



# **Windows Server 2019 migration guide**

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# Introduction

Digital transformation is fundamentally changing the ways organizations do business. The exponential rate at which technology is developing has already drastically transformed business processes and encouraged growth. Modern and innovative technologies are bringing agility, scalability, and security benefits to existing applications while building next-generation applications optimized for the cloud. However, many organizations are still running their business-critical applications on aging infrastructure with older operating systems. This greatly limits their ability to take advantage of modern, cloud-ready technologies that could help them stay ahead of competitors.

With a trusted range of industry-leading partners, Microsoft brings digital transformation and future-ready technologies to a new era of hybrid cloud computing. The pace of technological change continues to accelerate, and innovative approaches create new opportunities to transform how small- and medium-sized organizations do business. The latest Microsoft operating system, Windows Server 2019, helps organizations bridge on-premises environments with Microsoft Azure services to enable consistent hybrid scenarios that help grow business and extend operations to the cloud.

This guide is intended to help IT decision makers, IT administrators, and IT pros understand the importance of transforming legacy business workloads. It explains the latest technologies in Windows Server and describes a common approach to migrate application workloads from a previous version to Windows Server 2019.

# Innovative, secure infrastructure for future-ready business

For small- and medium-sized organizations with limited resources and budgets, building an up-to-date IT infrastructure is challenging and expensive. In a decade of innovation, so much has changed: cloud computing has brought a fundamental shift in the way traditional IT infrastructure and technology resources are procured, utilized, and managed. Organizations face many challenges with existing infrastructure and outdated operating systems, including:

- Lack of adaptability to meet modern business requirements

- Outdated security that fails to protect applications and data against modern security threats

- Complex operations due to isolated management across different application workloads

- Time-consuming manual process for resource provisioning

- Upcoming end of support for Windows Server 2008 and 2008 R2

# Windows Server 2019 bridges on-premises and cloud

Windows Server 2019 is the operating system that bridges on-premises environments with Azure services, adding additional layers of

security while helping modernize your applications and infrastructure. It maximizes your existing investments and builds on Windows Server security, app innovation, and hyper-converged infrastructure (HCI) capabilities to help transition your on-premises investments to the cloud. Windows Server 2019 is designed and engineered to help modernize your datacenter, delivering on four key areas:



Unique hybrid datacenter platform



Enhanced security capabilities



Faster innovation for applications



Unprecedented hyper-converged infrastructure

**Unique hybrid datacenter platform:** Extend your datacenter to Azure to maximize your investments and gain new hybrid capabilities.

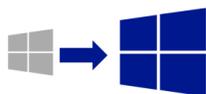
**Enhanced security capabilities:** Elevate your security posture by protecting the datacenter, starting with the operating system.

**Faster innovation for applications:** Enable the creation of cloud-native apps and modernize traditional apps using containers and microservices.

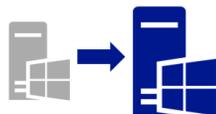
**Unprecedented hyper-converged infrastructure (HCI):** Evolve your datacenter infrastructure to achieve greater efficiency and security with enterprise-grade hyper-converged features.

## Ways to adopt Windows Server 2019

The process of moving to Windows Server 2019 can vary greatly, depending on your existing operating system. The pathway you take determines available options to upgrade or migrate to Windows Server 2019.



Upgrade to Windows Server 2019



Migrate to recent hardware



Bring innovation with Hyper-converged infrastructure



Build Hybrid infrastructure

## Upgrade to Windows Server 2019

Upgrading to Windows Server 2019 is an option if your organization wants to take advantage of future-ready technologies, yet intends to keep the same hardware and server roles you have set up, without flattening the server. You can upgrade in multiple ways. The process allows you to go from an older operating system—including Windows Server 2016, Windows Server 2012 and 2012 R2, Windows Server 2008 and 2008 R2, or even Windows Server 2003—to a newer one while keeping your settings, server roles, and data intact. You can upgrade from previous operating systems using a variety of [upgrade and conversion options for Windows Server 2016](#).

### Migrate to recent hardware

Migration is the process in which you move from your existing operating system to another system such as Windows Server 2019 by transferring to a different set of hardware or virtual machines. Migration involves many considerations, since it includes moving over server roles, applications, and data. Microsoft provides detailed information and tools for [installation, upgrade, and migration](#) that help guide you through the process of migrating roles and features to Windows Server 2019.

### Bring innovation with hyper-converged infrastructure

Organizations are adopting software-defined datacenters as the next step in their digital transformation journey to the cloud. Unbox datacenter innovation using software-defined compute, storage, and networking technology from Microsoft and your choice of hardware certified by the Windows Server Software-

Defined Solutions program. Building your Windows Server software-defined datacenter on the right hardware infrastructure is a crucial first step to successfully delivering high-performance, hyper-converged storage and networking infrastructure for your business-critical application—including legacy business applications to modern cloud technologies.

Evolve your datacenter to hyper-converged infrastructure to achieve greater efficiency and scale. The software-defined technology in Windows Server 2019 provides out-of-the-box capabilities to deploy hyper-converged infrastructure solutions such as virtualizing compute resources to run multiple operating systems side by side. This type of infrastructure allows you to build software-defined storage that helps ensure fault tolerance and better storage performance to virtualize your network. You can also help contain security vulnerabilities while simplifying management for your hyper-converged infrastructure through an intuitive, browser-based interface.



Windows Server 2019 gives organizations the flexibility to deploy Windows Server software-defined (WSSD) solutions with confidence on hardware that has been built and tested by the partner of your choice. With several partners and certified offers, the Windows Server software-

defined datacenter is the fastest route to the benefits of hyper-converged infrastructure.



## Build hybrid infrastructure

Windows Server 2019 is the operating system that bridges on-premises environments with Microsoft Azure services to enable hybrid scenarios that maximize existing investments. You can increase security and reduce business risk with multiple layers of protection built into the operating system. While planning for hybrid cloud, you can use Azure as the permanent location for your custom application or service, allowing the old server to remain available until you are ready to switch over to the new one in Azure. If you already have Software Assurance for Windows Server, you can save money by deploying with the [Azure Hybrid Use Benefit](#), which allows you to use your on-premises Windows Server licenses to run Windows virtual machines on Azure at a reduced cost.

## The right Windows Server 2019 version for you

Organizations can choose from these editions of Windows Server, based on the size of the organization as well as virtualization and datacenter requirements:

**Datacenter edition:** This edition delivers significant value for customers who need unlimited virtualization. It also provides powerful new features including Shielded Virtual Machines, software-defined storage, and software-defined networking.

**Standard edition:** This edition is ideal for customers who need limited virtualization but require a robust, general-purpose server operating system.

**Essentials edition:** Great for small businesses with up to 25 users and 50 devices in a cloud-connected environment. This edition is a good option for customers currently using the Foundation edition, which is not available with Windows Server 2019.

**Microsoft Hyper-V Server 2019:** This includes a free hypervisor, a standalone product that contains only the Windows hypervisor, a Windows Server driver model, and virtualization components.

## Evolve your licensing model

Windows Server 2019 is built on the strong foundation of Windows Server 2016, which has transitioned from processor-based to core-based licensing for Standard and Datacenter editions. This new licensing model provides a consistent licensing metric between on-premises and cloud environments. The transition to core-based licensing helps Microsoft align to a common and consistent currency across environments on-premises and in the cloud—removing friction from different licensing models, enabling multi-cloud scenarios. The change to core-based licensing is one of several steps Microsoft has taken to evolve the server licensing to support hybrid cloud.

Windows Server Standard and Datacenter editions are available in 2-core packs. The number of core licenses required equals the number of physical cores on the licensed server, subject to a minimum of eight core licenses per physical processor (i.e., four 2-pack core licenses) and a minimum of 16 core licenses per server (i.e., eight 2-pack core licenses). Additional cores can be licensed in increments of

two cores (i.e., one 2-pack core license) for gradual increases in core density growth.

**Required number of Core Licenses**

		Physical Cores per Processor				
		2	4	6	8	10
Procs per Server	1	16	16	16	16	16
	2	16	16	16	16	20
	4*	32	32	32	32	40

\*Standard edition may need additional core licenses  
**Minimum cores to license:** 8 per processor, 16 per server  
**Core licenses:** Sold as a 2-pack Core License

## Pathway to Windows Server 2019

Once an organization decides to migrate its aging infrastructure and older version of Windows Server to Windows Server 2019, the next step is to plan the optimal migration path. Microsoft provides comprehensive support for this end-to-end journey—assessing existing application workloads and including tools to help migrate as well as optimize workload performance. Microsoft offers a wide range of enterprise-grade tools and services across all three migration phases.

### Discover and assess

When creating a migration plan, it's critical to discover existing infrastructure and workloads that need to move. First, identify workloads that are running an older version of Windows Server. Once workloads have been identified, next assess business applications and Windows Server roles running on workloads. Prioritize the

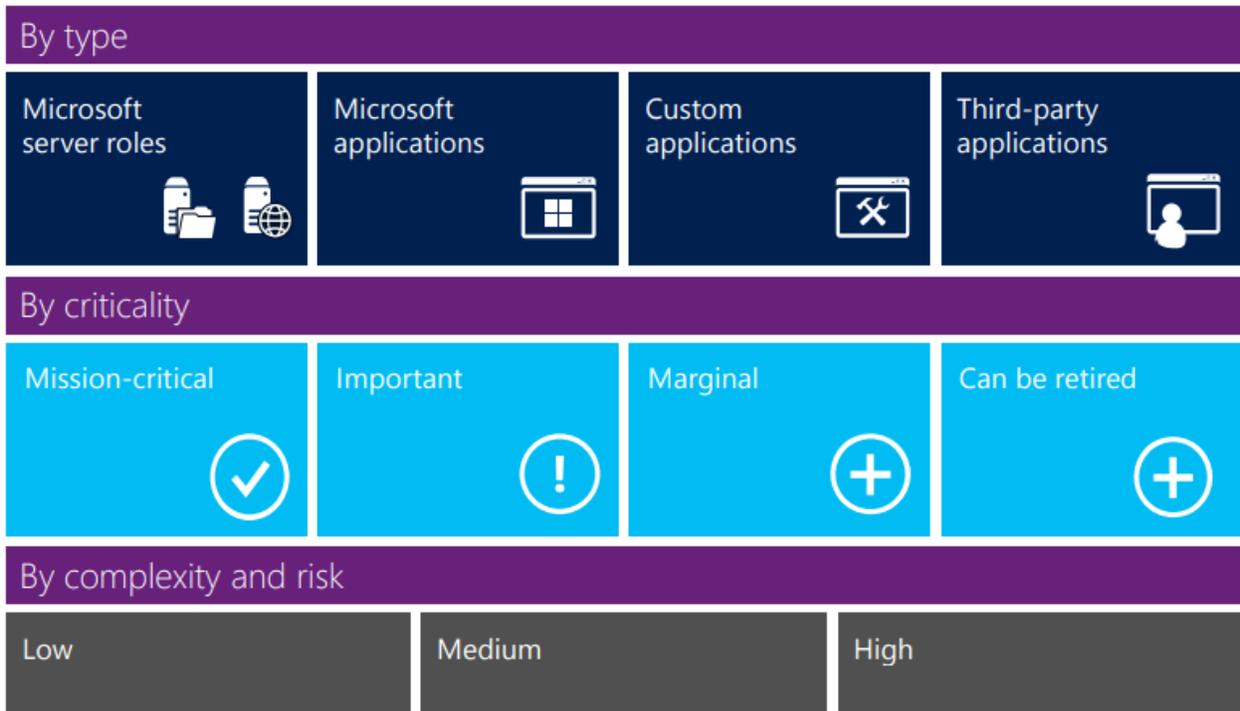
order of migration based on business priorities and migration risks.

To execute this phase, you need to perform three steps to gain insights about existing Windows Server workloads that will prepare a better workload portfolio for migration.

**Discover** – Your organization likely runs numerous application workloads across a range of servers. To kick-start any migration, you need an inventory mechanism that can feed data into subsequent steps. This will help compile an inventory of physical and virtual servers running any version of Windows Server in your environment. This data can also include profile information and performance metrics about your workloads. At the end of this step, you'll have a complete inventory of servers—with metadata for each—that allows you to build your migration plan.

**Map on-premises applications** – Using the information gathered during the discovery step, next map your workloads based on the type of applications and Windows Server roles deployed on those machines. Through this process, you can easily identify dependencies or communications between servers to include all necessary application workloads within the plan—helping to reduce risk and ensure a smooth migration. Group your servers logically to represent the applications, and then select the best migration strategy for each application based on its requirements and migration objectives.

**Evaluate** – With your application groups mapped, evaluate how best to migrate each workload running with an older version of Windows Server.



## Assessment tools

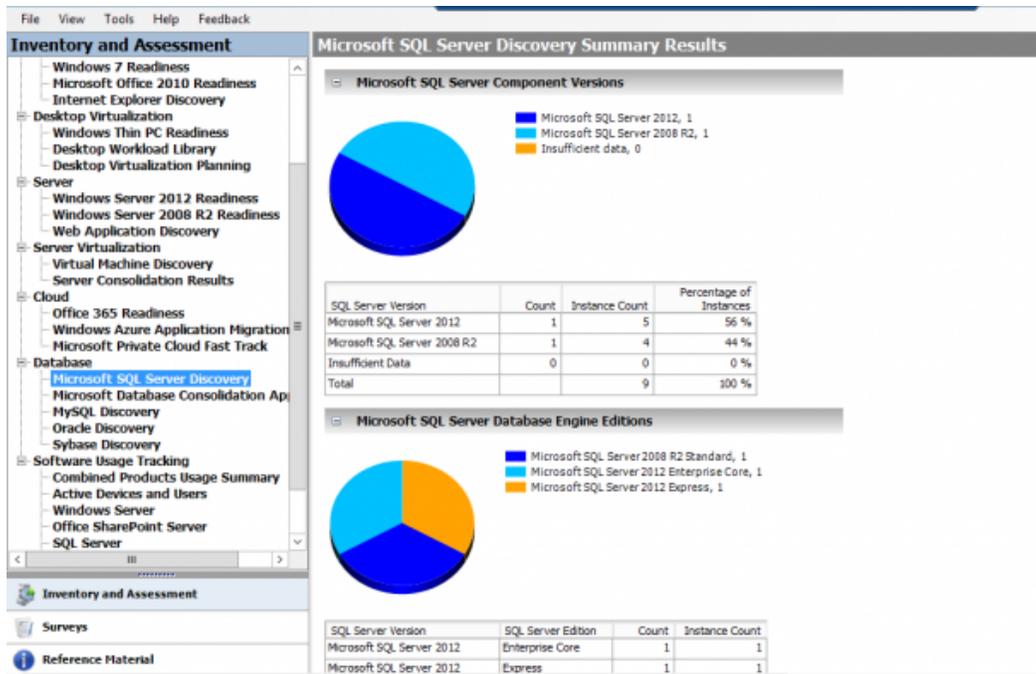
Microsoft provides complete support with tools and guidance for the Windows Server migration journey.

### *Microsoft Assessment and Planning Toolkit*

The [Microsoft Assessment and Planning Toolkit](#) (MAP) is an agentless, automated, multi-product planning and assessment tool for quicker and easier desktop, server, and cloud migrations. The toolkit provides detailed readiness assessment reports with extensive hardware and software information. It includes actionable recommendations to help organizations accelerate their IT infrastructure planning

process and gather more detail on assets that reside within their current environment. MAP also provides server utilization data for planning for Hyper-V server virtualization, identifying server placements, and performing virtualization candidate assessments. The toolkit performs five key functions:

- Discovery and inventory of computers and applications
- Hardware and software migration readiness assessments
- Software usage tracking
- Capacity planning for virtualization
- Public and private cloud migration



MAP uses Windows Management Instrumentation (WMI), Active Directory Domain Services (AD DS), SMS Provider, and other technologies to collect data in your environment. It inventories computer hardware, software, and operating systems in small or large IT environments, without installing any agent software on the target computers.

### Microsoft Data Migration Assistant

[Data Migration Assistant \(DMA\)](#) enables you to upgrade to a modern data platform by detecting compatibility issues that can impact database functionality on your new version of SQL Server. It recommends performance and reliability improvements for your target environment, and identifies issues that can affect an upgrade to an on-premises SQL Server. These are described as compatibility issues and are organized in categories such as breaking changes, behavior changes, and deprecated features.

Discover new features in the target SQL Server platform that the database can benefit from after an upgrade. Described as feature recommendations, these are organized into the categories of performance, security, and storage. DMA replaces all previous versions of SQL Server Upgrade Advisor and should be used for upgrades for most SQL Server versions. Supported source and target versions follow.

Sources version	Target version
SQL Server 2005	SQL Server 2012
SQL Server 2008	SQL Server 2014
SQL Server 2008 R2	SQL Server 2016
SQL Server 2012	SQL Server 2017 on Windows and Linux
SQL Server 2014	Azure SQL Database
SQL Server 2016	
SQL Server 2017 on Windows	

Microsoft recommends running assessments on production databases during non-peak times. Moreover, it's a best practice to perform the compatibility issues and new feature recommendation assessments separately to reduce the assessment duration.

### *Partner migration tools*

You can also use tools and consulting services from Microsoft to support the assessment process and beyond with tools like [Movere](#), [Cloudamize](#), [TSO Logic](#), and [Turbonomic](#). With the information provided by Microsoft migration assessment tools or third-party tools, it becomes much easier to select the roles, features, applications, and virtual machines that are the best candidates for migration.

## Migrate and transform

Once discovery and assessment are completed, it is now time to move farther and perform actual migration to transform your Windows Server workloads to the latest Windows Server 2019. Every workload is unique, and based on the type of Windows Server role or business application deployed on it, there is no single set of steps to follow for migration.

Organizations can opt for Windows Server 2019 bundled with next-generation server hardware, and migrate their business application data and critical business data and files. Microsoft

provides multiple tools to seamlessly migrate data to Windows Server 2019 to ensure smarter and faster migration with minimal business impact.

## Windows Server roles migration

Microsoft provides a complete set of guides to help you migrate specified Windows Server roles and features from one server to another, rather than in-place upgrades. Many roles and features can be migrated using Windows Server Migration Tools. This set of Windows PowerShell cmdlets helps your organization easily migrate role and feature elements and data to the latest version of Windows Server. Unless otherwise noted in the guides, migrations are supported between physical and virtual computers, and between full-installation options of Windows Server and servers that are running the Server Core installation option.

Here are some useful resources to understand types of server roles and their migration compatibility across different versions of Windows Server operating systems:

[Server role upgrade and migration matrix for Windows Server 2016](#)

[Recommendations for moving to Windows Server 2016](#)

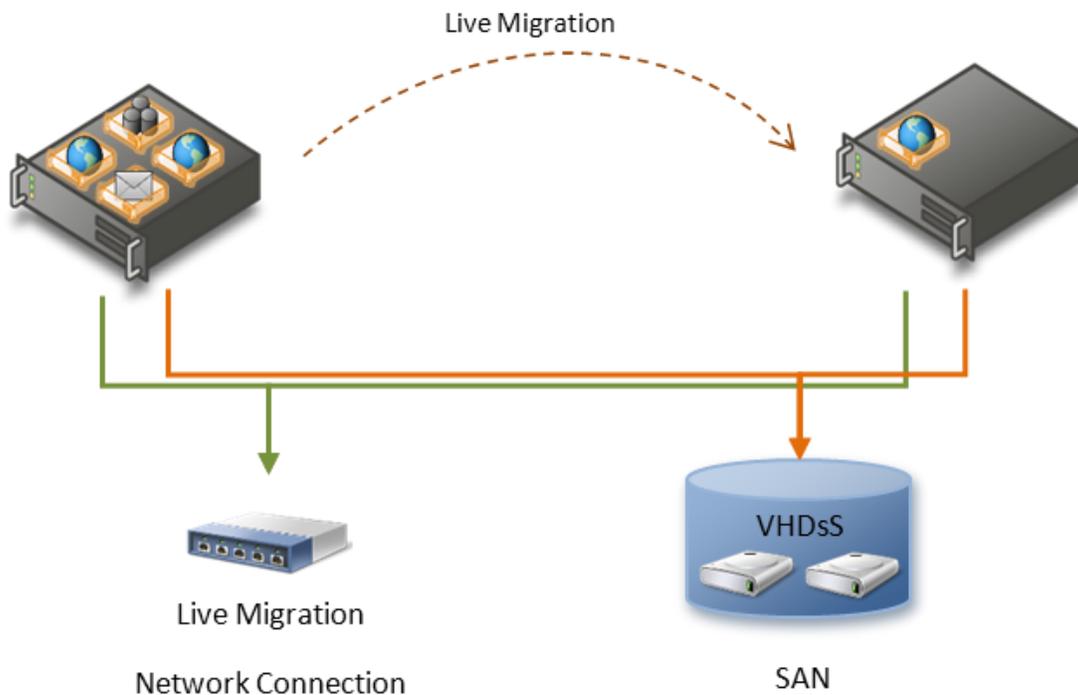
[Migrating Roles and Features in Windows Server](#)

## Transition of existing virtual machines

During Windows Server migration, moving existing virtual machines to the latest hardware is critical. While migrating virtual machines to a new host with the latest Windows Server and next-generation hardware, it is important to understand the different aspects of virtual machine migration. You need to identify which approach best suits your migration requirements while keeping it simple to result in minimal or zero business downtime. Windows Server supports the following ways to migrate your existing Hyper-V virtual machines to a modern host.

### Live migration

Live migration is a Hyper-V feature in Windows Server that allows you to transparently move running virtual machines from one Hyper-V host to another without perceived downtime. The primary benefit of live migration is flexibility—running virtual machines that are not tied to a single host machine. This allows actions like draining a specific host of virtual machines before decommissioning or upgrading.



Datacenters with multiple Hyper-V physical hosts will be able to move running VMs to the best physical computer for performance, scaling, or optimal consolidation—without impacting users.

The Hyper-V role in Windows Server 2019, Windows Server 2016, or Windows Server 2012 R2 is installed on the source and destination servers and set up for live migrations. You can do a live migration between hosts running Windows Server 2019 and Windows Server 2016,

as well as Windows Server 2012 R2 if the virtual machine is at least version 5.

Live migration makes it possible to keep virtual machines online, even during maintenance, increasing productivity for both users and server administrators. Datacenters will also be able to reduce power consumption by dynamically increasing consolidation ratios and powering off unused physical hosts during times of lower demand.

When paired with Windows Failover Clustering, live migration allows the creation of highly available and fault-tolerant systems. Live migration can also work without failover clustering. For more information about configuration and execution steps for live migration, visit the following links:

[Set up hosts for live migration without Failover Clustering](#)

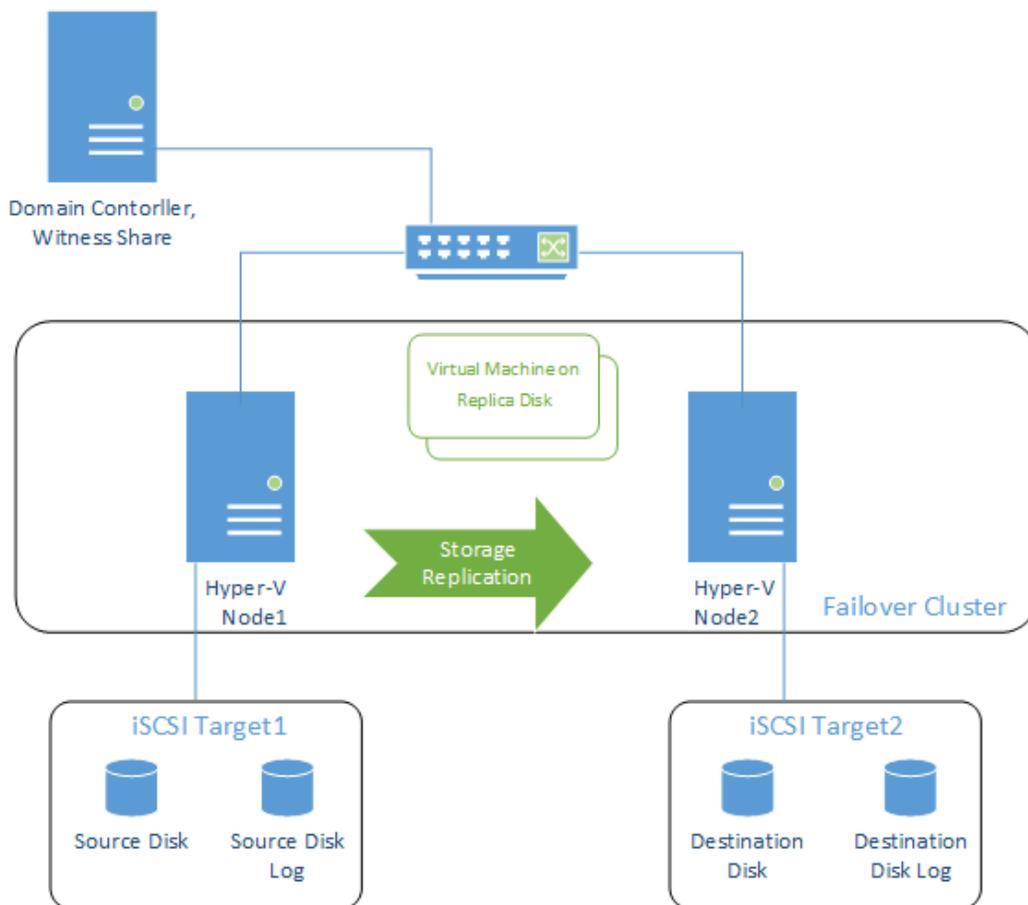
[Use live migration without Failover Clustering to move a virtual machine](#)

### Hyper-V VM replication

Hyper-V Replica is an integral part of the Hyper-V role. It contributes to your disaster recovery strategy by replicating virtual machines from one

Hyper-V host server to another to keep your workloads available. Hyper-V Replica creates a copy of a live virtual machine to a replica offline virtual machine. Hyper-V Replica works with any server network and storage vendor, providing unlimited replication capability out of the box.

In addition, Hyper-V Replica asynchronously replicates selected VMs from a primary Hyper-V host to a replica Hyper-V host across either LAN or WAN links. After initial replication is complete, subsequent changes are replicated at a defined interval. Hyper-V Replication enables replication for existing virtual machines to a different host—whether migrating to the newest version of Windows Server, updating new hardware, or adding a host to a cluster.



To learn more about setting up Hyper-V Replica, visit the following links:

[Setup Hyper-V Replica](#)

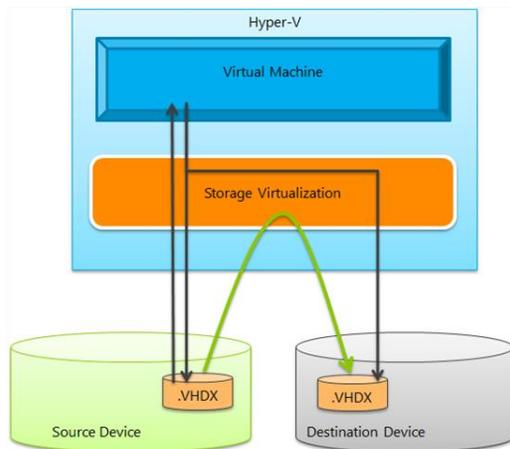
[Virtual machine replication using Hyper-V Replica](#)

## Backup and restore

Another method for migrating existing Hyper-V virtual machines is to back up and restore virtual machines. Hyper-V uses the Volume Shadow Copy Service (VSS) to back up and restore virtual machines to another Hyper-V host. If the VSS backup integration services are installed in the guest operating system, a VSS requester is installed that will allow VSS writers in the guest operating system to participate in the backup of the virtual machine. Hyper-V uses one of two mechanisms to back up each virtual machine, including:

**Saved State** – The default backup mechanism is called the "Saved State" method, where the virtual machine is put into a saved state during the processing of the PrepareForSnapshot event, snapshots are taken of the appropriate volumes, and the virtual machine is returned to the previous state during the processing of the PostSnapshot event.

**Child VM Snapshot** – The other backup mechanism is called the "Child VM Snapshot" method, which uses VSS inside the child virtual machine to participate in the backup.



To understand more about the process for backing up and restoring virtual machines, visit the following links:

[Overview of Processing a Backup Under VSS](#)

[Overview of Processing a Restore Under VSS](#)

## Business application migration

Apart from Windows Server roles and features or Hyper-V, you should plan ahead for the migration of workloads—whether Microsoft applications or custom applications from older operating systems to Windows Server 2019. Migrating existing applications to the Windows Server 2019 requires extensive planning to identify whether the existing application is compatible with Windows Server 2019. To take comprehensive advantage of Windows Server 2019 bundled with next-generation hardware, it is recommended to upgrade your application to a recent version to better meet compliance, security, performance, and optimization requirements.

Depending on the forward compatibility of your business application with Windows Server 2019, there can be multiple ways to migration your business-critical applications, including:

**Relocating application as-is on Windows Server 2019** – When your existing application supports forward compatibility with Windows Server 2019, you can migrate your application as-is to Windows Server 2019. Relocating an existing application to the modern platform is key to overcome the limitations of older operating systems and challenges with aging infrastructure. At the same time, you can unlock new opportunities to leverage advanced and future-ready capabilities with a combination of modern software and hardware.

**Virtualize application workload** – Most organizations have already adopted or are on their way to virtualization adoption using Hyper-V. You can virtualize your application workload and host it to Windows Server 2019 to accelerate performance, security, and availability with enterprise-class hyper-converged infrastructure. This application migration approach can bring the latest cloud-inspired innovation to your datacenter using software-defined compute, storage, and networking technology from Microsoft and your choice of hardware certified by the Windows Server Software-Defined Solutions program.

**Upgrade to rehost your application** – For those applications that are currently running

an older version of Windows Server and don't support forward compatibility with Windows Server 2019, it is a best practice to upgrade the applications to prepare to rehost. This migration approach gives you the opportunity to modernize your business application with the capabilities offered to the latest version of the application. At the same time, you will be able to leverage cloud-enabled innovation capabilities provided by Windows Server 2019 and bundled with modern hardware.

## Microsoft applications

Small and medium organizations use many Microsoft applications for their business process or to develop custom and third-party applications. Let's look at the commonly used Microsoft business applications and their migration approaches.

### Microsoft Exchange

For on-premises migration, consider which version of Microsoft Exchange Server your organization has, and which version can work seamlessly with Windows Server 2019. The following table identifies the operating system platforms on which each version of Exchange can run. Supported platforms are identified by an X character

Operating system platform	Exchange 2019	Exchange 2016 CU3 and later	Exchange 2016 CU2 and earlier	Exchange 2013 SP1 and later	Exchange 2010 SP3
Windows Server 2008 SP2					X
Windows Server 2008 R2 SP1				X	X
Windows Server 2012		X	X	X	X
Windows Server 2012 R2		X	X	X	
Windows Server 2016	X	X			
Windows Server 2019	X	X			

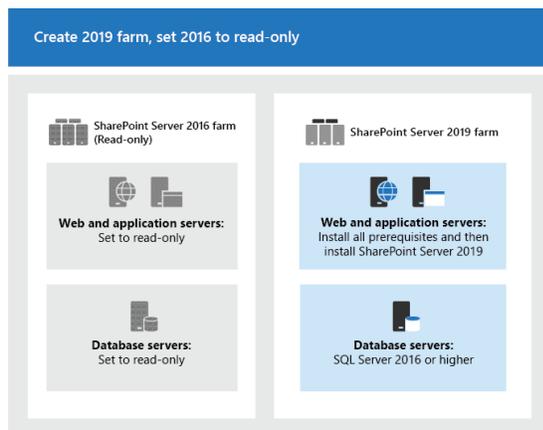
For on-premises migration, you must consider which version of Exchange Server you are running, and whether it is forward compatible with Windows Server 2019. Upgrading Exchange Server brings substantial new features and improvements, including changes in the architecture for Exchange deployments. You can also deploy coexistence scenarios that are supported for Exchange 2019 and earlier versions of Exchange.

Alternatively, you can migrate Microsoft Exchange on an older Windows operating system to Exchange Online, a hosted email for business. You can enable hybrid deployments of Exchange on an older operating system with Office 365 tenants that can be upgraded to the latest version of Office 365.

## Microsoft SharePoint

With the adoption of Windows Server 2019 comes the opportunity to upgrade to the latest version of Microsoft SharePoint 2019, designed to help you achieve new levels of reliability and performance. The new SharePoint delivers features and capabilities that simplify administration, protect communications and information, and empower users with a mobile, intelligent intranet and content collaboration solutions that work across devices and screens.

SharePoint Server 2019 supports upgrading from SharePoint Server 2016. When you upgrade from SharePoint 2016 products to SharePoint Server 2019, you must use a database attach upgrade, which means that you upgrade only the content for your environment and not the configuration settings. After you have configured a new SharePoint Server 2019 environment, you can copy the content and service application databases from the SharePoint 2016 Products environment to the SharePoint Server 2019 environment. You use a backup and restore process to copy the database, and you can also choose to set the databases to read-only in the SharePoint 2016 products environment so that users can continue to access their information, but not change it. [Get started with upgrades to SharePoint Server 2019.](#)



Alternatively, you can migrate to SharePoint Online (SPO), a component of Office 365 that is a cloud-based collaboration platform for you and your organization store, organize, and

share data and easily communicate with each other. With SPO, you can share common resources and applications on portals, search to discover information and expertise across your organization, and stay in the know with personalized news in SharePoint home and the SharePoint mobile apps.

A variety of options are available to migrate content to SharePoint Online from your on-premises SharePoint, depending on the size and quantity of files you need to move. What data do you want or need to move? Where is the content currently stored? Taking the time to plan your migration, including an inventory and assessment of your data, is key to a successful migration.

Method	Description
SharePoint Migration Tool	<p>The SharePoint Migration Tool (SPMT) can easily migrate your files from SharePoint on-premises document libraries, lists, or regular files shares.</p> <p>Download the tool at <a href="#">SharePoint Migration Tool</a>. To use the PowerShell version of the SPMT, see <a href="#">Migrate to SharePoint Online using PowerShell</a>.</p>
OneDrive sync client	<p>After installing the OneDrive sync client, you can drag and drop files to a folder on the computer. The content will automatically sync with either OneDrive or SharePoint Online.</p>
Manual upload	<p>Upload files one at a time from the SharePoint Online tenant.</p>

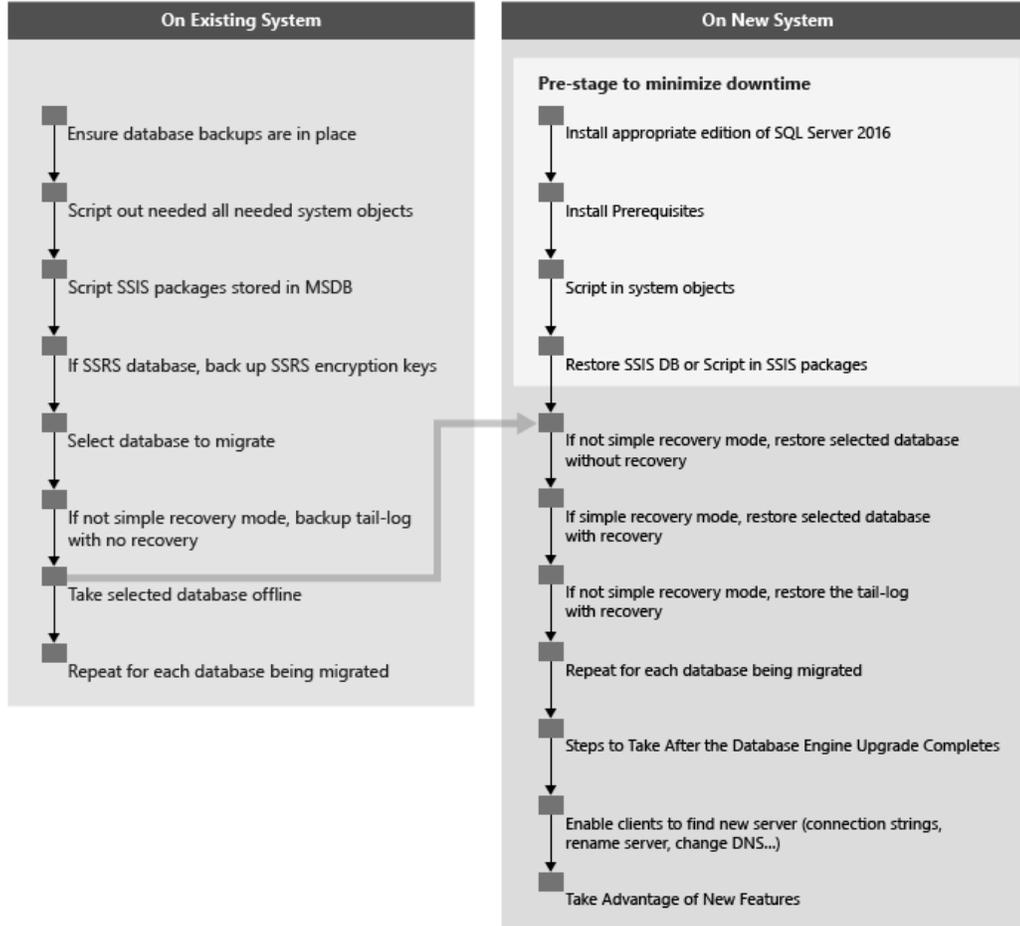
### Microsoft SQL Server

There are many considerations as you are planning to migrate SQL Server Database. While migrating from a previous version of SQL Server running on an older operating system, you should maintain the current environment as you build a new SQL Server environment on new hardware with the Windows Server 2019 operating system. After installing SQL Server in the new environment, you will perform a number of steps. You need to prepare the new environment in order to migrate user databases from the existing environment while minimizing downtime.

Once the new SQL Server environment has the same system objects as the existing environment, you then migrate the user databases from the existing system to the SQL Server instance in a manner that will limit downtime for the existing system. You can migrate the database by either using backup and restore or, in a SAN environment, by repointing logical unit numbers (LUNs). The steps required for a new installation upgrade vary slightly depending on whether you are using attached or SAN storage.

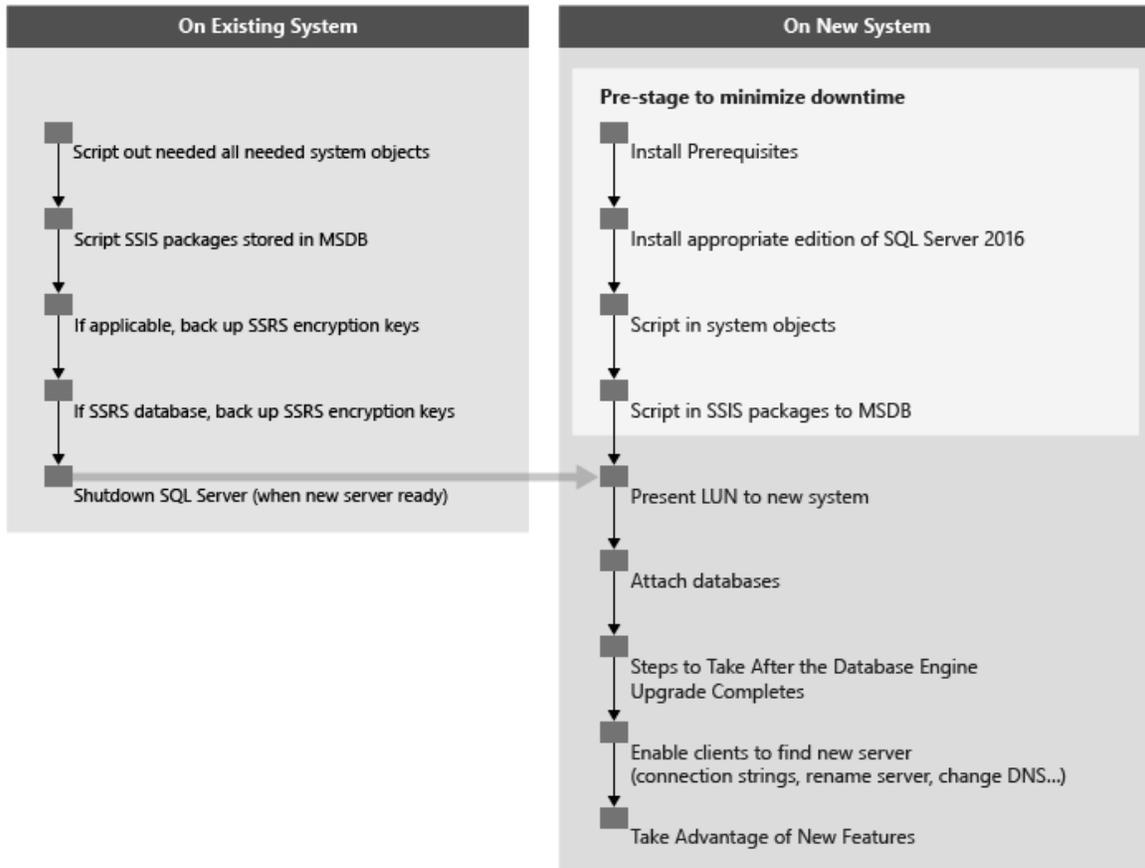
**Attached storage environment:** For a SQL Server environment with attached storage, the following diagram and links will guide you through the steps required for a new installation upgrade of the Database Engine.

SQL Server 2016 Relational Engine  
New Installation Upgrade Method Using Backup and Restore with Attached Storage



**SAN storage environment:** If you have a SQL Server environment using SAN storage, the following diagram and links will guide you through the steps required for a new installation upgrade of the Database Engine.

**SQL Server 2016 Relational Engine  
New Installation Upgrade Method Using Detach and Attach with SAN Storage**



## Storage migration

With Windows Server 2019, it is now easier to migrate data from older operating systems. Microsoft provides a different solution for migrating data to the latest Windows Server or Azure.

## Storage Migration Service

[Storage Migration Service](#) (SMS) is a new server role introduced with Windows Server 2019 in both Standard and Datacenter editions. SMS

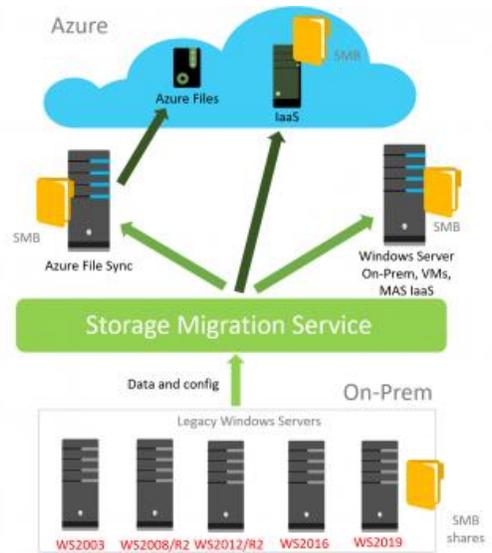
provides orchestrated workflow with Windows Admin Center—a graphical management system that allows scalable migrations of many servers simultaneously to new targets running on-premises or in Azure. Storage Migration Service helps you migrate servers and data without reconfiguring applications or users. You can migrate unstructured data from anywhere into Windows Servers 2019 and Azure with consistency and scalability.

SMS operates in three distinct phases:

**Inventory** – Performs inventory for the related storage, networking, security, sharing configuration, and data for the workloads you want to migrate.

**Transfer** – Defines source and destination nodes from an inventory list before deciding what data to transfer.

**Cutover** – Uses new servers to take over the identity of the old servers. The old servers enter a maintenance state where they are unavailable to users and applications for later decommissioning, while the new servers use the subsumed identities to carry on all duties.



The table below briefly summarizes which Windows operating system VMs are supported sources and destinations for SMS.

Supported source operating systems	Supported destination operating system
Windows Server 2003 Windows Server 2008 Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2 Windows Server 2016 Windows Server 2019	Windows Server 2012 R2 Windows Server 2016 Windows Server 2019*

\*Windows Server 2019 will have double the data transfer performance due to its inclusion of the SMS proxy service.

## Azure File Sync

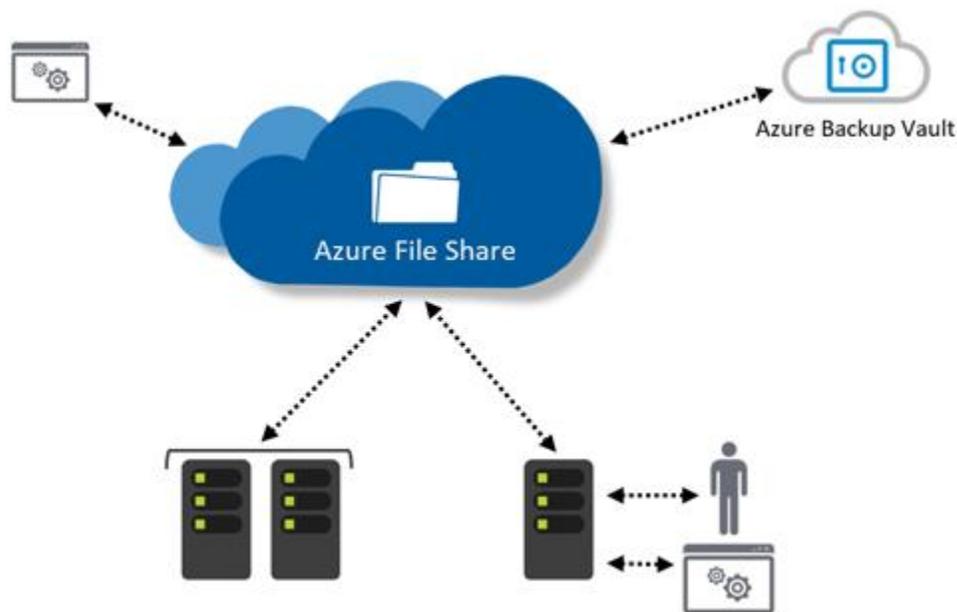
[Azure File Sync](#) extends on-premises file servers into Azure to provide cloud benefits while keeping the flexibility, performance, and compatibility of an on-premises file server. The cloud-based backup solution replicates files from your on-premises Windows Server to an Azure file share, enabling you to centralize your file services in Azure while maintaining local access to your data. Azure File Sync provides the following:

**Multi-site access** – Allows write access to the same data across Windows servers and Azure Files.

**Cloud tiering** – Stores only recently accessed data on local servers.

**Integrates with Azure backup** – Eliminates the need to back up your data on-premises.

**Fast disaster recovery** – Restores file metadata immediately and recalls data as needed.

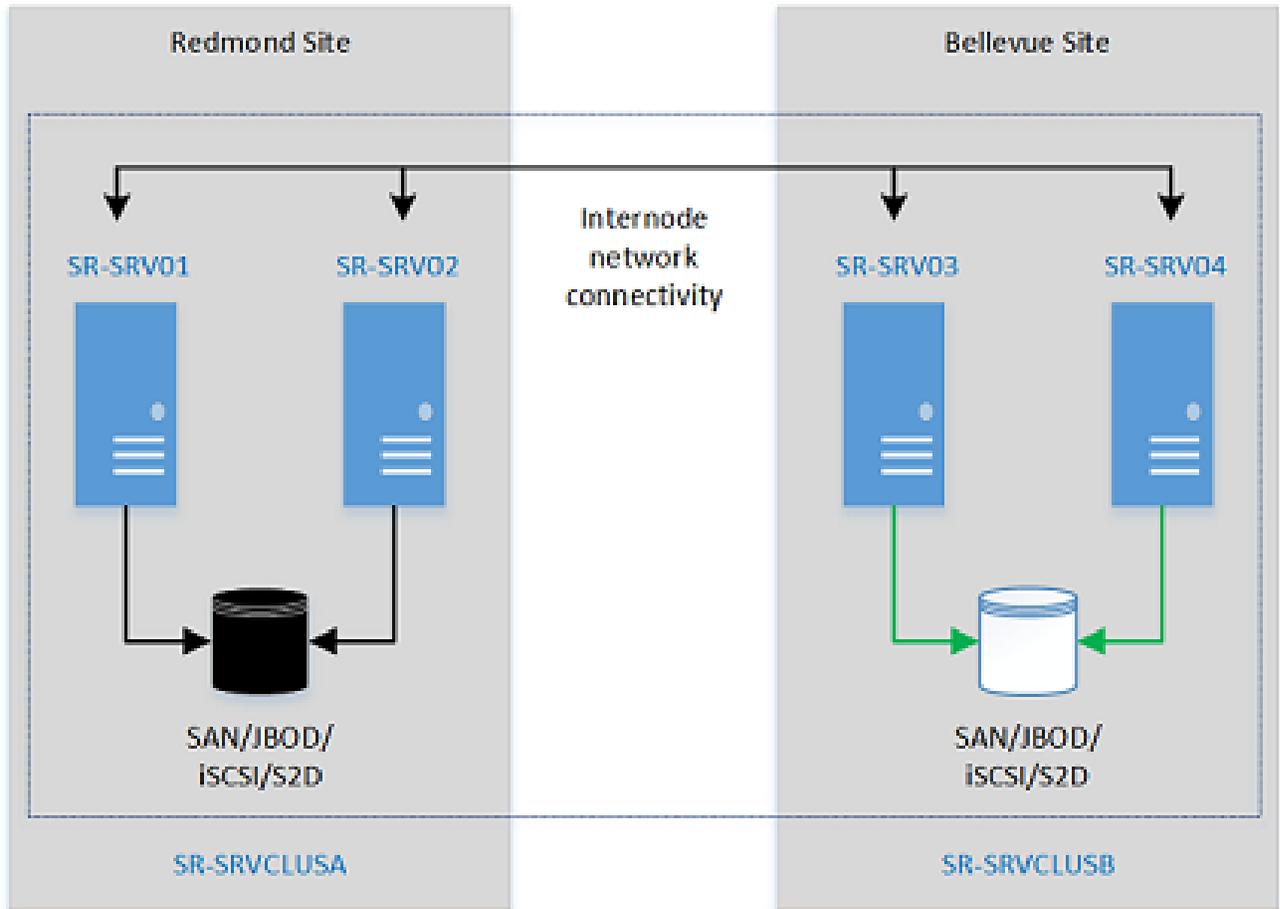


### ***Replace or supplement on-premises file servers***

Azure File Sync can be used to completely replace or supplement traditional on-premises file servers or network-attached storage (NAS) devices. Azure file shares can also be replicated with Azure File Sync to Windows Servers, either on-premises or in the cloud, for performance and distributed caching of the data where it is used.

### ***Lift and shift applications***

Azure File Sync makes it easy to lift and shift applications to the cloud that require a file share to store file application or user data. The solution enables both the classic lift-and-shift scenario, where both the application and its data are moved to Azure, and the hybrid lift-and-shift scenario, where the application data is moved to Azure and the application continues to run on-premises.



## Storage Replica

[Storage Replica](#) is Windows Server technology that enables the replication of volumes between servers or clusters for disaster recovery. It also allows you to create stretch failover clusters that span two sites, with all nodes staying in sync. Storage Replica supports synchronous and asynchronous replication:

### **Synchronous replication**

Mirrors data within a low-latency network site with crash-consistent volumes to ensure zero data loss at the file-system level during a failure.

### **Asynchronous replication**

Mirrors data across sites beyond metropolitan ranges over network links with higher latencies, but without a guarantee that both sites have identical copies of the data at the time of a failure.

## Customize applications

For many organizations, line-of-business (LOB) applications have been developed either for business processes or internal use and represent the most critical part of the IT infrastructure. While contemplating the adoption of Windows Server 2019 for digital transformation, it becomes crucial to think about how to move these legacy applications. A decision has to be made about whether the application should be moved as a lift and shift, or whether it has to be redesigned and transformed to become cloud-ready.

## Rehost applications

Rehosting applications is often referred to as this type of a lift-and-shift migration. The application is migrated as-is to Windows Server 2019 for better scalability, reliability, and security, as well as to leverage cloud-enabled technologies without the risks or costs of making code changes. For rehosting the custom application, you should work with the application development team to identify possible ways to migrate an application from a previous version of Windows Server to Windows Server 2019.

## Modernize applications

To enable digital transformation, organizations require the next generation of modern, integrated, and intelligent applications that help businesses grow, evolve, and digitally transform. As a cloud-ready operating system, Windows Server 2019 delivers new layers of security and Azure-inspired innovation for the applications and infrastructure that power your business. You can transform your legacy application by modernizing your application deployment architecture to retain your existing application code and business logic.

Windows Server 2019 helps you to secure and modernize existing enterprise server apps with little or no code changes; package existing apps in containers to realize the benefit of a more agile DevOps model; and then deploy either on-premises, to any cloud, or in a hybrid model. You can combine the benefits of containers with Service Fabric and the proven Windows Server platform to achieve business agility with cloud apps.

## Containerize applications

Move your traditional applications into a modern DevOps environment with few or zero code changes. Use containers to gain control and consistency by enabling “write-once, run-anywhere” apps that can be deployed on-premises, to any cloud, or in a hybrid architecture across clouds. For an additional layer of isolation, deploy your app with Hyper-V isolation, which packages the same container image with its own dedicated kernel to ensure tighter isolation in multi-tenant environments. With constant improvements to Windows Server containers and Windows Subsystem on Linux (WSL), customers can now run Linux containers side by side with Windows containers on a Windows Server. This enables Linux users to bring their scripts to Windows while using industry standards like OpenSSH, curl, and tar.

## Build cloud-native and hybrid applications

Windows Server 2019 ships with cloud-ready technologies for building cloud-native applications with microservices architectures. Create with familiar tools, including third-party frameworks, such as Node.js. Using proven Azure Service Fabric technology along with Windows Server 2019, build always-on, scalable, and distributed applications and run them in Azure, on-premises, or in a hybrid model.

To learn more about Windows Container services and how to deploy, visit these links:

[About Windows Container services](#)

[Systems requirements for Windows Container services](#)

[Container Host Deployment – Windows Server](#)

[Create Service Fabric clusters on Windows Server or Linux](#)

## Continue to optimize workloads

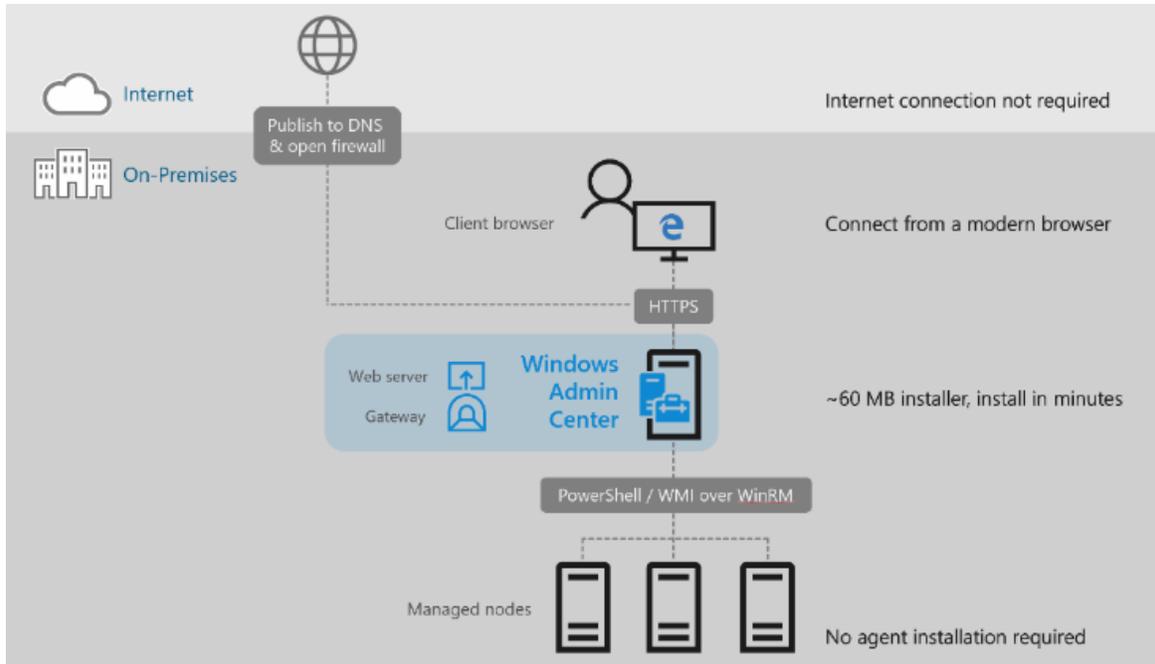
Optimizing workloads is an ongoing process of continuously streamlining your IT resources to enhance security, improve performance, and maximize ROI. Once roles and workloads have been successfully migrated to Windows Server 2019, you can start leveraging the benefits of cloud-ready and innovative technologies. These include cost savings from increased operational efficiencies and reduced capital expenditures, improved functionality, better security, and more flexibility. Advanced security capabilities help elevate your security posture by protecting the datacenter even at the operating-system level. Application-level innovation enables you to create cloud-native environments and modernize your traditional apps using containers and microservices. With hyper-converged features, Windows Server 2019 helps modernize the way IT pros scale storage, compute, and technology with faster time to value.

You can also extend your datacenter operations to the cloud for a seamless hybrid experience. With Windows Server 2019 built-in capabilities, small- and medium-sized organizations can take advantage of centralized hybrid management—whether your workloads run on-premises or in the cloud.

## Windows Admin Center

[Windows Admin Center](#) is an evolution of Windows Server 2019 in-box management tools. A single pane of glass consolidates all aspects of your local and remote server management. Windows Admin Center gives you full control over your entire server infrastructure and is particularly useful for managing servers on private networks.

Windows Admin Center runs in a web browser and manages Windows Server 2019, Windows Server 2016, Windows Server 2012 R2, Windows Server 2012, Windows Server 2008 R2, Windows 10, and more. It operates through the Windows Admin Center gateway installed on Windows Server 2019, Windows Server 2016, or Windows 10.



Windows Admin Center has the following key capabilities in its Server Manager solution:

- Display of resources and resource utilization
- Certificate management
- Device management
- Event Viewer
- File Explorer
- Firewall management
- Installed apps management
- Configuration for local users and groups
- Network settings
- Viewing/ending processes and creating process dumps
- Registry editing
- Scheduled tasks management
- Windows Services management
- Enabling/disabling roles and features

Hyper-V VMs and virtual-switch management

Storage management

Storage Replica management

Windows updates management

PowerShell console

Remote Desktop connection

Windows Admin Center also provides these solutions:

**Computer Management** – Provides a subset of the Server Manager features for managing Windows 10 client PCs.

**Failover Cluster Manager** – Provides support for ongoing management of failover clusters and cluster resources.

**Hyper-Converged Cluster Manager** – Provides an all-new experience tailored to Storage Spaces Direct and Hyper-V, featuring a dashboard with charts and alerts for monitoring

# Next steps

Take the next step today. Learn more through the resources below.

**Build your future with Windows Server**

<https://www.microsoft.com/windowsserver>

**Introduction to Windows Server 2019**

<https://www.microsoft.com/en-us/cloud-platform/windows-server>

**What's new in Windows Server 2019**

<https://docs.microsoft.com/en-us/windows-server/get-started-19/whats-new-19>

**Install | Upgrade | Migrate to Windows Server 2019**

<https://docs.microsoft.com/en-us/windows-server/get-started-19/install-upgrade-migrate-19>

