Training in ALICE

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Introduction

- **ALICE Experiment @ CERN LHC**
  ~2k members - 200 active in writing analysis code

- **Sparse training activities (< 2014) → organized (2014) → collaboration with LHCb (2017)**
  Bring our positive experience, seek advice for our sustainability problems

- **Our tutorials focus on enabling Physicists doing analysis**

  - **Analysis lifecycle + thematic classes:** three times a year, one day during ALICE weeks

  - **Analysis tutorial week/StarterKit:** full-immersion week now organized with LHCb

- **Our framework is in C++ and we have organized Grid analysis** (Python's getting popular)
  This requires code to be pushed to a GitHub repository, for which we have daily releases

How ALICE tutorials work

Before 2014: sparse presentations from Offline + various TWiki pages. In 2014: ran the first tutorial (on Git). It was such a success that we've decided to formalize it

- **Our tutorials are online:** no static/outdated slides, only Markdown pages on GitHub

- **Thematic topics:** 1h-2h long, 1-3 contributions during

  - Shorter classes require studying our web material afterwards (like university)

  - Sometimes we do longer classes with live demos and fine-grained question time

- **Local and interactive remote attendance possible:** avg 40 local + 70 connected

- Organized by the "analysis tutorial committee": Redmer Bertens and myself
  Plus, ~10 rotating teachers volunteering to prepare, teach and maintain our material

- Our teachers are always well-known experts on the subject
  We also have brilliant users showcasing useful tools they write

How ALICE + LHCb tutorials work

A presentation on the LHCb StarterKit gathered our attention: last year we've decided to do it together at CERN and we'll do it again this year!

- **Partly done together (git, bash, python…),** then we split for experiment-specific topics

- **Split in several small classes (20 pupils) with a teacher and helpers wandering around**
  Much more interaction than standard ALICE tutorials to make sure everybody understood

- **For beginners/first-timers:** also a good chance to meet other people and experts

- **For us, Vidyo connection was a hard requirement (wasn't part of the LHCb StarterKit)**
  A large part of our collaboration is quite far away from CERN: not easy/cheap to fly there.
  We have also opened a Mattermost channel to provide support during the lessons!

- **Separately advertised** in ALICE and LHCb as a conjoint event

- **Teachers and organizers rotate more often** in LHCb than ALICE
  The StarterKit is a tradition that can walk with its own legs, ALICE should do the same!

Computing skills set taught

- Bash, Git, very basic Python (shared with LHCb)

- Install and develop ALICE software on your laptop with aliBuild (ALICE's build tool)

- Write and run your analysis on the Grid from the grounds up

- ROOT and Python notebooks

- Contribute through GitHub Pull Requests
  When ALICE migrated from plain Git to GitHub Pull requests in 2017, this long tutorial was ran in advance in order to prepare users to the migration

- Advanced C++: debug, profile, memory efficiency, smart pointers…

- Understand the ALICE data flow from raw data to analysis objects
  Not really a skill we teach, but we've realized it was a rather obscure topic worth presenting

Feedback from our surveys

- **The majority of our beginners are PhD students with limited ROOT experience**
  However, thematic topics attract essentially postdocs

- **Teaching Python + ROOT notebooks was appreciated, even if officially we only use C++**
  Might be useful for planning future ALICE analysis frameworks

- **Users agree that our lessons can always be longer (no matter how long we make them!)**
  This is good, they want us to teach them more!

- **Users liked very much our conjoint effort with LHCb**

- **Coming in person to these events helped users making connections**
  We try to be friendly and they are in turn not scared to ask us for support

- **Our surveys also work as a QA for software**
  We know how to improve the tools we write

Collaboration and sustainability: open points

- **It is difficult to find persons volunteering for writing documentation and teaching**
  This is often seen as time-consuming and not rewarding in terms of career

- **Our tutorials are too much associated to the persons running them**
  Users expect *that* topic to be covered by *that specific person*, but what if she leaves?

- **We are learning and benefitting a lot from the conjoint LHCb experience**
  Shared material and teachers = more maintainers, less personalization

- **From the ALICE+LHCb experience: how do we vet teachers properly?**

  - ALICE alone has a few but very good teachers, but need to involve more

  - Not all of our teachers knew either how to teach, or the topic they were teaching

- **How do we involve people far away from CERN?**
  Maybe by creating TEDx-like events? A StarterKit-x blessed by ALICE + LHCb?