MOS: Workload-aware Elasticity for Cloud Object Stores [HPDC'16]

Observations

- Object size distribution is a key factor for classifying workload characteristics.
- CPU capacity of proxy servers is the first-priority resource for small-object-intensive workloads.
- ProxyCones = storagespaces + core/physical storage.
- Block sizes = storagespaces + blocksize/physical storage.
- Network bandwidth plays a critical role in the performance of large-object-intensive workloads.
- A faster network cannot effectively improve I/O for small-object intensive workloads.
- For large-object intensive workloads, we have to collectively consider the network bandwidth limits and the storage configuration.

Key Insights

- Cloud object store workloads can be classified based on the size of the objects in their workflows.
- When multiple tenants run workloads with drastically different behaviors, they compete for the object storage resources with each other.

Other projects:

- AnalyzeThis: An Analysis Workflow-Aware Storage System:
  An analysis workflow-aware storage system that seamlessly blends together the flash storage and data analysis.
- Multi-tiered Buffer Cache for Persistent Memory Devices:
  A tiered caching system for combining PM devices to achieve the best of both PCM and FB-DRAM at lower cost-per-GB.
- TurnKey: Unlocking Pluggable Distributed Key-Value Stores:
  A development platform that eases distributed KV store programming by providing common distributed management functionalities.
- MEMTUNE: Dynamic Memory Management for In-memory Data Analytic Platforms
  DUX: an application-attuned dynamic data management system for data processing frameworks.

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