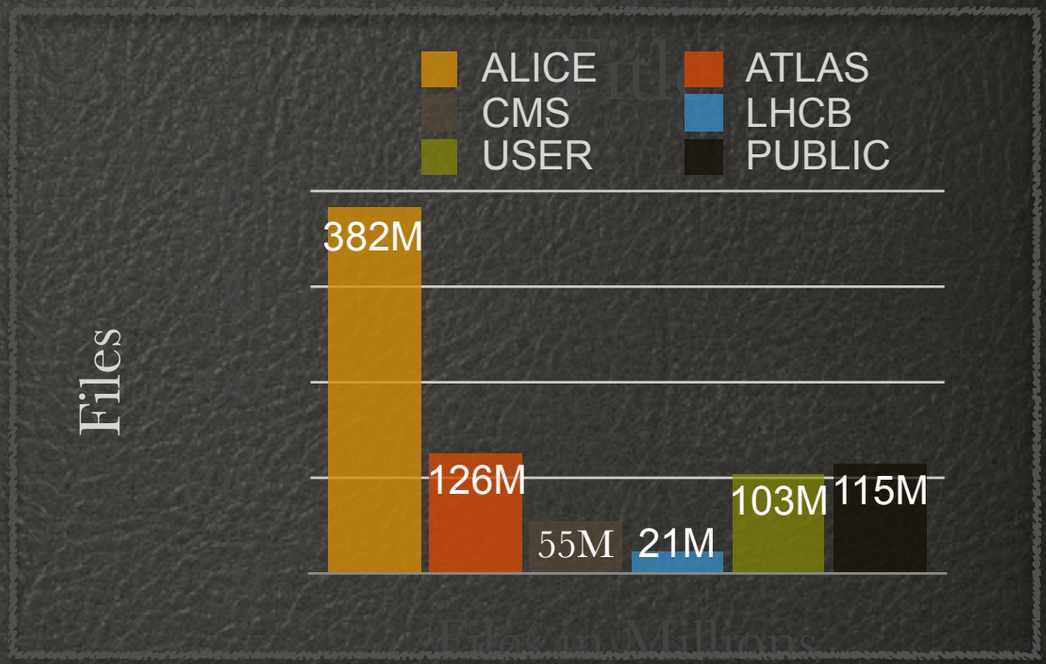
Protocols & SRM-less Operation

Andreas-Joachim Peters
for the CERN-EOS Team

EOS @ CERN

> 100 PB used
today 0.825 billion files

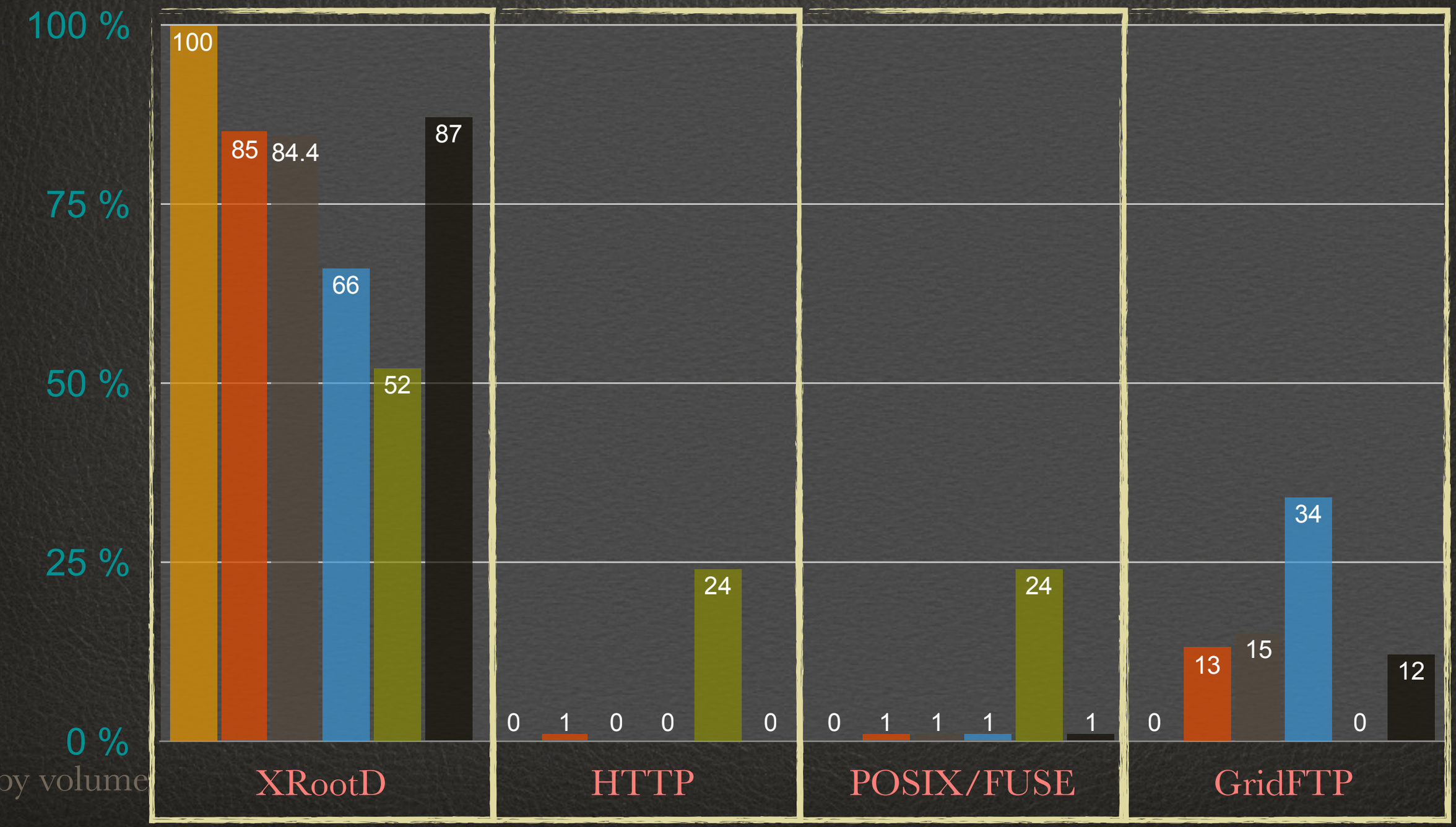
6 month traffic average:
26 GB/s read
10 GB/s write



6 instances
SRM BestMan, XRootD, HTTP++, FUSE, gridFTP

Protocol Usage

sample first week of August



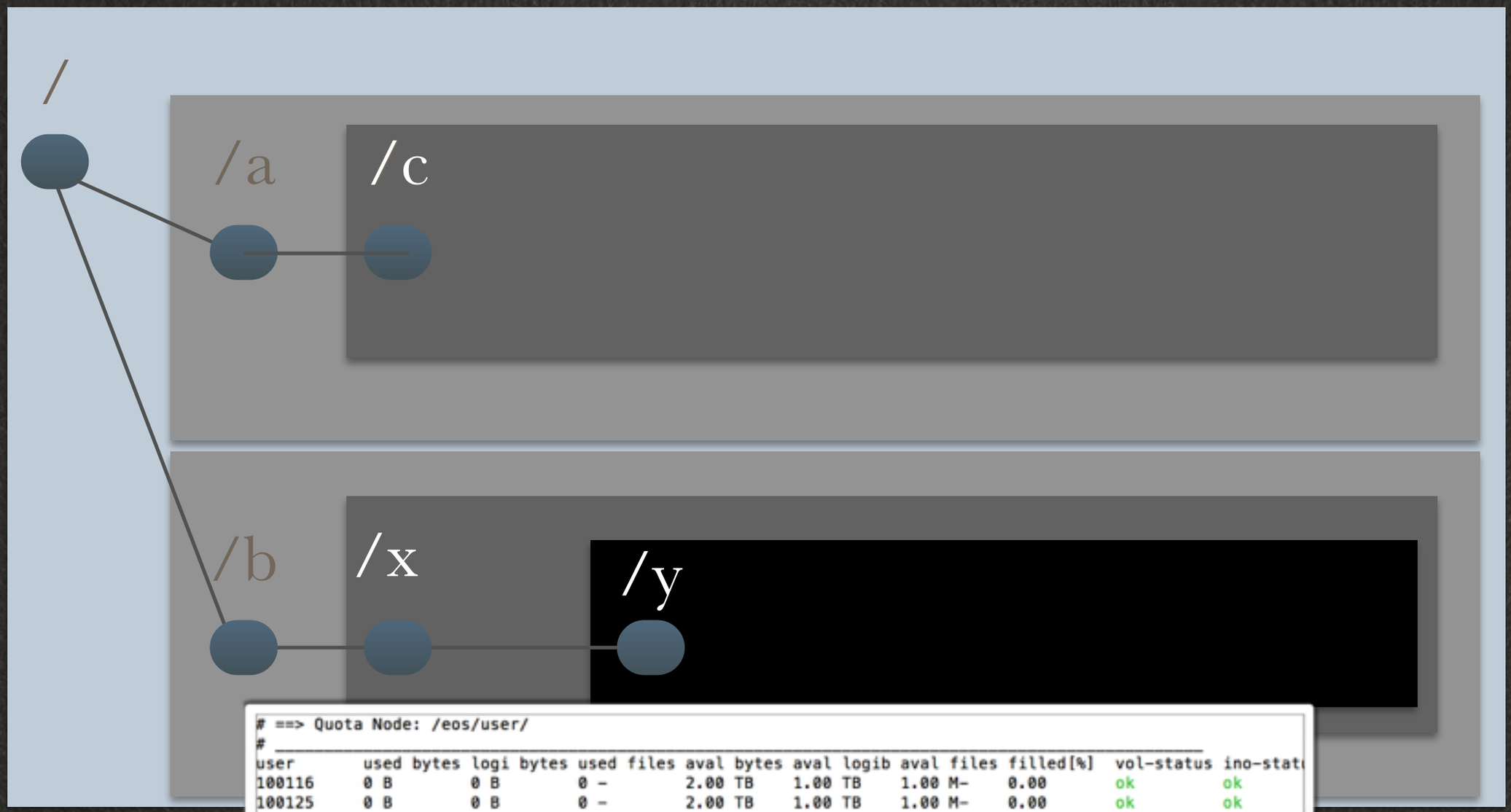
SRM-less operation

- deletion via
  - XRootD `xrdfs rm`
  - HTTP `DELETE`
  - gridftp `GLOBUS_GFS_CMD_DELE`
  - FUSE `unlink`
- checksum via
  - XRootD `xrd query checksum`
  - HTTP `header`
  - FUSE `getxattr`
  - gridftp `GLOBUS_GFS_CMD_CKSM`

SRM-less operation

- space query via
  1. EOS quota interface
     - `eos quota ls`
     - `df /eos/`
     - `xrdfs query space / (physical space) or <path> (group-sum/project accounting)`
  2. subtree accounting
     - **WebDAV** `propfind`
       - `quota-available-bytes`
       - `quota-used-bytes`
     - **`stat`** `<dir>` **`, ls -l`** `<dir>`
       - subtree size in st.st_size

Quota Interface

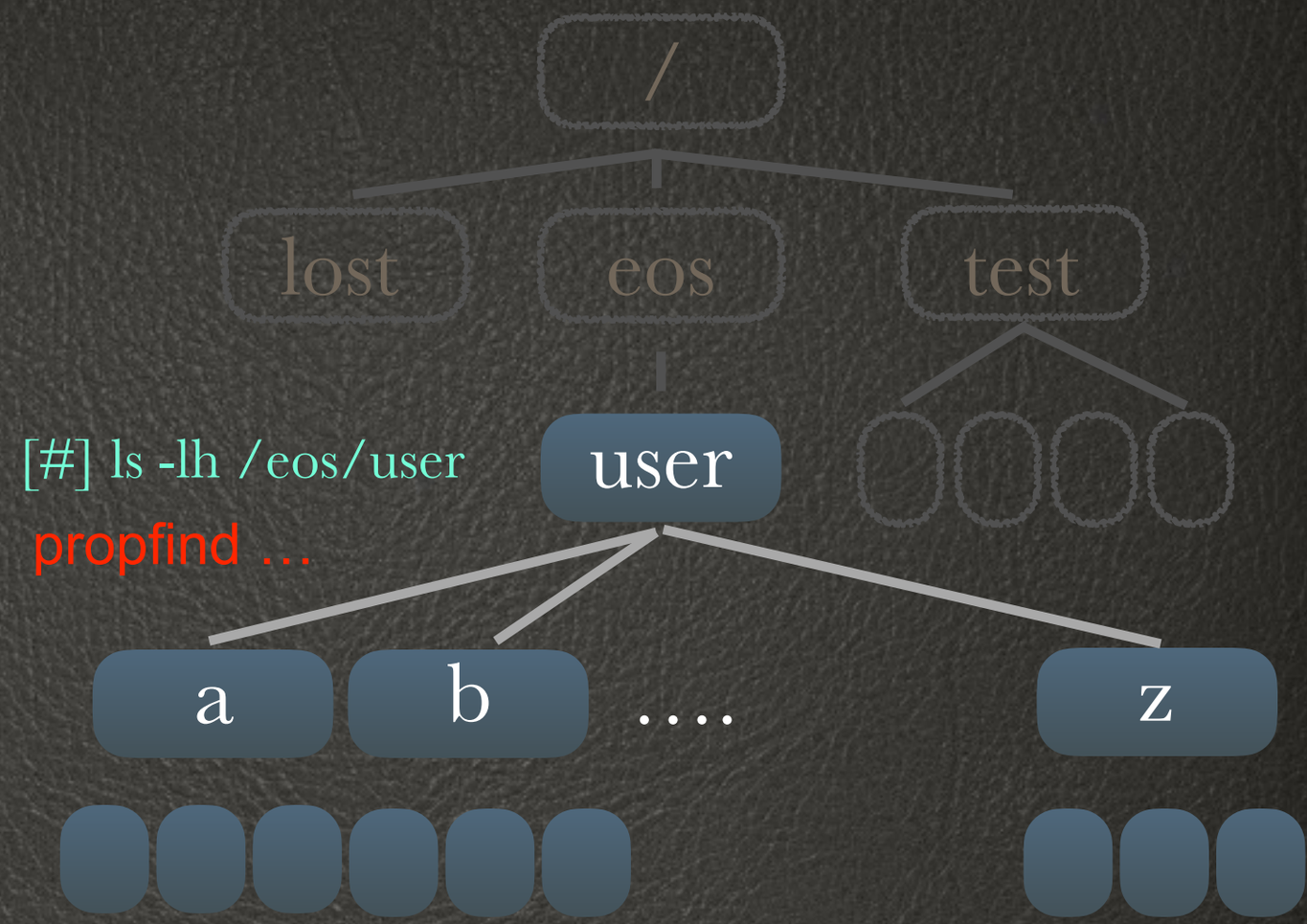



```
# ==> Quota Node: /eos/user/
# ____________________________________________________________________________________________________
user       used bytes  logi bytes  used files  aval bytes  aval logib  aval files  filled[%]  vol-status  ino-stat
100116     0 B         0 B         0 -         2.00 TB     1.00 TB     1.00 M-     0.00       ok          ok
100125     0 B         0 B         0 -         2.00 TB     1.00 TB     1.00 M-     0.00       ok          ok
100461     0 B         0 B         0 -         2.00 TB     1.00 TB     1.00 M-     0.00       ok          ok
100549     0 B         0 B         0 -         2.00 TB     1.00 TB     1.00 M-     0.00       ok          ok
100773     0 B         0 B         0 -         2.00 TB     1.00 TB     1.00 M-     0.00       ok          ok
100937     0 B         0 B         0 -         2.00 TB     1.00 TB     1.00 M-     0.00       ok          ok
102        0 B         0 B         0 -         2.00 TB     1.00 TB     1.00 M-     0.00       ok          ok
117        0 B         0 B         0 -         2.00 TB     1.00 TB     1.00 M-     0.00       ok          ok
12661      59.29 GB    29.64 GB    2081 -      2.00 TB     1.00 TB     1.00 M-     2.96       ok          ok
12670      457.18 MB   228.59 MB   1 -         2.00 TB     1.00 TB     1.00 M-     0.02       ok          ok
136        140 B       70 B        1 -         2.00 TB     1.00 TB     1.00 M-     0.00       ok          ok
1379       295.21 MB   147.60 MB   3 -         2.00 TB     1.00 TB     1.00 M-     0.01       ok          ok
14104      22.78 kB    11.39 kB    17 -        2.00 TB     1.00 TB     1.00 M-     0.00       ok          ok
```

Quota accounting provides physical & logical accounting!

Subtree Accounting

```
drwxr-xr-x. 1 daemon root  180G Sep  7 14:48 z
bash-4.1$ ls -lh /eos/user/
total 0
drwxr-xr-x. 1 daemon root     0 Dec 15  2014 0
drwxr-xr-x. 1 daemon root   13T Sep 12 11:23 a
drwxr-xr-x. 1 daemon root  3.3T Sep 12 12:57 b
drwxr-xr-x. 1 daemon root  3.8T Sep  6 15:54 c
drwxr-xr-x. 1 daemon root  3.0T Sep  9 12:18 d
drwxr-xr-x. 1 daemon root  2.8T Sep  9 17:41 e
drwxr-xr-x. 1 daemon root  1.9T Sep  8 10:24 f
drwxr-xr-x. 1 daemon root  6.4T Sep  2 14:31 g
drwxr-xr-x. 1 daemon root  2.4T Sep  9 21:59 h
drwxr-xr-x. 1 daemon root  392G Sep  5 18:15 i
drwxr-xr-x. 1 daemon root  8.7T Sep 12 00:28 j
drwxr-xr-x. 1 daemon root  2.7T Sep 11 17:59 k
drwxr-xr-x. 1 daemon root  6.9T Sep  6 17:23 l
drwxr-xr-x. 1 daemon root  9.7T Sep 11 12:58 m
drwxr-xr-x. 1 daemon root  3.8T Sep 12 11:03 n
drwxr-xr-x. 1 daemon root  639G Sep  1 16:04 o
drwxr-xr-x. 1 daemon root  4.7T Sep 12 10:02 p
drwxr-xr-x. 1 root   root  127T Oct  6  2014 proc
drwxr-xr-x. 1 daemon root  244G Aug  3 11:08 q
drwxr-xr-x. 1 daemon root  5.0T Sep  9 14:59 r
drwxr-xr-x. 1 daemon root  5.7T Sep  9 17:01 s
drwxr-xr-x. 1 daemon root  7.6T Sep  2 18:21 t
drwxr-xr-x. 1 daemon root 1007G Aug 11 09:29 u
drwxr-xr-x. 1 daemon root  1.9T Sep  4 21:17 v
drwxr-xr-x. 1 daemon root  667G Sep  6 13:13 w
drwxr-xr-x. 1 daemon root  891G Sep  8 16:27 x
drwxr-xr-x. 1 daemon root  2.3T Sep  8 12:10 y
drwxr-xr-x. 1 daemon root  180G Sep  7 14:48 z
bash-4.1$
```



Subtree accounting currently enabled only in EOSUSER
[used by CERNBOX]

SRM-less operation

- possible today without further development
  - SRM free FTS transfers for ATLAS since long
    - gridFTP servers are deployed as gateway machines
  - straight-forward to provide a quota output wrapper script to publish an agreed output format
  - up to experiment to use SRM-less operation but highly desired to decommission BestMan

Thank
you!

EOS
Open Source Storage