Cybermedia Center
Osaka University

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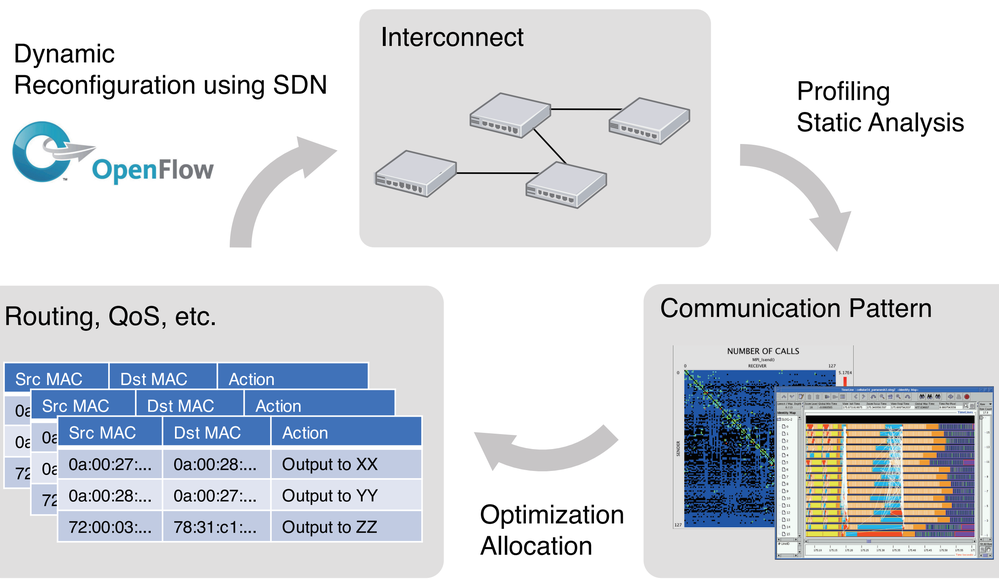
SC17 BOOTH 1943

Dynamically Optimized Interconnect Architecture Based on SDN

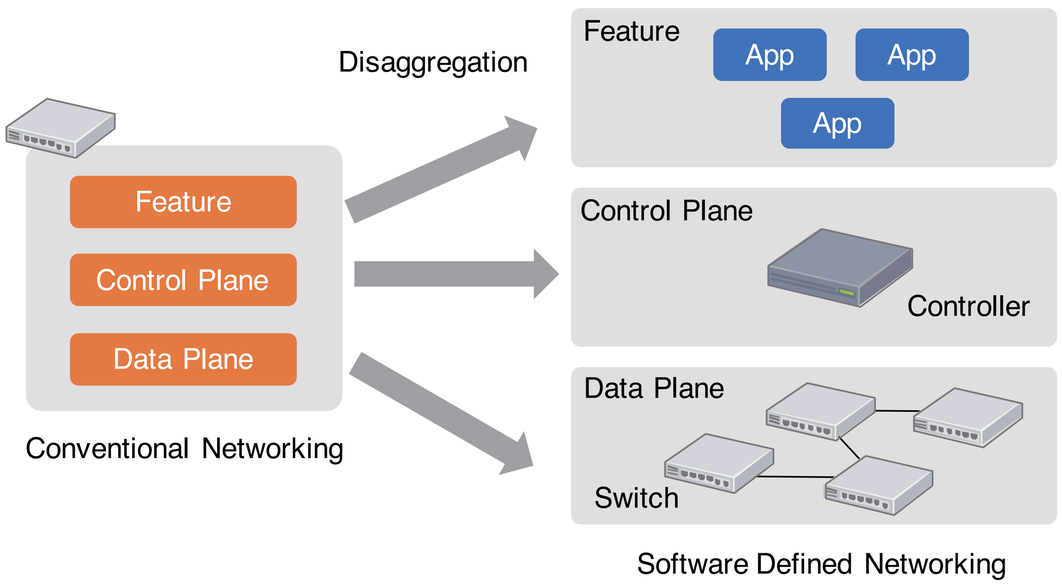
Fundamental Idea of SDN-enhanced MPI

Can we accelerate MPI communication and improve the utilization of interconnect by leveraging the network programmability of SDN?

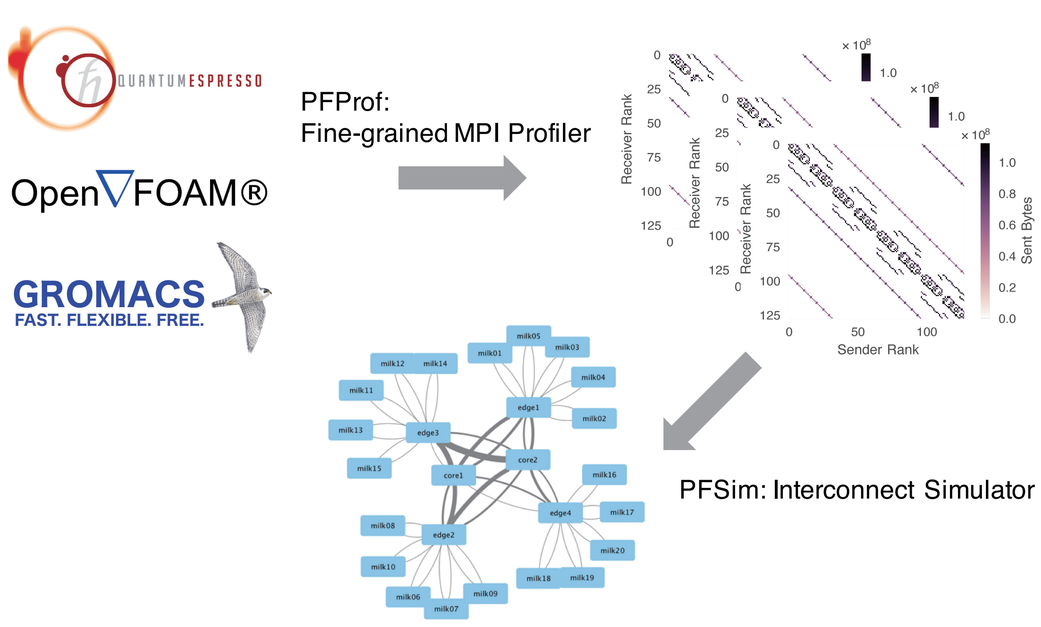


What is Software-Defined Networking（SDN）?

Software-Defined Networking (SDN) is a novel network architecture that decouples conventional networking function into a programmable control plane (responsible for deciding how to control the packets) and a data plane (responsible for the actual packet delivery).

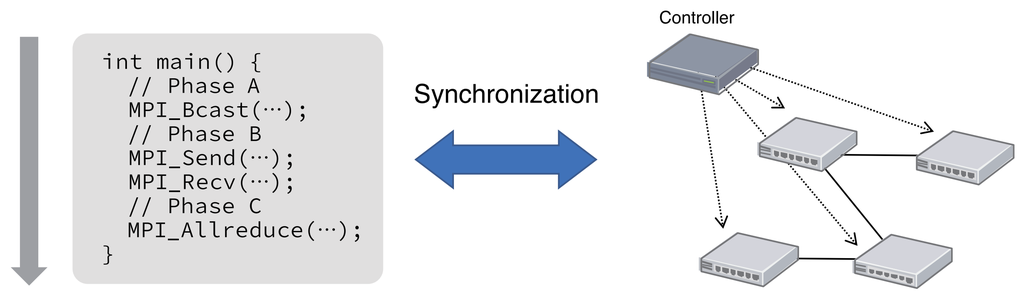


Toolset for Analyzing Application-aware Dynamic Interconnects

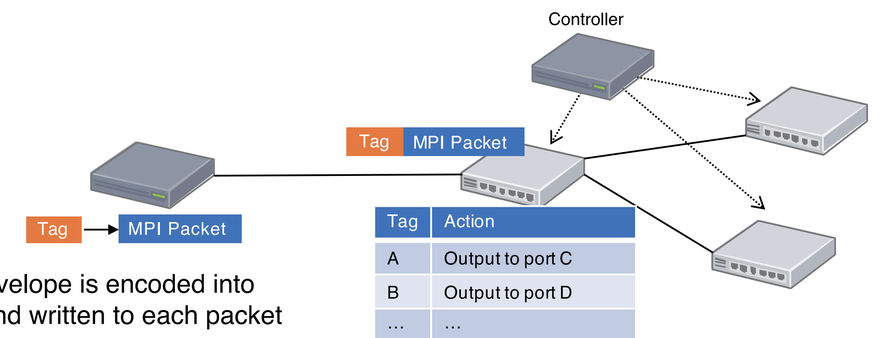


Coordination Mechanism of Computation and Communication

How do we reconfigure the interconnect in accordance with the execution of application?



Encode the MPI envelope into a tag and embed into each packet in the kernel

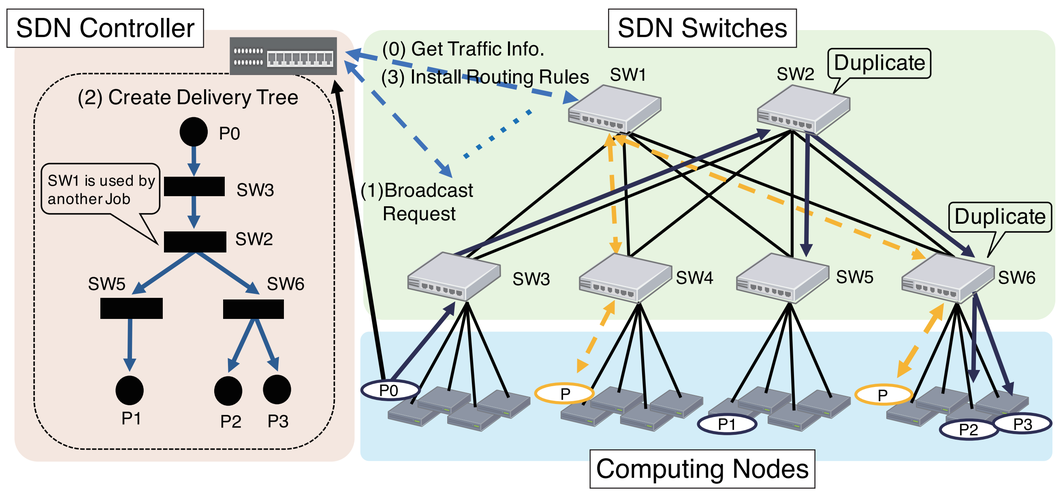


MPI envelope is encoded into a tag and written to each packet

Tag-based forwarding

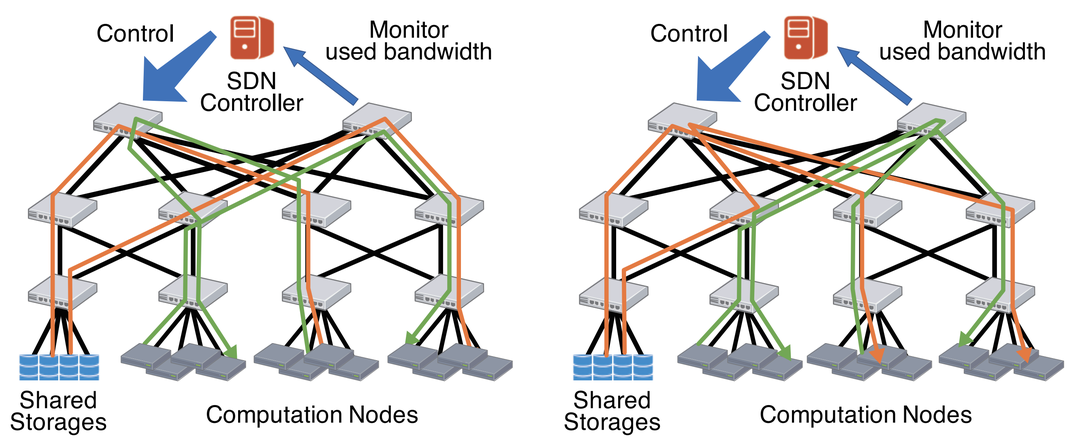
SDN-enhanced MPI Broadcast

We propose an accelerated implementation of MPI broadcast using SDN (SDN-MPI_Bcast). In this implementation, the SDN controller dynamically installs broadcasting rules to SDN switches based on the topology of the interconnect and other jobs running on the same cluster.



Contention Avoidance Between Staging Communication and Inter-process Communication

We propose two conflict avoidance methods to investigate whether the conflict between the two types of communication has influence on the performance of applications.



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