Exercises – Grid Workshop

1. Installation of the ARC client

Install and configure ARC on your computer. Documentation on installing ARC can be found at http://www.nordugrid.org/arc/

When configured the command ”arcproxy --version" should display:

```
arcproxy version 1.1.0
```

2. Installation of grid-certificate

Terena Certificate:

Use the information at
http://snicdocs.nsc.liu.se/wiki/Grid_certificates#Exporting_Terena_certificate_for_use_with_Grid_tools

To export your grid-certificate and install it in the .globus directory in your home directory.

Make sure the file userkey.pem mode is set to 400 and usercert.pem to 644.

NorduGrid Certificate:

Make sure you install the usercert.pem received from the NorduGrid CA in you .globus directory in your home directory.

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Verify your certificate using the command **grid-cert-info -subject.** This command should display your Distinguished Name (DN) in the terminal window.

3. Configure the ARC grid client.

Use the information in the slides to configure your ARC client for SweGrid. If configured correctly, the command **arcinfo** should display the following:

```
Execution Service: arc-ce01.pdc.kth.se
 URL: ARC0:ldap://arc-ce01.pdc.kth.se:2135/nordugrid-cluster-name=arc-
ce01.pdc.kth.se,Mds-Vo-name=local,o=Grid
 Queue: easy
 Health State: ok

Execution Service: svea.c3se.chalmers.se
 URL: ARC0:ldap://svea.c3se.chalmers.se:2135/nordugrid-cluster-
name=svea.c3se.chalmers.se,Mds-Vo-name=local,o=Grid
 Queue: svea
 Health State: ok
```

```
...

Execution Service: siri.lunarc.lu.se
 URL: ARC0:ldap://siri.lunarc.lu.se:2135/nordugrid-cluster-
name=siri.lunarc.lu.se,Mds-Vo-name=local,o=Grid
 Queue: arc
 Health State: ok
```

4. Querying the information system

Use the **arcinfo** command to query more information on specific resources. Use the **--cluster** switch to specify a resource explicitly. Use the **--long** switch to show more information on a resource. The following list shows the available resources at SweGrid:

- arc-ce.smokerings.nsc.liu.se - NSC
- siri.lunarc.lu.se - LUNARC
- grad.uppmax.uu.se - UPPMAX
- svea.c3se.chalmers.se – C3SE
- jeannedarc.hpc2n.umu.se – HPC2N
- arc-ce01.pdc.kth.se – PDC

5. Submitting testjobs

Use the **arctest** command to send testjobs to the resources. Use the built-in help using the **--help** switch to submit a job that prints the environment on a node.

Use **arcstat** to monitor the status of the submitted jobs.

Use **arckill** to kill a running job.

Use **arcget** to retrieve a finished job.

Use **arcclean** to clean a job that has not been downloaded with **arcget**.

6. Creating a simple job

Create a job description and needed files for a job that prints the current date and lists the files in the current working directory. The wall time of the job should be 5 minutes.

7. Creating a simple job sweep

Modify the code from http://www.scipy.org/Cookbook/CoupledSpringMassSystem to be a job sweep modifying the m1 parameter in the range 1.0 >= m1 <=2.0.

Executing the following code on the grid with different parameters:

```
python two_springs_solver.py > two_springs.dat
```

The python-files for this exercise can be found at the following URLs:

- dl.dropbox.com/u/2888586/grid_workshop/ex7/two_springs.py
- dl.dropbox.com/u/2888586/grid_workshop/ex7/two_springs_solver.py
- dl.dropbox.com/u/2888586/grid_workshop/ex7/two_springs_plot.py

8. Creating a MPI Job

Submit the following MPI example to grid using 8 cores:

```
program hello_mpi

use mpi

call mpi_init(ierr)
call mpi_comm_size(MPI_COMM_WORLD,npes, ierr)
call mpi_comm_rank(MPI_COMM_WORLD,irank,ierr)

print *,'Hello MPI! I am ',irank,' of ',npes

call mpi_finalize(ierr)

end program
```

Use the environment ENV/MPI/OPENMPI-1.4.4/GCC