# Time-Conscious Network Verifier

Test

## I. Encoding

We will start with the assertion that latency is a property that only make sense after connectivity between two nodes has been established. In other words, if two nodes in a network aren't connected (due to physical failure or ACL policy), then the latency between them will always be infinite. Because of this, we divide the problem of latency verification into two parts: verifying that two nodes are reachable (functional property) and only if the functional property is fulfilled, we would verify whether the latency between two nodes fulfill some property (temporal property)

### A. Topology Graph

For functional property verification, previous work [1] has laid the way for verifying reachability between two nodes under failure in a quantifiable and efficient manner. In this framework, the network is encoded in an edge-labeled directed graph $G_T = (V_T, E_T)$ where $V_T$ represents the routers in the network and $E_T$ represents the connectivity between a pair of source and destination router. Let the function $r : E_T \to R$ be the edge-label that represents the failure rate of a given connectivity.

## References

[1] S. Steffen, T. Gehr, P. Tsankov, L. Vanbever, and M. Vechev, "Probabilistic verification of network configurations," in Proceedings of the Annual conference of the ACM Special Interest Group on Data Communication on the applications, technologies, architectures, and protocols for computer communication, pp. 750–764, 2020.