



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

```
□□□□ #BSUB □□□□□□ bsub □□□□□□□□□□□□
```

```

“ □□□□□□□□ e5v3ib □□□□ 48□□□□□□□□□□□□ MgSiO3
□□□□□□□□ out □□□□□□□□□□ err □ Intel MPI □□□□□ 0

$ cat job.lsf
#BSUB -q e5v3ib
#BSUB -n 48
#BSUB -J MgSiO3
#BSUB -o out
#BSUB -e err
module load ips/2018u4
mpirun ./app

$ bsub < job.lsf
Job <3207099> is submitted to queue <e5v3ib>.

□□□□□□□□

$ bsub -q e5v3ib -n 48 -J MgSiO3 -o out -e err "module load
ips/2018u4;mpirun ./app"
Job <3207099> is submitted to queue <e5v3ib>.

```

# bsub □□□□

- -J job\_name □□□□

```
□□□□
```

- -n min\_tasks[,max\_tasks] □□□□ CPU□□□□□□□□□□ -n 4 □□□ 4~8□□□ -n 4,8

- `-m` `bmgroup` `hostname/hostgroup` `!`  
`+[num]` `c04n01` `c04n02` `-m "c04n01`  
`c04n02"` `f01n01~n03` `f01n01` `f01n02` `-m "f01n01+2`  
`f01n02+1 f01n03"`
- `-R "res_req"`  
`largemem` `-R`
- `-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]`  
`CPU` `MPI`

## 

- `-r`
- `-Q "exit_code [exit_code ...]"`  
`all` `~`

## 

- `-I`
- `-K`
- `-i input_file`





```
source /fs00/software/lsf/misc/ompthreads.sh [N]
```

3. MPI OpenMP

OMP\_NUM\_THREADS

CPU



- 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 

`-n` 

CPU 

 64  OpenMP  e7v4ib  -nt 

```
$ bsub -q e7v4ib -n 64 "./app-nt \${LSB_DJOB_NUMPROC}"
```

```
Job <3348175> is submitted to queue <e7v4ib>.
```

 64  OpenMP  e7v4ib  `OMP_NUM_THREADS` 



```
$ cat job.lsf
#BSUB -q e7v4ib
#BSUB -n 64
OMP_NUM_THREADS="\${LSB_DJOB_NUMPROC}"
./app
```

```
$ bsub < job.lsf
```

```
Job <3348182> is submitted to queue <e7v4ib>.
```

## MPI/OpenMP

 MPI  6  OpenMP 

 `OMP_NUM_THREADS` 

```
#BSUB -q 6140ib
#BSUB -n 72
export OMP_NUM_THREADS=6
source /fs00/software/lsf/misc/ompthreads.sh
```

