



2022 Digital Storage for Media and Entertainment Report

-- Digital Storage for the Capture, Creation, Editing, Archiving and Distribution of Entertainment Content --

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Coughlin Associates



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Acknowledgements

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Executive Summary

This report is the nineteenth report on data storage and emerging applications and the seventeenth report on data storage in the entertainment and media market published by Coughlin Associates.

Data storage is a key element in the digital transformation of content creation, editing, distribution and reception. Data capacity and communication speed increases, changing form factors, lowered product prices and the growing familiarity with digital editing, digital intermediates and various forms of digital distribution are key components in the continued growth and development of entertainment.

Because of the large file sizes required for high resolution and multi-camera images there is increasing demand for high capacity storage devices as well as high performance storage. The entire content value chain of content creation, editing, archiving, distribution as well as consumer electronics content reception devices, provide an accelerating feed-

forward mechanism. This drives growth in data storage for all entertainment content applications.

For many archiving and distribution applications where content is relatively static, low cost/high capacity SATA HDD storage, optical discs and tape-based storage libraries will predominate, with some flash memory used for caching and metadata. Note also that many active archive systems may also be hard disk drive based and will often include magnetic tape and SSDs for caching. Hard disk drives as well as SSDs are also used in high performance storage applications where storage cost factors must be balanced with performance requirements.

For applications requiring rugged field use or fast playback response, flash memory either as cards or solid-state drives (SSDs) are now standard fare.

Due to input from industry groups, SMPTE, HPA, EBU (as well as media and entertainment publications and websites) survey results and discussions with industry end users and equipment providers we have continued to adjust many of our models for current storage estimates as well as future growth in 2021 and beyond. In addition, we have expanded the continued impact of solid-state storage in our projections based upon expected lower flash memory storage costs and also increased our cloud and object storage projections, which has been accelerated by the COVID-19 pandemic.

We list some key points of the report in the following list.

Key Points

- The Covid-19 pandemic in 2020-2021 had a big impact on content creation during 2020 and 2021, except for broadcast acquisition
- Spending for digital cinema in 2021 and during the next few years will be impacted by the pandemic
- Creation, Distribution & Conversion of video content creates a huge demand driver for storage device and systems manufacturers
- As image resolution increases and as stereoscopic VR video becomes more common, storage requirements explode
- The development of 4K TV and other high-resolution venues in the home and in mobile devices will drive the demand for digital content (especially enabled by high HEVC (H.265) and VVC (H.266) compression and even greater standards for compression to enable 8K and higher resolution and frame rate workflows.
- HDD areal density increases are increasing with the introduction of energy assisted HDDs starting in 2021. However, flash memory price has continued to decline. This, plus the growth in higher resolution and higher frame rate content, is causing more applications to use flash memory
- Activity to create capture and display devices for 8K X 4K content is occurring with planned implementation in common media systems in this decade
- Active archiving will drive increased use of HDD storage for “archiving” applications, supplementing tape for long term archives

- Flash memory dominates cameras and is finding wider use in post-production and content distribution systems
- From 2020 to 2026 entertainment and media digital storage TAM (without archiving and preservation) will increase by about 2.5 X from \$6.3B to \$15.9B
- The growth in storage capacities will result in a total media and entertainment storage revenue growth of about 2.1 X between 2020 and 2026 (from \$9.1B to \$19.2B)
- Overall annual storage capacity demand for non-archival applications is expected to increase over the period from 2020 to 2026 by 8.8 X from 18.7EB to 163EB
- Between 2020 and 2026 we expect about a 3.2 X increase in the required digital storage capacity used in the entertainment industry and about a 4.4 X increase in storage capacity shipped per year (from about 69EB to 304EB)
- In 2020 content distribution is estimate at 44% of total storage revenue followed by archiving and preservation at 32%, post-production at 5% (due to the impact of COVID) and content acquisition at 19%.
- In 2026 the projected revenue distribution is 37% content distribution, 23% post production, 23% content acquisition and 17% archiving and preservation.
- By 2026 we expect about 59% of archived content to be in near-line and object storage, up from 50% in 2020
- In 2020 we estimate that about 72% of the total storage media capacity shipped for all the digital entertainment content segments was in HDDs with digital tape at about 21%, about 3% optical discs and flash at about 4%
- By 2026 tape capacity shipment share has been reduced to about 12%, HDDs shipped capacity is about 76%, optical disc capacity is down to about 0.3% and flash capacity percentage is at about 11%
- Media revenue is expected to increase about 1.8 X from 2020 to 2026 (\$1.eB to \$2.3B).
- Although no longer the biggest driver of digital storage growth, the digital conversion of film, video tape and other analog formats and its long-term digital preservation is still a significant driver for archived content
- Over 141 Exabytes of new digital storage will be used for digital archiving and content conversion and preservation by 2026
- Storage in remote “clouds” is playing an important role in enabling collaborative workflows, content distribution and in archiving
- Overall cloud storage capacity for media and entertainment is expected to grow over 13.8 X between 2020 and 2026 (10.1EB to 140EB)
- Overall object storage capacity for media and entertainment is expected to grow about 5.6 X between 2020 and 2026 (17.1EB to 96.5EB)
- Cloud storage revenue will be about \$3.3B by 2026
- By our estimates, professional media and entertainment storage capacity represents about 4.9% of total shipped storage capacity in 2020.
- In 2020 professional media and entertainment consumed about 15% of all tape capacity shipments, 6% of all hard disk drive shipments and 2% of all

flash memory shipments. We estimate that media and entertainment spending was about 10% of total storage revenue in 2020.

- Digital cinema will revive after the COVID pandemic, although we believe unless it moves to more immersive experiences it will not grow like in the past
- Silver halide film is in serious decline and only used in some special projects.
- AXF and other new standards may help format obsolescence
- Several petabytes of storage can be required for a complete stereoscopic digital movie production at 4K resolution and there is increasing production work at 8K or higher
- By the next decade total video captured for a high-end digital production could be hundreds of PB, approaching 1 Exabyte
- Movement to IP based workflows will reduce total costs for content management, including storage
- Non-linear editing requires high performance storage devices. Over the forecast period lower network storage costs and higher performing low cost storage networks will result in faster growth of network storage than direct attached and local storage
- ATA HDD arrays have become the dominant storage for readily retrievable fixed content storage, but flash memory is growing for this use as costs decline (NVMe using the PCIe bus is now the dominate flash interface)
- Magnetic tape will remain as an archival media although use in other applications is in decline, particularly content capture
- Flash memory is the clear majority storage media in professional video cameras with survey results showing about 59% utilization in the 2021 survey
- The continued need to storage data for higher performance and high capacity workflows are driving strong storage growth in the projection period—assuming no great negative economic trends.

The data presented in this report is subject to change as the content storage market develops. We have additional information that we have gathered in addition to that included in this published report. We will continue to monitor and develop our models of this market as time goes on. We would be glad to work with customers on specialized presentations or reports and in general to conduct research to answer specific questions on a project or ongoing basis.