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Acknowledgements

This report is the result of extensive interviews with many people and companies from throughout the entertainment content value chain as well as in-depth analysis of historical trends and future technology drivers. Companies contacted included storage component and systems companies as well as companies that incorporate storage into their content creation applications. The list of companies contacted is extensive and the data we gathered over several months is pretty comprehensive, not all of it is included in this report. Our thinking and projections were shaped by many inputs. In particular we would like to thank the following companies and organizations for their help and information: Active Storage, Amberfin, Aspera, Atempo, ATTO, Avid Technologies, BitCentral, Cache-A, DataDirect Networks, CET, Chosun Group, Dell, Discovery Channel, Dolby, Edit Share, EFILM, ESPN, Facilis, Fox, Front Porch Video, G-Tech, Harmonic, HDS, IBM Media and Entertainment Division, Imation, IMT, Isilon/EMC, LaCie, LSI, LTO Consortium, Maximum Throughput, Mediakive, Media Technology Market Partners, NetApp, NASCAR, NBC Universal, NetApp, Panasonic, Paramount, Plastercity Digital Post, Promise Technology, Qlogic, Quantum, Rorke Data, SeaChange, Seagate Technology, SGI, Sony, SpectraLogic, Sun/Oracle, Technicolor, Turner Broadcast, Versus, Warner Bros, Xendata. We also thank all the speakers who’s presentations have influence this report from the Creative Storage Conference, SMPTE Conferences, the NAB show and the Storage Visions Conference.

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Executive Summary

This report is the tenth report on data storage and emerging applications and the eighth report on data storage and 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 increases, 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 stereoscopic images there is increasing demand for high capacity storage devices. 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 ATA storage, optical disks and tape-based storage libraries will predominate. Hard disk drives as well as enterprise SSDs are also used in high performance storage applications where storage cost factors must be combined with performance requirements.

For applications requiring rugged field use or fast playback response flash memory either as cards or solid state drives (SSDs) are becoming more popular.

Due to input form from industry groups, SMPTE survey results and discussions with industry end users and equipment providers we have adjusted some historical model data. Data back to 2010 is shown in this report to help past report clients in interpreting the new data. Some areas have gained in capacity and revenue while some have declined vs. earlier editions of this report.

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

**Key Points**

- Creation, Distribution & Conversion of video content creates a huge demand driver for storage device and systems manufacturers
- As image resolution increases and as stereoscopic video becomes more common, storage requirements explode
• The development of HD TV and other high resolution venues in the home and in mobile devices will drive the demand for digital content
• Activity to create capture and display devices for 8K X 4K content is occurring with planned implementation in common media systems by the next decade
• Active archiving will drive increased use of HDD storage for “archiving” applications, supplementing tape for long term archives
• Flash memory will find wider use in cameras and content distribution systems
• Between 2012 and 2017 we expect about a 5.6 X increase in the required digital storage capacity used in the entertainment industry and about a four-fold increase in storage capacity shipped per year (from 22,425 PB to 87,152 PB).
• Total media and entertainment storage revenue will grow more than 1.4 X between 2012 and 2017 (from $5.6 B to $7.8 B)
• The greatest storage capacity demand in 2012 was for digital conversion and preservation as well as archiving of new content (about 98%). Content distribution follows in size with acquisition and post-production using less storage.
• In 2012 we estimate that about 43% of the total storage media capacity shipped for all the digital entertainment content segments was digital tape with about 41% HDDs, 16% optical discs and flash 0.2% (mostly in digital cameras and some media distribution systems).
• By 2017 tape will be reduced to 38%, HDDs shipped capacity will be 59%, optical disc capacity will be down to about 3% and flash capacity percentage will have increased from 0.2% to 0.3%.
• Total revenue for storage media and devices will increase about 1.3 X from 2012 to 2017 ($774 M to $974 M).
• The single biggest application (by storage capacity) for digital storage in the next several years as well as one of the most challenging is the digital conversion of film, video tape and other analog formats.
• Over 84 Exabytes of digital storage will be used for digital archiving and content conversion and preservation by 2017.
• Content distribution systems will drive the growth of network and direct attached/local storage in the projection period.
• Storage in remote “clouds” is beginning to play an important role in enabling collaborative workflows.
• Digital cinema is experiencing considerable growth, driven by the popularity of 3D content.
• Silver halide film as a content distribution media will vanish before the end of the decade.
• There is a pressing need to develop policies and procedures for format conversion to combat format obsolescence.
• Several petabytes of storage may be required for a complete stereoscopic digital movie production at 4K resolution and there is some production work as high as 8K
• 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.
• ATA HDD arrays are becoming the dominant mode for readily retrievable fixed content storage.
• Magnetic tape will remain as an archival media although use in other applications is in decline, particularly content capture
• Flash memory appears to be reaching tipping point in professional video cameras with survey results showing about 37% utilization in 2012 (growing from 2009 and 2010 survey results).
• The continued need to storage for higher performance and high capacity workflows are driving strong storage growth in the projection periods—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.
2012 DIGITAL STORAGE FOR MEDIA AND ENTERTAINMENT REPORT

This updated and expanded report is the eigth annual comprehensive reference document on this topic. The report analyzes requirements and trends in worldwide data storage for entertainment content acquisition; editing; archiving and digital preservation; as well as digital cinema; broadcast; satellite; cable; network; internet and VOD distribution. Capacity and performance trends as well as media projections are made for each of the various market segments. Industry storage capacity and revenue projections include direct attached storage, cloud, real time as well as near-line network storage.

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