Architecture of Job Scheduling Simulator for Evaluating Mapping Between Queue and Computing Node

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Introduction & Aim

On computer cluster, jobs and computing nodes are managed by job scheduler. Job scheduler has queues for storing jobs. Each queue is set mapping, which is correspondence between the queue and computing nodes. Job scheduler selects computing nodes only defined in the mapping for providing to jobs stored in the queue.

Mapping is an important factor affecting job throughput in the computer cluster. However, since how to decide the parameter value of mapping depends on administrator's experience and intuition, there is a possibility that it causes a decrease of the operation efficiency of the computer cluster.

To solve this problem, we aim to construct a **job scheduling simulator with mapping configuration** which enables to evaluate job throughput for various parameter sets of the mapping.

Module of Management Computing Node

To realize the job scheduling simulator, we propose **module of management computing node**. Proposed module links with Alea (existing job scheduling simulator).
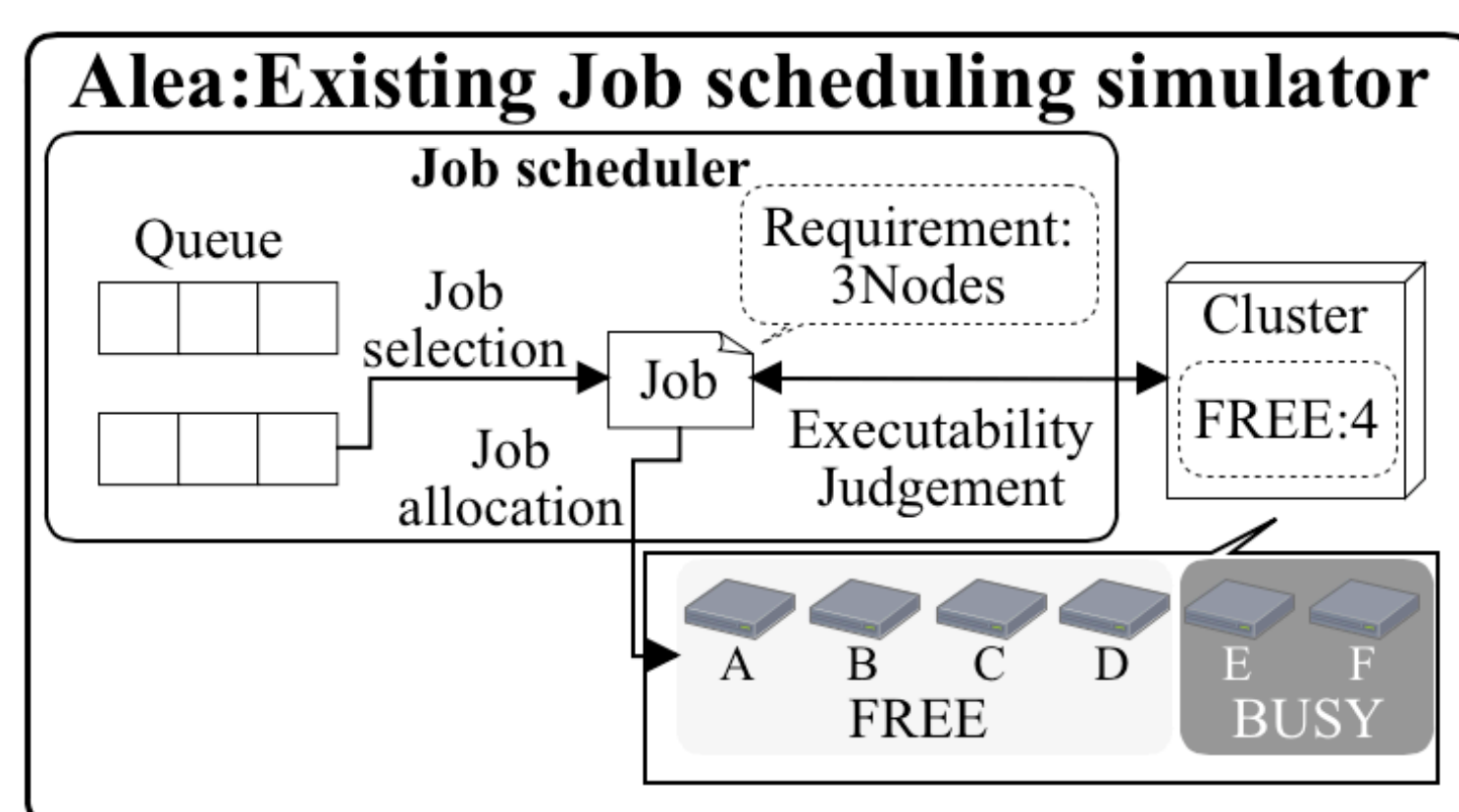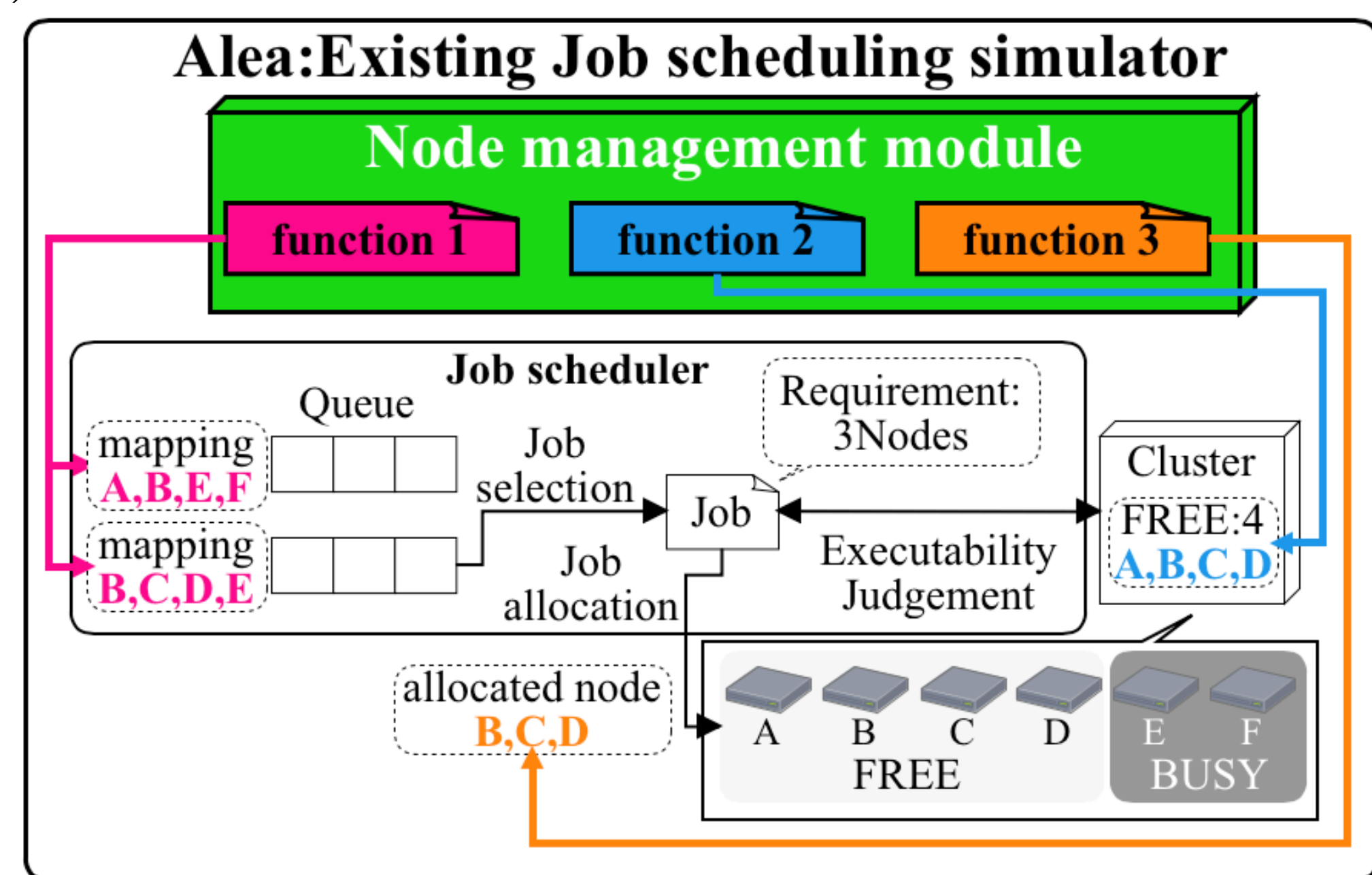

Structure of node management module

function1:Addition of mapping to each queue
function2:Management of status for each computing node
function3:Determination the computing node
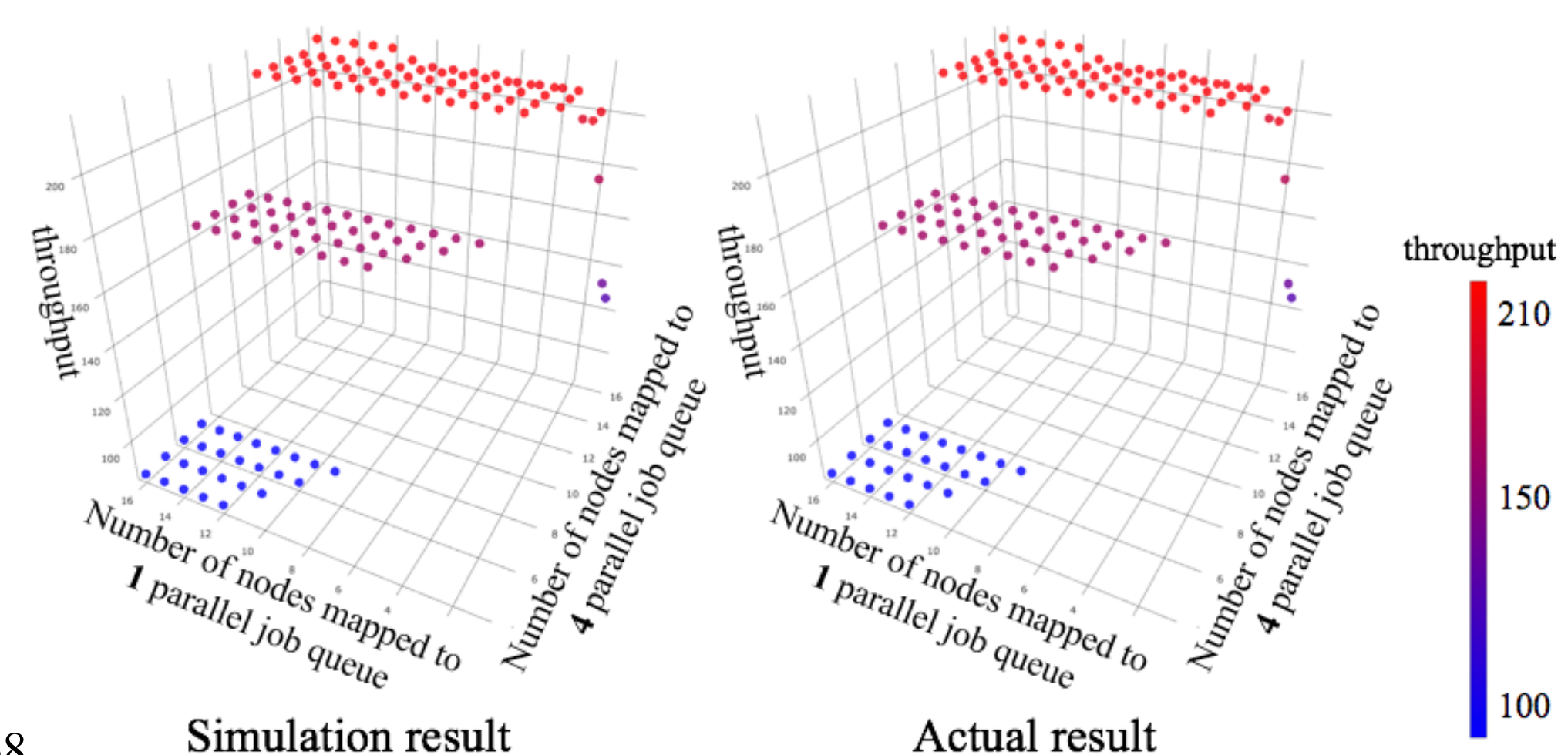   to allocate to the job

Evaluation

To evaluate whether the job scheduling simulator linked with proposed module can reproduce the behavior of the actual computer cluster, we have measured the throughput for all mapping patterns (142 patterns) and compared each other's throughput. The two results were very similar.

Simulation result   Actual result

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