Submitting batch jobs
Slurm on ecgate
Solutions to the practicals

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User Support Section

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Practical 1: Basic job submission

● Practicals must be run on **ecgate**, so make sure you log in there first!

```
$> ssh ecgate
$> cd $SCRATCH
$> tar xvzf ~trx/intro/batch_ecgate_practicals.tar.gz
$> cd batch_ecgate_practicals/basic
```

1. Have a look at the script "**env.sh**"

2. Submit the job and check whether it is running.

    ● What QoS is it using? What is the time limit of the job?

3. Where did the output of the job go? Have a look at the output

4. Submit the job again and then once it starts cancel it.

5. Check the output

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Practical 1: Basic job submission

```
$> cat env.sh
#!/bin/bash
# This is an example of a job dumping the SLURM related variables in the environment
[ -z "$SLURM_JOBID" ] && echo "This job should be run in batch!" >&2 && exit 1
echo "Current time is `date`"
echo "This should go to the error file..." >&2
echo "I am job id $SLURM_JOBID"
echo "Going to sleep for a couple of minutes..."
sleep 120
echo "Waking up!"
echo "Current time is `date`"
echo "Bye!"
$> ./env.sh
This job should be run in batch!
$> sbatch env.sh
Submitted batch job 1269989
$> squeue -j 1269989
  JOBID        NAME    USER      QOS      STATE      TIME TIMELIMIT    NODELIST(REASON)
1269989      env.sh    trx    normal   RUNNING      0:54 1-00:00:00             ecgb04
$> ls
env.sh   slurm-1269989.out   work
```

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Practical 1: Basic job submission

```
$> cat slurm-1269989.out
Current time is Sun Mar  2 15:27:17 GMT 2014
This should go to the error file...
I am job id 1269989
Going to sleep for a couple of minutes...
Waking up!
Current time is Sun Mar  2 15:29:17 GMT 2014
Bye!
$> sbatch env.sh
Submitted batch job 1270043
$> scancel -i 1270043
Cancel job_id=1270043 name=env.sh partition=batch [y/n]? y
$> cat slurm-1270043.out
Current time is Sun Mar  2 15:35:24 GMT 2014
This should go to the error file...
I am job id 1270043
Going to sleep for a couple of minutes...
slurmd[ecgb09]: *** JOB 1270043 CANCELLED AT 2014-03-02T15:35:35 ***
```

Practical 1: Basic job setup

- Can you modify the previous job so it…

  1. … runs in the express QoS, with a wall clock limit of 5 minutes?

  2. … uses the subdirectory work/ as the working directory?

  3. … sends the…

     a) … output to the file work/env_out_<jobid>.out ?

     b) … error to work/env_out_<jobid>.err?

  4. … sends you an email when the job starts?

- Try your job after the modifications and check if they are correct

  - You can do the modifications one by one or all at once…

Practical 1: Basic job submission

```bash
#!/bin/bash
# This is an example of a job dumping the SLURM related variables in the environment
#SBATCH --qos=express
#SBATCH --time=5
#Replace trx by your user id
#SBATCH --workdir=/scratch/ectrain/trx/batch_ecgate_practicals/basic/work
#SBATCH --output=env_out_%j.out
#SBATCH --error=env_out_%j.err
#SBATCH --mail-type=BEGIN

[ -z "$SLURM_JOBID" ] && echo "This job should be run in batch!" >&2 && exit 1
echo "Current time is `date`"
echo "This should go to the error file..." >&2
echo "I am job id $SLURM_JOBID"
echo "Going to sleep for a couple of minutes..."
sleep 120
echo "Waking up!"
echo "Current time is `date`"
echo "Bye!"
```

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Practical 2: reviewing past runs

- How would you...

  - retrieve the list of jobs that you ran today?

    ```
    $> sacct
    ```

  - retrieve the list of all the jobs that were cancelled today by user trx?

    ```
    $> sacct -u trx -s CANCELLED -S 00:00
    ```

  - ask for the submit, start and end times for a job of your choice?

    ```
    $> sacct –j 1234567 -o jobid,submit,start,end
    ```

  - find out the output an error paths for a job of your choice?

    ```
    $> sacct –j 1234567 -o jobid,comment%190
    ```

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Practical 3: Fixing broken jobs

- What is wrong in job1? Can you fix it?

  - No shebang specified at the beginning of the files

  - Spaces between directive and value

  - Job name must not contain any space

```
#!/bin/bash
#SBATCH --job-name=job_1
#SBATCH --output=job1-%J.out
#SBATCH --error=job1-%J.out
#SBATCH --qos=express
#SBATCH --time=00:05:00

# This is the job
echo "I was broken!"
sleep 30
```

Practical 3: Fixing broken jobs

● What is wrong in job2? Can you fix it?

    ● The qos name does not exist

    ● The time limit is wrongly set to 10 days instead of 10 hours

```bash
#!/bin/bash
#SBATCH --job-name=job2
#SBATCH --output=job2-%J.out
#SBATCH --error=job2-%J.out
#SBATCH --qos=normal
#SBATCH --time=10:00

# This is the job
echo "I was broken!"
sleep 30
```

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Practical 3: Fixing broken jobs

- What is wrong in job3? Can you fix it?

  - The output directory does not exist. You must create it before submitting

  - Slurm will not expand shell variables in directives. You must replace

    $SCRATCH with the right value

```
#!/bin/bash
#SBATCH --job-name=job3
#SBATCH --output=output/job3-%J.out
#SBATCH --error=output/job3-%J.out
#SBATCH --workdir=$SCRATCH/batch_ecgate_practicals/broken
#SBATCH --qos=normal
#SBATCH --time=00:01

# This is the job
echo "I was broken!"
sleep 30
```

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Bonus: Migrating from LoadLeveler

```
$> ll2slurm -i ll_job.sh -o slurm_job.sh
WARNING: ignoring directive 'environment'. The submitting environment is exported by
default in Slurm.
WARNING: ignoring directive 'job_cpu_limit'. Slurm uses wall clock instead of cpu time.
Please use --time option.
WARNING: No workdir (initialdir) set. Setting it to '/scratch/ectrain/trx'
```

```
#!/bin/ksh
#@ shell          = /usr/bin/ksh
#@ job_name       = limits
#@ output         = $(job_name).$(jobid).out
#@ error          = $(job_name).$(jobid).out
#@ environment    = COPY_ALL
#@ job_cpu_limit  = 00:03:00,00:02:55
#@ wall_clock_limit= 00:05:00,00:04:50
#@ class=normal
#@ queue


echo "Hello World!"
```

```
#!/bin/ksh
#SBATCH --workdir=/scratch/ectrain/trx
#SBATCH --job-name=limits
#SBATCH --output=limits.%j.out
#SBATCH --error=limits.%j.out
#SBATCH --time=00:05:00
#SBATCH --qos=normal


echo "Hello World!"
```

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