Disk Tiering Solutions from IBM, EMC, and HDS

Ros Schulman – Hitachi Data Systems

*Session **17144***

March 3, 2015 3:15-4:15pm

Sheraton

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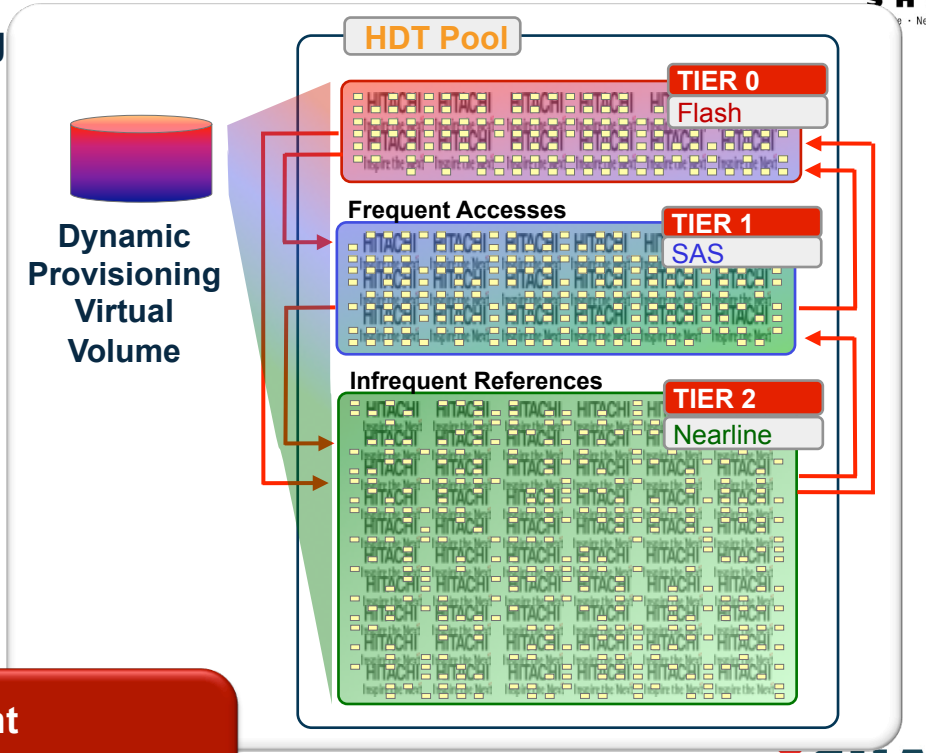
Hitachi Dynamic Tiering

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



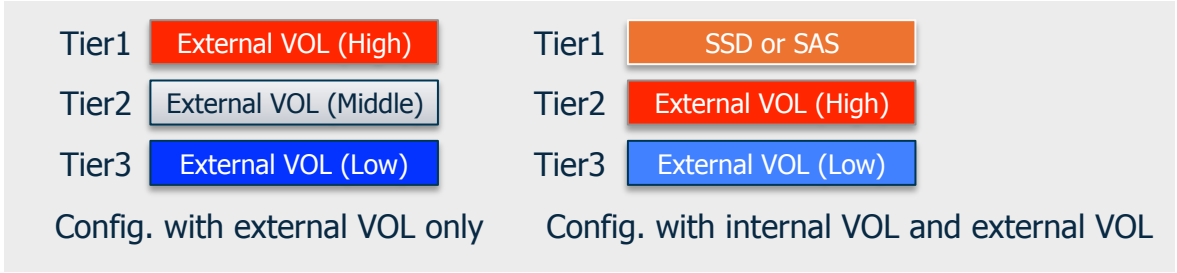
- **Simplifies operations and data management**
- **Reduces opex, capex, and TCO**
- **Data Moves in 38MB Pages**
- **Datasets can span multiple Tiers**

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

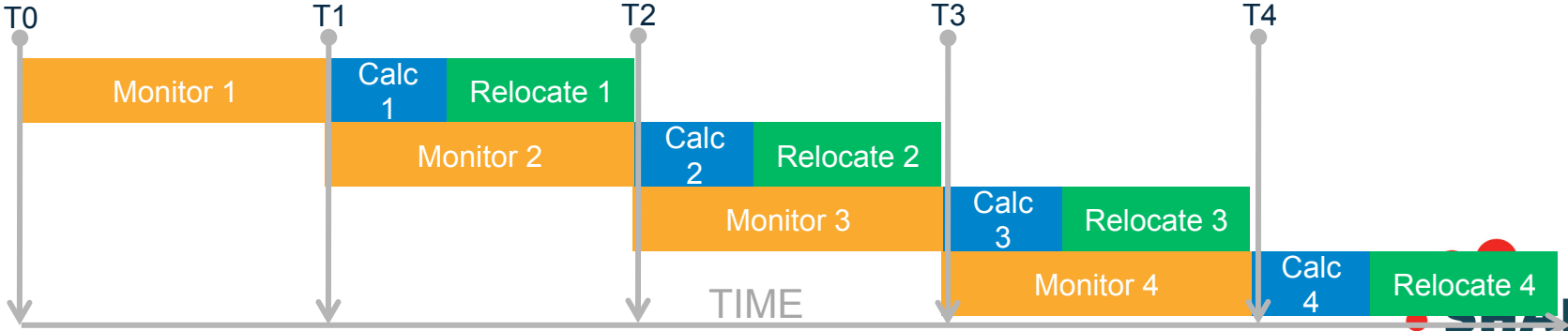


- HDT supports up to 3 tiers of external storage
  - external storage can be designated into 3 ranks (high, middle, low)
- External storage is always classified as lower tiers than internal storage

MEDIA TIER GROUPINGS SUPPORTED BY VSP	ORDER OF TIERS
SSD	1
SAS 15K RPM	2
SAS 10K RPM	3
SAS 7.2K RPM	4
SATA	5
External #1	6
External #2	7
External #3	8

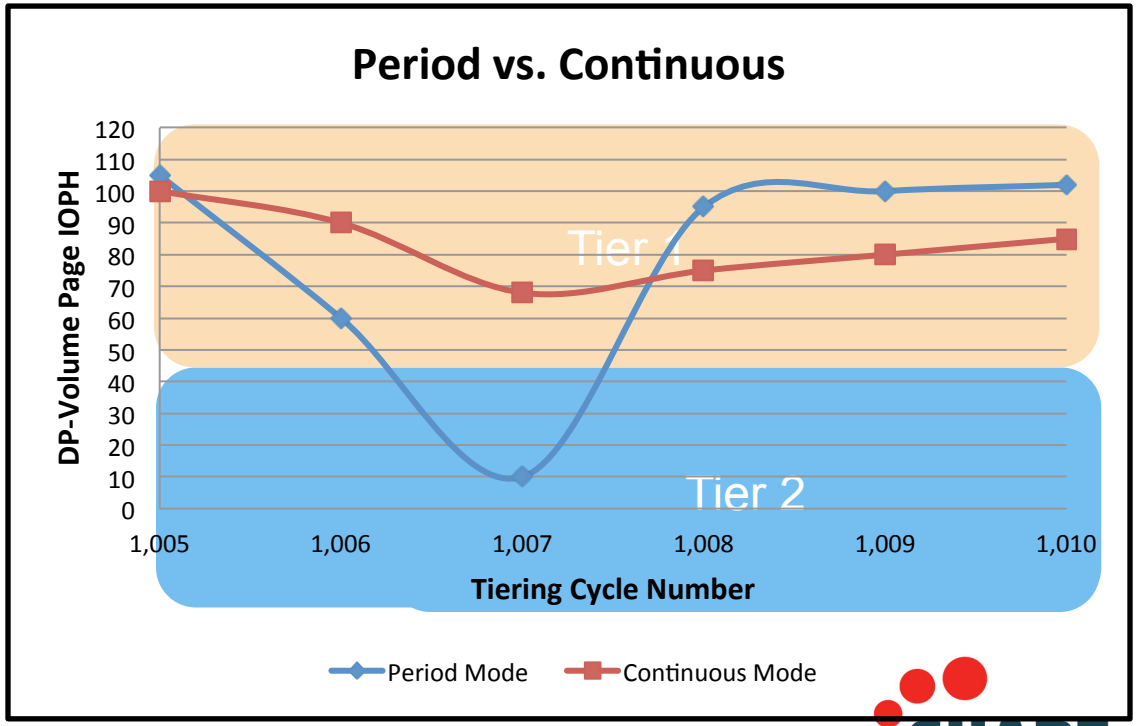
HDT Cycle How Tiering Learns your workload

- 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)



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



32 Custom tiering policies

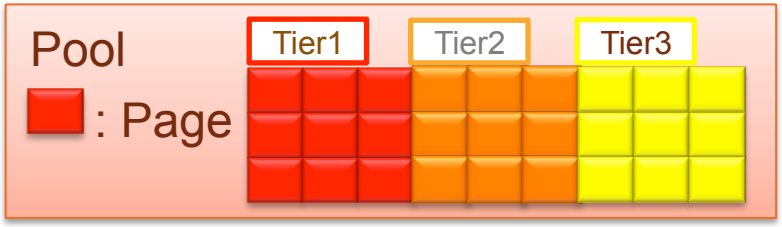
- Custom tier policy helps achieve SLAs by minimizing performance impact and maximizing utilization when multiple applications are sharing a pool
  - Group volumes from different pools into a group and apply a custom policy
  - Up to 32 policies can be created per system
  - Based on percent of allocated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

Custom Tiering Policy support

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



Used

Custom1

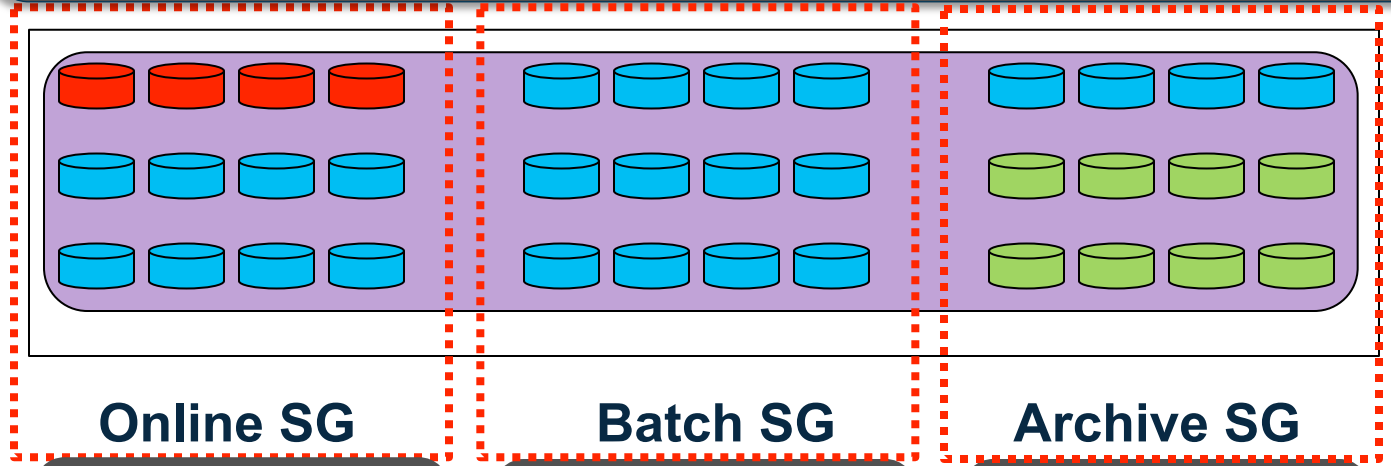
Assign at least 20% of tier1 to keep high performance. Assign 50% to lower cost tiers

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

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

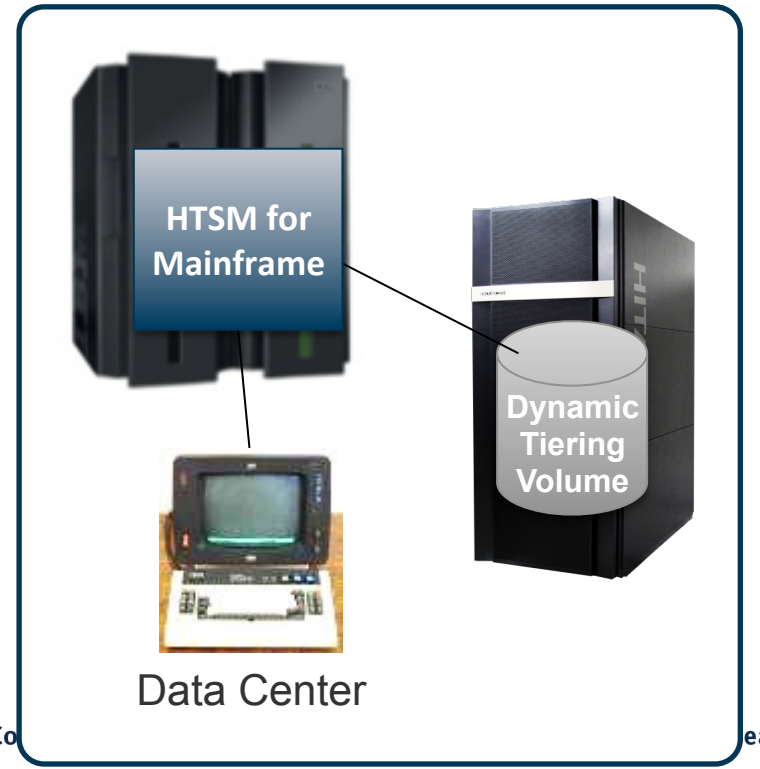


HDT Custom Policy Defined for Online Data Across Top 2 Tiers

HDT Policy Restricted to Tier 2 Residency

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

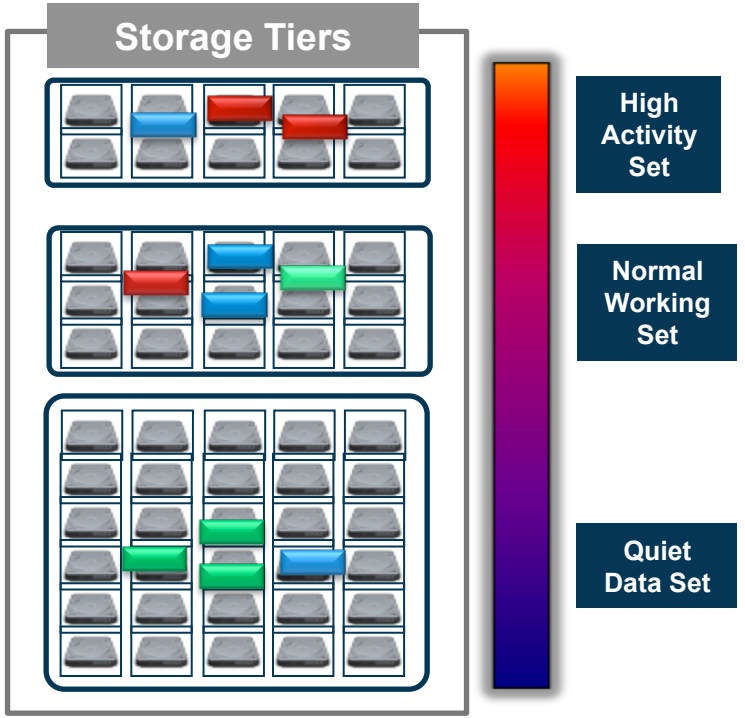
Hitachi Dynamic Tiering: Summary

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



AUTOMATE AND ELIMINATE THE COMPLEXITIES OF EFFICIENT TIERED STORAGE

Thank You!

For additional Hitachi information, please contact

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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)

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