
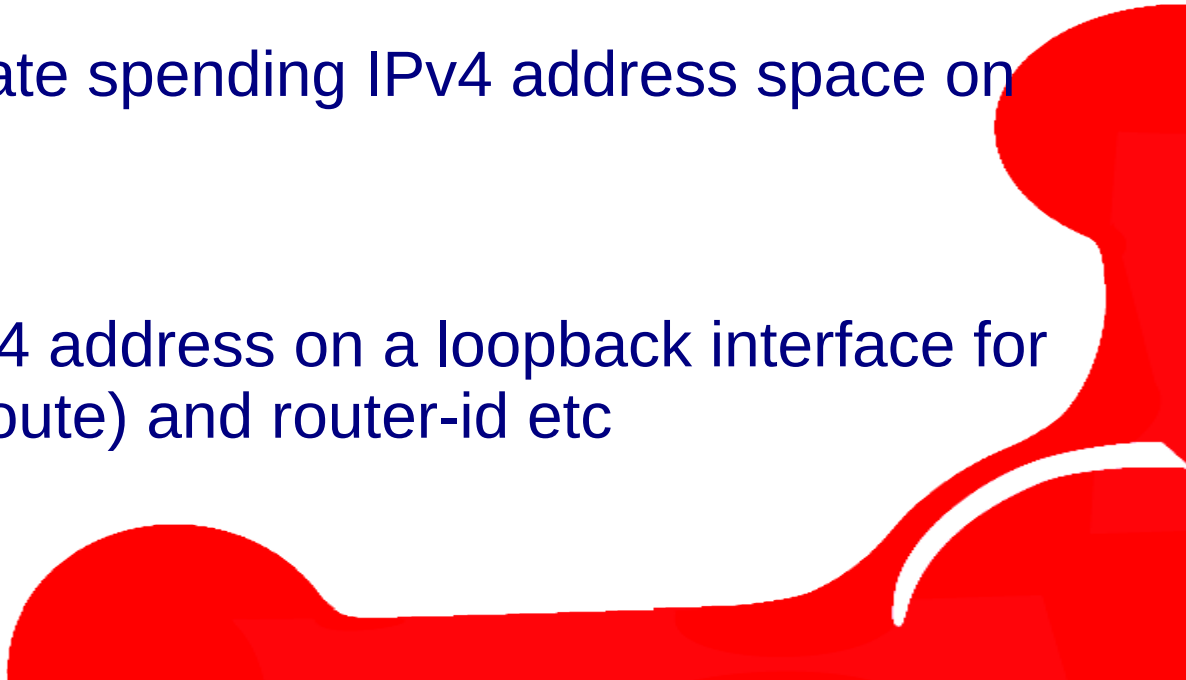


IPv6-only IXPs are Coming?

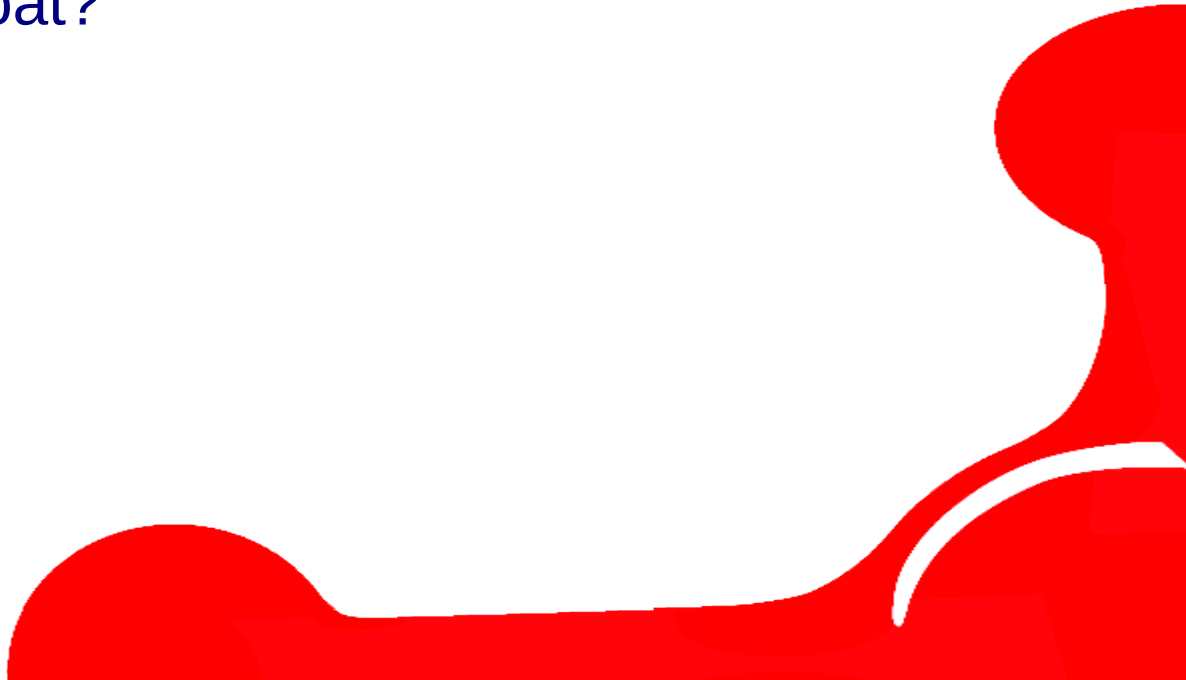
Aleksi Suhonen
March 2025

A large, abstract red graphic is located in the bottom right corner of the slide. It consists of several rounded, overlapping shapes that resemble a stylized figure or a decorative element. The color is a vibrant red, and it has a white outline on one of the lower curves.

What's This All About?

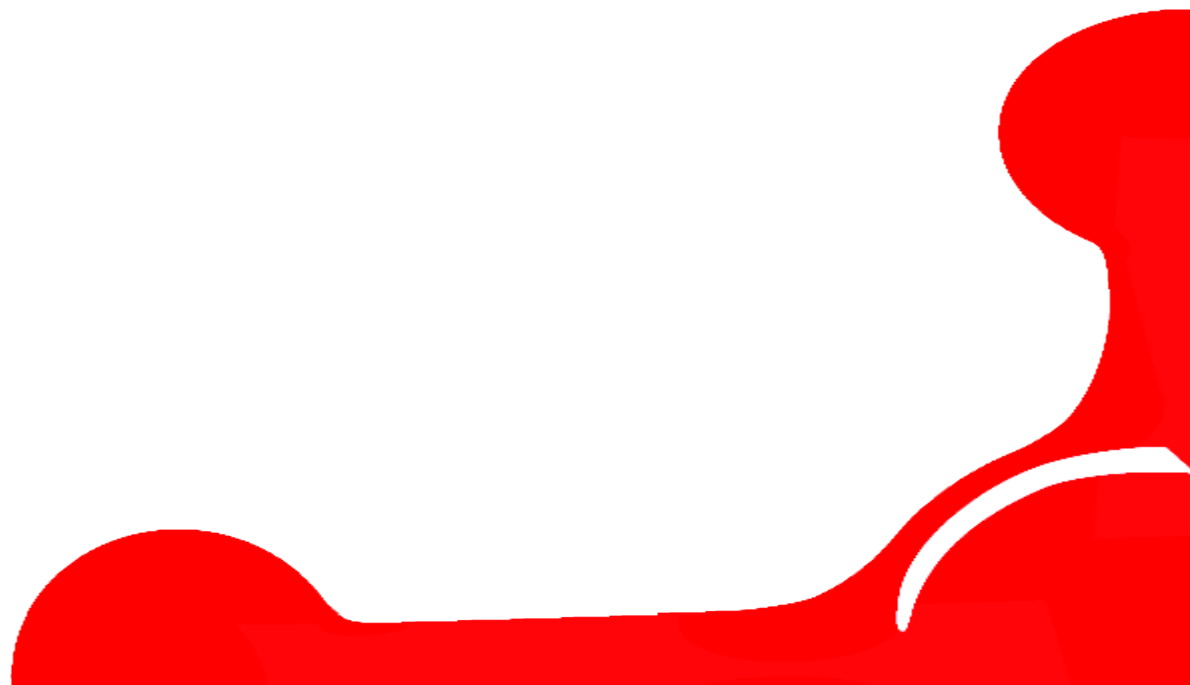
- RFC5549 specifies announcing IPv4 routes with IPv6 next-hop addresses using BGP
 - RFC8950 updates and replaces RFC5549
 - Allows networks to eliminate spending IPv4 address space on link networks
 - ARP replaced by IPv6 ND
 - Routers still need one IPv4 address on a loopback interface for ICMP errors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

But IXPs? Why?

- 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 with rounded, organic shapes occupies the bottom right corner of the slide. It features a white curved line near the bottom edge, resembling a stylized wave or a modern logo element.

Renumbering an IXP Is Painful


- 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

- 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
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Renumbering an IXP Is Painful

- DE-CIX renumbered just once
 - Since then they have extended the netmask twice
 - Less painful, but not painless
 - Thanks to Arnold Nipper and Daniel Wagner
- NIX.CZ renumbered /24 -> /22 in 2011-03-16
 - Thanks to Marian Rychtecky
- Netnod has never renumbered yet?

Alternative: One Final “Renumbering” Event

- 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?

- 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 the waters here

RFC8950-ixp Working Group

- 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

- The original RFC5549 is from 2018
 - Initial implementations aimed mostly at VPN AFI/SAFIs
 - Interoperability hasn't been tested much yet
 - IBGP next-hop-self important
 - ICMP Unreachables sometimes unpredictable
 - Unintentional blackholing possible
 - Looking-glass support near zero
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Thank you!

Questions?

