

# Dynam-IX: a Dynamic Interconnection eXchange

<https://dynam-ix.github.io>

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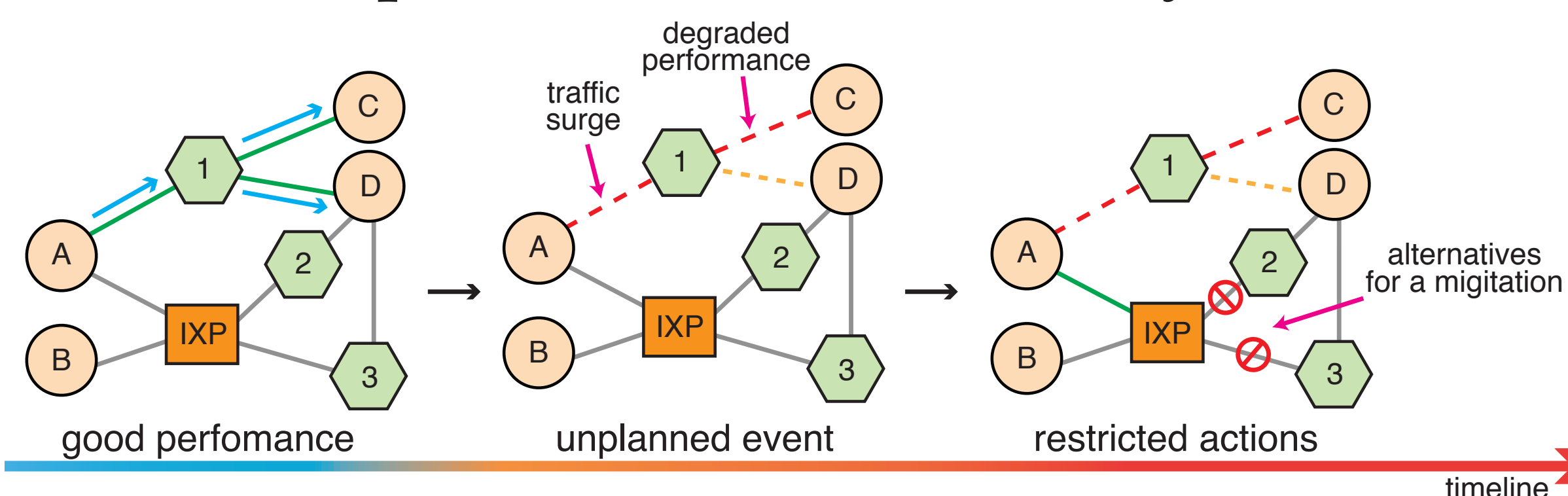
## Problem

IXPs offer a rich path diversity for improving wide-area traffic delivery performance

ASes need first to agree on exchanging traffic

Interconnection between ASes is mostly an *ad-hoc* and *lengthy* process heavily influenced by *personal relationships* and *brand image*

Limited responsiveness to traffic dynamics



Unleashing IXPs' large unexplored potential to improve wide-area traffic delivery performance requires:

a **structured process** to find peering partners and to establish interconnection agreements

an **expressive interface** to easily specify interconnection policies

a **mechanism to build trust** and to identify partners deemed reliable systematically

keeping the **privacy** of interconnection policies and their properties as operators are reluctant to share such information with third parties [2]

## Proposal

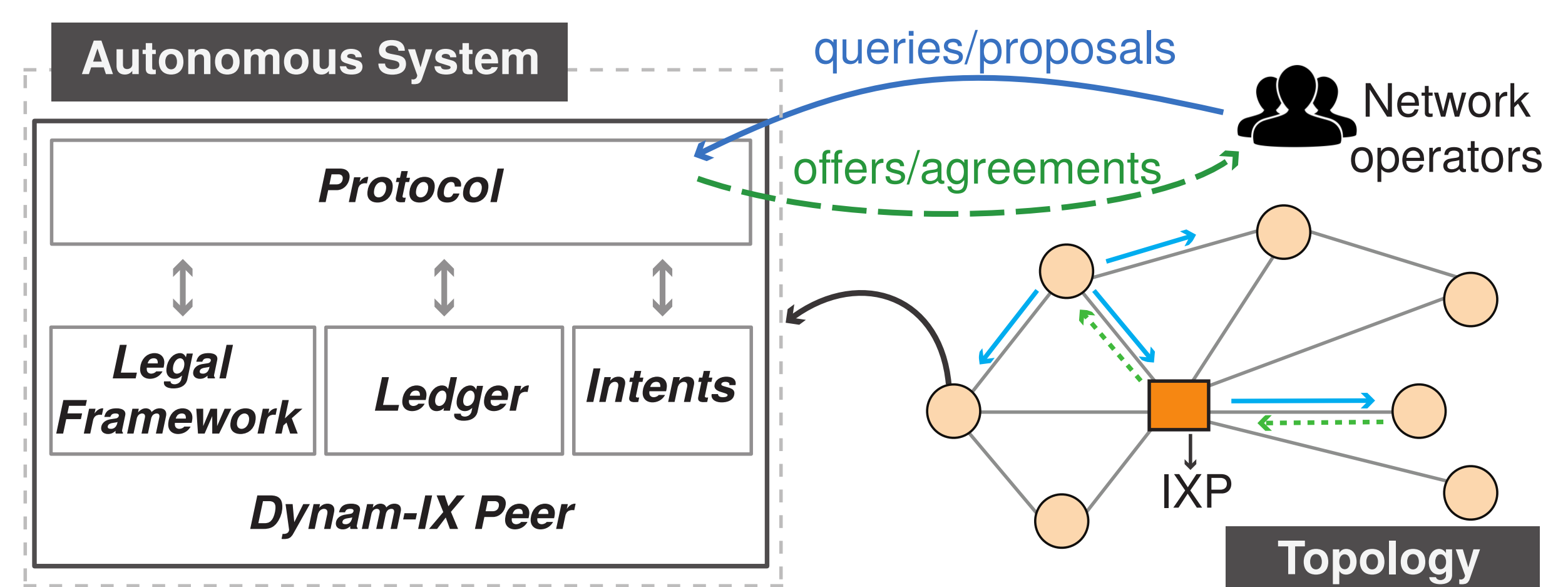
Dynam-IX design has four components:

**Protocol** allows ASes to find and establish interconnection agreements

**Legal Framework** handles contracts by defining general terms that are digitally signed by ASes

**Interconnection Intent Abstraction** specifies technical and business properties of a *target* (e.g., a prefix), including *routing*, *SLA*, *pricing*, and *time*

**Tamper-proof Ledger** enables operators to identify reliable ASes based on information from previous agreements



Dynam-IX is decentralized, preserving IXP *neutrality*, and achieving **privacy** while avoiding the *complexity* of techniques like Secure Multi-Party Computation (SMPC)

## Preliminary Evaluation

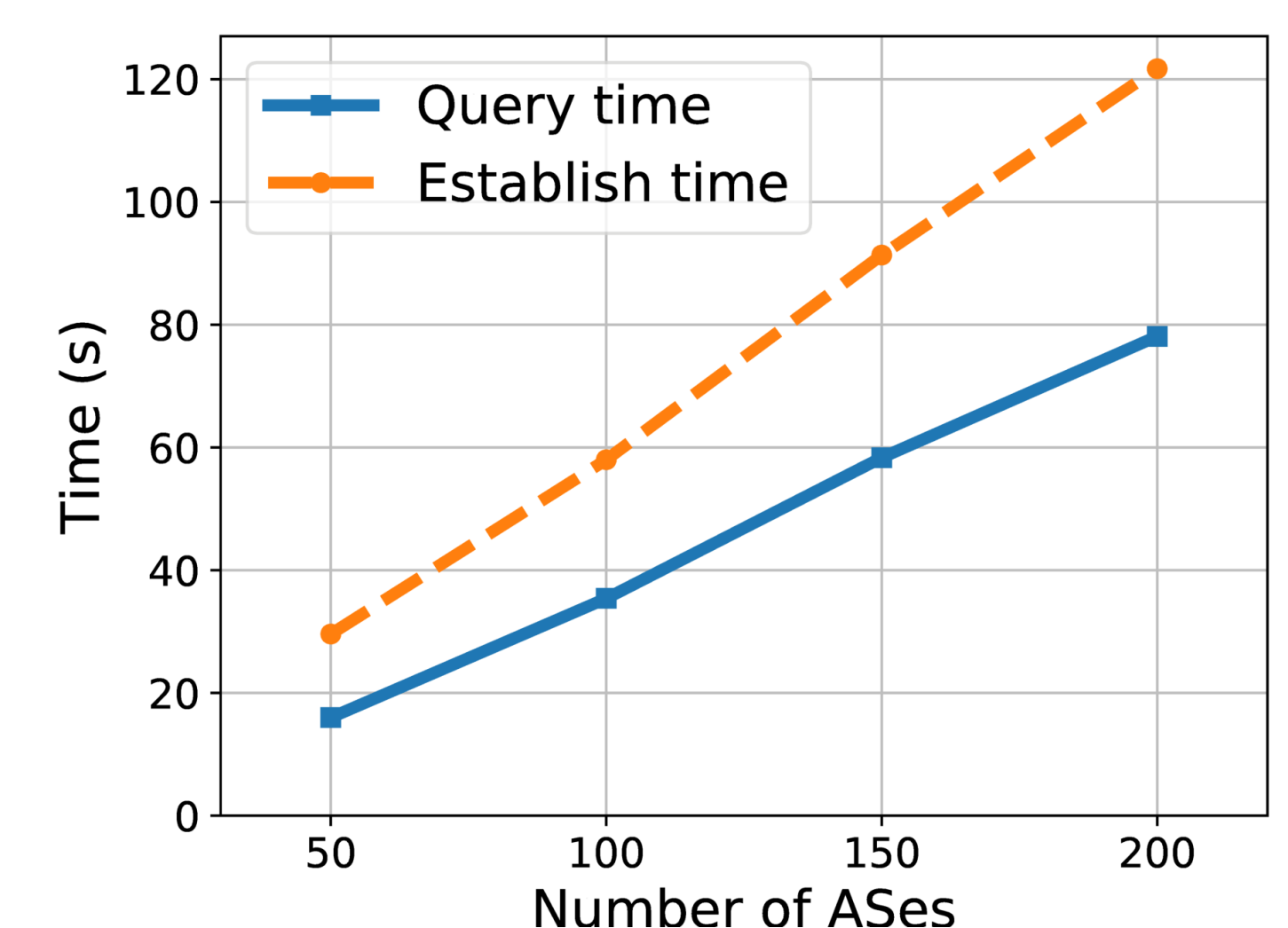
**Prototype.** Hyperledger Fabric as a distributed tamper-proof ledger

**Question.** How long does it take to establish an interconnection agreement?

**Metrics.** Time to query and time to establish an agreement

**Workload.** Multiple ASes flood a single AS with queries and establishing interconnection agreements proposals 30 times at maximum rate

**Scenario.** Up to 200 AWS EC2 instances, each hosting a single AS



## Summary and Future Work

Differently from previous work [1, 3, 4], Dynam-IX allows operators to identify reliable peering partners and to exploit the rich connectivity opportunities at IXPs quickly while achieving privacy

We plan to investigate the impact of Dynam-IX on storage and network traffic, and to compare its performance using different ledgers

## References

- [1] I. Castro, A. Panda, B. Raghavan, S. Shenker, and S. Gorinsky. Route Bazaar: Automatic Interdomain Contract Negotiation. In *USENIX HotOS 2015*, 2015.
- [2] M. Chiesa, D. Demmler, M. Canini, M. Schapira, and T. Schneider. Internet Routing Privacy Survey, 2017. Available at <https://six-pack.bitbucket.io/media/privacy-survey-2017.pdf>.
- [3] V. Valancius, N. Feamster, R. Johari, and V. Vazirani. MINT: A Market for INternet Transit. In *ReArch 2008*, 2008.
- [4] T. Wolf, J. Griffioen, K. L. Calvert, R. Dutta, G. N. Rouskas, I. Baldin, and A. Nagurney. ChoiceNet: Toward an Economy Plane for the Internet. *SIGCOMM Comput. Commun. Rev.*, 2014.