**CIMA**

**Description**

CIMA, CMS Instrument for Masterclass Analysis, is a web-based program in support of the CMS-WZH measurement of International Masterclasses (<http://www.physicsmasterclasses.org>). The purpose of CIMA is to keep track of results of student data analyses in the masterclasses and present the combination of results with the masterclass and across multiple masterclass.

This starts on the administrative side of CIMA. An administrator creates Events, usually attached to a given date, which are accessible on the public side through the web by large numbers of users simultaneously. For example, several masterclasses are held on March 7: an Event is created for that day. In the Event, Tables are made. Each masterclass at a different location has its own Table. In the Table, Groups - datasets of 100 particle decays - are assigned. A Table may have just a few or up to 30 Groups, depending on the expected number of students; 2 students are usually assigned to a Group.

During the masterclass, students use on online event display to visually analyze the particle decays in their Group. They choose the final state and initial state particles, as well as the charge, via check boxes in CIMA. Once the choices are made, the student choose the "Next" button and the choices are recorded for the whole Table. If they have chosen an  initial state particle for which the mass is needed, a mass will appear. Students manually add each mass in CIMA to a mass plot for the whole Table, to give them the experience of building a histogram datum-by-datum. At the end, their mentor can show key ratios and the mass plot in CIMA to students for discussion of the results and what they mean.

The results for each Table in an Event are combined in CIMA and can be shown from the administrative side. Thus when masterclass students participate in a videoconference between multiple masterclass institutes (each with its own Table and all linked in CIMA in a single Event), they can be shown the combined results for all of them by the videoconference moderators at CERN or Fermilab.

**Setup details** based on help from Michael Soiron and the setup of our servers:

* **Requirements** (all of these were in our server):
  + Apache2
  + PHP5
  + MySQL5
* **Database** setup:
  + We received Masterclass.sql which had the schema definition of the database.
    - In data1.i2u2.org, we created the database in MySql:

Connect:

mysql –u USERNAME –pPASSWORD

Create database:

create database Masterclass

Upload from query:

mysql –u USERNAME –pPASSWORD Masterclass < Masterclass.sql

Connect again and create user:

create user ‘cima’@’www18.i2u2.org’ identified by ‘PASSWORD’;

grant all privileges on \*.\* to ‘cima’@’www18.i2u2.org’ with grant option;

* **Server** setup at www18.i2u2.org:
  + **Apache configuration:**
    - At www18.i2u2.org find:
      * /etc/apache2/sites-enabled/i2u2
      * /etc/apache2/sites-enabled/i2u2-ssl
    - Add the following:
      * Find <VirtualHost \*:80> and add:

ProxyPass /cms/cima !

ProxyPassMatch ^/elab/.\*/cima !

* + - * Further below add:

# Cima

DocumentRoot "/home/quarkcat/sw/www-php/cima"

Alias /cms/cima "home/quarkcat/sw/www-php/cima"

AliasMatch ^/elab/(.\*)/cima/(.\*)$ /home/quarkcat/sw/www-php/cima/$2

<Directory "/home/quarkcat/sw/www-php/cima">

Options Indexes FollowSymlinks MultiViews

AllowOverride none

Order allow,deny

Allow from all

</Directory>

* + **Directory and files setup:**
    - Go to:
      * /home/quarkcat/sw/www-php and create a new folder for cima.
      * cp all the php files received for the application.
      * update the file database.php with the connection to the database.
      * $con=mysqli\_connect("data1.i2u2.org","cima","<password>","Masterclass");
  + **Restart Apache to serve the new code:**
    - apache2ctl/apachectl –k graceful