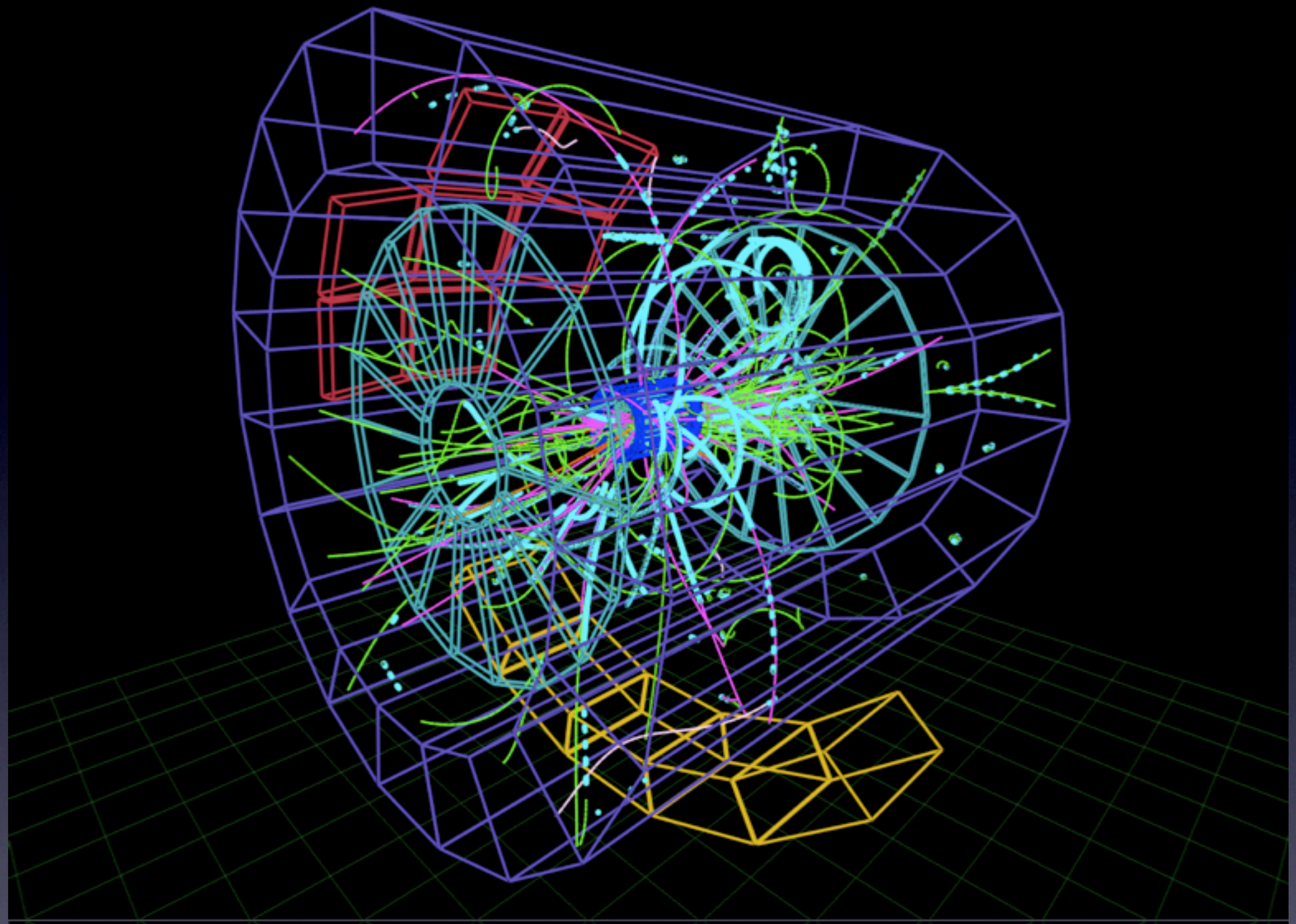
The ALICE Computing Model

Yves Schutz
CERN

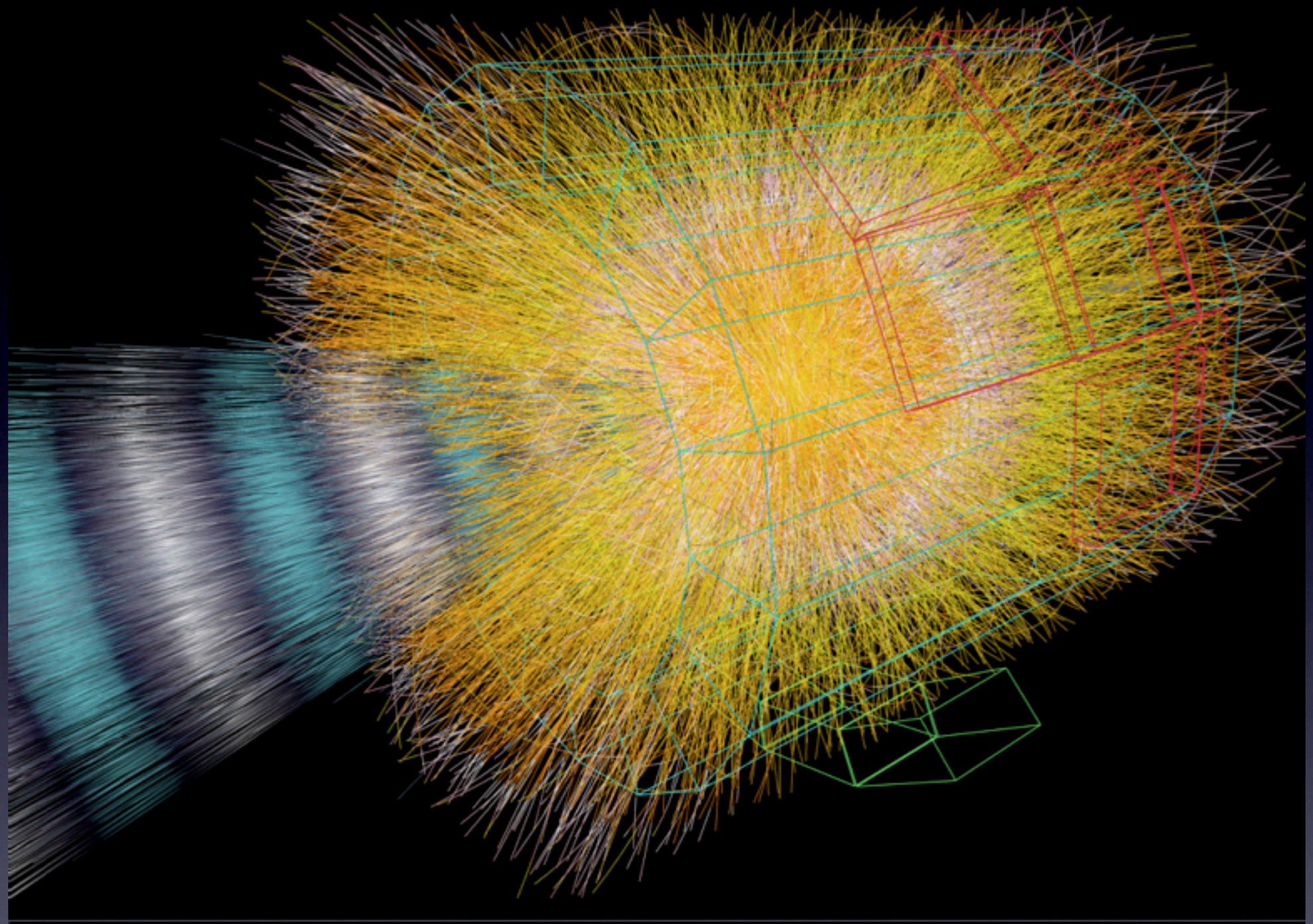
爱丽丝实验计算模型

Yves Schutz
CERN

The Challenge



$p+p$ @ $\sqrt{s}$ = 14 TeV



Pb+Pb @ $\sqrt{s_{NN}}$ = 5.5 TeV

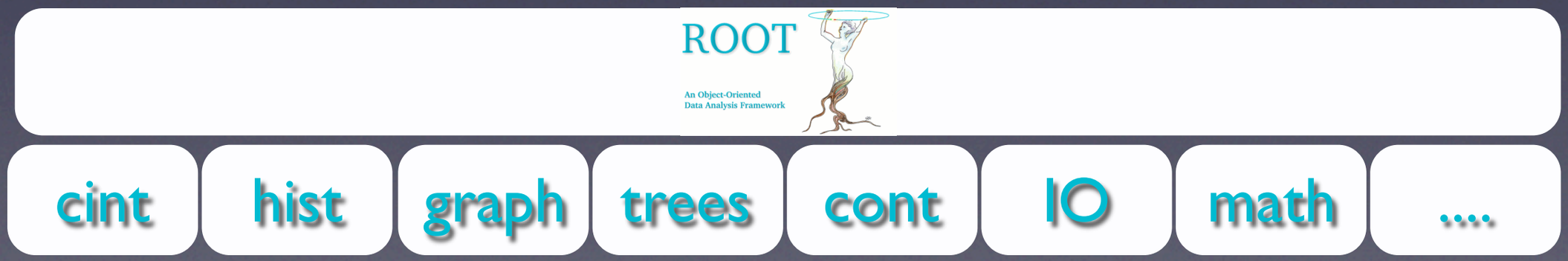
Event processing

The AliRoot framework

- One unique framework
  - Monte-Carlo generators
  - Particle transport through virtual detector
  - Event reconstruction for raw and MC
  - Data analysis
  - OO/C++ implementation
  - C++ interfaces for Fortran legacy code

AliRoot

AliRoot


ROOT
An Object-Oriented
Data Analysis Framework
cint
hist
graph
trees
cont
IO
math
....

AliRoot

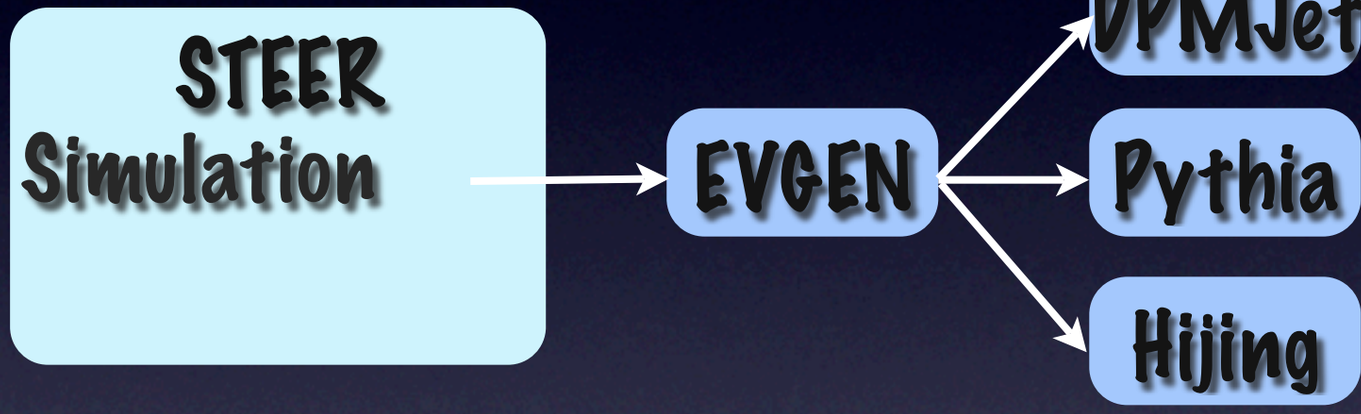
STEER

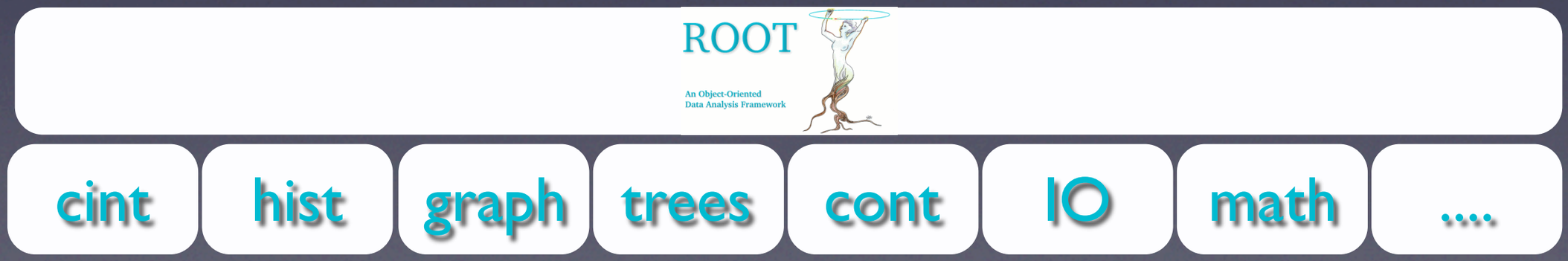
ROOT

An Object-Oriented
Data Analysis Framework

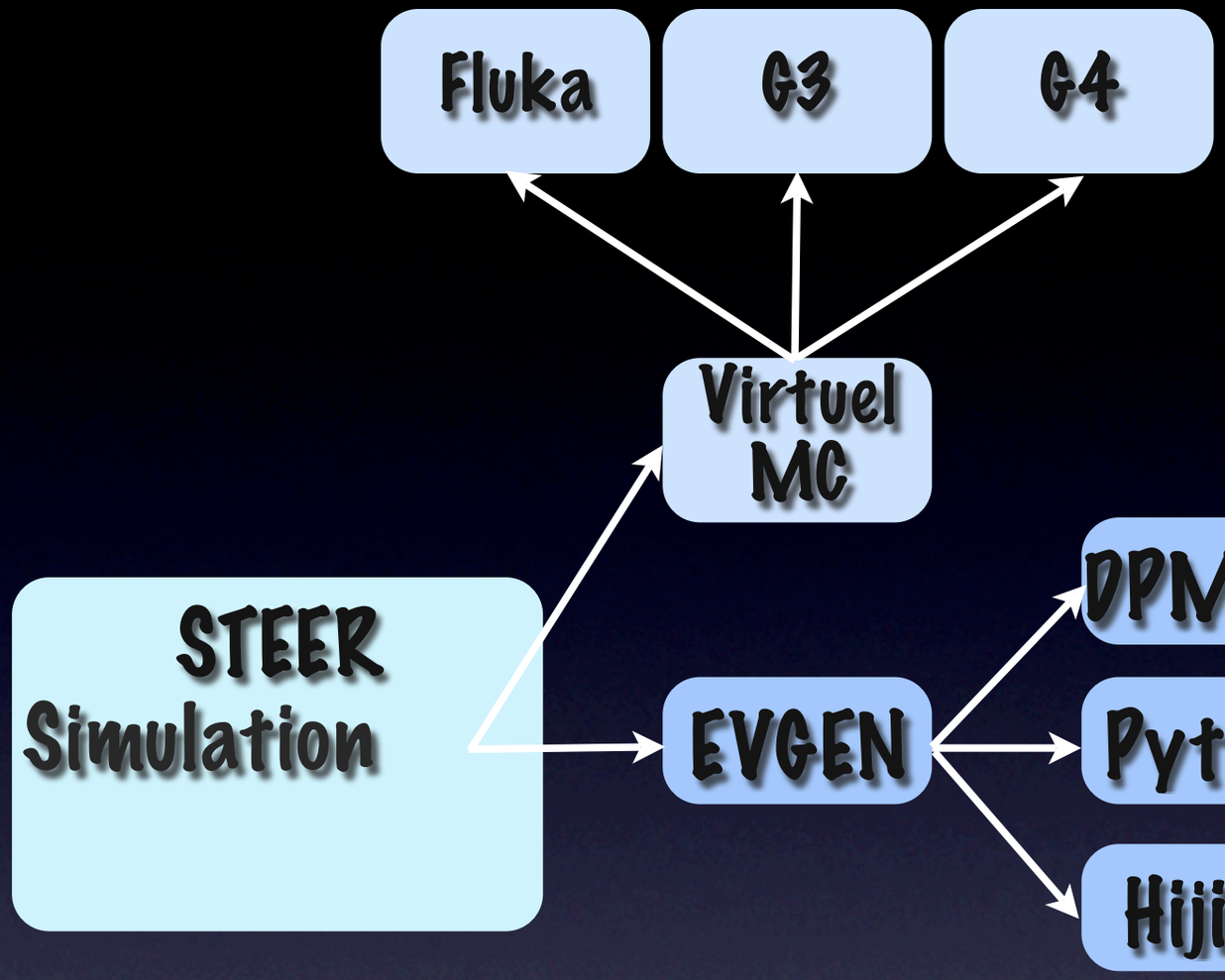
cint | hist | graph | trees | cont | IO | math | ....

AliRoot


STEER
Simulation
EVGEN
DPMJet
Pythia
Hijing


ROOT
An Object-Oriented
Data Analysis Framework
cint
hist
graph
trees
cont
IO
math
....

AliRoot



ROOT

An Object-Oriented Data Analysis Framework

cint | hist | graph | trees | cont | IO | math | ....

AliRoot

Fluka | G3 | G4

Virtuel MC

STEER Simulation

EVGEN

DPMJet | Pythia | Hijing

GeoModeller

FMD | PMD | MUON | PHOS | HMPID | TOF | TRD | TPC | ITS

ROOT

An Object-Oriented Data Analysis Framework

cint | hist | graph | trees | cont | IO | math | ....

AliRoot

Fluka | G3 | G4

Virtuel MC

STEER
Simulation
Reconstruction

EVGEN → DPMJet | Pythia | Hijing

ESD

RAW

GeoModeller

FMD | PMD | MUON | PHOS | HMPID | TOF | TRD | TPC | ITS

ROOT

An Object-Oriented Data Analysis Framework

cint | hist | graph | trees | cont | IO | math | ....

AliRoot

Fluka | G3 | G4

Virtuel MC

AOD ← Analysis

ESD

RAW

STEER
Simulation
Reconstruction

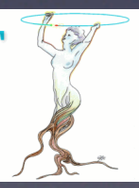
GeoModeller

EVGEN → DPMJet | Pythia | Hijing

FMD | PMD | MUON | PHOS | HMPID | TOF | TRD | TPC | ITS

ROOT

An Object-Oriented Data Analysis Framework



cint | hist | graph | trees | cont | IO | math | ....

AliRoot

Fluka | G3 | G4

Virtuel MC

AOD ← Analysis

ESD

RAW

STEER
Simulation
Reconstruction

GeoModeller

EVGEN → DPMJet | Pythia | Hijing

AliEn² @GRID

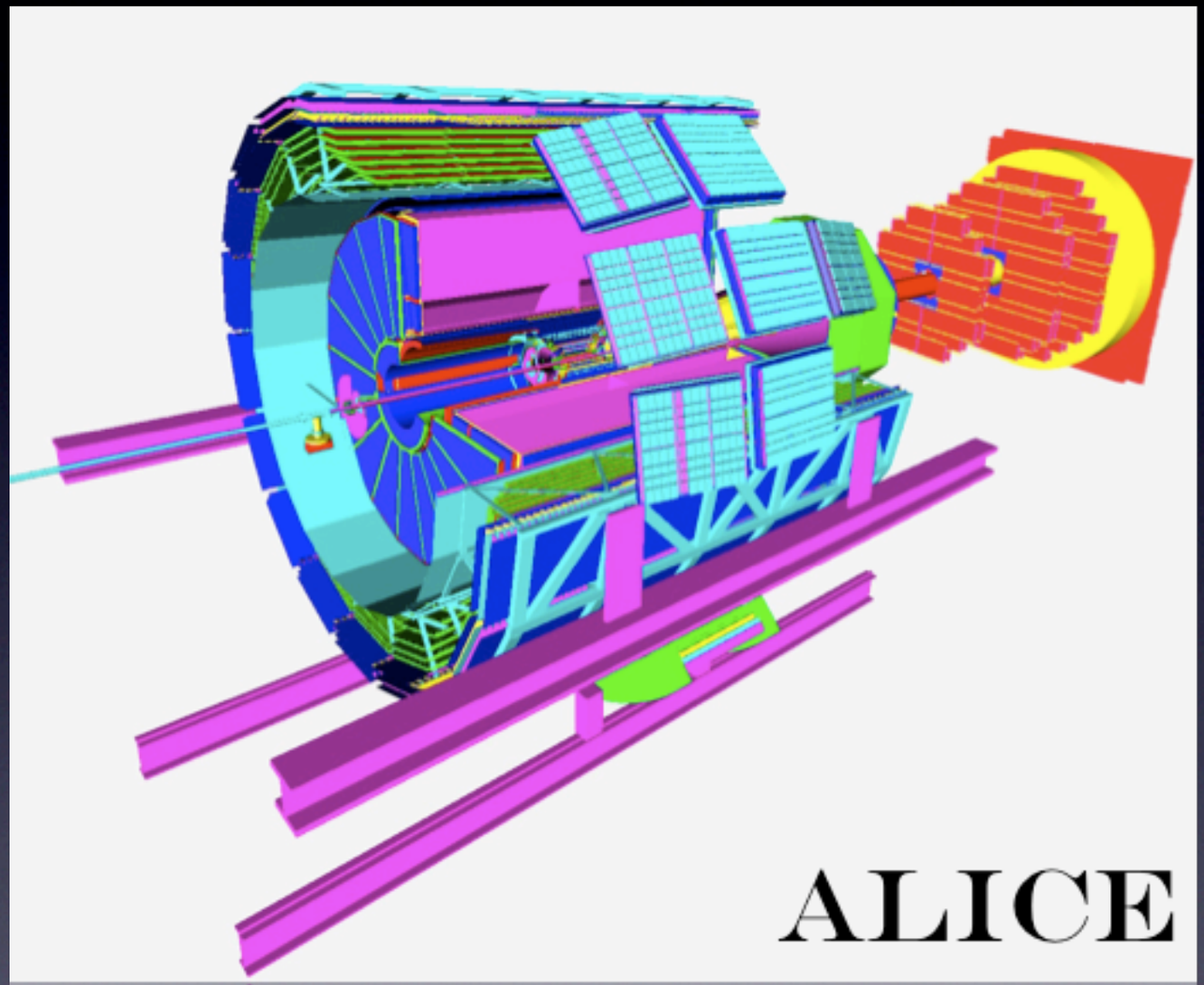
FMD | PMD | MUON | PHOS | HMPID | TOF | TRD | TPC | ITS

ROOT

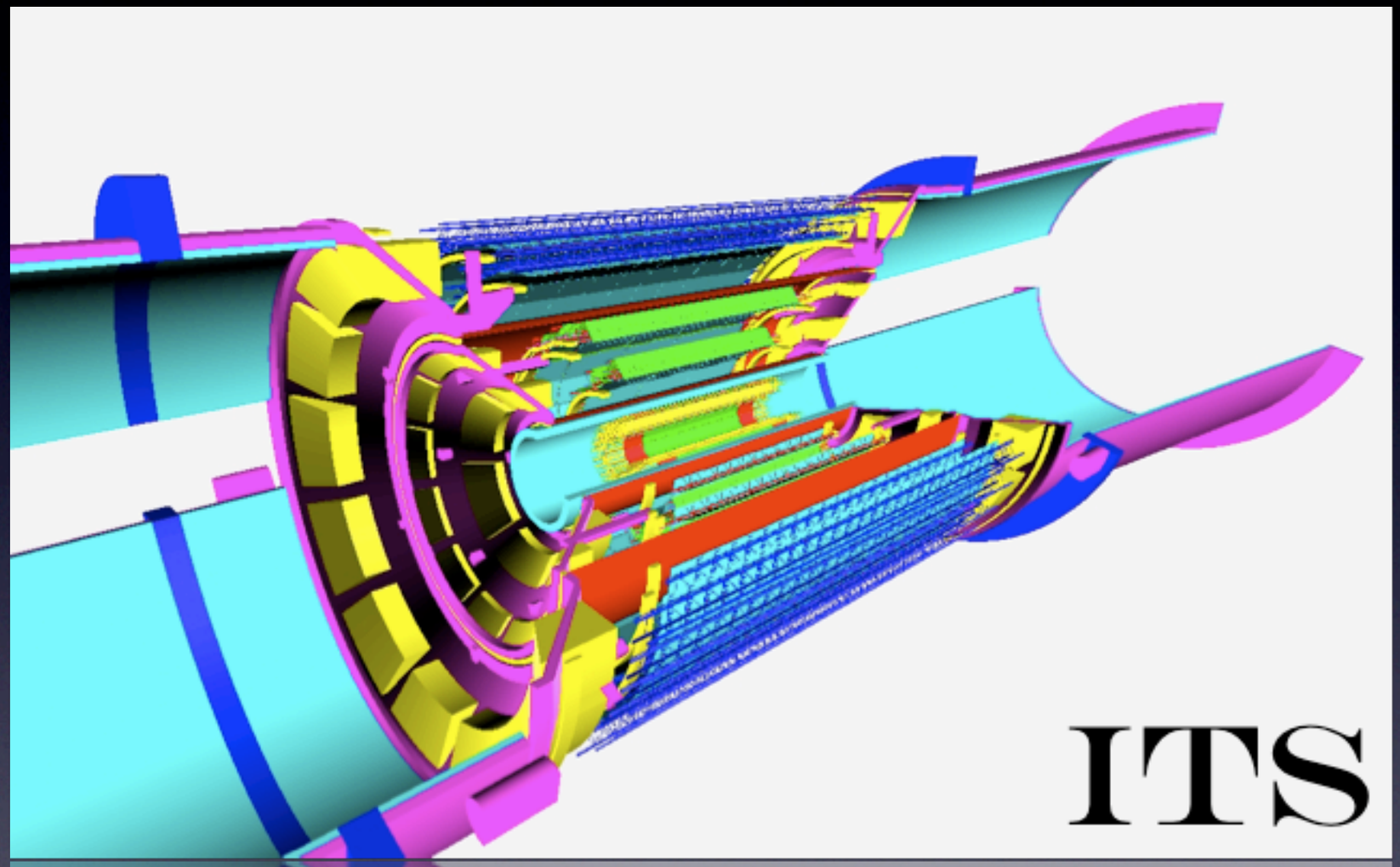
An Object-Oriented Data Analysis Framework

cint | hist | graph | trees | cont | IO | math | ....

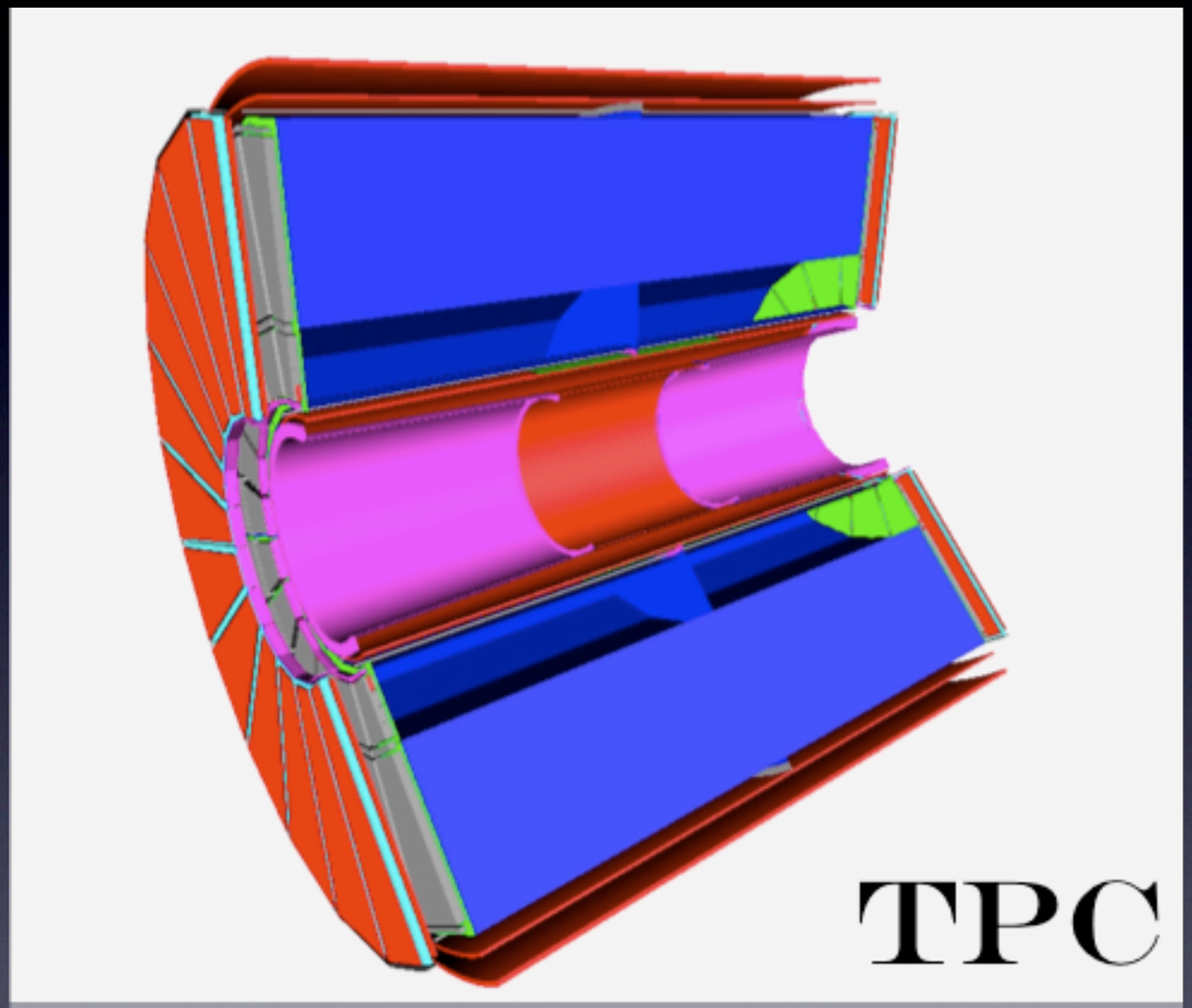
The Geometry modeler



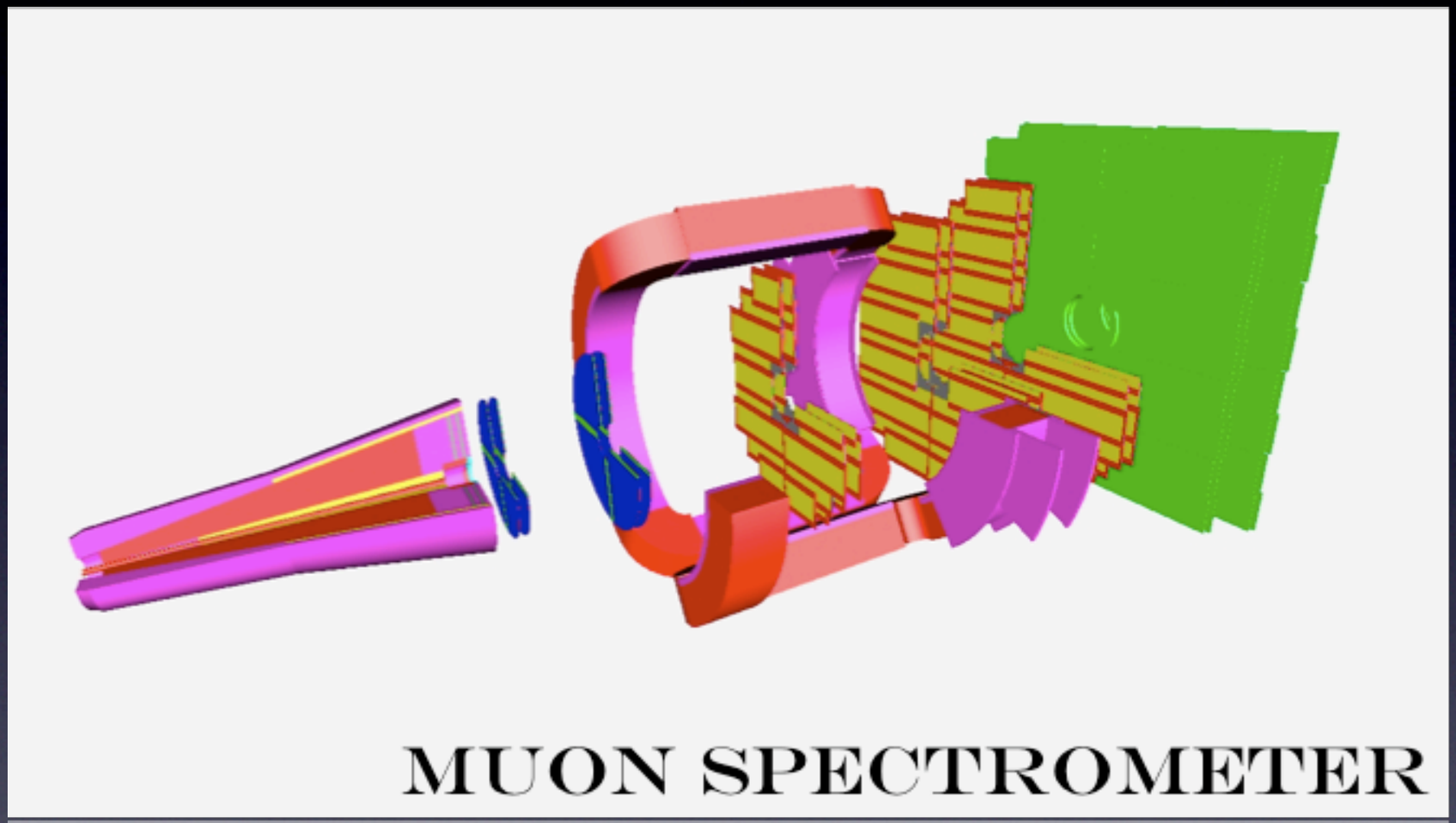
The Geometry modeler



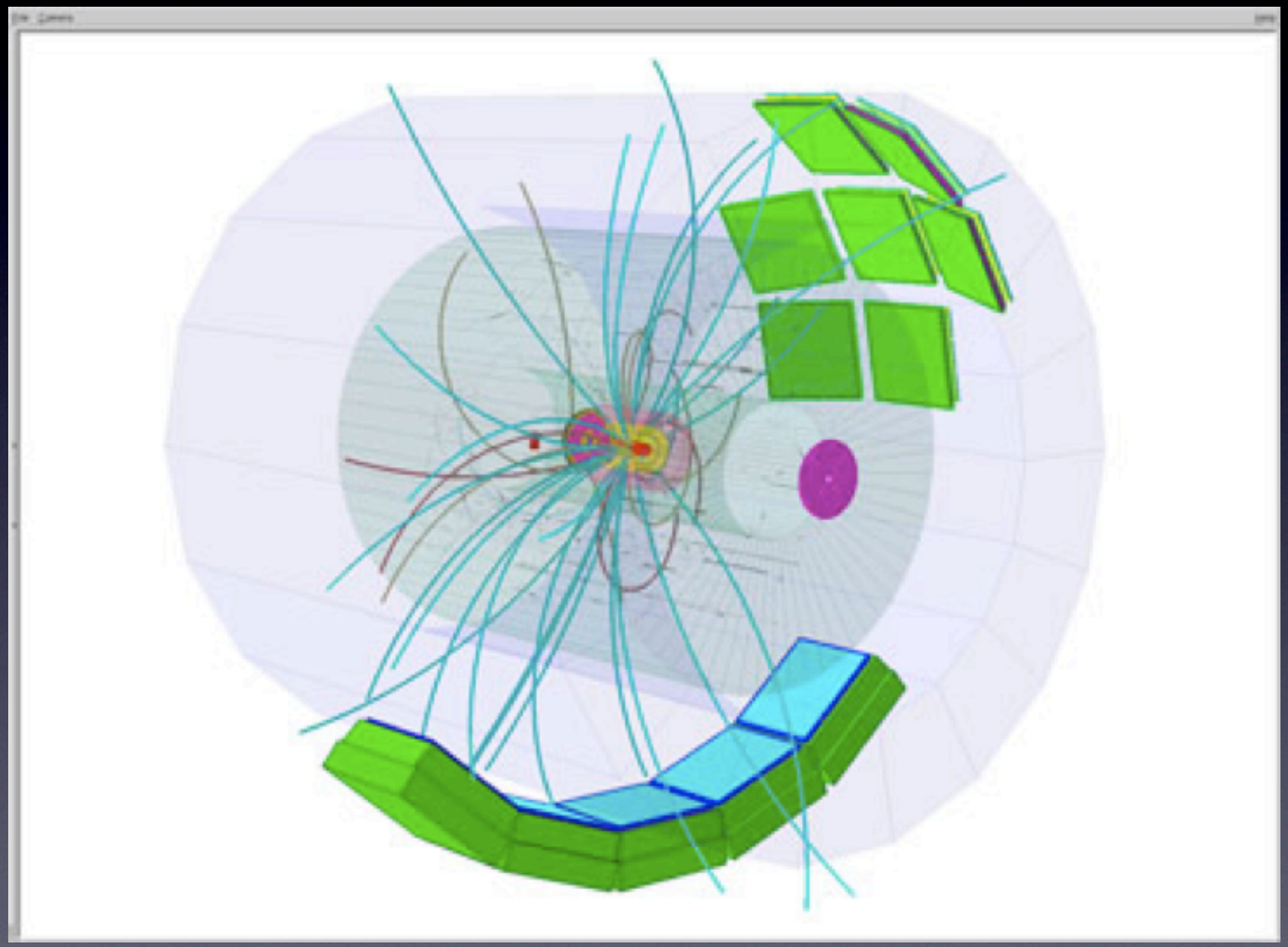
The Geometry modeler



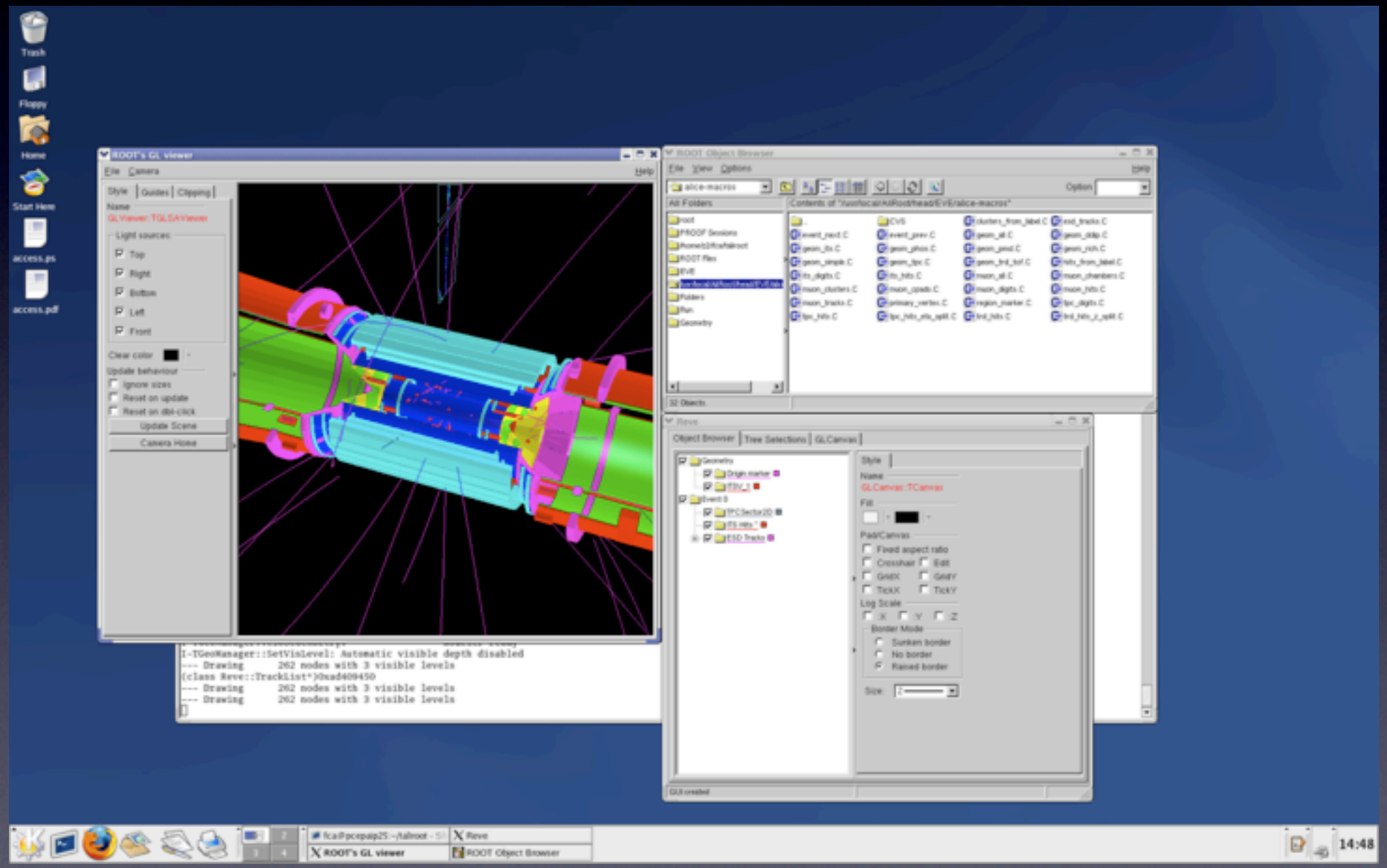
The Geometry modeler



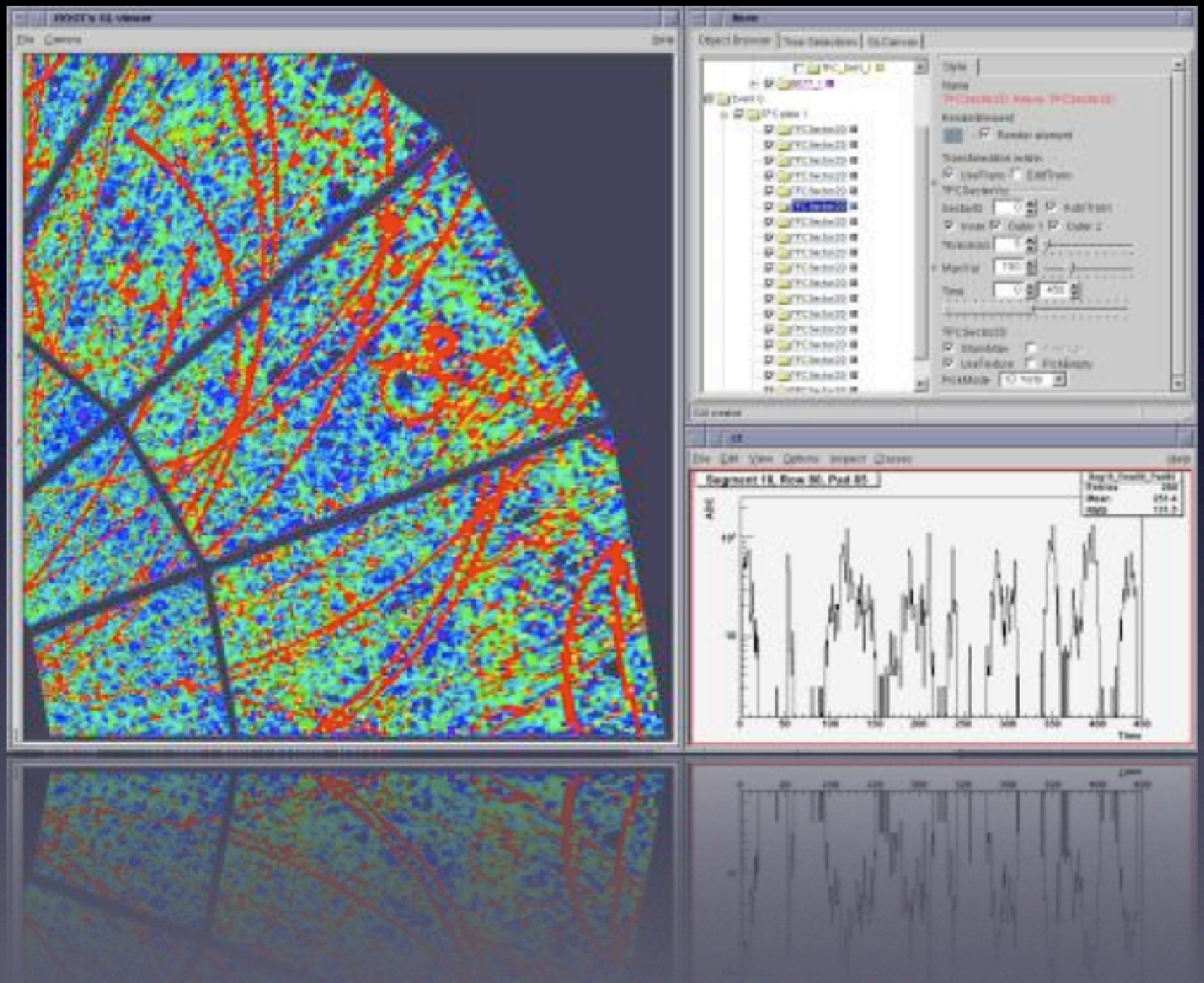
Reconstruction and event display



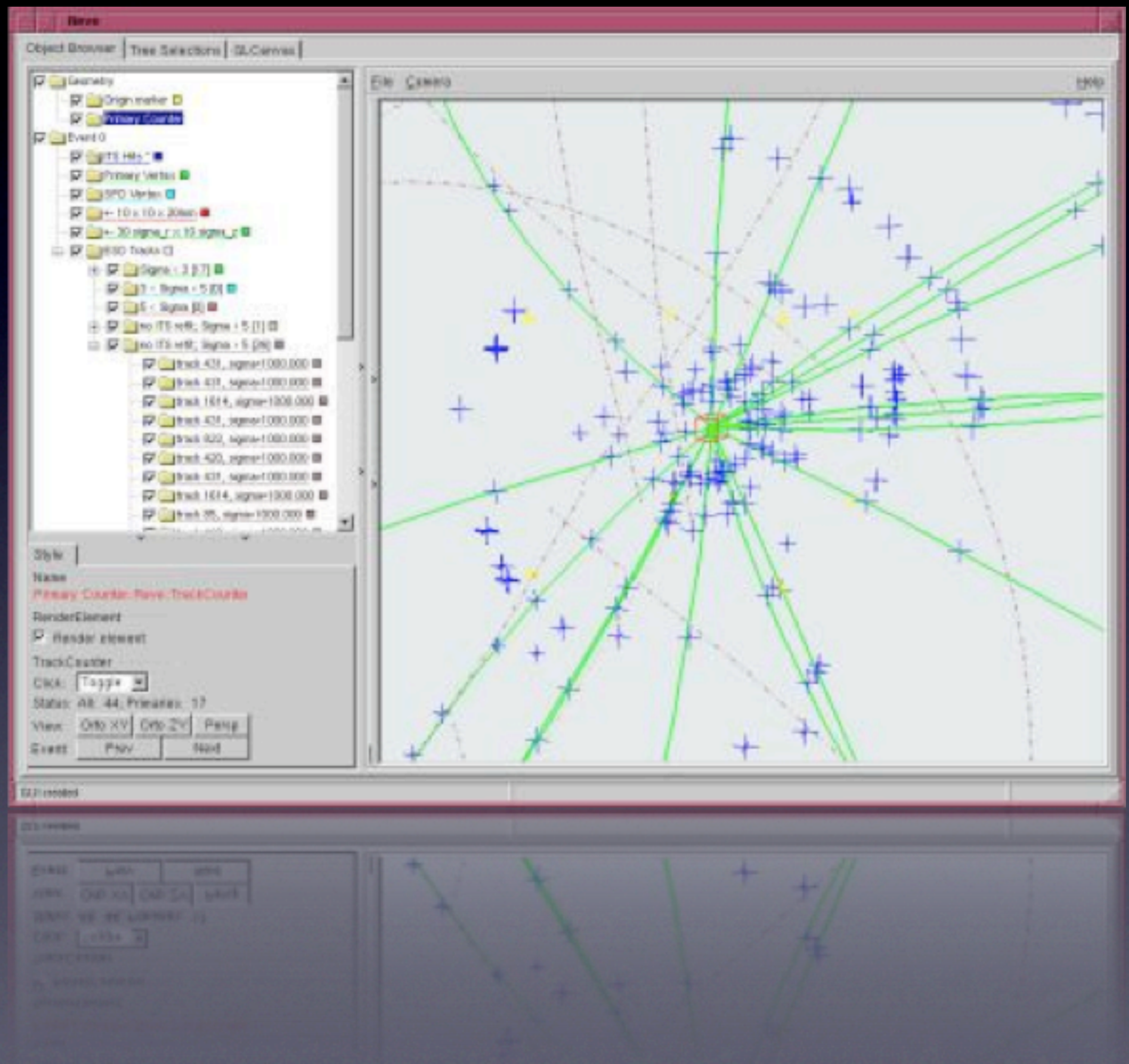
Reconstruction and event display



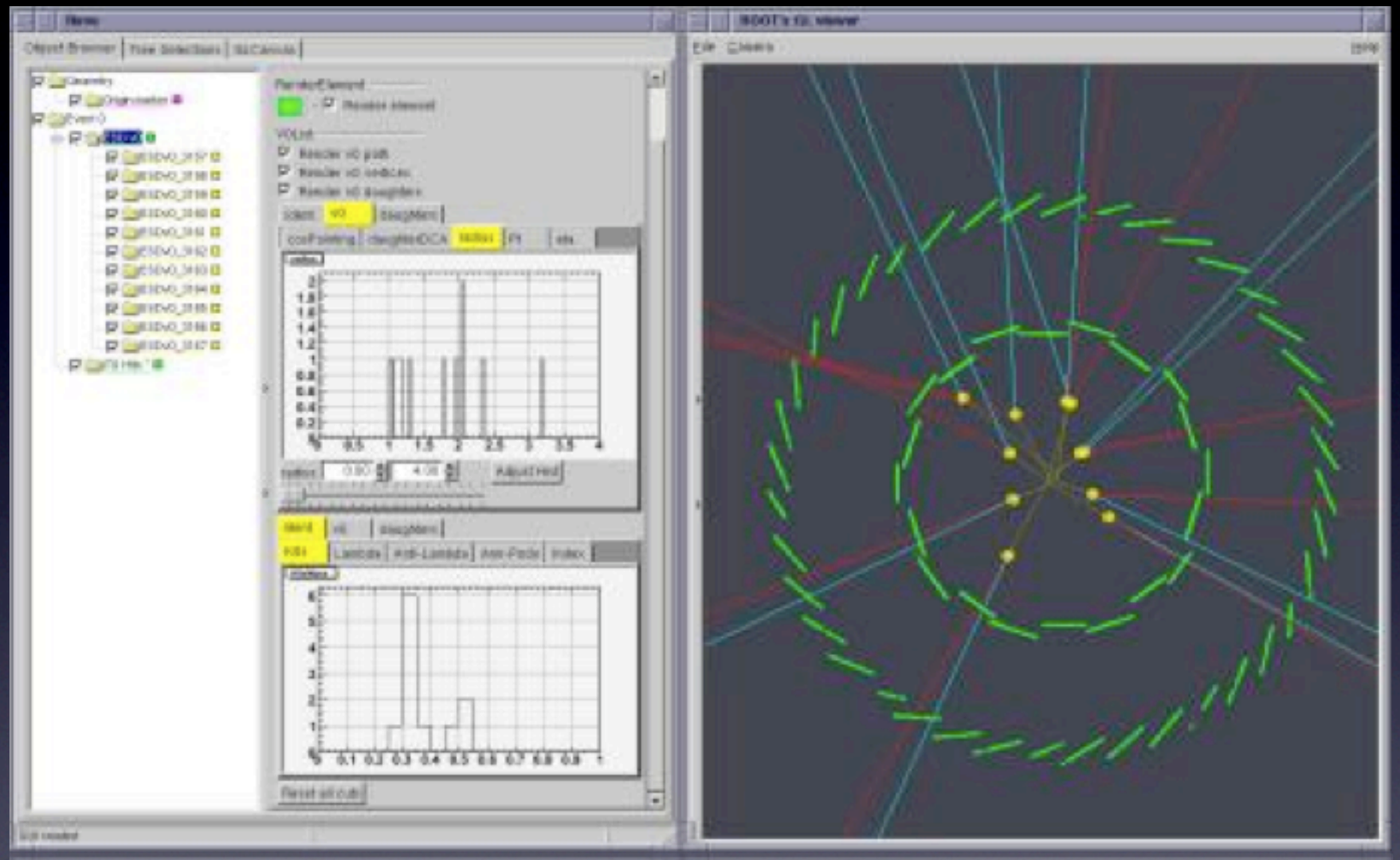
Reconstruction and event display



Reconstruction and event display



Reconstruction and event display



Nightly tests of current AliRoot version

AliRoot Releases for i686-pc-linux-gnu

Release	Date	Description	Status	Built on	Build time	Build #
HEAD	--/--/----	Current CVS head	✗	Sat Nov 17 02:02:48 2007	00:37:08	387
v4-07-Rev-01	23/10/2007	Production	✓	Wed Oct 24 16:33:53 2007	03:41:06	2
v4-06-Rev-05	09/10/2007	Production	✓	Tue Oct 23 10:51:00 2007	08:27:28	2
v4-04-Rev-14	20/06/2007	Geant Compat	✓	Fri Sep 21 17:51:36 2007	01:43:59	1

Generated on: Sat Nov 17 02:06:48 2007

Nightly tests of current AliRoot version

Builds

Start	Duration	Status	OS	Arch	Release	Prepare	Make	-install	-test	-cache	-autopkg
- All -		- All -	- All -	- All -	- All -						
17.11.2007 01:00	8m 3s	FAILED	darwin8.1.0	powerpc	HEAD	3m 38s	1m 54s	9s	9s	10s	9s
17.11.2007 01:00	34m 19s	FAILED	linux	x86_64	HEAD	3m 52s	27m 51s	7s	7s	7s	1m 22s
17.11.2007 01:00	1:27	FAILED	linux	ia64	HEAD	3m 24s	1:22	12s	12s	12s	39s
16.11.2007 01:00	9m 57s	FAILED	darwin8.1.0	powerpc	HEAD	5m 33s	1m 53s	9s	9s	10s	9s
16.11.2007 01:00	1:27	FAILED	linux	ia64	HEAD	5m 46s	1:22	12s	12s	12s	38s
16.11.2007 01:00	33m 48s	FAILED	linux	x86_64	HEAD	3m 19s	27m 7s	6s	6s	8s	1m 36s
15.11.2007 01:00	33m 36s	FAILED	linux	x86_64	HEAD	3m 40s	27m 0s	7s	6s	6s	1m 37s
15.11.2007 01:00	37m 24s	FAILED	linux	i686	HEAD	4m 23s	30m 40s	9s	10s	10s	1m 22s
15.11.2007 01:00	1:27	FAILED	linux	ia64	HEAD	4m 5s	1:22	13s	13s	12s	37s
14.11.2007 01:00	45m 49s	FAILED	darwin8.1.0	powerpc	HEAD	4m 6s	38m 53s	13s	12s	13s	12s
14.11.2007 01:00	1:27	FAILED	linux	ia64	HEAD	3m 58s	1:22	12s	12s	12s	36s
14.11.2007 01:00	42m 30s	FAILED	darwin8.6.1	i686	HEAD	6m 19s	31m 57s	11s	10s	11s	10s

Nightly tests of current AliRoot version

Simulation pp

Start	End	Duration	State	OS	Arch	Release	CPU time	Wall time	Total memory	RSS memory	File size
- All -			- All -	- All -	- All -	- All -					
09.11.2007 02:18	09.11.2007 03:47	1:28	OK	Darwin	i386	v4-07-Rev-01	1:09	1:11	1.294 G	769.5 M	60.4 M
08.11.2007 02:17	08.11.2007 03:44	1:27	OK	Darwin	i386	v4-07-Rev-01	1:08	1:10	1.294 G	749.3 M	60.4 M
02.11.2007 02:11	02.11.2007 03:39	1:27	OK	Darwin	i386	v4-07-Rev-01	1:09	1:10	1.294 G	790.1 M	60.4 M
31.10.2007 02:09	31.10.2007 03:36	1:27	OK	Darwin	i386	v4-07-Rev-01	1:08	1:10	1.294 G	762.1 M	60.4 M
26.10.2007 02:04	26.10.2007 03:32	1:27	OK	Darwin	i386	v4-07-Rev-01	1:09	1:11	1.294 G	801.8 M	60.4 M
25.10.2007 02:47	25.10.2007 04:29	1:41	OK	Linux	ia64	v4-07-Rev-01	1:28	1:31	858.3 M	419 M	59.05 M
25.10.2007 02:05	25.10.2007 03:32	1:27	OK	Darwin	i386	v4-07-Rev-01	1:09	1:10	1.294 G	801.8 M	60.4 M
25.10.2007 01:59	25.10.2007 02:45	45m 35s	OK	Linux	x86_64	v4-07-Rev-01	34m 27s	39m 17s	847 M	847 M	55.29 M
24.10.2007 13:41	24.10.2007 14:48	1:06	OK	Linux	i686	v4-07-Rev-01	51m 41s	57m 56s	714.4 M	714.4 M	60.52 M
24.10.2007 03:21	24.10.2007 05:04	1:43	OK	Linux	ia64	v4-07-Rev-01	1:28	1:33	863.3 M	571.5 M	59.05 M
04.05.2007 01:22	04.05.2007 02:26	1:04	OK	Linux	x86_64	v4-05-13	44m 27s	58m 59s	825.4 M	825.4 M	947.4 M

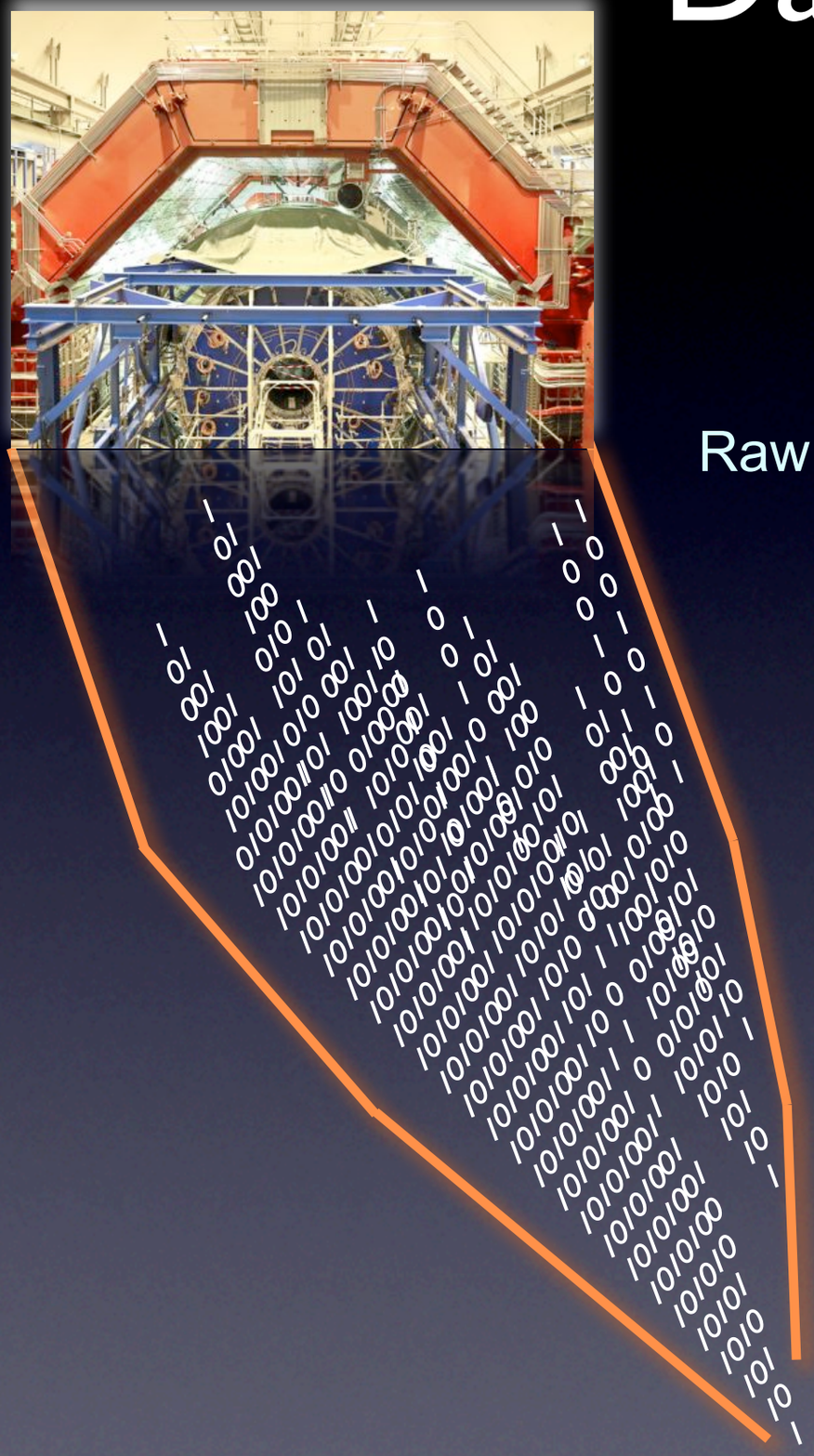
Nightly tests of current AliRoot version

Reconstruction pp

Start	End	Duration	State	OS	Arch	Release	CPU time	Wall time	Total memory	RSS memory	File size
- All -			- All -	- All -	- All -	- All -					
09.11.2007 02:18	09.11.2007 03:47	1:28	OK	Darwin	i386	v4-07-Rev-01	8m 6s	8m 27s	1.007 G	480.3 M	
08.11.2007 02:17	08.11.2007 03:44	1:27	OK	Darwin	i386	v4-07-Rev-01	8m 6s	8m 27s	1.007 G	480.3 M	
02.11.2007 02:11	02.11.2007 03:39	1:27	OK	Darwin	i386	v4-07-Rev-01	8m 5s	8m 23s	1.007 G	480.3 M	
31.10.2007 02:09	31.10.2007 03:36	1:27	OK	Darwin	i386	v4-07-Rev-01	8m 3s	8m 22s	1.007 G	480.3 M	
26.10.2007 02:04	26.10.2007 03:32	1:27	OK	Darwin	i386	v4-07-Rev-01	8m 17s	8m 35s	1.007 G	480.3 M	
25.10.2007 02:47	25.10.2007 04:29	1:41	OK	Linux	ia64	v4-07-Rev-01	5m 58s	7m 43s	692.1 M	599.8 M	
25.10.2007 02:05	25.10.2007 03:32	1:27	OK	Darwin	i386	v4-07-Rev-01	8m 16s	8m 34s	1.007 G	480.3 M	
25.10.2007 01:59	25.10.2007 02:45	45m 35s	OK	Linux	x86_64	v4-07-Rev-01	2m 33s	5m 5s	612.7 M	612.6 M	
24.10.2007 13:41	24.10.2007 14:48	1:06	OK	Linux	i686	v4-07-Rev-01	3m 27s	6m 27s	568.3 M	568.3 M	
24.10.2007 03:21	24.10.2007 05:04	1:43	OK	Linux	ia64	v4-07-Rev-01	5m 58s	7m 55s	707 M	659.4 M	
04.05.2007 01:22	04.05.2007 02:26	1:04	FAILED	Linux	x86_64	v4-05-13					

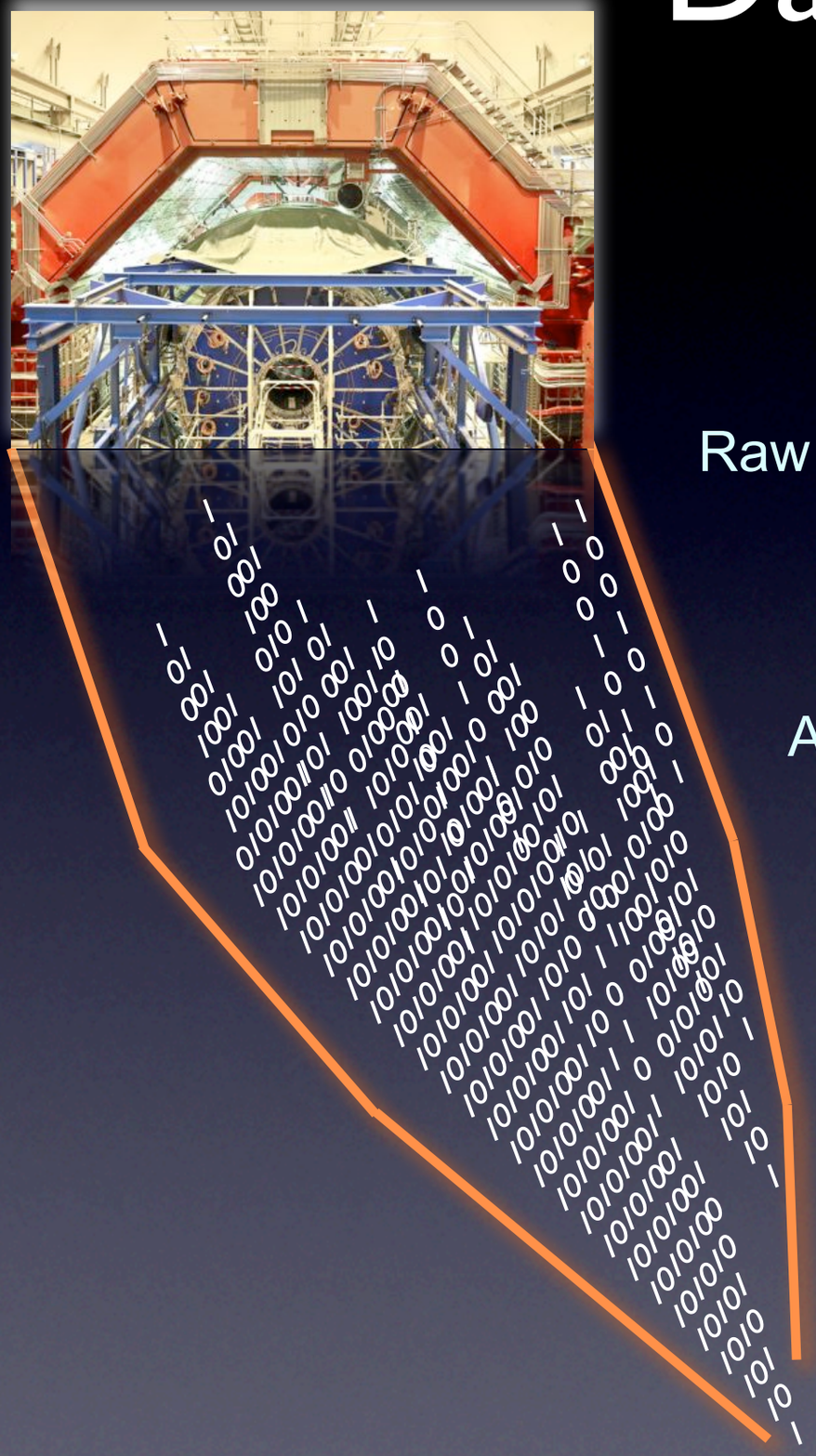
Data Processing

Data Acquisition



Raw stream form DDL: 8 kHz (160 GB/sec)

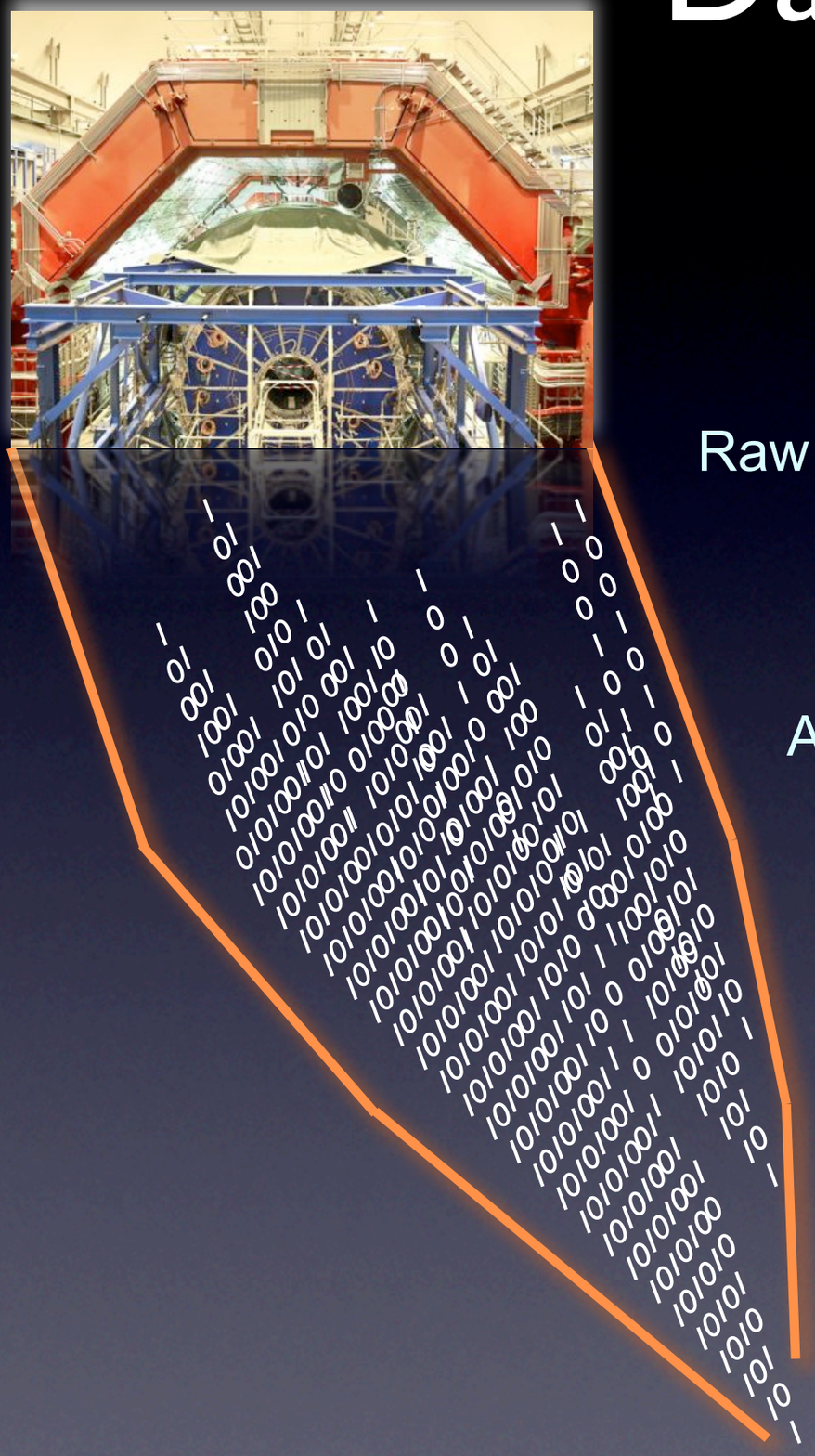
Data Acquisition



Raw stream form DDL: 8 kHz (160 GB/sec)

After level 0 trigger (1.2μs): 200 Hz (4 GB/sec)

Data Acquisition

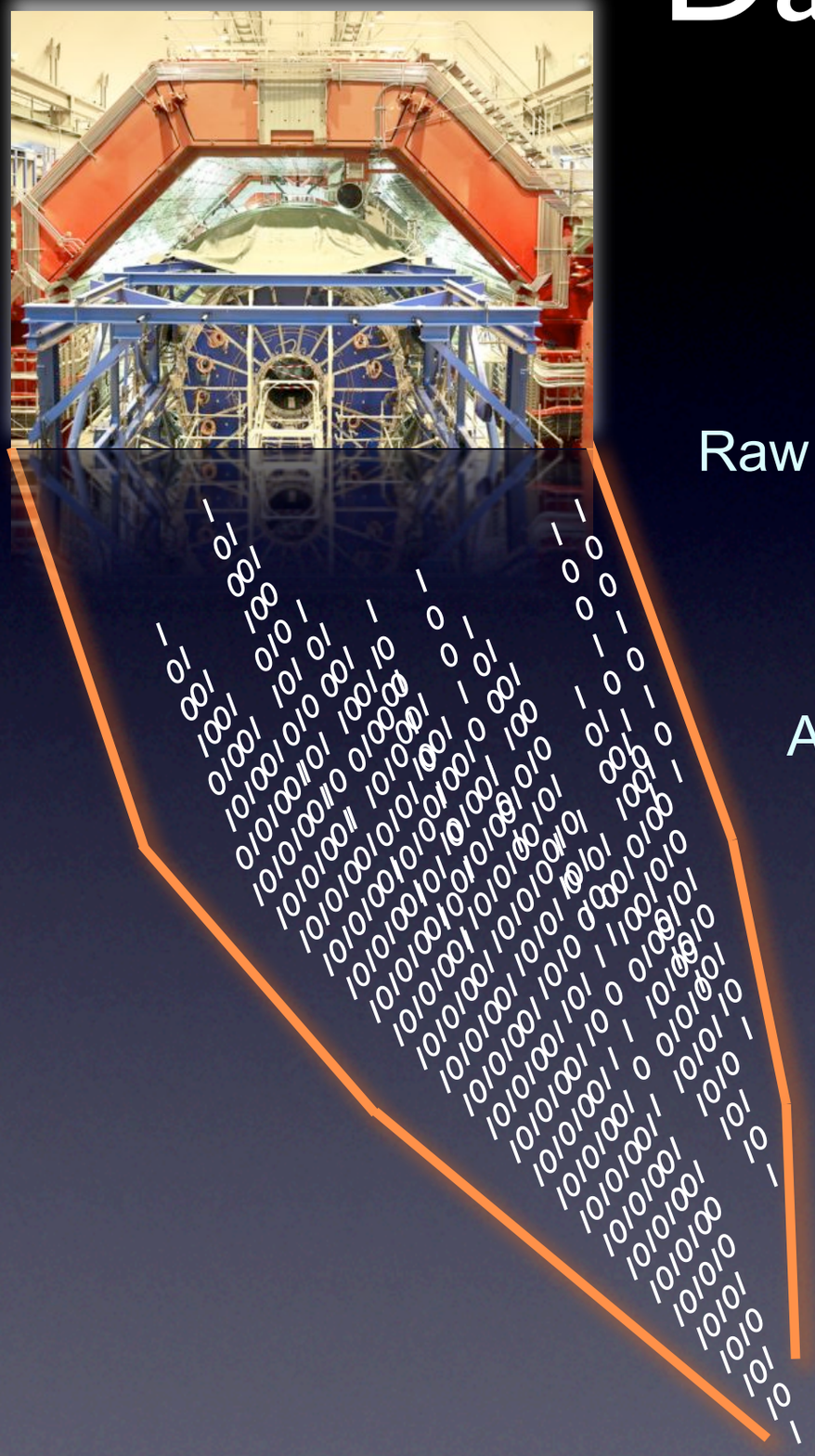


Raw stream form DDL: 8 kHz (160 GB/sec)

After level 0 trigger (1.2μs): 200 Hz (4 GB/sec)

After level 1 trigger (6.5μs): 100 Hz (2.5 GB/sec)

Data Acquisition



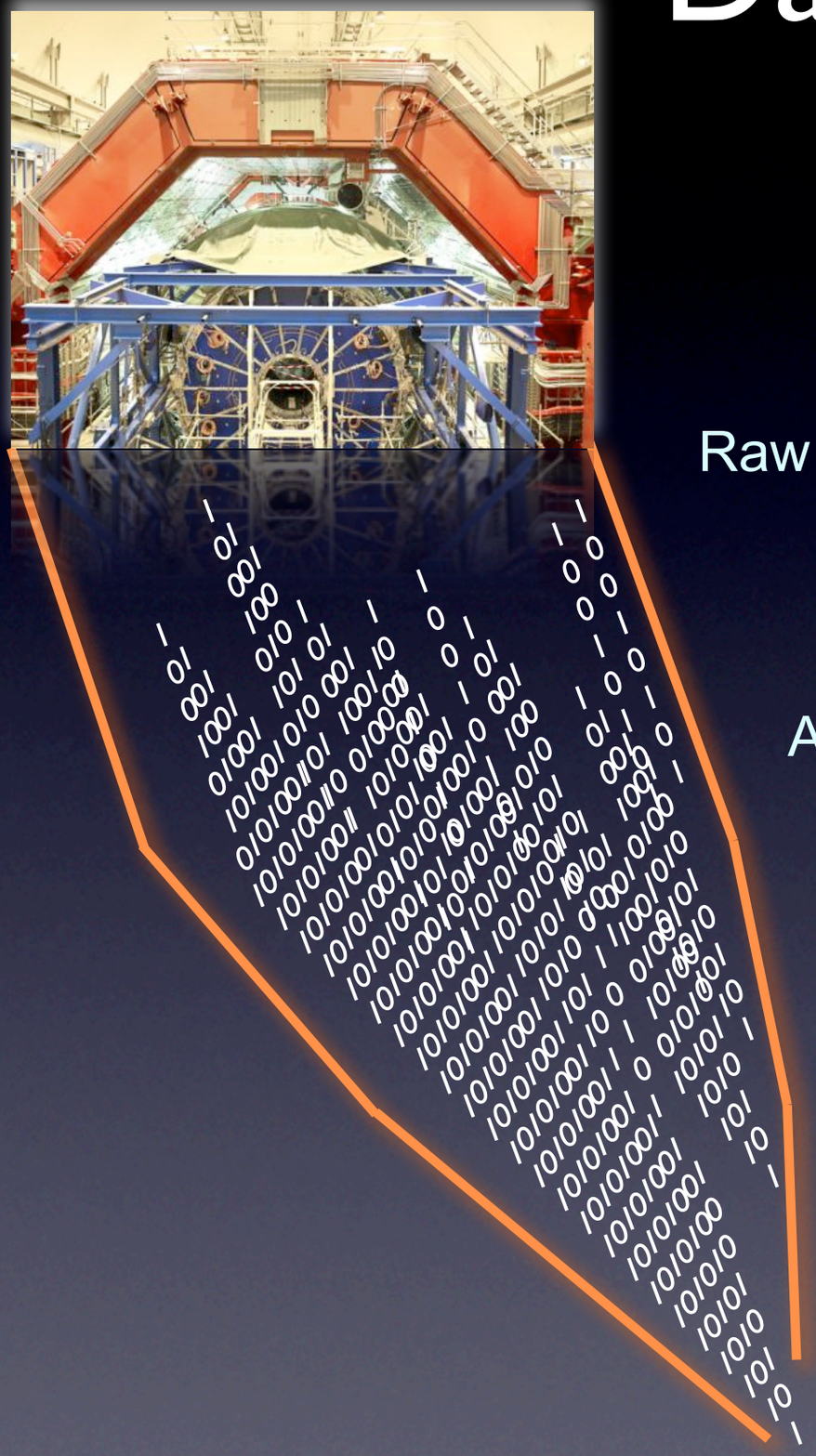
Raw stream form DDL: 8 kHz (160 GB/sec)

After level 0 trigger (1.2μs): 200 Hz (4 GB/sec)

After level 1 trigger (6.5μs): 100 Hz (2.5 GB/sec)

After HLT: 100 Hz (1.25 GB/sec)

Data Acquisition



Raw stream form DDL: 8 kHz (160 GB/sec)

After level 0 trigger (1.2μs): 200 Hz (4 GB/sec)

After level 1 trigger (6.5μs): 100 Hz (2.5 GB/sec)

After HLT: 100 Hz (1.25 GB/sec)

Total in mass storage: 2.5 PB/Year

Data processing

Raw: 2.5 PB/Year

Data processing

Raw: 2.5 PB/Year

Reconstruction (ESD) per event

- 800K Si2K×s
- 3 MB

Data processing

Raw: 2.5 PB/Year

Reconstruction (ESD) per event
- 800K Si2K×s
- 3 MB

Analysis (AOD) per event
- 250K Si2K×s
- 300 KB

Data processing

Raw: 2.5 PB/Year

Reconstruction (ESD) per event
- 800K Si2K×s
- 3 MB

Analysis (AOD) per event
- 250K Si2K×s
- 300 KB

Yearly requirement (pp & AA)
- CPU: 60 MSi2K
- Disk: 16 PB
- MS: 12 PB/year

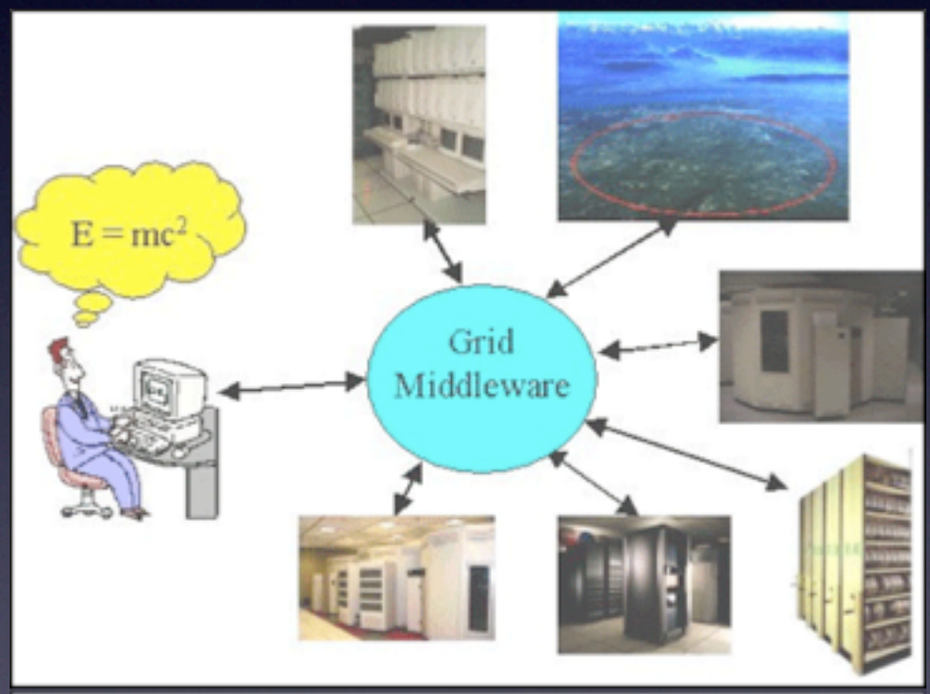
Requirements

- Required resources cannot be centralized
- Process the data as they are acquired
- Prompt online processing
- Give access to data and processing power to about 1000 collaborators
- A different model for pp and AA data
  - pp during 10^7 s (7 months)
  - AA during 10^6 s (1 month)
  - LHC shutdown 4 months

The Grid paradigm

let 1000 mice to the work of one elephant

- Data and CPU are distributed
- Heterogeneity
- Middleware(s)
  - Work load management
  - Data management
  - File transfer
  - Authentication
  - Monitoring
  - Accounting



The Grid paradigm

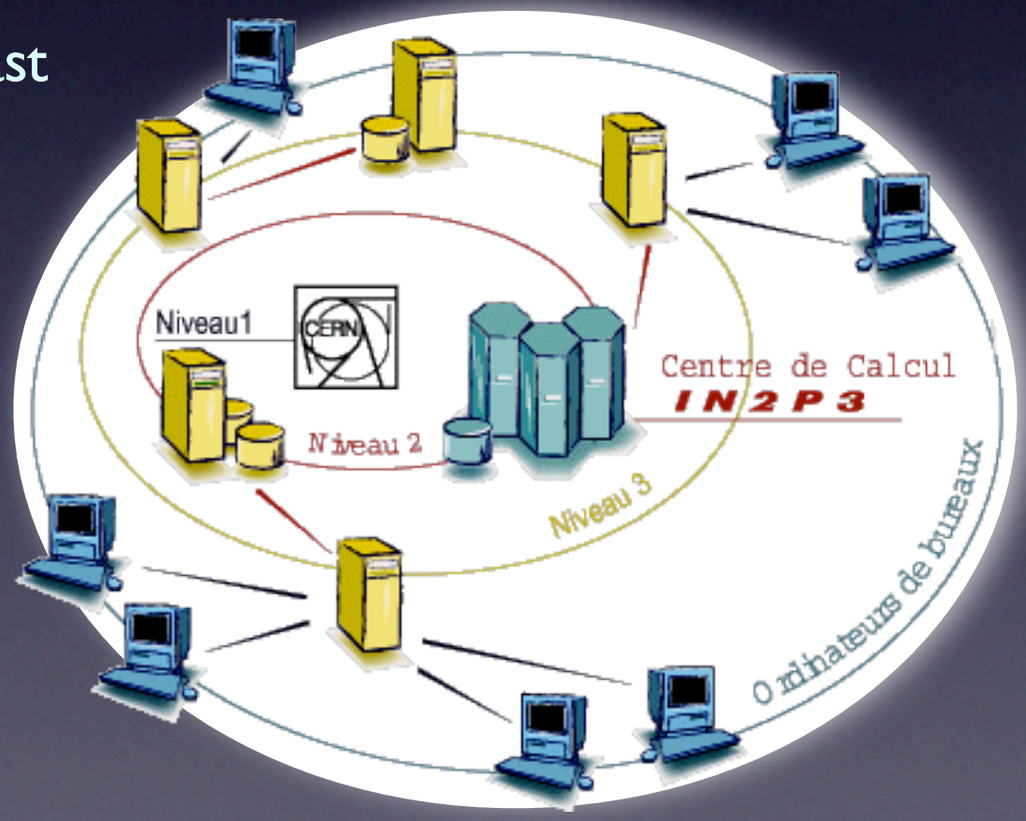
let 1000 mice to the work of one elephant

- Data and CPU are distributed
- Heterogeneity
- Middleware(s)
  - Work load management
  - Data management
  - File transfer
  - Authentication
  - Monitoring
  - Accounting

The Grid paradigm

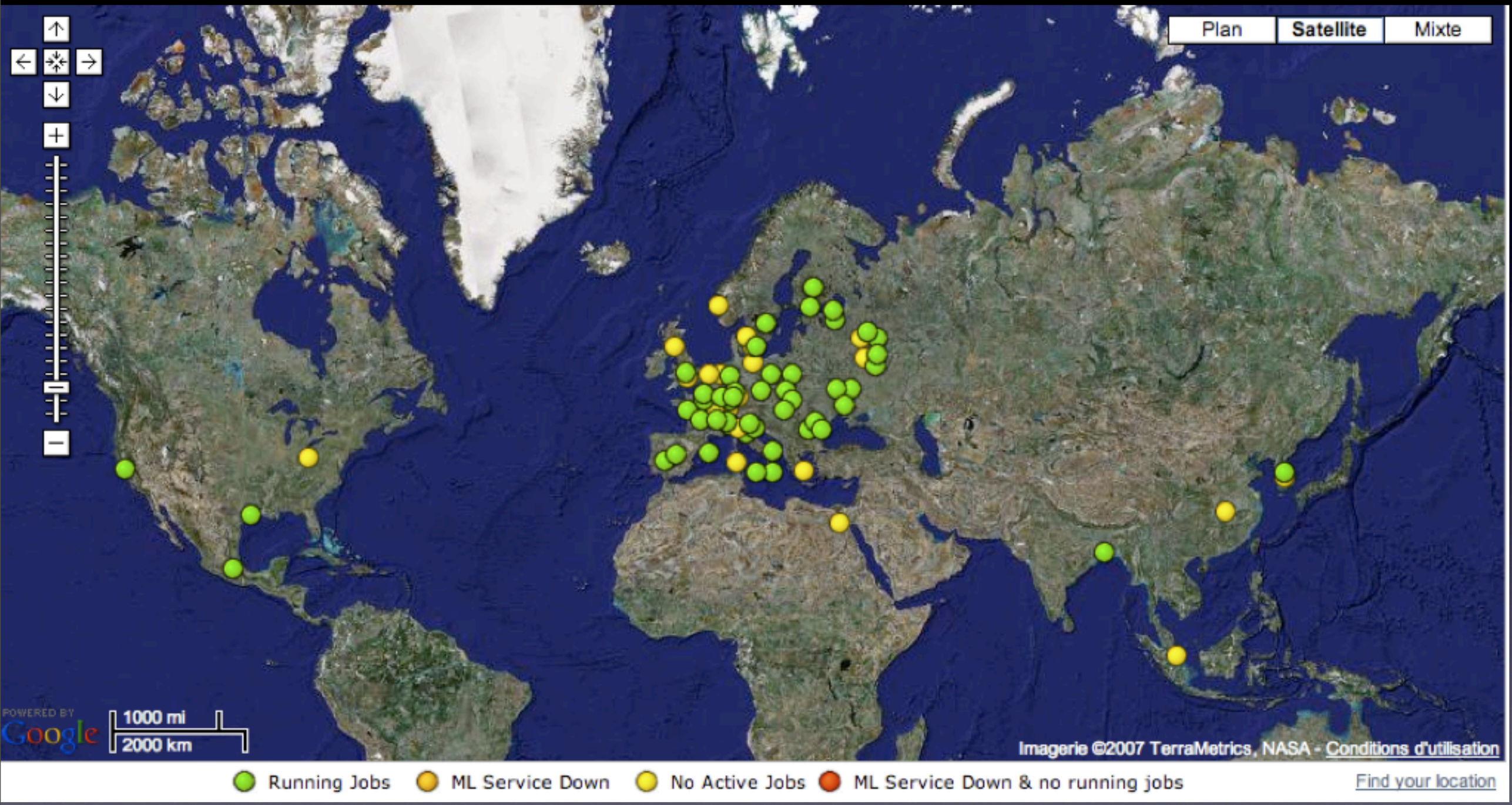
let 1000 mice to the work of one elephant

- Computing sites are hierarchized in Tiers according
  - Tasks
  - Services
- T0
  - CERN: raw data storage, first pass reconstruction, fast analysis
- Tier 1
  - Few large centers with custodial mass storage
  - Copy of raw; Additional reconstruction passes; Organized analysis
- Tier 2, Tier3
  - Many sites of various sites
  - Monte-Carlo; end user analysis



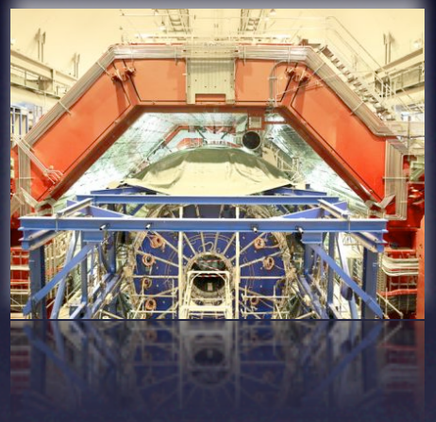
Where the resources are

Where the resources are

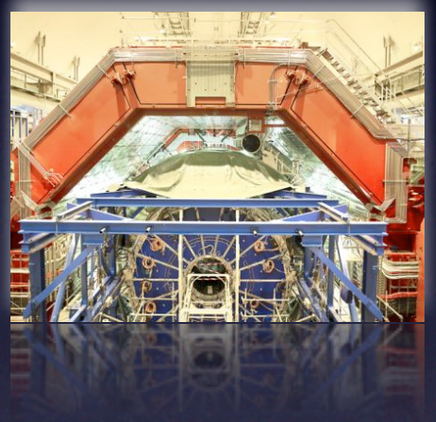


ALICE Computing Strategy

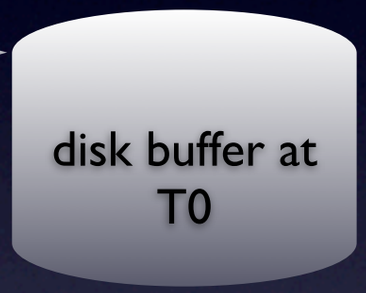
Data Flow for pp



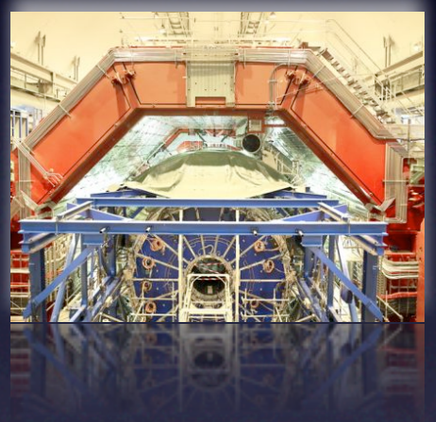
Data Flow for pp



RAW

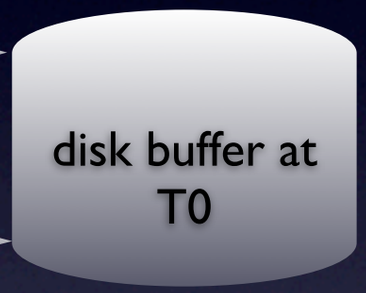


Data Flow for pp

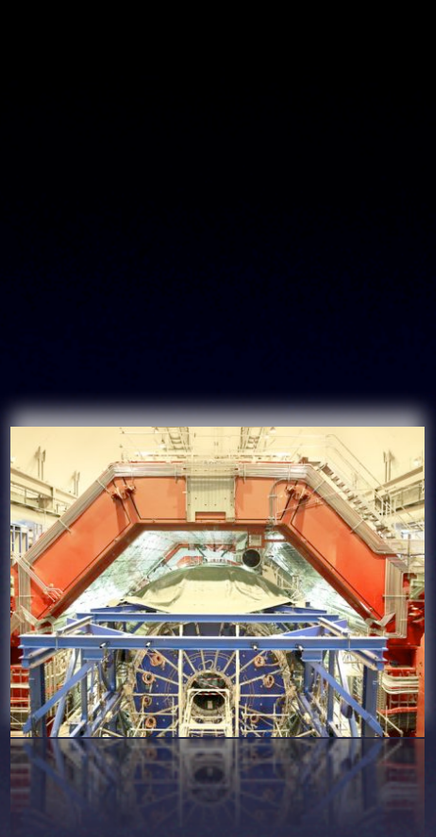


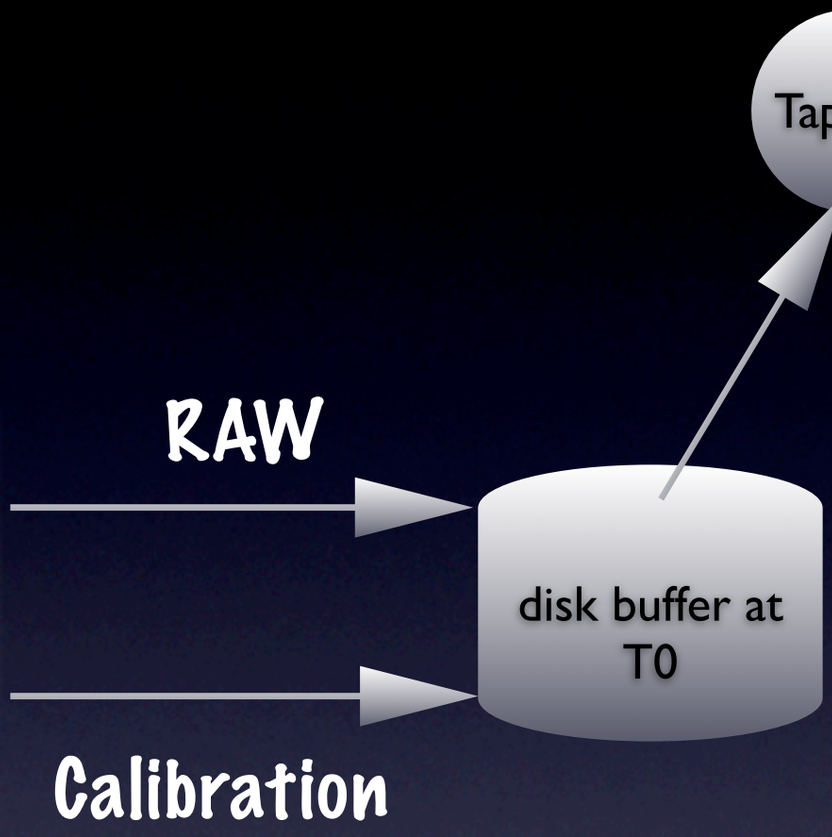
RAW

Calibration

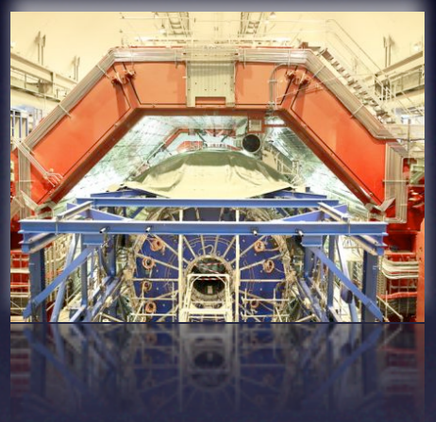


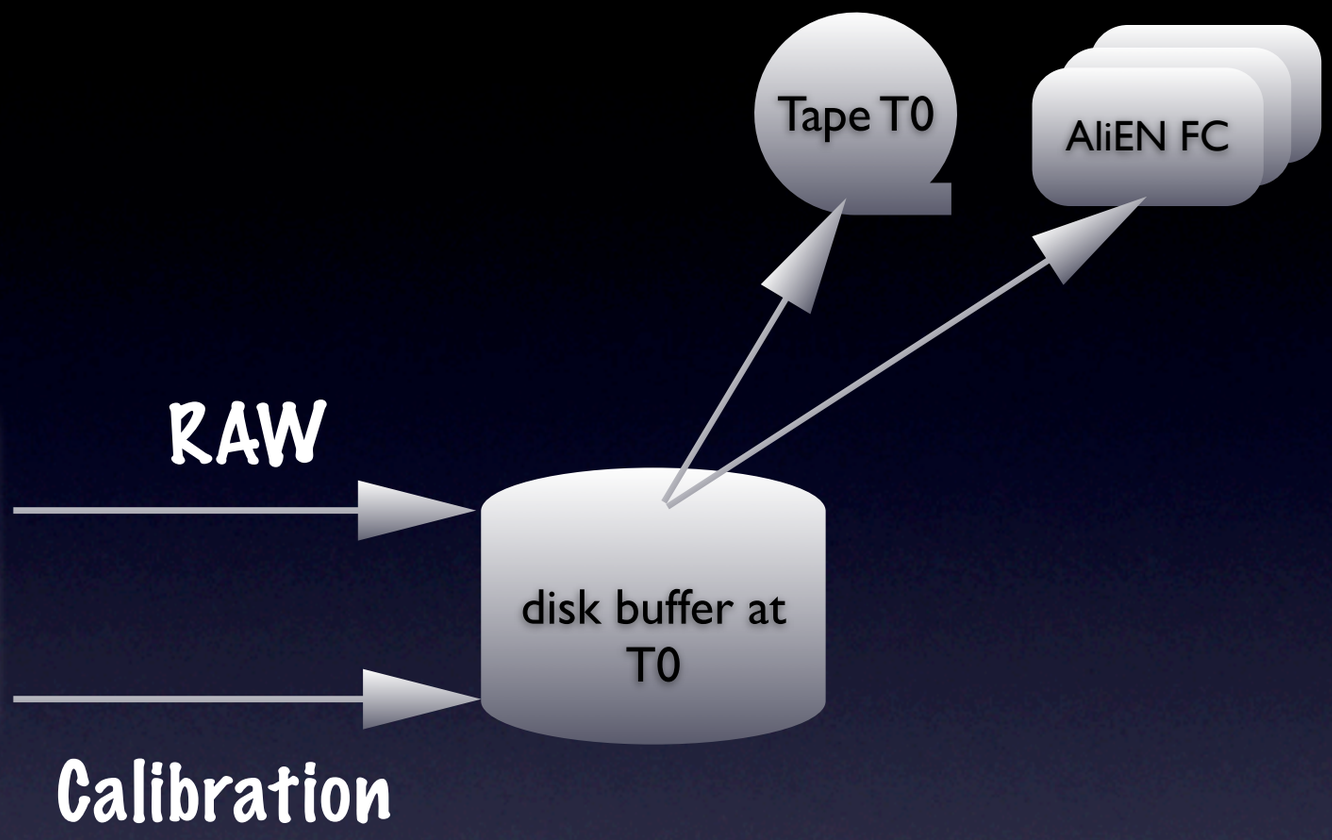
Data Flow for pp



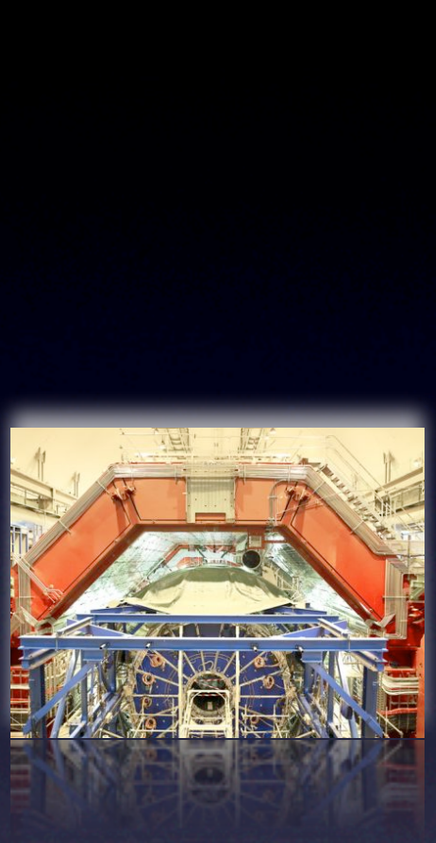


Data Flow for pp





Data Flow for pp



RAW

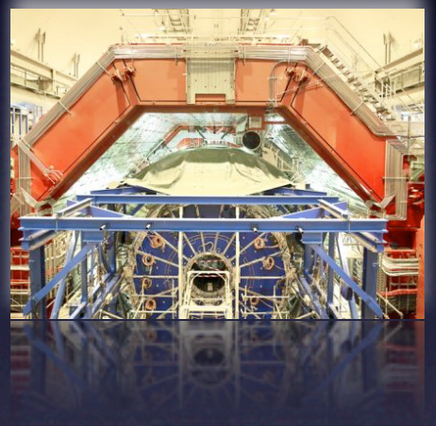
Calibration

Tape T0

AliEN FC

First pass
reconstruction

Data Flow for pp



RAW

Calibration

disk buffer at T0

Tape T0

AliEN FC

First pass reconstruction

Fast Analysis

PROOF WN

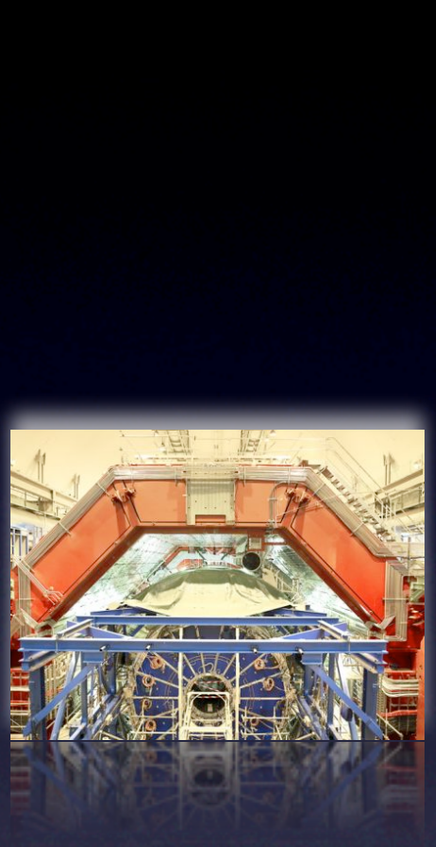
xrootd

PROOF WN

xrootd

CAF

Data Flow for pp



RAW

Calibration

Tape T0

AliEN FC

disk buffer at T0

Export

Fast Analysis

First pass reconstruction

Reconstruction passes

Organized analysis

PROOF WN

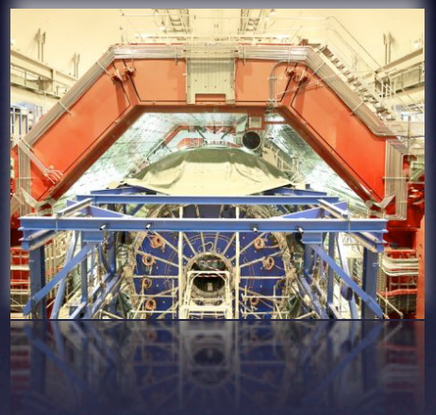
xrootd

PROOF WN

xrootd

CAF

Data Flow for pp



RAW

Calibration

disk buffer at T0

Tape T0

AliEN FC

Export

First pass reconstruction

Fast Analysis

Monte Carlo

End user analysis

Reconstruction passes

Organized analysis

PROOF WN

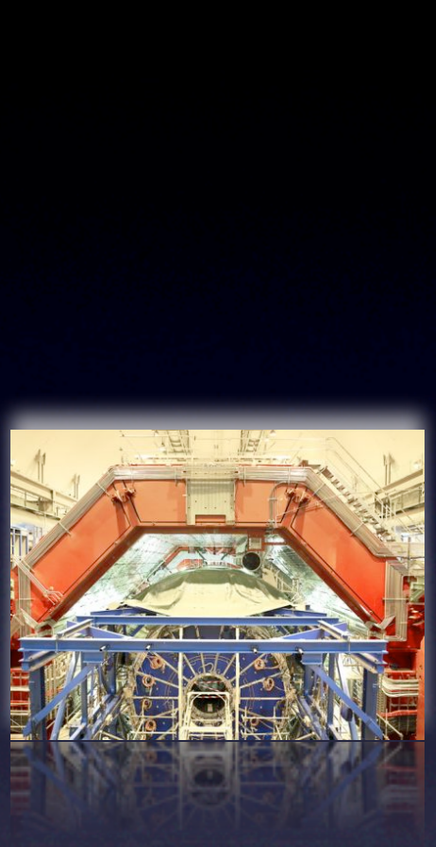
PROOF WN

xrootd

xrootd

CAF

Data Flow for pp



RAW

Calibration

disk buffer at T0

Tape T0

AliEN FC

Export

First pass reconstruction

Fast Analysis

MC data

ESD

Monte Carlo

End user analysis

Reconstruction passes

Organized analysis

PROOF WN

xrootd

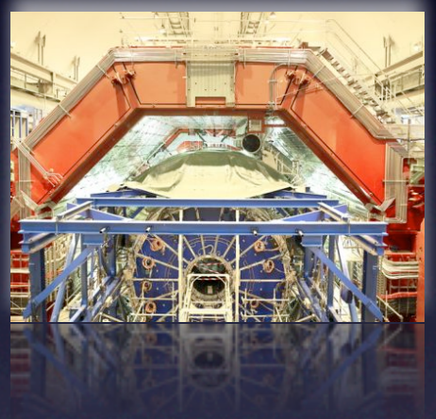
PROOF WN

xrootd

CAF

Data Flow for AA

During data taking



RAW

Calibration

Tape T0

AliEN FC

disk buffer at T0

Pilot reconstruction

Partial export

Fast Analysis

Monte Carlo

MC data

PROOF WN

PROOF WN

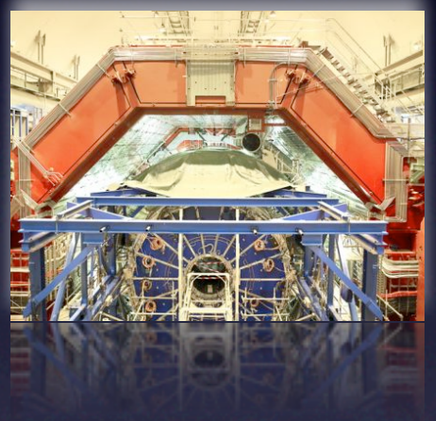
xrootd

xrootd

CAF

Data Flow for AA

During shutdown



Tape T0

AliEN FC

disk buffer at T0

First pass reconstruction

T0

Export

Fast Analysis

MC data

ESD

T2s

Monte Carlo

End user analysis

T1s

Reconstruction passes

Organized analysis

PROOF WN

xrootd

PROOF WN

xrootd

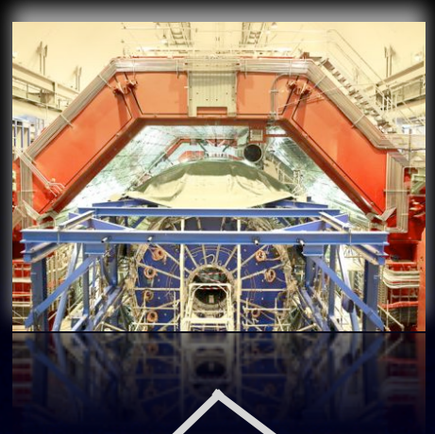
CAF

High level data flow

ONLINE

OFFLINE

Rec - Ana - Sim QA



GDC DA

Data file

Publish agent

lfn	guid	{se's}
lfn	guid	{se's}
lfn	guid	{se's}
lfn	guid	{se's}
lfn	guid	{se's}

CAF

DDL

HLT

LDC DA

DAQ network

xrootd

T0

Data file

FXS

LogBook

DQM Rec-Vis-QA

FXS

CASTOR cache

SRM

FTS

SRM

T1s

shuttle

DCS

FXS

xrootd

DCS DB

T1

CASTOR

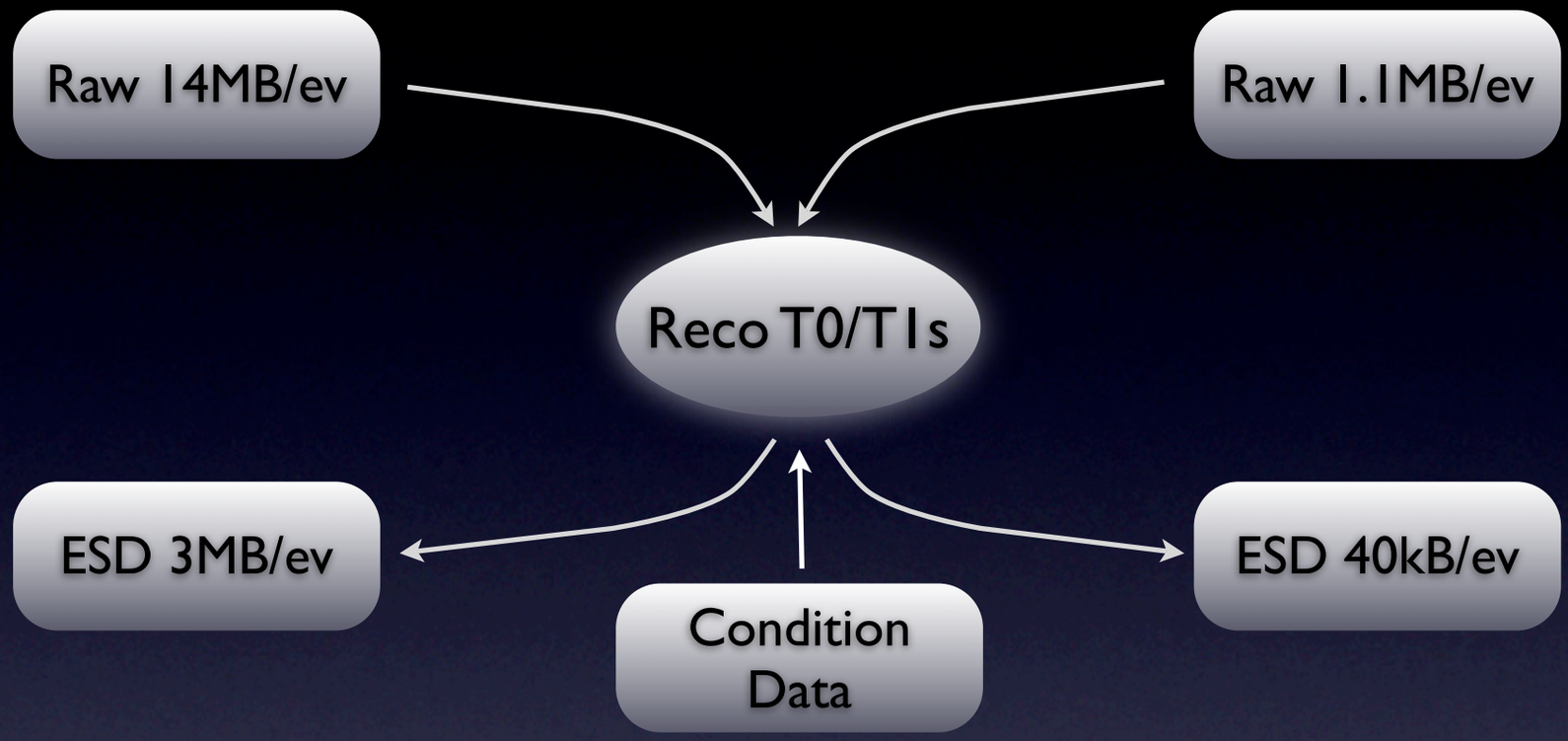
Data Reduction

Reco T0/T1s

Requires:

AliRoot, CDB, AliEN

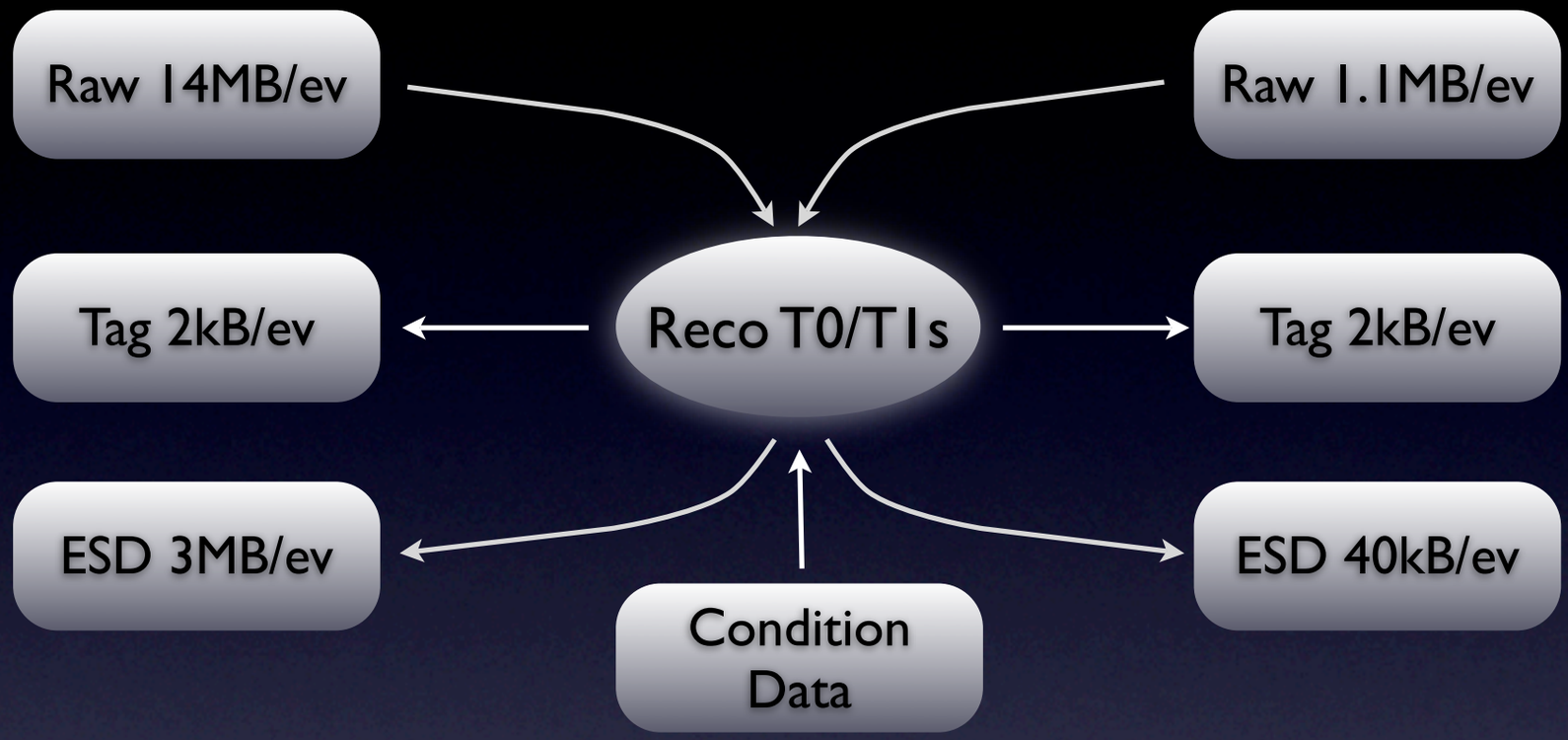
Data Reduction



Requires:

AliRoot, CDB, AliEN

Data Reduction



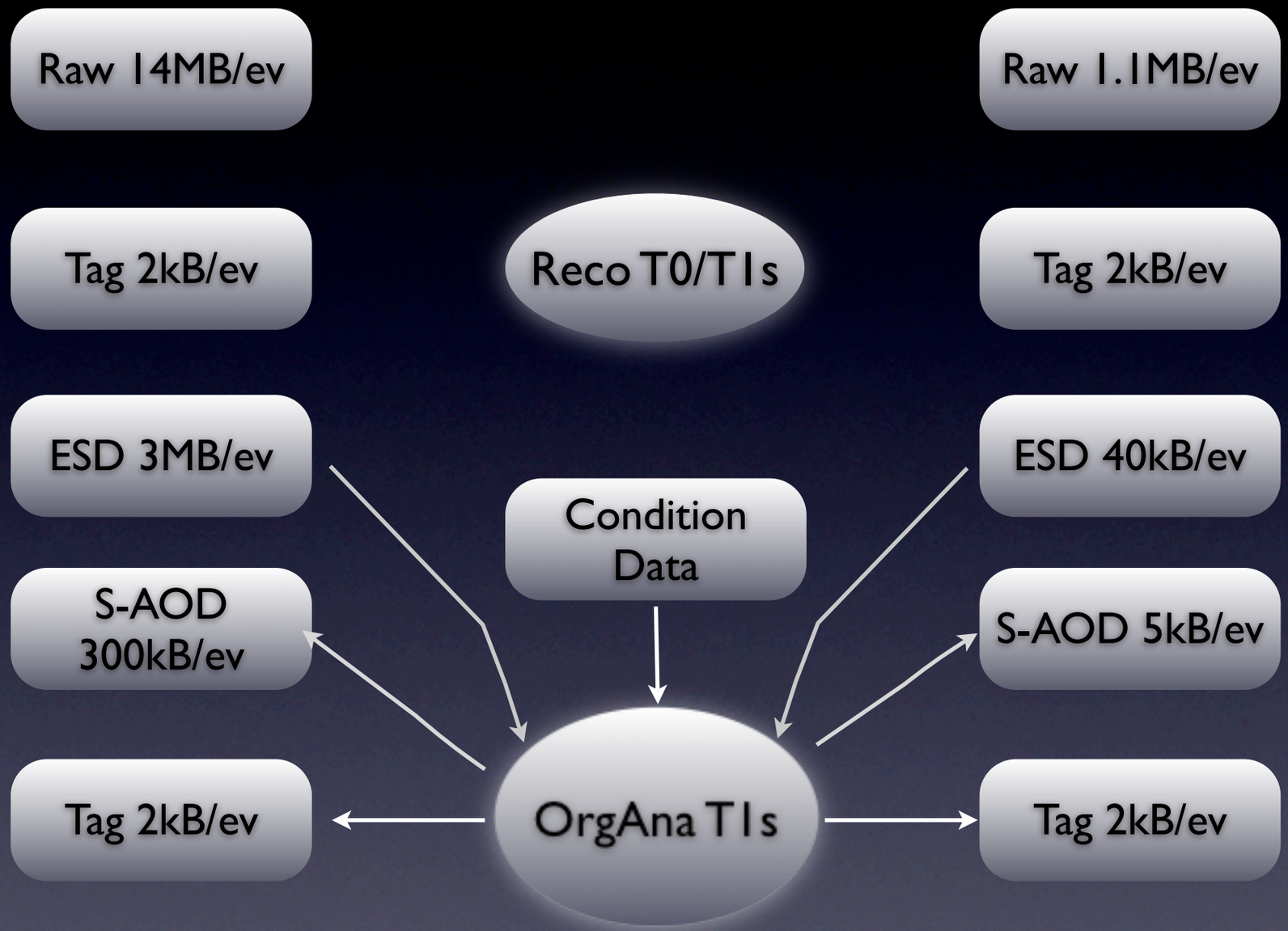
Requires:

AliRoot, CDB, AliEN

Data Reduction

Requires:

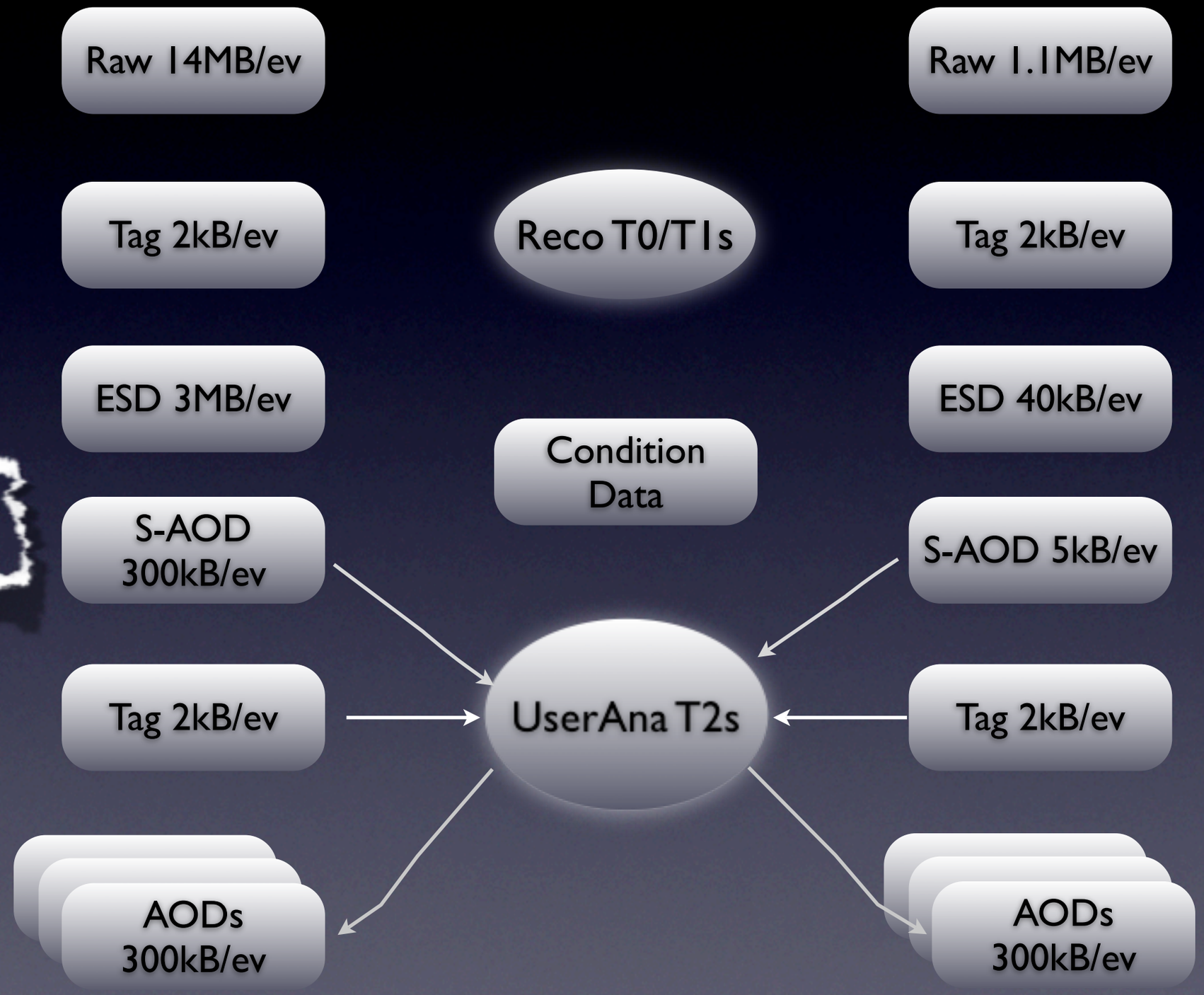
AliRoot, CDB, AliEN



Data Reduction

Requires:

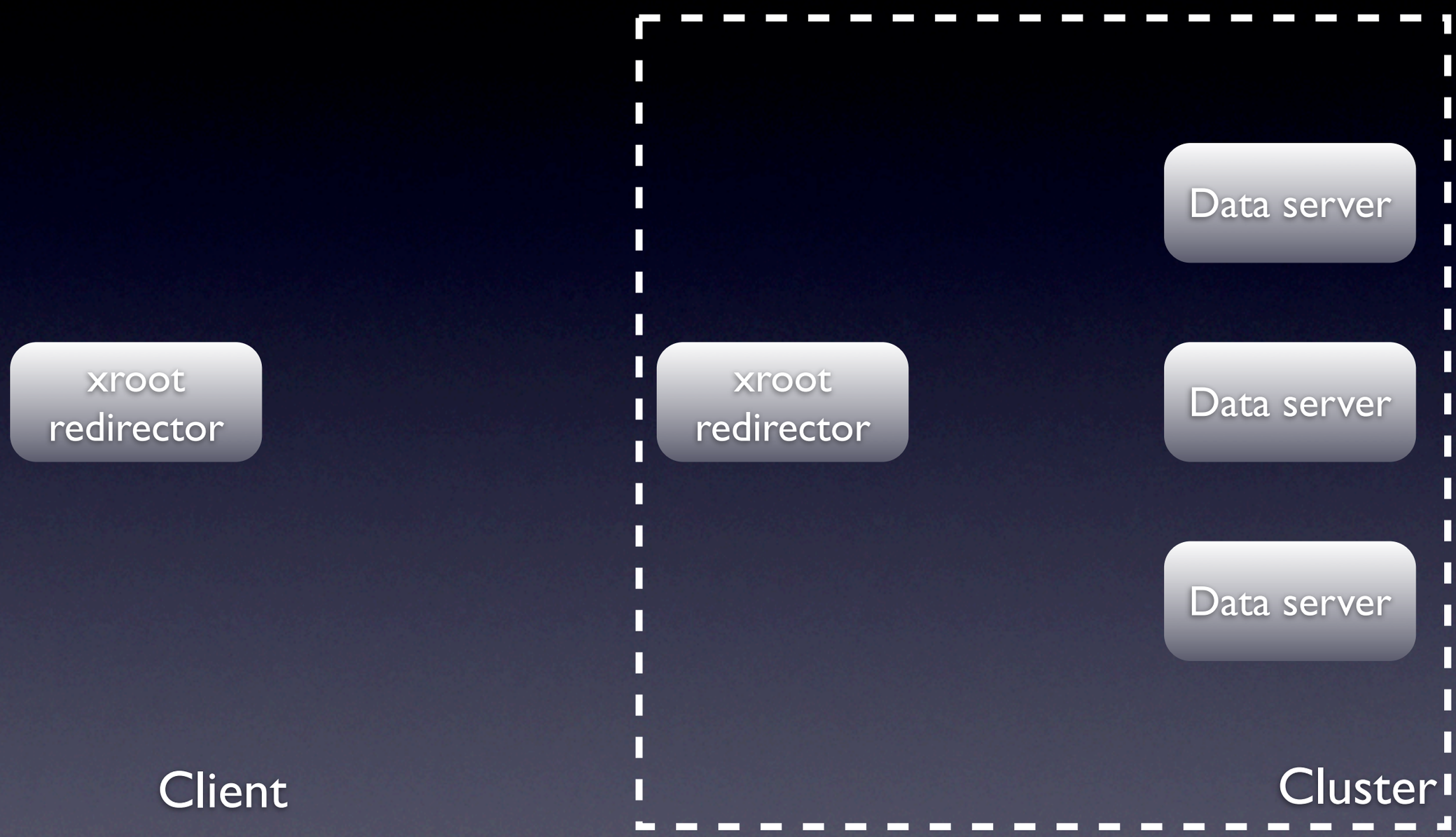
Root, few libs
Runs on laptop



The problem with storage

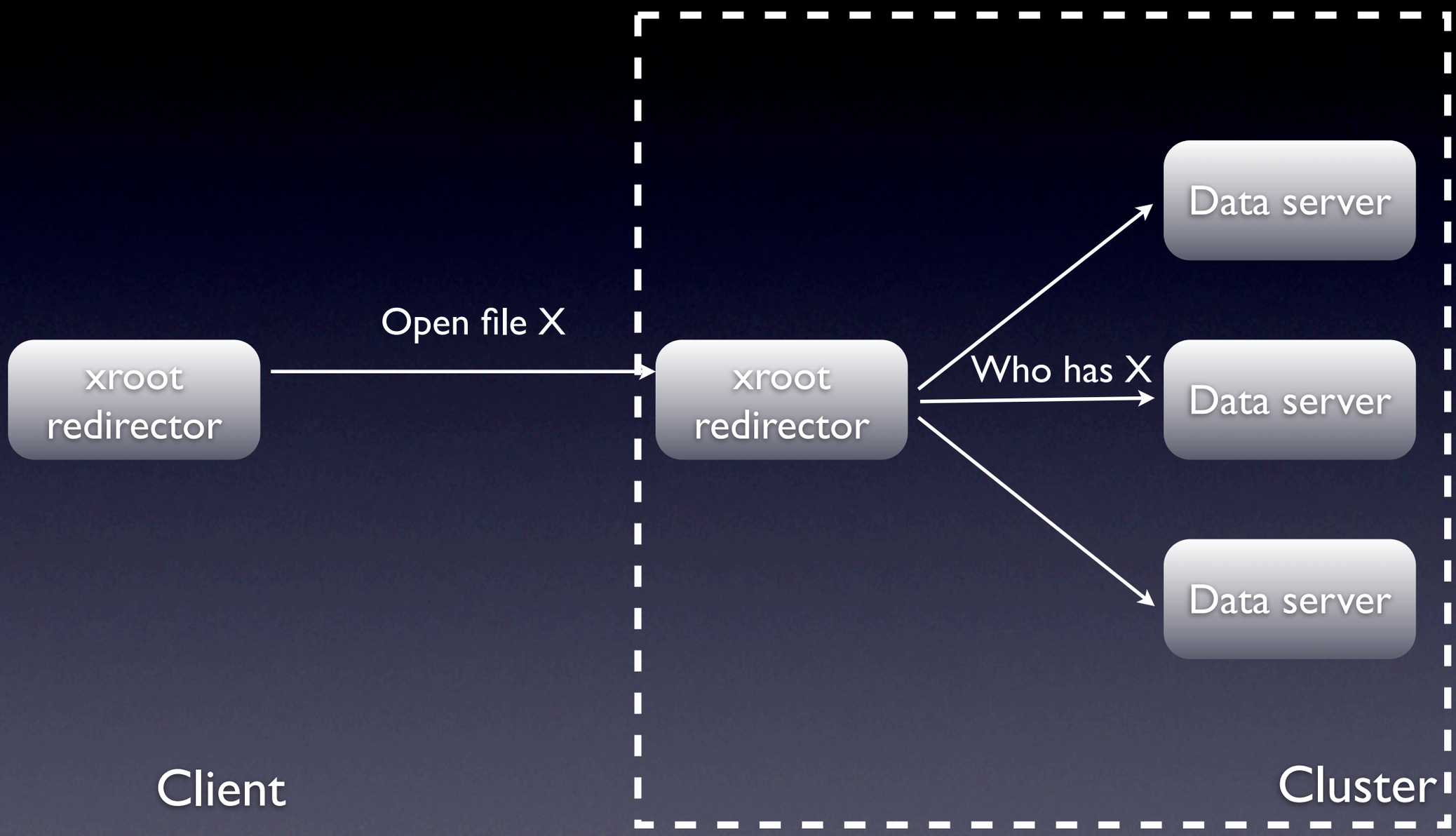
- The heterogeneity of storage protocols defies the very principle of uniform access to Grid resources
- The solution is to have an unique interface to the various flavors of storage
- ALICE choice is xrootd (eXtended ROOT Daemon): a high performance, highly scalable architecture for data access
- xrootd is distributed with root

xrootd basic strategy



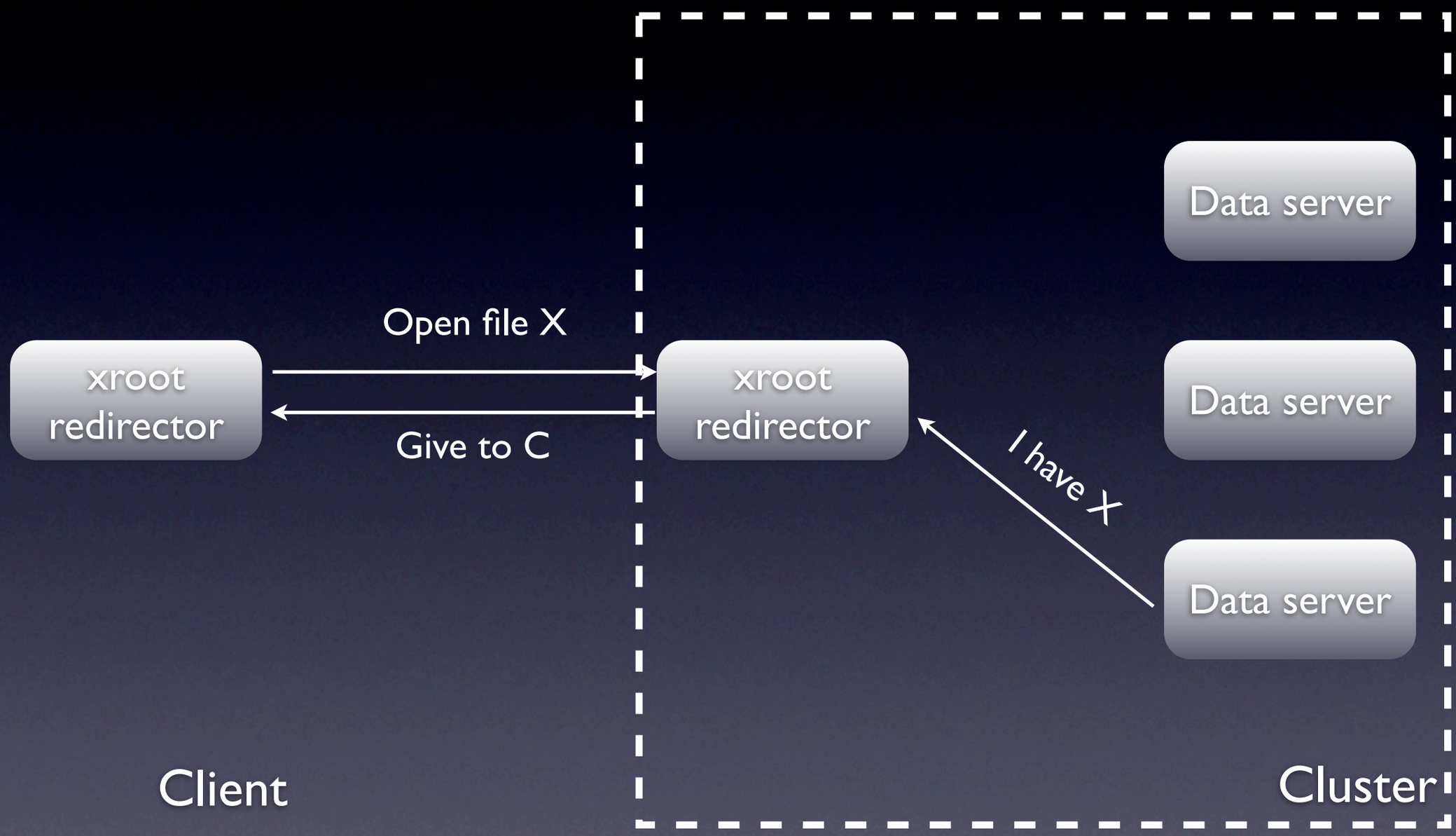
Client sees all servers as xrootd data servers

xrootd basic strategy



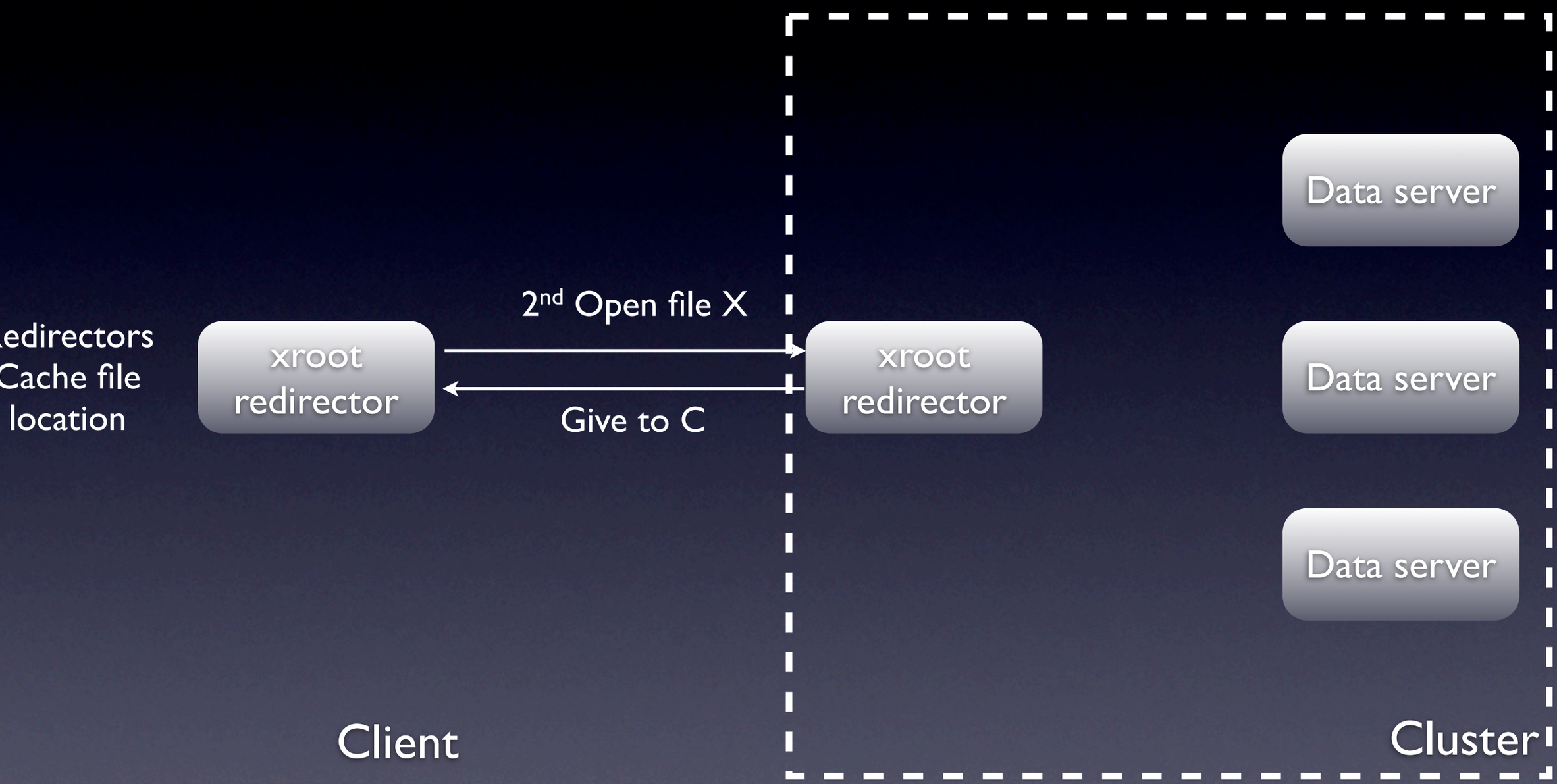
Client sees all servers as xrootd data servers

xrootd basic strategy



Client sees all servers as xrootd data servers

xrootd basic strategy

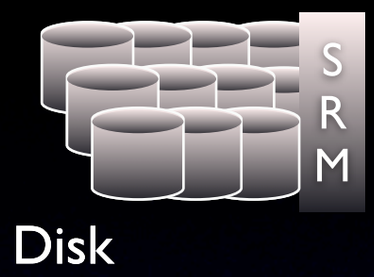


Client sees all servers as xrootd data servers

xrootd implementation in ALICE

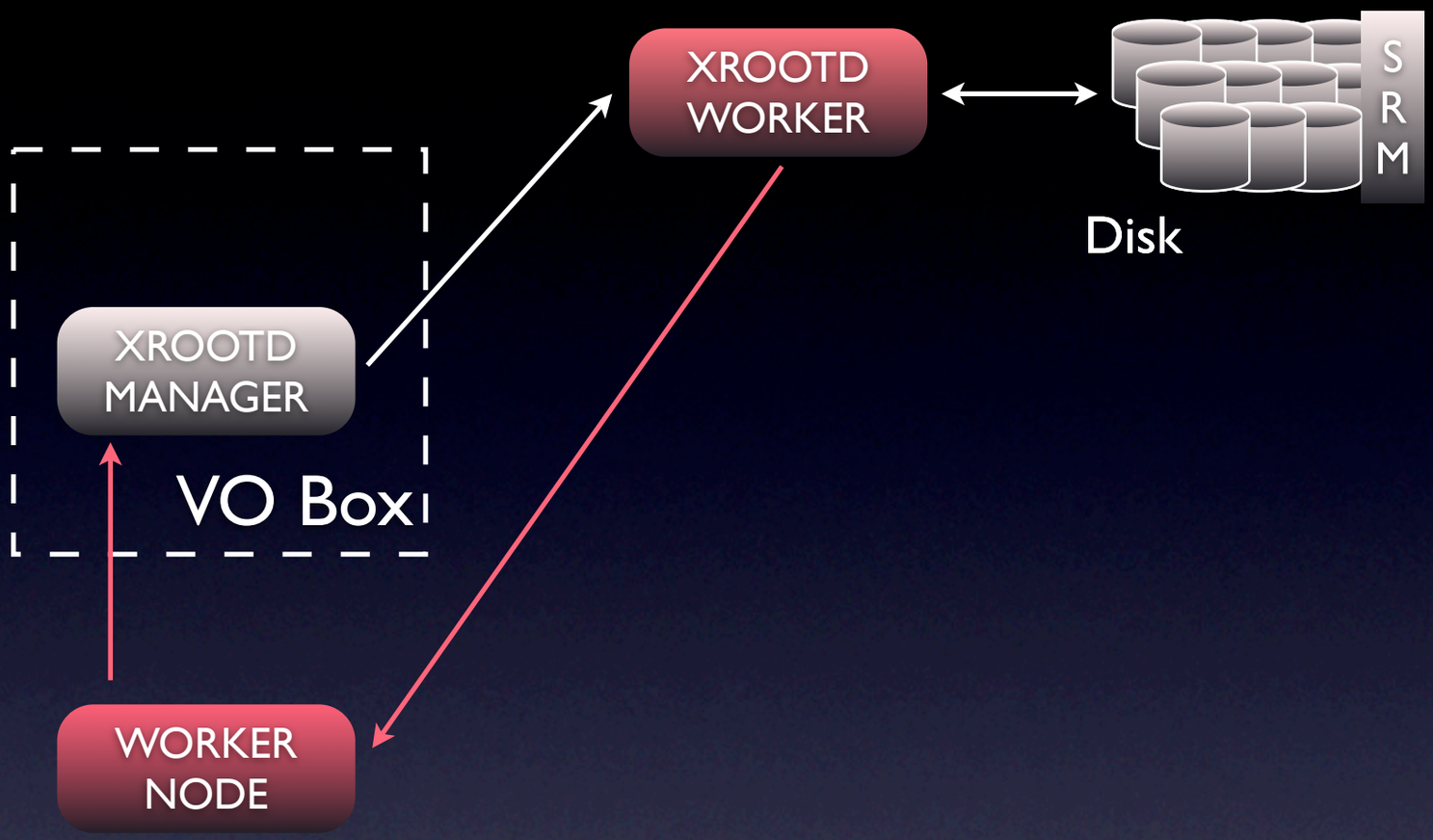
Disk

xrootd implementation in ALICE



Disk

xrootd implementation in ALICE



Disk

xrootd implementation in ALICE

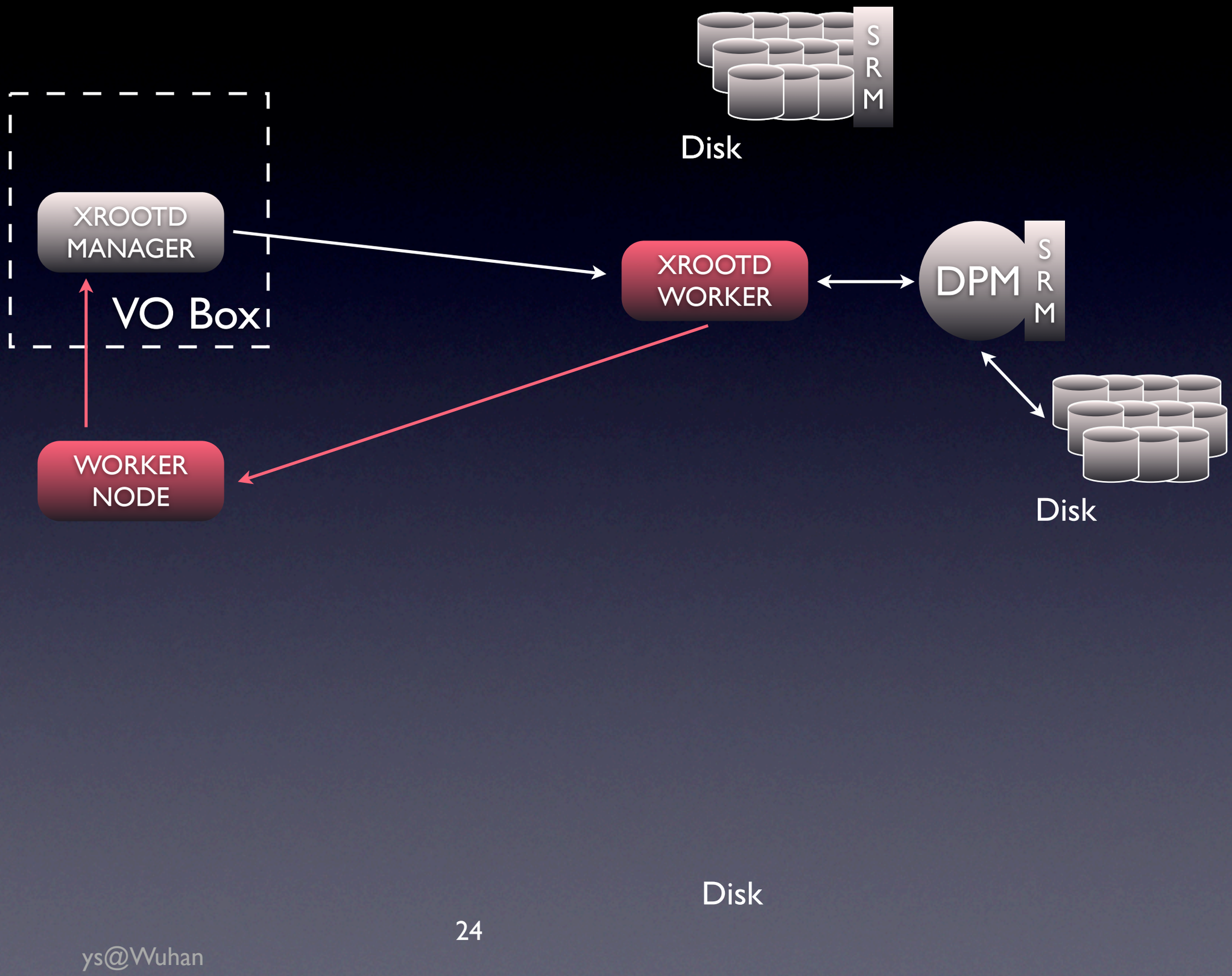
Disk

Disk

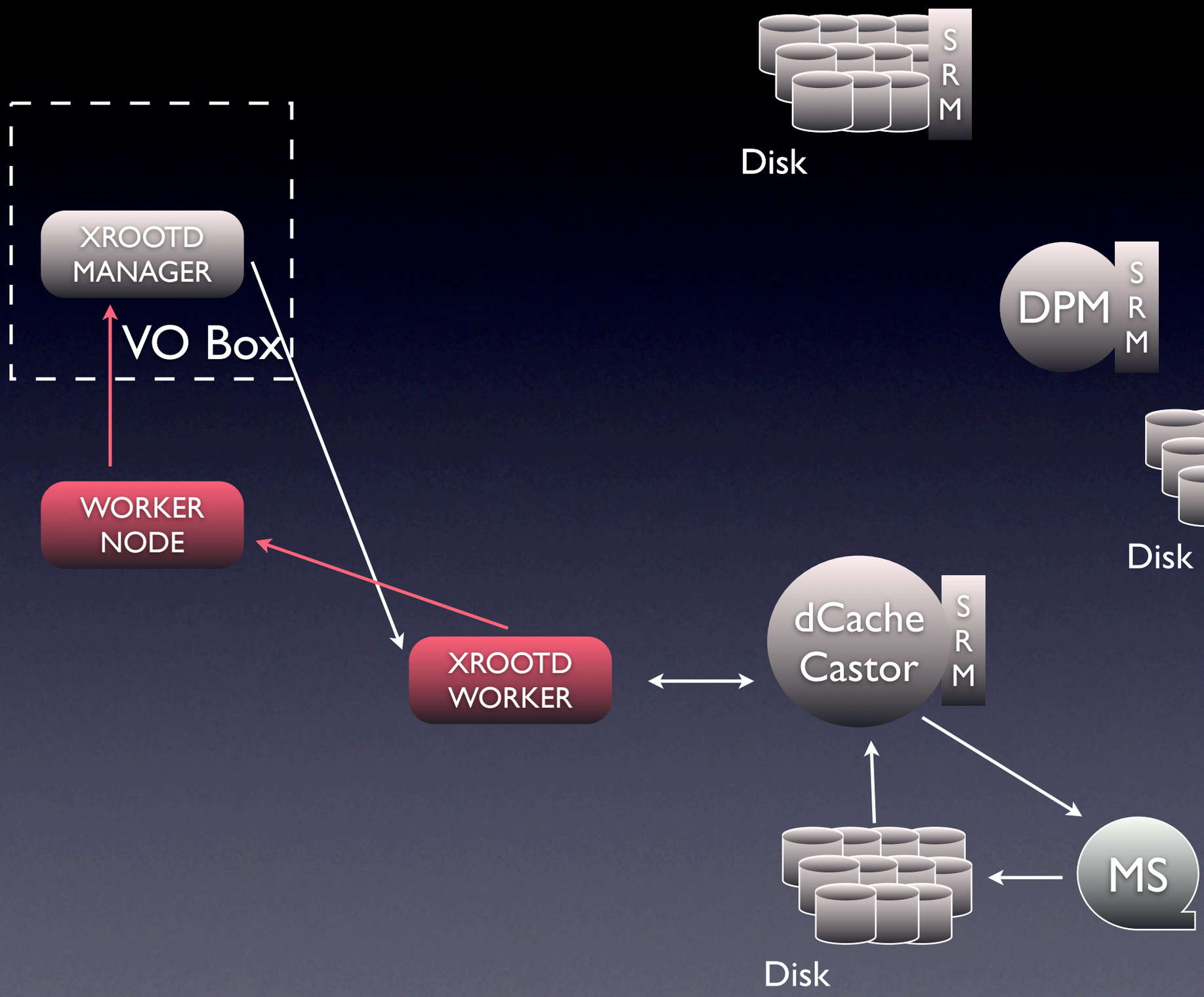
WORKER
NODE

Disk

xrootd implementation in ALICE



xrootd implementation in ALICE



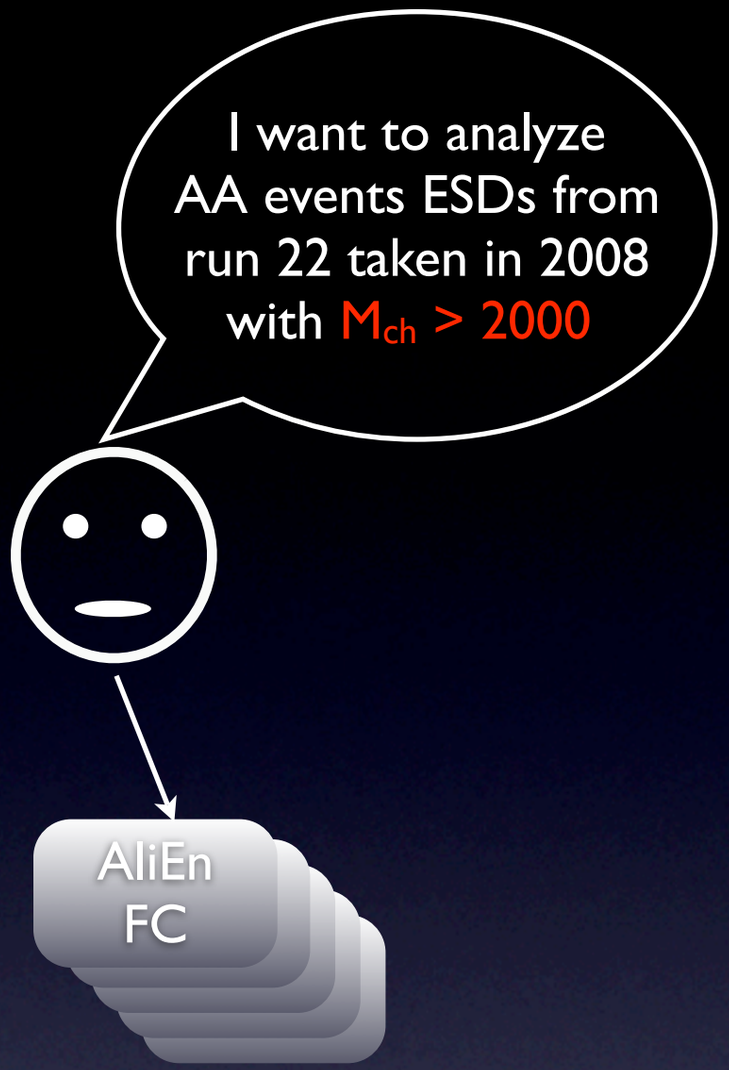
Analysis

- Three main analysis modes
  - Prompt data processing (calib, align, reco, analysis) @CERN with PROOF
  - Analysis with local PROOF clusters
  - Batch Analysis on the grid GRID infrastructure
- Access GRID via AliEn or ROOT UIs
  - GRID API class TAliEn
- Analysis
  - ROOT + at most a small library (into a par-file)
- Only one algorithm running in three different environments

Analysis flow

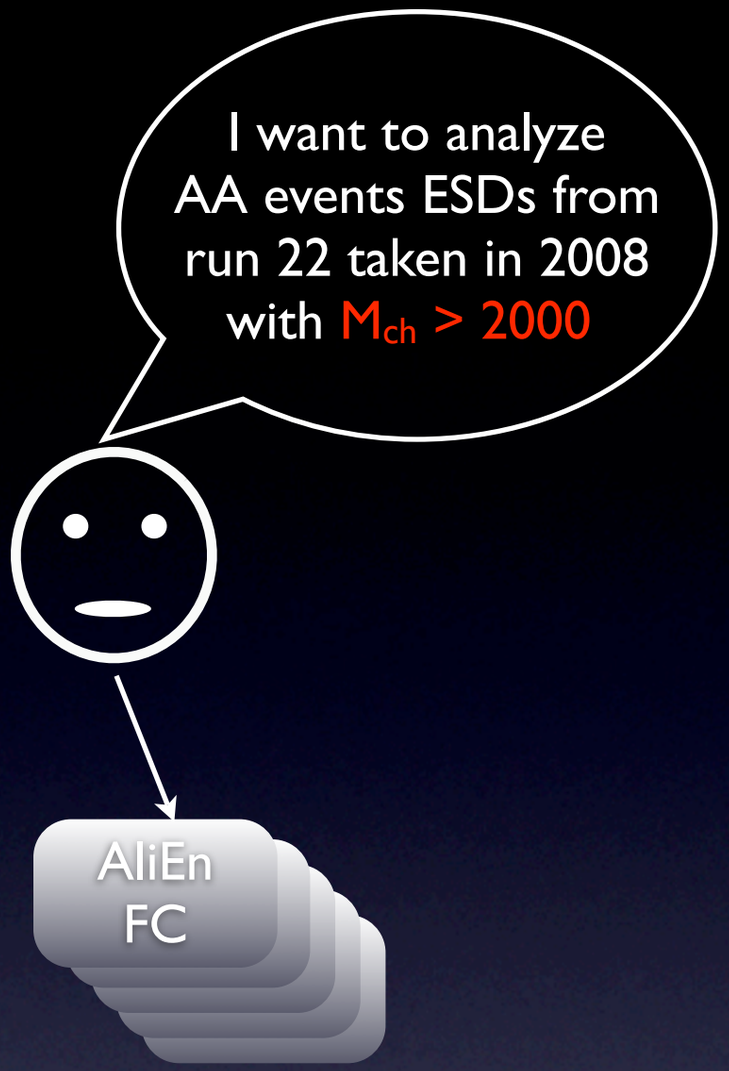
Analysis flow

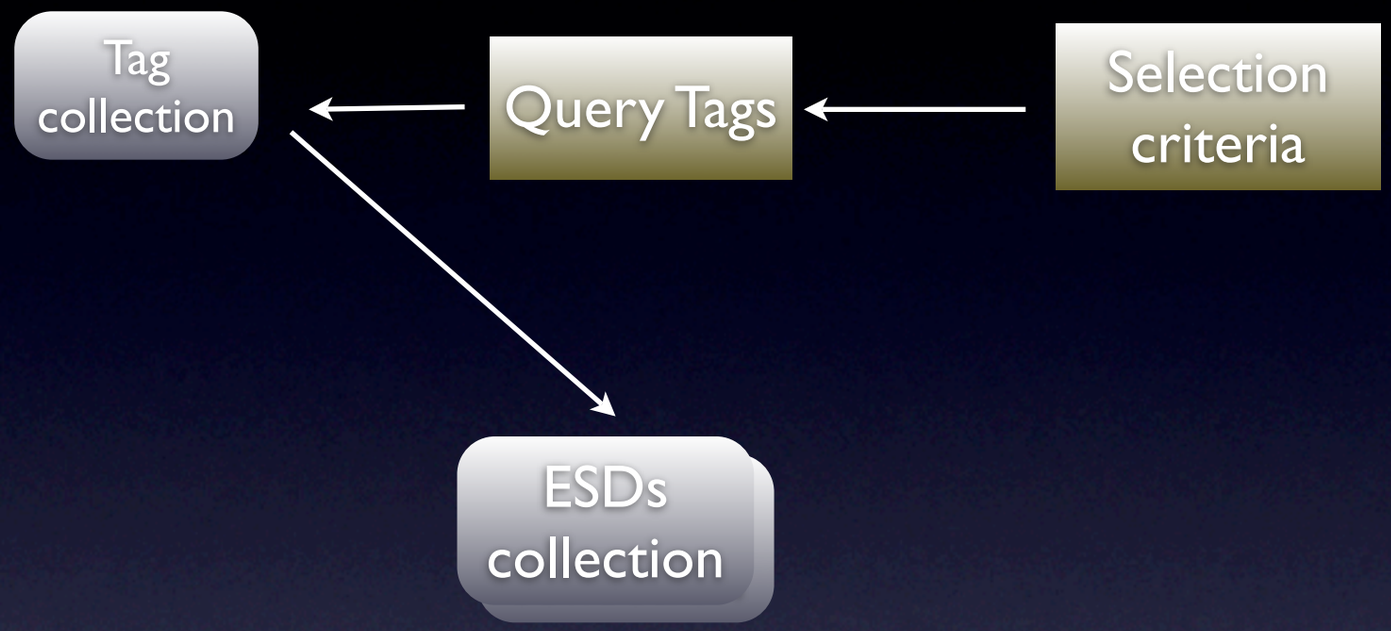
Analysis flow



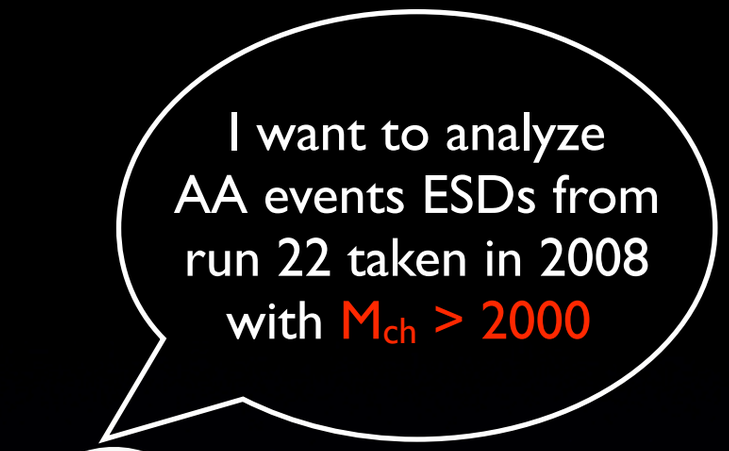
Tag
collection

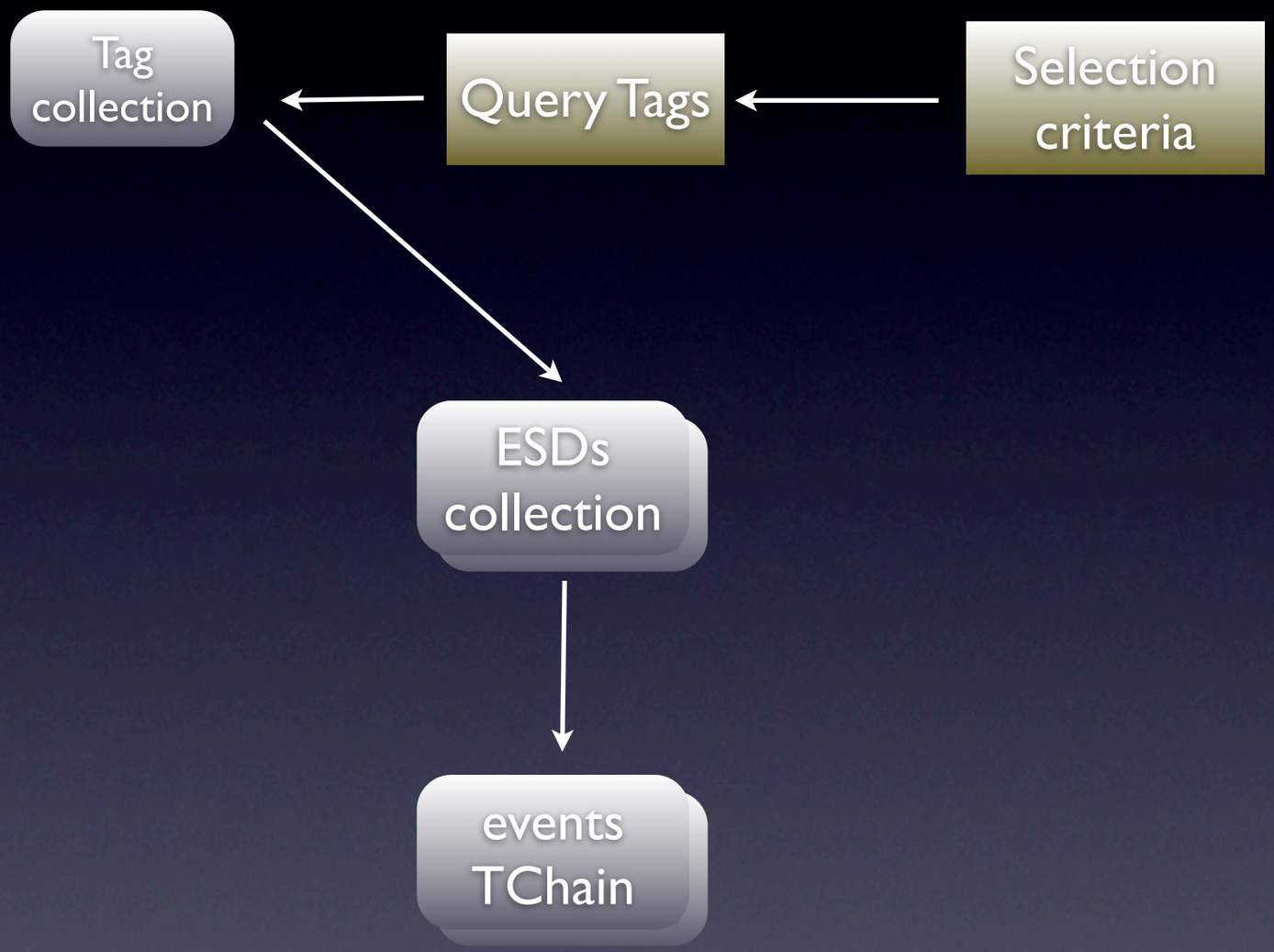
Analysis flow



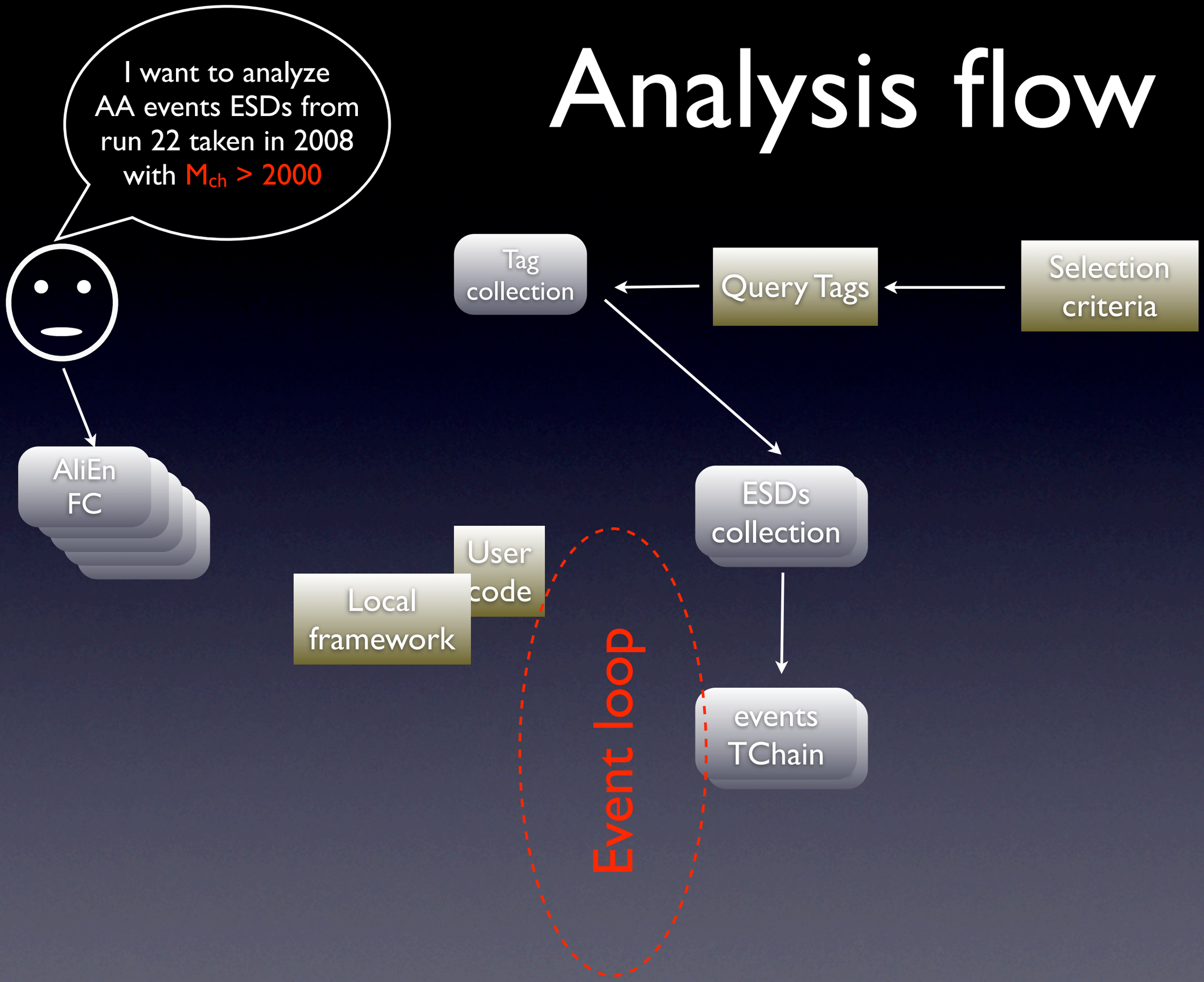


Analysis flow

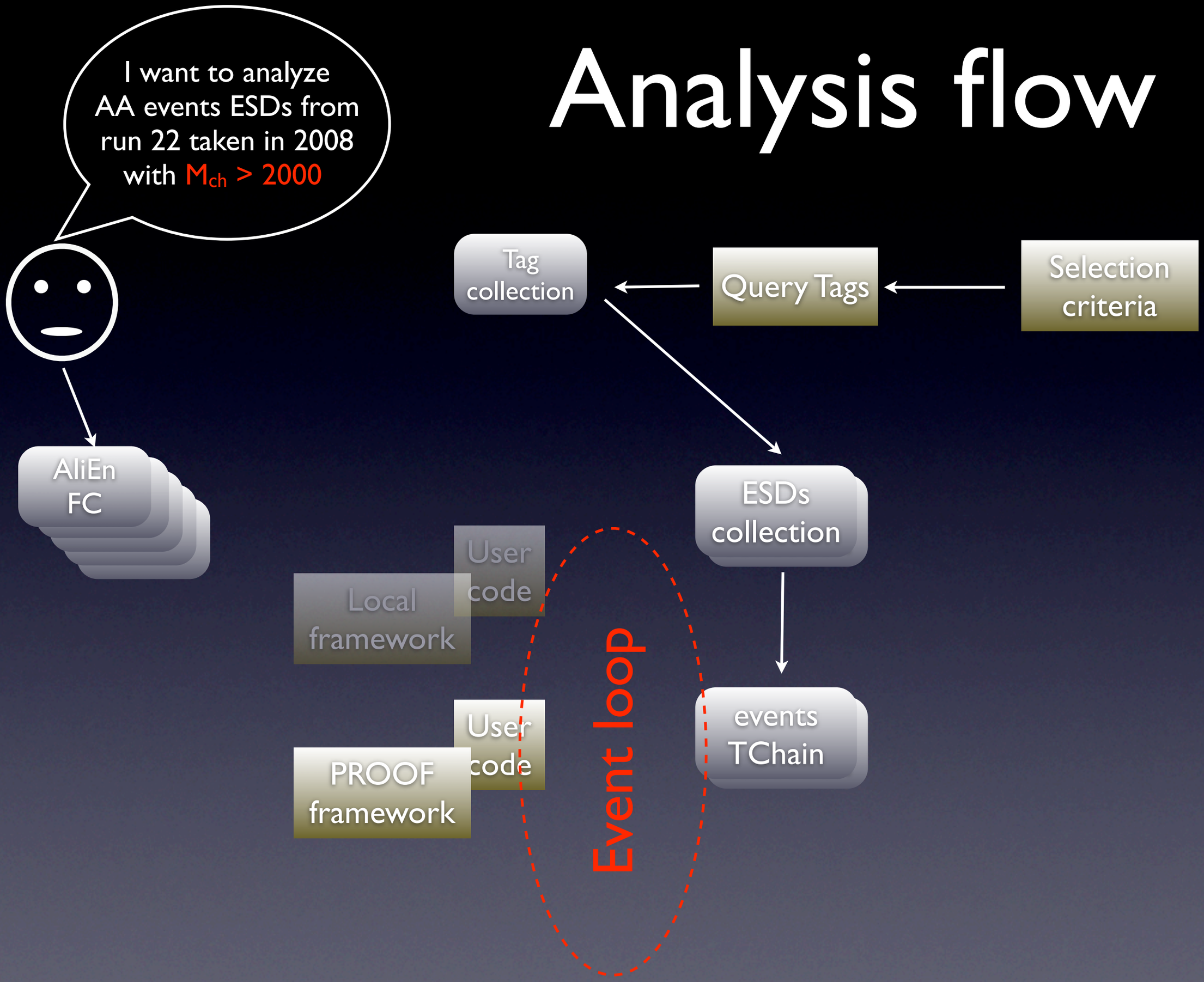




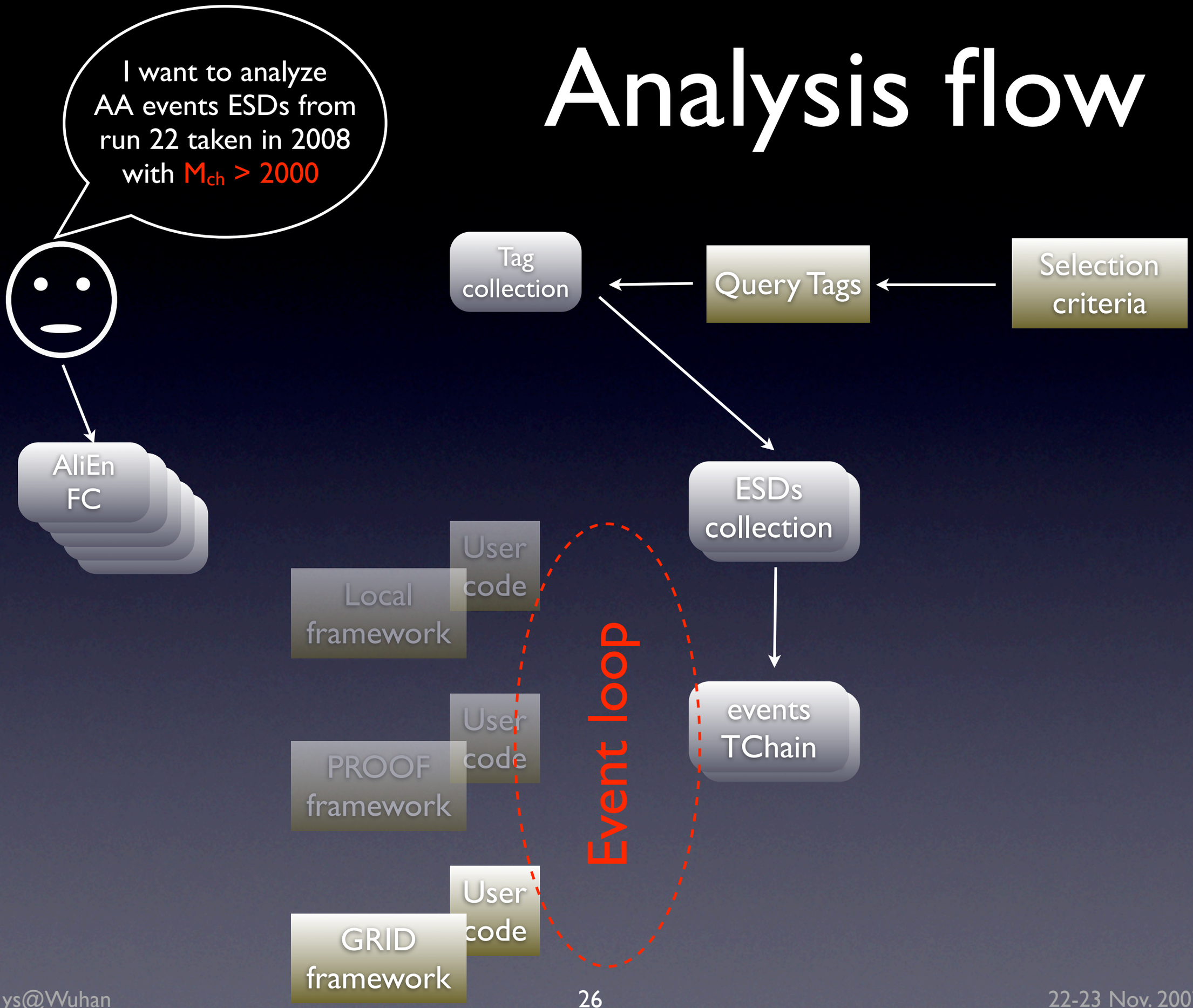
Analysis flow



Analysis flow



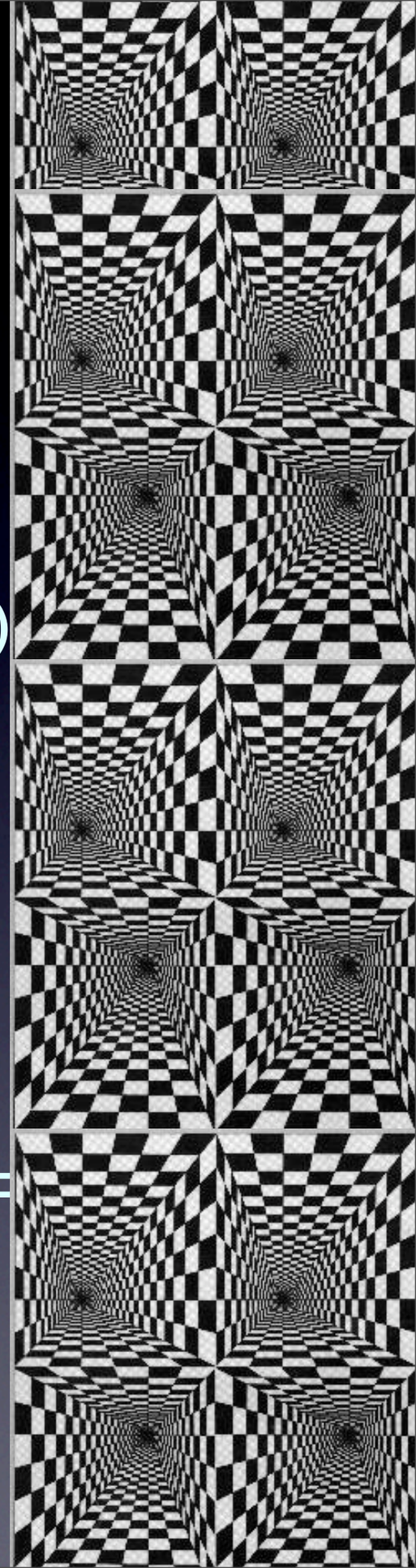
Analysis flow



PROOF

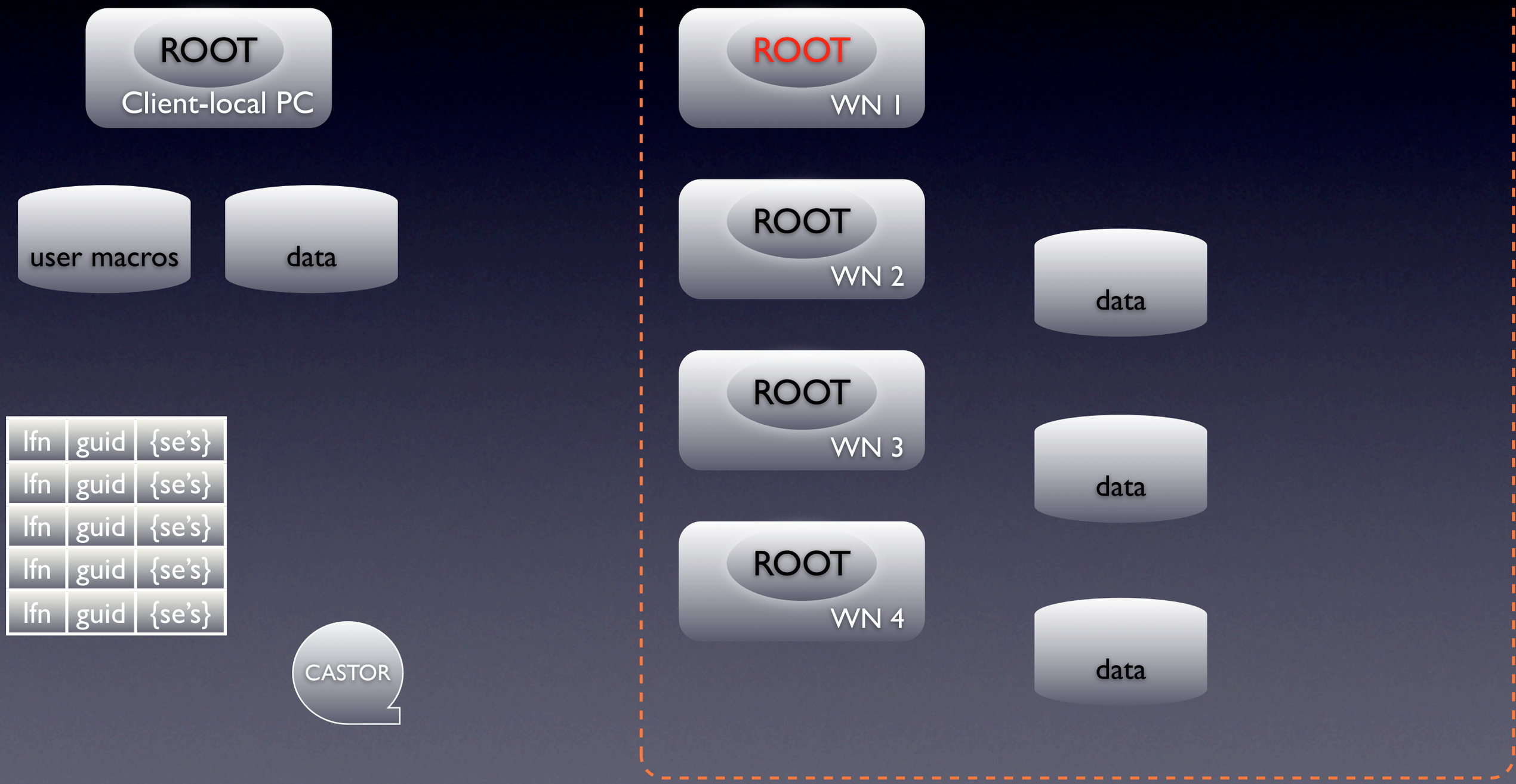
Parallel ROOT Facility

- Interactive parallel analysis on a local cluster
  - Parallel processing of local data (trivial parallelism)
  - Output handling with direct visualization
  - Not a batch system
- PROOF itself is not related to Grid
  - Can access Grid files
- The usage of PROOF is transparent
  - The same code can be run locally and in a PROOF system
- PROOF is part of root



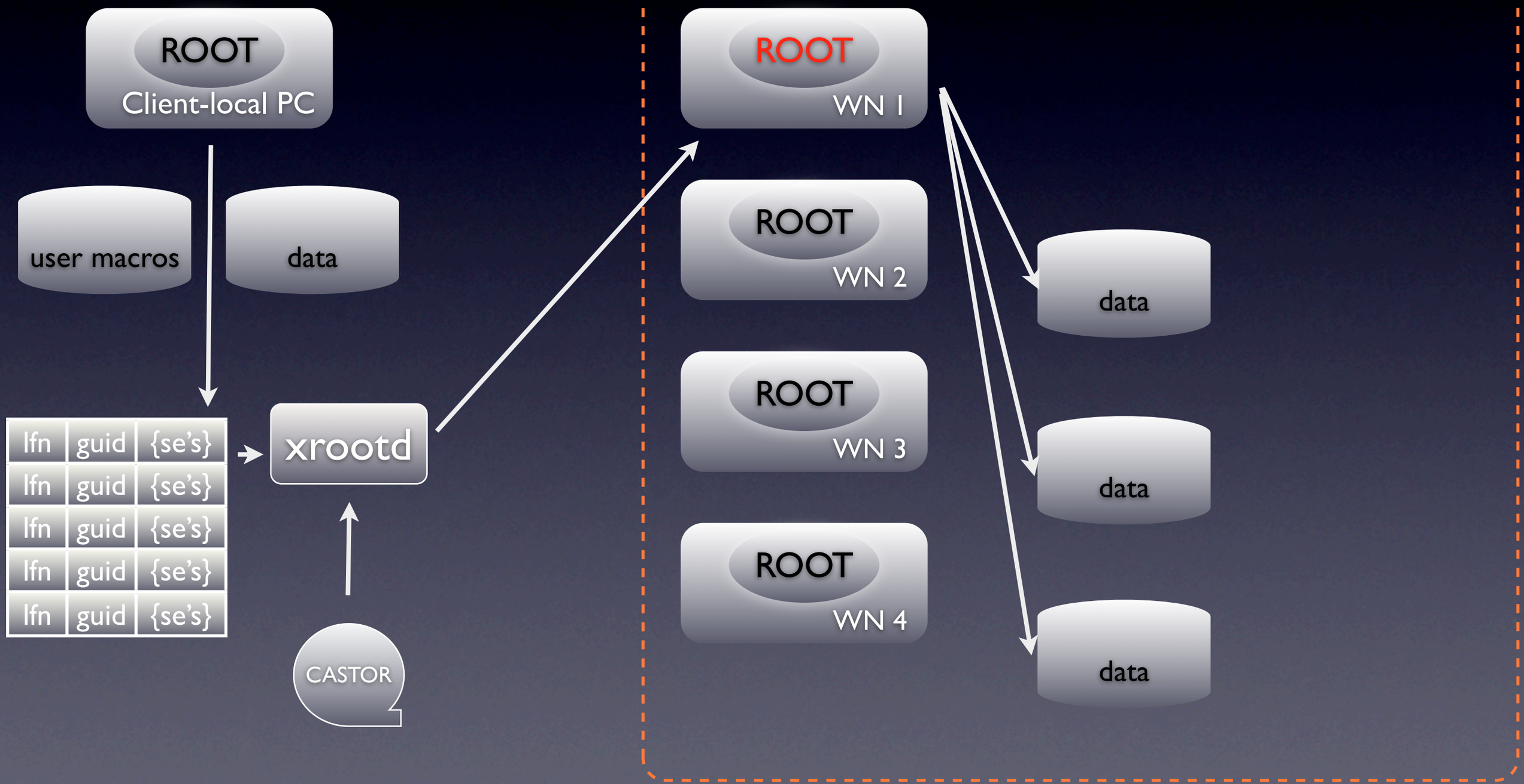
PROOF Schema

Loading user specified data



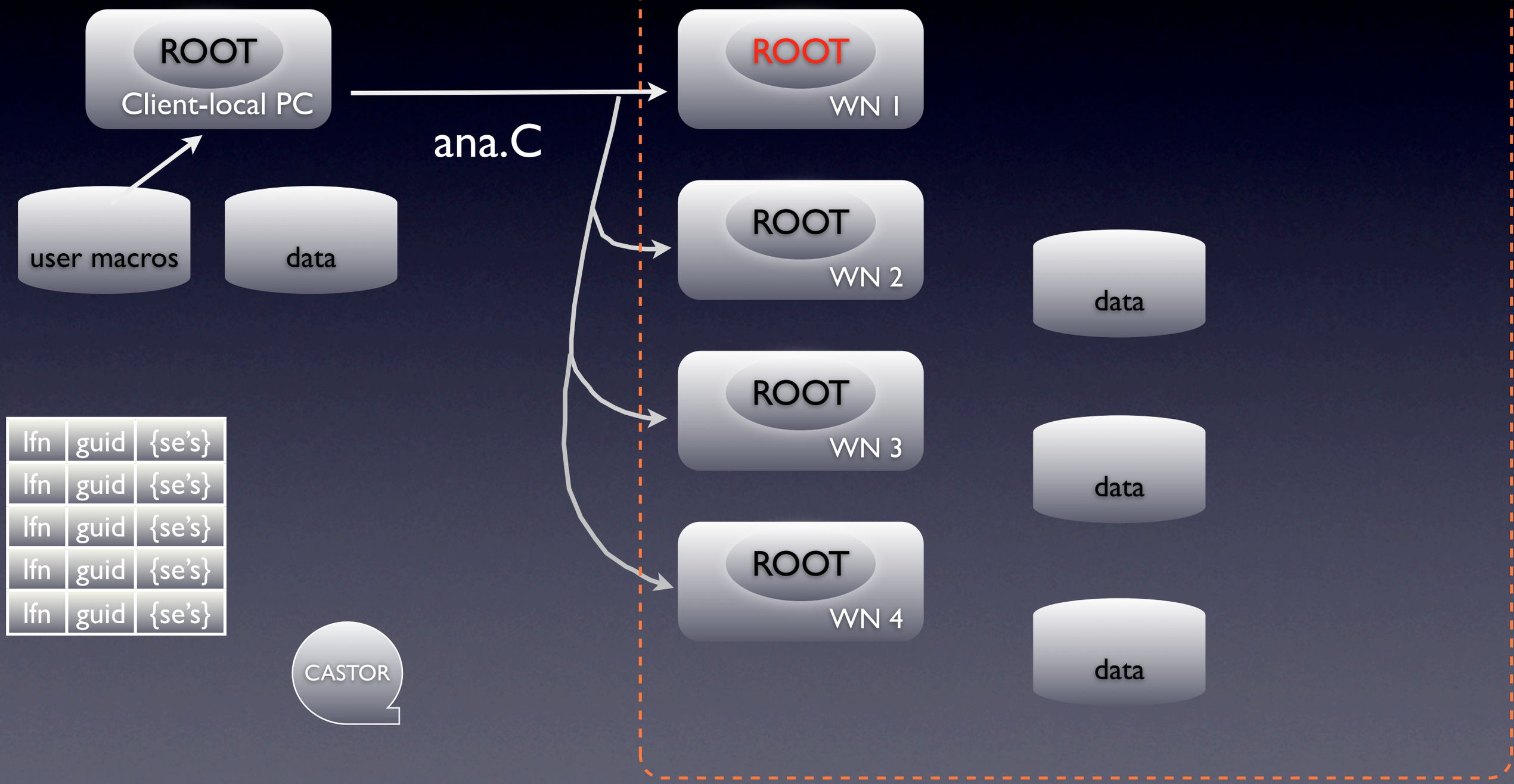
PROOF Schema

Loading user specified data



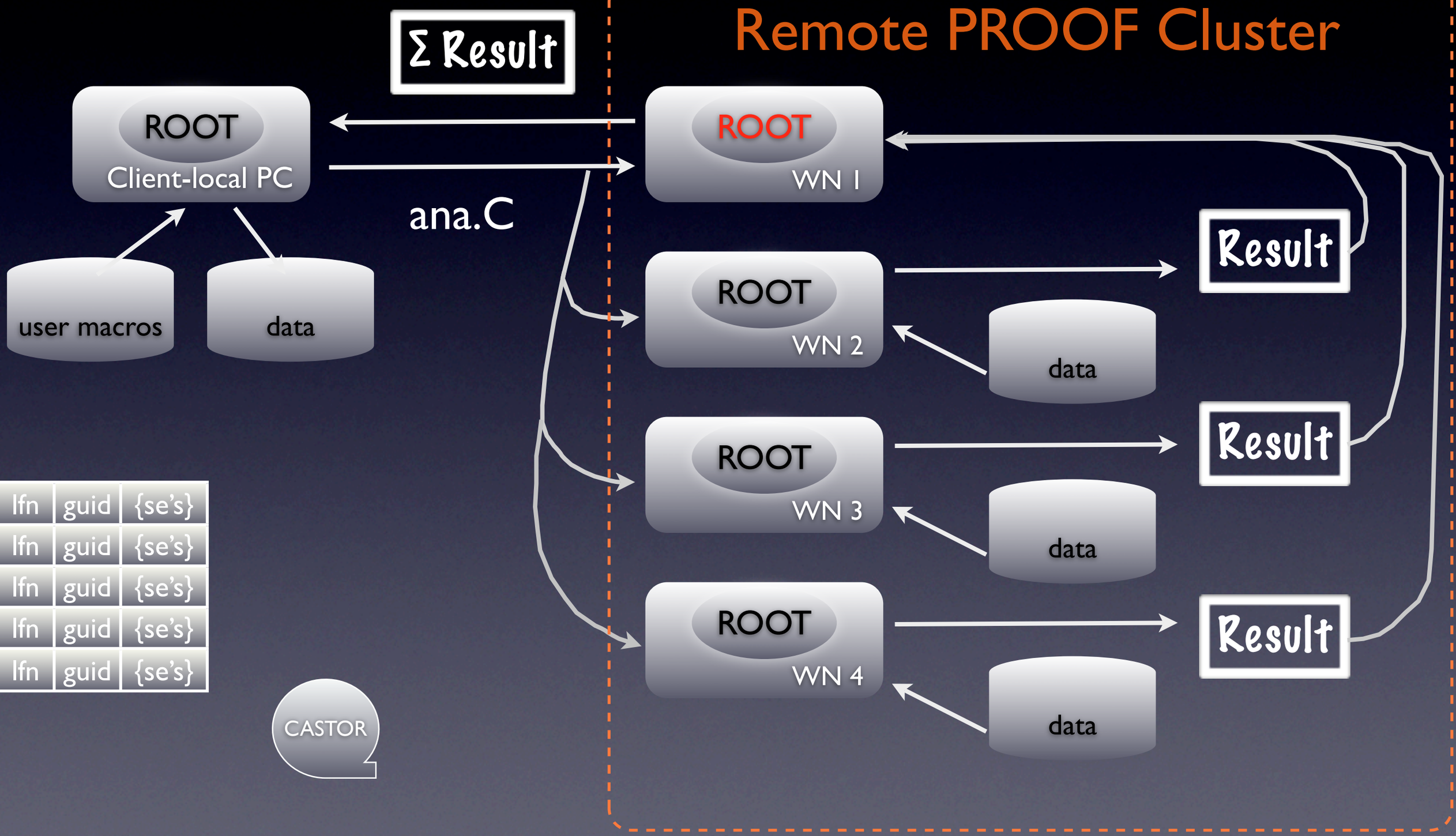
PROOF Schema

Running parallel jobs



PROOF Schema

Running parallel jobs



Analysis

Four kinds of analysis

- Ordered batch analysis
  - No end user intervention to operate this mode
- End user batch analysis
  - End user submits jobs to the Grid
- CernAnalysisFacility analysis
  - End user runs jobs from the root prompt on pre-staged data
- Local analysis
  - End user processes on its laptop local or Grid data

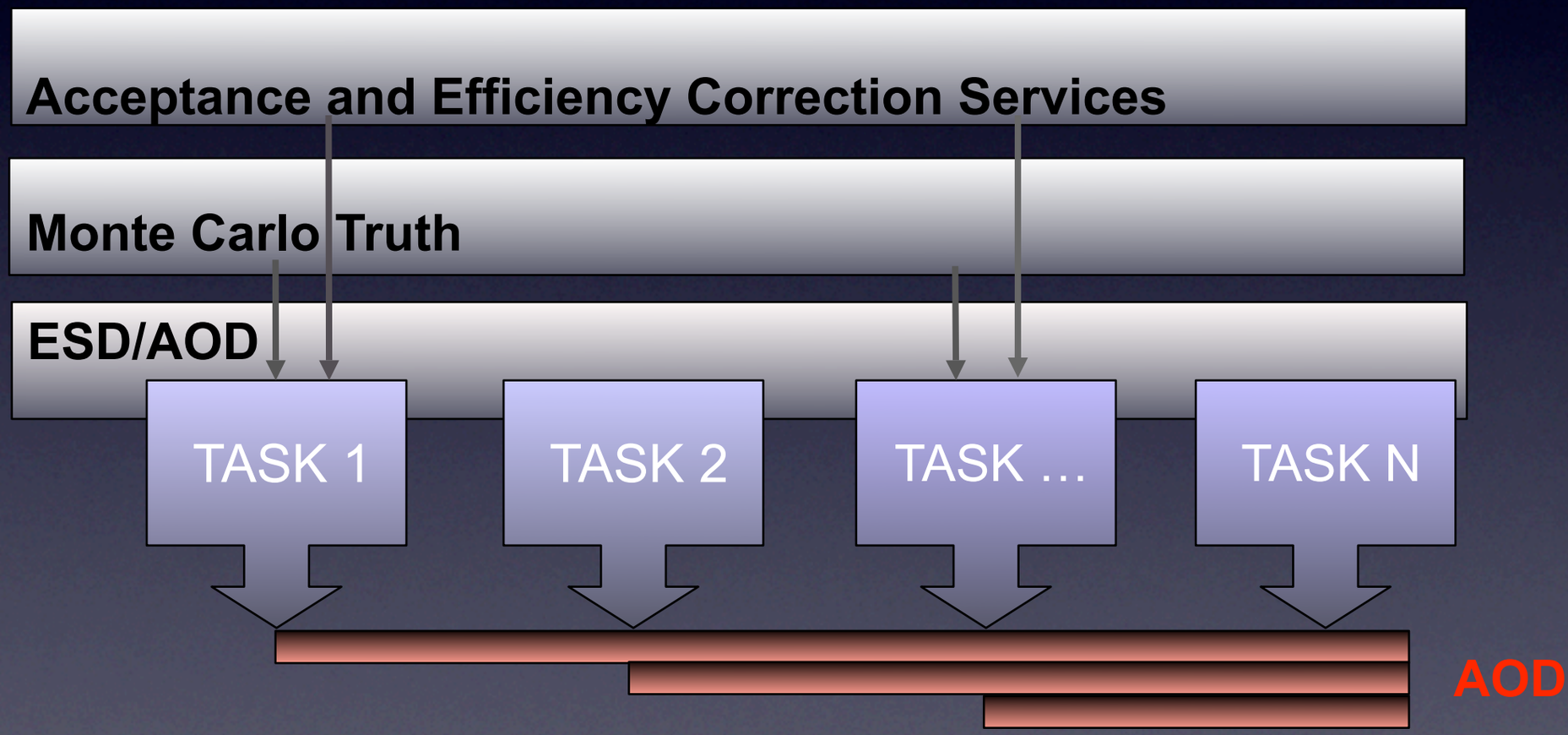
Organized Analysis

- Process in one pass the entire set of reconstructed data
- Flexible task and data container structure
- User code independent of computing schema (local, PROOF, GRID)

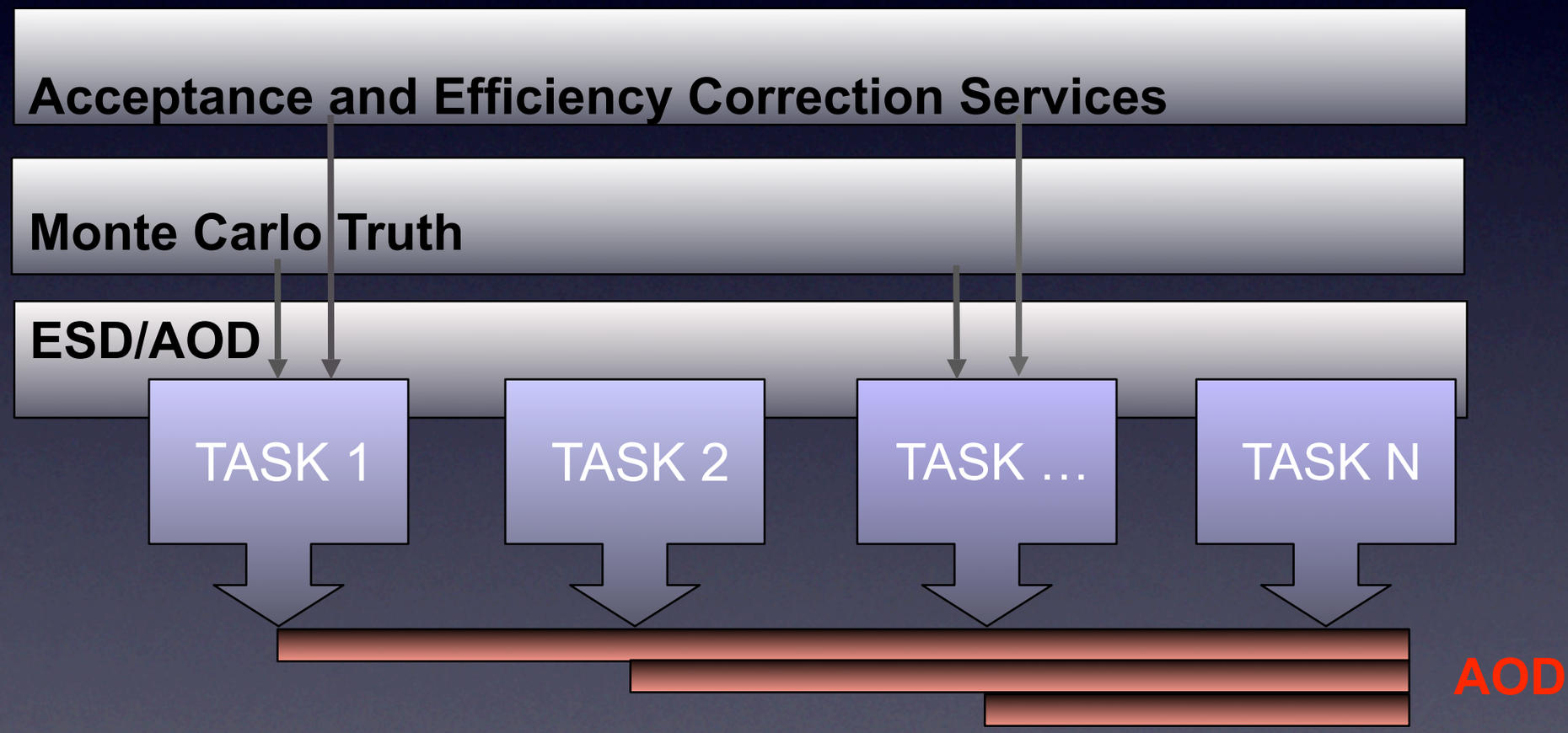
Analysis – Flow of the analysis procedure

- Input data (ESD, AOD, MC truth) accessed through common interface
- Output data
  - AODs
  - User histograms, containers for efficiency calculations
  - Transparent handling of memory resident and file resident data in distributed environment

Analysis Train

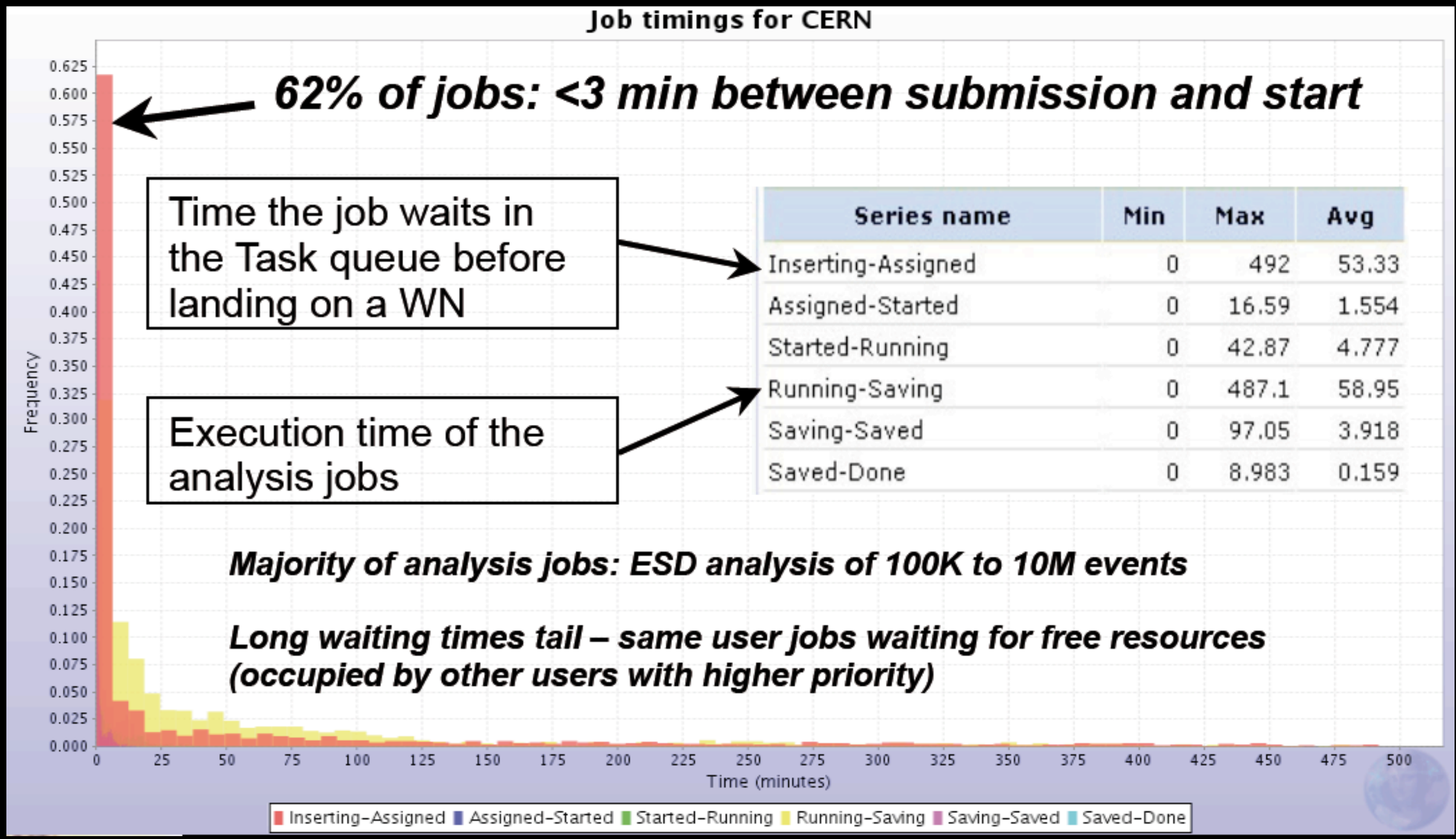


Analysis Train

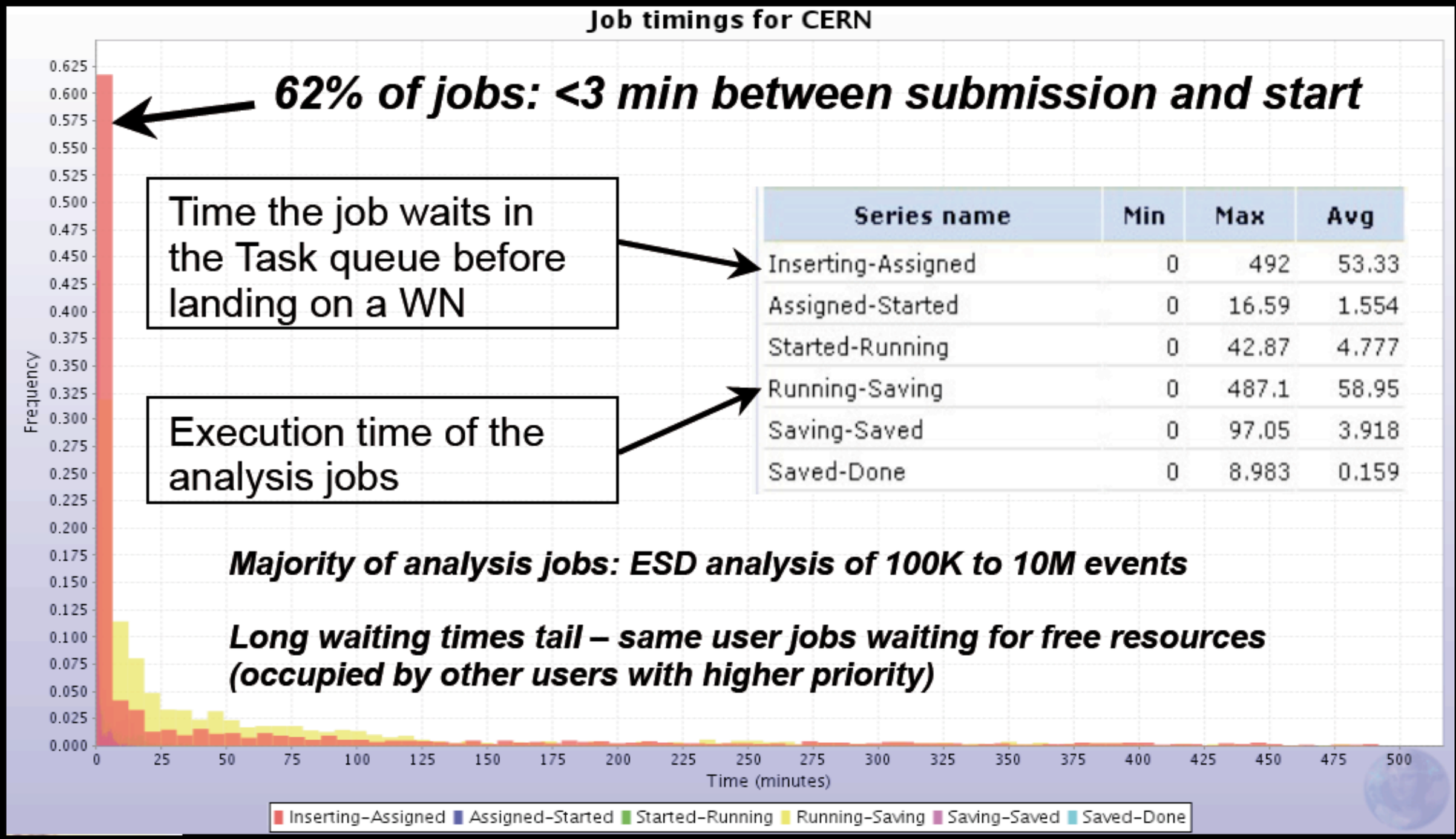


End user batch analysis

- The user does all by himself (aliensh)
  - Provide ROOT-macro, data collection and jobdescriptionlanguage
  - Submit the jobs to the Grid and monitors progress
  - Collect the output

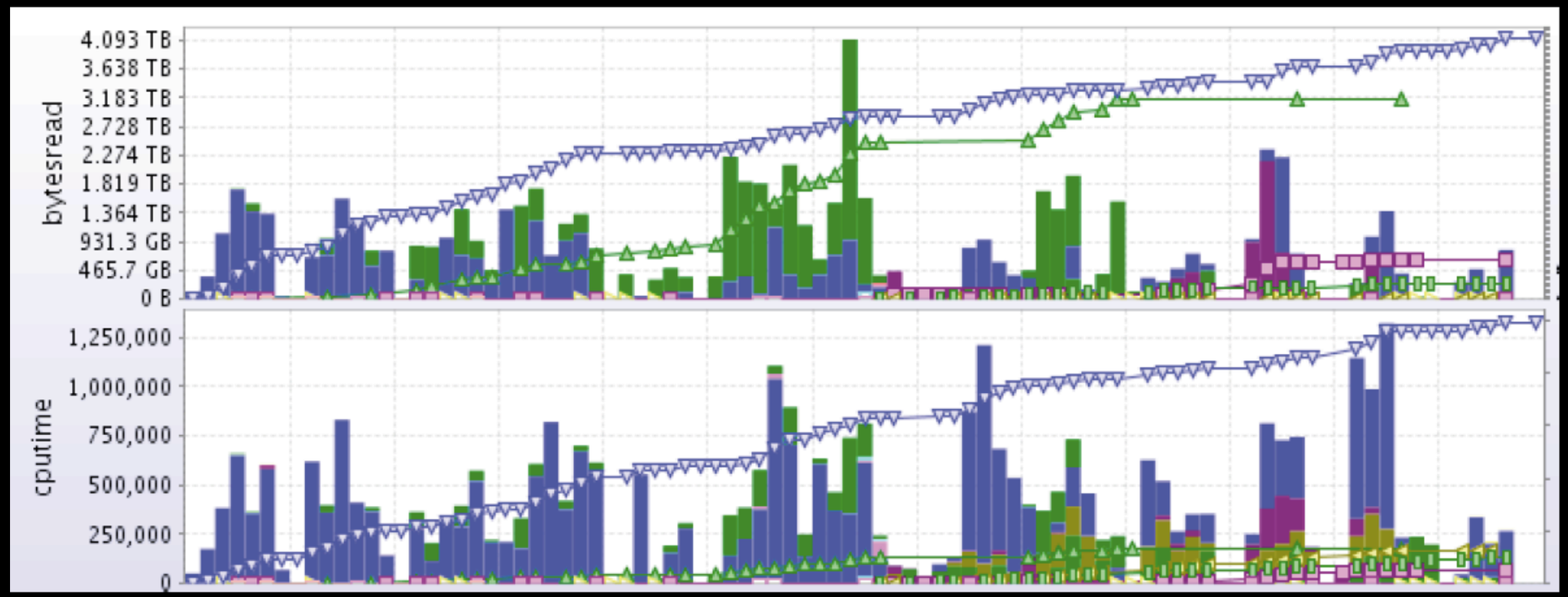

Job timings for CERN
62% of jobs: <3 min between submission and start
Time the job waits in the Task queue before landing on a WN
Execution time of the analysis jobs
Series name | Min | Max | Avg
Inserting-Assigned | 0 | 492 | 53.33
Assigned-Started | 0 | 16.59 | 1.554
Started-Running | 0 | 42.87 | 4.777
Running-Saving | 0 | 487.1 | 58.95
Saving-Saved | 0 | 97.05 | 3.918
Saved-Done | 0 | 8.983 | 0.159
Majority of analysis jobs: ESD analysis of 100K to 10M events
Long waiting times tail – same user jobs waiting for free resources (occupied by other users with higher priority)
Frequency
Time (minutes)
Inserting-Assigned Assigned-Started Started-Running Running-Saving Saving-Saved Saved-Done

Performances



CAF analysis

- CAF is extremely popular with ALICE users
- The user must :
  - provide its analysis library
  - provide its steering macro
  - can create a dataset or use an existing one
  - collect the merged output



http://pcalimonitor.cern.ch/PWG/

ID	Tag	Status	PWG	Type	Energy	Events		Dates		Files						
						Requested	Produced	Requested	Expected	CheckESD.C	Config.C	rec.C	sim.C	simrun.C	tag.C	JD
27	PDC 08/LHC08v	Completed	PWG4	p-p	14 TeV	4,000,000	4,316,900	11 Apr 2008	30 Apr 2008	View	View	View	View	View	View	Vie
26	PDC 08/LHC08u	Completed	PWG4	p-p	14 TeV	2,000,000	3,036,000	02 Apr 2008	16 Apr 2008	View	View	View	View	View	View	Vie
24	PDC 08/LHC08p	Completed	PWG4	p-p	5.5 TeV	2,000,000	4,267,800	20 Dec 2007	07 Jan 2008	View	View	View	View	View	View	Vie
23	PDC 08/LHC08q	Completed	PWG4	p-p	14 TeV	500,000	878,400	20 Dec 2007	07 Jan 2008	View	View	View	View	View	View	Vie
22	PDC 08/LHC08r	Completed	PWG4	p-p	14 TeV	2,000,000	2,900,000	20 Dec 2007	07 Jan 2008	View	View	View	View	View	View	Vie
21	PDC 07/LHC07g	Completed	PWG3	p-p	14 TeV	20,000,000	25,446,300	26 Nov 2007	06 Jan 2008	View	View	View	View	View	View	Vie
20	PDC 08/LHC08s	Completed	PWG3	p-p	14 TeV	200,000	197,400	26 Nov 2007	31 Dec 2007	View	View	View	View	View	View	Vie
19	PDC 08/LHC08w	Completed	PWG3	p-p	14 TeV	260,000	786,500	26 Nov 2007	31 Dec 2007	View	View	View	View	View	View	Vie
18	PDC 08/LHC08x	Completed	PWG3	p-p	14 TeV	5,000,000	6,331,700	26 Nov 2007	31 Dec 2007	View	View	View	View	View	View	Vie
17	PDC 08/LHC08t	Running	PWG3	p-p	14 TeV	125,000,000	123,779,510	19 Nov 2007	10 Mar 2007	View	View	View	View	View	View	Vie
16	PDC 07/LHC07f	Completed	PWG2	p-p	14 TeV	2,000,000	3,286,500	19 Nov 2007	26 Nov 2007	View	View	View	View	View	View	Vie

Jobs details - extracted from JDL

Job parameters				Application software			Details			
Run#	PID	Owner	Events	ROOT	ALIROOT	GEANT	Date	Staged	Output dir	T
		aliprod (10738)					last year	- All -		gamma-jet pp, P
260006	12502841	aliprod	97700	v5-18-00b	v4-11-Rev-02	v1-9-2	06.04.2008 02:05		/alice/sim/PDC_08/LHC08u/260006/	gamma-jet p
260005	12502718	aliprod	97700	v5-18-00b	v4-11-Rev-02	v1-9-2	06.04.2008 02:05		/alice/sim/PDC_08/LHC08u/260005/	gamma-jet p
260004	12501542	aliprod	97700	v5-18-00b	v4-11-Rev-02	v1-9-2	06.04.2008 02:05		/alice/sim/PDC_08/LHC08u/260004/	gamma-jet p
220046	12432260	aliprod	48500	v5-18-00b	v4-11-Rev-02	v1-9-2	03.04.2008 16:07		/alice/sim/PDC_08/LHC08p/220046/	gamma-jet p
220045	12422641	aliprod	65400	v5-18-00b	v4-11-Rev-02	v1-9-2	03.04.2008 11:06		/alice/sim/PDC_08/LHC08p/220045/	gamma-jet p

Monte-Carlo production

http://pcalimonitor.cern.ch/PWG/

ID	Tag	Status	PWG	Type	Energy	Events		Dates		Files						
						Requested	Produced	Requested	Expected	CheckESD.C	Config.C	rec.C	sim.C	simrun.C	tag.C	JD
27	PDC 08/LHC08v	Completed	PWG4	p-p	14 TeV	4,000,000	4,316,900	11 Apr 2008	30 Apr 2008	View	View	View	View	View	View	Vie
26	PDC 08/LHC08u	Completed	PWG4	p-p	14 TeV	2,000,000	3,036,000	02 Apr 2008	16 Apr 2008	View	View	View	View	View	View	Vie
24	PDC 08/LHC08p	Completed	PWG4	p-p	5.5 TeV	2,000,000	4,267,800	20 Dec 2007	07 Jan 2008	View	View	View	View	View	View	Vie
23	PDC 08/LHC08q	Completed	PWG4	p-p	14 TeV	500,000	878,400	20 Dec 2007	07 Jan 2008	View	View	View	View	View	View	Vie
22	PDC 08/LHC08r	Completed	PWG4	p-p	14 TeV	2,000,000	2,900,000	20 Dec 2007	07 Jan 2008	View	View	View	View	View	View	Vie
21	PDC 07/LHC07g	Completed	PWG3	p-p	14 TeV	20,000,000	25,446,300	26 Nov 2007	06 Jan 2008	View	View	View	View	View	View	Vie
20	PDC 08/LHC08s	Completed	PWG3	p-p	14 TeV	200,000	197,400	26 Nov 2007	31 Dec 2007	View	View	View	View	View	View	Vie
19	PDC 08/LHC08w	Completed	PWG3	p-p	14 TeV	260,000	786,500	26 Nov 2007	31 Dec 2007	View	View	View	View	View	View	Vie
18	PDC 08/LHC08x	Completed	PWG3	p-p	14 TeV	5,000,000	6,331,700	26 Nov 2007	31 Dec 2007	View	View	View	View	View	View	Vie
17	PDC 08/LHC08t	Running	PWG3	p-p	14 TeV	125,000,000	123,779,510	19 Nov 2007	10 Mar 2007	View	View	View	View	View	View	Vie
16	PDC 07/LHC07f	Completed	PWG2	p-p	14 TeV	2,000,000	3,286,500	19 Nov 2007	26 Nov 2007	View	View	View	View	View	View	Vie

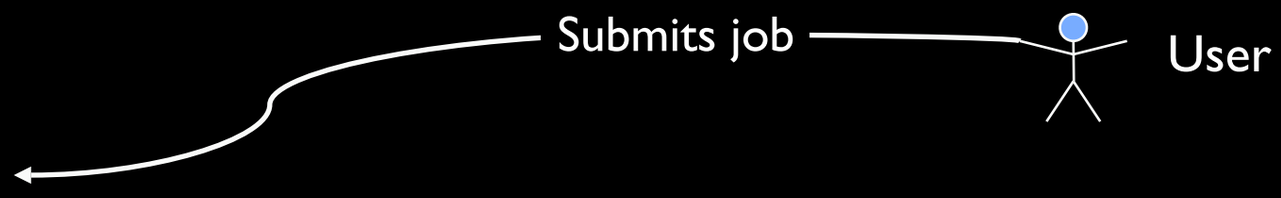
Jobs details - extracted from JDL

Job parameters				Application software			Details			
Run#	PID	Owner	Events	ROOT	ALIROOT	GEANT	Date	Staged	Output dir	T
		aliprod (10738)					last year	- All -		gamma-jet pp, P
260006	12502841	aliprod	97700	v5-18-00b	v4-11-Rev-02	v1-9-2	06.04.2008 02:05		/alice/sim/PDC_08/LHC08u/260006/	gamma-jet p
260005	12502718	aliprod	97700	v5-18-00b	v4-11-Rev-02	v1-9-2	06.04.2008 02:05		/alice/sim/PDC_08/LHC08u/260005/	gamma-jet p
260004	12501542	aliprod	97700	v5-18-00b	v4-11-Rev-02	v1-9-2	06.04.2008 02:05		/alice/sim/PDC_08/LHC08u/260004/	gamma-jet p
220046	12432260	aliprod	48500	v5-18-00b	v4-11-Rev-02	v1-9-2	03.04.2008 16:07		/alice/sim/PDC_08/LHC08p/220046/	gamma-jet p
220045	12422641	aliprod	65400	v5-18-00b	v4-11-Rev-02	v1-9-2	03.04.2008 11:06		/alice/sim/PDC_08/LHC08p/220045/	gamma-jet p

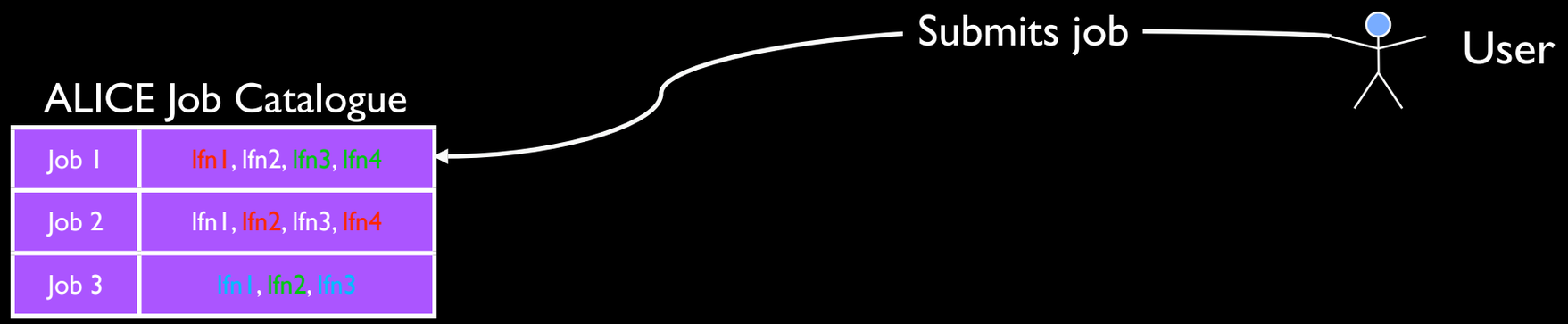
The ALICE Grid

Job submission in LCG

Job submission in LCG



Job submission in LCG



Job submission in LCG

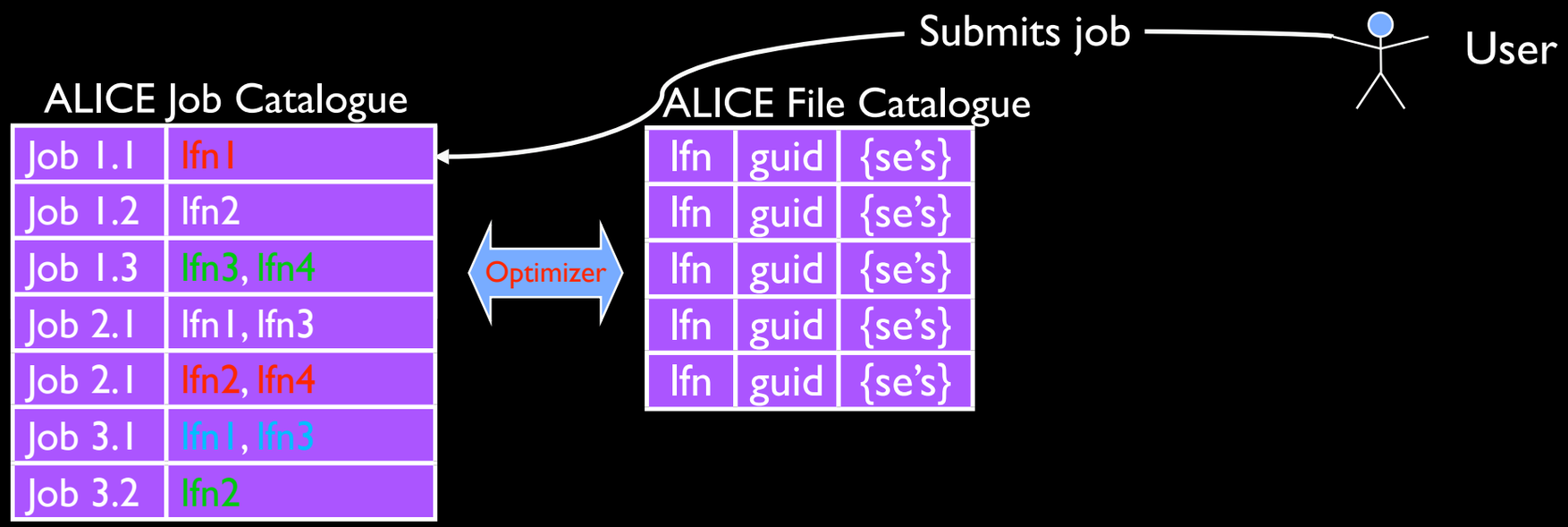
ALICE Job Catalogue

Job 1	lfn1, lfn2, lfn3, lfn4
Job 2	lfn1, lfn2, lfn3, lfn4
Job 3	lfn1, lfn2, lfn3

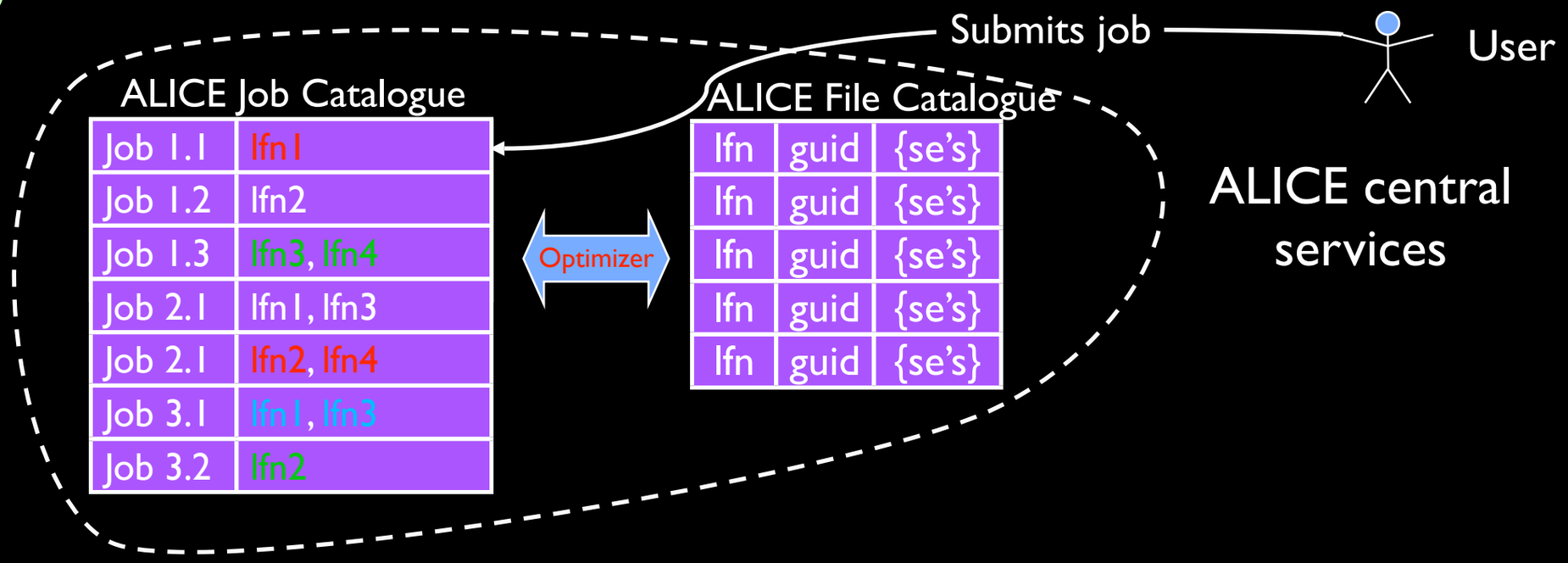
ALICE File Catalogue

lfn	guid	{se's}
lfn	guid	{se's}
lfn	guid	{se's}
lfn	guid	{se's}
lfn	guid	{se's}

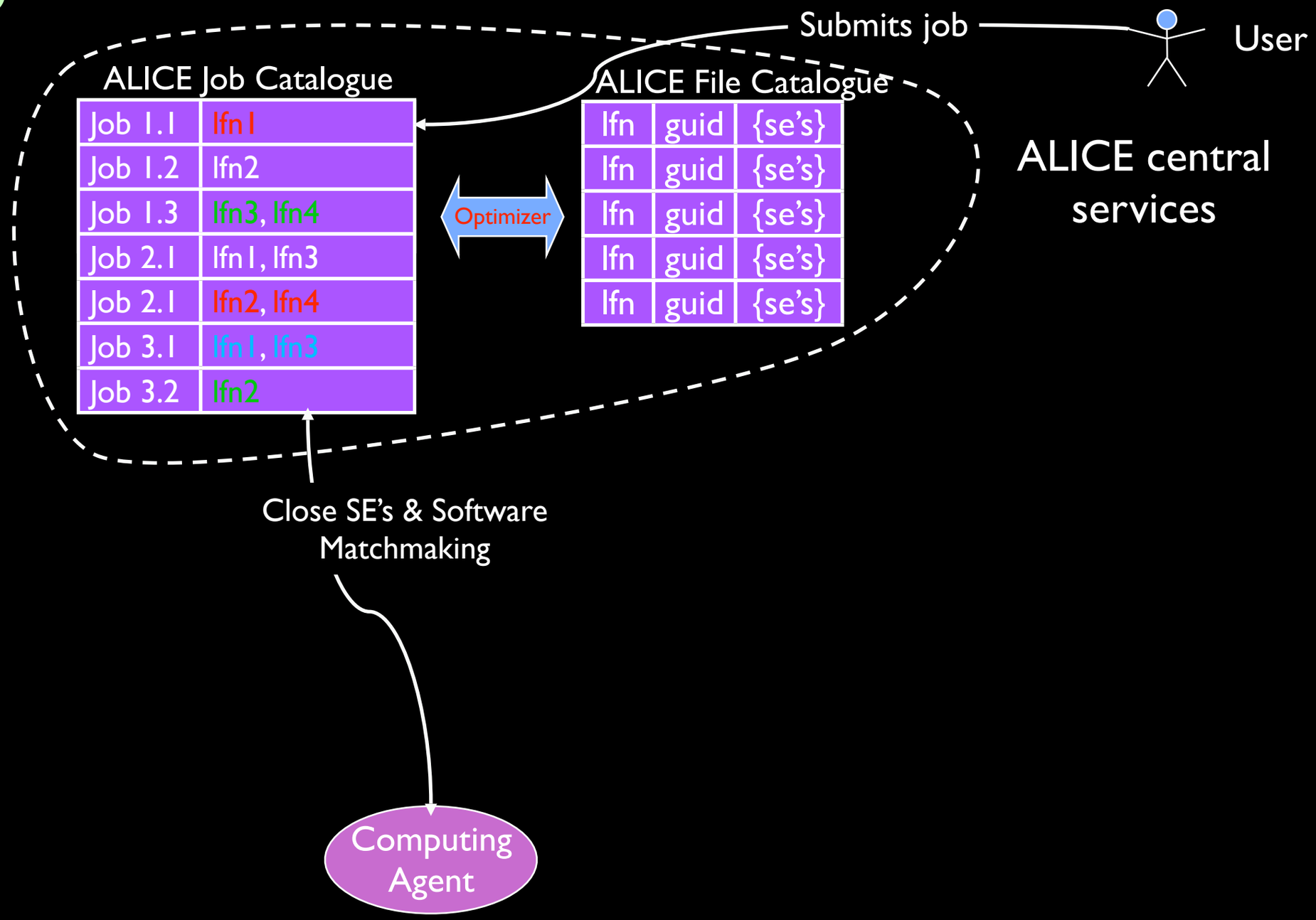
Job submission in LCG



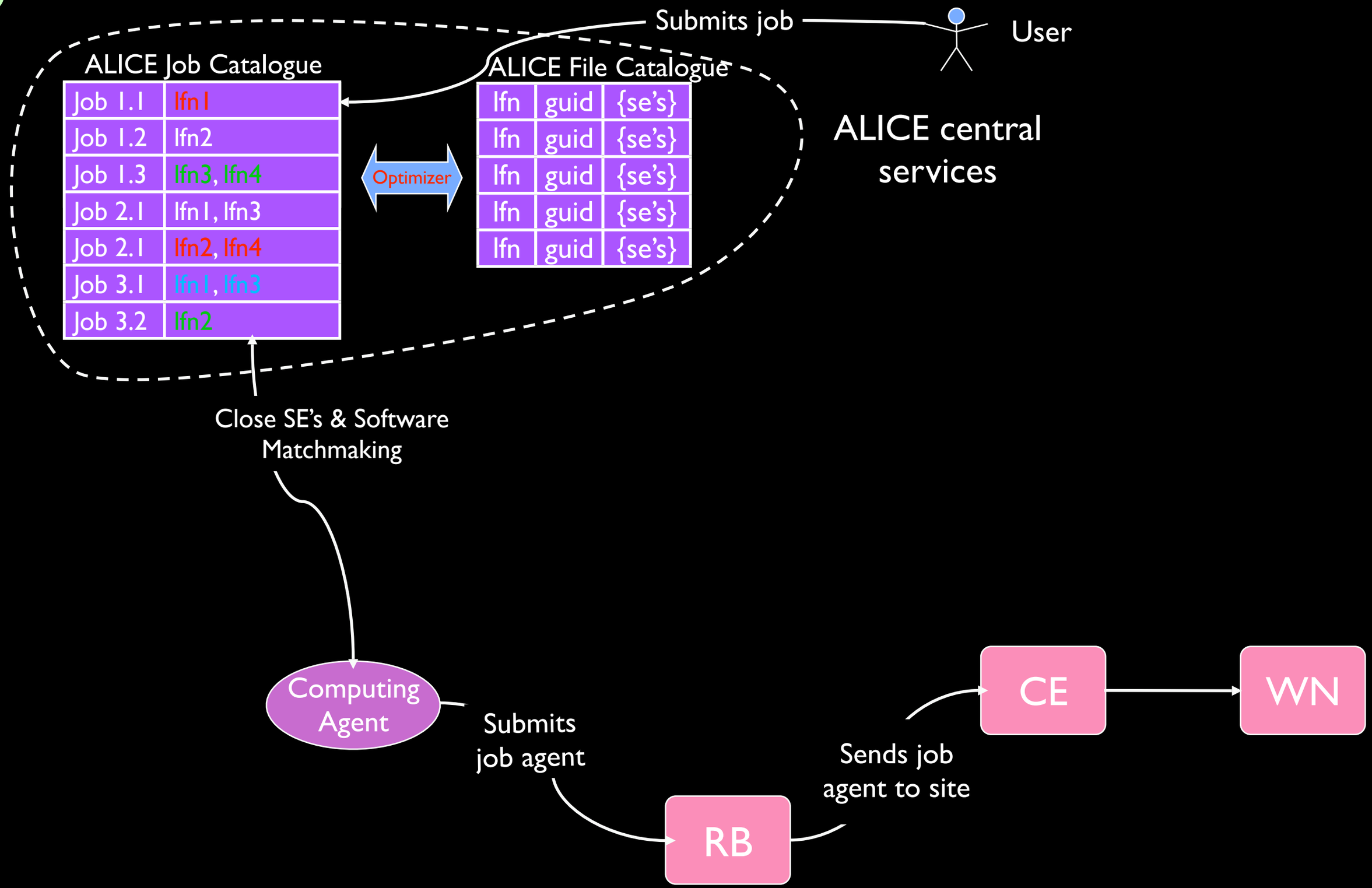
Job submission in LCG



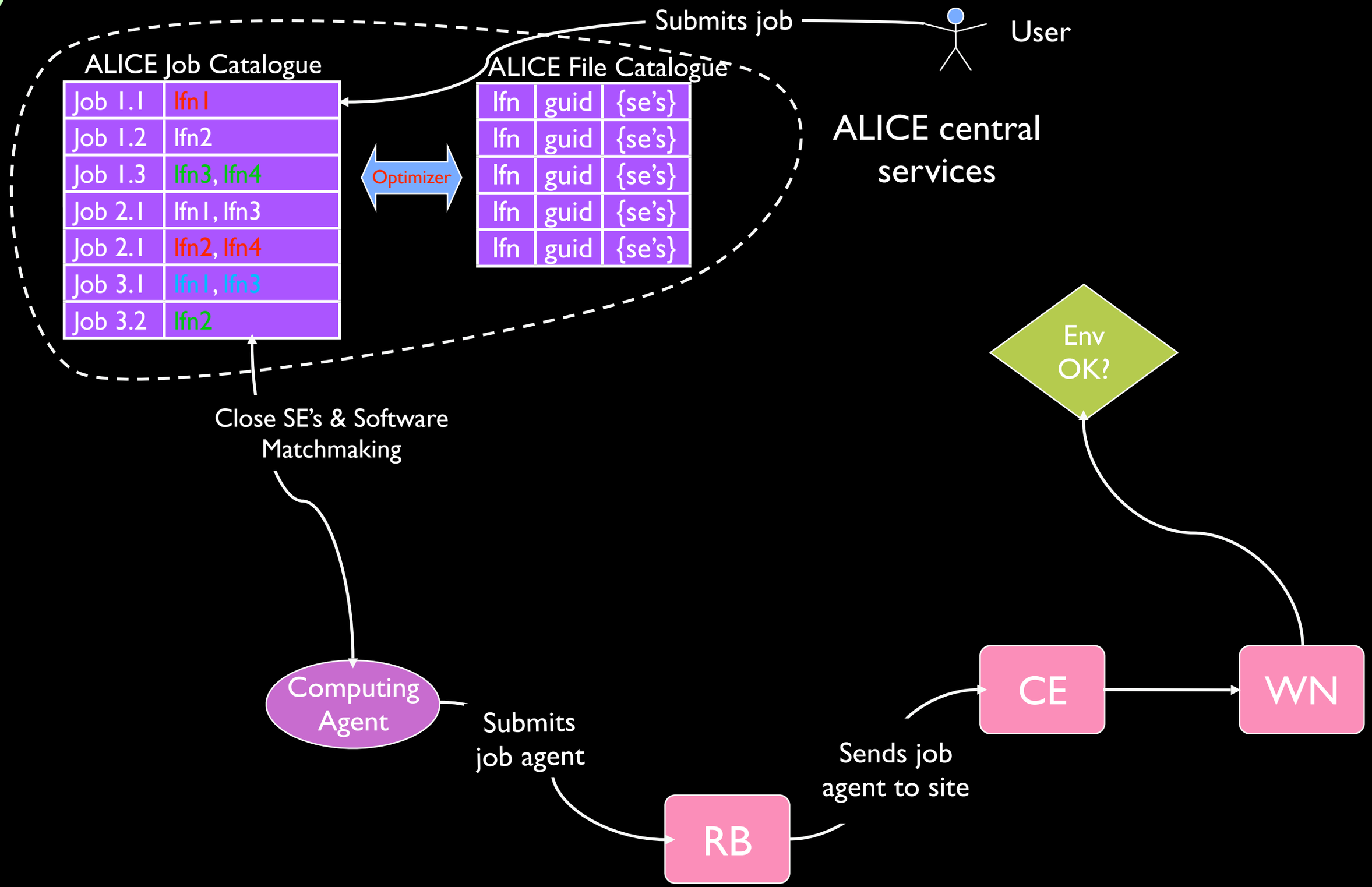
Job submission in LCG



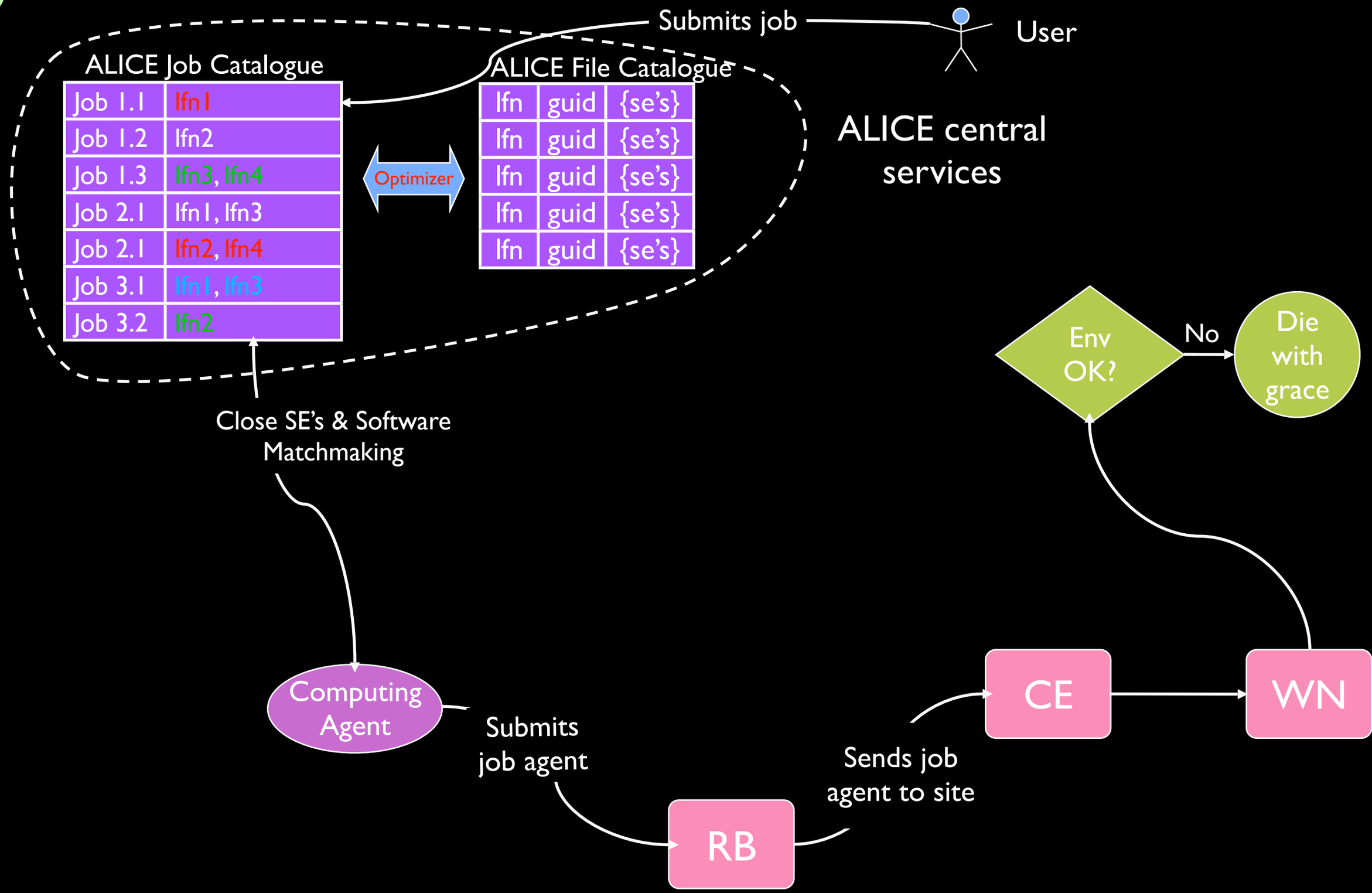
Job submission in LCG



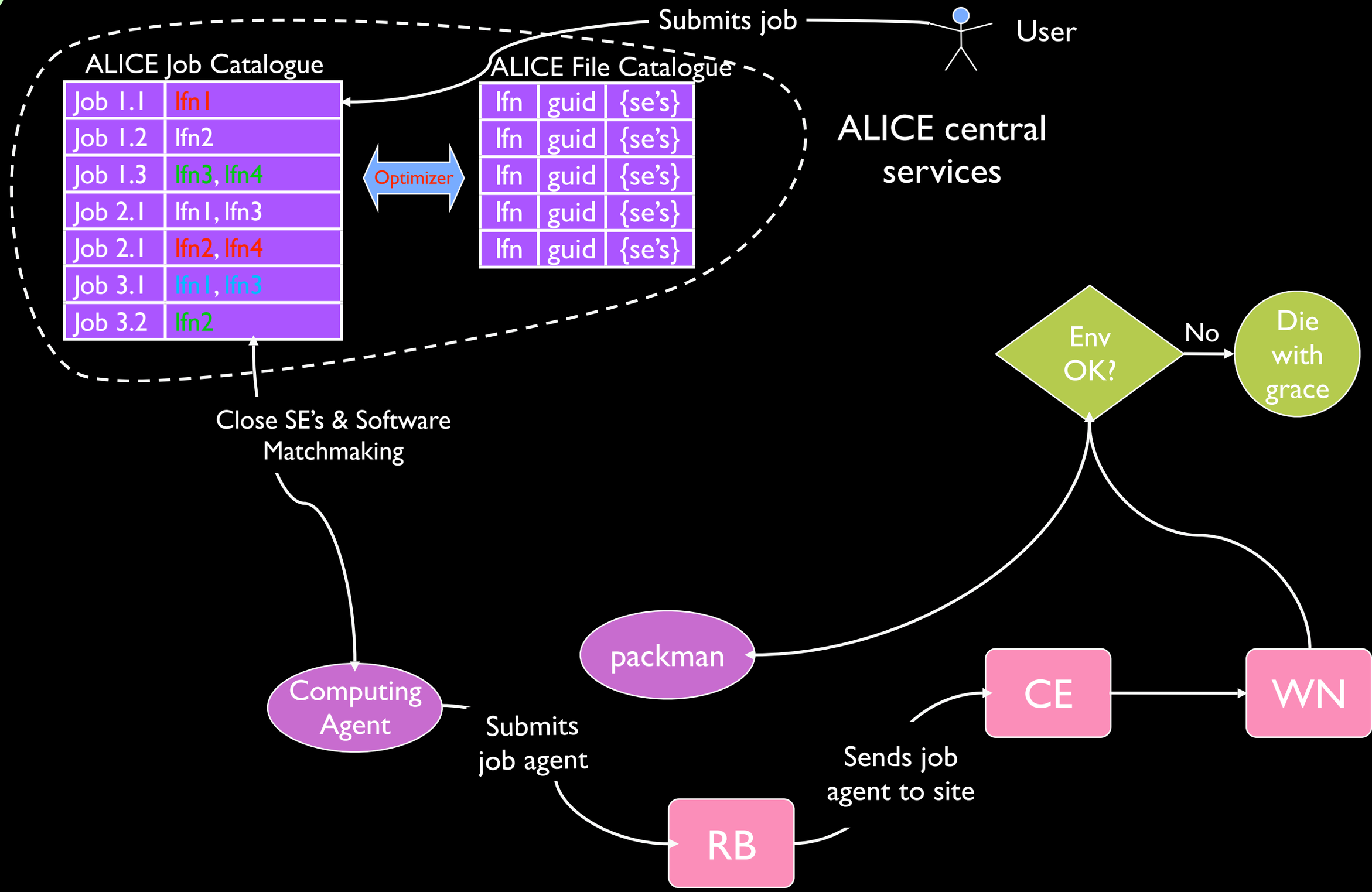
Job submission in LCG



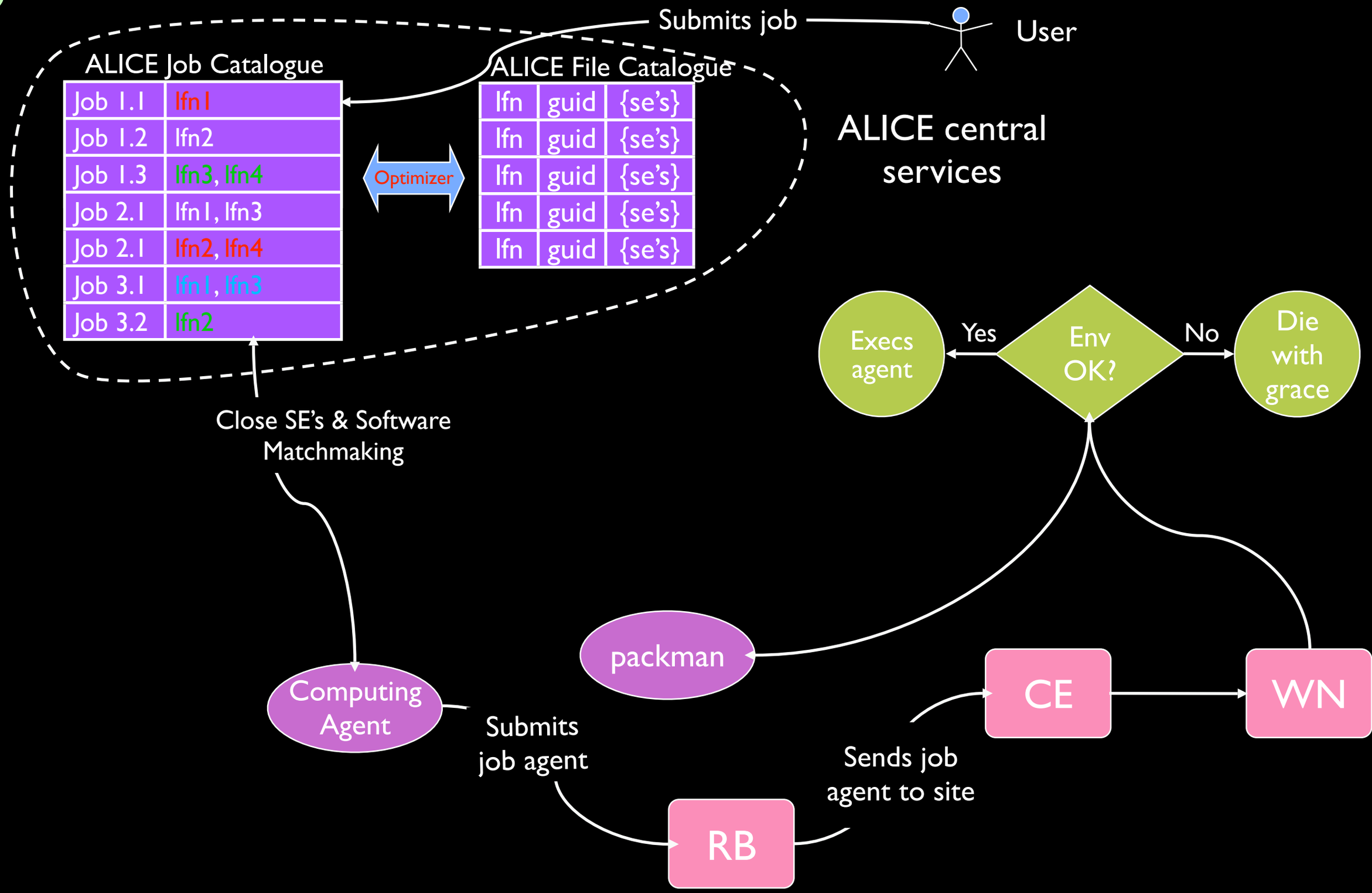
Job submission in LCG



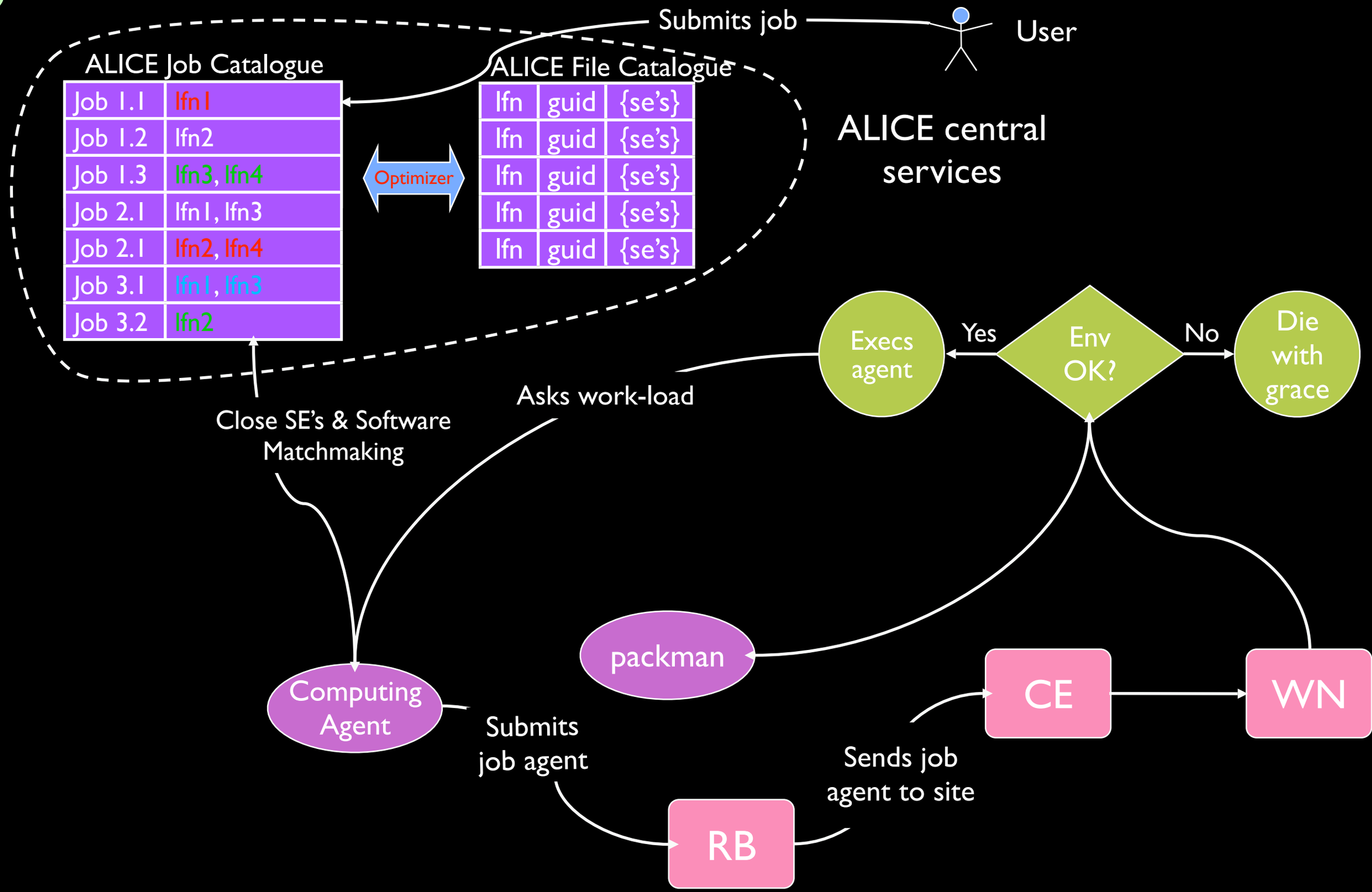
Job submission in LCG



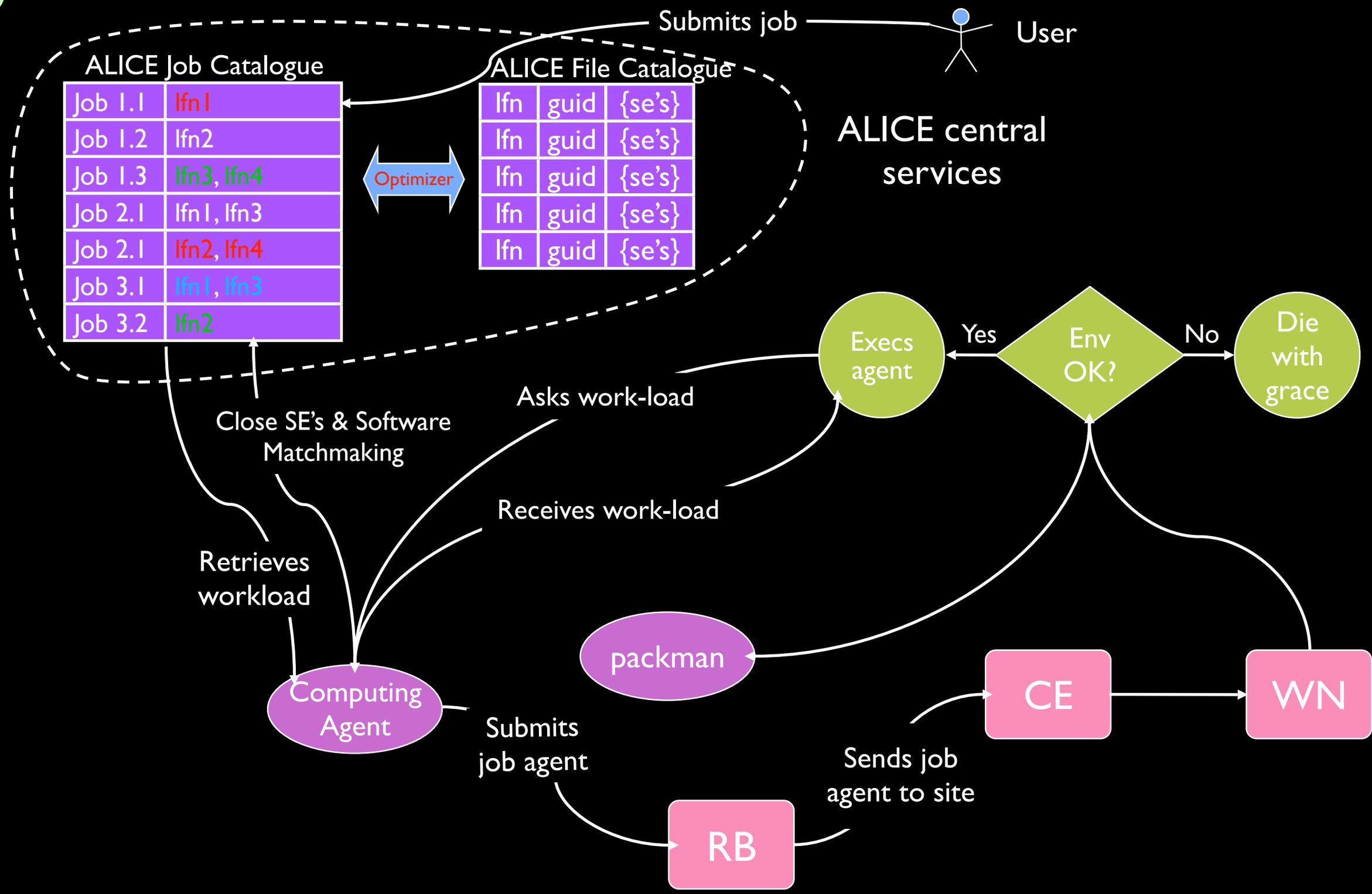
Job submission in LCG



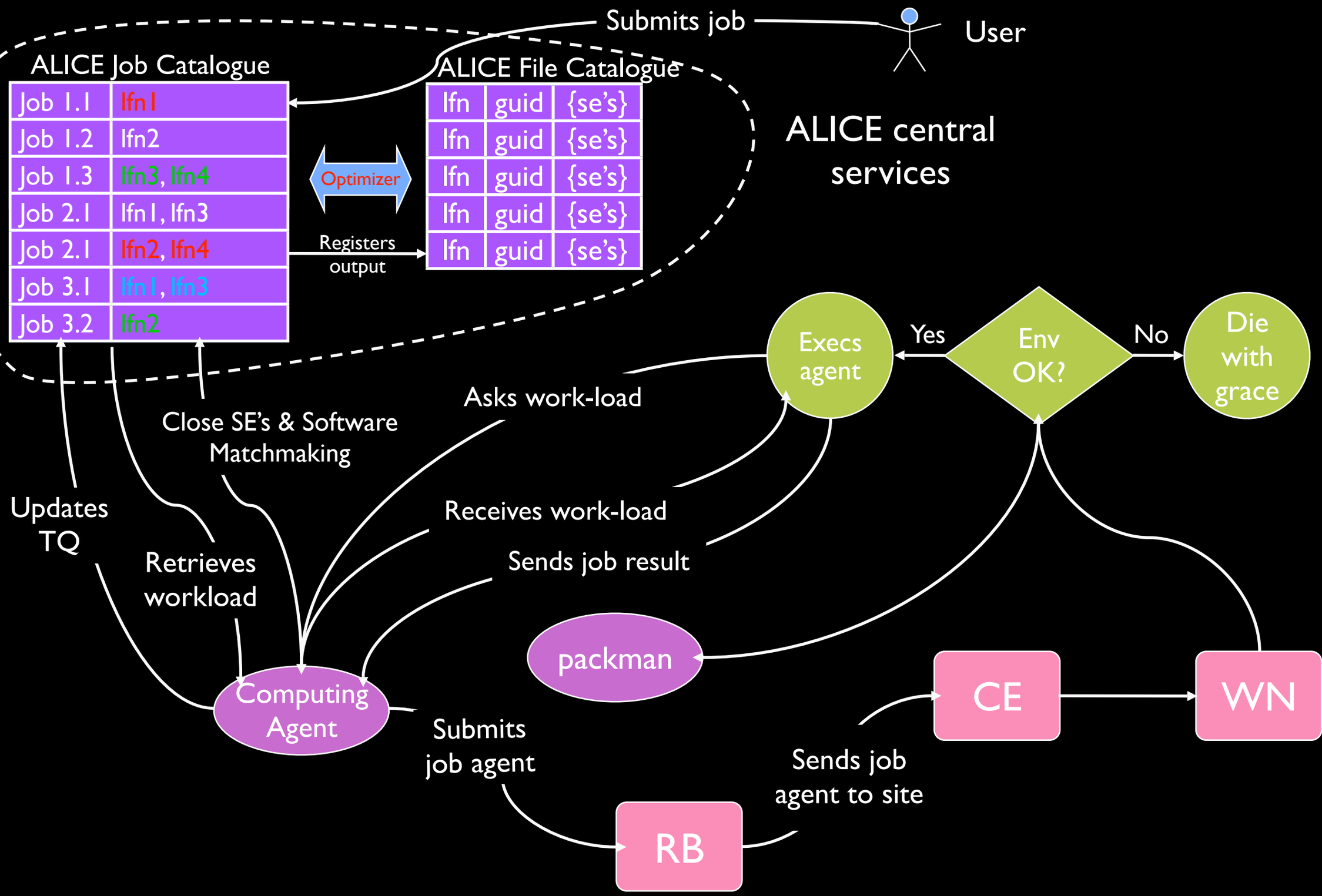
Job submission in LCG



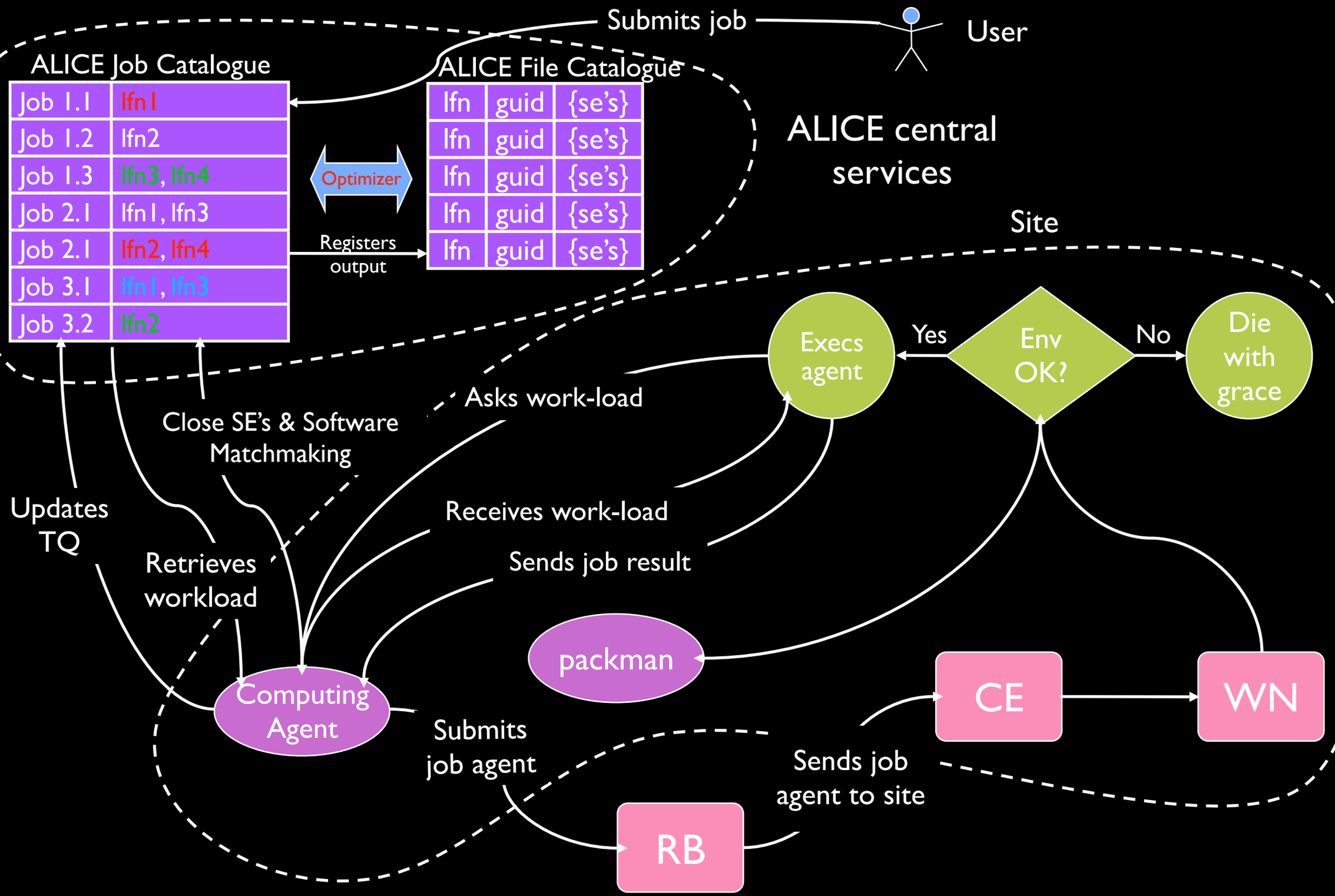
Job submission in LCG



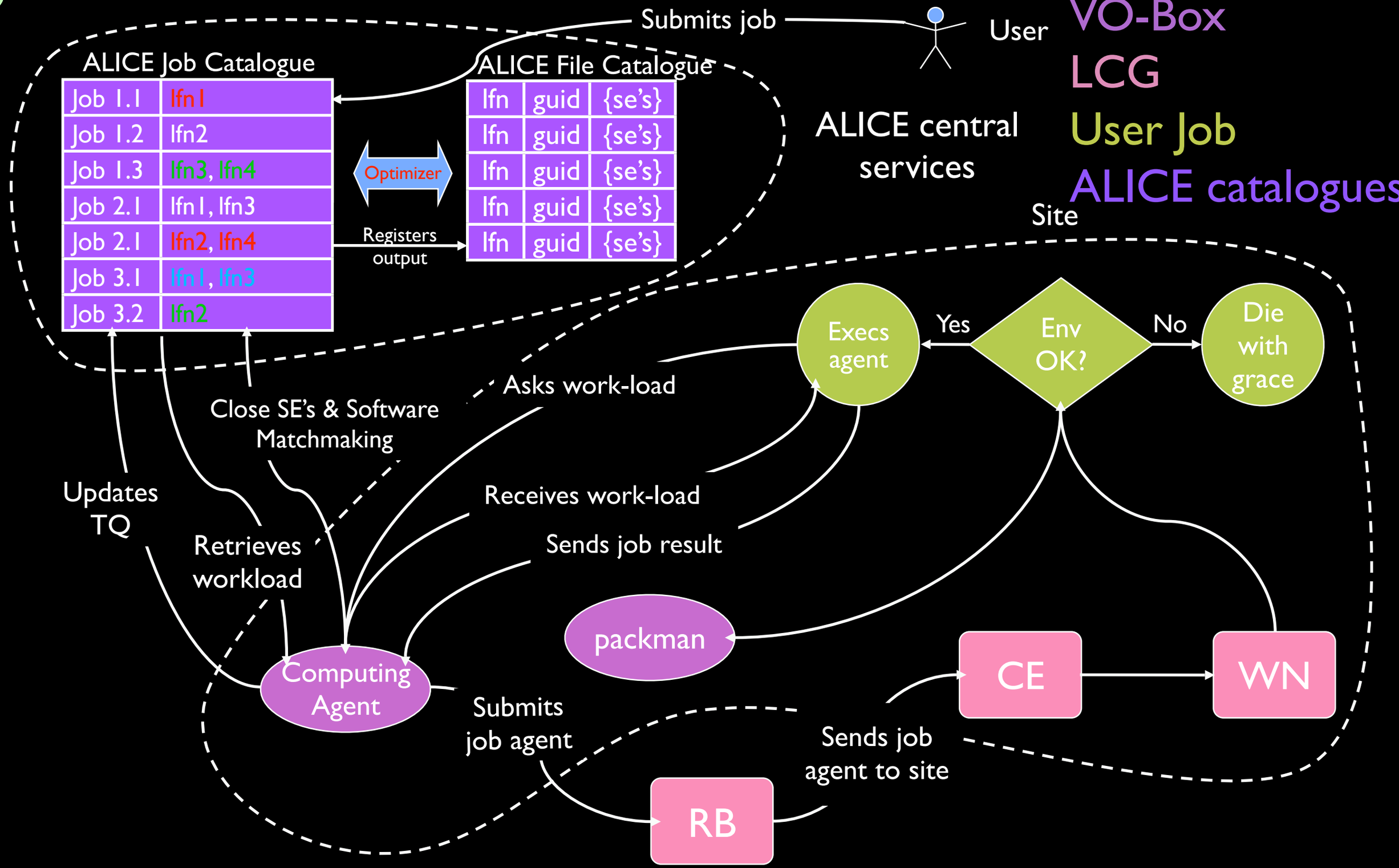
Job submission in LCG



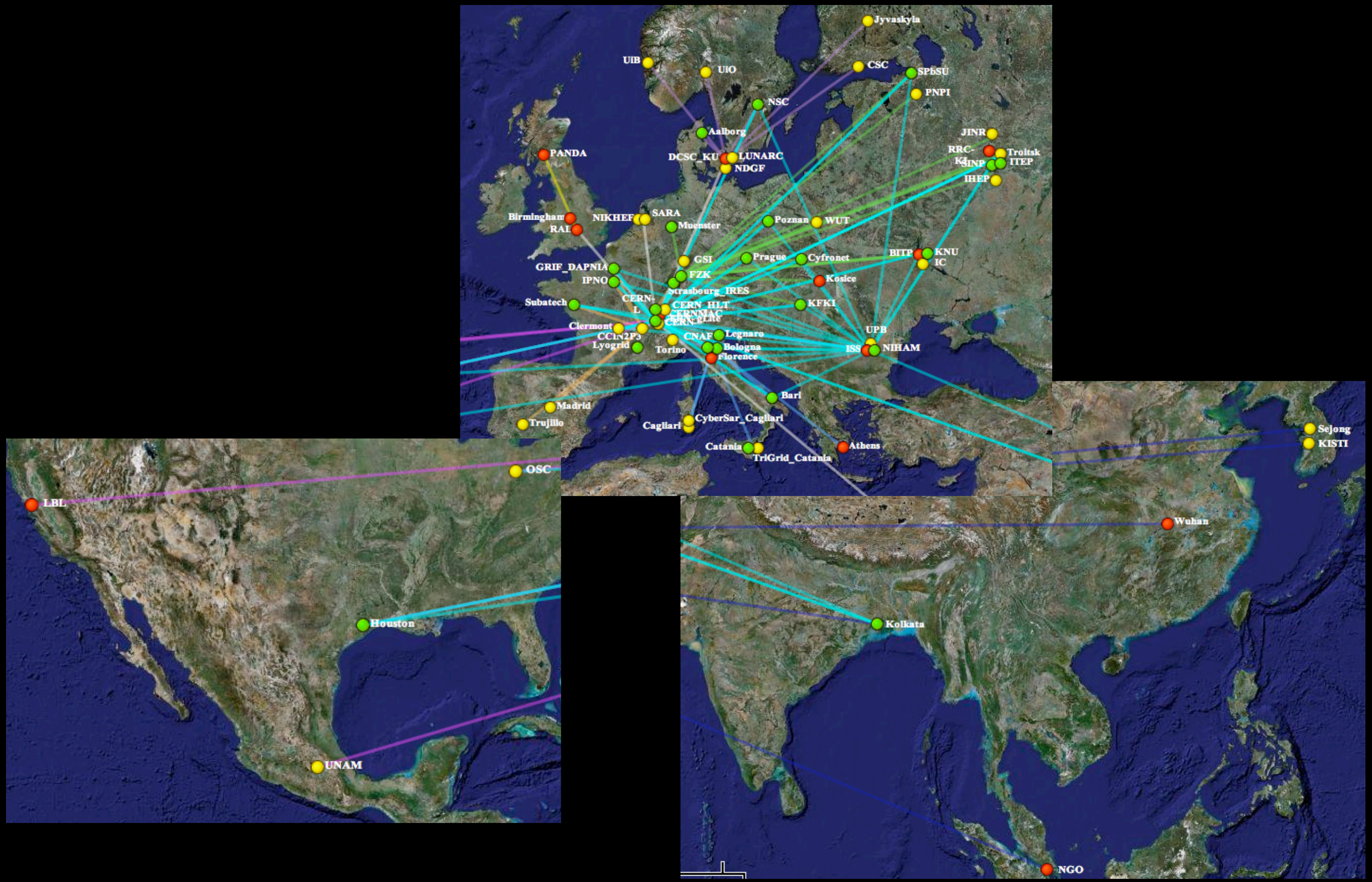
Job submission in LCG

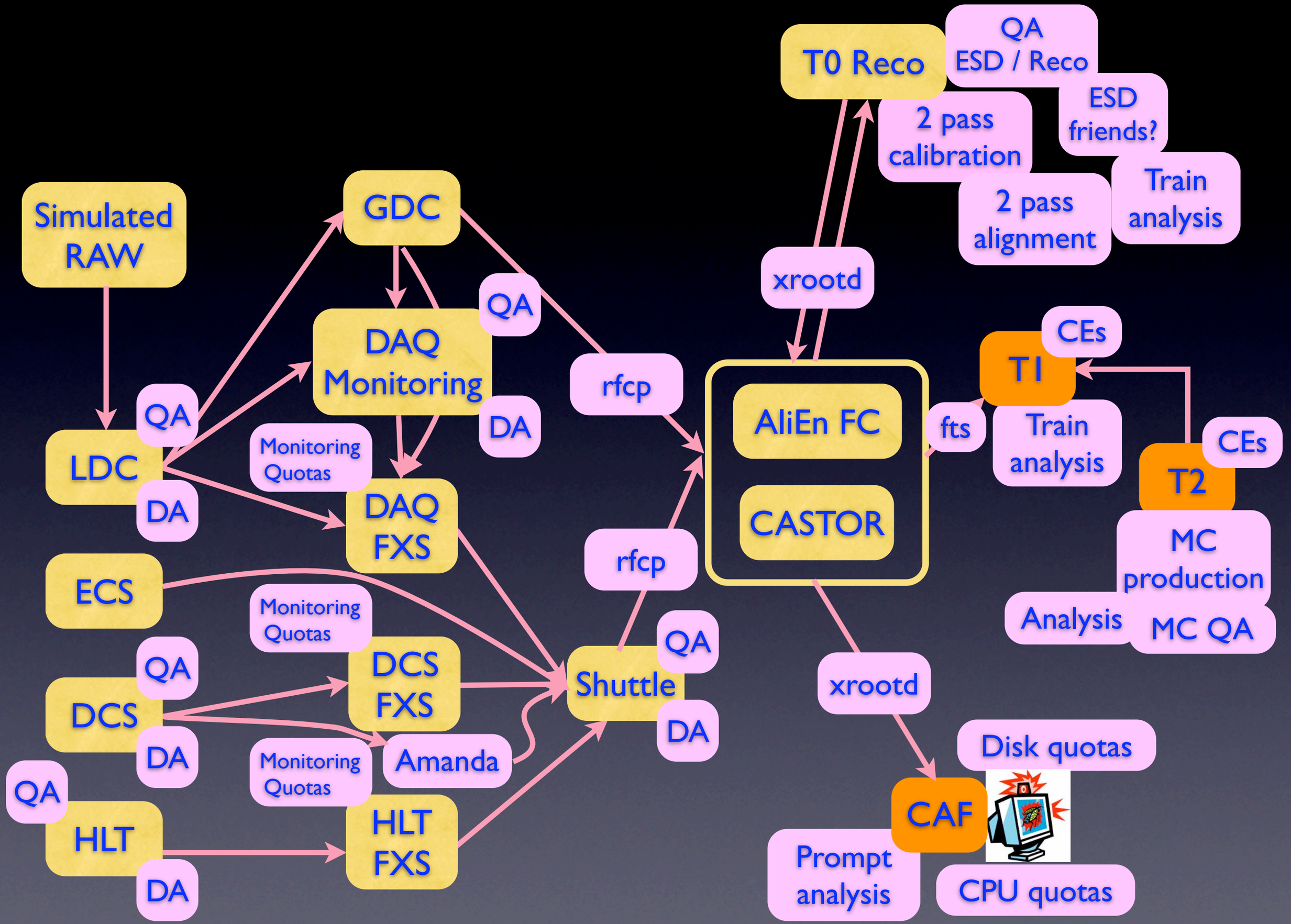


Job submission in LCG



The ALICE GRID




Simulated RAW
GDC
QA
DAQ Monitoring
DA
rfcp
QA
LDC
Monitoring Quotas
DA
DAQ FXS
ECS
Monitoring Quotas
QA
DCS FXS
DCS
DA
Monitoring Quotas
Amanda
QA
HLT
HLT FXS
DA
Shuttle
QA
DA
rfcp
T0 Reco
QA ESD / Reco
2 pass calibration
ESD friends?
2 pass alignment
Train analysis
xrootd
AliEn FC
CASTOR
xrootd
fts
T1
CEs
Train analysis
T2
CEs
MC production
Analysis
MC QA
Disk quotas
CAF
Prompt analysis
CPU quotas

Full Dress Rehearsal

Simulated RAW
GDC
QA
DAQ Monitoring
DA
QA
LDC
DA
Monitoring Quotas
DAQ FXS
rfcp
ECS
Monitoring Quotas
DCS FXS
QA
DCS
DA
Amanda
Monitoring Quotas
QA
HLT
DA
HLT FXS
Shuttle
QA
DA
rfcp
xrootd
T0 Reco
QA ESD / Reco
2 pass calibration
ESD friends?
2 pass alignment
Train analysis
AliEn FC
CASTOR
fts
T1
CEs
Train analysis
T2
CEs
MC production
Analysis
MC QA
xrootd
Disk quotas
CAF
Prompt analysis
CPU quotas