



CMS Software on CVMFS

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CMS CVMFS repos

cms.cern.ch

- **CMS Offline Software**
 - CMSSW Releases: 1000+ full, 600+ patch
 - CMSSW Github mirror (once a day)
- **CMS Computing Tools/Software**
 - CRAB: Grid job submission tools
 - PhEDEx agents: File transfer scripts for sites
 - Spacemon-client: Storage Element (SE) space accounting tools



CMS CVMFS repos

cms.cern.ch

- **CMS configuration and datafiles**
 - SITECONF: Site specific configuration (dynamic symlink)
 - GridPacks: Generators input files
 - LHAPDF: Parton Density Functions files
- Deployment is done via cron jobs
- No CVMFS GC



CMS CVMFS repos

cms-ib.cern.ch

- **Dedicated for CMS Offline SW Integration Builds(IBs)**
 - 11 Open CMSSW Release cycles, multiple archs/OS/gcc
 - Every 12 hours build new IBs
 - Build only if there are changes.
 - Sunday morning, force build all release cycles (30+ IBs)
 - 2-30mins publish time/IB
 - Keep two weeks worth of IBs on CVMFS
 - On avg./week: 120 IBs (70% full IB), 500GB, 12M files



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- **CMS Ref. datafile and configuration**
 - SITECONF: Customised site configuration for IBs
 - Reference data for CMSSW Github Pull Requests test/comparison
- Github repositories mirrors (updated on every push)
- Push model for deployment (Jenkins-CI)
- CVMFS GC runs once a week
- No CVMFS auto-tagging



SW Deployment Issues

Architectures/OS

- Installation for different architectures/OS
 - SLC5/6, CC7, Fedora
 - amd64, aarch64, ppc64, ia32 (not any more):
- Docker containers
- PRoot and QEMU
- Install and rsync changes to CVMFS
- EOS client to deploy GridPacks



SW Deployment Issues

Catalog size

- Large catalog size causes slow response to cvmfs clients
- CMSSW full release contains 75K+ files
 - CMSSW/src tree alone is 63K+
- Manual sub-cataloging is needed from time to time



SW Deployment Issues

Parallel Installation

- Can not deploy software in parallel e.g.
 - Two or more CMSSW releases for different arches
 - CMSSW releases and Computing SW Tools
 - GitHub Repositories mirrors
 - Data files: GridPacks, LHAPDF etc.



Other Issues

- Low frequency
 - CVMFS publish operation stuck specially when run under PRoot/QEMU
 - Abort and restart transaction
- File corruption in local cvmfs clients cache
 - ***cvmfs_config fsck*** + delete the corrupted file(s)