Framework for Masterclass developments and Task Force

Yiota Foka

GSI

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Motivation and environment

Possibility to implement Masterclass observables for different experiments
re-use of existing or develop new
in flexible and economic way

- introduce data (particles, decays)
- introduce geometry

Development of Masterclass for CBM (future experiment at GSI/FAIR)

- NOTE: miniCBM setup summer 2018

Development of Masterclass for HADES (running experiment at GSI)

Development of further Masterclasses for ALICE

- EXAMPLE: LHCb Do re-implement for ALICE (started from ALICE Vo)
- NOTE : NEW J/Psi developed in ALICE , coming official soon

Development of Masterclasses for STAR at RHIC etc

Development of CMS, ATLAS (HI and NOT only Masterclasses)

- pp same observables i.e. Do, J/Psi…

Starting Point and Evolution

ALICE Masterclasses

Strangeness (by Pawel Debski at CERN)
RAA (by Frederike Bock at GSI)
J/Psi (by Steffen Weber at GSI)

git clone https://github.com/zwound40/JpsiMasterclass

Unified Package (by Christian Holm Christensen Niels Bohr Institute)

https://gitlab.cern.ch/cholm/alice-masterclasses

Feedback from ROOT team

Danilo Piparo, Bertrand Bellenot

visit of Rene Brun at GSI 25 April

Feedback from Open Data team

Tim Smith, Tibor Simko

Future Plans

CERN Summer Student Proposal from ALICE

Supervisors: Redmer Alexander Bertens, Friederike Bock

Each year, about 15000 students participate…. physicsmasterclasses.org/ worldwide….

This summer student project is aimed at improving and expanding the current ALICE masterclasses

and at developing a **general, experiment independent framework** for displaying detector geometry
and reading in and manipulating open data.

Future Plans

CERN Summer Student Proposal from ALICE

Supervisors: Redmer Alexander Bertens, Friederike Bock

- The project comprises two distinct parts.
- The first part will deal with optimizing the current ALICE masterclasses and expanding the collection of existing analyses. This step will require one or more data analyses to be implemented in the masterclass framework, as well as preparing data on which these analyses can be run (i.e. selecting a sufficient number of events in which a process of interest can be found, preparing clean event displays, etc.). These (new) masterclasses **can either run in a virtual machine (as is currently done) or be provided via a lightweight Docker container**, ensuring compatibility with different operating systems. During this step of the project, the student can familiarize him/herself with the masterclass software and data analysis in general.
- The second part of the project is more ambitious and will focus on future developments. With the advent of ROOT6, **powerful tools for browser based data analysis have become available**. Browser-based masterclasses would greatly improve easy-of-use, as no installation of software is required. Browser-based 'notebooks' can either run via the CERN SWAN service, or a SWAN service can be deployed on local resources. In this phase of the project, the possibility to run a masterclass as a browser-based notebook will be explored, with the goal of implementing a 'pilot' masterclass.
- Prerequisites: knowledge of C++ and python is required, familiarity with virtualization (VM, docker) will be beneficial but not necessary per se

Contacts and

LHC Outreach Teams

CMS via Ken

ATLAS via Uta, HPB

LHCb

GSI/FAIR

HADES dedicated programmer and budget

CBM Summer Student for next summer, collection of real mini-CBM data

Task Force ?

BackUp Details

INFO

INFO FROM ROOT TEAM : Danilo Piparo

- the up2u (https://up2university.eu/) colleagues in IT can be involved in the thread
- CERN has its Notebook service, SWAN: you can find all information about it here https://swan.web.cern.ch . Since a couple of years, it's used for production work in several departments of CERN, such as the Beams, and regularly used as platform for trainings (yesterday for example for a ROOT ATLAS tutorial)
- a SWAN-like service can serve the purpose of the Master Classes. Actually it is not new to this kind of activities: here you can find a SWAN based standard model course for high school students (apologies, in Finnish: https://swan.web.cern.ch/content/outreach)
- a version of SWAN, including its storage backend, which can be deployed on local resources can be found here:https://cernbox.cern.ch/cernbox/doc/boxed/ . It runs successfully on Amazon resources for example.

INFO FROM up2u: Jakub Moscicki

- SWAN is successfully used for several training events at the MSc level (such as CERN School of Computing for example).
- We also test it for secondary education classes (Up2U).
- So there is quite an interesting potential for the Masterclasses too.

INFO

From: Christian Holm Christensen

see

https://gitlab.cern.ch/cholm/alice-masterclasses

The code is all there, so you can simply clone the repo.

Notes on the implementation can be found in

https://gitlab.cern.ch/cholm/alice-masterclasses/blob/master/README.md
https://gitlab.cern.ch/cholm/alice-masterclasses/blob/master/Base/doc/Implementation.md
https://gitlab.cern.ch/cholm/alice-masterclasses/blob/master/CONTRIBUTING.md

The code is documented heavily - see

https://cholm.web.cern.ch/cholm/alice-masterclasses/

The main changes wrt to the previously used code bases are

- Unified package. The exercises uses a common base case to simplify things. That is, the exercises are more easily defined in terms of this base code.

- Implementations of all needed utilities for the master classes - this means applications for instructors/teachers/convenors/... needed to run the classes smoothly.

- Easy translation of exercise documentation. The documentation is stored separately in HTML files - e.g., Description.en.html, Description.fr.html, Description.el.html, Description.da.html, and so on. If no translation is available, the code falls back to English.

- The changes done to each specific class is summarized in

https://gitlab.cern.ch/cholm/alice-masterclasses/blob/master/Strangeness/Changes.md
https://gitlab.cern.ch/cholm/alice-masterclasses/blob/master/Raa/Changes.md

- In general I've made the tools a little easier to use

- In general I've added a "teacher mode", which allows teachers to run quickly through the exercises using various cheats. This mode can be enabled by clicking the ALICE logo in the GUIs (hidden, but not too much)

In terms of deploying the master classes I've tried to simplify things a bit.

One can of course still just download the packages (either the full thing or each specific class) and unpack on machines that have ROOT installed already.

Optionally, one can choose packages which does not contain the data files (except the geometry.root data). In that case, one can load the data files via HTTP - either a local image or from CERN.

However, to make the packages more accessible (also outside the ALICE institutions - e.g., in a high-school class room), I've made Docker images that one can fetch.

Using Docker images means that one does not need to have an installation of ROOT on the target machine. Instead, the exercises will be executed in a virtual machine. All the user needs is an installation of Docker. See also

https://gitlab.cern.ch/cholm/alice-masterclasses/blob/master/.docker/README.md

Docker can readily be installed in Windows, MacOSX, and Linux.

There are a number of Docker images available.

If one has a working X server (including hardware acceleration) - e.g., on Linux and possible MacOSX, one can take the image

gitlab-registry.cern.ch/cholm/alice-masterclasses

If, on the other hand, one does not have X running on the target machine, or other reasons cannot use it, one can use the image

gitlab-registry.cern.ch/cholm/alice-masterclasses:web

This image (when executed) will start a small web-server. Connecting to that web-server using a web-browser, one is presented with an X desktop in which the master classes are run. This image makes it possible for anyone to execute the images at any place as long as the target machine has Docker installed.

Both of the Docker images comes in a variant that does not contain the data files. See also

https://gitlab.cern.ch/cholm/alice-masterclasses/container_registry