SSD and Deduplication – The End of Disk?

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Abstract

SSD and Deduplication – The End of Spinning Disk?

Solid State Disks (SSD) have become a “must have” storage technology, however rapid adoption is hampered by higher costs and longevity concerns. Data deduplication closes the gap, where savings rates of up to 5-35x dramatically reduces SSD effective cost. Deduplication also reduces writes, greatly enhancing SSD reliability.
Why SSD?

One Reason:

NO SEEK LATENCY

Storage virtualization, and subsequently server virtualization, have created fundamental storage challenges by greatly increasing the density and access randomness of storage I/O.
Where does SSD/Flash sit?

**Location**
- Local storage
- Intermediate appliance
- Networked storage

**Usage**
- Primary
- Tier
- Cache
Why Not SSD?

- **Price**
  - Flash storage remains substantially more costly than equivalent capacities of bulk storage

- **Reliability**
  - Flash must be powered on and “scrubbed” to maintain published error rates

- **Longevity**
  - Flash write cycles are limited, and common data patterns can result in exponentially faster wear
Dedupe Benefits for SSD

- **Increase performance**
  - Lower cost per IOP
  - Increase effective cache size
  - Reduce average read latency

- **Increase longevity**
  - Reduce wear on flash cells
  - More empty capacity for space reclamation

- **Increase efficiency**
  - Lower cost per GB
SSD-Specific Dedupe Advantage

- Deduplication requires some form of fingerprinting

- Fingerprint for disk storage
  - Must be statistically unique, collision resistant
  - SHA-256 is your best bet
  - Computationally intensive

- Fingerprint for flash storage
  - Must be statistically unique, but collisions possible
  - MurmurHash3, others work
  - Faster to compute – matching Flash performance

<table>
<thead>
<tr>
<th>Fingerprint Performance</th>
<th>SHA-256</th>
<th>MurmurHash3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>180 MB/s/core</td>
<td>3 GB/s/core</td>
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</table>
Will SSD Replace Disk?

High IOPS: It already has!
- Databases
- Large virtual environments

Low IOPS: Not anytime soon…
- Archive
- Video back-catalog

Dedupe expands use cases
- Reduced wear delivers lifetime reduced cost
- Reduced cost expands OLAP, VDI use cases
Hands-On Lab:
Solid State Storage in the Enterprise

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Send any questions or comments on this presentation to SNIA: tracktutorials@snia.org