Online Archive (OnA)
An Update

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Online Archiving System
Storage

- 10 Racks.
- 340 Linux machines.
- Total storage space: 350 TB
- Consumed space: 140 TB
- Free space: 210 TB
- 120 GB added daily.
## Spectrum

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
<th>Size (GB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audios</td>
<td>865</td>
<td>7</td>
</tr>
<tr>
<td>Images</td>
<td>1,221,269</td>
<td>8,071</td>
</tr>
<tr>
<td>Videos</td>
<td>153,958</td>
<td>58,241</td>
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<tr>
<td>Books</td>
<td>225,956</td>
<td>42,995</td>
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<td>Archives</td>
<td>257,764</td>
<td>8,905</td>
</tr>
<tr>
<td>Other</td>
<td>1,948,325</td>
<td>14,834</td>
</tr>
</tbody>
</table>
General Overview

- Data Nodes (Transformation Service)
  - Replicate to Mirror Nodes
  - Replicate to Mirror Nodes

- Clients (Client SDK)
  - Upload/Download
  - Metadata, Physical Location

- DB
Update - Transformation Service

- Forcing a certain archiving policy for uploaded data.
- Policy aims at storage optimization.
- Ex: JPF images instead of uncompressed TIFFs
- Policy defined on the server.
Update - Transformation Service

- User opens the OnA_Explorer to upload files
- OnA_Explorer contacts the policy server
- Policy server recommends transformations
- Files sent to server for processing
- Transformed returned to the Explorer
- Explorer uploads to the OnA
- Transformation can be over ridden if we need to archive particular files
Update - Transformation Service

- Client
  - Data to be transformed
  - Transformation Rules
  - Transformed data
  - Entire set of data

- Transformation server

- Online Archive system
Update - Data mirroring

• Pipeline scheme
• Mirroring starts after the first chunk of the file is received
• Make use of the network full duplicity (in and out)
• Eliminating data transient state (No Pooling)
• Removing bottle necks decreasing system internal load
• Minimizing queues
Update – Data Mirroring

Client → Mirror 1 → Mirror 2 → Mirror 3

Time line

Packet(n-2) → Packet(n-1) → Packet(n) → Packet(n) → Packet(n-2)

Ack → Ack → Ack

U/L → D/L → U/L → D/L → D/L
Future Work

• Easier access to repositories: Map a drive. Read then WORM
• Indexing and searching the metadata
• Adding multi-tiered storage capabilities and rules based storage; e.g. moving the least accessed data to a secondary storage media.
Future Work

- Decentralized solution to enhance scalability
- Experiment with different job mixes and distributions based on usage statistics.
- Experiment with large capacity nodes similar to the Backblaze storage pod solution. (http://blog.backblaze.com)
Economic Storage Solution for Dark Archives

- Backblaze storage pod
- Suitable for archiving and backup
- 4U height
- 45 SATA drives + 1 system drive
- SATA cards and SATA multiplier backplanes
- July 2011: a 135-terabyte, 4U server for $7,384
Economic Storage Solution for Dark Archives

BACKBLAZE STORAGE POD
MAJOR COMPONENTS LIST

- 45 HARD DRIVES - $5400
- 2 POWER SUPPLIES - $540
- 4 SATA CARDS - $175
- MOTHERBOARD & PROCESSOR - $365
- 4 GB RAM - $50
- CUSTOM BUILT CASE - $758
  - 6 FANS
  - 1 BOOT DRIVE
  - 9 MULTIPLIER BACKPLANES
Economic Storage Solution for Dark Archives

SATA WIRING DIAGRAM

ONE LOCKING 90-DEGREE SATA CONNECTOR ON THE BOTTOM OF EACH PORT MULTIPLIER BACKPLANE
Thank You