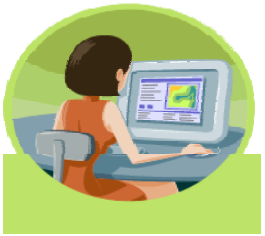
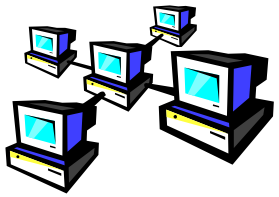
How does it work ? Main components

Enabling Grids for E-sciencE

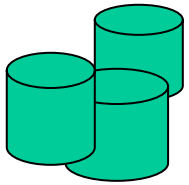


User Interface (UI): The place where users logon to the Grid

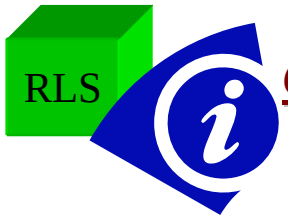
Resource Broker (RB): Matches the user requirements with the available resources on the Grid



Computing Element (CE): A batch queue on a farm of computers where the user Job gets executed

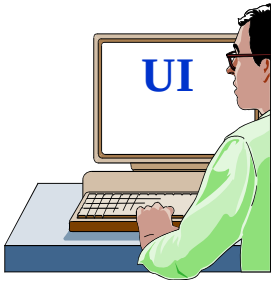


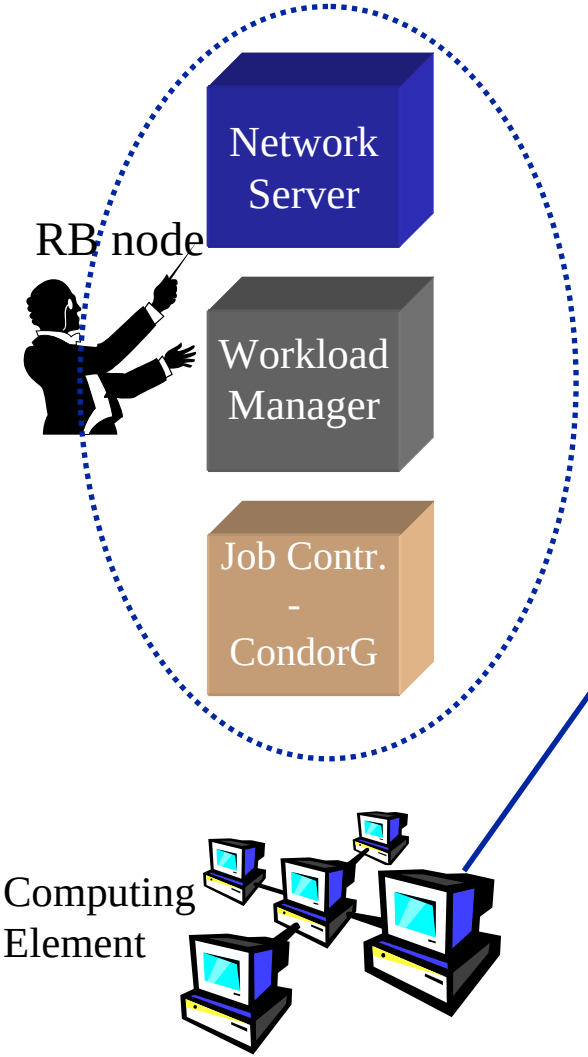
Storage Element (SE): A storage server where Grid files are stored (read/write/copy) or replicated.



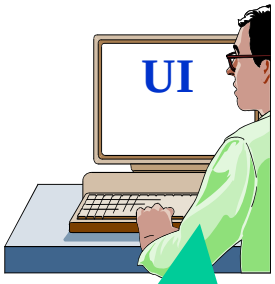
Catalogues(MDS/RLS): A storage server where Grid files are stored (read/write/copy) or replicated.

Job Submission





Job Submission



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

RB node

Network Server

Workload Manager

Job Contr. - CondorG

Computing Element

RLS

Inform. Service

Job Status

submitted

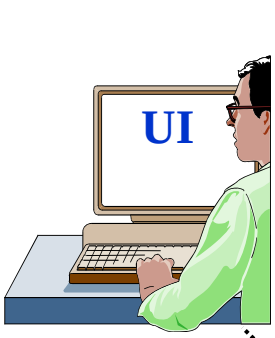
CE characts & status

SE characts & status

Storage Element

Job Submission

Enabling Grids for E-sciencE



Network Server

RB node

Workload

RLS

Job Status

submitted

Inform. Service

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;
```

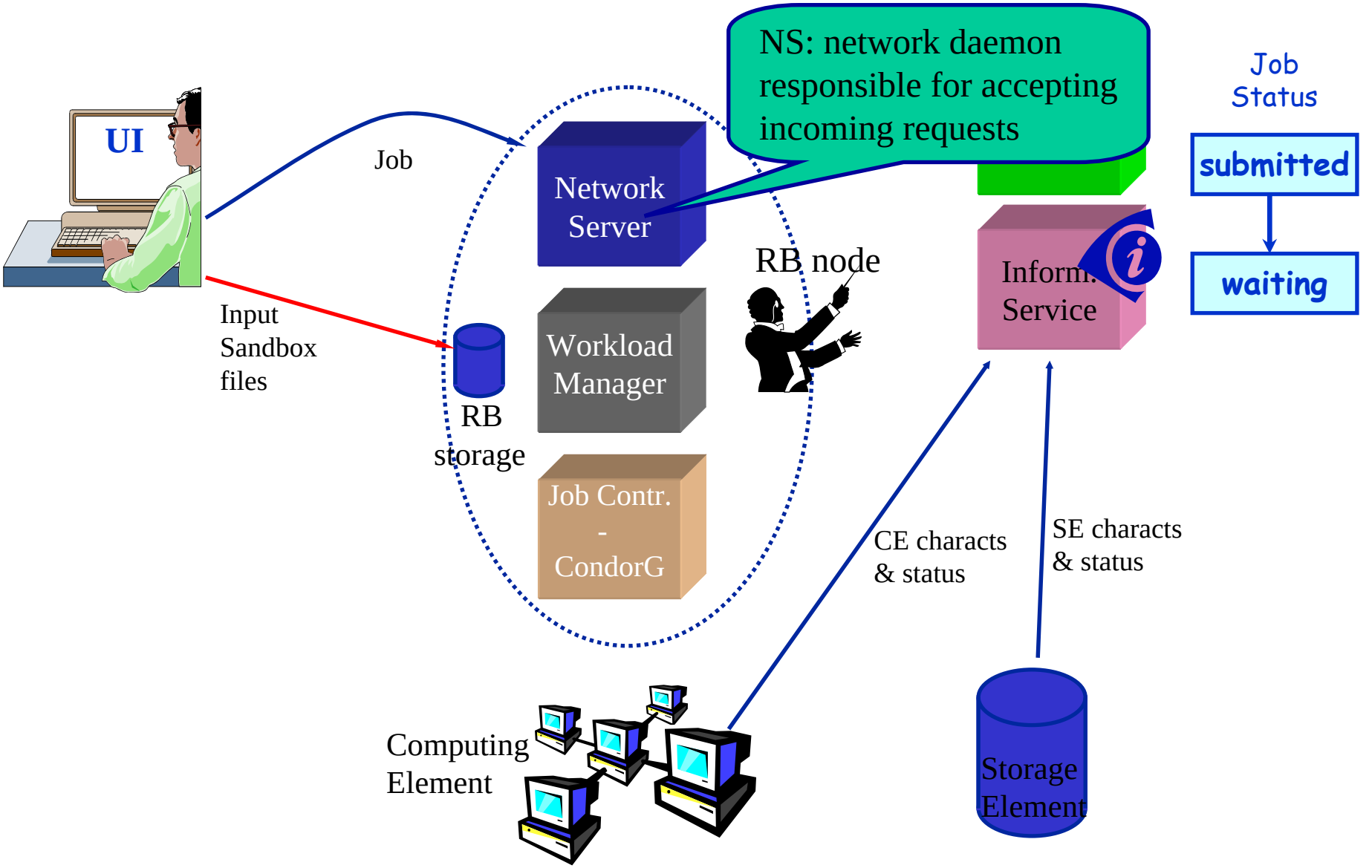
Job Description Language (JDL) to specify job characteristics and requirements

& status

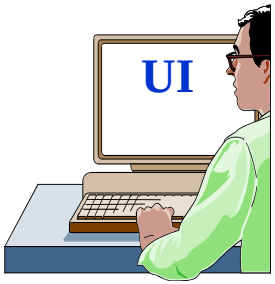
Computing Element

Storage Element

Job Submission



Job Submission



Network Server

Workload Manager

Job Contr. - CondorG

RB storage

RB node

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

RLS

Inform Service

Job Status

submitted

waiting

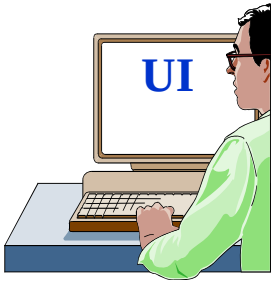
CE characts & status

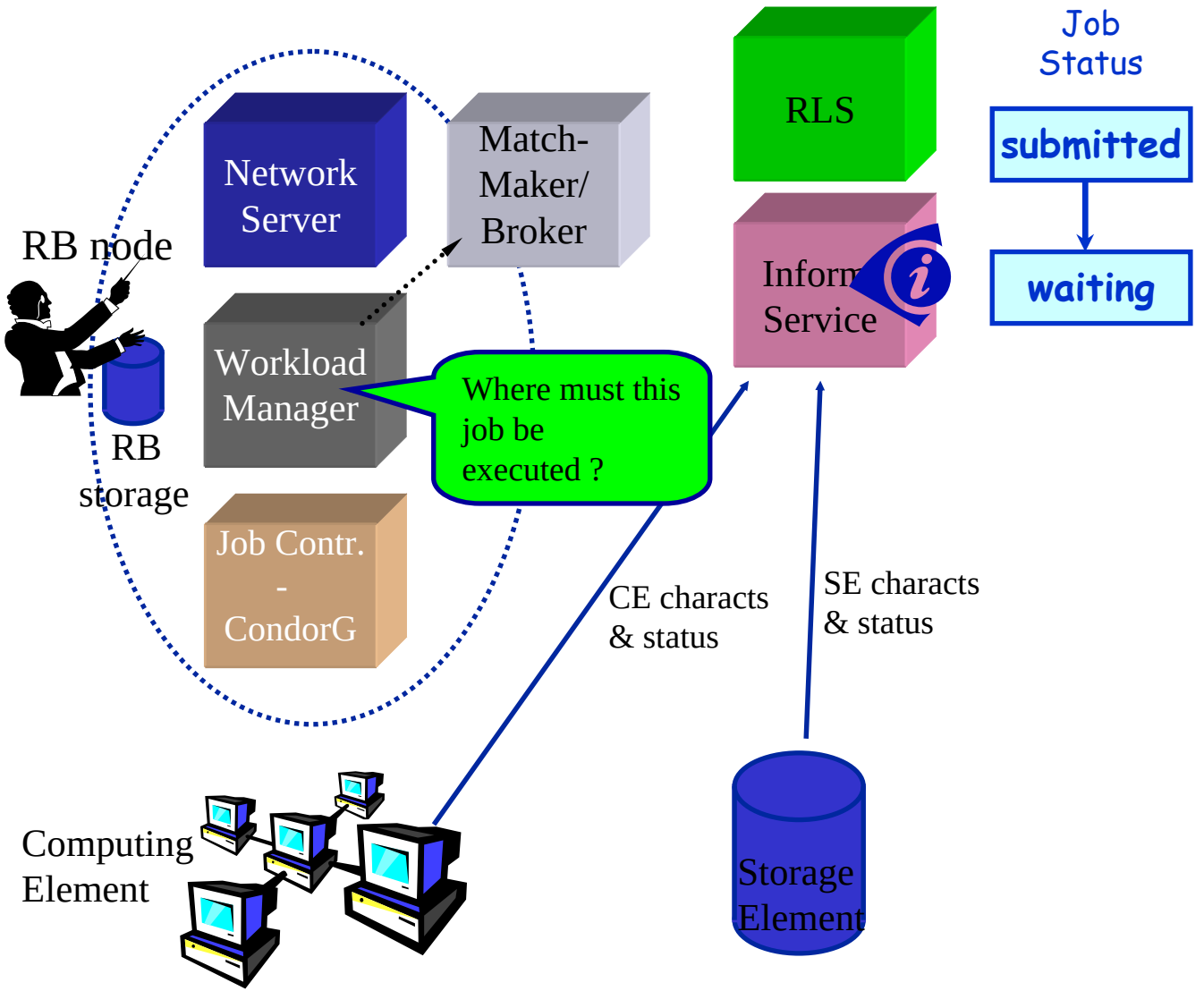
SE characts & status

Computing Element

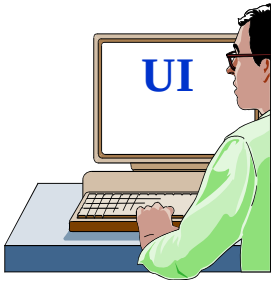
Storage Element

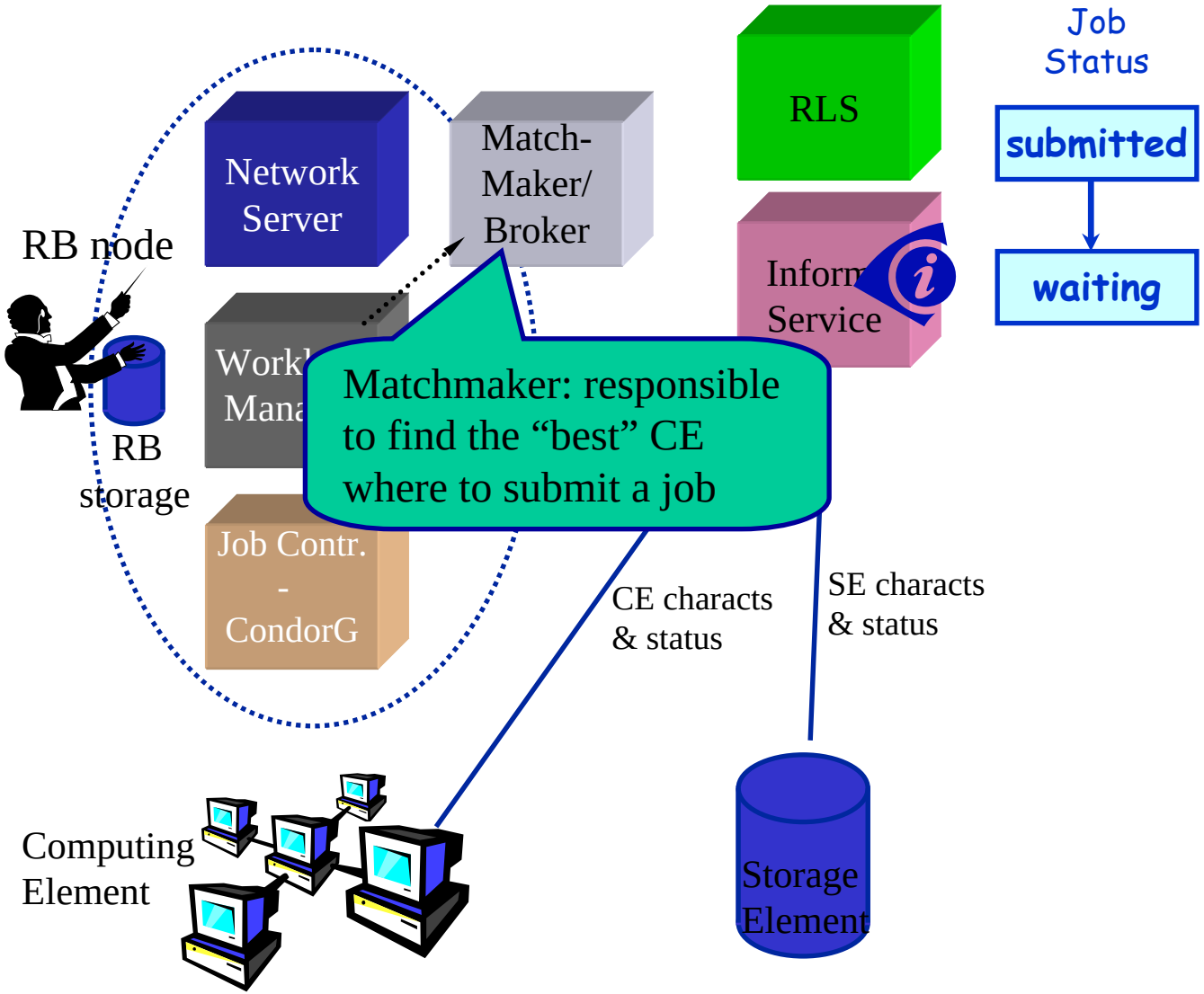
Job Submission



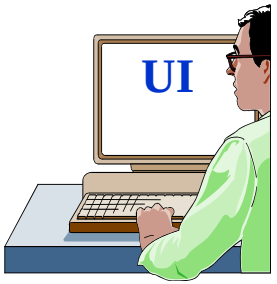


Job Submission





Job Submission



Where are (which SEs) the needed data ?

RB node

Network Server

Match-Maker/ Broker

RLS

Job Status

submitted

waiting

Workload Manager

Inform Service

RB storage

What is the status of the Grid ?

Job Contr. - CondorG

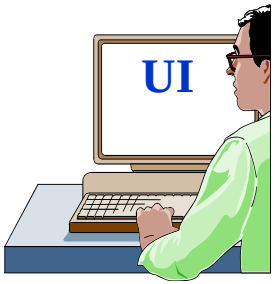
CE characts & status

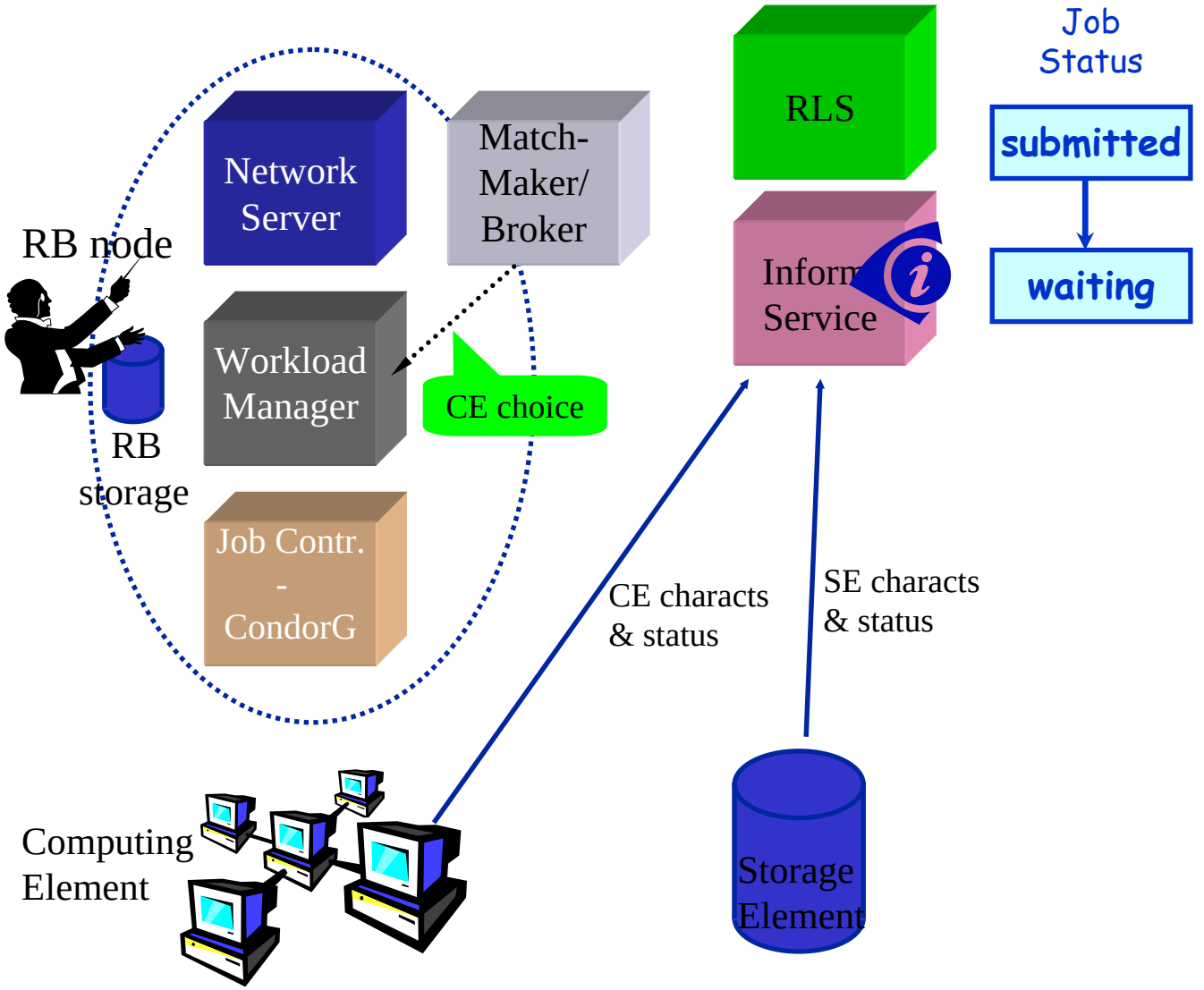
SE characts & status

Computing Element

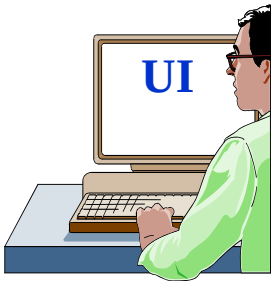
Storage Element

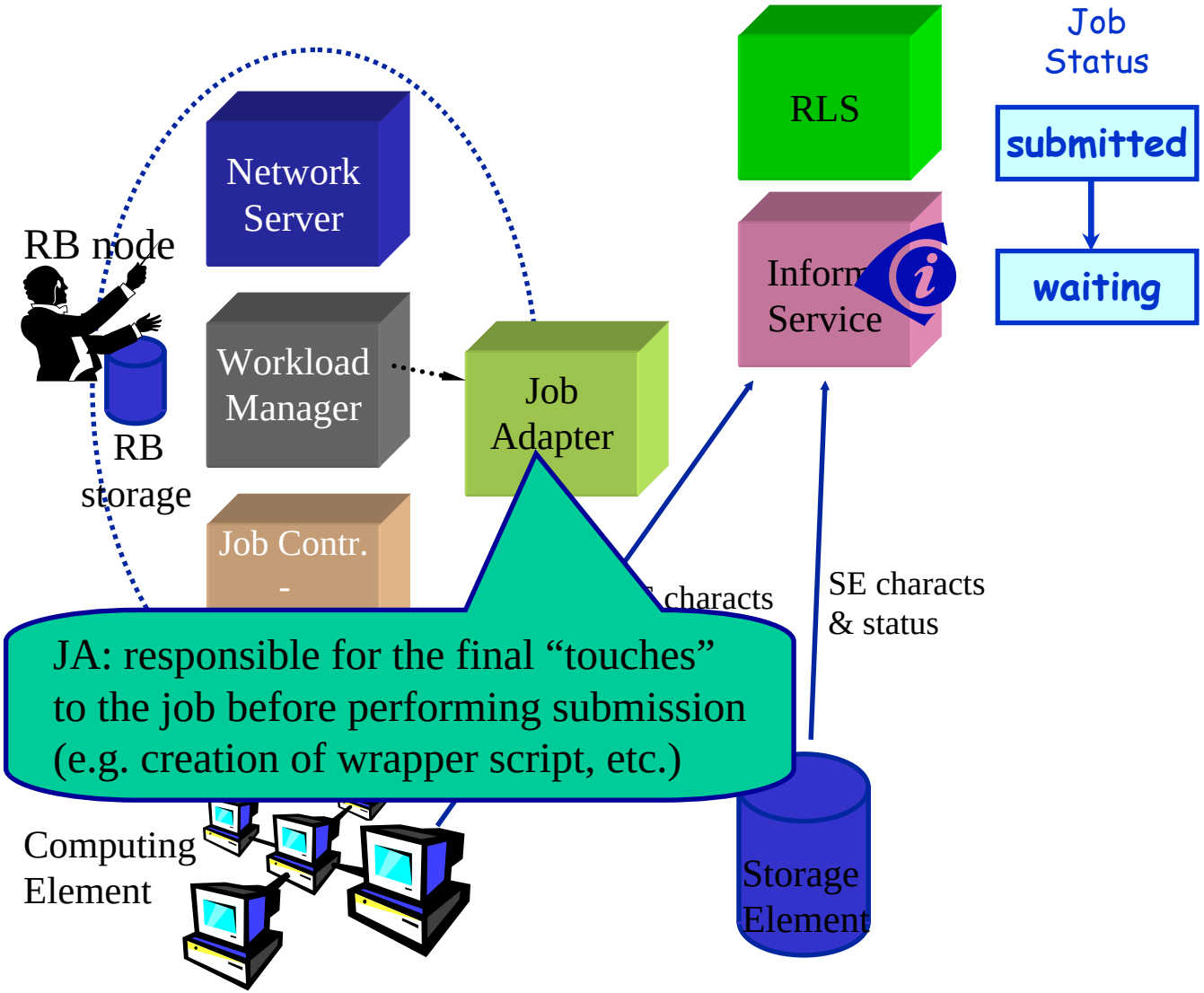
Job Submission



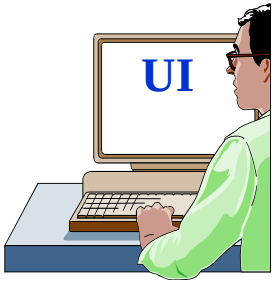


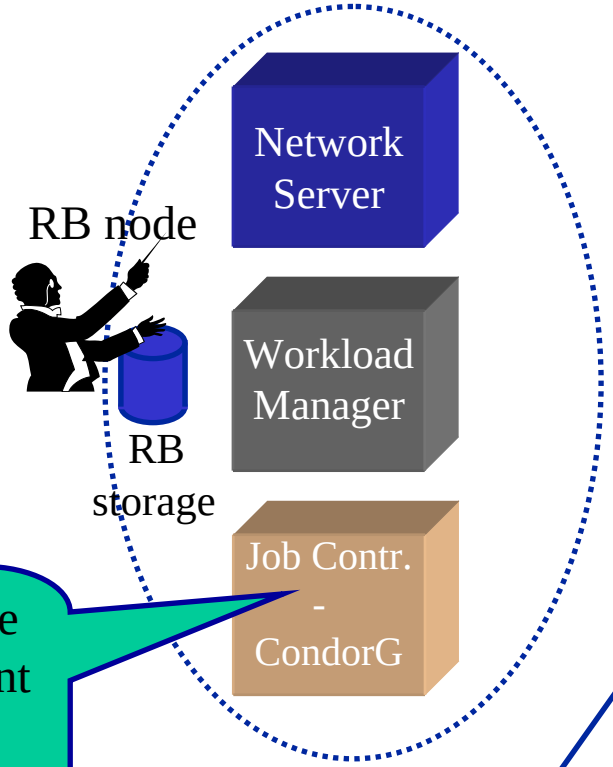
Job Submission



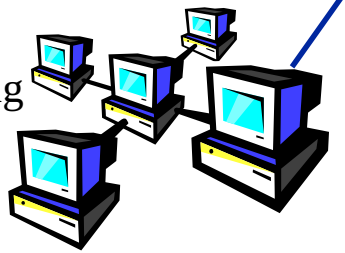


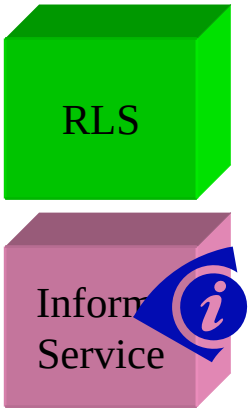
Job Submission





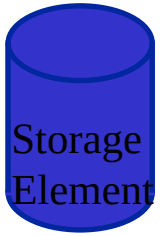
JC: responsible for the actual job management operations (done via CondorG)



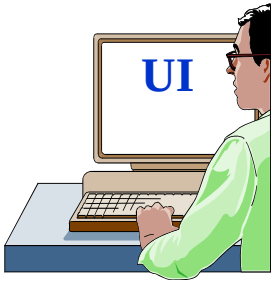


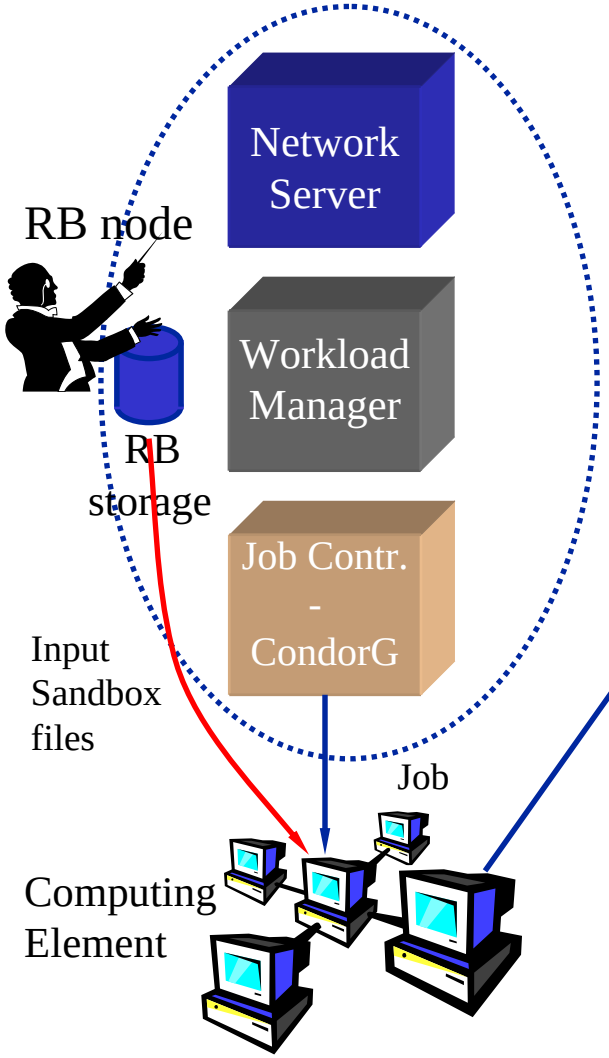
CE characts & status

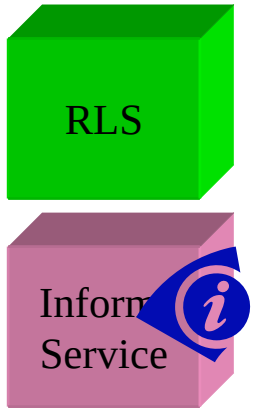
SE characts & status



Job Submission

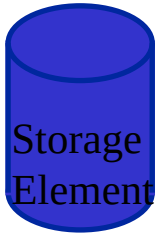


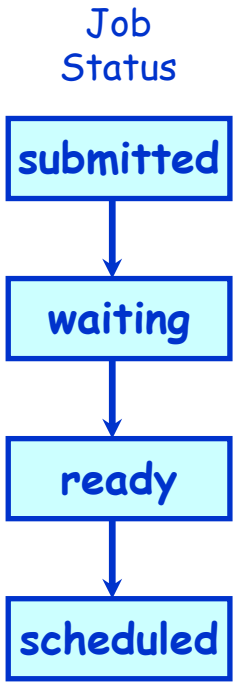




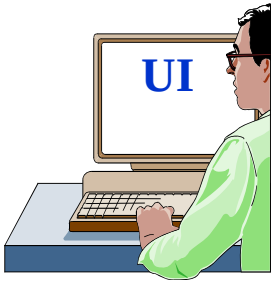
CE characts & status

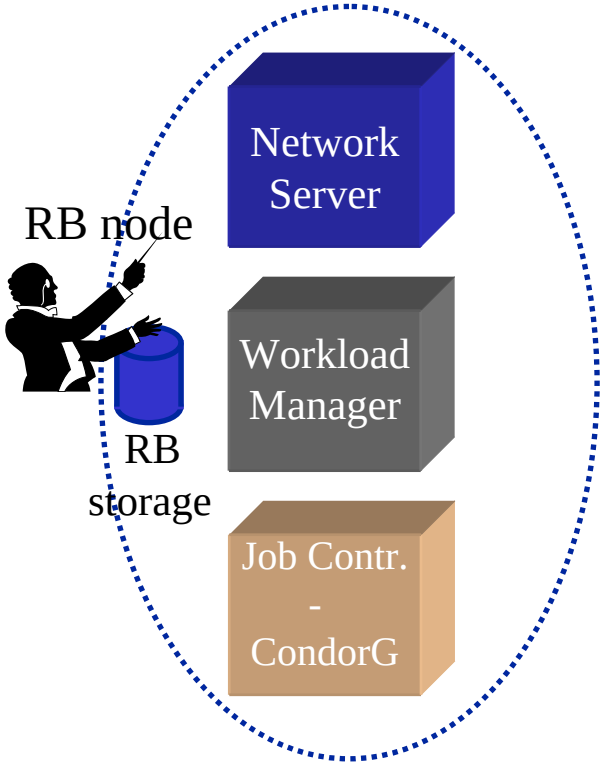
SE characts & status

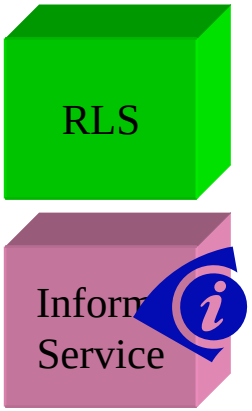


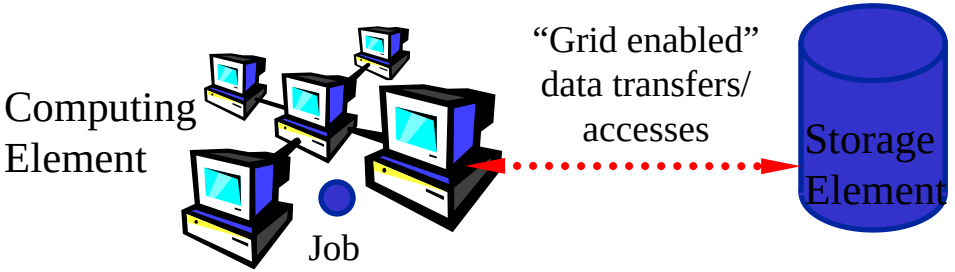


Job Submission

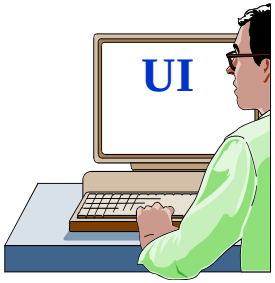


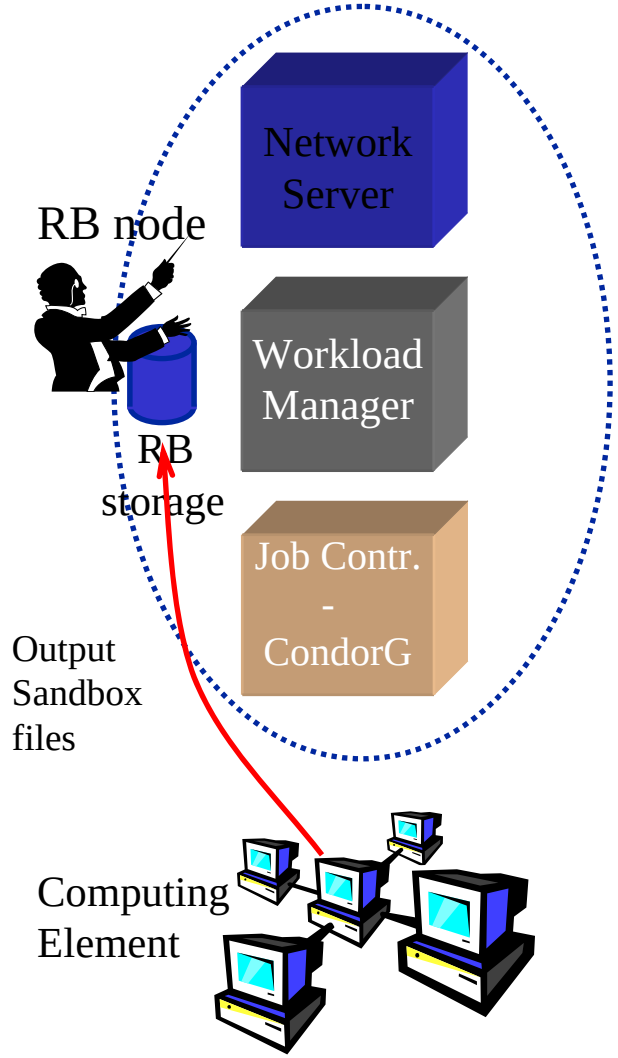


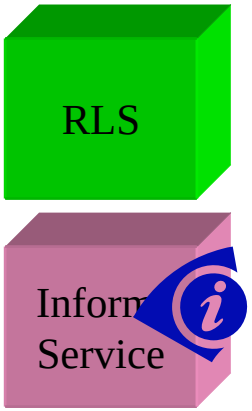


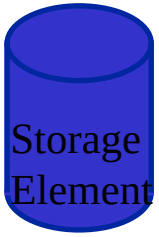


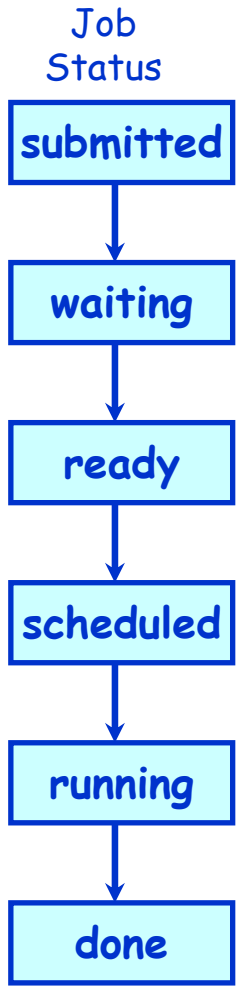
Job Submission



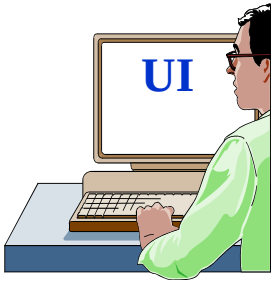




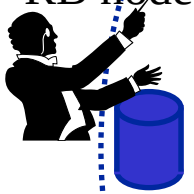




Job Submission



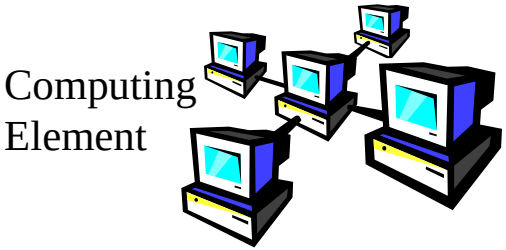
edg-job-get-output <dg-job-id>



Network Server

Workload Manager

Job Contr. - CondorG



RLS

Inform Service

Storage Element

Job Status

submitted

waiting

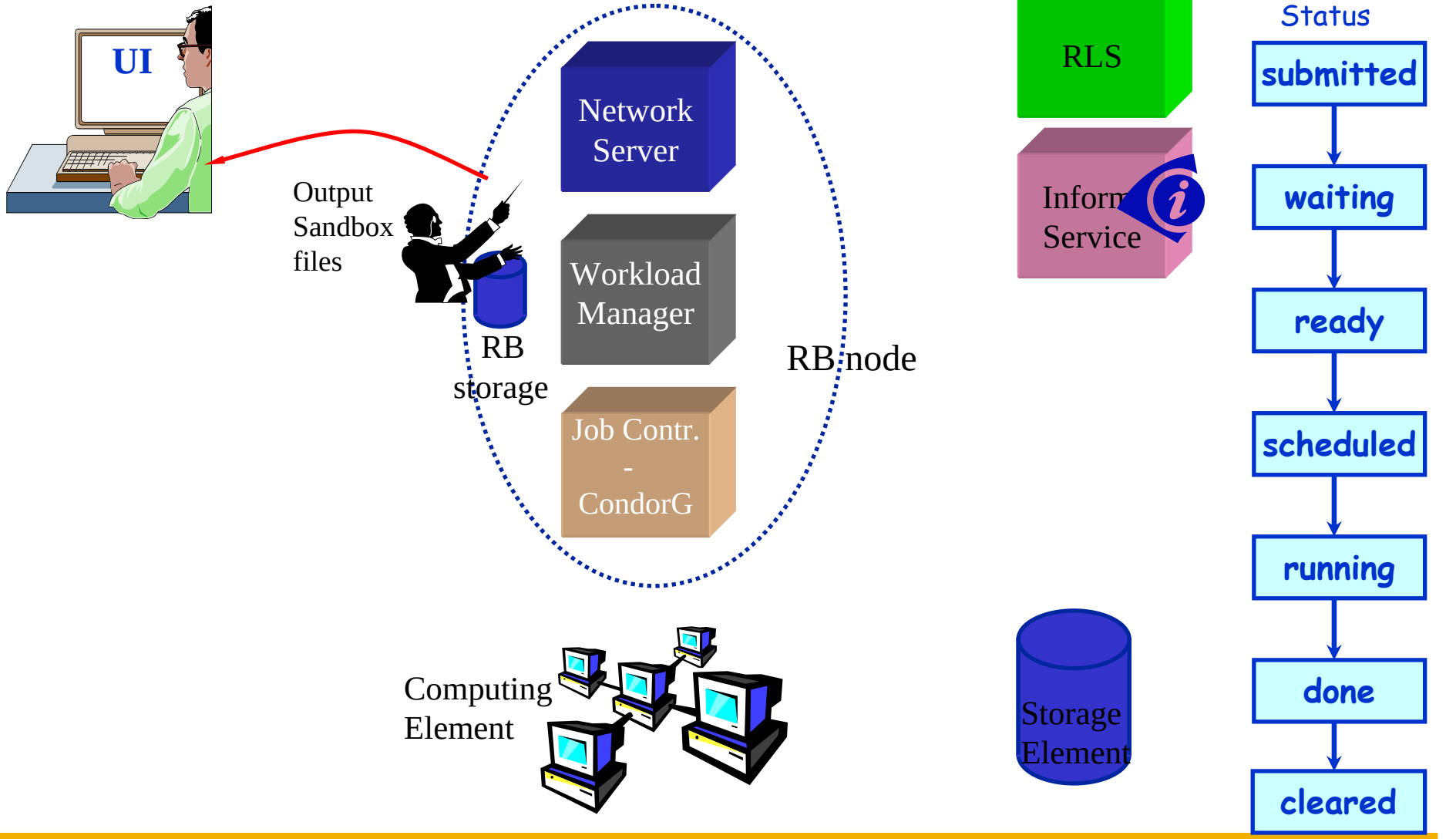
ready

scheduled

running

done

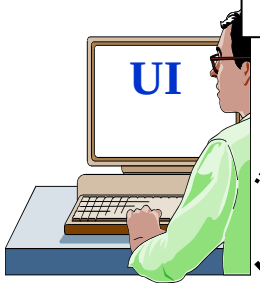
Job Submission



Job monitoring

Enabling Grids for E-sciencE

edg-job-status <dg-job-id>
edg-job-get-logging-info <dg-jobid>



LB: receives and stores job events; processes corresponding job status

Job status

Logging & Bookkeeping

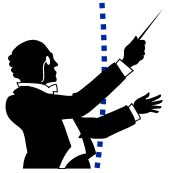
Network Server

Workload Manager

Job Contr. - CondorG

Log Monitor

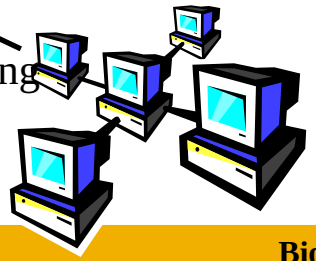
RB node



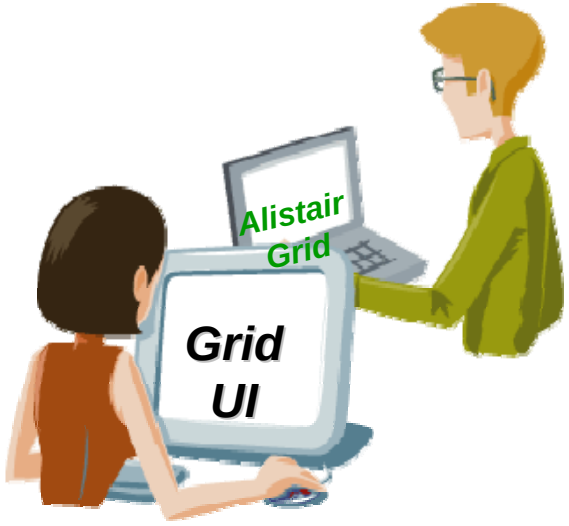
Log of job events

LM: parses CondorG log file (where CondorG logs info about jobs) and notifies LB

Computing Element



The Grid : Authentication and authorization



Users need to “logon” only once on the Grid UI

The access to the Grid is guaranteed through the use of X.509 certificates

A service is presented with the Certificate of the User and if the Certificate is OK, the user is guaranteed access to the Grid.

Certificates are used everywhere in Grid whenever you need to identify a user. For instance, the Web Portal for Grid Support will allow access to users with valid Grid certificates.

Let's see how it works!