EOS Durability Summary

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Overview

EOS Durability

- Concept
- How to apply it n
- Overview on eos-ops-durability

Current Status

- Look back to 2021

Wrap up

- What to improve

EOS Durability

EOS is a reliable filesystem!

How many files are suffering problems overtime? (Data risk, or corruption…)

The **sheer amount** of **use cases/workflows**, demands to keep track on these numbers!

FSCK, an **EOS component** that offers an extra layer of **data integrity.** Introduced @ EOS 2020 WS

Aside the **embedded functionalities,** we use a set of tools to **monitor** and **repair** this **data**.

- eos-ops-durability – miscellaneous tools
- eos-ns-inspect – namespace explorer

How to apply it

Input sources:

- Namespace scan (time consuming)
- FSCK report / Disk scanning (distributed)
- Failing or draining filesystems (sporadic & passive)

Process:

- Classify and group files per problem/symptom
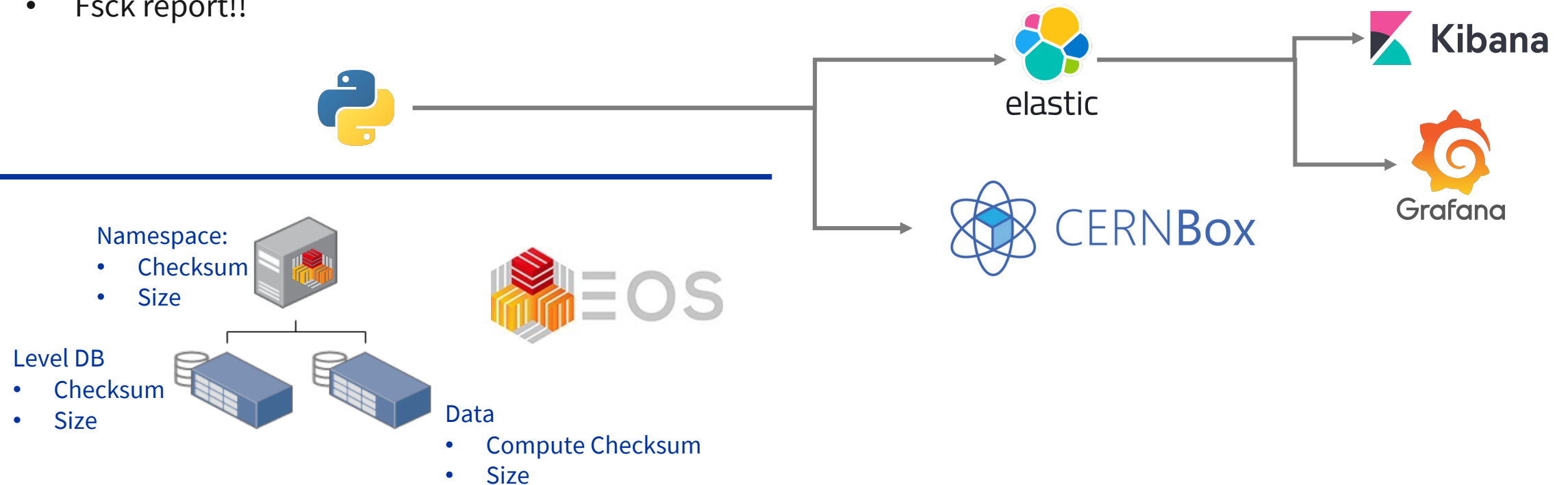
Outcomes

- Spot bugs
- Fixed files
- Monitor status

Overview eos-ops-durability

Detect, Classify, Repair & Monitor

- `eos-ns-inspect` - one replica and stripe diff files

- Drain failed filesystems

- Fsck report!!

Namespace:
- Checksum
- Size

Level DB
- Checksum
- Size

Data
- Compute Checksum
- Size

Classification overview – branching
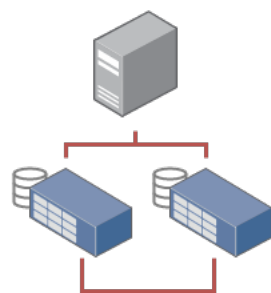
The concepts to have in mind:

- Under replicated data!!!
    - Misconfiguration (unlikely)
    - ENOENT, IO Error, etc... in one replica
- Corruption!!
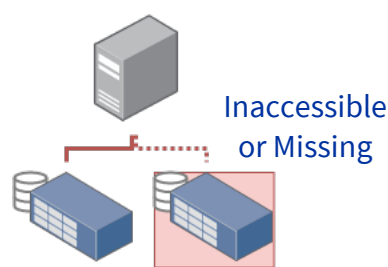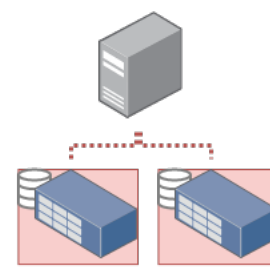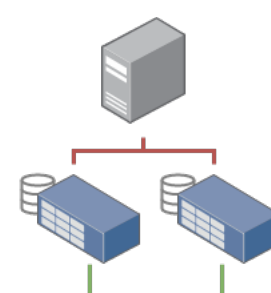   - Mismatch of checksum or size
- Over replicated data!?

Inaccessible   Missing   Corrupted
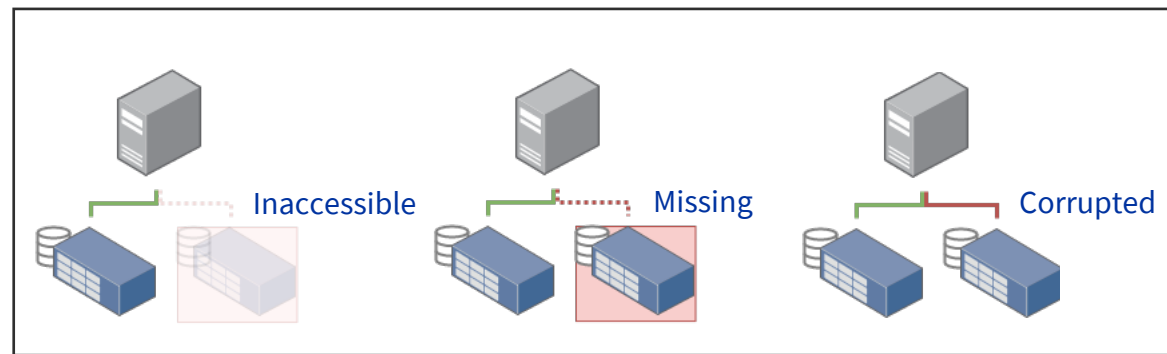
One Replica OK
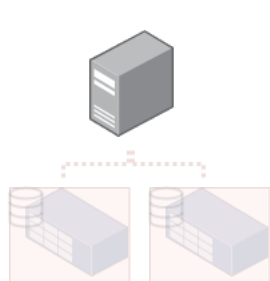
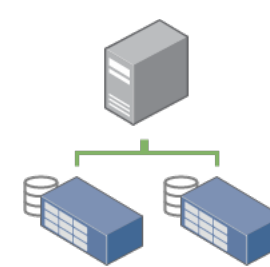Zero Replicas   Mismatching Replicas   Single Mismatching Replica   Inaccessible or Missing   Missing Replicas   Mismatching pair of Replicas*   All Replicas Ok

Current status

What happened during 2021

- `eos fsck repair` was enabled (in all instances)

  - Works on a complete scope of data (NS + disk)

  - Cleanup the working bench

    - Room to investigation (search root causes)

    - Bug fix (EOS-4782, EOS-4828, EOS-5052, …)

- eos-ops-durability - main highlights

  - Added `eos fsck report` as supported input

  - Now ported to Python3

Global view per instance ⌄

	current
alice	857 K
atlas	924 K
cms	136 K
lhcb	6.43 Mil

FSCK repair was enabled
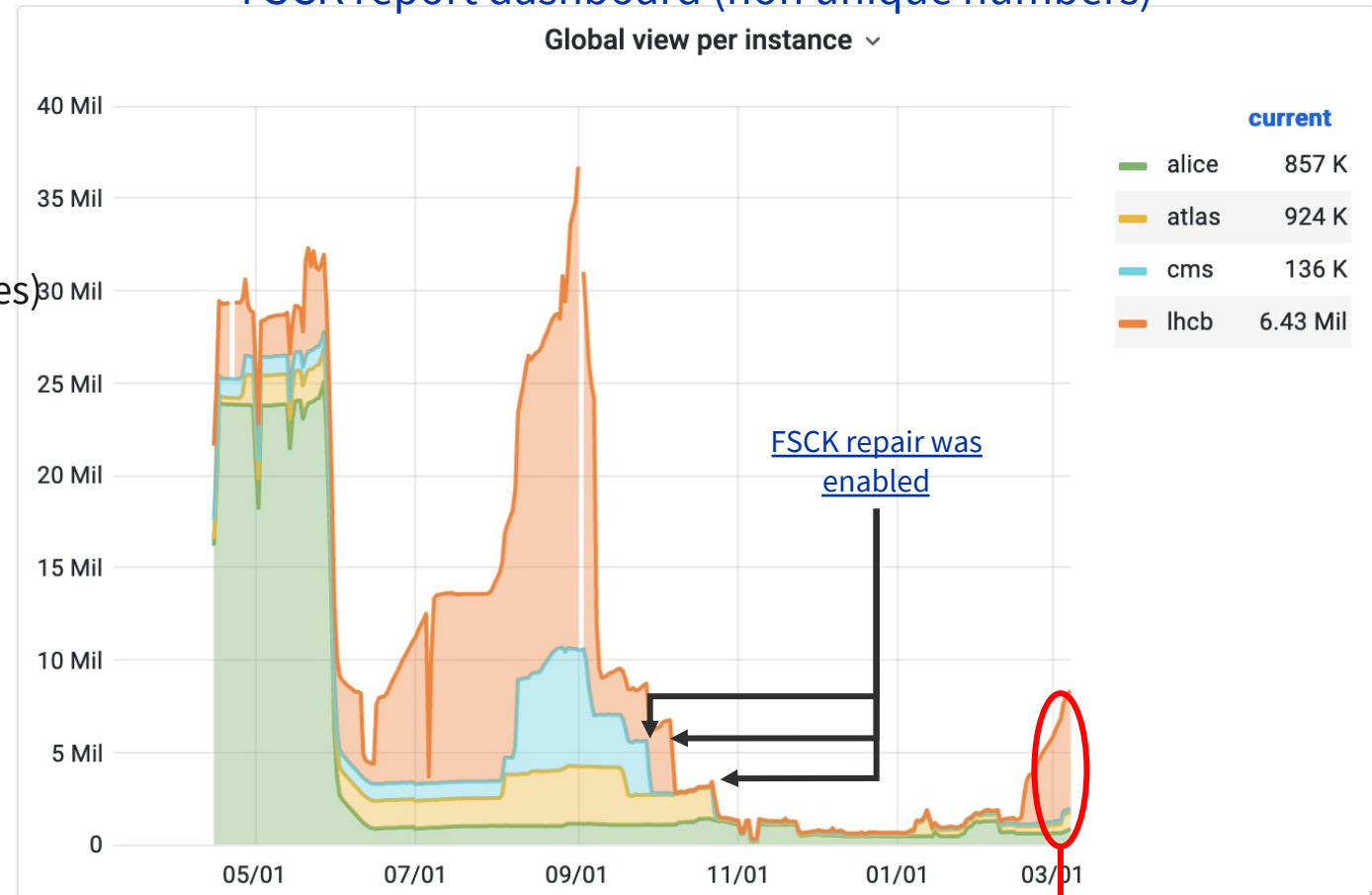
0.29% of total files
(from which, most are **not** @ risk)

Wrap up

We have the resources to protected endangered data, but there's risk while actions aren't taken.

- Prioritize recovery of data at risk

  - Files with one replica only!!

  - Set alarms to trigger upon sudden growths of such cases

- Invest more on root causes investigations

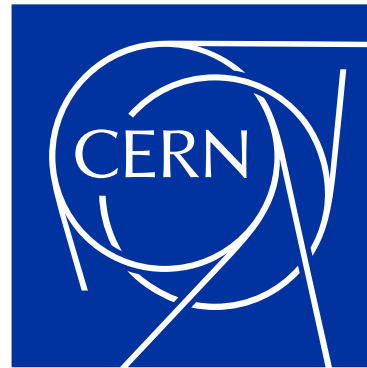**Ensuring durability is a continuous work** (as new problems can be found)

Having the system in good shape has given the opportunity to work on preserving it!

https://storage-ci.web.cern.ch/storage-ci/eos-ops-durability/tag/

https://gitlab.cern.ch/eos/eos-ops-durability/

home.cern