Evolution of production tools

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Summary

- Production Tools:
  - WebUI
  - Bookkeeping Database
  - Job scripts / Submission scripts
  - Monitoring jobs and production

- February Production (issues)
  - Sites
  - Submission
  - Configuration

People involved:

E. Luppi	Ferrara
L. Tomassetti	Ferrara
A. Fella	CNAF
G. Fontana	Ferrara
M. Ronzano	Ferrara

Production tools

- **Web based User Interface**

- PHP, javascript, JQuery framework for AJAX functionalities

- database classes for communication with bookkeeping database (RDBMS independent)
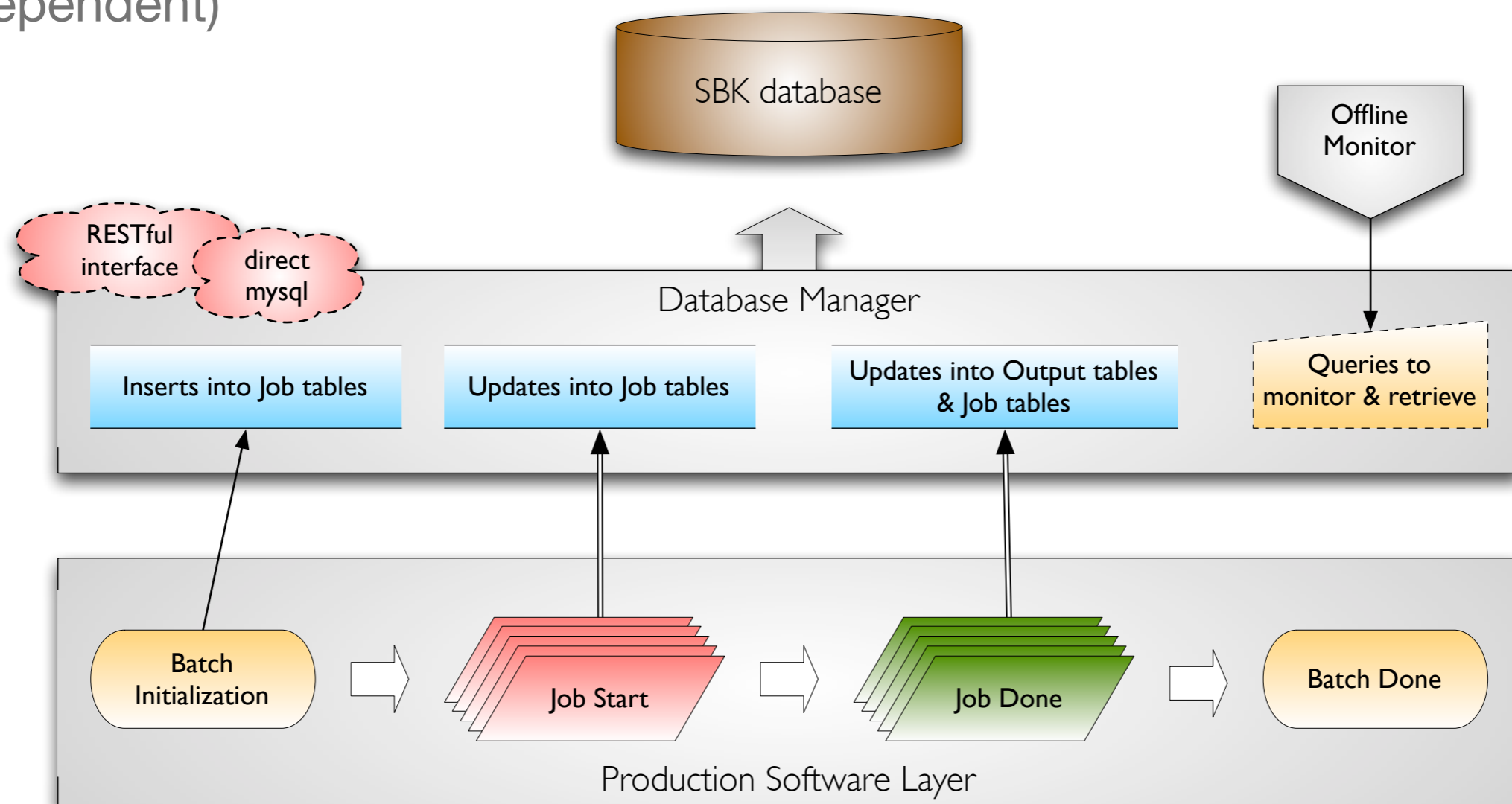
- **Production Submission Workflow**

- basic authentication and authorization based on common LDAP directory service

- FullSim / FastSim differentiation

- Batch System / Distributed (Grid) submission

  August milestone!
  Already done!!

- Possibility to 'export' the WebUI to remote sites for local usage (on batch system, requires a dedicated machine, ...)

Production tools
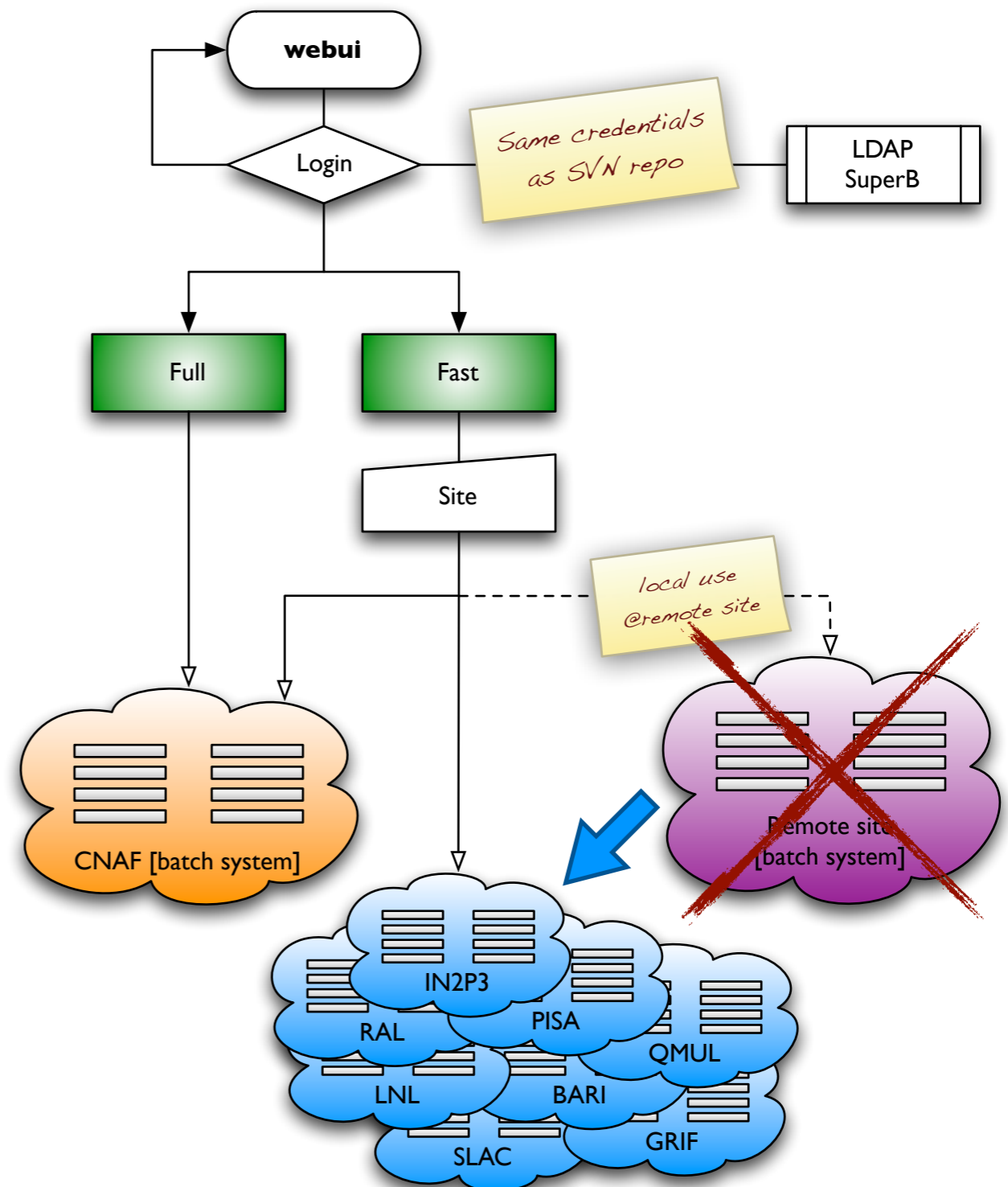
- **FullSim**

- LSF Batch System submission @CNAF only

- User (production manager) choices:

  - Geometry

  - Generator (and parameters)

  - Physics List

  - type (full / bgframes)

  - Number of events per job

  - Number of jobs (+ batches)

5

Production tools
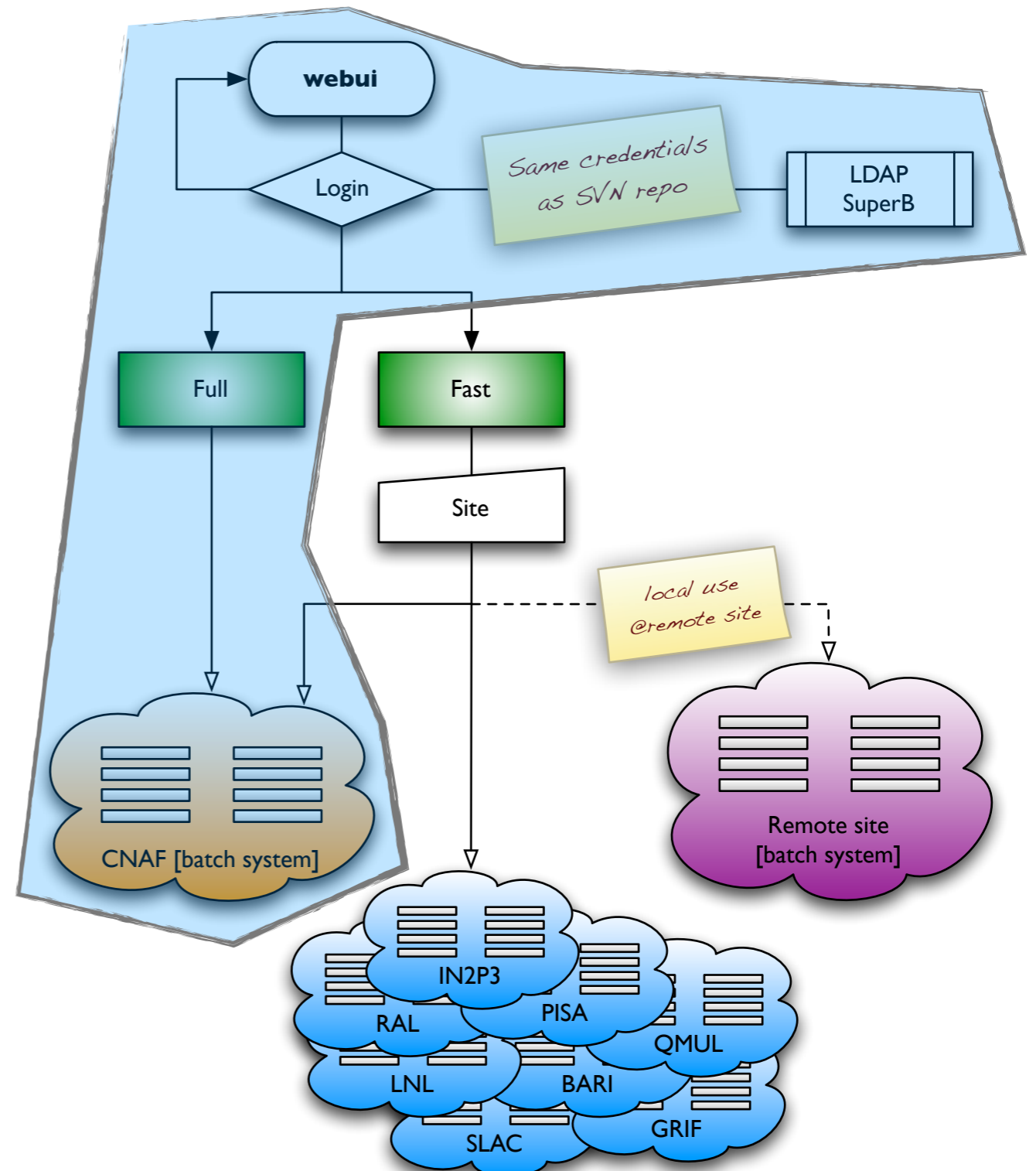
- **FullSim**

  - generator and geometry: e.g. RadBhaBha.Prod.mac, SuperB.Prod.mac

  - workdir must be accessible and readable by apache.apache

  - Production root (where output files will be written) ⇒ permissions

Production tools

- **FastSim**

- LSF Batch System submission @CNAF + Distributed submission

- User (production manager) choices:

  - Geometry

  - Generator

  - Background mixing (tcl)

  - Number of events per job

  - Number of jobs (+ batches)

  - Site
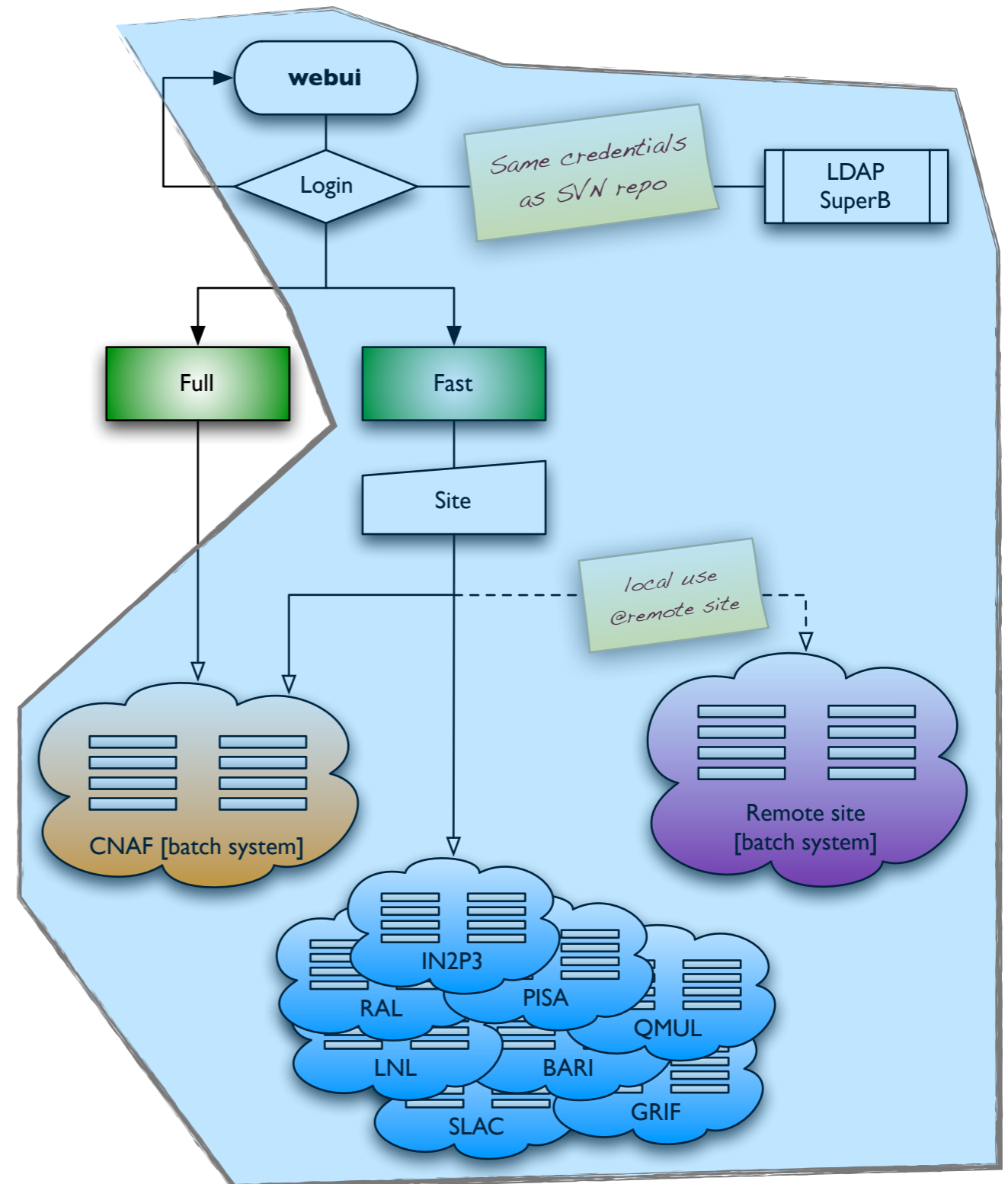
- **FastSim**

  - generator, geometry, bkg mixing files (tcl, dec, …) <u>must</u> be in the software

  - Production root ⟹ <u>permissions</u>

    - even worse than FullSim: local user + '<u>grid</u>' user

Production tools   Database

- **Bookkeeping database schema**

- Relevant metadata: geometry, generator, # of events, ...

- Status: done, prepared, submitted, running, failed, sys-failed

- wct, timestamp

- log reference, output reference, filesize
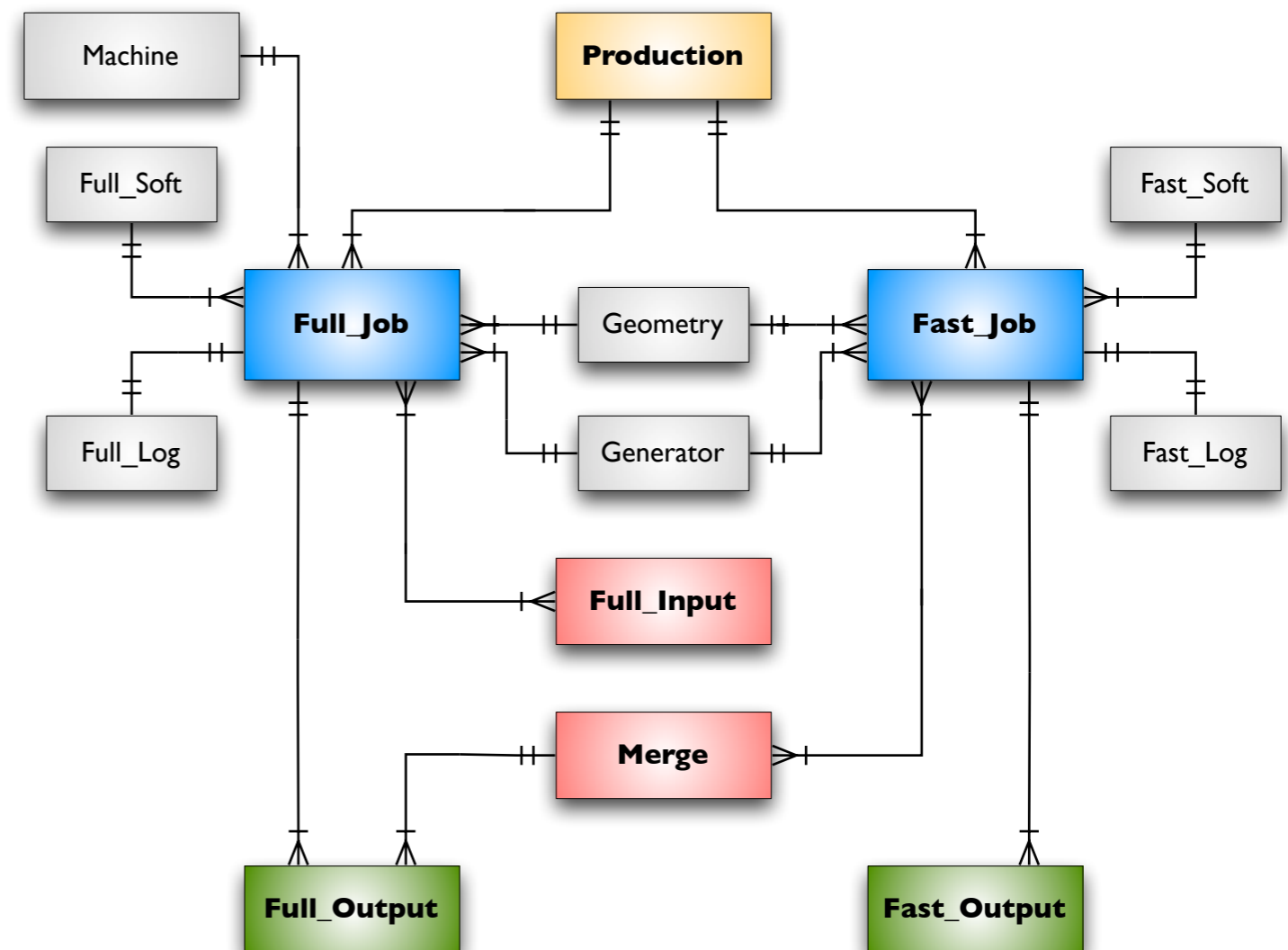
Production tools

- **bash script** which executes the simulation application

- prepared with proper parameters (from WebUI)

- base script (one per batch) with runnum as parameter

- environment + db interaction + exit status management + log and output transfer

- differentiation: LSF / Grid / SLAC

Production tools
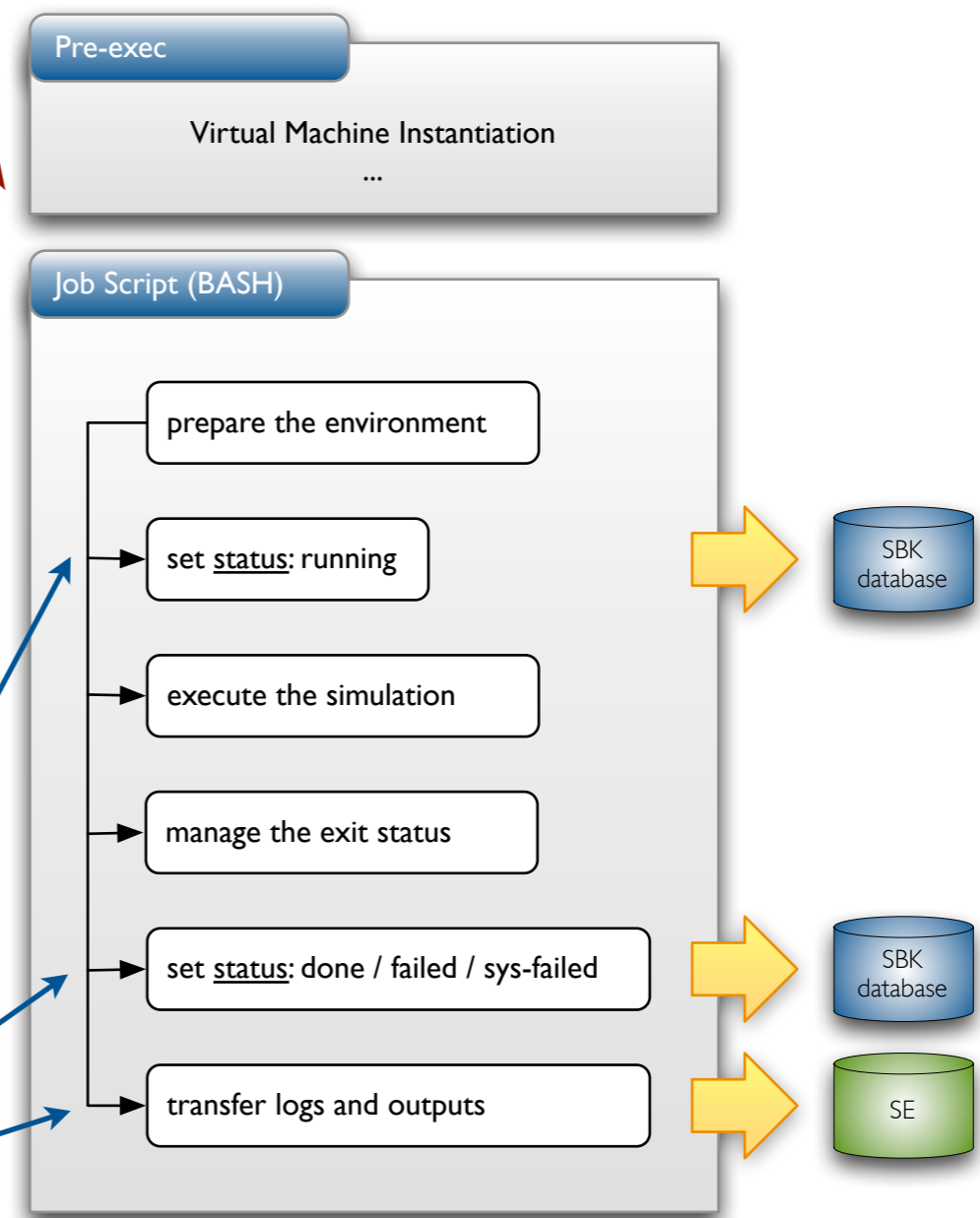
- DB interface:

  - local jobs
    direct mysql connection

  - distributed jobs
    RESTfull interface $\longrightarrow$ CURL
                                                only update

- File transfer:

  - local jobs
    cp

  - distributed jobs
    lcg-cr, lcg-cp, grid-ftp $\longrightarrow$ site dependent
                                                      failover policy

                                                      Replica on
                                                      remote site

Production tools

- Wrappers / launchers around the job scripts

- PHP *or* PHP + GANGA (Python) *or* PHP + low-level Grid commands
  The one that the production user launches from CNAF (bbr-serv09)

- Allows multi-job / multi-set submissions

- Provides initialization (inserts) of the bookkeeping database

- LSF Batch system (PHP) script provides resubmit functionalities

| Base Job Script (bash) | → | Ganga wrapper (Python) |

| WebUI Preparation | → | Submission Script (PHP) | → | Manual Launch |
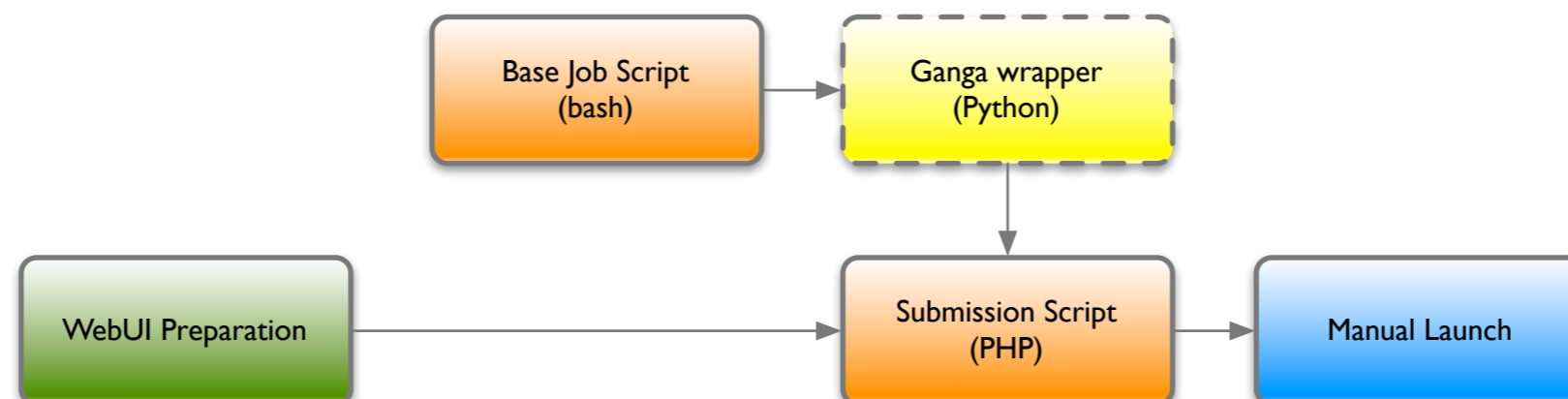
Production tools

- Bulk Submission

- Site from WebUI
  ⇛ partial use of WMS

- Site Requirements / CE(s)
  embedded in the scripts
  ⇛ partial use of WMS

- GridJobID management

- Access to the Dashboard
  included

Production tools

- **FastSim Distributed**
  input files and test release have
  been transferred via LCG-Utils
  to remote SE

- Submission performed by
  GANGA

- WMS routes the job(s) to the
  remote site

- The job is scheduled by the
  remote CE to their WN

Production tools

- **FastSim Distributed**
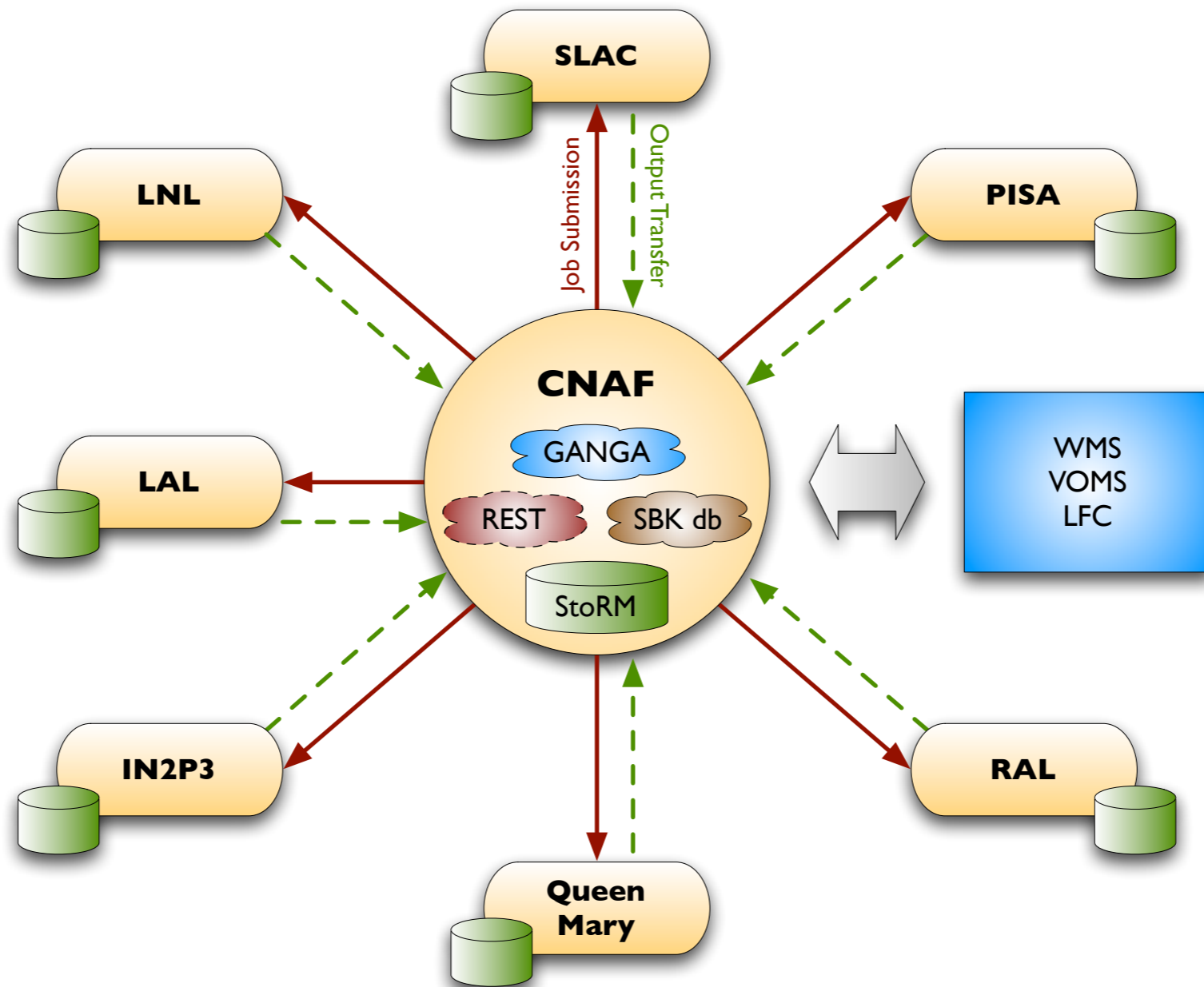
- Basic Monitor based on <u>bookkeeping database</u>

- Parametric

- Detailed

- Log file a

- Check o

Job's Output

channel_type	location_path	file_name	size	
DstD0ToKspipi	/storage/gpfs_superb/prod/2010_February_Generics/FastSim/DG_3/B0B0bar_generic/1003011099	DstD0ToKspipi.root	1.453 mb	✔
HadRecoil	/storage/gpfs_superb/prod/2010_February_Generics/FastSim/DG_3/B0B0bar_generic/1003011099	HadRecoil.root	4.690 mb	✔
S2b	/storage/gpfs_superb/prod/2010_February_Generics/FastSim/DG_3/B0B0bar_generic/1003011099	S2b.root	0.596 mb	✔
SemiLepKplusNuNu	/storage/gpfs_superb/prod/2010_February_Generics/FastSim/DG_3/B0B0bar_generic/1003011099	SemiLepKplusNuNu.root	0.062 mb	✔
TwoBody	/storage/gpfs_superb/prod/2010_February_Generics/FastSim/DG_3/B0B0bar_generic/1003011099	TwoBody.root	0.081 mb	✔

events
1 576 440 000
35 545 000
96 265 000
1 708 250 000

number: 1002002000
number: 1003013629

996 s (18.758 yr)

(show) (output) (graph)

259 jobs found matching the search criteria.

Runnum start end	# o eve							wct (s)
100200 100301							uperbBk	
1003013599	10000	B0B0bar_generic	DG_3	V0.2.1 221	done	1072757	INFN-T1	MixSuperbBkg_NoPair.tcl 19213.24
1003013598	10000	B0B0bar_generic	DG_3	V0.2.1 221	done	1072756	INFN-T1	MixSuperbBkg_NoPair.tcl 18830.00
1003013597	10000	B0B0bar_generic	DG_3	V0.2.1 221	done	1072755	INFN-T1	MixSuperbBkg_NoPair.tcl 19634.58
1003013596	10000	B0B0bar_generic	DG_3	V0.2.1 221	done	1072754	INFN-T1	MixSuperbBkg_NoPair.tcl 23934.02
1003013595	10000	B0B0bar_generic	DG_3	V0.2.1 221	done	1072753	INFN-T1	MixSuperbBkg_NoPair.tcl 19002.69

Production tools

- Reports on sites, channels and last status changes (only FastSim)

February Production

- 2010_February_Generics   integrated wct = 591541996s (18.8yr)

  20876 submitted jobs: 19180 done   544 failed   1152 sys-failed

  ⇒ 92% success rate (failures are mostly due to <u>tests, site overload, config</u>)
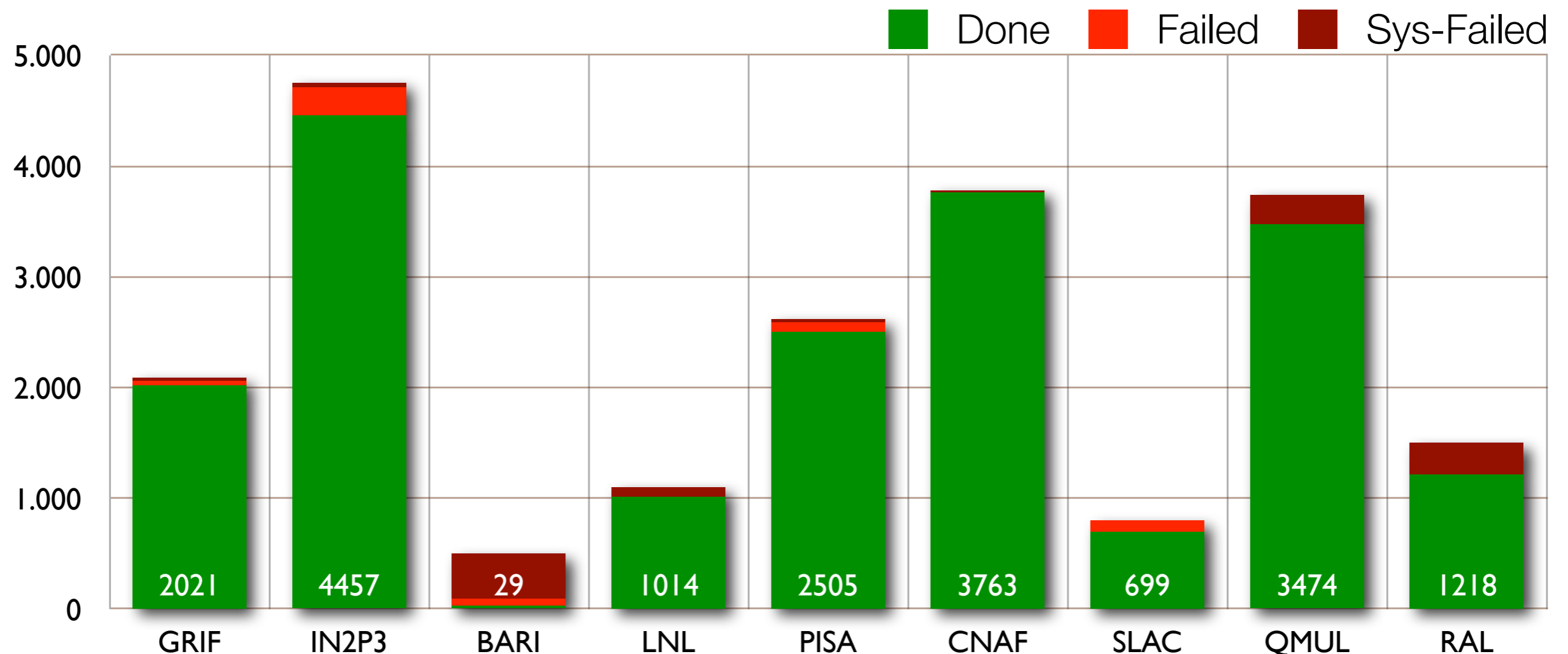
February Production Failures

- 2010_February_Generics

- Access to input files and/or software @remote sites (site overloads)   2.6% - (544)

- Tests (@BARI, @SLAC)   2.4% - (504)

- Proxy expiration (under investigation)   2.0% - (422)

- Output and Log transfers   3.0% - (629)

simply N / Total Number of submitted jobs
[overlap of failure causes]

February Production

- FullSim   background frames: $1 \cdot 10^6$ events
              background studies: $8 \cdot 10^5$ events

- FastSim   generics: $\sim 1.5 \cdot 10^9$ events + 10^8 events   ($\geq$20% of requests)
              signal mode: $\sim 8 \cdot 10^7$ events   (100% of requests)

Number of events (no background mixing)

Number of events (background mixing)
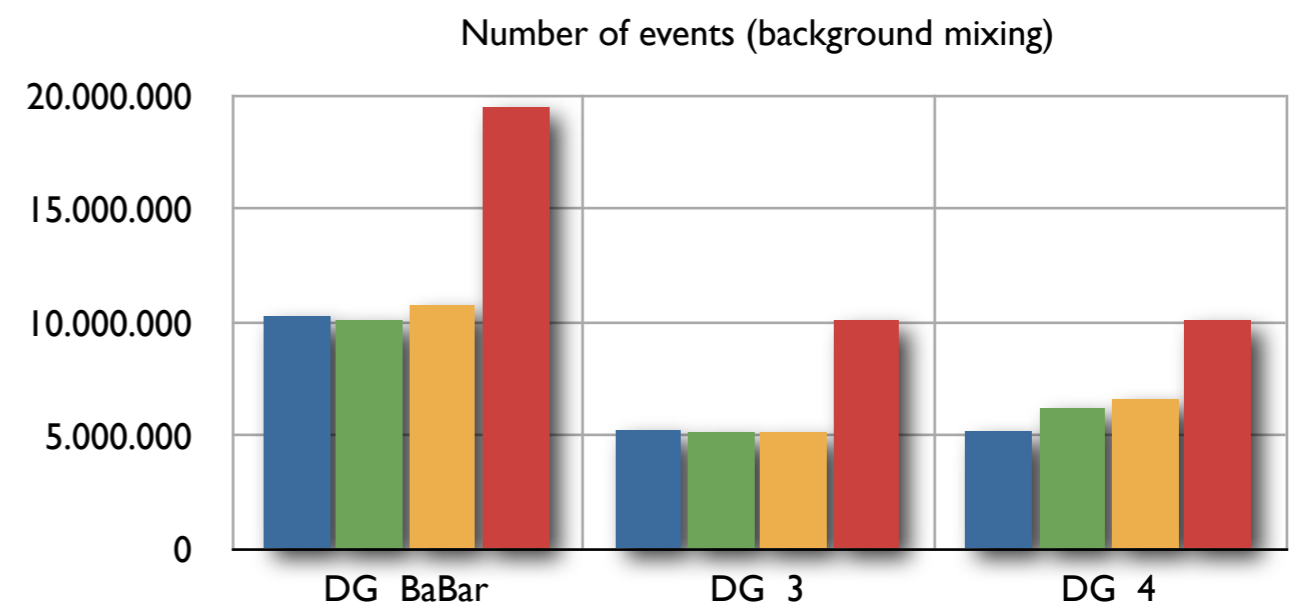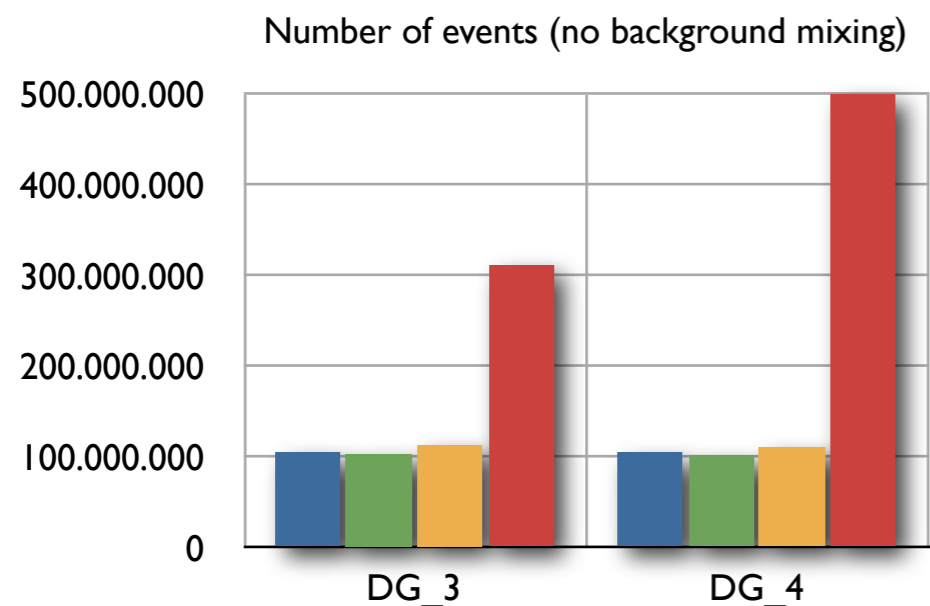
B+B-_generic   B0B0bar_generic   ccbar   uds

- Full Simulation (two flavours)

- Fast Simulation (two flavours)

- Not taking into account the Prod. Tools development/testing time
  3 people: **A. Fella**, M. Ronzano, **L. Tomassetti**
  24/24 ~~with some kind of shifts~~
  3 exhausting weeks!

- Some issues:
  - software build and distribution
  - configuration
  - interactions with others users
  - scheduling

see A. Fella talk

- Manual check of site load – both local (LSF) and remote
  ⇛ ~~collisions with user jobs~~, collaboration with site contacts extremely helpful

- Manual adjustment of job parameters (with interaction with experts)
  ⇛ running time as a function of numbers of events, geometry, generator, ...

- Manual check and management of SE (central repository) load
  ⇛ distribution in time of file transfers (job duration, scheduling, ...)

  ⇛ collisions with analysis and user accesses

- Write permissions on SE
  ⇛ local user, storm user

Next Productions Configuration

- Organization of software deployment

  - Common location for simulation programs (work dir and test releases)

  - Agreement on configuration file and structure (mac, gdml, tcl, ...)
    $\Rightarrow$ independence of executables from configuration files

  - Better separation of site requirements/parameters and job script

  - Automatic generation and distribution of test releases (fastsim)

Baseline to involve more people...

Conclusions

- Overview of the Production Tools

- FullSim & FastSim WebUI

- Use of the distributed infrastructure to enhance our computing power

- Very brief report on last productions

- Necessity to generalize the Tools and improve the inter-independence with software

- Involve more people

Open Questions

- Data accessibility

- Analysis of production performances

- Grid submission of FullSim jobs?

- Evolution of simulation executables (new features $\Rightarrow$ upgrade to Prod. Tools)

- Next Production: July – September?