Considerations on Conventions for Directory and Geometry (DRAFT)

Tao Lin 2020-09-28 CEPCSW Meeting

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- Directory naming convention and structure
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Motivation

- The latest workflow on GitHub:
 - Create an issue (<u>https://github.com/cepc/CEPCSW/issues</u>)
 - Create a pull request (<u>https://github.com/cepc/CEPCSW/pulls</u>)
 - Fork the official repo and make changes in developer repo
 - Review and merge
 - Close the issue
- The conventions between developers become important.
- Common questions:
 - If creating a new package, what' s the name and path?
 - If creating a new detector option, what' s the name and path?
 - How about the sub-detector option?

Proposed convention for package

- Conventions
 - The package name and the produced shared library name should be same.
 - The algorithms, services or tools in different implementation could be put into the same package.
 - Avoid too many libraries.
 - Add README.md under each package.
 - Avoid too deep hierarchy. 2 levels!
- Naming conventions: WWWXXXYYYZZZ
 - WWW: the first level identifier. Easy for us to locate the package
 - Det: Detector description
 - DetSim: Detector simulation, Digi: Digitization
 - Rec[o]: Reconstruction, Ana: Analysis, Val: Validation
 - <u>XXX</u>: the real name
 - YYY: no identifiers, Interface, Alg (algorithm), Svc (service), Tool, etc
 - ZZZ: no identifiers, or detector options if necessary
 - The challenge is to support different detector options.
 - For example, a reconstruction algorithm for a dedicated option.

Directory

✤ The current status

Directory name	Has 2 nd level packages?	Description
<u>Examples</u>	No. All the code in in the src with sub-directories.	The hub of all the examples and job options.
Detector	Yes.	Detector descriptions.
<u>Generator</u>	No.	The generator interface.
Simulation	Yes.	The detector simulation.
<u>Digitisers</u>	Yes.	The digitization simulation.
Reconstruction	Yes.	The reconstruction
<u>Utilities</u>	Yes.	Not a good name. Need
<u>Service</u>	Yes.	discussions.
docs	No.	Documentation

Examples

Only one module is produced.

양 master - CEPCSW / Exam	ples / src /	Go to file Add file -
South make edm4hep read & v	write examples be consistency	✓ 12 days ago 🕚 History
DumpIDAlg	WIP: use ntuplesvc to store the id.	last month
Edm4hepTest	make edm4hep read & write examples be consist	tency 12 days ago
FirstSvc	add an example of a service and an alg to use it.	14 months ago
HelloWorld	add a hello world algorithm.	14 months ago
PlcioTest	Migrate Examples.	5 months ago
SecondAlg	add an example of a service and an alg to use it.	14 months ago

Detector

- Prefix with Det and Geo
 - DetInterface: the interface
 - GeoSvc: the geometry service
 - DetXXX: the implementation of different detectors/sub-detectors.

양 master ▾ CEPCSW / Detec	ctor /	Go to file Add file ▼
mirguest WIP: Prepare a CRD d	irectory	🗸 13 days ago 🕚 History
DetCEPCv4	add barrelside region into cellld	13 days ago
DetCRD	WIP: Prepare a CRD directory.	13 days ago
DetDriftChamber	WIP: add a field 'chamber' to separate the two cha	ambers. 20 days ago
DetEcalMatrix	update Digi_Calo	4 months ago
DetInterface	Merge Chengdong's Tracking code.	last month
GeoSvc	Merge Chengdong's Tracking code.	last month

Simulation

- All the packages under Simulation are with prefix DetSim
 - Interface: all the interfaces in the simulation framework
 - Core: Simulation framework
 - Geom: integration with DD4hep
 - Dedx: dE/dx related tools
 - SD: Geant4 Sensitive Detection (detector response)
 - Ana: Geant4 user actions



Digitisers

In both digitisers and reconstruction, there are digitization packages.



Reconstuction

✤ Trac		king and PFA/Pandora		 Proposed naming convention: RecPandoraAlg RecSiliconTracking 	
		😵 master 👻 CEPCSW / Recor	nstruction /	Go to file Add file -	
		mirguest Merge branch 'maste	r' into master	9 days ago 🕚 History	
		Digi_Calo	update MC reco relation constructio	n 3 months ago	
		PFA/Pandora	remove abs path	10 days ago	
		SiliconTracking	Correct data type: trackerHit* -> Cor	nstTrackerHit 10 days ago	
		° master 👻 CEPCSW / Recor	nstruction / PFA / Pandora /	Go to file Add file -	
		Fang Wenxing remove abs pat	h	🗸 10 days ago 🕚 History	
		GaudiPandora	remove abs path	10 days ago	
		MatrixPandora	remove abs path	10 days ago	
		PandoraLikelihoodData9EBin	update pandora input style and add	vertex info 22 days ago	
		PandoraSettingsDefault.xml	update MatrixPandora	10 days ago	

Utilities

- The following packages are from iLCSoft.
 - DataHelper is from MarlinUtil
 - KalDet is from <u>KalDet</u>
 - KalTest is from <u>KalTest</u>
 - KiTrack is from <u>KiTrack</u>

As these packages are imported from other repos, it would be necessary record the commit version.

	ties /	Go to file Add file ▼
👩 zhaomr13 remove *.bak 📖		6 days ago 🕤 History
DataHelper	Correct data type	10 days ago
KalDet	remove file with *.remove	6 days ago
KalTest	remove file with *.remove	6 days ago
KiTrack	remove *.bak	6 days ago

Service

- This directory should be removed and the packages should be moved to better categories.
 - <u>TrackSystemSvc</u> -> Reconstruction/RecTrackingSvc?
 - <u>GearSvc</u> -> Detector/[Geo]GearSvc?
 - <u>EventSeeder</u>-> Reconstuction/RecEventSeederSvc?

😌 master 👻 CEPCSW / Servic	e /	Go to file Add file -
👩 zhaomr13 Merge branch 'maste	r' of github.com:zhaomr13/CEPCSW	6 days ago 🕚 History
EventSeeder	services for marlin processor migration	13 months ago
GearSvc	services for marlin processor migration	13 months ago
TrackSystemSvc	remove file with *.remove	6 days ago

InstallArea (after `make install`)

In InstallArea, there are libraries, headers, python and so on

- About 30 libraries are generated.
- About 20 MB in total.

Singularity> ls InstallArea/lib/*.so InstallArea/lib/libDataHelperLib.so InstallArea/lib/libDCHDigi.so InstallArea/lib/libDetCEPCv4.so InstallArea/lib/libDetCRD.so InstallArea/lib/libDetEcalMatrix.so InstallArea/lib/libDetEcalMatrix.so InstallArea/lib/libDetSimAna.so InstallArea/lib/libDetSimCore.so InstallArea/lib/libDetSimDedx.so InstallArea/lib/libDetSimGeom.so InstallArea/lib/libDetSimInterface.so InstallArea/lib/libDetSimSD.so InstallArea/lib/libDetSimSD.so

InstallArea/lib/libExamples.so InstallArea/lib/libGaudiPandora.so InstallArea/lib/libGearSvc.so InstallArea/lib/libGenAlgo.so InstallArea/lib/libGeoSvc.so InstallArea/lib/libKalDetLib.so InstallArea/lib/libKalTestLib.so InstallArea/lib/libKiTrackLib.so InstallArea/lib/libMatrixPandora.so InstallArea/lib/libSiliconTracking.so InstallArea/lib/libSiliconTracking.so InstallArea/lib/libSimpleDigi.so InstallArea/lib/libTrackSystemSvcLib.so

Singularity> ls	InstallArea/	python/		
DCHDigi	DetSimAna	Digi_Calo	Generator	TrackSystemSvc
DetCEPCv4	DetSimCore	EventSeeder	GeoSvc	
DetCRD	DetSimDedx	Examples	MatrixPandora	
DetDriftChamber	DetSimGeom	GaudiPandora	SiliconTracking	
DetEcalMatrix	DetSimSD	GearSvc	SimpleDigi	

Proposed convention for Geometry

- The XML compact and C++ constructor are the basic units in DD4hep.
 - Organized into two levels: the full-detector options (compact only) and the sub-detectors (compact + constructor)
 - The package containing the full detector option should provide a complete XML based compact files.
 - The compact and constructor for sub-detector should be kept same.
- The naming conventions: DDD_oX_vYY (unique name)
 - DDD: the detector (CRD, CEPC Reference Detector) or sub-detector name (ECalBarrel)
 - X: the options
 - YY: the implementations
- The different options could be easily managed in both Database and Git Repo.

Schematic View



Workflow

- Coordinators draft the plan for CRD_oX_vYY and notify all the developers.
 - Create a new issue (cc teams or members).
 - Add descriptions in README (via Pull Request).
- If sub-detectors do not exist, developers create the compact and constructor for the sub-detectors.
 - Create a new issue to describe the sub-detector information.
 - Submit changes (via Pull Request)
- If exist, developers tell the coordinators the xml to be used.
 - Post a message in the issue.
- Coordinators release the CRD_oX_vYY.
 - Collecting all the xml and submit changes (via Pull Request)
 - After review by all the developers, merge the PR and close the issue.

- CLIC is the detector name
 - Only compact files are stored here.
- In the compact directory, there are a list of the options and implementations.

ᢞ master → Icgeo / CLIC / co	Go to file	Add file 🔻
andresailer <u>CLIC o4 v14: only</u>	leave lcgeo relevant parts in README 🗸 on 11 Sep 201	9 🕲 History
CLIC_debug_tracking	Make the layers longer	5 years ago
CLIC_debug_tracking2	Added the new plugin options to the debug model	5 years ago
CLIC_o1_v01	Added proper detector names/titles in compact files for	5 years ago
CLIC_02_v01	Added proper detector names/titles in compact files for	5 years ago
CLIC_02_v02	- fixed dimension of barrel trackers (now 2)	5 years ago
CLIC_02_v03	Added proper detector names/titles in compact files for	5 years ago

The description could be found in <u>README.md</u>

	CLIC_o3_v14	CLIC_o3_v14: VertexEndcap: add sorting policy plugin for	2 years ago
	CLIC_o4_v14	CLIC_o4_v14: only leave lcgeo relevant parts in README	13 months ago
Ľ	README.md	Start new tracker model, change README in clic to markd	4 years ago

README.md

Production/Recommended version = CLIC_o2_v05

CLIC_o1_v01

- Windmill vertex (as in engineering design)
- Thick petals with gaps
- Tracker modules do not have right material budget
- LLR ECal Barrel
- Generic ECalEndcap Polyhedral HCal, Solenoid and Yoke

CLIC_o2_v01

- Staggered vertex (for software compatibility)
- Thick petals with gaps
- Tracker modules do not have right material budget
- LLR ECal Barrel

 Each sub-directory is a snapshot of the combination of different sub-detectors.

۲ ۲	master 👻 Icgeo / CLIC / con	mpact / CLIC_o1_v01 /	Go to file	Add file ▼
-	nikiforosnikiforou Added prope	er detector names/titles in compact files	on 23 Nov 2015	🕑 History
ß	BeamCal_o1_v01_01.xml	CLIC_o1_v01: Change BeamCal and LumiCal Segr	mentations	5 years ago
Ľ	Beampipe_o1_v01_01.xml	Added the LumiCal envelopes, extended the plug	g for 20c	5 years ago
ß	CLIC_o1_v01.xml	Added proper detector names/titles in compact t	files for	5 years ago
Ľ	ECalBarrel_o1_v01_01.xml	Edited layer structure such that there are no pass	sive layer	5 years ago
ß	ECalEndcap_o1_v01_01.xml	Added ECalEndcap similar to HCalEndcap, for the	<u>e time be</u>	5 years ago
ß	ECalEndcap_o2_v01_01.xml	Changed ID encodings in CLIC_o1_v01 to the new	w standard	5 years ago
ß	ECalPlug_o1_v01_01.xml	Changed ID encodings in CLIC_o1_v01 to the new	v standard	5 years ago
ß	HCalBarrel_o1_v01_01.xml	Changed ID encodings in CLIC_o1_v01 to the new	w standard	5 years ago
ß	HCalEndcap_o1_v01_01.xml	Changed ID encodings in CLIC_o1_v01 to the new	w standard	5 years ago
ß	InnerTracker_o1_v01_01.xml	Refactored the plugins.		5 years ago

- Each compact file is refer to a unique constructor.
 - Keep the same name.

ECalBarrel_o2_v01		Search
Code	2	2 code results in iLCSoft/lcgeo or view all results on GitHub
Commits	1	
Issues	0	CLIC/compact/CLIC_o2_v02/ECalBarrel_o2_v01_01.xml
		<pre>27 <detector <="" name="ECalBarrel" pre="" type="ECalBarrel_o2_v01"></detector></pre>
Discussions (Beta)	0	<pre>id="DetID_ECal_Barrel" readout="ECalBarrelCollection" vis="BlueVis" gap="0.*cm"></pre>
Packages	0	• XML Showing the top match Last indexed on 4 Jul 2018
Wikis	0	
		detector/calorimeter/ECalBarrel_o2_v01_geo.cpp
Languages		274 return sdet;
5 5		275 }
C++	1	276
XMI	1	<pre>277 DECLARE_DETELEMENT(ECalBarrel_o2_v01, create_detector)</pre>
2 11 T I In		C++ Showing the top match Last indexed on 4 Jul 2018

Summary

- Need to start the discussion and review on the conventions as soon as possible.
- Please comment in the CEPCSW issues
 - Directory: https://github.com/cepc/CEPCSW/issues/43
 - Detector: TBD
- ✤ CRD related Pull Request:
 - ECAL, Fangyi: PR #32
 - Beam pipe, Chengdong: PR #44
 - Drift chamber, Mengyao: PR #48