Microsoft

Azure Stack
Your Cloud, Your Datacenter

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    MCSE Server Infrastructure
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Twitter & Blog
    www.thomasmaurer.ch
    @thomasmaurer

Sharing knowledge and experience about Microsoft technologies

February 8 - 9, 2018 Houston, TX

Save the date

Justin Incarnato

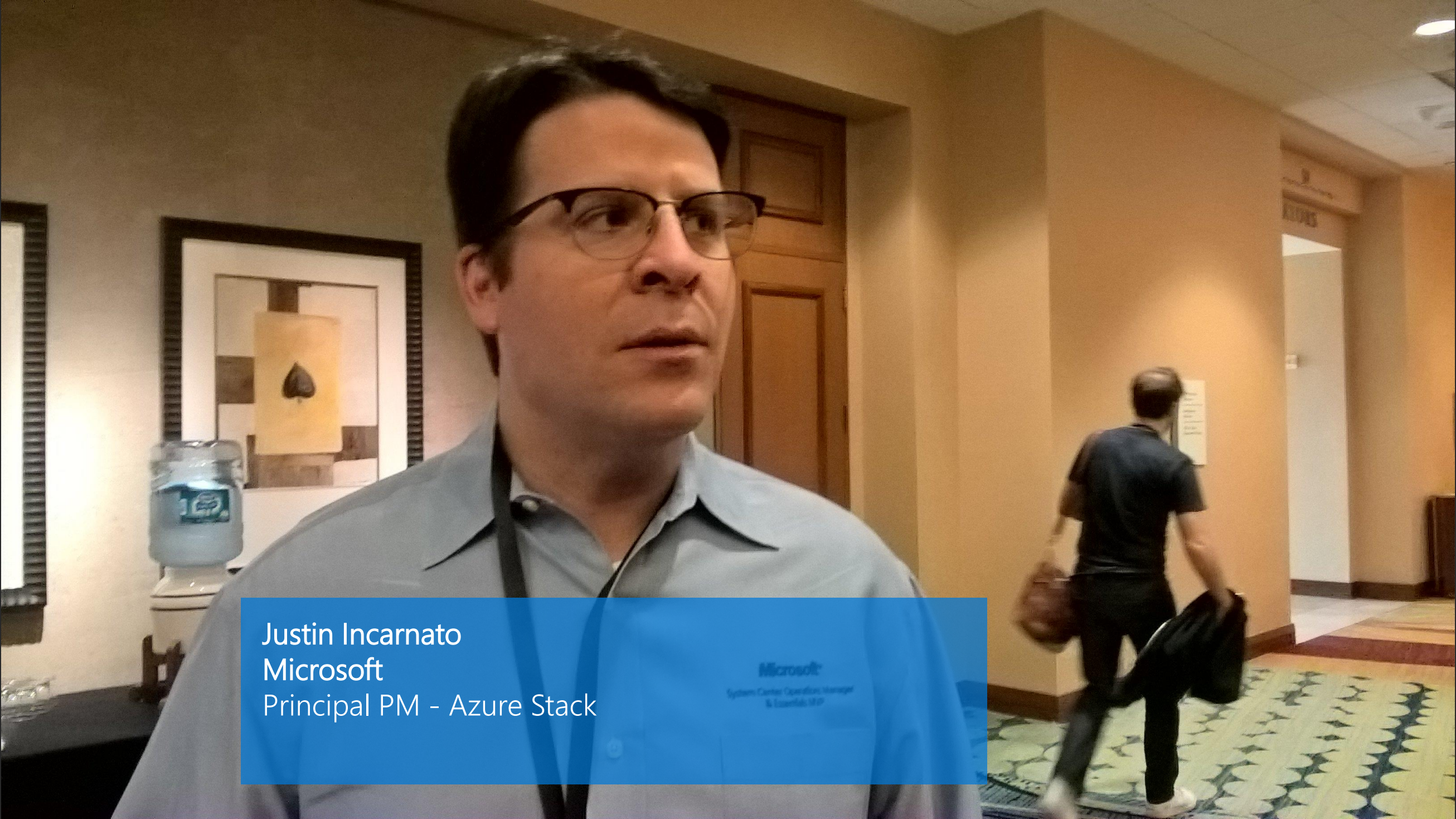Justin Incarnato
Microsoft
Principal PM - Azure Stack

Azure Stack – The Extension of Microsoft Azure

Power of Azure in your datacenter

Microsoft Azure Stack is a new hybrid cloud platform product that enables organizations to deliver Azure services from their own datacenter to help them achieve more.

Hyper-sc

Azure Stack

Enterprise-proven

Azure Stack

Private, public, and hybrid cloud

Platform engineered with commonalities for flexibility and consistency

CUSTOMER
DATACENTER

CONSISTENT
PLATFORM

MICROSOFT
AZURE
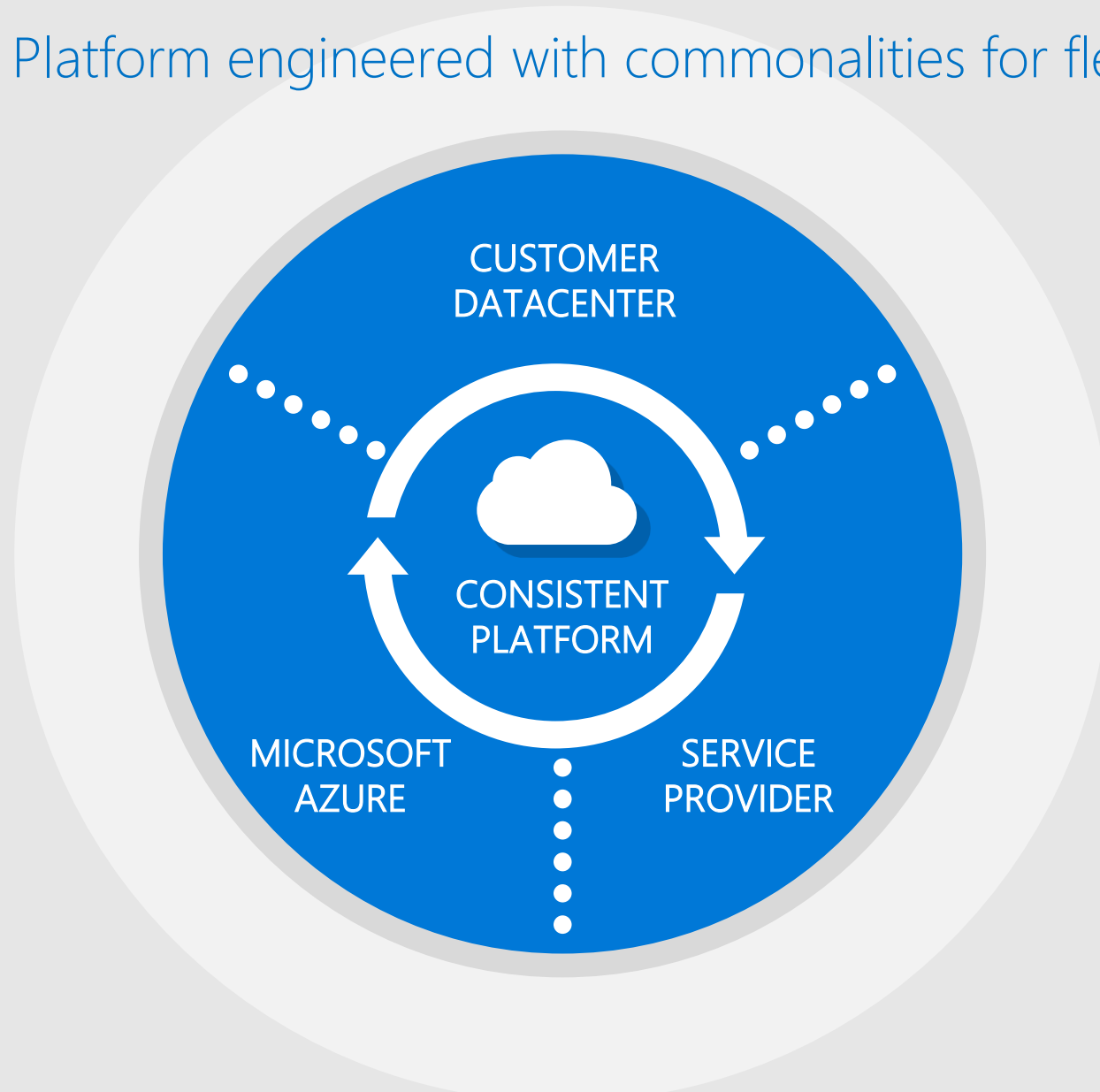
SERVICE
PROVIDER

▶ Development
code once, deploy
VMs anywhere

▶ Management
unified view across
premises

▶ Identity
single sign-on

▶ Virtualization
built in, not an add-on

▶ Data
analytics and storage
spanning clouds

Microsoft Platform Services

Security & Management
- Portal
- Azure Active Directory
- Azure AD B2C
- Multi-Factor Authentication
- Automation
- Scheduler
- Key Vault
- Store/Marketplace
- VM Image Gallery & VM Depot

Services Compute
- Cloud Services
- Service Fabric
- Batch
- RemoteApp

Integration
- Storage Queues
- BizTalk Services
- Hybrid Connections
- Service Bus

Media & CDN
- Media Services
- Content Delivery Network (CDN)

Web and Mobile
- Web Apps
- API Apps
- Mobile Apps
- Logic Apps
- API Management
- Notification Hubs

Developer Services
- Visual Studio
- Azure SDK
- VS Online
- App Insights

Data
- SQL Database
- Data Warehouse
- DocumentDB
- Redis Cache
- Azure Search
- Storage Tables

Analytics & IoT§
- HDInsight
- Machine Learning
- Stream Analytics
- Data Lake
- Data Factory
- Event Hubs
- Data Catalog
- IoT Hub
- Mobile Engagement

Hybrid Operations
- Azure AD Health Monitoring
- AD Privileged Identity Management
- Domain Services
- Backup
- Operational Analytics
- Import/Export
- Azure Site Recovery
- StorSimple

Infrastructure Services

OS/Server Compute
- Virtual Machines
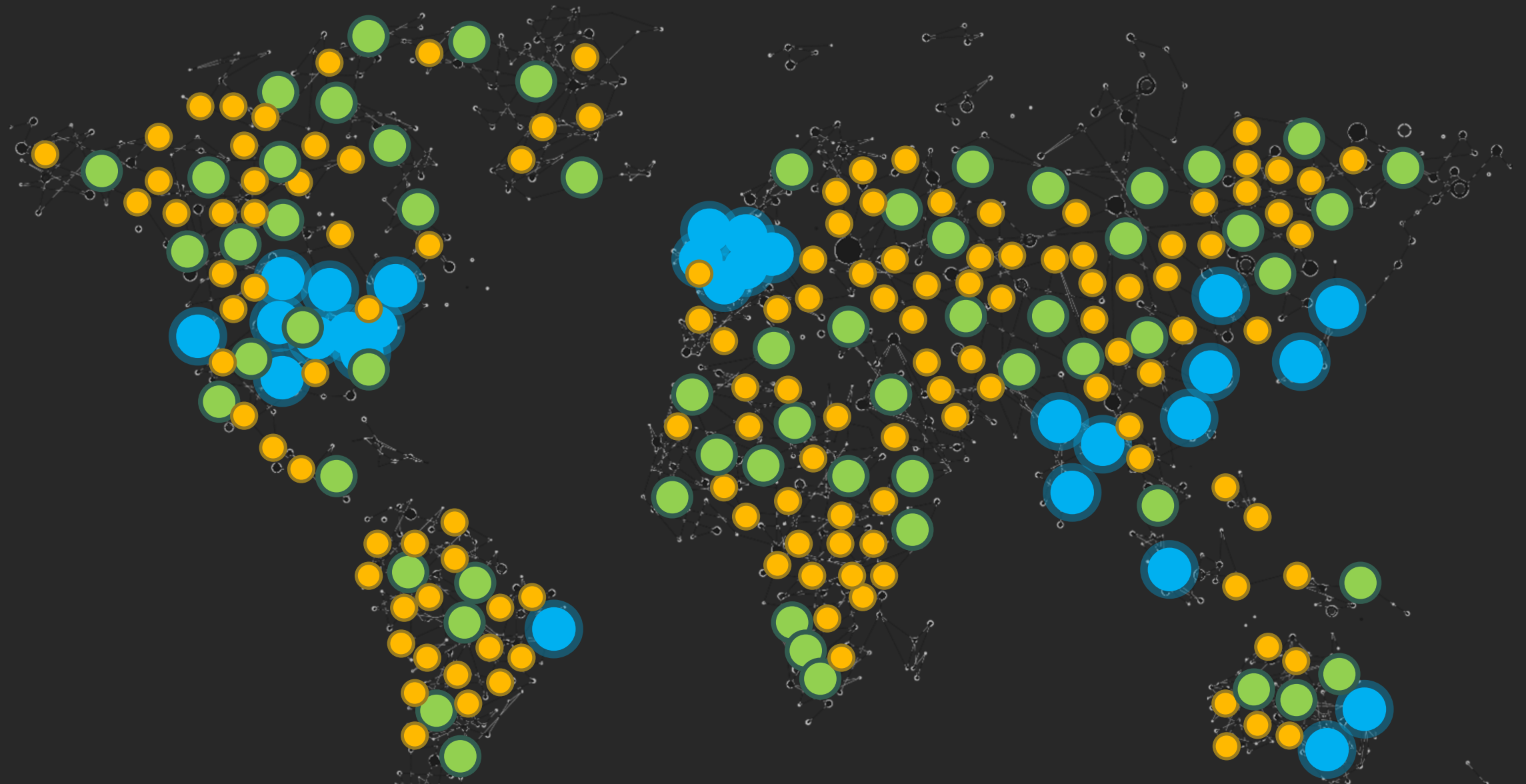- Container Service

Storage
- BLOB Storage
- Azure Files
- Premium Storage

Networking
- Virtual Network
- Load Balancer
- DNS
- Express Route
- Traffic Manager
- VPN Gateway
- App Gateway
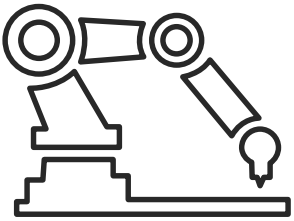
Datacenter Infrastructure (40 Regions)

>40 Azure regions

100s of service providers

1,000s of enterprises

Hybrid use cases: Azure and Azure Stack

Edge and disconnected
solutions

Cloud applications to meet
varied regulations

Cloud application
model on-premises

Power of Azure and the Control of the Datacenter
Microsoft Azure Stack

Consistency

Microsoft Azure Stack
Windows Server	Linux

Portal
IaaS | PaaS services

Cloud infrastructure

[powered by Windows Server
and Azure technologies]

Microsoft Azure
Windows Server	Linux

Portal
IaaS | PaaS services

Cloud infrastructure
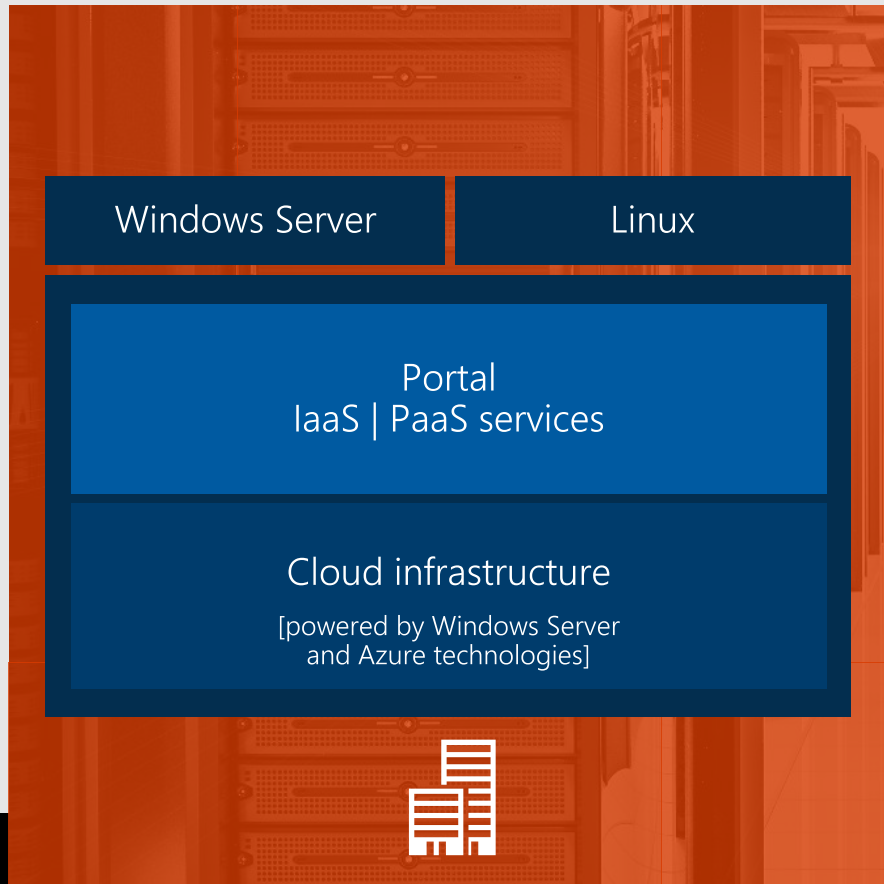
Microsoft Azure Stack
(on premises | hosted)
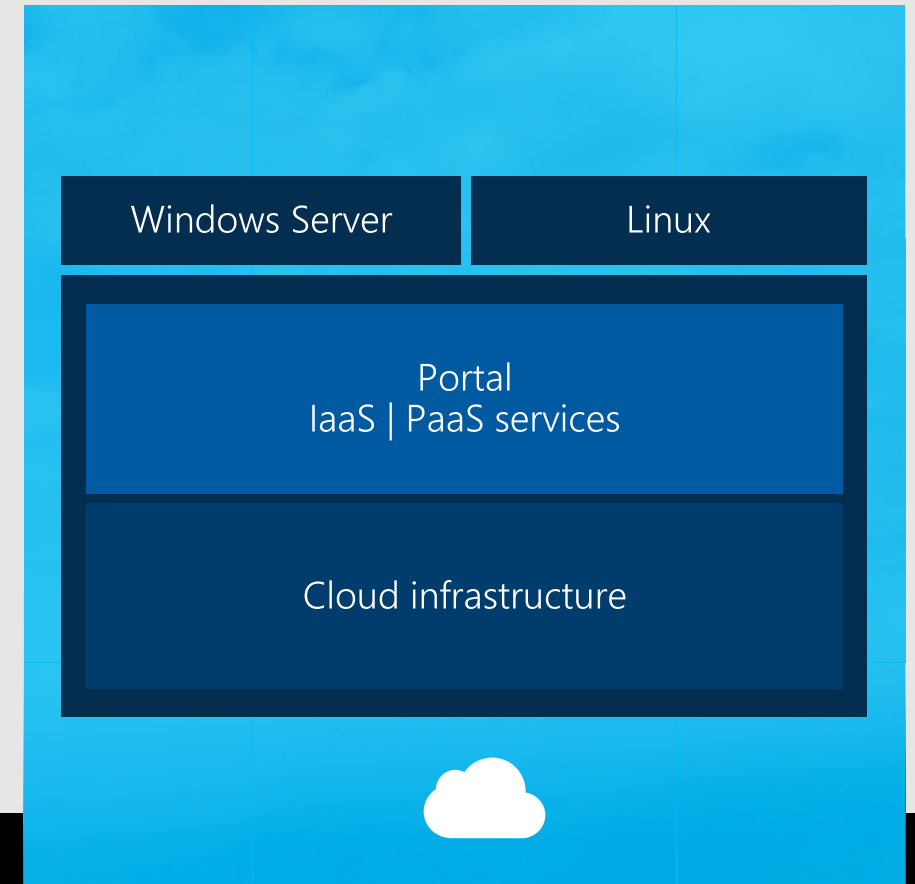
Microsoft Azure
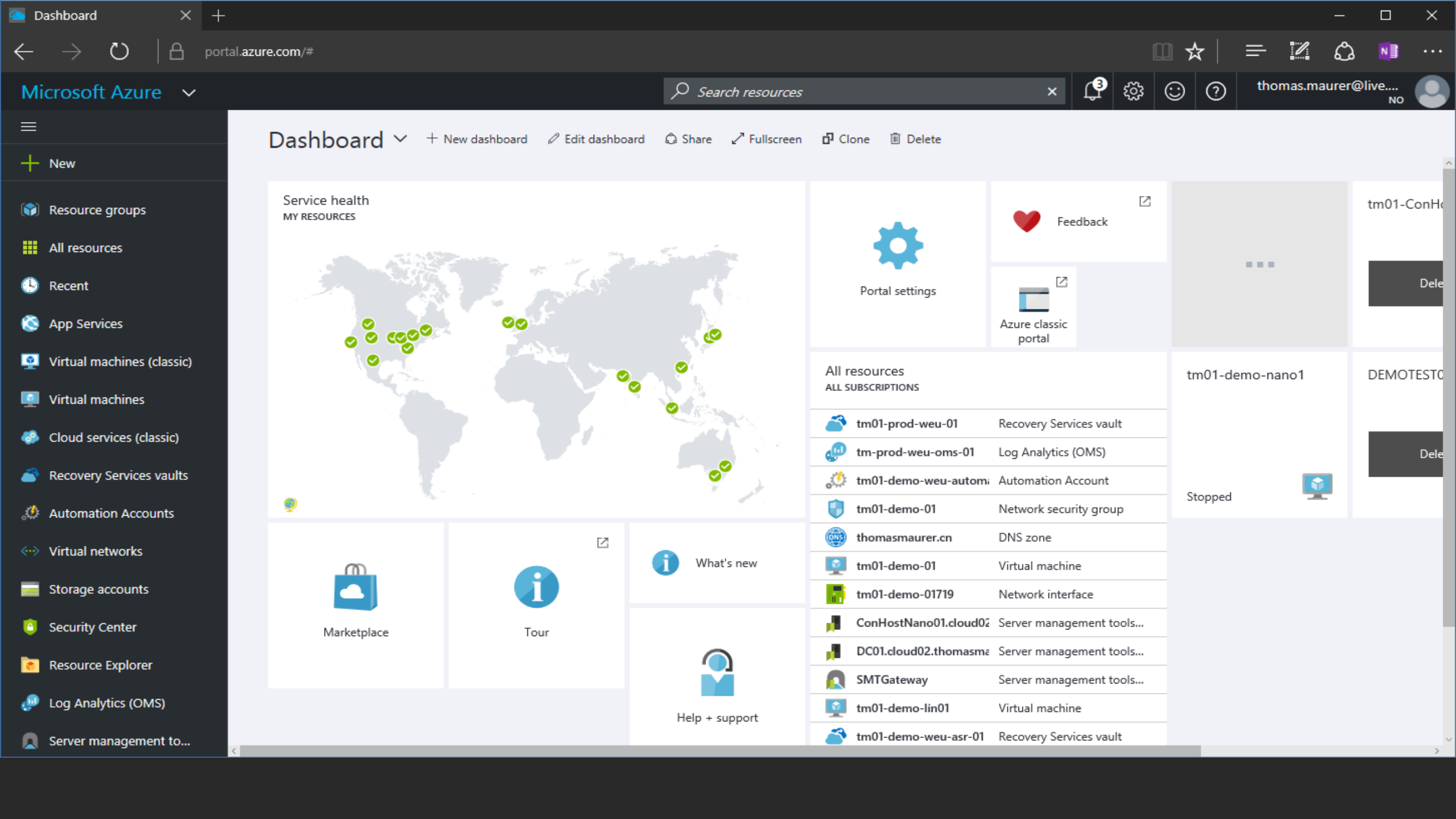
Microsoft Azure Stack

thomas.maurer@itnet...
ITNETX AG - DEMO

New

Dashboard

Virtual machines

All resources

Resource groups

Recent

Virtual machine scal...

Virtual network gat...

More services >

Dashboard

+ New dashboard   Edit dashboard   Fullscreen   Clone   Delete

Marketplace

All resources
ALL SUBSCRIPTIONS

Toms-TestVM01

Toms-TestVM02-ip

testvmsdiag281

See more

Quickstart tutorials

Windows Virtual Machines
Provision Windows Server, SQL Server, SharePoint VMs

Linux Virtual Machines
Provision Ubuntu, Red Hat, CentOS, SUSE, CoreOS VMs

App Service
Create Web Apps using .NET, Java, Node.js, Python, PHP

Get a subscription

Functions
Process events with a serverless code architecture

Feedback

SQL Database
Managed relational SQL Database as a Service

Azure Stack Integrated System

Delivering Azure Stack as an integrated system

Software

Hardware

Support

Services

Azure Stack integrated systems

Accelerated time to value

- From concept to operations in days, not months
- Help developers be productive much faster

Enriched lifecycle management

- Greater quality and system reliability
- Focus on delivering Azure services, not operations

Continuous innovation

- Newest services and fastest updates
- No disruption to tenant availability or experience

Azure

SOFTWARE   SERVICES   HARDWARE   SUPPORT

Azure Stack

TIME TO VALUE

LIFECYCLE MANAGEMENT

CONTINUOUS INNOVATION

Azure Stack integrated systems

Faster time to value →

More customization

| Do-it-yourself | Reference architecture | Integrated systems |

Speed & standardization

Azure Stack Integrated System

Software   Hardware

Support   Services

Azure Stack Integrated System

ToR Switch

ToR Switch

BMC Switch

Server

Server

Server

Server

Architecture, hardware, and topology

Deployment, configuration, provisioning

Validation

Monitoring, diagnostics

Security and privacy

Business continuity

Patching and updating

Field replacement of parts

Azure Stack Integrated System (Life Cycle)

Architecture, hardware, and topology

Deployment, configuration, provisioning

Validation

Monitoring, diagnostics

Security and privacy

Business continuity

Patching and updating

Field replacement of parts

Azure Stack Internals

ARM LAYER

Azure Portal (UX)	Templates/PowerShell/CLI, SDK, etc

Azure Resource Manager (ARM)

RP LAYER

PARTITION REQUEST BROKER

FRP	SRP	CRP	NRP	HRP	URP	...

INFRASTRUCTURE CONTROL LAYER

Infrastructure Deployment

- Bootstrap
- Patch & Update
- Scale Out
- FRU
- RESET
- START
- STOP

PHYSICAL NODE MANAGEMENT	STORAGE CONTROLLER	COMPUTE CONTROLLER	NETWORK CONTROLLER	INFRA ROLE CONTROLLER	HEALTH CONTROLLER

Workflows

Builds

INFRASTRUCTURE ROLES

ACS	NETWORK CONTROLLER	COMPUTE CONTROLLER	HEALTH CONTROLLER	INFRA ROLE CONTROLLER	ARM	UPDATE MGMT	DIRECTORY MGMT
STORAGE CONTROLLER	EDGE GATEWAY			INFRA MGMT CONTROLLER	PARTITION REQ BROKER		ADFS
	LB MUX			PHYSICAL NODE MGMT	INTERNAL DATA STORE		CERTIFICATE MGMT
				INFRA DEPLOYMENT			

HARDWARE LAYER

NETWORK (SWITCHES)	COMPUTE	STORAGE

Integrated delivery experience

Integrated systems

DELL EMC
Hewlett Packard Enterprise
Lenovo
CISCO
HUAWEI
WORTMANN AG

Fast to deploy

Get up and running quickly

Deliver 100s of VMs initially (and grow over time)

Pay-as-you-use

Extension of Azure model

Receive one bill

Integrated support, broadly available

Consistent support experience, no matter who you call

Available in 46 geos initially

Azure Stack concepts

Cloud

- Single instance of Azure Resource Manager (ARM)
- 1 or more Regions under management of ARM
- 1 or more Scale Units within a Region
- 4 or more servers within a Scale Unit

Region

- Set of Scale Units that share same "physical location"
- Under one physical and logical "administrator"
- Networking requirements
  - High-bandwidth/low latency
  - Flat, layer-3 network
- Other attributes are implied by customer choices

Scale Unit

- Associated with a single Region
- 1 or more Scale Units within a Region
- Unit of capacity expansion
- Fault domains (Azure consistency)
- Alignment of Hardware SKU – which is homogenous within Scale Unit

Peek into a Scale Unit

- 4 x servers + network switches
- Min spec for server
    - 2 x 10 Gb ports with RDMA
    - 256 GB Memory
    - 1 x boot media, 2 x SSD (cache) + 4 x HDD
    - 8 x cores per CPU, min 2 x CPU's
- Each server runs Windows Server 2016
- Failover cluster with hyper-converged storage spaces direct
- Resilient deployment of Azure Stack software in VM's
- Appropriate resiliency for each layer

ToR Switch

ToR Switch

BMC Switch

Server

Server
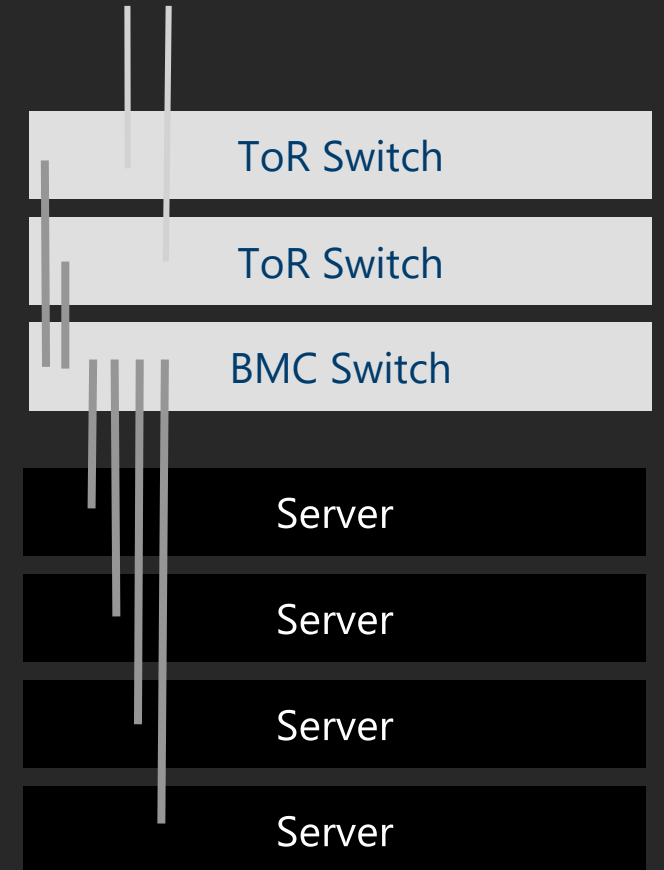
Server

Server

Azure Stack: Scale architecture

① One cloud "endpoint"

② Several regions

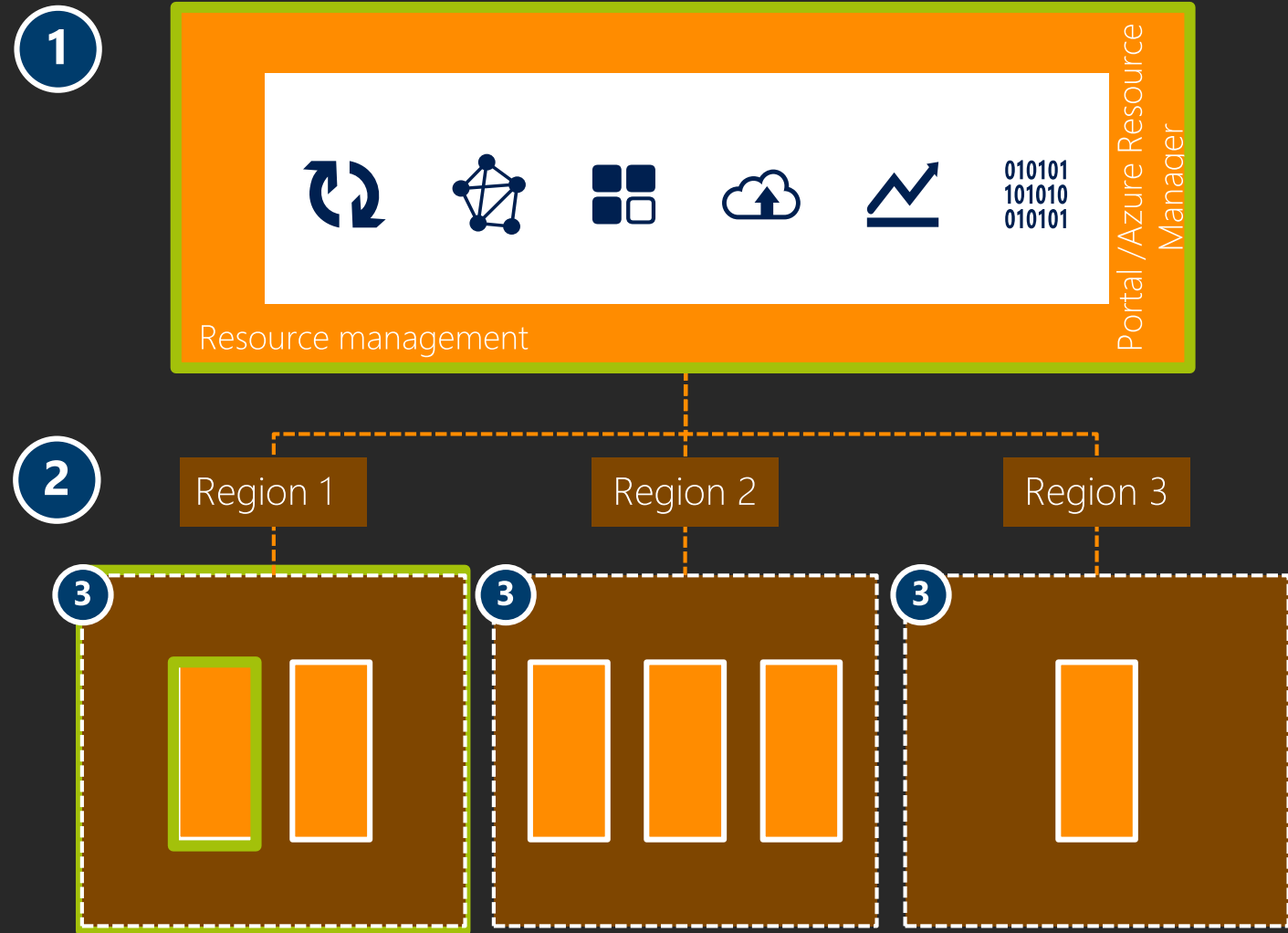③ Multiple scale units (SU) per region

GA
(#servers per scaleunit, #scaleunits,
#regions) (12, 1, 1)

CY 2018
Incremental capacity expansion
Multi-region and then multi scale units

Example: Global enterprise or service provider

① Resource management

Portal /Azure Resource Manager

010101
101010
010101

② Region 1   Region 2   Region 3

③   ③   ③

Azure Stack Datacenter Operations & Integration

Cloud operating model and job roles
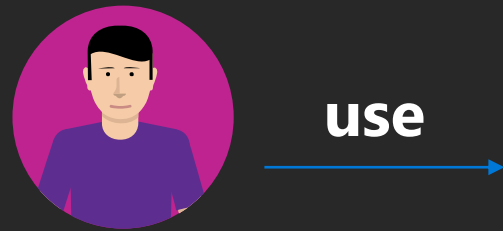
Azure customers → **use** → Azure ← **operate** ← Microsoft engineers
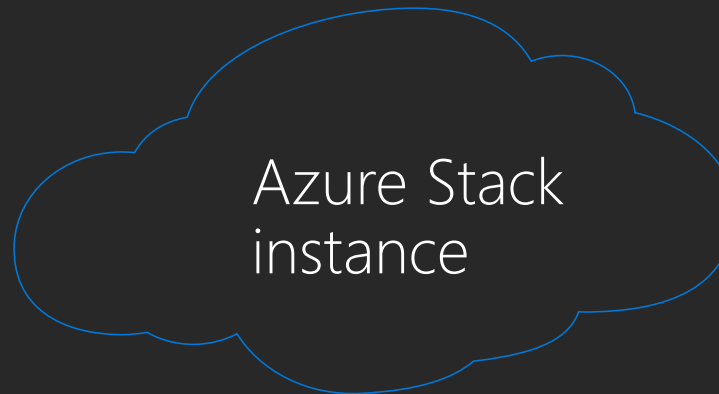
Your customers → **use** → Azure Stack instance ← **operate** ← Your engineers

DevOps
Cloud Administrator

Cloud Architect
Cloud Operator

Azure Stack Cloud Operator   VS   System Administrator

Azure Stack: Integration in your datacenter

Border
Devices

Datacenter
monitoring/ticketing/
hardware monitoring

Identity Integration
(User & Cloud
Operator)

Space, Power
& Cooling

TOR switch

TOR switch

BMC Switch

Server

Server

Server

Server

Hardware Lifecycle Host

Scale Unit
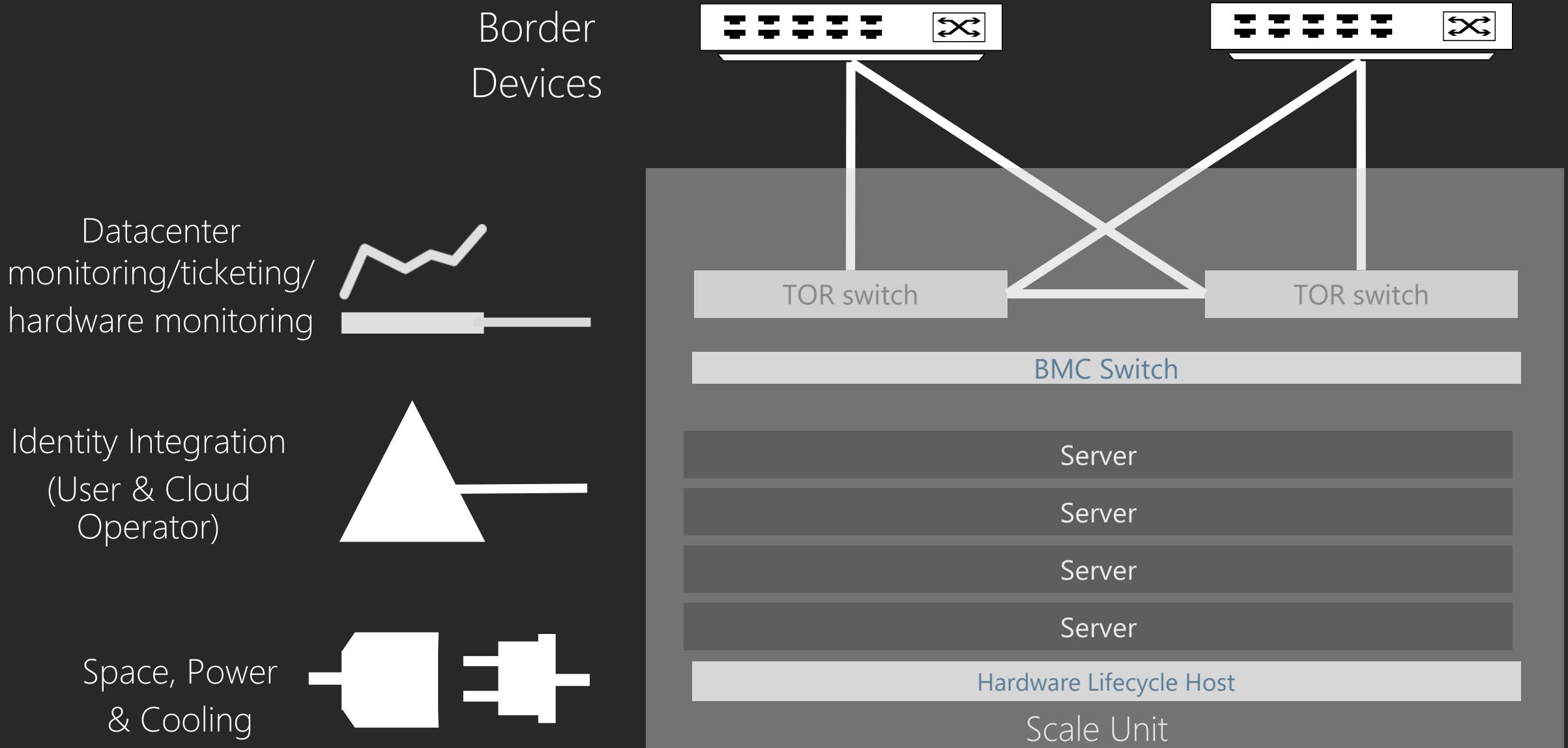
Patching and Update

- Pre-validated updates for software and firmware
- Designed to not disrupt tenant workloads
- Designed to be reliable, single-sourced and easy to use
- Designed to allow focus on other aspects of the business

OPERATIONS

Updates

Current Version: 1512

Last checked: 2015-12-24

Update in progress

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	ℹ Available	1602	2.8 MB
Update Rollup for Jan 2016	⋯ In progress	1601	5.2 MB

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

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	-	-
WOSS	Not started	-	-
WSUS	Not started	-	-

Update History

NAME	STATE	VERSION	DATE STARTED
Update Rollup for Dec 2015	✔ Finished	1512	2015-12-24
Update Rollup for Nov 2015	✔ Finished	1511	2015-11-26
Update Rollup for Oct 2015	✔ Finished	1510	2015-10-21
Update Rollup for Sept 2015	✔ Finished	1509	2015-09-27
Update Rollup for Aug 2015	✔ Finished	1508	2015-09-05

Azure Stack: Backup and Disaster Recovery

Cloud backup service

Azure Site Recovery

LRS blob replica, blob snap

Tenant space

On-premises Backup Target

VM   VM   VM

SQL   SQL   10 01   10 01

IaaS

PaaS

External File Share

Azure Infrastructure

Admin space
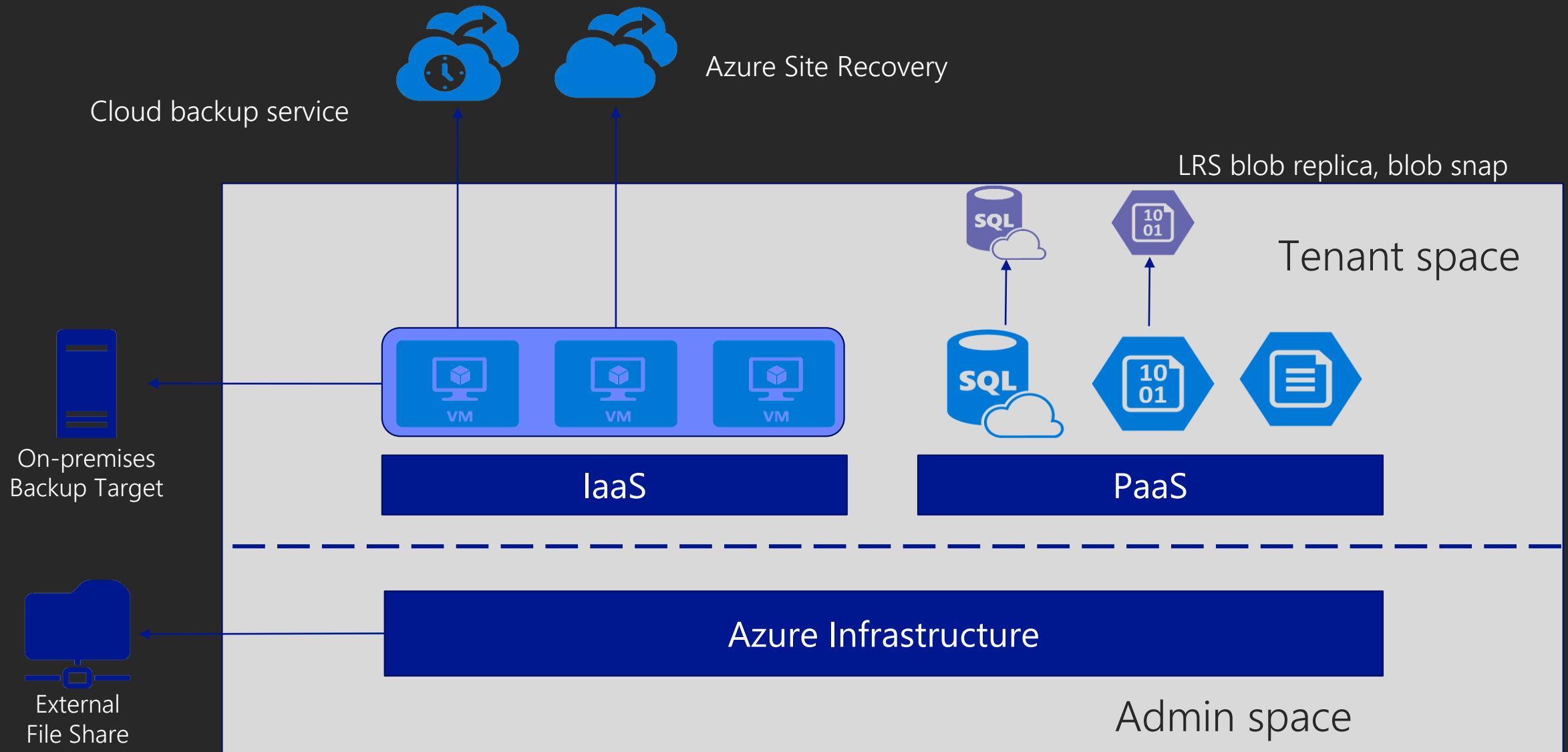
Azure Stack Developer Kit

What is the development kit?

The idea behind the One-node Development Kit is:

- Limited deployment duration (hours)
- Minimal hardware required
- Reduced component install (non-HA)
- Easy to install (PowerShell)
- Enable on-premises Azure modern application development
- Can integrate into a larger environment

Development Kit Hardware Requirements

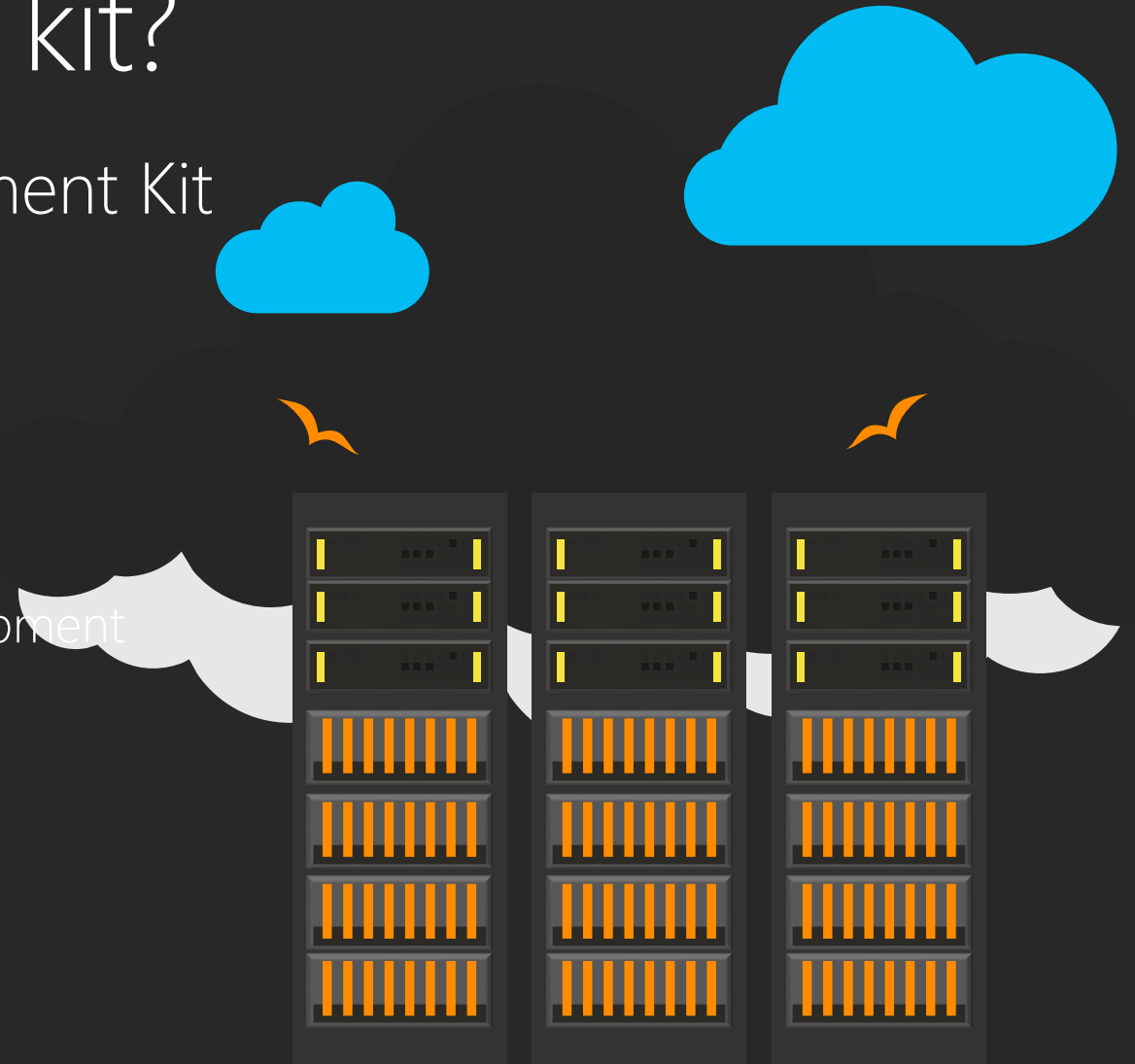| Component	Minimum	Recommended
Disk drives: Operating System	1 OS disk with minimum of 200 GB available for system partition (SSD or HDD)	1 OS disk with minimum of 200 GB available for system partition (SSD or HDD)
Disk drives: General development kit data*	4 disks. Each disk provides a minimum of 140 GB of capacity (SSD or HDD). All available disks will be used.	4 disks. Each disk provides a minimum of 250 GB of capacity (SSD or HDD). All available disks will be used.
Compute: CPU	Dual-Socket: 12 Physical Cores (total)	Dual-Socket: 16 Physical Cores (total)
Compute: Memory	96 GB RAM	128 GB RAM (This is the minimum to support PaaS resource providers.)
Compute: BIOS	Hyper-V Enabled (with SLAT support)	Hyper-V Enabled (with SLAT support)
Network: NIC	Windows Server 2012 R2 Certification required for NIC; no specialized features required	Windows Server 2012 R2 Certification required for NIC; no specialized features required
HW logo certification	Certified for Windows Server 2012 R2	Certified for Windows Server 2012 R2

Source: https://docs.microsoft.com/de-de/azure/azure-stack/azure-stack-deploy

Azure Stack Services

Azure IaaS available on-premises: beyond traditional virtualization

Virtual machines (VM), VM scale sets	Containers with Docker	Networking	Storage	Key Vault
Rapid deployment with automated scaling	Linux and Windows Server containers	Virtual network, load balancer, VPN gateway	Blobs, tables, queues	Securely protect application keys and secrets

Roadmap: Additional Azure consistency (New VM types, Managed Disks, storage API updates) in CY18.

Azure PaaS available on-premises: High productivity development

Azure App Service	Azure Functions	Azure Service Fabric	Azure Container Service (ACS)	Cloud Foundry
Web, Mobile, and API apps	Serverless Computing	Scalable distributed applications, deploy standalone Service Fabric clusters initially	Container management, with ACS engine support for Docker Swarm, Kubernetes, and Mesosphere DC/OS	Open source platform

Roadmap: Azure Service Fabric-as-a-Service and Azure Container Service-as-a-Service are planned to be available in CY18

One Azure ecosystem

Work with the tools and technologies you want across Azure and Azure Stack

Goal: Applications and services that are certified for Azure work on Azure Stack

Microsoft Azure

Azure roadmap

As Azure continues to grow, we want to keep you informed—so that we can plan for the future together. This product roadmap is the place to find out what's new and what's coming next. Let us know what you think by providing feedback and voting on items. You can also subscribe to notifications, so you'll always be the in the know.

Product Category	Status	Search
All ⌄	All ⌄ ⓘ	Search 🔍

📶 **Subscribe**

Azure Stack integrated systems with 16 node scale units

Date updated: Monday, February 12, 2018

We're currently working on increasing the maximum number of nodes in a scale unit to 16.

In development   Azure Stack   Azure Stack - Infrastructure

Azure Stack support for Azure Backup

Date updated: Monday, February 12, 2018

We're developing the ability for Azure Stack operators to backup and recover guest OS, data disks, and volumes using Azure Backup.

Explore

Check out recent Azure releases.

Azure updates ❯

Tell us what you think of Azure and what you want to see in the future.

Provide feedback ❯

Azure is available in more regions than any other cloud provider.

Check product availability in your region ❯

Read the Azure blog for the latest news.

Blog ❯

Roadmap H1 2018

- Azure Stack support for Azure Backup
- Azure Stack support for Azure Site Recovery
- Azure Container Service (AKS) on Azure Stack
- Templated Kubernetes deployments
- Templated Service Fabric cluster deployments
- Managed Disks in Azure Stack
- Azure Stack integrated systems with 16 node scale units
- Azure Stack integrated systems support for multiple scale units
- ....

Azure Stack Packaging and Pricing & Support

Purchased as an integrated system

Azure services
Billed by Microsoft via EA or CSP, support via Premier or Azure agreement.

Support
One integrated experience.

Hardware
Purchased directly from hardware partners, including support and installation services.

Pay-as-you-use model

- Extension of Azure business model
- Fee for consumption: only pay for services running on Azure Stack
- No upfront licensing fees: don't pay until you use the service
- Compatible with Azure: same subscriptions, monetary commitment, invoice
- EA and CSP channels

Azure

Azure Stack

Hosted and On-premises
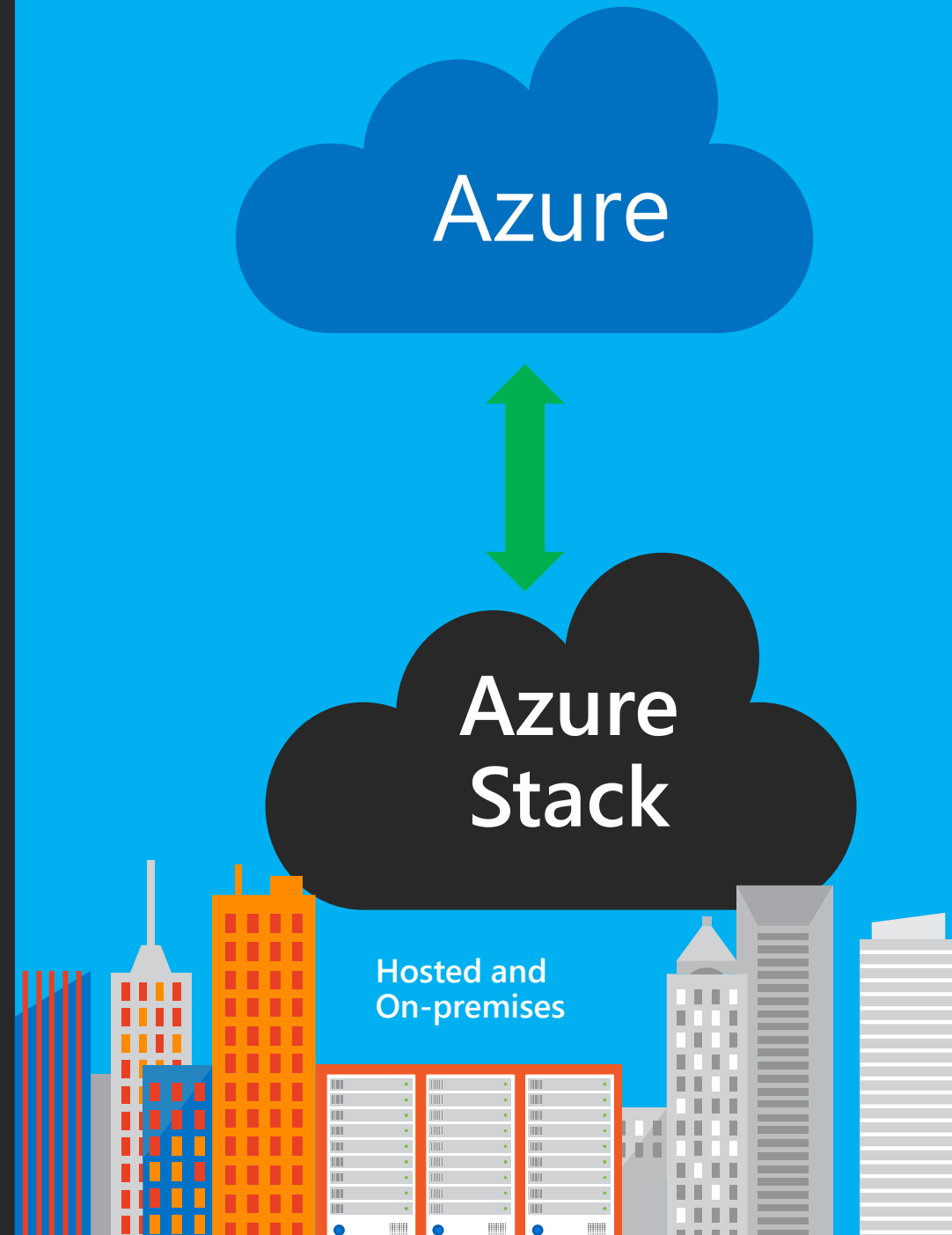
Pay-as-you-use pricing

Pay-as-you-use Pricing

	Service	Price
Up-Front Licensing	Azure Stack initial deployment	$0 – *no upfront licensing fees*
Consumption-Based Fees	Cloud Infrastructure; Management, Security, & Identity; Networking; Service Fabric	$0
	Virtual Machines: Base VM	$0.008/vCPU/hour *($6/vCPU/month)*
	Virtual Machines: with Windows Server	$0.046/vCPU/hour *($34/vCPU/month)*
	Azure Blob Storage Service	$0.006/GB/month
	Azure Tables & Queues Storage Service	$0.018/GB/month
	Azure Standard Unmanaged Disk	$0.011/GB/month
	Azure App Service (including Functions)	$0.056/vCPU/hour *($42/vCPU/month)*

- *Customers can bring their own Windows Server and SQL Server licenses to run on Base VM images*
- *Windows Server BYOL – must license the entire region*

Capacity model

For disconnected scenarios: no usage metering or connection to commerce

Fixed fee, annual subscription: based on number of physical cores

License all physical cores on a solution, with unlimited IaaS rights

Separate transaction from Azure: cannot use monetary commit, different billing

EA channel only

Azure

Azure Stack

Hosted and On-premises

Capacity model pricing

App Service Package

$400/core/year

- Includes: App Service, Base VM, Azure Storage
- Must license all physical cores on the deployment
- Windows Server and SQL Server are BYOL (on-premises license)
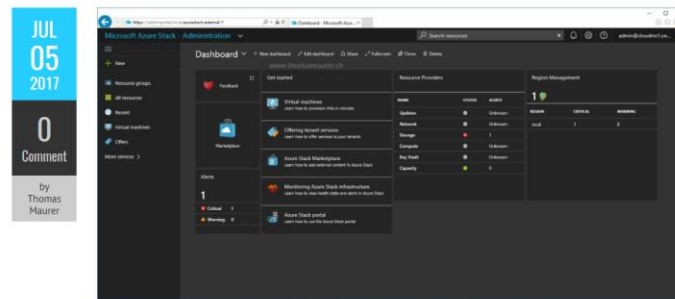
IaaS Package

$144/core/year

- Base VM, Azure Storage only
- Must license all physical cores on the deployment
- Windows Server and SQL Server are BYOL (on-premises license)

($144) core/year.) With the capacity model, you use your existing on-premises licenses to deploy Windows Server and SQL Server virtual machines.

The capacity model is available via EA only. It is purchased as an Azure Plan SKU via normal volume licensing channels. For typical use cases, Microsoft expects the pay-as-you-use model to be the most economical option.

Support

Azure Stack support is a consistent, integrated, hybrid support

https://www.thomasmaurer.ch/2017/07/microsoft-azure-stack-packaging-and-pricing-july-2017/

Integrated support experience

Azure-consistent support experience
no matter who you need support from

Coordinated escalation and resolution process

Cloud services support delivered by Microsoft
Existing Azure support or Premier Support contract

System support delivered by hardware partners
System support contract with hardware partners
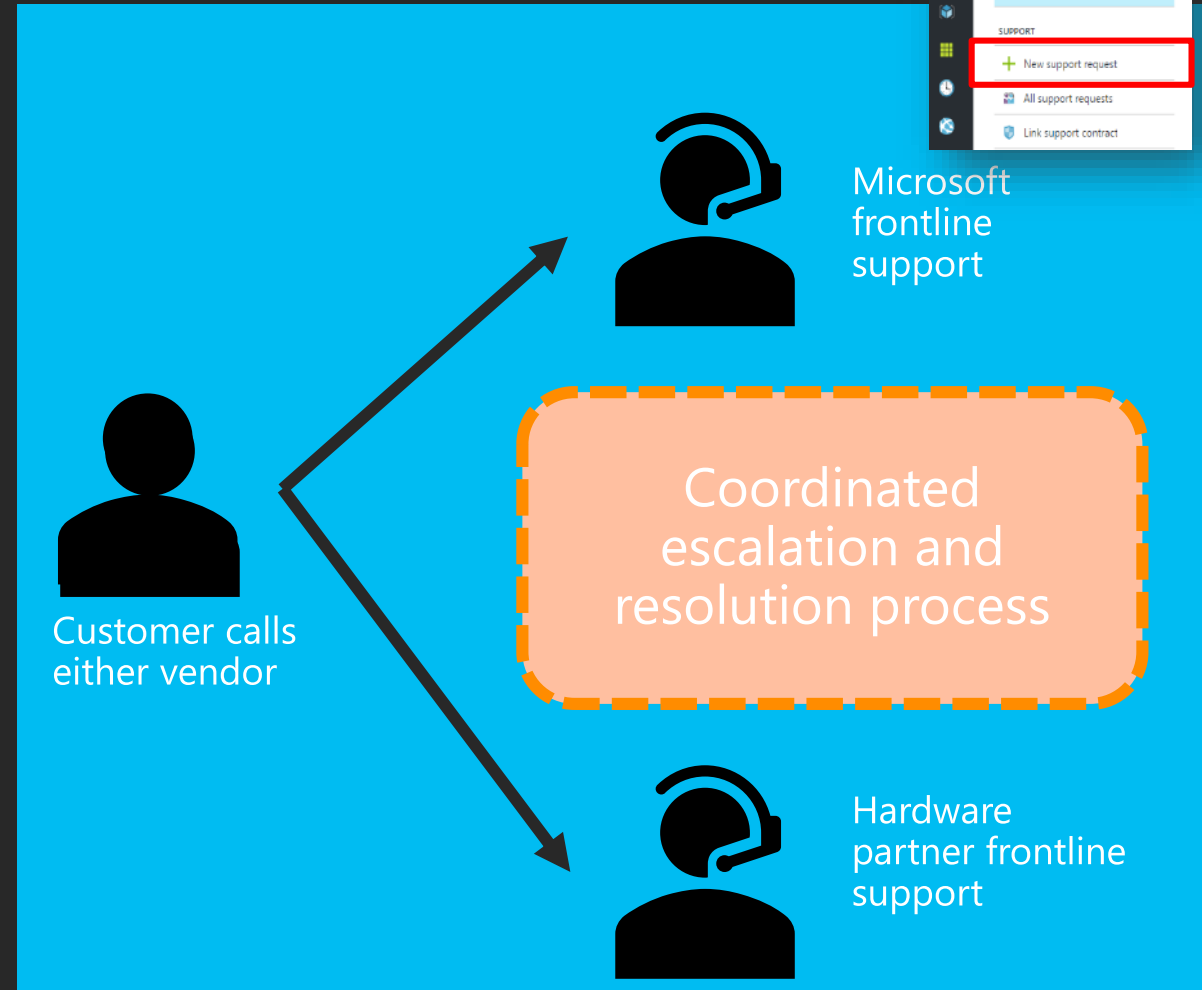
Two ways to purchase Azure Stack

As an integrated system

Customer controls management and operations (DIY or via SI)

Two contracts: one for Azure services and another for hardware

Typically hosted at customer premises

Example: Customer purchases Azure services from Microsoft, integrated systems from Dell EMC/HPE/Lenovo

As a fully managed service

Managed service provider does management and operations

Single point of purchase, one contract

Typically hosted at managed service provider premises

Example: Customer purchases a complete solution from itnetX

One integrated support experience

Consulting

AutoSave ● Off   💾   ↶ ↷ ⟐ ⌄   deployment_worksheet-hpe.xlsx - Last Saved 8/17/2017 10:43 PM ⌄   Thomas Maurer   ⊞   —   ☐   ✕

File   Home   Insert   Draw   Page Layout   Formulas   Data   Review   View   ♀ Tell me what you want to do   ⬆ Share   🕑   🙂

B65   ⦂   ✕ ✓ fx   You have an option to sync the internal time server (on the AD VM inside of your Azure Stack deployment) to an external time server. Provide the external time server information (IP address) below.   ⌄

🌐 Sensitivity: ▣ Public ✎ | Public | Internal | Confidential ⌄ | 🗑 | ✕

A	B	C	D	E	F	G	H

Microsoft Azure Stack Deployment Worksheet
As a preparation for your Azure Stack deployment, it's important that you plan, prepare and fill out both tabs in this deployment workbook, prior to starting the
deployment of your Azure Stack solution.
Please note: If your role does not involve managing the network infrastructure in your IT environment, it is criitical to communicate with the appropriate network,
identity and security teams to complete the information required to deploy Azure Stack.

Azure Connection, Identity Store, and Billing Model Decisions

Determine if Azure Stack will connect to Microsoft Azure. If connecting to Microsoft Azure, please identify the Identity Store and Billing Mode.
Read this article to learn more.

Connected?
Connect to Azure   Selected
Connect your Azure Stack system to Microsoft Azure (the deployment virtual machine must have Internet access), choose between Azure Active Directory and Active
Directory Federation Services to manage your identities, register your Azure Stack system to establish syndication between Azure Gallery and your Azure Stack Gallery, and
choose a billing model.

Read the Companion guide section to learn more about billing models.
Choose identity store: Azure Active Directory
Choose billing model: Consumption-based billing

Azure Active Directory Information (applicable when you select to deploy Azure Stack in a Connected mode)
The following parameters are required to deploy Azure Stack by using Azure Active Directory (AAD) as your identity store. Infrastructure services and their principal objects

information (IP address) below.

Time Server: 10.10.10.0

| Customer and Environment Info | Network Settings | HPE | Customer Pre-Delivery Checklist |

Name: Contoso

Customer and Environment Info | Network Settings | HPE | Customer Pre-Delivery Checklist   ⊕   ⦂   ◀ ⬛

Technology and service partners

Find partners with ready-made or custom Azure solutions, and partners who can help deploy and manage those solutions for your business

Search   ✕   🔍

PRODUCTS

Azure Stack ▾

SOLUTIONS

All ▾

COUNTRIES

All ▾

OCSL

OCSL

OSIsoft.

OSIsoft, LLC

orion
Business Innovation

**Orion Systems
Integrators, Inc.**

Rackspace

Rackspace

risual

Risual

①

SoftwareONE

tieto

Tieto Corporation

UOL DIVEO
Somos TI para você ser Negócio

**UOLDIVEO
Tecnologia Ltda**

WinWire
Technologies

**WinWire
Technologies Inc.**

WRAGBY BUSINESS SOLUTIONS &
TECHNOLOGIES LIMITED

**Wragby Business
Solutions &**

Xylos

Xylos NV

itnetX

itnetX

Summary: Accurately positioning Azure Stack

First consistent Hybrid Cloud Platform	Virtualization-replacement play
Integrated system with IaaS & PaaS	DIY infrastructure
Regularly updated for Azure-consistency	Static system you deploy & forget
Truly open and flexible (just like Azure)	.NET/Windows only

- Join our itnetX Booth!
- To learn about Azure Stack
- And to win a Tesla!
- Okay just kidding...
- But you can win a ticket to ExpertsLive Switzerland!