USC Viterbi
School of Engineering
Department of Computer Science

Towards A Longitudinal Study of Adoption of RPKI-Based Route Filtering

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with:
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Supported By: Google RIPE

Background

Prefix hijack prevention using Resource Public Key Infrastructure requires three steps:

Route Origin Authorization (ROA) + **Route Origin Validation** + **Local Policy**

Attests which AS is authorized to announce IP prefix

Router operation to verify BGP Updates based on ROA data

Decide handling of invalid BGP routes: drop? prefer valid?

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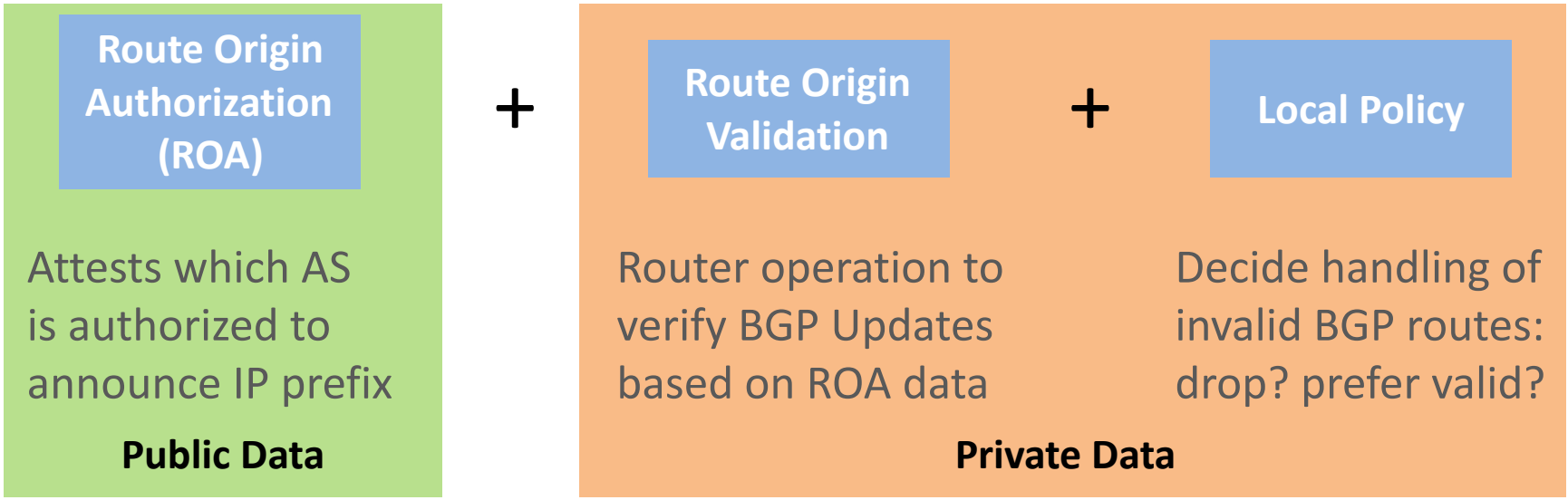


Goal: Measure the adoption of RPKI-based filter policies.

Challenge: Private data must be inferred from measurements.

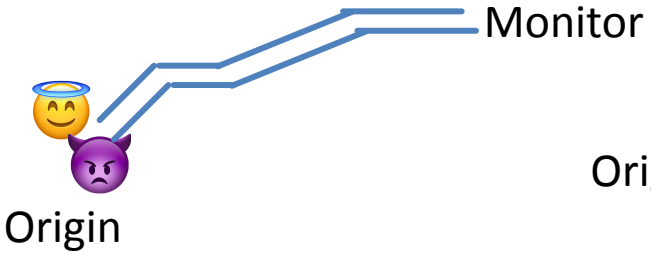
Uncontrolled experiments are unsuitable

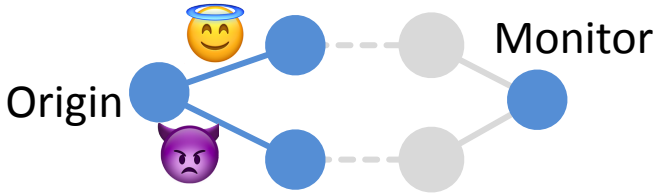
Natural (uncontrolled) experiments can lead to incorrect inference:

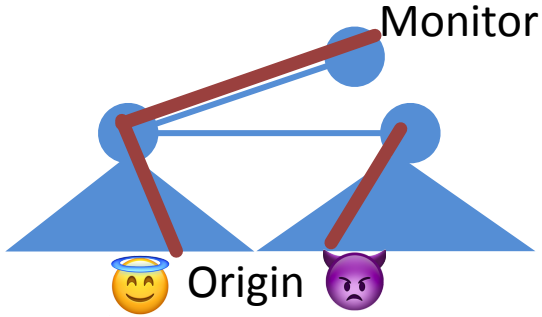
Suppose an AS is announcing a valid prefix and an invalid one.

Can we compare the 2 paths to infer route origin validation?

NO! Not definitively, as multiple explanations are plausible:







Observation:	Same paths	Different paths	No path to invalid
Possible ROV inference:	No ROV	ROV on 😇 path	ROV on 😇 path
Alternate explanation:	ROV policy to prefer valid, but none exist	TE by Origin	Limited visibility: Peer route not exported to monitor

We need controlled experiments

Hand-crafted ROAs and active BGP Updates from PEERING testbed.

+ Ground truth knowledge of:
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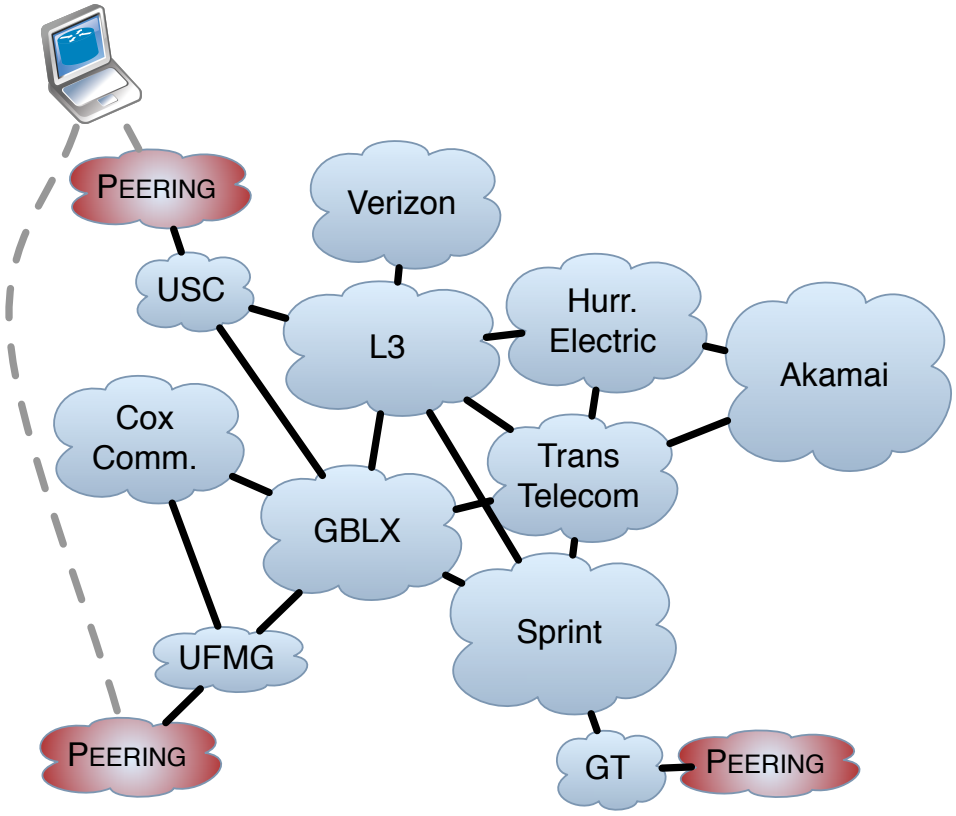

Simplified example to expose that GBLX performs ROV

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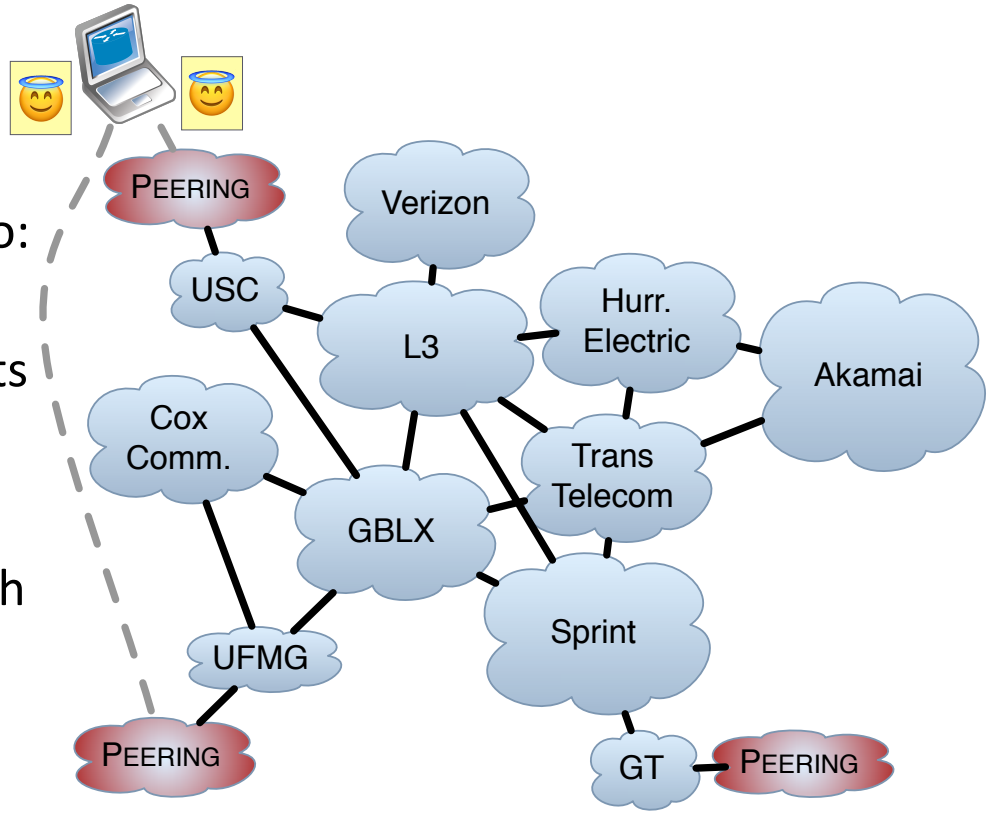

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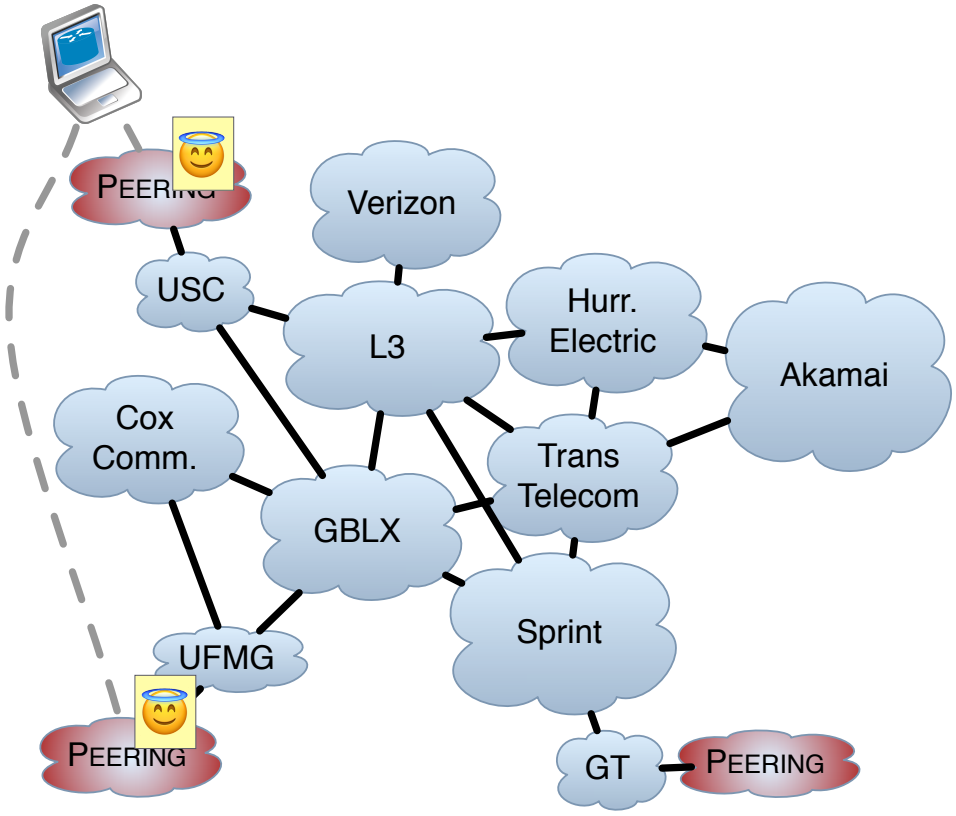

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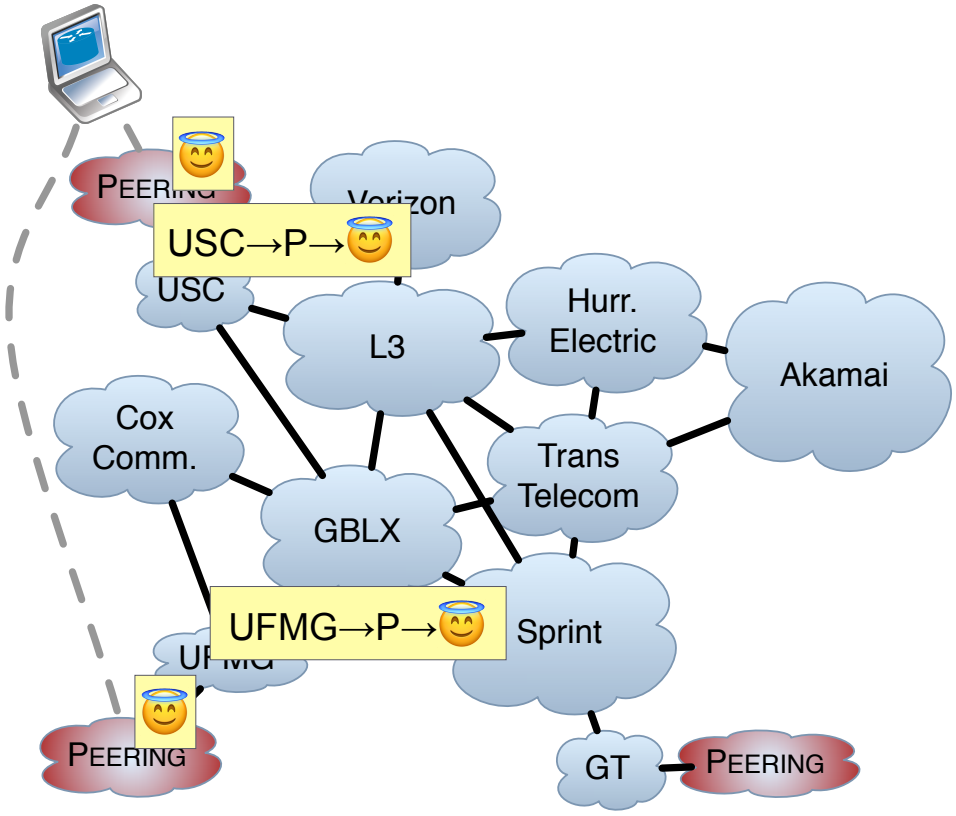

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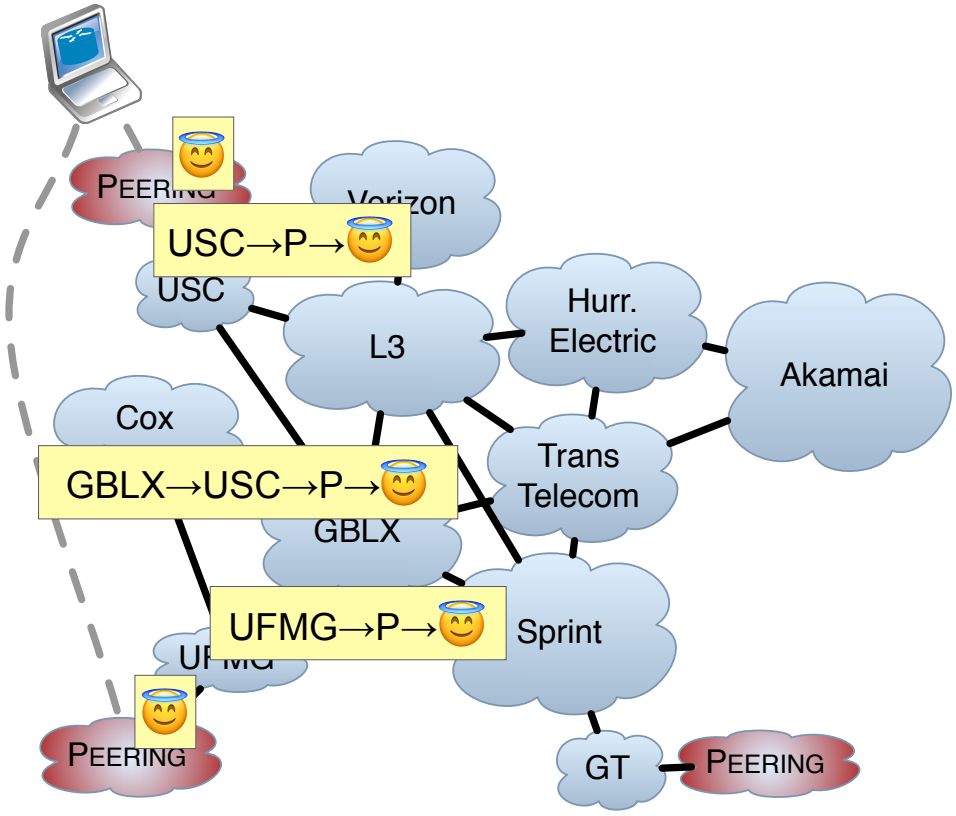

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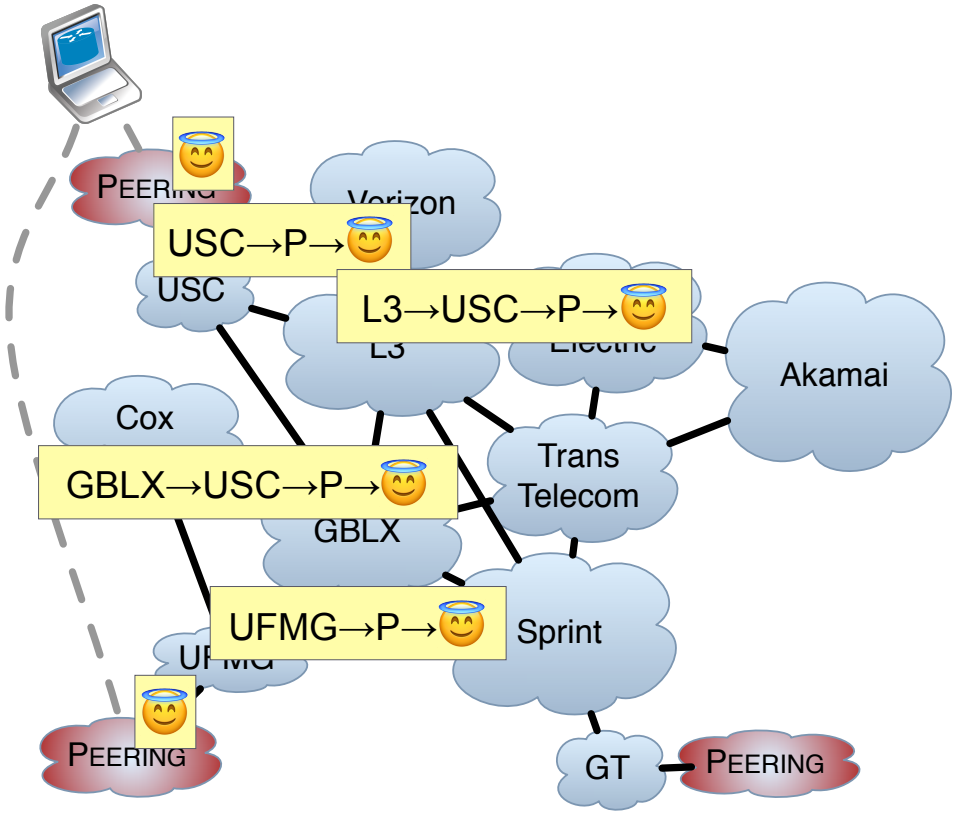

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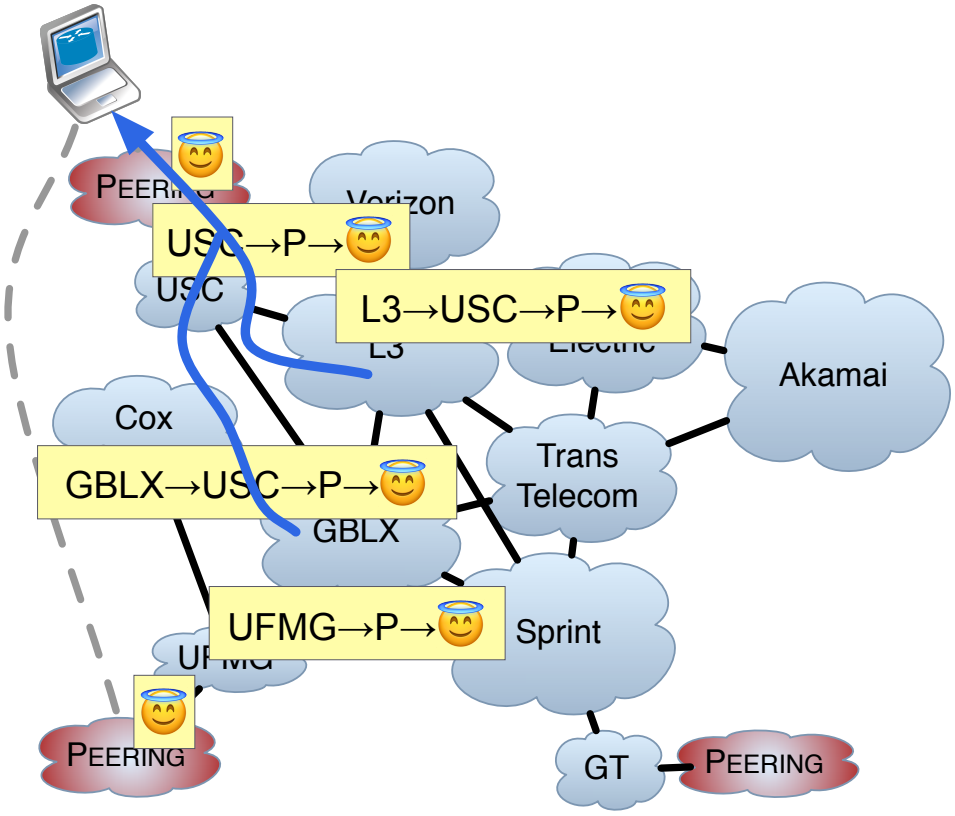

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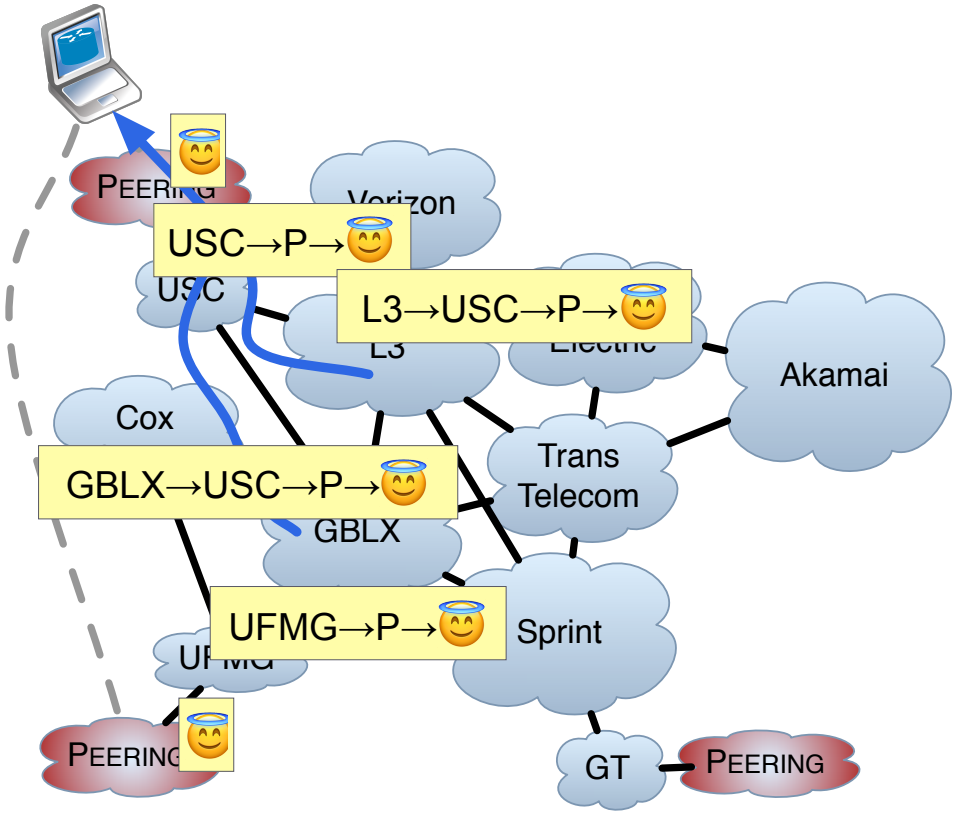

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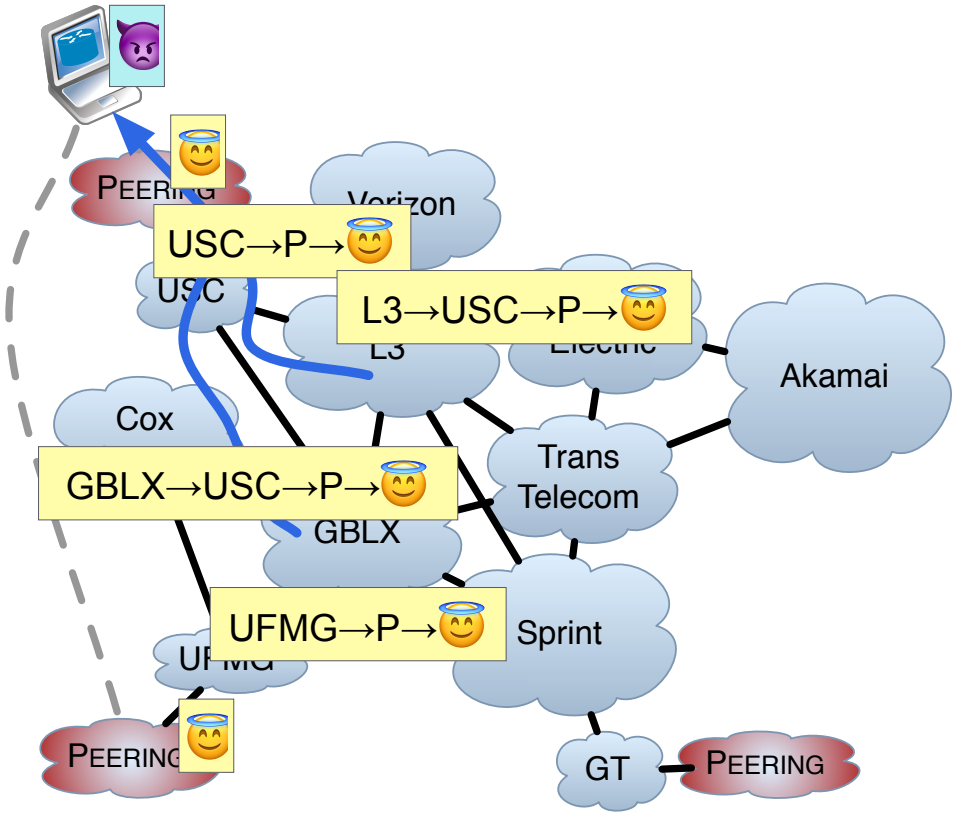

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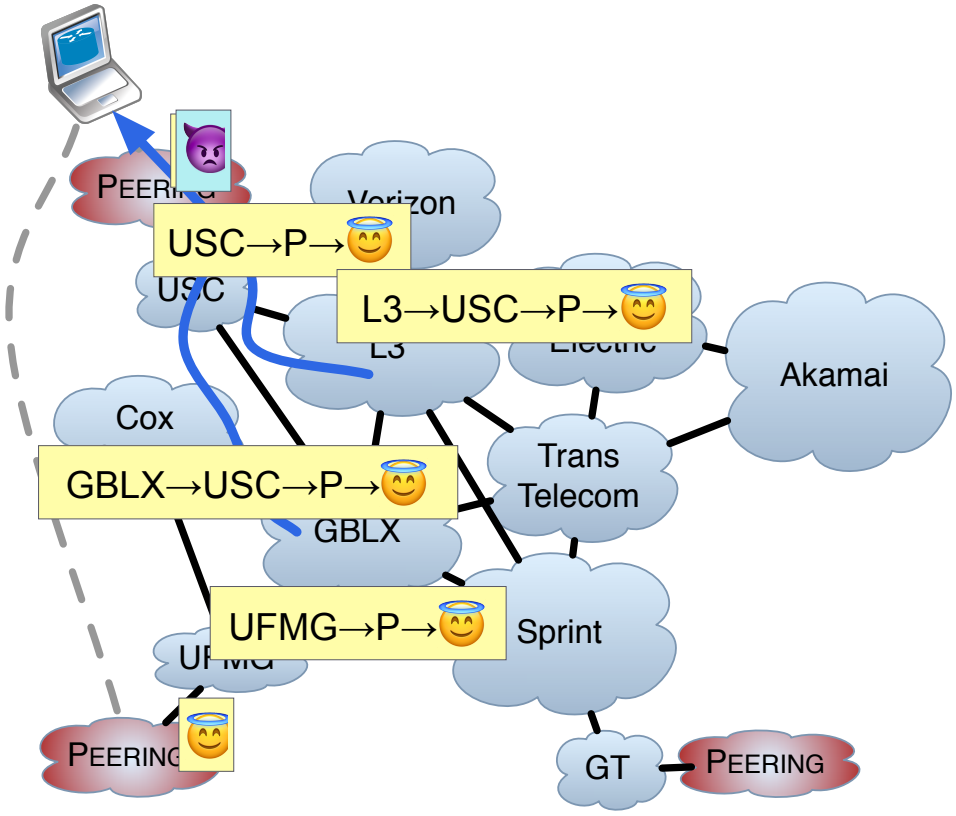

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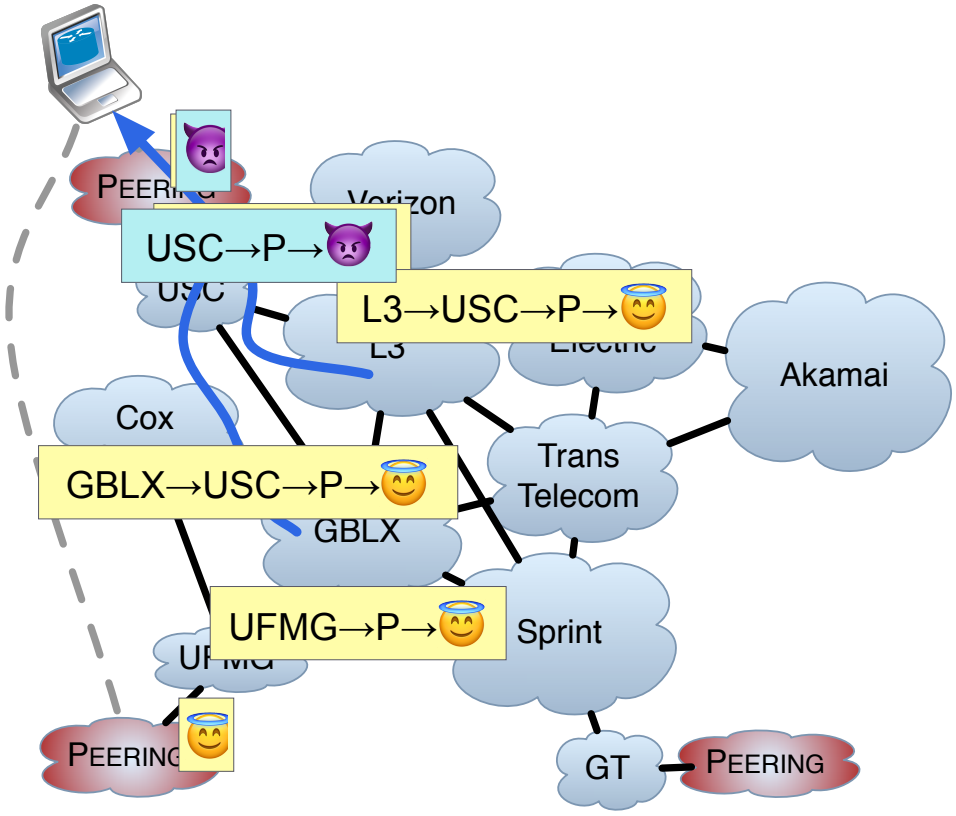

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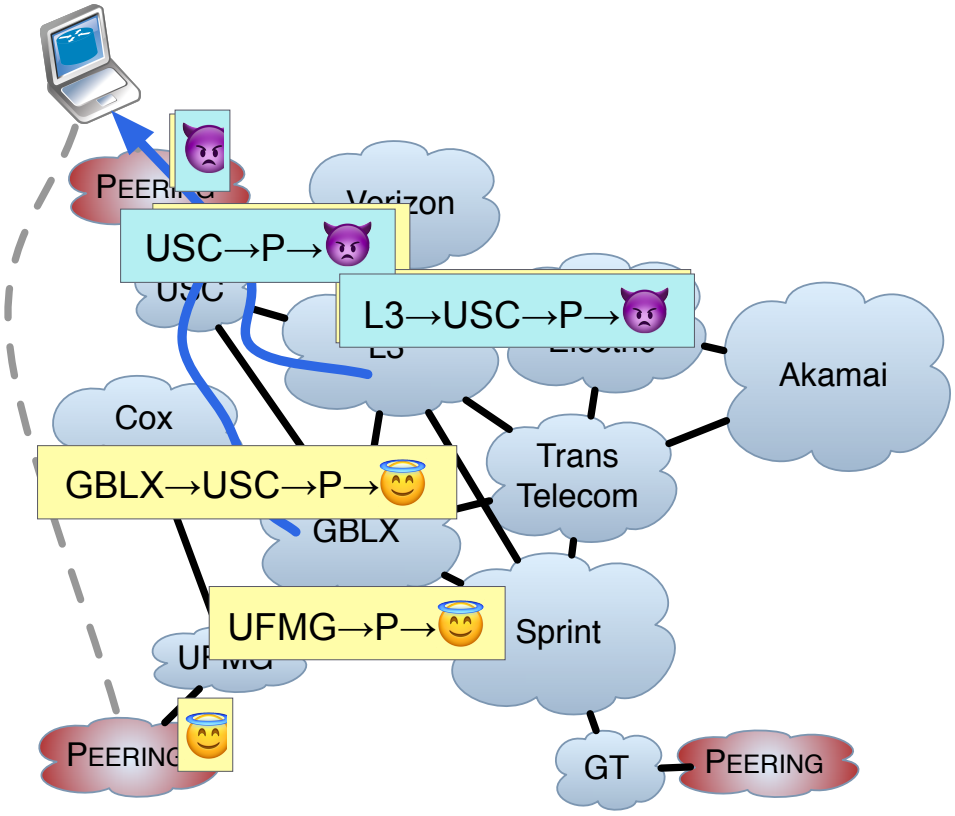

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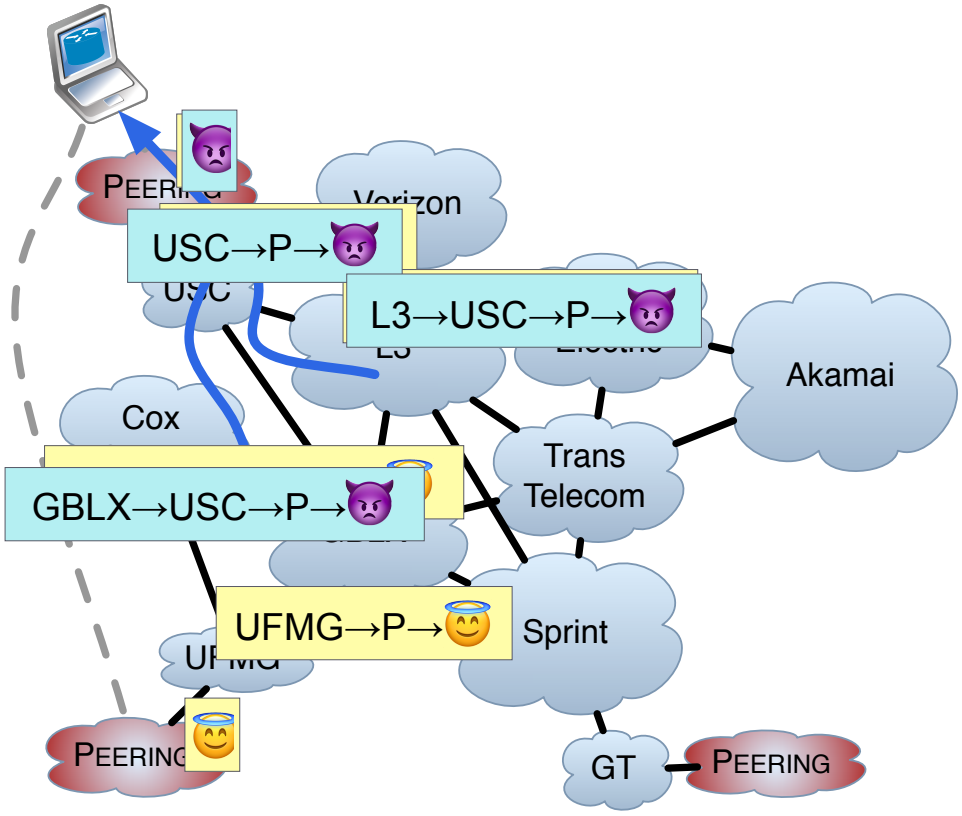

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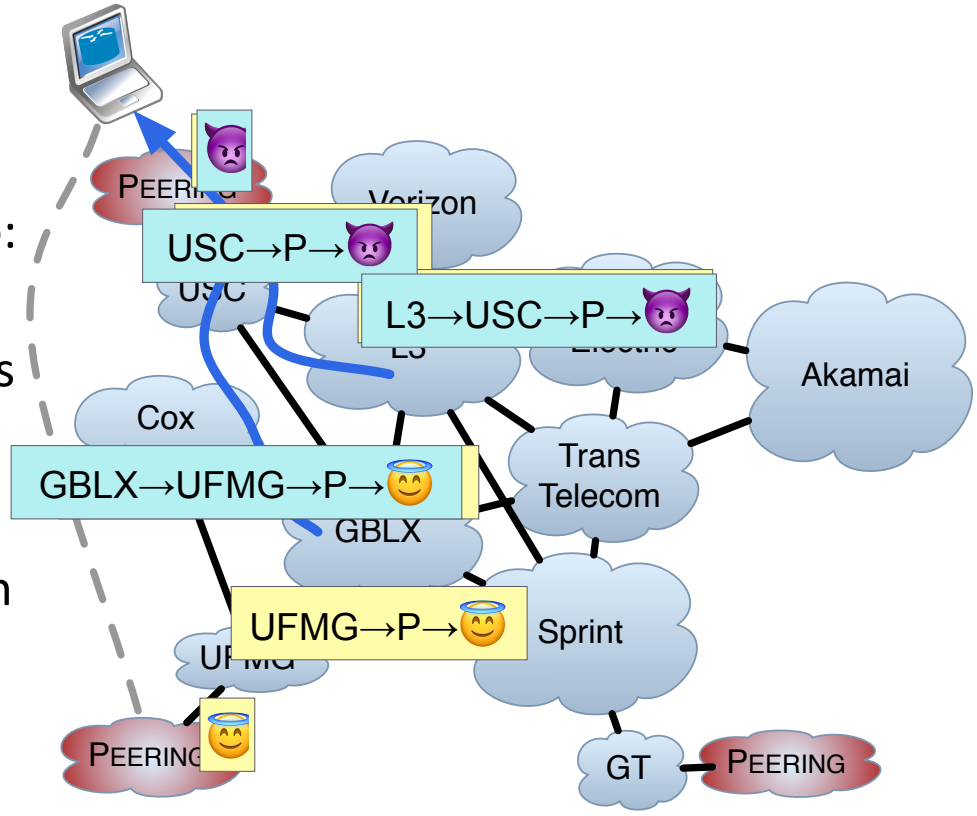

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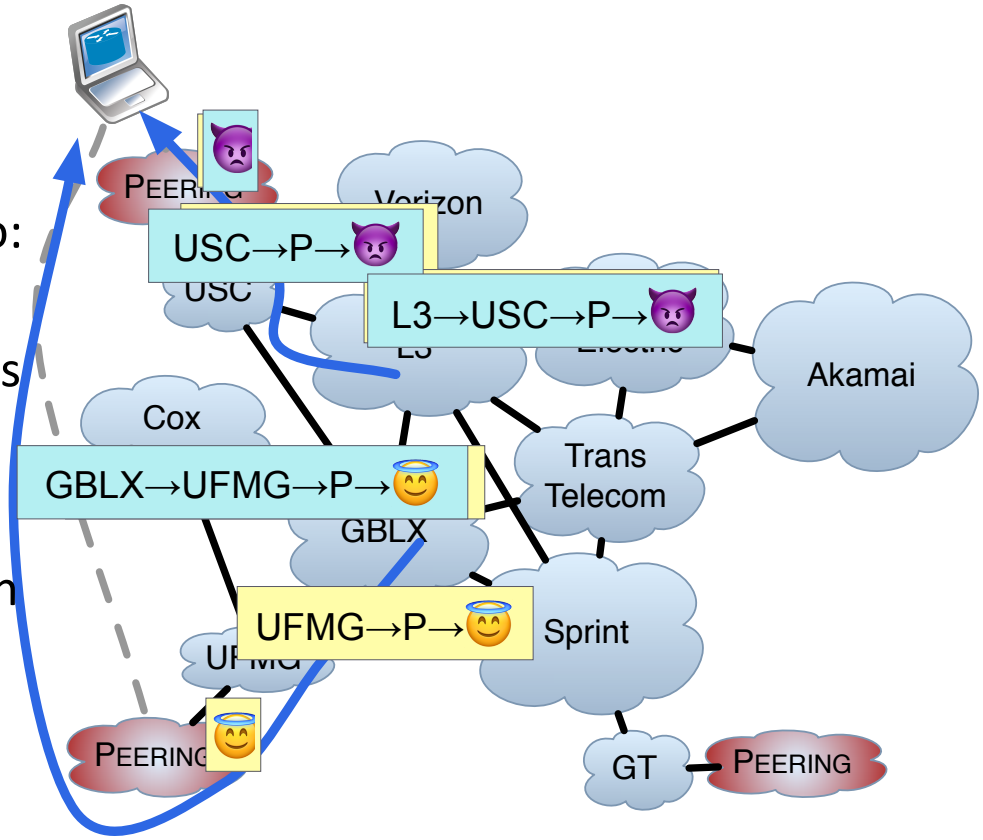

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