

Bug 7975 (CVE-2024-23307) - [ANCK 5.10][CVE-2024-23307] potentially integer overflow in raid5_cache_count

Status: RESOLVED FIXED

Reported: 2024-01-19 10:49 UTC by Shiloong

Alias: CVE-2024-23307

Modified: 2024-03-15 09:38 UTC ([History](#))

CC List: 4 users ([show](#))

Product: ANCK 5.10 Dev

See Also:

Component: block/storage ([show other bugs](#)) block/storage

Version: 5.10.y-16

Hardware: All Linux

Importance: P3-Medium S3-normal

Target Milestone: ---

Assignee: Joseph Qi

QA Contact: shuming

URL:

Whiteboard:

Keywords:

Duplicates (1): [8098](#) ([view as bug list](#))

Depends on:

Blocks:


Attachments

[Add an attachment](#) (proposed patch, testcase, etc.)

Note

You need to [log in](#) before you can comment on or make changes to this bug.

Description

Shiloong  2024-01-19 10:49:57 UTC

on behalf of Gui-Dong Han <2045gemin@gmail.com>:

```
In raid5_cache_count():
    if (conf->max_nr_stripes < conf->min_nr_stripes)
        return 0;
    return conf->max_nr_stripes - conf->min_nr_stripes;
The current check is ineffective, as the values could change immediately
after being checked.
```

```
In raid5_set_cache_size():
    ...
    conf->min_nr_stripes = size;
    ...
    while (size > conf->max_nr_stripes)
        conf->min_nr_stripes = conf->max_nr_stripes;
    ...
```

Due to intermediate value updates in `raid5_set_cache_size()`, concurrent execution of `raid5_cache_count()` and `raid5_set_cache_size()` may lead to inconsistent reads of `conf->max_nr_stripes` and `conf->min_nr_stripes`.


The current checks are ineffective as values could change immediately after being checked, raising the risk of `conf->min_nr_stripes` exceeding `conf->max_nr_stripes` and potentially causing an integer overflow.

This possible bug is found by an experimental static analysis tool developed by our team. This tool analyzes the locking APIs to extract function pairs that can be concurrently executed, and then analyzes the instructions in the paired functions to identify possible concurrency bugs including data races and atomicity violations. The above possible bug is reported when our tool analyzes the source code of Linux 6.2.

To resolve this issue, it is suggested to introduce local variables 'min_stripes' and 'max_stripes' in `raid5_cache_count()` to ensure the values remain stable throughout the check. Adding locks in `raid5_cache_count()` fails to resolve atomicity violations, as `raid5_set_cache_size()` may hold intermediate values of `conf->min_nr_stripes` while unlocked. With this patch applied, our tool no longer reports the bug, with the kernel configuration `allyesconfig` for `x86_64`. Due to the lack of associated hardware, we cannot test the patch in runtime testing, and just verify it according to the code logic.

<https://lore.kernel.org/linux-raid/20240112071017.16313-1-2045gemini@gmail.com/#r>

[Comment 1](#)

Shiloong  2024-01-19 10:51:12 UTC


This bug has been reported to upstream:

<https://lore.kernel.org/linux-raid/20240112071017.16313-1-2045gemini@gmail.com/#r>

it has been fixed by following commit:

<https://patchwork.kernel.org/project/linux-raid/patch/20240112071017.16313-1-2045gemini@gmail.com/>

[Comment 2](#)

Joseph Qi  2024-01-31 10:24:45 UTC

(In reply to Shiloong from [comment #1](#))

> This bug has been reported to upstream:

> <https://lore.kernel.org/linux-raid/20240112071017.16313-1-2045gemini@gmail.com/#r>


>

> it has been fixed by following commit:

> <https://patchwork.kernel.org/project/linux-raid/patch/20240112071017.16313-1-2045gemini@gmail.com/>

Seems it is not merged into mainline yet. So I suggest we wait until it is in mainline.

[Comment 3](#)

Shiloong  2024-01-31 11:34:54 UTC

*** [Bug-8098](#) has been marked as a duplicate of this bug. ***

[Comment 4](#)

小龙  2024-03-14 11:55:44 UTC

The PR Link: <https://gitee.com/anolis/cloud-kernel/pulls/2884>

[Comment 5](#)

Joseph Qi  2024-03-15 09:38:15 UTC

(In reply to 小龙 from [comment #4](#))

> The PR Link: <https://gitee.com/anolis/cloud-kernel/pulls/2884>

merged

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