Korea Institute of Science and Technology Information

The Advanced Data Searching System with AMGA at the Belle-II Experiment

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on behalf of the Belle-II computing group

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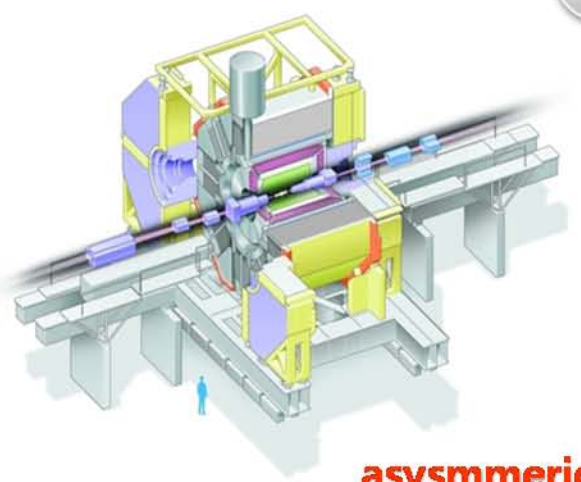
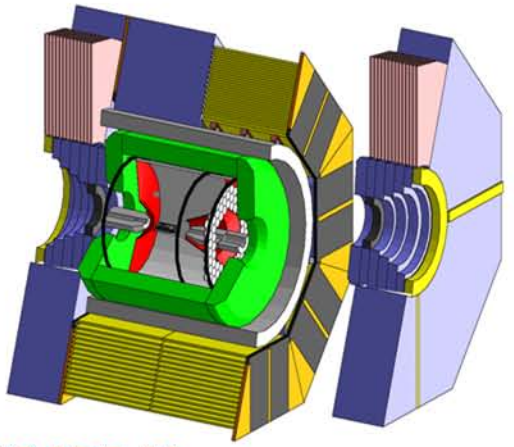
Comparsion Belle-II & Belle

	Belle	Belle-II
		
Circulation	~3.0Km	
Beam	asysmmeric 8.0GeV(e^-) 3.5GeV(e^+) CM 10.58GeV	
Luminosity	1ab^{-1}	50ab^{-1}
Goal	CP violation measurement	precise measurement

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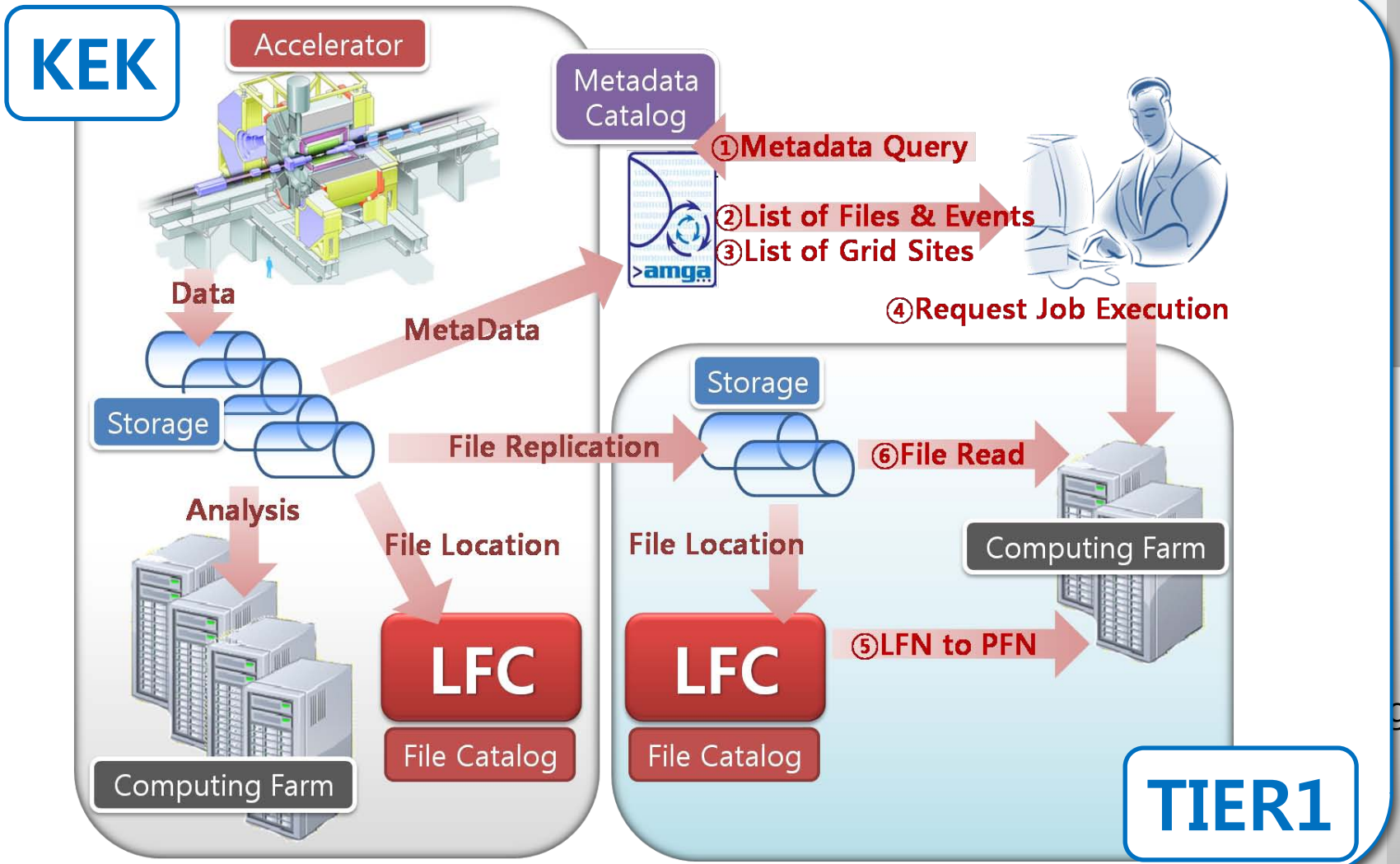
Coming problems at Belle-II experiment



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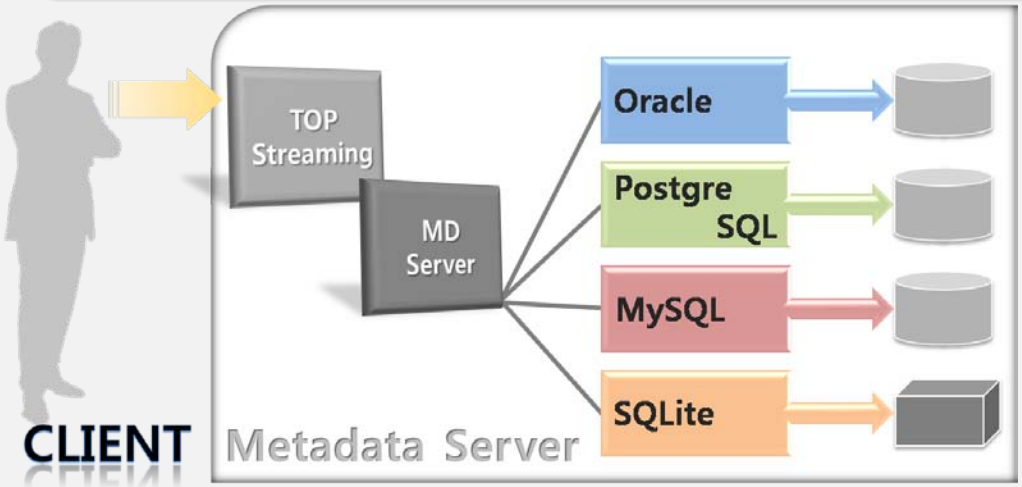
What is AMGA ? (Reference:www.eu-egee.org)

AMGA is the Meta-data catalog of EGEE's gLite 3.1 Middle-ware.

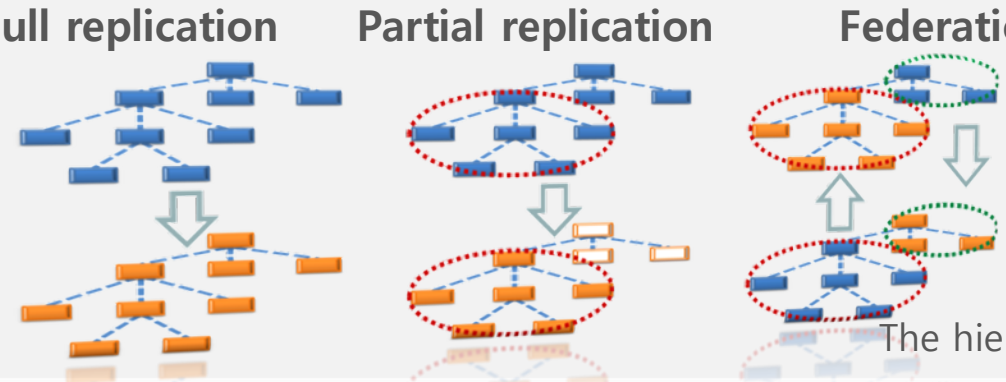


The AMGA functions:

- Authentication (Grid-Proxy certificates, VOMS)
- Logging, tracing
- DB connection pooling
- Replication of Data
- Use of hierarchical table structure ..the Grid idea.

It is a solution for Good Performance and Scalability.

AMGA replication makes use of hierarchical concept:



The hierarchical concepts of AMGA

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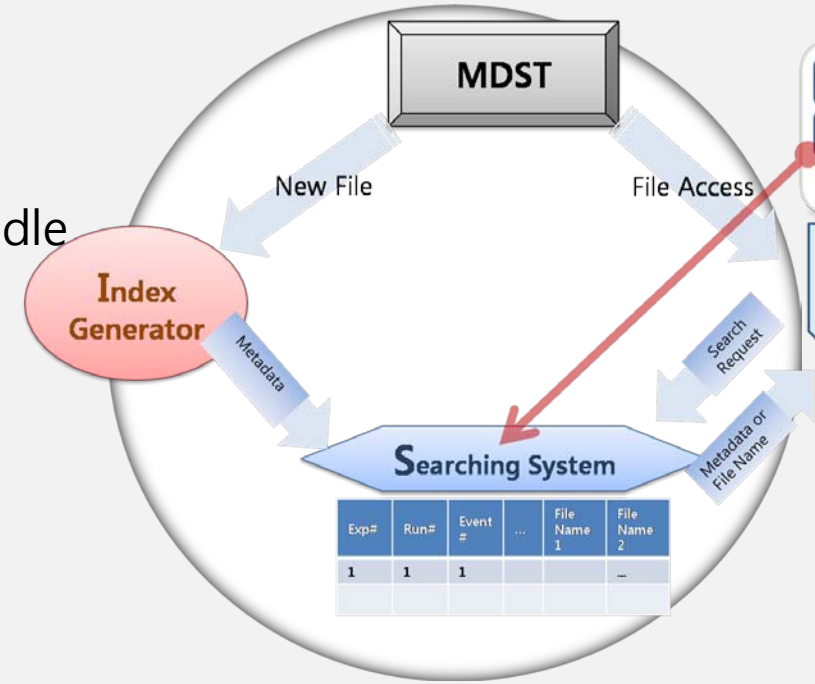
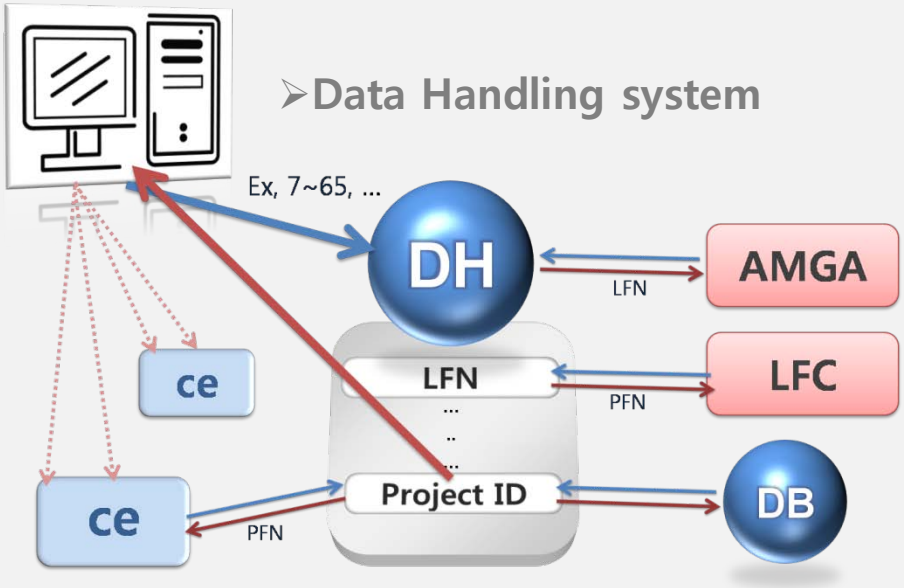
The Data Handling Scenario

- To improve the scalability and performance
- We apply AMGA which is middle ware for gLite



➢Meta catalog system

➢Data skim system



➢Data Handling system

Constructed the DH system for Belle-II

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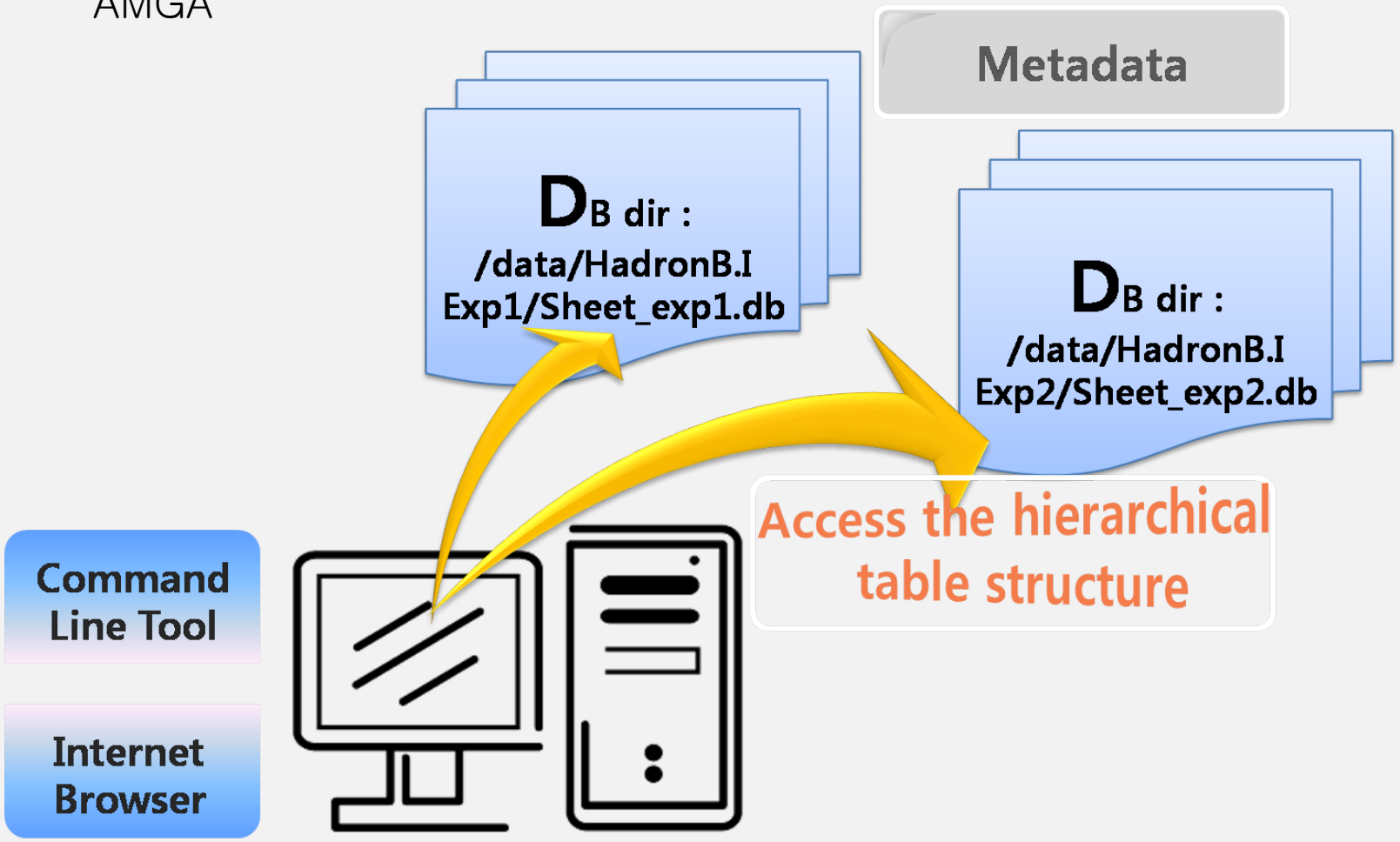
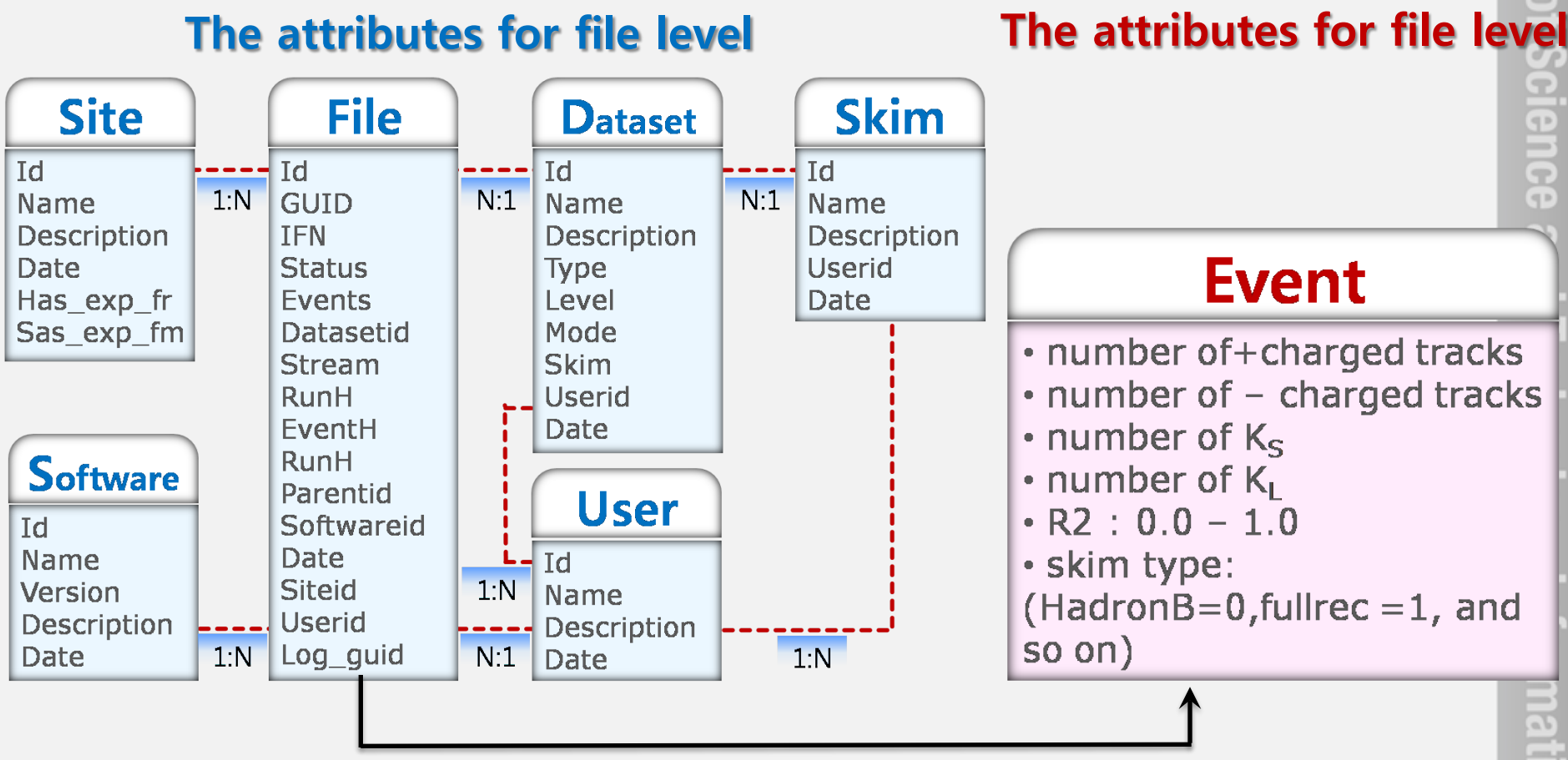
The progress of Belle/Belle-II Data Handling system

The architecture of database in AMGA



✓ The definition of the attributes



✓ How to access AMGA : made by J.H Kim, SunIl Ahn

Command Line Interface
- belle_amga_access (...)

Extraction Interface:
- belle_amga_extract LFN filename

Programming API
- belle_amga_connect

(host,port,dir)
→ belle_amga_search (condition)
→ belle_amga_eot ()
→ belle_amga_fetch (variable)
→ belle_amga_write (...)
→ belle_amga_close ()

✓ The optimization of the meta-data

- varying bit data-format(postgreSQL only)
- We suppose that the experiment is from 07 to 55.
- We suppose that there are 10 streams for MC.
- The data type is uds, charm, charged and mixed.
- There are 30 kind of skimming type.
- The total data size of Belle II will be ×60 than that of Belle.

Table: Reference

Sapce Occupation per file in DB	600bytes
Average number of events in a file	111,190
Sapce Occupation per event in DB	12bytes
Multiples in Belle II	60
Multiples in Belle II	60

● Reference for optimization of the mata-data

! Summary of optimization

	# of files	Size for file level	Size for event level	Size in Belle II for events
number of run in Belle	24,000	14 MB	125 GB	
number of skim types	30			
total number of real files	720,000	412MB		1.8TB
number of MC streams	10			
total number of MC files	240,000	137MB	1,988GB	
number of MC skim types	30			
total number of MC files	7,200,000	4120MB		17.4TB

We can make of the meta-data size(18Tbytes) for Belle-II

The progress of Belle/Belle-II Data Handling system

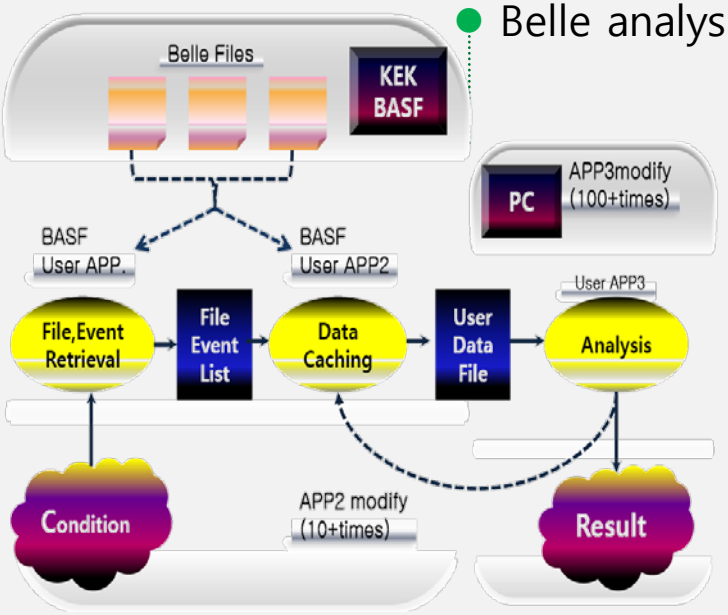
- Event size is corresponding with 12106394 events
- We have the same result from both Belle and Belle-II procedure.
- The metadata take a short time for searching dramatically.
- Both skim ratios are almost same.
- Belle:2415412/12106394 = 19.95%
- Meta-data:2415346/12106394 = 19.95%
- The differnence of events come from the meta-data quality.
- We can make the results smaller than that of Belle.

Table: Summary

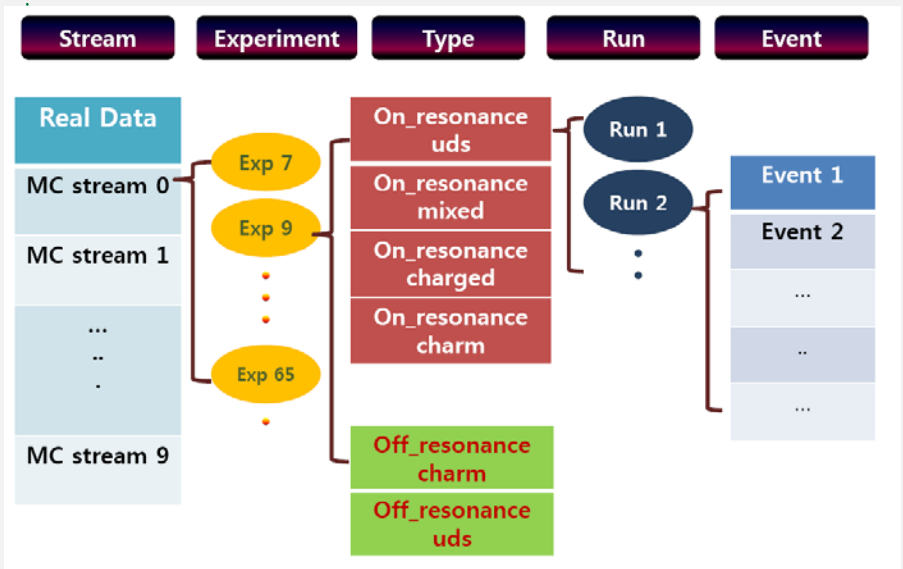
	Belle	Belle-II Meta System
CPU time	4hr15min6sec	4sec
Events	2415412	2415346
File size	25M(index)	6.7M(compression)

Evaluation of Meta system

Belle analysis workflow



Belle Data structure

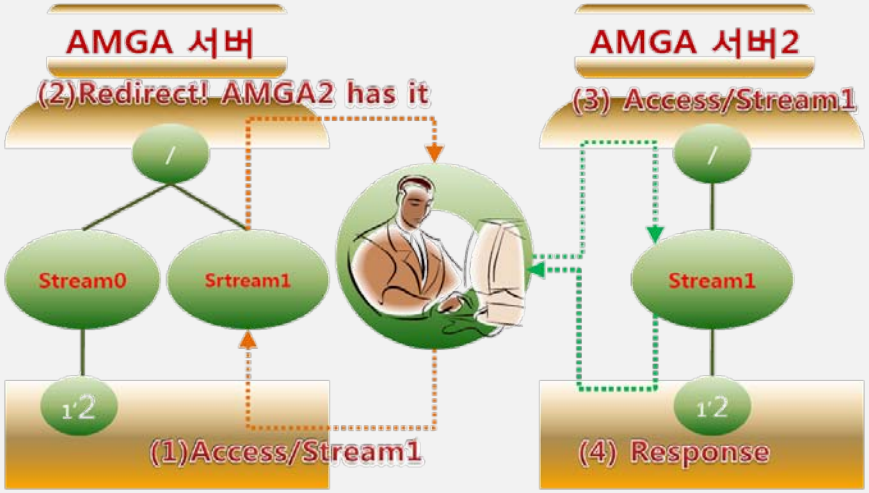


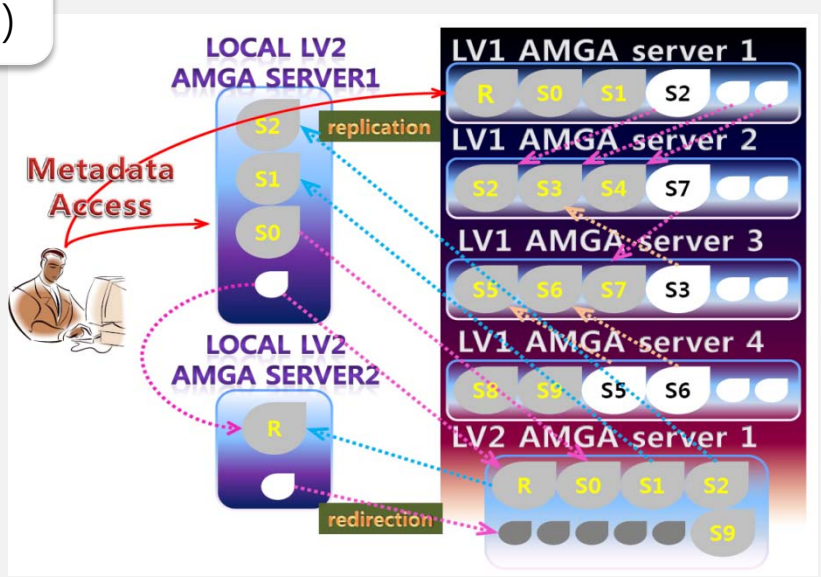
✓ The replication for meta system

http://b2comp.kek.jp/twiki/bin/view/Computing/DataHandling
We considered the sites,
KISTI(master) and **Melbourne(slave)**, for **AMGA system.**

- Melbourne-KISTI cooperated to make the master-slave for the replication of the meta-data catalog.

→Master node : 150.183.246.196(KISTI)
→Slave node: 192.231.127.47(Melbourne)





- The AMGA system for Large scale data

✓ Releasing the command tool

We released the **first version of the command tool.**

- The command tool is such as **check_process_url in Belle.**
- It is based on **AMGA client-2.0.**
- We evaluated actions of searching to optimize the usage.

What is benefit to use it?

- We can choose either the file level searching or the events level searching alternatively
- We can use it at remote network with strong security (Grid-Proxy certificates, VOMS)
- The command tool have simple question for user's convenience.
- We don't need to describe as "any" or "legacy" such as Belle.
- We can use it based on Grid.

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Publication

Journal of the Korean Physical Society, Vol. 57, No. 4, October 2010, pp. 715~724

Design of the Advanced Metadata Service System with AMGA for the Belle II Experiment

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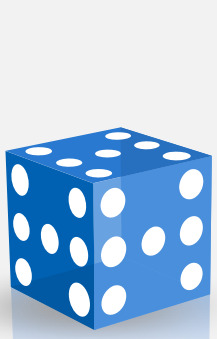
Summary

1. We composed of the **meta system for Belle-II**
2. We **optimized the meta system**
3. The **replication** from KISTI to Melbourune worked well
4. We released the **first version of the command tool**
5. Our results are **published at CPC 2009 and JKPS**



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THANKYOU

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