**Title:** Application-centric energy reduction scheme with dynamic lane assignment scheme in 100GE

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**Extended Abstracts:** Due to the explosive traffic demand, 100 Gb/s Ethernet (100GE) standard was specified in 2010. Along with the evolution of the link speed, the power consumption in network devices is also increasing. On the other hand, current network are designed to handle with the peak-load and link failures. It brings the extra power consumption during the low link utilization. Against the problem, many researches, which can reduce energy consumption when link utilization is low, are studied. Adaptive Link Rate (ALR) can be taken as an example.

ALR is the technology, which can reduce power consumption by changing the link speed. When traffic demand is high, high link rate are used and conversely, when traffic demand is low, low link utilization are used. Thus, ALR can get smaller power consumption, however, as ALR reduces more power, the packet delay is also increases. In other word, power consumption and packet delay are trade-off model in ALR. It is depend on the ALR policy. The more packet delay is caused by two factors. The rate-switching time and the time which are sent in lower link rate.

To handle with the above problem, we propose the dynamic lane assignment scheme for each application in 100GE. This proposal aims to solve two problems.

First, as described above, power consumption and packet delay are trade-off model. So, we propose a assignment scheme for each traffic type. Traffic type is divided into two classes, delay-tolerant and not-delay-tolerant one. By assigning lanes to each traffic type, each traffic type is handled by different ALR policy, so proposal scheme can realize both energy reduction and less packet delay.

Second, the dynamic lane assignment scheme is proposed. The amount of the incoming packet is different every time, so the dynamic lane assignment scheme for each application is needed.

Figure 1 shows the legacy 100GE architecture and Figure 2 shows the proposed 100GE architecture. To realize above requirement, we propose the 100GE using coherent lightwave technologies. The proposal scheme can realize dynamic lane assignment scheme for each application. We will evaluate the effectiveness of our proposal.