Disk Tiering Solutions from IBM, EMC, and HDS

Ros Schulman – Hitachi Data Systems
Session 17144
March 3, 2015 3:15-4:15pm
Sheraton
Hitachi Dynamic Tiering
Automated Optimized Tiered Storage Management

Before: Tiered storage and provisioning
- Labor intensive
- Data classification before tiering
- Complicated management of multiple storage tiers

Now: Dynamic tiering and provisioning
- Controller-based automation
- Single, self-managed, self-healing, efficient pool of data
- All the benefits of tiered storage
- All the benefits of dynamic provisioning
- No need for data classification

- Simplifies operations and data management
- Reduces opex, capex, and TCO
- Data Moves in 38MB Pages
- Datasets can span multiple Tiers
Hitachi Dynamic Tiering (HDT) Supports Virtualized Storage

- With HDT, the VSP virtualized storage controller and HUS VM virtualized storage controller support automated tiered storage management and performance acceleration for multiple tiers of heterogeneous external storage
  - As a diskless storage virtualization controller
  - Optimizes flash tier value
  - Leverages the breadth of offerings on the VSP/HUS VM

- Extends efficiency benefits of Dynamic Tiering to 3rd party storage
HDT support for external tiers

- For heterogeneous storage virtualization, VSP and HUS VM virtualized storage controllers support automated tiered storage management and performance optimization for multiple tiers of attached external storage.

- HDT supports up to 3 tiers of external storage:
  - External storage can be designated into 3 ranks (high, middle, low).

- External storage is always classified as lower tiers than internal storage.

<table>
<thead>
<tr>
<th>MEDIA TIER GROUPINGS SUPPORTED BY VSP</th>
<th>ORDER OF TIERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSD</td>
<td>1</td>
</tr>
<tr>
<td>SAS 15K RPM</td>
<td>2</td>
</tr>
<tr>
<td>SAS 10K RPM</td>
<td>3</td>
</tr>
<tr>
<td>SAS 7.2K RPM</td>
<td>4</td>
</tr>
<tr>
<td>SATA</td>
<td>5</td>
</tr>
<tr>
<td>External #1</td>
<td>6</td>
</tr>
<tr>
<td>External #2</td>
<td>7</td>
</tr>
<tr>
<td>External #3</td>
<td>8</td>
</tr>
</tbody>
</table>

- Tier 1: External VOL (High)
- Tier 2: External VOL (Middle)
- Tier 3: External VOL (Low)

- Config. with external VOL only
- Config. with internal VOL and external VOL

- HDT supports up to 3 tiers of external storage:
  - External storage can be designated into 3 ranks (high, middle, low).

- External storage is always classified as lower tiers than internal storage.
HDT Cycle How Tiering Learns your workload

- Cycle time set at the HDP pool level
- Manual mode
  - User can start and stop performance monitoring using any interval up to 7 days
  - Scripting can set complex schedules to custom fit to priority work periods
- Automatic mode
  - Customer defines strategy; it is then executed automatically
  - Continuous monitoring followed by relocation cycles
  - Monitor interval from 30 minutes to 1, 2, 4, 8 or 24 hours (default)

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HDT Control How Tiering Learns your workload

- Monitoring modes set at HDP/HDT pool level
- Period mode
  - The value used in the calculation cycle is the actual I/O load on DP volume page from previous monitoring cycle
- Continuous mode
  - The value used in the calculation cycle is the weighted average of multiple previous monitoring cycles for DP volume page
  - Reduces page trashing
  - May slow migration to upper tiers

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32 Custom tiering policies

- Custom tier policy helps achieve SLAs by minimizing performance impact and maximizing utilization when multiple applications are sharing a pool
  - Group volumes from different pools into a group and apply a custom policy
  - Up to 32 policies can be created per system
  - Based on percent of allocated capacity rates
  - Tier 1 maximum and tier 1 minimum
  - Tier 3 maximum and tier 3 minimum

Hitachi Dynamic Tiering logic improvement helps maximize performance

- Data page relocation improvement
- Page migration calculations

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Custom Tiering Policy support

Helps achieve SLAs by minimizing performance impacts and maximizing utilization when multiple applications share a dynamic tiering pool.

Pool

Tier1 Tier2 Tier3

Used

Custom1

Assign at least 20% of tier 1 for high performance.
Assign at most 40% of tier 1 for cost savings.
Assign at least 20% of tier 3 for cost savings.
Assign at most 40% of tier 3 to prevent low performance.

Custom2

Assign at least 20% of tier 1 to keep high performance.
Assign 50% to lower cost tiers.

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DFSMS and HDT

- With HDT for Mainframe storage policies, individual policies can be defined for volumes mapped to different storage groups
- Policies are supported based on tier ranges, analysis/migration periods, initial tier page assignments and relocation priority

Online SG
- HDT Custom Policy Defined for Online Data Across Top 2 Tiers

Batch SG
- HDT Policy Restricted to Tier 2 Residency

Archive SG
- HDT Policy Restricted to Tiers 2 and 3 Residency
Hitachi Tiered Storage Manager for Mainframe
Hitachi Dynamic Tiering Management

Host-based software

- Enables centralized and unified mainframe management of Hitachi Dynamic Tiering
  - Automation Policies
  - Integration with DFSMS and storage groups
- Facilitates online storage service level controls
  - Increase application performance
  - Improves problem avoidance
- Delivers a single, consistent interface
  - ISPF Command based and/or REXX Script driven
- Eliminates configuration errors through auto-discovery
  - Accelerates deployment
- Provides reporting and automatic notifications
New and future enhancements

• Fully Allocated volume support – Feb 2015
  – Allows you to reserve the entire volume, so another user cannot consume all the space in a pool
• Use for critical system volumes etc
Hitachi Dynamic Tiering: Summary

Solution capabilities

- Automated data placement for higher performance and lower costs
- Simplified ability to manage multiple storage tiers as a single entity
- Self-optimized for higher performance and space efficiency
- Page-based granular data movement for highest efficiency and throughput

Business value

- CAPEX and OPEX savings by moving data to lower-cost tiers
- Increase storage utilization up to 50%
- Easily align business application needs to the right cost infrastructure
Thank You!

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Session 16925: Simplify Your Life with New Native Mainframe Management Tools
Tuesday, March 3, 2015, 4:30-5:30, Room: Boren, Location: Sheraton Seattle
Speaker: Roselinda Schulman (Hitachi Data Systems)

Session 16926 – Improve your IT Analytics capabilities through Mainframe consolidation and simplification
Speakers: Roselinda Schulman (Hitachi Data Systems) and John Harker (Hitachi Data Systems)

Session 16923 – The Reality of Storage Virtualization
Thursday, March 5, 2015, 1:45-2:45
Speaker: William Smith (Hitachi Data Systems)

Session 16757- Agile, Available, and Recoverable – Demystifying Time to Data
Thursday, March 5, 2015, 4:30-5:30,
Speaker: Ros Schulman (Hitachi Data Systems) and Rebecca Levesque (21st Century Software)

Visit us in Booth #401

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