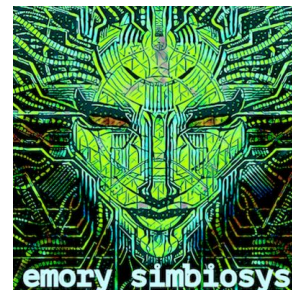


Can Microservices Drive a Renaissance in Workload-Aware Storage Management?

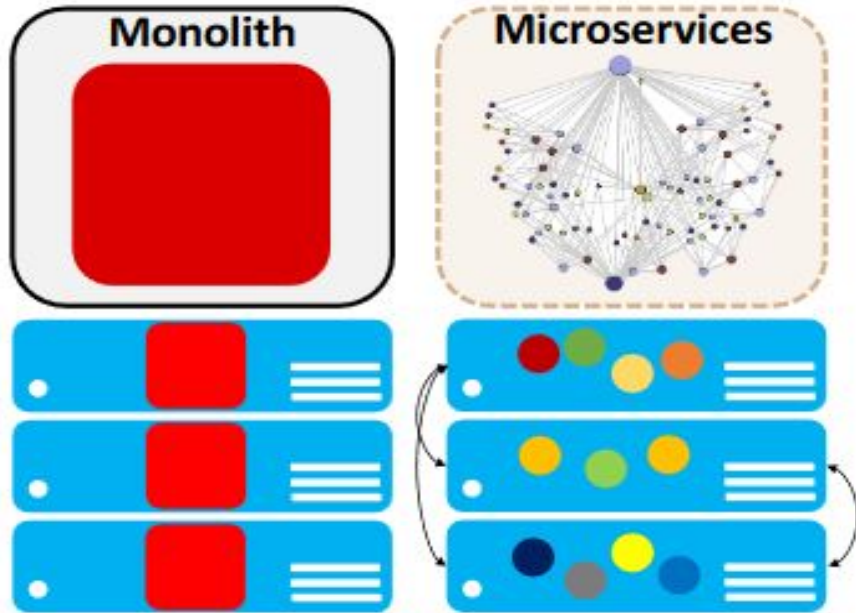
12th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage '20)

Pranav Bhandari¹, Lukas Rupprecht², Dimitrios Skourtis², Ali Anwar², Deepavali Bhagwat², Vasily Tarasov², Avani Wildani¹

¹Emory University, ²IBM

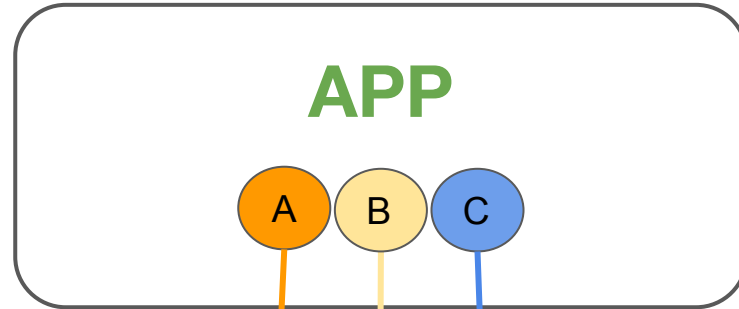


Microservices



- Isolation
- Flexibility
- Productivity
- Scalability
- **Storage?**

Storage

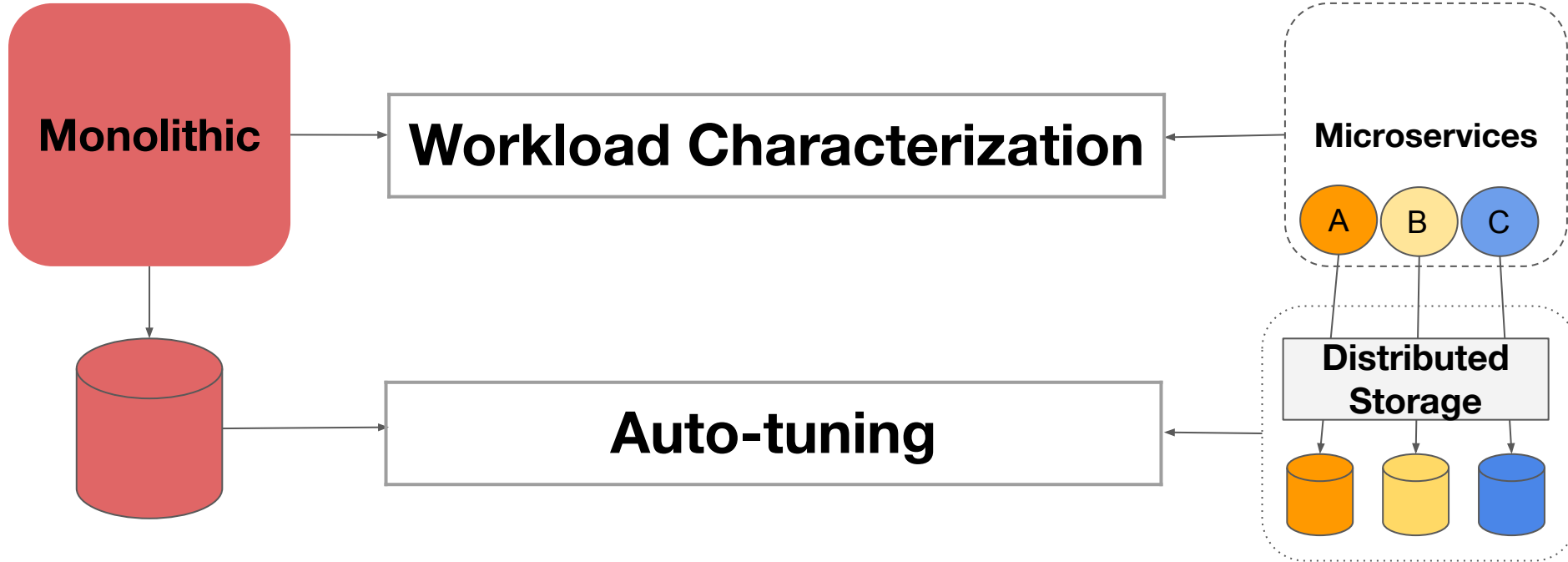


STORAGE

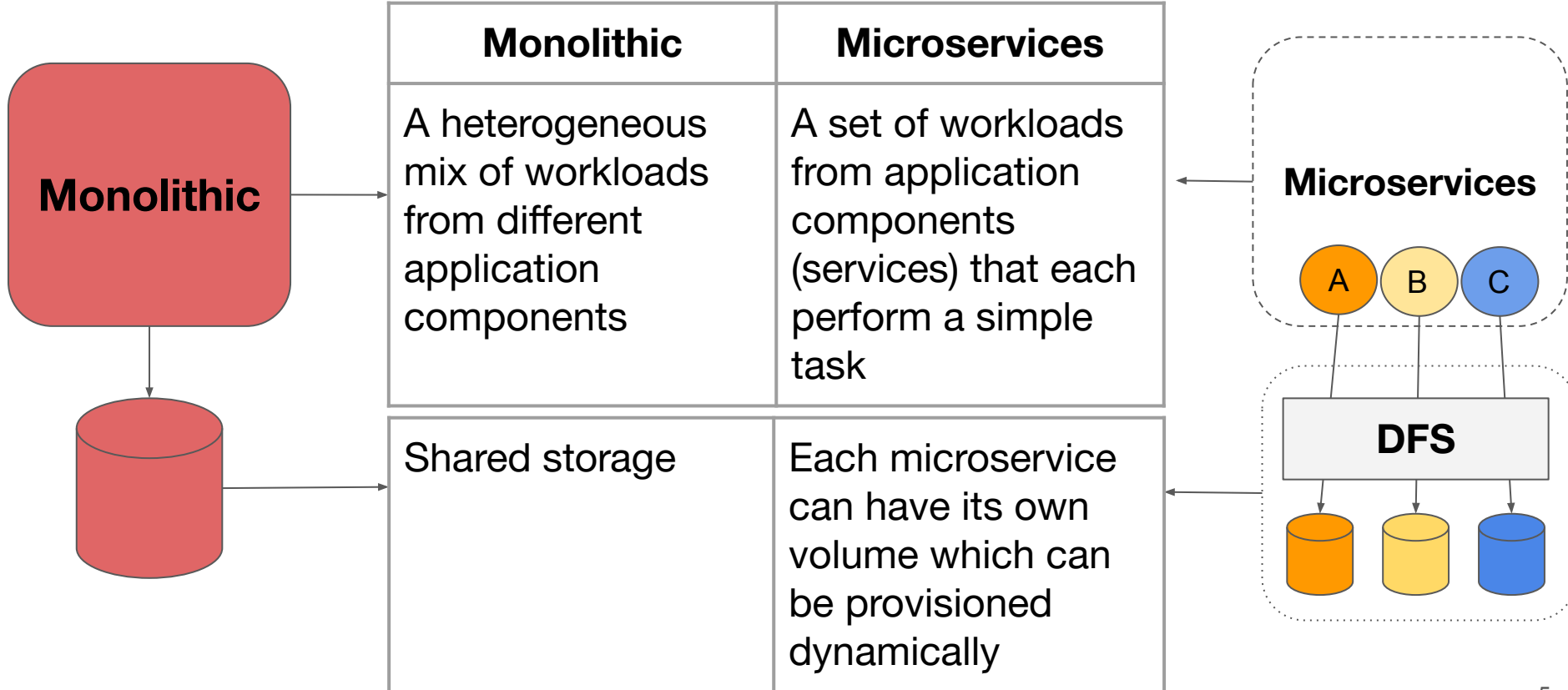
Distributed Storage (OpenEBS, Ceph, GPFS, GlusterFS)



Research



Motivation



Workload Stability

→ Access pattern based workload metrics

- ◆ read/write ratio
- ◆ locality
- ◆ I/O size distribution

→ Are these metrics more stable in the workloads of microservices compared to the monolithic workload of functionally similar application?

Storage Auto-tuning

→ Storage parameters

- ◆ cache (size, write policy, replacement policy, prefetching)
- ◆ replication
- ◆ block size

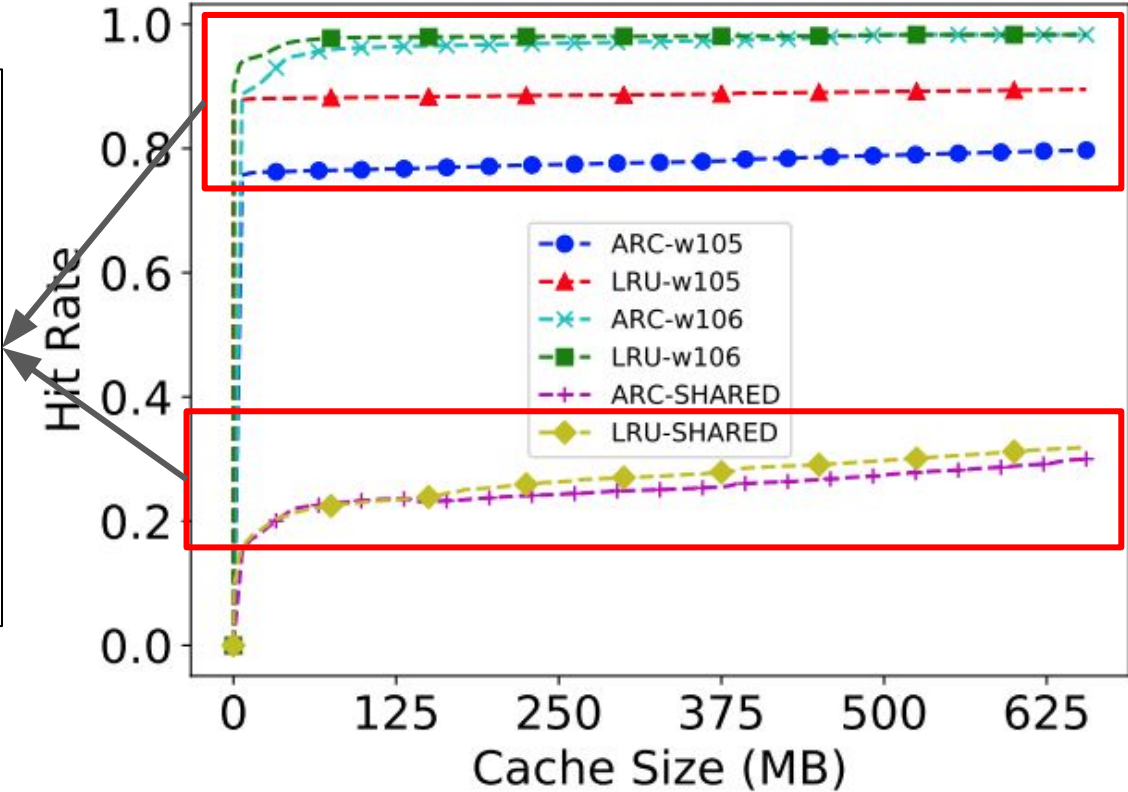
→ Case study: Cache Size

Setting

- Isolated I/O cache in host memory
 - ◆ Local in-memory data access
 - ◆ No network request to the storage service
- Cache allocated per persistent volume mounted on the host
 - ◆ Size cache based on the workload of the persistent volume

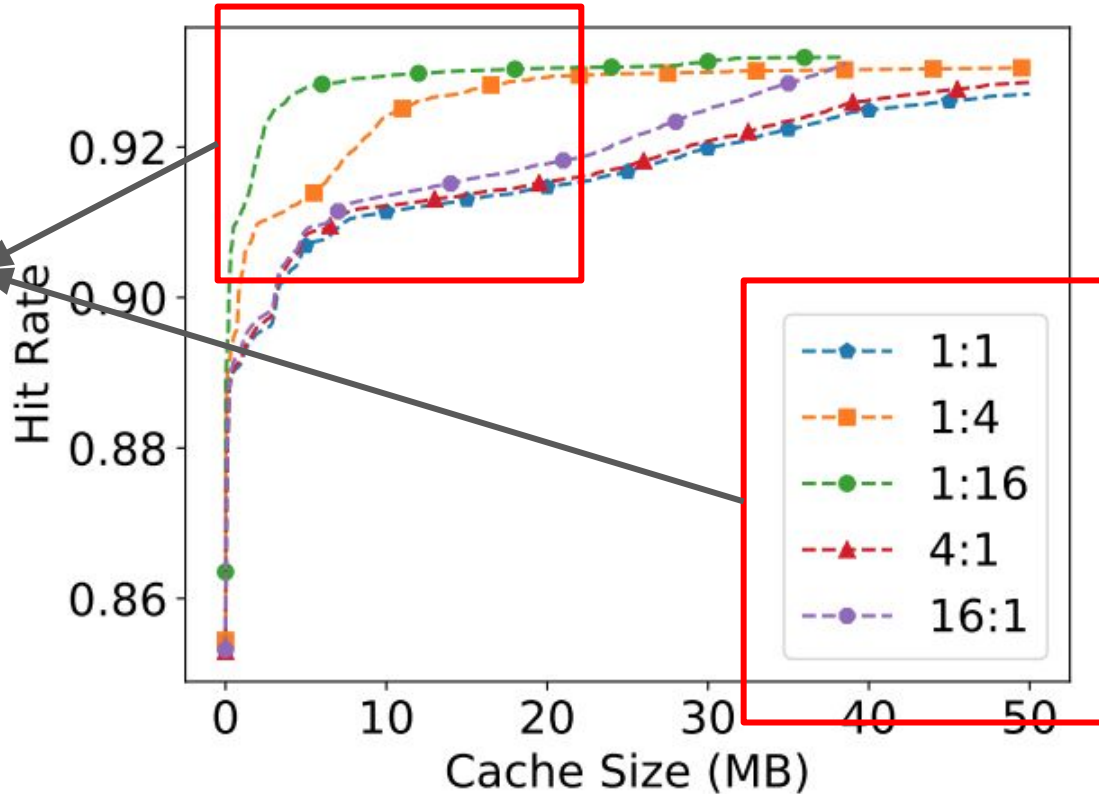
Shared vs Isolated Cache

Isolated cache performs better than shared cache!

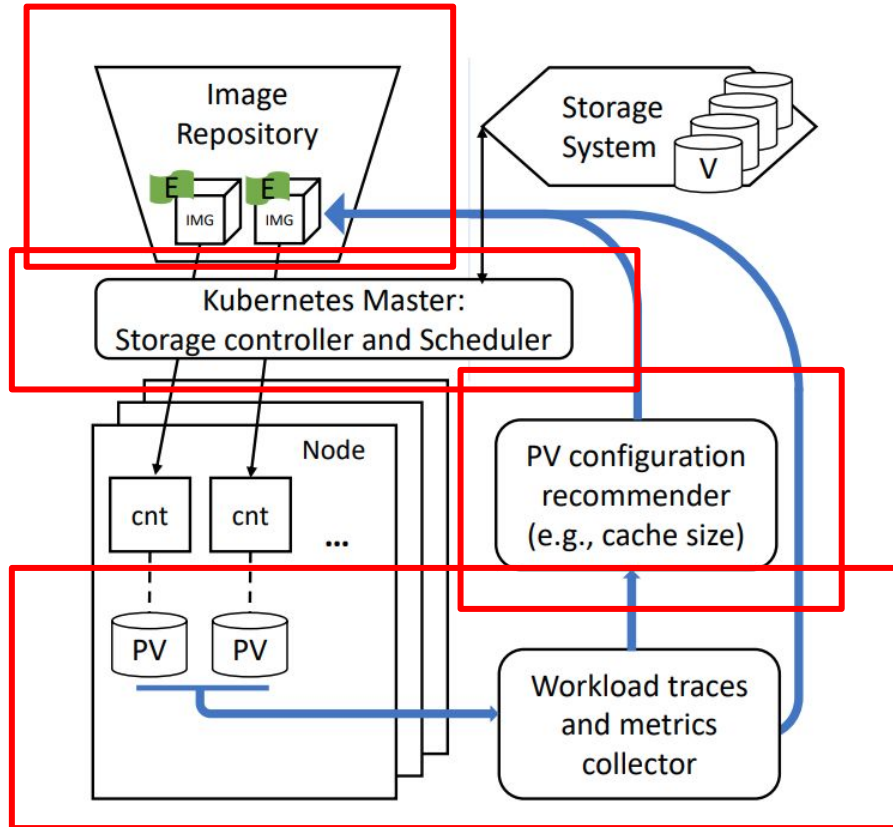


Cache Size Allocation

Workload analysis is needed for cache allocation!



Initial Design



Thank You!

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