A graph is k-resilient if it is possible to construct local routing tables for each vertex such that we can reach a specified destination vertex from anywhere in the graph. There is a conjecture that k-resilience is equivalent to (k+1)-connectivity. We prove this for 3-edge-connected graphs and 4-edge-connected planar triangulations.

In the proof we use independent directed spanning trees. Two spanning trees are independent if they share no common edge with the same direction. For k=3,4 we show that a graph has k independent spanning trees if and only if it is k-edge-connected. We search for the spanning trees constructively through reductions of parts of the graph. Some of these reductions can also be used in a general k-connected case.