



그리드 서비스

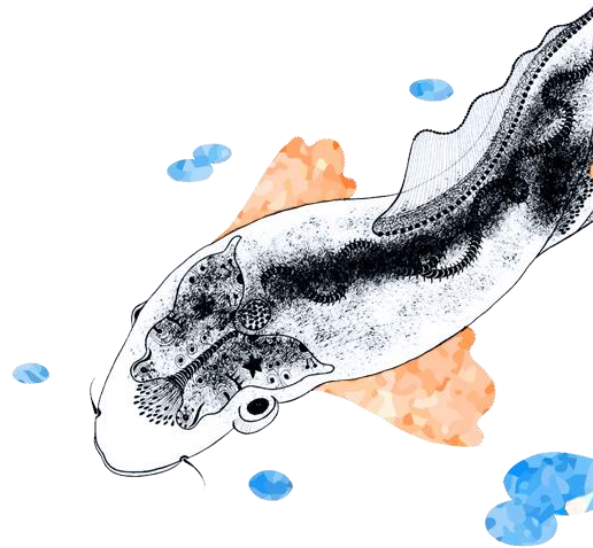
글로벌 분산 컴퓨팅

안상언

GSDC

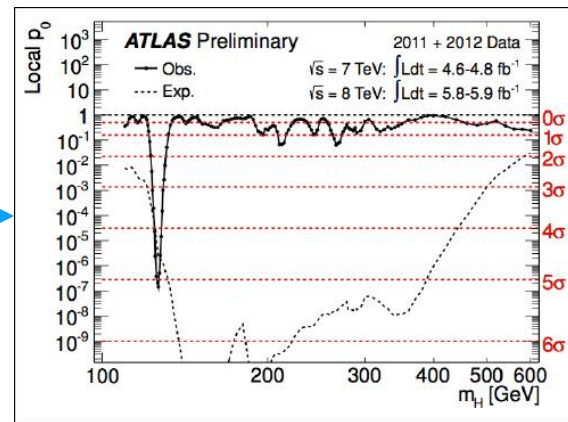
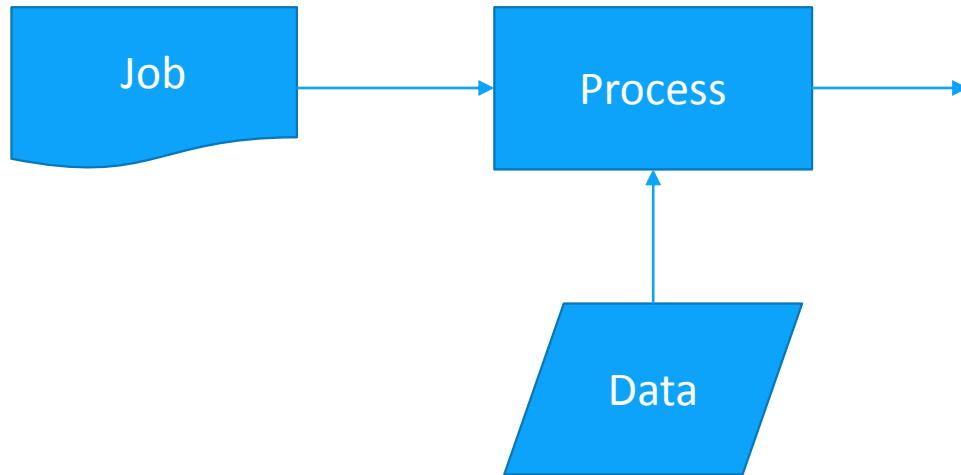
GSDC2016, KIRD

2016.12.29



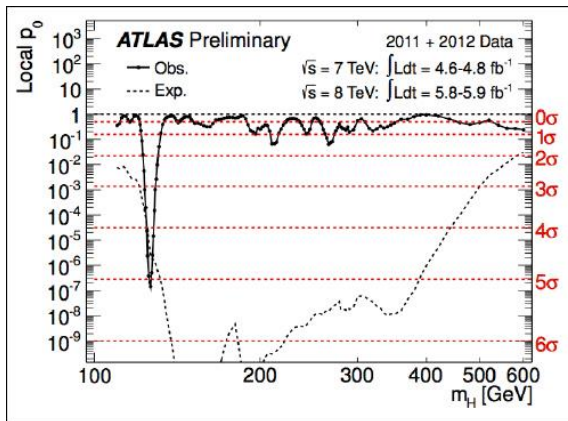
들어가는 말

- 글로벌 분산 컴퓨팅
 - ‘WLCG 소개’, ‘그리드 서비스’
- 왜 그리드가 LHC 데이터 처리에 필요한가?
- LHC 컴퓨팅 그리드는 실제로 어떻게 구성되어 있는가?

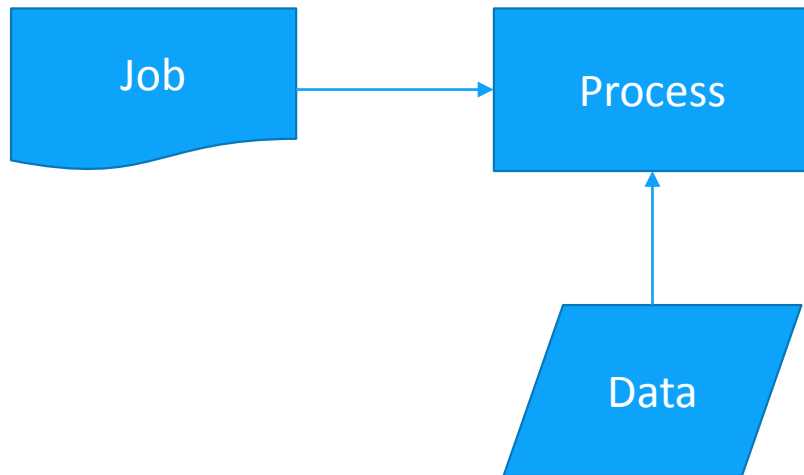




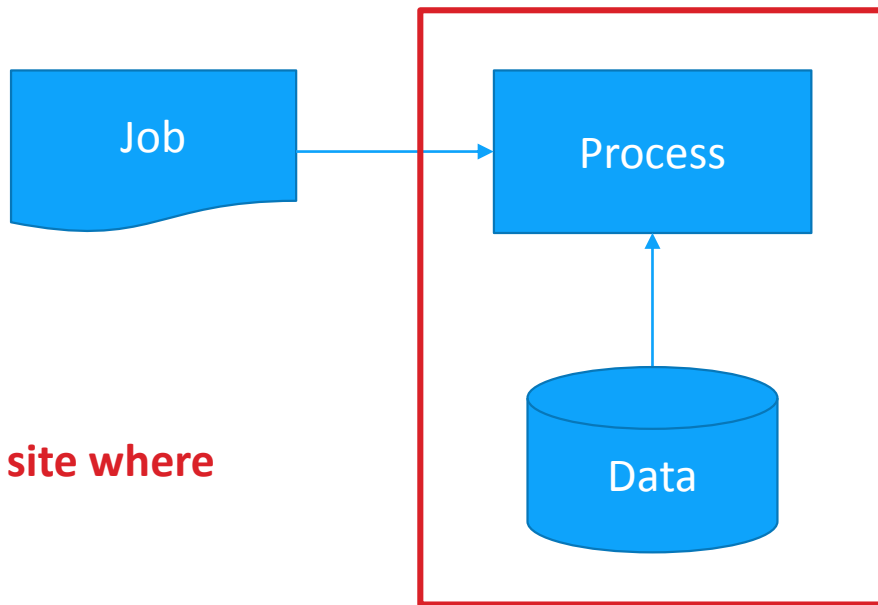
Job



WLCG 그리드 작업 처리 기본 정책



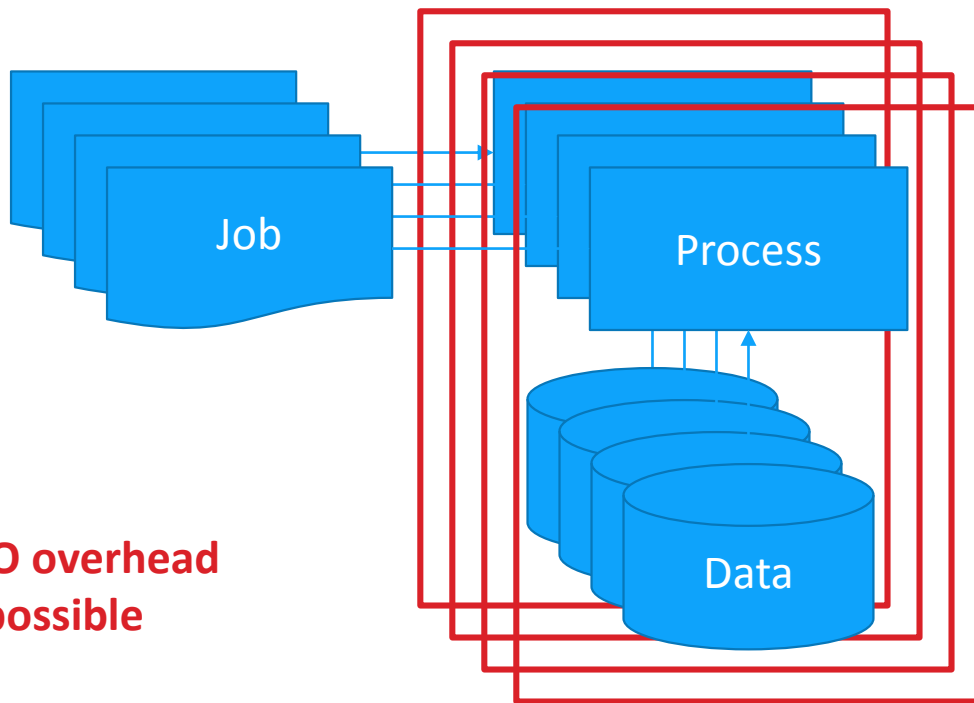
WLCG 그리드 작업 처리 기본 정책



**Job processed on site where
the Data stored**

Site Domain

WLCG 그리드 작업 처리 기본 정책



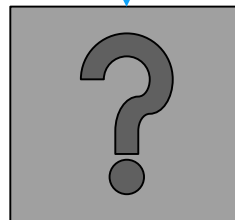
**To reduce I/O overhead
as much as possible**

Site Domain

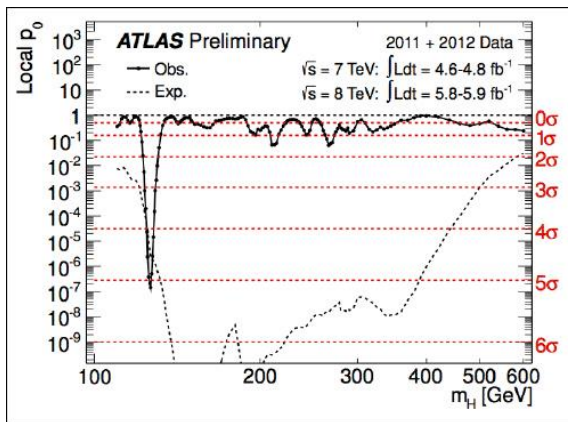
그렇다면 사용자 관점에서는?



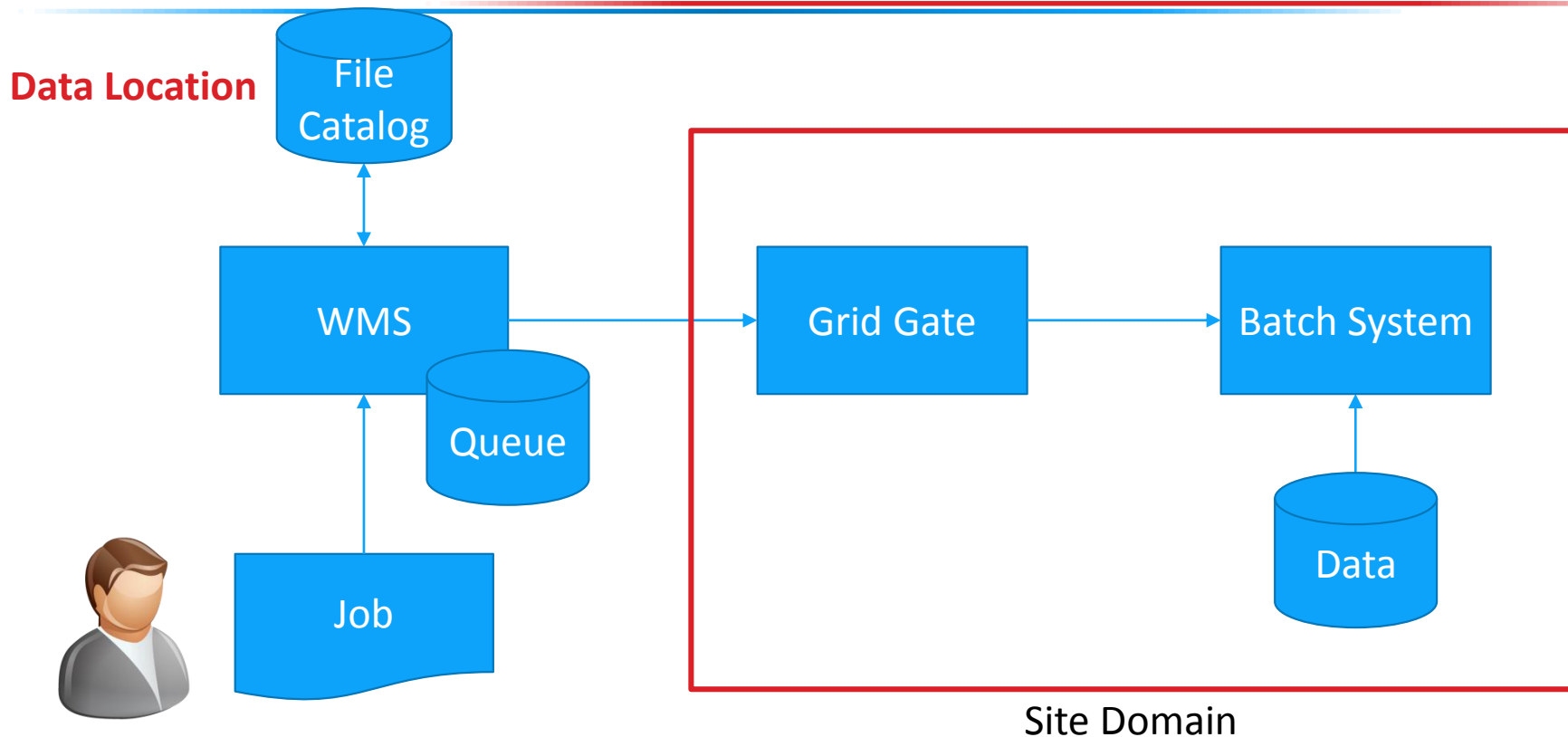
Job



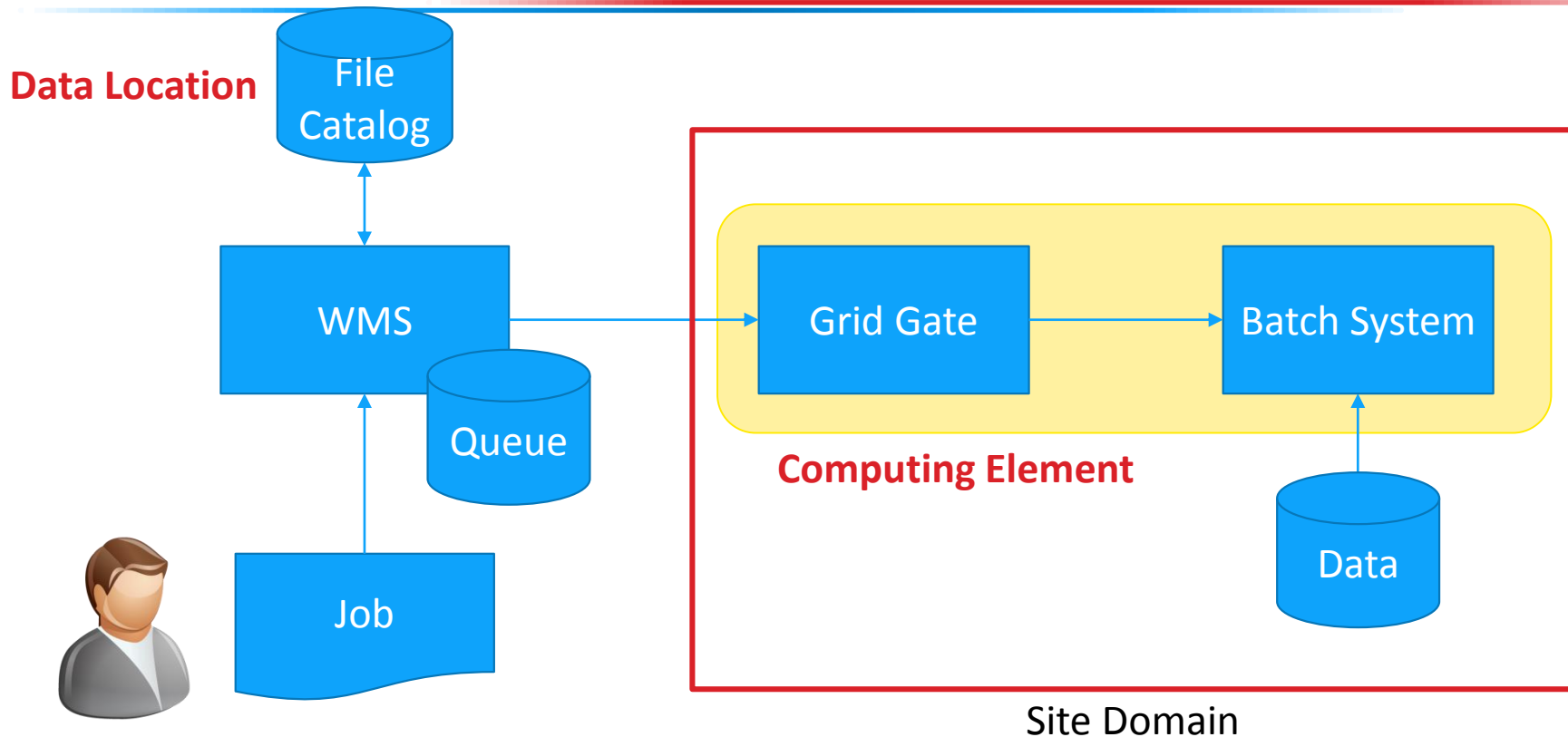
Don't care!



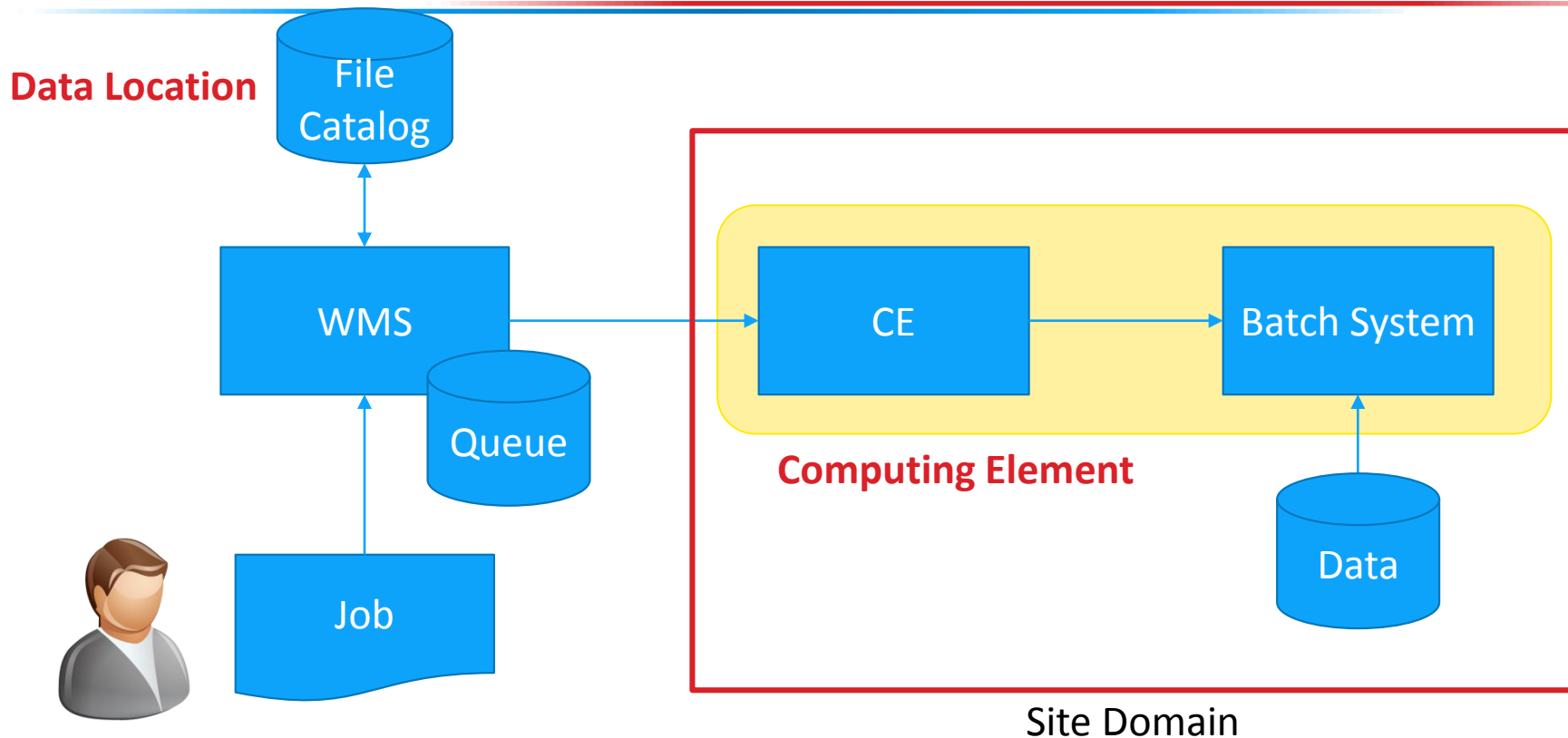
실제로 어떤 일이 벌어질까?



Computing Element



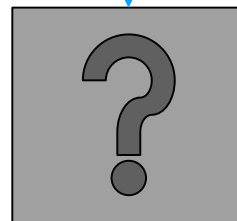
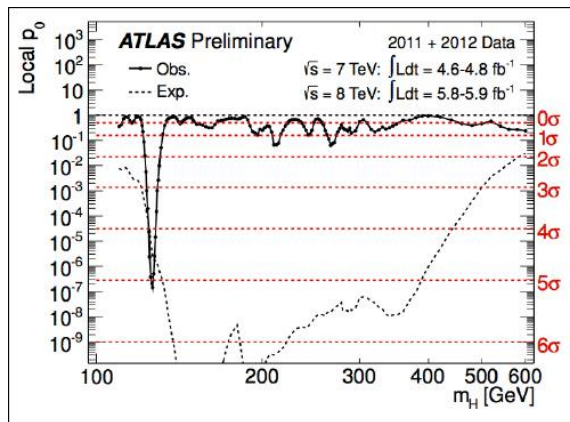
Computing Element



다시 한번 사용자 관점에서는?

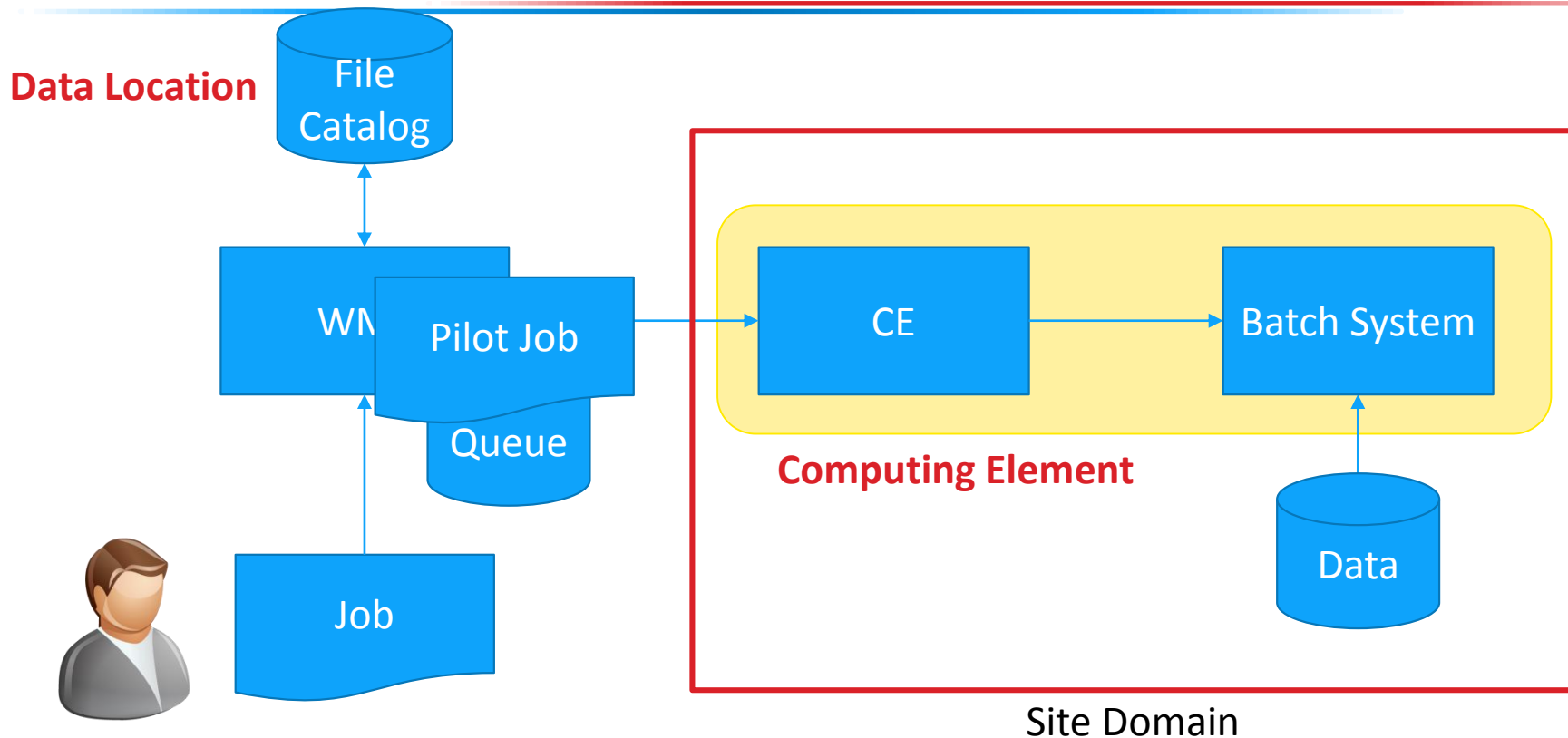


Job

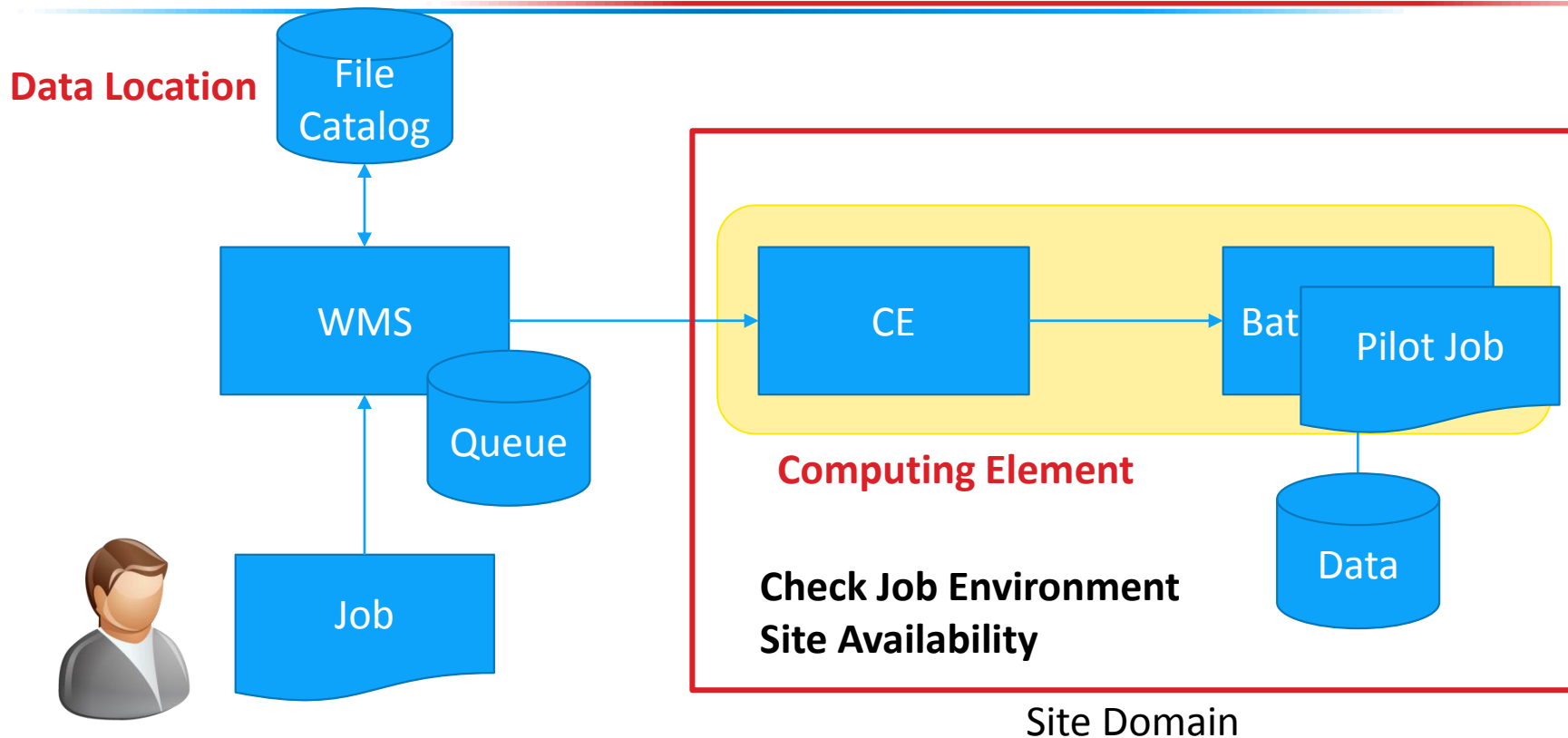


Don't care!
BUT
Result must be
returned fast
AND must not
DIE!!

Pilot Job



Pilot Job



[Latest Results](#)
[Historical View](#)
[Generate Report](#)
[Help](#)

Site-Groups		Profiles		Metric Exit Status
All Sites	ALICE_CE_CRITICAL	Algorithm: ARC-CE+CREAM-CE		All Exit Status
Sites		Service Flavours		Metrics
ISS_LCG ITEP JINR KFKI KISTI_GSDC	All Service Flavours CREAM-CE	All Metrics emi.cream.CREAMCE-DirectJobSubmit (alice)		OK WARNING CRITICAL UNKNOWN MISSING
<input type="checkbox"/> Show site metrics				<input type="button" value="Show Results"/>

Algorithm for calculating the Site and Service Availability

Legends for Metric Result Status

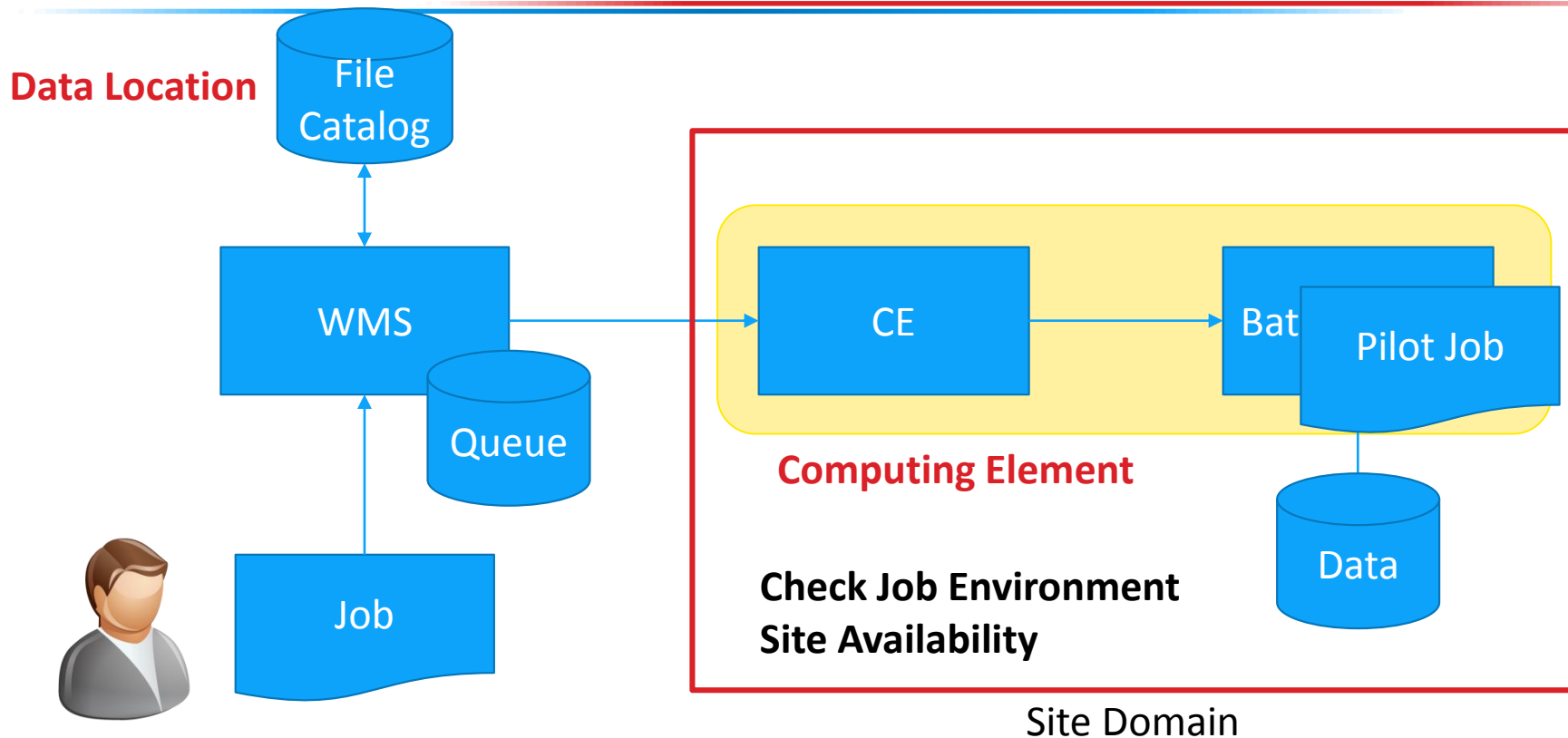
Status:	OK	WARNING	CRITICAL	UNKNOWN	MAINTENANCE
Legend:	OK	W	C	U	MT
Note: darkest colors: test is 0 - 12 hours old, ... lightest colors: test is more that 12 hours old					

Legend	Metric Name
1	emi.cream.CREAMCE-DirectJobSubmit (alice)

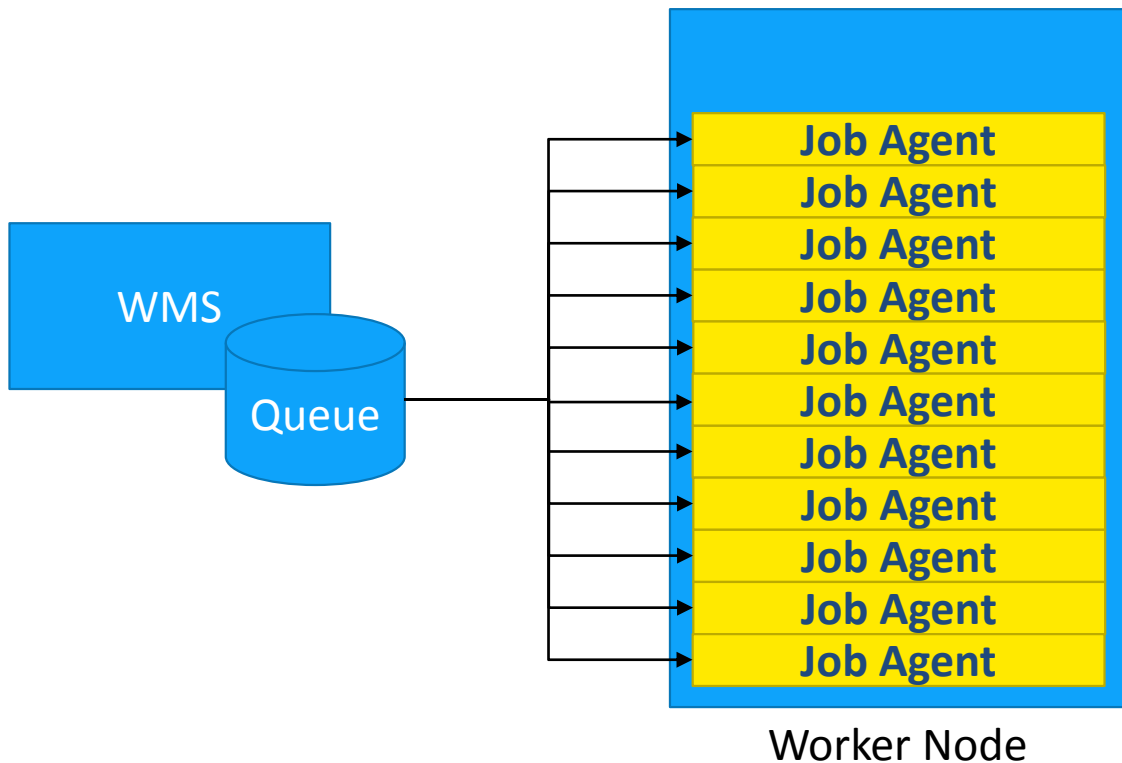
[Link to data](#)

Sitename	Flavour	Host status in profile	Hosts	1
KISTI_GSDC	CREAM-CE	OK	alice-t1-ce01.sdfarm.kr	OK
		OK	alice-t1-ce02.sdfarm.kr	OK
		OK	alice-t1-ce03.sdfarm.kr	OK

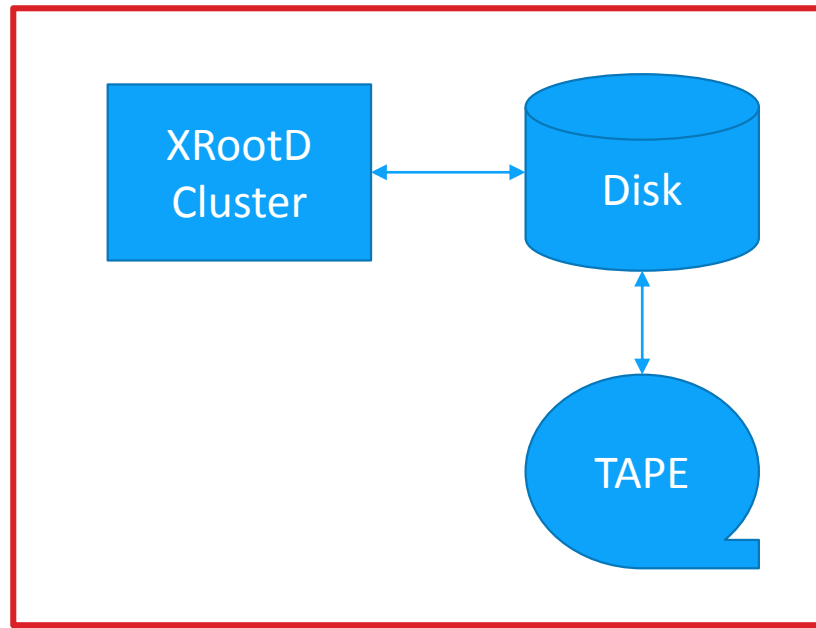
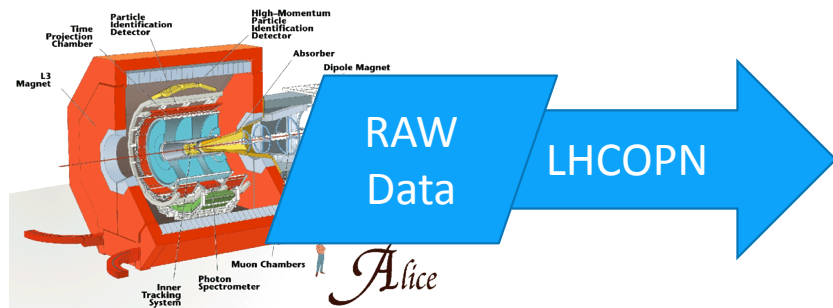
Pilot Job



그래서 실제로는

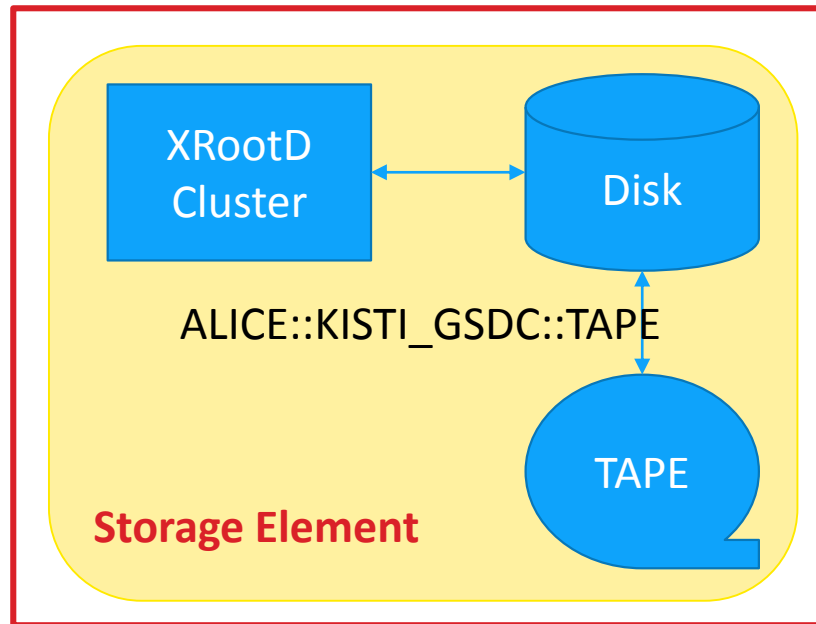
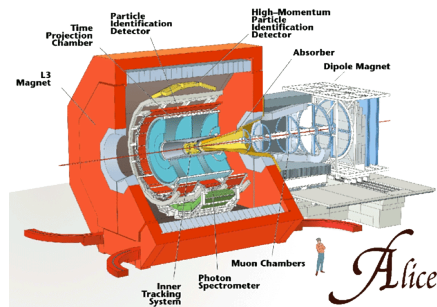


**Job Agent activated by
pilot job PULLS user Job
(The Real Job)**



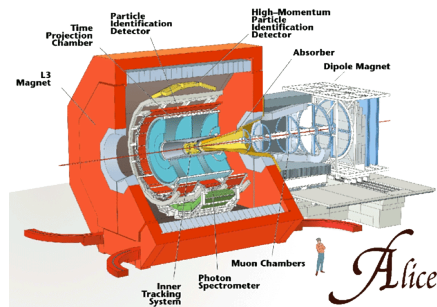
Site Domain

Storage Element

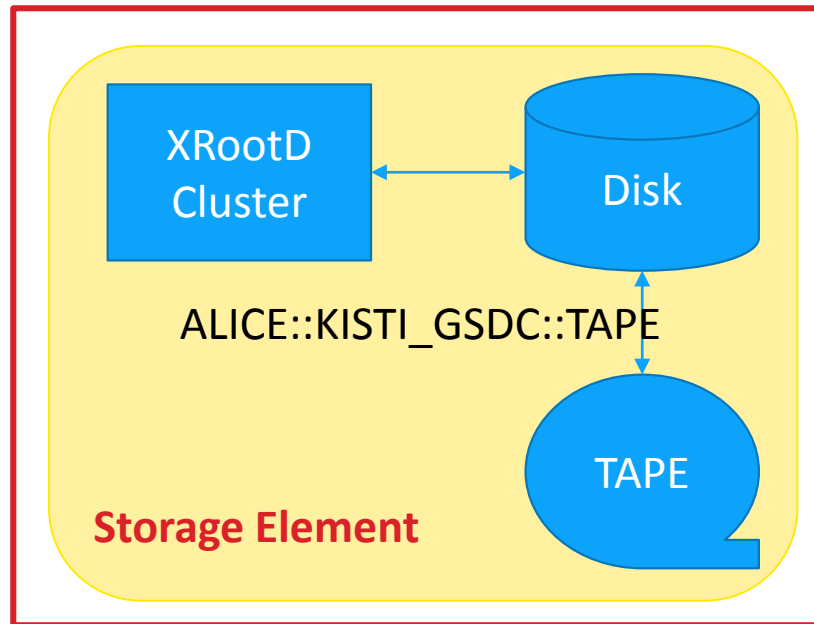
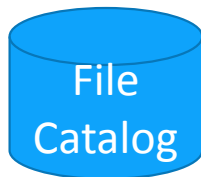


Site Domain

File Catalog



Data Location



Site Domain

LFN vs PFN

Logical
Filename

/alice/data/2016/LHC16e/123456/ESD/001/root_archive.zip



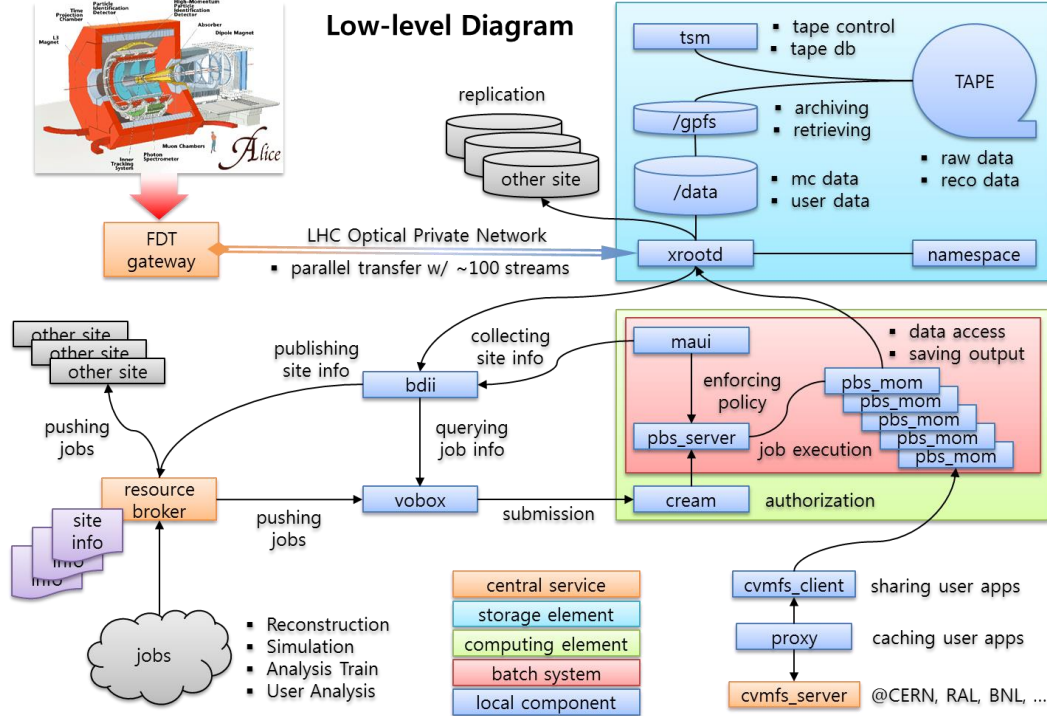
Physical
Filename

xroot://alice-t1-xrdr01.sdfarm.kr:1094//01/39482/.../root_archive.zip

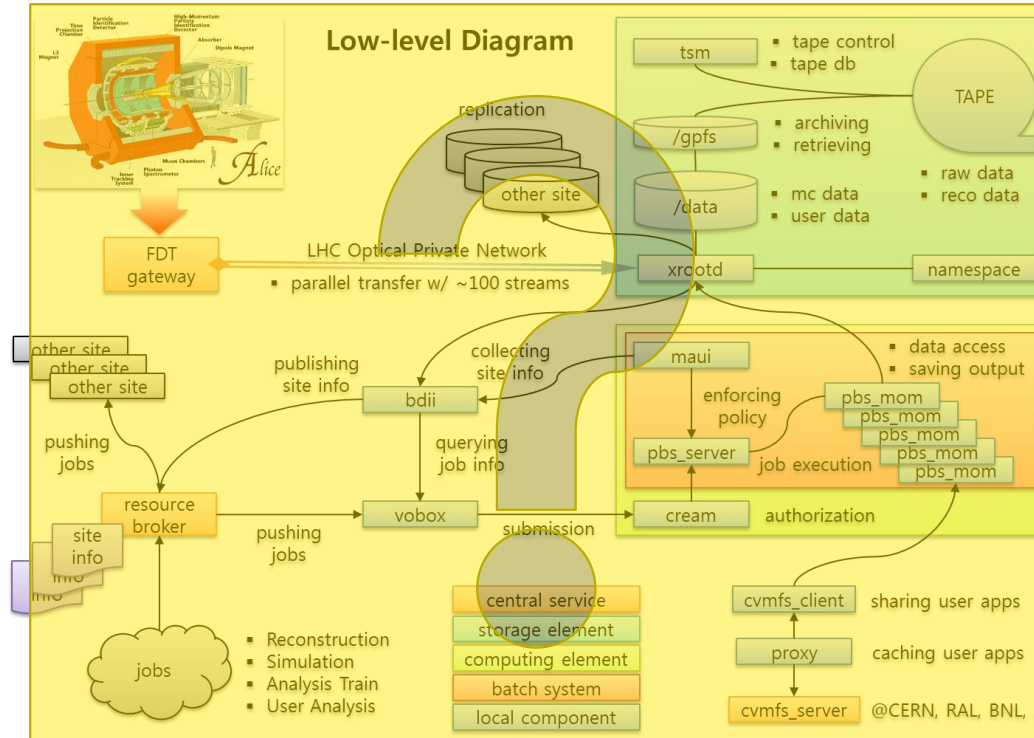
xroot://eos-alice.cern.ch:1094//01/39482/.../root_archive.zip

Replication

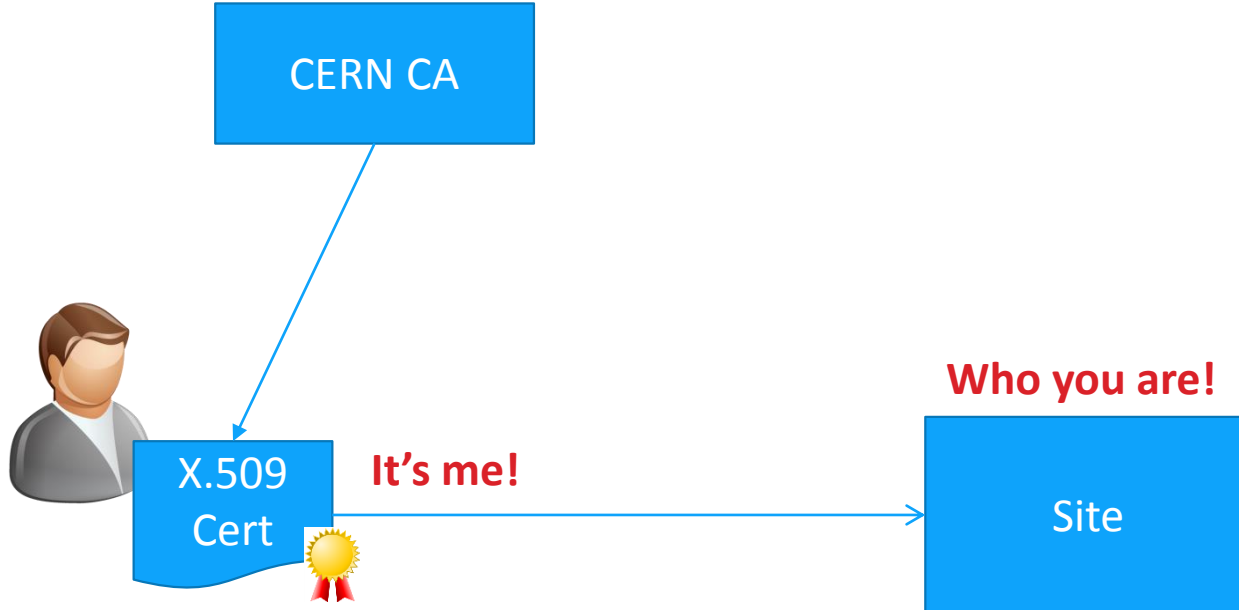
Real Picture



Data, Job, Trust?

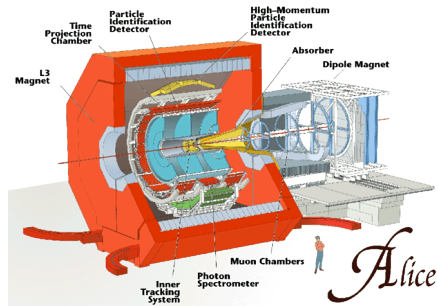


CA is not enough!



CA is not enough!

Hmm..



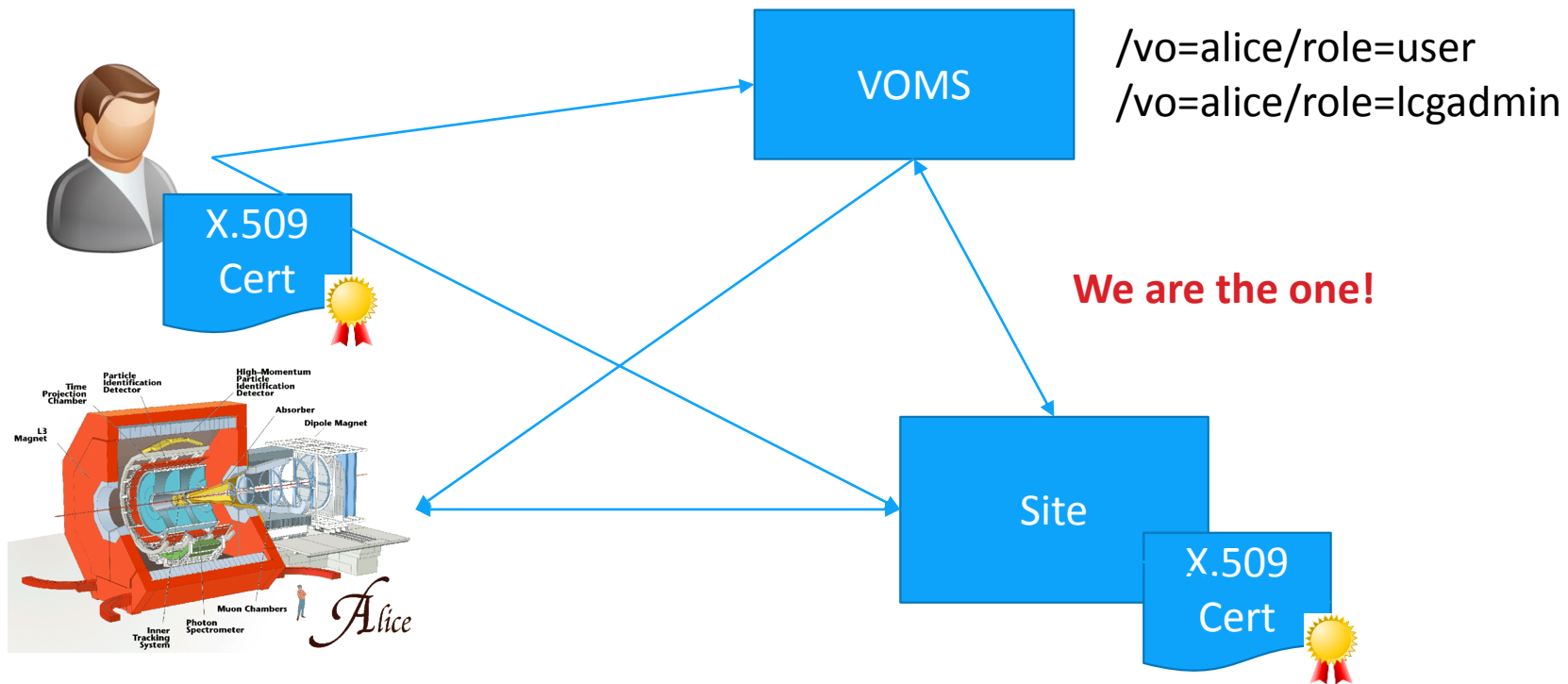
Give me data!

KISTI CA

Site

X.509
Cert





- Information Service
- Accounting - APEL
- Squid Proxy
- perfSONAR-PS
- ...

- WLCG 구성요소
 - Computing Element
 - Storage Element
 - Information Service
 - VOMS
 - ...