



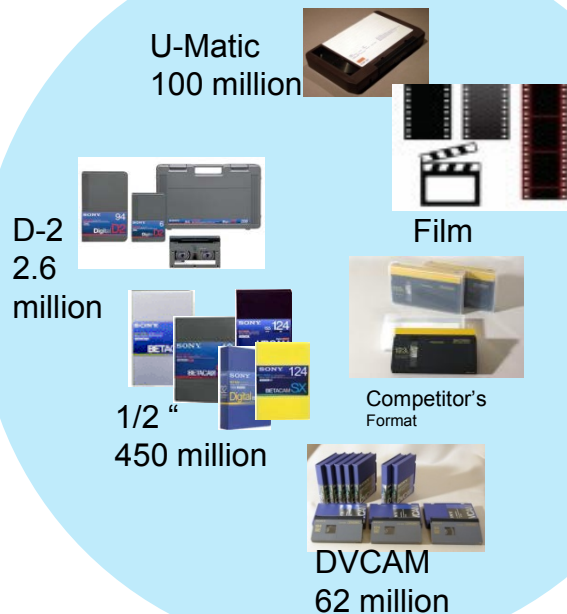
Sony Optical Disc Archive Solutions



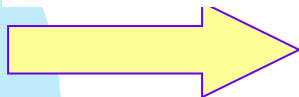
Optical Disc Archive

Migration from Video Tape to Digital Media

TTL Approx.700Mil Tapes (Sony only)



Media Contents
include the
“Cultural Assets”
that requires Long
Preservation



Need to digitize
video tapes on a
massive scale.

LTO ?



But not everybody think LTO is the
perfect solution...
There is no other good solution.

- No More Tape !! Mentality
(Everybody is saying “Tapeless”
but archive is Tape?)
- **Reliability** is not excellent
- **Backward Compatibility** is limited
to 2 generation.



Optical Disc Archive

– Key Advantages & Benefits

Optical Disc Media - Key Advantages and Benefits

Very long term/deep archive media,
years rated archive life.



**No forced
media/data
migration.**



**No backward read
compatibility issues.**



Non contact
media

Significantly **reduces Total
Cost of Ownership (TCO).**
Over media life



Good **random file access.**
Ideal for partial file retrieval.

**Secure, robust,
transportable
media**



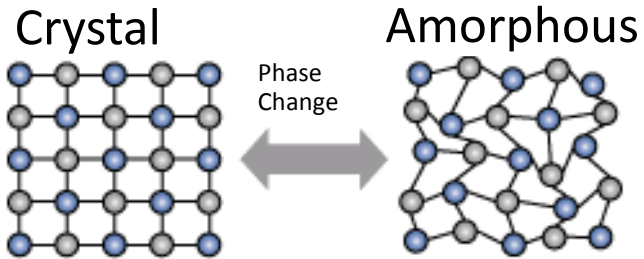
Eco friendly. Significant reduction in environmental
management and long
term media storage costs.



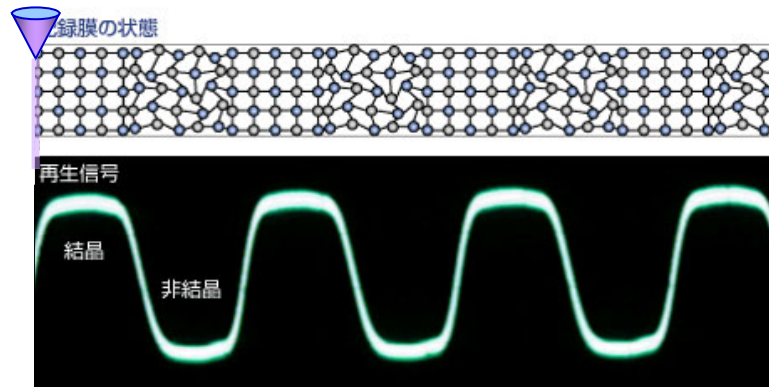
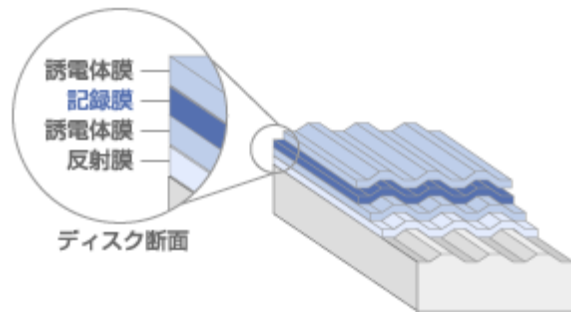
Optical Disc Media



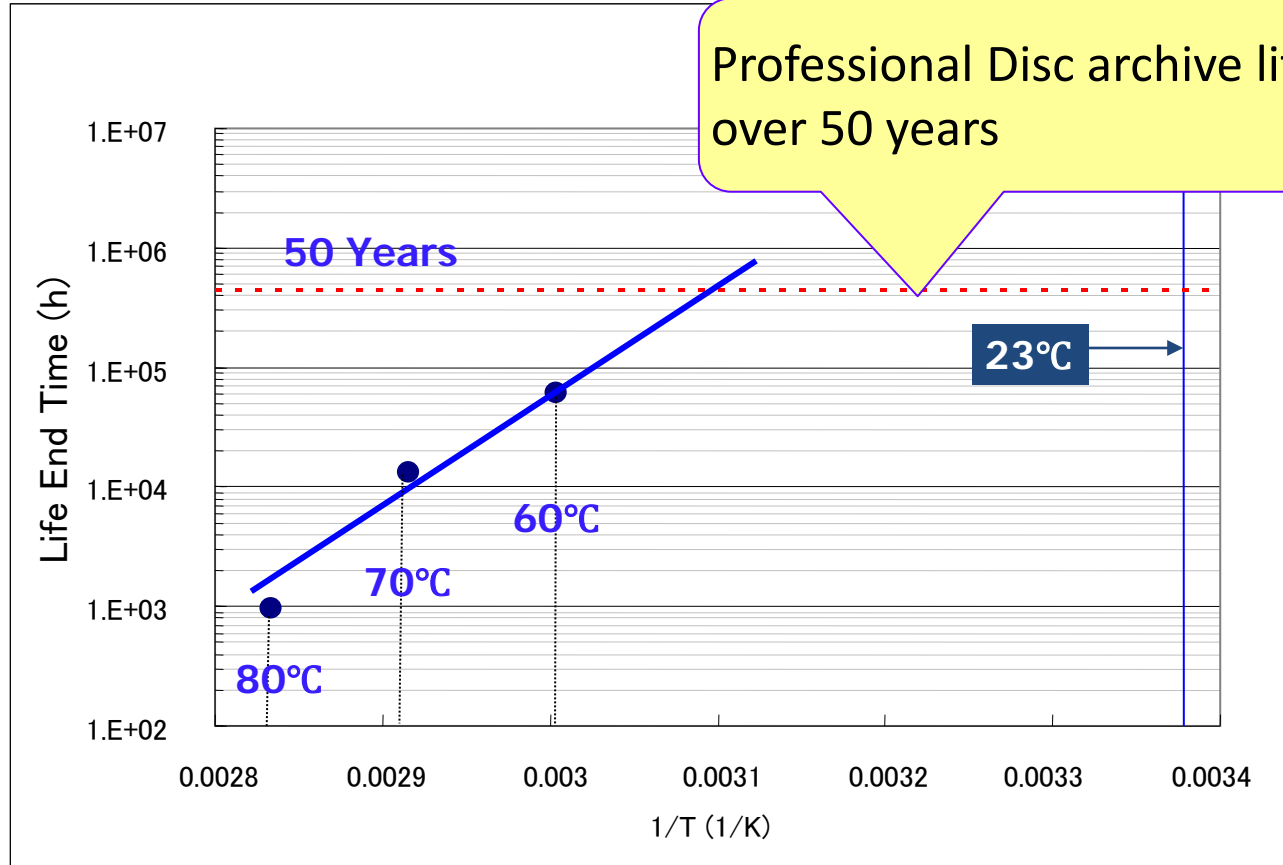
Phase Change - Basic Recording Mechanism



When the recording surface material is heated above the melting point (**600°C**) and then rapidly cooled, these substances have the property of solidifying in an amorphous state (without crystallization, and with the individual elements positioned randomly).

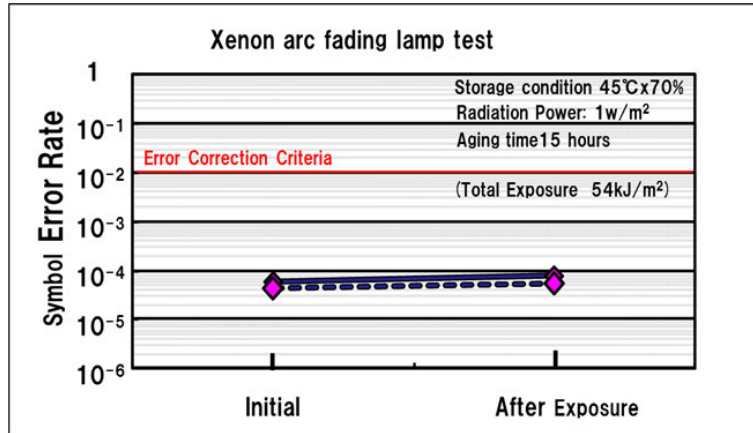


Accelerated Life Testing Results



Sea water robustness test

light exposure testing



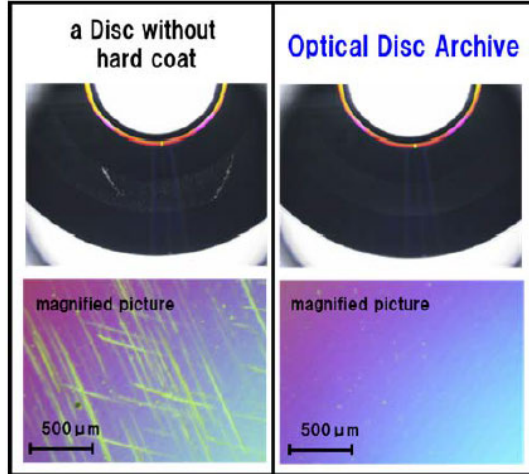
- The error rate is stable and remains unchanged

Soak test in seawater

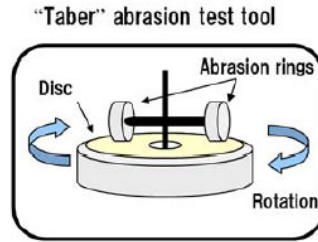


- There was no corrosion or damage of any kind to the discs themselves. All the recorded data was recovered with no failures.

Taber abrasion test



after 5 rotations of abrasion ring



Taber Abrasion Test

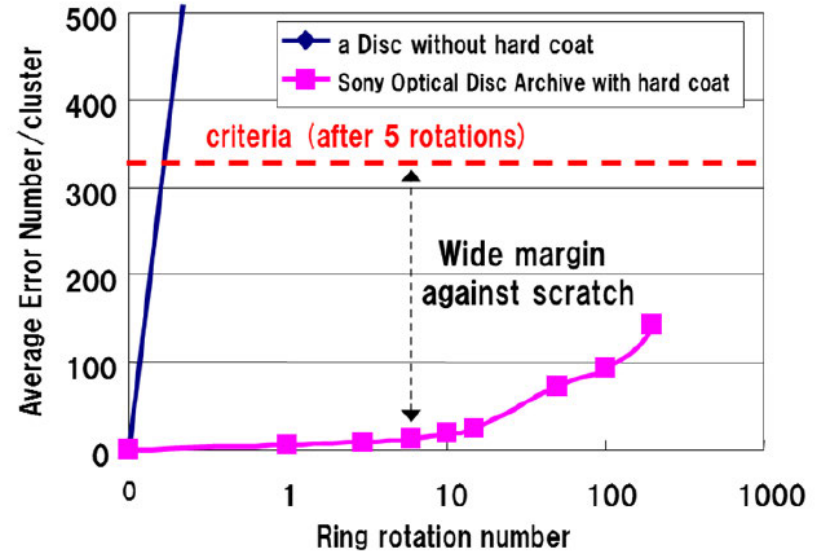


Figure 3-9. "Taber" abrasion test

Taber Abrasion Test

Proved Sony Optical DISC technology →



300GB

12X Optical DISCs inside one ODA cartridge →



x12

Robust shell for dust, water fingerprint →
protection, RFID, REC INH etc



1.5TB

Optical Disc types and capacity ranges



SL (300GB)

DL (600GB)

TL (1.2TB)

QL (1.5TB)

R (Write Once)



RE (Re-Writable)



ODA Storage Times vs REC format

Transfer Rate			35Mbps (4:2:0 HD)	50Mbps (4:2:2 HD)
Cartridge / Capacity				
ODC300R ODC300RE	300GB (R/RE)	SL R/RE	13H	8.5H
ODC600R ODC600RE	600GB (R/RE)	DL R/RE	27.5H	18.5H
ODC1200RE	1.2TB (RE)	TL RE	57H	38H
ODC1500R	1.5TB (R)	QL R	72H	48H

ODA media Road Maps



Next-generation optical disc format

Sony and Panasonic formulated a new standard of next-generation optical disc

"Archival Disc" standard formulated for professional-use next-generation optical discs

Sony Corporation
Panasonic Corporation

Press Release on March 10, 2014.

Tokyo, Japan - March 10, 2014 - Sony Corporation ("Sony") and Panasonic Corporation ("Panasonic") formulated "Archival Disc", a new standard for professional-use, next-generation optical disc for long-term digital data storage*.





Optical discs have excellent properties to protect themselves against the environment, such as they can also withstand changes in temperature and humidity when stored. They also allow inter-format conversion, ensuring that data can continue to be read even as formats evolve. This makes them ideal for long-term digital data storage. Recognizing that optical discs will need to accommodate much larger volumes of storage to meet the future growth in the archive market, Sony and Panasonic have been engaged in the joint development of next-generation optical discs.

Roadmap


Both Sony and Panasonic aim to launch systems with a recording capacity of 300 GB per disc from summer 2015, onwards. In addition, both companies plan to leverage their respective technologies to further expand the recording capacity per disc to 500 GB and 1 TB.

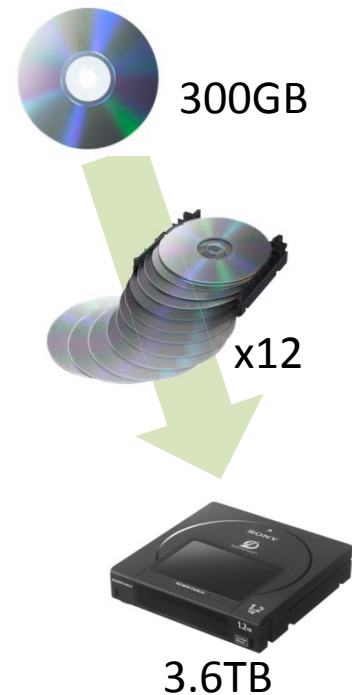
	Archival Disc Roadmap		
Capacity	300GB	500GB	1TB
Signal Processing Technology		High Linear Density (Inter Symbol Interference Cancellation Technology)	High Linear Density (Multi Level Recording Technology)
	Narrow Track Pitch (Crosstalk Cancellation Technology)		
Basic Specification	Double-Sided Disc Technology $\lambda=405\text{nm}$, $\text{NA}=0.85$, Layer Structure: 3Layers/side		

Optical Disc Format

	Capacity	Format Name	Symbol Logo
2015	1TB 500GB 300GB	Archival Disc	 Archival Disc
2003	QL 128GB TL 100GB DL 50GB SL 23.3/25GB	Blu-ray Disc	
1996	4.7GB	DVD	
1982	650MB	Compact Disc (CD)	

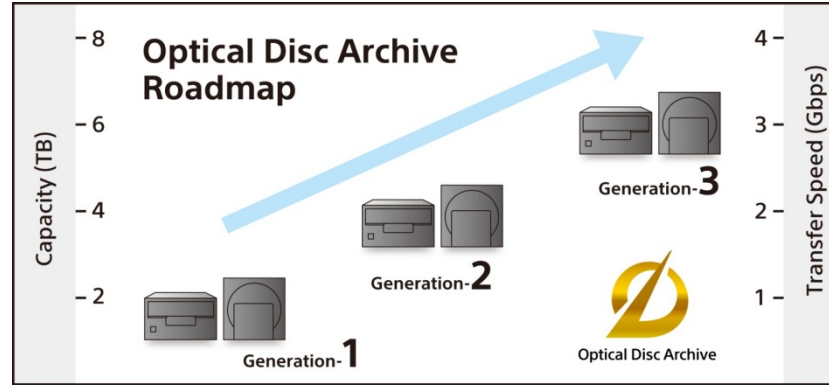
R&D Roadmap as “bare disc” format

 Archival Disc Roadmap			
Capacity			
	300GB	500GB	1TB
Signal Processing Technology		High Linear Density (Inter Symbol Interference Cancellation Technology)	High Linear Density (Multi Level Recording Technology)
	Narrow Track Pitch (Crosstalk Cancellation Technology)		
Basic Specification	Double-Sided Disc Technology $\lambda=405\text{nm}$, $\text{NA}=0.85$, Layer Structure: 3Layers/side		



Optical Disc Archive Roadmap

Sony officially released “Optical Disc Archive” roadmap at NAB2014



		Generation-1	Generation-2	Generation-3
Capacity		Up to 1.5TB	3.6TB	6TB
Transfer Speed	Read	Up to 1.1Gbps	2Gbps	3Gbps
	Write (w/Verify)	Up to 440Mbps	1Gbps	1.5Gbps

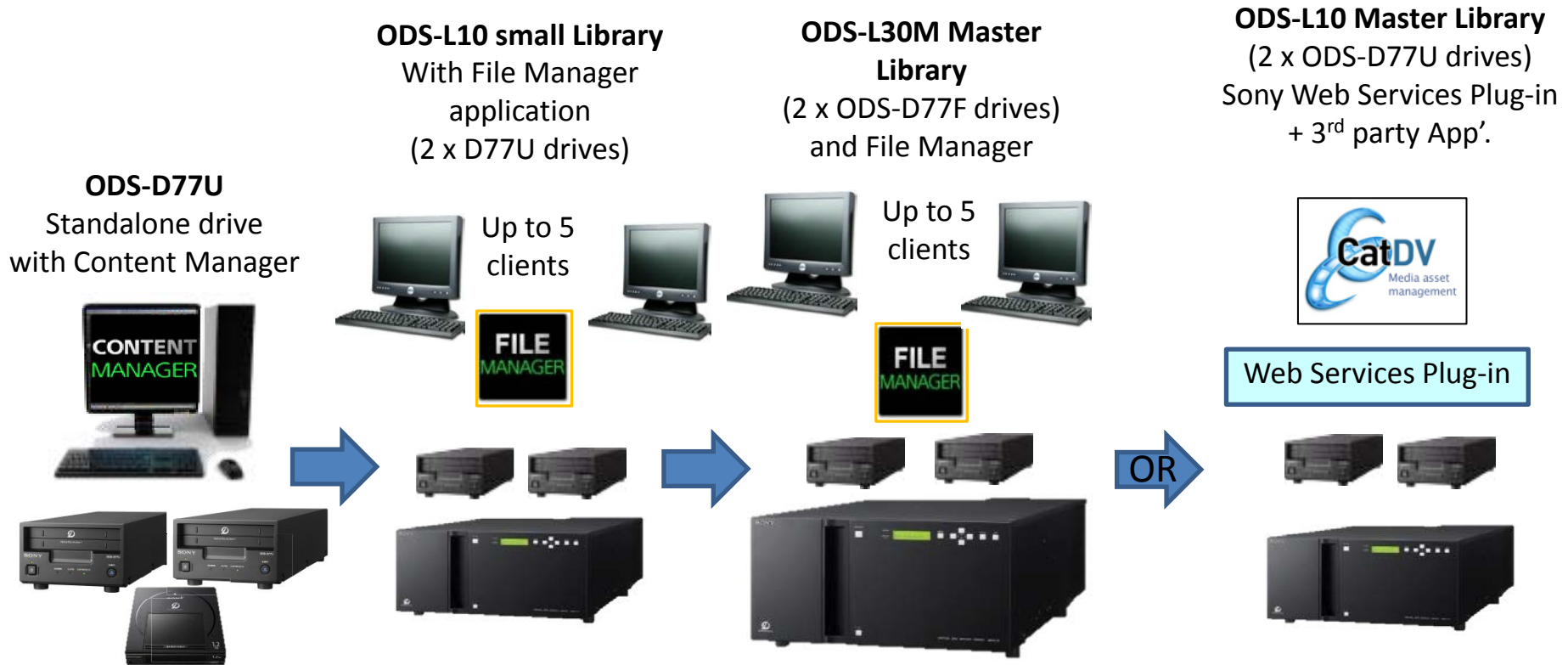
At least two manufacturers can produce
“Archival Disc” inside the cartridge

The target availability of Generation-2 is around NAB16

Strategy for Long Term Content Lifecycle Management



OD Archive Solutions – upgrade path



PetaSite Optical Disc Scalable Library

ODS-L30M
Master Library



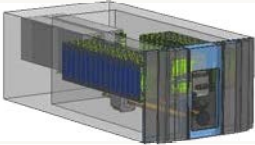
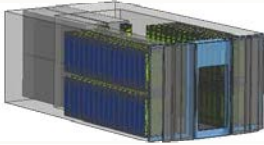
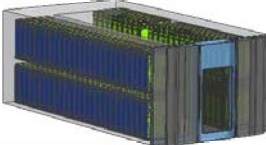
ODS-D77F
Optical Disc fibre
channel drive



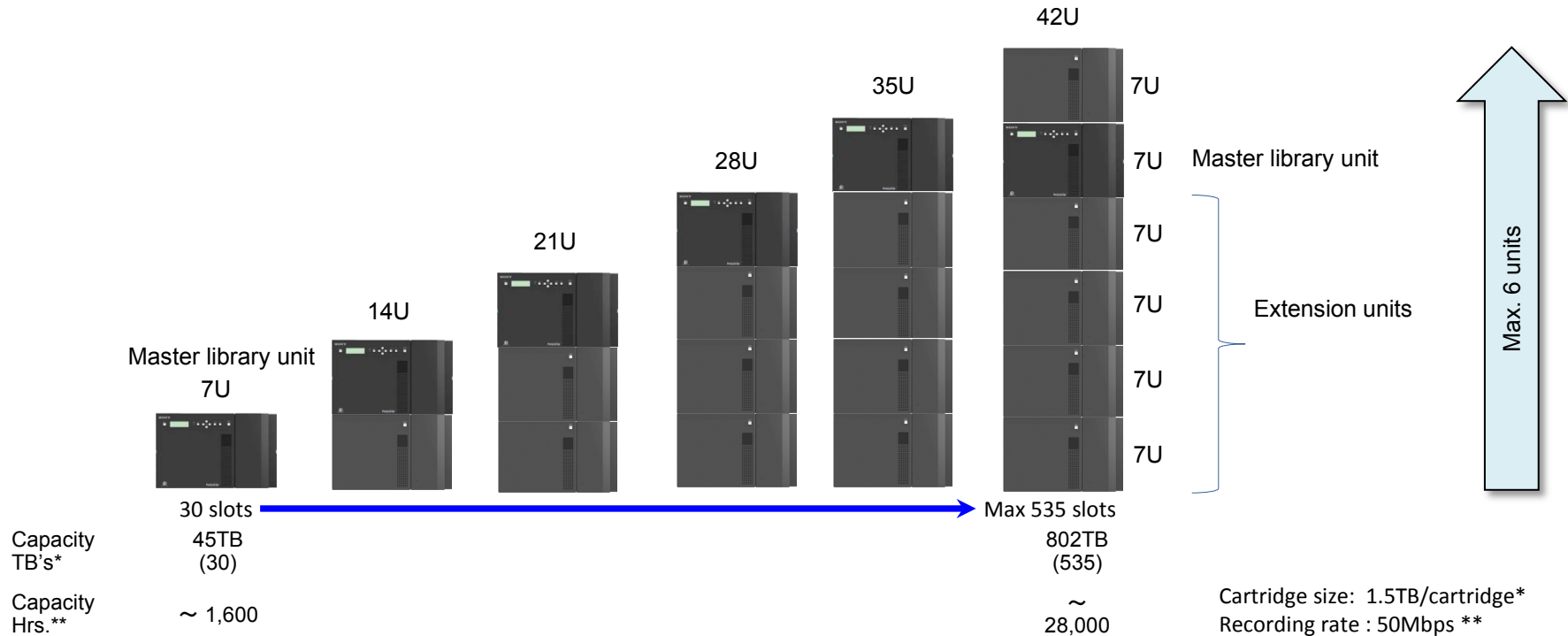
PetaSite Optical Disc
scalable library



PetaSite Optical Disc scalable library

Model	Master Library unit ODS - L30M	Extension Unit (drive & cartridge) ODS - L60E	Extension Unit (cartridge only) ODS - L100E
			
Size (Height)	7U	7U	7U
The Number of Drives (Max)	2	4	0
The Number of Cartridges (Max)	30	61	101

PetaSite Optical Disc Archive scalable library



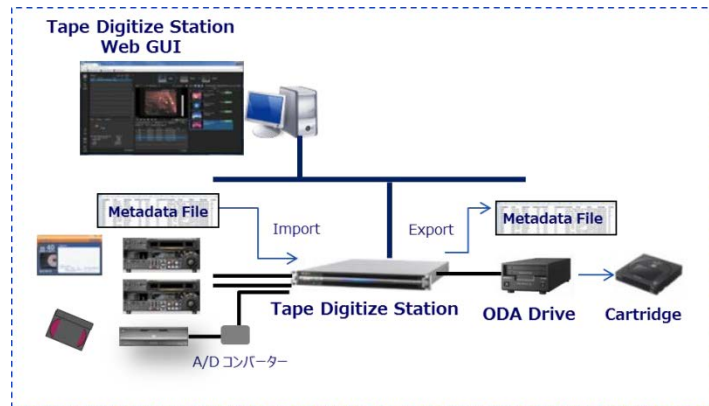


Tape Digitize Station PWS-100TD1



1. Tape Digitize Solution Package for “shelf archive”

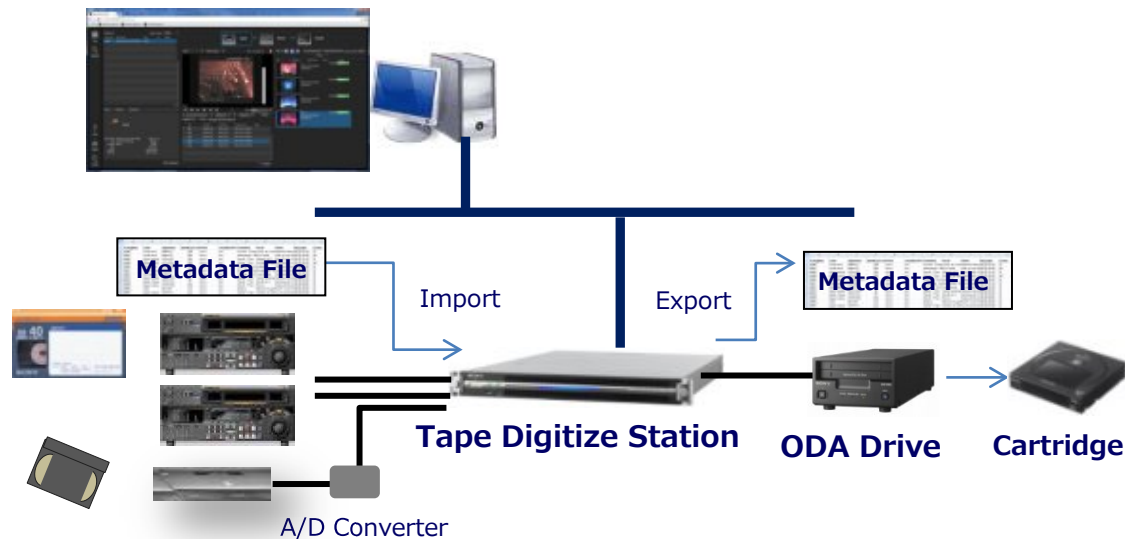
- Basic solution package providing simple operation of Tape Digitize Station and ODA Drive
- A solution to create digital format video files from legacy tape archive and migrate the files to a reliable and robust media like ODA cartridge for long term preservation of valuable assets



1. Tape Digitize Solution Package for “shelf archive”

Available Now

Tape Digitize Station Web GUI



Key Features

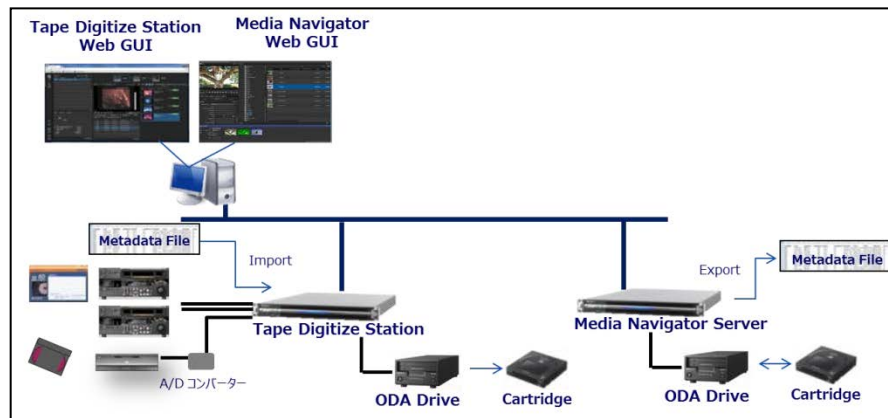
- Simple operation of VTR control and copying to ODA media
- Channel condition monitoring
- Embedded Auto-QC function
- Multi Codec support
- Import external metadata
- Export metadata to external systems

Target Customers

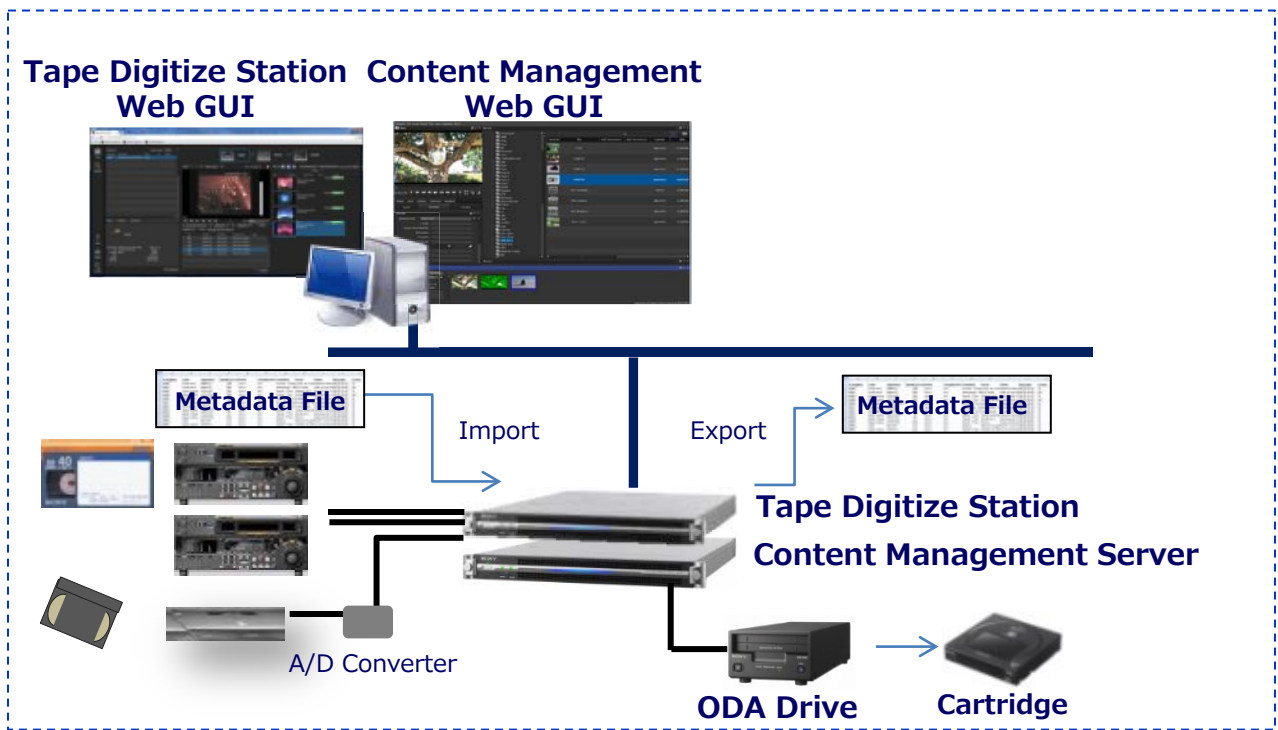
- Broadcast Stations
- Production Houses
- Religious organizations
- Tape library asset users

2. Tape Digitize with Content Management Solution Package

- Solution package providing simple operation of Tape Digitize Station and ODA Drive with a seamlessly integrated content management system
- A solution to create digital format video files from legacy tape archive and migrate the files to a reliable and robust media like ODA cartridge for long term preservation of valuable assets
- Integrated content management enables great efficiency for re-purposing of archive assets



2. Tape Digitize with Content Management Solution Package



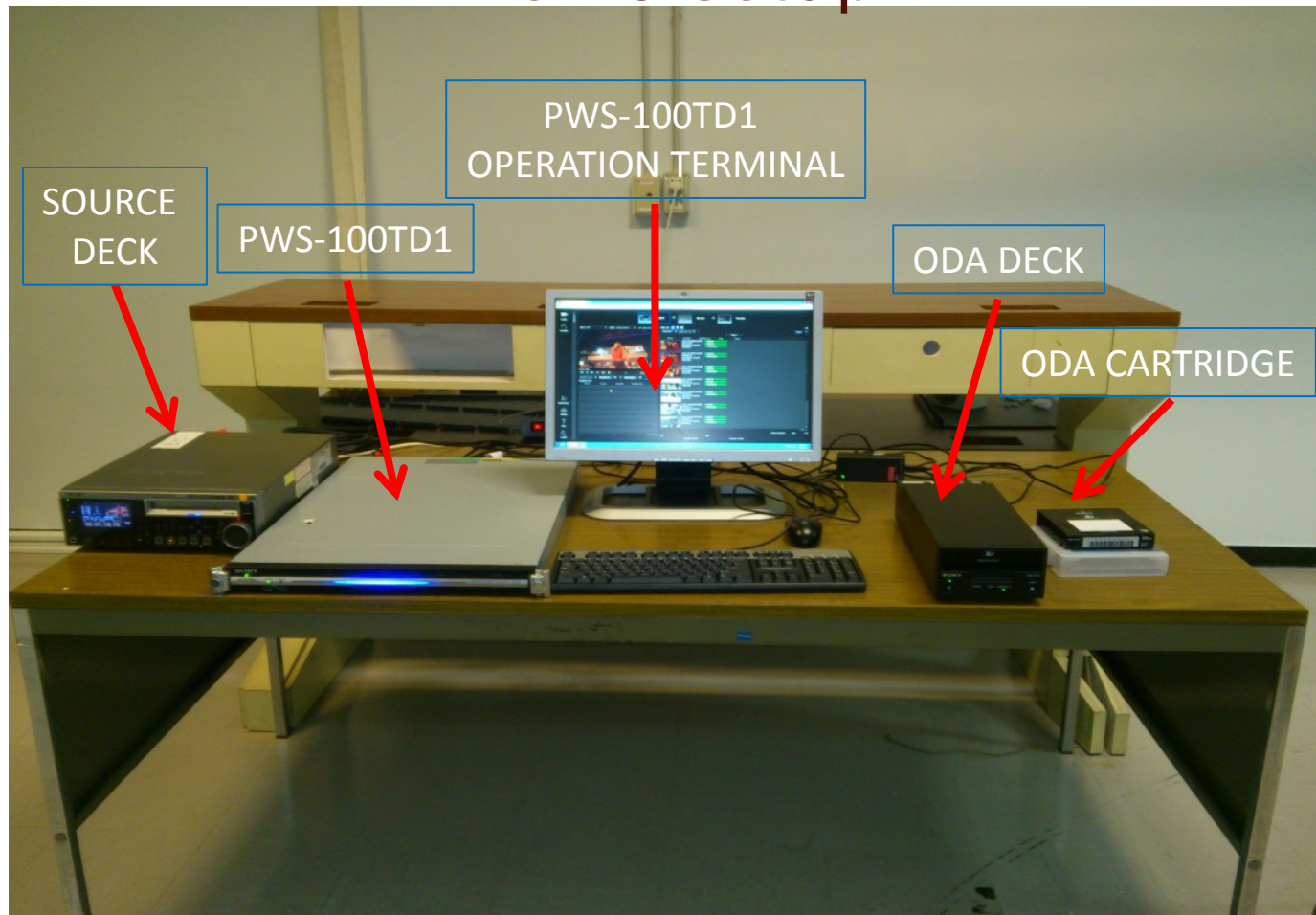
Key Features

- Simple operation of VTR control and copying to ODA media
- Channel condition monitoring
- Embedded Auto-QC function
- Multi Codec support
- Import external metadata
- Export metadata to external systems
- **Integrated metadata operation between Tape Digitize Station and Content Management system**
- **Rich metadata features and search functions**

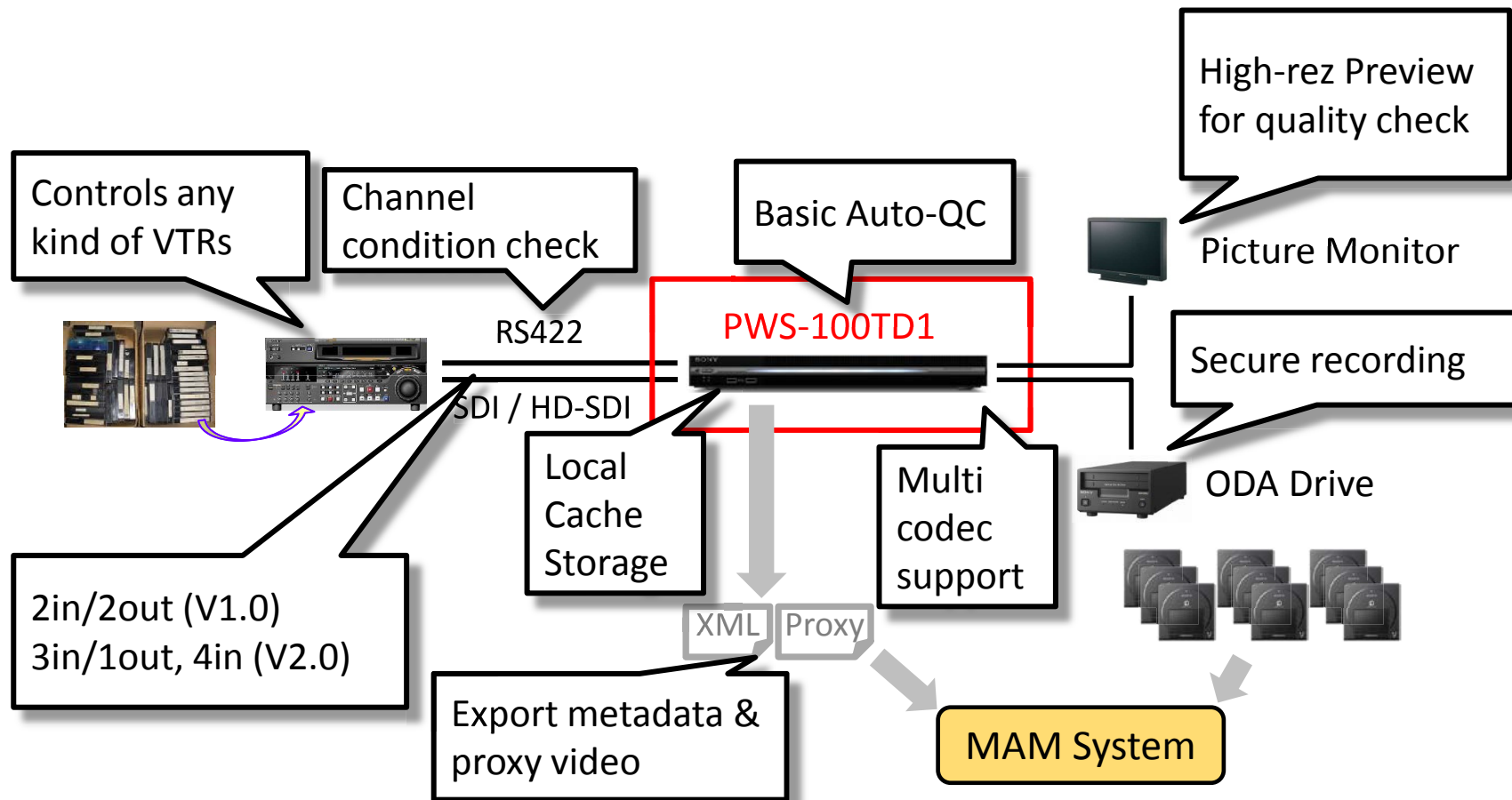
Target Customers

- Broadcast Stations
- Production Houses
- Religious organizations
- Tape library asset users

Demo setup



Main features



Monitoring “channel condition” signal from VTR

Following table describes what type of VTR tape format can be played / can be monitored of channel condition output, by each VTR model. Gray indicates it can't be played. Check mark indicates channel condition is available and “N/A” indicates it can be played but no channel condition output monitoring.

Category	Model	Betacam-SP	D-Beta	Betacam-SX	IMX	DVCAM	HDCAM
Betacam-SP	BVW-75	N/A					
	BVW-75P	N/A					
DVW	DVW-500/A500		✓				
	DVW-500P/A500P		✓				
	DVW-M2000	✓	✓	✓	✓		
	DVW-M2000P	✓	✓	✓	✓		
SX	DNW-75/A75			✓			
	DNW-75P/A75P			✓			
IMX	MSW-M2000	✓	✓	✓	✓		
	MSW-M2000P	✓	✓	✓	✓		
DVCAM	DSR-2000					✓	
	DSR-2000P					✓	
	DSR-1800					✓	
	DSR-1800P					✓	
HDCAM	HDW-M2000	✓	✓	✓	✓		✓

Front / Rear port configuration

