

Dynam-IX: a Dynamic Interconnection eXchange

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ABSTRACT

Internet connectivity is changing: Autonomous Systems (ASes) can now reach hundreds of networks directly through interconnections at Internet eXchange Points (IXPs) while reducing latency and improving traffic delivery performance and competitiveness. Despite the benefits, any pair of ASes needs first to agree on exchanging traffic. The current process to interconnect is mostly a manual and lengthy process that is heavily influenced by personal relationships and brand image. As a result, ASes miss interconnection opportunities and prefer long-term agreements at the expense of a potential mismatch between actual delivery performance and current Internet traffic dynamics.

To improve wide-area traffic delivery performance, we propose Dynam-IX, a privacy-aware framework that allows network operators to build trust cooperatively and quickly adapt their traffic engineering policies to exploit the rich interconnection opportunities at IXPs. Dynam-IX offers a protocol to automate the process of establishing interconnection agreements, a high-level interconnection intent abstraction to express interconnection policies, a legal framework to handle contracts, and a distributed tamper-proof ledger to create trust among ASes cooperatively. Our prototype shows that ASes can establish tens of agreements within a minute, unleashing traffic engineering possibilities, increasing peering port utilization and creating new economic opportunities.

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