


# IPv6-only IXPs are Coming?

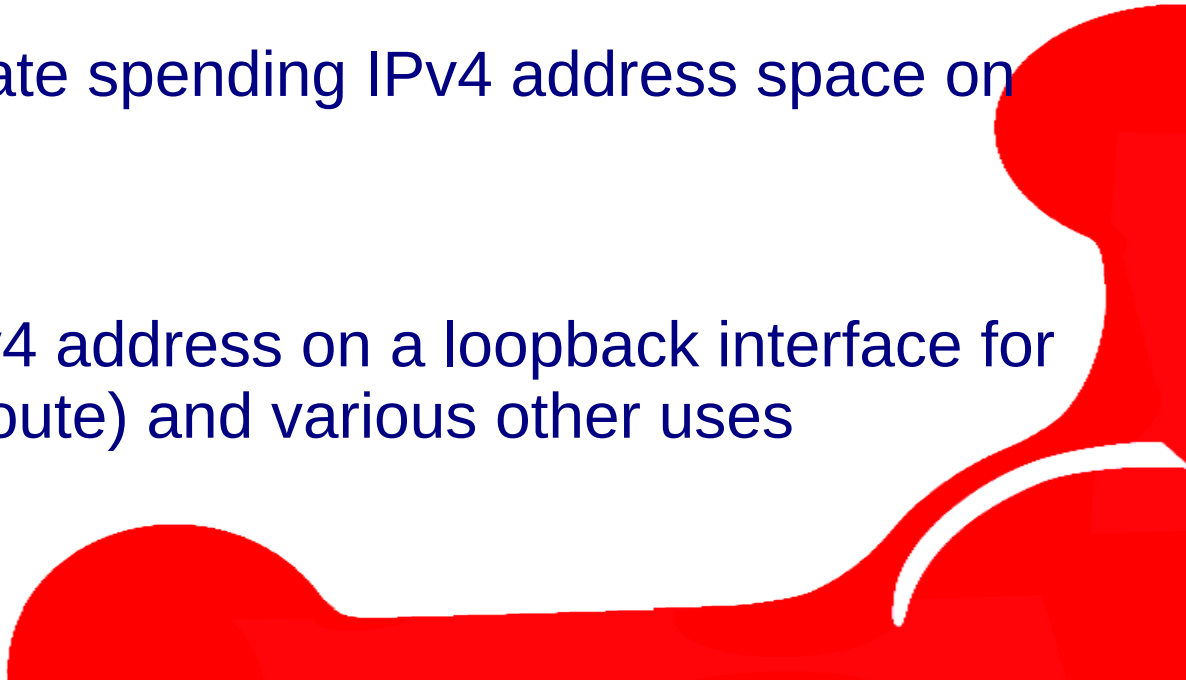
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Aleksi Suhonen  
March 2025

A large, abstract red graphic is located in the bottom right corner of the slide. It consists of several rounded, overlapping shapes in a vibrant red color, creating a modern, organic feel.

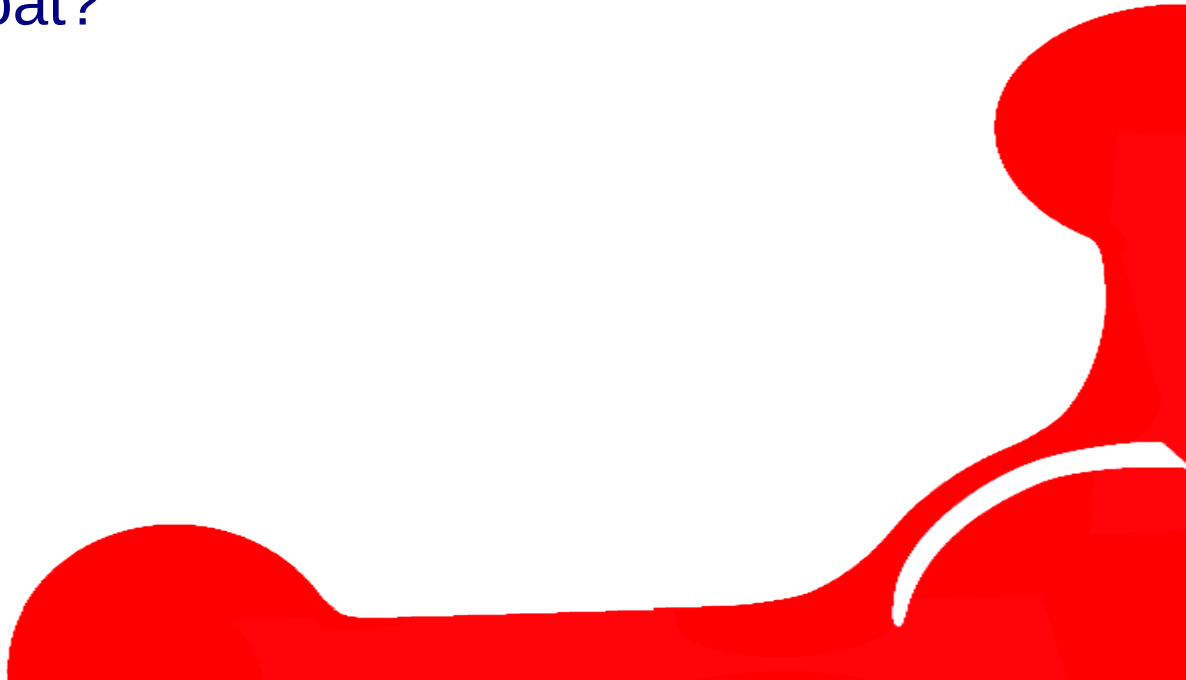
# What's This All About?

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- RFC5549 specifies announcing IPv4 routes with IPv6 next-hop addresses using BGP
  - RFC8950 updates and replaces RFC5549
  - Allows networks to eliminate spending IPv4 address space on link networks
  - ARP replaced by IPv6 ND
  - Routers still need **one** IPv4 address on a loopback interface for ICMP errors (think: traceroute) and various other uses
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- A large, stylized red graphic element in the bottom right corner of the slide, resembling a thick, curved brushstroke or a decorative shape.

## But IXPs? Why?

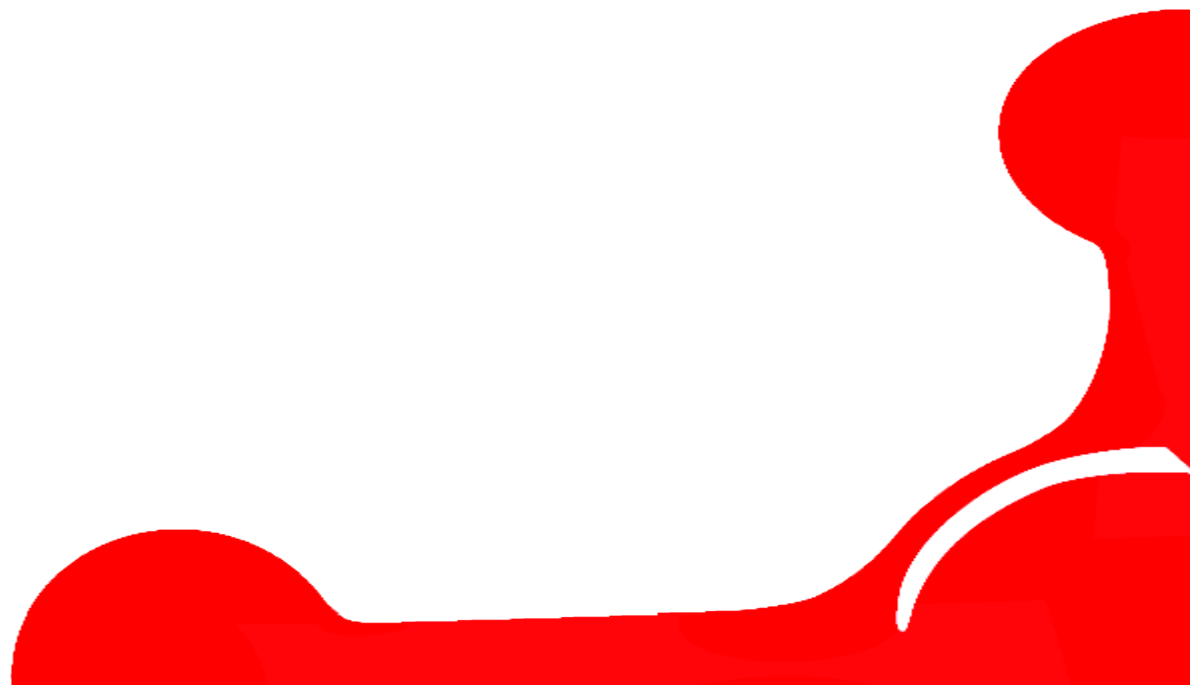
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- IXPs already have IPv4 addresses
  - RIPE even has a special address assignment policy for IXPs
  - Why bother rocking the boat?
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- A large, abstract red graphic in the bottom right corner of the slide, resembling a stylized shape or a splash of paint.

# Renumbering an IXP Is Painful

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- LINX renumbered from a /22 to a /21 on 2022-05-11
- Who here remembers that?



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# Renumbering an IXP Is Painful

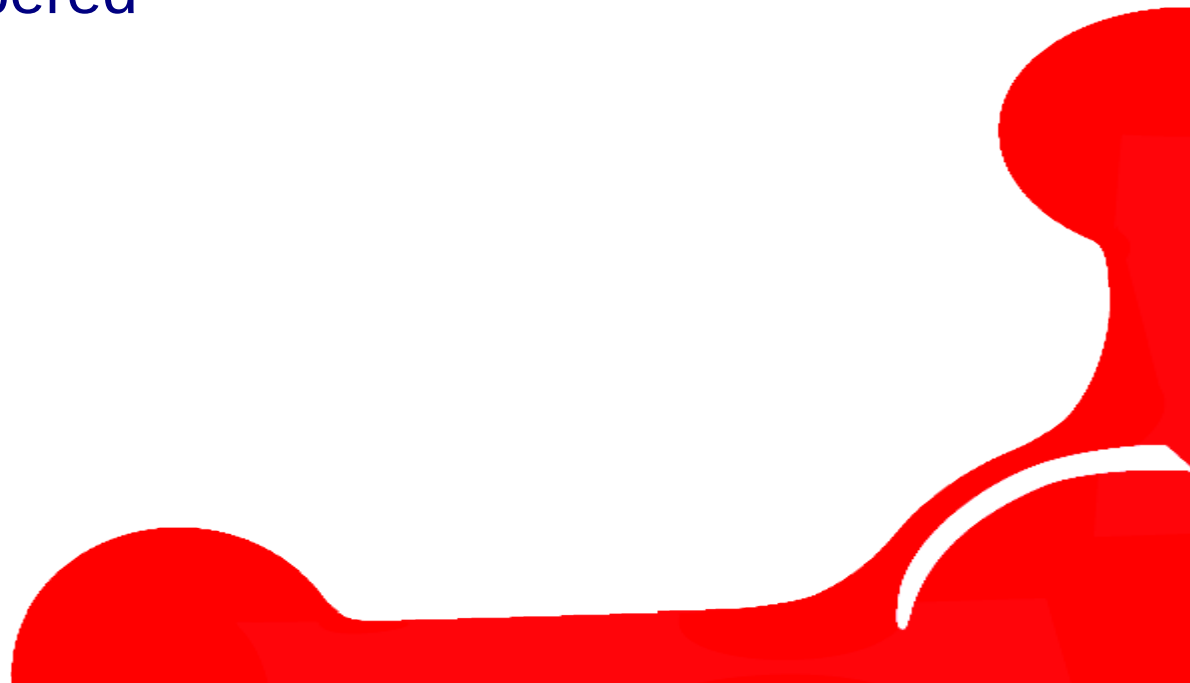
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- LINX renumbered from a /22 to a /21 on 2022-05-11
- Who here remembers that?
- LINX renumbered from a /23 to a /22 on 2012-06-11
- Who here remembers that too?
- LINX renumbered from a /24 to a /23 in 1997
- Thanks to Moyaze Shivji for the above dates

# Renumbering an IXP Is Painful

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- France-IX renumbering took almost two years 2019-2021
  - Thanks to Radu-Adrian Feurdean
- Netnod has never renumbered



# Alternative: One Final “Renumbering” Event

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- When the peering subnet becomes full, think about whether you really want to go through the pain of renumbering again and again...
- ... or switch to IPv6 next-hops, which aren't about to run out
- All members typically already have IPv6 addresses
- NIX (cz) is testing RFC8950 in their FENIX subnet
  - 6 members, 12 sessions mid February, 128 IPv4 prefixes affected
- TREN Tampere is also testing it



# What About New IXPs?

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- Updated IXP Address Space Assignment policy for IXPs: /26
  - Multiple renumbering events needed even before you reach /24
- Or take a chance to never have to renumber at all?
- TREX turku (in Åbo) is testing this approach


# RFC8950-ixp Working Group

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- Euro-IX started a working group to map out the challenges and work on best practices for adopting RFC8950 at IXPs
  - Chairmen: André Grüneberg (BCIX) and Aleksi Suhonen (me)
  - Members from DE-CIX, LINX, NIX.CZ, nic.cz, NetDEF, ...
  - DE-CIX is looking for BSc/MSc thesis writers
- <https://github.com/euro-ix/rfc8950-ixp>
  - Pull requests accepted...
- There's also a mailing list and a mattermost channel

# RFC8950 Challenges

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- The original RFC5549 is from 2018
  - Initial implementations aimed mostly at VPN AFI/SAFIs
  - Interoperability hadn't been tested much before this
  - IBGP next-hop-self even more important now
  - ICMP Unreachables unpredictable on some platforms
  - Unintentional blackholing possible
  - Looking-glass support near zero
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- A large, abstract red graphic is located in the bottom right corner of the slide. It consists of several rounded, overlapping shapes in a vibrant red color, with a white curved line cutting through one of the shapes.

# Thank you!

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Questions?

