Dynamic Block-level Management for Cloud Computing Systems

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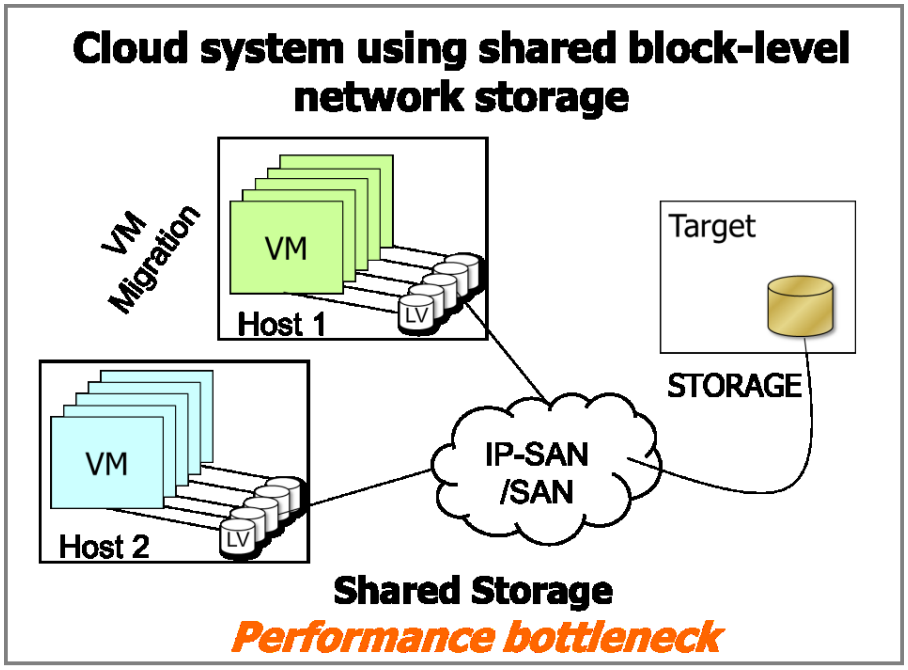
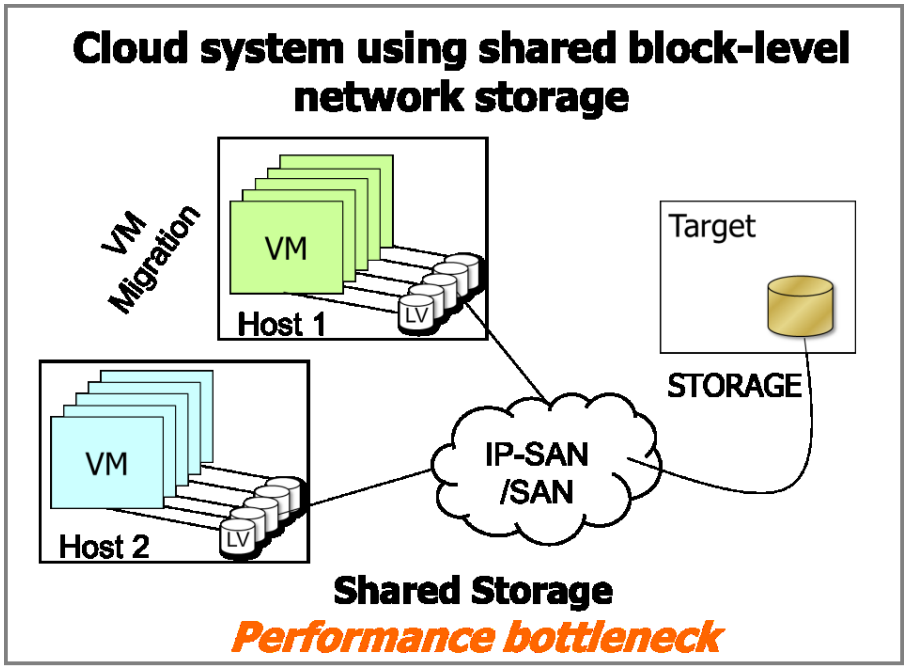
VISA

Introduction



- Block-level network storage commonly used in cloud systems
  - E.g., iSCSI, NBD, SAN
  - Provide virtual machine (VM) storage
  - Fast virtual machine migrations
  - Improved data availability

Problem Addressed

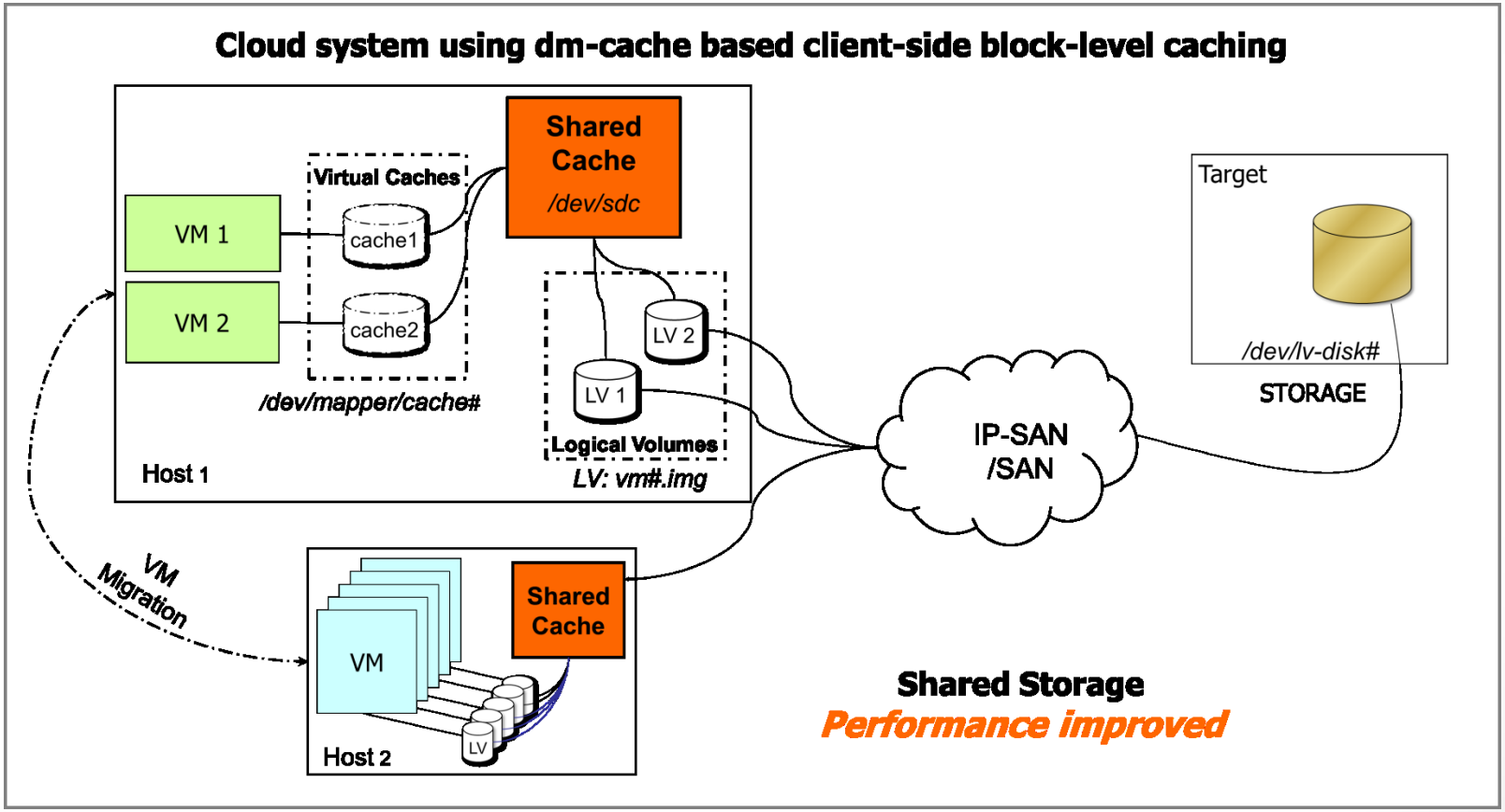


- Serious scalability issue as the size of cloud systems increases
  - Bottleneck in shared network storage
  - Performance interference across VMs
- **Goal:** Improve I/O performance of VMs in cloud systems using caching

Proposed Solution

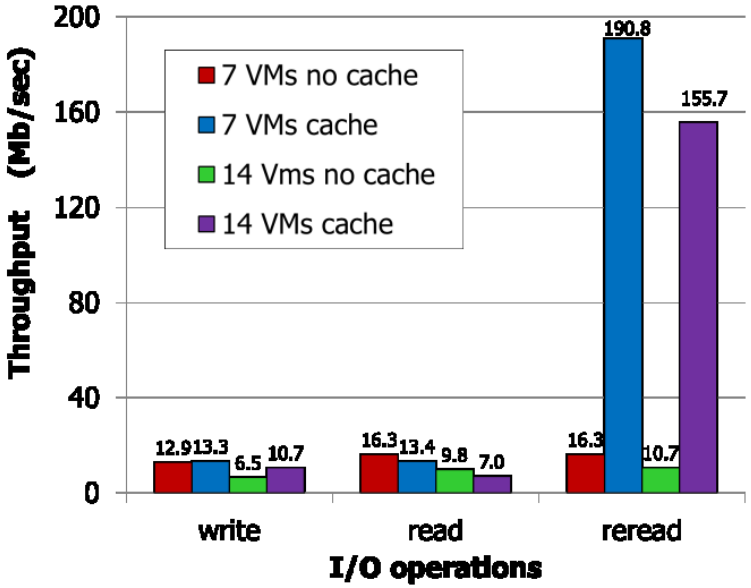
- **Dynamic block-level client-side caching for cloud computing systems**
  - Exploit data locality in VM data access
  - Utilize capacity and speed of storage (particularly SSDs) on the client-side
  - Implement via block-level virtualization to support different cloud storage systems
  - Support flexible, dynamic configuration of cache replacement and write policies

DM-cached based Caching



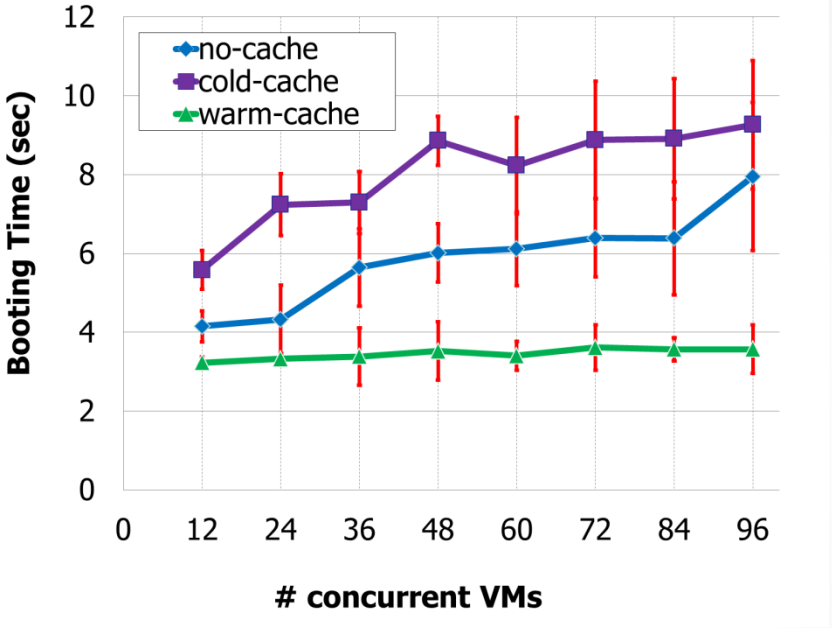
Evaluation

- **Experiment setup:**
  - Eight VM hosts, each with SSD based cache; One shared iSCSI-based network storage server



IOzone

14x higher throughput for reread



Concurrent Booting

Up to 123% faster booting

Thanks!!

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FIU Research Laboratory on virtualized infrastructure, systems, and applications (http://visa.cis.fiu.edu)