



Enabling Grids for E-science

# Command Line Grid Programming

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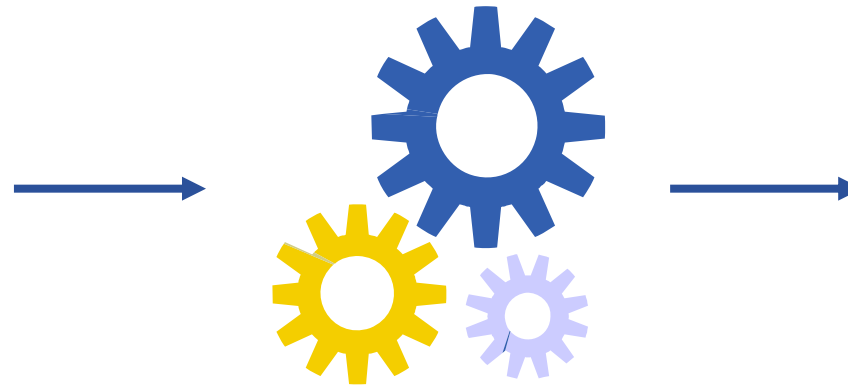
- Application definition
- Environment configuration
- Information discovery
- Data management
- Program definition
- Program execution
- Summary

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## Image Compression



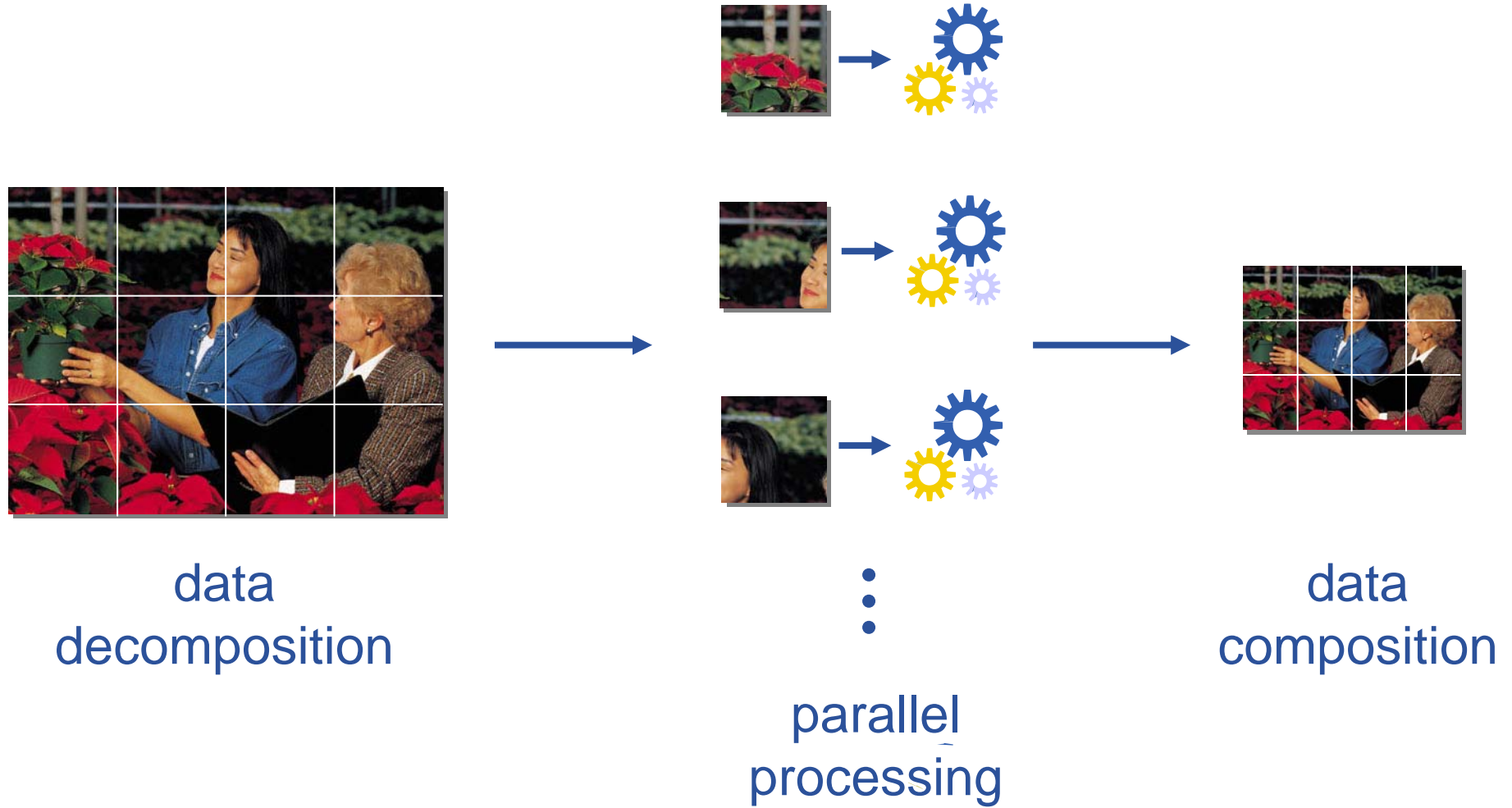
original  
image



compression  
algorithm

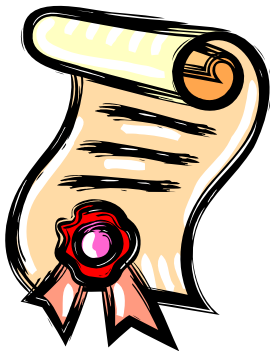


compressed  
image



You must already have...

1



CA certificate

2



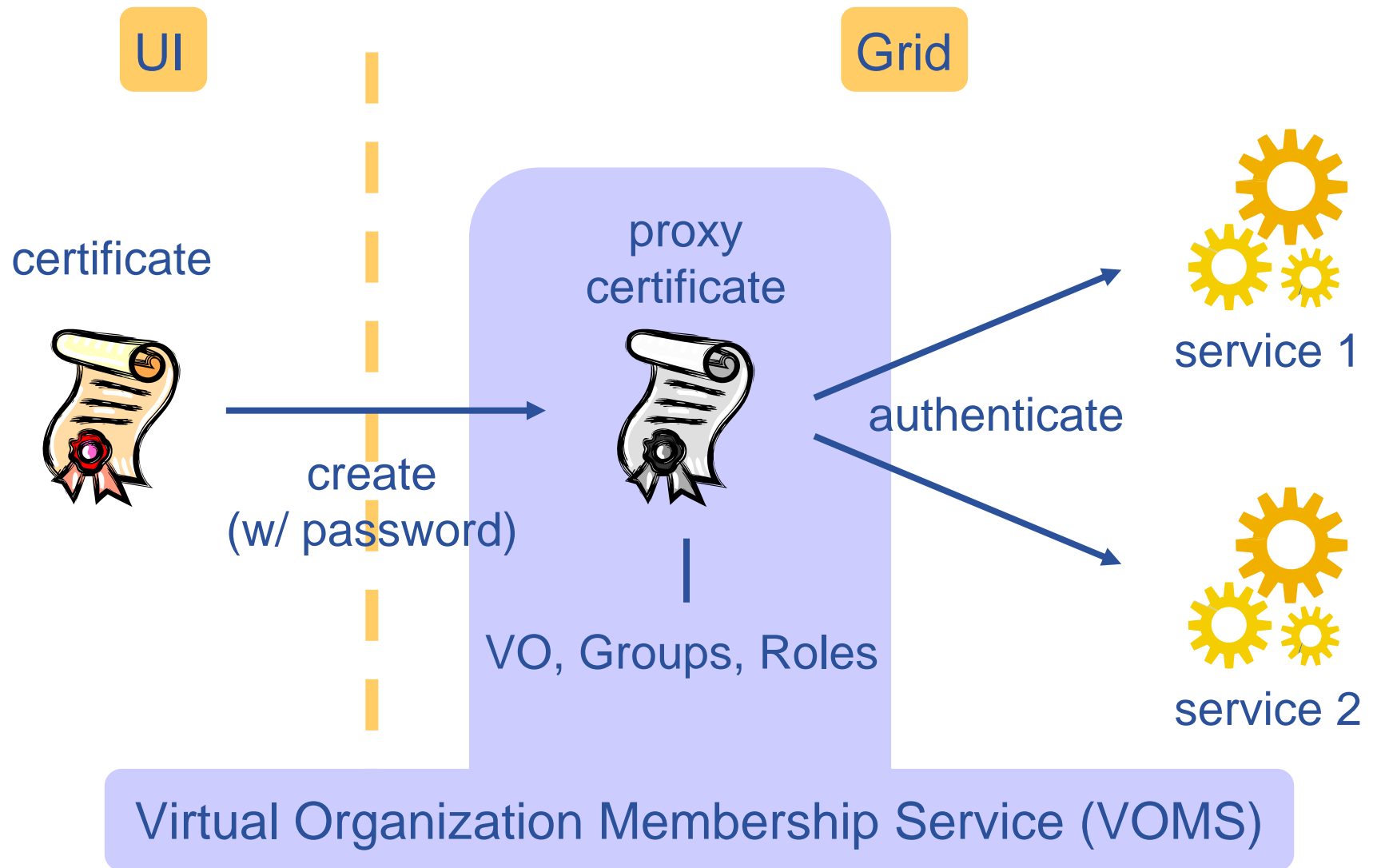
VO membership

3



UI account

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Command (voms-proxy-)	Description
init	Creates VOMS proxy
info	Prints VOMS proxy information
destroy	Destroys VOMS proxy
list	Lists VOMS server attributes

- gLite 3.0 User's Guide
- VOMS Core Services User's Guide

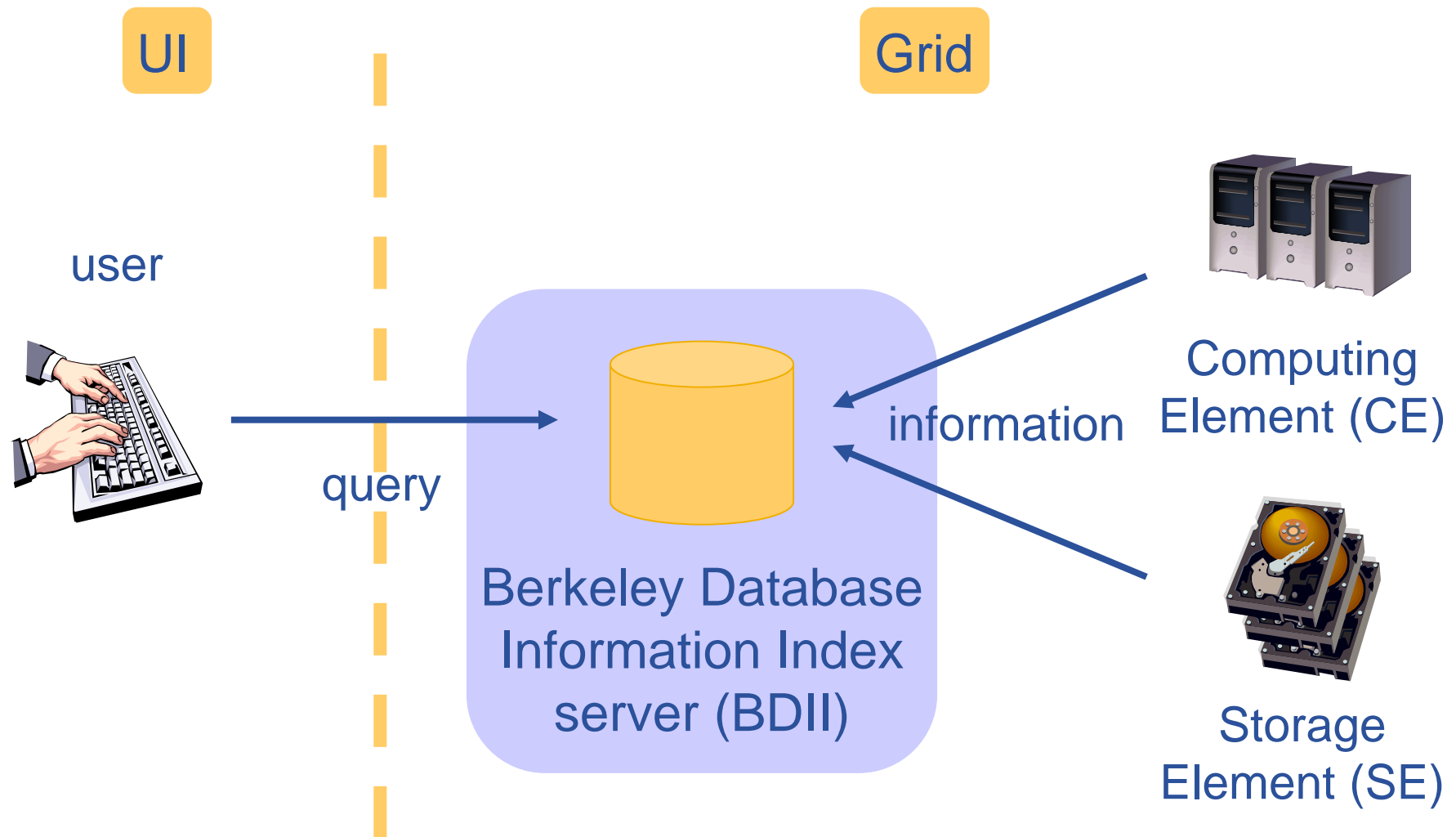
Contact VOMS server and create proxy certificate

```
> voms-proxy-init -voms=see
```

Check proxy certificate

```
> voms-proxy-info -all
```

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Command	Description
lcg-infosites	Prints Grid service information
Attributes	
--vo	VO name (mandatory)
--is	BDII server name

Options	Description
ce	Prints CE names
se	Prints SE names
closeSE	Prints CE and “close” SE names
all	Prints CE and SE names
lfc	Prints File Catalog (LFC) name

- gLite 3.0 User's Guide
- lcg-infosites -help

Get CE and SE names for VO

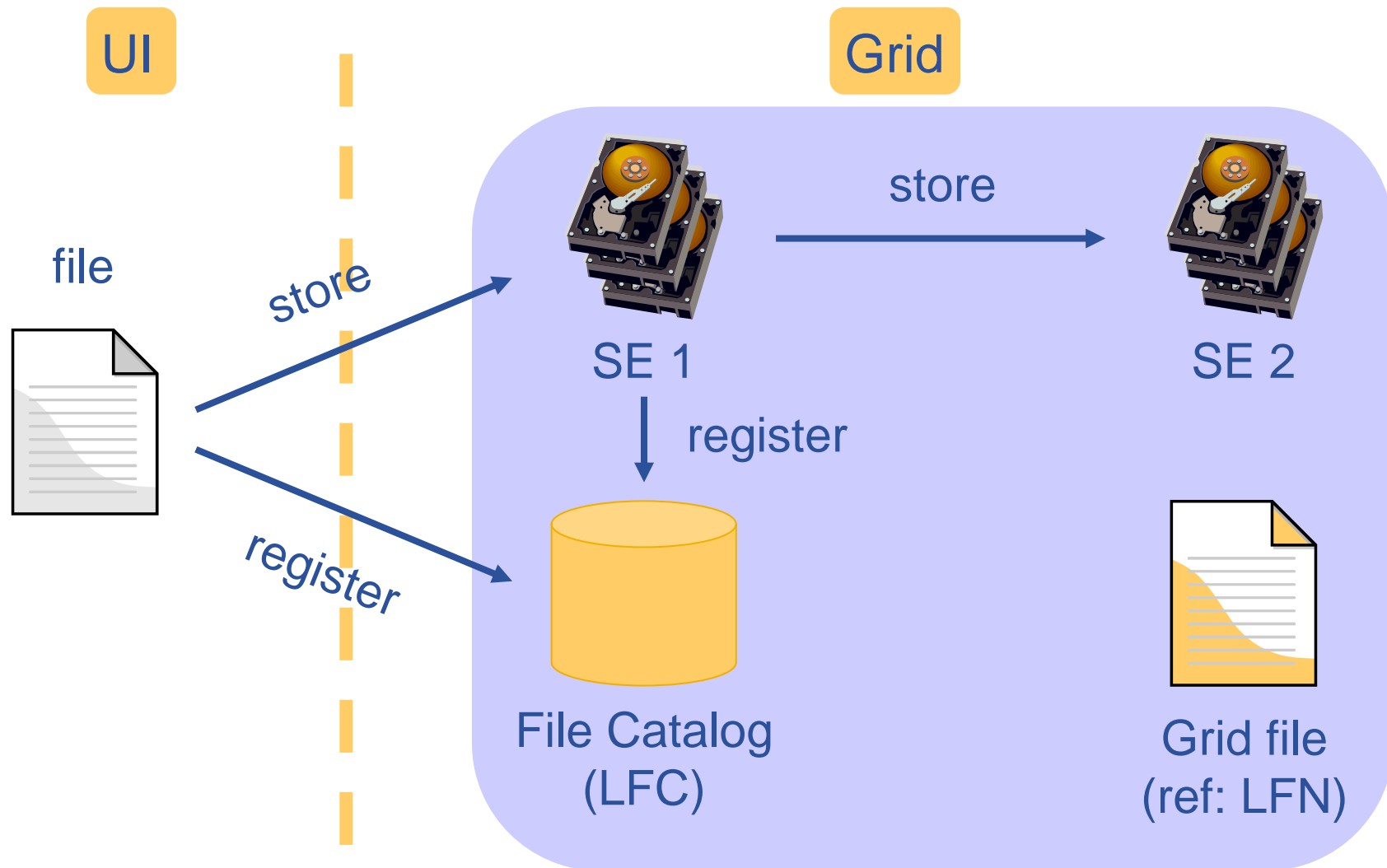
```
> lcg-infosites --vo see all
```

Get LFC name for VO

```
> lcg-infosites --vo see lfc
```

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Command (lcg-)	Description
cp	Copies file from Grid to UI
cr	Copies file from UI to Grid
rep	Creates replica of file
lr	Lists replicas of file
del	Deletes file (and replicas)

- gLite 3.0 User's Guide
- lcg-utils man pages

## Upload data (sub-images) to Grid

```
> lcg-cr --vo see -l lfn:/grid/see/subimg1
   file:/users/johndoe/subimg1
> lcg-cr --vo see -l lfn:/grid/see/subimg2
   file:/users/johndoe/subimg2
[...]
```

## Locate data (sub-image1)

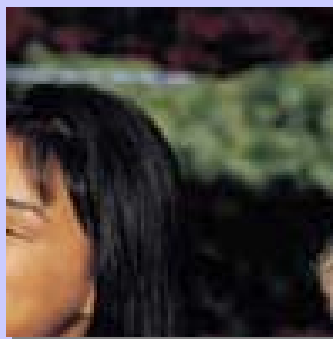
```
> lcg-lr --vo see lfn:/grid/see/subimg1
```

## Replicate data (sub-image1) to specific SE

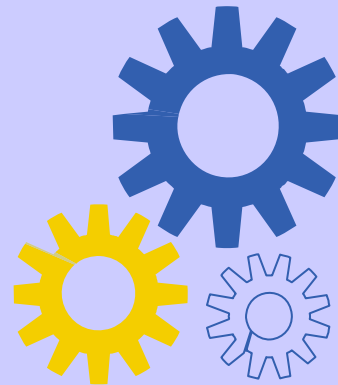
```
> lcg-rep --vo see -d se01.ariagni.hellasgrid.gr
   lfn: /grid/see/subimg1
```

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## Job Description Language (JDL)



original  
input data  
sub-image



compression  
program  
algorithm



compressed  
output data  
sub-image

Attribute	Description
Executable	Program to run on Grid
Arguments	Arguments of program
InputSandbox	Files to copy from UI to Grid
StdOutput	File to save program stdout
StdError	File to save program stderr
OutputSandbox	Files to copy from Grid to UI

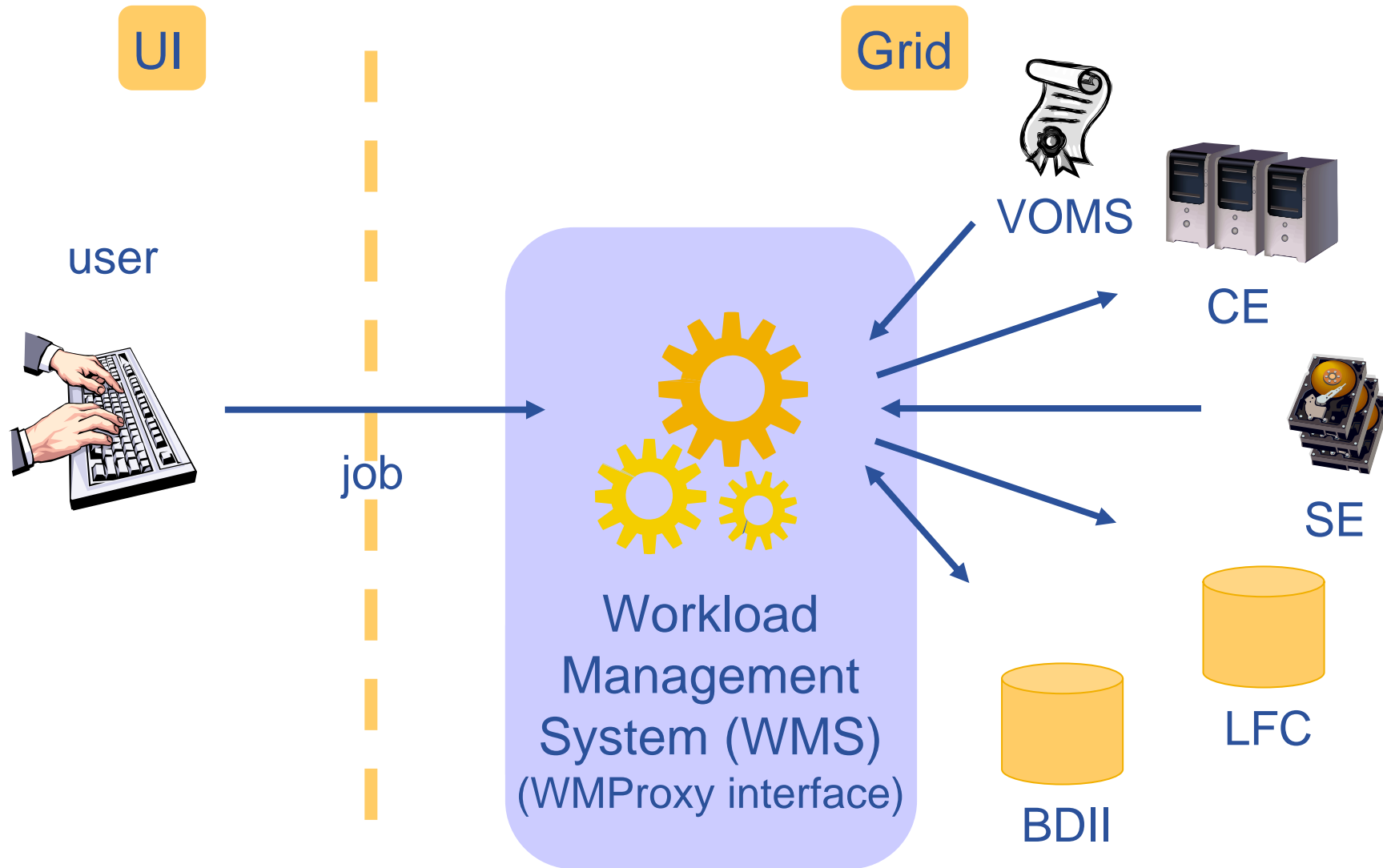
Attribute	Description
DataRequirements	
InputData	Grid files needed by program
DataCatalogType	Type of catalog referencing Grid files
DataAccessProtocol	Protocol for accessing Grid files
Requirements	Program resource requirements

- gLite 3.0 User's Guide
- JDL Attributes Specification

```
[
  Executable = "compress.sh";
  Arguments = "subimg1";
  InputSandbox =
    { "file:///users/johndoe/compress.sh" };
  StdOutput = "std.out";
  StdError = "std.err";
  OutputSandbox = { "std.out", "std.err",
    subimg1" };
  DataRequirements = {
    [InputData = { "lfn:/grid/cms/subimg1" };
    DataCatalogType = "DLI"];
  };
  DataAccessProtocol = { "gsiftp" };
]
```



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Command (glite-wms-job-)	Description
delegate-proxy	Delegates VOMS proxy to WMPProxy
submit	Submits a job
cancel	Cancels a submitted job
output	Copies OutputSandbox to UI
glite-job-status	Prints submitted job status

- gLite 3.0 User's Guide
- WMPProxy Service User's Guide

## Delegate proxy and set delegation id

```
> glite-wms-job-delegate-proxy -d del_id
```

## Submit job and save job id

```
> glite-wms-job-submit -d del_id -o job_id  
compress.jdl
```

## Check job status

```
> glite-job-status -i job_id
```

## Get job output when done

```
> glite-wms-job-output -i job_id
```

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- Parallelize application
- Authenticate with VOMS
- Get information with lcg-infosites
- Upload data with lcg-utils
- Describe application with JDL
- Execute application with glite-wms-job-\*

**The Grid is fast, simple, and free. So, use it!**

## Questions?

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