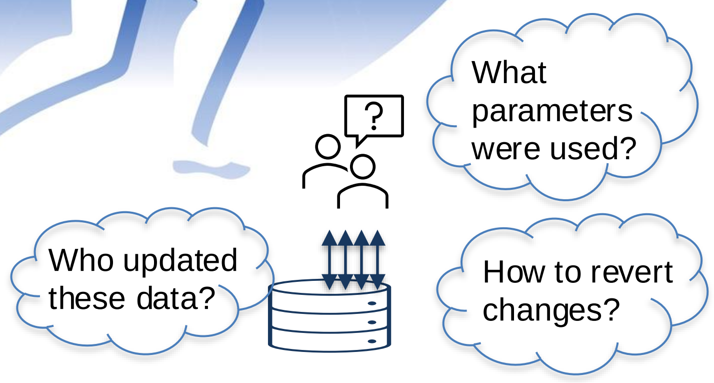
THE GIT BASED ATLAS DATA ACQUISITION CONFIGURATION SERVICE IN LHC RUN 3



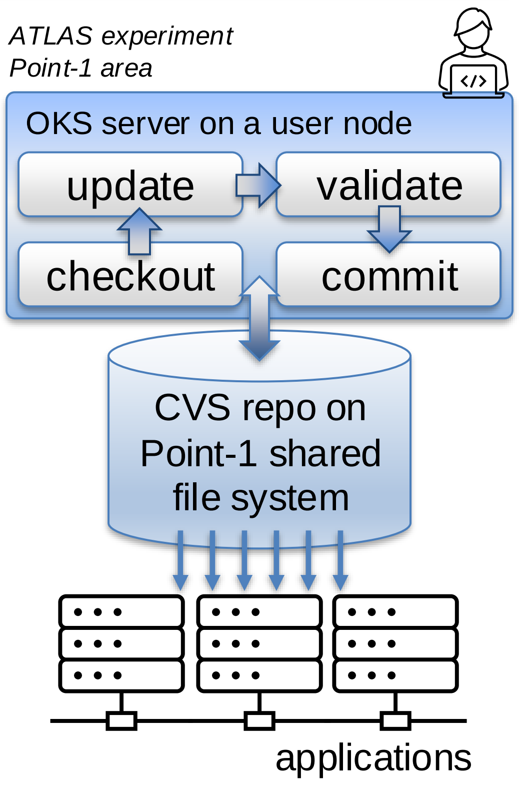
[1] "The OKS persistent in-memory object manager"
R. Jones, L. Mapelli, Y. Ryabov, I. Soloviev,
IEEE Transactions on Nuclear Science 45, 1958 (1998)

WHY DO WE NEED A VERSION CONTROL SYSTEM

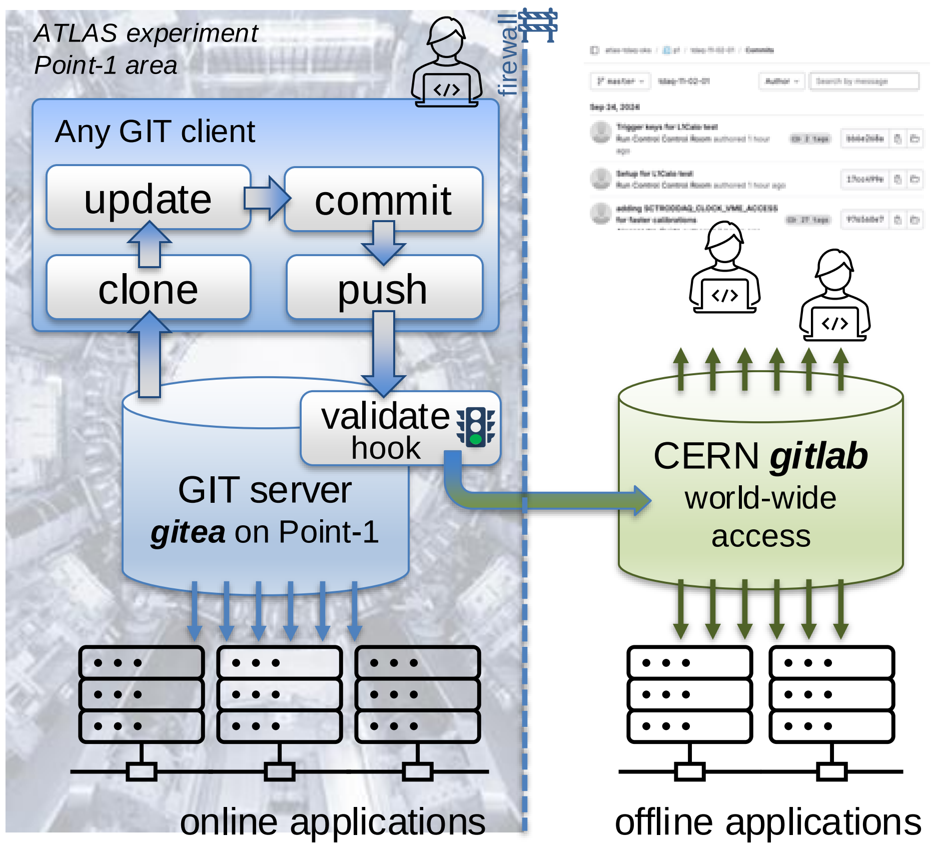
- ❑ The service provides the data taking configuration parameters describing ~50K online processes distributed on more than 3K nodes with details of their control, monitoring, diagnostic, recovery, data-flow and data quality configurations, as well as connectivity and parameters for various modules, chips and channels
- ❑ The parameters are stored in thousands OKS[1] XML files and updated by many experts tens times per day
- ❑ Key requirements: consistency of the data, performance, role-based access control, traceability of modifications, archiving

SOLUTION BEFORE RUN 3 AND NEED TO CHANGE

- ❑ CVS-based "OKS server" was successfully used by the configuration service during Runs 1 and 2
  - ❑ put intermediate layer between OKS file storage and CVS repo to verify consistency of OKS data and implement role-based user authorisation before performing CVS commit
- ❑ However, CVS became obsolete: no development since 2008, pushed out by SVN and GIT successors
- ❑ Few design and implementation limitations of the CVS-based OKS server implementation:
  - ❑ low security, no CVS interface exposed to users: validation-and-commit by privileged OKS application with special suid execution bit and environment variables
  - ❑ limited reliability, no CVS server used: client updated shared file system after successful commit
  - ❑ an application restarted during a run can read different configuration in case of new commits
  - ❑ no atomic commits: potentially might leave repository in inconsistent state on a commit failure
- ❑ It was decided to reimplement OKS repository using GIT and overcome known CVS-based issues
  - ❑ demonstrates many benefits, profits from expertise and commitment by ATLAS software experts
  - ❑ the most widely used version control system



NEW GIT-BASED IMPLEMENTATION



master
tdaq-11-02-01
Author
Search by message
Sep 24, 2024
Trigger keys for L1Calo test
Run Control Control Room authored 1 hour ago
Setup for L1Calo test
Run Control Control Room authored 1 hour ago
adding SCTRODDAQ_CLOCK_VME_ACCESS for faster calibrations

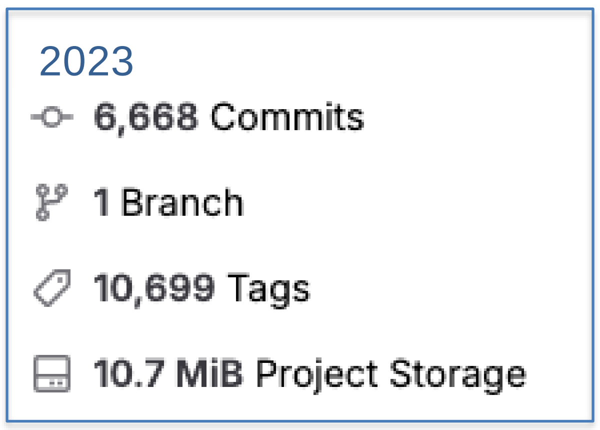
- ❑ Use *gitea* as a git server on Point-1 (ATLAS experiment area)
  - ❑ run on VM to provide high availability of service
- ❑ Implement configuration consistency verification, user authentication and authorisation as a **GIT hook**
  - ❑ the GIT interfaces are exposed to user and **any tools** can be used to access and update OKS files including git server built-in web interface
  - ❑ implement secure client authentication using **JWT** (JSON Web Tokens**)**
- ❑ **Atomic commits** of all changes in one push
- ❑ **No** need for a **shared file system**: an application makes a clone of OKS repository on a local file system
- ❑ Run **configuration preservation** for any (also restarted) application
  - ❑ access configuration version by GIT tag or commit hash
- ❑ Allow merge request for postponed changes
- ❑ Synchronisation of Point-1 gitea repository with CERN gitlab
  - ❑ provides read-only access to any ATLAS user world-wide
  - ❑ can be used to easily get OKS configuration for any past ATLAS run, eliminates a necessity for extra configuration archival into Oracle

PERFORMANCE

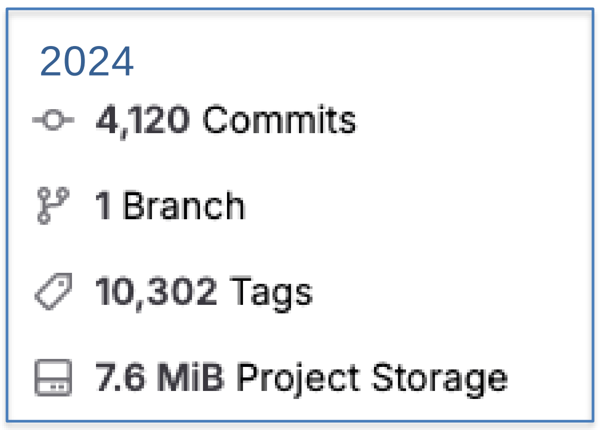
- ❑ 5 seconds to create new configuration on Point-1 including user authentication, authorisation, OKS consistency checks and gitea commit itself
- ❑ Less than 2 seconds to get historical data from gitlab:

```
lxplus$ time oks_clone_repository
1.81 user 0.59 system 0:01.68 elapsed 142% CPU
lxplus$ du -sh .
86M     .
```

OKS GIT REPOSITORY STATISTICS



2023
6,668 Commits
1 Branch
10,699 Tags
10.7 MiB Project Storage



2024
4,120 Commits
1 Branch
10,302 Tags
7.6 MiB Project Storage

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