Online SW: CMake

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Introduction

- CMake vs CMT
  - ATLAS is moving from CMT to CMake as software build tool
    - CMT: home grown HEP tool, recent development in/for ATLAS
    - CMake: open source, widely used, supported commercially
  - Both aimed at building multiple packages
    - CMT does it one at a time via a "use" hierarchy
    - But CMake configures the whole project and builds it all at once
    - Significantly faster: minimum ~15 minutes for complete L1Calo build
      - With colourful output…

```
Scanning dependencies of target l1isenums
[ 14%] Building CXX object isL1Calo/CMakeFiles/l1isenums.dir/cxx/GeneratorType.cxx.o
[ 14%] Linking CXX executable l1calo_send_ers
[ 14%] Built target l1calo_send_ers
Scanning dependencies of target JAR_dalL1Calo_l1calo_dal
[ 14%] Generating CMakeFiles/l1calo_dal_jar.dir/java_class_extras
[ 14%] Built target JAR_dalL1Calo_l1calo_dal
Scanning dependencies of target JAR_defsL1Calo_l1calo_defs
[ 14%] Generating CMakeFiles/l1calo_defs_jar.dir/java_class_extras
[ 14%] Built target JAR_defsL1Calo_l1calo_defs
Scanning dependencies of target JAR_isL1Calo_l1calo_is
[ 14%] Generating CMakeFiles/l1calo_is_jar.dir/java_class_extras
[ 14%] Linking CXX executable istest
[ 15%] Building CXX object halCore/CMakeFiles/halCore.dir/src/Comparator.cxx.o
[ 15%] Built target JAR_isL1Calo_l1calo_is
```

CMake Basics

- Simple language => instructions to build package
  - CMakeLists.txt in each package (like cmt/requirements)
  - Also project level CMakeLists.txt
  - Additional *.cmake files with common functions
  - "make" configures the system, writes Makefiles, then builds
- Mostly we use functions provided by TDAQ
  - Some L1Calo custom actions in an L1Calo.cmake file
- New packages
  - L1CaloCMake: project level CMakeLists.txt
  - cmakeCommon: for L1Calo.cmake (shared with RxGain project)
  - New scripts: under development
    - Depends a bit on possibly using TDAQ infrastructure for building SW and on changes with eventual move to git

CMake Status

- Basically all done
  - Implemented CMakeLists.txt for all(*) L1Calo packages
    - Also all receiver packages (RxGain project)
    - (*) Taken opportunity to purge some obsolete packages and software
    - Also tried not to install anything not strictly needed
      - If your favourites are missing they can easily be added back (cmxTest scripts?)
  - Will test a partition when tdaq-06-02-00 OKS files available
- Even documented!
  - Reiner has a nice twiki with instructions for TDAQ users:
    - https://twiki.cern.ch/twiki/bin/viewauth/Atlas/DaqHltCMake
  - I made something similar with L1Calo specific CMake stuff:
    - https://twiki.cern.ch/twiki/bin/view/Atlas/LevelOneCaloOnlineCMake
  - Links for CMake itself:
    - https://cmake.org/cmake/help/v3.6/manual/cmake-language.7.html
    - https://cmake.org/cmake/help/v3.6/manual/cmake-commands.7.html

Issues and Next Steps

- Issues
  - DetCommon is now on CVMFS (not AFS)
    - Must either install CVMFS client or use locally installed DetCommon RPM
  - LCG CMake insists on SLC (or Ubuntu or CentOS) and does not recognise non-CERN Scientific Linux (as used at QMUL)
    - Can hopefully be fixed…
- Next Steps
  - Try running test rig partition when TDAQ OKS is available
  - More work on scripts, nightly builds etc
    - Maybe use virtual build machines and CMake dashboards as TDAQ do
      - => Discuss with Reiner
  - Get some other L1Calo developers to try it
  - Move SW repository to gitlab
    - After end of data taking: less need for new releases or patches