Progress of LodeStar and It's Application

Wenhao Huang, Xingtao Huang, Qiyun Li, Na Yin

Shandong University

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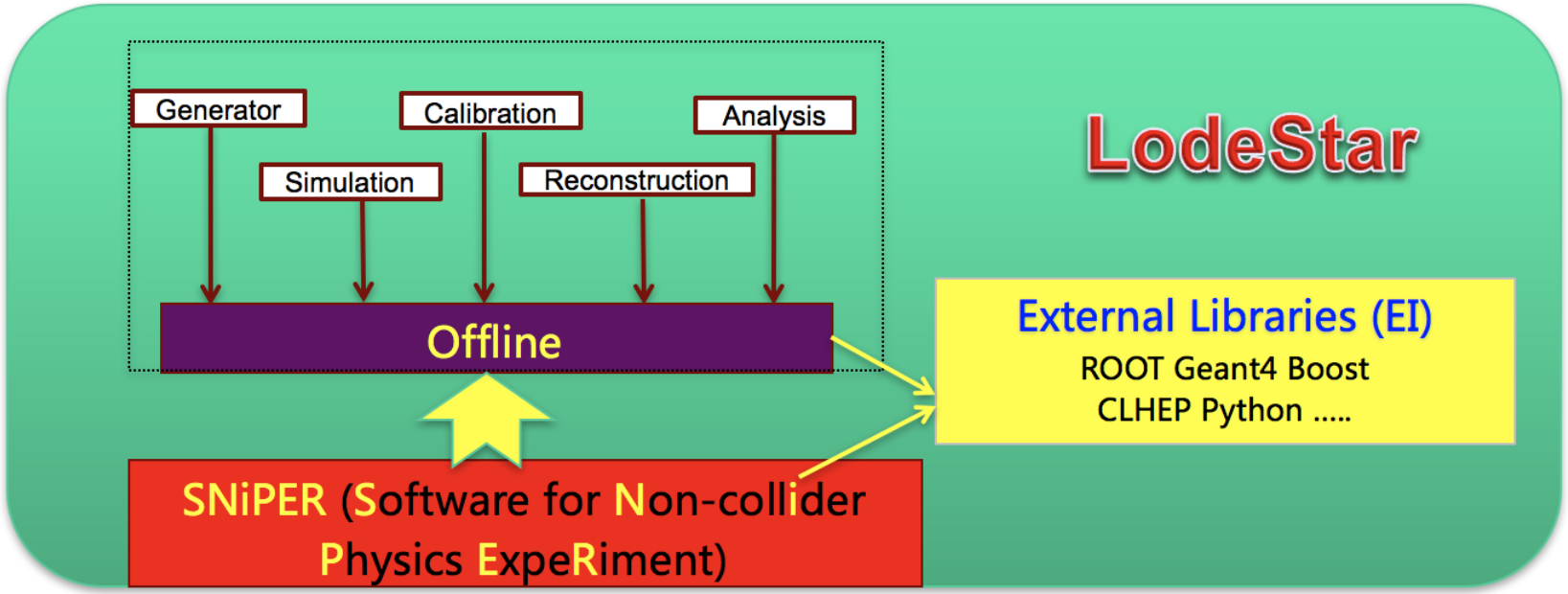
Outline

- Overview of LodeStar
- Progresses since Last Collaboration Meeting
- Current Status
- Summary & Plan

Whole Design of LodeStar

- LodeStar
  - **L**HAASO **O**ffline **D**ata Proc**e**ssing **S**oft**t**ware Fr**a**mewo**r**k
- Main Components:
  - Offline: specific to LHAASO Experiments
  - SNiPER: underlying framework
  - External Libraries: frequently used third-party software or tools



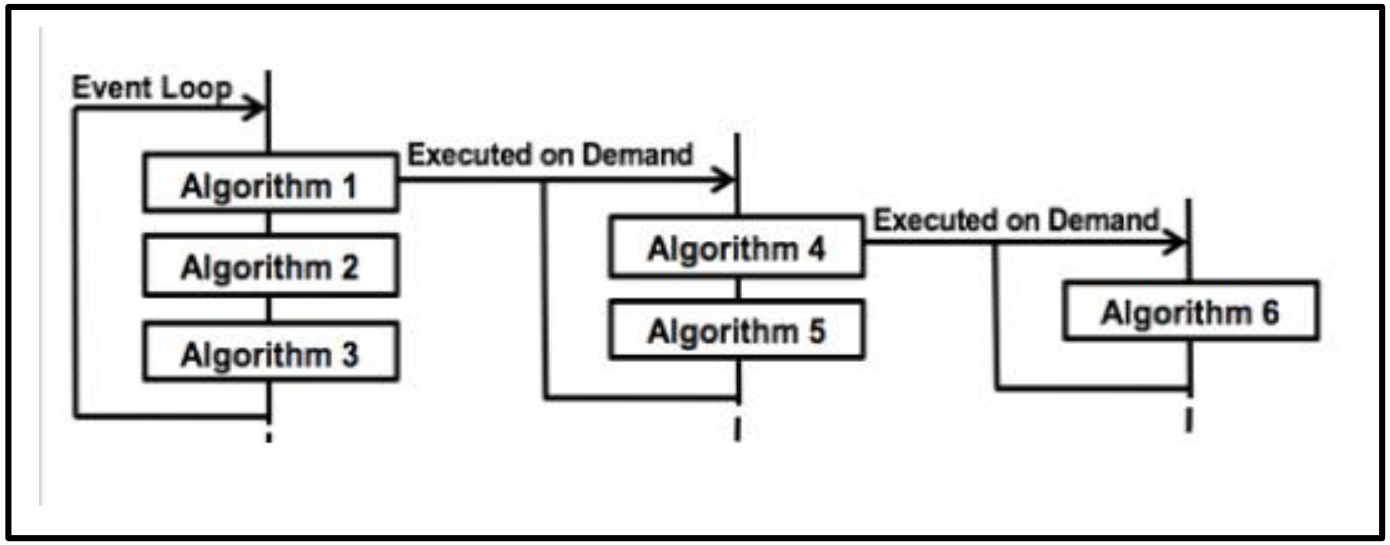
Features of LodeStar

- Modulization/Standardization
  - Algorithms, services and tools, which are most frequently used by users
    - Independent Function
    - Unified Interface

- Main functionality
  - **Unified event data definition**
  - **Unified Event management**
  - **Unified User interface and common Services**
    - **Python script for job configuration**
    - **Services for booking histograms or ntuples, database acccessing,…**
  - **Unified Event loop**
    - user only concentrate in the processing of ONE event.

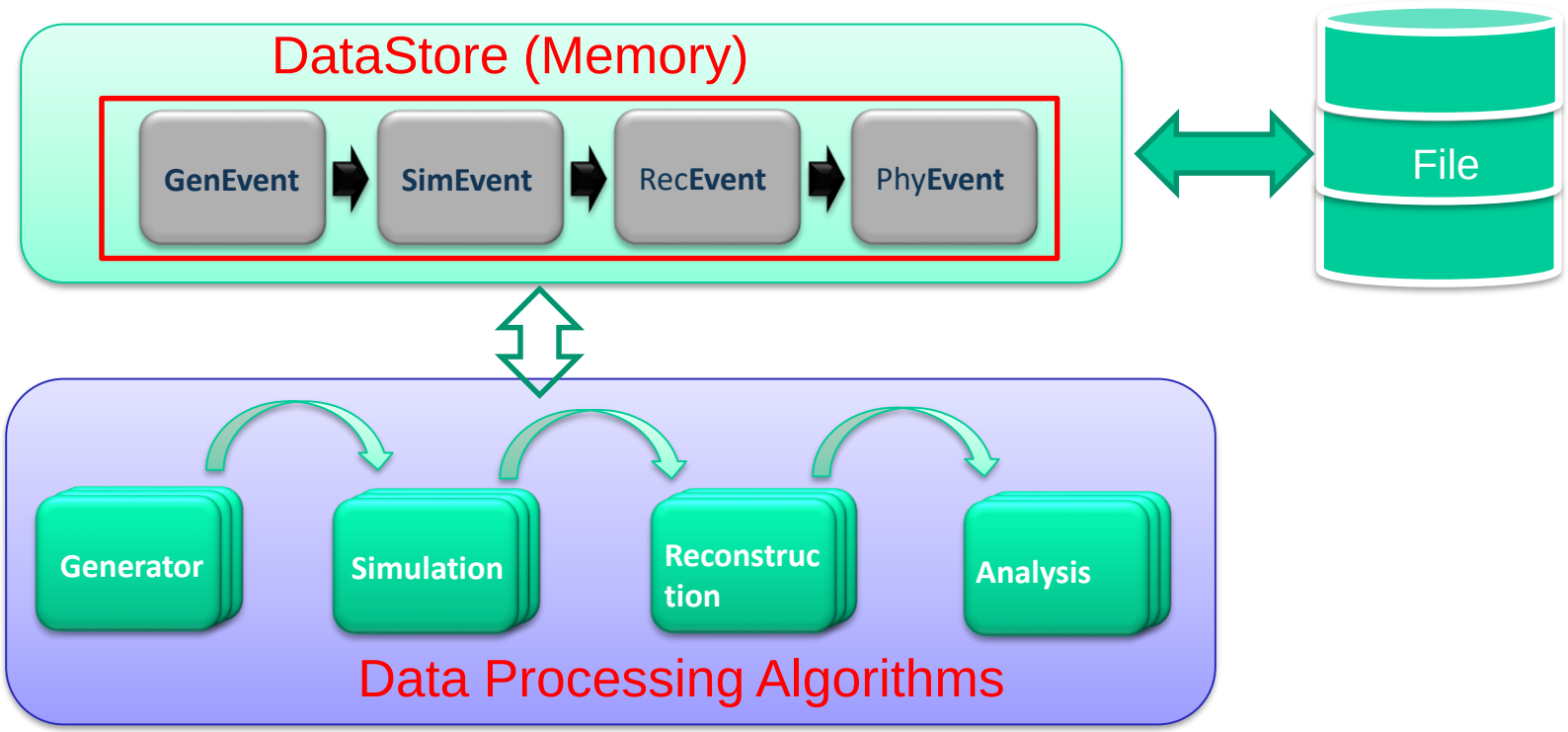
Event Loop

- Event loop is implemented by **algorithms**.
  - An unit of codes for Data Processing
    - the calculation during event loop
    - Most frequently used by users
- Algorithms are easy to combine
  - Managed by framework
  - Unified interface
  - Event sharing

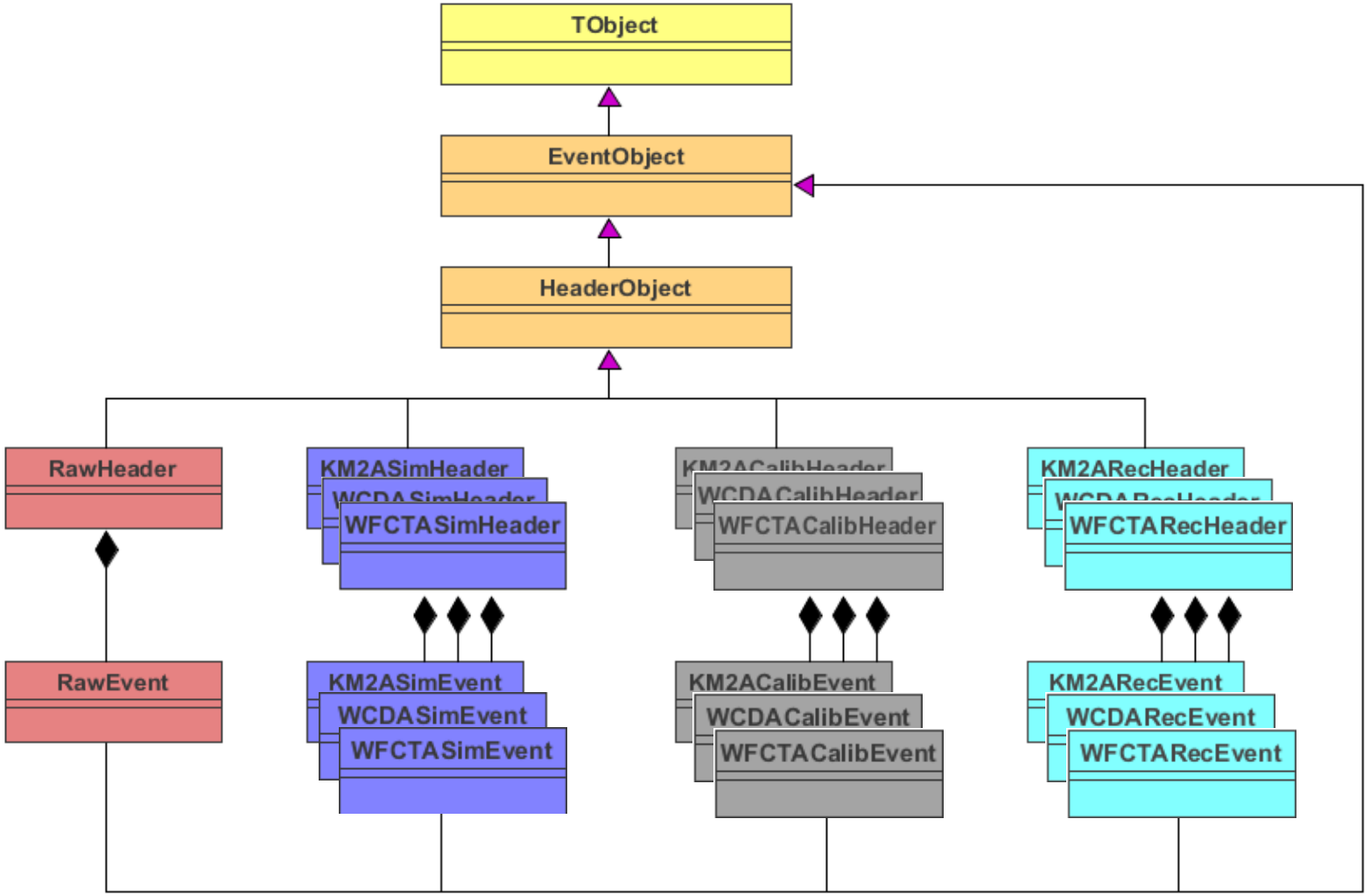


Event Data

- Event data:
  - Processed by algorithms
  - Defined by Event data model



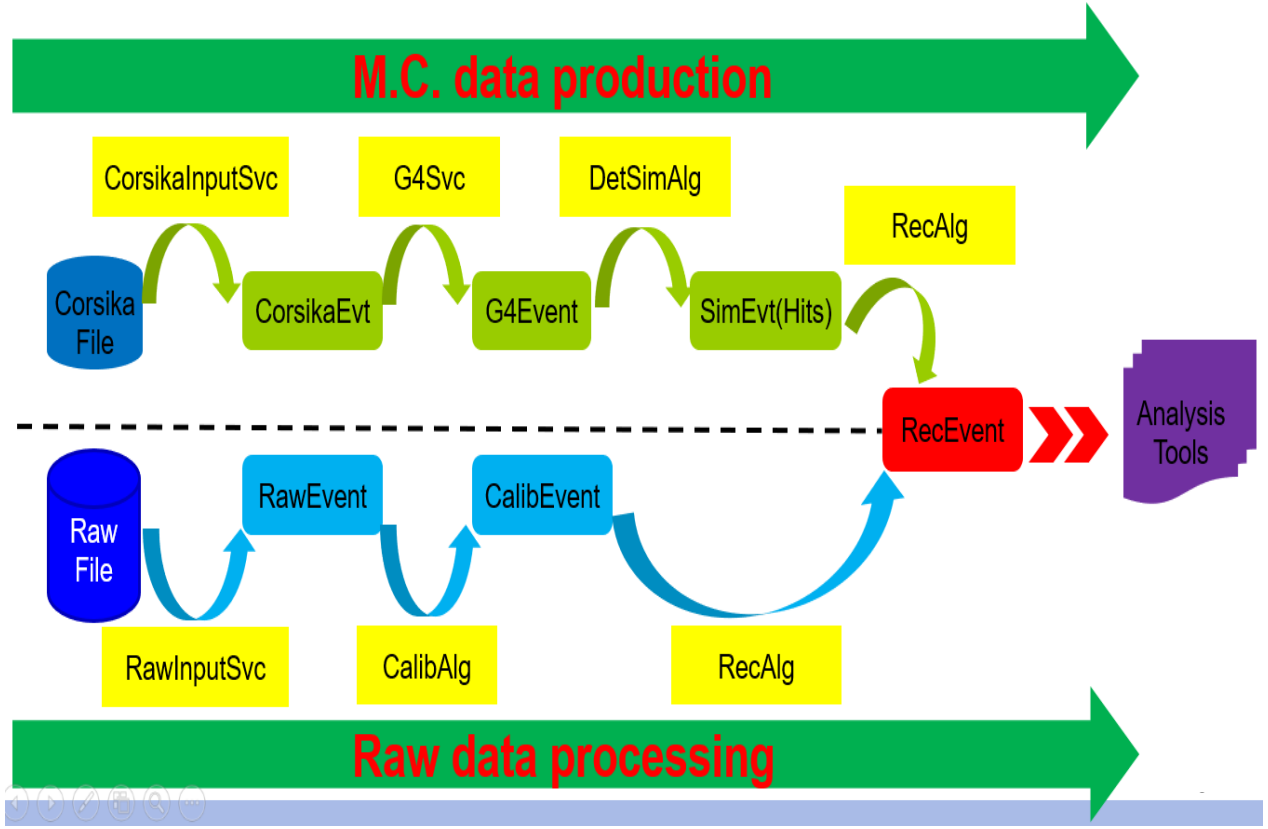
Event Data Model



- Each process defines their Event Objects
- Each subdetector defines their Event Objects
- All EventObject inherits from TObject.

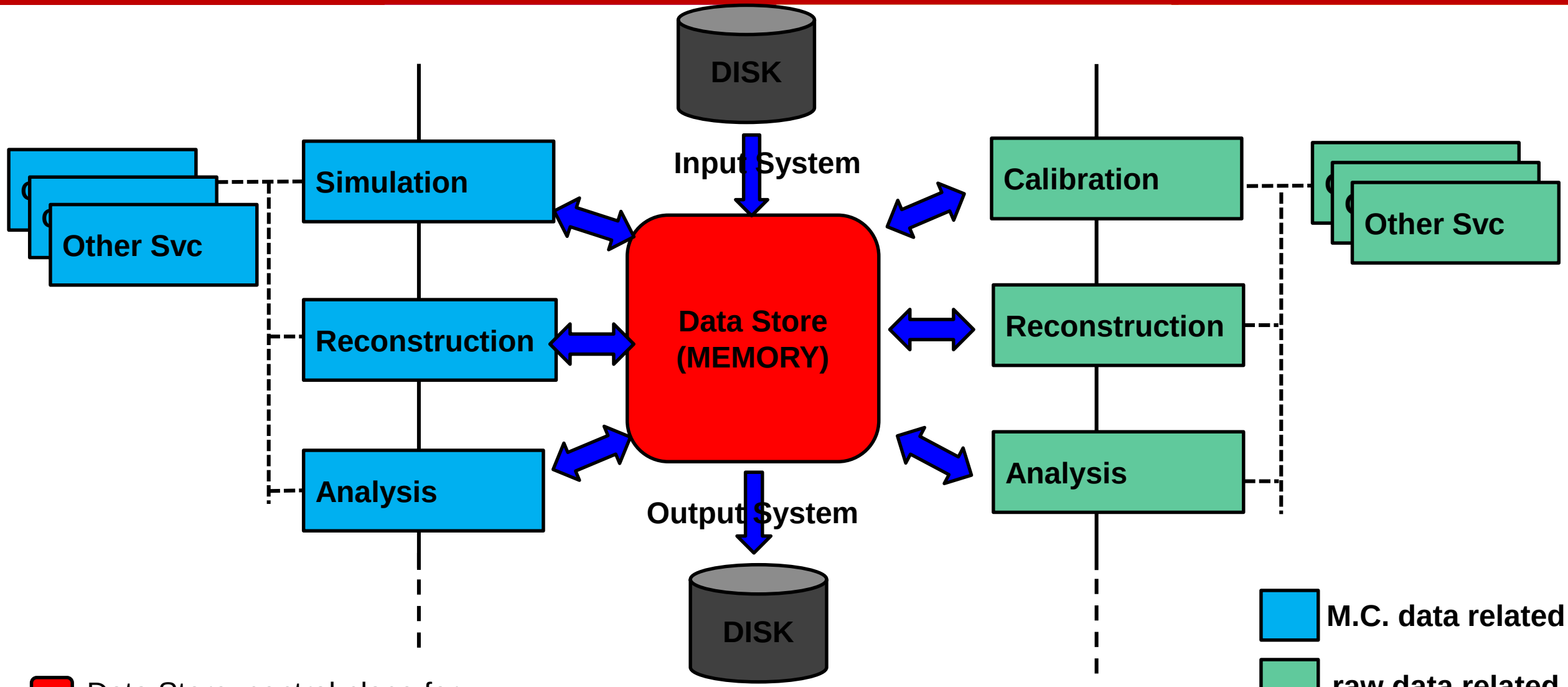
Data Input/Output System

- Three types of Inputs Systems
  - Corsika Input system (Corsika Data)
  - Raw Input system (Raw Data)
  - Root Input System(ROOT Data)



- One Unified Root Output system
  - Writing all Event data from Memory into Root Files

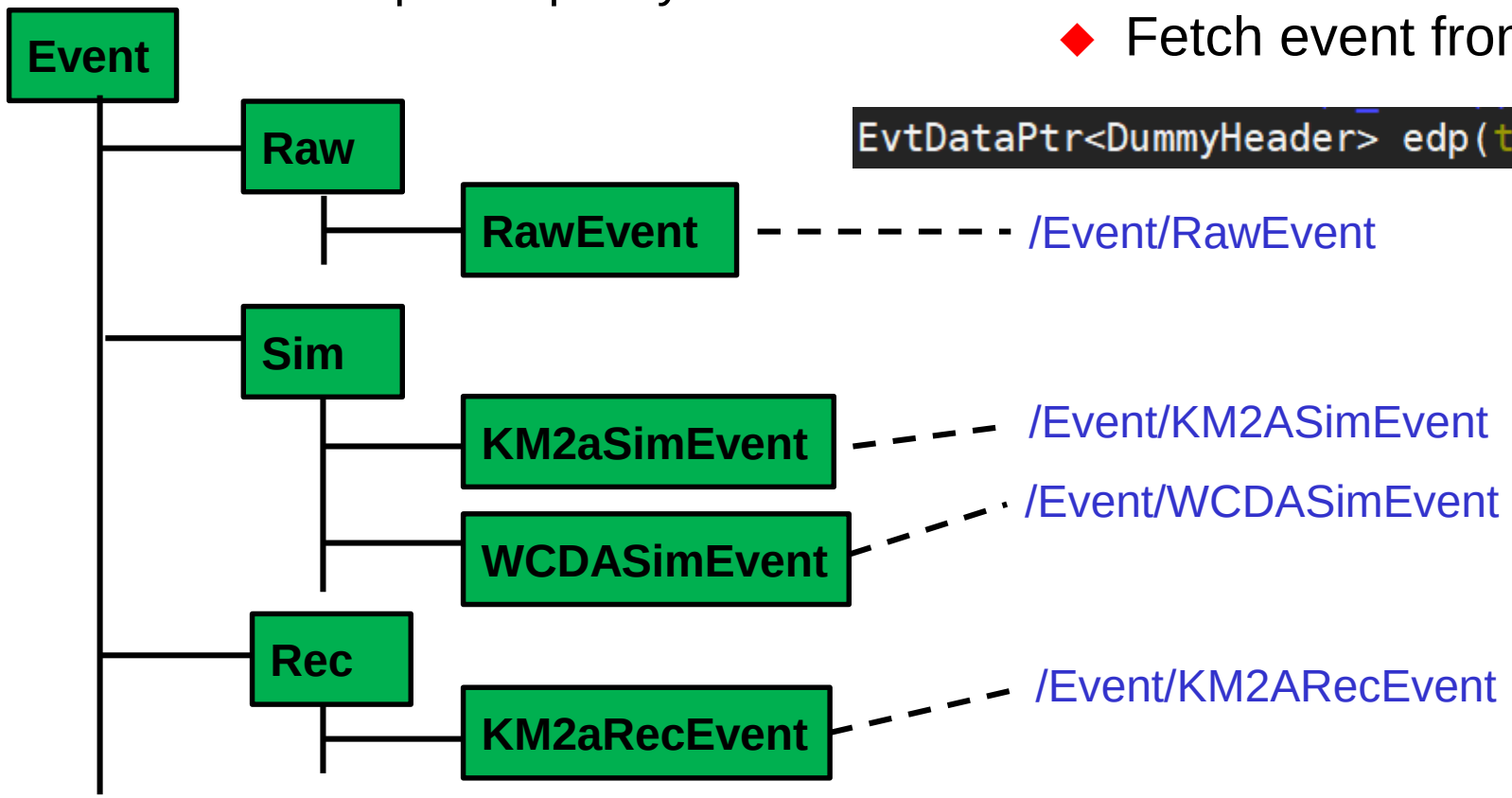
Event Management and Sharing in Data Store



Data Store: central place for holding and sharing Event data

Management of Event data in DataStore

- DatastoreMgr and “key”
  - Manage the logical path of Event data
  - Manage the lifecycle of Event data
  - Coordinate input/output system



- Put event into data store

```
SniperPtr<IDataStoreMgr> mMgr(getParent(), "DataStoreMgr");
mMgr->adopt(Header, "/Event");
```

- Fetch event from data store

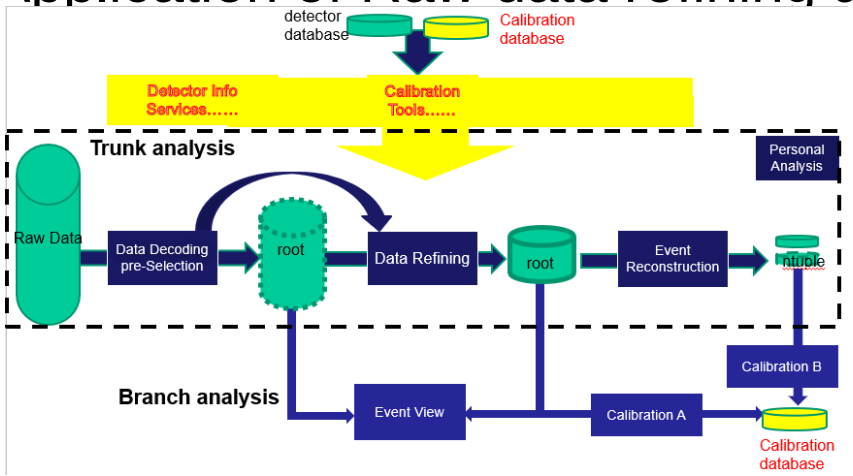
```
EvtDataPtr<DummyHeader> edp(this->getRoot(),"/Event/DummyEvent");
```

Progress since last collaboration meeting

- KM2A simulation(Wenhao Huang, Jing Zhao)
  - Corsika input interface
    - Corsika event may split into smaller one contains certain numbers of sub-particles
  - System memory check
    - Optimized algorithm
- Input/Output system interface
  - Event-steps
  - Event-starts
- WFCTA simulation(Lingling Ma, Wenhao Huang)
  - Data Model updating
  - Data flows from simulation to analysis

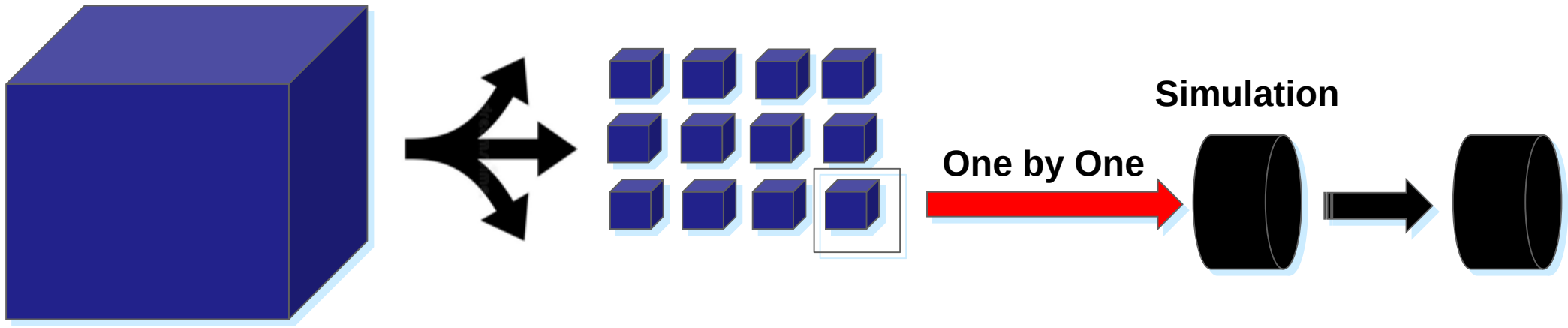
Progress since last collaboration meeting

- KM2A time calibration
  - Integration into LodeStar (Qiyun Li, Yuncheng Nan)
    - Product calibration data in framework way
- Management of calibration data
  - Stored in database
  - Calibration data service
- Application of Raw data refining and reconstruction (followed talk by Chenguang, Zhu)



Optimizations in KM2A Simulation

- Corsika Input



complete corsika event

split corsika event

- Split corsika event is the unit of corsika data proceeding

KM2A Time Calibration

- Produce calibration data
  - Average algorithm: KM2ATimAvg
  - Calibration algorithm: KM2ATimCal
- Calibration database
  - http://lhaasodb.hepg.sdu.edu.cn:8888/phpmyadmin/
  - Structure and information are under discussing.

+ 选项

	du_id	id	time	Time_Start	Time_End
编辑 复制 删除	1	2	10.31543794	2019-03-05 00:00:00	2019-03-05 00:00:00
编辑 复制 删除	2	3	9.356503145	2019-03-05 00:00:00	2019-03-05 00:00:00
编辑 复制 删除	3	4	17.54704151	2019-03-05 00:00:00	2019-03-05 00:00:00
编辑 复制 删除	4	9	17.73587896	2019-03-05 00:00:00	2019-03-05 00:00:00
编辑 复制 删除	5	10	15.14012148	2019-03-05 00:00:00	2019-03-05 00:00:00

Calibration Data Service

- DatabaseCalibSvc(calibration database service)
  - Fetch information from database according to certain “key” information
  - For KM2A Time is “timestamp”

```
SniperPtr<DatabaseCalibSvc> hs(getParent(), "hSvc");
    if (hs.valid()) {
        double calibtime = hs->GetKM2ACalibTime(200, "2019-06-20");
    }
```

“key” information: ”timestamp”

- DetcPosSvc(detector position service, by Yonggang, Wang)
  - Get detector position using detector id

```
SniperPtr<DetcPosSvc> hs(getParent(), "hSvc");
    if (hs.valid()) {
     double x =  hs->GetDetXByID(32);
     double y =  hs->GetDetXByID(32);
     double z =  hs->GetDetXByID(32);
    }
```

“key” information: ”detector id”

Current status

- Detector simulation works well in framework
  - KM2A fast simulation
  - KM2A full simulation
  - WCDA simulation
  - WFCTA simulation
- Simulation data Reconstruction
  - KM2A core position and direction reconstruction
  - WCDA core position reconstruction
- Calibration
  - KM2A time calibration
- Raw data refining and construction

Tutorial: Examples

- 14 Examples in backup corresponding the most common functions
- Tutorials
  - Example1(HelloWorld)
    - Basic operations to run an algorithm
  - Example2(Root Writer)
    - An easy way to use root-related functions: define histogram or Ntuple…
  - Example3(Data Model)
    - Learn about generate data model with xml files

Tutorial: Examples in backup

- Tutorials
  - Example4(Data I/O system)
    - Learn about event transmission between memory and disk
  - Example5~Example6(Specified Input System)
    - How to read corsika files
    - How input system to read raw files
  - Example8~Example12(Detector Simulation: KM2A, WCDA, WFCTA…)
    - How to run detector simulation
  - Example13~Example14(Reconstruction)
    - How to run reconstruction

Detector Simulation

- KM2A fast simulation （Ye Liu, Teng Li)
  - Fast simulatin algorithm: KM2ADetSimAlg
  - Reconstruction algorithm: KM2ARecAlg
  - http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Simulation/FastSimulation
  - Included in Example 8
- KM2A full Simulation (Jing Zhao, Songzhan Chen, Wenhao Huang)
  - One DetFactory Service :KM2ASimV2Factory
  - http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Simulation/KM2ASimV2
  - Included in Example 9

Detector Simulation

- WCDA Simulation (Hanrong Wu, Min Zha, Zhiguo Yao, Wenhao Huang)
  - One DetFactory Service: WcdaSimFactory for simulation without PMT
  - http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Simulation/WcdaSim/
  - One DetFactory Service: Wcda2SimFactory for PMT Simulation
  - http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Simulation/Wcda2Sim/
  - Included in Example 10 and Example 11
- WFCTA Simulation (LingLing Ma, Wenhao Huang, Teng Li)
  - One algorithm: WFCTADetSimAlg
  - http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Simulation/WFCTASim/
  - Included in Example 12

Calibration

- KM2A time calibration
  - Average algorithm: KM2ATimAvg
  - Calibration algorithm: KM2ATimCal
  - http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/calibration/KM2ATimCalAlg
  - Included in Example 7

Reconstruction

- KM2A core position and direction reconstruction(Songzhan Chen, Wenhao Huang)
  - One algorithm: Km2aRec
  - http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Reconstruction/KM2Arec
  - Included in Example 14

- Wcda core position reconstruction(Xiaojie Wang, Wenhao Huang)
  - One algorithm: Km2aRec
  - http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Reconstruction/WCDArec
  - Included in Example 13

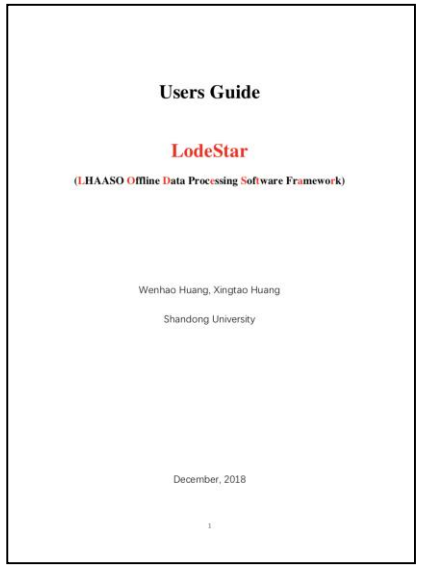
Latest version and documentation

- All codes have been committed to svn.
  - http://svn.lhaaso.ihep.ac.cn/LodeStar
- The latest version of LodeStar has been installed at ihep.
  - /afs/ihep.ac.cn/soft/LHAASO/LodeStar-SLC6/Pre-Release/L19-Pre1_v1r1

```
-bash-4.1$ cd /afs/ihep.ac.cn/soft/LHAASO/LodeStar-SLC6/Pre-Release/L19-Pre1_v1r1/
-bash-4.1$ ls
bashrc.sh          ExternalLibs  offline         setgcc494.sh  setup.sh        sniper
ExternalInterface  lhaasoenv     setgcc494.csh   setup.csh     setup-trunk.sh  tcshrc.csh
```

- **Doc-Db**

  581-v3


Users Guide

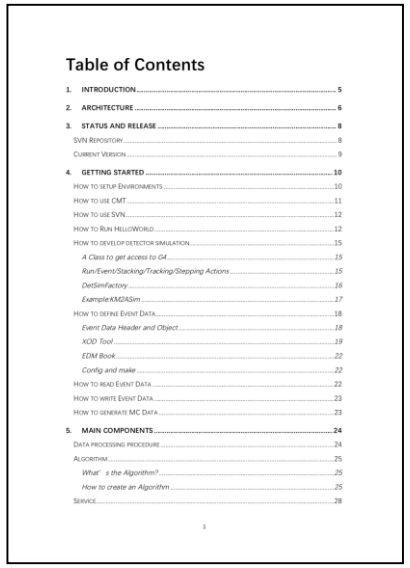
LodeStar

(LHAASO Offline Data Processing Software Framework)

Wenhao Huang, Xingtao Huang

Shandong University

December, 2018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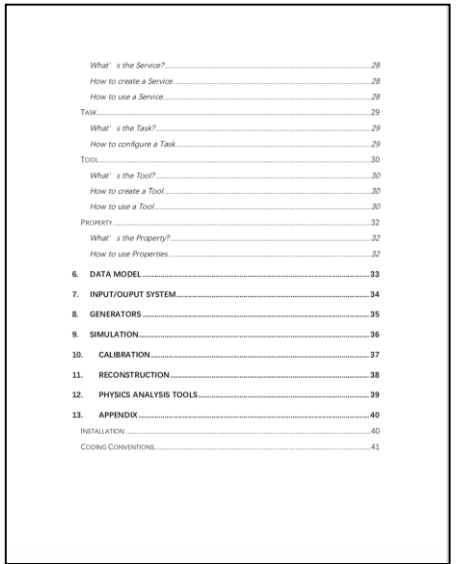
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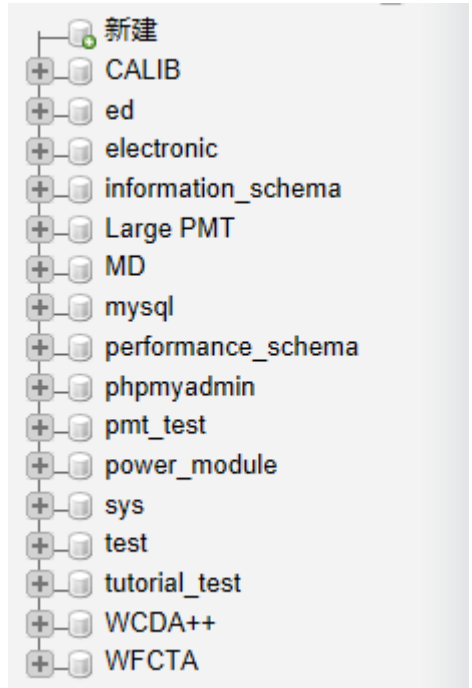
Database and elog related

- Database
  - http://lhaasodb.hepg.sdu.edu.cn:8888/phpmyadmin/
  - People in charge: Jia Liu(jialiu@ihep.ac.cn) Wenhao Huang(whyellowbred@foxmail.com)
- Elog
  - http://svn.lhaaso.ihep.ac.cn:8080/
  - O&M: Wenhao Huang(whyellowbred@foxmail.com)

Several logbooks are defined on this host.
Please select the one to connect to:

Logbook	Entries	Last submission
demo General Linux Tips & Tricks	4	Sat Aug 24 14:02:41 2019 by huangxt
test General Linux Tips & Tricks	2	Fri Oct 26 15:35:38 2018 by huangwh
edlog General Linux Tips & Tricks	12	Fri Mar 15 14:29:18 2019 by Liujia
mdlog Muon Detector group'elog	143	Mon Oct 21 15:17:48 2019 by 罗智，高启
wcdalog WCDA's logbook.	441	Tue Oct 8 14:17:03 2019 by liuc
wfctalog General Linux Tips & Tricks	19	Thu Jun 13 11:20:23 2019 by youzhiyong
gflog General Linux Tips & Tricks	0	-
daqlog General Linux Tips & Tricks	21	Fri May 10 19:36:05 2019 by Gu Minhao
omlog General Linux Tips & Tricks	0	-



Summary & Plan

- LodeStar provides the key functions for LHAASO Data processing
- M.C Data flow has been successfully integrated into Lodestar
  - Detector simulation (KM2A, WCDA and WFCTA)
  - Calibration(KM2A)
  - Reconstruction (KM2A, WCDA, WFCTA)
- Raw Data Flows are also integrated into LodeStar.
  - Raw data input
  - Calibration
  - Refining and construction
- Welcome more collaborators to use LodeStar
  - Running examples in the backup is a good way to start

- Wenhao Huang
  - whyellowbred@foxmail.com
- Xingtao Huang
  - huangxt@sdu.edu.cn

Do not hesitate to contact us!

Thank you

Backup

How to set up LodeStar Environment

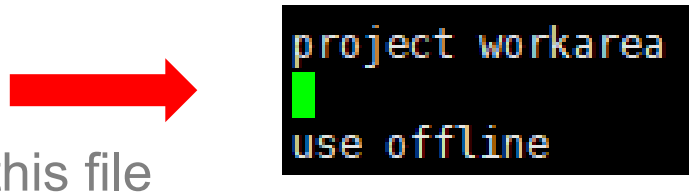
- Login ihep computing node
  - ssh –Y your_user_name@lxslc6.ihep.ac.cn
- Setup Lodestar environments
  - source /afs/ihep.ac.cn/soft/LHAASO/LodeStar-SLC6/Pre-Release/L19-Pre1_v1r1/setup.sh

  #your can also copy this script into your own directory
- Create your own project
  - cmt create_project workarea

  # a new directory, workarea, will be created automatically
  - cd workarea

  # put all your codes under this directory, workarea
  - cd cmt/
  - vim project.cmt

  #add “use offline” in this file



Example 1: Hello World

- Very simple algorithm

- We will learn
  - How to create and compile a LodeStar package
  - How to config and run an algorithm via python script
  - A little about cmt requirement
  - The way of 3 abstract functions called by framework
  - How to declare properties and do python binding

How to Run HelloWorld

- cd path_to_workarea

#Return to directory “workarea”. You can also do: cd ${CMTPATH%%:*}

- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Examples/HelloWorld/

a new directory, HelloWorld, will be created with some codes inside

- cd HelloWorld/cmt

a requirements file is used to configure HelloWorld package
#user need edit it by following this example in user’s package

- cmt config

#config package according to requirements file

- make

#compile and build HelloWorld package

- source setup.sh

#make the library usable

- cd ../share

a python script to confige this job

- python run.py

The HelloWorld Algorithm

- An algorithm should be derived from AlgBase

src/Hello.h

```
 4 #include <string>
 5 #include "SniperKernel/AlgBase.h"
 6
 7 class HelloAlg: public AlgBase {
 8
 9     public:
10         HelloAlg(const std::string& name);
11         ~HelloAlg();
12
13         bool initialize();
14         bool execute();
15         bool finalize();
16
17     private:
18         int m_count;
19         std::string m_string;
20
21 };
```

src/Hello.cc

```
 9 HelloAlg::HelloAlg(const std::string& name)
10     : AlgBase(name)
11 {
12     m_count = 0;
13     declProp("VarString", m_string);
14 }
15
16 HelloAlg::~HelloAlg()
17 {
18
19 }
20
21 bool HelloAlg::initialize()
22 {
23     return true;
24 }
25
26 bool HelloAlg::execute()
27 {
28     ++m_count;
29     LogInfo << "executing: " << m_count << std::endl;
30     SniperPtr<HelloSvc> hs(getParent(), "hSvc");
31     if (hs.valid()) {
32         hs->doSomething();
33     }
34     HelloTool* htool = tool<HelloTool>("htool");
35     htool->doSomething();
36     return true;
37 }
38
39 bool HelloAlg::finalize()
40 {
41     return true;
42 }
```

CMT requirement

- There is a directory called cmt in every package.
- And in that directory, there is a file called requirements.

requirements file (HelloWorld/cmt/requirements)

```
1 package HelloWorld
2
3 use SniperKernel v*
4
5 library HelloWorld *.cc
6 apply_pattern install_python_modules
7 apply_pattern linker_library library=HelloWorld
8 apply_pattern install_more_includes more="HelloWorld"
```

- Line 3 means that this package rely on package SniperKernel.

- Now you have no need to know everything about this file, just need to notice line 3…

Properties and python bonding

```cpp
HelloAlg::HelloAlg(const std::string& name)
    : AlgBase(name)
{
    m_count = 0;
    declProp("VarString", m_string);
}
```

without recompiling.

…pass it to algorithm,

- We set new value to “VarString” in python script and…

```python
#!/usr/bin/env python
# -*- coding:utf-8 -*-

import Sniper

task = Sniper.Task("task")
#task.asTop()
task.setLogLevel(3)

import HelloWorld
alg = task.createAlg("HelloAlg/hAlg")
alg.property("VarString").set("some value")

task.setEvtMax(5)
task.show()
task.run()
```

Example 2: RootWriter

- RootWriter
  - A simple interface to use root-related functions

- We will learn
  - How to define a histogram
  - How to define a Ntuple

How to Run HelloHist

- cd path_to_workarea

#Return to directory “workarea”. You can also do: cd ${CMTPATH%%:*}

- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Examples/HelloHist/

a new directory, HelloHist, will be created with some codes inside

- cd HelloHist/cmt

a requirements file is used to configure HelloHist package

- cmt config

#config package according to requirements file

- make

#compile and build HelloHist package

- source setup.sh

#make the library usable

- cd ../share

a python script to confige this job

- python run.py

The HelloHist Algorithm

src/HelloHist.cc

```cpp
bool HelloHistAlg::initialize()
{
   hist = new TH1D("hist","hist",8,0,8);

   return true;
}

bool HelloHistAlg::execute()
{
    LogInfo << "executing: " << m_count << std::endl;

    ++m_count;
    hist->Fill(m_count);

    return true;
}

bool HelloHistAlg::finalize()
{
    SniperPtr<RootWriter> ws(getParent(), "wSvc");
    if (ws.valid()) {
        ws->attach("Fkey/histDir", hist);
          return true;
    }
    else
         return false;
}
```

Fill 5 times

share/run.py

```python
import Sniper

task = Sniper.Task("task")
#task.asTop()
task.setLogLevel(3)

import HelloHist
alg = task.createAlg("HelloHistAlg/hAlg")

import RootWriter
svc = task.createSvc("RootWriter/wSvc")
svc.property("Output").set({"Fkey" : "HelloHist.root"})

task.setEvtMax(5)
task.show()
task.run()
```

How to Run HelloNtuple

- cd path_to_workarea

#Return to directory “workarea”. You can also do: cd ${CMTPATH%%:*}

- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Examples/HelloNtuple/

a new directory, HelloNtuple, will be created with some codes inside

- cd HelloNtuple/cmt

a requirements file is used to configure HelloNtuple package

- cmt config

#config package according to requirements file

- make

#compile and build HelloNtuple package

- source setup.sh

#make the library usable

- cd ../share

a python script to config this job

- python run.py

Example 3: Define your own data model

- XmlObjDesc (XOD)
  - a tool to define EDM with XML

- We will learn
  - How to generate EDM will written xml files
  - Event path in DataStore

How to build your data model

- cd path_to_workarea

#Return to directory “workarea”. You can also do: cd ${CMTPATH%%:*}

- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Examples/DummyEvent/

a new directory, DummyEvent, will be created with some codes inside

- cd DummyEvent/cmt

a requirements file is used to configure DummyEvent package

#user need edit it by following this example in user’s package

- cmt config

#config package according to requirements file

- make

#compile and build DummyEvent package

- source setup.sh

#make the library usable

Your own data model

- After compilation, there show be like this

```
-bash-4.1$ cd DummyEvent/
-bash-4.1$ ls
amd64_linux26  cmt  Event  src  xml
```

- In src directory, there would be a file named “DummyEDMDef.cc”.

```
-bash-4.1$ cd src/
-bash-4.1$ ls
DummyEDMDef.cc      DummyEventDict_rdict.pcm  DummyHeaderDict.cc
DummyEvent.cc       DummyEventLinkDef.h       DummyHeaderDict_rdict.pcm
DummyEventDict.cc   DummyHeader.cc            DummyHeaderLinkDef.h
```

- Notice that the path is defined here and we will use it in Example 4.

```
#include "EDMUtil/BookEDM.h"
LHAASO_BOOK_EDM(LHAASO::DummyHeader, LHAASO::DummyEvent, 999, /Event/DummyEvent);
```

path in DataStore

Example 4: Data model IO system(RootIO)

- This Example is based on Example3

- We will define algorithms:
  - To learn about data I/O system
    - create DummyEvent and write them into disk at root files.
    - read the root file above and fetch the results.

How to use your data model(1)

- cd path_to_workarea
- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Examples/IOTestAlg/

a new directory, IOTestAlg, will be created with some codes inside

- cd IOTestAlg/cmt

a requirements file is used to configure IOTestAlg package

- cmt config

#config package according to requirements file

- make

#compile and build IOTestAlg package

- source setup.sh

#make the library usable

How to use your data model(2)

- cd ../share

#Python scripts in this directory

- Python EdmWrite.py

#write out root file via output system

- Python EdmRead.py

#read the root file above via input system

```
iSvc = AlgTask.createSvc("RootInputSvc/InputSvc")
iSvc.property("InputStream").set({"/Event/DummyEvent" : "DummyEvent.root"})
```

```
oSvc = AlgTask.createSvc("RootOutputSvc/OutputSvc")
oSvc.property("OutputStream").set({"/Event/DummyEvent" : "DummyEvent.root"})
```

```
EvtDataPtr<DummyHeader> edp(this->getRoot(),"/Event/DummyEvent");
```

Example 5: Data model IO system(CorsikaInput)

- cd path_to_workarea
- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Examples/CorsikaIOTestAlg/

a new directory, CorsikaIOTestAlg, will be created with some codes inside

- cd CorsikaIOTestAlg/cmt

a requirements file is used to configure CorsikaIOTestAlg package

- cmt config

#config package according to requirements file

- make

#compile and build CorsikaIOTestAlg package

- source setup.sh

#make the library usable

- cd ../share

a python script to config this job

- python run.py

Example 6: Data model IO system(raw data Input)

- cd path_to_workarea
- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Examples/RawIOTestAlg/

a new directory, RawIOTestAlg, will be created with some codes inside

- cd RawIOTestAlg/cmt

a requirements file is used to configure RawIOTestAlg package

- cmt config

#config package according to requirements file

- make

#compile and build RawIOTestAlg package

- source setup.sh

#make the library usable

- cd ../share

a python script to config this job

- python run.py

Example 7: KM2A time calibration

- cd path_to_workarea
- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Calibration/KM2ATimCal/

a new directory, KM2ATimCal, will be created with some codes inside

- cd KM2ATimCal/cmt

a requirements file is used to configure KM2ATimCal package

#user need edit it by following this example in user's package

- cmt config

#config package according to requirements file

- make

#compile and build KM2ATimCal package

- source setup.sh

Example 7: KM2A time calibration

- cd ../share

a python script to config this job

- python average.py -i rootfile.flst -o Timeaverage
- python calib.py -i rootfile.flst –a Timeaverage -o Calibration

  Add “-c Calibration” for iteration, for example :

- python average.py -i rootfile.flst -c calibration -o Timeaverage

Example 8: KM2A fast simulation

- cd path_to_workarea
- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Simulation/FastSimulation/KM2ASimulation/

a new directory, KM2ASimulation, will be created with some codes inside

- cd KM2ASimulation/cmt

a requirements file is used to configure KM2ASimulation package

- cmt config

#config package according to requirements file

- make

#compile and build KM2ASimulation package

- source setup.sh

#make the library usable

- cd ../share

a python script to config this job

- python run.py

Example 9: KM2A full simulation

- cd path_to_workarea
- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Simulation/KM2ASimV2

a new directory, KM2ASimV2, will be created with some codes inside

- cd KM2ASimV2/cmt

a requirements file is used to configure KM2ASimV2 package

- cmt config

#config package according to requirements file

- make

#compile and build KM2ASimV2 package

- source setup.sh

#make the library usable

- cd ../share

a python script to config this job

- python DetSim_KM2A.py

Example 10: WCDA simulation(first step)

- cd path_to_workarea
- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Simulation/WcdaSim

a new directory, WcdaSim, will be created with some codes inside

- cd WcdaSim/cmt

a requirements file is used to configure WcdaSim package

- cmt config

#config package according to requirements file

- make

#compile and build WcdaSim package

- source setup.sh

#make the library usable

- cd ../share

a python script to config this job

- python DetSim_WCDA_2.py [input] [output] [option]

#such as: python DetSim_WCDA_1.py /eos/user/z/zham/dcorsika/p5.e12/DAT000832.part ./out -settingfile ../config/settings.conf

Example 11: WCDA simulation(second step)

- cd path_to_workarea
- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Simulation/Wcda2Sim

a new directory, Wcda2Sim, will be created with some codes inside

- cd Wcda2Sim/cmt

a requirements file is used to configure Wcda2Sim package

- cmt config

#config package according to requirements file

- make

#compile and build Wcda2Sim package

- source setup.sh

#make the library usable

- cd ../share

a python script to config this job

- python DetSim_WCDA_2.py [input] [output] [option]

Example 12: WTCTA simulation

- cd path_to_workarea
- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Simulation/WFCTASim

a new directory, WFCTASim, will be created with some codes inside

- cd WFCTASim/cmt

a requirements file is used to configure WFCTASim package

- cmt config

#config package according to requirements file

- make

#compile and build WFCTASim package

- source setup.sh

#make the library usable

- cd ../share

a python script to config this job

- python DetSim_WFCTA.py

Example 13: WCDA reconstruction(core position)

- cd path_to_workarea
- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Reconstruction/WCDArec

a new directory, WCDArec, will be created with some codes inside

- cd WCDArec/cmt

a requirements file is used to configure WCDArec package

- cmt config

#config package according to requirements file

- make

#compile and build WCDArec package

- source setup.sh

#make the library usable

- cd ../share

a python script to config this job

- python Rec_WCDA.py

Example 14: KM2A reconstruction(core position, direction)

- cd path_to_workarea
- svn co http://svn.lhaaso.ihep.ac.cn/LodeStar/offline/trunk/Reconstruction/KM2Arec

a new directory, KM2Arec, will be created with some codes inside

- cd KM2Arec/cmt

a requirements file is used to configure KM2Arec package

- cmt config

#config package according to requirements file

- make

#compile and build KM2Arec package

- source setup.sh

#make the library usable

- cd ../share

a python script to config this job

- python Rec_KM2A.py