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1. Overview

A. Definitions

“University Community” means Vanderbilt University students, faculty, and staff.

“Virtual Machine” (VM) is used to describe a virtual host provided by the Virtual Server (VS).

“Virtual Server” (VS) is the physical host of Virtual Machines.

“Managed Storage” refers to storage provided by the Service Provider. “Tier 1” refers to the highest-performing tier; “Tier 2” refers to the middle-performing tier; “Tier 3” refers to the lowest-performing tier of the managed storage service.

Storage Area Network (SAN) is architecture to attach remote computer storage devices such as disk arrays, tape libraries and optical jukeboxes to servers. In such a way to the operating system, the devices appear as locally attached devices. Network-attached Storage (NAS) is the name given to dedicated data storage technology which can be connected directly to a computer network to provide centralized data access and storage to heterogeneous network clients.

Logical Unit Number (LUN) is an address for an individual disk drive and by extension, the disk device itself. LUNs are normally not entire disk drives but rather virtual partitions (or volumes) of a RAID set.

“Tape Backup” refers to a service whereby data is archived onto magnetic tape and is covered by the Managed Backup product description and service level agreement.

“Technical specifications” of these services are expected to change over time and can change during the course of the contract. It is also possible for there to be more than one set of technical specifications within this service at a particular time. The technical specifications of the equipment in service on the Effective Date are provided in Appendix A.

Information Lifecycle Management (ILM) consists of the practices that facilitate operation storage management. These include the principles that guide ILM; the storage management tools and practices; database management practices; system performance and monitoring; system configuration; capacity planning; and business controls. Business controls generally include chargeback, costing and P&L-related metrics. Operational aspects of ILM include backup and data protection; disaster recovery, restore, and restart; archiving and long-term retention; data replication; and day-to-day processes and procedures necessary to manage a storage architecture.

B. Product Description

1. Managed Storage consists of platforms based on;
 - a. SAN; Tiered storage offering based on 3-tiers
 - b. NAS is a single tiered offering
 - c. Management of architecting, provisioning, capacity planning, and presentation of storage
 - d. Periodic Information Lifecycle Management (ILM) (reports as an additional service)
2. Managed Storage does not include:
 - a. Additional services (virtual services, backup, or disaster recovery)
 - b. Content management

2. Costs

Services and Pricing (reviewed annually)

A. SAN Storage	
i. Tier 1	\$10.80/GB/ year
ii. Tier 2	\$6.00/GB/year
iii. Tier 3	\$3.00/GB/year
B. NAS Storage	
i. Tier 3	\$3.00/GB/year
C. Additional Services	
i. Professional Services	\$100.00/hour
ii. SAN Connectivity	\$1500.00/port
iii. Host Bus Adaptor	\$1000.00/card

3. Detailed Product Description

Managed Storage will be housed in a professionally managed data center, with appropriate level of electrical and HVAC capacity and redundancy. Data centers are currently rated at Tier 2 plus. Capacity will be provided on demand.

Physical access to the data center is managed by the Service Provider's Network Operations Center. Access is restricted to authorized personnel and those escorted by authorized personnel. Authorized personnel who are not Service Provider staff are required to sign in each time they enter the Data Center and the time spent in the center is tracked. There are no exceptions to this rule. For additional information please refer to [ITS Policy 100](#): Data Center Access.

Managed Storage Infrastructure currently has the following components (components will be updated annually)

- Dual EMC Clariion CX3-40 Disk Array with redundant service processors
- EMC Celerra NS702G NAS Gateway with active/passive data movers
- EMC Navi-analyzer performance analysis software
- EMC PowerPath SAN load balancing software
- Dual Cisco MDS 9509 SAN Directors
- Cisco MDS 9216a SAN Director
- EMC SANCOPY replication software
- EMC Legato RepliStore replication software

Infrastructure of the provided service will be maintained using standard life-cycle methodologies.

All SAN connected hosts are required to connect to the SAN in a redundant fashion, and to use approved SAN path failover software such as PowerPath or MPXIO.

The Managed Storage devices are connected to the core Vanderbilt SANs through redundant two-gigabit fiber-channel connections.

Managed Storage will be presented as a virtual partitioned drive. Overhead requirements for operating and file systems must be taken into consideration; this is typically approximately ten percent.