Routing IPv6 in the Homenet

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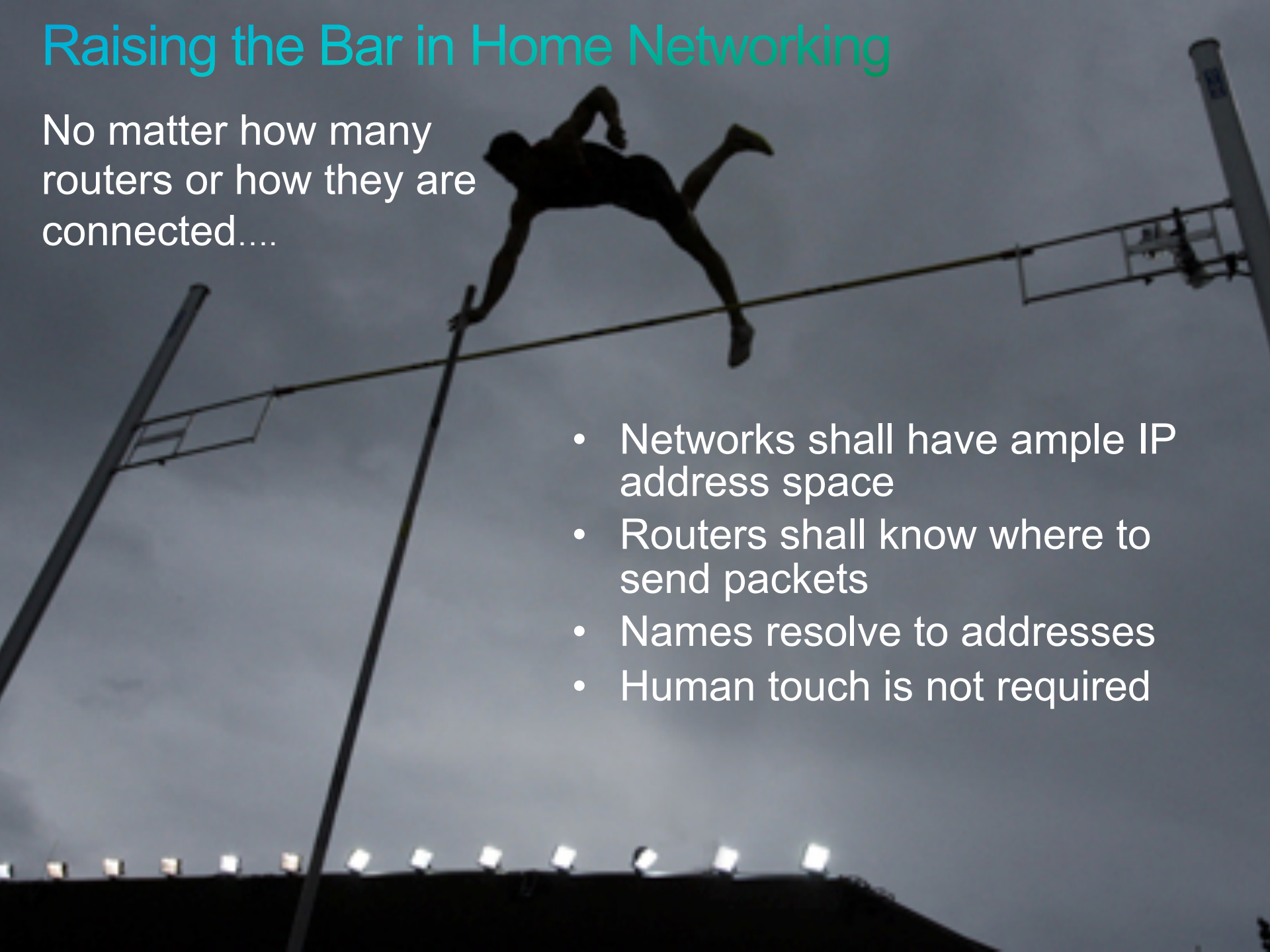
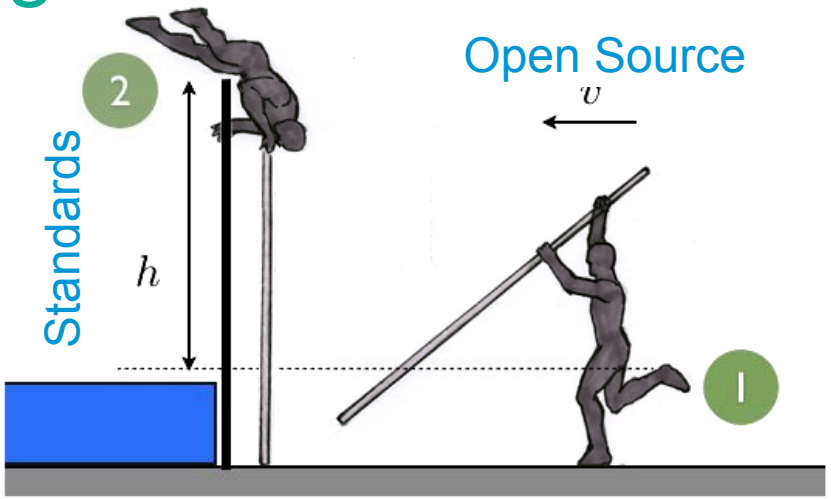
Raising the Bar in Home Networking

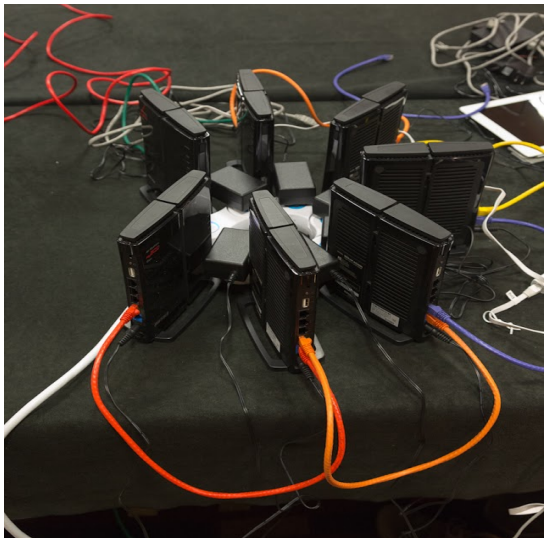
No matter how many routers or how they are connected....



- Networks shall have ample IP address space
- Routers shall know where to send packets
- Names resolve to addresses
- Human touch is not required

Reaching the bar

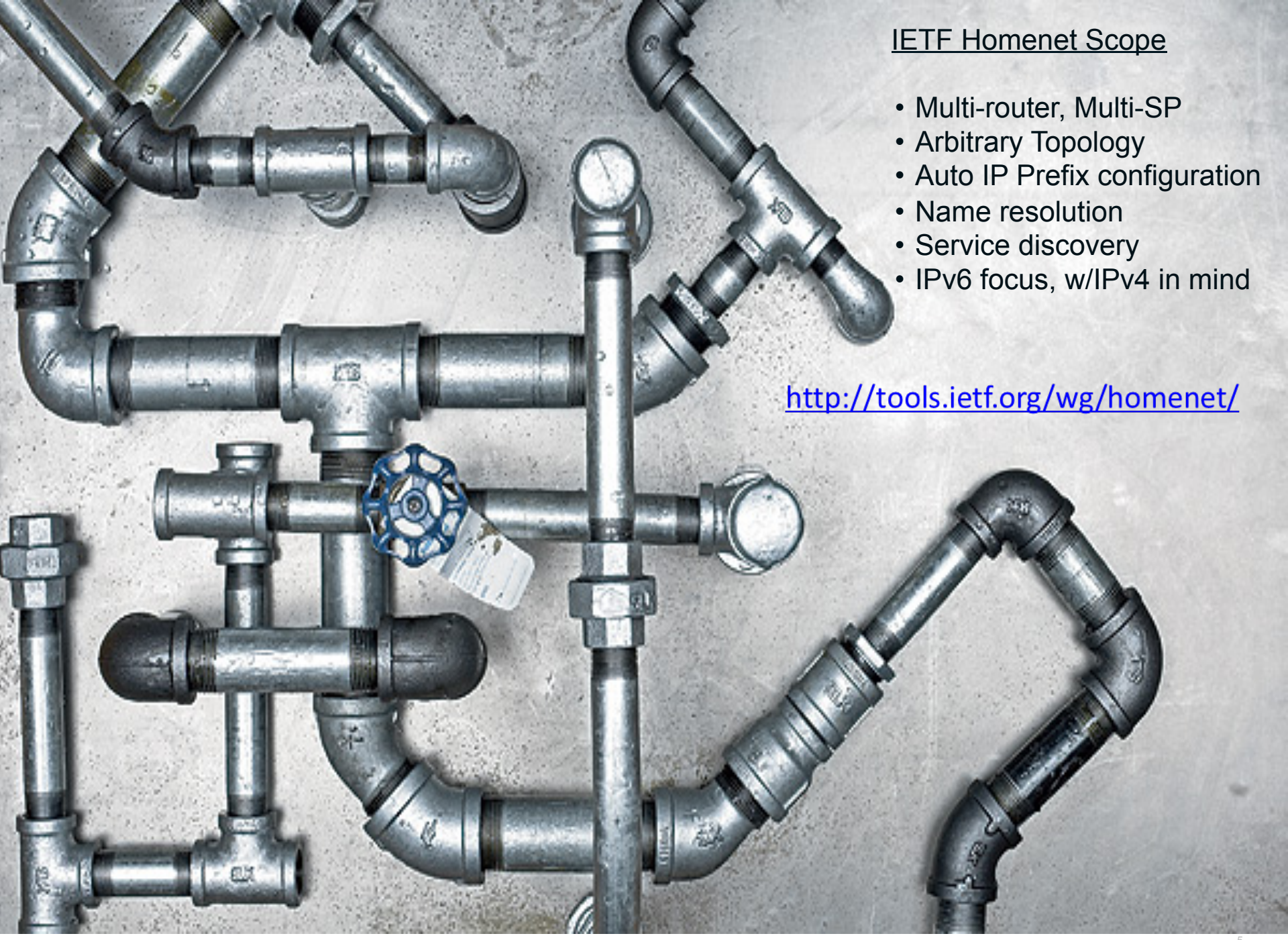




- IETF Homenet Working Group (established July 2011)
  - Interim kickoff meeting at Comcast in PA
  - Of 120+ IETF WGs, homenet is currently in the top 3 most well attended
  - http://tools.ietf.org/wg/homenet/
- Cisco Homenet Tech Fund (established June 2012)
  - Funding for open source development, prototyping, etc.
  - Please contribute! The idea is to make this a community effort.
  - irc #homenet https://github.com/fingon/hnet-openwrt-openwrt-feed
  - https://github.com/fingon/bird-ext-lsa https://github.com/fingon/hnet-core

Homenet and Hipnet

- Homenet is an IETF Working group, Hipnet is a Cablelabs project
- Homenet and Hipnet are targeting the same overall problem space with similar goals – to make IPv6 routing work within the home
- Hipnet goes as far as it can without introducing a routing protocol
- Homenet has been basing much of its work with a mindset that a home routing protocol will be necessary
- Hipnet and Homenet are incompatible with one another.
- At the last IETF in Berlin, a design team was formed to identify a migration strategy for existing IPv6 capable home routers and potential hipnet CPE to IETF Homenet routers.

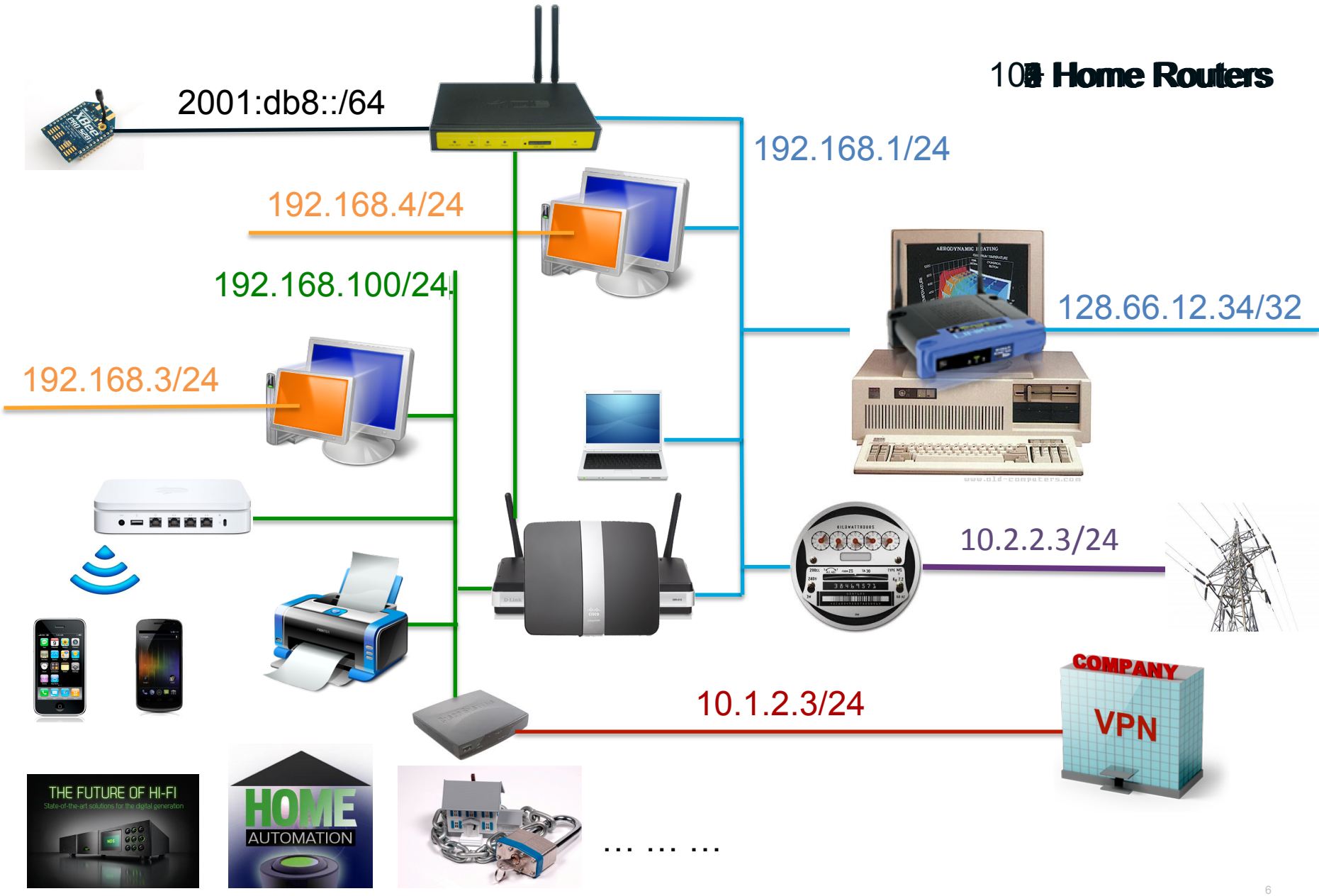


IETF Homenet Scope

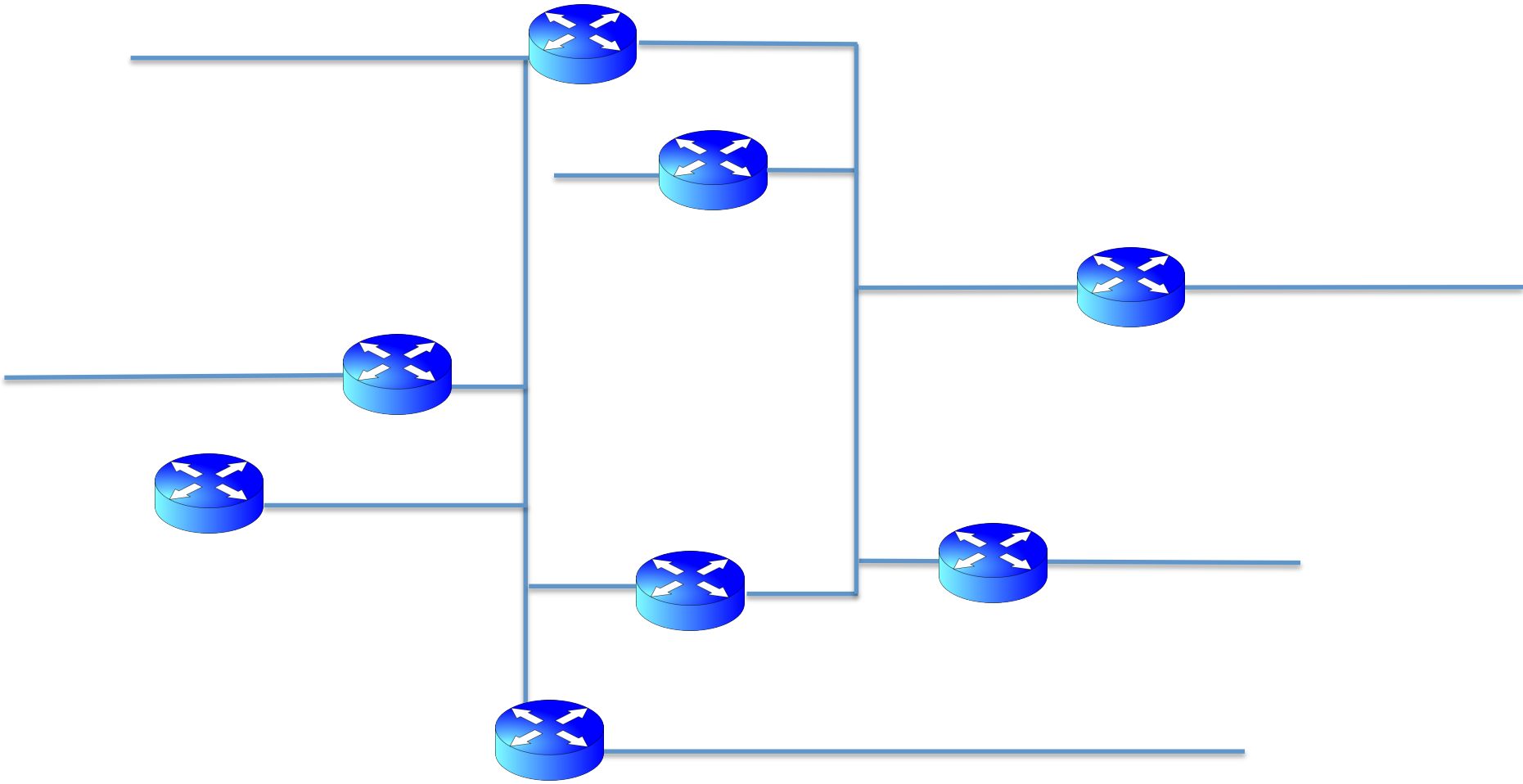
- Multi-router, Multi-SP
- Arbitrary Topology
- Auto IP Prefix configuration
- Name resolution
- Service discovery
- IPv6 focus, w/IPv4 in mind

http://tools.ietf.org/wg/homenet/

Evolution of an IPv4 home network



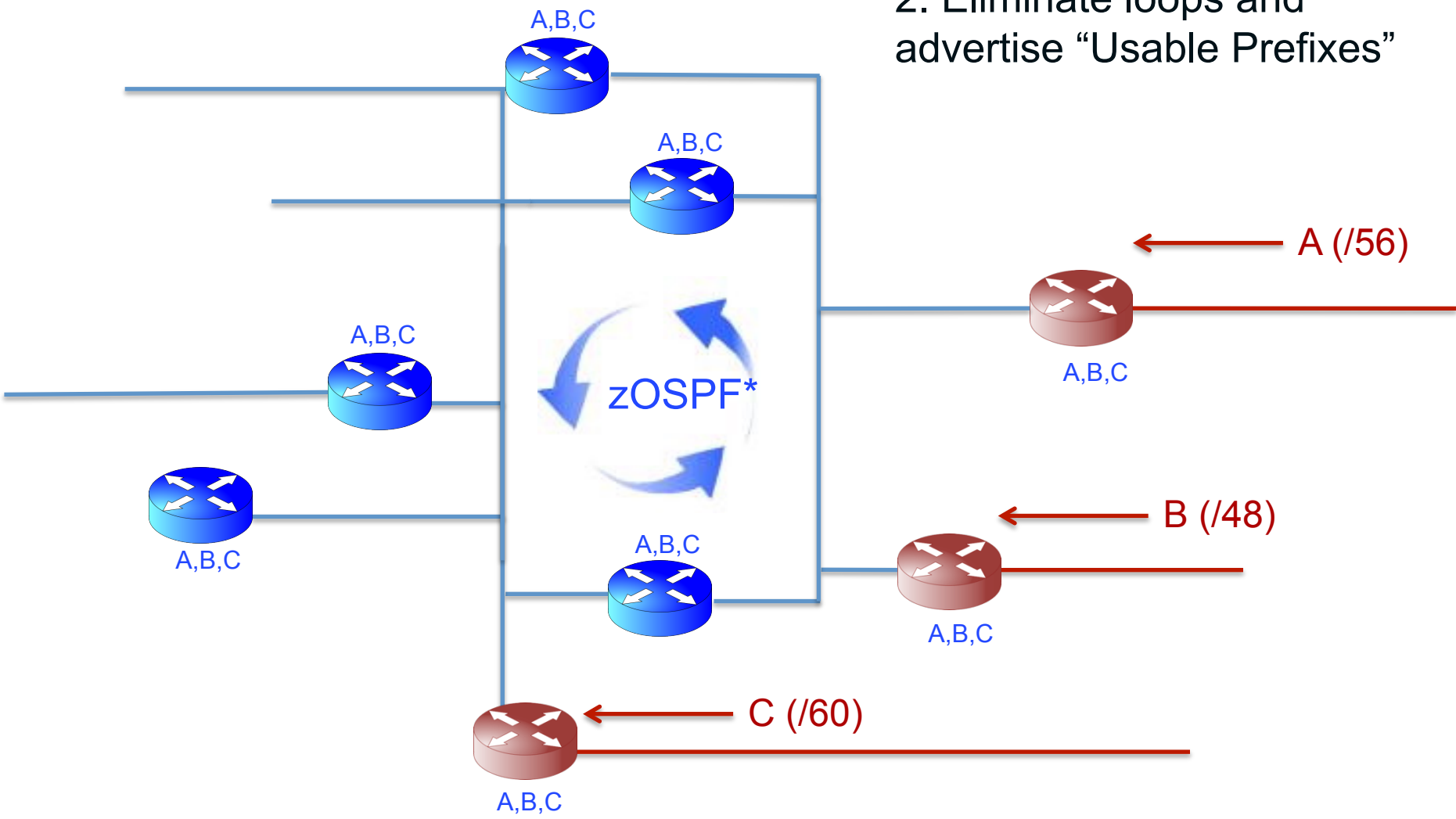
IETF Homenet



IETF Homenet

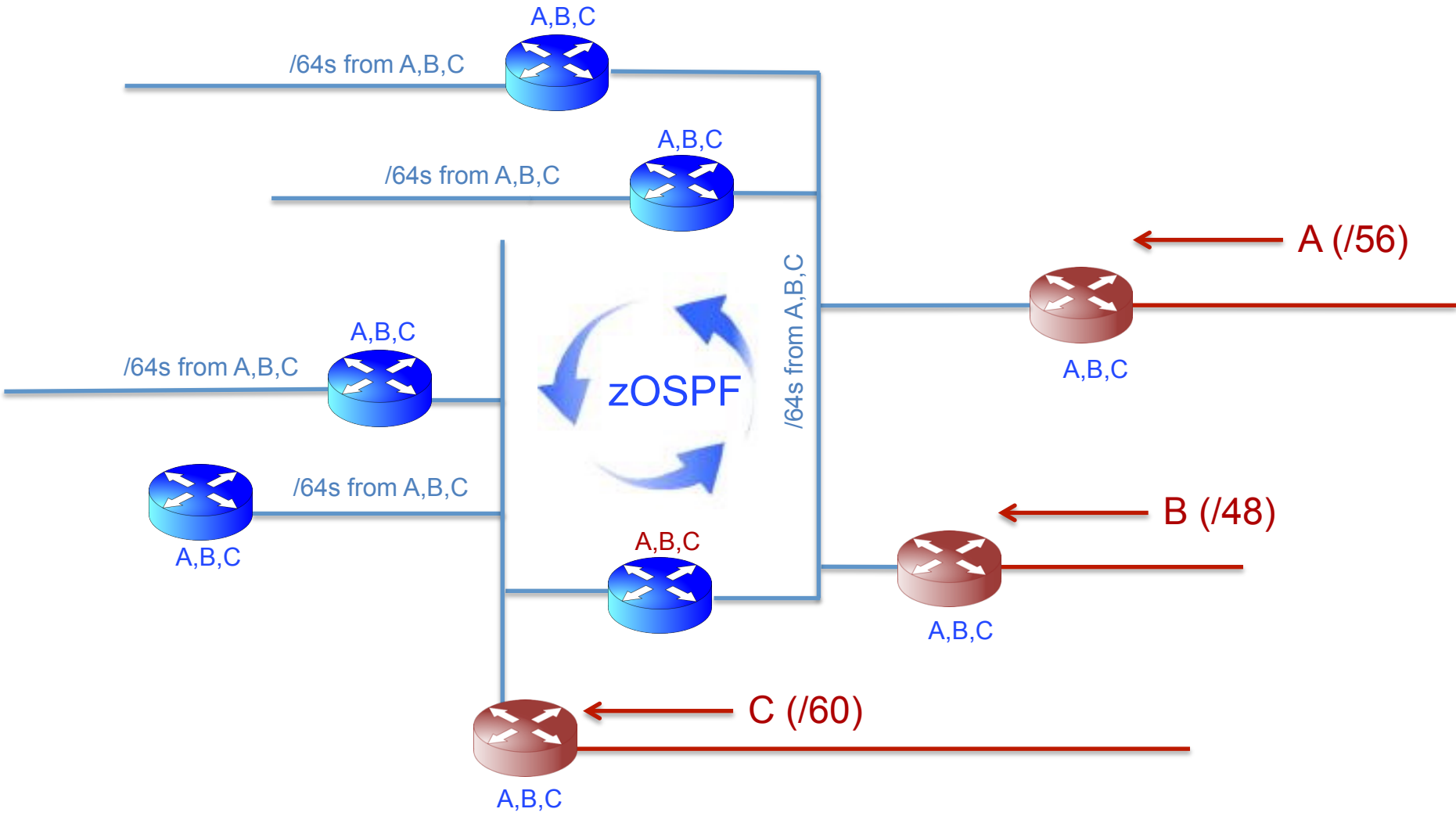
1. Identify Border Routers

2. Eliminate loops and advertise “Usable Prefixes”



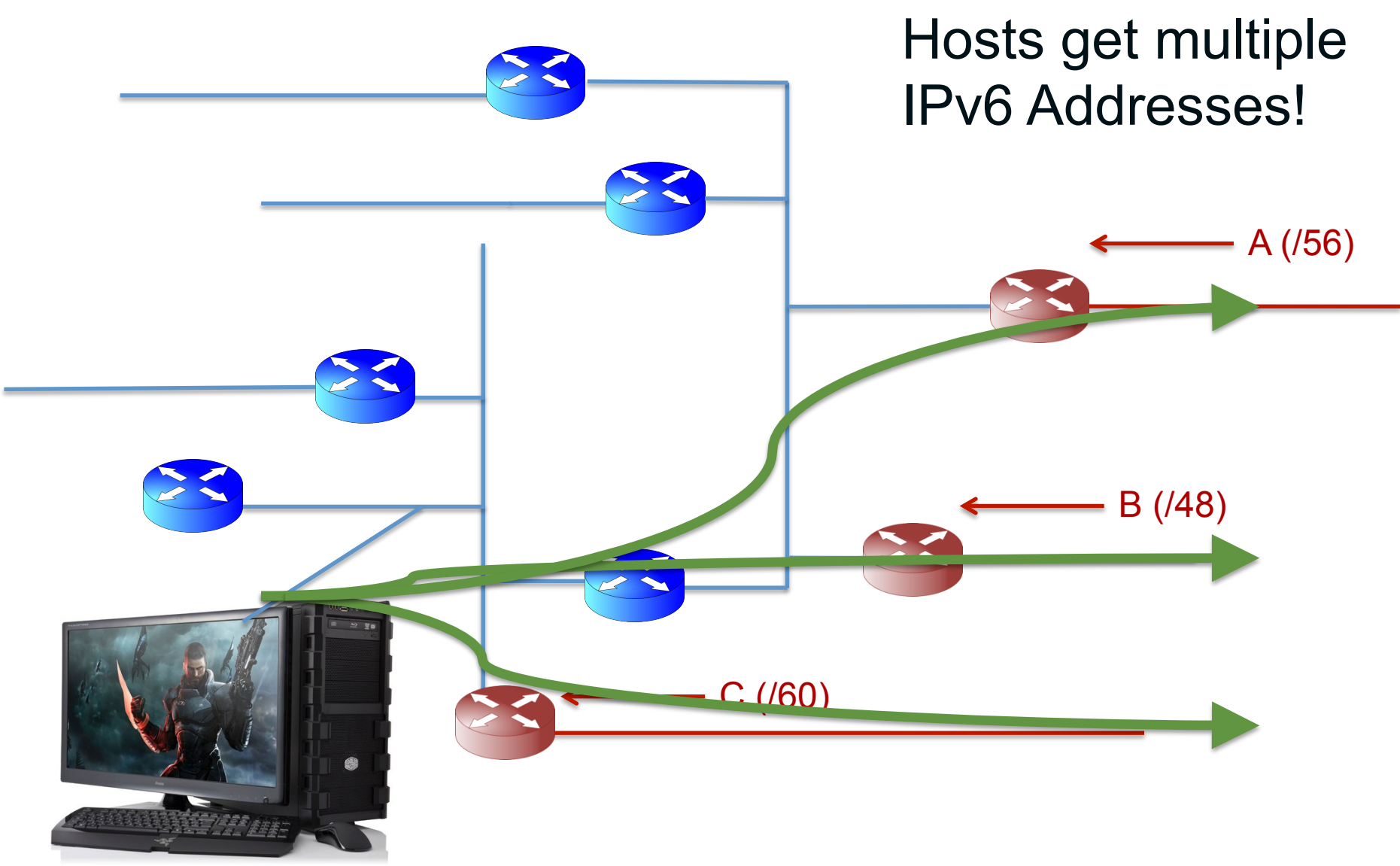
*Example of one proposal, draft-arkko…

3. Carve up Usable Prefixes into /64s and assign to links



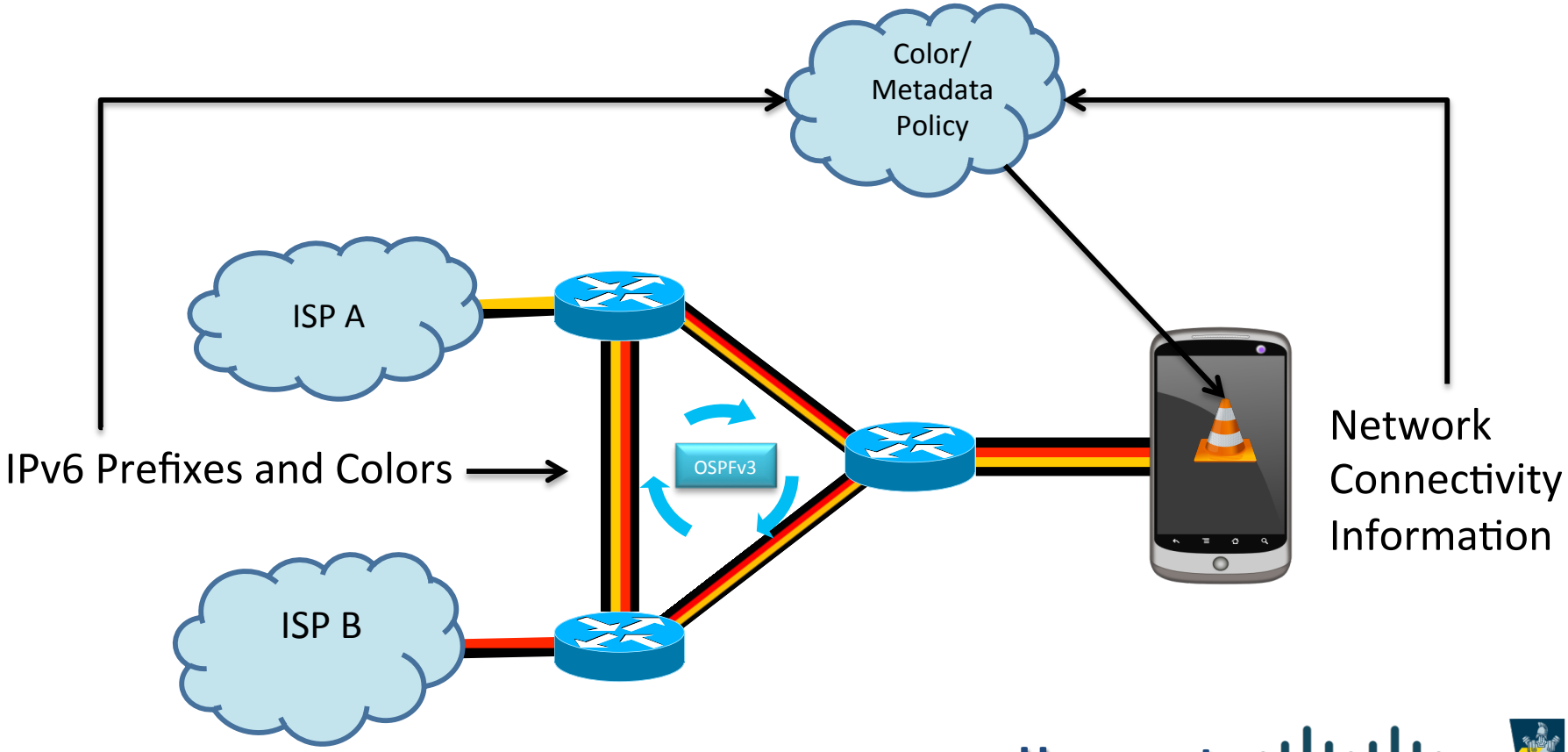
See: http://www.townsley.net/inf_ospf_homenet_paterson_Aug_2012.pdf

4. Route packets based on Source and Destination



IPv6 prefix colouring

`draft-lepape-6man-prefix-metadata`



Homenet
Working Group

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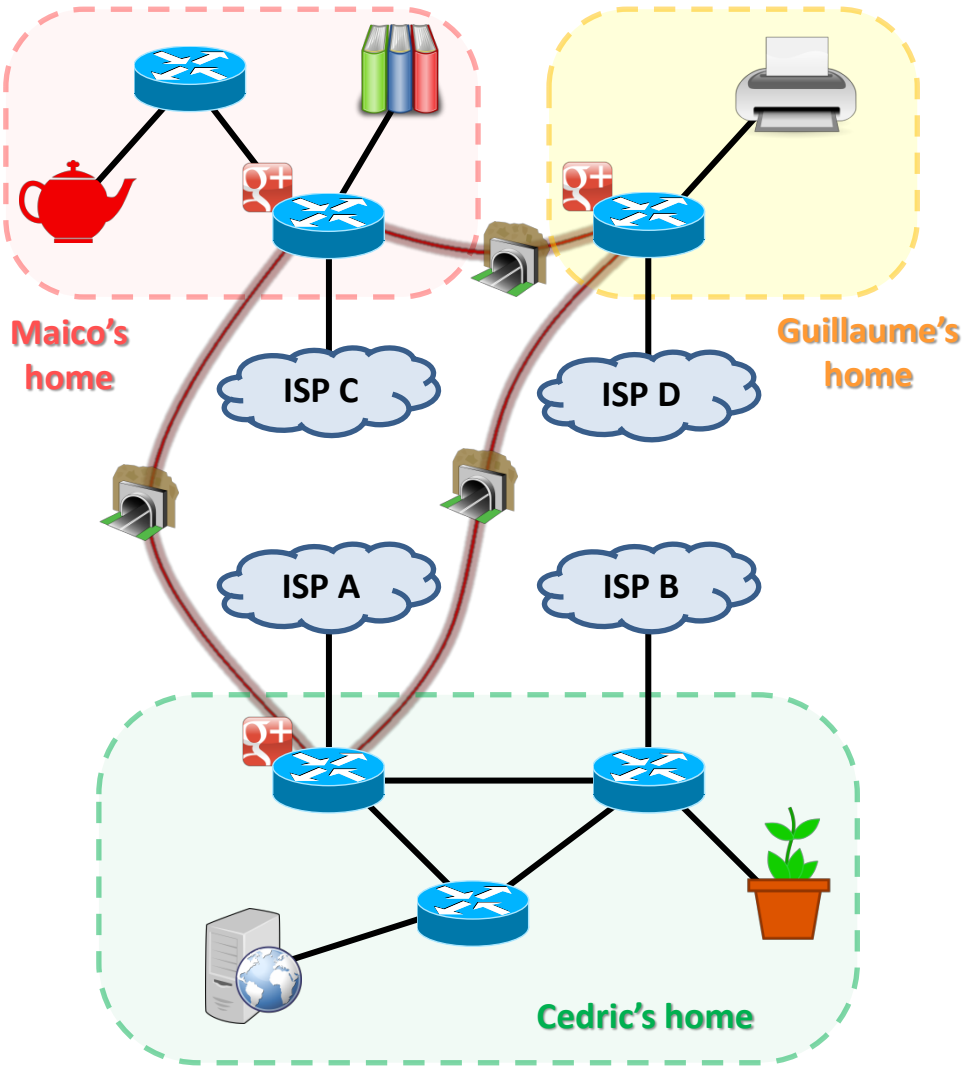
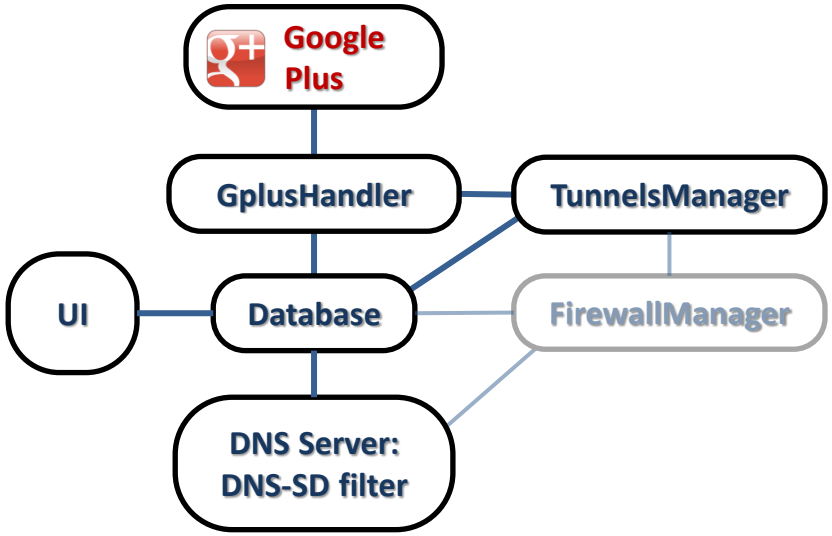
ParisTech



xHomenet

`draft-dessez-homenet-googleplus-interconnect`

Connecting home network via the social network Google Plus



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Don’t let “Home” in the title fool you…

- Homenet is about much more than just the Home

  (shhh… it’s a secret)

  - Automatic prefix distribution and assignment in some of your favorite routing protocols (OSPF, ISIS, etc…)
  - IPv6 site multihoming without NAT, Tunneling, or PI
  - Putting the multi-prefix, multi-address architecture of IPv6 to the test
  - Exposing previously hidden network information to applications for them to use intelligently

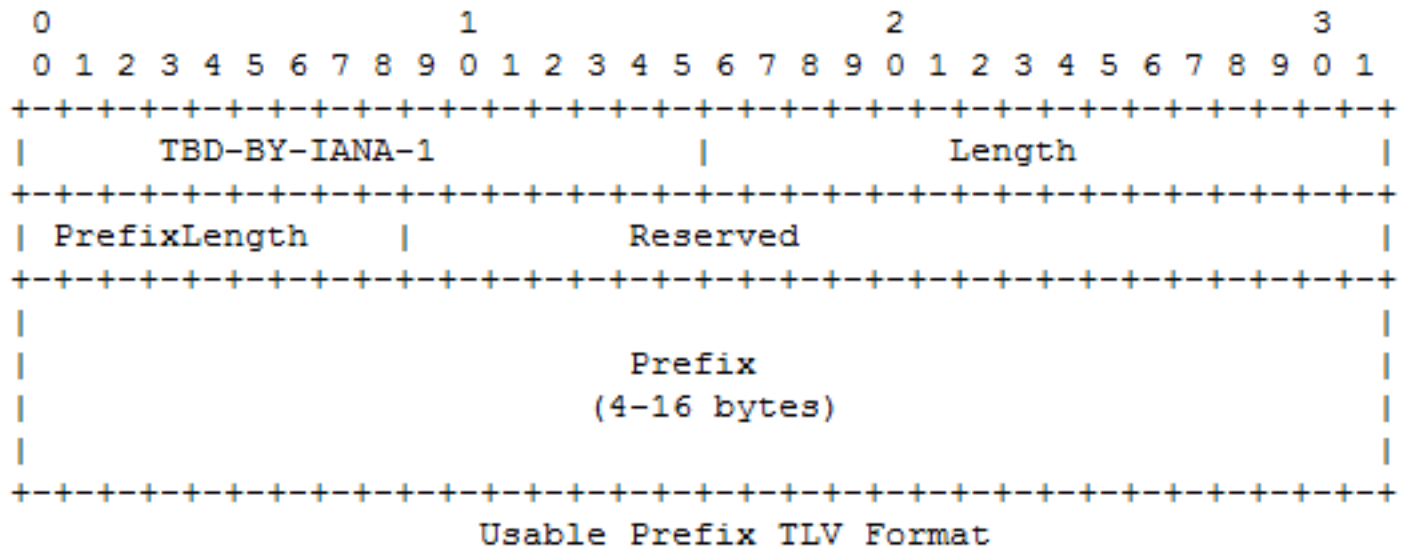
Homenet Summary

- IPv6 is increasingly available from ISPs to the home edge
- Homenet is taking IPv6 from the edge, into the home
- The goal is to “raise the bar” for home networking in the process
- RFCs and Open Source code are being developed – please contribute, this is *your* home we are working on!

Thank you.

Messages: Usable Prefix TLV

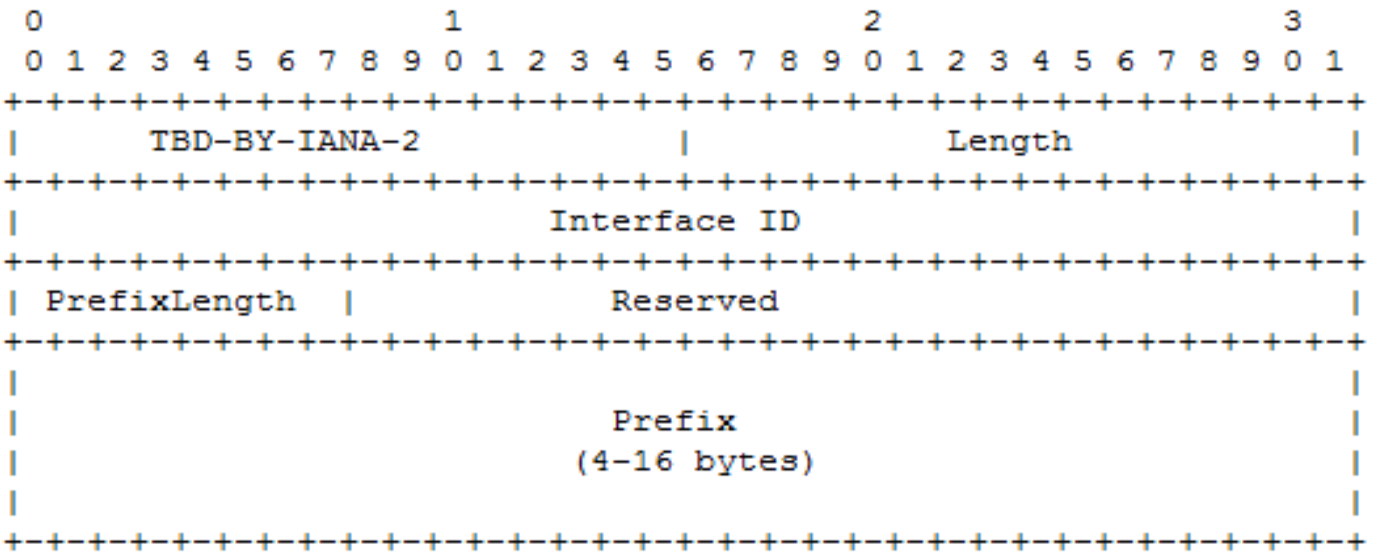
New OSPF LSA: Auto-Configuration LSA
Made up of TLVs: Type-Length-Value



Usable Prefix TLV Format

Advertised in the LSA of the router that learned of the prefix via DHCPv6 PD

Messages: Assigned Prefix TLV

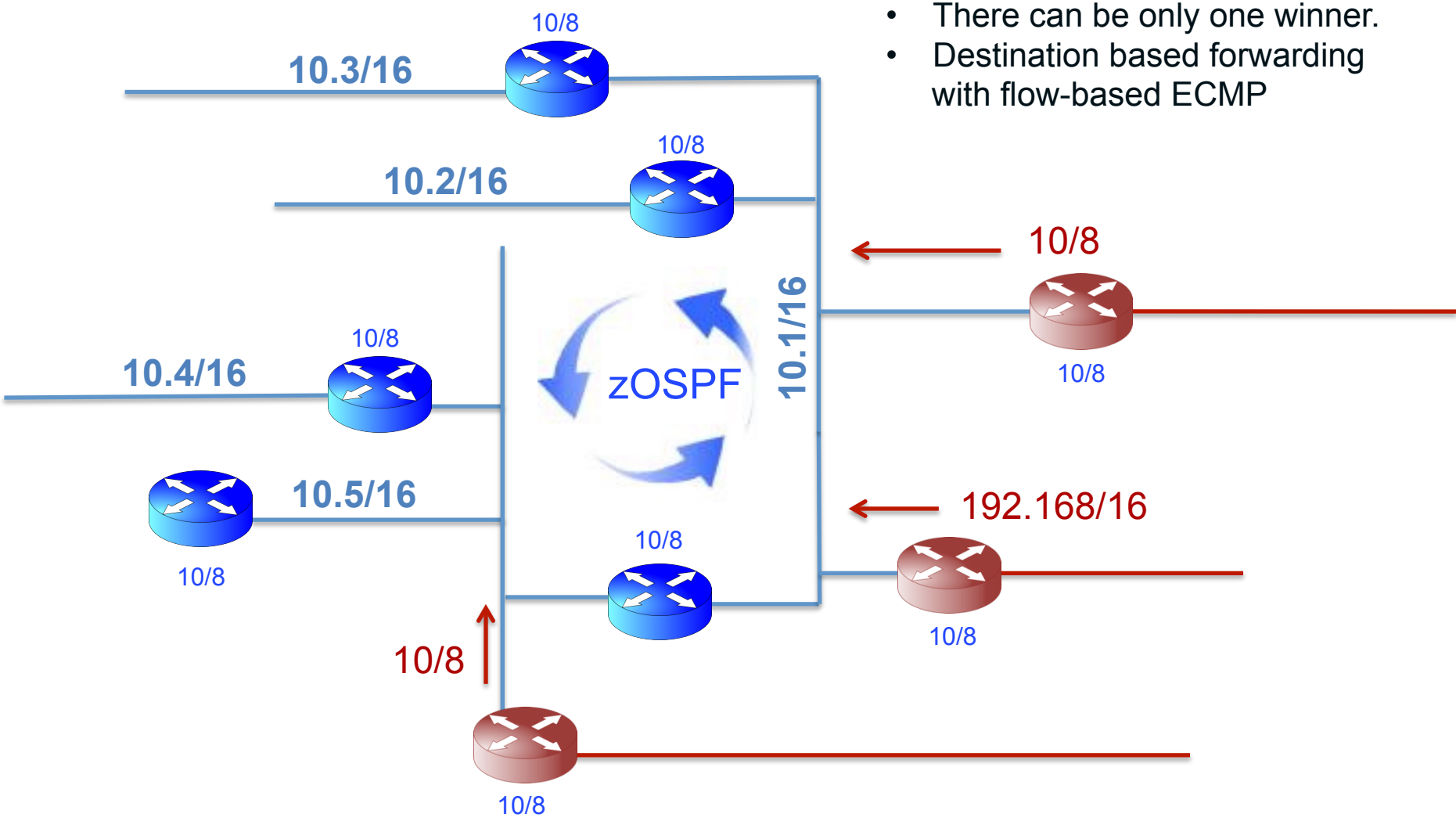


Assigned Prefix TLV Format

Advertised in the LSA of the router that is **responsible** for the assignment

IETF Homenet for IPv4

- Each edge router vies to announce its private IPv4 space.
- There can be only one winner.
- Destination based forwarding with flow-based ECMP



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