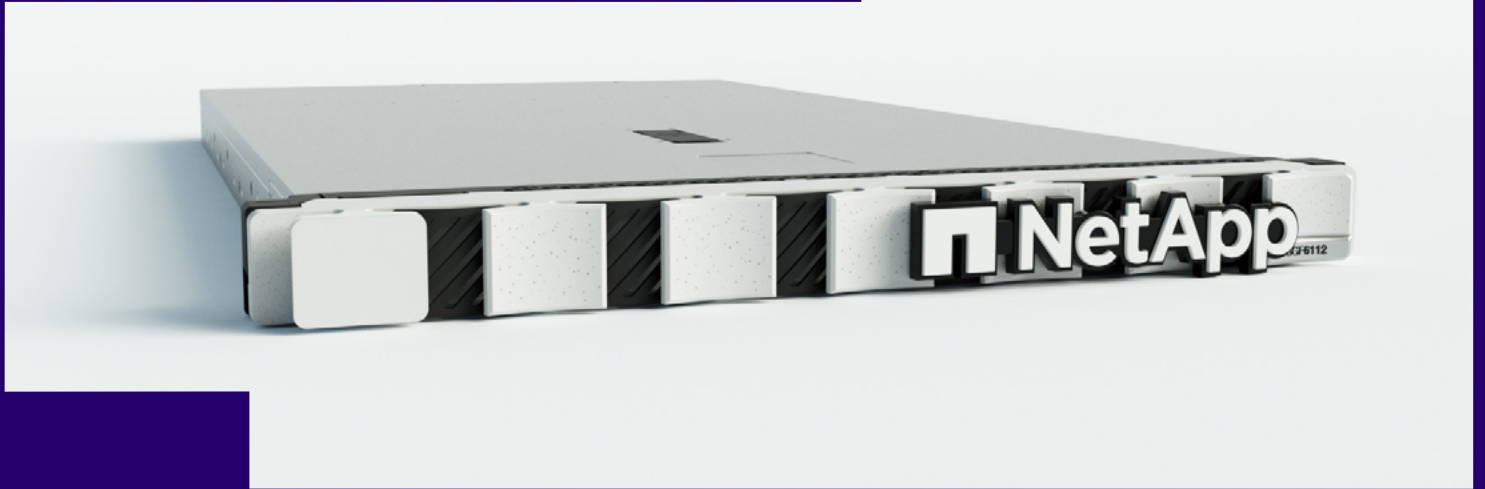
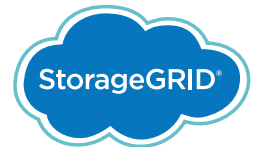


# NETAPP STORAGEGRID



Object storage that enables you to manage your unstructured data across public, private, and hybrid multicloud 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 (Amazon S3) API. With StorageGRID, you can 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 (Amazon SNS), Google Cloud, Microsoft Azure Blob, Amazon S3 Glacier, Elasticsearch, and similar services.

StorageGRID seamlessly integrates with the NetApp portfolio products. We have expanded capabilities with several NetApp BlueXP services offerings, such as BlueXP Console, Cloud Tiering (powered by FabricPool), Cloud Data Sense, Cloud Insights, Cloud Backup, InstaClustr, and Active IQ.

### Enable the hybrid cloud

StorageGRID supports industry-leading hybrid cloud solutions with its 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 with Amazon SNS. And 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, StorageGRID bridges the gap between enterprise IT and cloud semantics.

## 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 amount of unstructured data while lowering your TCO.
- **FAST: Combine high performance with cost efficiencies.** Unleash the full power of flash with StorageGRID object quality of service (QoS), dedicated load balancer, and lifecycle management capabilities.
- **FUTURE-PROOF: Realize cloud as a strategy, not just a location.** Today and tomorrow, StorageGRID delivers industry-leading features and capabilities to help you manage your data with the simplicity, speed, and fluidity that you have built your business on.

Cloud-to-cloud data management can also help you reduce costs. 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 data 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 for further cost savings, you can tier cold StorageGRID data to the cloud through Cloud Storage Pool to Amazon S3, Google Cloud, or Microsoft Azure.

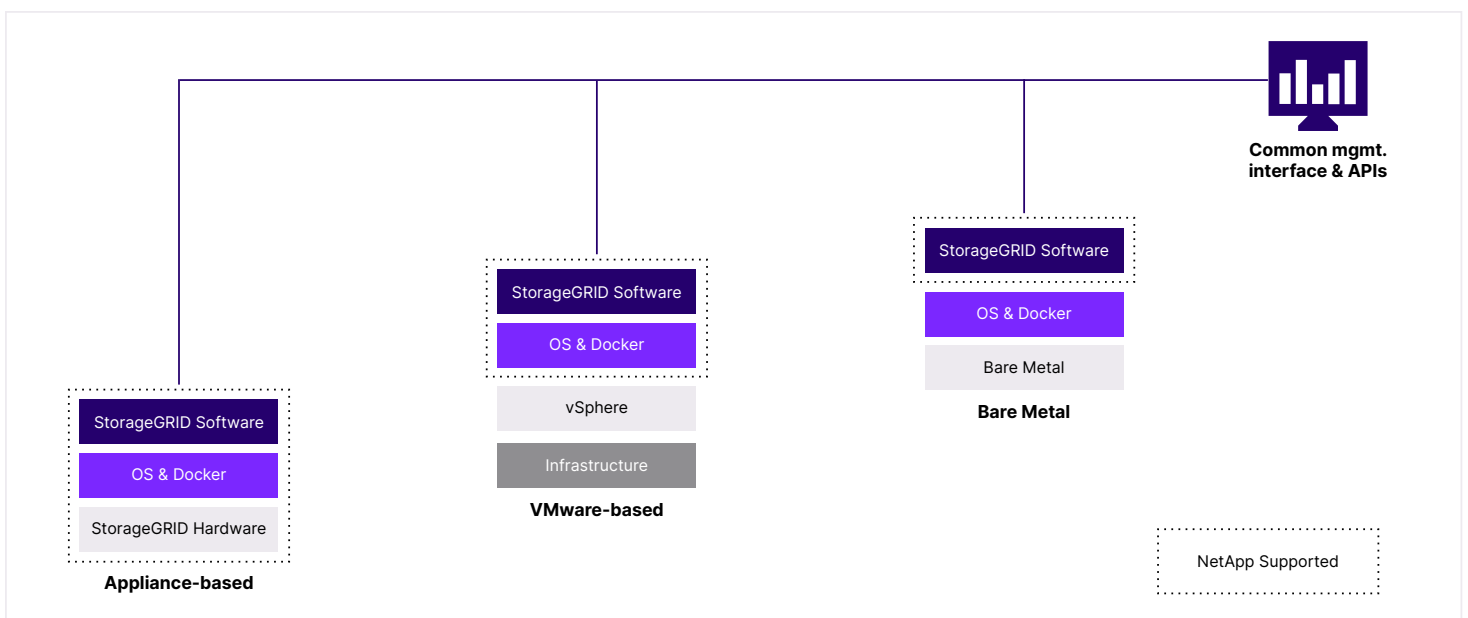


Figure 1: StorageGRID simple, automated deployment on flexible platforms

StorageGRID has an extensive integration with various ISVs. You can find the list of third-party solutions validated for StorageGRID [here](#).

**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 StorageGRID S3 Object Lock (using governance or compliance mode) to comply with regulations. You can configure StorageGRID so that data is stored with multiple 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. And other features such as multifactor authentication, role-based access control, and external key management make StorageGRID a leader in security capabilities.

**Use proven software designed for nondisruptive operations**

StorageGRID is an 11th-generation object store with more than two 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 BlueXPActive 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. StorageGRID also enables you to maintain and to update your infrastructure without business interruption or downtime.

**Deploy granular data protection policies**

StorageGRID appliances provide layered data protection at the hardware and software levels. You can protect against failed disk drives and rapidly rebuild lost data segments with local, node-level erasure coding (EC) or redundant array of independent disks (RAID), and you can protect against site-level disasters with geo-distributed EC or in-grid replication. For even greater protection, you can also replicate to another StorageGRID grid or to a cloud object store. An advanced grid federation functionality in StorageGRID enabled by Cross-Grid Replication (CGR) feature provides tenant account cloning and an active-active object level disaster recovery solution.

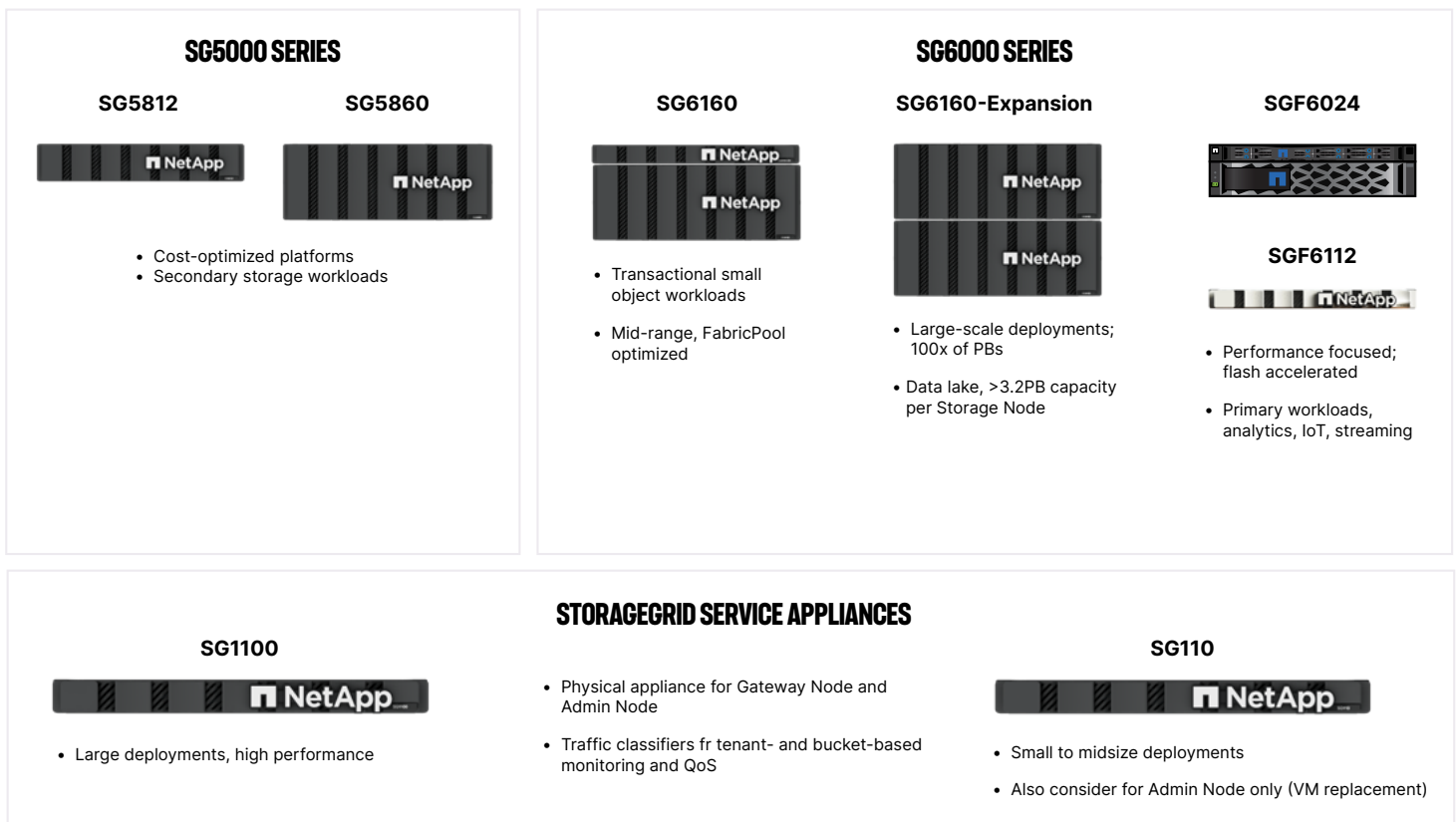


Figure 2: StorageGRID appliance portfolio.

## Flexible deployments

Because every deployment is unique, StorageGRID aligns with your environment, whether it includes nodes as 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 centralized and streamlined process that enables you to rapidly deploy petabytes of storage.

StorageGRID service appliances offer the option of even simpler deployment. The SG110 and SG1100 service appliances deliver an enterprise-grade load balancer with full high-availability (HA) capabilities as well as the option to host StorageGRID Admin Nodes. You can streamline deployments by implementing “all appliance grids.” And you have the flexibility to operate the node or HA node pair as a load balancer, an administrative node, or both roles simultaneously.

By deploying NetApp StorageGRID appliances, you get an enterprise-grade turnkey solution that is easy to implement. Each appliance is 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.

### Start your move to StorageGRID

You can migrate large amounts of data to a 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 a low-cost StorageGRID object store, NetApp makes it easy for you to migrate. Work with our experts to plan and to implement your transition to StorageGRID. Contact [NetApp consulting and Professional Services](#) or our [certified partners](#).

To learn more about the latest features, visit StorageGRID technical documentation resources [here](#).

## Key product features and technical specifications

Key features for object storage	NetApp StorageGRID provides
<b>Massive scalability and flexible infrastructure</b>	<ul style="list-style-type: none"><li>• Massive elastic content store</li><li>• Multiple geo-distributed sites</li><li>• Support for multiple storage tiers:<ul style="list-style-type: none"><li>• NVMe, SSD, SAS, SATA, Tape</li><li>• Amazon S3</li><li>• Microsoft Azure</li><li>• Google Cloud</li></ul></li><li>• Geo-erasure coding and geo-replication</li><li>• Deployment on VMs, hardware appliances, or bare-metal servers with Docker containers</li></ul>
<b>Application interfaces</b>	Massively parallel transaction engine with: <ul style="list-style-type: none"><li>• Integrated load balancing</li><li>• Transaction multithread pipelining</li></ul> Object access protocols: <ul style="list-style-type: none"><li>• Amazon S3</li></ul> System and account management: <ul style="list-style-type: none"><li>• Management API: System installation, system administration, tenant management, maintenance tasks, and system monitoring, including Prometheus</li><li>• Tenant API: Management of users, credentials, usage, and quotas</li></ul>
<b>Data services</b>	Platform services – tenant-configurable hybrid cloud integration: <ul style="list-style-type: none"><li>• S3 event notification with Amazon SNS and Kafka</li><li>• CloudMirror bucket replication with Amazon S3, Google Cloud, or S3-compatible target</li><li>• Metadata search and analysis with streaming metadata to external Elasticsearch</li></ul> WORM retention: <ul style="list-style-type: none"><li>• S3 Object Lock (compliance and governance mode)</li><li>• Reinforced data integrity with compliance-grade WORM</li><li>• Litigation hold</li></ul> Advanced security and encryption capabilities: <ul style="list-style-type: none"><li>• Transport Security Layer (TSL) 1.3 and AES 256-bit encryption</li><li>• Secure Hash Algorithm 2 (SHA-2) and CPU-efficient integrity protection</li><li>• External key management</li><li>• Automatic verification of StorageGRID upgrades and hot fixes with code signing functionality</li><li>• FIPS-compliant encrypted connections for the load balancers to ensure data security, compliance and confidentiality</li><li>• Configurable firewalls controls, management and S3 endpoint ports</li></ul> Disaster recovery <ul style="list-style-type: none"><li>• Cross Grid Replication (CGR) provides bucket level active-active replication across grids</li></ul>

Key features for object storage	NetApp StorageGRID provides
<b>Metadata and content awareness</b>	Metadata-based data management: <ul style="list-style-type: none"> <li>Content-aware self-healing maintains data protection even during network disruptions</li> <li>Policies can be modified and applied to both new and existing objects</li> </ul>
<b>Deployment options</b>	<ul style="list-style-type: none"> <li>Physical or virtual servers via Docker containers</li> <li>Virtual appliance:               <ul style="list-style-type: none"> <li>VMware ESXi and vCenter</li> </ul> </li> <li>Hardware appliances:               <ul style="list-style-type: none"> <li>StorageGRID all-flash SGF6112 (TLC and QLC) and SGF6024 (TLC) for high-performance primary object storage workloads, web apps, streaming</li> <li>StorageGRID SG6160 for transactional small object storage workloads, including FabricPool optimization, with expansion shelf options for large scale capacity, including data lakes</li> <li>StorageGRID SG5812 and SG5860 for secondary, capacity object storage workloads</li> <li>StorageGRID SG110 and SG1100 services appliances for simplified operations, including Admin Node software and load balancing</li> </ul> </li> </ul>
<b>Service-level objective and performance monitoring</b>	<ul style="list-style-type: none"> <li>Comprehensive performance feeds:               <ul style="list-style-type: none"> <li>Access throughput</li> <li>Replication throughput</li> <li>Time to policies achieved</li> </ul> </li> <li>QoS rate limiting to manage workload performance</li> <li>Transaction round-trip time</li> <li>Isolated application, replication, and admin network traffic</li> <li>Adjustable data policies with flexible information lifecycle management (ILM)</li> <li>Advanced system monitoring with Prometheus</li> </ul>
<b>Management and monitoring</b>	<ul style="list-style-type: none"> <li>Centralized and automatable installation and expansions</li> <li>Automated monitoring and tenant management through an API</li> <li>Rolling upgrades without downtime</li> <li>Comprehensive ad hoc real-time, rolling-period, and historical-usage query capability</li> <li>More than 200 predefined monitoring, usage, and performance reports</li> <li>Event-based audit messages for performance tracing, usage monitoring, and enabling billing or chargeback</li> </ul>
<b>Professional Services</b>	<ul style="list-style-type: none"> <li>Reduced deployment risk, streamlined implementation, and the ability to migrate quickly with minimal disruption:               <ul style="list-style-type: none"> <li>Discovery and design to determine solution requirements</li> <li>Validated process for appliance deployment and software configuration</li> <li>Data migration with proven methodologies and reliable tools</li> </ul> </li> </ul>

Models and specifications						
	SGF6112	SGF6024	SG6160	SG5860	SG5812	SG1100/SG110
<b>CPU cores</b>	48 @ 2.6GHz	40 @ 2.4GHz	40 @ 2.4GHz	8 @ 2.2 GHz	8 @ 2.2 GHz	48 @ 2.6 GHZ (SG1100) 24 @ 2.7 GHZ (SG110)
<b>Drive types supported</b>	SED: 1.9TB, 3.8TB 15.3TB (TLC)  Non-SED: 30.7TB QLC	SED: 15.3TB  Non-SED: 1.9TB,3.8TB,	Non-FDE: 4TB, 8TB, 12TB, 22TB  FIPS: 10TB	Non-FDE: 4TB, 8TB, 12TB, 22TB  FIPS: 10TB	Non-FDE: 4TB, 8TB, 12TB, 22TB  FIPS: 10TB	Not applicable.
<b>Capacity</b>	22.8TB - 368.4TB	45.6TB - 367.2TB	No Exp Shelf: 240TB - 1320TB 1 Exp Shelf: 480TB - 2640TB 2 Exp Shelf: 720TB - 3960TB	240TB - 1320TB	48TB - 264TB	Not Applicable
<b>Form factor</b>	1U, 12 drives	3U*, 24 drives	No Exp Shelf: 5U, 60 drives 1 Exp Shelf: 9U, 120 drives 2 Exp Shelf: 13U, 180 drives	4U, 60 drives	2U, 12 drives	1U*
<b>Connectivity</b>	4 × 10/25GbE	4 × 10/25GbE	4 × 10/25GbE 4 × 100GbE	4 × 10/25GbE	4 × 10/25GbE	4x 10/25/40/100GbE (SG1100) 4 × 10/25GbE (SG110)
<b>Width</b>	17.32" (44 cm)	17.32" (44 cm)	17.66" (44.86cm)	17.66" (44.86cm)	17.6" (44.7cm)	17.32" (44 cm)
<b>Depth</b>	32.01" (81.3 cm)	32.01" (81.3 cm)	38.25" (97.16cm)	38.25" (97.16cm)	21.1" (53.6cm)	32.01" (81.3 cm)
<b>Weight</b>	37.9 lb (17.19 kg)	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)

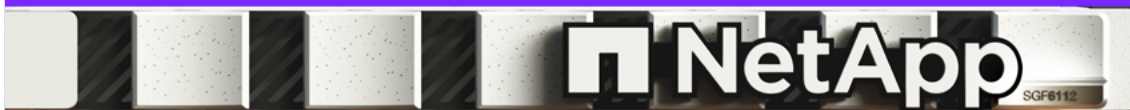
## Models and specifications

### Environmental specifications\*\*

	Typical	Max	Typical	Max	Typical	Max	Typical	Max	Typical	Max	Typical	Max
	1.92TB SSDs		15.3TB drives		4TB drives		4TB drives		4TB drives		Standard config	
<b>Amps</b>	2.758	3.92	2.42	5.88	6.29	9.68	6.25	8.06	2.02	2.54	1.67	2.62
<b>Watts</b>	549	784	527	1279	1374	2114	1361	1755	440	552	334	524
<b>BTU</b>	1872	2674	1799	4365	4690	7212	4642	5989	1501	1884	1140	1788
	3.84TB SSDs				8TB drives		8TB drives		8TB drives			
<b>Amps</b>	2.82	3.98			6	9.38	5.95	7.77	1.97	2.49		
<b>Watts</b>	566	796			1310	2050	1297	1692	429	541		
<b>BTU</b>	1932	2716			4472	6994	4425	5772	1462	1846		
	15.3TB SSDs				10TB drives (FIPS)		10TB drives (FIPS)		10TB drives (FIPS)			
<b>Amps</b>	3.08	4.4			6.29	9.68	6.25	8.06	1.97	2.49		
<b>Watts</b>	616	880			1374	2114	1360	1755	441	554		
<b>BTU</b>	2101	3001			4689	7211	4642	5989	1506	1889		
					12TB drives		12TB drives		12TB drives			
<b>Amps</b>					6.33	9.71	6.28	8.1	2.23	2.75		
<b>Watts</b>					1382	2122	1369	1764	498	611		
<b>BTU</b>					4718	7240	4671	6018	1700	2083		
					22TB drives		22TB drives		22TB drives			
<b>Amps</b>					5.99	9.37	5.61	7.47	2.21	2.77		
<b>Watts</b>					1308.26	2048.05	1223.43	1627.82	508.08	627.83		
<b>BTU</b>					4465.24	6987.32	4174.85	5555.48	1736.55	2139.27		

\* A 1U compute server is included in the form factor. Environmental specifications use 220V for the compute server.

\*\* The SG5860 and SG6160 require 208V-240V power. They do not function with 120V power.



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#### 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, then harnesses observability and AI, to enable the best data management. As the only enterprise-grade storage service natively embedded in the world's biggest clouds, our data storage delivers seamless flexibility and our data services create a data advantage through superior cyber-resilience, governance, and applications agility. Our CloudOps solutions provide continuous optimization of performance and efficiency through observability and AI. No matter the data type, workload or environment, transform your data infrastructure to realize your business possibilities with NetApp. [www.netapp.com](http://www.netapp.com)

