



Production Assets: Data Management

CONTEXT

Ensuring redundancy of original camera files (OCF) and original production audio files (OPA) is vital to protect against data loss, which can cause significant financial and creative setbacks.

There are various methods to back up and verify production assets; below are GEM's minimum requirements followed by recommended best practices.

MINIMUM REQUIREMENTS

- All original camera and audio files must be securely stored, reliably accessible, and safely maintained throughout Production and Post-Production.
 - Implement established data management strategies such as the industry-standard 3-2-1 backup rule.
 - Each production is responsible for maintaining solid data management until final delivery to GEM. For questions about media management, consult your GEM contact.
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ACCEPTABLE ARCHIVAL FORMATS FOR GEM

- GEM Cloud Storage via [Content Hub Footage Ingest]
 - LTO Tapes
 - (Generations 6, 7, 8, 9 with LTFS format)
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CHECKSUM VERIFICATION

- Every copy of OCF and OPA should include checksum verification using xxHash64be, xxHash128, or MD5 hash types.

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- Checksum validation is often part of professional offload software.
 - Generate a unique machine-readable checksum manifest with each transfer, accompanied by original files. GEM recommends the
 - ASC MHL
 - format.
 - When uploading to GEM Cloud Storage, follow checksum requirements described in the [Content Hub Footage Ingest guidance].
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3-2-1 BACKUP STRATEGY

- Keep at least three copies of all OCF and OPA.
 - Store backups on at least two different types of media, e.g.:
 - Camera/sound cards
 - NVMe drives (avoid ExFAT formatting)
 - RAID arrays (5, 6, or 10; RAID 0 only for temporary usage)
 - LTO generations 6-9 in LTF5 format
 - Cloud file storage
 - Keep one backup in a geographically separate location.
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CONTENT HUB FOOTAGE INGEST

- GEM's Footage Ingest service is a tool to simplify and accelerate data management delivery but is not itself a backup strategy.
 - Completion of verified OCF/OPA backup to GEM Cloud Storage via Footage Ingest satisfies the 3-2-1 backup criterion.
 - Uploaded files undergo verification within GEM's Data Center Storage and Cloud Storage for full integrity assurance.
 - Notifications via email and Content Hub dashboard keep production informed throughout validation.
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BEST PRACTICES

Checksum Management and Chain of Custody

- Validate subsequent copies against the original checksum manifest to maintain data integrity and chain of custody.
- GEM recommends using the [ASC MHL] checksum manifest standard.

Repurposing Camera Cards

- Assign responsibility for final card deletion and reuse, ideally to Editorial or Dailies Lab staff.
- Confirm OCF and OPA backups comply with 3-2-1 and perform thorough visual verification against reports before clearing media.
- Maintain sufficient camera cards to cover at least two days of shooting while discussing needs with all stakeholders.

Repurposing Temporary On-Set Storage

- Clear temporary storage only after ensuring data resides on at least three checksum-verified media, including archival delivery formats.
- Complete visual checks against relevant logs prior to reuse.

Visual Inspection and Quality Control

- Perform visual spot checks during offload by scrubbing footage for anomalies.
- Conduct comprehensive full quality control (QC) in controlled environments at 4K minimum resolution to detect artifacts, including dead pixels and moiré patterns.
- Use professionally calibrated monitors consistent with the project's [color management plan].
- Full QC must be conducted from checksum-verified safety copies, not directly off camera cards.

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Editorial Sign-Off

- Editorial is best positioned to identify inconsistencies by cross-referencing reports, proxies, and metadata across departments.
- Their sign-off validates the receipt and quality of all captured material.

Offload Bandwidth and Performance

- Ensure all devices in the data management chain meet or exceed the speed of the source media to avoid bottlenecks.
- Consider write and verify speeds of LTO media and the upload bandwidth for GEM Cloud Storage.

This summary frames GEM's data management expectations and recommendations clearly for robust and reliable media backup workflows.