FRAMING IN SPACEWIRE NETWORKS

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Short Paper

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ABSTRACT

In multilayered network architecture an information flow is split in pieces many times. At the Transport layer a message is split into packets; at the Data Link layer packets are split into frames. Frames can be the same or not the same with flits. Flit (flow control unit) is a basic unit for flow control at the data link layer; flits could be credited, sent and accounted without regard to frames, packets and messages. Phit (physical unit) is the data count that is transferred over a link; in some sense, flits could be split into phits.

SpaceWire protocols use packets at the Network level and 8-byte flits for flow control at the Exchange level. For further evolution of SpaceWire technology framing could be introduced. The article considers different forms, levels and application of frames in other standards and protocols: FibreCahnnel, Ethernet, Infiniband, Networks-on-Chip. Application of frames for operating with different classes of traffic, QoS, separation of data and control flows is illustrated.

We consider adaptability of different variants of frames implementation for SpaceWire. As an example of using of frames we consider mechanisms of virtual channels implementation, proposed already and other possible. The length of packets in the SpaceWire standard is not limited. Therefore implementation of virtual channels is not possible without limitation of packet length or using additional mechanism, for example frames. We compare framing features, data transmission overhead, hardware cost, power consumption and analyze its adaptability to SpaceWire.