

General components of Grid middleware and User Interfaces

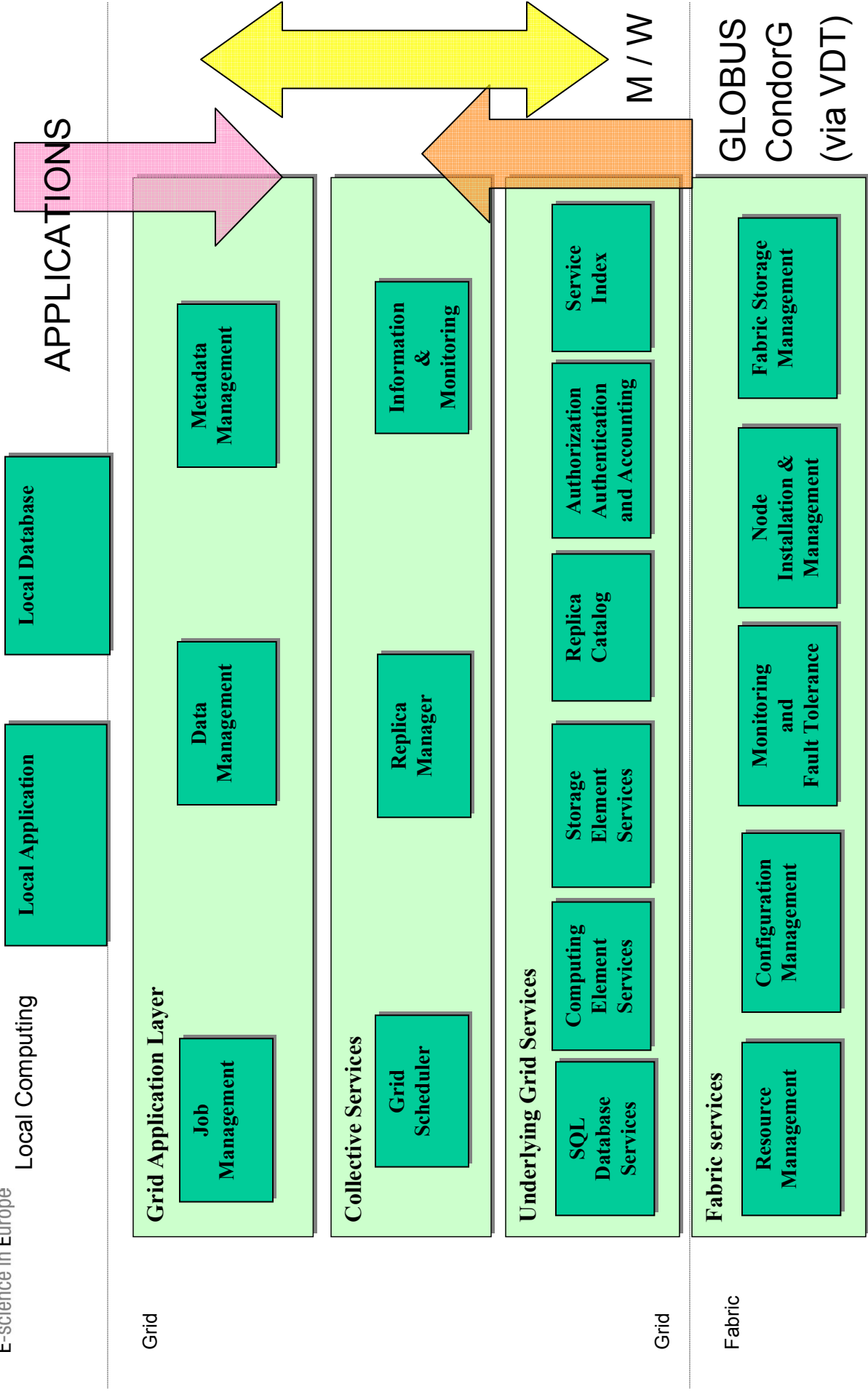
Roberto Barbera



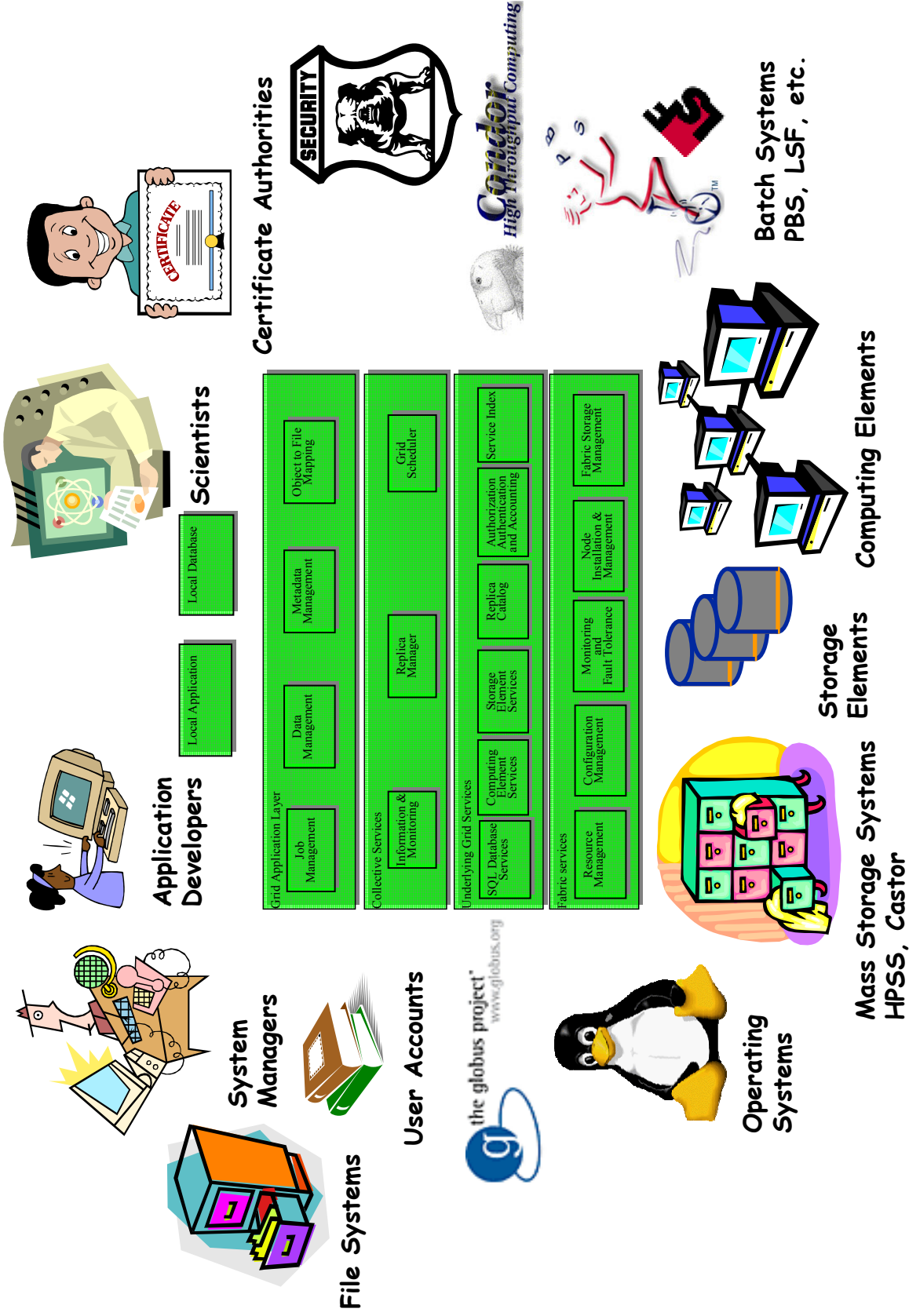
EGEE is funded by the European Union under contract IST-2003-508833

- The multi-layer model of middleware services
- The Command Line user interface
- The GENIUS Portal
- Summary and conclusions

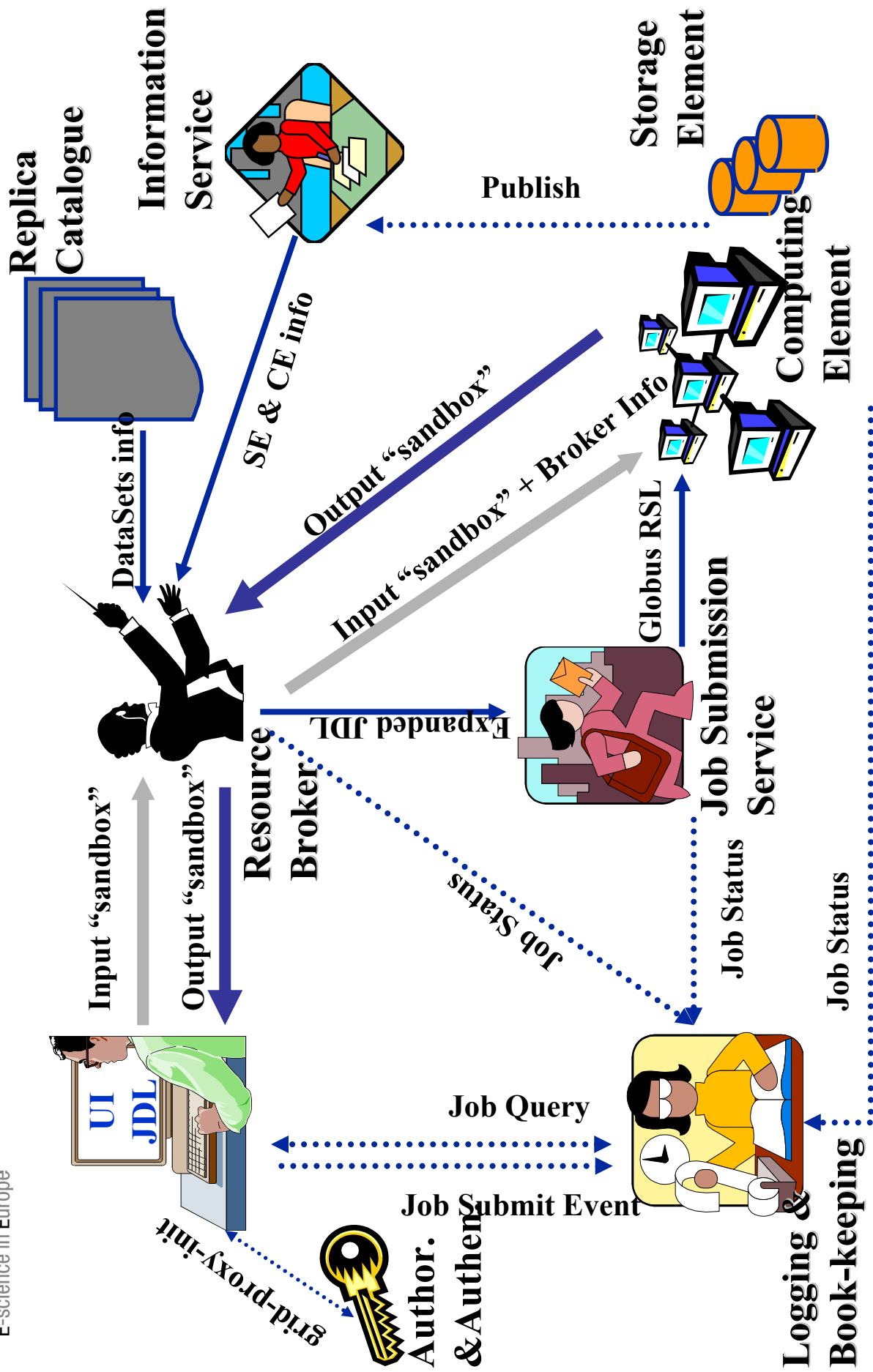
Middleware architecture



Middleware interfaces



Job workflow



The Command Line user interface

- The user interacts with Grid via a **Workload Management System (WMS)**
- The Goal of WMS is the **distributed scheduling and resource management in a Grid environment.**
- What does it allow Grid users to do?
 - To submit their jobs
 - To execute them on the “best resources”
 - The WMS tries to optimize the usage of resources
 - To get information about their status
 - To retrieve their output

Job Description Language (JDL)

- The supported attributes are grouped in two categories:
 - Job Attributes
 - Define the job itself
 - Resources
 - Taken into account by the RB for carrying out the matchmaking algorithm (to choose the “best” resource where to submit the job)
 - *Computing Resource*
 - Used to build expressions of Requirements and/or Rank attributes by the user
 - Have to be prefixed with “other.”
 - *Data and Storage resources*
 - Input data to process, SE where to store output data, protocols spoken by application when accessing SEs

JDL: relevant attributes

- **JobType**
 - *Normal* (simple, sequential job), *Interactive*, *MPICH*, *Checkpointable*
 - Or combination of them
- **Executable** (mandatory)
 - The command name
- **Arguments** (optional)
 - Job command line arguments
- **StdInput, StdOutput, StdError** (optional)
 - Standard input/output/error of the job
- **Environment**
 - List of environment settings
- **InputSandbox** (optional)
 - List of files on the UI local disk needed by the job for running
 - The listed files will automatically staged to the remote resource
- **OutputSandbox** (optional)
 - List of files, generated by the job, which have to be retrieved

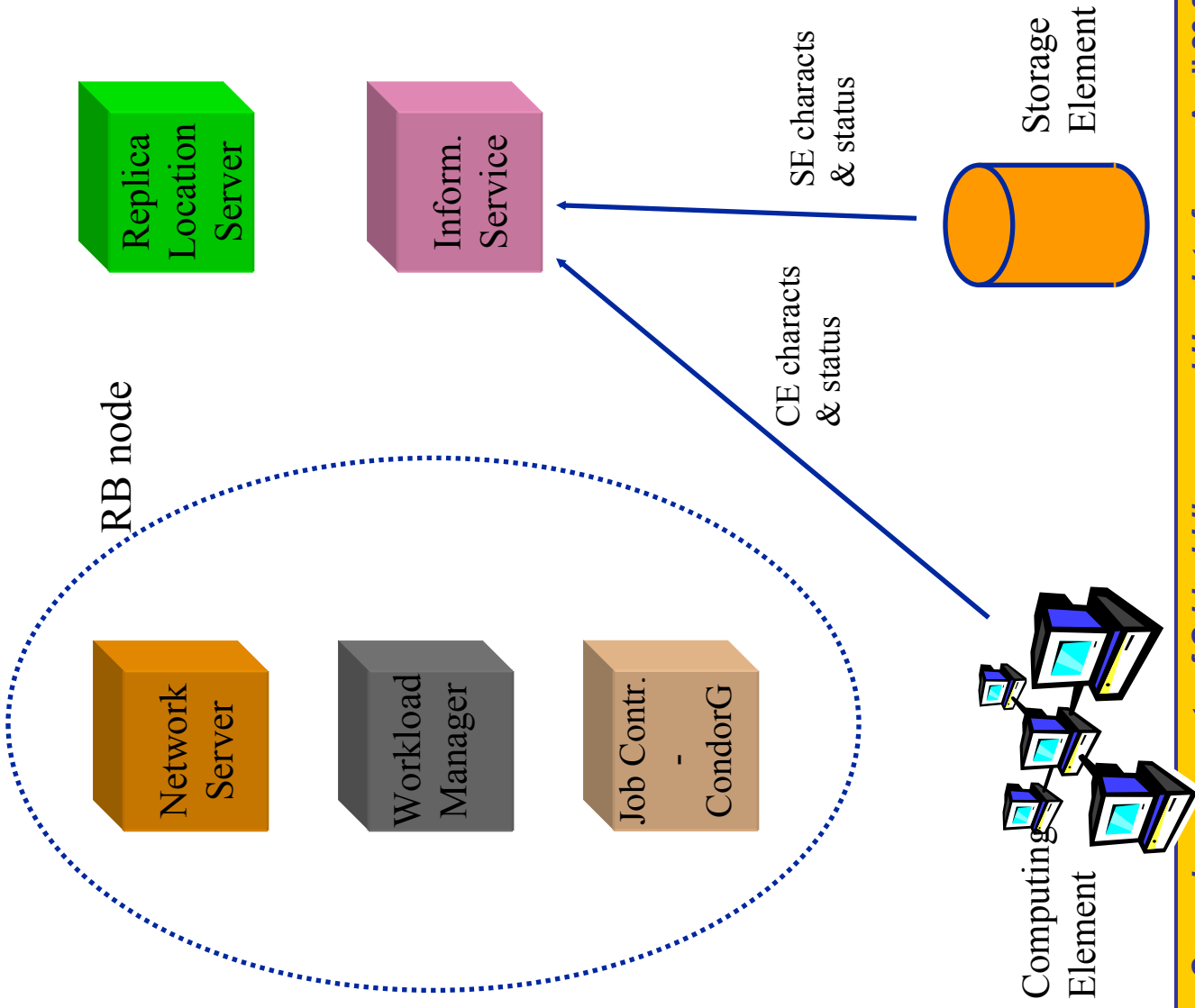
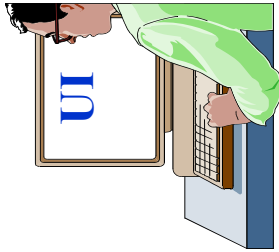
- **Requirements**
 - Job requirements on computing resources
 - Specified using attributes of resources published in the Information Service
 - If not specified, default value defined in UI configuration file is considered
 - Default: *other.GlueCEStateStatus* == "Production" (the resource has to be able to accept jobs and dispatch them on WNs)
- **Rank**
 - Expresses preference (how to rank resources that have already met the Requirements expression)
 - Specified using attributes of resources published in the Information Service
 - If not specified, default value defined in the UI configuration file is considered
 - Default: - *other.GlueCEStateEstimatedResponseTime* (the lowest estimated traversal time)
 - Default: *other.GlueCEStateFreeCPUs* (the highest number of free CPUs) for parallel jobs (see later)

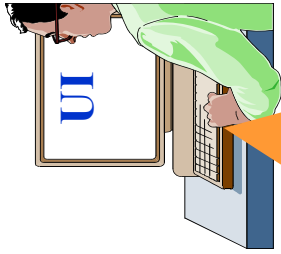
JDL: relevant attributes

- **InputData**
 - Refers to data used as input by the job: these data are published in the Replica Location Service (RLS) and stored in the SEs)
 - LFNs and/or GUIDs
- **DataAccessProtocol** (mandatory if InputData has been specified)
 - The protocol or the list of protocols which the application is able to speak with for accessing *InputData* on a given SE
- **OutputSE**
 - The Uniform Resource Identifier of the output SE
 - RB uses it to choose a CE that is compatible with the job and is close to SE

Job submission

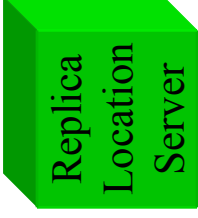
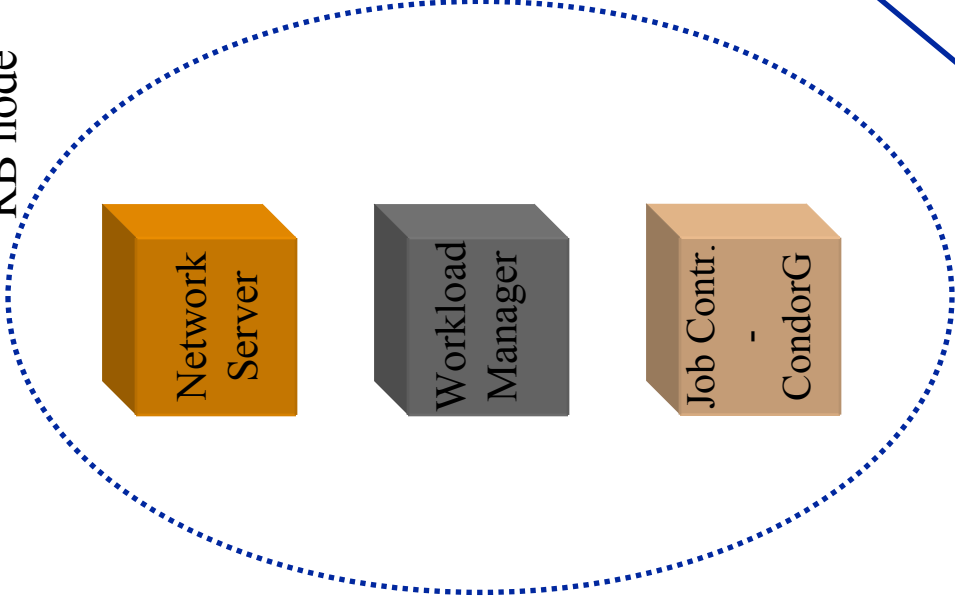
- **edg-job-submit** [**-r** *<res_id>*] [**-c** *<config file>*] [**-vo** *<VO>*] [**-o** *<output file>*] *<job.jdl>*
 - **-r** the job is submitted directly to the computing element identified by *<res_id>*
 - **-c** the configuration file *<config file>* is pointed by the UI instead of the standard configuration file
 - **-vo** the Virtual Organization (if user is not happy with the one specified in the UI configuration file)
 - **-o** the generated *edg_jobId* is written in the *<output file>*
 - Useful for other commands, e.g.:
 - **edg-job-status -i** *<input file>* (or *edg_jobId*)
 - **-i** the status information about *edg_jobId* contained in the *<input file>* are displayed





UI: allows users to access the functionalities of the WMS (via command line, GUI, C++ and Java APIs)

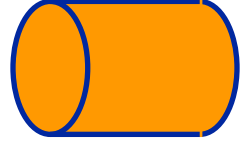
RB node



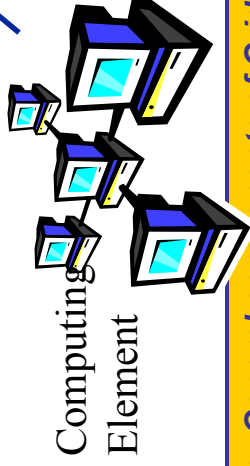
Job Status

submitted

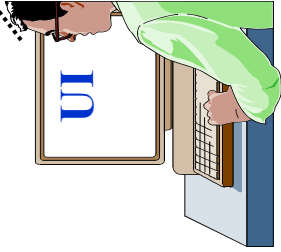
CE characts & status



Storage Element



Computing Element

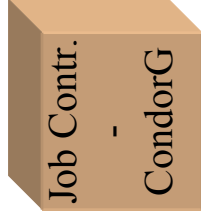


edg-job-submit myjob.jdl

Myjob.jdl

```

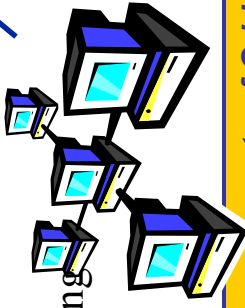
JobType = "Normal";
Executable = "${CMS}/exe/sum.exe";
InputSandbox = {"home/user/WP1testC", "/home/file*", "/home/user/DATA/*"};
OutputSandbox = {"sim.err", "test.out", "sim.log"};
Requirements = other: GlueHostOperatingSystemName == "linux" &&
other: GlueHostOperatingSystemRelease == "Red Hat 6.2" &&
other: GlueCEPolicyMaxWallClockTime > 10000;
Rank = other: GlueCEStateFreeCPUs;
    
```



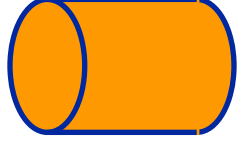
Job Description Language (JDL) to specify job characteristics and requirements

CE characts & status

SE characts & status



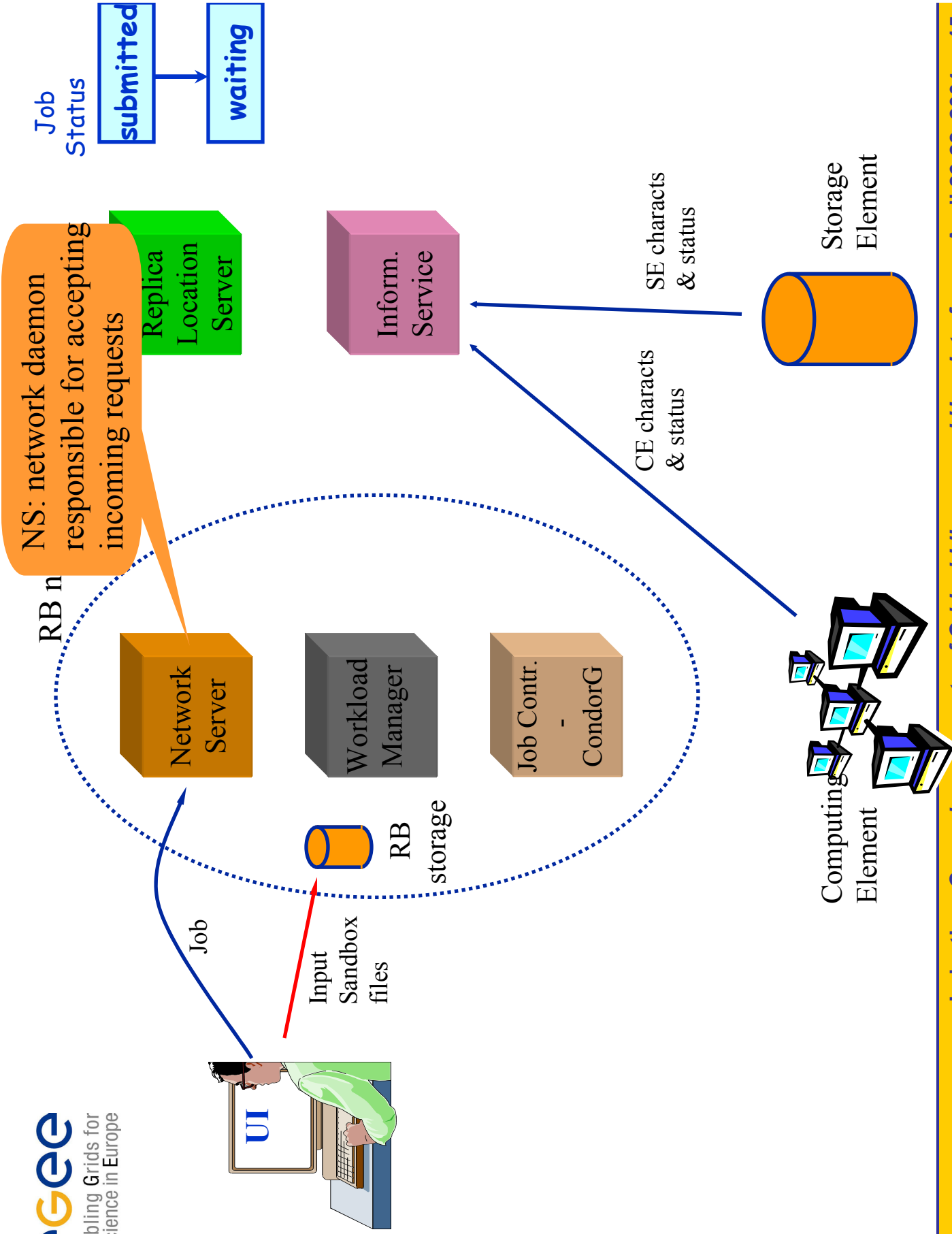
Computing Element

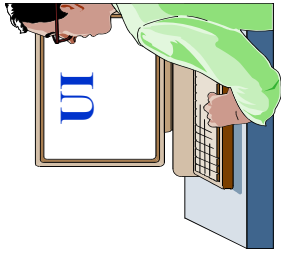


Storage Element

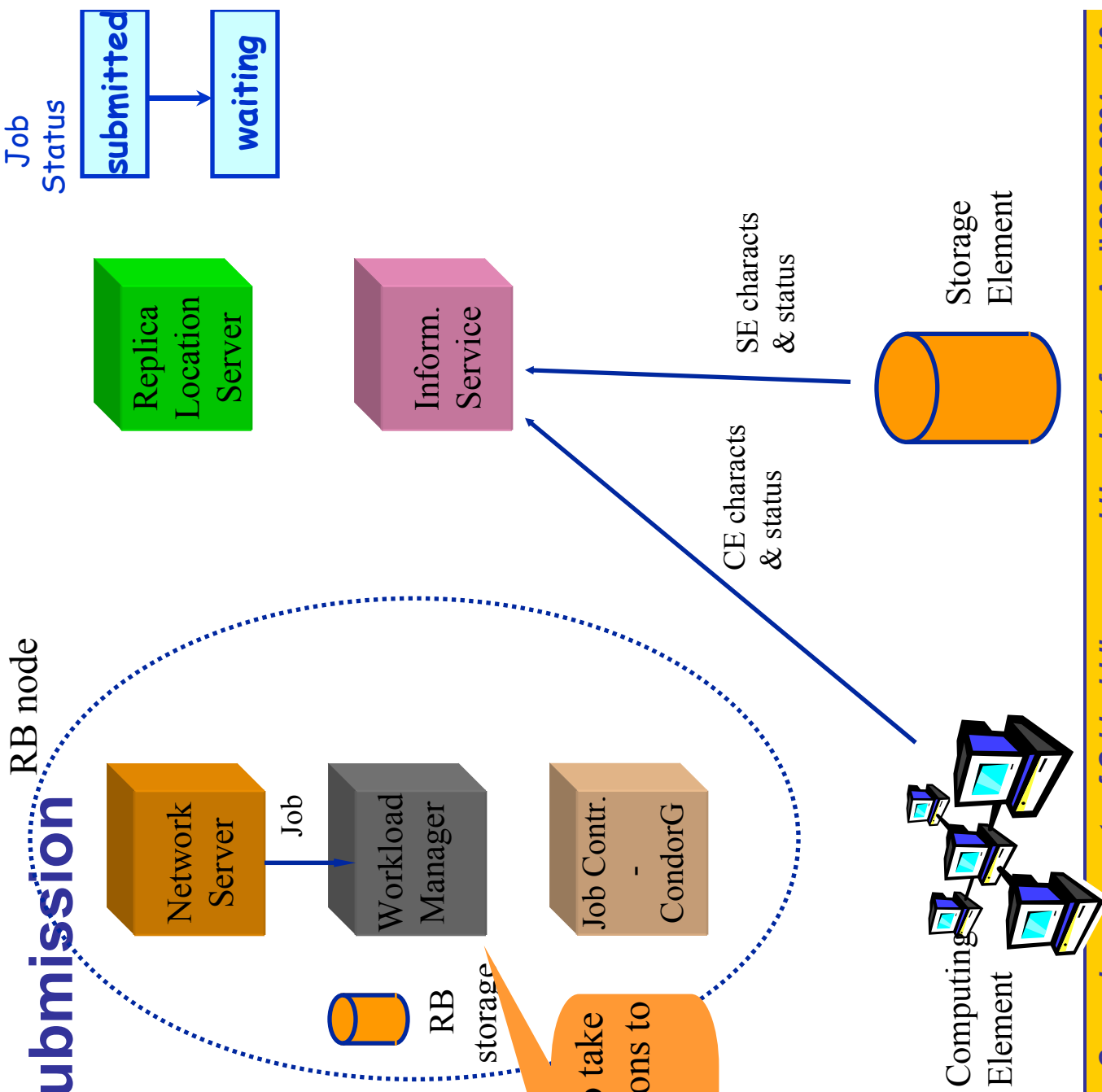
Job Status

submitted

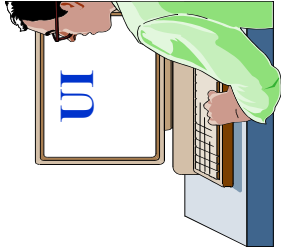




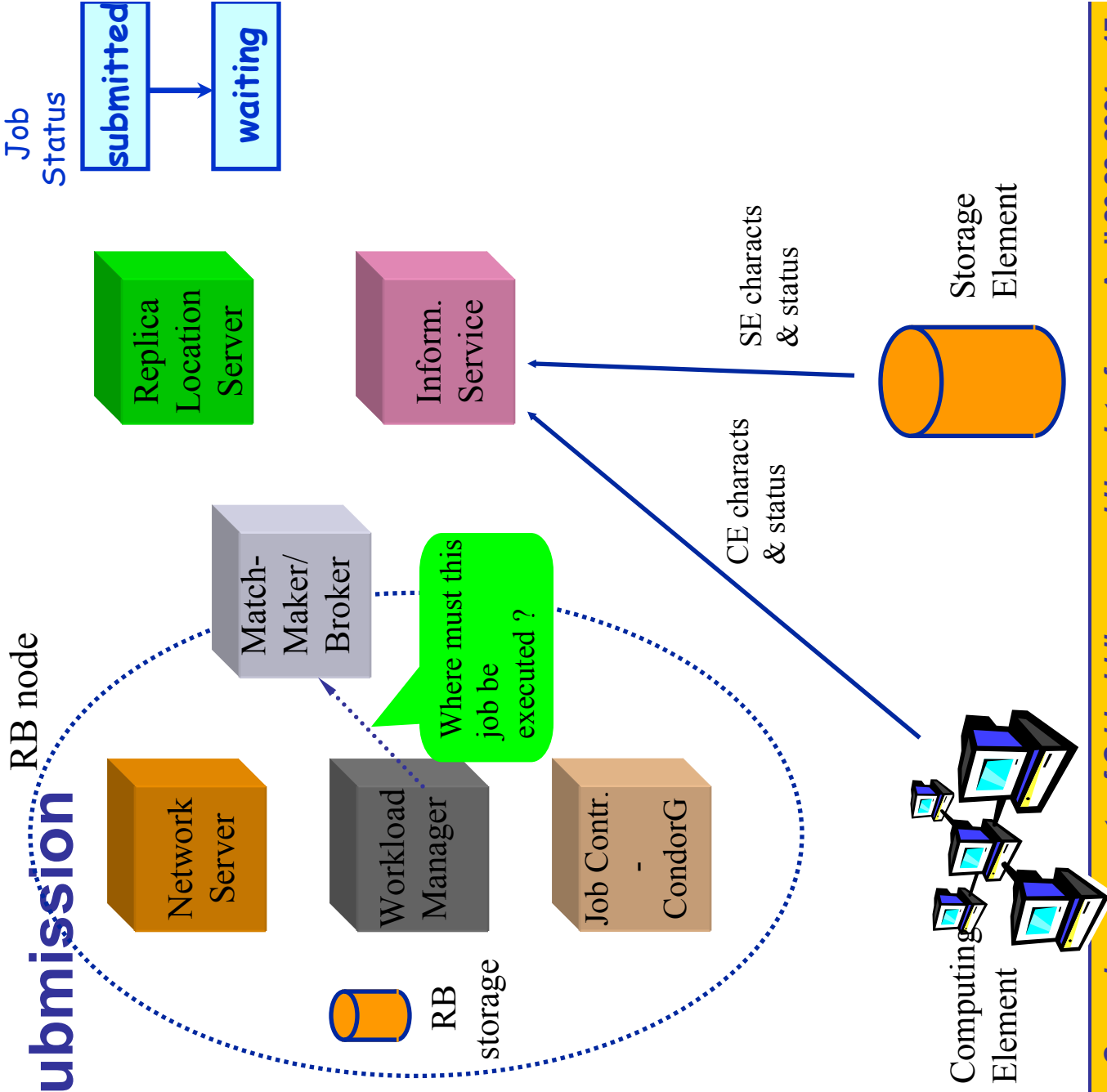
Job submission

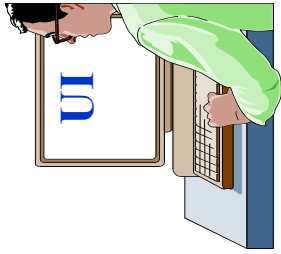


WM: responsible to take the appropriate actions to satisfy the request

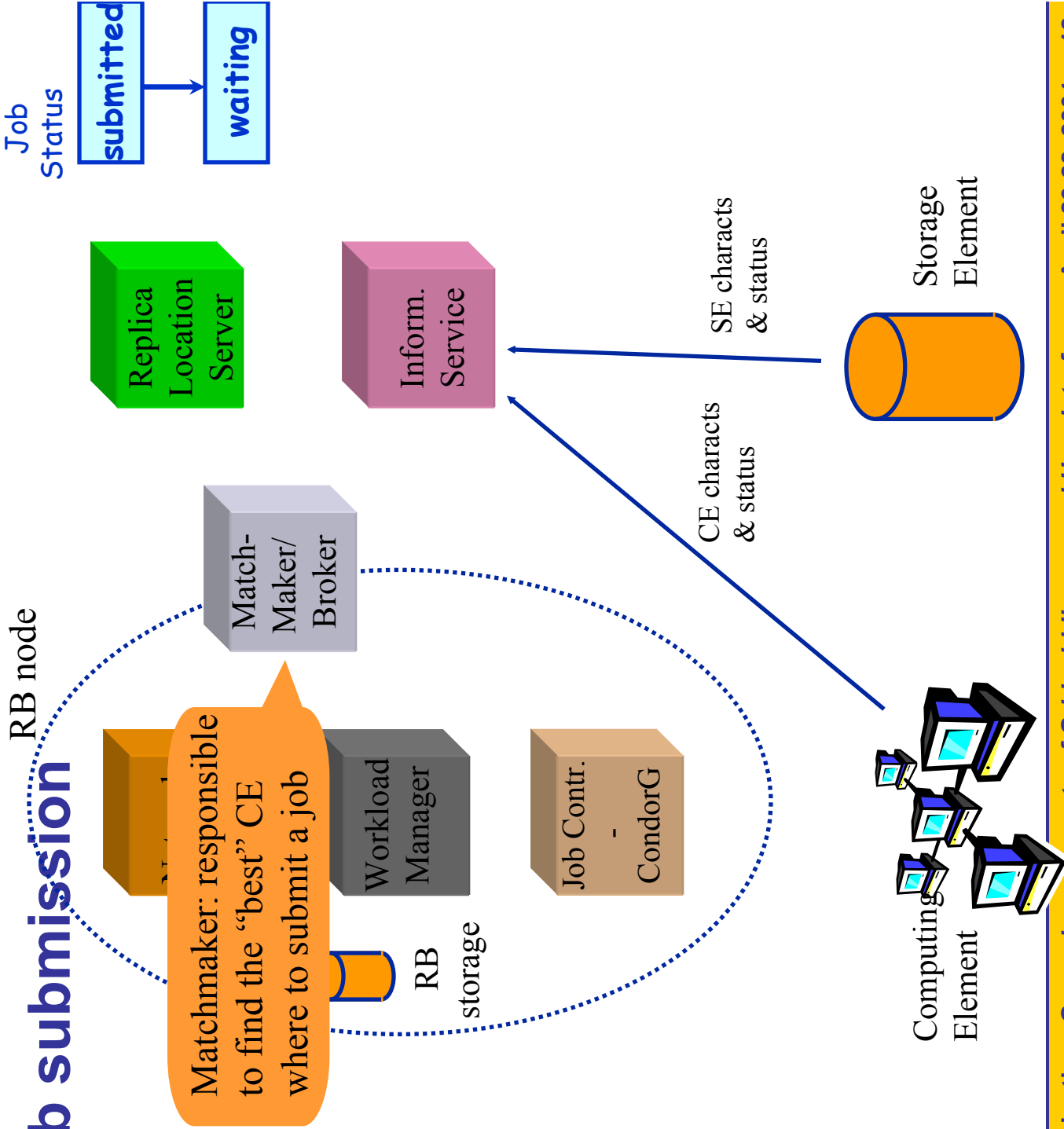


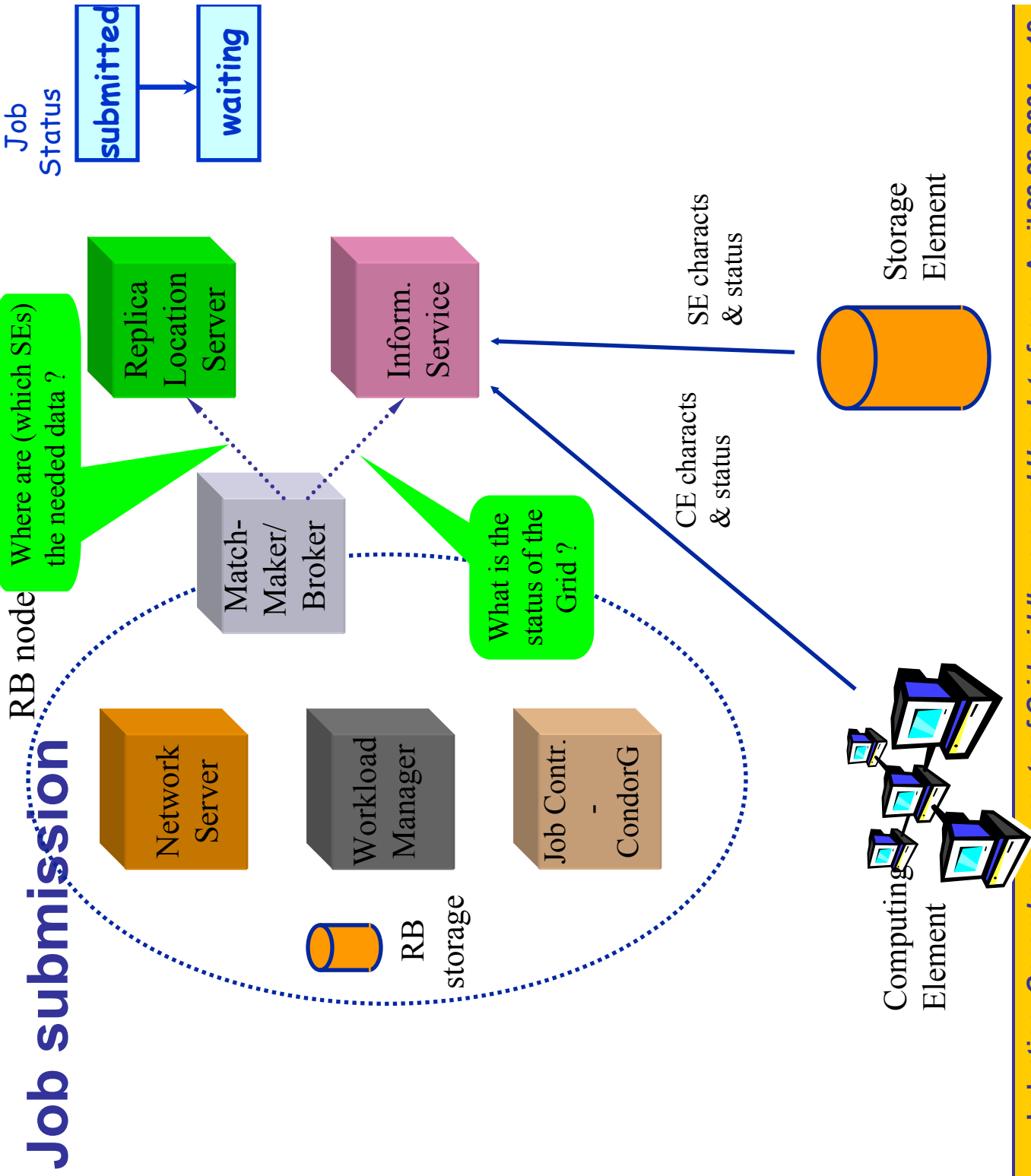
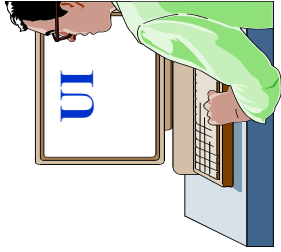
Job submission

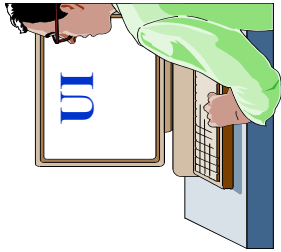




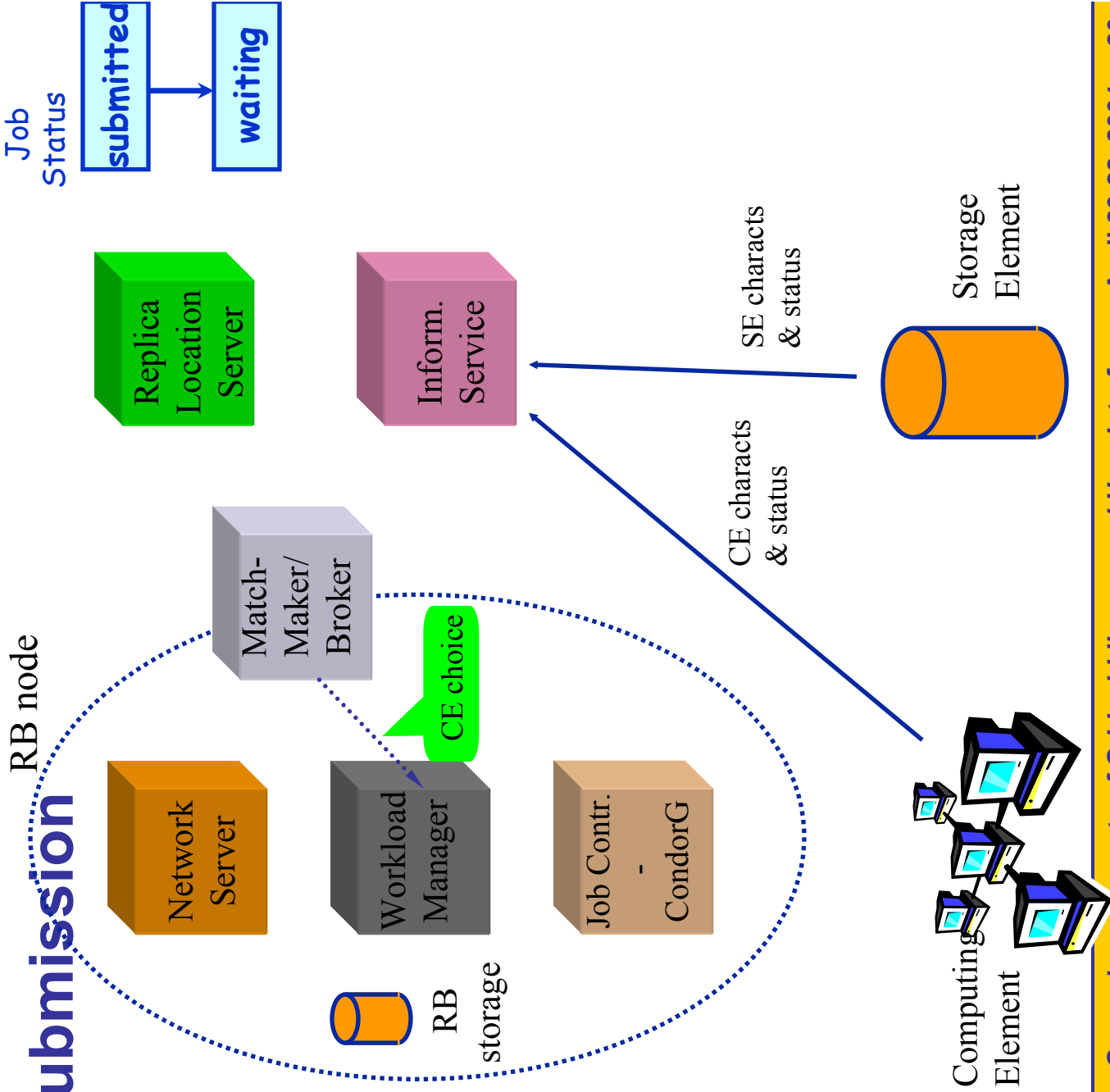
Job submission

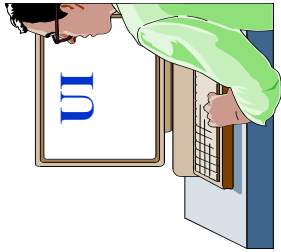




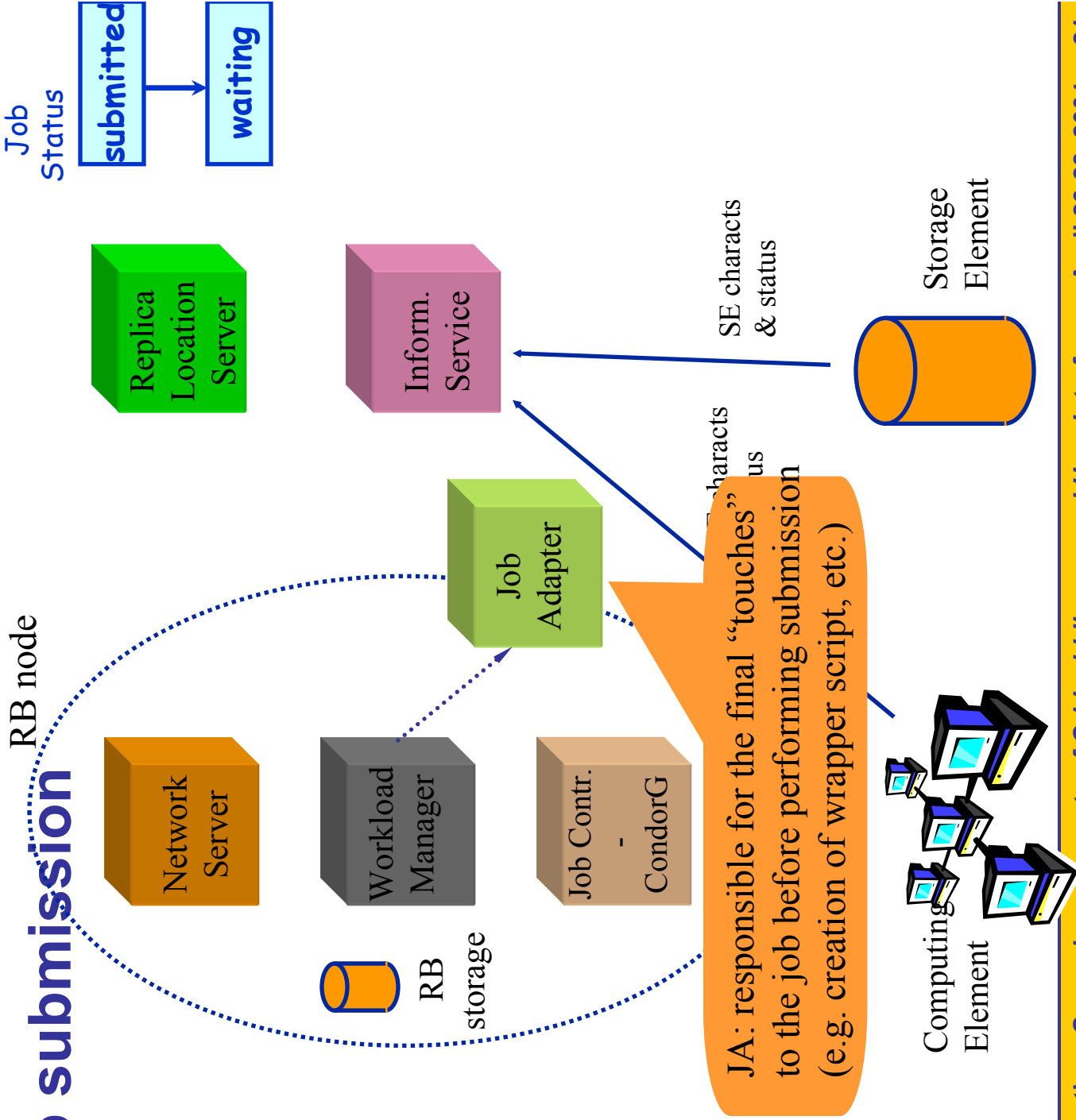


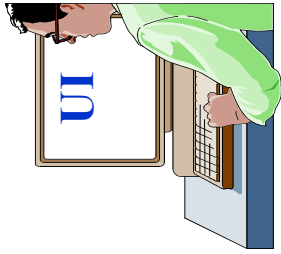
Job submission





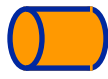
Job submission



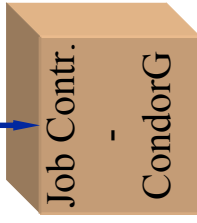


Job submission

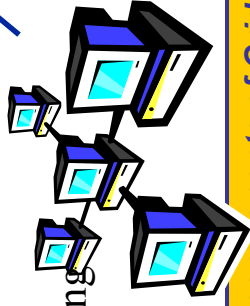
RB node



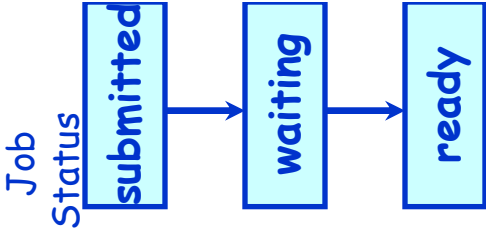
Job



JC: responsible for the actual job management operations (done via CondorG)

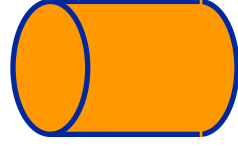


Computing Element

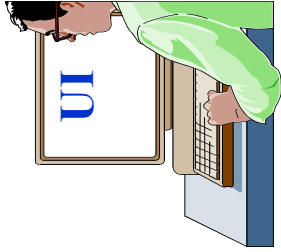


CE characts & status

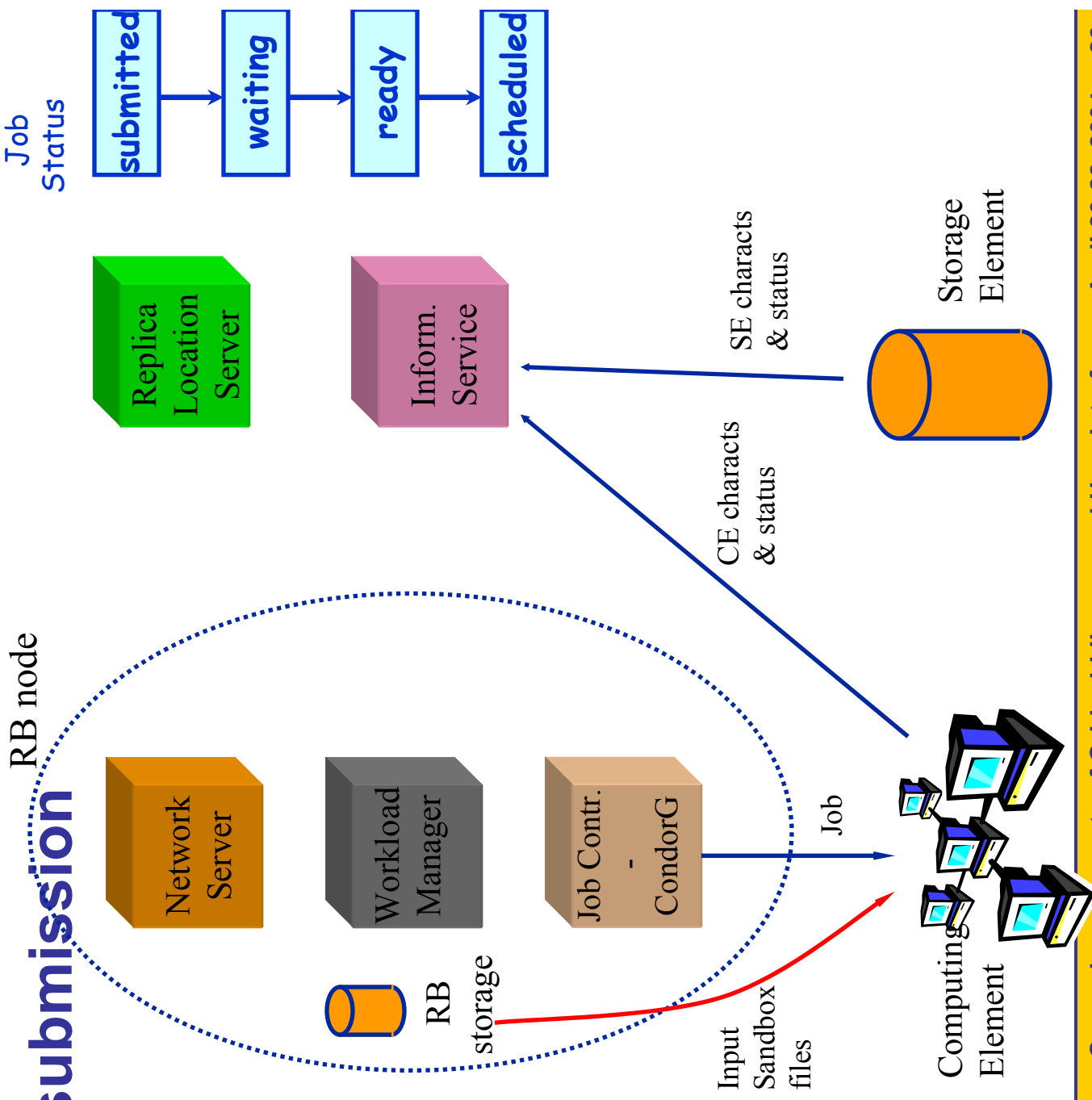
SE characts & status

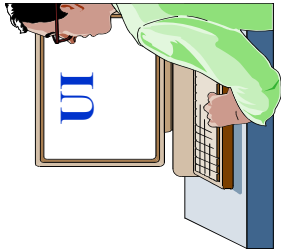


Storage Element

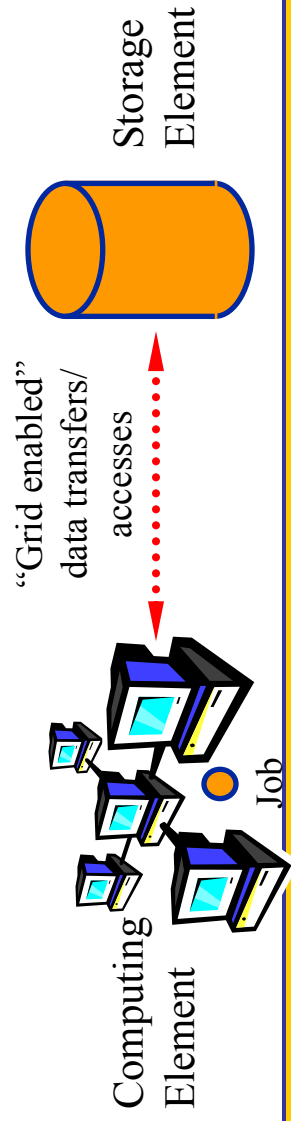
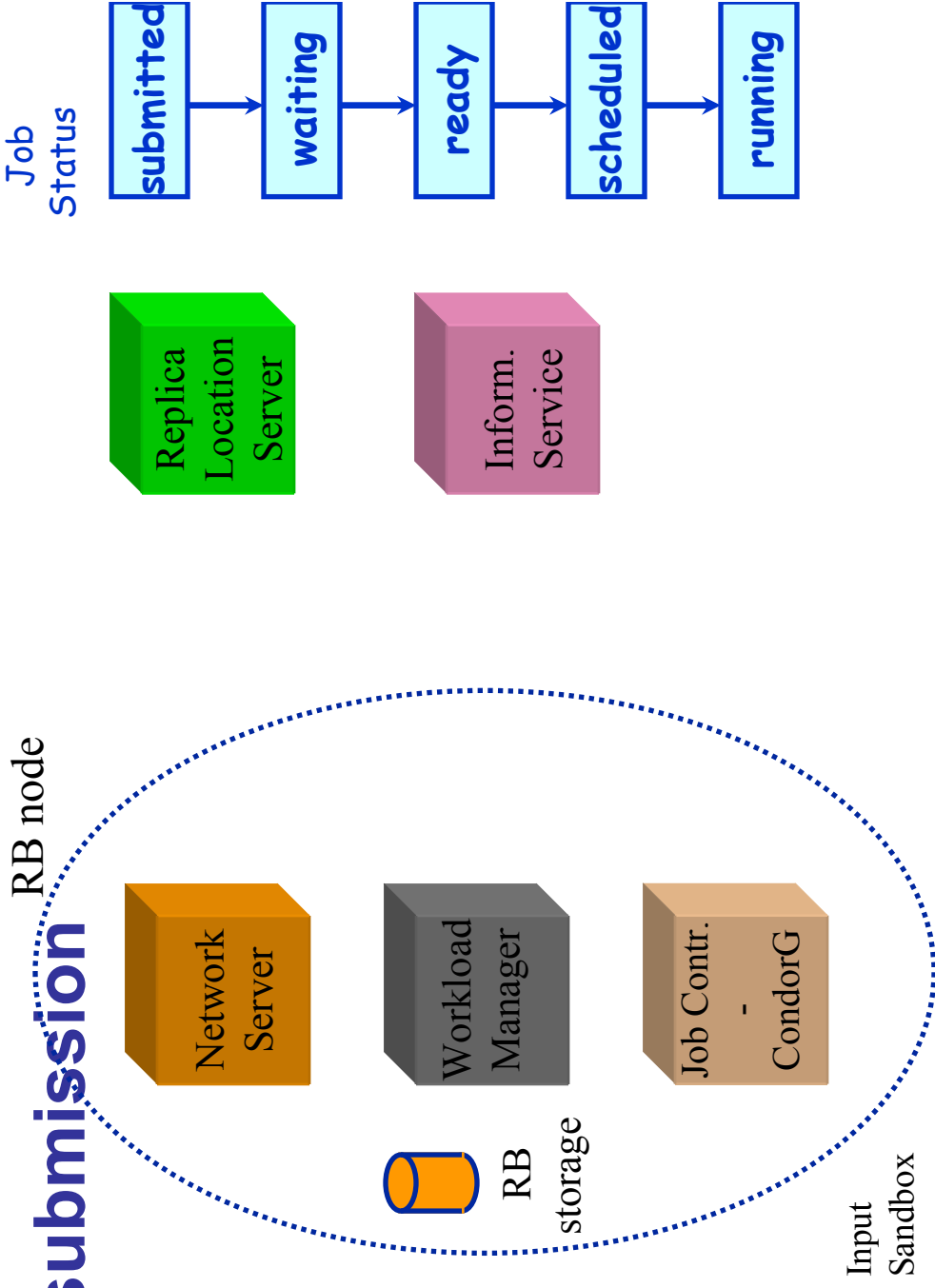


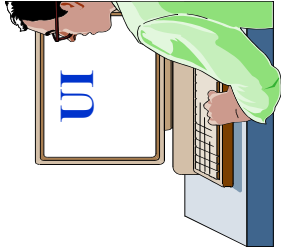
Job submission



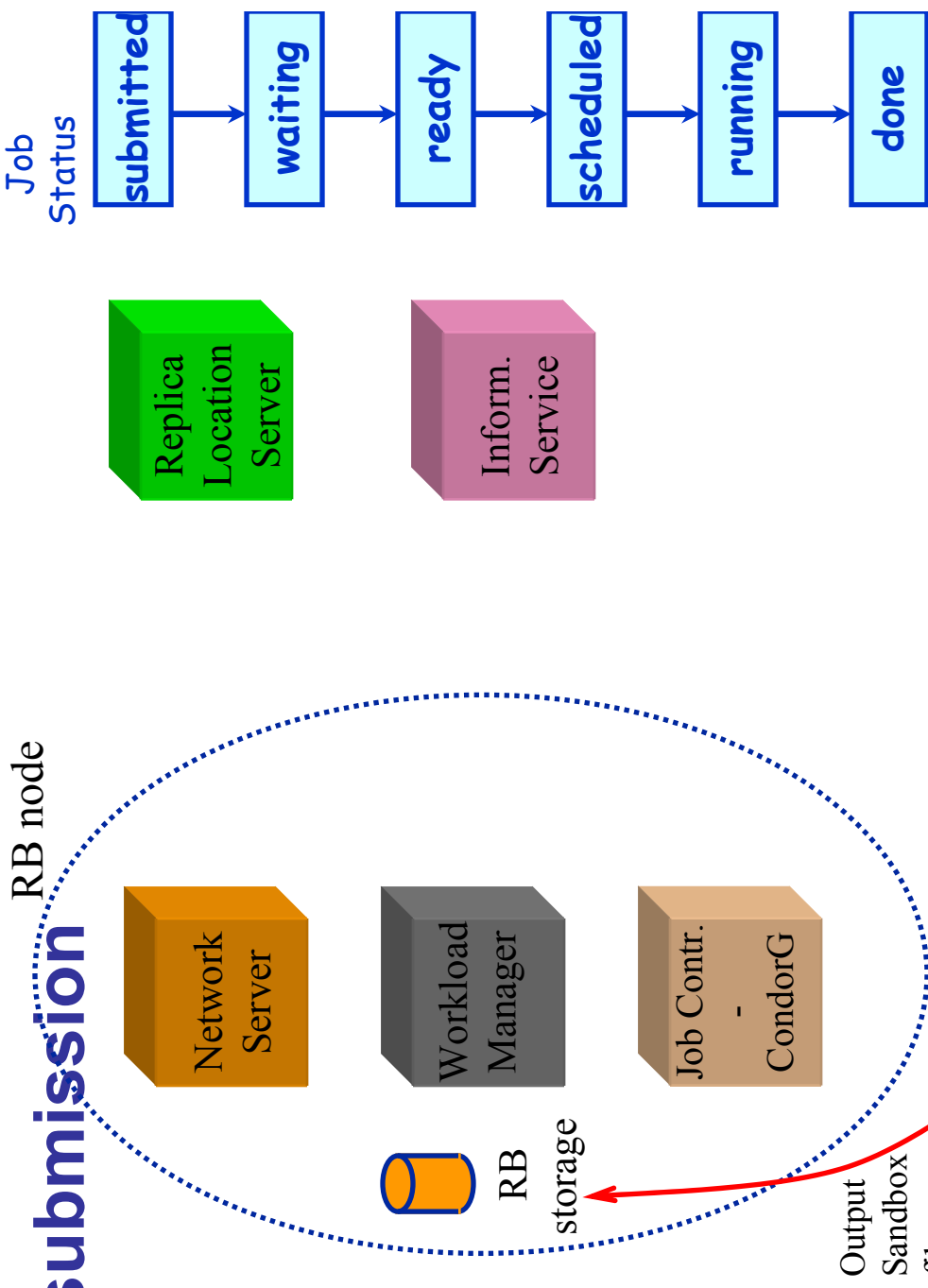


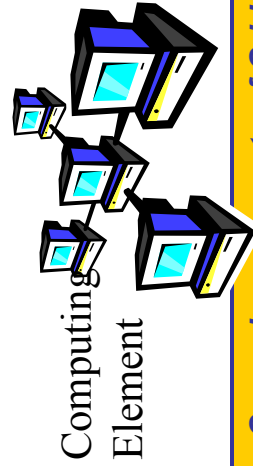
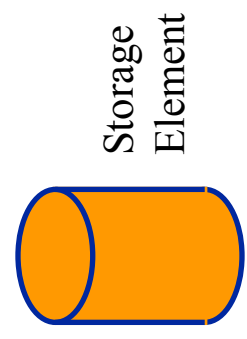
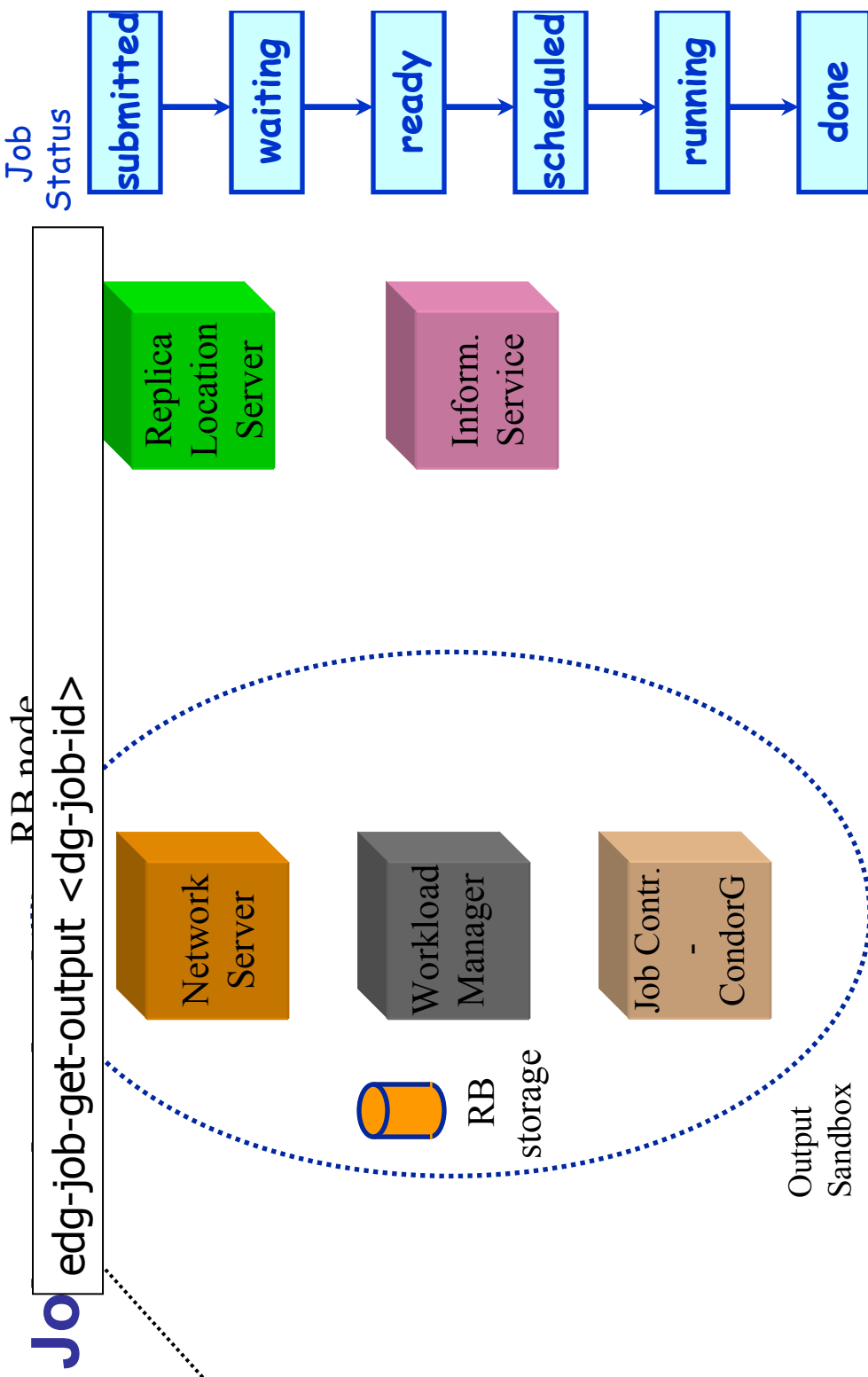
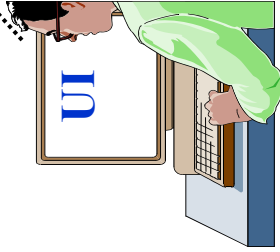
Job submission



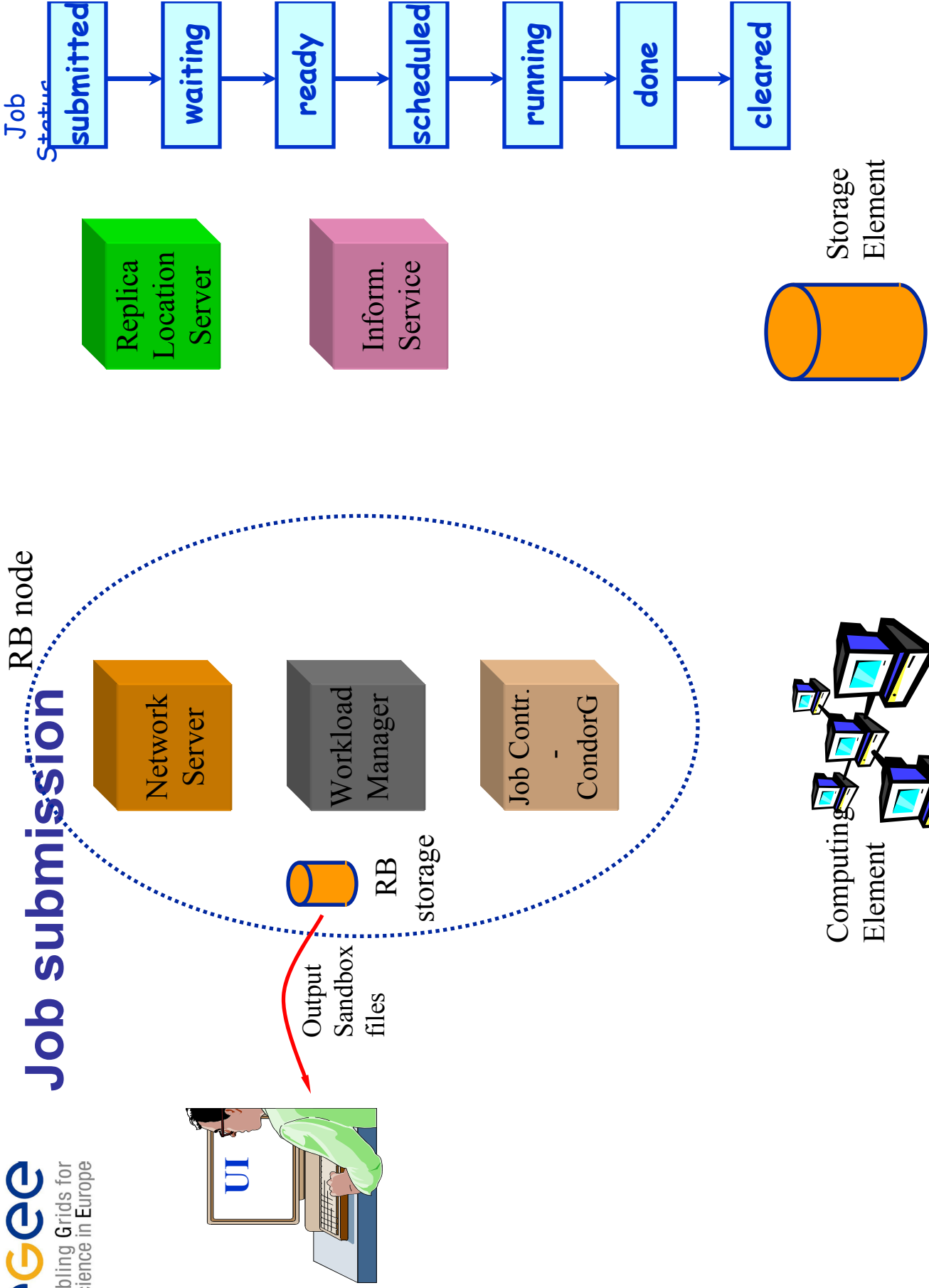


Job submission

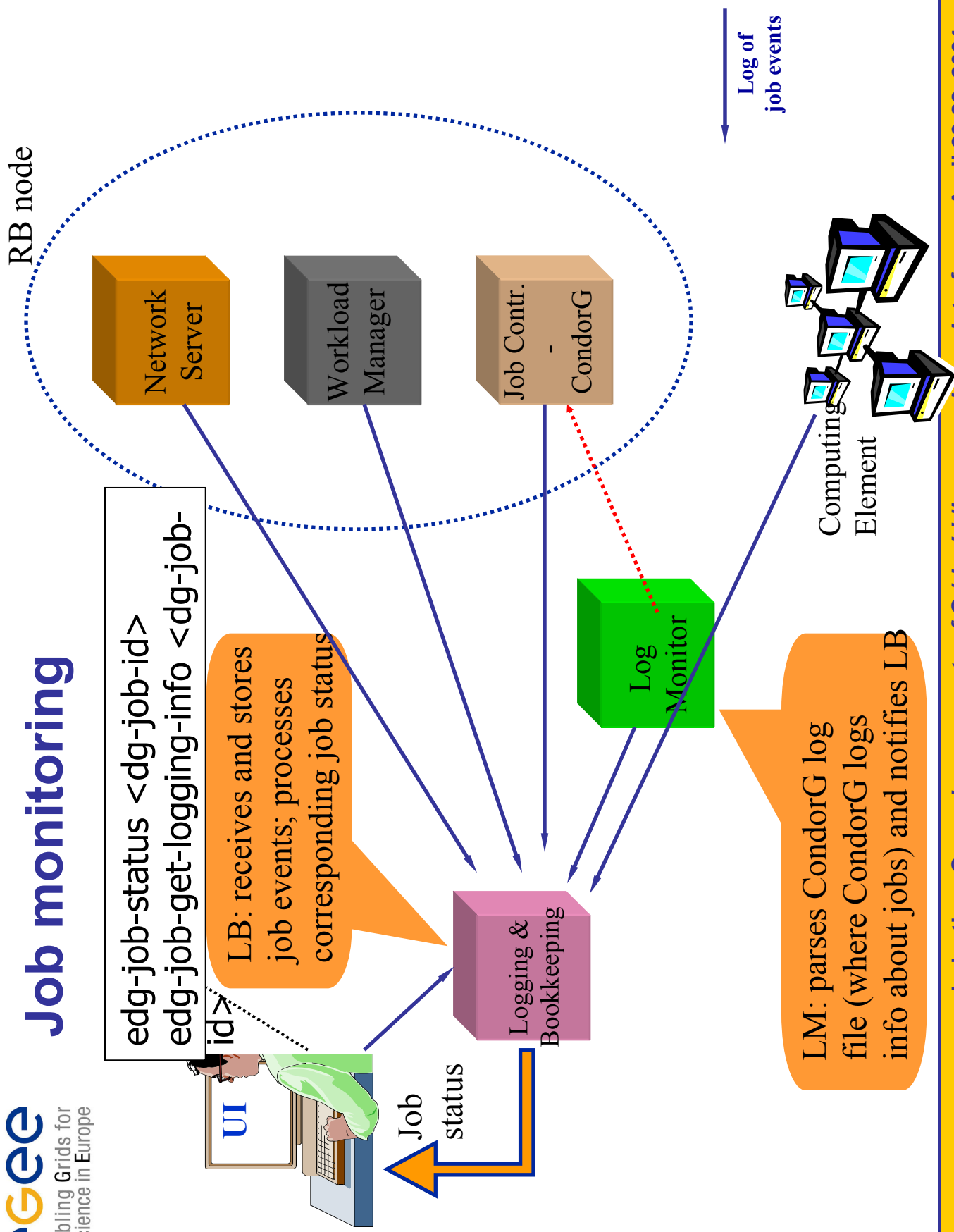




Job submission



Job monitoring

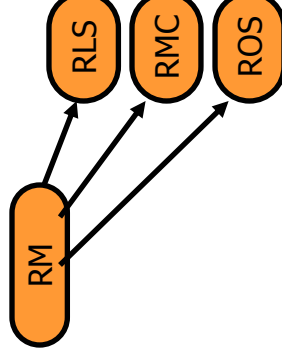


Other (most relevant) UI commands

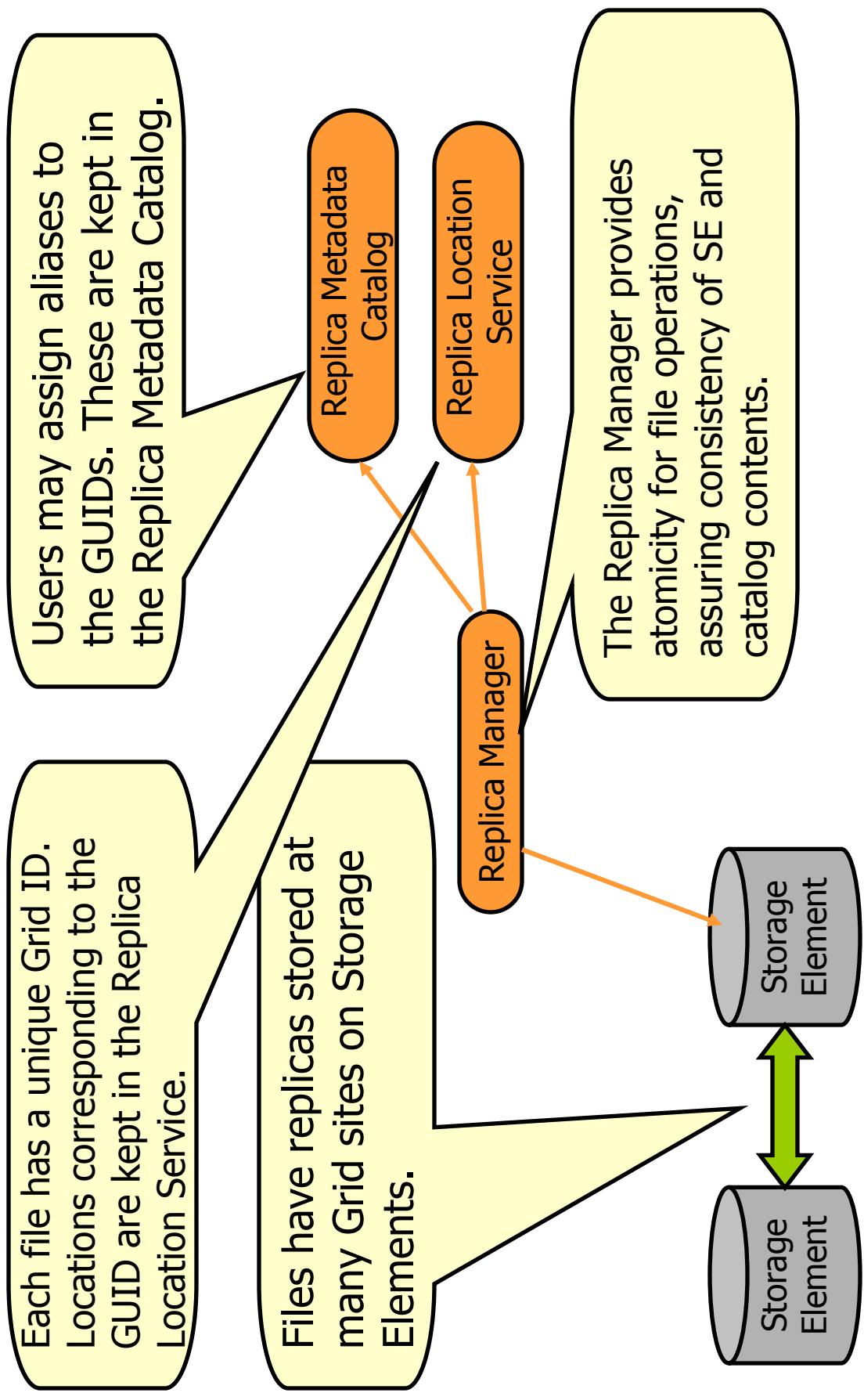
- **edg-job-list-match**
 - Lists resources matching a job description
 - Performs the matchmaking without submitting the job
- **edg-job-cancel**
 - Cancels a given job
- **edg-job-status**
 - Displays the status of the job
- **edg-job-get-output**
 - Returns the job-output (the OutputSandbox files) to the user
- **edg-job-get-logging-info**
 - Displays logging information about submitted jobs (all the events “pushed” by the various components of the WMS)
 - Very useful for debug purposes

Data Management Tools

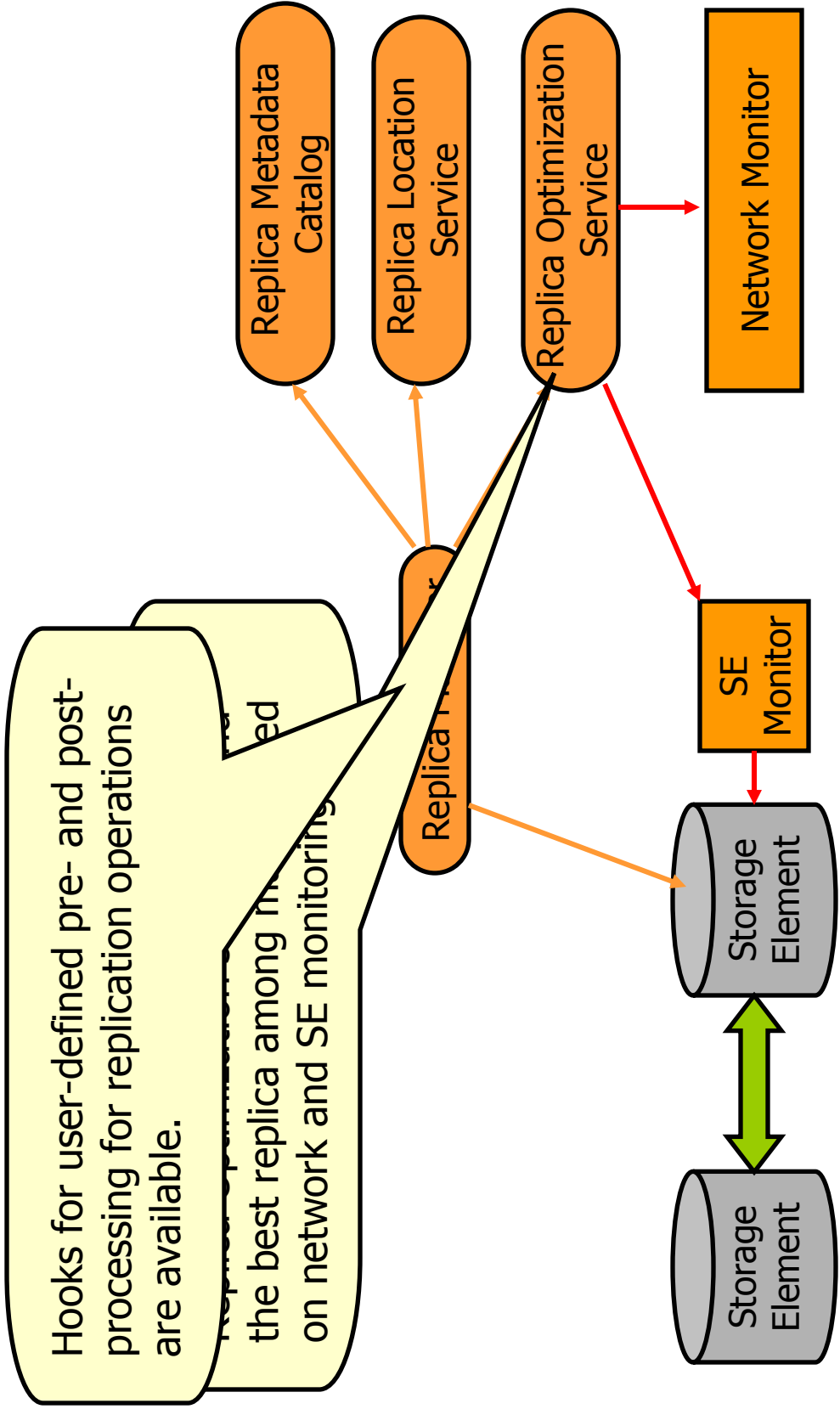
- Tools for
 - Locating data
 - Copying data
 - Managing and replicating data
 - Meta Data management
- On EDG you have
 - Replica Location Service (RLS)
 - Replica Metadata Service (RMC)
 - Replica Optimisation Service (ROS)
 - Replica Manager (RM)



Replication Services: Basic Functionality

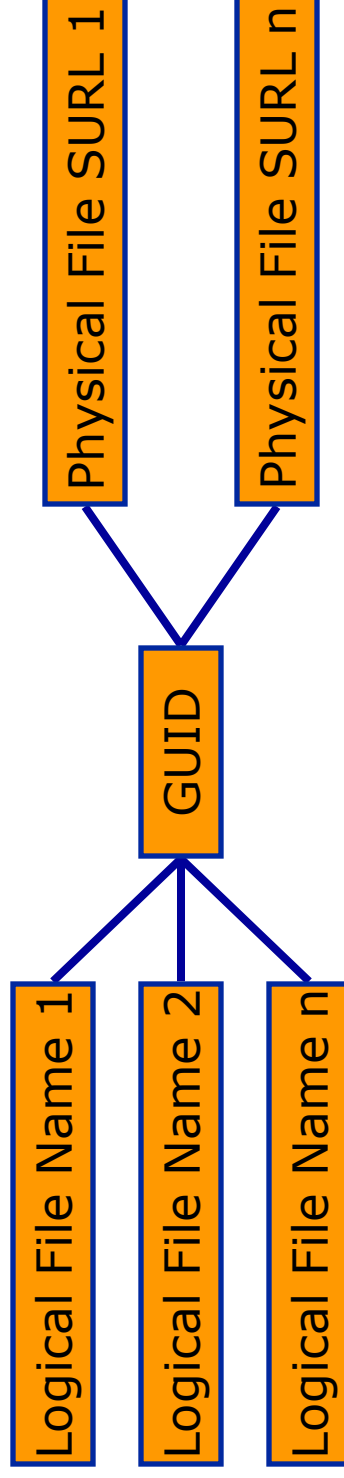


Higher Level Replication Services



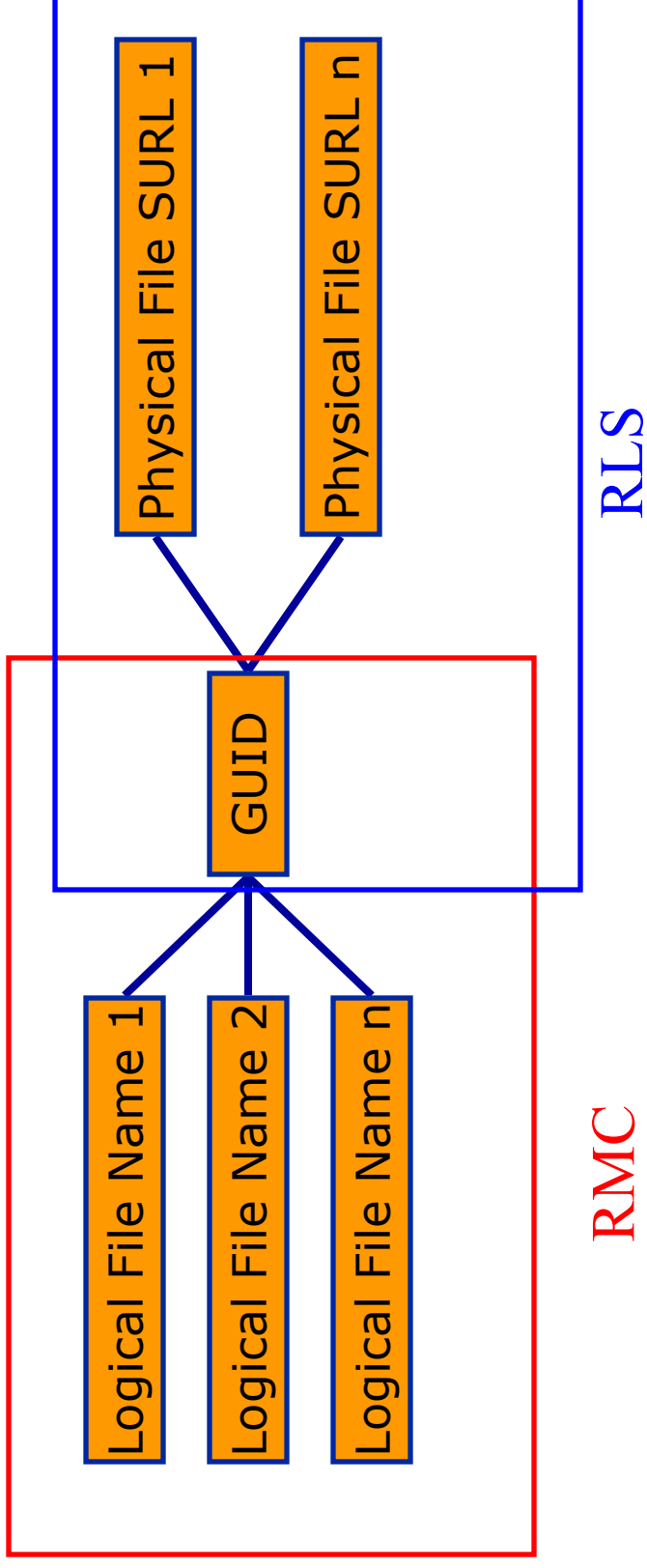
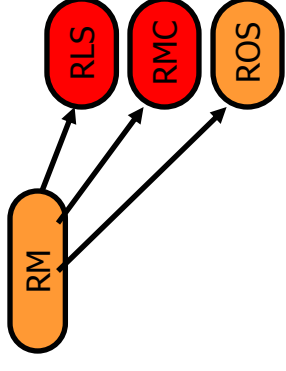
Naming Conventions

- Logical File Name (**LFN**)
 - An alias created by a user to refer to some item of data e.g.
“lfn:cms/20030203/run2/track1”
- Site URL (**SURL**) (or Physical File Name (**PFN**))
 - The location of an actual piece of data on a storage system e.g.
“srm://pcrd24.cern.ch/flatfiles/cms/output10_1”
- Globally Unique Identifier (**GUID**)
 - A non-human readable unique identifier for an item of data e.g.
“guid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6”



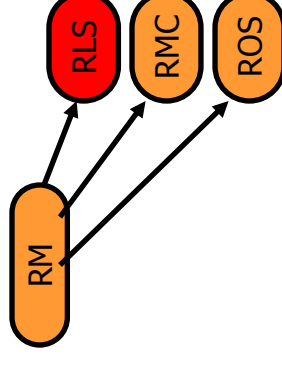
Replica Metadata Catalog (RMC) vs. Replica Location Service (RLS)

- **RMC:**
 - Stores LFN-GUID mappings
- **RLS:**
 - Stores GUID-SURL mappings



Replica Location Service (RLS)

- The **Replica Location Service** is a system that maintains and provides access to information about the **physical location of copies** of data files.
- It is a **distributed service** that stores **mappings** between **globally unique identifiers** of datafiles and the **physical identifiers** of all existing replicas of these datafiles.
- Design is a joint collaboration between Globus and EDG-WP2



The Replica Manager Interface – Management Commands

- [copyAndRegisterFile](#) args: source, dest, lfn, protocol, streams
 - Copy a file into grid-aware storage and register the copy in the Replica Catalog as an atomic operation.
- [replicateFile](#) args: source/lfn, dest, protocol, streams
 - Replicate a file between grid-aware stores and register the replica in the Replica Catalog as an atomic operation.
- [deleteFile](#) args: source/seHost, all
 - Delete a file from storage and unregister it.
- Example

```
edg-rm --vo=tutor copyAndRegisterFile  
file:/home/bob/analysis/data5.dat  
-d lxshare0384.cern.ch
```

The Replica Manager Interface – Catalog Commands (1)

- [registerFile](#) args: source, lfn
 - Register a file in the Replica Catalog that is already stored on a Storage Element.
- [unregisterFile](#) args: source, guid
 - Unregister a file from the Replica Catalog.
- [listReplicas](#) args: lfn/surl/guid
 - List all replicas of a file.
- [registerGUID](#) args: surl, guid
 - Register an SURL with a known GUID in the Replica Catalog.
- [listGUID](#) args: lfn/surl
 - Print the GUID associated with an LFN or SURL.

The Replica Manager Interface – Catalog Commands (2)

- [addAlias](#) args: guid, lfn
 - Add a new alias to GUID mapping
- [removeAlias](#) args: guid, lfn
 - Remove an alias LFN from a known GUID.
- [printInfo\(\)](#)
 - Print the information needed by the Replica Manager to screen or to a file.
- [getVersion\(\)](#)
 - Get the versions of the replica manager client.

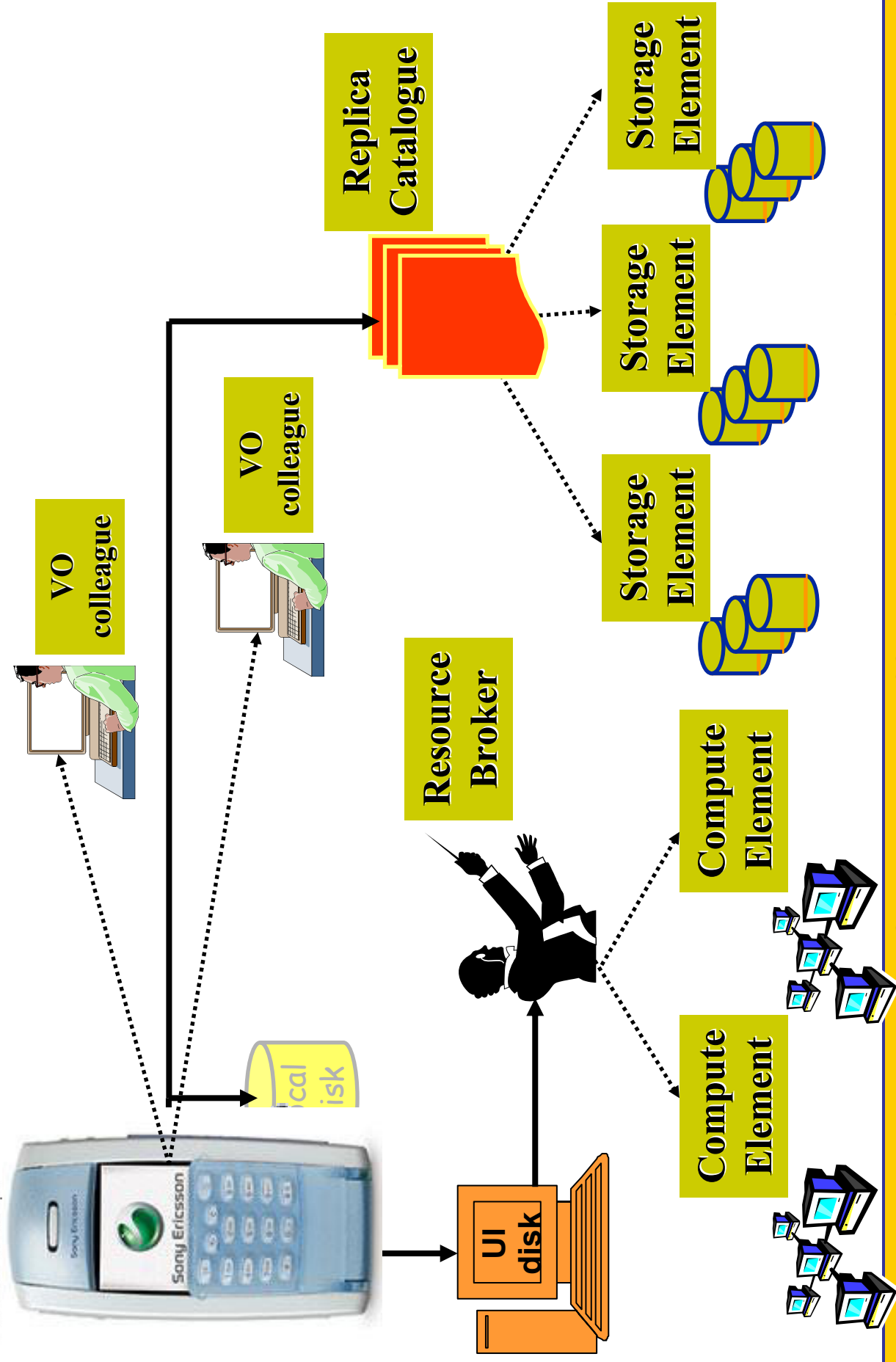
The Replica Manager Interface – *Optimization Commands*

- listBestFile args: lfn/guid, seHost
 - Return the 'best' replica for a given logical file identifier.
- getBestFile args: lfn/guid, seHost, protocol, streams
 - Return the storage file name (SFN) of the best file in terms of network latencies.
- getAccessCost args: lfn/guid[], ce[], protocol[]
 - Calculates the expected cost of accessing all the files specified by logicalName from each Computing Element host specified by ceHosts.

The Replica Manager Interface – *File Transfer Commands*

- [copyFile](#) args: source, dest
 - Copy a file to a non-grid destination.
- [listDirectory](#) args: dir
 - List the directory contents on an SRM or a GridFTP server.

The “transparent” grid access



A web portal: why and how ?

- It can be accessed from everywhere and by “everything” (desktop, laptop, PDA, phone).
- It can keep the same user interface independently of the underlying middleware.
- It must be redundantly “secure” at all levels: **1)** secure for web transactions, **2)** secure for user credentials, **3)** secure for user authentication, **4)** secure at VO level.
- All available grid services must be incorporated in a logic way, just “one mouse click away” .
- Its layout must be easily understandable and user friendly.

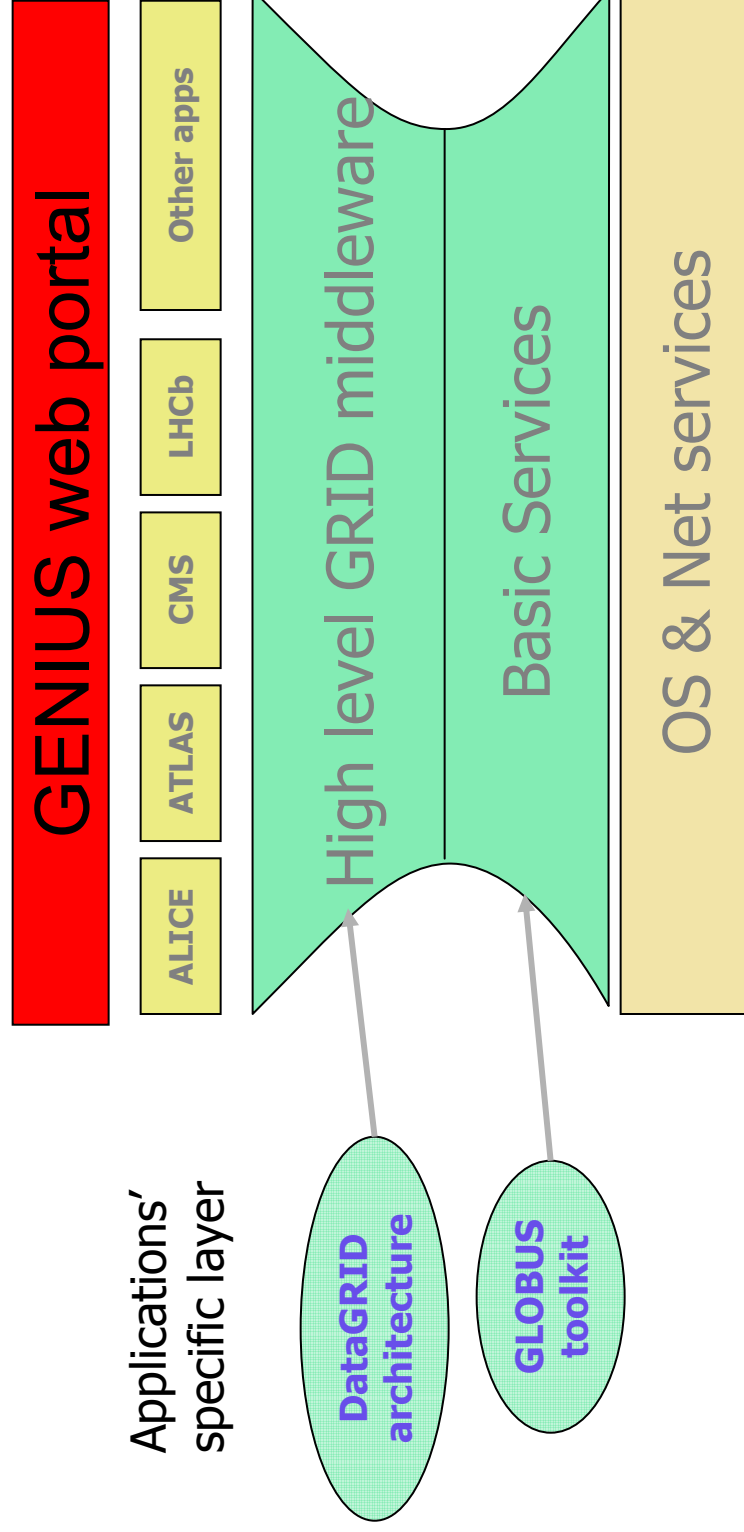


GENIUS®

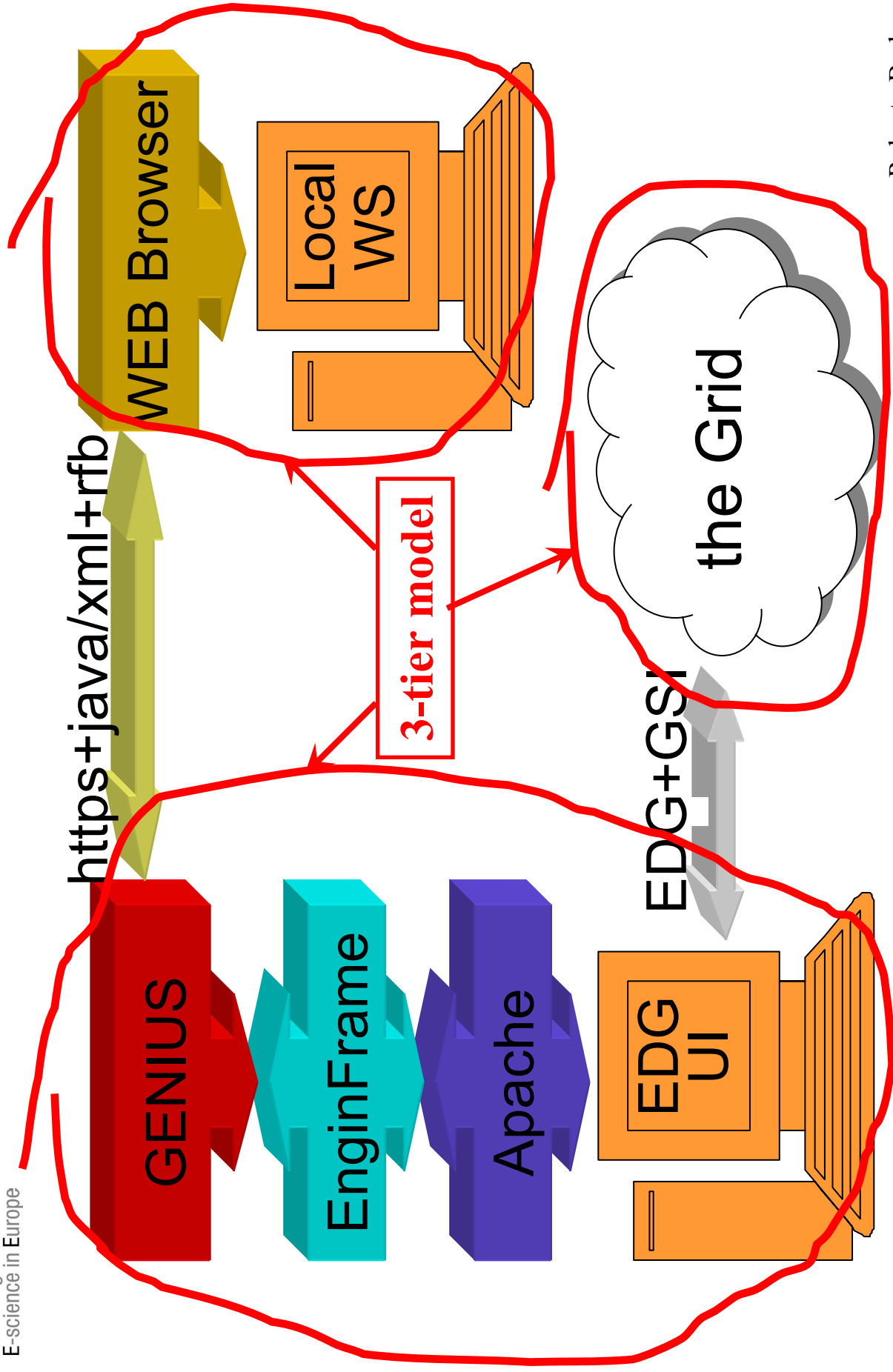
(Grid Enabled web environment for
site Independent User job Submission)

[<https://genius.ct.infn.it>]

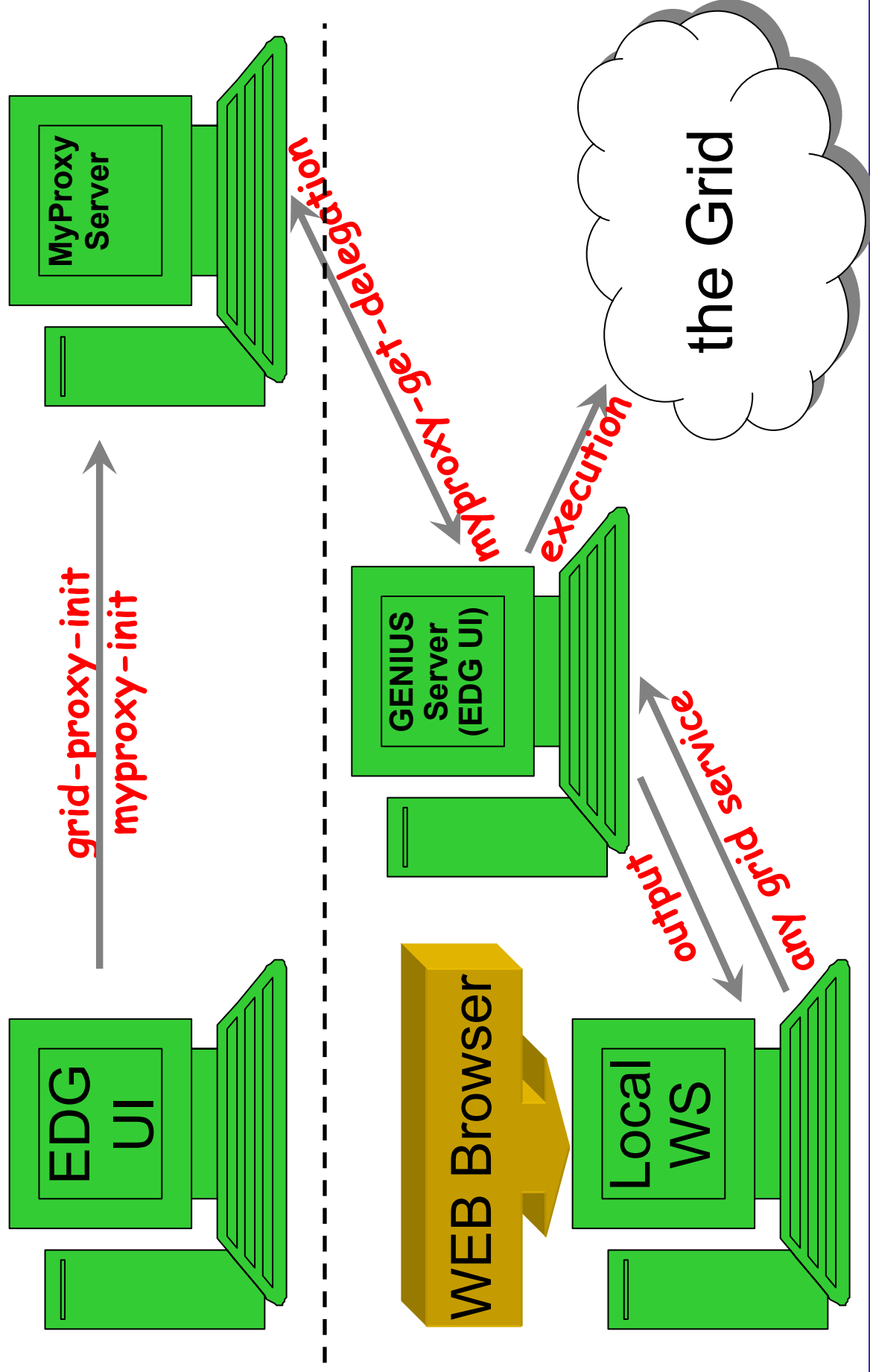
INFN/NICE collaboration



GENIUS: how it works



Grid authentication with MyProxy



GENIUS home page

Welcome to the GENIUS INFN GRID Portal - Mozilla

File Edit View Go Bookmarks Tools Window Help

https://genius.ct.infn.it/

Home Bookmarks Instant Message WebMail Calendar Radio People Yellow Pages Download Customize...

INFN
Istituto Nazionale di Fisica Nucleare

EnginFrame

genius
Enabling Grids for E-science in Europe

Grid Enabled web eNvironment for site Independent User job Submission

Welcome to GENIUS 2.8.3

[Important Notice](#)
[GENIUS User's Guide \(doc, pdf, ps, ps.gz\)](#)
[New Grid Authentication with MyProxy](#)
[GENIUS MyProxy Server Installation](#)
[GENIUS CVS Available](#)
[GENIUS Mailing List](#)
[GENIUS Mailing Archive \(Help on Major/Minor Commands\)](#)
[GRID MOVIE](#)
[Useful Links](#)
[Credits](#)

This portal is best viewed with Mozilla 1.6
 Netscape (4.79, 4.80, 6 and higher) and Internet Explorer (5 or higher) can also be used.
 The use of any other web browsers could induce some visualization mismatches and is not currently suggested.
 GENIUS is based on Apache 1.3.29 and OpenSSL 0.9.7c.
 Last update: **Fri 2 Apr 2004**

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[LCG-2](#)
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GENIUS file services

[Home](#) | [Bookmarks](#) | [Instant Message](#) | [WebMail](#) | [Calendar](#) | [Radio](#) | [People](#) | [Yellow Pages](#) | [Download](#) | [Customize...](#)

[ENFN](#) | [engiframe](#) | [GENIUS](#) | [E-Science in Europe](#)

RB: cnaf_gridit | **VO: alice** | **RLS: GRDIT** | [Your Data](#) | [Logout](#)

Grid Enabled web eNvironment for site Independent User job Submission

File Services
[up](#)
[Create a File](#)
[View a File](#)
[Edit a File](#)
[Rename a File/Directory](#)
[Delete a File/Directory](#)
[Upload a TAR ball](#)
[Upload a file](#)
[Show the Environment](#)
 powered by
[EngifFrame 3.2](#)
 compliant with
[LCC-2](#)
[GRD.IT](#)

With this service you may view a file in your home directory.

Select File to View:

alice_c_ms.com	414
alio	1,644
alio	1,136
authentication	294
ground	807
ground	2,623
ground.soc	2,491
defect.pov	1,951
demtools.jdl	1,158
dma.pov	4,731
edg_wl_ui_gui_log4j.log	0
edglog.log	1,050
file_09003.txt	14
golden_CO-dem	1,098,752
grand_canyon_A2-dem	1,160,192

Selected: alio/jdl

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[ENFN](#) | [engiframe](#) | [GENIUS](#) | [E-Science in Europe](#)

RB: catania_gridit | **VO: alice** | **RLS: GRDIT** | [Your Data](#) | [Logout](#)

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File Services
[up](#)
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[LCC-2](#)
[GRD.IT](#)

```

#####
##
## ----- Job Description for DEMTOOLS -----
##
## author: roberto.barbata@ict.it
##
#####
##
## Type = "Job";
##
## Country = "Italy";
##
## InputFile = "7/13/07/ahf";
##
## ProxyServer="13share0207.cesr.ch";
##
## StdOutput = "demtools.out";
##
## StdError = "demtools.err";
##
## InputSandbox = {"start_demtools.sh","mount_sainte_helens_WA_dem","grand_canyon_A2-dem"};
##
## RetryCount = 1;
##
## Resources = "1x demtools.sh";
##
## Requirements = "Member ("DEMTOOLS-1.0", other.CivetHostApplicationsSoftwareRunTimeEnvironment) || Member ("T
    
```

GENIUS authentication with MyProxy

The screenshot shows a Mozilla browser window titled "Welcome to the GENIUS INFN GRID Portal - Mozilla". The address bar contains "https://genius.ct.infn.it/". The page layout includes:

- Navigation Menu:** File Services, Security Services, Job Services, Data Services, Info Services, Monitoring Services, Interactive Services, Grid Settings, Set VO, Current VO Services, Statistics, Logout.
- Powered by:** EnginFrame 3.2, compliant with LCG-2, GRID.IT.
- Logos:** INFN Istituto Nazionale di Fisica Nucleare, enginframe, genius, eGEE Enabling Grids for E-science in Europe.
- Text:** Grid Enabled web eNvironment for site Independent User job Submission.
- Login Form:**
 - Header: Login to the GRID
 - Username: barbera
 - MyProxy Password: [password]
 - Validity (hours): 4
 - Login button

GENIUS grid settings

Welcome to the GENIUS INFN GRID Portal - Mozilla

File Edit View Go Bookmarks Tools Window Help

http://www.genius.e-inf.n/

Home Bookmarks Instant Message WebMail Calendar Radio People Yellow Pages Download Customize...

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enginframe

Grid Enabled web environment for site Independent User job Submission

RB: cnaf_gridit VO: alice RLS: GRIDIT Your Data Logout

Grid Settings

With this service you can select the Resource Broker and the Replica Location Server you want to use. It is possible also to set the MyProxy Server on which you stored your temporary proxy to get from GRID Authentication.

Resource Broker (RB):

Replica Location Server (RLS):

MyProxy Server:

- File Services
- Security Services
- Job Services
- Data Services
- Info Services
- Monitoring Services
- Interactive Services
- Grid Settings
- Set YO
- Current YO Services
- Statistics
- Logout

powered by
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Welcome to the GENIUS INFN GRID Portal - Mozilla

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Grid Enabled web environment for site Independent User job Submission

RB: cnaf_gridit VO: alice RLS: GRIDIT Your Data Logout

Grid Settings

With this service you can select the Resource Broker and the Replica Location Server you want to use. It is possible also to set the MyProxy Server on which you stored your temporary proxy to get from GRID Authentication.

Resource Broker (RB):

Replica Location Server (RLS):

MyProxy Server:

- File Services
- Security Services
- Job Services
- Data Services
- Info Services
- Monitoring Services
- Interactive Services
- Grid Settings
- Set YO
- Current YO Services
- Statistics
- Logout

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GENIUS VO selection

Welcome to the GENIUS INFN GRID Portal - Mozilla

File Edit View Go Bookmarks Tools Window Help

https://genius.ct.infn.it/

Home Bookmarks Instant Message WebMail Calendar Radio People Yellow Pages Download Customize...

INFN Istituto Nazionale di Fisica Nucleare

- File Services
- Security Services
- Job Services
- Data Services
- Info Services
- Monitoring Services
- Interactive Services
- Grid Settings
- Set VO
- Current VO Services
- Statistics
- Logout

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Grid Enabled web environment for site Independent User job Submission

RB: cnaf_gridit VO: alice RLS: GRIDIT Your Data Logout

Set VO

With this service you can select the Virtual Organization you belong to.

Virtual Organization (VO):

- ALICE (currently selected)
- GILDA
- ATLAS
- BABAR
- BIO
- Biomedical
- CMS
- D0
- DIANE
- Dissemination
- Earth Observation
- ITeam
- LHCb
- PANDA
- THEOPHYS
- TUTOR
- VIRGO
- WORLDGRID
- WPSix

GENIUS graphic job editor (work in collaboration with DATAMAT)

Welcome to the GENIUS INFN GRID Portal - Mozilla

Grid Enabled web environment for site Independent User job Submission

Job Editor

Job Name: /home/barbara/allroot.jdl

Executable: hmvsh

Arguments: script-short.sh

Standard Streams:

- StdOutput: allroot.out
- StdError: allroot.err
- Input Sandbox: allroot.in

Output Sandbox:

- grun_3_09_06_JMLC
- Config_JBT.C
- AllTSDigitsProcPoints.C
- AllTSTrackingWLC

Requirements: [Empty]

Rank: Unknown

Welcome to the GENIUS INFN GRID Portal - Mozilla

Grid Enabled web environment for site Independent User job Submission

Job Editor

Job Name: /home/barbara/allroot.jdl

Executable: hmvsh

Arguments: script-short.sh

Standard Streams:

- StdOutput: allroot.out
- StdError: allroot.err
- Input Sandbox: allroot.in

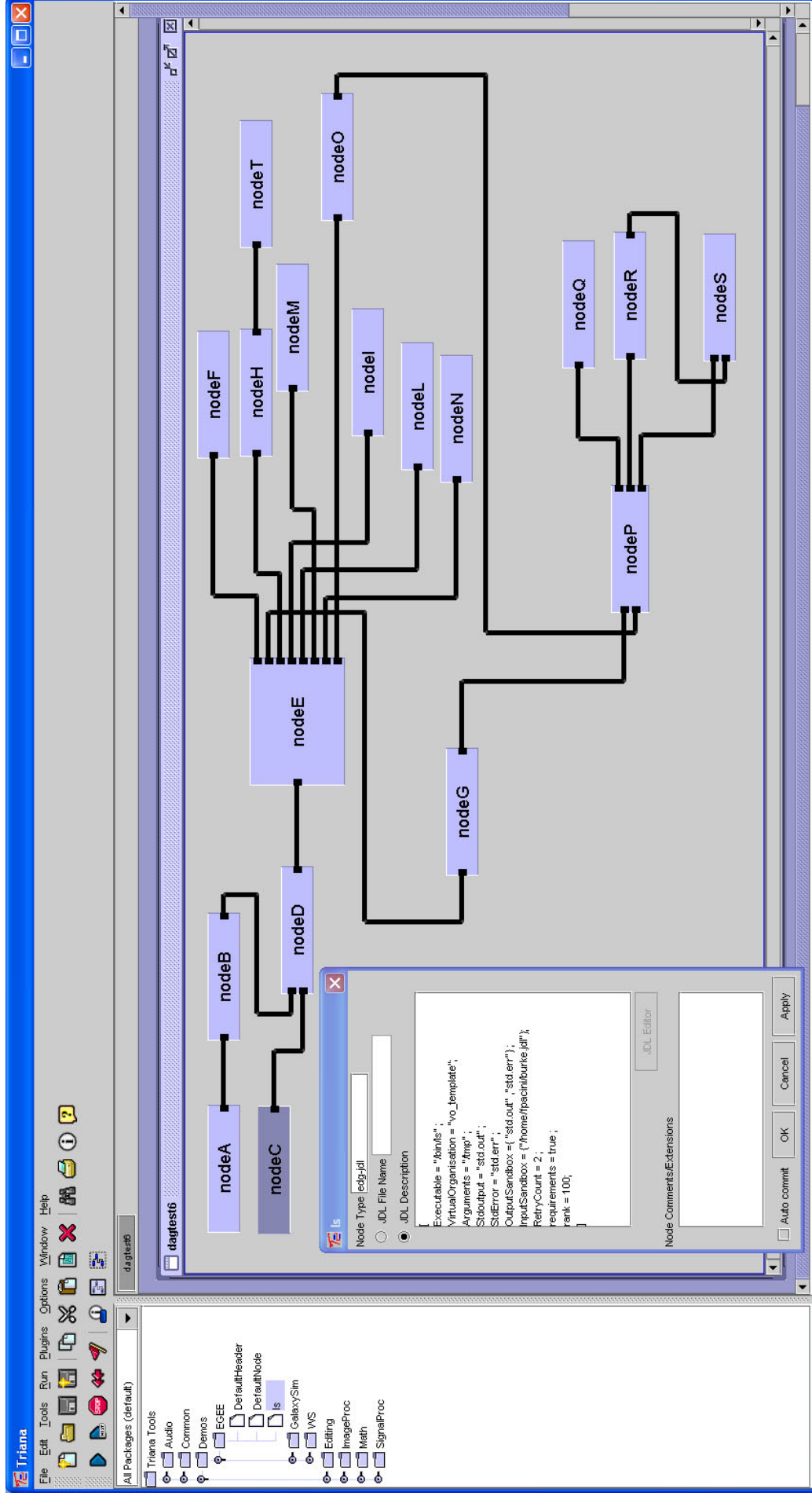
Output Sandbox:

- grun_3_09_06_JMLC
- Config_JBT.C
- AllTSDigitsProcPoints.C
- AllTSTrackingWLC

Requirements: [Empty]

Rank: Unknown

GENIUS graphic workflow editor (integration with TRIANA from GridLab)




GENIUS single job submission

Welcome to the GENIUS INFN GRID Portal - Mozilla


File Edit View Go Bookmarks Tools Window Help


Address: https://genius.ct.infn.it/


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eGEE
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E-science in Europe

Grid Enabled web eNvironment for site Independent User job Submission

RB: catania_gridit
VO: alice
RLS: GRIDIT
Your Data
Logout

Now you may also choose a specific Computing Element for your job.

JDL File Selected

Specify the CE Resource

/home/barbera/hostname.jdl

Let the CATANIA_GRIDIT Resource Broker choose

- grid002.ca.infn.it:2119/jobmanager-lcgpbs-infnite
- grid002.ca.infn.it:2119/jobmanager-lcgpbs-long
- grid002.ca.infn.it:2119/jobmanager-lcgpbs-short
- grid002.pi.infn.it:2119/jobmanager-lcgpbs-infnite
- grid002.pi.infn.it:2119/jobmanager-lcgpbs-long
- grid002.pi.infn.it:2119/jobmanager-lcgpbs-short
- grid008.to.infn.it:2119/jobmanager-lcgpbs-infnite
- grid008.to.infn.it:2119/jobmanager-lcgpbs-long
- grid008.to.infn.it:2119/jobmanager-lcgpbs-short
- grid012.ct.infn.it:2119/jobmanager-lcgpbs-infnite
- grid012.ct.infn.it:2119/jobmanager-lcgpbs-short
- grid20.bo.infn.it:2119/jobmanager-lcgpbs-long
- grid20.bo.infn.it:2119/jobmanager-lcgpbs-short
- gridba2.ba.infn.it:2119/jobmanager-lcgpbs-infnite
- gridba2.ba.infn.it:2119/jobmanager-lcgpbs-long
- gridba2.ba.infn.it:2119/jobmanager-lcgpbs-short
- gridit001.pol.infn.it:2119/jobmanager-lcgis-infnite
- gridit001.pol.infn.it:2119/jobmanager-lcgis-long
- gridit001.pol.infn.it:2119/jobmanager-lcgis-short


GENIUS single job queue

Welcome to the GENIUS INFN GRID Portal - Mozilla


File Edit View Go Bookmarks Tools Window Help

Address bar: <https://genius.ct.infn.it/>


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eGEE
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E-science in Europe

Grid Enabled web eNvironment for site Independent User job Submission

RB: catania_gridit

VO: alice

RLS: GRDIT

Your Data

Logout

Job Queue

#	Job ID	JDL Name	Last Update	Destination	Status
1	G0ECFDFOnNTEK2gOP_AxrDg_home/barbera/hostname.idl		Thu Apr 15 19:28:04 2004	gridba2.ba.infn.it:2119/jobmanager-icgpbs-long	Scheduled

Single Job

- up
- Job Submission
- Job Queue
- Job Data
- Clean Job Queues
- Close Interactive Job Session

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GENIUS multi job submission

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Grid Enabled web eNvironment for site Independent User job Submission

RB: cnaf_gridit
VO: alice
RLS: GRDIT
Your Data
Logout

Multi Job

- up
- Job Submission
- Job Queue
- Job Data
- Clean Job Queues

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GRID.IT

Job Submission

Please, select the name of the group containing the jobs that you want to submit. If it is a new group, choose the JDL(s) files relative to the jobs. Then select the number of cycles of multi-job submissions that you want to submit.

Job Group Name:

JDL File(s):

Multi-Job Type:

Submission Cycles:

Remote File Browsing - Mozilla

<input type="checkbox"/>	alice_rc_def.conf	413
<input type="checkbox"/>	alice_rc_hbt_production.conf	422
<input type="checkbox"/>	alice_rc_hbt_production_mss.conf	423
<input type="checkbox"/>	alice_rc_mss.conf	414
<input checked="" type="checkbox"/>	alirroot.jdl	1,644
<input type="checkbox"/>	alirroot.test.jdl	1,136
<input type="checkbox"/>	authentication.log	294
<input checked="" type="checkbox"/>	csound.jdl	807
<input type="checkbox"/>	csound.orc	2,633
<input type="checkbox"/>	csound.seo	2,491
<input type="checkbox"/>	deficity.pov	1,951
<input checked="" type="checkbox"/>	demtools.jdl	1,158
<input type="checkbox"/>	dna.pov	4,731
<input type="checkbox"/>	edg_wl_u_gon_rugby.png	0
<input type="checkbox"/>	edglog.log	1,050

Path: /home/barbera

GENIUS multi job queue

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Grid Enabled web environment for site Independent User job Submission

RB: catania_gridit VO: alice RLS: GRIDIT Your Data Logout

#	Job ID	Last Update	Destination	Status	Exit Code	Action
6	_O11R41j0zrO9yk-h9WdQ	Thu Apr 15 19:29:11 2004	grid012.ct.infn.it:2119/jobmanager-legpbs-infinite	Running		Cancel
5	SPSM_X9bG1OJiday7ew8hA	Thu Apr 15 19:26:36 2004	grid012.ct.infn.it:2119/jobmanager-legpbs-infinite	Scheduled		Cancel
4	gEDcoARDsY3AfpFMfzw	Thu Apr 15 19:29:10 2004	grid012.ct.infn.it:2119/jobmanager-legpbs-infinite	Running		Cancel
3	tRr2Va5JOtbqQJAzvJApNw	Thu Apr 15 19:29:10 2004	grid012.ct.infn.it:2119/jobmanager-legpbs-short	Running		Cancel
2	CCEFFOji-44rMu63qS0Miw	Thu Apr 15 19:29:11 2004	grid012.ct.infn.it:2119/jobmanager-legpbs-infinite	Running		Cancel
1	CCEFFOji-44rMu63qS0Miw	Thu Apr 15 19:29:11 2004	grid012.ct.infn.it:2119/jobmanager-legpbs-infinite	Running		Cancel

Multi Job
up
Job Submission
Job Queue
Job Data
Clean Job Queues

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GENIUS data spooler (1/2)

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Address: <https://genius.ct.infn.it/>

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eGEE
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Grid Enabled web eNvironment for site Independent User job Submission


RB: catania_grdit VO: alice RLS: GRIDIT Your Data Logout

[Destroy](#)

Directory contents - 20040415_212509_test-job-2/barbera_gEDcoARDsYJ3Afp9pFMizw

[Home](#)
[Back](#)

csound. aiff	11,379,286	c	csound. out. txt	12,691
csound. etr. txt	175			



https://genius.ct.infn.it/ef/download/csound_aiff?spooler=spooler//opt/gen...ders/tmp.1082057707024.ef&file=barbera_gEDcoARDsYJ3Afp9pFMizw/csound_aiff

GENIUS data spooler (2/2)

Welcome to the GENIUS INFN GRID Portal - Mozilla

File Edit View Go Bookmarks Tools Window Help

Address bar: <https://genius.ct.infn.it/>

Navigation: Home, Bookmarks, Instant Message, WebMail, Calendar, Radio, People, Yellow Pages, Download, Customize...

Logos: INFN Istituto Nazionale di Fisica Nucleare, engframe, eGEE Enabling Grids for E-science in Europe, genius

Navigation Menu: Job Services (up, Single Job, Multi Job, List Available Resources, Job Editor, Job GUI, Close Job GUI Session)

Footer: powered by EnginFrame 3.2 compliant with LCG-2 GRID.IT

RB	VO	RLS	Your Data	Logout
Destroy	catania_gridit	alice	GRDIT	test-job-2/barbera_gEDcaARDsY3AFp9pFMizw

Grid Enabled web eNvironment for site Independent User job Submission

Save As dialog: File name: csound.out, Save as type: Text File

GENIUS RLS browsing

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Home Bookmarks Instant Message WebMail Calendar Radio People Yellow Pages Download Customize...

Search

http://www.genius.e-inf.n/

ENGINFRAME

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ENGINFRAME

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RB: catania_gridit VO: alice RLS: GRIDIT Your Data Logout

Data Services

- up
- Publish a File
- Navigate RLS

powered by

- EnrichFrame 3.2
- compat with
- LCG-2
- GRIDIT

current directory is /

alroottest.jdl
EgLog

- mr-10737-AHTSChustersV2_3.09.06_05020.root
- mr-10737-AHTSTracksV2_3.09.06_05020.root
- mr-10737-AHTSChusters_3.09.06_05020.root
- mr-10737-AHTSChecksSorted_3.09.06_05020.root
- mr-10737-AHTSChecks_3.09.06_05020.root
- mr-10737-galice_3.09.06_05020.root
- mr-10737-istacks_3.09.06_05020.root
- mr-10737-nm_3.09.06_05020.log
- mr-11594-AHTSChustersV2_3.09.06_05020.root
- mr-11594-AHTSTracksV2_3.09.06_05020.root
- mr-11594-AHTSChusters_3.09.06_05020.root
- mr-11594-AHTSChecksSorted_3.09.06_05020.root
- mr-11594-AHTSChecks_3.09.06_05020.root
- mr-11594-istacks_3.09.06_05020.root

Welcome to the GENIUS INFN GRID Portal - Mozilla

Home Bookmarks Instant Message WebMail Calendar Radio People Yellow Pages Download Customize...

Search

http://www.genius.e-inf.n/

ENGINFRAME

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ENGINFRAME

Grid Enabled web eNvironment for site Independent User job Submission

RB: catania_gridit VO: alice RLS: GRIDIT Your Data Logout

Data Services

- up
- Publish a File
- Navigate RLS

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- compat with
- LCG-2
- GRIDIT

You have selected the file **alroottest.jdl**
This logical file corresponds to the following SEM(s).
Click on the SEM(s) to view its properties.

- [sfn://geni005.cern.ch/files/alice-generated/2004.04.04.15/files/040404037641](#)

☉ = The Best Replica

GENIUS data publication

[Welcome to the GENIUS INFN GRID Portal - Mozilla](#)
 File Edit View Go Bookmarks Tools Window Help
 https://genius.ct.infn.it/

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 File Edit View Go Bookmarks Tools Window Help
 https://genius.ct.infn.it/

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 File Edit View Go Bookmarks Tools Window Help
 https://genius.ct.infn.it/

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Data Services
 up
 Publish a File
 Navigate RLS

powered by
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 LCG-2
 GRID.IT

RB:
 With this service
 Choose SE
 Choose File/D
 Choose Remo
 Publish

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 Enabling Grids for E-science in Europe

Grid Enabled web eNvironment for site Independent User job Submission
 RB: catania_gridit VO: alice RLS: GRDIT Your Data Logout

```

edg-replica-manager starting...
Issuing command : copyAndRegisterFile
Parameters:
file:///home/barbera/.genius/filestopublish/filetopublish
-1
lfn:na4-wbs.gif
-d
gridba6.ba.infn.it
Destination is a host : //gridba6.ba.infn.it
Call replica manager copyAndRegister function
Filesize to copy (MB) = 0.013323784
copy : From : /home/barbera/.genius/filestopublish/filetopublish
      To : gsiftp://gridba6.ba.infn.it/flatfiles/SE00/alice/generated/2004-04-15/file9588a666-E
copy : Protocol : gsiftp
copy : # streams: 1
Transfer took: 3818 ms.
Copy successful to : File name = gsiftp://gridba6.ba.infn.it/flatfiles/SE00/alice/generated/2004-04-15/file9588a666-E
File size = 13971
File Owner = -
Associated SE:
Created new entry for url with logical name lfn:na4-wbs.gif
guid:9c991f27-8f17-11d8-b7be-a63a3c237fce
Copy and Registration successful.
  
```

GENIUS data replication

Welcome to the GENIUS INFN GRID Portal - Mozilla

RB: catania_gridit VO: alice RLS: GRDDIT Your Data Logout

Grid Enabled web e-Nvironment for site Independent User job Submission

publish command: `publishcmd`

File size: 11482965 bytes

File name: `genius-2004-04-15-rls-rls-off-8463-1148-2965-1449043-7641`

powered by: `Enlighten 3.2`

compatible with: `LSG 2.2`

GRIDIT

Welcome to the GENIUS INFN GRID Portal - Mozilla

RB: catania_gridit VO: alice RLS: GRDDIT Your Data Logout

Grid Enabled web e-Nvironment for site Independent User job Submission

publish command: `publishcmd`

File size: 11482965 bytes

File name: `genius-2004-04-15-rls-rls-off-8463-1148-2965-1449043-7641`

powered by: `Enlighten 3.2`

compatible with: `LSG 2.2`

GRIDIT

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Grid Enabled web e-Nvironment for site Independent User job Submission

publish command: `publishcmd`

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File name: `genius-2004-04-15-rls-rls-off-8463-1148-2965-1449043-7641`

powered by: `Enlighten 3.2`

compatible with: `LSG 2.2`

GRIDIT

Welcome to the GENIUS INFN GRID Portal - Mozilla

RB: catania_gridit VO: alice RLS: GRDDIT Your Data Logout

Grid Enabled web e-Nvironment for site Independent User job Submission

publish command: `publishcmd`

File size: 11482965 bytes

File name: `genius-2004-04-15-rls-rls-off-8463-1148-2965-1449043-7641`

powered by: `Enlighten 3.2`

compatible with: `LSG 2.2`

GRIDIT

GENIUS information services

Welcome to the GENIUS INFN GRID Portal - Mozilla

Info Services

- up
- Check Testbed
- Explore Testbed

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LCG-2
GRID.II

Grid Enabled web environment for site Independent User job Submission

- ibm1.40.cnaf.infn.it : 2170
- mds-vo-name=local_o=grid
- mds-vo-name=infn-bari
- mds-vo-name=infn-bologna
- mds-vo-name=infn-cagliari
- mds-vo-name=infn-catania
- GlueCESEBIndGroupCEUniqueID=grid012.ct.infn.it:2119/jobmanager-lcgpbs-infnite
- GlueCESEBIndGroupCEUniqueID=grid012.ct.infn.it:2119/jobmanager-lcgpbs-long
- GlueCEUniqueID=grid012.ct.infn.it:2119/jobmanager-lcgpbs-short
- GlueCEUniqueID=grid012.ct.infn.it:2119/jobmanager-lcgpbs-infnite
- GlueCEUniqueID=grid012.ct.infn.it:2119/jobmanager-lcgpbs-long
- GlueClusterUniqueID=grid012.ct.infn.it
- GlueUniqueID=grid005.ct.infn.it
- GlueSLUniqueID=grid005.ct.infn.it
- GlueServiceURI=ldap://grid005.ct.infn.it:2136
- in=grid012.ct.infn.it/siteinfo
- mds-vo-name=infn-feirara
- mds-vo-name=infn-ini
- mds-vo-name=infn-napoli

DAP Explorer - Mozilla

GlueCEInfoKeeperPort = 2119

GlueCEInfoHostName = grid012.ct.infn.it

GlueCEInfoLRMType = jbs

GlueCEInfoLRMVersion = OpenPBS_2.4

GlueCEInfoTotalCPUs = 112

GlueCEStateEstimatedResponseTime = 0

GlueCEStateFreeCPUs = 100

GlueCEStateRunningJobs = 0

GlueCEStateStatus = Production

GlueCEStateTotalJobs = 0

GlueCEStateWaitingJobs = 0

GlueCEStateWorstResponseTime = 0

GlueCEPolicyMaxCPUTime = 172800

GlueCEPolicyMaxRunningJobs = 4

GlueCEPolicyMaxTotalJobs = 999999

GlueCEPolicyMaxWallClockTime = 259200

GlueCEPolicyPriority = 1

GlueCEAccessControlBaseRule = Vo:alice

Buttons: New/Add, Modify, Delete, Rename, Reset

GENIUS monitoring services

The screenshot shows a Mozilla browser window displaying the GENIUS monitoring service. The browser's address bar shows the URL: `http://icomp7.in2p3.fr/topogrid-bin/cgi-applet.sh?file=trace.txt;datagrid;pcp+pos.dat;agrid`. The page content is divided into two main sections:

Grid Monitoring Dashboard:

Site	Slot#	SlotFree	SlotLoad
ba.infn.it	189	186	1%
bo.infn.it	30	30	0%
bo.ingv.it	24	24	0%
ca.infn.it	15	12	20%
cr.cnaf.infn.it	-	2137	-
ct.astro.it	0	0	-
ct.infn.it	336	300	10%
fe.infn.it	48	18	62%
le.infn.it	0	0	-
lnl.infn.it	144	115	20%
mi.infn.it	126	126	0%
na.infn.it	72	72	0%
oat.ts.astro.it	6	6	0%
pd.infn.it	198	198	0%
pg.infn.it	12	6	50%
pi.infn.it	21	15	28%
pv.infn.it	18	18	0%
roma1.infn.it	90	87	3%
to.infn.it	104	24	76%
ts.infn.it	6	6	0%
TOTAL	4601	3380	17%

Network Topology (trace.txt.dat;agrid;pcp):

The network topology diagram shows a complex web of connections between various sites. Key nodes highlighted in red include:

- 8 nycm [62.40.103.254]
- uz.nyu.edu [198.32.100.100]
- ablene-gw.dez.be.geant.net [12.194.214.68.42]
- marseille-pos1-0.cesri.renater.fr [193.51.179.222]
- GE-159 StartLight.assoc.net [140.109.251.150]
- MAC-ESOT-0-0-EB-IRIS2.red.trediris.es [130.241.30.206.240.1]
- ed008.cnaf.infn.it [154.100.108]
- inipd-mi-garr.net [193.183.206.134.46]
- marseille-mon.dat [139.124.70.101]

GENIUS interactive services

Welcome to the GENIUS INFN GRID Portal - Mozilla
 File Edit View Go Bookmarks Tools Window Help
 https://genius.ct.infn.it/

INFN Istituto Nazionale di Fisica Nucleare

EnginFrame

eGEE Enabling Grids for E-science in Europe

genius

Grid Enabled web Environment for site Independent User job Submission

Interactive Services
 up
 P2P Services
 Open Desktop
 Close Desktop
 Set Desktop Password

powered by
 EnginFrame 3.2
 compliant with
 LCG-2
 GRID.IT

```

barbera@genius:~
csound.orc
csound.sco
defcity.pov
demtools.jdl
dna.pov
csg-1.4
edg_wl_ui_gui_log4j.log
edg_log.log
file_09003.txt
generated
golden_C01.dem
grand_canyon_AZ.dem
grun_3_09_06_hbt.C
grun_4_01_00.C
hadrontherapy.jdl
genius:> ned hadrontherapy.jdl
bash: ned: command not found
genius:> nedit hadrontherapy.jdl
bash: nedit: command not found
genius:> nedit
bash: nedit: command not found
genius:> emacs hadrontherag.jdl
genius:> emacs hadrontherapy.jdl

```

```

test-ist2003-1_02102003_095622
test.jdl
test.sh
test1.txt
test10tris_23012004_L172110
test2.txt
emacs@genius.ct.infn.it

```

```

JobType = "Job";
Executable = "/bin/sh";
MyProxyServer="lxshare0207.cern.ch";
StdOutput = "hadrontherapy.out";
StdError = "hadrontherapy.err";
InputSandbox = {"hadrontherapy.sh", "macro.mac"};
OutputSandbox = {"hadrontherapy.err", "hadrontherapy.out", "picco.dat", "disar
", "disen.dat"};
RetryCount = 7;
Arguments = "hadrontherapy.sh";
Requirements =
Member("GFANT4-6", other.GlueHostApplicationSoftwareRuntimeEnvironment) && o
GlueCPolicyMaxCPUTime>100 && other.GlueCESateStatus == "Production" && o
GlueHostNetworkAdapterOutboundIP ;
#CEId = other.GlueCEUniqueID == "grid012.ct.infn.it:2119/jobmanager-pbs-inf
";

```


GENIUS P2P services

Welcome to the GENIUS INFN GRID Portal - Mozilla

File Edit View Go Bookmarks Tools Window Help

Address: <https://genius.ct.infn.it/>

Home Bookmarks Instant Message WebMail Calendar Radio People Yellow Pages Download Customiz...

eGEE Enabling Grids for E-science in Europe

enginframe

genius

Grid Enabled web eNvironment for site Independent User job Submission

RB: catania_gridit VO: alice RLS: GRDIT Your Data Logout

GENIUS Chat Room for ALICE VO

Options Clear Font: monospaced 12 Users: 1

** Welcome on Chat Everywhere
 ** If you have any problem with this server, send a mail
 ** to roberto.barbera@ct.infn.it.
 ** You may type /help to see the available commands
 **
 <barbera> hello everyone !

barbera <-- Type here

Powered by [Chat Everywhere](#)

Applet Chat started

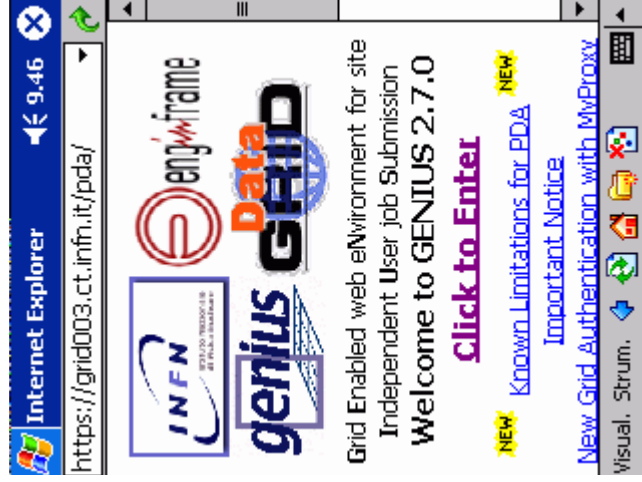
INFN Istituto Nazionale di Fisica Nucleare

P2P Services
 up
 Register
 Access

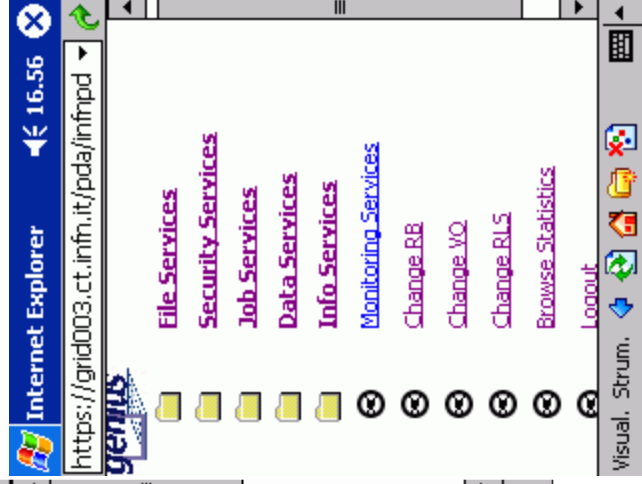
powered by
 EnginFrame 3.2
 compliant with
 LCG-2
 GRID.IT

GENIUS for PDA (1/2)

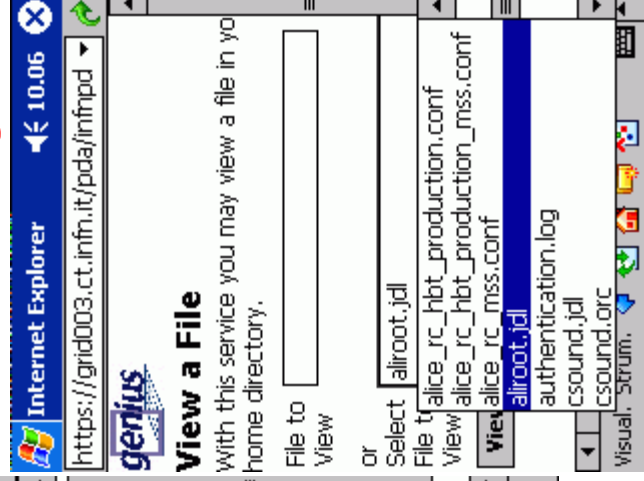
Home Page



Services



Remote file browsing



Remote file inspection



GENIUS for PDA (2/2)

Job submission

Internet Explorer | 11.32 | https://grid003.ct.infn.it/pda/infnpd

Job Submission

Please, select a JDL file to submit.

JDL File

- /home/barbera/csound/jdl
- /home/barbera/allroot.jdl
- /home/barbera/csound/jdl
- /home/barbera/demtools.jdl
- /home/barbera/hostname.jdl
- /home/barbera/hostname1.jdl
- /home/barbera/interactive.jdl
- /home/barbera/powray_defcity.jdl

RB:

Visual. Strum.

Job monitoring

Internet Explorer | 13.19 | https://grid003.ct.infn.it/pda/infnpd

Job Queue

#	Job ID	JDL Name	Last Update	Destination	Status	Exit Code	Action
4	bYqRSTINJoW6xOuwwzYKRG	/home/barbera/hostname.jdl	Thu Oct 9 07:52:14 2003	testbed001.cnaf.infn.it:211	Done	0	Get Output

Visual. Strum.

RC browsing

Internet Explorer | 11.24 | https://grid003.ct.infn.it/pda/infnpd

Current directory is /

- [data/prova](#)
- [data.out](#)
- [data.out1](#)
- [data.out2](#)
- [data.out3](#)
- [datatest](#)
- [datatest1](#)
- [edlog.log](#)
- [hostname.out](#)

Visual. Strum.

GridICE integration

Internet Explorer | 17.09 | http://edt002.cnaf.infn.it:8081/grid

Computing power

Site	Computing power	JOB Load
ba.infn.it	3064	0%
bo.infn.it	4797	0%
ct.infn.it	2798	0%
fe.infn.it	21942	0%
inl.infn.it	2903	0%
mi.infn.it	3972	0%
na.infn.it	n/a	n/a
pd.infn.it	60166	0%
to.infn.it	n/a	n/a
ts.infn.it	n/a	n/a

Visual. Strum.

GENIUS for cell phone



Summary and conclusions

Let's go to the practical