Short Headers Suffice for Communication in a DAG with Link Failures

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This paper considers a number of communication problems, including end-to-end communication and multicasts, in networks whose underlying graphs are directed and acyclic and whose links are subject to permanent failures. In the case that each processor has separate input queues for each in-edge, we present protocols for these problems that use single bit headers. In the case that each processor has a single input queue for all of its in-edges, we prove that $\Theta(\log d)$-bit headers are necessary and sufficient.