Aridac: Adaptive Resource Isolation of Non-volatile Devices Under Containerized Environment Project Final Report

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Abstract—Container technology makes cloud computing possible by offering resource isolation and scalability, however, resource sharing brings the problem where heavy containers consume most of the resources and break the fairness. To achieve fairness and maintain a good overall system performance, we propose an adaptive resource isolator for block device namely Aridac, which could adjust the disk resource quota of containers in running time.

In this section, we aim to prove two major things. First, the scenario of resource preemption exist; second, to test if our policy is able to prevent the resource preemption. and the quota limit can adapt the dynamic desire of application (e.g. increase or decrease).

5.1. Workload Design

- Workload 1 Two containers A and B running with same rate (200KiB/s) in the beginning. At some point, B's I/O usage goes high without limit (2MiB/s), preempting A's resource.
- Workload 2 Two containers A and B running with same rate (200KiB/s) in the beginning. At some point, B's I/O usage goes high without limit (2MiB/s), preempting A's resource. After a while, B's usage goes back to normal rate (200KiB/s).

Our policy should prevent the above resource preemption. Also, the quota allocated by our policy should keep align with the containers' desire dynamically. The only difference between two workloads is that, in workload 2, B's usage goes back to its normal rate, where our policy should be able to adjust the quota low.