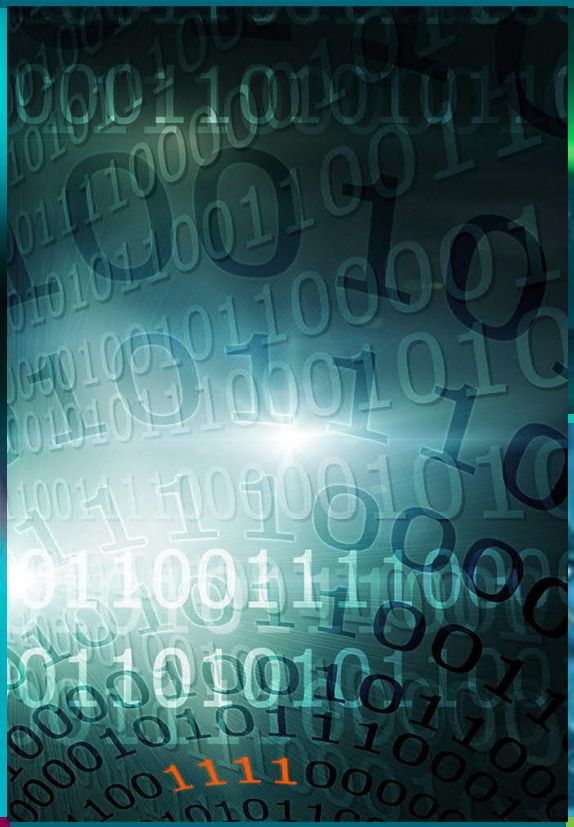
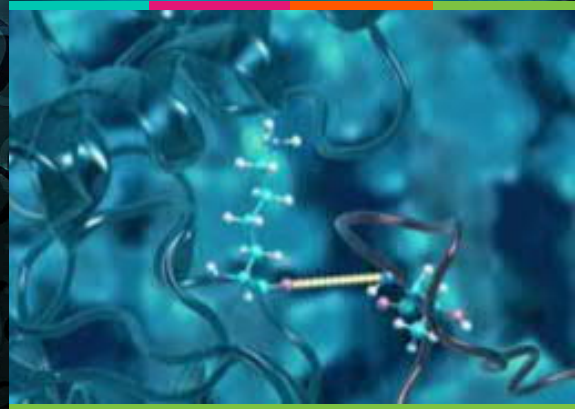
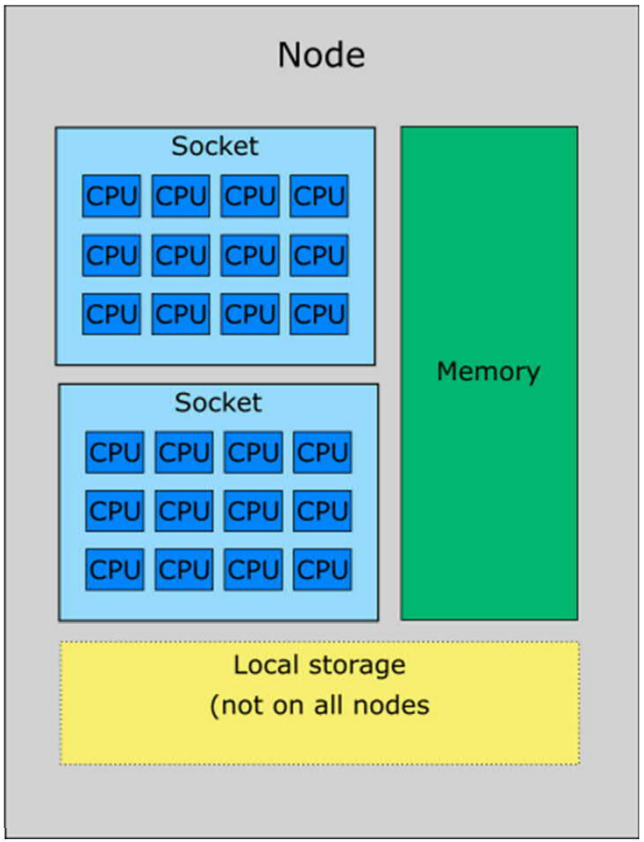
Brief introduction to HPC environments





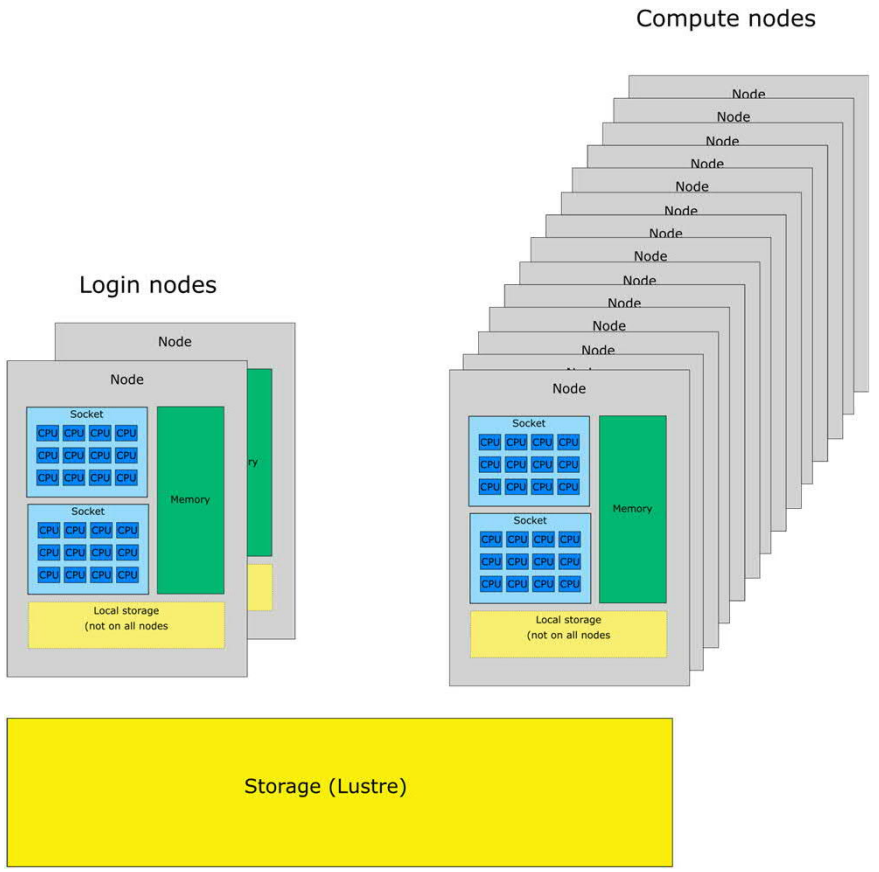
Some notes on vocabulary

computer ~= node
processor ~= socket
core ~= CPU



Cluster systems

- Login nodes are used to set up the jobs
- Jobs are run in the compute nodes
- A batch job system (aka scheduler) is used to run and manage the jobs
  - On this course we use Slurm
  - Other common systems include SGE and Torque/PBS
  - Syntax is different, but basic operation is similar



- To be able to plan your jobs efficiently, you need to familiarize yourself with the available resources
- Each system is different, so check the documentation
- Things to check
  - What batch job system is used
  - What kind of nodes are available?
    - Number of cores
    - Size of memory
    - Extra hardware, e.g GPU, fast local storage
  - What partitions (queues) are available
    - Job sizes, max length, etc
  - Provisioning policy
    - Per core/per node/other

Puhti nodes

	Type	CPU	CPU cores	Memory	Number of nodes
Puhti CPU parition	M	Xeon Gold 6230	2 x 20 cores @ 2.1 GHz	192 GB	532
	L	Xeon Gold 6230	2 x 20 cores @ 2.1 GHz	384 GB	92
	IO	Xeon Gold 6230	2 x 20 cores @ 2.1 GHz	384 GB + 3.2 TB NVMe	40
	XL	Xeon Gold 6230	2 x 20 cores @ 2.1 GHz	768 GB	12
	BM	Xeon Gold 6230	2 x 20 cores @ 2.1 GHz	1.5TB	6
Puhti-AI GPU partition	GPU	Xeon Gold 6230 4 x V100 32 GB	2 x 20 cores @ 2.1 GHz	384 GB (Host) 128 GB (GPUs) 3.2 TB NVMe	80

Puhti CPU partitions

Partition	Time limit	Max tasks	Max nodes	Node types	Max memory	Max local storage
test	15 min	80	2	M	382 GB	
interactive	7 days	1	2	IO	16 GB	160 GB
small	3 days	40	1	M, L, IO	382 GB	3600 GB
large	3 days	4000	100	M, L, IO	382 GB	3600 GB
longrun	14 days	40	1	M, L, IO	382 GB	3600 GB
hugemem	3 days	160	4	XL, BM	1534 GB	
hugemem_longrun	14 days	40	1	XL, BM	1534 GB	

Puhti GPU partitions

Partition	Time limit	Max GPUs	Max nodes	Node types	Max memory	Max local storage
gputest	15 min	8	2	GPU	382 GB	3600 GB
gpu	3 days	80	20	GPU	382 GB	3600 GB

Note that for each GPU, you should reserve at most 10 cores/task.