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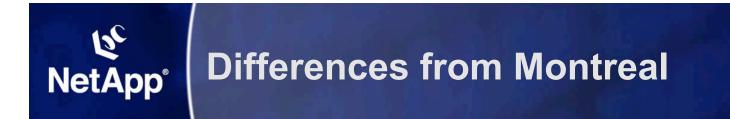
### NFSv4 Interim WG Meeting Data Retention 2006-09

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For Alan Yoder and David Black



- New regulations regarding rules for retaining data for years beyond point of creation or last change
- Harder to comply with regulations without technology to provide "mistake proofing"
- Several Data Retention products out there today:
  - EMC Centera
  - NetApp SnapLock
- Products effectively implement Write Once, Read Many semantics over read/write magnetic disks



- Alan Yoder and David Black have made a formal proposal based on related work and discussion in SNIASNIA
  - draft-yoder-nfsv4-retention-00.txt
- Appears to model the SNIA Data Retention APIs
- Impact on NFSv4.1 (next slide)

## NetApp<sup>\*</sup> Impact on NFSv4.1

- 7 new attributes
  - rtime duration of retention
  - rbtime when retention starts
    - rbtime + rtime is when the file "expires"
  - etime like rtime for "event based" retention
  - ebtime when event based retention starts
  - retention\_flags
    - RET4\_SIMPLE\_RETENTION\_ENABLED
    - RET4\_EVENT\_RETENTION\_ENABLED
    - RET4\_SIMPLE\_RETENTION\_INFINITE
    - RET4\_EVENT\_RETENTION\_INFINITE
  - admin\_hold\_flags indicates an injunction is in effect that override expiration of a file
  - srvr\_ret\_capabilities\_flags
    - RET4\_SIMPLE\_RETENTION
    - RET4\_EVENT\_RETENTION
    - RET4\_SIMPLE\_RETENTION\_INFINITE
    - RET4\_EVENT\_RETENTION\_INFINITE
    - RET4\_ADMIN\_HOLD
- New ACL permission: ACE4\_WRITE\_RETENTION
  - Provides permission to set and change any of the first 6 attributes
- Recent discussion within SNIA is that the permissions for enabling retention and setting retention duration ought to be different than the permissions for setting holds



- References to XAM, which is not yet publicly available
  - WG chairs in both SNIA (David Black) and IETF (Spencer Shepler) agree that IETF NFSv4 RFC must be independent of SNIA XAM spec.

### Retention needs better definition

- e.g. does it include file contents and name, what about named attributes?
  - SNIA defines retention on an XSET which contains data plus "fixed" properties. It is permissible to define an XSET plus some named attributes.
  - SNIA leaves file name lock down as a TBD, as to be defined by the NFSv4.1 protocol
    - XAM uses UUIDs not filenames, and no one is proposing adding UUIDs as alternate namespace for NFS (right?)
- Are these enforced on the client or server side?
  - The server is expected to retain the file independent of what a potentially-clueless client tries to do



 I-D mandates that the defaults for rbtime and ebtime be zero. Begin times of January 1, 1970 look weird. I-D also mandates that begin time be set to the current time of day when the retention is enabled.

```
Simple and event based retention could get the attributes via:
struct retention_attr_get4 {
uint64_t rag_duration;
nfstime4 rag_begin_time<1>; /* if zero length, begin time not enabled
*/
};
and set via:
struct retention_attr_set4 {
bool ras_enable;
uint64_t ras_duration<1>; /* if zero length, not changing duration */
};
```

This way, it's the client's API problem to report a begin time when retention not yet enabled.

## NetApp<sup>®</sup> Eisler's Critique and Suggestions (continued)

#### I-D notes:

#### > The needs of the API are different from the needs of the protocol.

- The protocol needs to be simple.
- Fewer attributes, and fewer linkages between attributes is less error prone
- As has been discussed, the NFSv4.1 WG doesn't get to see the APIs until SNIA sees fit to release them, so API can't be a prime concern for the WG
- - The API on the client can map this how it sees fit (e.g. map the magic constant to the APIs \_INFINITE flag)
  - retention\_flags can now be deleted

# Eisler's Critique and Suggestions (continued)

srvr\_ret\_capabilities\_flags is replicating the function of supp\_attr

– So drop srvr\_ret\_capabilities\_flags

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- Summary of retention after proposed changes to the I-D
  - Two "get only" attributes for retention times
  - Two "set only" attributes for retention times
  - One admin\_hold\_flags attribute
  - Effectively reduces 7 attributes to 3
  - One (or two) permission bits in an ACE