Overview

Information is the ultimate competitive advantage. The ability to use and deploy information faster than your competition often is the only way to increase revenue and better target your products and services. The ability to leverage mobile devices and cloud data repositories along with private data that, due to legal or ethical limitations, cannot leave your data center, is a current IT challenge.

The Cisco® Integrated System for Microsoft Azure Stack enables your organization to access development tools, data repositories, and related Azure services to reinvent your applications and gain new information from your secured data. Azure Stack provides the same APIs and user interface as the Azure public cloud. The Integrated System enables your team to save time building cloud-enabled applications, even when disconnected from Azure, and manage customer data while adhering to regulations on data location and accessibility. Cisco’s infrastructure leverages the key automation benefits of the Cisco Unified Computing System™ (Cisco UCS®) with leading Cisco Nexus® networking and data security technology, while ensuring an industry-leading performing design to meet your future hybrid-cloud growth requirements.

Run Microsoft Azure services in your data center

What if you could access Microsoft Azure services to cloud-enable your legacy applications and manage data that cannot leave your data center, even in environments that cannot access the Internet? Cisco provides a highly performant solution designed to meet your growing requirements.
Benefits

- **Design by Cisco**: All major system components are designed, developed, and manufactured by Cisco, which simplifies system management, provides for single-source support, and helps avoid unforeseen product roadmap issues.

- **Leading system performance**: The latest Intel® Xeon® Scalable Processors, up to 2048 GB of memory per server, Nonvolatile Memory Express (NVMe) standard storage cache, and optional Solid State Disk (SSD) are part of the package.

- **Firm data center standards**: Maintain your IT organization's data center standards for Cisco Nexus switching and system racks by installing all system components in your racks and leveraging your networking team's existing expertise.

- **Freedom to choose**: Purchase Azure services from any vendor.

- **Proven tools**: Cisco UCS Central Software and Cisco Nexus hardware enable easy management of multiple locations or regions from a single screen on your desktop.

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Trends and challenges

**Regulatory limits on data location**

In an effort to safeguard consumer data, many governments have enacted strong statutes that define exactly what type of data can move to the cloud versus what must remain confined to your data center.

In May 2018, 28 European countries began enforcing the General Data Protection Regulation (GDPR), which governs the locality of consumer data and establishes specific data-management job functions that must be addressed by each company doing business in those countries. Companies in violation can be fined up to 4 percent of their global annual turnover. This regulation also governs any non-European company that transacts any business with the 28 nations. Thus, the impact of GDPR will be felt globally.

Many individual countries and local government bodies are also enacting similar legislation that will affect an organization's ability to move data to and from any public cloud. IT departments must be mindful of these new data limits to avoid public ill will should consumer data enter the public domain.

**Data sovereignty**

Vertical sectors, such as financial, medical, and governmental, face ethical issues and potential public outcry should their customers' or citizens' data enter the public realm. Exposed credit-card data can cause an immediate negative impact to a company's bottom line, and the news is filled with examples. Imagine a healthcare company's embarrassment should patients' medical histories become publicly available. Even worse, the safety of a nation could be jeopardized if a secure government database were compromised. The question is: How can you manipulate data that cannot leave your data center?

**Customization: Cloud-enabling legacy applications**

Many organizations still run applications that were developed years ago, before smart phones, tablets, and various remote data collection capabilities became available. In addition, as businesses expand into new markets, the challenge of localizing these applications for language, exchange-rate, and traffic-pattern data is a constant worry.

Such applications reside within your data center and cannot be hosted on a public cloud. This lack of cloud capability also prevents these applications from being co-licensed by third parties, eliminating a potential new revenue stream. If you could redesign these applications to incorporate new data input devices rapidly and leverage development tools and data stores, what positive impact might this have to your bottom line?
“Microsoft and Cisco are proven innovators and trusted technology partners, giving customers the confidence that their IT environments can be supported and secure.”

Mike Neil
Corporate Vice President,
Enterprise Cloud Group,
Microsoft Corporation

**Connectivity issues: Latency**

Some data center solutions or applications run in environments that are completely or intermittently disconnected from the Internet. Mining operations, off-shore drilling, and shipping are examples in which a constant connection to the Internet is not possible. Many government and other highly secure data centers do not permit any connection to the outside world, and often any equipment going into the data center, even a laptop, cannot be removed for any reason. Temporary “data centers” supporting auto races, rock concerts, athletic events such as the Olympic Games, and other large events often must process data while operating off line. How can Azure services be accessible when the Internet itself is inaccessible?

Figure 1. Example IT trends impacting hybrid cloud use

<table>
<thead>
<tr>
<th>Regulations</th>
<th>Data sovereignty</th>
<th>Customization</th>
<th>Latency</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Regulations Icon" /></td>
<td><img src="image" alt="Data Sovereignty Icon" /></td>
<td><img src="image" alt="Customization Icon" /></td>
<td><img src="image" alt="Latency Icon" /></td>
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**Cisco Integrated System for Microsoft Azure Stack**

The Cisco solution starts with rack-optimized Cisco UCS C240 M5 Rack Servers. These models house two Intel Xeon Scalable Processors, up to 2.0 Terabytes (TB) of memory, and up to 121 TB of storage per server. You can select from 17 different processors, provided that each server is configured with exactly the same processors, memory, and storage. The servers drive the Azure Stack software and house all of the virtual machines and data.

Each server is connected to two third-generation fabric interconnects, which house the Cisco UCS Manager software; having two avoids the vulnerability of having a single point of failure in the architecture. These fabric interconnects in turn are connected to two Cisco Nexus 9000 switches to enable connectivity to the data center’s border switches. Each switch and fabric interconnect maintain a copy of the other’s configuration to help enable easy replacement, should it be required. Each server is configured with NVMe cache storage and 40 Gigabit Ethernet, which is managed by a Cisco Nexus 2000. The unified fabric that connects the system enables 40 Gigabit Ethernet traffic, which is a clear benefit as the system configuration grows over time.
Azure Stack installation services managed by Cisco Advanced Services are included (a typical installation takes only three days). Cisco also places the system components in your system rack, as we support your choice of system racks. We can configure any node increment from four up to the limit supported by Azure Stack.

Cisco Solution Support is also included. Solution Support is the highest level of Cisco support and provides up to 24 x 7 x 4 hour onsite repair. In addition, your support calls are automatically routed to a team specially trained on Azure Stack. This team can also move a support call to the Microsoft Case Exchange system to enable Microsoft support to engage as needed. This way, human error in reentering call details is avoided. The call flow also works in reverse if you elect to contact Microsoft support initially.

**How is Azure Stack managed and deployed?**

The system administrator manages the system through the Azure Stack administrative portal. Management includes setting up new tenants and users, downloading Azure services, assigning who can access them, and learning of new monthly Azure Stack releases as they are tested by Cisco and become available. It is Microsoft’s expectation that you will update your system on a monthly basis to stay current on new features and patch updates. Because the Azure Stack user interface is the same as that of Azure, those with Azure experience will be able to get up to speed on the system quickly. In addition, all functions of Cisco UCS Manager that you may be familiar with remain available to you. You will receive automatic notifications of any system updates, which you can apply at your convenience. We simply ask that you do not attempt to alter the initial setup of Azure Stack and the service profiles that define your server nodes.

“Cisco’s servers have proven to be very stable and very optimized for all environments. Like many hosting providers and enterprises, we have been using Cisco for networking for many, many years, and we have a really good relationship with Cisco.”

**Thomas Raabo**
Chief Technology Officer
Sentia.com
“Through our joint engineering with Microsoft, we’re delivering to our customers a turnkey solution that is easy to deploy, manage, and scale that addresses the needs of both application developers and IT managers alike.”

Liz Centoni
Senior Vice President and General Manager
Cisco Systems, Inc.
Solution variations

While all system solutions can be configured with up to 2.0 TB of memory and a choice of 17 different processors, a wider range of storage flexibility is available. You can select to use either all-flash storage or hybrid storage (see Figure 3). The all-flash option is configured with solid state drives, with NVMe composing the cache tier with 30, 45, 60 or 121 TB of capacity per server.

In comparison, the hybrid option has traditional spinning drives with NVMe configured as the cache tier, with 32, 64, 96 or 120TB of capacity. Each server in your system must be configured with the same capacity, and you cannot mix the all-flash and hybrid storage options. With the all-flash option, Cisco is once again highlighting our solution by setting an industry-leading performance standard.

When to select all-flash versus hybrid

Your choice of storage option should reflect the type of workloads you plan to run, the performance you expect, and your budget. If you forecast workloads where there is a benefit in reducing the read/write disk latency, such as databases with large data blocks, then all-flash should be preferred. Hybrid is more cost effective but comes with a performance trade-off, the degree of which differs for each customer. Your Cisco sales representative or partner can provide direction on this topic.

Figure 3. Cisco Integrated System for Microsoft Azure stack: all-flash and hybrid storage options
Use cases

<table>
<thead>
<tr>
<th>Industry</th>
<th>Use cases</th>
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<tbody>
<tr>
<td>Financial</td>
<td>• Credit card details becoming public knowledge</td>
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<tr>
<td></td>
<td>• Brokerage information exposed, impacting consumer confidence</td>
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<tr>
<td>Medical</td>
<td>• Patient history exposure leading to public embarrassment and potential lawsuits</td>
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<tr>
<td>U.S. government</td>
<td>• Secured data centers disconnected from Internet</td>
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<tr>
<td></td>
<td>• Tax records released into public domain</td>
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<tr>
<td></td>
<td>• National security compromised</td>
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<td></td>
<td>• International embarrassment from leaked data</td>
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<tr>
<td>Shipping</td>
<td>• Disconnected from Internet</td>
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<tr>
<td>Off-shore drilling</td>
<td>• Disconnected from Internet</td>
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<tr>
<td>Indian reservations, GDPR, country regulations</td>
<td>• Need to clearly define location and movement of all customer-specific data</td>
</tr>
<tr>
<td>Mining</td>
<td>• Disconnected from Internet</td>
</tr>
<tr>
<td>All</td>
<td>• Cloud-enabling of legacy applications to incorporate new data input capabilities, localize application per geographic region</td>
</tr>
<tr>
<td></td>
<td>• Loss of potential revenue stream from relicensing applications located on Azure Marketplace</td>
</tr>
<tr>
<td></td>
<td>• Adhering to GDPR regulations in 28 European counties</td>
</tr>
</tbody>
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Services

Azure Stack onsite installation

Cisco provides the installation of Azure Stack in your data center. Once you place your order, three planning conference calls are set up to review all the steps necessary for a successful implementation. Key to these meetings are outlining customer responsibilities and tracking progress to ensure that targeted installation dates are met. These customer activities include racking, stacking, and cabling of all system equipment; completing a pre-installation worksheet; obtaining the required customer-addressable IP connections; ensuring a direct Layer 3 connection from your data center border switches to the Azure Stack Top-of-Rack (ToR) switches; and ensuring accessibility to the data center, among other required tasks.

The installation is performed on site, which ensures that the latest version is applied. The code is delivered through a laptop, which eliminates the need for a systems management (or hardware lifecycle host [HLH]) server to continually draw power and take up space in the rack. Once all hardware and cabling are checked, Cisco begins by loading a set of automation scripts that configure each server, fabric interconnect, and ToR switch, thus reducing the time required for setup from hours to minutes. Next, Azure Stack is loaded properly: a number of validation checks are performed and connectivity to Azure is ensured (or a token is applied if it is running in a disconnected setup). Finally, the system is handed over to you, and details on how to submit Cisco and Microsoft support requests are reviewed.

The system is now ready for your team to start accessing Azure services and realizing the benefits this hybrid cloud solution can bring to your business.
Solution support services
Cisco’s highest level of support is configured with each Cisco Integrated System for Microsoft Azure Stack. This high-level support provides that any hardware break or need for repair is addressed on site within 4 hours of determining that such a repair is required. Each customer is assigned a specific Solution Support Contract number, and this routes your support request to a specific team within the Cisco Technical Assistance Center (TAC) that has been specially trained on Azure Stack and therefore understand this environment and the challenges it can bring.

Should Cisco determine that your issue is better served by Microsoft, the support call and any information that your team provided is electronically entered into the Microsoft Case Exchange System, Microsoft’s support call management system. The process works in reverse should your support request start with Microsoft. At no time are you caught between these support organizations. Microsoft and Cisco support teams each have access to the same system configurations that you purchase, so any code development or testing can occur before being sent to your data center. You have peace of mind knowing your organization is running tested code.

Data protection with Commvault.
When you leverage Cisco’s infrastructure, you gain high performance networking and industry-leading versatility for virtualized environments with Cisco Unified Fabric. You also automate infrastructure management with Cisco UCS Manager and help ensure consistency with policy-based management. With the latest updates to the Commvault Data Platform, Commvault continues expanding its unique data protection capabilities to Azure Stack, including Cisco infrastructure.

What does this mean for you?
It simply means that no matter where your data lives, Commvault has you covered. One data protection platform protects your data regardless of whether it is on Cisco Integrated System for Azure Stack, in Azure, another public or private cloud—or wherever you need it. This lowers costs, providing one set of tools for your team to know and use. Plus, automated policies reduce human error and administrative costs.

Commvault uniquely provides agentless backup and recovery of your Azure Stack Virtual Machine (VM) and Blob storage, including granular recovery of files and folders from a simplified data management platform.

Key benefits are:
1. Deep integration with Azure Stack: To provide agentless protection of the Azure Stack environment, Commvault leverages the Azure Stack APIs to directly protect and recover data in Azure Stack.

2. Simplified data protection of your Azure Stack: Commvault simplifies backup and recovery for Azure Stack because you are not burdened by deploying and managing agents for data protection. Simply create an SLA-based policy, and you are ready to back up data and VMs in your environment. Recovering VMs, files, and folders is just as easy.

3. Improved recovery times: Meet more aggressive SLA demands with fast Azure Stack data recovery in a production-ready state.

4. Scalable and flexible data protection platform for your Azure Stack environment: The Commvault Data Platform can scale as your Azure Stack environment grows.

5. Seamless, low-risk migration to Azure Stack: Move workloads across platforms in just a few clicks. Reduce migration risk and streamline native workloads to and from Azure Stack.

Commvault’s capabilities resonate with service providers and enterprise customers because it provides a streamlined data protection strategy to satisfy demanding data protection requirements.

The Cisco Integrated System for Microsoft Azure Stack is designed from the ground up using only Cisco system components to provide leading performance, support your data center standards, and provide the tools to manage your hybrid cloud growth over time. Cisco has a broad array of public, private, and hybrid cloud solutions that help augment an investment in Azure Stack, and many of Cisco’s products are available as an Azure service. Cisco truly understands the challenges you face.
Call to action

Join your customer data to Azure Services today

In a 2016 study by IDC,* only 3 percent of respondents indicated that their hybrid cloud was optimized. Are you ready to address the wave of digital transformation before it hits your business, with an optimized hybrid-cloud solution from Cisco? We stand ready to help you take the next steps on your journey, whether that is assessing which of your apps to cloud-enable, deciding how Azure Services can manage your customer data, or sizing a system for your specific needs. For additional information, visit https://www.cisco.com/c/en/us/solutions/data-center/integrated-system-microsoft-azure-stack/index.html and then contact your Cisco Services sales representative or Cisco authorized channel partner.