

LIGHTWORKS NEW, HIGH-PERFORMANCE SHARED STORAGE SOLUTION FOR COLLABORATIVE REAL-TIME NETWORKED EDITING

Introduction

The Lightworks Touch is a third-generation editing system that incorporates the ergonomic flexibility of the classic Lightworks and Heavyworks products within a state-of-the-art computing environment.

Lightworks' core philosophy has always been to put the editor in complete control. With the advent of The Lightworks Touch, we've taken this philosophy even further to make the editor, not the machine, the heart of the system.

With this concept in mind, Lightworks has developed a shared storage solution for collaborative workflow editing, which is fast, powerful, simple and intuitive.

Lightworks shared storage provides centralised access to projects and material. Any Lightworks Touch system on a storage network (SAN), can access any shot at any time. Multiple Lightworks Touch systems can be digitising and/or editing projects and material (shots and edits) from the centralised storage simultaneously. As soon as a shot is digitised (or imported from a file), instant access from any Lightworks Touch system is available.

Lightworks' intuitive and flexible project management structure is retained to provide a simple and powerful toolset when operating in a networked environment. Networking is transparent, the editor is provided with the same speed and responsiveness as if running a local project.

Terminology

A fibre channel network is sometimes referred to as a Storage Area Network (SAN)

Key Technology Benefits

- Advanced shared storage solution for The Lightworks Touch
- Open shared storage architecture
- Scalable low bandwidth or high bandwidth networking
- Centralised media and storage for efficient project sharing
- Low cost shared storage networking
- Off-the-shelf storage configurations
- Scalable storage capacity from 500 GB to 640 TB

- Cost-effective ATA, SCSI or fibre channel disk technology
- Robust networking capabilities
- RAID protected storage
- No separate server computer required (in certain configurations)
- Robust security permissions

Key Workflow Benefits

- Work on any project from any Lightworks Touch on the network
- Material drives are shared. Unused disk space is available to all users connected on the network
- Only one machine on the network needs to be connected to a tape deck for digitising or playout
- Shots and edits can be transferred between Touch systems instantly without copying operation. The same shot can be used by more than one user at the same time
- Third party backup devices (such as a DLT) can make backups of projects and material for all users centrally
- Compatible computers from other manufacturers can co-exist on the network and share the same video/audio data

FEATURES AND BENEFITS

Shared storage significantly improves the productivity and workflow of any post production facility by eliminating the limitations associated with moving media across a network or physically reconnecting storage between Lightworks Touch editing systems.

For example, one Lightworks Touch (say, an assistant's system) can be digitising all day long to the central storage. A second Lightworks Touch system (the editor's) can be editing all day long. As soon as shots have been digitised, the assistant can provide access to the editor. This instant access allows projects to be finished faster, providing a solution to the digitising bottleneck.

Shared storage also provides the editor with more time to focus on the creative aspects of the craft editing process rather than project

management issues. Once an edit is complete, the assistant can playout the completed sequence while the editor continues cutting a different version of the edit or begins a new project.

Low Cost Networking

The Lightworks Touch has been designed to use off-the-shelf networking components with an open architecture. This allows Lightworks to provide lower cost, high performance networking while being able to adapt rapidly to new technologies and trends within the computer industry. Note - While an open architecture is provided, only qualified networking components are approved for use within a Lightworks Touch networked environment.

Transparent Setup and Configuration

An intuitive software interface provides simple setup and configuration of the network from within the Lightworks Touch application.

Transparent Network Operation

The Lightworks Touch has the same responsiveness and speed as if the material and projects are stored locally.

High Storage Capacity

Up to 640 TB of RAID protected storage can be used.

RAID Protected Storage

All network storage is configured with RAID 5 protection. If a disk goes down, no editorial downtime occurs. Once the disk is replaced (or a hot spare is available), an automatic re-build occurs in the background while editing continues.

Low Bandwidth and High Bandwidth Networking

Low bandwidth networking is provided by Ethernet which acts as the network interface between each Lightworks Touch system and the central storage. The network provides adequate bandwidth to allow up to 10:1 pictures and to be recorded and played back to and from the central storage.

High bandwidth networking is provided by 2Gbit fibre channel which acts as the network interface between each Lightworks Touch system and the central storage. The network provides adequate bandwidth to allow up to 1.13:1 pictures to be recorded and played back to and from the central storage.

Instant Transfer of Shots and Edits

After digitising to the central storage, material can be instantly made available to other Lightworks Touch systems connected to the central storage - without time consuming re-digitising or copying of files and projects.

Any System can be used for Editing or Digitising

Shared storage networks can be configured to allow any Lightworks Touch system on the network to see any network project or material. Any system can be used for editing, digitising, or for project management.

Centralised Project Management

A networked lobby is created on the central storage, which allows access to any network project. Separate network lobbies can be created to allow for security measures when facilities or clients do not wish networked projects to be accessed by other users on the shared storage network.

Robust Security

User permissions can be set to allow access privileges to networked lobbies and storage.

GENERAL CONFIGURATION

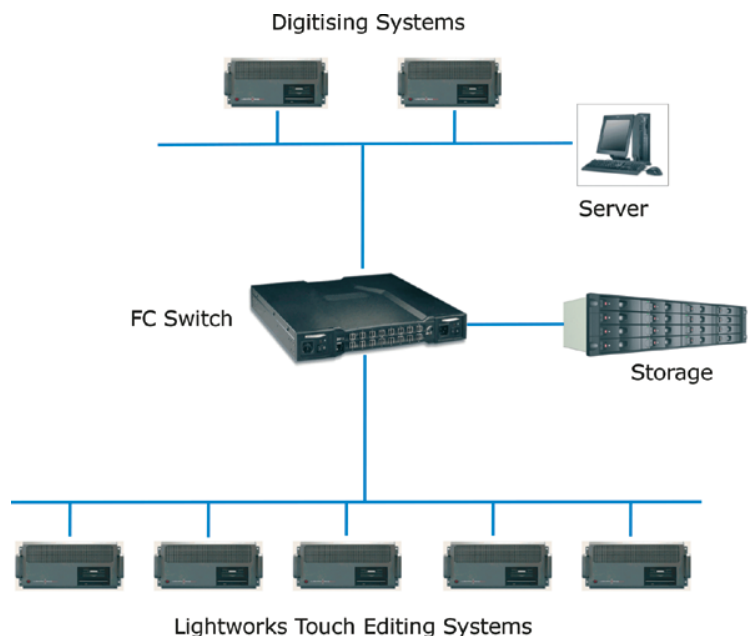
Low Bandwidth Network

A low bandwidth network describes an offline shared storage network whereby one Touch system acts as the server, with all storage connected to that system. A number of other Lightworks Touch systems can be connected together via a Ethernet (100 baseT) Hub (or switch) with the server system.



High Bandwidth Network

A high bandwidth network describes a fibre channel network whereby all Lightworks Touch editing systems are connected either directly to the storage or connected via a switch to the storage, using optical cabling. The system can be configured so that one Lightworks Touch system, or a separate PC on the network, may act as the server.



DESCRIPTION OF COMPONENTS

Low Bandwidth Networking

Ethernet Card

The Lightworks Touch comes (as standard) with a 100baseT Ethernet port. This provides the network connectivity.

Server

One Lightworks Touch system, connected to the Ethernet network, provides the central storage for both networked projects and networked material.

- Up to six internal disk drives (ultra SCSI 3) can be configured for network use from within the Lightworks Touch main crate
- Up to 14 external disk arrays can be connected to the external ultra 160 SCSI bus for network use
- An optional fibre channel card can be purchased to provide up to 128 disk arrays online
- Disk arrays provide space for up to 16 disk drives
- Low cost fibre channel-ATA or SCSI-ATA disk arrays are available. These provide SCSI or FC connectivity but use low cost ATA (EIDE) or serial ATA drives for storage. High drive capacity - 200, 250 and 300 GB disks are available
- All disk arrays are configured for RAID 5 protected storage. If a disk fails, editing and digitising can continue with no downtime
- Hot-swapping of disks is permitted. Automatic background rebuild of disk array occurs after failure
- Disk arrays provide redundancy with hot-swappable dual fans and power supplies in case of failures

Ethernet Hub/Switch

A minimum of two Lightworks Touch systems can be configured for networking using a point-to-point twisted pair Ethernet connection. If more than two Lightworks Touch systems are required, an Ethernet hub or switch is needed.

Networking

No additional software is required for low bandwidth shared storage networking. The Lightworks Touch software application comes standard with all necessary functionality.

High Bandwidth Networking

The high bandwidth shared storage network uses advanced architecture to provide scalability and guaranteed bandwidth to the networked environment.

To meet this flexibility in providing stability, only 'best-of-breed' components are used.

Each Lightworks Touch system sitting on a high

bandwidth network is configured with:

- 1 fibre channel card or HBA (Host Bus Adaptor) as it also known
- 1 copy of Tivoli SANergy file sharing software
- 1 fibre optical cable
- 1 Ethernet connection

Fibre Channel (2Gbit) Host Buss Adaptors

Provide the connection between each Lightworks Touch and the central storage. The connection can sustain the highest quality recording and playback of video / audio to and from the central storage.

Fibre Optical Cables

Provide the high bandwidth fibre channel connection between the storage and each Lightworks Touch on the network.

Storage

In a high bandwidth network, the storage is connected directly to the fibre channel network.

- Each disk array can provide space for up to 12 or 16 disk drives
- Low cost fibre channel (ATA or SCSI- ATA) disk arrays are available. These provide SCSI or FC connectivity but use low cost ATA (EIDE) drives for storage. High drive capacity - 200, 250 and 300 GB disks are available
- Direct attachment for two Lightworks Touch systems (no switch required)
- All disk arrays are configured for RAID 5 protected storage. If a disk fails, editing and digitising can continue with no downtime
- Hot-swapping of disks is permitted. Automatic background rebuild of disk array occurs after failure
- Disk arrays provide redundancy through hot-swappable dual fans and dual power supplies

Direct Attachment to Storage

In a high bandwidth network, two Lightworks Touch systems can attach directly to the fibre channel storage. If more than two Lightworks Touch systems need to connect to the network, a fibre channel switch is required.

Switch

A fibre channel switch is a hub which provides scaleable high bandwidth fibre channel connectivity to the entire network. Switch management software tools provide security features such as allowing only certain Lightworks Touch systems to see each other (and certain disk arrays) on the network at any given time.

File Sharing Software

Networking is provided as a standard feature within the Lightworks Touch. However, in a high bandwidth shared storage network, file sharing and locking software is required because the storage is not being managed by the Windows 2000 Operating system.

Lightworks Touch networking has been specially designed to use Tivoli's SANergy software. The application sits in the background, and works in conjunction with the Lightworks software to provide seamless shared storage networking. After installation, users are not required to configure SANergy on a regular basis.

One Lightworks Touch system, or a separate server computer on the network, is required to act as a server for SANergy. This is configured during setup. After installation, users are not normally required to reconfigure the software.

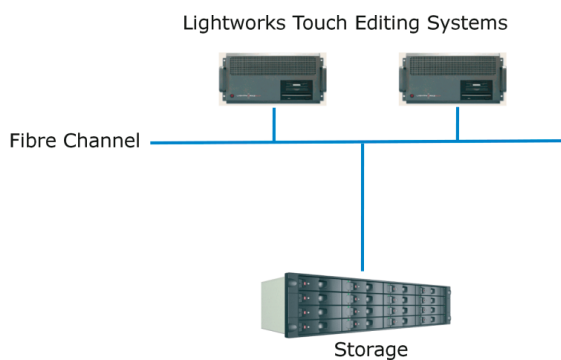
Operational Workflow

The following workflow examples highlight the key benefits of Lightworks Touch networking with real-world examples on how this technology and toolset is being used in a real post production environment.

Example Workflow A Long form editing - film and TV

Lightworks Touch networking provides a number of benefits for small scale post production editing environments.

With production and post production schedules being squeezed ever tighter, the pressure on the post production of long form drama and feature films is at an all time high. Lightworks provides an extremely cost effective two-seat high bandwidth shared storage network. A number of productions have used this workflow, such as Universal Pictures' 'Bruce Almighty' and Martin Scorsese's 'The Aviator'.



Key Benefits

- Low cost, high bandwidth, two-seat shared storage network
- More efficient workflow for assistant's and editor's Lightworks Touch systems
- Both Lightworks Touch systems can connect directly to a disk array. No fibre channel switch is required
- Large storage capacity at low cost, one disk array can contain 3 TBs of storage
- RAID protected material and projects
- High resolution editing - material can be digitised at online picture quality (1:1 to 5:1)
- Work on any project from either Lightworks Touch
- Assistant can perform project management, digitising, syncing up of rushes/dailies, effects

and playouts without stopping editor. Editor free to concentrate on cutting.

- Only one Lightworks Touch on the network needs to be connected to a tape deck for digitising or playout
- Shots and edits can be transferred between Touch systems instantly without copying operation. The same shot can be played by more than one Lightworks Touch system simultaneously
- Third party backup devices (such as a DLT) can make backups of projects and material for all users centrally
- Network scalable - network can grow as and when more editing/assistant systems are required
- Open networking - compatible computers from other manufacturers can co-exist on the network and share the same material. See Workflow B example

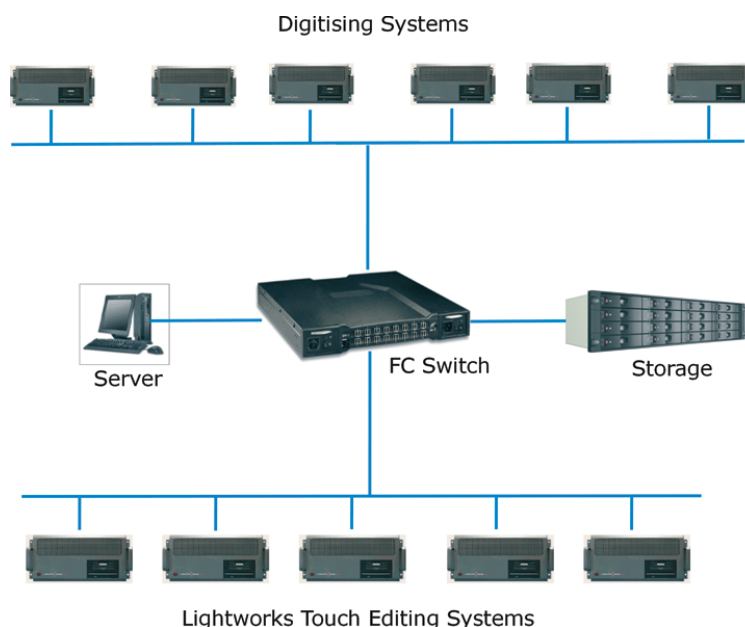
Example Workflow B Example workflow for broadcast

"Shoot to Disk" high bandwidth shared storage network for television production.

Mersey Television, independent producers of 'Hollyoaks' and 'Brookside', two of the most successful drama series on the UK's Channel 4, use five Lightworks Touch editing systems for "Shoot to Disk" production.

The term "Shoot to Disk" describes an emerging trend by television producers to move to a tapeless networked environment.

Five Lightworks Touch editing systems are connected on a high bandwidth fibre channel network to 8 TB of RAID protected fibre channel disk drives. Six digitising stations are also connected to the network to provide direct to disk recordings straight from each set.



The video, time-of-day timecode, and up to four audio tracks are digitised from any of the digitising stations, directly on to the shared storage, instead of traditional videotape. Instant playback and review of each take is available on the studio floor.

Meanwhile, any of the Lightworks Touch systems can immediately start editing the material directly from the central storage. No material is copied in the process. Shot logs are imported into networked projects, which are also stored centrally. Editors can move to any of the five edit suites from day to day to continue editing, if the current suite is required for other duties.

Once editing is complete, an OMFI file is created for audio dubbing and final mixing. This is placed into a nominated folder on the central storage where an AMS Audiofile DAW (Digital Audio Workstation) accesses the file. Once audio dubbing is complete the audio and video are laid down to a Digital Betacam master and sent for transmission. The final edits are then archived using a DLT backup device.

The multi-channel digitising stations are provided by Gee Broadcast. Lightworks and Gee have worked together to integrate Lightworks Touch and the Geevs digitising station to provide seamless interoperability. This was achieved through the open architecture embodied in both products.

The fibre channel storage uses advanced parallel architecture to provide fault-tolerant RAID protection, scalability, and the delivery of guaranteed bandwidth to the production environment.

Key Benefits

- Low cost, high bandwidth, shared storage network
- Scalability - network can grow as and when more editing and digitising systems are required.
- Open networking - compatible with Gee Broadcast Geevs Video Disk Server. Can co-exist on the high bandwidth network and share the same material
- Large storage capacity at low cost
- RAID protected material and projects
- More efficient workflow - 'Camera to Disk' recording
- Instant random access playback on set
- High resolution editing - material is digitised at online picture quality (2:1)
- Work on any project from any Lightworks Touch system on the network
- Only one Lightworks Touch system needs to be connected to a tape deck for playout
- Shots and edits can be transferred between Touch systems instantly without copying

operation. The same shot can be played by more than one Lightworks Touch system simultaneously

- Third party backup devices (such as a DLT) can make backups of projects and material for all users centrally

Conclusion

Lightworks has developed an extremely cost-effective shared storage solution for collaborative workflow editing, which is fast, powerful, simple and intuitive.

In today's workflow-critical post production environment, scalable and flexible networking options are essential. In offering low bandwidth networking as a no cost feature, and high bandwidth networking as a competitively priced option, Lightworks Touch provides the most appropriate solution available.

As technology evolves, the open architecture of the Lightworks Touch enables users to enjoy the benefits of future networking advancements without the penalties associated with proprietary systems.



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