



Upgrade to
Windows Server
2019

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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.

Microsoft fuels digital transformation with leading future-ready technologies in a new era of hybrid cloud computing. The pace of change continues to accelerate, and exciting technological innovation opens new opportunities and the potential to transform the way small and medium-sized businesses (SMBs) are doing businesses. Microsoft offers consistent hybrid scenarios for businesses to grow and to extend operations to the cloud with Windows Server 2019. This latest operating system provides the flexibility to upgrade from older versions of the Windows Server operating system to Windows Server 2019.

This guide is intended to help IT decision makers, IT admins, and IT pros understand the importance of transforming legacy business workloads using the latest version of Windows Server operating system, featured with modern and innovative technologies. It also covers possible scenarios for upgrading from older versions of Windows Server to Windows Server 2019.

Outdated IT environments limit innovation and security

For SMBs, IT resources and budgets are often limited, so building an up-to-mark IT infrastructure can be challenging and expensive. Many organizations are still running their business applications on the older Windows Server operating systems. The existing infrastructure keeps them from taking advantage of modern and cloud-ready technologies to stay ahead of competitors. The many other challenges of using outdated operating systems include:

- 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- Outdated security that fails to protect applications and data against modern security threats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
- End of support for Windows Server 2008 and 2008 R2

Windows Server 2019 bridges on-premises and cloud

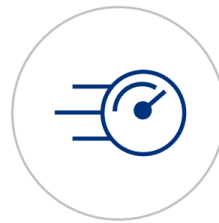
Windows Server 2019 is the operating system that bridges on-premises environments with Azure services, adding additional layers of security while helping organizations modernize applications and infrastructure. It maximizes existing investments and builds on Windows Server security, app innovation, and hyper-converged infrastructure (HCI) capabilities to help organizations bridge on-premises investments to the cloud. Windows Server 2019 is designed and engineered to help modernize datacenters, 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.

The Windows Server 2019 version for you

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

Datacenter edition: This edition delivers significant value for customers who need unlimited virtualization. It also provides powerful new features, including shielded virtual machines (VMs), 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: Free hypervisor, a stand-alone product that contains only the Windows hypervisor, a Windows Server driver model, and virtualization components.

Licensing model

Windows Server 2019 is built on the strong foundation of Windows Server 2016, which has transitioned from processors-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 both on-premises and in the cloud and removes friction from different licensing models, enabling multi-cloud scenarios. This 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 licenses) 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

Upgrade and migrate to Windows Server 2019

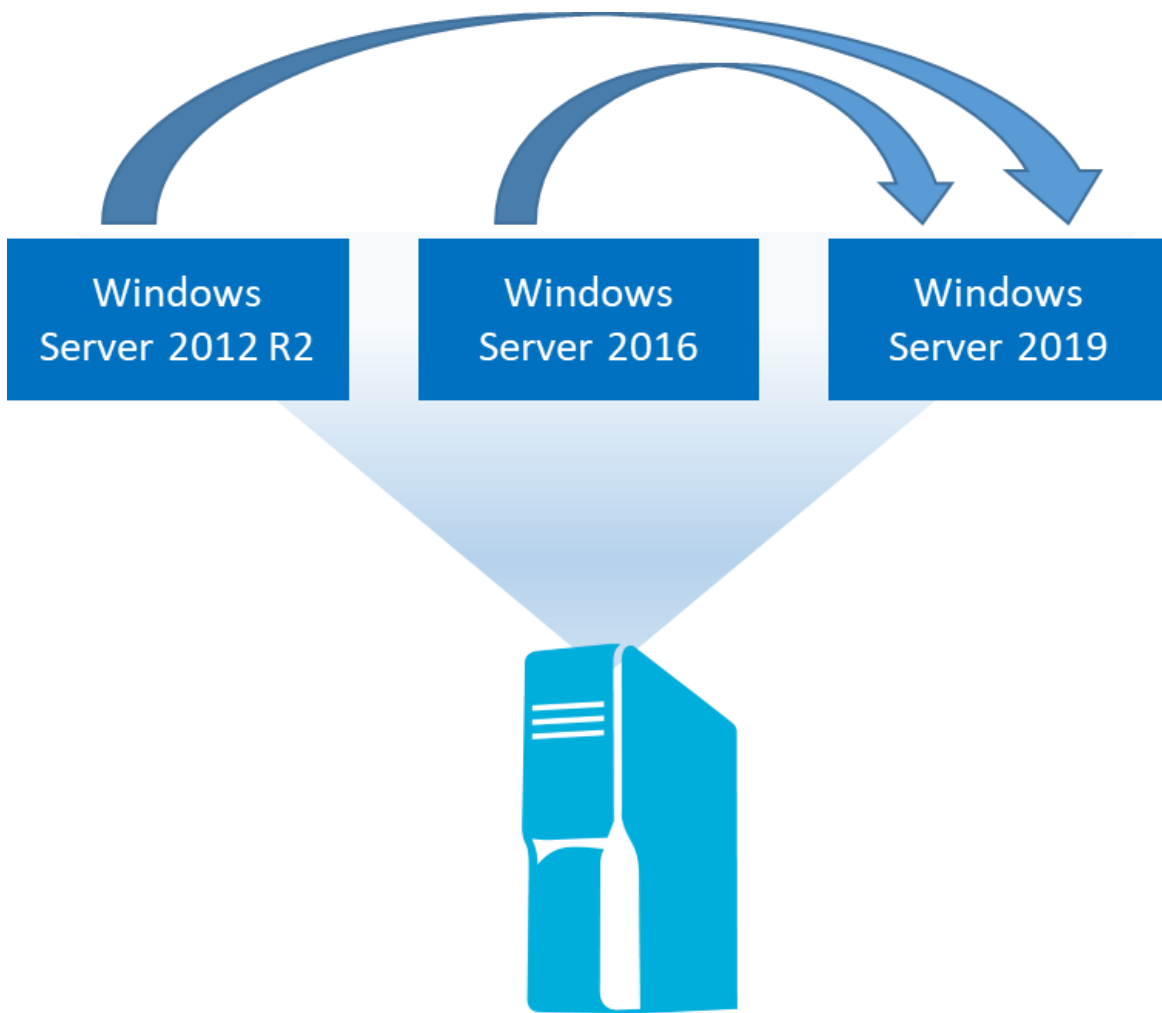
If your organization wants to take advantage of future-ready technologies but keep the same hardware and the server roles you have set up without flattening the server, upgrading is an option—and there are multiple ways to do it. The upgrade process allows an organization to go from an older operating system to a newer one while keeping its settings, server roles, and data intact.

Many customers run Windows Server 2012/R2, Windows Server 2008/R2, or even Windows Server 2003 for their legacy application workloads or different server roles. The process of upgrading to Windows Server 2019 might vary depending on the version of the operating system the organization is starting with and the pathway it takes.

In-place upgrade

In-place upgrades allow an administrator to upgrade an existing installation of Windows Server to a newer version while retaining the same hardware, settings, and installed features. If your server is running Windows Server 2012

R2 or Windows Server 2016, it can be upgraded to Windows Server 2019 with an in-place upgrade. An organization can upgrade from an evaluation version of the operating system to a retail version, from an older retail version to a newer version, or, in some cases, from a volume-licensed edition of the operating system to an ordinary retail edition.



In-place Upgrade

Depending on the initial operating system and the intended pathway, following these general guidelines will support your pathway:

Upgrades from 32-bit to 64-bit architectures are not supported. All editions of Windows Server 2019 are 64-bit only.

Upgrades from one language to another are not supported.

Upgrades from pre-release versions (previews) of Windows Server 2019 are not supported. Instead, you should perform a clean installation to Windows Server 2019.

Upgrades that switch from a server core installation to a server with a desktop installation (or vice versa) are not supported.

Upgrades from a previous Windows Server installation to an evaluation copy of Windows Server are not supported. Evaluation versions should be installed as a clean installation.

Upgrades work best in VMs where specific OEM hardware drivers are not needed for a successful upgrade.

If the server is a domain controller, see [Upgrade Domain Controllers to Windows Server 2016 / 2019](#) for important information.

The table below briefly summarizes which Windows operating systems can be upgraded to which editions of Windows Server 2019.

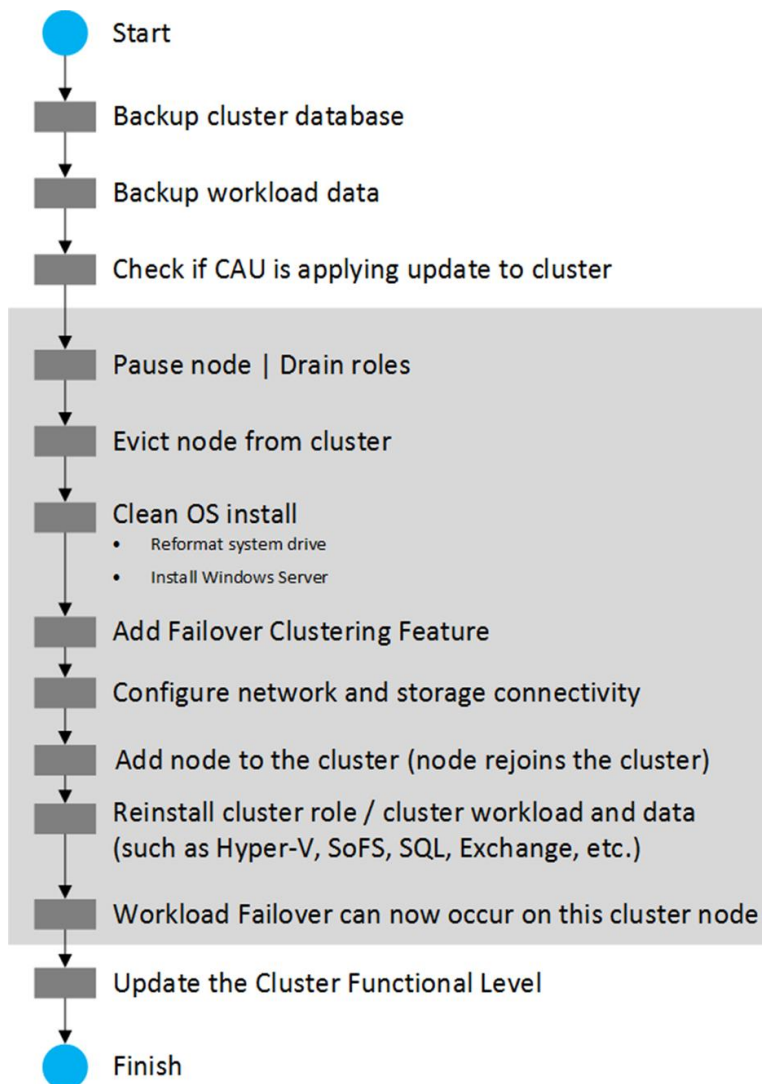
If you are running these editions:	You can upgrade to these editions:
Windows Server 2012 Standard Windows Server 2012 R2 Standard Windows Server 2016 Standard	Windows Server 2019 Standard or Datacenter
Windows Server 2012 Datacenter Windows Server 2012 R2 Datacenter Windows Server 2016 Datacenter	Windows Server 2019 Datacenter
Windows Server 2012 R2 Essentials Windows Server 2016 Essentials	Windows Server 2019 Essentials

Cluster OS Rolling Upgrade

Upgrade the Windows Server operating system of the cluster nodes without stopping the Hyper-V or the Scale-Out File Server workloads with a Cluster OS Rolling Upgrade. Using this feature, the downtime penalties against service level agreements (SLA) can be avoided. This approach doesn't require any additional hardware, although you can add additional cluster nodes temporarily to small clusters to improve the availability of the cluster during the Cluster OS Rolling Upgrade process.

To keep the cluster workloads running during Cluster OS Rolling Upgrade process, moving a cluster workload from an older version of Windows Server node to Windows Server 2019 node works as if both nodes were running Windows Server 2016. When Windows Server 2019 nodes are added to the cluster, they operate in Windows Server 2016 compatibility mode. A new conceptual cluster mode, called "mixed-OS mode," allows nodes of different versions to exist in the same cluster.

Below is a pathway for a Cluster OS Rolling Upgrade:



Data migration

Many organizations are running an older version of Windows Server on aging infrastructure. They want to move their business-critical workloads to the next generation hardware and the latest version of Windows Server with precisely blended software and hardware. Solve your

operational and budgetary challenges at the same time with extensive capabilities and features to effortlessly manage a hybrid cloud, HCI, and security and application innovation. Microsoft gives you the flexibility to either deploy your organization's hardware or choose next-generation hardware from OEM partners.

If you opt for Windows Server 2019 bundled with next-generation server hardware, you can easily migrate your business application data and critical business data and files to Windows Server 2019. Microsoft provides multiple tools to seamlessly migrate data to the latest Windows Server whether deployed on-premises or in Microsoft Azure.

Storage Migration Service

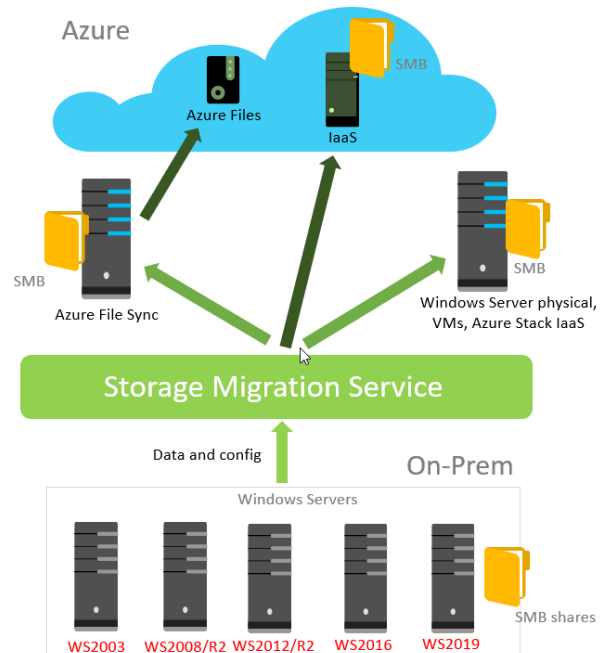
Storage Migration Service (SMS) is a new server role introduced with Windows Server 2019 in both Standard and Datacenter editions. SMS provides orchestrated workflow with Windows Admin Center, a graphical management system that allows scalable migrations of many servers simultaneously to new targets running on-premises or in Azure. SMS helps you migrate servers and their data without reconfiguring applications or users. Organizations can migrate unstructured data from anywhere into Windows Servers 2019 and Azure with consistency and scalability.

SMS operates in the following three distinct phases:

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

Transfer: Defines source and destination nodes from inventory list and decides what data to transfer.

Cutover: New servers 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.



While planning the migration of data to Windows Server 2019, there are a few things to consider:

At least two Windows Server 2019 computers or VMs with the SMS features installed (Build 17744 or later) are necessary. One will operate as the orchestrator and one as the destination of the migration. *Note: it is possible for a single computer to act as the orchestrator and destination, such as in a small environment with a single server to migrate. However, a large environment will usually have a single orchestrator and many destinations, and the following steps are documented with this environment in mind.*

The Windows Admin Center must be installed on a computer (this can be a laptop or a desktop).

The SMS preview extension for Windows Admin Center must be installed.

All computers must be domain-joined.

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

Supported source operating systems	Supported destination operating systems
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

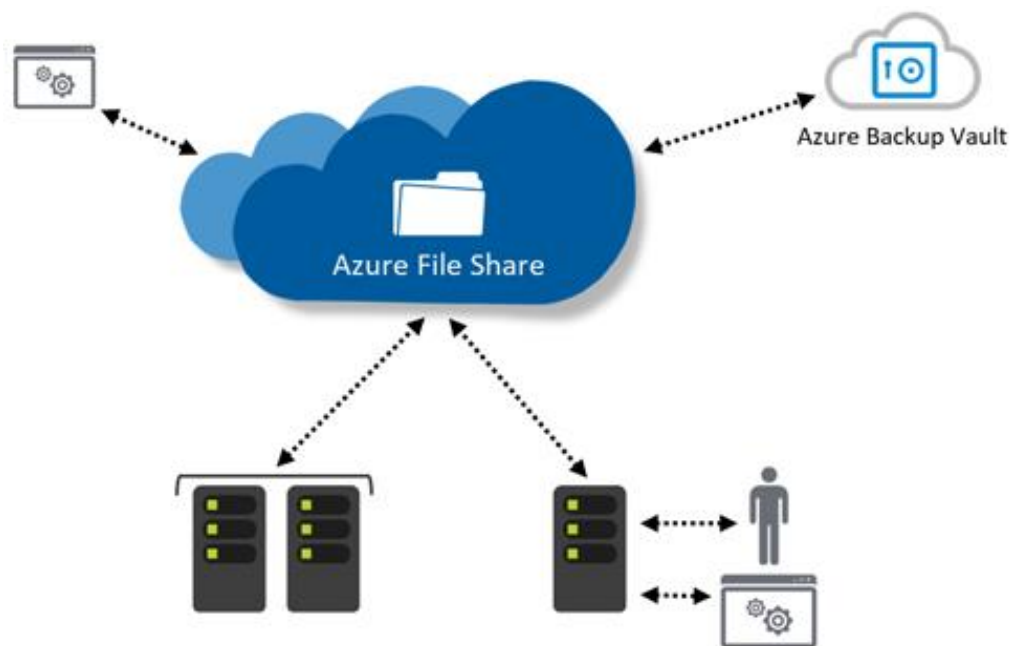
Azure File Sync extends on-premises files servers into Azure providing cloud benefits while keeping the flexibility, performance, and compatibility of an on-premises file server. Azure File Sync replicates files from your on-premises Windows Server to an Azure file share, enabling you to centralize your file services in Azure while maintaining local access to your data. Azure File Sync provides:

Multi-site access: Provides write access to the same data across Windows servers and Azure files.

Cloud tiering: Store only recently accessed data on local servers.

Integrates with Azure backup: No 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 Files can be used to completely replace or supplement traditional on-premises file servers or 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's being used.

Lift and shift applications:

Azure Files makes it easy to lift and shift applications to the cloud that expect a file share to store file application or user data. Azure Files 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 Files, and the application continues to run on-premises.

Storage Replica

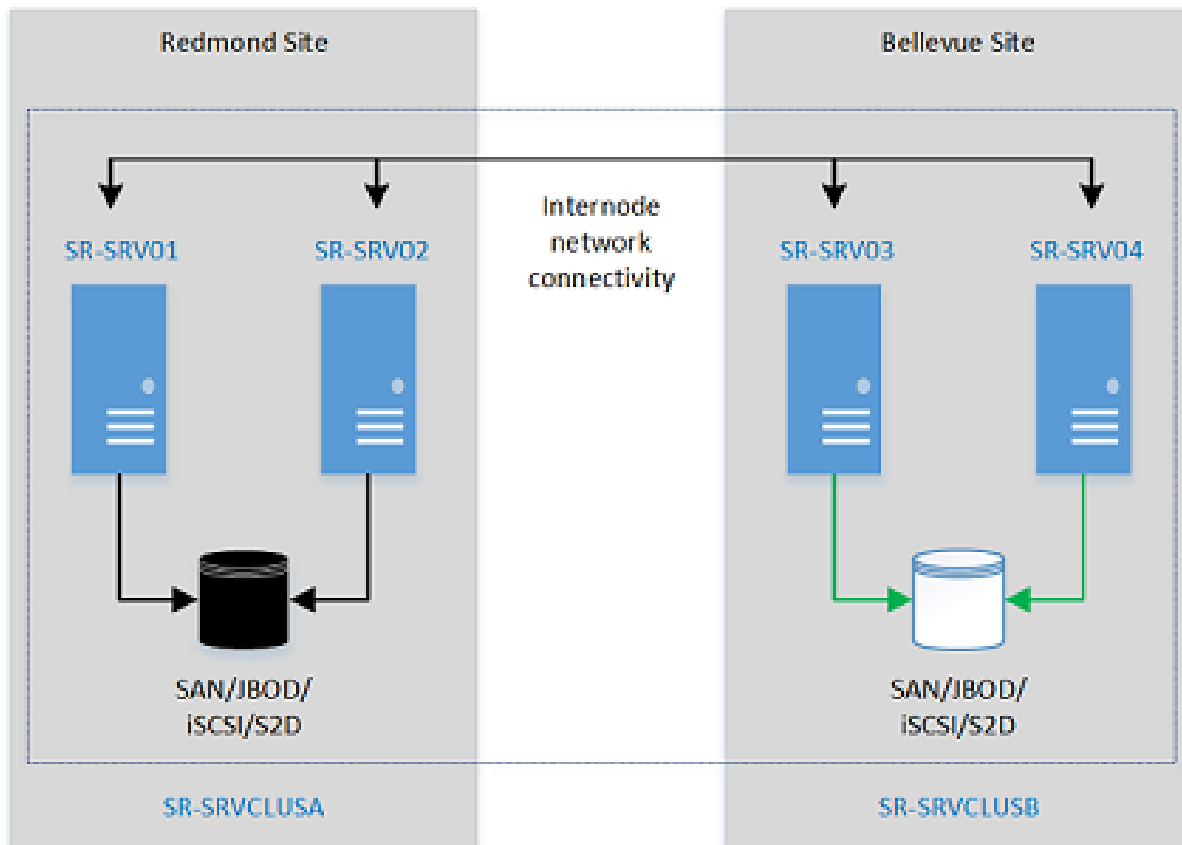
Storage Replica is a Windows Server technology that enables replication of volumes between servers or clusters for disaster recovery. It also enables you to create stretch failover clusters that span two sites, with all nodes staying in sync. Storage Replica supports synchronous and asynchronous replication.

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.



Next steps

Take the next step. Learn more at:

Build your future with Windows Server

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>