# D R A F T

# CernVM, Systems & Services
# Plan Of Work for 2018

G Ganis

On behalf of the CSS team

12 March 2018

# Outline

- Mandate of the new CSS team
  - Team members
- Last year activities
  - With respect to plans
- A plan of work for 2018
  - General guidelines
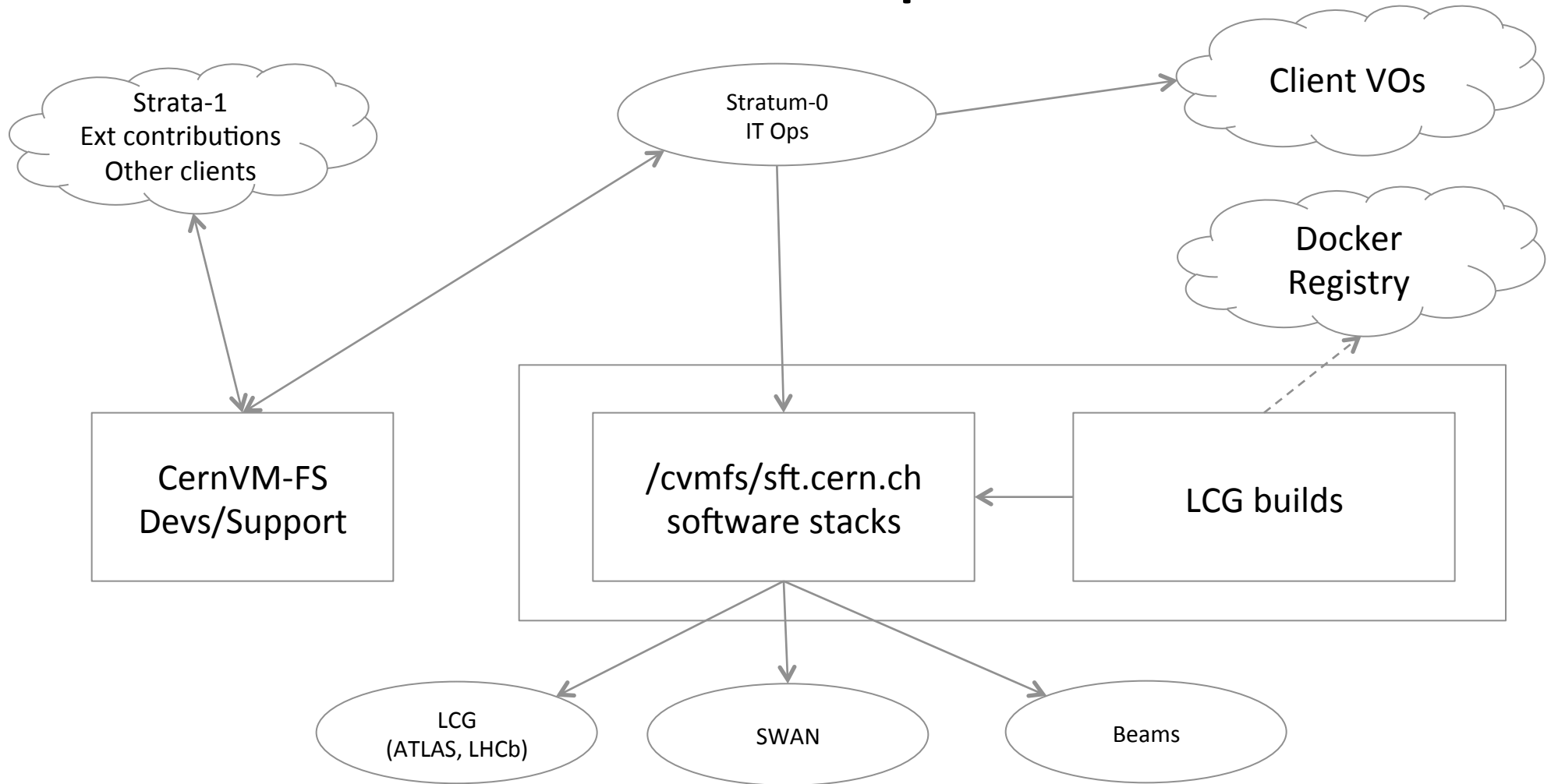  - Details

# Team mandate

Create the conditions and synergies to:

- Develop a *Software Provisioning Service*
  - From the tool for efficient software distribution to the building and validation of the software distributed

- Preserve and develop activities and/or products rotating around it
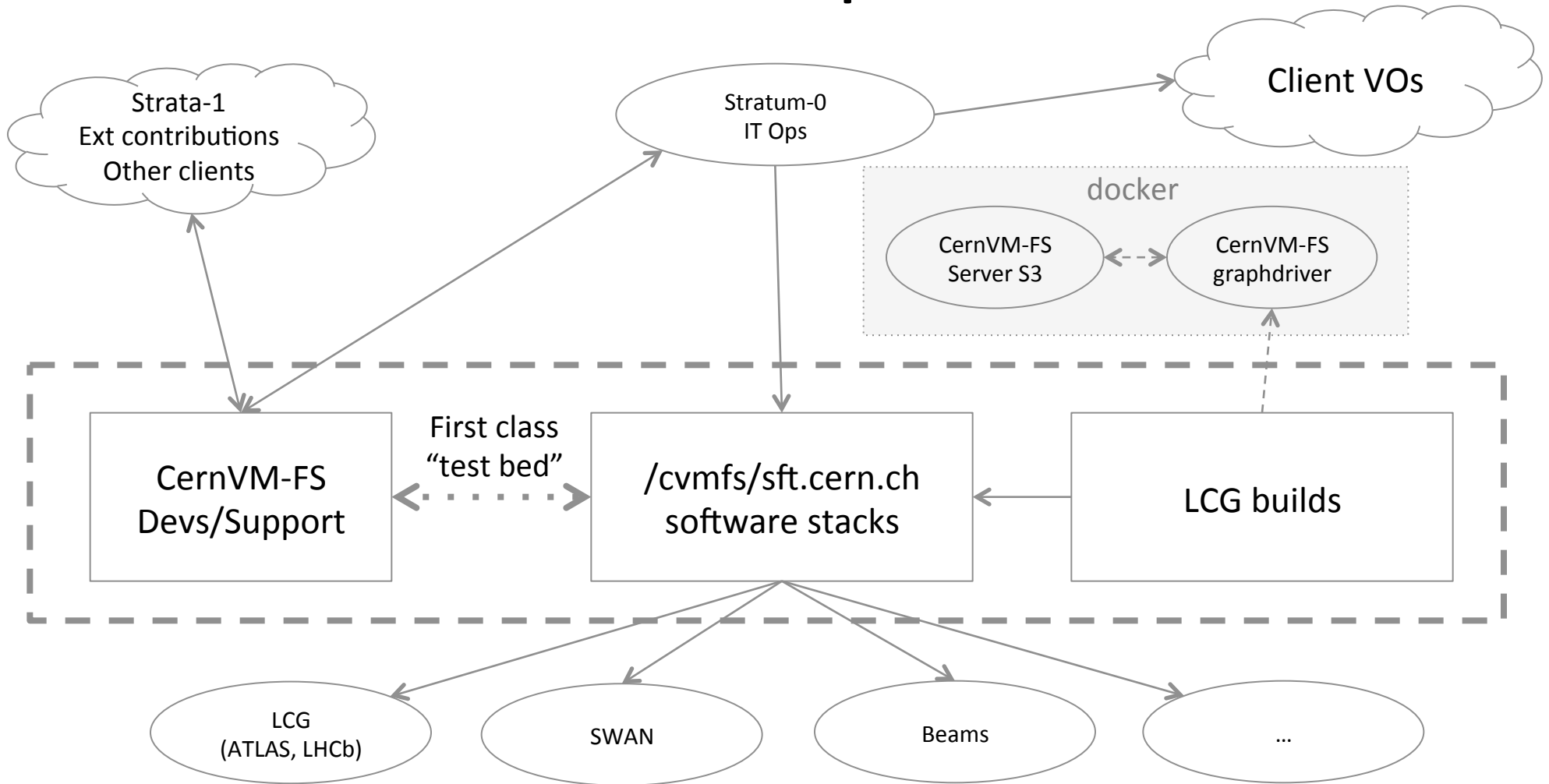
# Potential synergetic evolution

- Deeper integration in the Devs/Ops/Support model

- Optimization of the Jenkins container service

- CernVM appliance as base image

- HSF packaging

- …

# Current Devs/Ops model

# New Devs/Ops model



Strata-1
Ext contributions
Other clients

Stratum-0
IT Ops

Client VOs

docker

CernVM-FS
Server S3

CernVM-FS
graphdriver

First class
"test bed"

CernVM-FS
Devs/Support

/cvmfs/sft.cern.ch
software stacks

LCG builds

LCG
(ATLAS, LHCb)

SWAN

Beams

...

# Team members

- From CernVM
  - GG, J Blomer, R Popescu
- From SPI
  - P Mendez Lorenzo, I Goulas, R Pacholek
- From Genser
  - D Konstantinov,  G Latyshev, I Razumov
- From Web services
  - N Kousi

# Team members: details

| | | 2018 | 2019 | |
|---|---|---|---|---|
| G Ganis | S | 80% | 80% | C |
| J Blomer | S | 80% | 80% | C |
| P Mendez L | S | 80% | 80% | S |
| I Goulas | S | 100% | 100% | S |
| R Popescu | F | 100% | 66% | C |
| N Kousi | F | 75% | | W |
| R Pacholek | TS | 80% | | S |
| S Mosciatti | TS | 90% | | C, S |
| D Konstantinov G Latyshev I Razumov | PAS, User | 150% | 150% | G, S |
| Total (FTE) | | 8.35 | 5.6+ | |

C: CernVM, S: Systems/Services, G: Genser, W: Web

# Last year activities

- CernVM{-FS}
- SPI
- GenSer

# CernVM{-FS} in 2017

- Most of the effort went to address CernVM-FS challenges
- CernVM: maintenance / consolidation

# CernVM-FS in 2017 (1)

*Improving publishing phase (v2.4)*

- Complete the implementation of a working prototype ☑
- Commissioning of the new prototype w/ ALICE ☑ w/LHCb
- Deployment for ALICE conditions data ☒
- Further work to reduce the propagation delay
  - To Stratum 1, clients ☑
- Performance measurements and improvements
  - Scalability, … ☑

# CernVM-FS in 2017 (2)

*Improve flexibility for client deployments (v2.4)*

- Commission version & snapshot support          ☑
- Support for client cache plug-ins              ☑
- Cache plug-in managers for different backend   ☑   xrootd
  - Ceph, shared RAM cache, …

*Docker integration*

- Realize full read/write Docker workflow        ☑
  - Effectively replace Docker registry w/ CernVM-FS
- Extend to generic container service            ≈

# CernVM-FS in 2017 – other

- Support for Debian 8 & 9
  - In collaboration with LIGO
- Support for Yubikey cryptographic hardware to sign repository master key
  - Fermilab contribution (D. Dykstra)
- Data Access via CernVM-FS: 3 PB of CMS adat available in OSG
  - Nebraska Univ. (B. Bockelman)
- Invited talk and paper at ISC/WOPSSS
  - (Software deployment solutions for HPCs)

# CernVM in 2017 (1)

- Consolidation /Maintenance of v3.6
  - Follow-up security hotfixes for v3.6 ☑
  - Preparing for commissioning v4 when lxplus moves to CC7 ☑
- Consolidate cernvm-launch
  - Support creation of cluster ☑
  - Common repository of context files ☑
  - Deprecate cernvm-online and webapi ≈
- Performance benchmarking ☒
  - Prepare context for benchmarking
    - Follow benchmark working group (B. Panzer)
  - Define set of representative cases
    - CERN Openstack, various configurations
    - Commercial clouds (Amazon, Google, Azure)
      - Coordinate with IT

# CernVM in 2017 (2)

- Analytics (Piwik)
  - Better understanding usage ≈
- AoB
  - CernVM images available in CERN Openstack ☑
  - Inclusion in LCG builds ☑

# CernVM in 2017 - Misc

- CernVM-Online and WebAPI
  - Identify and extract components that can be managed by the group
- Infrastructure
  - Migration of test HW in bld 157 to IT
- Follow-up DPHEP evolution
  - Workshop in March
- Follow-up contacts with potential external users
- Prepare for next workshop
  - Tentative period: Dec 2017 or Jan 2018

# SPI in 2017

- Docker containers
- Renovation of lcgsoft
- Architecture builds
- Miscellanea

# SPI in 2017 (1)

*Docker containers*

- 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

# SPI in 2017 (2)

*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

# SPI in 2017 (3)

*Architecture in the builds*

- Add build node architecture in the current build-platform      ☑

```
architecture-os-compiler-buildmode
```

  - Benefits for math packages (e.g. VecGeom)
    - Associated builds affected by the build system architecture
  - Build in smart way
    - Architecture independent packages should not rebuild multiple times
  - Creation of compiler wrappers
    - Ensure common flags for all packages
  - In agreement with HSF conventions

# SPI in 2017 (4)

*Other activities*

- Spack developments ongoing ☑
  - Javier's 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 on going (Q1 for the conclude 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

# SPI in 2017 - other

- MoU with Beams department to use the LCG software stacks
  - Exercised with LCG_92
- First version of LCGTest

# Genser in 2017

- Deployment of new generator versions in existing LCG releases
    - 32 versions added
    - 662 installations performed
        - Version x Release x Platform
    - Mostly in CernVM-FS, still some in AFS

# Plan Of Work for 2018

- On the common ground
  - Realise the next Devs/Ops/Support model
    - Distributed release manager for /cvmfs/sft.cern.ch
    - Final commissioning of the Docker graphdriver
    - Full integration in the LCG build & validation infrastructure
      - Complete migration of builds to (Docker) containers
- Specific plans
  - CernVM
  - SPI
  - GenSer
- Web development

# CernVM-FS in 2018 (1)

- Review of garbage collection for production repositories
  - Address current issues observed by CMS and LHCb
- Refactoring of the CernVM-FS server code
- Deployment of the distributed backend
- Repository publish-subscribe service
- S3 end-points into the repository
  - Docker graphdriver write support
  - "end user" areas support

# CernVM-FS in 2018 (2)

- Content delivery
  - Evaluation of XRootD as transport layer
  - Evaluation of commercial cloud based storage w/ S3 backend
- Prototype *containerd* and CernVM-FS integration
- Integration test setup for Mac Os X
- Consolidation of cernvm-monitor.cern.ch
- Containerized CernVM-FS server
  - In collaboration with IT

# CernVM-FS in 2018 (3)

Student Projects:

- Collect repository maintenance statistics
  - Purpose: improve monitoring
  - Summer Student
- Support for optimised extraction of contents
  - Purpose: Relevant for HPC and/or containers
  - Openlab student
- Prototype CernVM-FS WebAssembly client
  - Purpose: R&D
  - GSoC student

# CernVM in 2018

- Production level maintenance of v3 and v4
- Update to LTS kernel v4.14
- Streamline cernvm-online.cern.ch
- Consolidation of cernvm-launch

# SPI in 2018 (1)

- Consolidation and maintenance of the LCG build and deployment infrastructure
  - Tools and scripts optimizations
  - New platforms and compilers as requested
    - AVX2, ARM64
- Consolidate release for the Beams department
  - LCG..._python3
- Automation of package versions and builds
  - GitHub notifications

# SPI in 2018 (2)

- Bring LCGTest in production state
- Review the list of packages
- Sort the /cvmfs/sft.cern.ch/ top area
  - Remove unused (or misplaced) directories, AFS references, …
  - Document the content and the way to use it
    - Add README, promote views, lcgenv

# Genser in 2018

- Continue fulfilling requests from the experiments and users for addition of new generators and/or new versions

- Migration to LCGTest

# 2018: details for Web services

- (Details of the move to Drupal 8)
  - (Including the updated IT strategy; ENTICE 26/2/2018)
- (Some details on the revised EP-SFT site)

# Service Tasks

| Service/Task | Main Responsible | Alternate | Documentation |
| --- | --- | --- | --- |
| Jenkins service | Patricia Mendez | Gunter Folger | HowTo |
| Coverity service | Gabriele Cosmo | Axel Naumann | |
| CDash service | Benedikt Hegner | Patricia Mendez | HowTo |
| SLC/CC nodes | Patricia Mendez | Gunter Folger | |
| Windows nodes | Bertrand Bellenot | Gunter Folger | |
| Mac nodes | Radu Popescu | Witold Pokorski | |
| Other OS nodes | Gerardo Ganis | Axel Naumann | |
| Drupal Manager | Nefeli Kousi | (Danilo Piparo) | |
| ITUM contact | Jakob Blomer | Patricia Mendez | |
| C5 contact | Patricia Mendez | Jakob Blomer | HowTo |
| Jira Service | Ilias Goulas | Benedikt Hegner | |
| Training | Danilo Piparo | Enric Tejedor | |

# AoB

- CHEP abstracts
- Other conferences
- …

# Summary

- (…)