NetApp Keystone® Storage-as-a-Service Service Description

This Service Description describes the On-Premises and Hybrid Cloud, consumption-based, STaaS Services that are available to an End User pursuant to the Keystone STaaS Terms, incorporated herein. Capitalized terms not specifically defined in this Service Description have the same meaning as in the Keystone STaaS Terms. In addition, the definitions available at Definitions for Keystone Service Description 3.4 apply to this Service Description.

STaaS Services described in this Service Description may be provided to End User by NetApp or a NetApp Partner. Partner may also assume some of the responsibilities of NetApp under this Service Description.

1. STaaS Features and Services.

1.1. Capacity.

1.1.1. Committed Capacity

Use of the STaaS Services requires a subscription to a certain amount of Committed Capacity per Unified or Block Optimized PSL, or per Disaggregated Cluster, per Order, subject to minimum Committed Capacities and capacity change increments as set forth in the applicable table of Section 1.2. Committed Capacities are defined per Storage Array for Unified and Block Optimized DSTs and per Disaggregated Cluster for Disaggregated DST.

1.1.1. Consumed Capacity

1.1.1.1. **Unified or Block Optimized Data Storage Type.**

1.1.1.1.1. Effective Capacity Metering: Consumed Capacity is calculated, per Storage Array, as the amount of metered Effective Capacity in use to store all instances and types of End User Data, plus Usable Capacity in use to store metadata and differential data of Snapshot™ copies and certain clones.

1.1.1.1.2. Usable Capacity Metering: Consumed Capacity is calculated, per Storage Array, as the amount of metered Usable Capacity in use to store all instances and types of End User Data, plus Usable Capacity in use to store metadata and differential data of Snapshot™ copies.

1.1.1.2. **Object Data Storage Type.** Consumed Capacity is calculated as the amount of metered Usable Capacity in use to store all instances and types of End User Data on all nodes based on information lifecycle management ("ILM") policy(ies) configured.

1.1.1.3. **Cloud Volumes ONTAP.** Consumed Capacity is calculated as the amount of metered Provisioned Effective Capacity of all CVO volumes.

1.1.1.4. **Disaggregated Data Storage Type.** Consumed Capacity is calculated, per Disaggregated Cluster, as the amount of metered Usable Capacity in use to store all instances and types of End User Data, plus Usable Capacity in use to store metadata and differential data of Snapshot™ copies.

1.1.2. Burst Capacity

1.1.2.1. **Burst Capacity Limit.** Keystone Services provide a default Burst Capacity Limit of 20% of Committed Capacity, per Storage Instance, with additional options as an Additional Service, provided below.

1.1.2.2. **Burst Rate.** Burst Capacity consumption will be invoiced at the specified Committed Capacity rate corresponding to the selected DST and PSL.

1.1.2.3. **Burst Waiver Period.** STaaS Services provide a Burst Waiver Period of sixty (60) days from the Start Date.

1.2. Data Storage Types

1.2.1. Unified.

Data Storage Type	**Unified** (ONTAP)				
Supported protocols	FC, iSCSI, NFS, NFSv4/RDMA, NVMe/FC, NVMe/TCP, SMB, S3				
Performance Service Level (all specifications per PSLI ["H/A Pair"])	**Extreme**	**Premium**	**Standard**	**Standard Hybrid**	**Value**
Example Workloads	AI/ML, HPC, InMem DB	Analytics, EDA, OLTP	OLAP, IoT, Containers	File, Virtualization, B&R	Backup, Archive
Min Committed Capacity	50 TiB		100 TiB	200 TiB	100 TiB
Target 90th percentile Latency	<= 1ms	<= 1ms	<= 4ms	<= 1ms	> 4ms
Target Maximum IOPS[*, a]	1M	550K	250K	300K	N/A

Target Maximum GBps[*, a]	40	20	10	5	N/A
Committed Capacity Adjustment Increment (increase or decrease)	25 TiB	25 TiB	25 TiB	50 TiB	25 TiB
Committed and Metered Capacity type	Effective Capacity or Usable Capacity			Usable Capacity	Effective Capacity or Usable Capacity

[*] The "Target Maximum IOPS" and "Target Maximum GBps" are mutually exclusive per Performance Service Level; actual performance may differ based on various factors, including, for example, OS version, hardware workload type, and simultaneity.

[a] IOPS: NFS; Random; 70%R/30%W; 8K block size; 1ms latency (4ms for Standard). Throughput: NFS; Sequential, 100% R; 32K block size.

1.2.2. **Block Optimized**

Data Storage Type	**Block Optimized** (ONTAP)		
Supported protocols	NVMe/TCP, NVMe/FC, FC, iSCSI		
Performance Service Level (all specifications per PSLI ["H/A Pair"])	**Extreme**	**Premium**	**Standard**
Example Workloads	SAP HANA, Oracle (OLTP), MS SQL Server, EPIC		
Target 90th percentile Latency	<= 1ms	<= 1ms	<= 4ms
Target Maximum IOPS[*, b]	850K	450K	120K
Target Maximum GBps[*, b]	65	25	6
Min Committed Capacity	50 TiB		100 TiB
Committed Capacity Adjustment Increment (increase or decrease)	25 TiB		25 TiB
Committed and Metered Capacity type	Effective Capacity or Usable Capacity		

[*] The "Target Maximum IOPS" and "Target Maximum GBps" are mutually exclusive per Performance Service Level; actual performance may differ based on various factors, including, for example, OS version, hardware workload type, and simultaneity.

[b] IOPS: FCP; Random; 70%R/30%W; 8K block size; 1ms latency (4ms for Standard). Throughput: FCP; Sequential, 100% R; 64K block size.

1.2.3. **Object**

Data Storage Type	**Object** (StorageGRID)	
Supported protocols	S3	
Performance Service Level	**Standard**	**Value**
Min Committed Capacity	200 TiB	500 TiB
Committed Capacity Adjustment Increment (increase or decrease)	25 TiB	100 TiB
Committed and Metered Capacity type	Usable Capacity	

1.2.4. **Cloud Volumes ONTAP**

Data Storage Type	**Cloud Volumes ONTAP**
Supported Protocols	NFS, CIFS, iSCSI, S3* (*AWS & Azure only)
Min Committed Capacity	4 TiB
Committed Capacity Adjustment Increment (increase or decrease)	1 TiB
Committed and Metered Capacity type	Effective Capacity

1.2.5. **Disaggregated** (may also be referred to as "AFX")

Data Storage Type	**Disaggregated** (ONTAP)
Supported Protocols	NFSv3, NFSv4/RDMA, pNFS, SMB, S3
Performance Service Level (all specifications per storage controller, unless otherwise indicated)	**Extreme**
Example Workloads	AI/ML, HPC, InMem DB
Target 90th percentile Latency	<= 1ms
Target Maximum IOPS [*, c]	625K
Target Maximum GBps [*, c]	20
Min Committed Capacity (per Disaggregated Cluster)	200 TiB
Committed Capacity Adjustment Increment (increase or decrease)	100 TiB
Committed and Metered Capacity type	Usable Capacity

[c] IOPS: ONTAP 9.18.1; NFSv4; Random; 70%R/30%W; 4K block size. Throughput: ONTAP 9.18.1; NFSv4; Sequential, 100% R; 64K block size.

1.3. Features.

1.3.1. Unified and Disaggregated DSTs include use of all *ONTAP One* features on STaaS Products.

1.3.2. Block Optimized DST includes use of all *ONTAP One for SAN* features on STaaS Products.

1.3.3. Object DST includes use of all StorageGRID features on STaaS Products.

1.4. Services.

STaaS Services include the following services, which will be performed by NetApp or NetApp authorized partner or sub-contractor, as applicable:

1.4.1. **STaaS Products**. Size, select and provide the STaaS Products required to deliver STaaS Services, including power cords and SR-SFPs for, and network cabling between STaaS Products. NetApp will determine the STaaS Products used to deliver such STaaS Services. NetApp may replace or modify the STaaS Products from time to time, at NetApp's expense, provided the STaaS Services continue to meet the applicable Service Description, irrespective of any published EOA/EOS.

1.4.2. **Site Requirements**. Provide End User Site preparation requirements.

1.4.3. **Shipping**. Provide initial and final return shipping of STaaS Products.

1.4.4. **Installation**. Provide installation for initial, add-on, and updates of STaaS Products. STaaS Services installation includes the following if/as applicable:

- Deployment project management.
- Creating deployment configuration workbook(s).
- Installation and cabling of STaaS Products.
- Updating STaaS Product firmware.
- Installing and updating STaaS Software and licenses.
- Configuring ONTAP disk spares, RAID, and aggregates.
- Configuring cluster interconnect switches.
- Configuring ONTAP switched or switchless cluster.
- Configuring and testing ONTAP AutoSupport (ASUP).
- Installing, configuring, and testing Monitoring Tools on End User provided VMs.
- Creating minimum test configuration (to be deleted after testing) and testing STaaS Service operation.
- Document validated deployment.
- Exclusions:
    - Installing, configuring, or testing of End User equipment, servers, clients, virtual machines, or networks.
    - End User specific solutioning, installation, configuration, or integrating of End User specific solutions, or applications including, backup/recovery, disaster recovery, data migration, performance assessments, or Cluster Expansion.
    - CVO deployment.
    - Installing and configuring DII.

1.4.5. **Activation**. Enable monitoring, metering, invoicing, and support and make STaaS Services available for use.

1.4.6. **Metering/Monitoring**. Perform capacity consumption metering and basic health and performance monitoring of STaaS Products and STaaS Services using a Monitoring Tool. STaaS Services monitoring and alerting is limited to NetApp's requirements to deliver STaaS Services and does not provide for customer specific monitoring and alerting requirements.

Monitoring Tools connect to and communicates only with the management plane of the STaaS Products. Neither NetApp nor a Monitoring Tool has physical or logical access to, operates on, processes, or transmits End User data. During remote troubleshooting, support, or maintenance activities, End User controls providing permission, monitoring, and logging of remote NetApp access to required STaaS Products. Remedy eligibility is subject to SLA (defined below), including the Monitoring Tools requirements and applicable NetApp-caused-failure exception.

Keystone Services require full and continuous enablement of each of:

- AutoSupport® (ASUP), on each Storage Array or Disaggregated storage controller, configured to send usage information daily, and
- Keystone Collector Agent, deployed on End User provided and managed virtual machines, at each End User Site.

1.4.7. **Reporting**. Provide Capacity Report through a Monitoring Tool or with each invoice. STaaS Services reporting is limited to NetApp's requirements to deliver STaaS Services and does not provide for customer specific reporting requirements.

1.4.8. **Notification**. Notify End User of basic incidents that may affect delivery or use of STaaS Services through a Monitoring Tool.

1.4.9. **Technical Support.** Provide technical support by email or telephone. Keystone technical support is subject to the following exclusions:

- Backup and recovery of the End User's operating systems, applications, or user data.
- End User application troubleshooting or performance tuning.
- Identification or removal of viruses or malware.
- Operational testing of End User specific application, compute, networking, storage, or processes.
- Services required due to End User's failure to incorporate any system fix, repair, patch, or modification provided by NetApp.
- Services required due to End User's failure to take avoidance action previously advised by NetApp.
- Services that, in NetApp's opinion, are required due to unauthorized attempts by non-NetApp personnel to install, repair, maintain, or modify hardware, firmware, or software.
- System administration tasks.
- Training.
- Troubleshooting for interconnectivity or compatibility incidents.

1.4.10. **On-Site Parts Delivery, Replacement, Support**. Deliver parts and/or send authorized engineers to End User Site, as required.

1.4.11. **Capacity, Health, and Performance management**. Manage STaaS Products to deliver STaaS Services. Subscription Hardware updates are based on STaaS Hardware end-of-support schedules, amongst other criteria.

1.4.12. **Updates.** Identify, plan, and optionally install, in coordination with End User, updates and patches required for STaaS Services. Subscription Software updates are subject to the following exclusions:

- Identification and installation of patches and hotfixes that are specifically required by the End User but not required for operation and delivery of STaaS Services.
- Software updates required to enable and revert from Cluster Expansion.

1.4.13. **Return**. At Subscription Term expiration, provide packaging (if required), deinstall STaaS Products and arrange for return to NetApp, and sanitize media, using industry recognized methods and reset STaaS Products to factory settings upon return to NetApp facility.

1.4.14. **Performance SLO**. NetApp will use commercially reasonable efforts designed to achieve the Latency, IOPS, and GBps indicated for each PSL. Keystone performance service level objective is subject to the following terms and conditions:

- Degraded performance means the amount of time, in minutes, per incident that 90th percentile latency target is not met.
- 90th percentile latency is measured per PSLI within a Keystone Order. Latency is sampled every 5 minutes and the 90th percentile value over a 24-hour period is used as the daily measure, considering the following:
- Measurements that are not using at least 5 IOPs at the time of measure will be excluded from sample set.
- Greater than 30% writes at the time of measure will be excluded from sample set.
- Latency injected by customer's use of AQoS will be excluded from sample set.
- Latency injected by customer's use of AQoS to maintain absolute minimum IOPS per volume will be excluded from sample set.
- For volumes with FabricPool enabled, latency incurred due to data transfer to/from target (cold) storage will be excluded from sample set.
- Latency caused by the application, host, or End User network outside of the ONTAP® cluster will be excluded from sample set.
- When using the MetroCluster Additional STaaS Service, target latency includes only IO to/from local storage array.
- If there are less than 10 valid measurements during the 24-hour period, then results for this day will be discarded.
- In FabricPool configurations, Performance Levels apply only if all requested data blocks are residing on FabricPool source (hot) storage and the source storage is not in a SnapMirror® Synchronous relationship.
- Applicable to NetApp AFF and AFX platforms only.
- All per PSLI min/max and other limits apply.

- All PSLIs must have full and continuous enablement of Monitoring Tool and ASUP.

1.4.15. **Additional SLOs**. NetApp will use commercially reasonable efforts designed to achieve:

1.4.15.1. Service Parts Delivery and Replacement. Four hours delivery and on-site replacement, from time need is determined by Keystone Support, where geographically available.

1.4.15.2. Sustainability. Power consumption up to maximum rated watts of STaaS Products deployed to deliver Storage Array for Unified (not including "Value" PSL) and Block Optimized DST, or Disaggregated Cluster for Disaggregated DST, as provided in the Service Description Supplement.

1.4.15.3. Technical Support. STaaS Services provides the following Time-to-Respond (TTR) targets, after receipt of incident ticket by Keystone support, based on incident priority level assigned by Keystone support:

Priority	TTR Target	Service Window
P1 – Business operations severely impacted	30 mins	24x7x365
P2 – Business operations degraded	2 hrs	24x7x365
P3 – Little or no business impact	8 hrs	8x5 - local business hours
P4 – Informational or administrative inquiries	24 hrs	8x5 - local business hours

1.4.16. **Excluded**. STaaS Products do not include the following items. Additional fees may apply if required to be added:

- Cluster switches for exclusive use during the period of Cluster Expansion or non-Keystone requirements. Cluster switches are included only for initial configuration consisting of more than two Keystone controllers.
- Racks or PDUs.
- Network cables and cabling between STaaS Products and End User's products.
- SFPs for exclusive use during the period of Cluster Expansion or for use in End User products.
- Long distance SFPs.
- STaaS Product modifications, during term, due to change in End User's technical requirements (e.g. protocol, connectivity).

1.5. Keystone Success Management. STaaS Services include remote Keystone Success Management ("KSM") service, available during local business hours, providing:

1.5.1. Conduct, as needed, STaaS Services specific review calls that may include:

- General questions regarding STaaS services.
- Subscription consumption and planning.
- STaaS Products maintenance and update planning.
- Invoice review.
- Incident review.
- STaaS escalation management.

1.5.2. KSM scope does not include End User owned equipment.

1.5.3. KSM does not replace nor duplicate scope of services provided by NetApp's Support Account Manager.

1.5.4. If desired, End User may separately purchase Support Account Manager services for STaaS Products.

1.6. General.

Keystone STaaS provides End User the right to use certain features and services listed in this Keystone STaaS Service Description. Use of these features and services is subject to the following terms and conditions:

- All capacity consumption attributable to use of these features counts towards Consumed Capacity.
- Hardware and software resources consumed through use of these features may affect available capacity and performance.
- Usage of features are subject to feature specifications and limits.
- Data Tiering to ONTAP targets:
  - Data that are tiered to a NetApp target do not count towards source's Consumed Capacity.
  - "NetApp targets" include NetApp's ONTAP or StorageGRID® solutions platforms.
  - Tiering non-NetApp targets requires the "Data Tiering to Non-NetApp Targets" Additional STaaS Service described in the Keystone STaaS Service Description.

2. **SLA**. The Service Levels described at SLAs for Keystone Service Description 3.4 ("SLA") are included, to the extent indicated on the Order.

3. **Additional Services**. The optional additional services provided in the Additional Services for Keystone Service Description 3.4 (each, an "Additional STaaS Service") are available, possibly for additional Fees, as may be further described in the Quote. Additional STaaS Services can be added to Subscriptions with greater than 12 months remaining, unless otherwise set forth therein.

4. **Order**.

4.1. Order type. Keystone Services provide two, non-convertible order types

- On-Premises Service.
- Hybrid Cloud Service.

4.2. Subscription Term.

- STaaS On-Premises Service offers up to 5-year Term.
- STaaS Hybrid Cloud Service offers up to 3-year Term with co-termination of On-Premises Service and CVO.

4.3. Start Date.

Date on which Subscription Term starts and Fees begin to accrue that is the earlier of, either:

- Date on which NetApp notifies End User that STaaS Services have been activated and available for use.
- 30 days from STaaS Products ship date, if STaaS Services cannot be activated within 30 days after STaaS Products ship date due to End User delays, as determined by NetApp.

4.4. Renewal. End User may renew its subscription, with the same terms, using the STaaS version noted on relevant Quote for as long as that STaaS version is offered.

5. **Billing**.

5.1. Capacity Reports

NetApp will use the Capacity Reports to calculate the Fees due under each invoice for STaaS Services and such Capacity Reports will be deemed to contain the final and conclusive summary of the Consumed Capacity used by End User during the applicable billing period, unless End User can establish that such Capacity Report contains a material error. The Consumed Capacity will be based on data available from AutoSupport and/or the Keystone Collector Agent, as detailed below.

Should any data not be available from the Monitoring Tools for producing an invoice for a particular billing period ("Billing Period"), data from Data Infrastructure Insights will be used, if available and purchased, to provide the Consumed Capacity. If data for a Billing Period is unavailable through the Monitoring Tools and also Data Infrastructure Insights, Consumed Capacity for such period will be, for the purpose of invoicing for that Billing Period, End User's 60 day rolling average usage (from the Monitoring Tools) for the timeframe immediately prior to the period. Should the subscription be less than 60 days, the rolling average usage over any time frame available will be used to calculate the Consumed Capacity. In event NetApp is able to obtain data from the Monitoring Tools after the invoice for the Billing Period is generated, and the previously calculated Consumed Capacity is greater than the Consumed Capacity as calculated with the Monitoring Tools, NetApp will provide a credit for the difference.

5.2. Unavailable Monitoring Data.

If data is unavailable from the Monitoring Tools for any period of sixty (60) consecutive days, and NetApp determines, in its reasonable discretion, that such unavailability is not caused by NetApp, NetApp will calculate Consumed Capacity for that period as the sum of (a) Committed Capacity and (b) the Burst Limit. Where the applicable Order reflects a Zero Commit (such that no Committed Capacity or Burst Limit exists), NetApp will instead use the Installed Usable Capacity as a proxy for Committed Capacity in the calculation under this clause.

5.3. Minimum Payment.

Each Order is subject to a Minimum Payment amount that is payable during the applicable billing period identified in the Order.

5.4. Hybrid Cloud Service.

- Minimum payment for Hybrid Cloud Service may include an amount based on metered Provisioned Capacity of all CVO volumes.
- Fees payable by End User for Hybrid Cloud Service do not include AWS, Azure, or other cloud service provider charges, which must be paid by End User and cloud services connectivity maintained for so long as CVO is being used.

5.5. Total Fees.

The total Fees payable for a billing period are determined for each billing period and will include Minimum Payments, additional usage-based consumption charges for any Burst Capacity as described in Section 1.1, and/or fixed rate charges.

5.6. Invoices.

Fees payable for a billing period will be included in a single invoice and will identify the components of such Fees. End User will be invoiced in accordance with the invoice period selected in the Order.

Time Period	When billed	Product(s)	
		On-Premises Service	Hybrid Cloud Service
Monthly*	In arrears	✓	✓
Annual	In advance	✓	-
Quarterly	In advance	✓	-
Semi-Annual	In advance	✓	-

* First and last month invoices may be pro-rated, on per day basis, if Start Date is not first of month.

6. **Subscription Modifications**. Subscriptions may be modified as described at Subscription Modifications for Keystone Service Description 3.4. Requested modifications to a subscription must be communicated to NetApp in timely manner to enable planning, delivery, and deployment of additional STaaS Products, if needed. Changes to Committed Capacities are subject to the increase or decrease increments and minimum Committed Capacity requirements for each applicable Performance Service Level.

7. **End User Responsibilities**. End User is responsible for the administration and operation of the STaaS Products, including, but not limited to what is described at End User Responsibilities for Keystone Service Description 3.4.