Large MC sample production using ILCDIRAC

ILD software and analysis meeting

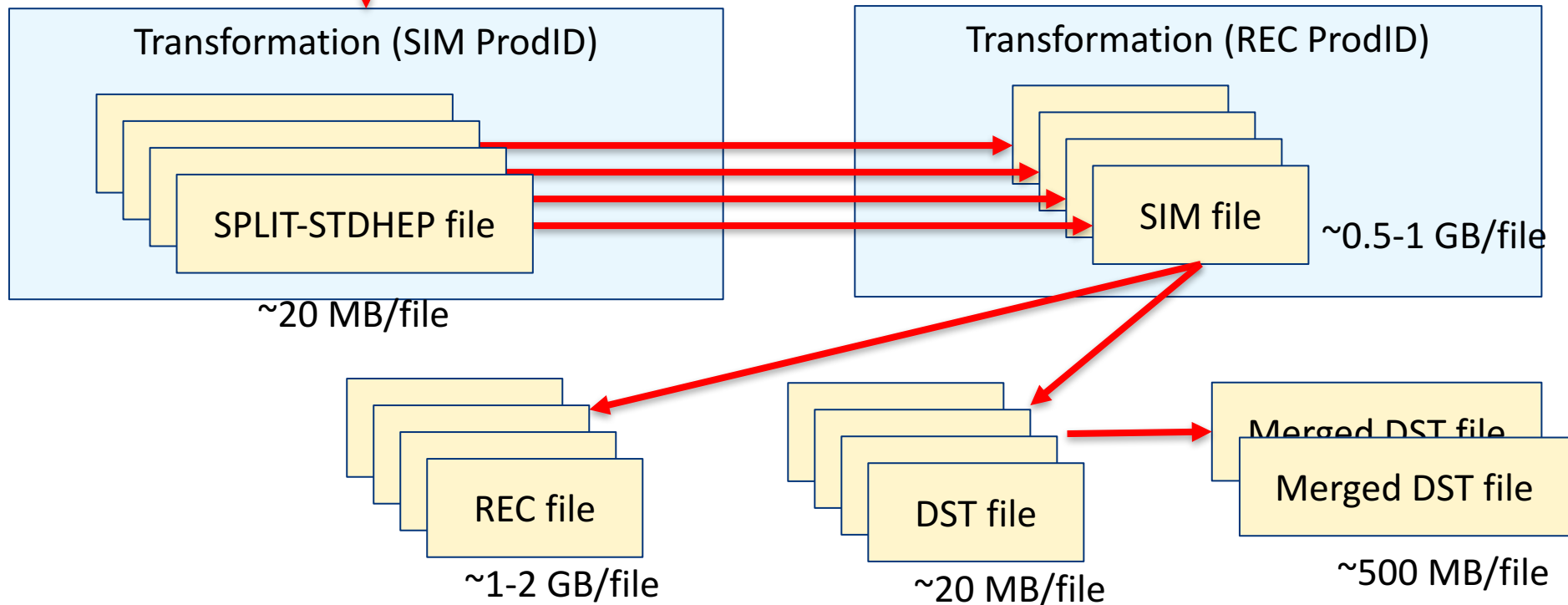ILD MC production conveners

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ILCDIRAC production scheme

Generator samples
(Whizard: GEN STDHEP)

ILCDIRAC Server is maintained by CERN clicdp
(FileCatalog DB, jobs manager)

Prepare split stdhep files (1kevt/file)

Jobs submitted to ~20k ComputingElement (CE) CPU

Transformation (SIM ProdID)

SPLIT-STDHEP file

~20 MB/file

Transformation (REC ProdID)

SIM file

~0.5-1 GB/file

REC file

~1-2 GB/file

DST file

~20 MB/file

Merged DST file

Merged DST file

~500 MB/file

Files are located to several StorageElement (SE) and find by FileCatalog and MetaKey

Large sample production request from LAL group (2f→qq)

Request from LAL group (Roman and Sviatoslav)

ee→Z/γ→bb 250 GeV b-charge analysis eL.pR, eR.pL each 250 fb^{-1} luminosity with M(qq)>150 GeV cut at whizard. (ILD analysis meeting slide at 2017 Feb. 08)

https://agenda.linearcollider.org/event/7514/contributions/38411/attachments/31211/46885/bilokin-ild-080217.pdf

EvtType: 2f-highM_Z_hadronic
GenProcessName : 2f-highM_z_h
Energy : 250 GeV

DST-merged files are placed at DESY, KEK, IN2P3

ProcessID	ProdID	Pol	Cross section	Total [M evt] 250 fb-1	N files /1k evt 250 fb-1	Gen DST Files /1k evt	Gen Lumi (fb-1)	SIM (TB)	REC (TB)	DST (TB)	Merged DST (TB)	Total size (TB)
110011	7637	eL.pR	37421.5	11.2	9,355	9,978	266.5	10.0	19.7	0.28	0.28	
110012	7638	eR.pL	11961.1	3.9	2,990	3,312	276.9	3.3	6.5	0.09	0.09	
Total				15.12	12,346			13.3	26.2	0.37	0.37	40.2

Total disk usage: 40.2 TB (All on DESY-SRM and replicate to other sites)

Consideration for stable production on DIRAC

- **Files can not access if network is down** or other issue happen
  - Better to **replicate** to several sites of **analysis files (meged DST)**
  - **Replication keep redundancy** of file access
- Common SEs made of **cache DISK + TAPE backend system**
  - Not suitable to put small file size (<10 MB) data (DST, log etc)
  - **Even for tape, > 10TB size usage should be negotiate with sites**
  - **Read take time if files are "Staged-out" to tape (timeout issue)**
- Frequently accessed files (OverlayBG) are prefer to put DISK SE sites
  - Tape backend files easily "staged out" and cause timeout
  - Overlay BG files to be put on the DISK site and replicate
- FileCatalog can not access if CERN ilcdirac server has problem
  - **No way to solve so far, just wait...**

Summary of location and sizes

	Size	Destination	Replication	Location on Dirac File catalog
GEN	270 GB	KEK-SRM		/ilc/prod/ilc/mc-dbd/generated/250-TDR_ws/2f-highM/
Split GEN	270 GB	PNNL-SRM		/ilc/prod/ilc/mc-dbd.generated/250-TDR_ws/2f-highM/temp001/
OverlayBG	183 GB	KEK-SRM	DESY-SRM PNNL-SRM	/ilc/user/a/amiyamot/mc-dbd/ild/sim/250-TDR_ws/aa_lowpt/
SIM	13.3 TB	DESY-SRM	KEK-SRM (Plan)	/ilc/prod/ilc/mc-dbd/ild/sim/250-TDR_ws/2f-highM_Z_hadronic/ILD_o1_v05/v01-14-01-p00/ 00007637(eL.pR), 00007638(eR.pL)
REC	26.2 TB	DESY-SRM	IN2P3-SRM (Plan)	/ilc/prod/ilc/mc-dbd/ild/rec/250-TDR_ws/2f-highM_Z_hadronic/ILD_o1_v05/v01-16-p10_250/ 00007637(eL.pR), 00007638(eR.pL)
DST	372 GB	DESY-SRM	KEK-Local for merge	/ilc/prod/ilc/mc-dbd.log/ild/dst/250-TDR_ws/2f-highM_Z_hadronic/ILD_o1_v05/v01-16-p10_250/ 00007637(eL.pR), 00007638(eR.pL)
Merged DST	372 GB	DESY-SRM	IN2P3-SRM KEK-SRM	/ilc/prod/ilc/mc-dbd/ild/dst-merged/250-TDR_ws/2f-highM_Z_hadronic/ILD_o1_v05/v01-16-p10_250

On KEKCC local: /hsm/ilc/grid/storm/prod/ilc/mc-dbd/…
On DESYPNF local: /pnfs/desy.de/ilc/prod/ilc/mc-dbd/…
On IN2P3PNF local : /pnfs/in2p3.fr/data/ilc/prod/ilc/mc-dbd/…

Situation about DIRAC production

Submitted jobs: SIM: 13400 jobs, REC: 13400 jobs (1job = 1 file/k evt)

Total submitted jobs: 26800 jobs (files)

Full submission start: 2017/03/09 → All jobs can process in parallel on DIRAC environment!

98% finished : 2017/03/12

SIM+REC flow spent : 1-1.5 days(SIM) + 0.5-1.0 day (REC) = 2.5 days

→Most of jobs (99.8%) finished within 3 days!

Stdhep, Overlay files should be placed DISK site for stable SIM/REC process

If CERN DB server have problem, file catalog access has stacked (2017/03/14)

Mokka SIM

Marlin REC

	ID		AgentType	Type	Name	Files	Processed (%)	Created	Total Created	Running	Done	Failed	CreationDate [UTC]	LastUpdate [UTC]
	7632	Active	Automa...	MCSimulation	110011_250.0_i...	10052	99.7	0	10928	23	10029	876	2017-02-27 08:06	2017-3-8 00:22
	7633	Active	Automa...	MCSimulation	110012_250.0_i...	3330	99.9	0	3619	3	3326	290	2017-02-27 10:03	2017-3-8 00:22
	7635	Cleaned	Manual	MCReconstructi...	110011_250.0_i...	0	0	0	0	0	0	0	2017-02-28 02:11	2017-3-8 22:42
	7636	Cleaned	Manual	MCReconstructi...	110012_250.0_i...	0	0	0	0	0	0	0	2017-02-28 02:19	2017-3-8 22:42
	7637	Active	Automa...	MCReconstructi...	110011_250.0_i...	10029	99.3	0	11651	7	9963	1676	2017-03-7 03:26	2017-3-7 03:26
	7638	Active	Automa...	MCReconstructi...	110012_250.0_i...	3328	99.5	0	3775	0	3309	462	2017-03-7 05:47	2017-3-7 05:47

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Processing job status on DIRAC

BG overlay file download is one of the reason of failure
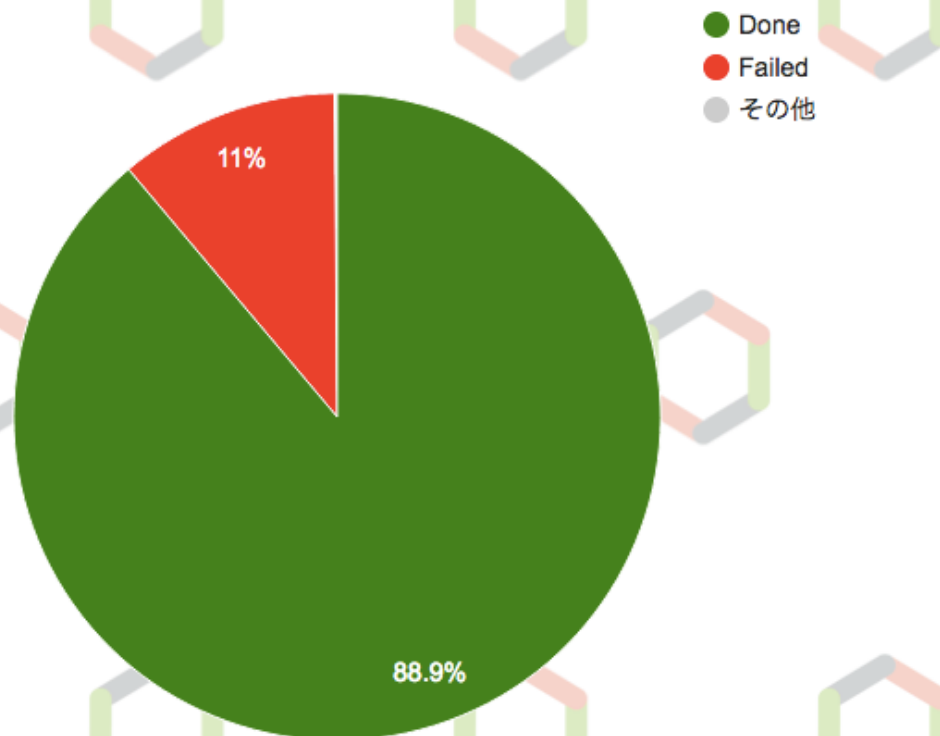
Failed jobs are automatically resubmitted to other site
Total processed jobs are ~30000 jobs with additional 11% failure
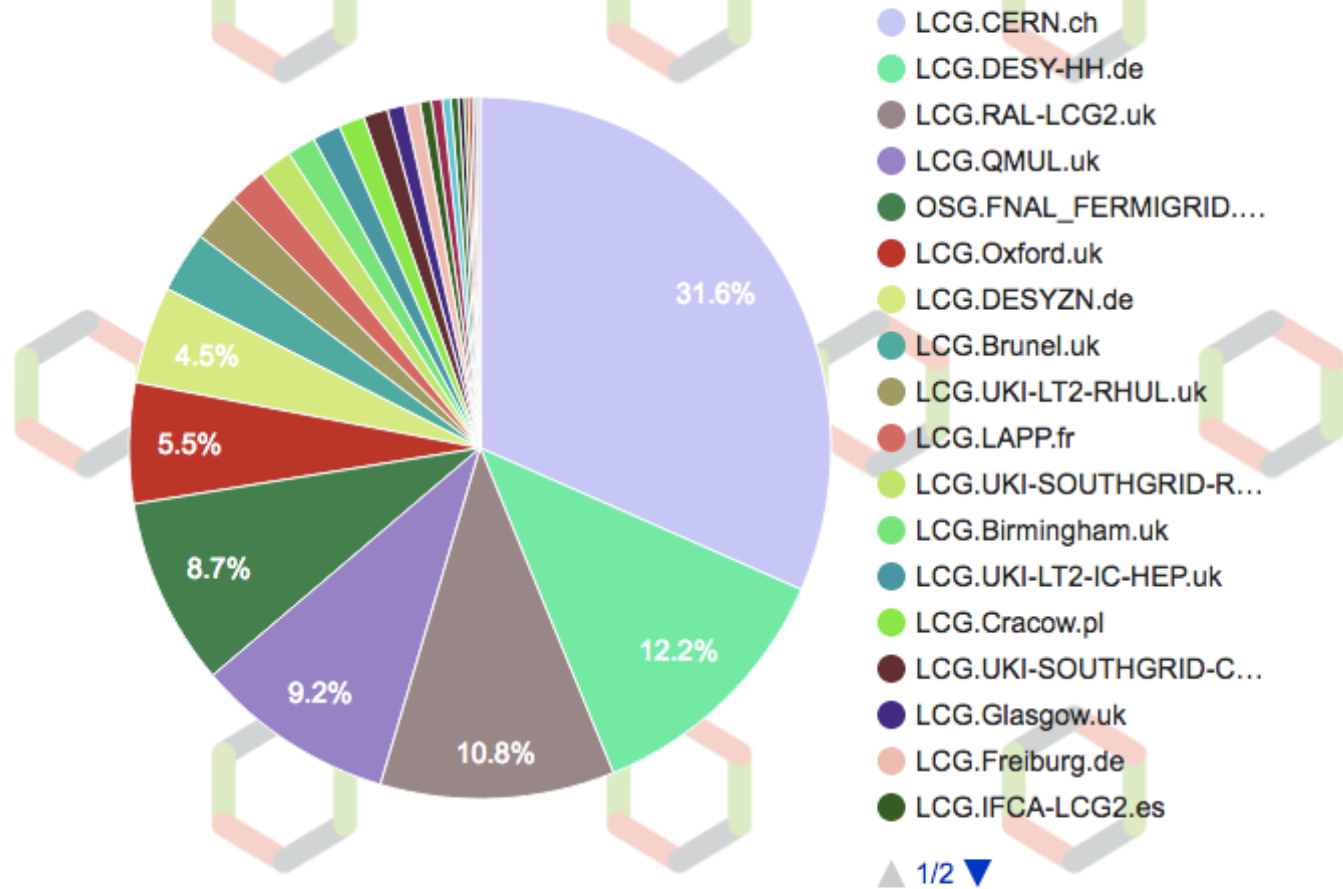
ILCDIRAC sites used this production

Selected Statistics :: Site (Mon Mar 13 2017 18:26:56 GMT+0900 (JST))

Key	Value
LCG.CERN.ch	8430
LCG.DESY-HH.de	3251
LCG.RAL-LCG2.uk	2876
LCG.QMUL.uk	2453
OSG.FNAL_FERMIGRID.us	2308
LCG.Oxford.uk	1480
LCG.DESYZN.de	1197
LCG.Brunel.uk	749
LCG.UKI-LT2-RHUL.uk	609
LCG.LAPP.fr	460
LCG.UKI-SOUTHGRID-RAL...	406
LCG.Birmingham.uk	347
LCG.UKI-LT2-IC-HEP.uk	345
LCG.Cracow.pl	317
LCG.UKI-SOUTHGRID-CA...	299
LCG.Glasgow.uk	209
LCG.Freiburg.de	195
LCG.IFCA-LCG2.es	138
LCG.UKI-NORTHGRID-LIV...	134

Legend:
- LCG.CERN.ch
- LCG.DESY-HH.de
- LCG.RAL-LCG2.uk
- LCG.QMUL.uk
- OSG.FNAL_FERMIGRID....
- LCG.Oxford.uk
- LCG.DESYZN.de
- LCG.Brunel.uk
- LCG.UKI-LT2-RHUL.uk
- LCG.LAPP.fr
- LCG.UKI-SOUTHGRID-R...
- LCG.Birmingham.uk
- LCG.UKI-LT2-IC-HEP.uk
- LCG.Cracow.pl
- LCG.UKI-SOUTHGRID-C...
- LCG.Glasgow.uk
- LCG.Freiburg.de
- LCG.IFCA-LCG2.es

1/2

KEK site can not use so far
because of LSF system inconsistency with CERN LSF system

Production summary information (ELOG)

Preparing ELOG system for MC-production logging
https://ild.ngt.ndu.ac.jp/elog/dbd-prod

Previous production info is also under migration

MC production request queue

LAL group :Roman and Sviatoslav
 b-charged analysis 2f→qq (M_{qq}>150 GeV)
250 GeV eL.pR, eR.pL 250 fb^{-1} each

Done
250 fb-1 both

DESY group : Habermehl, Moritz
νν+γs , ee+γs for WIMP search study
500 GeV, 500 fb^{-1}, (LR, RL) + (LL, LR, RL, RR)

GEN file
under preparation

DESY group : Shinich Kawada
h→μμ study?
500 GeV

Will be hear today