# EOS archive tool

2024

Elvin Sindrilaru

Why an archive tool?

- **EOS quota limits** - free up storage space in EOS for users' online activities

- Spare users from developing *ad hoc* archiving solutions

- Manage **efficiently** the movement of data between disk and archive storage

- Have control over the archiving rules and easily tune the configuration

EOS archive CLI

- **eos archive** <subcmd>

  • **create** <eos_path> <archive_location>

    • Create archive file for <eos_path> directory whose contents will be archived at:

    <archive_location>

  • **put** [--recover] <eos_path>

    • Copy the contents of the EOS directory to the archive destination.

  • **get** [--recover] <eos_path>

    • Copy the contents of the archive back to EOS.

  • **purge** [--recover] <eos_path>

    • Delete all disk resident data keeping the archive file and the archived data.

  • **list** [all|put|get|job_uuid]

    • List ongoing transfers. By default, all transfers are listed.

  • **delete** <eos_path>

    • Delete all archived data including the archive file - **Admin command.**

Archiving workflow
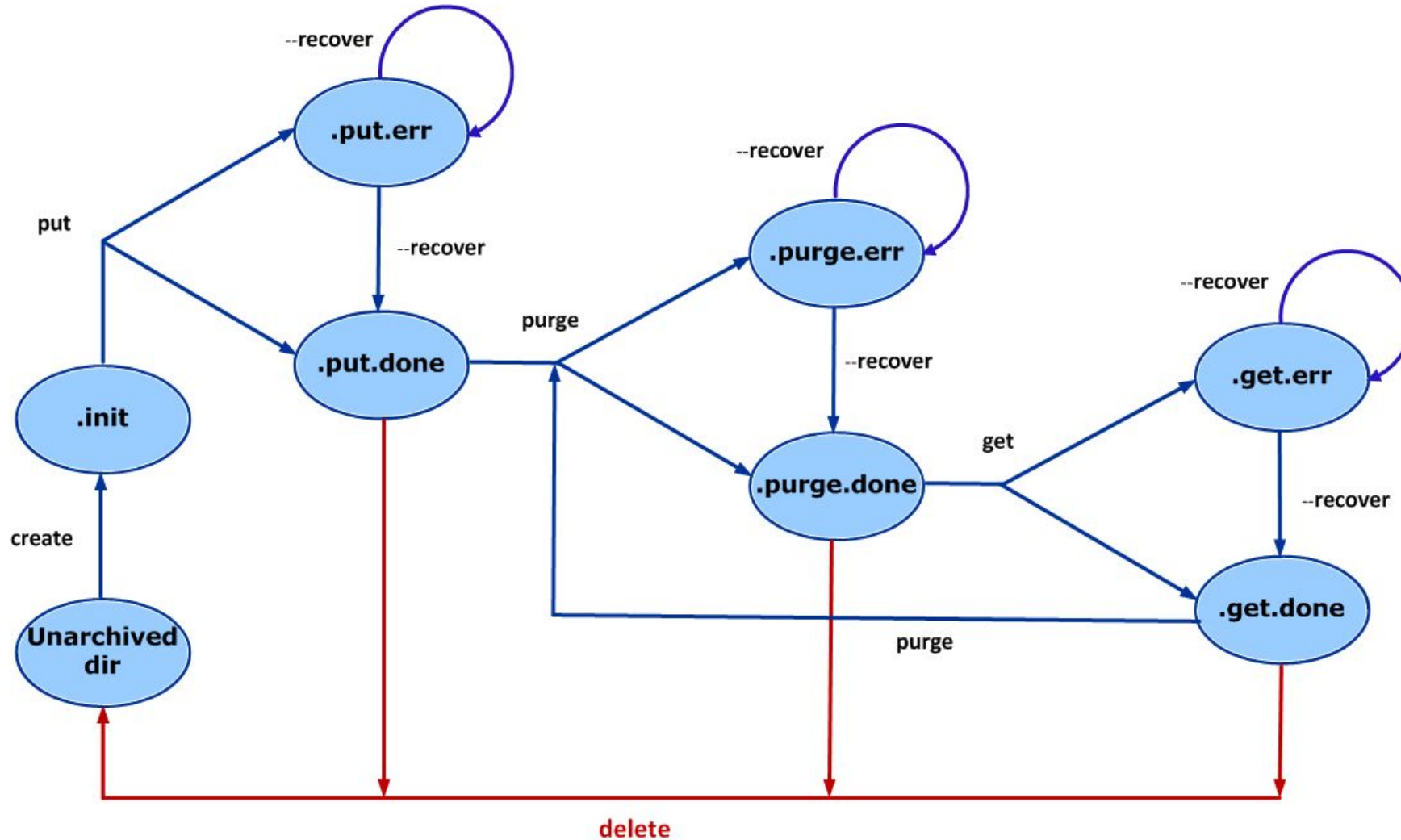
Archive and log files

- **Archive file** – contains entries in JSON format

  - Header (source, destination, archive size etc.)

  - Directory/file EOS metadata information in JSON format

  - Never modified during the lifetime of an archive

  - Can be used in the future to get information about the contents of the archive

  - Archive "get" restores files in the original layout (2 replicas, RAIN etc.)

- **Archive log file – archive.log**

  - Summary of the last executed transfer

  - Hints to why a transfer has failed

  - Users can/should access it in case of errors

Archiving internals

- **Archive transfer operation**

  - Separate process handling in a multi-threaded way the **third-party copy operations, integrity checks, directory structure creation** etc.
  - Only users in the **ACLs with the a - archive flag** can perform archive operations on the given path
  - **Wait on tape** - jobs waits indefinitely for successfully transferred file to be migrated to tape
    - Helped us in the past to spot issues on the CTA side
  - **Limitations -** user gets an error when trying to create the archive
    - can not deal with 0 size file (CTA)
    - EOS special internal files i.e. atomic/version files

- **Archive configuration**

  - Control the level of parallelism of the archive transfers from the `/etc/eosarchiverd.conf`
    - `MAX_TRANSFERS=10 (default)` - max number of transfers (process) to run in parallel, the other are queued
    - `MAX_THREADS=5 (default)` - max number of threads per process doing work
    - `BATCH_SIZE=10 (default)` - max batch size of ops to be performed per thread
    - `MAX_RETRIES=5 (default)` - max number of retries when a batch fails - protect against transient failures

Archiving in practice

- **What is left on EOS after a successful archive?**

```
[root@eoscms-ns-ip563 (mgm:master mq:master) ~]$ eos archive list | grep SMP_20
|Thu Feb 24 16:28:37 2022      |/eos/cms/store/group/phys_smp/archival/2022-02-16-SMP_20_005/
          |purge done    |
[root@eoscms-ns-ip563 (mgm:master mq:master) ~]$ eos ls -lrta /eos/cms/store/group/phys_smp/archival/2022-02-16-SMP_20_005/
drwxr-xr-+   1 pgras    zh            18077344 Feb 24  2022 .
drwxr-xr-+   1 root     zh           524708304 Oct 12  2022 ..
-rw-r--r--   2 pgras    zh             9686603 Feb 24  2022 .archive.log
-rw-r--r--   2 root     root           8390741 Feb 16  2022 .archive.purge.done
[root@eoscms-ns-ip563 (mgm:master mq:master) ~]$ head -4 /var/tmp/archive.info
{"src": "root://eoscms.cern.ch//eos/cms/store/group/phys_smp/archival/2022-02-16-SMP_20_005/", "dst": "root://eosctacms.cern.ch//eos/ctacms/archive/archive/cms/cb2c697cb0f42cda04ee116576fe1b928ea
7ba067f2e28d508a07a125b67aa4c/", "svc_class": "archive", "dir_meta": ["uid", "gid", "mode", "attr"], "file_meta": ["size", "mtime", "ctime", "uid", "gid", "mode", "xstype", "xs"], "uid": "2814",
"gid": "1399", "timestamp": 1645005866, "num_dirs":        1040, "num_files":       31696}
["d", "./", "2814", "1399", "40755", {"sys.acl": "g:1399:!d,egroup:cms-eos-pag-smp:r!d,egroup:cms-eos-pag-smp-cleaners:rwa+d,z:i", "sys.eos.btime": "1645005655.650981459", "sys.forced.blockchecks
um": "crc32c", "sys.forced.blocksize": "4k", "sys.forced.checksum": "adler", "sys.forced.layout": "replica", "sys.forced.nstripes": "2", "sys.forced.space": "default", "sys.recycle": "/eos/cms/pr
oc/recycle/", "user.acl": ""}]
["d", "SMP_20_005_archive/", "51667", "1399", "42755", {"sys.accounting.vos.0": "cms", "sys.acl": "u:22014:rw,u:31275:rw,u:5410:rw,g:1399:!d,egroup:cms-eos-pag-smp:rw!d,egroup:cms-eos-pag-smp-cle
aners:rw+d,z:i", "sys.eos.btime": "1644923408.890932465", "sys.forced.blockchecksum": "crc32c", "sys.forced.blocksize": "4k", "sys.forced.checksum": "adler", "sys.forced.layout": "replica", "sys.
forced.nstripes": "2", "sys.forced.space": "default", "sys.recycle": "/eos/cms/proc/recycle/", "user.acl": ""}]
["d", "SMP_20_005_archive/wgamma-miniaod-genonly-2016/", "51667", "1399", "42755", {"sys.accounting.vos.0": "cms", "sys.acl": "u:22014:rw,u:31275:rw,u:5410:rw,g:1399:!d,egroup:cms-eos-pag-smp:rw!
d,egroup:cms-eos-pag-smp-cleaners:rw+d,z:i", "sys.eos.btime": "1585155291.964649406", "sys.forced.blockchecksum": "crc32c", "sys.forced.blocksize": "4k", "sys.forced.checksum": "adler", "sys.forc
ed.layout": "replica", "sys.forced.nstripes": "2", "sys.forced.space": "default", "sys.recycle": "/eos/cms/proc/recycle/"}]
```

- **What is left on EOS after a failure?**
  - All the initial files plus the archive file and logs.

home.cern