Application portals and grid-enabled applications

Jonas Lindemann

GRID advantages

- Unified model for accessing resources
- Better security model
- Easier sharing of resources
- Easier cooperation

GRID disadvantages

- A new conceptual model
- Many implementations
- Interoperability issues
- Binary incompatibilites
- Library dependencies
- Usability issues
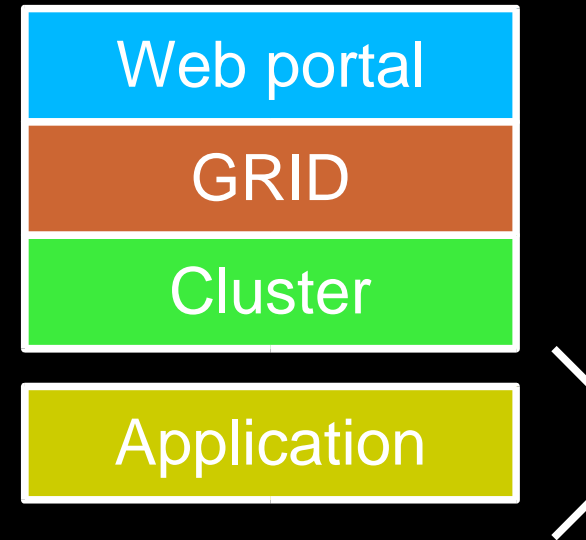
Using the GRID (ARC style)

- Get a certificate
  - grid-cert-request
  - mail request to Certificate Authority for signing
  - Install signed certificates
- Create a grid proxy
  - grid-proxy-init
- Describe your job
  - XRSL = &(executable=...)(inputFiles...)...
- Submit task
  - ngsub -d 1 -t 4 -f job.xrsl
- Monitor job progress
  - ngstat -a
- Get results
  - ngget gsiftp://sigrid.lunarc.lu.se/jobs/13123....

Problems with this approach

- Command line is <u>not</u> ok for everyone
  - Many users don't care how it is done
  - Want to select file and click "Submit"
- Unix/Linux system needed
  - Not obvious how to do it on other systems

Are Grid portals the solution?

- User interface to the <u>Grid</u>

- Designed to handle all kinds of jobs

- Applications are just another option

- Grid knowledge required

Web portal
GRID
Cluster

Application

Are Grid portals the solution?

Shouldn't it be the other way?

Application portals

- Users are application-experts

- Grid is an "infrastructure"

- Portals interface to applications on the Grid

- Transparent access to Grid resources

- Attract other users groups

Web portal
Application UI
GRID
Cluster
Application
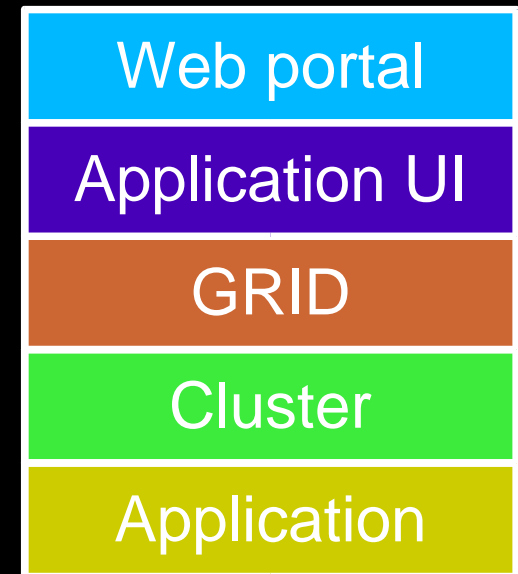
LUNARC Application Portal

- Provide easy access to <u>applications</u> on the GRID and LUNARC resources

- Portal handles GRID details

- Extendable
  - Plugin based
  - SDK for adding applications

File　Edit　View　Go　Bookmarks　Tools　Window　Help

Back　Forward　Reload　Stop　https://grid.lunarc.lu.se/LAP/　Search　Print

Home　Bookmarks　Release Notes　Plug-ins　Extensions　Support　Mozilla Community

LUNARC
Application Portal

Information　　Authorisation　　Session　　Preferences　　Create　　Manage　　Monitor　　About...

Welcome to the LUNARC Application Portal!

This portal provides easy access to commonly found applications at LUNARC. Please use the top menu to access the functionality of this portal.

Please note that all function require a valid grid-proxy.

LAP Version 0.5.0

Written by: Jonas Lindemann

Credits:

Web application developed in WebWare for Python
Grid access though NorduGrid/ARC middleware (client)
HyperText HTML code generation library by John A. (Andy) Dustman
DHTML Menus (TransMenu) by Aaron Boodman (www.youngpup.net)

Done

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Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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LAP Version 0.5.0

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Grid Proxy Init

Password: **********   Options

☐ Use PKCS11 Device

Create   Exit

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Done

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Proxy Created

Pas   ns

Proxy was successfully created.

OK

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Done

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Information   Authorisation   Session   Preferences   **Create**   Manage   Monitor   About...

POVRAY...
ABAQUS...
MOLCAS...
MATLAB...
Python...
NumArray...
Generic...
Generic self-compiling...

Welcome to the LUNARC Application Portal!

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Please note that all function require a valid grid-p...

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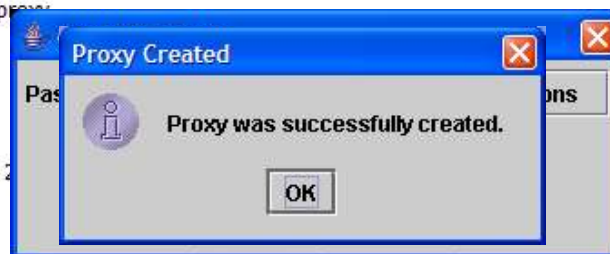
Written by: Jonas Lindemann

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Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/AbaqusJobPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

LUNARC
Application Portal

Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Login

Proxy file [   ] Browse...

Login   Reset

Done

Back Forward Reload Stop https://grid.lunarc.lu.se/LAP/context/AbaqusJobPage Search Print

Home Bookmarks Release Notes Plug-ins Extensions Support Mozilla Community

LUNARC
Application Portal

Information Authorisation Session Preferences Create Manage Monitor About...

Create a Abaqus job

Input file	[ ] Browse...
License server	gorkon.byggmek.lth.se
CPU time (s)	60
Job name	NoName
Email notification	[ ]

Create   Reset

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Done

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/AbaqusJobPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

LUNARC
Application Portal

Information   Authorisation   Sess

File Upload

Look in: Desktop

My Recent Documents

Desktop

My Documents

My Computer

My Network

- My Documents
- My Computer
- My Network Places
- dia
- Komodo 3.0
- Mozilla
- WinSCP3
- Anteckningar
- Genvägar
- Irrlicht
- EGC2005.txt
- Initialize proxy
- t1-std.inp
- test001.input
- test.pov

File name: t1-std.inp   Open

Files of type: All Files   Cancel

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Done

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/AbaqusJobPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Create a Abaqus job

Input file	C:\Documents and Settin	Browse...
License server	gorkon.byggmek.lth.se	
CPU time (s)	5	
Job name	AbaqusJob345	
Email notification	jonas.lindemann@bygg	

Create   Reset

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Done

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/AbaqusJobPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Message

Job created successfully

OK

Done

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/ManageJobPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Manage jobs

- ○ MolcasJob
- ○ MolcasJob2
- ◉ AbaqusJob345
- ○ PovrayTest
- ○ AbaqusTest677
- ○ AbaqusTestJob
- ○ LAPTest
- ○ AbaqusJob2
- ○ Abaqus
- ○ MolcasJob3

[Edit]   [View files]   [Submit]   [Delete]   [Reset]

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/ManageJobPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Submitting job...

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Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/ManageJobPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Message

Job submitted with jobid
gsiftp://toto7.lunarc.lu.se:2811/jobs/16329109767B759985674831

OK

LAP Version 0.5.0

Done

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/ManageJobPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Running jobs
Whenim64 status
Toto7 status
Sigrid status
(TwoTen) status

- ○ MolcasJob
- ○ MolcasJob2
- ○ AbaqusJob345
- ○ PovrayTest
- ○ AbaqusTest677
- ○ AbaqusTestJob
- ○ LAPTest
- ○ AbaqusJob2
- ○ Abaqus
- ○ MolcasJob3

Edit   View files   Submit   Delete   Reset

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Transferring data from grid.lunarc.lu.se...

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/JobStatus   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

LUNARC
Application Portal

Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

ID	Name	Status	Error
gsiftp://sigrid.lunarc.lu.se:2811/jobs/1471710976603711728463490	UserguideMPI	FINISHED 2004-10-13 11:41:32	
gsiftp://toto7.lunarc.lu.se:2811/jobs/163291097678759985674831	AbaqusJob345	SUBMIT	
gsiftp://sigrid.lunarc.lu.se:2811/jobs/322221097668459767609295	UserguideMPI	INLRMS: Q	

LAP Version 0.5.0

Done

File　Edit　View　Go　Bookmarks　Tools　Window　Help

Back　Forward　Reload　Stop　https://grid.lunarc.lu.se/LAP/context/JobStatus　Search　Print

Home　Bookmarks　Release Notes　Plug-ins　Extensions　Support　Mozilla Community

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Application Portal

Information　Authorisation　Session　Preferences　Create　**Manage**　Monitor　About...

Existing jobs...

Running jobs　　　>　　Manage...

Syncronise...

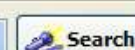| ID	Name	Status	Error
gsiftp://sigrid.lunarc.lu.se:2811/jobs/1471710976603711728463490	UserguideMPI	FINISHED 2004-10-13 11:41:32	
gsiftp://toto7.lunarc.lu.se:2811/jobs/163291097678759985674831	AbaqusJob345	SUBMIT	
gsiftp://sigrid.lunarc.lu.se:2811/jobs/322221097668459767609295	UserguideMPI	INLRMS: Q	

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Transferring data from grid.lunarc.lu.se...

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop https://grid.lunarc.lu.se/LAP/context/ManageGridJobPage Search Print

Home Bookmarks Release Notes Plug-ins Extensions Support Mozilla Community

LUNARC
Application Portal

Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Manage GRID jobs		
JobID	JobName	Status
○ gsiftp://sigrid.lunarc.lu.se:2811/jobs/1471710976603711728463490	UserguideMPI	FINISHED 2004-10-13 11:41:32
○ gsiftp://toto7.lunarc.lu.se:2811/jobs/163291097678759985674831	AbaqusJob345	INLRMS: R
○ gsiftp://sigrid.lunarc.lu.se:2811/jobs/32222109766845976 7609295	UserguideMPI	INLRMS: Q

Get   Kill   Clean   Reset

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Done

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/ManageJobPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Downloaded job files		
JobID	Last accessed	Last modified
⊙ 530210947266371996811907	Wed Oct 13 04:02:05 2004	Thu Sep 9 19:49:26 2004
○ 126710944767611580550489	Wed Oct 13 04:02:05 2004	Mon Sep 6 15:35:26 2004
○ 119531094460997422216120	Wed Oct 13 04:02:05 2004	Mon Sep 6 11:03:03 2004
○ 148101094726793140708316	Wed Oct 13 04:02:05 2004	Thu Sep 9 19:51:00 2004
○ 136091094726289189484762	Wed Oct 13 04:02:05 2004	Thu Sep 9 12:53:35 2004

View   Delete   Back   Reset

LAP Version 0.5.0

Done

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/ViewFilesPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

LUNARC
Application Portal

Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Downloaded job files

Type	File	Size	Last accessed	Last modified
○	gmlog	4096	Wed Oct 13 04:02:05 2004	Thu Sep 9 19:49:33 2004
○	t1-std.msg	3270	Fri Oct 8 09:03:49 2004	Thu Sep 9 19:49:20 2004
○	abaqus_v6.env	48	Thu Sep 9 19:49:11 2004	Thu Sep 9 19:49:11 2004
○	run.sh	40	Thu Sep 9 19:49:09 2004	Thu Sep 9 19:49:09 2004
○	stdout.txt	394	Fri Oct 8 09:02:32 2004	Thu Sep 9 19:49:13 2004
○	t1-std.odb	2928536	Thu Sep 9 19:49:18 2004	Thu Sep 9 19:49:19 2004
○	t1-std.fil	6611544	Thu Sep 9 19:49:23 2004	Thu Sep 9 19:49:24 2004
○	t1-std.prt	2547699	Thu Sep 9 19:49:21 2004	Thu Sep 9 19:49:22 2004
○	stderr.txt	282	Thu Sep 9 19:49:15 2004	Thu Sep 9 19:49:15 2004
○	t1-std.com	1201	Thu Sep 9 19:49:16 2004	Thu Sep 9 19:49:16 2004
○	t1-std.sta	446	Thu Sep 9 19:49:25 2004	Thu Sep 9 19:49:25 2004
○	t1-std.dat	11944	Thu Sep 9 19:49:17 2004	Thu Sep 9 19:49:17 2004
○	t1-std.inp	774	Thu Sep 9 19:49:12 2004	Thu Sep 9 19:49:12 2004

View   Download   Download all (tar.gz)   Back   Reset

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Done

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/ViewFilesPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

LUNARC
Application Portal

Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

t1-std.msg

```
1 ABAQUS VERSION 6.4-1      DATE 09-Sep-2004       TIME 12:44:31      P
 For use at Lund under academic license from ABAQUS, Inc.
   BARREL VAULT (100 X 204 MESH)
  SELF-WEIGHT
 STEP    1     INCREMENT    1     STEP TIME    0.00



                       S T E P     1    S T A T I C   A N A L Y S



         SELF-WEIGHT

         FIXED TIME INCREMENTS
         TIME INCREMENT IS                          2.220E-
         TIME PERIOD IS                             2.220E-

      LINEAR EQUATION SOLVER TYPE        DIRECT SPARSE

      THIS IS A LINEAR PERTURBATION STEP.
      ALL LOADS ARE DEFINED AS CHANGE IN LOAD TO THE REFERENCE STATE

      EXTRAPOLATION WILL NOT BE USED
```
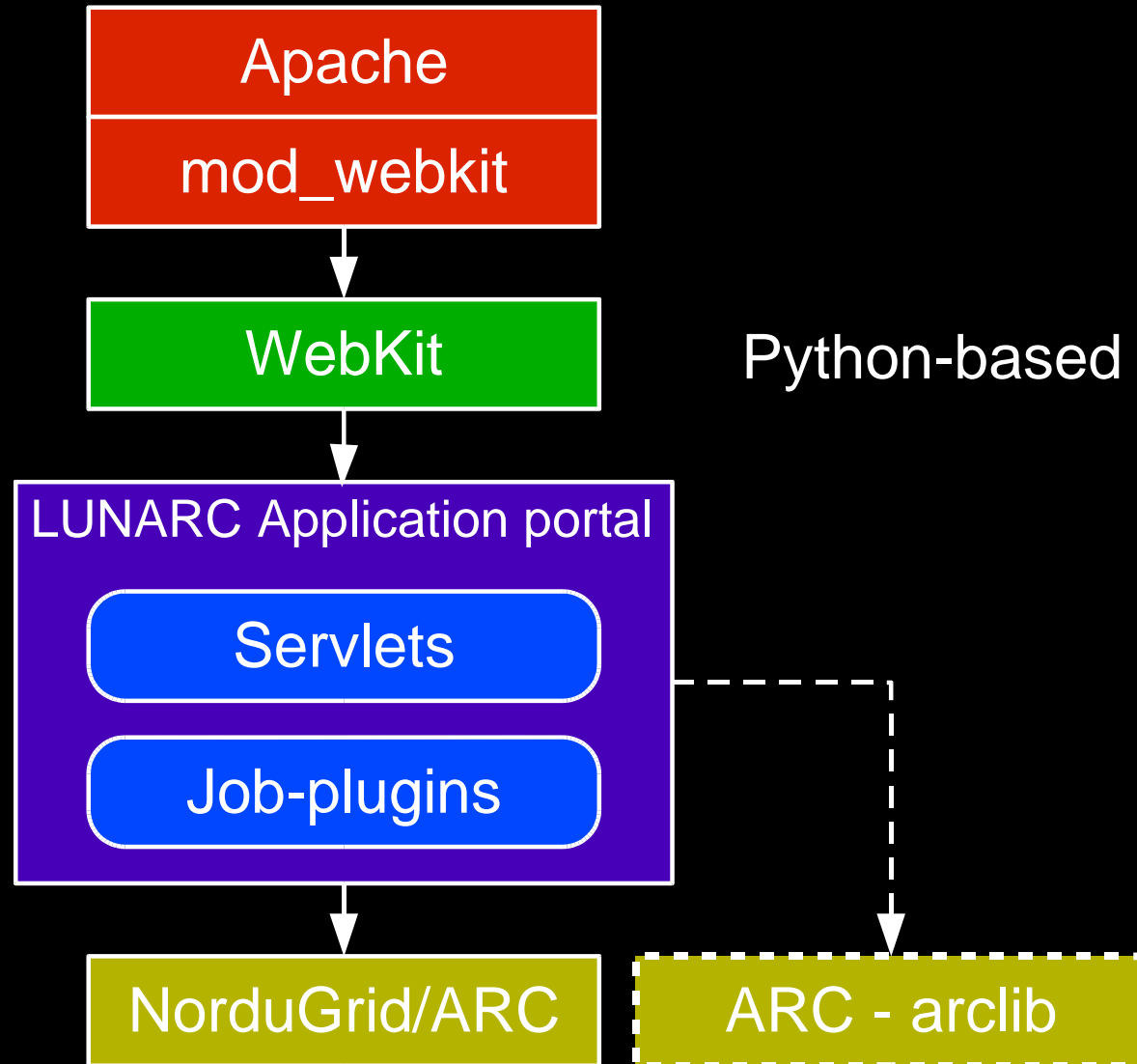
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Done

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/ViewFilesPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Application Portal

Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Opening t1-std.msg

The site has suggested that "t1-std.msg" be handled as an attachment. It is of type application/force-download (WinZip File) and located at:

https://grid.lunarc.lu.se/LAP/context/

What should Mozilla do with this file?

○ Open it with the default application

○ Open it with   [   ]   Choose...

● Save it to disk

☐ Always perform this action when handling files of this type

OK   Cancel

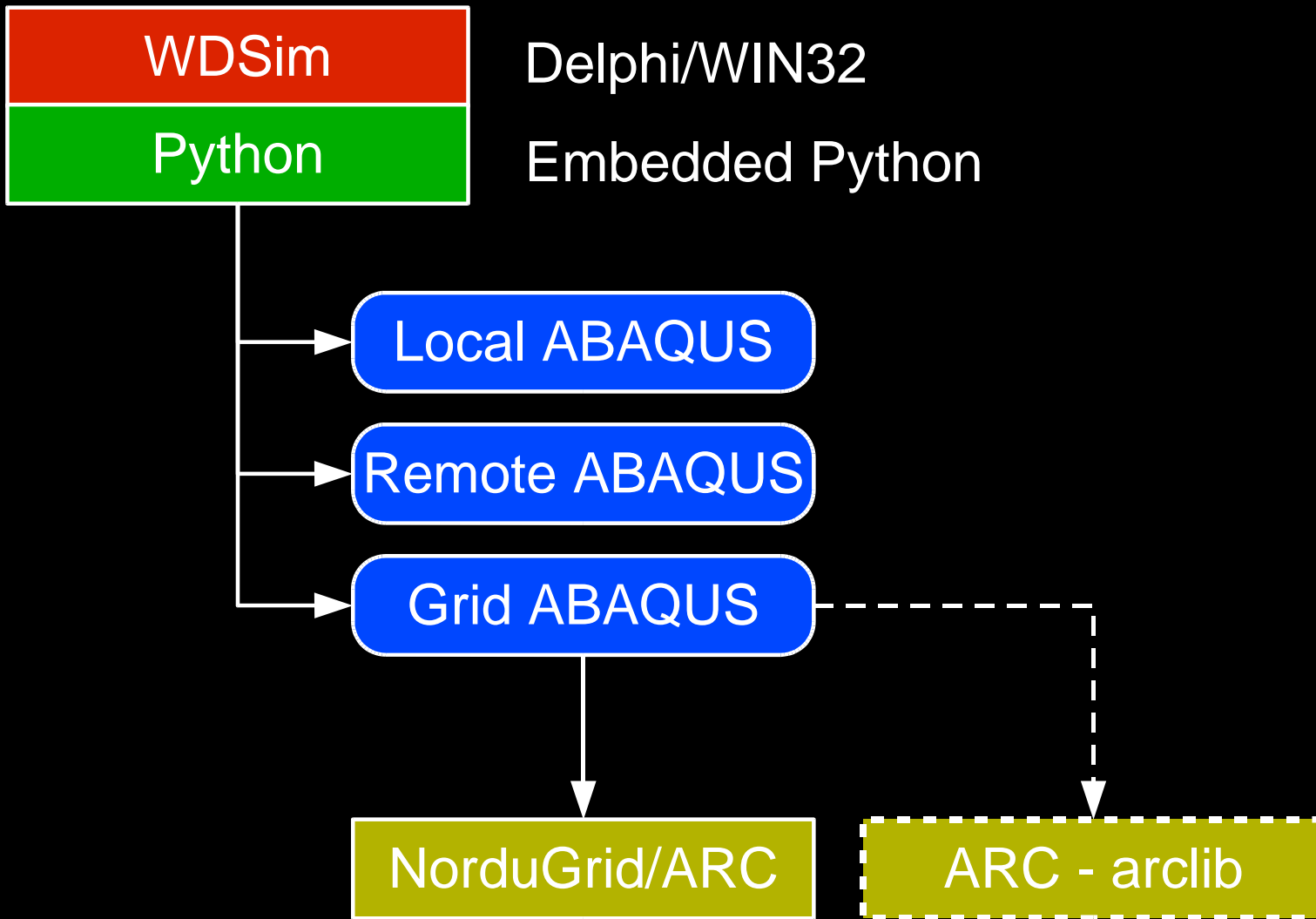|	Type			
○				33 2004
○				20 2004
○				11 2004
○				09 2004
○				13 2004
○				19 2004
○				24 2004
○				22 2004
○				15 2004
○				16 2004
○				25 2004
○	t1-std.dat	11944	Thu Sep 9 19:49:17 2004	Thu Sep 9 19:49:17 2004
○	t1-std.inp	774	Thu Sep 9 19:49:12 2004	Thu Sep 9 19:49:12 2004

View   Download   Download all (tar.gz)   Back   Reset

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Done

Portal implementation

Apache

mod_webkit

WebKit

Python-based

LUNARC Application portal

Servlets

Job-plugins

NorduGrid/ARC

ARC - arclib

Portals not the only solution!

WDSim implementation

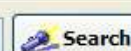| WDSim | Delphi/WIN32 |
| Python | Embedded Python |

Local ABAQUS

Remote ABAQUS

Grid ABAQUS

NorduGrid/ARC

ARC - arclib
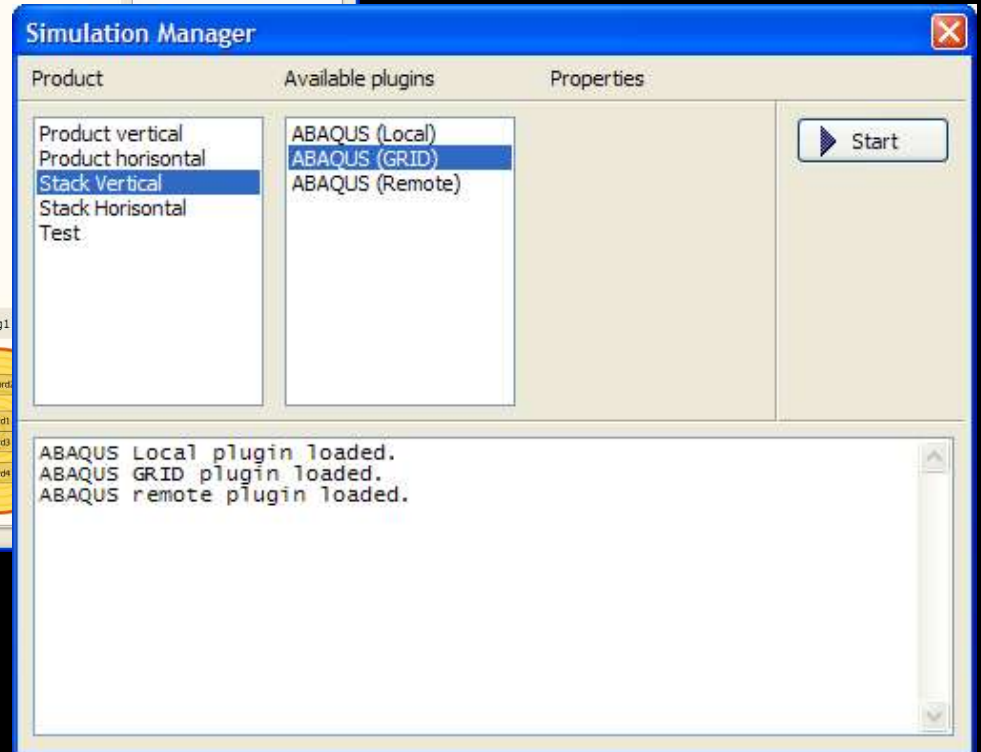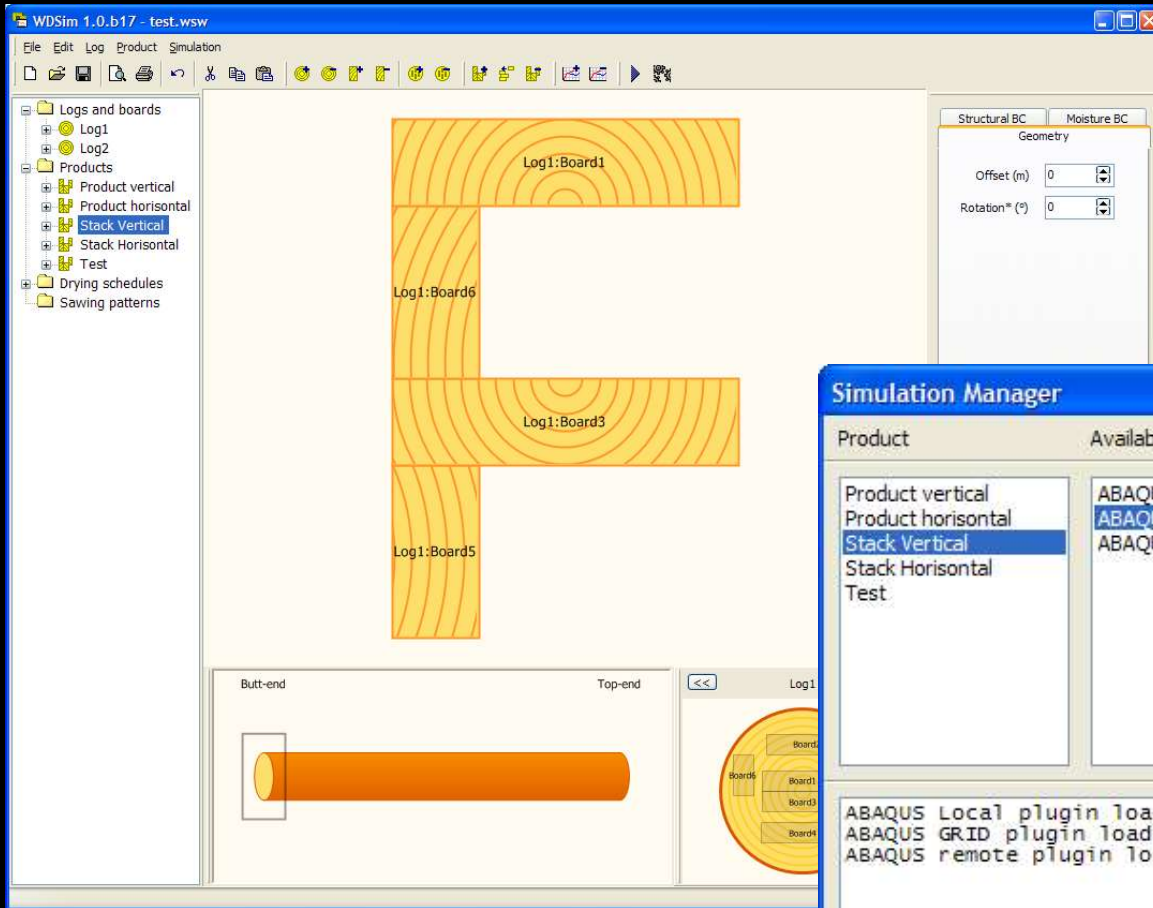
Conclusions

- Grid enables:
  - Unified access
  - Better security
  - Better resource use
- Application portals
  - Provide unterfaces to applications
  - Transparent access to resources
  - Grid used as "infrastructure"
  - Attract new user groups
- Grid-enabling of applications
  - Fits into user workflow

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/WelcomePage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Application Portal

Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Generate a certificate request...

Welc Requesting resource access... **rtal!**

This portal provides easy access to commonly found applications at LUNARC. Please use the top menu to access the functionality of this portal.

Please note that all function require a valid grid-proxy.

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File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/CertRequestPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Grid Certification Request

Name	Jonas Lindemann
Organisation 0	Grid
Organisation 1	NorduGrid
Domain	example.org
Email	emann@byggmek.lth.se
Private key passphrase	**********
Private key passphrase verification	**********

Submit   Reset

LAP Version 0.5.0

Done

File   Edit   View   Go   Bookmarks   Tools   Window   Help

Back   Forward   Reload   Stop   https://grid.lunarc.lu.se/LAP/context/CertRequestPage   Search   Print

Home   Bookmarks   Release Notes   Plug-ins   Extensions   Support   Mozilla Community

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Information   Authorisation   Session   Preferences   Create   Manage   Monitor   About...

Request confirmation and download

Please verify that the subject is correct before downloading the certificate request. To correct the subject please press 'Back'

/O=Grid/O=NorduGrid/OU=byggmek.lth.se/CN=Jonas Lindemann/Email=jonas.lindemann@byggmek.lth.se

[Download request and private key]   [Back]   [Reset]

Done