Storage Service Classes that can be provided

Production file storage

File Properties

- "large" i.e. enough for efficient tape transfer

- Redundancy at the disk layer is assumed

- It is also assumed that no data is removed from tape without the agreement of the experiments. Note that any deletion of data from a storage class must be accompanied by the removal of the relevant catalogue entry.

Service Classes

1. Multiple "tape" copies, guaranteed different media
   - Not particularly of interest to LHC
2. Multiple tape copies
   - Not particularly of interest to LHC experiments given copies at multiple sites.
3. Single tape copy, user managed cache [user is charged for tape]
   - Possible interest, but certainly not critical for SC4. *[Editors note: corresponds to LHCb requirement for rDST at the site of generation?]*
4. **Single tape copy, system managed cache**
   - **Required for SC4; basic storage as provided by Castor and dCache today.**
   - **The user knows that there is always a tape copy of the file and is charged for the tape storage used.**
   - **The cache can be « pool size**
   - **For SC4, use SRM "permanent" for this storage class?**

5. No tape copy as standard, but data deleted from cache by system written to tape
   - This is a low performance implementation of 6: access performance is lower for old files
   - User does cannot assume there is a tape copy so no charge to user for tape space used
   - Unlike 4, the cache size is a large percentage of the advertised pool size
   - Acceptable to experiments if sites can't achieve 6
     i. If they can't, why not delete file and copy in from remote site?
        1. Site is then not independent of others
        2. bad for users as Grid job should have gone to site which does have the data, c.f. point about catalogue entry being removed if a file is deleted from a pool.

6. **No tape copy, user managed cache**
   - **Storage system with no hierarchy.**
   - **Access performance constant for all files [required SC4]**
   - **For SC4, use SRM "durable"?**

7. No tape copy, data deleted by system from cache disappears.
   - This is scratch space.
   - Problem: if data deleted, file catalog entry must be deleted as well

User file storage

File Properties

- "small", on disk, but need to be secure; tape transfer probably inefficient

- (No staging. "lost files" recovered by system transparently

- Not imperative on initial SC4 timescale; use "home directories"

- problem is recording these files in catalog.

Service Classes

a) Ultra high reliability disk storage
b) "Tape" copy independent of file life on disk
c) Classical backup ("tape" copy deleted n months after file)
d) Disk only, redundancy
e) Disk only, no redundancy

Options to distinguish between service classes

i. Multiple endpoints

- [deprecated by sites] (but two for SC4 OK as pragmatic solution)

ii. Distinction made in namespace [/system/<storage_type>/</expt>]

iii. Mapping achieved within SRM; implementation by system hidden to users

Files required in two storage classes must be sent to sites twice, once with each attribute.