Contents

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Introduction

The purpose of this document is to describe the “Best Practices” in integrating any third party system with SGL’s FlashNet Media Archive Content Management solution. This document will provide an overview of which core functions are available in the FlashNet API’s and how they may be used to extend the typical media workflow to include an Archive Content Management solution.

FlashNet has the ability to present many different forms of physical storage to outside systems via its XML or library based API’s. As well as acting as a buffer to changes in storage technology these API’s simplify the process of managing content through different ‘layers’ of storage. For example content can be moved or copied to the archive and held on disk storage for a certain period of time. This enables more valuable space on on-line storage to be used more effectively. After a certain period of time the archive disk storage may start to fill up and it may be desirable to migrate content into more efficient and longer term forms of storage like data tape. In this case the FlashNet Storage Manager service will copy and/or move content deeper into the archive. Even though the original content has moved it is still available to any third party system via the same means that it was placed in the archive in the first place.

As the usage needs of the archive increase it may be necessary to add more tape drives, disk storage or even additional libraries. This can all be done without affecting the API mechanism used to gain access to content. In parallel to this it is possible to add and change the controlling systems for the archive, production and play-out for example. In this case the FlashNet API provides the facility for the controlling system to identify itself via the use of a product ID.

Function Overview – XML api

Connection – The FlashNet XML API is by far the most popular and offers a light weight easy to deploy mechanism to gain access to the full range of API calls. Connection to the FlashNet cluster is achieved by opening a TCP socket connection to one of the cluster nodes. The required port number is defined in the services file on each cluster node and can therefore be set to any value.

Archive – The calling application MUST pass the UID, source path, file size and group at a minimum in order to archive media. It is recommended to supply a user-friendly display name for the job. It is important to note that the group that the UID belongs to may change as a result of content management rules in the Archive system itself. This must be accounted for in the design of the “grouping” structure of the client facing tools. For example, the clips may be archived to a group called PROMO_DSK%. PROMO_DSK is a disk volume and rules in the FlashNet system move content from PROMO disk to PROMO_L5 after 30 days. The clips are then deleted from the group PROMO_DSK. In the context of archiving, ‘Group’ defines the entry point to the archive and not necessarily its final destination. It is also recommended that the archive include the priority of the request. Optionally, a single block of user-defined metadata may be passed to the archive system to be stored along with the clip. An archive request aka asset may contain multiple related or even unrelated files.

Product ID – In order for FlashNet to have an informed perspective of which external systems ‘own’ which content, this parameter should be set. Many archive users require the ability to filter content stored by which system put the content there. The typical example of this is the increasing use of a single archive shared between a production system and transmission play-out automation system. In this case the production system would have a different Product ID to that of the play-out system. These ID's do not have to be globally unique, just unique between controlling systems per site.

Restore – The calling application is only required to pass the desired UID to the restore request. It is recommended to supply a user-friendly display name for the job. This will effect a restore back to the original path of the archived file. Typically, however, a new destination path is supplied. Optionally, a partial restore request may be made by specifying the start and end frame offsets for certain file types.

Status – Each Archive or Restore operation gets a Request ID assigned to it when submitted via the API. The status of this request ID, i.e. the bytes transferred and the exit status may be obtained and presented to the user by the calling application.

SearchArchive – The calling application may issue this command to check that an asset exists in the archive. This is often used to check if a UID exists in the archive before allowing it to be re-archived. This may also be called as a maintenance task to update the client facing database. This list can grow too many millions of UIDs over time so it is not recommended that this method be used to build the list of available archives. This method may also be called before a restore request is issued to make sure that the media for the request is actually online and is not on media that has been externalized from the changer.

Delete – The calling application may issue this command to delete a UID in the archive. This marks the UID for deletion in the FlashNet database. The file is not immediately deleted and may exist on tape for many months depending on the settings for "Tape Defrag" in the FlashNet software. Deletes from disk usually happen within a few hours.

Best Practices

For performance reasons it is recommended to keep the number of jobs submitted to the FlashNet queue to be less than 100 at any one time. When more than 100 jobs are submitted it is recommended that the additional jobs are maintained in a queue by the Integrator's automation controller.
The most efficient way to manage archiving to tape is to submit the clips in group order wherever practical. 'Round Robin' groups can be employed to increase the number of concurrent transfers for a specific Disk Volume.

Ideally, the total number of tape groups should match, or be less than, the number of tape drives

Job priority should be defined as a value from 1 (highest) to 100 (lowest) so that restores have a higher priority than backups. A setting of 40 for restores and 50 for backups is a good starting point.

Assets added to the queue should have the Display Name set with a user-friendly name for the job, such as the appropriate clip name, to enable correlation between the automation controller and FlashNet process log.

Jobs submitted should have the Product ID set to identify the Automation Vendor

Tape Groups

Tape Groups, are often, and probably should be, different than the groups in the client facing tools. For example in the MAM it may be desirable to group media files by categories such as News, Sports and Weather. If there is no difference in the archive media policy, they may all be archived to one group TAPE_L5. Tape groups should be thought of more in terms of a physical partition on disk storage, not the organization structure of media files within the MAM. The number of groups should also be the minimum that satisfy the differing requirements of the workflow. If consecutive jobs being archived are to different groups then this will initiate frequent tape exchanges which are unproductive and slow down the throughput into the archive.

Example Archived media is retained indefinitely vs. Archived media that will be deleted after 30 days. If it is possible to identify and separate the media, than it can be more efficient to keep the 30 day media in a separate group as this aids the tape Lifecycle Defrag efficiency.

If media has the same retention criteria then there is little to be gained by organizing it into different groups. An exception to this may be if specific groups (say a Series) of media are required to be removed from the archive for off-shelf storage. The value of that should be carefully considered (due to its possible effects on archiving efficiency) and if utilized it is certainly worth considering archiving the series sequentially, especially if archiving directly to tape.

Archiving to Tape Groups from Automation

The principle here is to put enough jobs into the queue such that we do not needlessly unload tapes if the next material is to be archived to the same Group.

Order of material submitted for archiving to Tape Groups

In order to minimize the number of tape exchanges that are required when archiving to different tape groups (and if operational requirements allow) it is recommended to sort the archive list according to its destination tape group.

Archiving to Disk Volumes from Automation

Here the requirements for submitting clips grouped by media are not so stringent in terms of grouping the media. FlashNet Lifecycle rules will later group the material to be written to tape according to its tape group.

Paths to media files

There are two different types of paths to media that are commonly used by FlashNet.

- UNC paths \\server\share\clip.mxf these are resolved by Windows on the FlashNet server.

The user rights are assigned to the service that FlashNet is running as and as such the storage must allow that user to log in without a username/password dialog.

NFS ***style*** paths server:/path/clip.mxf these are resolved internally by FlashNet by looking at our comms method table. If the host name matches the matching comms method is used to connect to the destination device i.e. Omneon, Nexio, K2, or even Generic FTP.

Sample MAM workflow

Groups

- MAM requests list of groups (ListGroup)
- MAM displays list of groups to user but allows user to edit selection eg changing Mam_DSK1 to Mam_DSK%

Archive

- MAM initiates a search archive command to make sure UID is not already in use
- If the UID is in use in FlashNet, the MAM gives the user an option to overwrite
- If the user selected overwrite, MAM sends a delete to FlashNet beforehand
- MAM sends archive request to FlashNet
- MAM may get Job status on the returned RID
- Final status of 11 = Passed, or 18 = Warning are to be considered in archive, everything else is a FAILED job.
- MAM may initiate search archive at the end of the job to obtain:
  - The initial location of the archive media (Tape Name and Archive Number) keep in mind this may change due to HSM policies
  - The FlashNet process(ing) log of the request which shows the detail of the archive job

Note: Please protect against the user sending trivial jobs to FlashNet. Allow the user to multi select trivial assets and send those in one archive request. Archive jobs (requests) less than 5-15 Gigabytes will result in tape thrashing.

Restore

- **MAM initiates search archive to see if the asset is online**
- **From the returned XML, If any copy of the asset is online, then the job will pass and may be submitted**
- **If all the copies of the asset are offline, then present the user with the list of locations so that media may be returned to the library.**
- **IGNORE assets whose status is DELETED, this is like the asset is in the Trash. It may be undeleted by SGL support modifying the FlashNet database.**
- **MAM may get the job status on the returned RID**
- **Final status of 11 = Passed, or 18 = Warning are to be considered in archive, everything else is a FAILED job.**
- **It is not useful to store the Process log of the restore request other than to show a possible failure point in the job, the restore log should never overwrite the archive process log.**

Notification – Synchronization

- **It is not recommended to use Search Archive to rebuild the entire catalogue of the archive periodically (or at start up). It is realistic to expect that tens of millions of assets may accumulate in FlashNet over time. Some method of synchronization is desirable but its implementation must be carefully considered.**
- **The FlashNet notification service can be "subscribed" to in order to get notification that something has happened in the archive. E.g. Tape Exported, Asset duplicated. There will be separate documentation for this in the future**

Definitions

Queue

The FlashNet process and database table that keeps track of all jobs submitted to the archive.

Round Robin

This can be thought of as a "Group of disk volumes". It is used to enable API clients to perform more than one transfer concurrently to a disk volume. All members of the Round Robin group must be able to be matched by specifying a wildcard at the API. Example NEWS_DSK% (= Disk volumes NEWS_DSK1, NEWS_DSK2 etc.)

Round Robin only applies to SPANNING tape groups, Almost all new installations are LTFS groups which are NON SPANNING.

Tape Group

A logical organization of tapes.

Volume

Either a tape or a disk volume used for writing data, a volume can only be written to by one archive job at a time. (At the API the use of 'group', 'tape' or 'disk volume' is interchangeable; FlashNet will resolve the argument to the most suitable, physical volume.)

Current volume

In a SPANNING tape group, the tape that has been assigned for data written to that group. There can only be one current volume in a group at any given time. A disk group cannot be referenced by name, so this concept has no meaning to the user; FlashNet will choose which logical 'disk' to use. SPANNING tape groups are becoming a legacy configuration.

Tape Exchange

A function of the tape library to unload/load a tape volume to get ready to write. It can take up to 4 minutes for some library's to get ready to write data. If the request for example is to archive a single 6 gig file per tape exchange the job will have spent ½ of its runtime doing a tape exchange rather than IO.