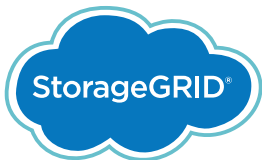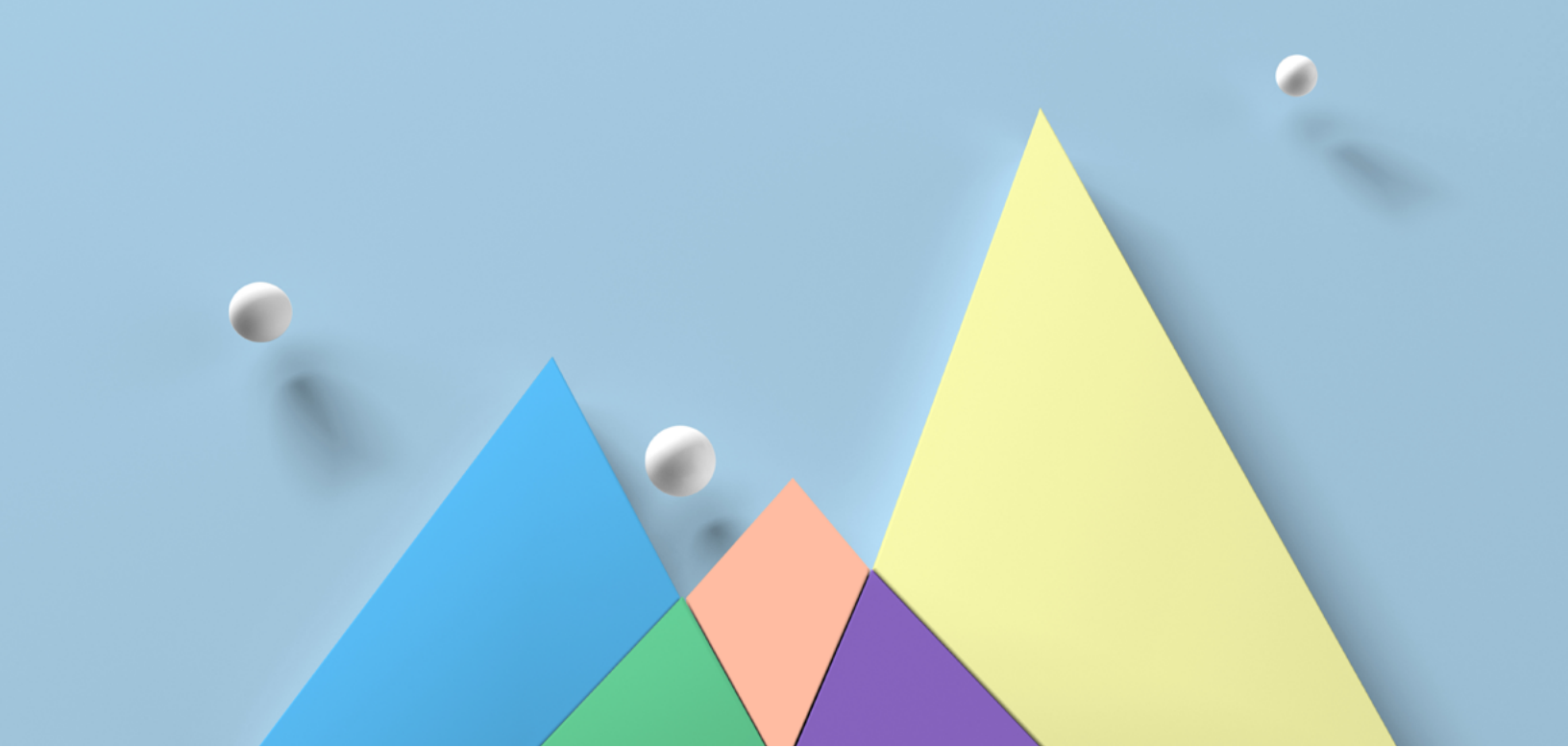# NetApp StorageGRID

■ NetApp

StorageGRID®

Object storage that enables you to manage your unstructured data across public, private, and hybrid multi-cloud environments

The challenge

Today's unprecedented growth in unstructured data offers enterprises opportunities to uncover new customer engagements and revenue streams. To keep pace, IT must overcome the challenges of keeping up not only with the volume of data, but also with changes in how data is stored and accessed. Users need IT to support a huge number of applications, from traditional workloads to cloud-based applications, with access to data across data centers, remote offices, and the public cloud.

Object storage through cloud-based data management is quickly becoming the norm, but it comes with its fair share of concerns:

- Is my data safe?
- What happens if my requirements change?
- What is cost effective today and tomorrow?
- Does choosing one solution create vendor lock-in?
- Can I meet performance demands with data that lives both on premises and in the public cloud?

The solution

NetApp StorageGRID is a software-defined, object-based storage solution that supports industry-standard object APIs like the Amazon Simple Storage Service (S3) API. It allows you to build a single namespace across up to 16 data centers worldwide, with customizable service levels for metadata-driven object lifecycle policies. The integrated lifecycle management policies optimize where your data lives throughout its lifecycle.

StorageGRID optimizes the durability and availability of your data across multiple geographies. Whether your data is on premises or in a public cloud, it enables hybrid cloud workflows to fit your business demands with access to Amazon Simple Notification Service (SNS), Google Cloud, Microsoft Azure Blob, Amazon Glacier, Elasticsearch, and similar services.

Enable the hybrid cloud

StorageGRID offers industry-leading hybrid cloud integration with user-controlled platform services. You can keep your data in a local private cloud while taking advantage of public cloud offerings. Storage tenants can configure mirroring of selected objects at the bucket level to an S3-compatible public cloud. You can trigger hybrid cloud workflows by integrating S3 notification of events in your on-premises buckets

Key benefits

Smart: Explore the industry's leading data lifecycle management software.

- With the data management capabilities of the NetApp® StorageGRID® object-based storage solution, you can deliver high-value outcomes from your large, unstructured data while lowering your TCO.

Fast: Combine performance with cost efficiencies.

- It's all about the software. Unleash the full power of flash with StorageGRID object QoS, dedicated load balancer, and lifecycle management capabilities.

Future-proof: Realize cloud as a strategy, not just a location.

- NetApp StorageGRID will always be there for you, delivering industry-defining features and capabilities to help you manage your data with the simplicity, speed, and fluidity you build your business on.

with Amazon SNS. You can gain further value with metadata search and analytics by streaming object metadata to an external Elasticsearch service, on premises or in the public cloud.

StorageGRID lets you take advantage of industry-leading Amazon S3 APIs, such as object versioning, object locking, multipart upload, S3 Select, Amazon Identity and Access Management–style access policies, cross-origin resource sharing, and object tags. With Active Directory and LDAP identity federation for Amazon S3, StorageGRID bridges the gap between enterprise IT and cloud semantics.

Cloud-to-cloud data management can also enable cost savings. StorageGRID can manage and store objects in its own globally distributed infrastructure, and in Amazon S3 or S3-compatible object stores or public clouds. Depending on your hybrid cloud strategy, you can replicate with the StorageGRID CloudMirror service to Amazon S3, Google Cloud, or an S3-compatible object store for data protection, or to leverage cloud services. And you can tier cold StorageGRID data to the cloud through Cloud Storage Pools to Amazon S3, Google Cloud, or Microsoft Azure for cost savings.

Facilitate compliance with tamper-proof data retention

StorageGRID offers many features to help you meet your regulatory obligations. It can provide immutable protection for your critical data assets.

StorageGRID is built with multitenancy at its core. Every tenant is its own partition, with its own rights and permissions, while sharing the same consolidated infrastructure. Not all tenants need to be the same; they can have different performance, capacity, and security requirements.

Storage tenants can configure write once, read many (WORM) retention with S3 Object Lock to comply with regulations. You can configure StorageGRID so that compliance data is stored with duplicate copies or logical equivalents, such as erasure-coded objects. You can secure your data with software-based encryption in flight and at rest, with built-in audit trails, and with FIPS drives on some StorageGRID appliances. In addition, other features such as multifactor authentication, role-based access control, and external key management make StorageGRID a leader in security capabilities.

Proven software designed for nondisruptive operations

StorageGRID is an 11th-generation object store with 2 decades of production deployments in the most demanding industries. With the strength of the portfolio, NetApp has demonstrated more than 20 years of product hardening with more than 1 million systems shipped. With advanced features such as the NetApp Active IQ® Digital Advisor for proactive, immediate response, and with backing by NetApp's world-class support organization, StorageGRID is

a solution that you can trust with your critical data assets. With StorageGRID, you can also maintain and update your infrastructure without business interruption or downtime.

Granular data protection policies

StorageGRID appliances provide layered erasure coding (EC) at the hardware and software levels. Protect against failed disk drives and rapidly rebuild lost data segments with node-level EC, and protect against site-level disasters with geo-distributed EC. For even greater protection, replicating to a cloud object store is also possible. StorageGRID can apply the data protection rules synchronously (RPO=0) or asynchronously for even better performance.

StorageGRID also offers integration with enterprise backup vendors and leading data protection applications.

Visit **NetApp Partner Connect** to learn more.

Flexible deployments

Because every deployment is unique, StorageGRID aligns with your environment, whether that includes nodes as virtual machines (VMs), as optimized hardware-based appliances, as bare-metal servers with Docker containers, or as a combination across virtual and physical environments. In all cases, designing, deploying, and managing StorageGRID is a centrally managed and streamlined process that enables you to rapidly deploy petabytes of storage.
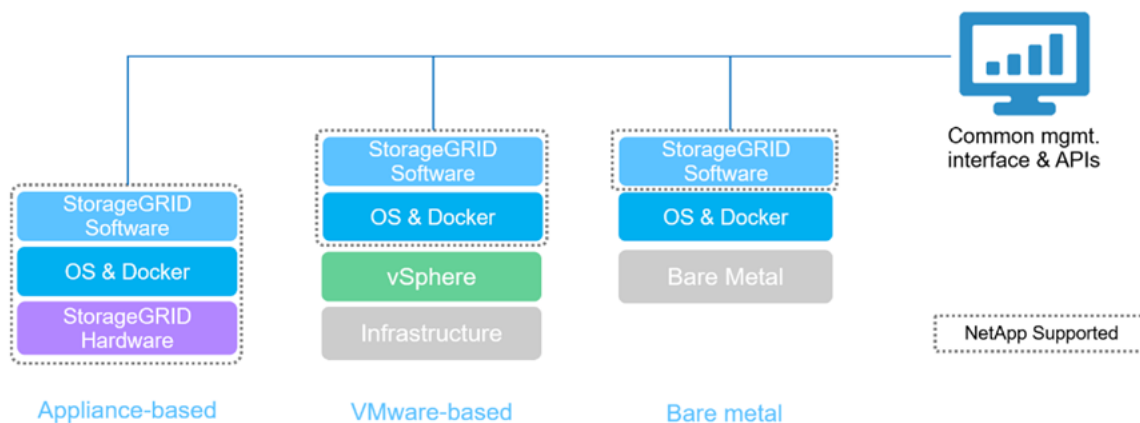

Figure 1) StorageGRID simple, automated deployment on flexible platforms.

SG5000 Series

SG5712   SG5760

- Cost-optimized platforms
- Secondary storage workloads

SG6000 Series

SG6060   SG6060-Expansion   SGF6024

- Transactional small object workloads
- Mid-range; FabricPool optimized

- Large-scale deployments; 100s of PBs
- Data lake, > 3.2PB capacity per Storage Node

- Performance focused; flash accelerated
- Primary workloads, web apps, IoT, streaming

StorageGRID service appliances

SG1000

- Large deployments, high performance

- Physical appliance for Gateway Node and Admin Node
- Traffic classifiers for tenant- and bucket-based monitoring and QoS

SG100

- Small to midsize deployments
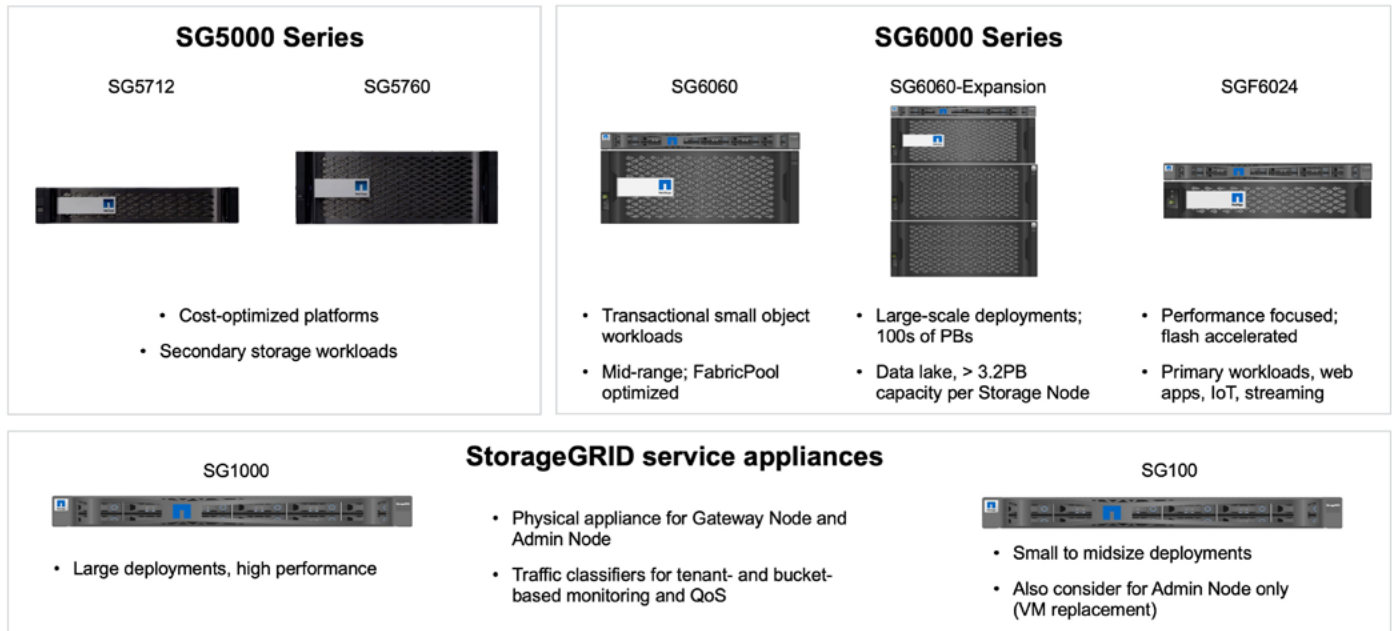- Also consider for Admin Node only (VM replacement)

Figure 2: StorageGRID appliance portfolio

The latest StorageGRID service appliances offer the option of increased simplicity of deployment. The SG100 and SG1000 service appliances deliver an enterprise-grade load balancer with full high-availability (HA) capabilities as well as the option to host StorageGRID Admin Nodes. This enables customers to streamline deployments by implementing "all appliance grids." Customers have the flexibility to operate the node or HA node pair as a load balancer, an administrative node, or both roles simultaneously.

Deploying NetApp StorageGRID appliances creates an enterprise-grade turnkey solution that is easy to implement. Each appliance was built to meet specific performance or capacity needs. You can also deploy software-only StorageGRID nodes as containers on physical or virtual servers, taking advantage of the heterogeneous storage underneath.

If you're looking for greater agility and financial flexibility, StorageGRID is available through the NetApp Keystone™ Flex Subscription storage-as-a-service offering.

StorageGRID®

Start your move to StorageGRID
You can migrate large amounts of data to the StorageGRID system while simultaneously using the system for day-to-day operations. Whether you're migrating your legacy storage or repatriating data from the cloud to low-cost StorageGRID object store, NetApp makes it easy for you to migrate. Consult our experts to plan and implement your transition to StorageGRID.

Contact NetApp Consulting and Professional Services or our certified partners.

Key features for object storage	NetApp StorageGRID provides

Massive scalability and flexible infrastructure	• Massive elastic content store
	• Multiple geo-distributed sites
	• Support for multiple storage tiers:
	  – SSD, SAS, SATA, tape
	  – Amazon S3
	  – Microsoft Azure
	  – Google Cloud
	• Geo–erasure coding and geo-replication
	• Deployment on VMs, hardware appliances, or bare-metal servers with Docker containers

Application interfaces	Massively parallel transaction engine with: • Integrated load balancing • Transaction multithread pipelining Object access protocols: • Amazon S3 and OpenStack Swift System and account management: • Management API: system installation, system administration, tenant management, maintenance tasks, and system monitoring including Prometheus • Tenant API: management of users, credentials, usage, and quotas
Data services	Platform services – tenant configurable hybrid cloud integration: • S3 event notification with Amazon SNS • CloudMirror bucket replication with Amazon S3, Google Cloud or S3-compatible target • Metadata search and analysis with streaming metadata to external Elasticsearch WORM retention: • S3 Object Lock • Reinforced data integrity with compliance-grade WORM • Litigation hold Advanced security and encryption capabilities: • Transport Security Layer (TSL) 1.3 and AES 256-bit encryption • Secure Hash Algorithm 2 (SHA-2) and CPU-efficient integrity protection • External key management
Metadata and content awareness	Metadata-based data management: • Content-aware self-healing maintains data protection even during network disruptions • Policies can be modified and applied retroactively to existing objects

Deployment options	• Physical or virtual servers via Docker containers
	• Virtual appliance:
	  – VMware ESXi and vCenter
	• Hardware appliances:
	  – StorageGRID SGF6024 for high-performance primary object storage workloads, web apps, streaming
	  – StorageGRID SG6060 for transactional small object storage workloads, including FabricPool optimization, with expansion shelf options for large scale capacity, including data lakes.
	  – StorageGRID SG5712 and SG5760 for secondary, capacity object storage workloads
	  – StorageGRID SG100 and SG1000 services appliances for simplified operations include Admin Node software and load balancing

Service-level objective and performance monitoring	• Comprehensive performance feeds:
	  – Access throughout
	  – Replication throughout
	  – Time to policies achieved
	• QoS rate limiting to manage workload performance
	• Transaction round-trip time
	• Isolated application, replication, and admin network traffic
	• Adjustable data policies with flexible information lifecycle management
	• Advanced system monitoring via Prometheus

Management and monitoring	• Centralized and automatable installation and expansions • Automated monitoring and tenant management through an API • Rolling upgrades without downtime • Comprehensive ad hoc real-time, rolling-period, and historical-usage query capability • 200+ predefined monitoring, usage, and performance reports • Event-based audit messages for performance tracing, usage monitoring, and enabling billing or chargeback

Professional Services	• Reduced deployment risk, streamlined implementation, and the ability to migrate quickly with minimal disruption
	  – Discovery and design determines solution requirements
	  – Validated process for appliance deployment and software configuration
	  – Data migration with proven methodologies and reliable tools

Models and specifications

|	SGF6024	SG6060	SG5760	SG5712	SG1000/SG100
CPU cores	40 @ 2.4GHz	40 @ 2.4GHz	8 @ 2.2 GHz	8 @ 2.2 GHz	40 @ 2.1 GHZ (SG1000) 20 @ 2.4 GHZ (SG100)
Raw capacity	800GB SSDs = 19.2TB 1.6TB SSDs (FIPS) = 38.4TB 3.8TB SSDs = 91.2TB 7.6TB SSDs = 182.4TB 15.3TB SSDs = 367.2TB	4TB drives = 232TB (712TB with 2 Exp Shelves) 8TB drives = 464TB (1,424TB with 2 Exp Shelves) 10TB drives (FIPS) = 580TB (1,780TB with 2 Exp Shelves) 12TB drives = 696TB 18TB drives = 1044TB (3,204TB with 2 Exp Shelves)	4TB drives = 240TB 8TB drives = 480TB 10TB drives = 600TB 12TB drives = 720TB 18TB drives = 1080TB	4TB drives = 48TB 8TB drives = 96TB 10TB drives = 120TB 12TB drives = 144TB 18TB drives = 216TB	Not applicable.
Form factor	3U*, 24 drives	5U*, 58 Drives 118 with 1 Exp Shelf 178 with 2 Exp Shelves	4U, 60 drives	2U, 12 drives	1U*
Connectivity	4 x 10/25GbE	4 x 10/25GbE	4 x 10/25GbE	4 x 10/25GbE	4x 10/25/40/100GbE (SG1000) 4 x 10/25GbE (SG100)
Width	17.32" (44 cm)	17.66" (44.86cm)	17.66" (44.86cm)	17.6" (44.7cm)	17.32" (44 cm)
Depth	32.01" (81.3 cm)	38.25" (97.16cm)	38.25" (97.16cm)	21.1" (53.6cm)	32.01" (81.3 cm)
Weight	90.74 lb (41.17 kg)	289 lb (131 kg)	250 lb (113 kg)	63.9 lb (29 kg)	37.9 lb (17.19 kg)

Environmental specifications

	Typical	Maximum	Typical	Maximum	Typical	Maximum	Typical	Maximum	Typical	Maximum
	800GB drives		**4TB drives**		**4TB drives**		**4TB drives**		**Standard configuration**	
Amps	2.25	5.52	6.29	9.68	6.25	8.06	2.02	2.54	1.67	2.62
Watts	490	1204	1374	2114	1361	1755	440	552	334	524
BTU	1671	4108	4690	7212	4642	5989	1501	1884	1140	1788
	1.6TB drives		**8TB drives**		**8TB drives**		**8TB drives**			
Amps	2.27	5.56	6	9.38	5.95	7.77	1.97	2.49		
Watts	512	986	1310	2050	1297	1692	429	541		
BTU	1683	4132	4472	6994	4425	5772	1462	1846		
	3.8TB drives**		**10TB drives (FIPS)**		**10TB drives (FIPS)**		**10TB drives (FIPS)**			
Amps	2.36	5.74	6.29	9.68	6.25	8.06	1.97	2.49		
Watts	513	1251	1374	2114	1360	1755	441	554		
BTU	1750	4268	4689	7211	4642	5989	1506	1889		
	7.6TB drives		**12TB drives**		**12TB drives**		**12TB drives**			
Amps	2.42	5.88	6.33	9.71	6.28	8.1	2.23	2.75		
Watts	527	1279	1382	2122	1369	1764	498	611		
BTU	1799	4365	4718	7240	4671	6018	1700	2083		
	15.3TB drives		**18TB drives**		**18TB drives**		**18TB drives**			
Amps	2.42	5.88	5.24	7.04	5.80	7.62	2.28	2.82		
Watts	527	1279	1140	1534	1263	1660	524	640		
BTU	1799	4365	3890	5235	4310	5666	1791	2181		

The SG5760 and SG6060 require 208V-240V power. They will not function with 120V power.
* 1U compute server included in form factor – environmental specifications using 220V for compute server.
** available in SED and non-SED drives.
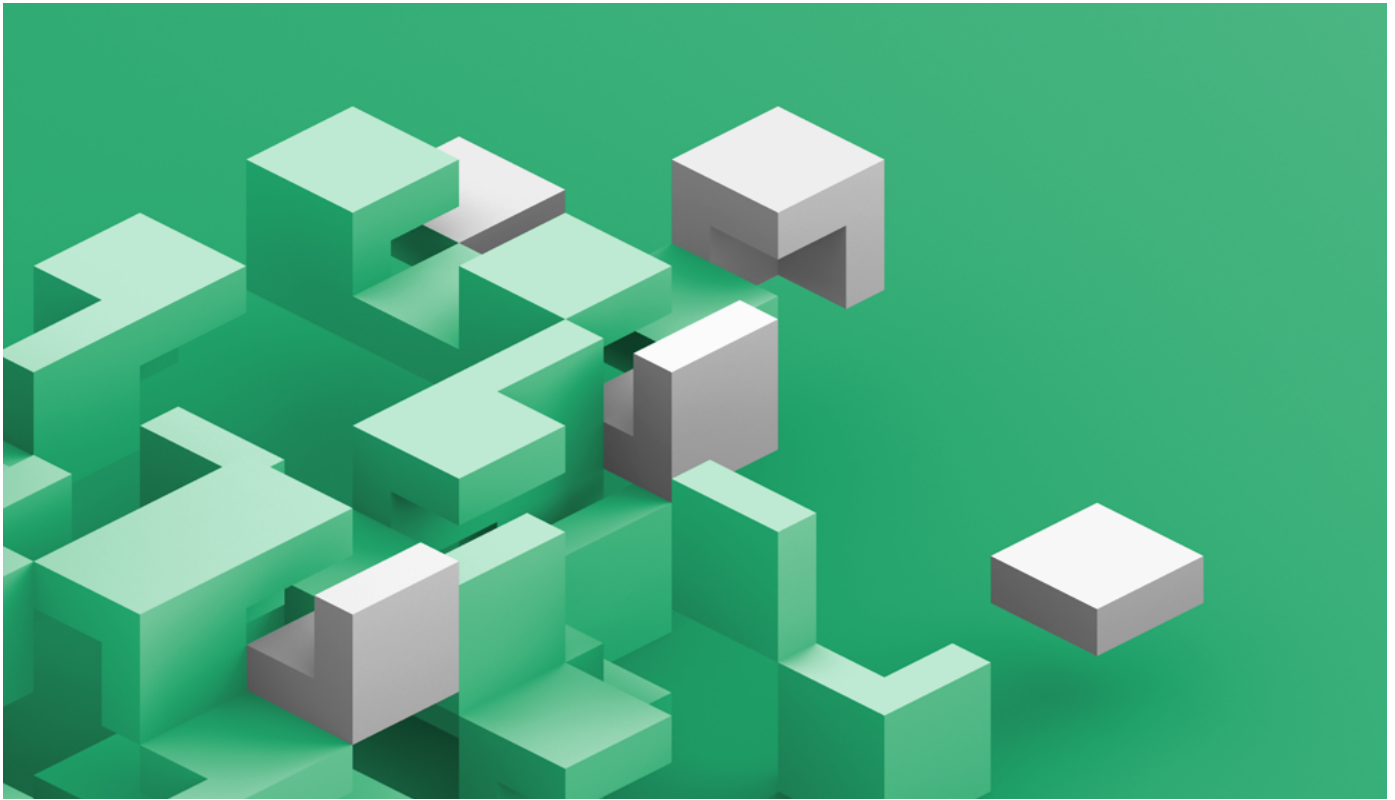
About NetApp

In a world full of generalists, NetApp is a specialist. We're focused on one thing, helping your business get the most out of your data. NetApp brings the enterprise-grade data services you rely on into the cloud, and the simple flexibility of cloud into the data center. Our industry-leading solutions work across diverse customer environments and the world's biggest public clouds.

As a cloud-led, data-centric software company, only NetApp can help build your unique data fabric, simplify and connect your cloud, and securely deliver the right data, services and applications to the right people—anytime, anywhere. www.netapp.com

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