On-Chip SDM Switching for Unicast, Multicast and Traffic Grooming in Data Center Networks

This paper reports on the use of a novel photonic integrated circuit that facilitates multicast and grooming in an optical data center architecture. The circuit allows for on-chip spatial multiplexing and demultiplexing as well as fiber core switching. Using this device, we experimentally verify that multicast and/or grooming can be successfully performed along the full range of output ports, for different group size and different power ratio. Moreover, we experimentally demonstrate SDM transmission and 5 Tbit/s switching using the on-chip fiber switch with integrated fan-in/fan-out devices and achieve errorfree performance (BER ≤ 10⁻⁹) for a network scenario including simultaneous unicast/multicast switching and traffic grooming.

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