





[illegible][illegible][illegible]

```
bsub [options] command [arguments]
```

- “  e5v3ib  24  MPI  ”

```
bsub < jobfile
```

jobfile  shell

```
#BSUB [options]
command [arguments]
```

[illegible]

```
f01n02 -m "f01n01+2
```

f01n02+1 f01n03" ☐

- `-R "res_req"`

[illegible]

-R

largemem

- R "select[hname!=host\_name]" ☐ host\_name☐

&&☐☐☐☐

```
-R "select[hname!=x001 && hname!=x002]"  x001 x002
```

- X

- `-W [hour:]minute`  kill

CPU??

- `-R affinity[core:cpubind=core:membind=localprefer:distribute=pack]` 

[illegible][illegible]

?????

- r

- `-Q "exit_code [exit_code ...]"` 

all 

--	--	--	--	--	--	--

????

- $-I$

[illegible]

□ □ □ □

- K

- `-i input_file` ☐

- `-o output_file` 

- `-e error_file` 

- [illegible]

output\_%J 

```
-o /dev/null
```



- 

[illegible]

??????

?????

- LSB\_JOBID[ ] ID
- LSB\_QUEUE[ ]
- LSB\_JOBNAME[ ]
- LSB\_DJOB\_NUMPROC[ ] CPU[ ]
- LSB\_DJOB\_HOSTFILE[ ]
- LSB\_HOSTS[ ] CPU[ ]
- LSB\_MCPU\_HOSTS[ ] CPU[ ]

```
LSB_DJOB_NUMPROC=6
LSB_HOSTS="node1 node1 node1 node2 node2 node2"
LSB_MCPU_HOSTS="node1 3 node2 3"
```

```
$ cat $LSB_DJOB_HOSTFILE
node1
node1
node1
node2
node2
node2
```

“ LSB\_HOSTS [ ] LSB\_MCPU\_HOSTS [ ] LSB\_MCPU\_HOSTS  
[ ] LSB\_HOSTS [ ] LSB\_HOSTS [ ] 4096 [ ]  
LSB\_MCPU\_HOSTS[ ]

??????


????

[ ] e52660 [ ]

```
$ bsub -q e52660 ./app
Job <3279929> is submitted to queue <e52660>.
$ cat job.lsf
#BSUB -q e52660
./app
```

```
$ bsub < job.lsf
Job <3279930> is submitted to queue <e52660>.
```

## MPI ????

**MPI**   **mpirun** 

 48  Intel MPI  e5v3ib 

```
$ bsub -q e5v3ib -n 48 "module load ips/2018u4;mpirun ./app"
Job <3280120> is submitted to queue <e5v3ib>.
```

 48  Open MPI  e5v3ib 

```
$ cat job.lsf
#BSUB -q e5v3ib
#BSUB -n 48
module load iccifort/15.0.3 imkl/11.2.3 openmpi/1.10.0-iccifort-15.0.3
mpirun ./app

$ bsub < job.lsf
Job <3280122> is submitted to queue <e5v3ib>.
```

## OpenMP ????

**OpenMP**   **CPU** 

 64  OpenMP  e7v4ib  -nt 

```
$ bsub -q e7v4ib -n 64 "./app-nt \${LSB_DJOB_NUMPROC}"
Job <3348175> is submitted to queue <e7v4ib>.
```



```
bsub -q e5v4p100ib -gpu num=1 ./gpu_app
```

■■■■■

4■ GPU ■■■■

62v100ib ■■■■

GPU-CPU ■■

```
bsub -q 62v100ib -gpu "num=4:aff=yes" ./gpu_app
```

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