



ATLAS Software on 64-bit Processors

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- ◆ ATLAS software structure
 - ◆ Project (Packages) Builds -> (nightly releases)
 - ◆ Development Releases (present: 12.3.x)
 - ◆ Production Releases (present 12.0.x)
- ◆ First 64 bit ATLAS Release: 12.3.0
 - ◆ CMTCONFIG=x86_64-slc4-gcc34-dbg
 - ◆ Release Number 12.3.0:
AtlasOffline, AtlasProduction
 - ◆ Release Number 2.3.0:
AtlasTrigger, DetCommon, AtlasAnalysis, AtlasCore,
AtlasEvent, AtlasSimulation, AtlasConditions,
AtlasReconstruction,

- ◆ Installation + Environment:
 - ◆ Create the installation directory
 - ◆ Use: `pacman -get am-CERN:12.3.0`
 - ◆ Requirements file in the `cmthome` directory

```
set CMTSITE STANDALONE
set SITEROOT /usr1/scratch/atlas/software/12.3.0
macro ATLAS_DIST_AREA /usr1/scratch/atlas/software/12.3.0
macro ATLAS_TEST_AREA /usr1/scratch/hvogt/testarea
apply_tag projectArea
macro SITE_PROJECT_AREA ${SITEROOT}
macro EXTERNAL_PROJECT_AREA ${SITEROOT}
apply_tag setup
apply_tag simpleTest
use AtlasLogin AtlasLogin-* $(ATLAS_DIST_AREA)
set CMTCONFIG x86_64-slc4-gcc34-dbg
set DBRELEASE_INSTALLED 2.9.1
```

- ◆ Run:

```
cmt config
source setup.sh -tag=12.3.0
```

- ◆ Trying to run the Full Chain
(according to the ATLAS Workbook)

- ◆ Running HelloWorld

```
cd /usr1/scratch/hvogt/testarea/12.3.0
cmt co -r UserAnalysis-00-08-43 PhysicsAnalysis/AnalysisCommon/UserAnalysis
cd PhysicsAnalysis/AnalysisCommon/UserAnalysis/cmt
source setup.sh
gmake
cd ../run
get_files HelloWorldOptions.py
athena.py HelloWorldOptions.py
```

-> successful

- ◆ Running Pythia

```
get_files PDGTABLE.MeV
get_files jobOptions.pythia.py
athena.py jobOptions.pythia.py > athena_gen.out
```

-> fails

- ◆ Trying to run the Full Chain
(according to the ATLAS Workbook)

- ◆ Modifications required for Running Pythia

```
/usr1/scratch/atlas/software/12.3.0/
```

```
./AtlasSimulation/2.3.0/Generators/Lhapdf_i/cmt/requirements  
(replace -DFVOIDP=INTEGER*4 by -DFVOIDP=INTEGER*8)
```

```
./AtlasSimulation/2.3.0/Generators/Lhapdf_i/src/lhapdfc_common_block_address.F  
(replace FUNCTION by FVOIDP FUNCTION to be consistent)
```

```
./AtlasSimulation/2.3.0/Generators/Lhapdf_i/src/Address_c.cxx  
(replace extern "C" int adressc_ by extern "C" void* adressc_)
```

```
./AtlasEvent/2.3.0/Simulation/HepMC/HepMC/HEPEVT_Wrapper.h  
(replace long int by int in HEPEVT_Wrapper::write_byte_num)
```

```
./AtlasSimulation/2.3.0/Generators/Tauola_i/cmt/requirements  
(replace -DFVOIDP=INTEGER*4 by -DFVOIDP=INTEGER*8)
```

```
./AtlasSimulation/2.3.0/Generators/Pythia_i/cmt/requirements  
(replace -DFVOIDP=INTEGER*4 by -DFVOIDP=INTEGER*8  
add macro cernlib_fflags with -DFVOIDP=INTEGER*8)
```

- ◆ Running Pythia

-> ok.

- ◆ Trying to run the Full Chain
(according to the ATLAS Workbook)

- ◆ Simulating Events with Athena

-> fails

- ◆ Modifications required

```
/usr1/scratch/atlas/software/12.3.0/  
./AtlasConditions/2.3.0/MuonSpectrometer/MuonGeoModel/  
(-> "warning: comparison is always true due to limited range of data type")  
-> unsigned int must be changed to unsigned long (c++ string type) for  
./MuonGeoModel/DBReader.h, ./src/RpcReadoutElement.cxx, ./src/TgcReadoutElement.cxx
```

- ◆ Running Simulation

-> passes through

- ◆ Trying to run the Full Chain
(according to the ATLAS Workbook)

- ◆ Digitizing Events with Athena
-> failed to load modules: **AmdcAth**

- ◆ Modifications required

```
/usr1/scratch/atlas/software/12.3.0/  
./AtlasConditions/2.3.0/MuonSpectrometer/Amdcsimrec/AmdcAth/cmt  
(-> gmake fails with  
./external/fortran/gcc-v-4.2.0-20060924/gfortran64/irun/lib64/libgfortran.a )  
-> use libgfortran.so instead of libgfortran.a (-fPIC required)
```

- ◆ Running Digitization

-> starts running but fails in

```
./AtlasCore/2.3.0/Database/AthenaPOOL/AthenaPoolCnvSvc/src/AthenaPoolCnvSvc.cxx
```

-> must still be investigated

- ◆ Simulating Events with Sherpa
(seen in the Nightly Builds of Project: AtlasSimulation)

- ◆ Problem in package Generators/Sherpa_i
-> cannot find -lAmegicPSGen

- ◆ Requires the complete reinstallation of

```
/usr1/scratch/atlas/software/12.3.0/
```

```
./external/sherpa/sherpaV1.0.8/SHERPA-MC-1.0.8
```

```
-> run "gmake distclean ;TOOLS/makeinstall -c"
```

```
./AtlasSimulation/2.3.0/Generators/EvtGen_i/cmt
```

```
-> run "cmt config ; source setup.sh ; gmake"
```

- ◆ Running Sherpa in

```
external/sherpa/sherpaV1.0.8/SHERPA-MC-1.0.8/SHERPA-1.0.8
```

```
-> ok.
```


Summary

- ◆ Main problem for the transition to 64 bit is the `int` vs. `long` laziness in the code
- ◆ All pointer types are now 8 Bytes long and require correct type declarations
- ◆ Fortran coded parts of ATLAS software must be wrapped to C++ taking into account the 64 bit address space
- ◆ Shared libraries require the `-fPIC` compiler option
- ◆ 64-bit modifications are reported to David Quarrie