

## CenturyLink Service Guide

# Unified Storage

This CenturyLink Service Guide (“SG”) sets forth a description of Unified Storage (“Service”) offerings by CenturyLink, including technical details and additional requirements, if any. This SG is subject to and incorporated into the Service Agreement and Service Schedule between the parties. The specific details of the Service ordered by Customer will be set forth on the relevant Service Order. For avoidance of doubt, any references in the Agreement, Schedules, or Service Orders to SSG, shall mean SG.

Version	Previous	Section Modified	Date
HOS-20170221-SG-UnifiedStorage	HOS-20140909-SG-UnifiedStorage	All	February 21, 2017

## Service Description

1. **Standard Service Description:** Unified Storage (the “Service”) is a Managed Hosting product that consists of the installation, configuration, administration, monitoring, support and maintenance for the components described in Section 1.1. Unified Storage is a multi-tenant network attached storage product that provides file sharing storage services via Network File System (“NFS”) and Common Internal File System (“CIFS”) (as defined in Definitions section below). The Service is managed by CenturyLink if the customer has a CenturyLink Managed Hosting Environment, however when a customer has a CenturyLink Colocation Environment, customer may choose to self-manage or have CenturyLink manage. For this Service, Customer must execute the Managed Hosting Service Schedule and the Service Level Agreement (SLA) associated with this Service is the “Unified Storage SLA.”
  - 1.1. **Components:** Customer chooses from the following options. See Figure 1.0 Unified Storage Features in the Tables and Appendices section below for a visual representation of the components.
    - 1.1.1. **Network Attached Storage (“NAS”):** As part of the Service, Customer will be allocated the amount of NAS for which they have subscribed. NAS is available as described in Table 1.0 Unified Storage. The performance calculations listed are measured at the Storage Array as defined herein. The calculations are based on random, non-sequential input and output operations assuming a 4k-Block Size (as defined herein) and a blend of 50% read and 50% write operations. The following are included in the standard Service.
      - 1.1.1.1. **Dedicated Virtual Server:** One dedicated virtual NAS server (vserver) for services to CIFS (Windows) and NFS (UNIX/Linux) file sharing clients.
      - 1.1.1.2. **Dedicated Ports:** Installation and configuration of ports to connect Customer server through the dedicated vserver to the configured storage volumes(s).
      - 1.1.1.3. **Redundant Connectivity:** Redundant connectivity to protect against physical failure.
      - 1.1.1.4. **Support and Maintenance:** 24/7/365 maintenance, management, monitoring and support.
      - 1.1.1.5. **Snapshots:** As part of the Service, the Customer may choose to enable Snapshots. “Snapshots” are read-only, point-in-time views of data providing a recovery mechanism with real-time access. See Table 3.0 Snapshots for additional information.
  - 1.2. **Installation:** CenturyLink will perform installation tasks marked with an “X” in the CenturyLink column in Table 2.0.

**Supported Operating Systems:** Table 4.0 Supported Operating Systems describes the supported operating systems for NAS. The matrix of supported operating systems is subject to change as new versions of operating systems are tested and introduced into CenturyLink’s standard support model and end of life operating systems are no longer supported. All configurations and combinations of operating systems and software must be listed on our storage vendor’s compatibility matrices to be deemed compatible with the Service.
  - 1.3. **Configuration:** CenturyLink will perform configuration tasks marked with an “X” in the CenturyLink column in Table 2.0. CenturyLink’s SLA only applies to the respective vendors’ supported configurations at the time SLA support requests are triggered. If any configuration or version is identified as “unsupported” by a vendor, the Services are subject to all of the following conditions and/or requirements: (i) a service level objective (“SLO”) in lieu of any other applicable SLA will apply. This SLO shall refer to reasonable effort support by CenturyLink, in its sole discretion and no credits shall apply; (ii) CenturyLink, in its reasonable discretion may elect to charge the customer for any support or additional tasks/work incurred resulting from Customers continued use of unsupported configuration. Customer acknowledges and agrees that it is solely responsible for selecting and ensuring its software and systems are up to date and supportable. Customer’s failure to do so may result in CenturyLink’s inability to provide the Services and CenturyLink shall have no liability therefrom. When an operating system and/or any 3rd party software used in connection with the Service is no longer supported by the applicable vendor, then 1) CenturyLink’s SLA will no longer apply, and 2) Customer may be required to purchase vendor supported upgrades at an additional cost to allow CenturyLink to continue to provide the Services.
  - 1.4. **Licensing and Third Party Terms:**

If any third party software, including any corresponding documentation, is provided to Customer by CenturyLink in connection with the Service, Customer agrees to be bound by any additional licensing terms and conditions

applicable to such third party software and that it will use such third party software strictly in accordance with such terms and conditions. CenturyLink makes no representations or warranties whatsoever with regard to such third party software.

In conjunction with the Services, you may be allowed to use certain software developed and owned by third parties ("Third Party Software"). The Customer's election to use the Third Party Software constitutes acceptance of the additional terms and conditions for the NetApp software located at the following URLs:  
<http://www.netapp.com/us/how-to-buy/stc.aspx>

2. **Customer Acknowledgements and Responsibilities:** Customer is responsible for the tasks listed below and all tasks marked with an "X" in the Customer column in Table 2.0 Roles and Responsibilities. Customer further acknowledges and agrees that its failure to perform its obligations set forth in Table 2.0 may result in CenturyLink's inability to perform the Services and CenturyLink shall not be liable for any failure to perform in the event of Customer's failure.
  - 2.1. **Provide Contact:** Designate and maintain a Customer Contact during the Service Term (including current contact information). "Customer Contact" means a technical point of contact available 24x7 with sufficient knowledge, authority and access to address configuration issues, event notifications, system or infrastructure modifications and authentication of applicable CenturyLink systems.
  - 2.2. **Allow Access:** Customer agrees, as reasonably requested by CenturyLink, to provide access to Customer's premise and equipment and to otherwise cooperate with CenturyLink in performing the Service.
  - 2.3. **Notification of Changes:** Customer agrees to notify CenturyLink of any changes in the Customer hardware, including any system configuration changes or any hardware or software upgrades, which may affect the services provided. Any Customer action which causes the data residing within the Storage Service to become inaccessible directly caused by Customer's failure to notify CenturyLink of changes will not be subject to the SLA.
  - 2.4. **Hardware Purchase:** Installation of an additional dedicated Network Interface Card ("NIC") is also required for all Customers when total sustained IP traffic consumes 60% or more of server bandwidth. Customers with Dedicated Cloud Compute or Managed Hosting must purchase the NIC from CenturyLink. Colocation customers may purchase the NIC from CenturyLink or another vendor.
  - 2.5. Customer acknowledges and agrees that it is solely responsible for selecting and ensuring its software and systems are up to date and supportable
  - 2.6. Customer consents to CenturyLink's and its affiliates or subcontractors' use and transfer to the United States, or other countries, data or information (including business contact information such as names, phone numbers, addresses and/or email addresses) of the customer for the sole purpose of: (i) fulfilling its obligations under the Agreement; and (ii) providing information to Customer about CenturyLink's products and services. Customer represents that it will ensure that all information provided to CenturyLink is accurate at all times and that any business contact has consented to CenturyLink's processing of such information for the purposes identified herein.
3. **Additional Services:** At Customer's option and expense Customer can choose to add the service listed below which can be added to the standard Service (described in Section 1.0) for an additional fee described in a Service Order. Contact a sales representative for additional information.
  - 3.1. **Storage Replication:** Storage Replication is an add-on feature to Unified Storage. Storage Replication provides replicated copies of Snapshots to a secondary data center. Once per day, the daily Snapshot will be replicated to the secondary site on a schedule managed and determined by CenturyLink. Not all locations where Unified Storage is available offer the Storage Replication service due to various data sovereignty laws governing the countries of service. The Table 5.0 below shows the availability by country for Storage Replication and such availability may be updated or changed in CenturyLink's sole discretion from time to time.

## Tables and Appendices

**Table 1.0 Unified Storage**

Item	Attribute
Drive Type	SATA
Input/Output Speed	500 Available IOPS
Increments for Purchase	Available in 50Gb increments
Available Storage Type	NAS

**Table 2.0 Roles and Responsibilities**

**CenturyLink Managed**

Activity	Task	CenturyLink	Customer
Installation	Obtain and deploy all hardware, including NICs, in which licensed software will be installed either through CenturyLink Managed Hosting Services or through self- implementation	X	
	Provide switch dedicated to Unified Storage and complete ongoing management of the switch	X	
	Allow CenturyLink to install necessary software to enable operations, monitoring and reporting		X
	Install and configure a VLAN compatible with the Unified Storage service	X	
	Installation of an additional dedicated NIC is required to segregate file-sharing traffic. Segregating all file sharing traffic simplifies connectivity, preventing any degradation in performance of the Customers' other networking services, and eliminating the possibility of bandwidth usage charges in conjunction with other CenturyLink Network and Security products. See section 2.5 for additional information	X	
Configuration	Provide access to Customer's premises and equipment and to otherwise cooperate with CenturyLink in performing the services		X

Activity	Task	CenturyLink	Customer
Administration	Notify CenturyLink of any changes in the Customer hardware, including any system configuration changes or any hardware or software upgrades, which may affect the services provided hereunder		X
Monitoring	Creation of partitions, adding volumes, adding or modifying shares and exports and facilitating the addition of capacity	X	
	Monitoring the environment including the disk array, management console(s), storage operating systems, NAS infrastructure as applicable and fiber running to Customer Environment	X	
Management and Support	Customer shall provide (or order through CenturyLink as available) all NICs, and multi-pathing (failover) software required to deliver the Services to the Customer and keep maintenance contracts current as applicable		X
	Administer changes, microcode upgrades and/or other hardware/software improvements/upgrades	X	

### Customer Managed

Activity	Task	CenturyLink	Customer
Installation	Obtain and deploy all hardware, including NICs, in which licensed software will be installed either through CenturyLink Managed Hosting Services or through self- implementation		X
	Provide switch dedicated to Unified Storage and complete ongoing management of the switch		X
	Provide configuration guidelines for the switch	X	
	Install and configure a VLAN compatible with the Unified Storage service (CenturyLink provides configuration guidelines for the VLAN)		X
	Allow CenturyLink to install necessary software to enable operations, monitoring and reporting		X
	Installation of an additional dedicated NIC is		

Activity	Task	CenturyLink	Customer
	required to segregate file-sharing traffic. Segregating all file sharing traffic simplifies connectivity, preventing any degradation in performance of the Customer's other networking services, and eliminating the possibility of bandwidth usage charges in conjunction with other CenturyLink Network and Security products. See section 2.4 for additional information.		
Configuration	Provide access to Customer's premises and equipment and to otherwise cooperate with CenturyLink in performing the services		X
Administration	Notify CenturyLink of any changes in the Customer hardware, including any system configuration changes or any hardware or software upgrades, which may affect the services provided hereunder		X
Monitoring	Creation of partitions, adding volumes, adding or modifying shares and exports and facilitating the addition of capacity	X	
	Monitoring the Environment including the disk array, management console(s), storage operating systems, NAS infrastructure as applicable and fiber running to Customer Environment	X	
Maintenance and Support	Customer shall provide (or order through CenturyLink as available) all NICs, and multi-pathing (failover) software required to deliver the Services to the Customer and keep maintenance contracts current as applicable		X
	Administer changes, microcode upgrades and/or other hardware/software improvements/upgrades	X	

### Table 3.0 Snapshots

As part of Unified Storage, Customer may choose to enable Snapshots. Snapshots are read-only, point-in-time views of Customer data providing a recovery mechanism with real-time access. These recovery points can be created manually or, more commonly, via an automated schedule supporting creation and deletion. Customer should request that CenturyLink enable Snapshots during the installation process.

**Standard Features and Terms**

Three Snapshots will be taken per day at eight hour intervals based on Greenwich Mean Time (GMT)

Snapshots will be held for seven days resulting in 21 copies being maintained per cycle

A 20% Snapshot reserve will be consumed from the primary storage volume or LUN. Storage may be displayed differently, depending on host, as a result of overhead and other differences found in host configurations

Customer access to the Snapshot repository for self-directed Snapshot configuration, management and recovery. CenturyLink is not responsible for Customer activities that corrupt or irreparably damage Customer data.

If the change rate of the Customer data, which results in Snapshot consumption exceeding the Snapshot reserve of 20%, the Snapshot(s) will extend into the usable volume size to allow the new Snapshot to occur. In cases where the free space in the volume is not sufficient to allow the Snapshot to occur, an automatic attempt to delete Snapshots to create sufficient space in the volume will be performed by the storage array.

**Table 4.0 Supported Operating Systems**

Operating System	NAS Storage
Microsoft Windows 2008	•
Microsoft Windows 2008 R2	•
Microsoft Windows 2012	•
Sun Solaris 10	•
Sun Solaris 11	•
RedHat Linux 5	•
RedHat Linux 6	•
RedHat Linux 7	•
VMware ESXi 5.1	•
VMware ESXi 5.5	•
VMware ESXi 6.0	•

**Table 5.0 Data Center Availability for Storage Replication Service**

Center	Destination Data Center
AT1	DL2
BO2	CH3
CH3	DL2
CH4	DL2
DC3	DL2
DL2	CH3
DN1	DL2
HK2	N/A
NJ2	CH3
NJ3	CH3
LO1	LOND
LOND	LO1
MP2	DL2
SC8	CH3
SE2	CH3
SING2	SING8
SING8	SING2
SH2	N/A
TKYO	N/A
TR1	TR3
TR3	TR1

## Definitions

**Block Size:** A fixed length sequence of bits or bytes.

**CenturyLink Portal:** The interface that ties together centralized systems that CenturyLink uses to provide services to Customers. Included in the CenturyLink Portal, which is located at: <https://savvisstation.savvis.com/> are systems for order processing, provisioning, procurement, management and monitoring, change management, billing, Customer support/ticketing and reporting.

**Colocation:** A Data Center Service offering from CenturyLink where equipment, space, power, cooling physical

Services not available everywhere. Business customers only. © CenturyLink, Inc. All Rights Reserved. The CenturyLink mark, pathways logo and certain CenturyLink product names are the property of CenturyLink. All other marks are the property of their respective owners.

security and bandwidth are available for rental to Customers.

**Common Internal File System (CIFS):** A file sharing protocol used natively by the Windows operating system to share files over a TCP/IP network.

**Data Center** means the facility in which the systems are located.

**Dedicated Cloud Compute (“DCC”):** A managed server service that includes use of a dedicated standalone server, virtualization, space and power for the server, operating system license, network connectivity, management and monitoring of the server hardware and operating system.

**Environment:** The setting where software and other products are placed into operation for their intended uses by end users.

**Foundation Hosting:** A CenturyLink managed server service that includes use of (a) a dedicated standalone server provided and owned by CenturyLink, (b) space and power for the server, (c) network connectivity, and (d) failed server hardware replacement services, which are initiated in response to a trouble ticket opened by the Customer.

**Hosting Area Network (HAN):** The managed networking infrastructure that supports CenturyLink Managed Hosting services.

**Intelligent Hosting:** A CenturyLink managed server service that includes use of a dedicated standalone server, space and power for the server, operating system license, network connectivity, management and monitoring of the server hardware and operating system.

**Maintenance Windows:** A period of time designated in advance by CenturyLink, during which preventive maintenance that could cause disruption of service may be performed. Current Scheduled Maintenance windows are:

- Americas: Saturday 00:00AM to 5:00AM; Sunday 00:00AM to 5:00AM
- EMEA: Saturday 02:00AM to 6:00AM
- APAC (Except Japan): Saturday 21:00 (GMT) AM to Sunday 01:00(GMT)
- Japan: Sunday 04:00 (JST) to 8:00 (JST)

**Network Attached Storage (NAS):** is file-level storage service that enables file sharing among customer servers via data storage.

**Network File System (NFS),** a file sharing protocol used natively by the UNIX and Linux operating systems to share files over a TCP/IP network.

**Read/Write Operations:** Capable of being displayed (read) and modified (written to). Most objects (disks, files, directories) are read/write.

**Storage Array:** A disk array is a data storage system that contains multiple disk drives and a cache memory. It efficiently distributes data across multiple drives and enables fault tolerance through redundant array of independent disks (RAID).