RAL site update

George Patargias on behalf of the Antares team

pre-GDB Tape Evolution

07/11/2023

Introduction

➢ **Two main storage endpoints at RAL**

- ✓ **Echo: Ceph cluster for disk storage**

- ✓ **Antares: EOS/CTA instance for tape storage**

➢ **Antares main features**

- ✓ **Tier-1 EOS cluster: 13 x 1.5TB SSD nodes**

- ✓ **Facilities EOS cluster: 2 x 3.5TB + 7 x 1.5TB SSD nodes**

- ✓ **Tier-1 tape library: 20 x TS1160, 14 x LTO9 drives**

- ✓ **Facilities tape library: 28 x TS1160, 12 x LTO8, 6 x LTO9 drives**

- ✓ **EOS: 4.8.105-1, CTA: 4.8.7-1**

Recent developments

➤ **May 2023: Minor version upgrade to EOS 4.8.98 and CTA 4.8.7 and enabled HTTP Tape REST API**

➤ **June 2023: CASTOR Facilities migration to Antares completed**

➤ **August 2023: CASTOR decommissioned at RAL!**

CASTOR Facilities migration

➤ **The last CASTOR to CTA migration**

➤ **Data migrated: ~13.3 million files (>100PB)**

➤ **More complex than the Tier-1 data migration**

- ✓ **Integrate Facilities client code with EOS-CTA**

- ✓ **Remove FileID clashes with ~100,000 Tier-1 files**

- ✓ **Care for the dual-copy tape pools**

Antares: Current setup
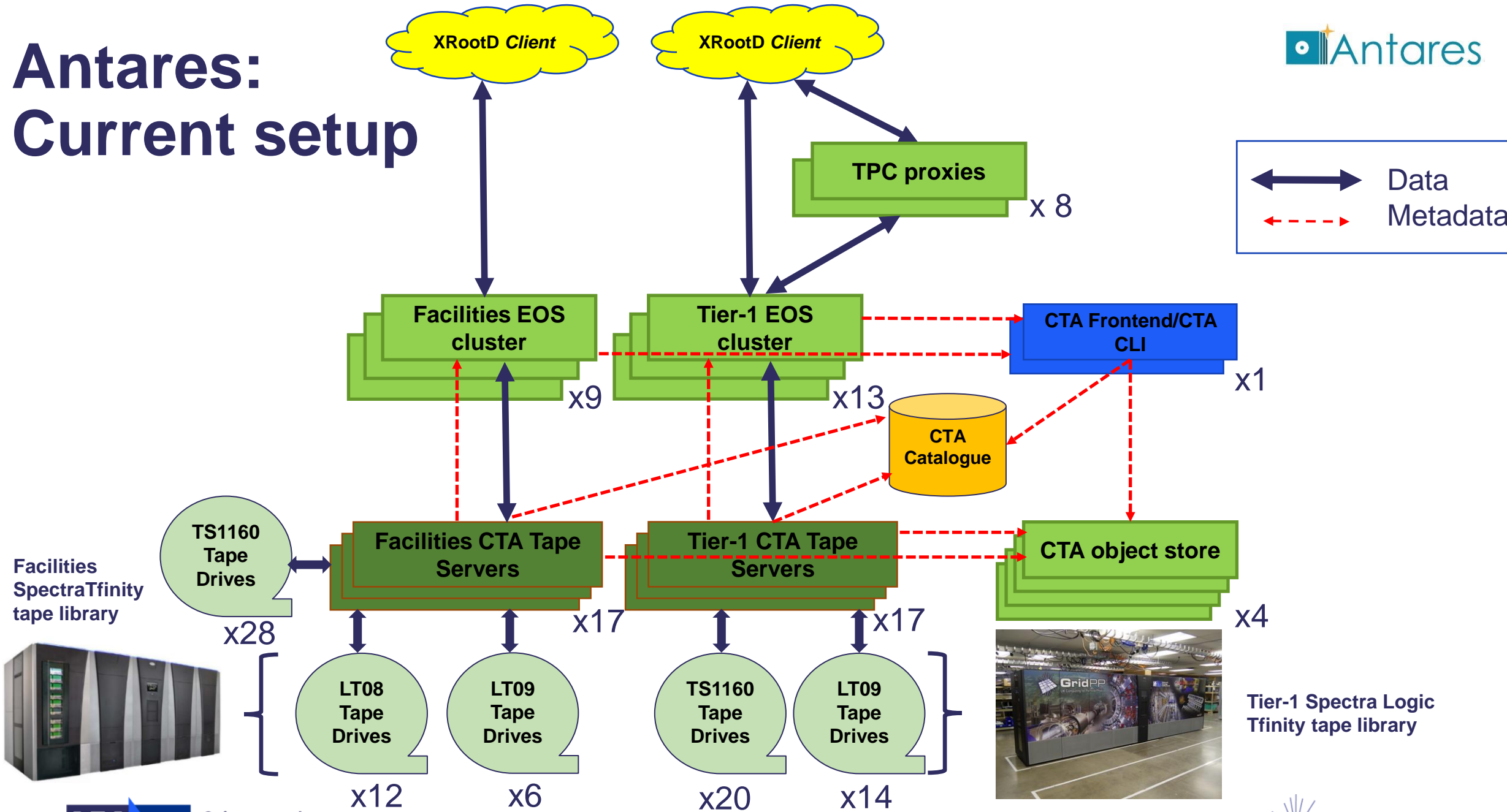
RAL site update

Experiment file sizes

➢ **For LHC, the max file size is limited to 128GB**
  - **For local users 1.1TB**

➢ **Small SSD buffer that fixes the files in place until archived/recalled**

➢ **Size of the largest available EOS FS determines CTA max file size**

➢ **CTA max file size may need change due to some uncertainty in the size of the file aggregates that Facilities ingest servers send to Antares**

➢ **What is CTA max file used by other sites?**

Antares Tier-1

➢ **LHC Run-3 ingest rates are achieved**

atl23 pool growth rate
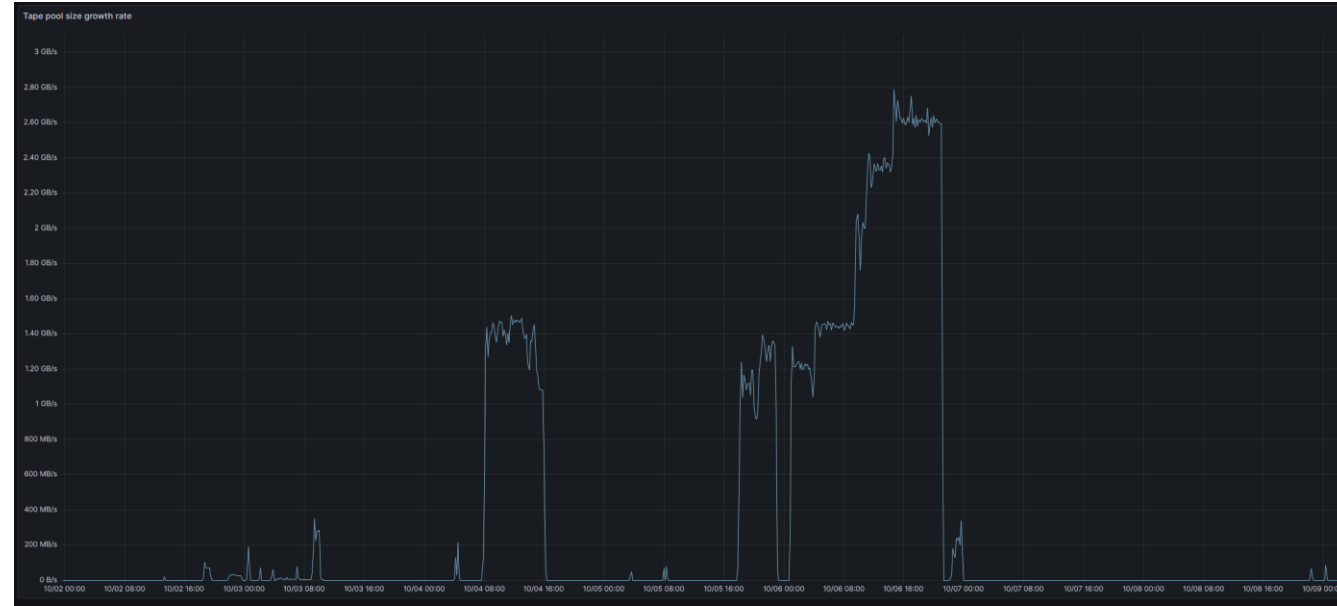
➢ **Initially, only XRootD access was offered to LHC users**

- **Use TPC proxies for external transfers**
- **Combine with WebDAV by doing multi-hop transfers**

➢ **WebDAV fully enabled**

- **Used by ATLAS and LHCb**
- **Deployed fix (EOS 4.105) for the bug that disrupted ATLAS recalls**

CTA Databases

➢ **Until August, the Antares DB was a 3 node RAC**

➢ **The DBA team decided that a third node was not needed – DB load very low**

➢ **CTA Oracle service is running on a single node anyway**

➢ **The two Oracle nodes removed from CTA were used to create a new OL8 DB**

Future plans

➢ **Upgrade to EOS5 following CERN**

➢ **Run cta-taped in a container**

➢ **Plan and carry out upgrade to Rocky 9**

➢ **Transition to LTO media**

Tape storage for SKA

- **Construction phase expected to finish 2028**
  - **Marking start of full operations**
- **Keep recent (and popular) data on disk**
- **Custodial data archived to nearline storage**
- **Current estimates suggest ~ 1 Exabyte of data to tape (or equivalent nearline storage) (including replicas for resilience).**
- **Increasing linearly per year.**
- **UK will represent up to O(15-20)% of SKA data.**