



PoW for the LCG Releases Project

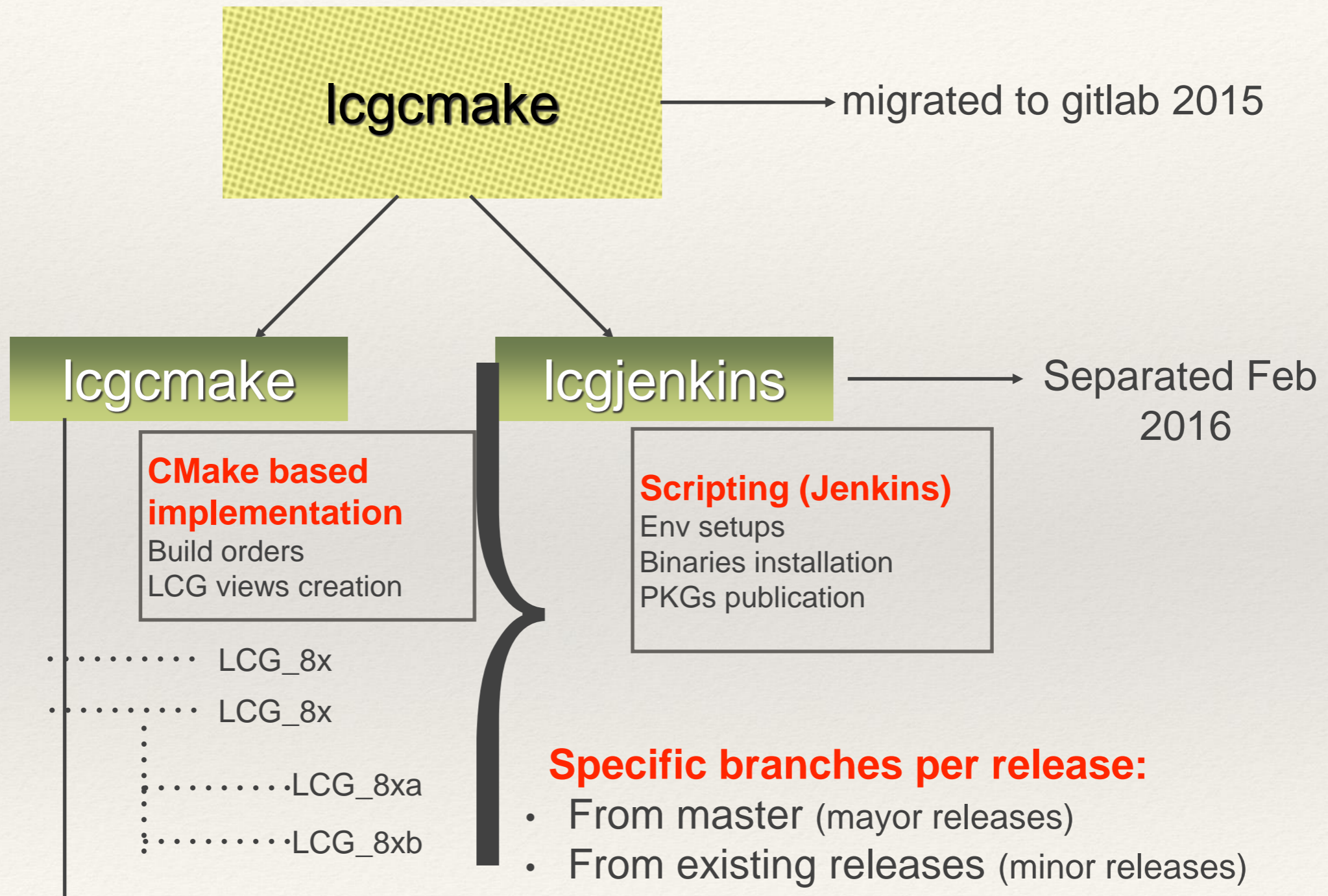
Patricia Mendez Lorenzo
EP-SFT Group Meeting
30 - January - 2017

Outlook

- ❖ 2016 activities and achievements
- ❖ Plans presented during the 2016 POW
- ❖ Plans for 2017

- ❖ SFT - TEAM Members
 - ❖ Javier Cervantes
 - ❖ Genser TEAM (Dmitri Konstantinov, Grigory Latyshev, Ivan Razumov)
 - ❖ Pere Mato
 - ❖ Patricia Mendez
 - ❖ Martin Storo (Summer Student in 2016)
 - ❖ Lots of helps of the full SFT members team

Central SW structures: Evolution



lcgcmake in 2016

❖ Packages and versions

- ❖ Regular implementation of new packages and versions (LIM meeting agreements)
- ❖ SW package basis for SWAN (Enric, Danilo, Pere) and MetalibM (Danilo, Vincenzo) projects
- ❖ Started to distribute established packages developed in BE (e.g., PyTimber) (together with Danilo)
- ❖ dev3python3 new slot: test of dev3 packages with this new python version

❖ Packages post-installation improvements

- ❖ LCG views improvements: Compatible Installation of software packages belonging to a LCG release under a single \$PREFIX
 - ❖ Package conflict management through a “preference” list declaration
- ❖ post-install generalisation
 - ❖ Re-allocation packages software adapted to nightly builds

❖ Collaboration with ATLAS

- ❖ Machine learning packages implementation together with ATLAS
- ❖ arm64 lcgcmake interface under development with ATLAS

Scripting evolution in 2016

Major change: binaries distribution based now in tar files

- ❖ RPMs based method deprecated

PRINCIPAL GOAL:
NIGHTLIES, RELEASES, GENERATORS ARE ALL
FLAVOURS OF THE SAME BUILD AND
INSTALLATION PROCEDURE

- ❖ python based script for installation purposes (implementation in log4j/make)
- ❖ Homogeneous approach for builds
 - ❖ nightlies, releases and partial MCgenerator installation use all the same installation method
 - ❖ Specific nightly installation methods deprecated

tar files installation procedures evolution

1. Allocation of tar files in a file system with a web interface frontend
2. Download and installation of tar files based on the txt summary file inputs
3. Creation of specific nightlies or releases tree structure
4. Reallocation procedures (post-install)

❖ Installation options (flavours):

❖ Full release approach (releases)

- ❖ Full set of tar files expected and installed

❖ Incremental (releases, nightlies, generators) against CVMFS (or AFS)

- ❖ Only new packages/versions are built and packaged, rest of packages simply linked
- ❖ Post-installation scripts adapted to nightly builds tree structure

❖ Limited (Root externals)

- ❖ Installation area includes a limited number of packages declared at build time

tar files installation orchestration (I)

- ❖ Installation approaches orchestrated via Jenkins with generic jobs for AFS and CVMFS
 - ❖ Automatically triggered at the end of nightly builds
 - ❖ On demand for releases
- ❖ Further steps include for nightlies and releases:
 - ❖ LCG views creation and installation in AFS and CVMFS
 - ❖ lcgsoft publication
 - ❖ Infrastructure migrated from AFS to lcgjenkins
 - ❖ 2016 Code improvements to include nightly builds publication and entries removals of the associated Django DB
 - ❖ NOTE: RPMs are still created and provided (experiments demand) for LCG releases
 - ❖ RPM DB completed and updated
 - ❖ (At least) One full platform installation tested before LCG release announcement

lcgsoft.cern.ch

LCG Software Elements

This page lists the various configurations of the LCG external and generator software stack provided by CERN's EP-SFT group to the LHC experiments. Details on the software distribution can be found on the repository page of the [lcgmake](#) toolkit.

LCG Configurations

release ▲ / ▼	release date ▲ / ▼	description
dev4	Jan 26, 2017	Daily publication of the dev4 nightly build
dev3	Jan 26, 2017	Daily publication of the dev3 nightly build
87	Dec 07, 2016	LCG_87 release including ROOT 6.08.02

Main | LCG Configuration dev3

Compare with another configuration: ---

Description: Daily publication of the dev3 nightly build
Release date: Jan 26, 2017
Platforms: x86_64-slc6-gcc49-opt
x86_64-slc6-gcc49-dbg
x86_64-slc6-gcc62-opt

Jenkins job aimed to clean the lcgsoft DB for dev3 and dev4 running every night

Packages

Projects:

COOL	3_1-patches
CORAL	3_1-patches
LCGCMT	LCGCMT_dev3
RELAX	RELAX-root6
ROOT	HEAD
Geant4	10.02.p02

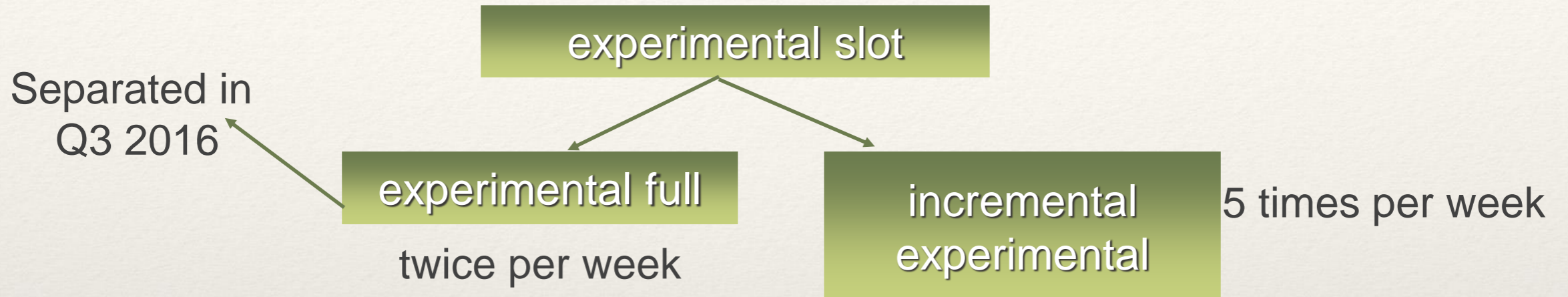
Databases:

cx_oracle	5.1.1
genshi	0.7
mysql	5.7.11

tar files installation orchestration (II)

- ❖ Additional implementations - release area management
 - ❖ Implementation of full/partial releases removal
 - ❖ Re-installation of existing packages in already published releases
 - ❖ Use case: Buggy packages, incomplete containers (pytools, pyanalysis...)

Software Validation: Operations



Results not distributed

dev2 (deprecated Q3 2016)

dev3 (ROOT HEAD)

dev4 (ROOT v6.08-patches)

2016: Results distributed to AFS and CVMFS. Separated Stratum0 node for nightly builds

Up LCG_87

Incoming releases

**2016: Distribution to AFS and CVMFS
Stratum0 node for releases and compilers**

LCG Releases

Platforms, compilers, releases in 2016

❖ Platforms

Release	dev3	dev4	experiment.
slc6,gcc49,opt-dbg centos7, gcc49, opt-dbg centos7,gcc62,opt-dbg ubuntu16,native,opt-dbg	slc6,gcc49,opt-dbg centos7, gcc49, opt-dbg centos7,gcc62,opt-dbg ubuntu16,native,opt-dbg	slc6,gcc49,opt-dbg centos7,gcc62,opt-dbg mac1011,native,opt-dbg	slc6,gcc49,dbg slc6,clang39,opt centos7,gcc62,opt mac1011,native,opt ubuntu16,native,opt

❖ Releases in 2016

- ❖ 5 Major releases: LCG83, 84, 85, 86 and 87
- ❖ 8 Minor releases: LCG_81d, e and f. LCG_85a, b, swan1, swan2 and swan3

Platforms, compilers, releases in 2016

- ❖ New compilers in 2016:

- ❖ gcc (SLC6 and Centos7 in both AFS and CVMFS):

- ❖ 5.1.0, 5.2.0 (native and ABI4), 6.1.0 (native and ABI4), 6.2.0 (native and ABI4)

- ❖ 6.3.0 arriving this week

- ❖ clang

- ❖ AFS → 37 (slc6), 38 and 39 (slc6, centos7) and CVMFS → 39 (slc6, centos7)

- ❖ In addition, CMake new versions in both AFS and CVMFS: 3.4.3, 3.5.2, 3.6.0, 3.7.0

Jenkins server evolution

- ❖ Instance updated in Summer to v.1.626
- ❖ Two big service interruptions (Summer, Autumn 2016)
 - ❖ Service down for several hours due to the AFS based slaves
 - ❖ Reconnection approach becomes a bottleneck
- ❖ Implementation of new slaves (Current available CPUs)

SLC6

248

Centos7

104

Ubuntu

24

Mac

8

Deprecation of AFS: Actions in 2016

- ❖ Tar files repository: From AFS to EOS
 - ❖ Sources, and tar files for both nightlies and releases
 - ❖ Web interface provided-supported by IT
- ❖ Distribution of binaries and views
 - ❖ Regularly provided in CVMFS and AFS (experiment demand)
- ❖ Compiler and software
 - ❖ CVMFS and AFS (experiment demand)
- ❖ Still remaining in AFS
 - ❖ Django DB for Icgsoft publication purposes (Plans for 2017)

What we presented at the 2016 PoW

What we said one year ago

BUILD ITEM PLANS

- **Plans for 2016**

- Implementation of the final binary installation based in tar files (Q2/Q3) ✓
- Build of Grid PKGs from sources in collaboration with IT (Q3) ✗
- Provision of nightly builds in CVMFS (Q2) ✓
- New platforms and compilers (on demand) ✓
 - arm64 builds as next step (thanks to the collaboration with ATLAS) Ongoing
 - Ubuntu 14 (available in nightlies, to be included in releases) ✓
 - clang37 and 38 (release expected in few weeks)
- Closer collaboration with HSF project Ongoing
 - Evaluation of Spack vs. LCGCMAKE

What we said one year ago

BUILD ITEM PLANS

• Plans for 2016

- Include new system and compilers for nightly and releases ✓
- Publish packages included in the nightly builds in lcgsoft (Q2) ✓
- Provide nightlies builds in CVMFS (Q2) ✓

JENKINS PLANS

• Plans for 2016

- Coverity setup for ROOT Ongoing
- Better handling of email notifications (Q3) ✓
- GeantV external dependencies management based on LCG views (Q2) X
 - This approach could be also very interesting for Geant4

What did we say one year ago

IN ADDITION: DEPRECATION OF AFS

- Working together with IT to become AFS independent (Q3-Q4)
 - LCG Release project; current AFS dependencies:
 1. Binaries LCG releases distributions
 2. RPM DB
 3. RPMs release packages and external sources
 4. Compilers and CMake distributions
 - Strategy to follow
 1. Promote CVMFS as unique storage system for binaries distribution ✓
 2. Two steps for its deprecation
 1. Move the current RPM DB from AFS to a local area of a backed up machine ✗
 2. Full deprecation of the RPM approach in benefit of tar files ✓
 3. EOS storage backend system for RPMs, tar files and external sources ✓
 1. http access based
 4. Current gcc, clang and make versions will be provided in CVMFS only ✓

Plans for 2017

Renovation of lcgsoft

- ❖ Rely on IT services and support
 - ❖ Change the DB to an IT supported structure
 - ❖ Current infrastructure based on a Django DB in AFS
 - ❖ Candidates (Elastic Search, mysql)
 - ❖ Web interface service provided by IT
- ❖ Include more detailed information
 - ❖ Packages, versions, dependencies and responsible already provided
 - ❖ Release notes per each release to be implemented
- ❖ When
 - ❖ 1st probe of concept in terms of DB migration before the summer
 - ❖ Summer Student requested to develop the project (After Summer 2017)

2017: Docker Container year

- ❖ Slaves: Launch of Jenkins jobs through Docker containers including setup and build
 - ❖ Generic and homogeneous slaves configuration
 - ❖ more scalable and stable approach in Jenkins
- ❖ Release distribution: Provide pre-configured containers including LCG packages
 - ❖ In principle the approach should be configurable to reduce set of packages
- ❖ Long-term project (Q3)

3. Architectures in the builds

- ❖ Add build node architecture to the current build-platform

`architecture-os-Compilers-Buildmode`

- ❖ Benefits for math packages (i.e., VecGeom)

- ❖ Associated builds affected by the build system architecture

- ❖ Building in a smart way

- ❖ architecture independent packages should not rebuild multiple times

- ❖ Creation of compiler wrappers

- ❖ Ensure common flags for all packages

- ❖ In agreement with the HSF conventions

Other activities

- ❖ Spack developments ongoing
 - ❖ Javier' main project (up to Q3)
- ❖ arm64 builds in collaboration with ATLAS (Q2)
- ❖ Provide intel icc17 builds (Q1)
 - ❖ Openlab contacted to provide the latest version in CVMFS
 - ❖ Green light on the 17/01 —> </cvmfs/projects.cern.ch/intelsw>
- ❖ Document, document and document... (NOW)
 - ❖ Activity ongoing (Q1 for the concluded 2016 activities)
- ❖ New packages, improvements and releases agreed with the LIM members (Q1-Q4)
 - ❖ Bi-weekly meeting with experiment representative
 - ❖ ROOT representative have been also invited (Axel, Danilo, Enric) and participate regularly

Group Services Responsible

Service/Task	Main Responsible	Alternate	Documentation
Jenkins service	Patricia Mendez	?	HowTo
Coverity service	Federico Carminati	Axel Naumann	
CDash service	?	Patricia Mendez	HowTo
Web Services deprecated root.cern.ch	IT Dep Axel Naumann	IT Dep ?	HowTo
SLC/CC nodes	Patricia Mendez	Gunter Folger	
Windows nodes	Bertrand Bellenot	Gunter Folger	
Mac nodes	Witek Pokorski	Elena Gianolio	
Other OS nodes	Gerardo Ganis	Axel Naumann	
Drupal Manager	Danilo Piparo	Nefeli Kousi	
ITUM contact	Patricia Mendez	?	
C5 contact	Federico Carminati	Patricia Mendez	HowTo