

FLUX Store

Post-Production Data Server

FilmLight

Designed from the ground up to stream images.

Fit for Purpose

For more than a decade, Baselight systems have been leading the market in grading high-resolution images. Integral to the success of those systems has been the development of a unique storage technology, capable of streaming multiple 4K image sequences.

FLUX Store models 360, 1000 and 2000 are networked post-production storage servers that utilise the high-bandwidth internal disk system and cloud network infrastructure developed for Baselight. FLUX Store can be deployed in a facility as easily as general storage, whilst providing a solution that is purpose designed and industry proven for streaming high-resolution media.

Scalable and Affordable

Each FLUX Store provides either 0.36PB, 1PB or 2PB[†] of streaming protected storage using a constant-rate hardware RAID 60 – developed by FilmLight – across 24, 72 or 144 drives respectively. FLUX Store has a filesystem designed specifically for handling image streams with minimal fragmentation and seeking, which allows the use of high-capacity, lower RPM drives resulting in a low cost per TB.

Each store is connected to the Baselight cloud network by dual 10GbE, or 40/50/100GbE links capable of multiple streams of uncompressed playback to remote Baselight systems. Additional FLUX Store systems can be added to the cloud simply, as projects demand.

Performance-Monitored

FLUX Store comes complete with its own diagnostic suite to maintain performance. This is based on the fl-diag disk system tests provided with Baselight - including read/write data rate, disk latency, SMART monitoring, etc.

Tuned for Production

The FLUX Store appears as a high performance NAS to the rest of the facility simply using NFS or SAMBA over Ethernet. For high performance streaming clients, drivers are being produced for other industry standard postproduction applications. The first of these released allows the FLUX Store to present as a local mount on a CODEX Vault allowing the Vault Software to transfer the media from the camera magazines to the FLUX Store directly, including sensor stitching and checksum verification as if this was local Vault storage.

Open Connectivity

You can connect any client to the FLUX Store via Ethernet - connection speeds from 1 to 100Gbps are available, with a range of different interfaces, according to the hardware options chosen.

FLUX Tools

FLUX Store is equipped with the standard FLUX Tools that are used to manage media on Baselight systems. The tools are fully scriptable and support a range of operations including:

- » Batch copy
- » Batch conversion
- » File synchronisation

Metadata filtering and sorting functions are also available via FilmLight's FLUX Manage application which, in conjunction with the FLUX indexed filesystem provide an ultra-fast, revolutionary new method of data wrangling designed to cope with today's complex productions of 100:1 shooting ratios and 1000+ VFX shots (see the 'FLUX Manage' datasheet for more information).

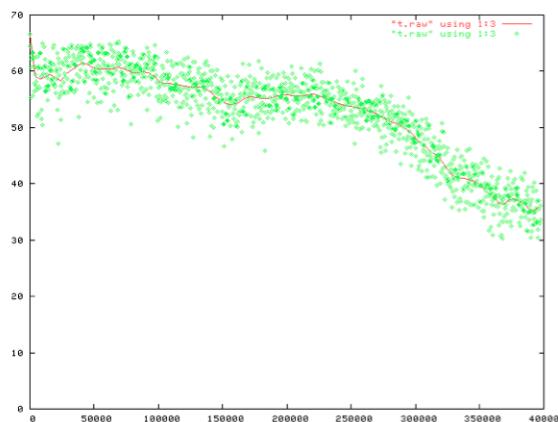
Laid out for Post-Production

Utilising features developed and proven over a decade of providing storage for high-resolution Baselight colour grading systems, the files on disk are:

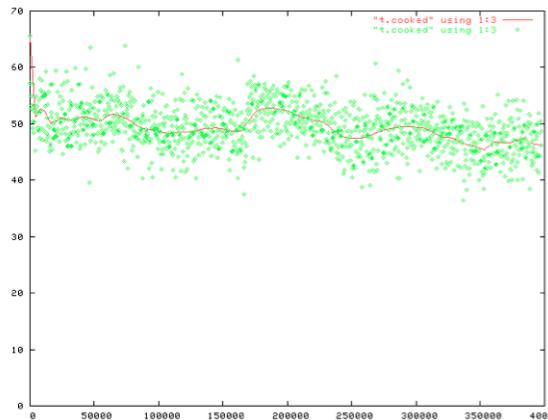
Constant Rate

The storage is made up of multiple pairs of 12 drive sets that are each hardware RAID 6. The RAID 60-style configuration that overlays this is formed using a FilmLight-developed version of software RAID called CRAB (Constant Rate Allocated Blocks), arranged so that fast blocks from the periphery of one set are combined with slower blocks from the near-spindle tracks of the other set.

This ratio varies across the platters so that the storage keeps a constant raw block rate as it fills from 0% to 100%.



Data rate across the drive without CRAB



Data rate across the drive with CRAB

Contiguous

All image files that are copied onto the system using FLUX Tools are written in contiguous blocks without in-file fragmentation.

Written with Block Affinity

Image sequences that are copied onto the system using FLUX Tools are laid down in order on the drive, such that 0000.exr is adjacent to 0001.exr and so on up to a specific batch size.

Defragmented

Image files placed onto the system without using FLUX Tools are automatically rearranged to be contiguous and to have block affinity.

Secure on XFS

XFS has been the favourite filesystem for post-production since SGI provided it to the community. Most facility engineers know how to maintain this system using standard Linux tools.

FilmLight constantly monitors and validates the latest released versions of the XFS filesystem, including folding back its own patches into the public domain. FilmLight's changes to XFS do not change the way the filesystem is presented to the system administrator.

Ease of Maintenance

Built-in diagnostics, automated email alerts and browser-based tools enable simple and efficient maintenance of FLUX Store and ensure maximum availability and security of your data.



Diagnostic tools web interface

Hot-swappable Drives

When a drive needs to be replaced, the faulty drive can be easily identified and hot-swapped, avoiding any down-time for users.



Indication of faulty drive in extension chassis

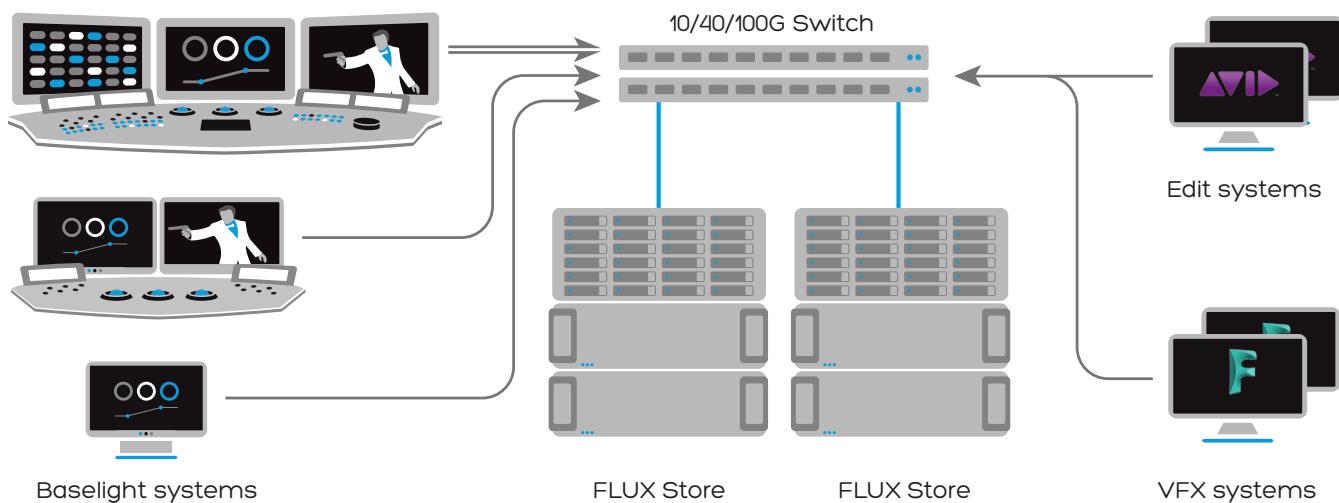
Integrated with Baselight

Render Capacity

FLUX Store can be configured with the same GPU and CPU processing capability as a Baselight TWO system, as well as a Baselight Render licence so you can offload render tasks from your main suites.

Streamed across the Cloud

Remote Baselight systems and other FLUX Store units read and write data using FilmLight's cloud service. This runs an image server daemon at the remote end of the network to stream data to/from the disks using the same I/O subsystem that Baselight would run locally. The data is then streamed across the cloud and striped across all available Ethernet network interfaces (unlike network bonding, which can only accelerate multiple conversations and not a single data stream).



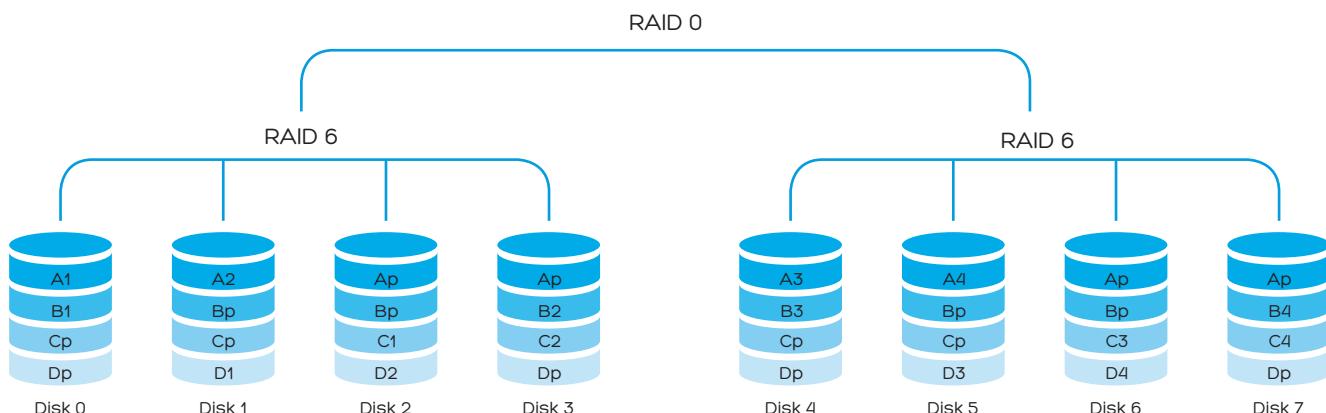
FLUX Store integrates easily with your other systems

RAID 60 in More Detail

The RAID 60 configuration of FLUX Store combines the striping of RAID 0 with the distributed double parity of RAID 6.

Striping helps to increase capacity and performance without adding extra disks, while each RAID set can withstand the loss of up to two disks without risk to your data.

In short—FLUX Store means fast and secure storage for your images.



RAID 60 example showing two sets of four drives – FLUX Store uses two sets of twelve drives

Technical specifications

FLUX Store comes as standard with:

- » 24 x 18TB drive RAID 60 storage (FLUX Store 360)
72 x 18TB drive RAID 60 storage (FLUX Store 1000)
144 x 18TB drive RAID 60 storage (FLUX Store 2000)
- » Dual 10GbE (SFP+) or Single/Dual 25/40 QSFP or
40/50/100 QSFP28 Ethernet (PCIe card)
- » Dual 1/10GbE (RJ45) Ethernet (built-in)
- » GPU for:
 - Baselight rendering
 - FLUX Manage processing

Options

The FLUX Store main chassis has available PCIe slots, which can be fitted with:

- » Additional render GPUs where applicable, up to the following limits (one fitted as standard):
24 or 72 drive FLUX Store - Maximum 3 GPUs;
144 drive FLUX Store - Maximum 2 GPUs
- » QLogic/ATTO Fibre Channel card to bridge to SAN

Physical specifications

The different FLUX Store models are composed of a single main chassis plus up to two extension chassis according to the total number of drives:

FLUX Store 360 - main chassis only

FLUX Store 1000 - main chassis plus one extension

FLUX Store 2000 - main chassis plus two extension chassis

Main Chassis

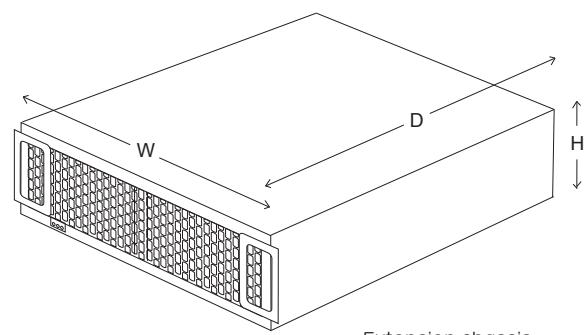
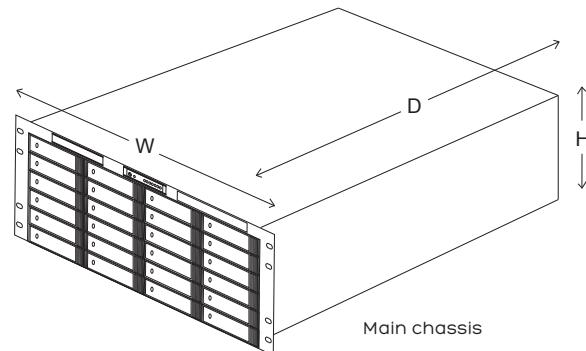
- » 5U 19" rack-mount
- » Dimensions (WxHxD) = 482x220x721mm (19x8.7x28.4")
- » Total weight = 50kg (110 pounds)
- » Power supply = 100-240V, 14A (Max @ 110V)
- » Heat output = 2kW (6824 BTU/h)

Performance

All figures for sequential file access on a 2PB FLUX Store:

	Write	Read
Local filesystem	6100 MB/s	10100 MB/s
Local filesystem rebuilding RAID drive	2700 MB/s	4000 MB/s
Baselight cloud*	3300 MB/s	2000 MB/s

* Baselight v5.3 utilising 100GbE interfaces



[†]Sizes are in powers of 1000 rather than 1024, e.g. MB rather than MIB.

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