

Device Mapper statistics project



Fumiya Shigemitsu



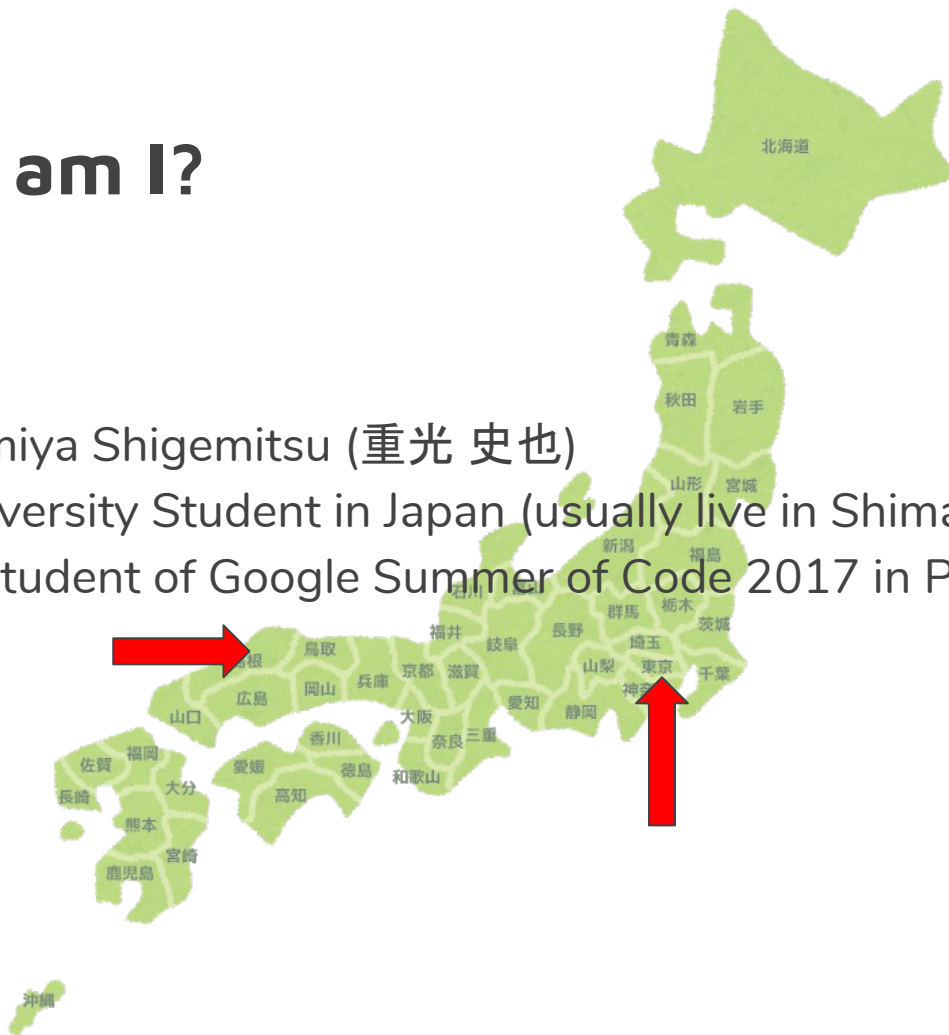
Today's topics

1. My Last Year's Google Summer of Code Project
2. What I learned from experience of Google Summer of Code



Who am I?

- Fumiya Shigemitsu (重光 史也)
- University Student in Japan (usually live in Shimane prefecture)
- A Student of Google Summer of Code 2017 in PCP



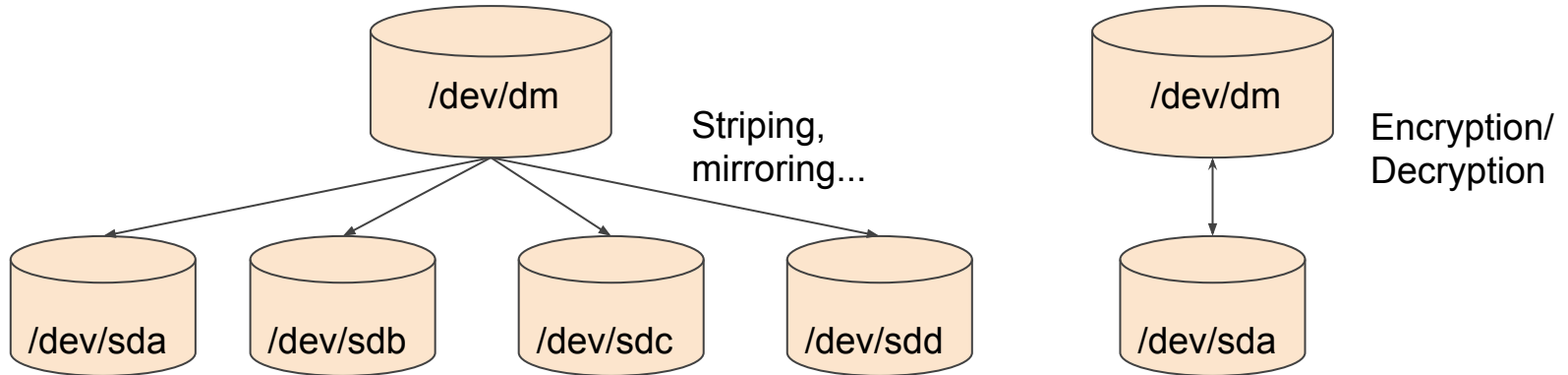


MY PROJECT



What is Device Mapper?

- Device Mapper is a framework for block devices.
 - Mapping physical devices onto virtual block devices
- Examples



Device Mapper statistics project

(in Google Summer of Code 2017)

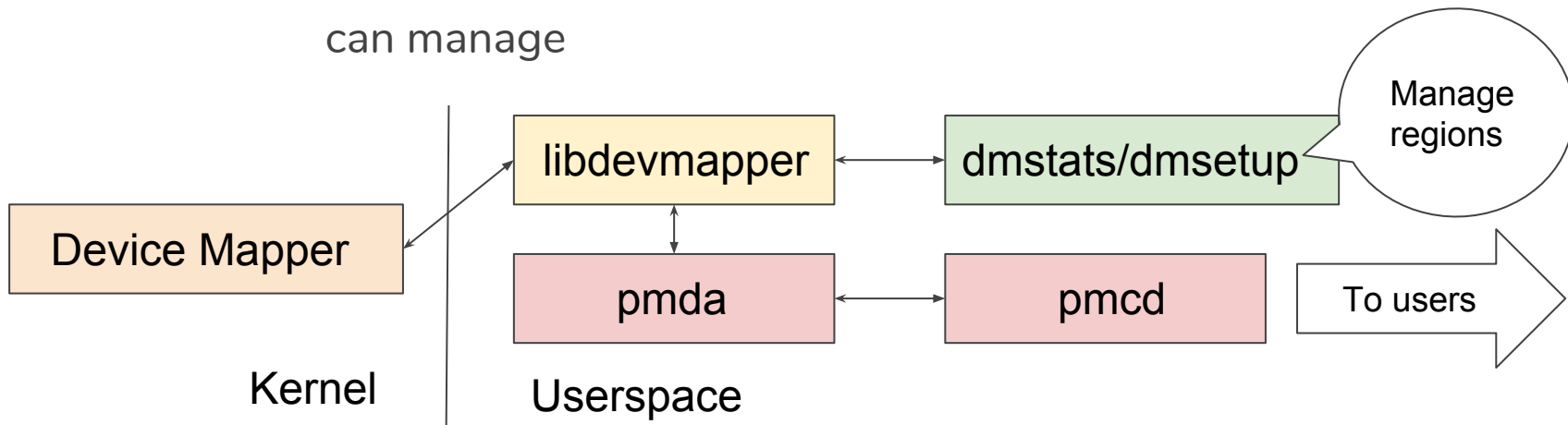
- Provide flexible IO statistics of device-mapper devices for PCP users
- Update the Device Mapper PMDA
 - Named as pmdadm





Approaches

- With dmstats API (libdevmapper)
 - managing device-mapper statistics regions and obtaining counter values
 - Get the data from API and convert it to a form that pmcd can manage





Metric types

- Basic counters
 - Raw counter data from the kernel
 - 13 types of counters for each statistics area
- I/O histogram latency
 - The frequency distribution of user specified I/O latency intervals
- For details, see pmdadm(1) man page

Basic Counters

```
[root@namaebi ~]# pminfo dmstats
dmstats.read
dmstats.reads_merged
dmstats.read_bytes
dmstats.reads_time
dmstats.write
dmstats.writes_merged
dmstats.write_bytes
dmstats.writes_time
dmstats.in_progress
dmstats.io_ticks
dmstats.queue_ticks
dmstats.read_ticks
dmstats.write_ticks
dmstats.histogram.hist_count
dmstats.histogram.hist_bins
[root@namaebi ~]#
```

Histogram files

Basic counters

- PMDADM recognizes created DM Devices statistics regions
- Statistics values can be seen from PCP commands

```
[root@namaebi ~]# dmstats list
Name          GrpID RgID ObjType RgStart RgSize #Areas ArSize ProgID
fedora-swap   -     0 region    0 3.91g   1 3.91g dmstats
fedora-root   -     0 region    0 15.00g  1 15.00g dmstats
[root@namaebi ~]# pminfo -f dmstats.write

dmstats.write
inst [0 or "fedora-swap"] value 0
inst [1 or "fedora-root"] value 267894
```

DM device name

Counts of Writes

I/O latency histogram

- The instances name include DM device name, Region ID, Histogram Boundary

```
[root@namaebi ~]# dmstats list --histogram
Name          GrpID RgID ObjType RgStart RgSize #Areas ArSize #Bins
fedora-swap   -      0 region    0 3.91g   1 3.91g 3
fedora-root   -      0 region    0 15.00g  1 15.00g 3
[root@namaebi ~]# pminfo -f dmstats.histogram.hist_count
dmstats.histogram.hist_count
inst [0 or "fedora-swap:0:0s"] value 0
inst [1 or "fedora-swap:0:500us"] value 0
inst [2 or "fedora-swap:0:1ms"] value 0
inst [3 or "fedora-root:0:0s"] value 1525
inst [4 or "fedora-root:0:500us"] value 77
inst [5 or "fedora-root:0:1ms"] value 343593
[root@namaebi ~]#
```

DM device name, Region ID, Boundary

Number of IOs



How to create statistics regions

- “dmstats create” makes statistics regions
 - Histogram boundary is created from --histogram bin boundaries
- For details, see dmstats(8)

```
[root@namaebi ~]# dmstats list --histogram
[root@namaebi ~]# dmstats create --alldevices --bounds 500us,1ms
fedora-swap: Created new region with 1 area(s) as region ID 0
fedora-root: Created new region with 1 area(s) as region ID 0
[root@namaebi ~]# dmstats list --histogram
Name                GrpID RgID ObjType RgStart RgSize #Areas ArSize #Bins Histogram Bounds
fedora-swap         -      0 region      0 3.91g      1 3.91g 3      0s,500us,1ms
fedora-root         -      0 region      0 15.00g     1 15.00g 3      0s,500us,1ms
[root@namaebi ~]#
```



DEMO





What I learned though the project





What I learned through GSoC'17

- To be positive is important for such activity
 - Want to learn I/O technic in Linux
 - Bring myself
 - Get good opportunity
- The project made my ability improved
 - Learn much things
 - Understanding source code deeply
 - Fixing complex bugs



Google
Summer of Code

The image features a solid orange background. In the top-left corner, there are three vertical bars of varying heights, each composed of several overlapping semi-transparent circles. In the bottom-right corner, there are four vertical bars of increasing height from left to right, also composed of overlapping semi-transparent circles.

Thank you for listening:)