

LSC
Laboratorium 2
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AGH

1. Answer the questions:

a. What is the difference between wall time and cpu time? Wall time is the total time elapsed between the start of the execution and the execution being finished. The CPU time is the time actually spent by the CPU executing the job (not counting e.g. waiting for resources).

Wall time is defined as the total time from the start of the execution to the execution being finished. CPU time is the whole time that the CPU spent on executing the job, including I/O operations like waiting for resources.

2. Create a job that prints out a "Hello world"

```
[ares][plgdawid126@login01 ~]$ cat hello_world.sh
#!/bin/bash
#SBATCH -p plgrid
#SBATCH -N 1
#SBATCH --ntasks-per-node=1
#SBATCH -A plglscclclass-cpu

echo "Hello world"
```

3. Create an interactive job and check how many cores are available on a computing node? Does the resource manager have this information? If yes, how to obtain this information?

```
[ares][plgdawid126@login01 ~]$ scontrol show partition all
PartitionName=all
  AllowGroups=ALL AllowAccounts=admins,softmgr AllowQos=ALL
  AllocNodes=login01,login02,login-int,slurm01,ac0001 Default=NO QoS=N/A
  DefaultTime=00:15:00 DisableRootJobs=YES ExclusiveUser=NO GraceTime=0 Hidden=NO
  MaxNodes=UNLIMITED MaxTime=3-00:00:00 MinNodes=0 LLN=NO MaxCPUsPerNode=UNLIMITED
  Nodes=ac[0001-0788],ag[0001-0009]
  PriorityJobFactor=1000 PriorityTier=2 RootOnly=NO ReqResv=NO OverSubscribe=NO
  OverTimeLimit=NONE PreemptMode=OFF
  State=UP TotalCPUs=38112 TotalNodes=797 SelectTypeParameters=NONE
  JobDefaults=(null)
  DefMemPerCPU=3850 MaxMemPerNode=368000
```

TotalCPUs / TotalNodes = 37824 / 788 = 48 cores per node

4. Create an array job that will print first 10 lines of a file, one line per job, you can read the /etc/passwd file.

```
#!/bin/bash
#SBATCH -p plgrid
#SBATCH -N 1
#SBATCH --array=0-9
#SBATCH --ntasks-per-node=1
#SBATCH -A plglsciclass-cpu

IDX=$((SLURM_ARRAY_TASK_ID + 1))
sed "${IDX}q;d" /etc/passwd
```

```
[ares][plgdawid126@login01 ~]$ cat slurm-1317726_0.out
root:x:0:0:root:/root:/bin/bash
[ares][plgdawid126@login01 ~]$ cat slurm-1317726_1.out
bin:x:1:1:bin:/bin:/sbin/nologin
[ares][plgdawid126@login01 ~]$ cat slurm-1317726_5.out
sync:x:5:0:sync:/sbin:/bin/sync
[ares][plgdawid126@login01 ~]$
```

5. Use an array job to render a series of 10 frames. We'll use blender for this purpose.

```
#!/bin/bash
#SBATCH -p plgrid
#SBATCH -N 1
#SBATCH --array=0-9
#SBATCH --ntasks-per-node=4
#SBATCH -A plglsciclass-cpu

IDX=$((SLURM_ARRAY_TASK_ID + 1))
xvfb-run -a blender --background -noaudio ripple_dreams_fields.blend --render-output ./img_${IDX}.png --render-frame ${IDX}
```

```
[ares][plgdawid126@login01 ~]$ sbatch render.sh
Submitted batch job 1317784
[ares][plgdawid126@login01 ~]$
[ares][plgdawid126@login01 ~]$ squeue
```

JOBID	PARTITION	NAME	USER	ST	TIME	NODES	NODELIST(REASON)
1317784_0	plgrid	render.s	plgdawid	R	0:02	1	ac0075
1317784_1	plgrid	render.s	plgdawid	R	0:02	1	ac0075
1317784_2	plgrid	render.s	plgdawid	R	0:02	1	ac0088
1317784_3	plgrid	render.s	plgdawid	R	0:02	1	ac0088
1317784_4	plgrid	render.s	plgdawid	R	0:02	1	ac0445
1317784_5	plgrid	render.s	plgdawid	R	0:02	1	ac0445
1317784_6	plgrid	render.s	plgdawid	R	0:02	1	ac0445
1317784_7	plgrid	render.s	plgdawid	R	0:02	1	ac0445
1317784_8	plgrid	render.s	plgdawid	R	0:02	1	ac0512
1317784_9	plgrid	render.s	plgdawid	R	0:02	1	ac0512

```
[ares][plgdawid126@login01 ~]$ ls
hello_world.sh      img_9.png0009.png  slurm-1317726_4.out  slurm-1317746_4.out  slurm-1317769_4.out
img_1.png0001.png   print_lines.sh      slurm-1317726_5.out  slurm-1317746_5.out  slurm-1317769_5.out
img_10.png0010.png  render.sh           slurm-1317726_6.out  slurm-1317746_6.out  slurm-1317769_6.out
img_2.png0002.png   ripple_dreams_fields.blend  slurm-1317726_7.out  slurm-1317746_7.out  slurm-1317769_7.out
img_3.png0003.png   slurm-1317487.out   slurm-1317726_8.out  slurm-1317746_8.out  slurm-1317769_8.out
img_4.png0004.png   slurm-1317608.out   slurm-1317726_9.out  slurm-1317746_9.out  slurm-1317769_9.out
img_5.png0005.png   slurm-1317726_0.out  slurm-1317746_0.out  slurm-1317769_0.out  slurm-1317784_0.out
img_6.png0006.png   slurm-1317726_1.out  slurm-1317746_1.out  slurm-1317769_1.out  slurm-1317784_1.out
img_7.png0007.png   slurm-1317726_2.out  slurm-1317746_2.out  slurm-1317769_2.out  slurm-1317784_2.out
img_8.png0008.png   slurm-1317726_3.out  slurm-1317746_3.out  slurm-1317769_3.out  slurm-1317784_3.out
```