

# McM : The Evolution of PREP. The CMS tool for Monte-Carlo Request Management.

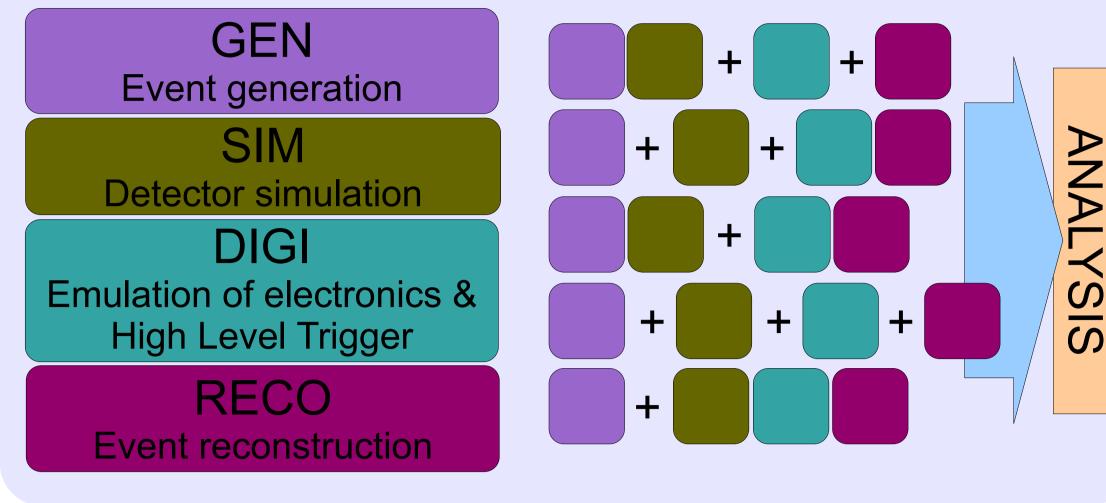
The analysis of the LHC data at the CMS experiment requires the production of a large number of simulated events. In 2012, CMS has produced over 4 Billion simulated events in about 100 thousands of datasets. Over the past years a tool (PREP) has been developed for managing such a production of thousands of samples. A lot of experience working with this tool has been gained, and conclusions on its limitations have been drawn. For better interfacing with the CMS production infrastructure and data book-keeping system, new database technology (couchDB) has been adopted. More recent server infrastructure technology (cherrypy + javascript) has been set as the new platform for an evolution of PREP. The operational limitations encountered over the years of usage have been solved in the new system. The aggregation of the production information of samples has been much improved for a better traceability and prioritization of work. This contribution will cover the description of the functionalities of this major evolution of the software for managing samples of simulated events for CMS.

Compact Muon Solenoid

Campaign Chained campaign Flow Chained request Chained request

# Steps in the Production of a Monte-Carlo Sample

The CMS software framework is organized such that the production of a dataset for analysis has to be done in successive steps, with I/O from disk. Arrangement of the steps is dictated by : software specifics, storage and software requirements, flexibility for further reprocessing, etc. In this document, a request is the logical container of the information required to perform one of such step. McM allows for the formation of any combination of steps.



#### Batch Nickations Mccm Dashboard User

Jean-Roch Vlimant for the CMS Collaboration

Building the Request Configuration A request document holds a sequence of arguments to a configuration utility, bound to the software release used in production. It can be modified from the values defined in the campaign in specific cases.



prepare

validate

approve

process

chain

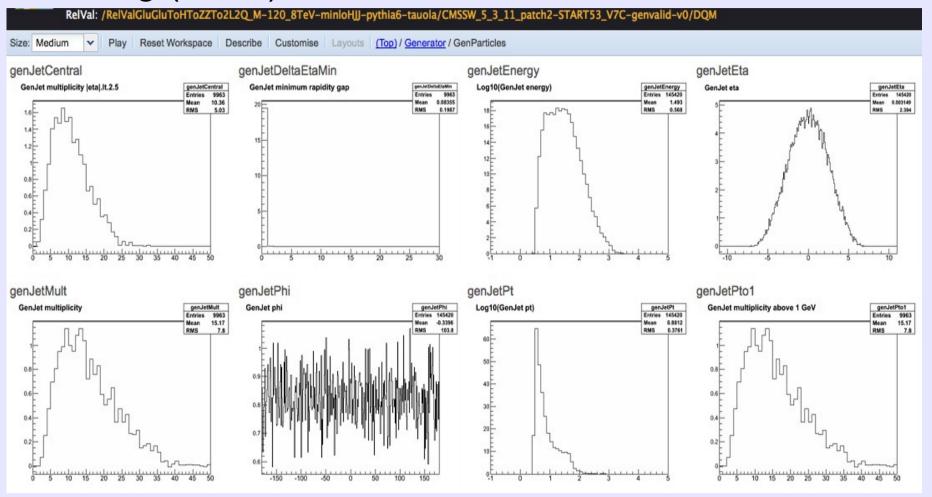
process

chain

process

# Validation of The Physics Content

The configuration of all varieties of event generator is complex. The full production of a samples can take a long time. In order to not waste resource ans delay delivery, a validation job on a selected number of events, is driven by McM and upload a set of plots to the Data Quality Monitoring (DQM) server.



# Campaigns of Requests

Requests for all intermediate steps are gathered in campaign by type, energy, release software, etc. For book-keeping and clarity. Modification to the baseline request configuration are allowed for special requests, and within a certain flow of requests between campaigns.

Prepid ^	SW Release I	Energy <sup>1</sup>	Next <sup>‡</sup>	Notes I
Fall13 🖥 ★	CMSSW_6_2_0_patch1	13	• Fall13dr 🗐 Ü	GEN-SIM campaign 62-posLs1 @13 TeV
HiFall11 🖩 ★	CMSSW_4_4_5_patch4	2.76	• HiFall11DR44	MC production campaign for the 2011 heavy-ion run. These are
HiFall13 🖩 ★	CMSSW_5_3_11_patch6	2.76		
Summer11 🗊 ★	CMSSW_4_1_8_patch14	7	● Fall11R1 II U ● Summer11dr53X II U	Production targeted to 2011 datasets.
Summer11Leg 🖥 ★	CMSSW_5_3_11_patch6	7	• Summer11LegDR	Legacy Summer11 requests
Summer12	CMSSW_5_3_11_patch6	8	● Summer12DR53X <sup>■</sup> U	Production targeted to 2012 dataset
Summer12FS53	CMSSW_5_3_11_patch6	8		Fastsim production in the 5.3 series
Summer13SW53	CMSSW_5_3_10_patch2	13	● Summer13dr53X■ U	Production targeted 13TeV datasets with 5.3
UpgFall13 🖩 ★	CMSSW_6_1_2_SLHC6_patch1	14	• UpgFall13d	Gen-Sim campaign for 14 TeV upgrade sample with BE5D geom

# Flow between Campaigns

Specific modifications to the baseline parameters of a campaign are allowed, once agreed and relevant for a relatively large number of sample production requests. The specification goes into the "flow" object, which links many campaigns to a single campaign.

flowS12to53 <sup>Ŭ</sup> ★	● Summer12 <sup>U</sup>	Summer12DR53X <sup>U</sup>	<ul> <li>sequences</li> <li>Default</li> <li>Default</li> <li>size_event : 450</li> <li>time_event : 17.5</li> </ul>
flowS12to53NP <sup></sup> ⊍★	● Summer12 <sup>U</sup>	Summer12DR53X Ϋ	<ul> <li>sequences <ul> <li>default</li> <li>pileup : NoPileUp</li> <li>Default</li> </ul> </li> <li>size_event : 100</li> <li>time_event : 1</li> </ul>
flowS12to53RD Ŭ★	● Summer12 <sup>U</sup> ■	Summer12DR53X	<ul> <li>sequences <ul> <li>default</li> <li>conditions : START53_V7N::All</li> <li>pileup : fromDB</li> <li>runsScenarioForMC : Run2012_AB_C_D_oneRunPerEra</li> <li>default</li> <li>conditions : START53_V7N::All</li> </ul> </li> <li>size_event : 300</li> <li>time_event : 20</li> </ul>

**Evolution in Between Requests** by the Requests are prepared Physics from various contacts McM produce groups. can validation histograms to check the physics content prior full to production. At each relevant stage the contact, then the generator convener has to sign-off on the content. The request is then processed through the desired chain of requests.

Production Contacts Prepare requests based on the needs of Physics groups

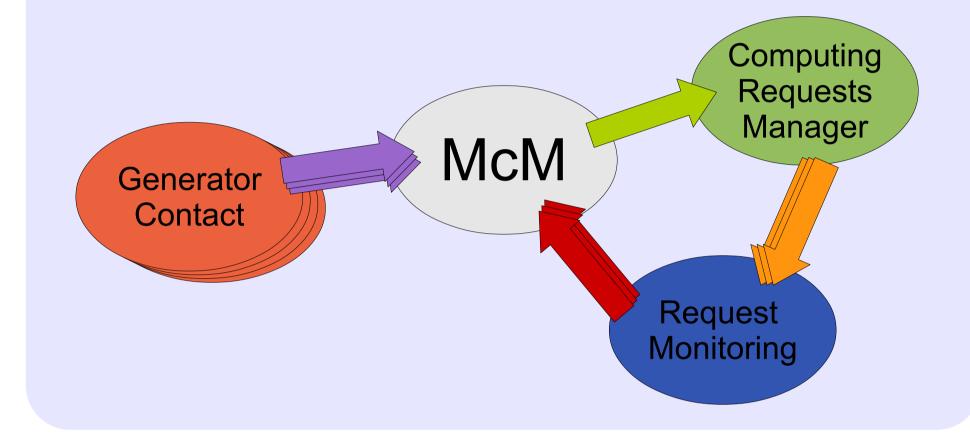
Generator Convener Check the content of the requests

Production Operators Handle the operation at production sites

McM Handles automated operations on requests

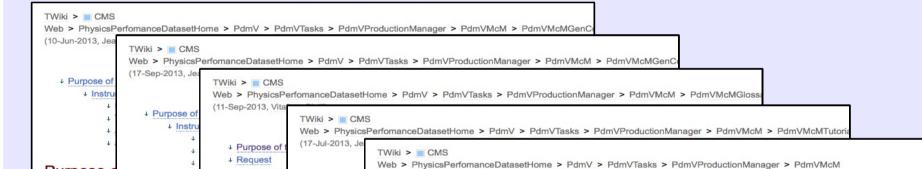
# **Cycles of Production**

Requests prepared in McM are sent for production to the computing system, monitored during processing, and the output is fed back to McM for completion of the production or preparation of the next request.



# **Documentation and Glossary**

A set of documentation twiki [http://twiki.org/] is written with instructions and glossary for users, contacts and operators. The documentation is a collaborative effort.



Attach PDF

#### Chains of Campaigns

Campaigns that are connected with "flows" form chains of campaigns. A "chained campaign" defines what are the necessary operations toward the finalization of the production of a sample for analysis.

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# Chains of Requests

Actions to be Taken on Samples Production operators set the required action on the root requests before creating the chained requests. Specific priority block and partial processing can be specified.

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#### Overview and Outlooks

McM uses evolutive contemporary technology. It incorporates the experience gained from past years of operation of production tools at the interface of Analysis and Computing. Novel concepts (flow, chained requests, chained campaigns, actions) were introduced to simplify and automatize the production of a sample through the logical and technical steps of processing. McM enforces testing and validation of the single requests prior to production to improve manpower and computing efficiencies. Special and vanilla requests be handled within targeted campaigns of can production. McM serves as bookkeeping of sample production. It permits the aggregation of information on production from within or from other CMS services. Extensive documentation and tutorials are provided to the users and contacts. McM is the service for central production of samples for analysis in CMS.

User can visualize and follow the successive requests required for the completion of the production of a given Monte-Carlo sample.

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McM has a very simple and common infrastructure, with schema oriented documents stored in a database, object manipulations are done on the server side in a python application, visualization and operation in JavaScript on the client side.

CouchDB<sup>™</sup> [http://couchdb.apache.org]

Python [http://python.org/] CherryPy [http://www.cherrypy.org/]

JavaScript, Angularjs [http://angularjs.org/]

Meem 📫

Dashboard 🎬

Invalidations 🙂

Chained request 🎫

Action 🗟

Request

#### McM Home page

Updated to use HTML5 links: exclude # from URL's

Welcome to the McM Monte-Carlo Request Management Brought to you by PdmV vlimant : administrator



Home 希