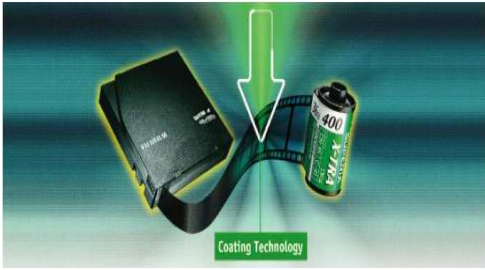


FUJIFILM



Fujifilm's partnership offer for LTO tapes

If one were to attempt to distinguish the respective roles in the distribution between the LTO tape drives manufacturers and the tape cartridge manufacturers, we could summarize in the following image:

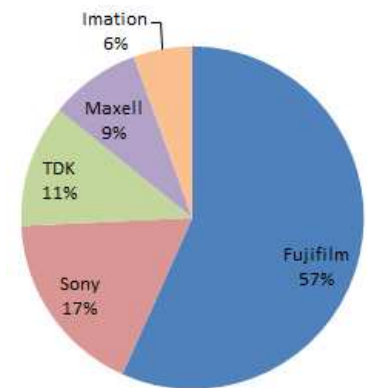
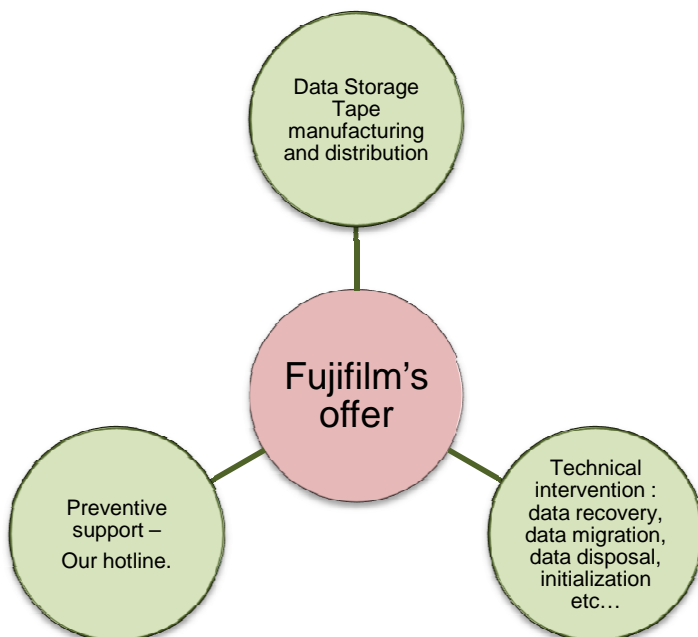
1. In the LTO industry, manufacturers are constantly adapting their specifications to market criteria and regularly increase the performance of their drives : the new LTO6 drive must reach 2.5 TB native and 160MB/s capacity transfer rate. In other words, the main mission of the Hardware vendor is to succeed in convincing the customer to go for LTO tape drives.

2. As far as it concerns a tape manufacturer such as Fujifilm, our job begins when the first data is stored on LTO tape cartridges: LTO technology must provide the end users with long term archive life and security. Throughout the years and the data storage process, IT managers can be confronted to vital questions such as the conservation of the data, the restore time, or to accidental situations such as the drive losing speed in read and write, data loss risk etc... sometimes such issues can have hard consequences. Lots of questions can be answered with the right support, but all end users don't always know that the service support from the tape manufacturer comes as a complementary technical support .

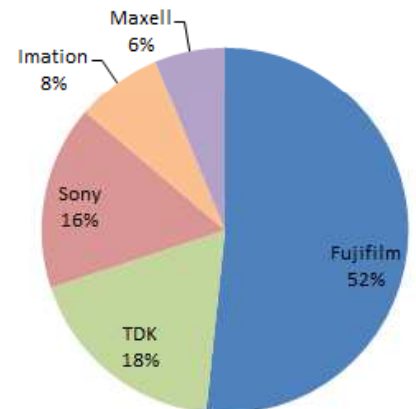
Using Fujifilm branded LTO tapes means using Fujifilm's hotline

Which Gas do we recommend as anti-fire protection ? Why shouldn't an end user over pass 250 full file passes on an LTO5 tape ? How can one define quality variance between different tape coating technologies ? Our latest Q2 Newsletter was a gathering of commonly asked questions by various European end users .

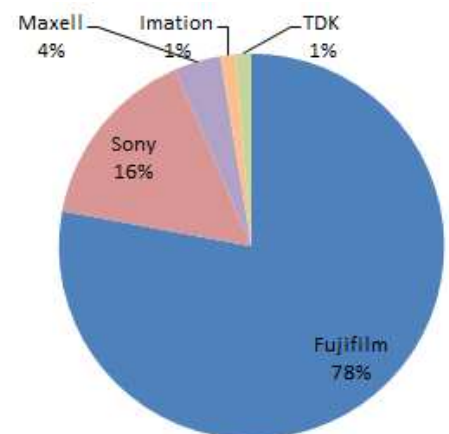
Our mission is, not only to achieve distribution of LTO tapes, but also to provide the end users and resellers with full support and security related to the usage of LTO technology. Our European hotline, represented in each country by local Fujifilm sales teams is our main identity . Our European technical team consists of 30 people based in our Kleve Data Center and is fully at your disposal :



Worldwide manufacturing share for LTO4 tapes in Q4 2012 (SCCG figures).



Worldwide manufacturing share for LTO5 tapes in Q4 2012 (SCCG figures).



Worldwide manufacturing share for LTO6 tapes in Q4 2012 (SCCG figures).



Fujifilm LTO tapes product line and complementary products .



LTO6 Tape cartridge

- Capacity : 2.5/6.25TB
- Barium Ferrite technology
- P/N : 16310732
- Worm version
- Encryption.
- Drive transfer rate :160Mb/s



Universal cleaning cartridge

P/N: 42965



LTO5 Tape cartridge

- Capacity : 1.5/3TB
- Nanocubic technology
- P/N : 4003276
- Worm version
- Encryption
- Drive transfer rate :140Mb/s



DC-Analyzer – diagnosis tool



LTO4 Tape cartridge

- Capacity : 800GB/1.6TB
- Nanocubic technology
- P/N : 48185
- Worm version
- Encryption
- Drive transfer rate :120Mb/s



LTO3 Tape cartridge

- Capacity : 400/800GB
- ATTOMM technology
- P/N : 47022
- Drive transfer rate :80Mb/s



Transport case for LTO Tapes

Capacity : 20 cartridges
 Dimensions: 445mmx362mmx159mm
 Weight: 3.2Kg
 Colour : Black
 Lockable - Brass combination padlock included as standard



LTO2 Tape cartridge

- Capacity : 200/400GB
- ATTOMM Technology
- P/N : 45087
- Drive transfer rate :40Mb/s



LTO1 Tape cartridge

- Capacity : 100/200GB
- ATTOMM Technology
- P/N : 42962
- Drive transfer rate :20Mb/s



Code-Bar labeling



Fujifilm 3592 tapes product line



3592 Tape Cartridge
 • "standard" version
 • Capacity :300/900GB
 • P/N: 4004019



3592 Tape Cartridge
 • "Economy" version
 • Capacity :60/180GB
 • P/N: 17006



3592 Tape Cartridge
 • "standard" version
 • Worm
 • Capacity : 300/900GB
 • P/N.: 17007



3592 Tape Cartridge
 • "Economy" version
 • Worm
 • Capacity : 60/180GB
 • P/N: 42962

Features and benefits of Fujifilm 3592 Tape cartridge :

- High-reliability curved sliding door and leader pin system to provide dust protection and enhance durability.
- Smooth tape surface that assures tape-to-head contact, minimal specing loss, high output and improved cartridge life.
- High precision head tracking with timing bases servo systems
- Built-in cartridge Memory chip that stores access history and media performance information.



3592 Cleaning cartridge
 P/N : 46619

Tape coating technology :

Please bear in mind that 3592 tapes available with Fujifilm logo are being manufactured with the Nanocubic technology, despite the newer generations such as advanced 3592, are using BaFe technology.

3592 capacities per tapes and drives.

























Tape Cartridge	3592 JJ Gen Economy 3592 60GB	3592 JA Gen1 3592 300GB	3592 JB Gen2 Extended 3592 700GB	3592 JK Gen3 Advanced 3592 Eco 4TB	3592 JC Gen3 Advanced 3592 4TB
Fujifilm Tape Cartridge P/N	46617	4004019			
IBM Tape Cartridge P/N	24R0316	18P7534	23R9830	46X7453	46X7452

IBM 3592 drives					
IBM 3592 J1A -E02- Gen 1	60 GB	300 GB			
IBM 3592 TS1120-E05- Gen 2	100 GB	500 GB	700 GB		
IBM 3592 TS1130-E06- Gen 3	128 GB	640 GB	1 TB		
IBM 3592 TS1140-E07- Gen 4		Read Only	1.6 TB	500 GB	4 TB



How does Barium Ferrite improve data storage quality on LTO tapes?

See on below table the benefits of using Barium Ferrite tape coating technology :

End user benefit	Small size Particles	Particles perpendicularly magnetized	High Magnetic properties from BaFe	High SNR Ratio	Pre Oxydized Material	Smoother Tape surface
High storage capacity	 Barium Ferrite			 Barium Ferrite		 Barium Ferrite
Reduce shoo-shining effect		 Barium Ferrite	 Barium Ferrite	 Barium Ferrite		 Barium Ferrite
Better transfer rate = time gain		 Barium Ferrite	 Barium Ferrite	 Barium Ferrite		 Barium Ferrite
Long archive life	 Barium Ferrite		 Barium Ferrite		 Barium Ferrite	
Compensate head erosion = longer life time		 Barium Ferrite	 Barium Ferrite	 Barium Ferrite		 Barium Ferrite
Minimize data loss risk (BER)	 Barium Ferrite	 Barium Ferrite	 Barium Ferrite		 Barium Ferrite	 Barium Ferrite
Stable recording						 Barium Ferrite

Few explanations related to the table above.

Please find as follows few examples of explanations of the above table. Few major issues such as : how to minimize data loss, how to perform higher transfer rate or how to achieve more stable recording.

A lower error rate in time minimizing the risk of data loss.

Almost all the technical advances of the BaFe technology provide, one way or another, with response to the major concern of users: security, or how to reduce the risk of losing critical data.

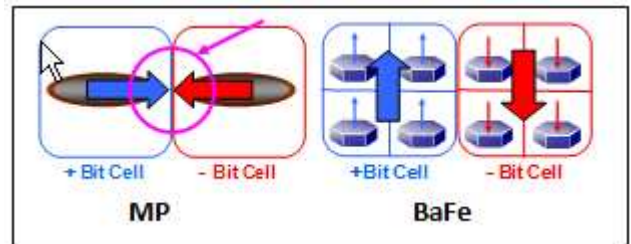
The constant increasing amount of data stored on LTO tapes increases furthermore this risk of data loss.

BaFe particles are much smaller than traditional MP particles. They are more numerous in the same cell.

Natural demagnetization of some particles, throughout the time, is less of a risk for the cell with BaFe technology, since the cell is less depending on each particle.



Also, vertical polarization of BaFe particles allows all cells to be visible by the drive's head and to avoid demagnetization effects which appear during the use of MP particles since they are horizontally polarized. This demagnetization can be generated by opposing magnetic forces and can cause read and write errors. It can also negatively prevent the recovery of data recorded on the tape. This risk is quite small with BaFe because magnetic forces can naturally not oppose..

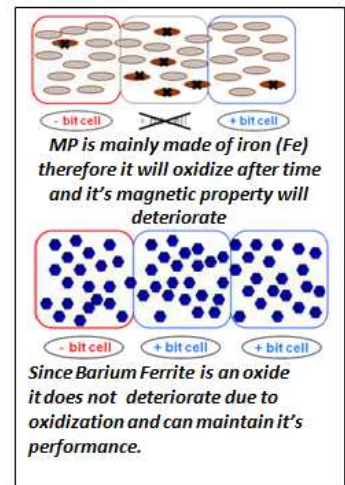


Barium Ferrite and MP polarization

As far as it concerns the SNR, this high Signal-to-Noise ratio, ensures, thanks to the strength and clarity of the signal, that it can be easily recognized by the drive head. There will be, therefore, necessarily less read and write errors.

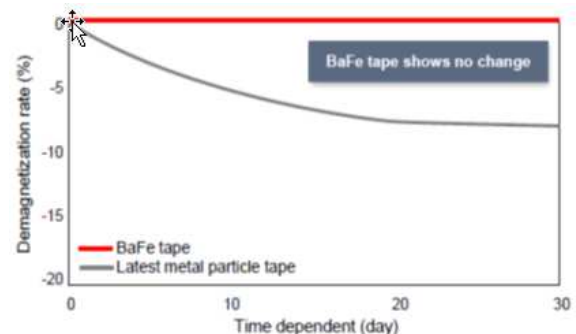
BaFe being already an oxide, there can be no data loss generated over time by any kind of oxidizing phenomenon while MP technology obviously loses data cells.

The erosion of the drive head may be compensated by the higher magnetic properties of Barium Ferrite technology. Compared error rates evolution, the closest we get to the drive being end of life, show a real advantage for BaFe over MP



A high transfer rate in order to save time

Barium ferrite particles help optimize the data transfer rate. Indeed, as we have seen, their vertical polarization and high magnetic properties optimize the readability of signal (high signal-to-noise ratio) which will be quickly recognized by the drive's head. The low risk of being confronted to the effects of shoe-shining ensures that the data transfer will not be delayed by the drive stopping. In addition, the fact that the surface of the tape is smoother, due to the small size of the particles and their homogeneous dispersion, allows the tape to slip more easily and quickly on the drive's head. This optimization of the speed of data transfer saves time during the backup process.

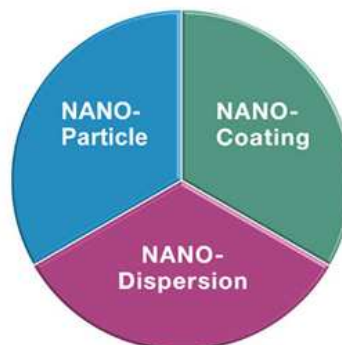


Barium Ferrite provides with longer archive life than MP

A more stable recording.

Barium ferrite particles, coated on the tape thanks to Fujifilm's Nanocubic technology, provide LTO6 tapes with smoother surface. The signal is then easier to recognize by the head since it has a consistent level and will therefore lead to a more stable recording.

Less smooth tape (with more asperities) may cause fluctuations in the signal quality level. Even more when the friction of the belt on the drive's head can create a slight fluttering of the tape. The air produced by this movement between the tape and the drive alters the magnetic field and could disrupt data recording. The stability of the recording made on BaFe tapes, allows the data to be read easier, even if the read and write head begins to be worn out by time.



NANO-Particle Technology

Developed two types of magnetic particles; one is an ultra-fine metal particle, and the other is a small tabular ferromagnetic hexagonal barium-ferrite particle.

NANO-Coating Technology

Developed nano-order ultra-thin magnetic layer for high resolution.

NANO-Dispersion Technology

Developed Uniform particle dispersion technology featuring newly developed polymer compound.

Would you wish to have access to full information about Barium Ferrite, its features and benefits, please don't hesitate to contact us and we will provide you with full presentation and training related to this new revolutionary tape coating technology.



The value proposition of Data Tape Storage

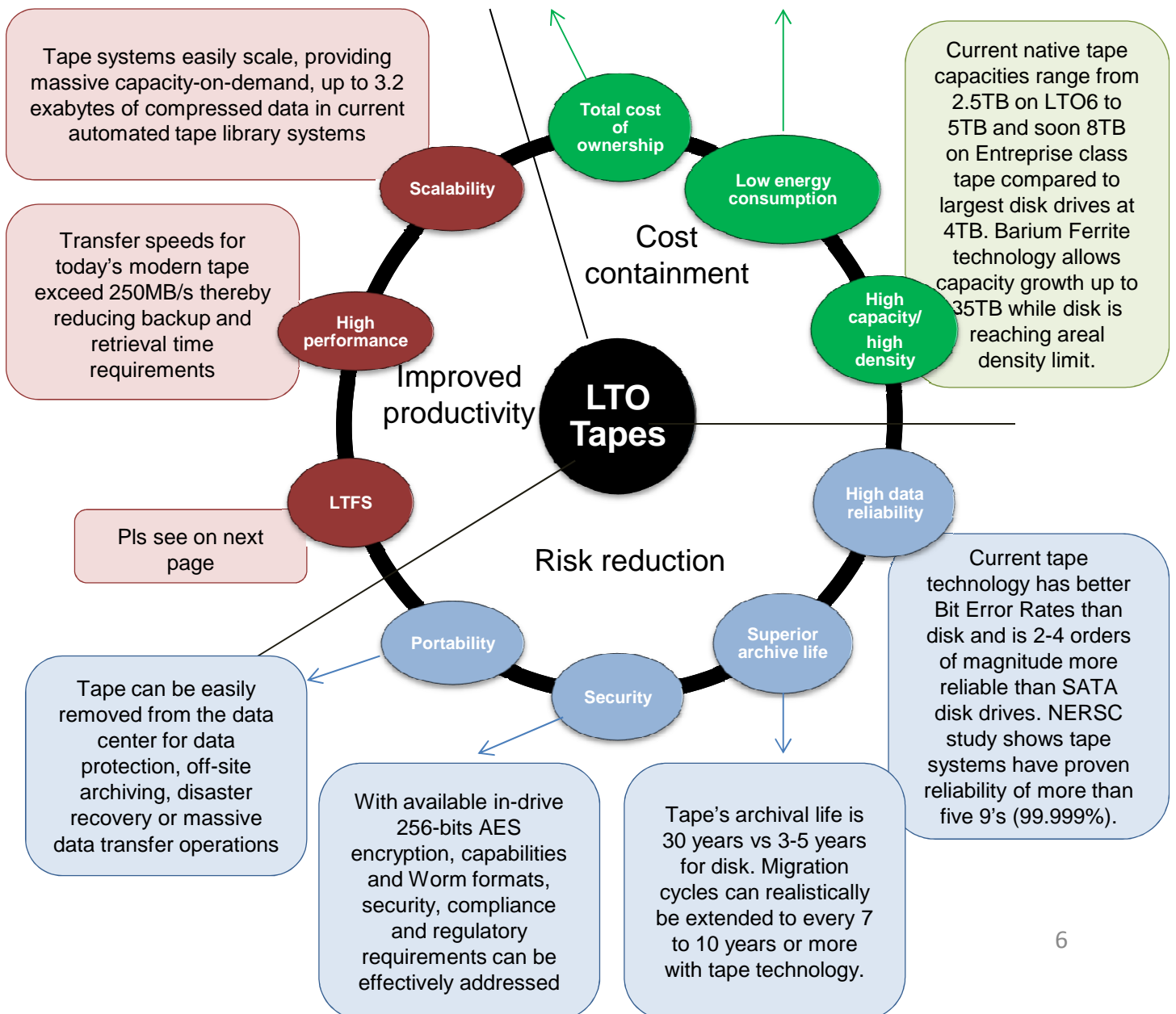
Explosive data growth and shrinking IT budgets are putting pressure on companies to find innovative storage solutions to meet their organizational demands. Increasingly that means tape, thanks to its significant cost advantages, reliability, and continued innovations improving tape's capacity, speed, and ease-of-use.

While many organisations already know tape for its traditional uses as backup, disaster recovery and compliance, modern applications now enable tape to be used as an active file archive and as low-cost NAS storage. For access to large quantities of stored data, tape's role in big data, cloud, HPC and IT operations is expanding dramatically.

Whether for back-up or archive applications, no other technology, be it disk, or flash can achieve the benefits of cost-containment, risk reduction and deliver improved productivity the way today's advanced tape technology can.

Studies from leading analysts show tape systems cost less than disk. ESG reported a 4X advantage in backup applications for LTO5 vs VTL with de-duplication. For long term archiving, other studies show a 15X cost advantage for LTO tape vs disk.

Contributing to low TCO, studies show that tape consumes at least 200X less power than disk since data on tape consumes little or no energy and does not require cooling the way spinning does.





LTFS : You would need disk or flash applications at cheap pricing ? Try tapes !

LTO format' scalability allows the development of new specifications, such as LTFS, which provides ways of preserving both gross and finalized digital content by combining high capacity, fast data access, low cost and turns tape technology into a storage tool that is as easy to use as hard disks or USB keys.

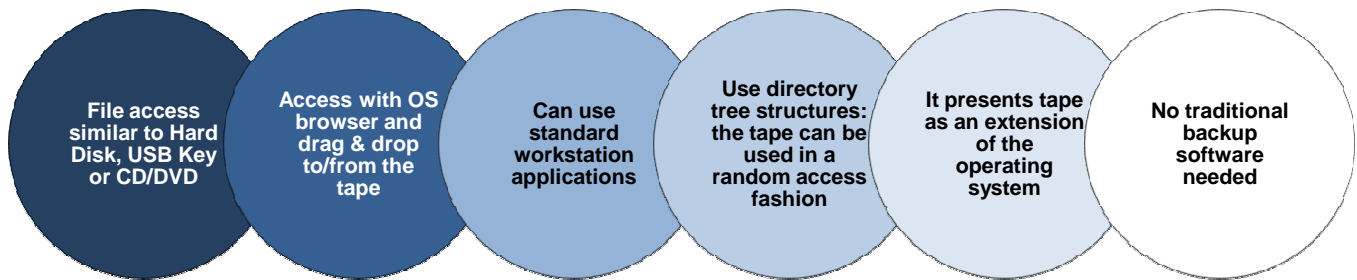
Thus, LTFS is a partition of the LTO tape in half. Part of the tape is dedicated to the inclusion of an index of the information stored as metadata. The index can be copied and modified. The old copies of it being retained, the tape cartridge can be restored to a previous state. The other part contains the data as such.

Of course, the index uses a very small space on the tape, so it does not prevent from obtaining the full native or compressed capacity of the tape.

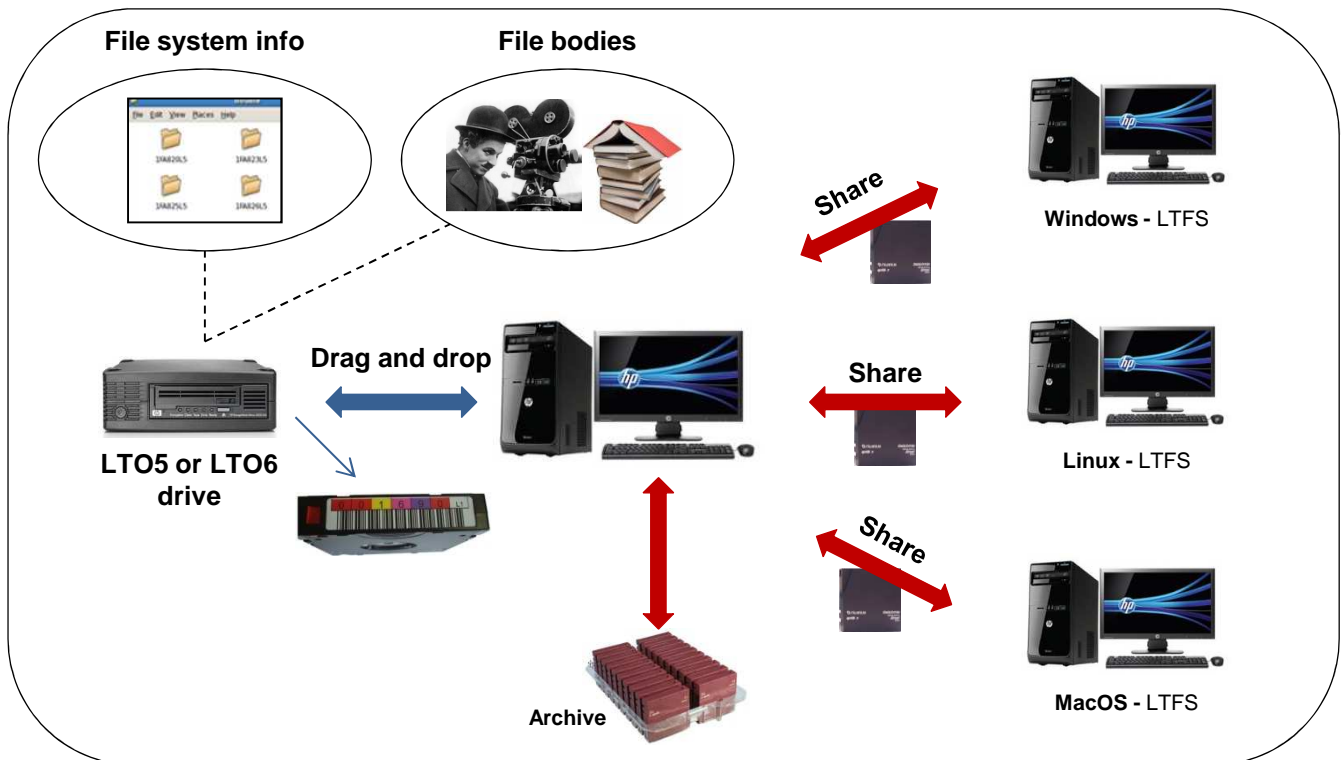
The LTFS system is self-describing : the access and management of the files stored on the tape is as easy and friendly as with a hard disk, a USB key or a CD/DVD thanks to data indexing.

Unrelated to the backup software used to record the tape, it will retrieve the data entered independently of the hardware or software platforms used initially. Making it a tool that is ideal for sharing content including during post-production.

6 fundamental informations about LTFS.



LTFS – Benefits : Easily View, Archive and Share Files





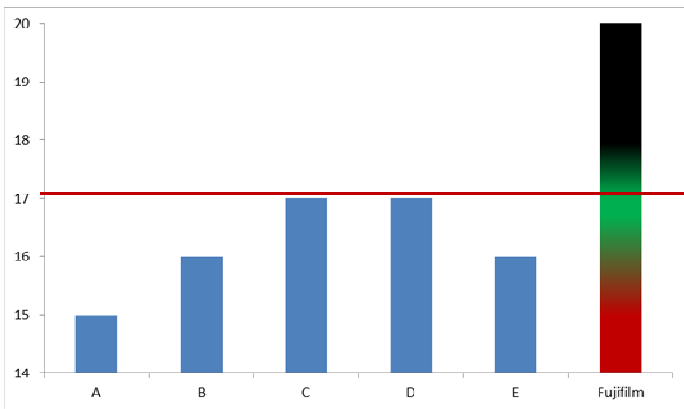
Conclusion : 8 good reasons to use Fujifilm LTO tapes.

1- Fujifilm is worldwide N°1 manufacturer for LTO tapes with over 50% manufacturing share for LTO4 and LTO5 and over 70% for LTO6 tapes.

2- Fujifilm is the only tape manufacturer that develops new tape coating technologies : after the ATOMM technology, Fujifilm came up with higher manufacturing qualities for LTO4 and LTO5 tapes thanks to the Nanocubic technology and now is launching the Barium Ferrite revolution for LTO6

3- Fujifilm can manufacture storage tapes that can offer up to 35TB capacity while the areal density of MP technology is hardly good enough to manufacture LTO6 tapes.

4- Barium Ferrite's Signal-to-Noise ratio (SNR) is higher than MP's. The gap between Output and Noise shows the performance of the tape. We call this Signal to Noise Ratio (SNR). High SNR contributes to high capacity and stable recording. Therefore a high SNR also means higher security for the data recorded. Please see on table below the comparative test between Fujifilm's LTO6 tapes SNR vs competition :

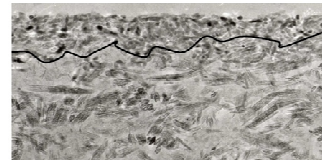


5- Fujifilm's archive life for Barium Ferrite LTO6 tapes is superior to MP's. BaFe is an Oxide, therefore it does not lose properties during oxydation as opposed to MP.

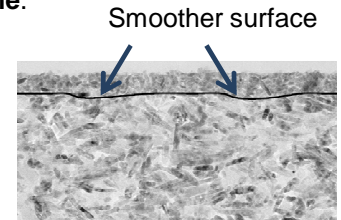
There is a notion of data loss with time, that does not exist with Barium Ferrite.

6- Barium Ferrite particles can increase the storage capacity of a tape and increase its magnetic properties in the same time.

Please see on picture :



LTO5 using MP technology



LTO6 using Barium Ferrite

7- There are points of reliability on an LTO tape cartridge that are critical:

As such, FUJIFILM has a number of licenses and rights to the development of technologies for the cartridge by itself. This constant care of the mechanism of the cartridge can ensure your optimum safety in the use of the tape : the simple door spring, sturdy welded cartridge, reinforcement of the release pad and many other (pls see our Q1 2013 newsletter), many details that could be taken as secondary but which are vital and for which Fujifilm has developed its own technology.

Please see as follows the unique leader pin-holder, for which Fujifilm owns specific patents and rights :



8- Dr.Schmeink, our Technical manager is waiting for your call !



FUJIFILM Europe GmbH (Sp. z o.o.)

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Dystrybutor: MC Storage www.mcstorage.pl e-mail: kontakt@mcstorage.pl

Find some more information on :

<http://www.linkedin.com/company/fujifilmdatastorage>