LSF Job Manage System HOWTO

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This document will instruct you to submit and manage jobs via LSF, it contains the information about using LSF to submit, check and delete jobs.

Following the document's operation and feedback's methods will help you complete the job successfully. It will be very kind to provide advices, thank you!

1 Check the Cluster's Running Status via LSF

1.1 Check the LSF Computing Nodes List bhosts

# bhosts								
HOST_NAME	STATUS	JL/U	MAX	NJOBS	RUN	SSUSP	USUSP	R
fat01	ok	-	16	0	0	0	0	
fat02	ok	-	16	0	0	0	0	
fat03	ok	-	16	0	0	0	0	
fat04	ok	-	16	0	0	0	0	
fat05	ok	-	16	0	0	0	0	
fat06	ok	-	16	0	0	0	0	
fat07	ok	-	16	0	0	0	0	
fat08	ok	-	16	0	0	0	0	
fat09	ok	-	16	0	0	0	0	
fat10	ok	-	16	0	0	0	0	

1.2 Check the LSF Queues bqueues

Check the whole queues' overall information:

# bqueues										
QUEUE_NAME	PRIO	STATUS	MAX	JL/U	JL/P	JL/H	NJOBS	PEND	RUN	SUSP
cpu	40	Open:Active	-	-	-	-	2072	0	2072	O
fat	40	Open:Active	-	-	-	-	0	0	0	þ
gpu	40	Open:Active	-	-	-	-	288	0	288	þ
mic	40	Open:Active	-	-	-	-	0	0	0	þ
cpu-fat	40	Open:Active	-	-	-	-	16	0	16	0

Check for some queue's information:

```
# bqueues fat
QUEUE_NAME PRIO STATUS MAX JL/U JL/P JL/H NJOBS PEND RUN SUSP
fat 40 Open:Active - - - 0 0 0
```

1.3 Check the load of computing nodes lsload

Check the overall load:

Check for some node's load:

```
# lsload node001

HOST_NAME status r15s r1m r15m ut pg ls it tmp swp mem

node01 ok 0.3 0.1 0.1 1% 0.0 0 332 152G 62G 61G
```

2 Submit the Jobs via LSF bsub

2.1 Submit Jobs Manualy

LSF uses bsub to submit jobs. The format of bsub is:

```
bsub -n Z -q QUEUENAME -i INPUTFILE -o OUTPUTFILE COMMAND
```

Z is the number of threads needed, -q assign the queue. If there is no option -q, the system will submit the jobs to the default queue. INPUTFILE is name of the file read by the program, OUTPUTFILE is the output file's name.

For the serial job, COMMAND can directly be your program's name. Example: submit the serial program mytest via LSF:

```
bsub -n 1 -q q_default -o mytest.out ./mytest
```

For the MPI parallel program, the format of COMMAND is -a mpich_gm mpirun.lsf PROG_NAME. Example: submit the parallel program mytest via LSF which uses 16 threads:

```
bsub -n 16 -q q_default -o mytest.out -a mpich_gm mpirun.lsf ./mytest
```

2.2 Interactive Batch Submit

You can start up an interactive shell environment by using bsub to submit multiple parallel jobs whose running arguments are the same:

```
# bsub
bsub> -n 16
bsub> -q q_default
bsub> -o output.txt
bsub> COMMAND1
bsub> COMMAND2
bsub> COMMAND3
```

It is equal to:

```
bsub -n 16 -q q_default -o output.txt COMMAND1
bsub -n 16 -q q_default -o output.txt COMMAND2
bsub -n 16 -q q_default -o output.txt COMMAND3
```

2.3 Write a LSF scripts to submit jobs

```
#BSUB -n 16
#BSUB -q q_default
#BSUB -o output.txt
-a mpich_gm mpirun.lsf ./mytest
```

bsub also accepts the state of jobs from stdin, that means we can write the LSF script to submit jobs. bsub's script is easy to write, the code above is an example named bsub.script, submit bsub.script to LSF via input redirection:

```
bsub < bsub.script
```

It is equal to:

```
bsub -n 16 -q q_default -o output.txt -a mpich_gm mpirun.lsf ./mytest
```

2.4 A more complicated LSF script

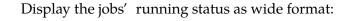
```
#BSUB -J HELLO_MPI
#BSUB -o job.out
#BSUB -e job.err
#BSUB -n 256
source /lustre/utility/intel/composer_xe_2014.3.163/bin/compilervars.sh intel64
source /lustre/utility/intel/mkl/bin/intel64/mklvars_intel64.sh
source /lustre/utility/intel/impi/4.1.1.036/bin64/mpivars.sh
MPIRUN=`which mpirun`
EXE="./mpihello"
CURDIR=$PWD
cd $CURDIR
rm -f nodelist nodes >& /dev/null
touch nodelist
touch nodes
NP=0
for host in `echo $LSB_MCPU_HOSTS |sed -e 's/ /:/g'| sed 's/:n/\nn/g'`
do
echo $host >> nodelist
echo $host | cut -d ":" -f1 >> nodes
nn=`echo $host | cut -d ":" -f2`
NP=`echo $NP+$nn | bc`
done
```

3 Other Job Manage Operations

3.1 Check the jobs' status bjobs

Check the submitted jobs' running status:

```
bjobs
```



bjobs -w

Display all the jobs:

bjobs -a

Display the running jobs:

bjobs -r

Display the pending jobs and reasons:

bjobs -p

Display the suspending jobs and reasons:

bjobs -s

Display detailed information of job JOBID:

bjobs -1 JOBID

3.2 Kill the Jobs bkill

Kill the jobs unwanted:

bkill

Kill the job JOBID:

bkill JOBID

Remove the job JOBID from LSF instead of waiting its progresses killed by the operating system:

bikill JOBID

3.3 Monitor the Output of Jobs bpeek

Display the stdout and stderr output of a unfinished batch job

bpeek

Display the output of the job with the specified ID JOBID

bpeek JOBID

3.4 Jobs' History Information bhist

display the history of batch jobs

bhist

Display the specified job(s) JOBID only

bhist JOBID