ARB will be blocked
  - ❑ Will state duplicate IP as source VM does not get shutdown
  - ❑ Leverage a Dynamic LNET rather than Static to work around
    - ❑ A fix is coming

Other Migration Options – No Arc Azure Local VM

- ✓ Carbonite Backup and restore to Azlocal
- ✓ Commvault Backup and restore to Azlocal
- ✓ Veeam, Backup and Restore to Azlocal
- ✓ Migrate from Azure (Corent)



Azure Arc Gateway for Azure Local



- ❑ Should always be used, as also enables future capabilities
  - ❑ Greenfield only Deployment today
  - ❑ We should expect Brownfield enablement later this year
  - ❑ Supports 5 x Arc gateways per subscription
- ❑ Reduces Outbound firewall rules from 106 down to 12-17 from 2506
  - ❑ Only required for Bootstrap and cert revocation
- ❑ Routes HTTPS traffic via Arc GW
- ❑ HTTP traffic goes out via firewall or proxy
- ❑ Can deploy Azure local over public internet
  - ❑ Post Deploy can enable private link
    - ❑ For Key Vault
    - ❑ For Storage accounts
    - ❑ Adjust proxy bypass for these HTTPS URLs

Adless – Local Identity without AD

Security

Local Identity without Active Directory

Preview

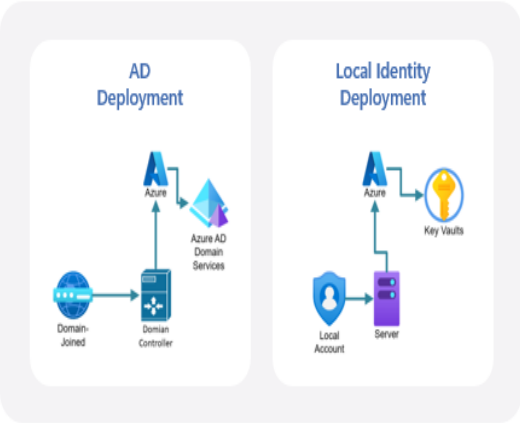
Simplified identity model with Azure Key Vault

Deploy without Active Directory – hosts don't need to be domain joined

Full feature parity with AD-based deployment, including live migration and other fabric operations

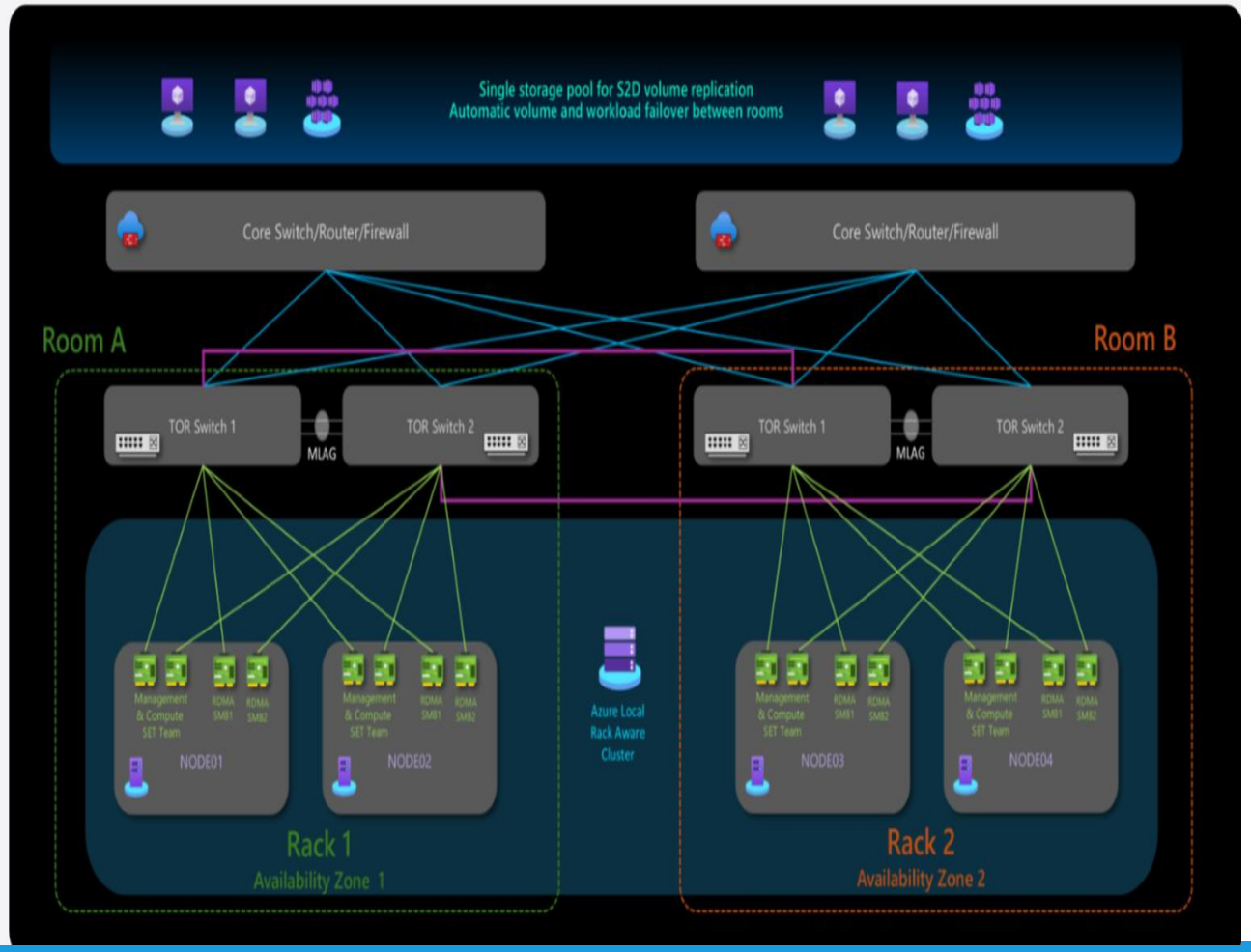
Secrets automatically backed up to Azure Key Vault - local user passwords and BitLocker recovery keys

Built-in DNS Support – customers no longer need to provide their own DNS



- ❑ Great for the Edge or DMZ
  - ❑ Does not require AD for the Infra
  - ❑ What about workloads and AD
    - ❑ **Entra ID Domain join Arc extension**
- ❑ Will release with its own local DNS at GA
  - ❑ ARB and DNS durability
- ❑ Local Admin Tooling Supported (Auth via local account and Certs)
  - ❑ Cluster Fail Over Manager
  - ❑ Hyper-V Manager

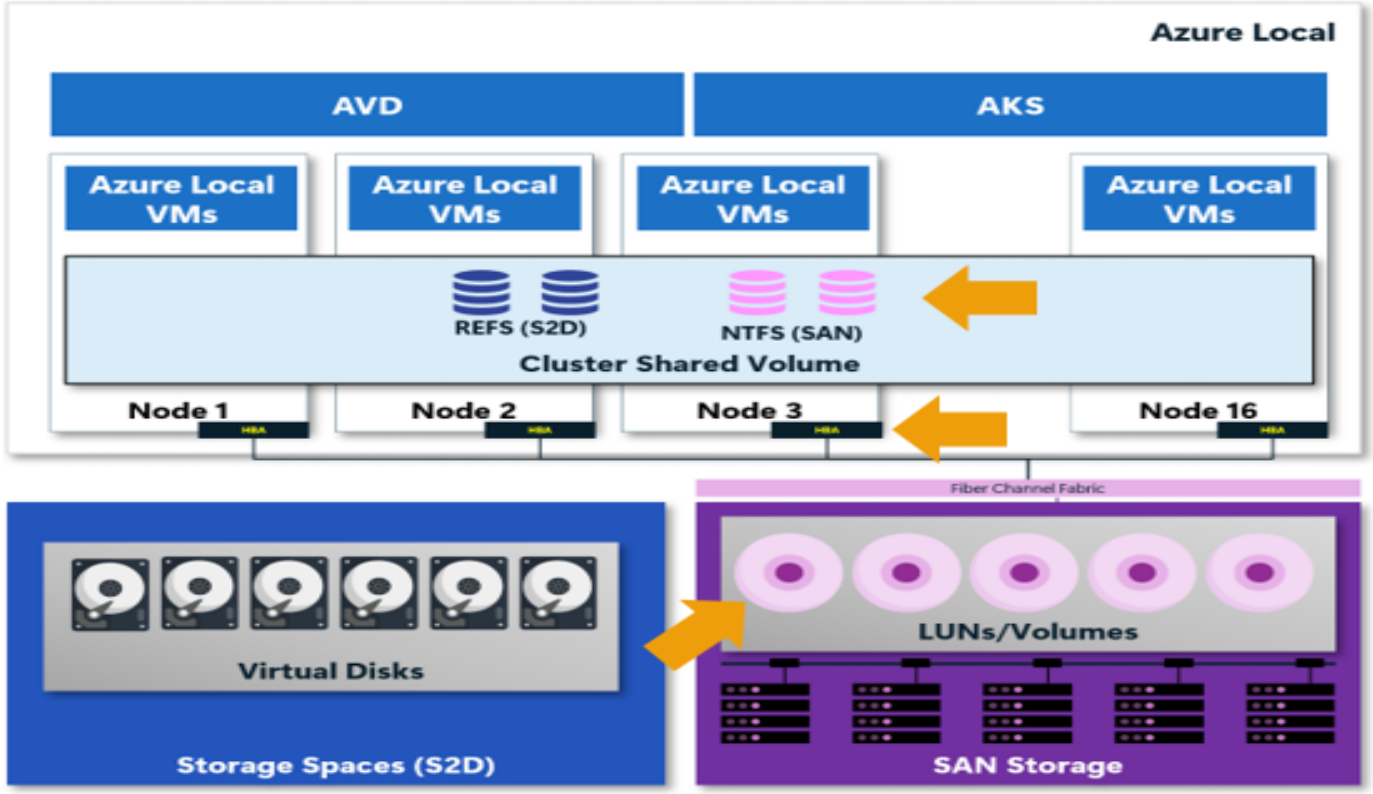
Azure Local Rack Aware Cluster



- ❑ Standard Cluster Architecture deployed across 2 x Rooms
  - ❑ Fault domain of Disk, Node and Rack
  - ❑ 1+1, 2+2, 3+3 and 4+4
  - ❑ 2-way and 4-way mirror
    - ❑ Deploy with Rack Aware Nested Mirror (4-way Mirror)
    - ❑ With a 2+2 can suffer 1 Rack and node or disk in remaining Rack
- ❑ Only Single Tier NVMe / SSD
  - ❑ RDMA Direct (Switchless) not supported
- ❑ Requires 10Gb or 25Gb per Network Adapter
  - ❑ RDMA could take all bandwidth for S2D storage
  - ❑ Dual 10Gb may suffice for many ordinary requirements
  - ❑ 1Ms return time for S2D
- ❑ SAN support would remove this limitation, the same for size of cluster

Azure Local S2D + SAN Storage

External Storage expansion architecture for Azure Local



Configuration/Pre-Requisites:

1. HBAs will be required on the host for FC configs
2. SAN device is connected to Azure Local through dual networks for redundancy (*Customers Need physical NIC ports for each of the networks. vNICs are not permitted*).
3. Each Azure Local instance has a NIC that is attached to each Network
4. Configure appropriate host groups and zoning in the fabric

Setup:

1. Create LUN(s) on SAN Storage
2. From **each** Host attach ISCSI/FC target
3. Create NTFS Volume
4. Perform a storage Rescan.
5. Use WAC to automatically format it and create CSV

For POC, these steps will need to be done manually. Eventually, these will be folded into Deployment
There can be multiple CSVs attached to each node.

Consumption (VM):

1. Create a Storage Path in the Azure Portal that points to the share
2. While creating Arc VM, specify storage path as the one from the SAN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The new style of IT


VirtualMetric


veeam


evri

Q/A

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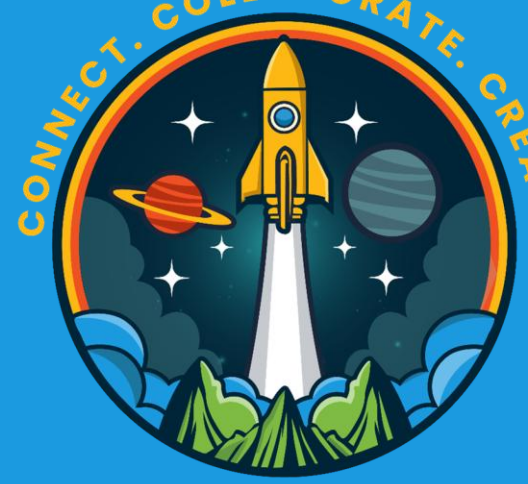
Session feedback available in home feed of the app after the session



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