1.

Good afternoon! It's my pleasure to introduce my work here. The title of the paper is "Dual-channel access mechanism for cost-effective NoC design". I am Shijun Lin from Tsinghua University, Beijing, China.

2.

Here is the outline.

3.

Network-on-Chip (NoC) paradigm is emerging as a new design methodology when entering the billion-transistor era.
NoC design is different from traditional network design because of the following three characteristics: first, Resource-limited; second, Latency-sensitive; third, Traffic predictability.
Therefore, NoC design must be a trade-off between performance and cost!

4.

The router and NI design in single-channel access mechanism is shown in figure 1. In this mechanism, every IP only has one channel to enter the network even when more than one virtual channel is available. Therefore, single-channel access mechanism can't make good use of network capacity.

5.

The router and NI design in dual-channel access mechanism is shown in figure 2. In dual-channel access mechanism, two access channels are provided for every IP. This mechanism make sure that NoC works at the state of "light-congestion" all the time, thus make good use of network capacity and improve the performance.

6.

Static allocation method is used in the access arbiter since the traffic of NoC is predictable.
That is, we pre-allocate the access channels for data of different destination IPs according to their average traffic load.
The principles of the pre-allocation process are:
First, data of the same destination IP is allocated to the same access channel; therefore, the transmission order is guaranteed.
Second, make sure that the average traffic loads of both access channels are as close as possible so as to increase the utilization of access channels.

7.

Here is the experimental results.
The parameters in our simulation platform are shown in table 1. And the comparison results of area is shown in table 2.

8.

Comparison results of Performance are shown in table 3. From table 3, we can see that compared

with single-channel access mechanism, dual-channel access mechanism improves greatly in performance especially when the traffic load is high.

9.

Then, we come to conclusion.

In this paper, dual-channel access mechanism is proposed to design cost-effective NoC. This access mechanism increases the injection rate by parallel access method and thus improves the throughput and latency performances greatly. Simulation and synthesis results show that dual-channel access mechanism increases the throughput and cuts down average latency greatly with reasonable implementation cost, especially when the traffic load is high. Thus, dual-channel access mechanism is more cost-effective than single-channel access mechanism.

Thank you for your attentions!