

SeaChange® Universal MediaLibrary

New Generation IT-based Storage for Broadcasters and Content Providers

The SeaChange Universal MediaLibrary (UML) is an enterprise-class server infrastructure that offers simple-to-manage, open storage to enable broadcasters to economically deploy and expand their operations. As an open storage solution, the UML offers unmatched scalability, density, and reliability. Beyond storage, the UML's highly versatile system design provides a multitude of capabilities that combine to make it a cost-effective choice.

The UML can serve as a play-to-air server and as a production storage for today's most popular non-linear editors. Furthermore, the UML can be segmented into multiple partitions with each part supporting a different workflow demand. The UML supports SeaChange's edit-in-place feature, which allows editors to access program content that is being ingested into the production storage. The UML is a key efficiency driver for broadcasters to optimize their file-based workflows like never before. The UML core storage technology can be paired with SeaChange MediaClient codecs or standalone edge servers to meet the most demanding broadcast environments.

SYSTEM ARCHITECTURE

The UML system architecture draws on SeaChange's heritage of delivering powerful, highly available storage and streaming solutions to create a media library that far surpasses traditional storage methods. The UML is comprised of a pair of highly available UML servers, the innovative Matrix Storage Array platform, and the proven SeaChange Grid File System. This combination creates an economical, high-availability core storage solution that delivers the performance and reliability that broadcasters demand.

The UML utilizes Linux servers that provide an incredibly fast and reliable management server pair, offering broadcasters the level of organization required for massive amounts of storage. In an "active-active" architecture, each UML server head provides access to dual ported storage, i.e., all 72 drives in a Matrix Storage Array, which allows application performance to scale and yet keeps storage simple to manage. The UML server provides fault resiliency by mirroring write-back data between host-based DRAM caches using a high-speed Infiniband connection. The UML server is therefore capable of fast failover within seconds, ensuring that the storage library is always available to the rest of the network.

The Matrix Storage Array platform offers unmatched storage. Each 5RU Matrix Storage Array chassis contains 6 front-access blades that can be pulled out for maintenance while online. Each blade module contains 12 top-load drive slots that enable simple drive replacement, without impacting ongoing critical operations. The Matrix Storage Array provides high throughput performance since all of the drives are pooled together to act as one, yet remain independent in order to be able to handle the level of requests demanded by the broadcaster.

The SeaChange Grid File System (GFS) brings new meaning to the terms 'scalable' and 'proven.' SeaChange GFS deploys an innovative Distributed Layered Resource Management (DLRM) model to balance load between multiple metadata servers and between many storage nodes. The DLRM-based file system scales better and provides higher throughput performance than any other network file system. This distributed file system has the unique ability to display all assets, regardless of physical location, in one simple-to-use interface. This means that editors, producers, and broadcasters can access the content they are looking for no matter where the content is sitting in the network.

The combination of the Linux-based UML management servers, core storage technology, and the distributed file system found in the UML offers broadcasters a new level of performance, reliability, and scalability.

BENEFITS

Industry-leading Performance

- 5Gb/s single session performance
- 17Gbps throughput per UML (78x220Mbps streams)

Universal Access

Simultaneous SAN and NAS Access

Scalable Grid Storage

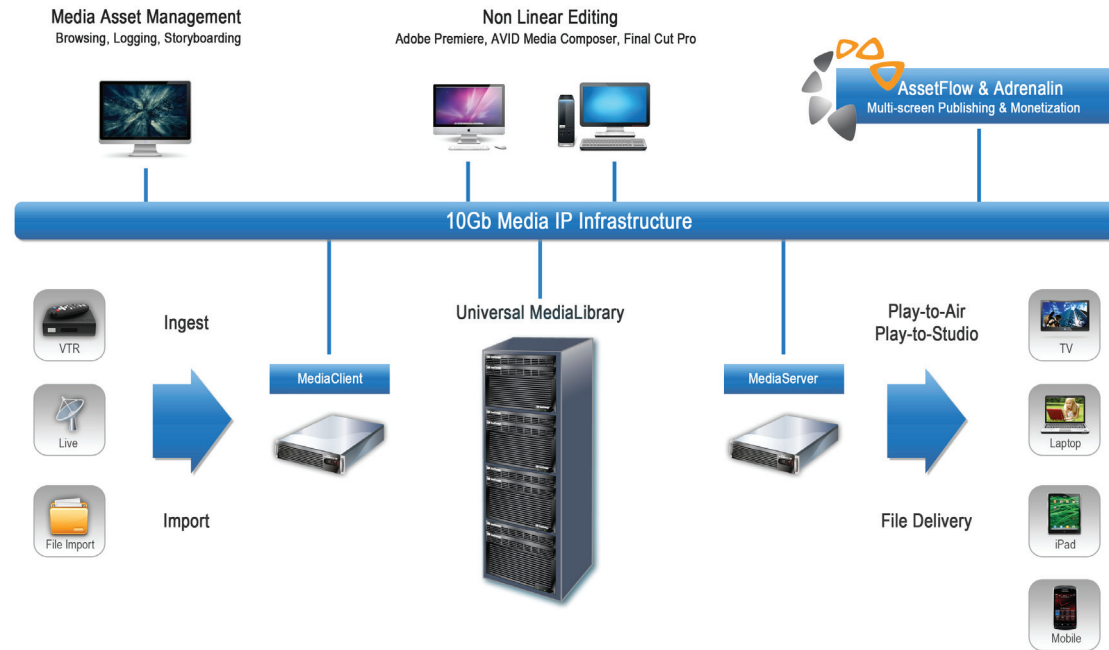
- Linearly scalable from 72TB to 144PB and 17Gb/s to 34,000Gb/s
- Horizontal and vertical scaling
- 10 second plug-and-forget scaling

Media-centric

- Media-centric file layout with file notification
- High throughput and tuned for real-time performance
- Client-based bandwidth control for QoS

Highly Reliable and Self-protected

- RAID 6, High Availability
- File-level mirroring and replication



SCALABILITY

In today's world of ever-growing content stores and increasing channel lineups, being able to scale is a must. The UML delivers on all fronts. From 144TB to petabytes of storage, the UML can scale utilizing the high performance SeaChange GFS and without sacrificing availability, performance, or reliability. Fully loaded, one UML provides 108TB of RAID 6-protected usable space in a 5RU storage matrix. The UML is now configured to scale to a grid storage system by connecting multiple bricks to act as a single, virtualized file storage. As each UML is added, the file system adds to the existing storage pool without the need to restripe data. Each additional UML also provides more access bandwidth. As a result, UMLs can scale up to support PB of content - an unmatched capacity in the industry.

PERFORMANCE

Each UML is equipped with four 10GigE ports, delivering GB-level performance in a simple-to-manage fashion. The distributed SeaChange GFS enables simple and cost-effective management of multiple UMLs over an IP network. It ensures automatic load balancing among all UMLs to eliminate bottlenecks, increasing storage utilization. In addition, multimedia applications can run directly on the powerful Linux UML server heads. External clients such as editing stations or MediaClient codecs can access the UML storage via open access protocols such as CIFS, FTP, and HTTP. Due to the large amount of bandwidth available, one UML can easily be partitioned to support all types of media workflow, such as play-to-air, non-linear editing, and archiving as illustrated in the above workflow diagram.

HIGH AVAILABILITY

The "active-active" Linux-based UML server provides constant access to all drives with fast server failover. RAID 6 stripes data across six Matrix blades in packs of 12 drives. The 10+2 RAID pack delivers high performance and high storage efficiency while protecting against single or double-drive failure. Matrix redundancy and non-stop operation is delivered via a fully redundant and hot-swappable architecture. Disk drives, cooling fans, and even one of the six drive blades are fully hot-swappable and powered by four redundant power supplies. The architectural design surpasses competing library solutions in the market to deliver the highest performance, security, and data integrity for stored library content.

ECONOMICAL AND SIMPLE TO USE

By integrating SeaChange GFS into the UML server with the high density Matrix Storage Array, the UML offers a manageable, scalable NAS system that combines the traditional function of a file system, volume management, and RAID into one intelligent virtualization layer. Broadcasters can simply plug external applications or clients into the UML and take advantage of the vast storage resources that are part of the single file system pool.

With density, simplicity, and reliability, the UML offers the most economical solution in the industry for broadcasters to simplify workflow, reduce OPEX, and deliver results.



SeaChange UML Server Pair

Chassis	Two 2RU rack-mountable servers
Network Interface	2x Chelsio port 10GigE TOE with PCI-E 8x w/ optical interface
Network Control Interface	Onboard dual 1GigE Ethernet ports
File System	Distributed File System
Server Node Interconnect	Primary - InfiniBand, IPMI, and RS-232 Secondary - Ethernet
Power Requirements	- Dual 720W supplies - AC Input: 100/240 VAC @ 60/50 Hz - Maximum power draw (startup) 230W - Normal power draw (operating) 200W
Heat Dissipation	685 BTU/hour
Dimensions	Height: 3.5" (89cm, 2RU) Width: 17.2" (437cm) Depth: 24.8" (630cm)
Weight	43.5 lbs (19.7 kg)
Operating Environment Temperature	10-35 degrees Celsius
Humidity	8-90% relative humidity, non-condensing
Altitude	3000 meters (8,000 ft) maximum

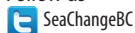
Matrix Storage Array

Chassis	5RU rack-mountable chassis
Disk Drives	72 drives, 6 blades of 12 drives each
Maximum drives supported per Matrix	72 7.2K RPM SATA or SAS drives (1 or 2TB disk drive)
Hot swap and redundancy	Disk drives, cooling fans, power supplies, blades
Power Requirements	- Four 850 power supplies, two minimum for operation - AC Input: 100-240 VAC, 50/60 Hz x2 - Maximum power draw (startup): 1300 W (both 1TB and 2TB SAS drives) - Normal power draw (operating): 900 W (1TB SAS drives); 1200 W (2TB SAS drives)
Heat Dissipation	3100 BTU/hour (1TB SAS drives) 4100 BTU/hour (2TB SAS drives)
Dimensions	Height: 8.75" (22.2cm, 5RU), Width: 17.7" (45cm), Rack Depth: 30.00" (76.2cm), EIA310 compliant
Weight	Chassis without drives: 85 lbs (38.6 kg), Chassis with seventy-two drives: 239 lbs (108.4 kg)
Operating Environment Temperature	10° C to 30° C (50° F to 86° F) ; Humidity: 20-80% relative humidity, noncondensing; Altitude: 3000 meters (8,000 ft) maximum

Regulatory Approval:

- FCC CFR 47 Part 15 A
 - This device complies with Part 15 of the FCC rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.
- EN55022
 - Conducted emissions. European Union EMC Low Voltage Directive.
- AS/NZ3548
 - In accordance with Australia/New Zealand Conducted emissions requirements for Class A, Information Technology Equipment (I.T.E.).
- VCCI
 - In accordance with Japanese limits and margins of compliance to VCCI requirements.
- CE European Low Voltage Directives
 - EN55024:1998 EN61000-4-2:1995 Immunity, ESD
 - EN55024:1998 EN61000-4-3:1995 Immunity, Radiated
 - EN55024:1998 EN61000-4-4:1995 Immunity, EFT
 - EN55024:1998 EN61000-4-5:1995 Immunity, Surge, $\pm 2\text{KV}$ Common Mode, $\pm 1\text{KV}$ Diff.
 - EN55024:1998 EN61000-4-6:1995 Immunity, Conducted RF
 - EN55024:1998 EN61000-4-8:1995 Immunity, Power Frequency Magnetic Field
 - EN55024:1998 EN61000-4-11:1995 Immunity, Voltage Variations
 - EN61000-3-2:2000 Harmonic Current Emissions
 - EN61000-3-3:2000 Voltage Fluctuations and Flicker
- CB Scheme
 - IEC 60950-1, Information Technology Equipment – Safety. Part 1, General Requirements Editions 1 & 2.
- Safety
 - ETL Intertek in accordance with safety standard OSHA 60950-1 Information Technology Equipment.
 - 60950-1, Information Technology Equipment – Safety. Part 1, General Requirements Edition 1.
 - CSA C22.2 No. 60950-1, Information Technology Equipment – Safety. Part General Requirements Edition 1.
 - IEC 60950-1, Information Technology Equipment – Safety. Part 1, General Requirements Editions 1 & 2.

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