Azure Hybrid Cloud at the Rugged Edge

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The world needs Hybrid & Edge

Data Sovereignty and Secrecy

Network Bandwidth and Latency

Systems of Record

Many Application patterns and workloads

Billions of Edge Devices

Azure Edge Technology Platforms

Consistently build and run hybrid apps across on-premises, cloud, and edge

Azure Stack Hub
Autonomous Cloud

Connected and disconnected
Cloud compute with Edge aggregation
Application modernization

Rugged Cloud Appliance

Modular Data Center

Azure Stack Hub Platform

Rugged Edge portfolio

Rugged Mobile Appliance

Rugged Edge Appliance

Rugged Cloud Appliance

Rugged Data Center

Azure Stack Edge Platform

Azure Stack Hub Platform

Use Cases

Cloud capability in disconnected environments

Manage and operate IoT networked systems in theater

Humanitarian assistance and disaster response

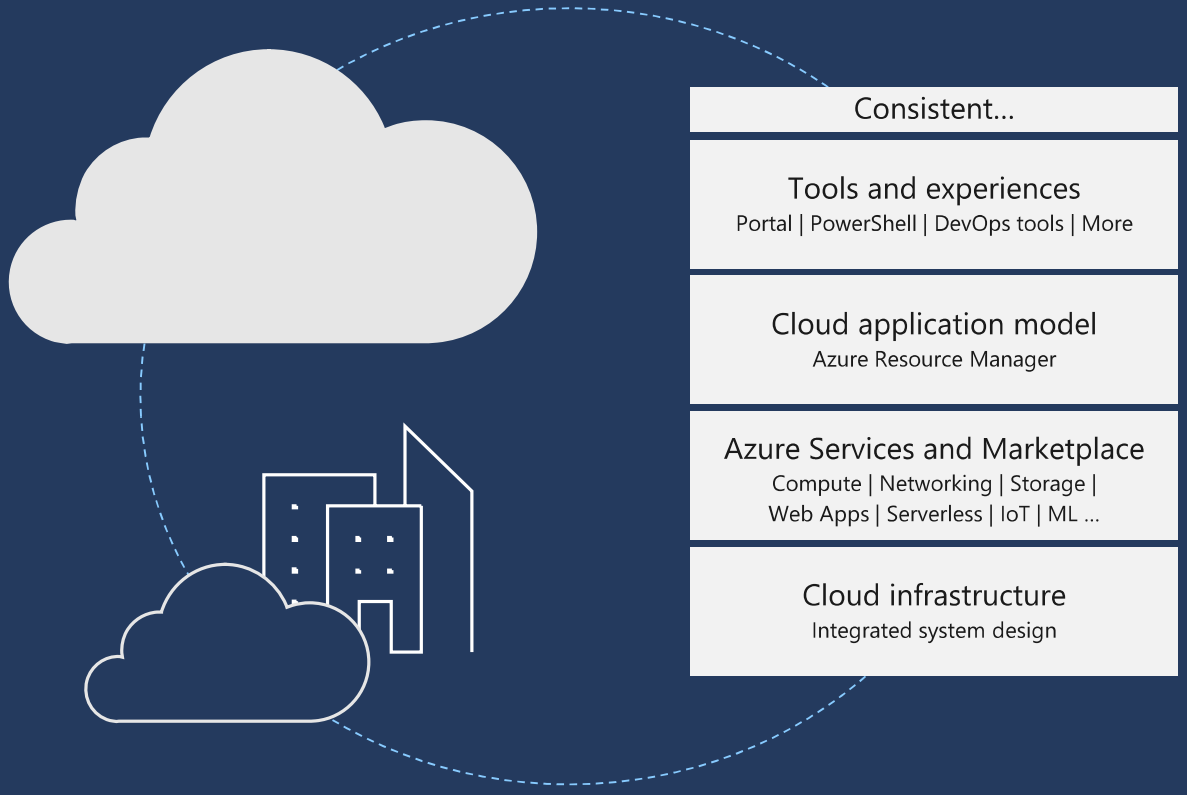
Azure Stack Hub Platform

Azure Stack Hub

Azure Stack is an extension of the Azure **platform**

It brings the agility and innovation of cloud computing to **on-premises** environments

Organizations can build modern applications across hybrid cloud environments with the right **flexibility** and **control**



Azure Stack Hub

Consistent…

Tools and experiences
Portal | PowerShell | DevOps tools | More

Easily transfer your skills and processes between Azure clouds while using the tools you want

Cloud application model
Azure Resource Manager

Manage your cloud resources the same way everywhere

Azure Services and Marketplace
Compute | Networking | Storage |
Web Apps | Serverless | IoT | ML …

Get what you need when you need it with true cloud services on-premises

Cloud infrastructure
Integrated system design

Operators can manage efficiently with integrated systems

Azure Stack Hub Platform: an extension of Azure

Consistent application development

Azure services available on-premises

Integrated system

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Tools

Experiences

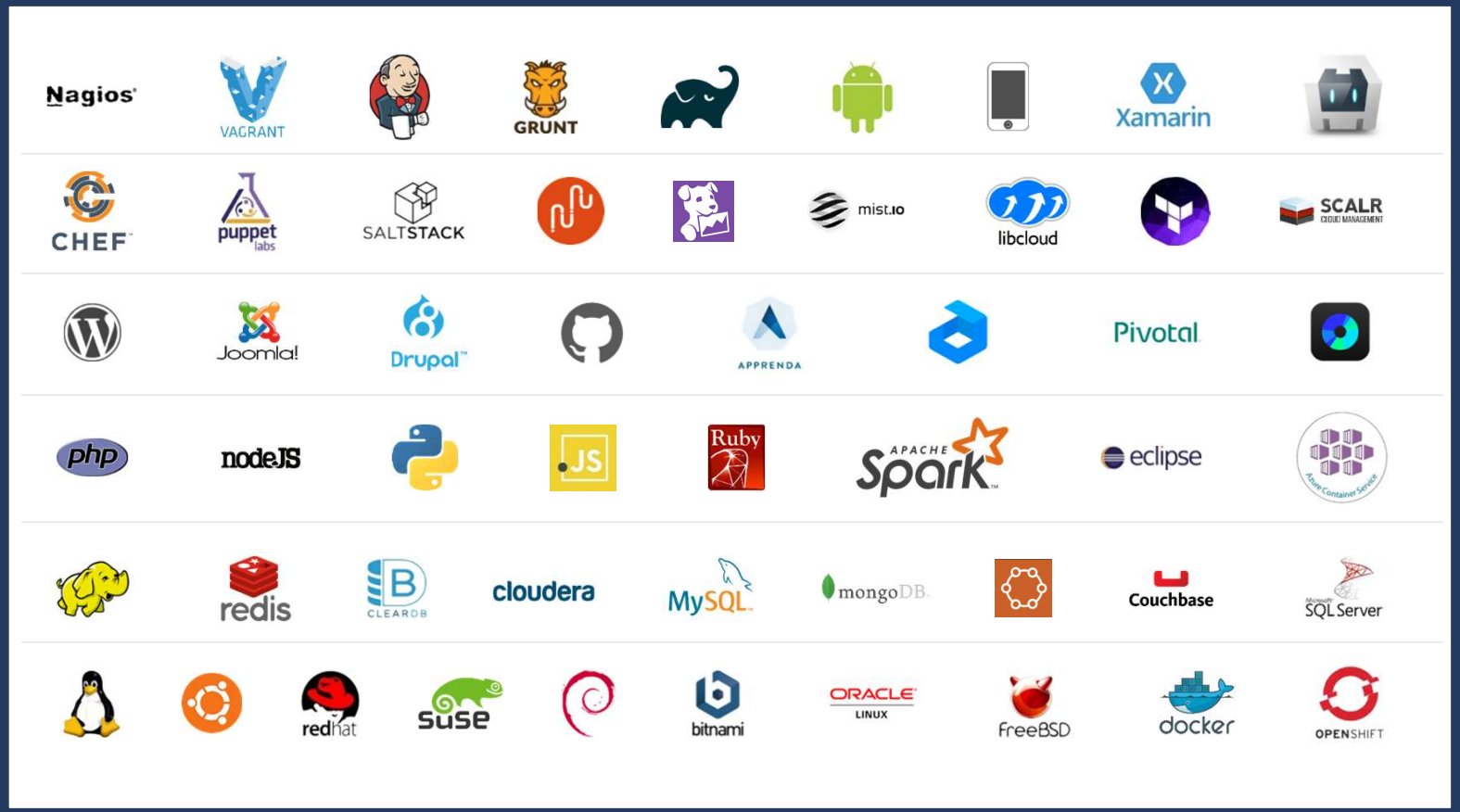
Deployments

Application patterns

Automations

Operations

Use familiar tools and platforms



Azure Stack Hub: an extension of Azure

Consistent application development

Azure services available on-premises

Integrated system

IoT Hub

Serverless

App service

Kubernetes

Marketplace

Virtual machines

Networking

Storage

Key Vault

Event Hub

Azure Stack Hub: an extension of Azure

Consistent application development

Azure services available on-premises

Integrated system

Architecture, hardware, and topology

Deployment, configuration, provisioning

Validation

Monitoring, diagnostics

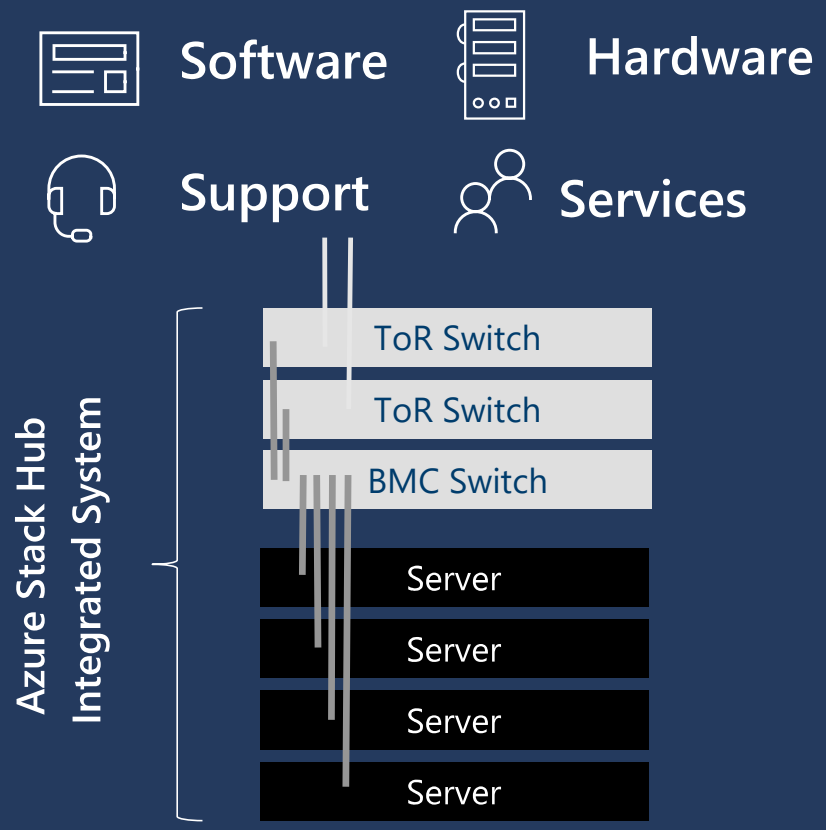
Security and privacy

Business continuity

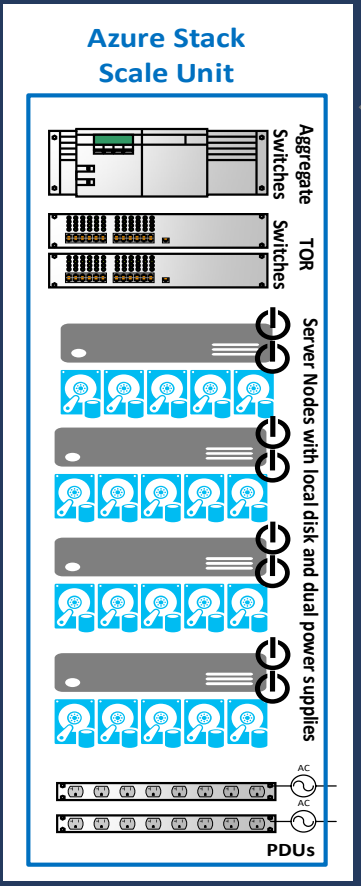
Patching and updates

Field replacement of parts

Azure Stack Hub: Integrated System



Azure Stack Hub: Resiliency



Switch resiliency

- A single TOR or Aggregate switch can fail

Server resiliency

- A single Server node can fail, as long as disk failures are limited to one other Server node

Disk resiliency

- A single disk can fail anywhere in the scale unit
- Multiple disks can fail, as long as they are limited to two server nodes

PDU resiliency

- A single power supply or PDU can fail with no issues

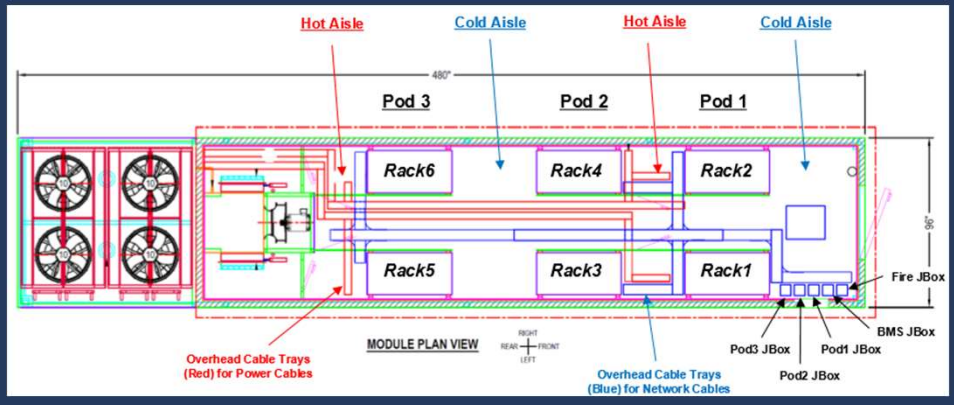
Security principles: Hardened by default

- Secure OS baseline
- HW security features (e.g. secure boot, UEFI)
- Windows Server 2019 security features
  - Credential Protection (Credential Guard)
  - Code Integrity (Device Guard)
  - Antimalware (Windows Defender)
- Constrained admin
  - Least privilege, RBAC
  - Just Enough Administration
- 2-layers of encryption for data at rest
- Network encryption
- Fully automated secrets rotation for all services

Overview of Rugged Datacenter

Contains 3 distinct Azure Stack Hub Systems, one per security classification

- Use sizing calculator to assess capacity needs
- Each Azure Stack Hub configuration
  - 8 Node Azure Stack Hub (with GPU)
  - Usable vCores: 1,104
  - Usable VM disk storage: 230 TB
  - Usable Object Storage: **3 PB** in each classification
  - Usable Memory: 8,097 GB
  - Usable vGPU's: 128
  - Networking: 25 GbE

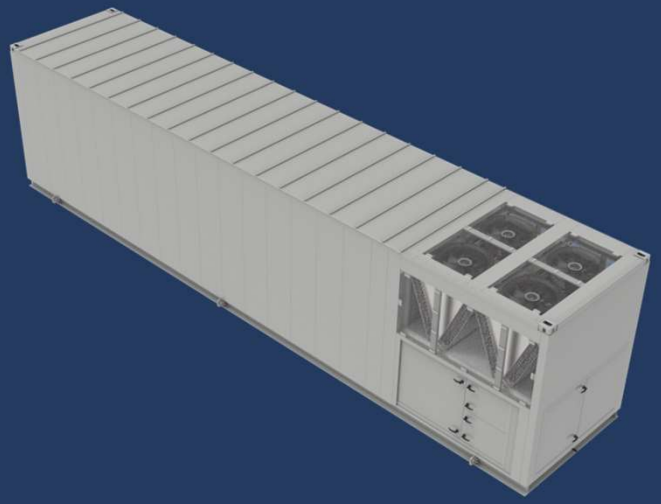


Pre-Deployment Considerations

- Collect required Network deployment information
  - IP Space, Nameprefix
  - DNS Forwarder, Timeserver
  - Identity provider (AAD or AD)
  - Obtain appropriate certificates and validate using our certificate validation tool
  - Review Network and Firewall integration requirements.

- Network
  - 12 pairs of LC-LC single mode 1,10,40 Gb/s
- Power: 400A, 480V, 60Hz
  - Single Pole 400A Cam Lok Male Connections (3P+G)
- Operating Environmental Range
  - Temp -32°C (-25.6°F) to 43°C (109.4°F)*
  - Humidity 0% to 100%

Rugged Datacenter



Transportable Cloud

Autonomous in-theater cloud

Built up to Top Secret Classification Standards

Multiple Classifications

Cloud Endpoint

Connect and Manage multiple Tactical Edge Devices

Rugged Cloud Appliance

- Pre-Deployment Consideration
  - Power: 110-240V, 50/60Hz, 4.981KW
  - 4 pairs LC-LC Multimode Fiber 1/10 Gbps
- Operating Environmental Range
  - Temp -32°C (-25.6°F) to 43°C (109.4°F)*
  - Humidity 5% to 85%

- High – Rugged Cloud Appliance
  - 4 Node Azure Stack Hub
  - Usable vCores: 284
  - Usable storage: 34.2 TB
  - Usable Memory: 1037 GB

- Low – Rugged Cloud Appliance
  - 4 Node Azure Stack Hub
  - Usable vCores: 184
  - Usable storage: 15.4 TB
  - Usable Memory: 547 GB

Combining data from multiple Rugged Edge Devices with Systems of record

Forward Operating Base

Images / Data

Storage Account

AI Application

Images / Data

Mobile Checkpoint

Images / Data

AI/ML

Kubernetes Cluster

Configuration

Azure Stack Edge Service

IaaS and PaaS

Incident response Team

Configuration

Operating Base

Rugged Cloud Appliance

Limited/restricted connectivity
Submarines, aircrafts, and ships

Efficient field operations
Embassies, disaster relief or humanitarian efforts

IoT applications
Device provisioning, tracking and management applications

Smarter management of mobile fleet assets
Utility and maintenance vehicles