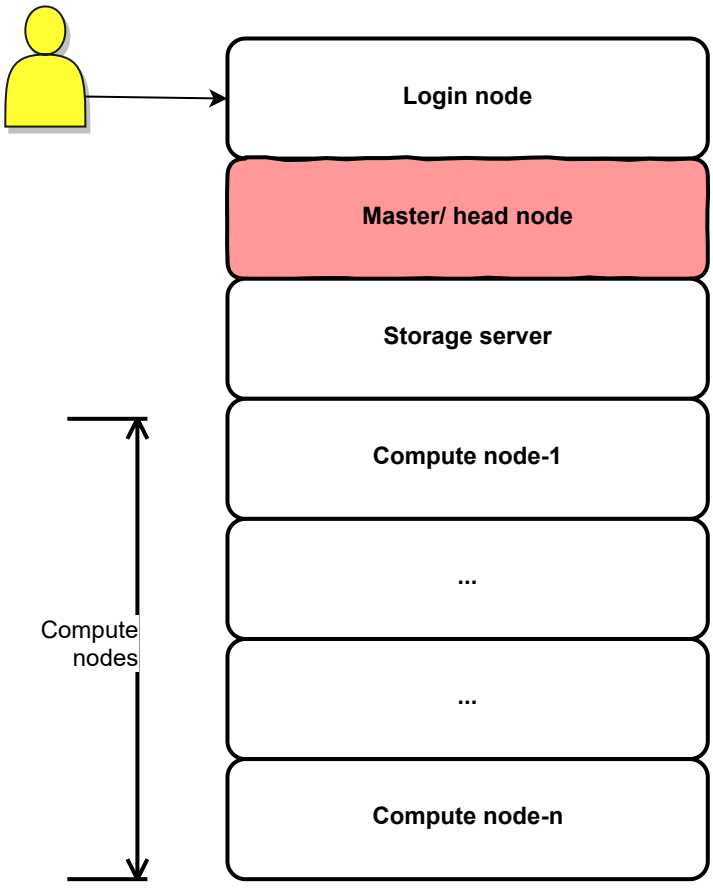
Master node(s)

What is a master or head?



A typical HPC diagram (master node highlighted)

Clusters are complex environments, and the management of the individual components is very important. The management node (generally named as the: `master` or `head` node) provides many important capabilities, including:

- **Monitoring** the status of individual nodes (typically compute nodes).
- Issuing management commands to individual nodes to correct problems or to provide commands to perform management functions, such as **power on/off**.
- In most clusters, the compute nodes (and other nodes) may need to be reconfigured and/or reinstalled (**provisioned**) with a new OS image

relatively often. The master node provides the images and the

mechanism for easily and quickly installing or reinstalling software on the cluster nodes.

- The master node can also provide **networking services** that help the other nodes in the cluster work together to obtain the desired result. Control nodes can provide two sets of functions: Dynamic Host Configuration Protocol (`DHCP`), Domain Name System (`DNS`), and other similar functions for the cluster. These functions enable the nodes to easily be added to the cluster and to ensure they can communicate with the other nodes.

- **Scheduling tasks** (to be discussed in detail soon!) can be another important role for a master node. For instance, if a compute node finishes one task and is available to do additional work, the control node may assign that node the next task requiring work. However, sysadmins may decide to allocate a separate node (Scheduler node) for this purpse to reduce loads on the master node.

To create high availability (HA) , the master node can have a backup master node. Also, in some systems, master node's tasks may be distributed over various nodes such as Job-scheduler node, log-server nodes, monitoring node, etc.

A free cluster management software stack like **OSCAR** can fulfill a lot of the above needs, but there are other commerical software tools, such as **Bright Cluster Manager** from Bright Computing or **HPC Cluster Manager** from Microsoft that can help sysadmins to deploy and mange a HPC system. Further details on the HPC management is out-of-the-scope for this particular couse.