A proposal of Network-aware Job Management System leveraging SDN

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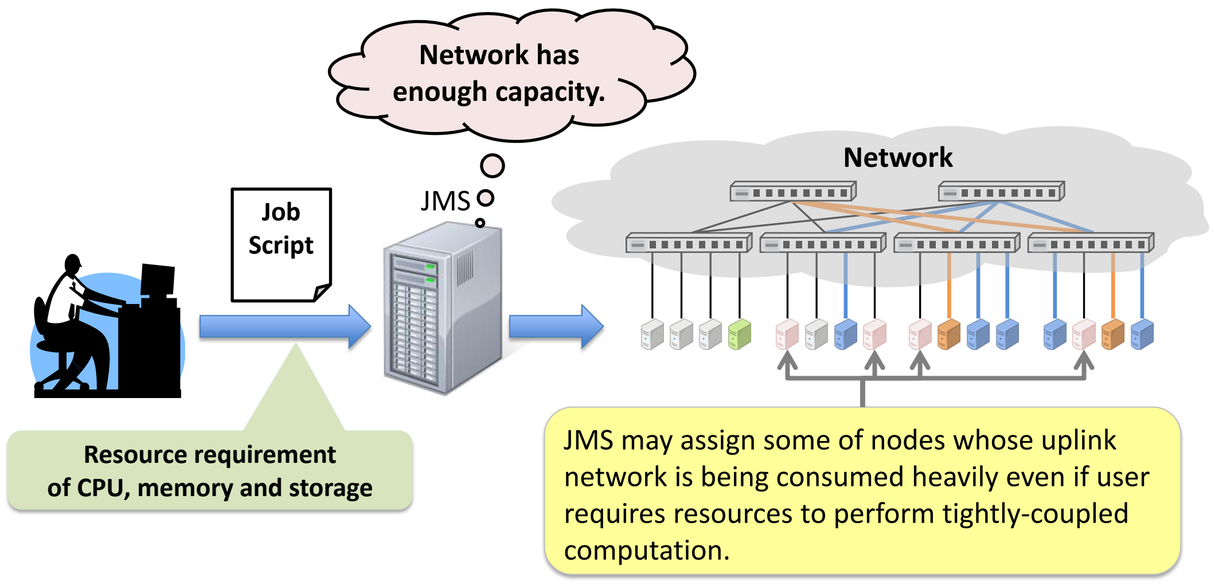
Background

High performance computing has been becoming more large-scale and distributed. Today, since the current dominant trend of high-performance computing is cluster system, it tends to be built with more computers for more performance improvement and acceleration. In general, for gaining high-performance from such cluster system, whether we can execute computation in parallel on as many computing resources composing the cluster as possible is a key of importance. Particularly in these days, the performance of interconnect among computing resources of the cluster plays more important role due to a fact that parallel computation performed on distributed multiple resources requires communication. This is especially true of tightly-coupled computation.

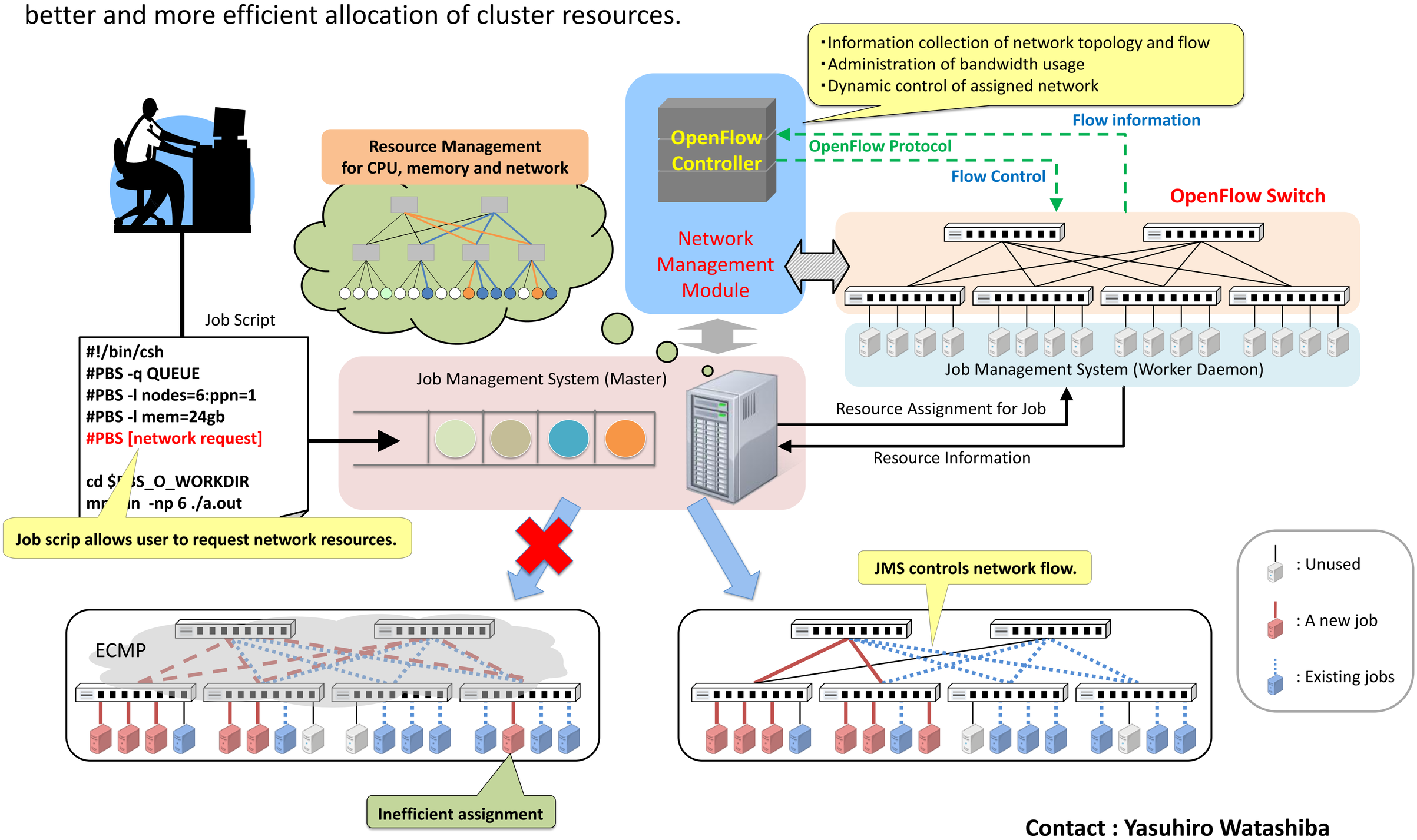
Problem

No current Job Management System (JMS), which is generally used on cluster systems for computational workload distribution and balancing purpose, is designed to consider how network resources, that is, interconnects are used in submitting jobs to computing resources of a cluster system.



Proposal

We have started the research and development of network-aware job management system that allocates appropriate set of computing and network resources in an on-demand fashion, based on user-provided resource requirement information. The key feature of our proposed JMS is the integration of **Software-Defined Network (SDN)** concept into traditional JMS, in a hope that our proposed JMS leverages network programing functionality brought by SDN for better and more efficient allocation of cluster resources.



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