



# Reducing Storage Management Costs via Informed User-Based Policies

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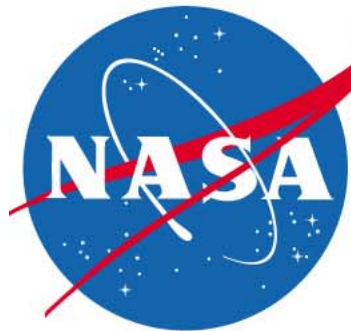
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# Motivation

- Storage sizes are increasing
- Storage hardware costs are decreasing
- TCOs 5–10 times hardware costs
  - ◆ Administration costs
  - ◆ Backup costs
- Our solution: **reduce** the rate of consumption of storage

# Realizing Space Savings

- Reclaim space from 3 classes of files
  - ◆ Infrequently accessed files
    - Compress (lossless)
  - ◆ Infrequently accessed multimedia files
    - Re-encode at lower quality or resolution
  - ◆ Regenerable files
    - Remove (e.g., produce PS from PDF)

# Motivational Studies

- Conducted a study of 4 different sites to determine savings possible
- Simulations using SEER and Roselli traces
- **Conclusions**
  - ◆ Space growth rates can be reduced by 52%
  - ◆ Increase disk lifetimes from 11 to 19 months

# Elastic Quota System

- Users have two kinds of quotas:
  - ◆ Elastic and persistent
- Persistent quota is normal quota
- Elastic quota is unlimited
- Users can mark files elastic explicitly or through rich policies
- The system does not guarantee elastic files' persistence
  - ◆ Space reclamation thread

# Reclamation Policies

- **Type:** Kind of policy
  - Global, User, User-Policy
- **Method:** How space should be reclaimed
  - gzip, rm, re-encode, tar, mv
- **Sort:** Order of files being reclaimed
  - size, mtime, ctime, atime
- **Filter:** Optional list of file extension to apply the policy to

# Status

- Implemented and evaluated on Linux
- Small overheads compared to ext3

Check us out at the poster session

# Elastic Quotas

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