Introduction

The ATLAS experiment processes continuously during data taking the collected data at its Tier0 center using the ATLAS Offline Software; furthermore much of the time is spent producing Monte Carlo simulations of many physics processes in the ATLAS detector. In order to maintain a high quality of software, to enable smooth running of the Tier0 center and timely production of Monte Carlo, a number of strategies are deployed within ATLAS. The software is run in many different configurations on nightly builds to identify problems - these tests are monitored by teams of rotating shifters, who also monitor compilation of the software and follow up on bug reports to ensure progress is made developing required patches to the software.

Nightly Builds

New software patches are first added to a validation nightly build. Only in the case the known problem is seen to be fixed, or the new feature is deemed to not cause new problems, can the patch migrate to the regular nightly build. This allows developers to always have a stable build each day to work with. The nightly builds are numerous - the main ones being a development nightly build where all the latest features are added, a data taking build which corresponds to the release used as the basis for the regular nightly build, and another build that corresponds to the release used to run the Monte Carlo simulations. Each of these have both a validation and a regular version. Furthermore each build is built with and without debug symbols and in both 32 and 64 bit flavours.

Nightly Tests

Each day a set of tests are run on each nightly build (by the NICOS system) to assess new problems and changes in output seen. Two software frameworks are used to run these outputs: for ATNIGHT (ATN) and RunTimeTester (RTT) frameworks. The ATN framework allows us to run short tests (of order 5 minutes) on the worker nodes where releases are built. The RTT framework runs much longer tests on a dedicated batch farm hosted at CERN - these tests include running of the reconstruction software in numerous configurations and dedicated tests to monitor the memory usage of reconstruction software. Furthermore the FullChainTests (FCT) and TierChainTests (TCT) which emulate the exact sequence of software tasks for Monte Carlo and data processing respectively are run each day. The RTT allows tests to run for a maximum of 24 hours - after 24 hours all running and pending jobs are cancelled, and the RTT starts a new run for the next days set of nightly builds.

Software Patches

Validation Nightly

Open new bug report

Record bug identification number

Savannah

Monitors all open reports

Bug Tracking

Bug reports may be submitted by software developers, Tier0 shifters (for problems seen in data processing jobs at the Tier0), Grid shifters (for problems seen in Monte Carlo jobs running on the Grid for example) or interested third-parties. Bug reports are submitted into the Savannah bug tracking system - bugs are categorised according to software area so that one can see all open bugs in the offline reconstruction software for example. An orthogonal system, called Software Quality (SQ) Flags has been developed by the TagCollector software team, which allows to list all bugs for a given release on one page (with links to the bug in savannah). Software shifters use this page to monitor bugs for all nightly releases they are responsible to monitor.

Shift Communications

At the end of each shift a detailed report is submitted into the ATLAS Electronic Log (ELOG) system for perusal by software experts. Furthermore short emails are sent to a list stalking whether any nightly build for a given release is usable or not - this allows software developers to understand whether that days nightly is something they can work with, or if they should fall back to usage of a previous days nightly. Furthermore it alerts other shifters to any serious problems present to avoid duplication of effort.

Cleaning Weeks

Periodically we run software cleaning weeks whereby less critical problems are worked on to further improve the software quality. This has included in the recent past cleaning up old bug reports from savannah, looking at less frequently checked software tests for any problems not seen in the standard suite of tests and checking log files for superfluous output that could be removed.

Conclusions

The ATLAS collaboration builds a set of nightly releases each day, on which numerous ATN and RTT based tests are run. Shifters monitor both these tests and compilation statuses of a subset of the nightly releases. They then communicate the findings each day so that appropriate action can be taken. Once a nightly build is considered to have high quality software a fixed release can be built which can then be validated on the grid via the BCT and finally the SampleA production to be used by the Physics Validation teams.