



EQUINIX

EQUINIX AND HPE FOR MICROSOFT AZURE STACK HYBRID CLOUD

SOLUTION BRIEF

OPTIMIZING PERFORMANCE, SECURITY AND COMPLIANCE WITH A HYBRID CLOUD SOLUTION

As digital transformation drives the distribution of services and controls closer to customers, employees, partners and ecosystems, the shift requires a digital edge strategy and placement of strategic control points next to users, clouds and networks. To help streamline this process, Equinix and Microsoft partnered to offer a Microsoft and Equinix Azure Stack solution for businesses to rapidly implement a high-performance, secure hybrid cloud environment.

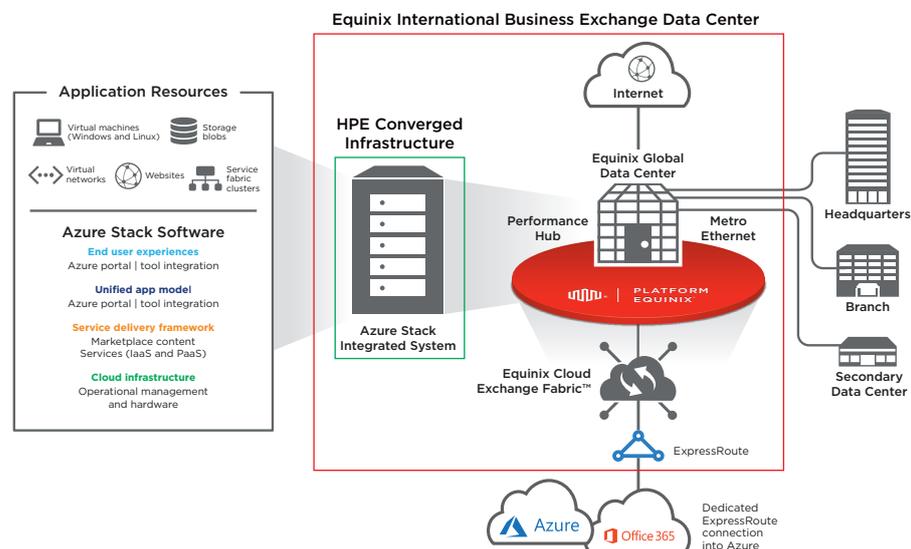
Applications and workloads operating in a hybrid cloud environment are optimized for specific business requirements with a blend of on-premises and cloud-based systems with:

- Superior application performance and user experience
- Localized data for privacy and compliance
- Increased security via tighter network controls

Azure Stack is deployed through purpose-built integrated systems, which enables reduced time to market for applications and workloads that deliver value to enterprise customers, service providers and systems integrators (SIs).

Solution architecture

The solution is deployed within an Equinix International Business Exchange™ (IBX®) data center. Microsoft and Equinix developed a standard, repeatable process to directly and privately connect to Microsoft Azure ExpressRoute through Equinix Cloud Exchange Fabric™ (ECX Fabric™).



Equinix IBX Data Centers for Azure Stack

Equinix IBX data centers, a key component of Platform Equinix®, provide access to vital ecosystems where major networks, enterprises and business partners interconnect to each other and to more than 1,700 network and 2,900 cloud and IT service providers. These secure, state-of-the-art facilities are strategic communication hubs and gateways to Microsoft Azure. Each IBX offers superior physical, human and electronic security.

With N+1 power redundancy (UPS and generator) and N+1 cooling redundancy for high availability, Equinix boasts an average global uptime record of 99.9999%. Private, dedicated cage space meets the needs for an Azure Stack deployment starting with a single scale unit with expansion to multiple scale units as application needs grow.

Equinix adheres to major certification and compliance programs such as SSAE 16 ISAE 3402, SOC 1 Type 2, SOC 2 Type 2, ISO 27001 and PCI DSS. Each regional IBX has specific [technical specifications](#).

Across the global interconnection platform, Equinix spans 52 markets on five continents, and hosts an advanced portfolio of digital services and ecosystems. More than 9,800 companies populate the diverse ecosystems with large industry verticals in the financial, healthcare, advertising/media and IT services sectors.

ECX Fabric

ECX Fabric directly, securely and dynamically connects to Microsoft ExpressRoute and Azure via software-defined interconnection. ECX Fabric is an advanced interconnection service that enables private remote connections for direct cloud access to Azure with automated provisioning.

The key features of the ECX Fabric include:

On-demand cloud connection automation—a self-serve portal and APIs simplify the process of managing dedicated connections to Azure and other cloud services

One port, many connections—Equinix is home to more than 2,900 cloud and IT service providers, and the number is growing. As more join ECX Fabric, service providers and users can connect to more participants over a single physical port

Inter-metro connectivity—directly and securely connect distributed infrastructure and digital ecosystems on Platform Equinix via global, software-defined interconnection. ECX Fabric uses the SDN capabilities in the exchange to enable any customer to dynamically connect its own infrastructure across Equinix locations or connect to any other customer on the Equinix global platform, regardless of location

Global reach—the data centers that host ECX Fabric are found in 30 key global markets

Secure, high-performance direct connections—direct connections within the data center are more secure and reliable and have lower latency than public internet connections

The ECX Fabric portal provides online access to provision 1Gb or 10Gb ports on ECX Fabric and create remote connections to Azure ExpressRoute in several bandwidth options from 50Mb up to 10Gb, as a Layer 2 service. Access to the portal can be found [here](#). For a deployment and configuration overview, review the [Deployment and Configuration Overview](#).

ExpressRoute for Azure Stack

Microsoft Azure ExpressRoute lets you extend your on-premises networks into the Microsoft Cloud over a private connection facilitated by Equinix. With ExpressRoute, you can establish connections to Microsoft Cloud services, such as Microsoft Azure, Office 365 and Dynamics 365. As a direct connection to Azure from your Azure Stack deployment, ExpressRoute is not a VPN connection over the public internet. This decreases latency and increases reliability and predictability. For more information about Azure ExpressRoute, see the [ExpressRoute overview](#).

HPE ProLiant for Microsoft Azure Stack

HPE ProLiant for Microsoft Azure Stack is a pretested, factory-integrated hybrid cloud solution, providing a consistent development, management and security experience. Co-engineered by Hewlett Packard Enterprise and Microsoft, it delivers Azure-consistent, software-defined Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) on HPE hardware. This allows service providers to provide a hybrid cloud solution that combines the speed, agility and simplicity of an Azure public cloud with the secure environment of a powerful Azure Stack managed private cloud.

The HPE ProLiant for Azure Stack solution is offered in multiple node systems. There are 4-, 8- and 12-node systems in market. Based on industry-leading ProLiant DL380 Gen9 servers, complete solutions include:

- Two HPE Networking 5900 series top-of-rack switches
- One HPE Networking 5900 series management switch
- One HPE ProLiant DL360 Gen 9 hardware lifecycle host
- 4–12 configurable HPE ProLiant DL380 Gen 9 compute nodes

Rack height is standard 42U. Power connections are a minimum of two NEMA L15-30P (three phase) with a 3.9kW, 6.4kW or 8.8kW (example per rack) power usage for 4-8-12-node configurations.

Focus on outcome, not cloud infrastructure, with Azure Stack

As a purpose-built, pre-integrated, factory-built, hybrid cloud solution, HPE ProLiant for Microsoft Azure Stack accelerates deployment and simplifies scaling, enabling you to deliver the agility and accelerated time to market your business is looking for—fast. It leverages the power of HPE with full opportunity lifecycle support, including consumption-based pricing, pre- and post-sales consulting and professional services, and collaborative marketing.

And with Equinix, Microsoft's largest ExpressRoute partner with nodes in 22 locations worldwide, you create private, dedicated connections between Azure data centers and your infrastructure located in one of 200 Equinix IBX data centers globally. ExpressRoute connections bypass the public internet. They offer more reliability, faster speeds and lower latencies than typical internet connections. In some cases, using ExpressRoute connections to transfer data between on-premises systems and Azure can also yield significant cost benefits.

The combination of HPE, Microsoft, and Equinix provides an enterprise-grade Azure Stack solution to meet your private/public cloud strategy. Systems integrators, service providers and the enterprise will finally realize the promise of hybrid cloud.

For additional information on the Microsoft Azure Stack/Equinix/HPE solution, please contact your regional Equinix office or email info.microsoft@equinix.com

Equinix technical specifications for Azure Stack

Microsoft Azure Stack is available for order as an integrated system only. Azure Stack software is pre-installed on the HPE hardware configuration listed below and deployed in an Equinix IBX data center.

Equinix and Microsoft Azure Stack solution

- Protected, diverse AC power
- Equinix Performance Hub™ cabinet
- ECX Fabric ports: 1Gb or 10Gb
- Dedicated Microsoft ExpressRoute access
- Ethernet WAN and/or internet access ports

HPE technical specifications for Azure Stack

HPE ProLiant for Azure Stack

Microsoft Azure Stack: Hybrid cloud platform software for Azure-consistent, software-defined IaaS and PaaS

Compute nodes: (4) HPE DL380 Gen9 12LFF CTO servers, each with:

- (2) HPE DL380 Gen9 E5-26xxv4 processors
- (8, 16, or 24) HPE 2R4 PC4-2400T-R DIMMs*
- (4) SSD drives: HPE 960 GB or 1.92 TB SATA MU LFF SCC SSD
- (10) HDD drives: HPE 4 TB, 6 TB, or 8 TB 6G SATA 7.2K 3.5in 512e SC HDD
- (1) HPE Ethernet 10 GB 2P 546FLR-SFP+ Adapter
- (1) HPE H840/4G Array Controller
- (1) HPE TPM Module 2.0 Kit
- (1) HPE OneView
- (1) HPE iLO Advanced

Servers: Can be configured with a matching pair of:

- HPE DL380 Gen9 E5-2699v4 GHz 2.2 (22 cores)
- HPE DL380 Gen9 E5-2698v4 GHz 2.2 (20 cores)
- HPE DL380 Gen9 E5-2695v4 GHz 2.1 x (18 cores)
- HPE DL380 Gen9 E5-2683v4 GHz 2.1 x (16 cores)
- HPE DL380 Gen9 E5-2660v4 GHz 2.0 (14 cores)
- HPE DL380 Gen9 E5-2650v4 GHz 2.2 (12 cores)

Memory choices are 256 GB, 384 GB, 512 GB, 768 GB (cost-optimized) and 768 GB (high-performance option).

Hardware lifecycle host

- (1) HPE DL360 Gen9 8SFF CTO Server
- (2) HPE DL360 Gen9 E5-2620v4 Kit
- (4) HPE 16 GB 1Rx4 PC4-2400T-R Kit
- (4) HPE 600 GB 12G SAS 10K 2.5in SC ENT HDD
- (1) HPE Ethernet 10Gb 2P 546FLR-SFP+ Adapter
- (1) HPE TPM Module 2.0 Kit
- (1) HPE OneView
- (1) Microsoft Windows Server® 2016
- (1) HPE iLO Advanced

Switches

- (2) HPE 5900AF-48XG-4QSFP+ Switch (Workload)
- (1) HPE 5900AF-48G-4XG-2QSFP+ Switch (Management)

Environment

HPE 642 mm, 1075 mm, or 1200 mm Shock Intelligent Rack with PDUs, cabling, hardware kits and options

Microsoft technical specifications for Azure Stack

Azure IaaS services

- Azure Virtual Machines (A, D and Dv2 sizes), Azure Virtual Machine Scale Sets
- Azure Storage (blobs, tables, queues)
- Azure Networking—Virtual Networks, Load Balancer, VPN Gateway
- Azure Key Vault Azure

PaaS services

- Azure App Service: Web Apps, Mobile Apps, API Apps
- Azure Functions
- Standalone Azure Service Fabric clusters on IaaS VMs (deployable to Azure Stack or Azure)
- Azure Container Service (ACS) Engine support (includes Docker Swarm, Mesosphere DC/OS, and Kubernetes container management templates)
- MySQL RP
- SQL Server RP

Microsoft technical specifications for ExpressRoute

Connection steps

The steps to connect to Microsoft ExpressRoute from the customer border router are as follows:

- Create ExpressRoute circuit via Azure Portal and attain Service Key
- Provision a virtual circuit via ECX Fabric
- Complete ExpressRoute logical configuration for ExpressRoute route instances
- Configure customer border gateway protocol (BGP) peering

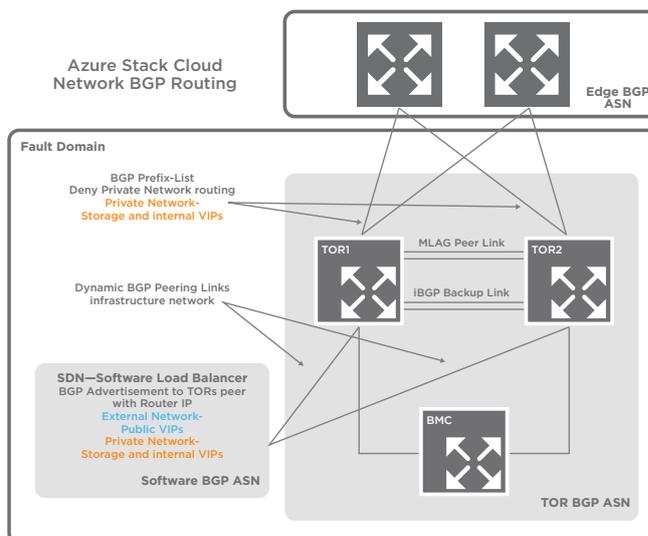
Requirements

The following are specific requirements to connect Azure Stack and Azure using ExpressRoute:

- Azure subscription to create an ExpressRoute circuit and VNets in Azure
- Provisioned ExpressRoute circuit through ECX Fabric
- Router that has the ExpressRoute circuit connected to its WAN ports
- LAN side of the router linked to the Azure Stack Multitenant Gateway
- Router that supports site-to-site VPN connections between its LAN interface and Azure Stack Multitenant Gateway
- If more than one tenant is added in your Azure Stack deployment, the router must be able to create multiple VRFs (virtual routing and forwarding)

For specific Azure, Azure Stack and router configurations, see [Connect Azure Stack to Azure using ExpressRoute](#). Physical network design, logical networks and network infrastructure recommendations are explained in [Network Connectivity](#).

Azure Stack deploys two top-of-rack (TOR) switches in a standard design. It is recommended to connect similarly up to two customer border routers for resilient and highly available infrastructure, which then connects to dual Equinix Cloud Exchange ports and dual ExpressRoute virtual circuits. Using BGP guarantees the customer system is always aware of network changes.



Subnet addresses

There are a host of IPv4 subnet addresses the customer must plan for. The following table shows the logical networks and subnets.

LOGICAL NETWORK	DESCRIPTION	SIZE
Public VIP	Azure Stack uses a total of 32 addresses from this network. Eight public IP addresses are used for a small set of Azure Stack services, and the rest are used by tenant virtual machines. If you plan to use App Service and the SQL resource providers, 7 more addresses are used.	/26 (62 hosts) - /22 (1022 hosts) Recommended = /24 (254 hosts)
Switch infrastructure	Point-to-point IP addresses for routing purposes, dedicated switch management interfaces, and loopback addresses assigned to the switch.	/26
Infrastructure	Used for Azure Stack internal components to communicate.	/24
Private	Used for the storage network and private VIPs.	/24
BMC	Used to communicate with the BMCs on the physical hosts.	/27

Complete border router connectivity and BGP are explained in [Border Connectivity](#). Additional information regarding [DNS](#) and [Firewall integration](#) is available.



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About Equinix

Equinix, Inc. (Nasdaq: EQIX) connects the world's leading businesses to their customers, employees and partners inside the most-interconnected data centers. In 52 markets across five continents, Equinix is where companies come together to realize new opportunities and accelerate their business, IT and cloud strategies.

In a digital economy where enterprise business models are increasingly interdependent, interconnection is essential to success. Equinix operates the only global interconnection platform, sparking new opportunities that are only possible when companies come together.