

# ONTAP UNIFIED DATA STORAGE MANAGEMENT



Powering the data that drives your business.

## The challenge

Data-driven businesses outperform their competitors by 20% (McKinsey, "[The Data Dividend: Fueling Generative AI](#)" (2023)). To achieve the data-driven ideal, data needs to be easily accessible by users and applications, achieve a balance of performance and efficiency, and be protected from both natural and human-made disasters. And businesses typically must do all of this while fitting into constrained IT budgets.

Many businesses struggle to achieve all three of these goals. Data spread across disconnected infrastructure or clouds creates silos and complexity. Mismatch of performance and application needs creates inefficiencies. And the layer of complexity to secure data creates barriers to use.

## The solution

To address these challenges, you need a storage infrastructure that unifies data and eliminates silos; supports any data, anywhere, at the right price for performance; and eliminates the risk of data loss, destruction, or theft with integrated and intelligent AI-based protection. NetApp® ONTAP®, the industry's leading storage management software, breaks down silos and unifies storage and data, providing a single platform for all of your data across all your locations throughout the lifecycle of the data.

# ONTAP makes storage simple

## ONTAP: The Power Behind Every NetApp Innovation

ONTAP is the operating system that powers every NetApp storage product, on premises and in the cloud. Enterprise customers trust ONTAP to manage over 100 exabytes of data. Its flexibility allows it to adapt to any workload, from terabytes in edge deployments to petabytes in AI data centers. With ONTAP, you get three powerful personalities in one OS: Unified AFF and FAS for extreme versatility across block, file, and object; ASA for simplified, high-performance block workloads; and now AFX, a disaggregated architecture that scales performance and capacity independently to meet the demands of enterprise AI. Every innovation in ONTAP benefits the entire NetApp portfolio, so you get consistent security, automation, and data services, no matter how or where you deploy it.

### Get proven storage efficiency

With ONTAP, you get a comprehensive portfolio of storage efficiency capabilities. Inline data compression, deduplication, and compaction work together to reduce your storage costs and maximize the data you can store. Plus, you can multiply your savings with space-efficient NetApp Snapshot™ copies, thin provisioning, replication, and cloning technologies.

### Tier automatically to cloud

ONTAP lets you deliver high performance to your applications and reduce storage costs by automatically tiering cold data from the performance tier to NetApp StorageGRID® object storage or a public cloud. Free up space on your performance tier, such as NetApp ASA, AFF, and FAS systems, or Cloud Volumes ONTAP instances in a public cloud so you can consolidate more workloads. For new all-flash system purchases, data tiering means that you can buy a smaller initial AFF or ASA configuration.

### Maximize investment protection

ONTAP gives you the flexibility to create an integrated, scalable storage environment by clustering your on-premises storage controllers from different families—AFF all-flash and FAS hybrid-flash systems—and from different generations. You can grow your system with the latest hardware, continue to use your older hardware, and connect all of it to an ONTAP environment in the cloud. When it's time to retire a storage system, you can simply upgrade the controllers and keep your data in place on the existing disk shelves.

### Get simple, powerful management capabilities

ONTAP integrates with NetApp BlueXP™ to provide unified control of your storage and data services to support an intelligent data infrastructure, across your hybrid multicloud. It enables you to discover, deploy, optimize, and manage your infrastructure and data, anytime, anywhere, across your on-premises and hybrid multicloud environments. Powerful AIOps drive operational simplicity with automated workflows, predictive analytics, and intelligent, actionable insights that improve system health, performance, and security. Its integrated services maximize data protection and cyber resilience, while minimizing costs.

## KEY BENEFITS

**Simple.** Eliminate complex silos for greater data access and reduced costs.

- Provide a common set of industry-leading data services
- Support any data; block, file, and object from one platform
- Manage everything from a single user-friendly GUI or automate with CLI and APIs

**Powerful.** Serve any data, anywhere, with the right performance and price.

- Support for a wide range of platforms, including all-flash and hybrid
- Integrated into all major clouds as a first-party service
- The best of software-defined and appliance storage to support core, cloud, and edge workloads

**Protected.** Mitigate risk with secure and available storage.

- Replication, Snapshot technology, and multisite high availability
- Integrated AI to automatically detect anomalies and threats to your data
- Zero Trust architecture with complete access control and fully integrated at-rest and in-flight data encryption technology

It includes flexible consumption investment management that unlocks control, protects investments, and delivers real-time return on investment (ROI) details, centrally.

## ONTAP is powerful

**Serve any data, anywhere, with the right performance at the right price.**

To support your critical applications, you need a storage environment that delivers high performance and availability across your hybrid multicloud. But you also need the versatility to scale and adapt as your business changes. ONTAP delivers on all these requirements with performance at scale and nondisruptive operations.

### Get flash optimization

ONTAP delivers the high throughput and consistent, submillisecond low latency that enterprise applications require, while providing comprehensive data services. ONTAP is optimized for flash, including ASA and AFF systems with NVMe solid-state drives (SSDs), NVMe over TCP, and NVMe over Fabrics.

## Deliver consistent performance

To maintain high customer satisfaction, adaptive quality of service (AQoS) helps you deliver consistent performance by automatically adjusting storage resource levels to respond to changes in workloads (number of terabytes of data, priority of the workload, and so on). AQoS simplifies the implementation of policies to keep your workloads within prescribed minimum and maximum throughput targets.

## Stay ahead of business changes with seamless scalability

You can start small and grow with your business by using high-capacity SSDs or HDDs or public cloud to scale your ONTAP storage environment. On-premises systems that run ONTAP can handle SAN, NAS, and object workloads that range from a few terabytes to up to 707PB. You can scale up by adding capacity to existing storage controllers or scale out by adding controllers to seamlessly expand your cluster up to 24 nodes. Or quickly deploy an ONTAP environment in public clouds using Cloud Volumes ONTAP. ONTAP also supports massive NAS data containers that are easy to manage. With NetApp ONTAP FlexGroup volumes, a single namespace can grow to 60PB or 400 billion files while delivering consistent high performance and resilience.

## ONTAP protects your data

### Reduce risk with the most secure and available storage

In a world full of threats, whether human-made (such as ransomware) or natural disaster, ONTAP provides the security and availability you need to eliminate risk from operations and enhance business continuity.

### Integrated data protection and nondisruptive operations

With ONTAP, you can meet your requirements for local backup with nearly instantaneous recovery by using space-efficient Snapshot copies. Achieve remote backup/recovery and disaster recovery with NetApp SnapMirror® asynchronous replication or with SnapMirror Cloud when replicating data to a cloud object store in a public or private cloud. Or, to step up to zero-data-loss protection (RPO=0), use SnapMirror synchronous replication.

### Protect business operations from regional outages

For your critical applications that require continuous data availability, NetApp MetroCluster® and SnapMirror active sync technologies synchronously mirror between locations to provide business continuity against human-made or natural disasters. The storage arrays can be deployed at a single site, across a metropolitan area, or in different cities. MetroCluster is a robust, full-system infrastructure for your SAN and NAS workloads. SnapMirror active sync enables the flexibility to granularly protect the most critical SAN applications with continuous availability if a data center disaster occurs.

### Scale and maintain nondisruptively

With ONTAP, you can service and update your infrastructure during regular working hours without disrupting your business. Dynamically assign, promote, and retire storage resources without downtime over the lifecycle of an application. Data can be moved without

## Support your workloads efficiently wherever they run

With ONTAP, you can design and deploy your storage environment across the widest range of architectures, so you can match the approach that's right for your evolving business needs.

- **On NetApp hardware systems.** Employ AFF all-flash systems, for the best latency for demanding performance; ASA all-flash systems for block-optimized workloads; and FAS systems, for a balance of performance and capacity.
- **Within a converged infrastructure.** FlexPod® from NetApp and Cisco is a secure, smart, sustainable, hybrid-ready converged infrastructure platform that helps customers accelerate a large and growing portfolio of modern and enterprise reference architectures.
- **As software-defined storage on commodity servers.** ONTAP Select.
- **In the cloud.** Cloud Volumes ONTAP, Amazon FSx for NetApp ONTAP, Azure NetApp Files, Google Cloud NetApp Volumes.

You can move your data seamlessly between architectures to place it in the optimal environment for performance, capacity, and cost efficiency.

application interruption, so you can get the data on the node that delivers the optimal combination of speed, latency, capacity, and cost.

### Secure consolidation

You can save time and money by sharing the same consolidated infrastructure for workloads or tenants that have different performance, capacity, and security requirements. And with ONTAP, you don't have to worry that the activity in one tenant partition will affect another. With multitenancy, a storage cluster can be subdivided into secure partitions that are governed by rights and permissions.

### Robust security and ransomware protection

Built-in security to harden ONTAP includes ransomware detection for primary storage. Industry-leading security capabilities in ONTAP help you to integrate data security and ransomware detection and response for user behavior and workloads on file, block, and native cloud. NetApp Autonomous Ransomware Protection, powered by AI, offers real-time detection of anomalies with automatic responses for fast recovery. Multiadmin verification prevents malicious and accidental changes to your data by requiring multiple approvals for critical admin tasks. The built-in NetApp Volume Encryption feature enables you to easily protect your at-rest data by encrypting any volume.

In-flight encryption for backup and replication protects your data in transit. Other features like multifactor authentication, role-based access control (RBAC), and onboard and external key management increase the security of your data.

### Rigorous compliance

To meet your stringent compliance and data retention policies, NetApp SnapLock® software enables write once, read many (WORM) protected data for your ONTAP environment. NetApp also provides superior integration with enterprise backup vendors and leading applications. In addition, cryptographic shredding by the NetApp secure purge technology enables you to remediate data spillage online while the system is still in use. It also provides state-of-the-art “right-to-erasure” capability for General Data Protection Regulation (GDPR).

### Industry-leading support at every stage of your journey

Make a simple, straightforward transition to ONTAP. No matter what your starting point is, NetApp streamlines your move to ONTAP. Consult our experts to plan and implement your transition and gain the latest ONTAP advantages from day one. You can use NetApp Professional Services or NetApp Services Certified Partners, you can do it yourself by using our proven tools and processes, or you can combine these approaches. Plus, when you’re running ONTAP, you can use the Managed Upgrade Service to get the most from your investment by keeping your ONTAP software always up to date.

	Function	Benefit
<b>Data compaction</b>	Packs more data into each storage block for greater data reduction	Works with compression to reduce the amount of storage that you need to purchase and operate
<b>Data compression</b>	Provides transparent inline and postprocess data compression for data reduction	Reduces the amount of storage that you need to purchase and maintain
<b>Deduplication</b>	Performs general-purpose deduplication for removal of redundant data	Reduces the amount of storage that you need to purchase and maintain
<b>FabricPool</b>	Automates data tiering to a NetApp StorageGRID object storage solution or a public cloud	Decreases storage costs for cold data and frees up space on your high-performance tier
<b>FlexCache®</b>	Caches actively read datasets within a cluster and at remote sites	Accelerates read performance for hot datasets by increasing data throughput within a cluster, and improves the speed and productivity of collaboration across multiple locations
<b>FlexClone®</b>	Instantaneously creates file, LUN, and volume clones without requiring additional storage	Saves you time in testing and development and increases your storage capacity
<b>FlexGroup</b>	Enables a single namespace to scale up to 60PB and 400 billion files	Supports compute-intensive workloads and data repositories that require a massive NAS container while maintaining consistent high performance and resilience
<b>FlexVol®</b>	Creates flexibly sized volumes across a large pool of disks and one or more RAID groups	Enables storage systems to be used at maximum efficiency and reduces hardware investment
<b>MetroCluster</b>	Robust infrastructure that combines array-based clustering with synchronous mirroring to deliver continuous availability and zero data loss for SAN and NAS workloads; up to 700km distance between nodes	Maintains business continuity for critical enterprise applications and workloads if a data center disaster occurs
<b>Multi-Admin Verification</b>	Requires multiple approvals for critical admin tasks, such as “volume snapshot delete” or “volume delete”	Prevents malicious and accidental changes to your data. A single cluster administrator, or a ransomware attacker with a compromised administrator account, cannot execute critical commands without approvals from one or more additional administrators
<b>Dynamic authorization framework</b>	Uses additional environmental factors such as IP address, location, or time to authorize actions of highly sensitive or powerful accounts such as administrator	Creates an additional layer of protection to prevent malicious actors using compromised credentials from performing highly controlled or destructive actions
<b>Performance capacity</b>	Provides visibility of performance capacity that is available for deploying new workloads on storage nodes	Simplifies management and enables more effective provisioning of new workloads to the optimal node
<b>QoS (adaptive)</b>	Simplifies setup of QoS policies and automatically allocates storage resources to respond to workload changes (number of terabytes of data, priority of the workload, and so on)	Simplifies operations and maintains consistent workload performance within your prescribed minimum and maximum IOPS boundaries
<b>Ransomware protection</b>	Provides built-in real-time AI-powered detection and response at the primary storage layer to defend data with automatic Snapshots as soon as file anomalies are detected	Defends against ransomware attacks and enables quick recovery, to strengthen the overall security posture at the storage layer

	Function	Benefit
<b>SnapCenter®</b>	Provides host-based data management of NetApp storage for databases and business applications	Offers application-aware backup and clone management; automates error-free data restores
<b>SnapLock</b>	Provides WORM file-level locking, preventing changes and deletion of the file	Supports regulatory compliance and organizational data retention requirements; plus, enables air-gap separation of Snapshot copies for enhanced ransomware protection and quick recovery from an attack
<b>SnapMirror</b>	Provides integrated remote backup/recovery and disaster recovery with incremental asynchronous data replication; preserves storage efficiency savings during and after data transfer	Provides flexibility and efficiency when replicating data to support remote backup/recovery, disaster recovery, and data distribution
<b>SnapMirror active sync</b>	Combines flexible array-based clustering with application granularity for synchronous mirroring across two- and four-node configurations to deliver symmetric active-active multisite replication for business continuity of mission-critical SAN workloads	Cost-effectively protects the most critical SAN applications with continuous availability to maintain business continuity if a data center disaster occurs
<b>SnapMirror Cloud</b>	Provides integrated remote backup/recovery and disaster recovery with incremental asynchronous data replication leveraging S3 cloud resources	Provides flexibility and efficiency when replicating data to a cloud object store in a public or private cloud, to support remote backup/recovery, disaster recovery, and data distribution
<b>SnapMirror Synchronous</b>	Delivers incremental, volume-granular, synchronous data replication; preserves storage efficiency savings during and after data transfer	Achieve zero-data-loss protection (RPO=0)
<b>SnapRestore®</b>	Rapidly restores single files, directories, or entire LUNs and volumes from any Snapshot copy	Instantaneously recovers files, databases, and complete volumes from your point-in-time Snapshot copy
<b>Snapshot</b>	Makes incremental data-in-place, point-in-time copies of a LUN or a volume with minimal performance impact	Enables you to create frequent space-efficient backups with no disruption to data traffic
<b>NetApp Volume Encryption</b>	Provides data-at-rest encryption that is built into ONTAP	Lets you easily and efficiently protect your at-rest data by encrypting any volume on an AFF or FAS system; no special encrypting disks are required

**Table 1) ONTAP offers a robust set of standard and optional features.**

ONTAP software licensing	Features
<b>Required software:</b>	
<b>ONTAP One (only for NetApp AFF A-Series, AFF C-Series, and FAS systems)</b>	Comprehensive, unified software suite that includes all protocols (SAN/NAS/Object) as well as ONTAP technologies such as SnapRestore, SnapMirror, SnapCenter, FabricPool (to ONTAP-S3 and StorageGRID), FlexClone, FlexCache, FPolicy, encryption <sup>1</sup> , Autonomous Ransomware Protection, SnapLock, and multitenant key management
<b>ONTAP One for SAN (only for NetApp ASA systems)</b>	Comprehensive software suite that includes SAN protocols as well as ONTAP technologies applicable for SAN workloads such as SnapRestore, SnapMirror, SnapCenter, FabricPool (to ONTAP-S3 and StorageGRID), FlexClone, FlexCache, FPolicy, encryption <sup>1</sup> , SnapLock, and multitenant key management

<sup>1</sup> Encryption availability subject to Global Trade Compliance



Contact Us

#### About NetApp

NetApp is the intelligent data infrastructure company, combining unified data storage, integrated data services, and CloudOps solutions to turn a world of disruption into opportunity for every customer. NetApp creates silo-free infrastructure, harnessing observability and AI to enable the industry's best data management. As the only enterprise-grade storage service natively embedded in the world's biggest clouds, our data storage delivers seamless flexibility. In addition, our data services create a data advantage through superior cyber resilience, governance, and application agility. Our CloudOps solutions provide continuous optimization of performance and efficiency through observability and AI. No matter the data type, workload, or environment, with NetApp you can transform your data infrastructure to realize your business possibilities. [www.netapp.com](http://www.netapp.com)

