

Installing the ATLAS Offline Software

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“Setting Up a Tier 3 Center (I)” Session

Introduction

- This talk is about installing the ATLAS offline SW.
- It is NOT about:
 - Installing Trigger or Data Acquisition Software (HLT / TDAQ)
 - Installing Grid Middleware (OSG, LCG, EGEE)
 - Installing the ATLAS Production System (Panda)
 - Installing Distributed Database tools (DDM, DQ2)
- All of the information is based on the ATLAS Twiki:
<http://twiki.cern.ch/twiki/bin/view/atlas/WebHome>
- In particular most of the information is taken from the “ATLAS WorkBook” and the ATLAS Computing Twiki:
<https://twiki.cern.ch/twiki/bin/view/Atlas/WorkBook>
<https://twiki.cern.ch/twiki/bin/view/Atlas/AtlasComputing>
- New users should start with the WorkBook!

Introduction (Continued)

- The first part of the talk follows the WorkBook sect.:
<https://twiki.cern.ch/twiki/bin/view/Atlas/WorkBookInstallingAtlasSoftware>
- Installing Athena takes three steps:
 1. Installing Pacman (the software installation tool)
 2. Installing Athena (the offline software)
 3. Validating the Installation (not strictly required but do it!)
- To see what software versions are available:
<http://atlas-computing.web.cern.ch/atlas-computing/projects/releases/status/>
- Pacman installs the environment automatically. Versions of two key packages matter the most:
 - CMT (a code management tool which builds make files)
 - gcc (the C++ compiler)
- If things don't work, you probably have a wrong version of one these in your PATH.
 - The versions of CMT and gcc change with each release!

Software Numbering Scheme

- ATLAS has three types of releases:
 1. Production releases which are most suitable for Tier 3s.
 - Numbered N.0.X[.Y] - currently 12.0.7 & 13.0.10.
 - The [.Y] is the patch level and is should be used by experts.
 - This talk demonstrates installing 12.0.6.
 2. Development releases are intended for active code developers (though may be needed at times for a Tier 3).
 - Numbered N.X.0 - currently 13.1.0.
 3. Nightly builds for experts.
 - Numbered rel_0 - rel_6 and only kept for 7 days.

First Step: Pacman

- This talk demonstrates the method of installing a single version of Athena into a single directory tree.
 - Do not install another Athena version in the same directory.
- Login to an clean session - root privilege is NOT needed but do use a special account to own the SW.
- cd to the install area:

```
> cd ../AthenaTestInstall # Use whatever name you like
```

- Get Pacman from Saul Youssef's server at BU:

```
> wget http://physics.bu.edu/pacman/sample_cache/tarballs/pacman-  
latest.tar.gz  
> tar -zxf pacman-latest.tar.gz  
> rm pacman-latest.tar.gz  
> cd pacman-  
> source setup.[c]sh  
> cd ..
```

OR

- Use the Pacman version on AFS if AFS is available:

```
> source /afs/cern.ch/atlas/software/pacman/pacman-  
latest/setup.[c]sh
```

- The Athena installation will include a recent Pacman.

Second Step: Get the Software

- You need to pick a software mirror. The choices are:

am-CERN (CERN/Tier 0)

am-BNL (Brookhaven National Laboratory/US Tier 1)

am-RAL (Rutherford Laboratory/UK Tier 1)

am-BU (Boston University/Northeast US Tier 2)

am-IHEP (IHEP/China)

am-IU (Indiana University/Midwest US Tier 2)

am-UM (University of Michigan/Great Lakes US Tier 2)

- Choose the mirror closest (network-wise) to the machine where the software is being installed.

- Test that Pacman is working correctly:

```
> pacman -lc am-IU      # Choosing the IU mirror.
```

```
[...] # Lots of lines of output see next slide...
```

Second Step: Continued

- After ~30-60 s, you see lots of output similar to this:

```
am-IU <| ATLAS
Generic
  [ ] 11.2.0
  [ ] 11.3.0
  [ ] 11.3.0+KV
  [...] # Hundreds of lines of output
  [ ] uuid_1_38_x86_64_slc4_gcc34_opt
Mirror of: ATLAS
Created by: kallbac
Created on host: pacman
Platform: RHEL-3
Python version: 2.3.4 (#1, Apr 21 2005, 03:48:36)
  [GCC 3.3.5-20050130 (Gentoo Linux 3.3.5.20050130-r1, ssp-3.3.5.20050130-
  1, pie-
Pacman version: 3.20
Time of creation: Thu Mar 15 22:27:05 2007
Start of last successful -update-check: Tue Jun 5 12:01:01 2007
End of last successful -update: Tue Jun 5 12:10:51 2007
=> Up to date.
```

- The release to be installed should be on the list.
 - In this example, the release will be: [] 12.0.6 or 12.0.6+KV.

Second, Third Step: Install & Validate

- Now get create a directory and install:

```
> # Do not accidentally install under the Pacman directory tree just created
> cd ../AthenaTestInstall
> mkdir 12.0.6
> cd 12.0.6
> pacman -get am-IU:12.0.6+KV
Do you want to add [http://pacman.uits.indiana.edu/atlas/Atlas.mirror/] to
  [trusted.caches]? (y or n): y # Must answer y for install to continue
Package [am-IU:Generic:http://atlas-computing.web.cern.ch/atlas-
  computing/links/monolith/whole/Generic:12.0.6+KV] found in [am-IU]...
Package [am-IU:Generic:http://atlas-computing.web.cern.ch/atlas-
  computing/links/monolith/whole/Generic:12.0.6] found in [am-IU]...

[...] # Many lines - takes ~1 hour to install software and reach validation

Downloading [AtlasProduction_12_0_6_i686_slc3_gcc323_opt.tar.gz] from
  [http://pacman.uits.indiana.edu/atlas/Atlas.mirror/http_!!cern.ch!atlas-
  computing!links!kitsDirectory!projects!cache/o..fd8162a8df1654a548bc53033b
  370493]...
Untarring [AtlasProduction_12_0_6_i686_slc3_gcc323_opt.tar.gz]...
Downloading [JobTransforms-12-00-06-01.tar.gz] from
  [http://classis01.roma1.infn.it/pacman/cache/./packages/12.0.6.1]...
Untarring [JobTransforms-12-00-06-01.tar.gz]...
Downloading [KitValidation-01-09-13.tar.gz] from
  [http://classis01.roma1.infn.it/pacman/cache/./packages]...
Untarring [KitValidation-01-09-13.tar.gz]...

[...] # Kit Validation automatically sets up - continues on next slide
```

Third Step: Validation

- Validation output completes (after several hours):

```
About to execute: ./KitValidation/*/share/KitValidation -r 12.0.6 -p
/d2/AthenaTestInstall -kng -t /d2/AthenaTestInstall/KV-12.0.6/tmp --bw --project
AtlasProduction --disable
AthenaPoolTest.kvt,AthenaPoolNavigation.kvt,AthenaPoolCaloCluster.kvt,AthenaPoolElementLinks.kvt,RecExCommon.kvt,RecExToESD.kvt,ESDtoAOD.kvt,DC3
```

```
#####
##          Atlas Distribution Kit Validation Suite          ##
##          31-05-2007   v1.9.13-1                          ##
##                                                    ##
## Alessandro De Salvo <Alessandro.DeSalvo@roma1.infn.it> ##
#####
Testing AtlasProduction 12.0.6
athena executable           [ PASSED ]
athena shared libs         [ PASSED ]
Release shared libraries   [ PASSED ]
Release Simple Checks      [  OK  ]
Athena Hello World        [  OK  ]
ReadSiDetectorElements     [ PASSED ]
ReadTRTDetectorElements   [ PASSED ]
InDetDetDescr Example     [  OK  ]
MooEvent compilation      [  OK  ]
Pythia Event generation   [  OK  ]
/d2/AthenaTestInstall/12.0.6/KV-12.0.6/tmp
DC3 Z -> e e G4 event generation (python JT) [  OK  ]
/d2/AthenaTestInstall/12.0.6/KV-12.0.6/tmp
DC3 Z -> e e G4 event atlasG4 (python JT)   [  OK  ]
/d2/AthenaTestInstall/12.0.6/KV-12.0.6/tmp
DC3 Z -> e e Digitization (python JT)      [  OK  ]
/d2/AthenaTestInstall/12.0.6/KV-12.0.6/tmp
DC3 Z -> e e event reconstruction (python JT) [  OK  ]

#####
## AtlasProduction 12.0.6 Validation [  OK  ]
#####
```

How to Update Your Installation

- Use “pacman -update” to bring the installation up to date (using Pacman version installed with Athena):

```
> cd ../AthenaTestInstall/12.0.6
> source setup.[c]sh
> cd ../../
> pacman -update-check    # A message about available updates
> pacman -lc -d version patch up    # More info about installation
[...]    # Many lines of output
> pacman -update
```
- You should not need to update but sometimes things are changed in place.
 - Against the rules but it happens (did for 13.0.10).
- A much more likely scenario is that a newly released version will need to be installed in a new directory.
 - An alternative is to use the Pacman multi installation method that allows multiple versions of the release to be installed in the same directory.
- Note: Updating and Patching a release are different.

Patching Your Installation - CMT

- Use account that you used to install the release.

```
> mkdir testarea # The name is arbitrary but  
# must match requirements file.
```

- Then setup your installed CMT (Configuration Management Tool):

```
> source ../AthenaTestInstall/12.0.6/CMT/v1r19/mgr/setup.[c]sh  
> mkdir cmthome  
> cd cmthome  
> emacs requirements # Enter requirements file on slide 18  
> cmt config
```

```
-----  
Configuring environment for standalone package.  
CMT version v1r19.  
System is i386_linux26  
-----  
Creating setup scripts.  
Creating cleanup scripts.
```

- Initializing CMT needs to be done only once for each new version of CMT (NOT once per session).
 - Using the correct version of CMT is crucial.

Patching Your Installation

- Patching 12.0.6 to 12.0.6.5 (use account owning installation):

```
> cd ~
> source cmthome/setup.[c]sh -tag=12.0.6
> cd ../AthenaTestInstall/12.0.6
> source setup.[c]sh
> pacman -get http://cern.ch/atlas-
computing/links/kitsDirectory/Production/cache:AtlasProduction_12_0_6_5_i686_slc3_g
cc323_opt
Do you want to add [http://cern.ch/atlas-
computing/links/kitsDirectory/Production/cache] to [trusted.caches]? (y or n): y
Package [AtlasProduction_12_0_6_5_i686_slc3_gcc323_opt] found in
[http://cern.ch/atlas-computing/links/kitsDirectory/Production/cache]...
Package [AtlasProduction_12_0_6_5_noarch] found in [http://cern.ch/atlas-
computing/links/kitsDirectory/Production/cache]...
Package [AtlasProduction_12_0_6_5_noarch] found in [http://cern.ch/atlas-
computing/links/kitsDirectory/Production/cache]...
Downloading [AtlasProduction_12_0_6_5_i686_slc3_gcc323_opt.tar.gz] from
[http://cern.ch/atlas-computing/links/kitsDirectory/Production/cache/../../kits]...
Untarring [AtlasProduction_12_0_6_5_i686_slc3_gcc323_opt.tar.gz]...
Downloading [AtlasProduction_12_0_6_5_noarch.tar.gz] from [http://cern.ch/atlas-
computing/links/kitsDirectory/Production/cache/../../kits]...
Untarring [AtlasProduction_12_0_6_5_noarch.tar.gz]...
Generating cmt setup scripts...
>
```

- You can rerun KitValidation if you want to.

Release 13.0.X Installation

*** Discussion title: Releases and Distribution Kit Announcements

I've added the usual top level packages so

```
% pacman -get <mirror>:13.0.10
```

```
% pacman -get <mirror>:13.0.10+KV
```

will work once your mirror is updated. - Saul

Visit this Atlas message (to reply or unsubscribe) at:

<https://hypernews.cern.ch/HyperNews/Atlas/get/releaseKitAnnounce/193/2/1.html>

Use these instructions **ONLY** if you really understand how to use release 13

Release 13 is not fully validated and still being patched and fixed!

Stay with 12.0.6 (12.0.7 soon) for now unless there is a real reason to switch to 13.

Also note the change in numbering instead of 13.0.1 the release is 13.0.10.

Having Athena Installed Automatically

- Sites with the OSG middleware installed can have each production release of Athena installed automatically.
 - Currently Xin Zhao is doing is using an older set of scripts to install the software on the any site that asks him.
 - Soon these installations will be done using Panda and the “Pacball” method - see Torre Wenaus or contact Hiro Ito.
 - This new method is just being tested and should be in production soon.
- Depending on what the users of Tier 3 site are doing, the automatically installed versions of Athena may be insufficient and it may be necessary to install specific versions of the software.

Where to go next?

- Advanced Athena installation web page:
<https://twiki.cern.ch/twiki/bin/view/Atlas/AtlasSoftwareInstallInstructionsAdvanced>
- Developing software using an installed kit:
<https://twiki.cern.ch/twiki/bin/view/Atlas/UseAtlasSoftwareProjectsKit>
- Installing Python job transforms (patches e.g. 12.0.6.5):
https://twiki.cern.ch/twiki/bin/view/Atlas/AtlasPythonTrf#How_to_get_the_transformations
- Installing the nightly kit (bleeding edge software):
<https://twiki.cern.ch/twiki/bin/view/Atlas/NightlyDistributionKit>

- Running HelloWorld against the installed Athena version is a good test thing are working correctly.
 - It also leaves you with a skeleton analysis package which you can build on.

HelloWorld

- The next thing to try is to get the Athena HelloWorld Python script to run in a standard user account.
 - This is too involved to do in my 30 minute time allotment.
 - However I have included the steps on the next 8 slides so people can work on this in their free time.
 - If you get stuck feel free to ask the experts here for help.
- Everything on these slides are based on two Atlas Computing WorkBook sections:
 - <https://twiki.cern.ch/twiki/bin/view/Atlas/WorkBookSetAccount>
 - <https://twiki.cern.ch/twiki/bin/view/Atlas/WorkBookRunAthenaHelloWorld>
- A warning: recently the CERN AFS cell has experienced significant problems.
 - Consequently at times CERN AFS fails to provide access to files. All you can do is wait and try again later.

HelloWorld - Setting Up CMT

- Login into a clean session as a normal user and make a directory to hold the directory tree of test files that are needed for HelloWorld:

```
> mkdir testarea # The name must match the requirements file.
```

- Then setup your installed CMT (Configuration Management Tool) for your user account:

```
> source ../AthenaTestInstall/12.0.6/CMT/v1r19/mgr/setup.[c]sh
> mkdir cmthome
> cd cmthome
> emacs requirements # Enter requirements file on the next slide
> cmt config
```

```
-----
Configuring environment for standalone package.
CMT version v1r19.
System is i386_linux26
```

```
-----
Creating setup scripts.
Creating cleanup scripts.
```

- Initializing CMT needs to be done only once for each new version of CMT (NOT once per session).

requirements File Content

```
set CMTSITE STANDALONE
set SITEROOT /d2/AthenaTestInstall/12.0.6      # Put your own place here.

macro ATLAS_DIST_AREA ${SITEROOT}
macro ATLAS_TEST_AREA ${HOME}/testarea      # Put your own place here.

apply_tag projectArea
macro SITE_PROJECT_AREA ${SITEROOT}
macro EXTERNAL_PROJECT_AREA ${SITEROOT}

apply_tag setup
apply_tag simpleTest
apply_tag optimized
apply_tag special

use AtlasLogin AtlasLogin-* $(ATLAS_DIST_AREA)
set CMTCONFIG i686-slc3-gcc323-optset

DBRELEASE_INSTALLED 3.1.1
```

HelloWorld: Invoking CMT

- Now invoke CMT for the current session:

```
> cd ~
> source cmthome/setup.[c]sh -tag=12.0.6
```

- The above source command needs to be done for every session. Now test that CMT is working:

```
> echo $CMTCONFIG
i686-slc3-gcc323-opt
> echo $CMTPATH
/s4/luehring/testarea:/d2/AthenaTestInstall/12.0.6/AtlasOffline/12.0.6:/d2/AthenaTestInstall/12.0.6/AtlasSimulation/2.0.6:/d2/AthenaTestInstall/12.0.6/AtlasAnalysis/2.0.6:/d2/AthenaTestInstall/12.0.6/AtlasEvent/2.0.6:/d2/AthenaTestInstall/12.0.6/AtlasConditions/2.0.6:/d2/AthenaTestInstall/12.0.6/AtlasCore/2.0.6:/d2/AthenaTestInstall/12.0.6/Gaudi/0.16.1.13-LCG43C-t:/d2/AthenaTestInstall/12.0.6/LCGCMT/LCGCMT_43C:/d2/AthenaTestInstall/12.0.6/AtlasTrigger/2.0.6:/d2/AthenaTestInstall/12.0.6/DetCommon/2.0.6:/d2/AthenaTestInstall/12.0.6/AtlasReconstruction/2.0.6
> cmt
#> cmt command [option...]
# command :
# none
[...]
```

Many, many lines of output.
Tests of CMT continue on next page.

HelloWorld: Testing CMT

- More tests that CMT is OK:

```
> which cmt
```

```
cmt: aliased to ${CMTROOT}/${CMTBIN}/cmt.exe
```

```
> where cmt
```

```
cmt is aliased to ${CMTROOT}/${CMTBIN}/cmt.exe
```

```
/d2/AthenaTestInstall/12.0.6/CMT/v1r19/Linux-i686/cmt
```

```
> cmt show path
```

```
# Add path /s4/luehring/testarea from initialization
```

```
# Add path /d2/AthenaTestInstall/12.0.6/AtlasOffline/12.0.6 from initialization
```

```
# Add path /d2/AthenaTestInstall/12.0.6/AtlasSimulation/2.0.6 from ProjectPath
```

```
# Add path /d2/AthenaTestInstall/12.0.6/AtlasAnalysis/2.0.6 from ProjectPath
```

```
# Add path /d2/AthenaTestInstall/12.0.6/AtlasEvent/2.0.6 from ProjectPath
```

```
# Add path /d2/AthenaTestInstall/12.0.6/AtlasAnalysis/2.0.6 from ProjectPath
```

```
# Add path /d2/AthenaTestInstall/12.0.6/AtlasConditions/2.0.6 from ProjectPath
```

```
# Add path /d2/AthenaTestInstall/12.0.6/AtlasCore/2.0.6 from ProjectPath
```

```
# Add path /d2/AthenaTestInstall/12.0.6/Gaudi/0.16.1.13-LCG43C-t from ProjectPath
```

```
# Add path /d2/AthenaTestInstall/12.0.6/LCGCMT/LCGCMT_43C from ProjectPath
```

```
# Add path /d2/AthenaTestInstall/12.0.6/AtlasTrigger/2.0.6 from ProjectPath
```

```
# Add path /d2/AthenaTestInstall/12.0.6/DetCommon/2.0.6 from ProjectPath
```

```
# Add path /d2/AthenaTestInstall/12.0.6/AtlasReconstruction/2.0.6 from ProjectPath
```

```
# Add path /d2/AthenaTestInstall/12.0.6/AtlasReconstruction/2.0.6 from ProjectPath
```

HelloWorld: Downloading Code

- Download the UserAnalysis package (skeleton) from CERN:

```
> /usr/kerberos/bin/kinit -4 fredlu@CERN.CH # Using full path is crucial
Password for fredlu@CERN.CH: # Upper Case CERN.CH required
> klog fredlu
Password:
> setenv CVSROOT :kserver:atlas-sw.cern.ch:/atlas-cvs
> cd ~/testarea
> cmt co -r UserAnalysis-00-09-10 PhysicsAnalysis/AnalysisCommon/UserAnalysis
# ===== working on package UserAnalysis version UserAnalysis-00-
  09-10 path PhysicsAnalysis/AnalysisCommon in
  /s4/luehring/testarea/PhysicsAnalysis/AnalysisCommon/UserAnalysis
# get top files
cvs update: Updating .
Creating setup scripts.
Creating cleanup scripts.
run directory already installed
```

- Important notes:

- The above only works if you have the AFS client software. The workbook details what to do if you don't have AFS installed.
- Setting up CMT puts a bad version of kinit in your path. You must use the full path to your system kinit for the above instructions to work. This problem is corrected for release 13.

HelloWorld: Building User Code

- Compile the skeleton and run Athena:

```
> ls PhysicsAnalysis/AnalysisCommon/UserAnalysis
ChangeLog  cmt  CVS  doc  python  Root  run  share  src  UserAnalysis
> cd PhysicsAnalysis/AnalysisCommon/UserAnalysis/cmt
> source setup.[c]sh
> gmake QUIET=yes
-----> (Makefile.header) Rebuilding constituents.make
-----> (constituents.make) Rebuilding setup.make i686-slc3-gcc323-
      opt.make
CMTCONFIG=i686-slc3-gcc323-opt
setup.make ok
i686-slc3-gcc323-opt.make ok
-----> (constituents.make) Rebuilding library links

[...] # Lots of lines of output

-----> (constituents.make) install_joboptions done
      all ok.
```

- Now the code is ready to run.

HelloWorld: Running

- Run the code:

```
> cd ../run
> get_files HelloWorldOptions.py
Only 1 file found from the specifications
Willing to acquire file HelloWorldOptions.py from
  /d2/AthenaTestInstall/12.0.6/AtlasCore/2.0.6/InstallArea/jobOptions/AthEx
  HelloWorld
Copying file HelloWorldOptions.py from
  /d2/AthenaTestInstall/12.0.6/AtlasCore/2.0.6
> athena.py HelloWorldOptions.py
Thu Jun  7 10:47:12 EDT 2007
Athena                INFO including file "AthenaCommon/Compat.py"
Athena                INFO including file "AthenaCommon/Bootstrap.py"
ApplicationMgr       INFO Successfully loaded modules :
ApplicationMgr       INFO Application Manager Configured successfully
StatusCodeSvc        INFO initialize
[...] # Many Lines of output and a few seconds of running time.
EventSelector        INFO finalize
StoreGateSvc         INFO Finalizing StoreGateSvc - package version
  StoreGate-02-15-20-07
DetectorStore        INFO Finalizing DetectorStore - package version
  StoreGate-02-15-20-07
ToolSvc              INFO Removing all tools created by ToolSvc
cleaning up
StatusCodeSvc        INFO initialize
ApplicationMgr       INFO Application Manager Finalized successfully
ApplicationMgr       INFO Application Manager Terminated successfully
```

Help & Trouble Reporting

- Kit installation issues should be reported on the “Releases and Distribution Kit Problems” HyperNews:
<https://hypernews.cern.ch/HyperNews/Atlas/get/releaseKitProblem.html>
- Athena problems and help requests can be posted at:
<https://hypernews.cern.ch/HyperNews/Atlas/get/Prelimbugs.html>
<https://hypernews.cern.ch/HyperNews/Atlas/get/offlineSWHelp.html>
- Register for the HyperNews follow the instructions at:
<https://hypernews.cern.ch/HyperNews/Atlas/top.pl>
- If you suspect a bug, **PLEASE** post them to Savannah:
https://savannah.cern.ch/search/?type_of_search=soft&words=%%%&type=7
- You will need to pick a category to post with link above - if you can't figure out the category post to:
<https://savannah.cern.ch/bugs/?func=additem&group=atlas-bugs>
- Please report bugs! Savannah requires registration.
 - Follow link labeled “New user” on left tool bar to register.