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Platforms, Compilers, Librarian Issues

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DESY

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Platforms

- SLC4 - no more
 - Build machines updated to SLC5, what couldn't be upgraded (too old) - dropped
 - Few SLC4 desktop machines still around
 - end of general user support for SLC4 - 31 December 2010
 - Hard date for end-of-life of SLC4 (no more updates) February 2012
- SLC5/gcc43
 - Main development and production platform
 - All that in 32bit and 64bit
 - Efforts since some time to build and validate 64bit binaries
 - Ongoing 64bit validation in 16.0.3.4 now moving to 16.6.3.3 - high luminosity production digi and reco jobs
 - 10-20% CPU gain
 - Memory increase x 1.5



Platforms

- SLC5: end of support (32b and 64b) likely at the end of 2013
 - no exact date known at present
- SLC6 - BETA version available as of 14.02.2011
 - Installation instructions and first know problems at <http://linux.web.cern.ch/linux/scientific6/beta.shtml>
 - Formal certification of SLC6 started on 31st of January
 - Public SLC6 service (like lxplus6) to be available soon
 - first step to quattorize
 - Then lxplus6
 - LCG-AA externals nightly builds / ATLAS build& tests infrastructure on SLC6
 - Having regular SLC6 nightly builds
 - Probably with LCG provided gcc 4.5.X compiler
 - Compatibility libraries will be needed and will be provided by IT/LinuxSupport
 - They probably will become part of "CERN recommended setup"



Platforms

- Features and improvements coming from RHEL6 (base of SLC6)
 - Updated kernel and core technology stack
 - Fully integrated virtualization
 - Better power management
 - Next generation networking
 - Performance improvements
 - Better scalability, physical, virtual and cloud deployments are supported
 - Filesystem - ext4 - provides support for larger files sizes, high performance file system for extremely large files and optimized for large data transfers
 - Ext3 easily can be upgraded to ext4; 16TB max file size (2TB for ext3)
 - Improved automatic system for bug reports
 - Coming with gcc 4.4
 - Again we will not use the default compiler, probably LCG provided gcc4.5.X



Platforms

- MAC OS X - nightlies slowly progressing
 - 2 builds OPT&DBG in 64bit done inside MIG11
 - Few developers on best effort base (as always)
 - Most problems - after a switch to new LCG version
 - Machines unstable to merge nightlies into dev
 - Can be done once instabilities improved
 - No fixed releases on MAC OS X
 - Often problems due to openAFS client
 - Machines out of IT scope



Platforms - New Hope

- MAC usage at CERN is getting popular
 - Nice MAC OS X platform, MAC HW move to Intel
- IT is making efforts to recognize and support Apple laptops and desktops with MAC OS X as a standard CERN platform covering
 - Operating system - what is supported currently (latest 2 10.6 & 10.5 now)
 - Hardware - what's supported by Apple (when 10.7 arrives, PowerPC - dropped)
 - Applications - widely used and some can be requested by user community
 - User help - selecting hardware & software, ease order process, installations and upgrades, integration with other tools in IT, identifying needs and wishes
- Official support via Service Desk
 - IT will establish link with Apple to provide adequate technical support
- Some things will NOT be provided - central configuration and account management, home directory service, back up service, no support for iPods, iPads and iPhones



Platforms

- CernVM - getting popular
 - allows you to run ATLAS software inside a virtual machine
 - Very nice tutorial for ATLAS users/developers prepared by Yushu Yao
 - All needed information for setting up, using and bug reporting at <https://twiki.cern.ch/twiki/bin/view/Atlas/CernVM>
 - Installation of full and patch (Production and Analysis) ATLAS offline releases done on central CernVM-FS by Alessandro De Salvo
 - All latest ATLAS offline releases available on CernVM
 - Insure the latest release is available to CernVM users ASAP
- There is more detailed information and dedicated session "CVMFS status and plans" on Wednesday from 14:00



Compilers

- Icc 11.1 Intel C++ Compiler
 - Was in use for few weeks in LCG nightly, main purpose - performance studies and improvements
 - Status - frozen - had to put our efforts in LCG_59b and LCG_60 integration and tests
 - Shall we resume the activity ?
- ATLAS specific gcc 4.3.5
 - New compiler permits to use safely SSE scalar fp operations
 - On top patched by Roberto Vitillo
 - `__attribute__((final))` - devirtualization saving the lookup in vtable, perform inlining and more precise analysis by the compiler
 - Testing in MIG5 - all compile fine and some ATN tests fine
 - Some packages segfault at runtime when compiled with `-msse`
 - Known issue as http://gcc.gnu.org/bugzilla/show_bug.cgi?id=40550



Compilers

- *Gcc 4.4.5* was next to be tried
 - alignment patch for *gcc-4.4.4* that was never applied to 4.3
 - Roberto provided the patched compiler on AFS as *gcc 4.4.5*
 - *LCG-AA* did not like that series 4.4 - we had to drop that idea
 - They propose that we use *gcc 4.5*.
- *Gcc 4.5.2* - request to *LCG-AA* to be installed on AFS
 - Once ready we will setup *MIG5* with it
 - *CMTCONFIG* will stay *i686-slc5-gcc43-opt* for the tests
 - Once we confirm it is ok we can go for a new *CMTCONFIG* and *LCG-AA* externals build with that new compiler



Librarian issues

- CERNLIB removal - have been asked by LCG-AA to drop the package
 - Will not be supported on SLC6
 - Functionality can be get from Lapack (AtlasLapack) and ROOT
 - Testing in MIG10
 - Found few obsolete packages - dropped
 - Few packages (easy) fix by developers
 - TopRex_i (AtlasSimulation,) Trigmufast (AtlasTrigger) - to be fixed
- CTVMFT removal
 - Testing in MIG10
 - InsituMuonPerformance and TrigHLTOfflineMon (AtlasAnalysis) needs fixing
- Fix that and CERNLIB removal - DONE



Librarian issues

- **Makefile.cmt on project level**
 - Used for compilation at project level
 - Originally developed by Marco Clemencic (LHCb) and adopted for ATLAS
 - Makefile.cmt will be distributed with GAUDI
 - Additional customizations can be added to it or to a Makefile.atlas
 - In use in 17.X.0-EXP nightly
 - `make -f Makefile.atlas -j -l20` (needs CMT to be setup before)
 - No `tbroadcast` in use - still same compilation time
 - Same compilation and ATN test results
 - All Dependencies calculated once in the beginning
 - Next step is to check the performance and quality in incremental build mode



Librarian issues

- Project level file merging - base established by Sebastien Binnet
 - Rootmap files
 - genConf files
 - Tpcnvdb files
 - In use since several months in the nightlies, in parallel with merging on package level
 - Proposal to drop the package merging in nightly and release builds only
 - Expected to have improvement on build speed/compilation
 - Also avoids problems with corrupt merged files
<https://savannah.cern.ch/bugs/index.php?70697>
 - Control with tag, set up in CMTEXTRATAGS by NICOS and build procedures
 - Transparent for developers and if they compile locally - compiling, merging, testing per package base for them



Librarian issues

- Coverity - Static Analysis Tool (license obtained through CERN)
 - Dedicated build (physical) machine and dedicated web manager machine (VM)
 - building and analyzing ATLAS offline and online (tdaq,tdaq-common,dqm-common) software
 - Time to build - 3x more the usual build time (can not use distcc)
 - Takes even more time analyze and submit the results to Coverity Integrity Manager(CIM)
 - Dedicated e-group atlas-sw-coverity-users for communication and access to the CIM machine (self subscription policy for ATLAS)
 - CIM is at <http://atlas-coverity.cern.ch>
 - Once subscribed to the e-group use your AFS/LXPLUS/NICE credentials to log in

Librarian issues

- Full development nightly, tdaq-03-00-01, tdaq-common-01-16-02, dqm-common-00-14-02 have been analyzed and results submitted to CIM
 - same defects are having the same CID (Coverity ID)
 - All checkers (66) were enabled during the analysis, many defect reports some of which invalid or coming from external packages
 - We can fine -tune , have lots of flexibility with the tool
 - Full overview of the results so far on the next slide



Librarian issues

Name ^	New Defects	Outstanding Defects	Resolved Defects	Total
AtlasAnalysis-dev	4698	4746	2	4748
AtlasConditions-dev	1396	1415	4	1419
AtlasCore-dev	2874	2895	41	2936
AtlasEvent-dev	2152	2253	47	2300
AtlasHLT-dev	243	243	0	243
AtlasOffline-dev	53	53	0	53
AtlasReconstruction-dev	2809	2868	1	2869
AtlasSimulation-dev	538	597	21	618
AtlasTrigger-dev	4183	4185	0	4185
DetCommon-dev	241	241	0	241
dqm-common	115	115	0	115
GAUDI-dev	671	671	0	671
tdaq	10068	10110	1554	11664
tdaq-common	182	182	0	182



Librarian issues

- Can ignore specific reports for the checkers
 - Boost:lock_error - causing lots of UNCAUGHT_EXCEPT in tdaq
 - 1340 of that one now ignored in tdaq
- Next analysis planned in the coming days
- We can start having regular analysis and reports every week
- Preliminary twiki page started at
 - <https://twiki.cern.ch/twiki/bin/viewauth/Atlas/AtlasCoverity>
- Tool is very powerful and useful and we all can benefit of having it around.