

Some basic concepts of servers

- Node: define (architecture-ly) local memory
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Socket: room for (physically) processor
- (light-weight) thread 线程 $\subset$ (heavy-weight) process 进程
- node $\rightarrow$ core $\rightarrow$ (software-ly) thread
- task $\sim$ process or thread
- NVSwitch (GPU-to-GPU all-to-all+NVLink) > NVLink (GPU-to-GPU pt-to-pt) > PCIe (general purpose)
- Container for reproducible static environment: code + environment
 - Docker: image (.sif file) $\rightarrow$ explicit mounting $\rightarrow$ Daemon $\rightarrow$ Docker $\rightarrow$ container
 - Apptainer: image/ports $\rightarrow$ default + specific mounting $\rightarrow$ services $\rightarrow$ Apptainer $\rightarrow$ container
 - Docker, root-owned, more popular; Apptainer (OSCAR), user based, for scientific use
 - To use: `apptainer build XX.sif docker://<DockerHub_url> (website); export APPTAINER_BINDPATH=XXX; export PYTHONUSERBASW=XXX; apptainer run -nv (for GPU) <imagename>; export PATH=$PATH:$PYTHONUSERBASW; <exec> (e.g. python)`

