



CIPRICO

# Challenges of High Resolution Video Transport in Digital Intermediate and Post Production

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May 2007

# Industry Video Transport Challenges



- \$100K-400K spent on moving data around on Firewire drives during movie production
  - Uncompressed 2K-4K video creates new challenges during DI and post production environments – 1Q 4K reel = 1.6-2.0TB
  - Time spent copying is increasing exponentially – problematic for last minute or just-in-time production
  - Security of digital data during transport
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# How Much Information?

## Feature film storage metrics (assuming 10-bit file depth)

	2K resolution	4K resolution
Average size of single frame (1 sec = 24 frames)	13MB	50MB
Average storage size of finished film	2TB	8TB
Data generated during production	100-400TB	400-1,600TB
Typical bandwidth for real-time film playback	300MBps	1,200MBps (1.2GBps)
Number of 2Gbps Fibre Channel HBAs for real-time film playback	2	6-8

## Storage requirements for feature film scanning (File sizes and stream rates)

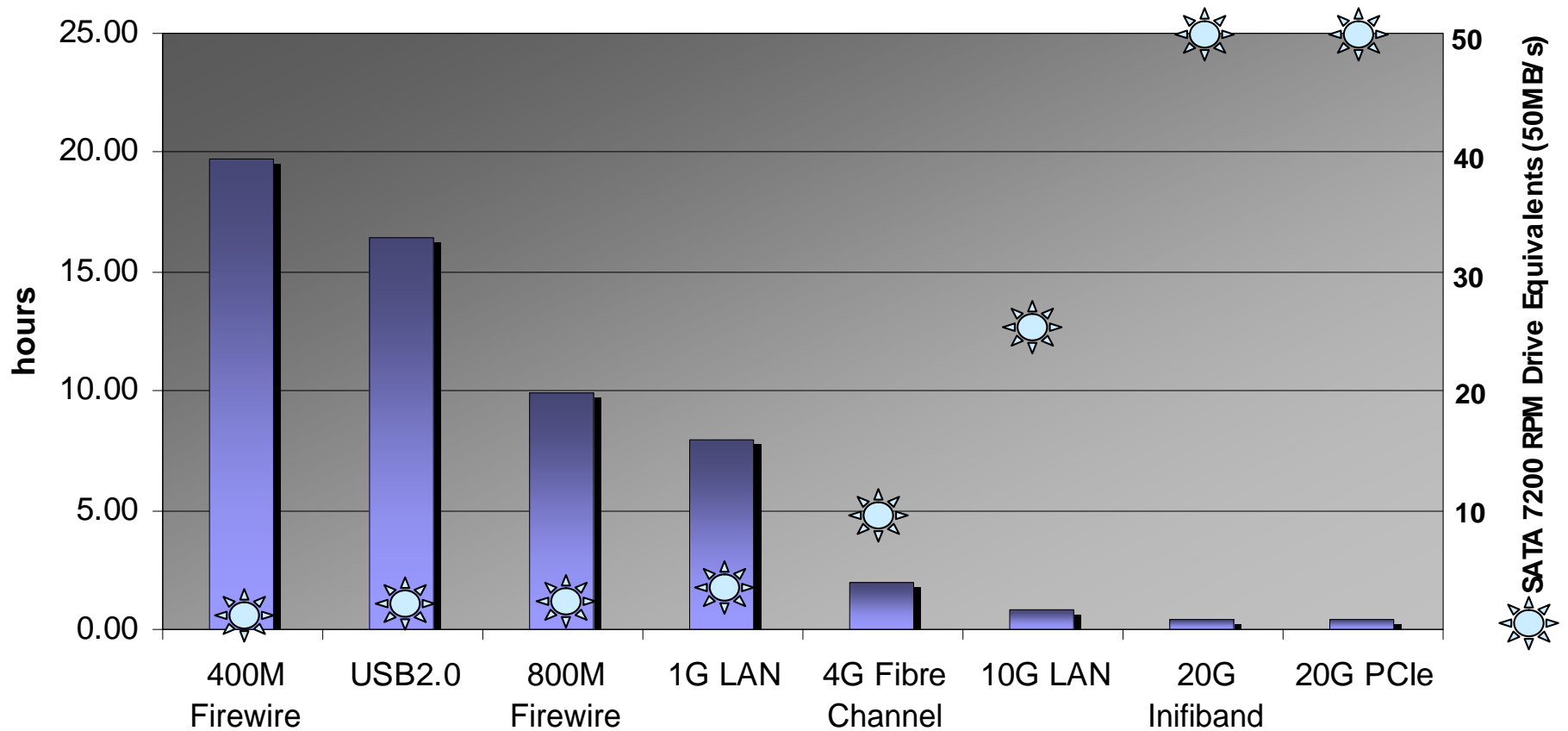
	Color depth	Frame size*	Stream rate	Storage per hour
HD 1080p	8 bits/color	6.2MB	186MBps	670GB per hr
	10 bits/color	7.8MB	233MBps	840GB per hr
2K (2,048 x 1,556)	10 bits/color	12.8MB	307MBps	1.1TB per hr
	16 bits/color	20.3MB	487MBps	1.8TB per hr
4K (4,096 x 3,112)	10 bits/color	51MB	1.2GBps	4.3TB per hr
	16 bits/color	81MB	1.9GBps	6.9TB per hr

\*Frame size includes (typical) embedded overhead.

Source: Data Direct Networks

# Copying 1.6TB to a Device

1.6TB Total Transfer Time - One Direction (hrs)



# Example

- Studio transfer to special effects house
- Time taken for transport
  - Studio export from SAN to FW800 Drive ~ 10 hours
  - Special effects copy to editing system ~ 10 hours
  - Special effects copy back to FW drive ~ 10 hours
  - Studio import back into SAN ~ 10 hours
- Total ~ 40 hours of non-productive time
- Only viable approach today is to make the SAN portable and remove the copies

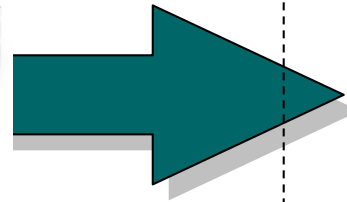
# Fibre Channel Portability

## SITE A - Capture

*MediaVault 4440*



*vPOD(s)*



## SITE B - Studio

*MediaVault 4440*



## SITE C - Special Effects



# Media Vault 4440/vPod Features

- Portable Fibre Channel RAID pod
- vPOD holds 1 “Reel” of 4K film content
- Single vPOD contains
  - 10 x 2-1/2” disk drives
  - Selectable RAID 0/RAID 6 controller
  - Two 4 Gb Fibre Channel ports
- Shock tolerance
  - 325G operating shock, 1000G non-operating
- Ultra quiet
- High impact shipping containers available

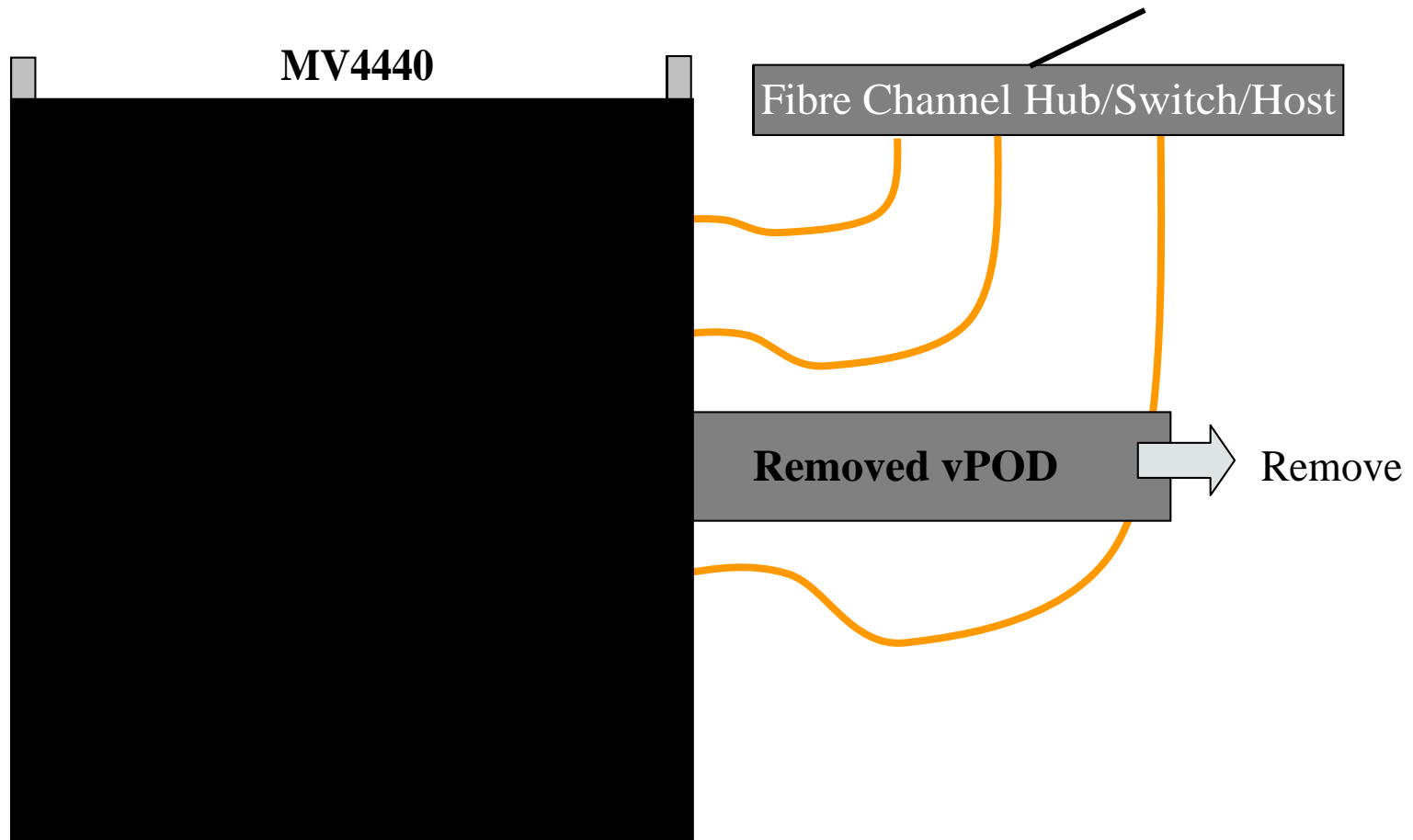


**MV 4440**  
**Quad vPOD Chassis**



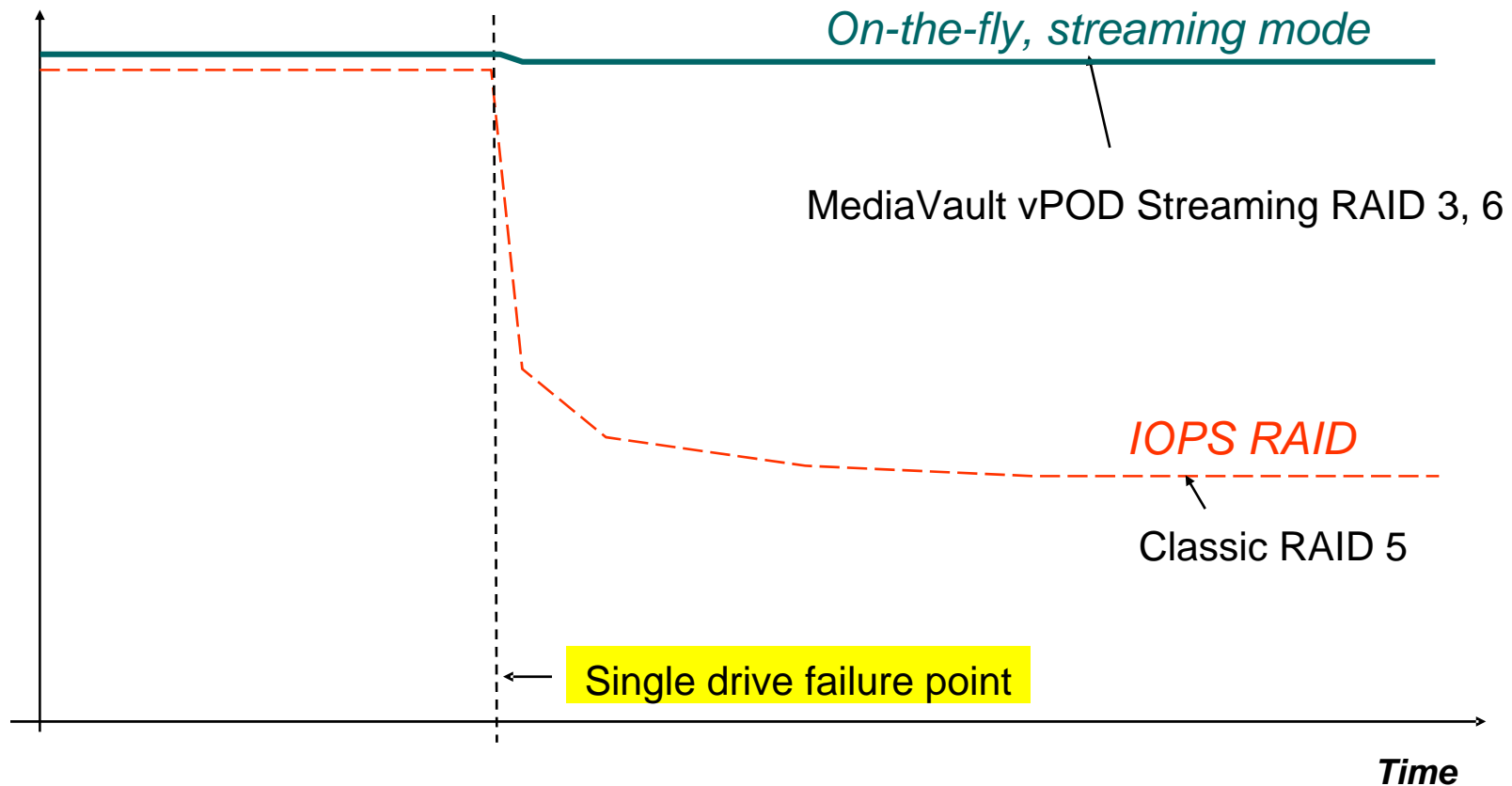
**vPOD**  
**(1.6 or 2.0TB)**

# Media Vault 4440/vPod - How it works



# vPOD RAID 6 Profile

Streaming Writes (MB/s)



**On the fly XOR (hardware) better for surviving disk crash when streaming media = no lost data/performance on video capture or editing**

# Security Options



- Protection from stolen disks during transport
  - Split up RAID and send disks separately
  - Software encryption
    - CPU based – slows down transfer rates
  - HDD built-in based shows most promise
    - e.g. Hitachi's Bulk Data Encryption
    - No performance loss
    - AES 128bit
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