DISC 2012-10-20, Yvonne-Anne Pignolet[1], Stefan Schmid[2], Gilles Tredan[3]

Brief Announcement
Do VNet Embeddings Leak Information about ISP Topology?

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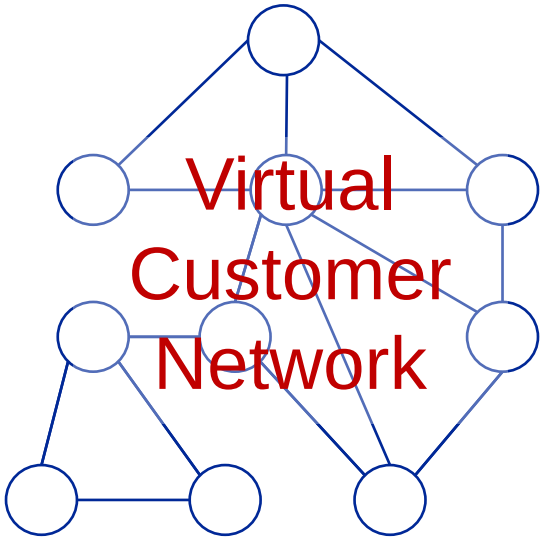
VNet Embedding

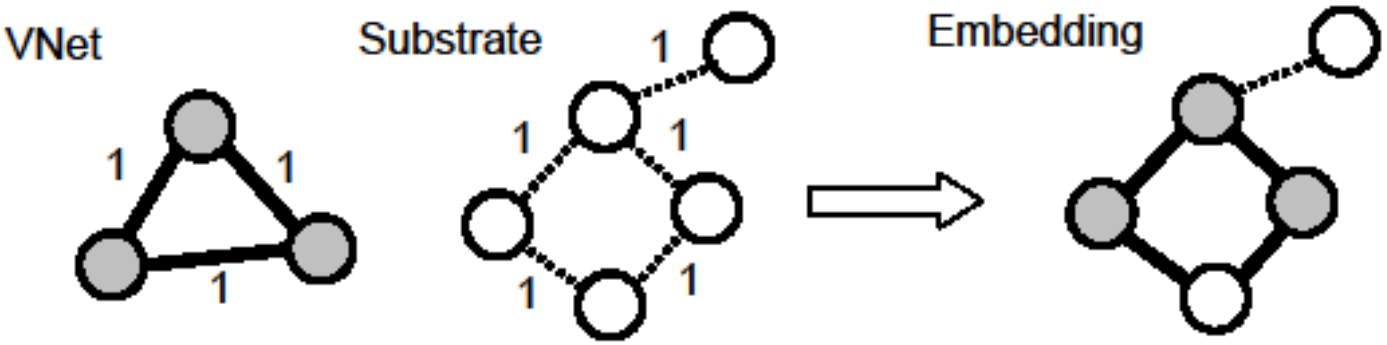


embedding
request

offer

Information Leak?

VNet Request Complexity



How many requests are necessary to infer the ISP's topology?

Assumptions in this BA:

- Request topologies are simple, undirected graphs with unit demands
- ISP topology is a simple, undirected graph with unit capacity
- Virtual links over multiple ISP nodes cost $\varepsilon > 0$ at each relay
- ISP replies with «YES» if request embeddable, «NO» otherwise

Results (not all contained in BA)

Lower bound

- Given enough time, the topology can be inferred: Request complexity for arbitrary graphs is $\Omega(n^2)$

Algorithms

- O(n) requests for trees and (with some extensions and careful analysis) cactus and generalized block graphs
- $O(n^2)$ request for arbitrary graphs

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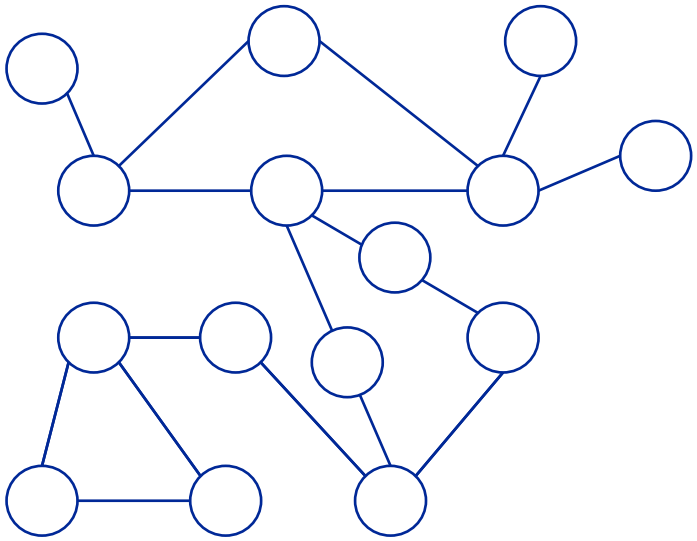
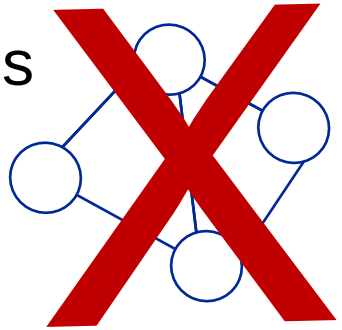
Cactus Graph Inference



Cactus ~ no diamonds
~ trees with
cycles as
branches



Theorem:
Cactus topologies can be discovered with request complexity $\Theta(n)$.