Power Management

Workload-Aware Power Management

Moab's workload awareness enables it to provide a unique and innovative solution to power management. It is estimated that over the life of an HPC system, accrued energy costs are equivalent to the cost of the hardware itself. With HPC systems expanding rapidly, energy control is increasingly necessary to reducing costs, meeting power targets, and minimizing carbon footprint. Through idle system power reclamation and per-application power optimization, Moab HPC Suite offers the tools necessary for organizations to identify, create, and implement the optimal power savings solutions to meet their power management objectives.

Idle System Power Reclamation

Through Moab's Intelligent Power Management, HPC users can lower the power state of idle nodes in order to reclaim unnecessary energy usage. HPC systems inevitably experience some measure of node idleness, for example, at the start and end of the life of a cluster, during evenings, weekends, and holidays, or any other time when job submissions slow down or halt.

Moab identifies nodes that are not currently executing workload and takes them offline by lowering their power state to either standby, suspend, hibernate, or off. This will result in significant reductions in excess power usage, especially with large systems.

To maintain fast response times, Moab HPC Suite utilizes a Green Pool Buffer Policy which helps to mitigate the delay inherent in restarting these offline nodes. The Green Pool is a small number of nodes permitted to remain in an idle state, thereby ensuring that there are always online nodes readily available for new jobs. The Green Pool then powers down or powers up nodes to maintain quick access to idle nodes, but leverages Moab's predictive power to ensure that the system is always prepared to perform optimally, while still saving energy appropriately.

- Eliminate excess power consumption
- Decrease carbon footprint
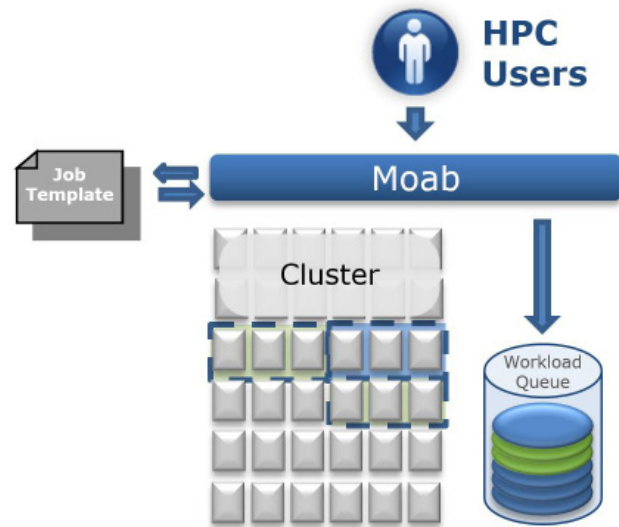- Maintain system responsiveness
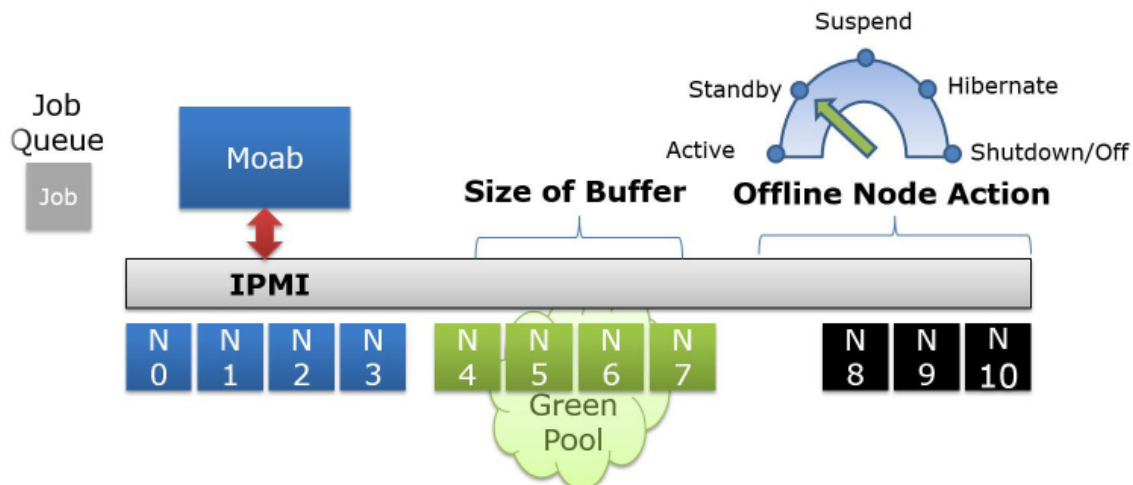
Per-Application Power Optimization

Moab HPC Suite also offers the ability to automate individual CPU clock frequency on a per-application basis. At job submission the end user has the opportunity to override defaults and set a specific clock speed in correspondence with the nature and type of the job. Power can therefore be saved by appropriately reducing the clock speed of non-CPU intensive or low priority workloads, where increased speed won't make a difference in performance, and maintaining defaults will only result in consuming energy needlessly. In addition, admins can assign a clock job submission option to a best practices Moab job template, causing all jobs matching that template to automatically inherit the desired clock speed.

- Reduce unnecessary power usage
- Minimize energy costs
- Stay within application-optimized power caps

Adaptive
C O M P U T I N G