

## Jobtypes, Queues, Queue Factors, and CPU Points

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### jobtype

A jobtype is assigned for each job. Number of available computation nodes depends on the jobtype. CPU points per hour are also defined by the jobtype. Jobtype is currently defined as follows.

| jobtype  | definition   |
|----------|--|
| largemem | jobs with jobtype=largemem for g16sub, if -j largemem is specified               |
| vnode    | jobs with ncpus=64 or ncpus=128 for g16sub, (-np 64 or -np 128) and not largemem |
| core     | jobs with ncpus < 64   |
| gpu      | jobs with ngpus > 0  |

### Queues

Computing nodes can be used per node (128 cores), per vnode (64 cores), or per core basis. TypeG nodes are equipped with GPUs.

| jobtype  | node type | memory        | utilization unit | per job limit                     | total # of vnodes (# of cores)     |
|----------|-----------|---------------|------------------|-----------------------------------|------------------------------------|
| largemem | TypeF     | 7.875 GB/core | vnode or node    | 1-14 vnode(s)<br>(64-896 cores)   | 28 vnodes<br>(1,792 cores)         |
| vnode    | TypeC     | 1.875 GB/core | vnode or node    | 1-50 vnode(s)<br>(64-3,200 cores) | 1,248+ vnodes<br>(79,872+ cores)   |
| core     | TypeC     | 1.875 GB/core | core             | 1-63 core(s)                      | 200+ vnodes<br>(12,800+ cores)     |
| gpu      | TypeG     | 1.875 GB/core | core             | 1-48 GPU<br>1-16 core(s)/GPU      | 32 vnodes<br>(2,048 cores 128 GPU) |

- The maximum walltime for a job is up to next scheduled maintenance. Only about half of computation nodes can be used for jobs which run more than one week.
- You can omit jobtype in the jobscript except for "jobtype=largemem"; other types can be judged from the resource specification.
- 80 nodes (160 vnodes) of Type C nodes are shared by "vnode" and "core" type jobs.
- Short "vnode" jobs might run on TypeF nodes.
- Short "core" jobs might run on TypeG nodes.
- [In exclusive-use case, the limits above can be loosened.](#) (English page is not yet available, sorry.)

### CPU Points and Queue Factors

CPU points per hour (Queue Factor) depend on the jobtype as follows.

| jobtype  | CPU Queue Factor               | GPU Queue Factor |
|----------|--------------------------------|------------------|
| largemem | 60 points / (1 vnode * 1 hour) | -                |
| vnode    | 45 points / (1 vnode * 1 hour) | -                |

| jobtype | CPU Queue Factor            | GPU Queue Factor             |
|---------|-----------------------------|------------------------------|
| core    | 1 point / (1 core * 1 hour) | -                            |
| gpu     | 1 point / (1 core * 1 hour) | 60 points / (1 GPU * 1 hour) |

- On ccfep, CPU points are calculated from cpu time.
- On other nodes, CPU points are calculated from elapsed time.
- If you run out of CPU points, jobs of your group (running and waiting jobs included) will be removed CPU and your new job submission will be rejected.
- [CPU points usage status can be checked with "showlim" command.](#)
- It never actually costs money.

#### Point calculation example

- 64 core job for 3 hours => 1 (vnode) \* 45 (points/vnode\*hours) \* 3 (hours) = 135 points
- 8 node job (128\*8=1024 cores) for 1 week (168 hours) => 2 (vnodes/nodes) \* 45 (points/vnodes\*hours) \* 8 (nodes) \* 168 (hours) = 120,960 points
- 16 core + 1 GPU job for 24 hours => ( 16 (cores) \* 1 (points/cores\*hours) + 1 (gpus) \* 60 (points/GPU\*hours) ) \* 24 (hours) = 1,824 points

#### Group Limits (# of CPU cores, # of GPUs, # of Jobs)

The group limits of available number of CPU cores, GPUs are determined from the initially allocated points. Limitation on number of jobs is common for all the groups.

| Group Limit                   |                |           |           |
|-------------------------------|----------------|-----------|-----------|
| initially assigned CPU points | # of CPU cores | # of GPUs | # of jobs |
| 7,200,000+                    | 9,600          | 64        | 5,000     |
| 2,400,000+                    | 6,400          | 42        |           |
| 720,000+                      | 4,096          | 28        |           |
| 240,000+                      | 3,200          | 12        |           |
| -240,000                      | 768            | 8         |           |

- There are additional limits for core jobs (ncpus<64) and jobtype=largemem jobs. [Those limit values can be checked with "jobinfo -s" command.](#)
- Group limit is determined from initially allocated CPU points. CPU points from additional resource requests are not considered in principle.
- The limit values may be changed depending on the congestion status of the queue. The current limit values can be shown with "jobinfo -s" command.