

# Assignment-4 Report

*A Project Report  
by*

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## **Chapter 1**

# **Introduction to KSM**

KSM stands for kernel-same page merging. It's a powerful tool used in Linux for de-duplication. It optimizes memory usage and improves the performance of the system.

## **1.1 Working of KSM**

KSM works by continuously scanning the pages in the memory; if two pages are the same, then it performs de-duplication 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. So whenever a process modifies a shared page kernel will create a duplicate copy and let that process modify that page.

## **1.2 Setup for experiments**

We have used intel i5 13th generation CPU, 16 GB ram and given each VM 4 GB of RAM and 2 cores each.

## Chapter 2

# Running VMs without workloads

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. So, after starting the script, we started the first VM. KSM was on, so it started de-duplicating the pages that can be merged. this continued till some time, so the graph is flattened on that time. After this, we started another VM, this will again the shared pages as de-duplication is happening. This will also get flattened after some time because no pages will be left which are potential candidates for merging.

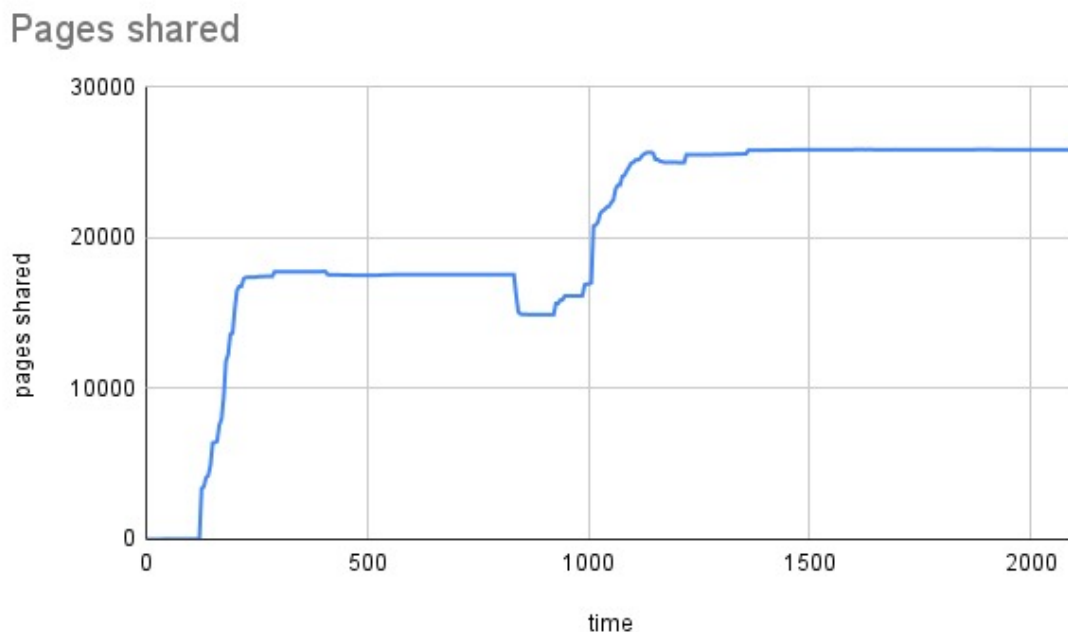


Figure 2.1: Plot between pages shared and time

Another plot is created for the general profit and the time. which shows how effective the KSM is. it has the same behaviour as the pages shared. after the first VM is started,

general profit keeps on increasing up to a certain limit, then flattens out. When second VM starts, profit again starts increasing and flattens out after some time.

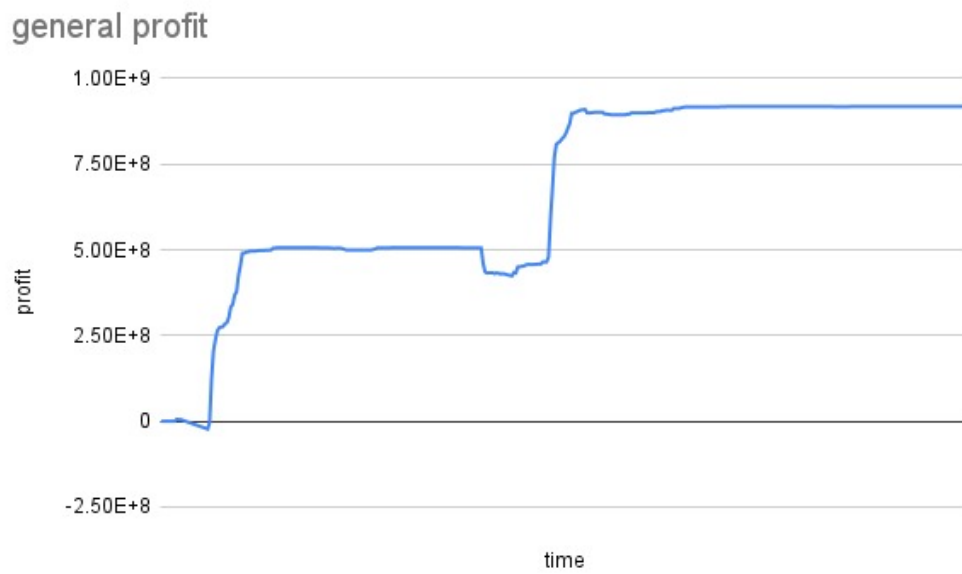


Figure 2.2: Plot between General profit and time

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