WELCOME TO THE 2018 Creative STORAGE™ CONFERENCE

June 7, 2018 at the DoubleTree Hotel, Culver City, California

AN ENTERTAINMENT STORAGE ALLIANCE™ EVENT
Storage Takes Off!
2018 Creative Storage℠ Conference
June 7th 2018 at the DoubleTree Hotel, Culver City, California
AN ENTERTAINMENT STORAGE ALLIANCE™ EVENT

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Storage Visions 2018

October 22-23, 2018 at The Hyatt Regency, Santa Clara, CA

Conference Theme
Thriving in the Data Apocalypse

Submit a Speaking Request:
Be a Sponsor:

Register Now to get conference and room discounts

Storage Growth!
2016
16ZB
2025
163ZB

The Storage Visions® 2018 Conference Theme:
Thriving in the Data Apocalypse!

Join Us at our NEW VENUE; The Hyatt Regency, Santa Clara, CA and Help Us Celebrate Our 17th Anniversary

JOIN CEO's, Industry Leaders, manufacturers and end users at Storage Visions 2018!

FOCUS ON:
Surviving The Data Apocalypse
Memory/Storage-Centric Computing
High Performance Applications
Storage for High Res Capture And Prod.
Flash, HDDS And Tape Slay Data Challenges
Apocalypse or Opportunity?

Big Data and Small Pipes
Long Term Storage
Clouds, AI And Data Growth
Challenges and Promise Of
Ubiquitous Data
Emerging Memory Technologies

WWW.STORAGEVISIONS.COM
AGENDA – 7:30 AM to 1:30 PM

7:30 AM Breakfast

8:00 AM Results from the 2018 Media and Entertainment Storage Survey and the 2018 Media and Entertainment Report – Tom Coughlin, Coughlin Associates

8:15 AM Session A: There’s an IP in my workflow, or was that a thunderbolt: Digital Storage for modern 8K/4K, HDR, VR Content Creation and Post Production
Moderator: Curtis Chan, Cognitive Impact
Speakers: Justin Wenck, PCI SIG
        Sumit Puri, Liqid
        Larry O’Conner, OWC
        Chris Whittington, CrossPORT Network Solutions

9:15 AM Morning Break

9:30 AM Keynote Speaker 1: David Friend, Co-Founder and CEO, Wasabi

10:00 AM Keynote Speaker 2: Jay Batista, GM, Tedial North America

10:30 AM Session B: The Real State of Virtual Reality: What does it take to be successful?
Moderator: Melissa Perenson, Journalist
Speakers: Andrew Cochrane, The AV Club
         Steven Xu, HTC Vive
         Andrew Shulkind, M. Bonnieux
Panelist: Alex Klive, 360 Designs

11:30 Session C: Accelerating Workflows and Collaborative Tools: Solid State Storage for Real Time Production
Moderator: Allan McLennan, PADEM Media Group
Speakers: Scott Miller, Dreamworks
         Diamond Lauffin, StorByte
         Saker Klippsten, Zoic Studios
         Amir Bemanian, Technicolor
         Michael Oros, SNIA
Panelist: Michael Oros, SNIA

12:30 PM Lunch - Sponsored by Wasabi
AGENDA – 1:30 to 8 PM

1:30 PM Keynote Speaker 3: Aaron Semmel, Producer, BoomBoomBooya

2:00 PM Session D: Collaboration in the Clouds: Storing and Delivering Content Where it is Needed
Moderator: Alex Grossman, Symply
Speakers:  • Andy Liebman, Editshare
         • Michelle Munson, Eluvio
3:00 PM Keynote Speaker 4: Jason Coari, Director, Scale-out Solutions, Quantum

3:30 Afternoon Break

3:45 PM Session E: Rise of the Machines: Digital Storage and Security in Media and Entertainment Workflows
Moderator: Debra Kaufman, Broadcast Beat
Speakers:  • Yoram Tal, Colorist and Online Editor
         • Jonathan Bourke, Translation LLC
         • Robert Russo, Avid
         • Jeff Stansfield, Advantage Video
Panelists: • Jonathan Halstuch, RackTop Systems
           • Brandon Oliver, Huge

4:45 PM Session F: Preserving Digital Content—the Challenges, Needs, and Options
Moderator: Larry Jordan, Digital Production Buzz
Speakers:  • Linda Tadic, Digital Bedrock
         • Andy Klein, Backblaze
         • Chris May, Spectra Logic
         • Michael Oros, SNIA
Panelists: • Denis Laconte, Iron Mountain
           • Rod Christenson, Aparavi

5:45 PM Reception - Sponsored by Quantum

8:00 PM End of Day (exhibits close)
Presentation Access!!

The Presentation Code

18CSx

Is Case Sensitive

Presentations will be posted this evening

This Code Also appears on the Conference Program Handout
Data rates and storage capacity requirements

<table>
<thead>
<tr>
<th>Format</th>
<th>Resolution (width X height)</th>
<th>Frame Rate (fps)</th>
<th>Data Rates (MB/s)</th>
<th>Storage Capacity GB/Hour</th>
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<tbody>
<tr>
<td>SDTV (NTSC, 8-bit)</td>
<td>720 X 480</td>
<td>~30</td>
<td>31</td>
<td>112</td>
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<td>HDTV (1080p, 8-bit) RGB</td>
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<td>149</td>
<td>537</td>
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<tr>
<td>UHD-1 4K (10-bit) RGB</td>
<td>3840 X 2160</td>
<td>60</td>
<td>1,866</td>
<td>6,718</td>
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<tr>
<td>UHD-2 8K (12-bit) RGB</td>
<td>5760 X 4320</td>
<td>120</td>
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<tr>
<td>Digital Cinema 2K (10-bit) YUV</td>
<td>2048 X 1080</td>
<td>24</td>
<td>199</td>
<td>717</td>
</tr>
<tr>
<td>Digital Cinema 4K (12-bit) YUV</td>
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<td>48</td>
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<td>6,860</td>
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<tr>
<td>Digital Cinema 8K (16-bit) YUV</td>
<td>8192 X 4320</td>
<td>120</td>
<td>25,480</td>
<td>91,729</td>
</tr>
</tbody>
</table>

8K Ultra-HD may use more than 170X capacity of HD!

Talk of 16K content, especially for VR/AR projects

2017 Digital Storage in Media and Entertainment Report, Coughlin Associates
8K, 360° Video and AR/VR Will Drive Content Growth
Exabyte Video Projects Coming?

- Video at 16,000 X 8,000 pixel resolution, 24 bits/pixel, 300 fps raw video content could require 115 GB/s data rates and 414 TB/hour. If 4 cameras were used to create data for a 360 degree presentation, the raw data would be 1.66 PB for an hour of content.

- Within 10 years we could have pro-video projects generating close to an exabyte of data.
The 2018 Annual Survey on Digital Storage in Media and Entertainment

- 9th survey since 2009
- Participants from all different continents and industry segments
- Covers digital storage and content creation/capture, post production, content distribution and archiving and preservation
- Covers Flash Memory, Hard Disk Drives, Optical Discs and Magnetic Tape
- White paper on top level results available
- Full survey used to help with update for the 2018 Digital Storage in Media and Entertainment Report
- Thanks to those of you here who have participated.
Percentage of various recording media in professional video cameras

<table>
<thead>
<tr>
<th>Year</th>
<th>Magnetic Tape</th>
<th>HDD</th>
<th>Optical</th>
<th>Flash Memory</th>
<th>Film</th>
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<tbody>
<tr>
<td>2009</td>
<td>34%</td>
<td>23%</td>
<td>9%</td>
<td>19%</td>
<td>15%</td>
</tr>
<tr>
<td>2010</td>
<td>25%</td>
<td>22%</td>
<td>17%</td>
<td>28%</td>
<td>8%</td>
</tr>
<tr>
<td>2012</td>
<td>20%</td>
<td>22%</td>
<td>12%</td>
<td>44%</td>
<td>2%</td>
</tr>
<tr>
<td>2013</td>
<td>15%</td>
<td>18%</td>
<td>7%</td>
<td>59%</td>
<td>1%</td>
</tr>
<tr>
<td>2014</td>
<td>7%</td>
<td>24%</td>
<td>10%</td>
<td>57%</td>
<td>2%</td>
</tr>
<tr>
<td>2015</td>
<td>4%</td>
<td>21%</td>
<td>8%</td>
<td>66%</td>
<td>1%</td>
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<tr>
<td>2016</td>
<td>2%</td>
<td>34%</td>
<td>8%</td>
<td>54%</td>
<td>2%</td>
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<tr>
<td>2017</td>
<td>5%</td>
<td>33%</td>
<td>3%</td>
<td>59%</td>
<td>0.16%</td>
</tr>
<tr>
<td>2018</td>
<td>2%</td>
<td>35%</td>
<td>2%</td>
<td>56%</td>
<td>5%</td>
</tr>
</tbody>
</table>
Percentage of Digital Long-Term Archives on Various Media

- HDD dominant at 54% (68% if all network and cloud storage is also tape)
- Tape still significant at 25% (same as in 2017)
- Smaller organizations don’t use tape as much (this was 40+% from 2013 through 2016)
• In 2018, 47.5% of responding participants said they used cloud-based storage for editing and post production
• In 2018, 55.6% of the respondents said that they had 1 TB or more storage capacity in the cloud
The Cloud in Media and Entertainment

- 77% said that they did proxy distribution through the Internet
- 6% said that they archived on a private or public cloud in 2018
- 65.7% said they would use a private or public cloud for archiving in 2018
Flash Revenue Share in Media & Entertainment

Revenue by Media Type

2017
- Tape: 3%
- Flash: 22%
- HDD: 75%

2022
- Tape: 1%
- Flash: 22%
- HDD: 77%

2017 Digital Storage in Media and Entertainment Report, Coughlin Associates
Where Will This Flash Be Used?

- Flash memory used in professional video camera media was 56% for survey participants using it in 2018.
- There is increasing flash used in post production and this is expected to grow.
- For CDN content delivery about 48% used flash memory on their edge servers and 39% on central delivery servers in 2018.

2017 Digital Storage in Media and Entertainment Report, Coughlin Associates

2018 Creative Storage Conference
Media and Entertainment Storage Trends

• Media applications for storage in the cloud will be a significant driver in overall cloud storage—projected to increase over 15-fold between 2017 and 2022.

• Cloud storage (public and private) will play an increasingly important role in all aspects of professional media and entertainment.

• Flash memory use will grow as price declines and bandwidth demands increase

• HDDs, optical discs and tape will serve as bulk storage

• AI will play an increasing role in accessing and managing content
This updated and expanded report is the fourteenth 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 OTT 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 (including object storage), real-time as well as near-line network storage.

ORDER FORM FOR THE 2018 DIGITAL STORAGE FOR MEDIA AND ENTERTAINMENT REPORT (PDF)

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Email: info@tencoughlin.com
References

• **2018 Survey of Digital Storage for Media and Entertainment Professionals**