



ALICE Environment on the GRID

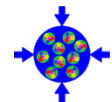
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A. Abramyan and N. Manukyan acknowledge financial support of World Federation of Scientists within Armenian HEP National Scholarship Programme



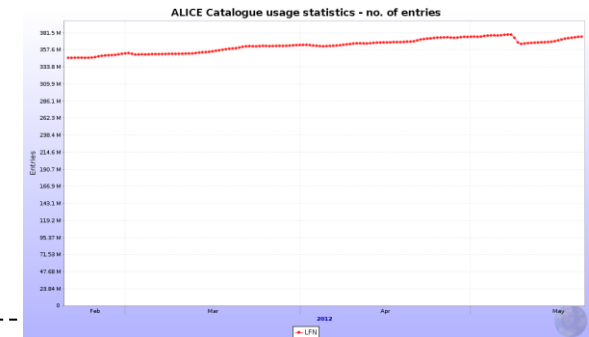
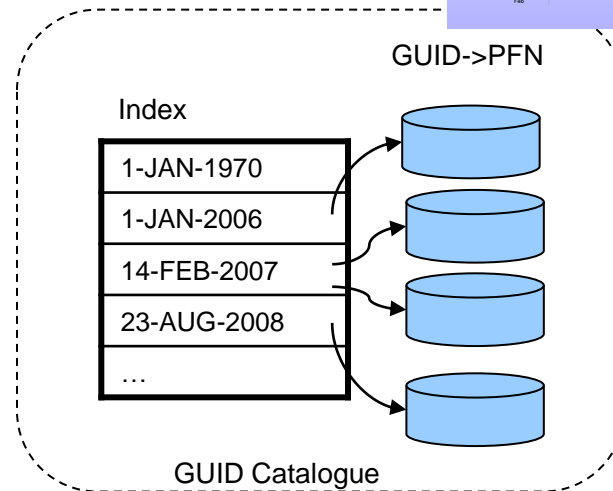
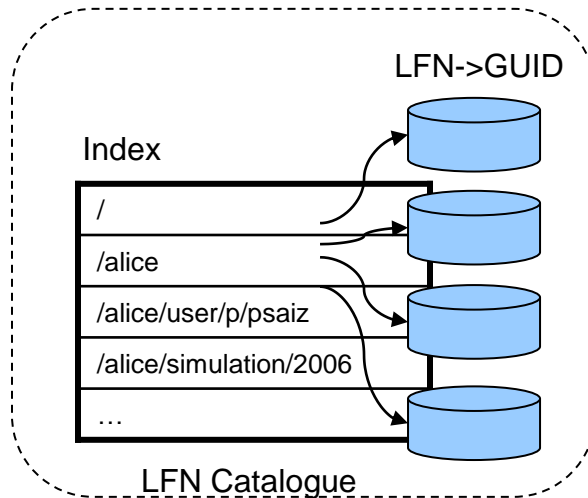
- AliEn
 - File Catalogue
 - TaskQueue
 - Data access
- AliEn in ALICE
- New development
- Conclusions

- All components to create a GRID
- File Catalogue
 - UNIX-like file system
 - Mapping to physical files
 - Metadata information
 - SE discovery
- Transfer Model
 - With different plugins
- TaskQueue
 - Job Agent & pull model
 - Automatic installation of software packages
 - Simulation, reconstruction, analysis...
- Developed by ALICE
 - Used by several communities



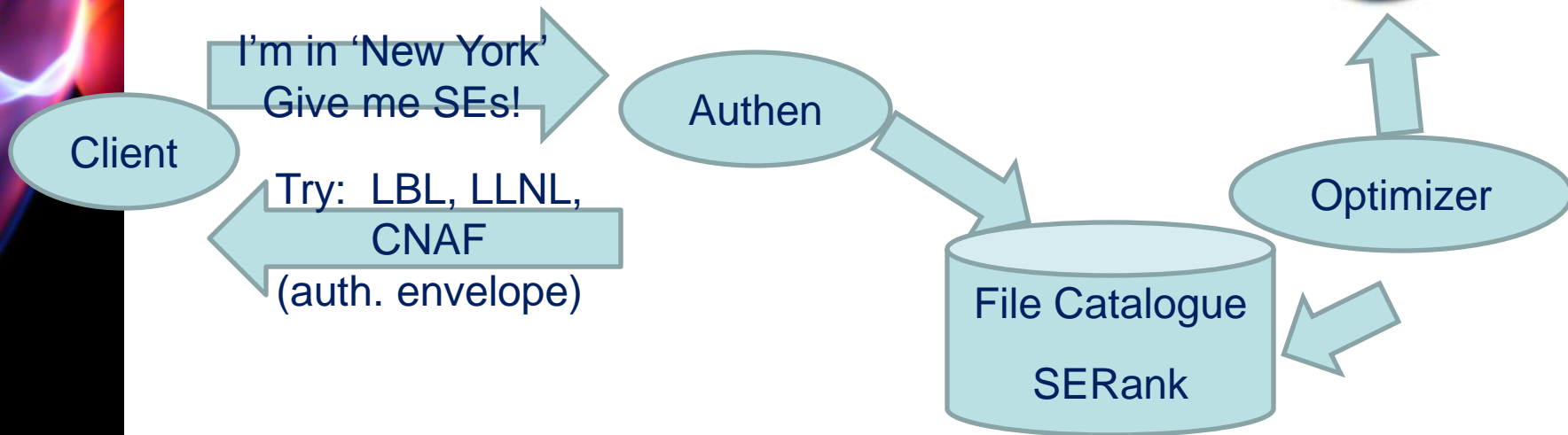
- **Global Unique** name space
 - Mapping from LFN to PFN
- **UNIX-like** file system interface
- Powerful **metadata** catalogue
- **Automatic** SE selection
- Integrated **quota** system
- Multiple storage **protocols**: xrootd, torrent, srm, file
- **Collections** of files
- Physical file **archival**
- **Roles and users**

- Entries can be retrieved by **LFN** or **GUID**
- **Flexible** table structure, allowing for easy scalability
- ALICE: **350M entries** (270GB DB size)

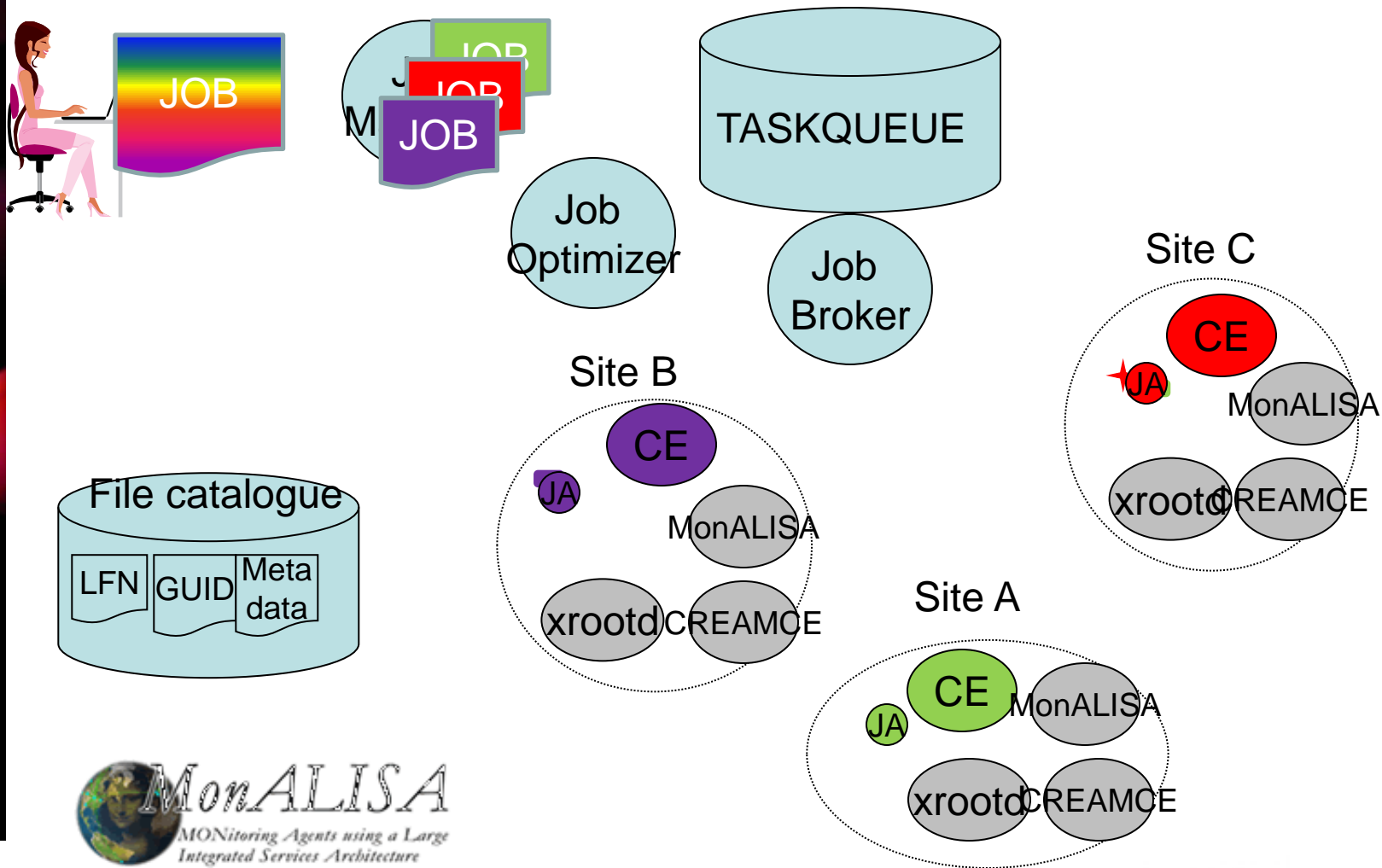


- Mostly **xrootd** protocol
- Jobs only download configuration files
- Data files are accessed **remotely**
 - The **closest replica** to the job, local replica first
- JobAgent uploads **N replicas** of the output
- Schedules data transfers only involve the raw data
 - Done via **xrd3cp**
- Use of **torrent** for AliEn and software package distribution.

- Client automatically directed to the best SE to store/retrieve files
 - Find the closest working SE of a given QoS
- Built-in retrial mechanism



- Central TaskQueue with all jobs
- Optimizers: rearrange
 - Priorities & quotas on user/role level
- Vobox on sites that submit to batch system
- Job Agents (JA)
 - Install AliEn/ Software packages
 - Sanity check
 - Validate output
 - Upload output





AliEn user interface			
		ARC/	
CONDOR	AliEn		LCGE/OMITE
		NORDUGRID	



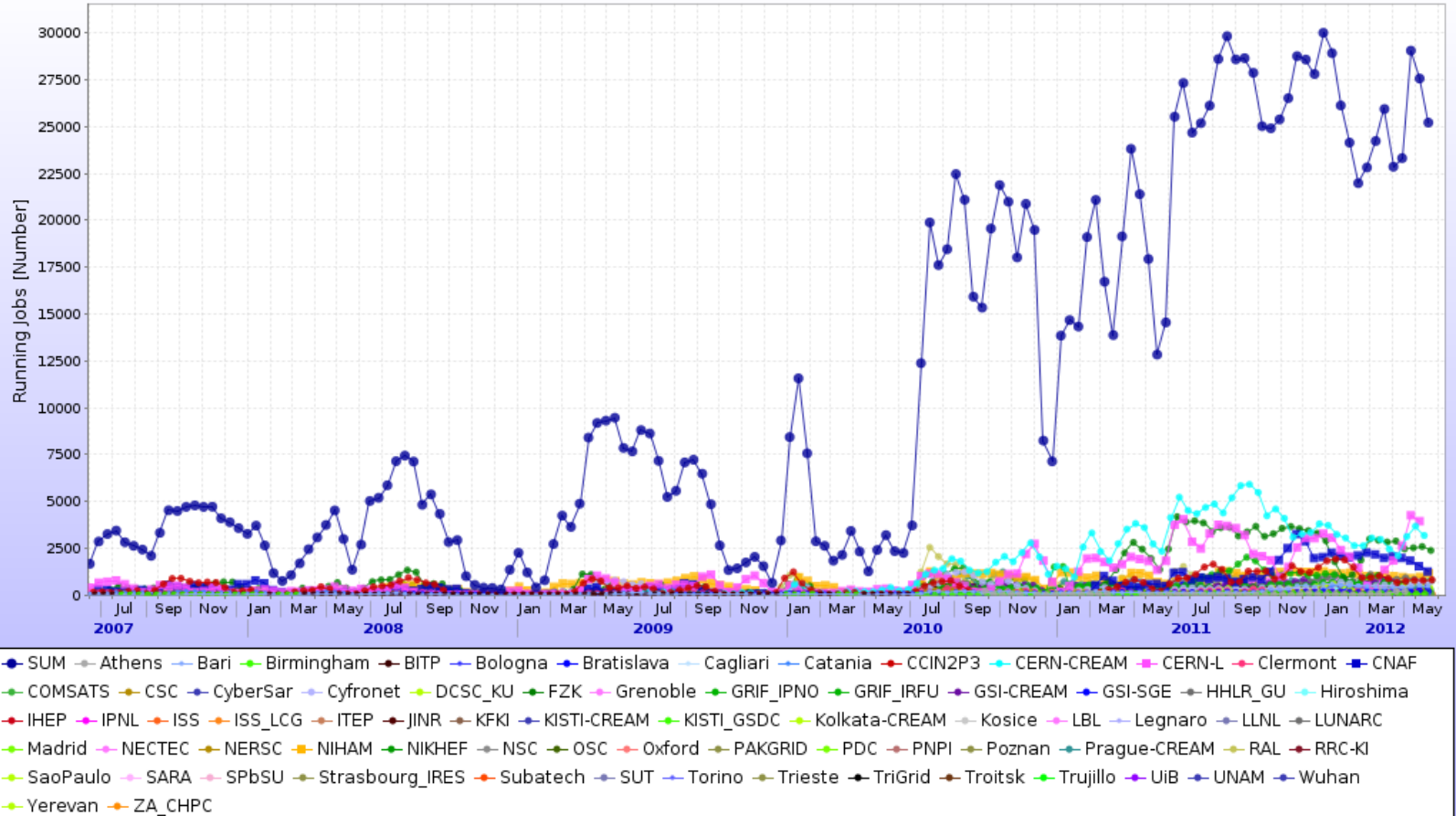
Nice! I STILL do not have to worry about ever changing GRID environment...



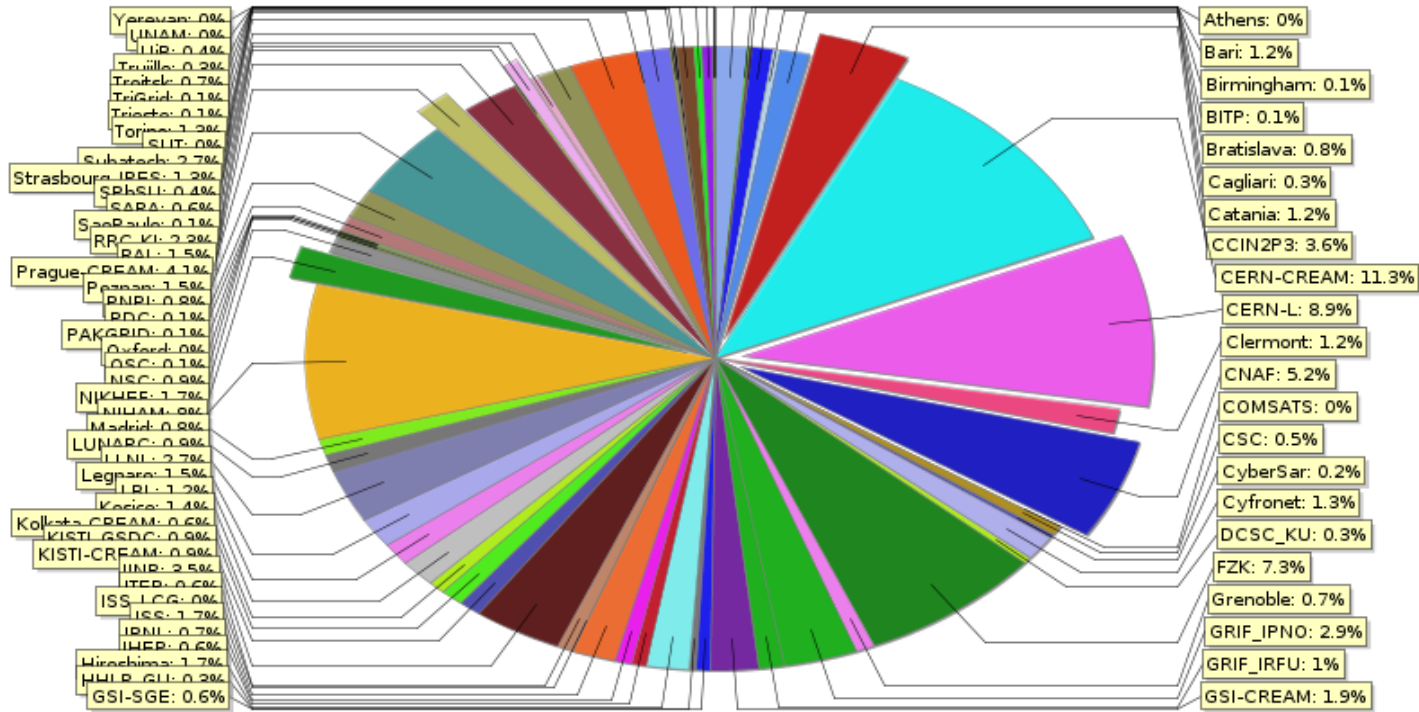
More than 80 centres



Running Jobs



Done jobs statistics



- Athens ● Bari ● Birmingham ● BITP ● Bratislava ● Cagliari ● Catania ● CCIN2P3 ● CERN-CREAM ● CERN-L ● Clermont ● CNAF ● COMSATS ● CSC ● CyberSar
- Cyfronet ● DCSC_KU ● FZK ● Grenoble ● GRIF_IPNO ● GRIF_IRFU ● GSI-CREAM ● GSI-SGE ● HHLR_GU ● Hiroshima ● IHEP ● IPNL ● ISS ● ISS_LCG ● ITEP ● JINR
- KISTI-CREAM ● KISTI_GSDC ● Kolkata-CREAM ● Kosice ● LBL ● Legnaro ● LLNL ● LUNARC ● Madrid ● NIHAM ● NIKHEF ● NSC ● OSC ● Oxford ● PAKGRID ● PDC
- PNPI ● Poznan ● Prague-CREAM ● RAL ● RRC-KI ● SaoPaulo ● SARA ● SPbSU ● Strasbourg_IRES ● Subatech ● SUT ● Torino ● Trieste ● Troitsk
- Trujillo ● UIB ● UNAM ● Yerevan

- Several major AliEn iterations
 - Starting in 2001
 - Scale testing
 - Evaluating different approaches
 - And learning from the exercises
- Keeping (almost) the same CLI
 - Even if backward incompatible under the hood





- Plenty of new improvements
 - Catalogue simplification
 - Proxy renewal
 - Removal of PackMan
 - Job Memory checkup
 - New JDL fields
 - Extreme Job Brokering
 - ...
 - And baseline for new development
- Simplify operations
- New functionality

- Postpone splitting of job until last moment
- Decide data to be analyzed based on current location of JA & files not analyzed yet
- Can define Max/Min number of files to be analyzed
 - Even if the files are not local
- Less subjobs:
 - Easier merging
- More intelligence in the broker
 - Limiting JDL fields to match

- Interactive jobs
- Correlate Monitoring data
- Multi core jobagents
- Trust model
- jAliEn
- File popularity
- Catalogue crawler
- Error classification
- Distributed brokering



Posters: Tuesday

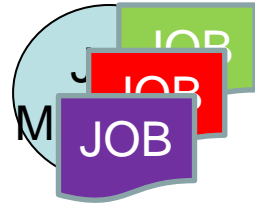
**Dynamic parallel ROOT facility clusters on the Alice Environment
A new communication framework for the ALICE Grid**

- Multicore jobagent
 - One agent per core (overkill)
or
 - One agent per machine (needs development)
- Combining jobs with similar input
 - And dispatch them together
- Distribute (part of) brokering to the vobox
 - Sent multiple jobs to Vobox
 - Let the vobox distribute them among the JA
 - Reduce load on central services
 - Possibility to reuse files from previous jobs

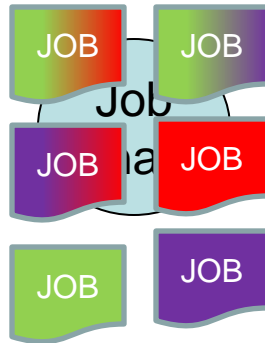
- ALICE has been using the GRID since 2001
- AliEn provides an interface to the GRID
 - Access to multiple resources
 - Transparent to the user
- AliEn Components
 - File & metadata catalogue
 - TaskQueue
 - Transfer model
- Can be used by other communities
- Plenty of areas for research

<http://alien.cern.ch>

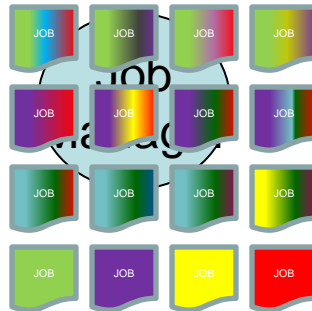




Works nicely if one replica per file



A bit more complex with 3 SE and 2 replicas



And a lot more with 50 SE and 3 replicas

	Site A	Site B	Site C
File 1	✓	✓	
File 2		✓	✓
File 3	✓		✓
File 4	✓	✓	
File 5	✓	✓	✓

Current schema

Submit 4 jobs:



Broker per file

Submit 3 empty subjobs

