Assignment - 4

Sharing is caring!
CS 695

Het Patel (23M0751)

Bharat Patidar (23M0761)

KSM - Kernel Same page Merging

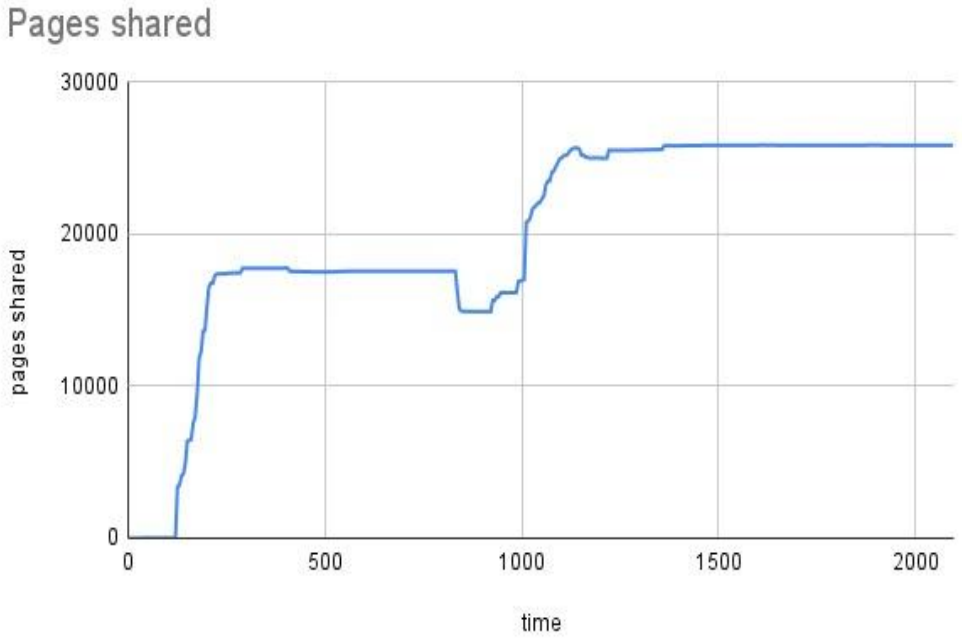
- It’s a powerful tool used in Linux for deduplication.
- **optimizes memory usage** and **improves the performance** of the system.
- KSM works by continuously **scanning the pages** in the memory.
- If **two pages are the same**, then it performs **deduplication** on them.
- It keeps only **one copy** of the page and lets the processes share it between them.
- Uses the **COW flags** on the shared pages.

Experimentation setup

- We have used intel i5 13th generation CPU, 16 GB ram and given each VM 4 GB of RAM and 2 cores each.
- We have written a Python script that reads the proc files in “/sys/kernel/mm/ksm/” every 5 seconds and stores the results in the file.

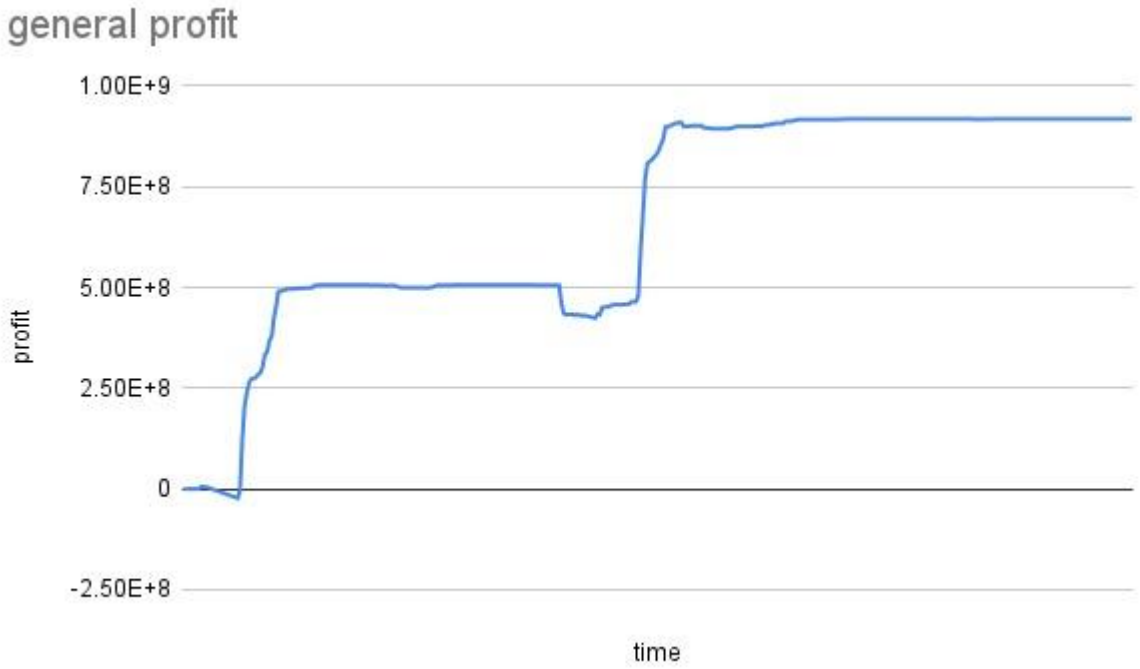
Running 2 VMs one by one

- Script is started, after some time VM1 is started. KSM will merge duplicate pages.
- After some time second VM is started, again some more pages will get merged.



General profit vs time

- General profit represents the net amount of memory saved using KSM.
- Profit will go negative initially, because initially there are no shared pages is found but system is storing the metadata.



Running 2 VMs with workload

- We run our workload program on two VMs which generates 10000 pages and keep on accessing them.

- Blue line is the pages shared without workload. Red line is the pages shared with the workload.