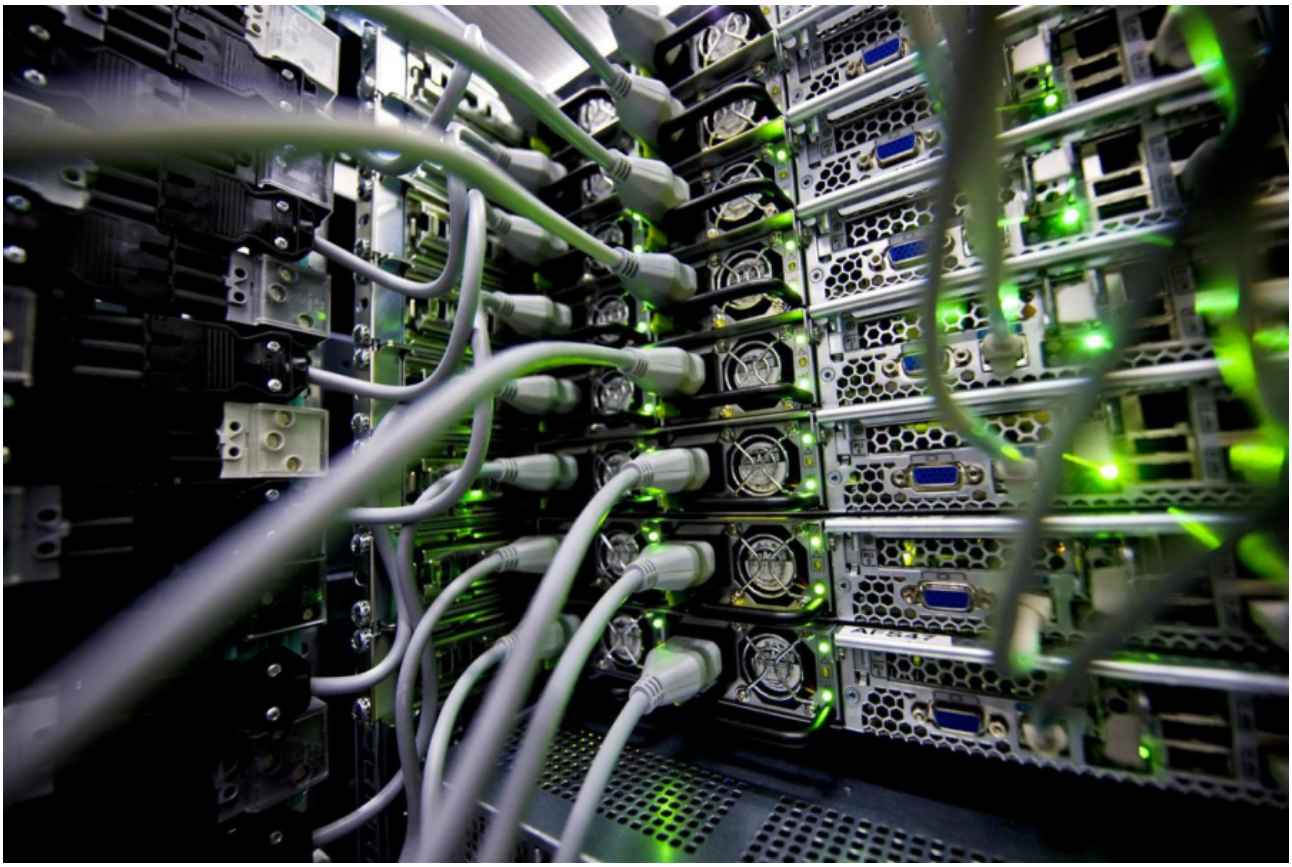
INFN-CNAF Tier-1 User Guide (April 2023 - v16)



INFN-CNAF Tier-1 user guide
Summary

1. CNAF
2. Tier-1
3. Bastion & user interfaces
    a. x2go
4. Farming
5. Storage
6. The HPC cluster
    a. Account Request
        i. Access
    b. SLURM architecture
        i. Check the cluster status with SLURM
    c. The structure of a basic batch job
        i. Submit basic instructions on Slurm with srun
        ii. #SBATCH options
        iii. Advanced batch job configuration
        iv. Retrieve job information
        v. Killing a submitted job
    d. Submission examples
        i. Simple batch submit
        ii. Simple MPI submit
        iii. Simple GPU submit
        iv. Simple Python submit
        v. Python submit with a virtual environment
    e. Migrating from LSF
    f. Environment Modules
7. Cloud @ CNAF
8. Digital Personal Certificates and Proxies management

    a. Manual proxy extension
9. Job submission
    a. HTCondor jobs
        i. Submit local jobs
        ii. Submit Grid jobs
        iii. Experiment share usage
    b. Examples
        i. Multiple job submission
        ii. CPUs, GPUs and RAM requests
        iii. Jobs with ROOT-program as executable
    c. Singularity in batch jobs
        i. Obtain images
        ii. Create a new image using a recipe (expert users)
        iii. Run software
    d. Jupyter notebook in interactive batch jobs
        i. File persistency and quota
        ii. User environment customization
        iii. Conda environment creation
        iv. Software installation in a Conda environment
    e. DAG Jobs
        i. Example
10. Data Transfers
    a. Data transfers without SRM
    b. Data transfers with SRM
        i. Gfal utils
        ii. ClientSRM utils
    c. XrootD (extended ROOT deamon)
    d. Data transfers using http endpoints
        i. Proxies
            1. Third-party-copies
        ii. Tokens
            1. Curl examples
            2. Data transfers inside a job
    e. Tape
        i. Check if the file is on the disk (using local POSIX commands)
        ii. Check if the file is on the disk (with Grid tools using VO based authentication)
        iii. Migrate files on tape
        iv. Recall files from tape (using Grid tools with VO-based authentication)
        v. Recall files from tape (without Grid tools)
    f. StoRM Tape REST API
        i. Check if a file is on disk/tape (archiveinfo)
        ii. Recall files from tape (stage request)
        iii. Delete a stage request
        iv. Release a file
11. Monitoring
    a. Monitoring with Grafana
12. Helpful information and tips
    a. How to use Python libraries in a conda virtual environment
        i. On a user interface
        ii. In a HTCondor job
    b. Other tips
    c. How to import users from a VOMS server to IAM (expert users)
13. Support
14. Problem report
15. Appendix A - Submit Description File Commands
16. Appendix B - Helpful links
17. Bibliography