Scheduling Beyond CPUs for HPC
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1 Background Knowledge

2 Background and Motivation

3 Methodology of BBSched

Pareto set

A **Pareto set** is a set of optimal solutions, where no objective can be improved without worsening another objective.

Burst Buffer

A **Burst Buffer** is an intermediate storage layer positioned between compute nodes and parallel file systems (PFS) in high-performance computing (HPC) systems.

- Absorb the bursty I/O data generated by data-intensive applications.
- Built from solid-state drives (SSDs).
- Can be either attached to compute nodes as local resources or configured as global resources shared by compute nodes.

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Multi-Resource Scheduling

- HPC systems are equipped with diverse global and local resources.
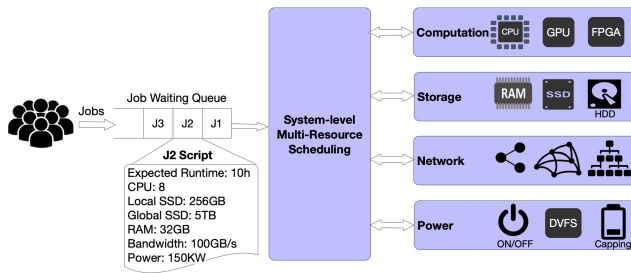- HPC job scheduler plays a crucial role in efficient use of resources.

Figure 1: HPC job scheduling problem involves in multiple resources.

Limitations of Existing Scheduling Methods

Existing methods often overlook alternative solutions or optimal resource combinations, leading to under-utilization of resources or poor application performance.

- Naive method
- Constrained method
- Weighted method
- Bin packing method

Goal

The Motivation of the this paper is to improve overall resource utilization and reduce job wait time in HPC systems.

- providing rapid scheduling decisions
- minimizing the impact on site policies
- ensuring extensibility to accommodate emerging resources

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