

Architecture of the Event Distribution Network for Cross-Triggering Debug

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The Communication Centric Debugging Strategy approach offers debug capabilities for NoC based Multi Processors Systems on Chip focused on the communication between computational blocks. Communications are observed by Monitors that, in presence of a specific attribute in the communication, generates a debug event to the Protocol Specific Instrument (PSI) that halts the communication on a different area of the chip.

Event Distribution Interconnect

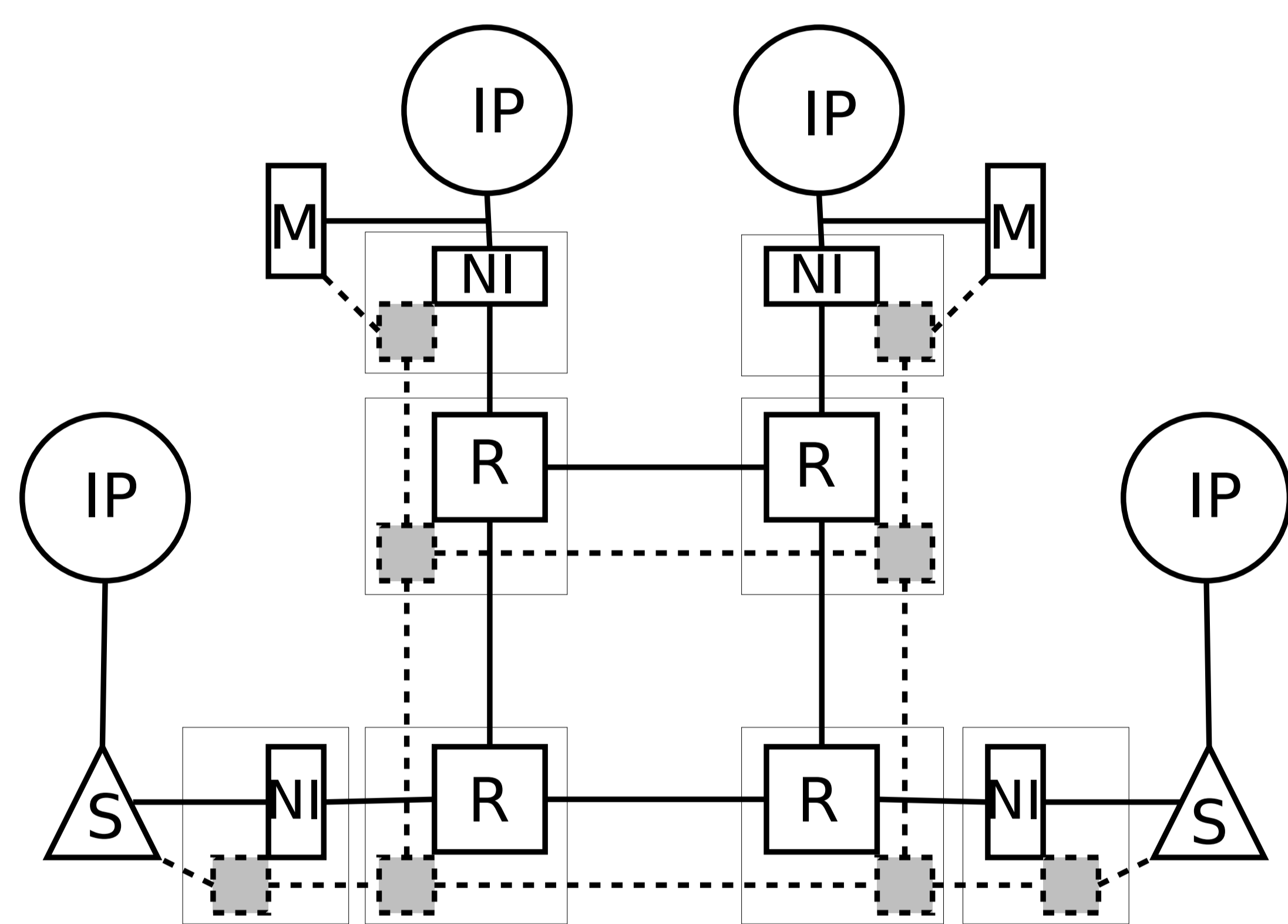


Figure 1: Example of Debug Use Cases

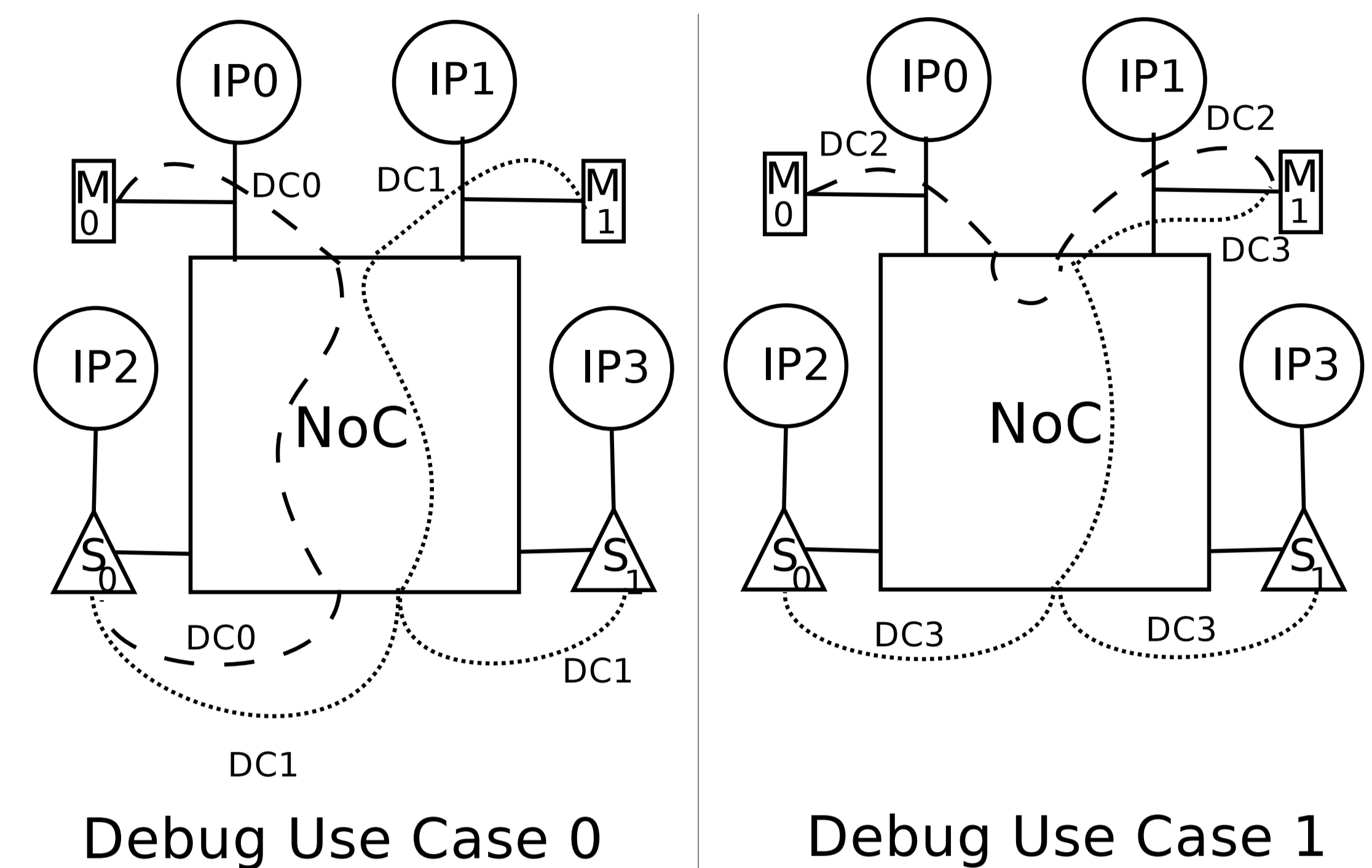


Figure 2: Example of Debug Use Cases

Events generated by Debug Monitors are transmitted to their target Debug Monitor(s) and/or PSI(s) via the EDI. The EDI is a specialized NoC dissociated from the chip interconnect.

The EDI Node propagates the debug event arriving in any of its input ports to all output ports on the same layer. A route is configured in the EDI Node by gating output ports.

The EDI Node can feature multiple layers to allow multiple events to be routed through it.

Results

To evaluate the EDI, five test NoCs were evaluated. The NoCs consist of a 2x2, three 4x4, and a 8x8 router meshes. The three 4x4 topology variation allowed for 1, 2, and 4 IPs per router. The area of a single EDI Layer was measured to be around 0.9% of the area occupied the tested NoCs, where 0.3% is dedicated to the JTAG control in the EDI Node and the remaining 0.6% is occupied by the mask registers and logic gates. These results show that the proposed implementation of the EDI incurs low overhead on the overall system.

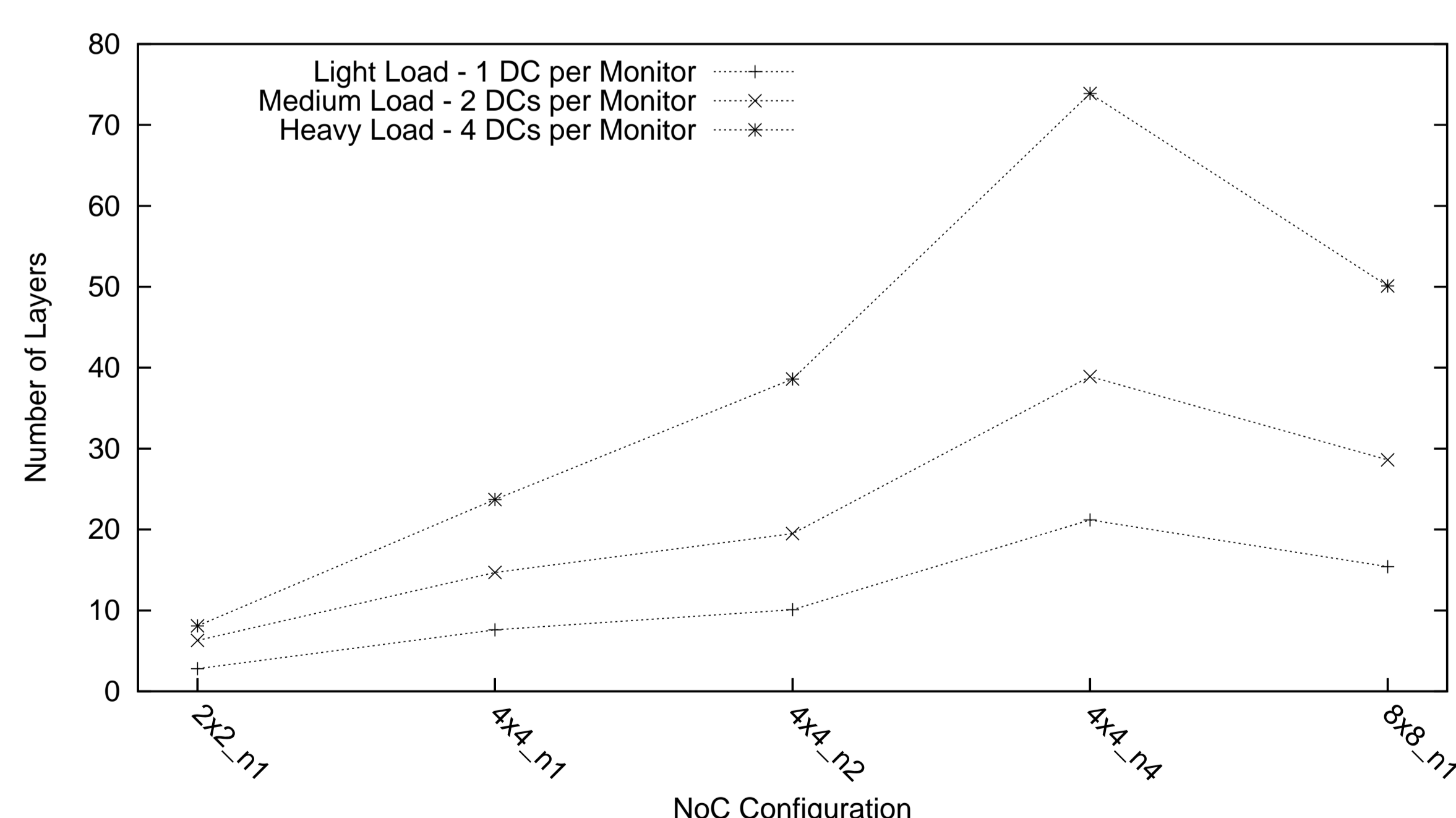


Figure 3: Number of layers

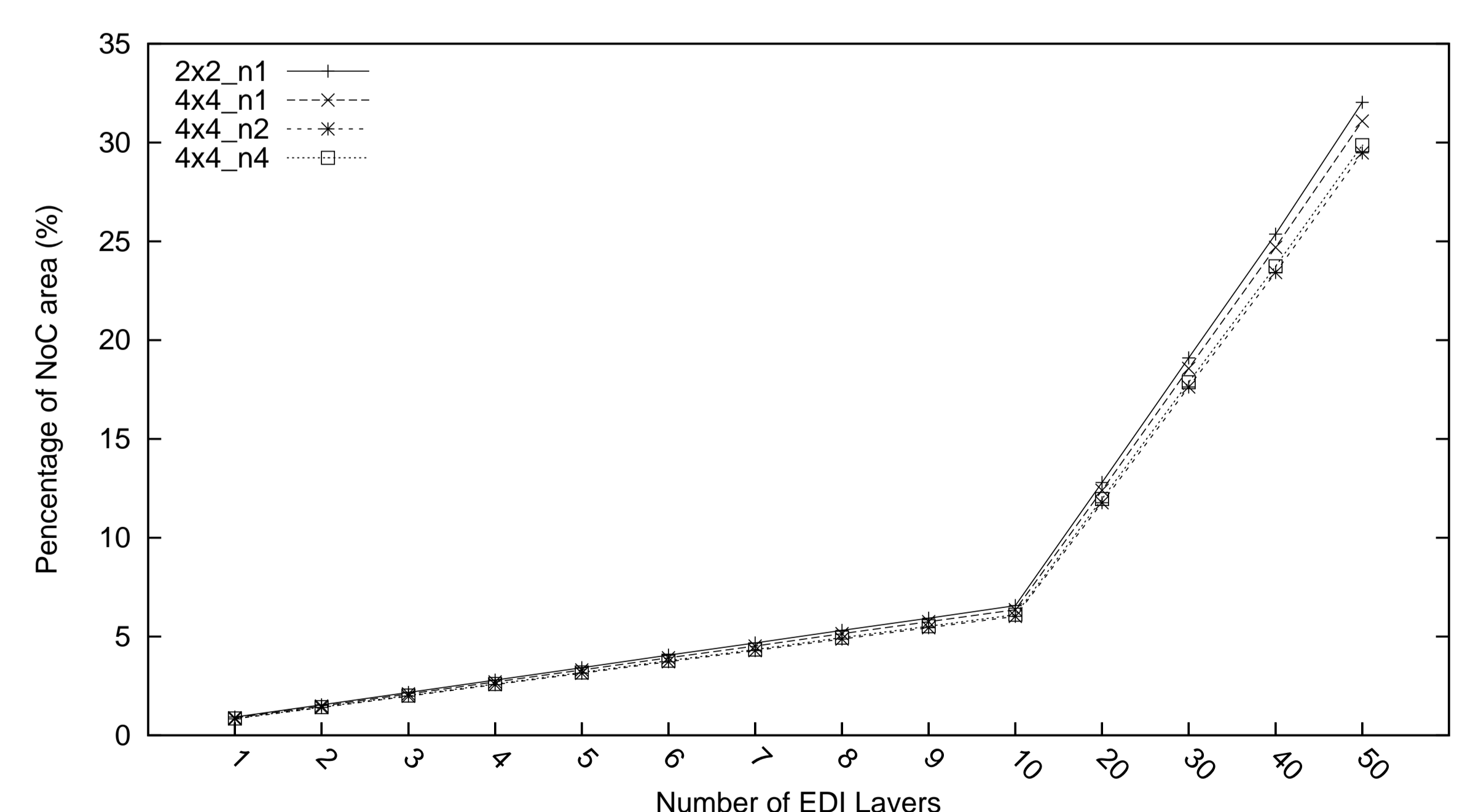


Figure 4: Area of layers relative to the Broadcast no Crossing

