Homenet in 15 minutes

We've been at this for a while…

Nov 2009: 1st Homegate BoF
July 2011: Homenet WG approved
Oct 2011: 1st Homenet Interim

RIPE 64, April 2012

Experiences in Setting Up Automatic Home Networking

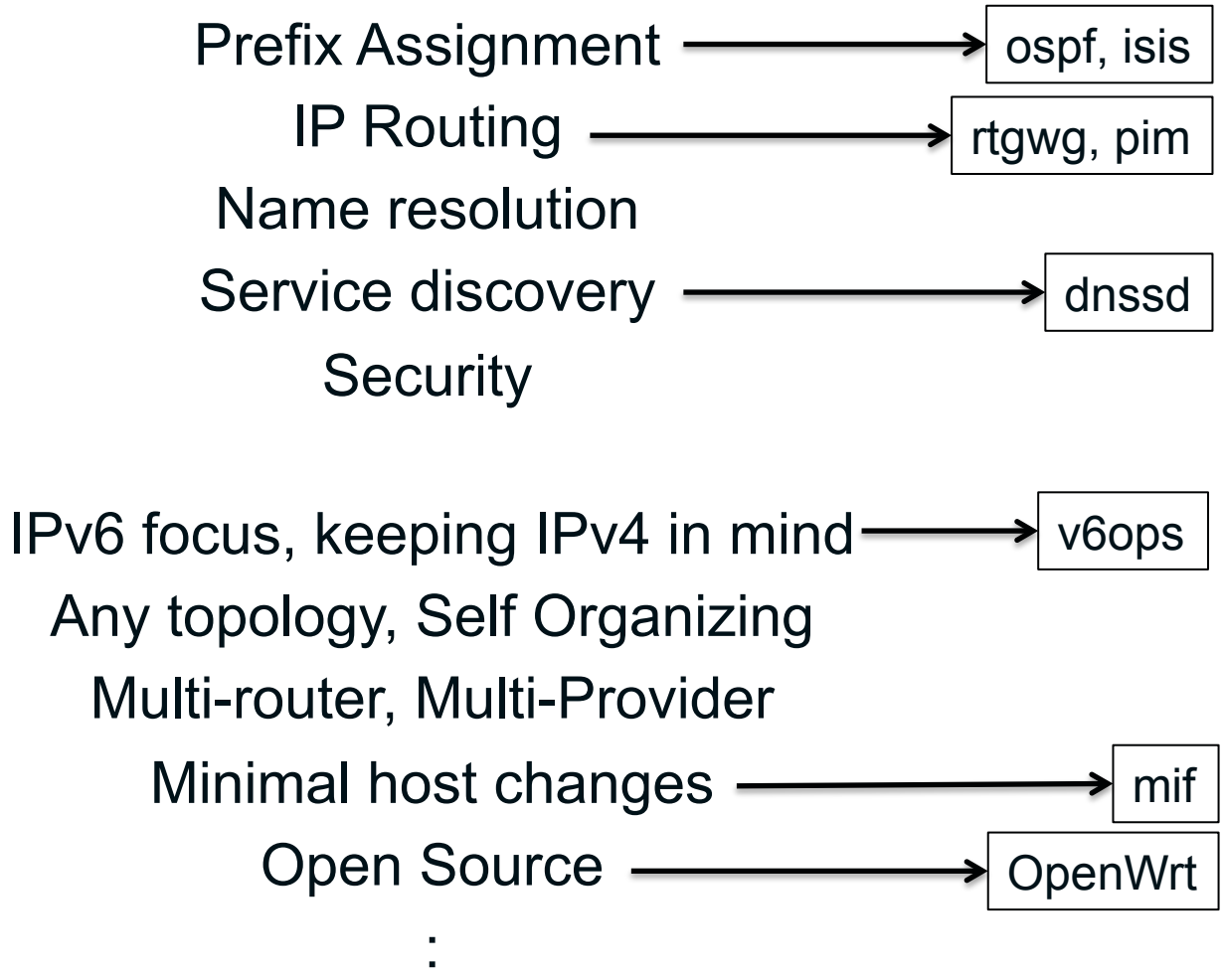
Jari Arkko
Ericsson Research

The Dream

No matter how many boxes you have
And how you connect them

- Networks shall have address space
- Routers shall know where to send packets
- Names resolve to addresses
- Human touch is not required
  [Especially by my mother!]

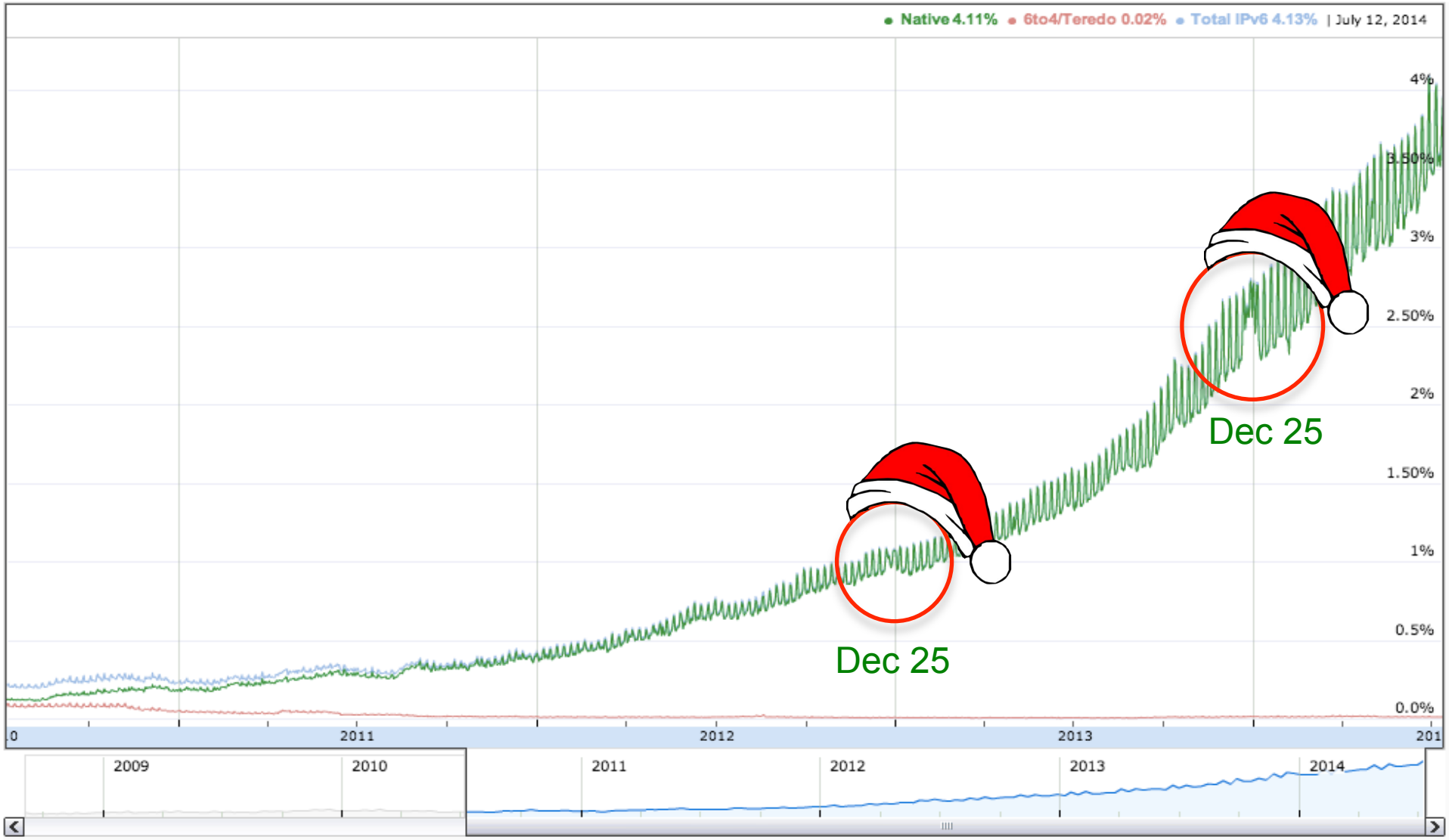
Homenet Scope, Principles and other WGs



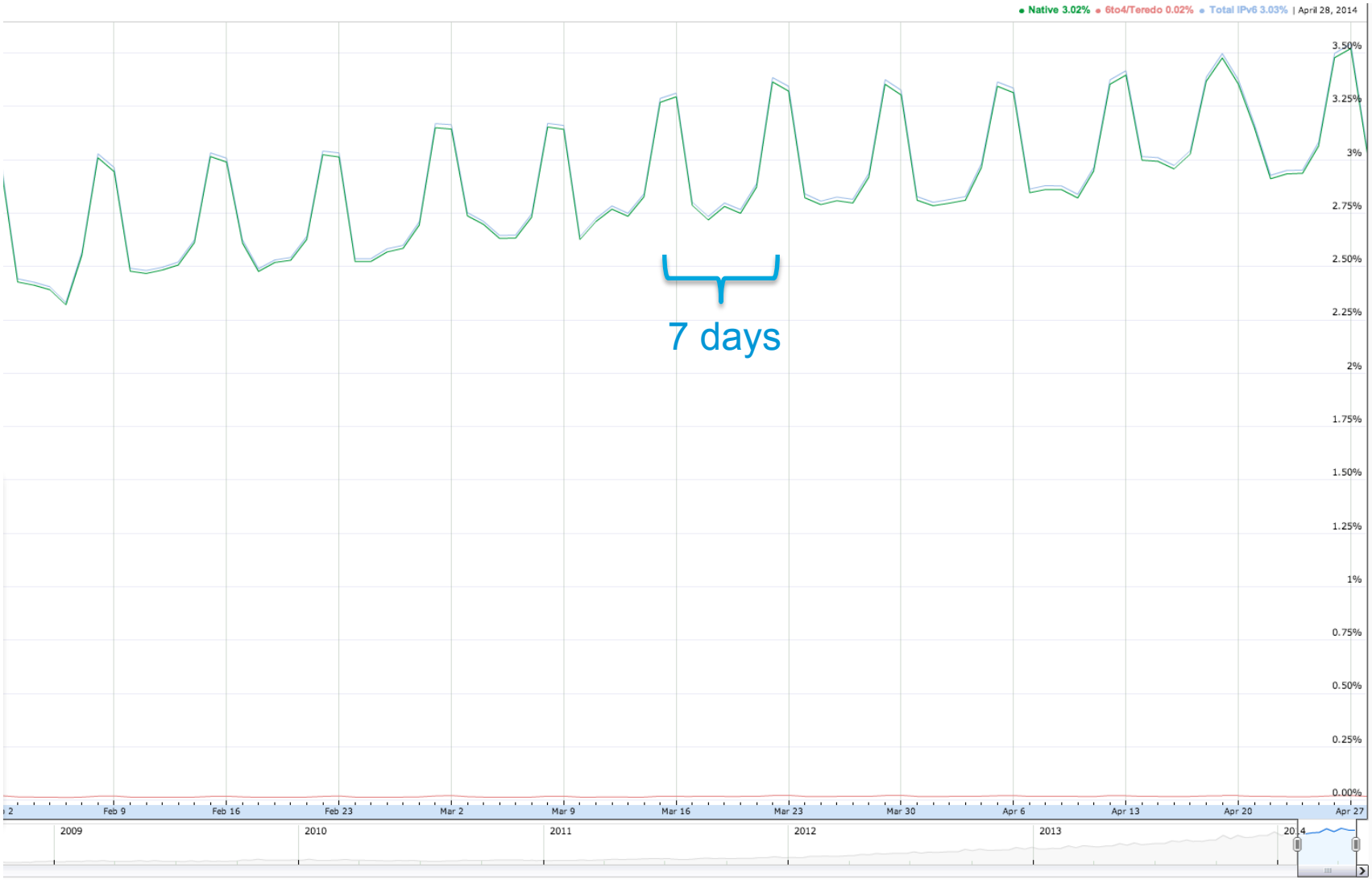
http://tools.ietf.org/wg/homenet/

RFC 7368 - Architectural Principles

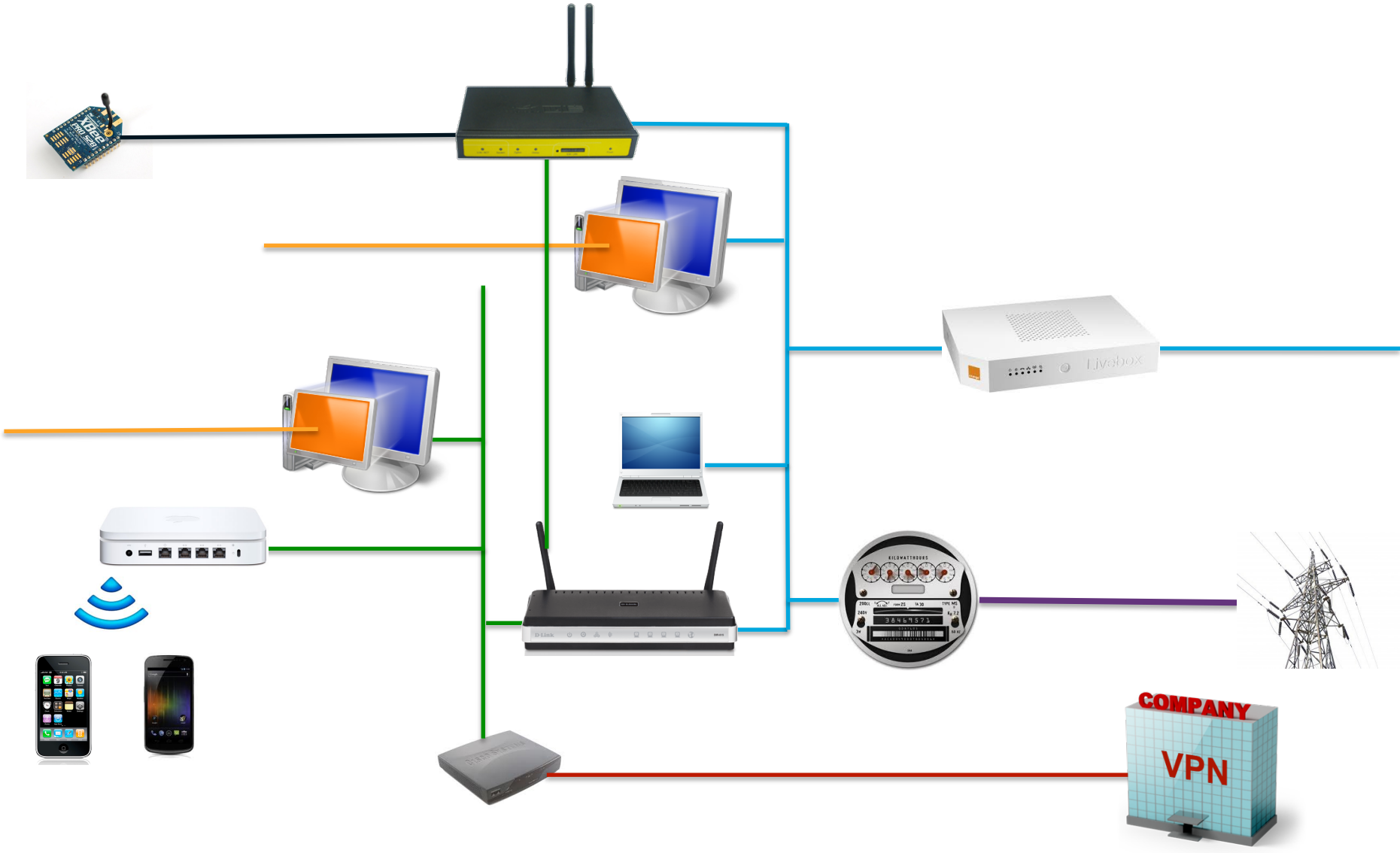
% IPv6 vs. IPv4 as seen by Google



% IPv6 Google – Zooming In

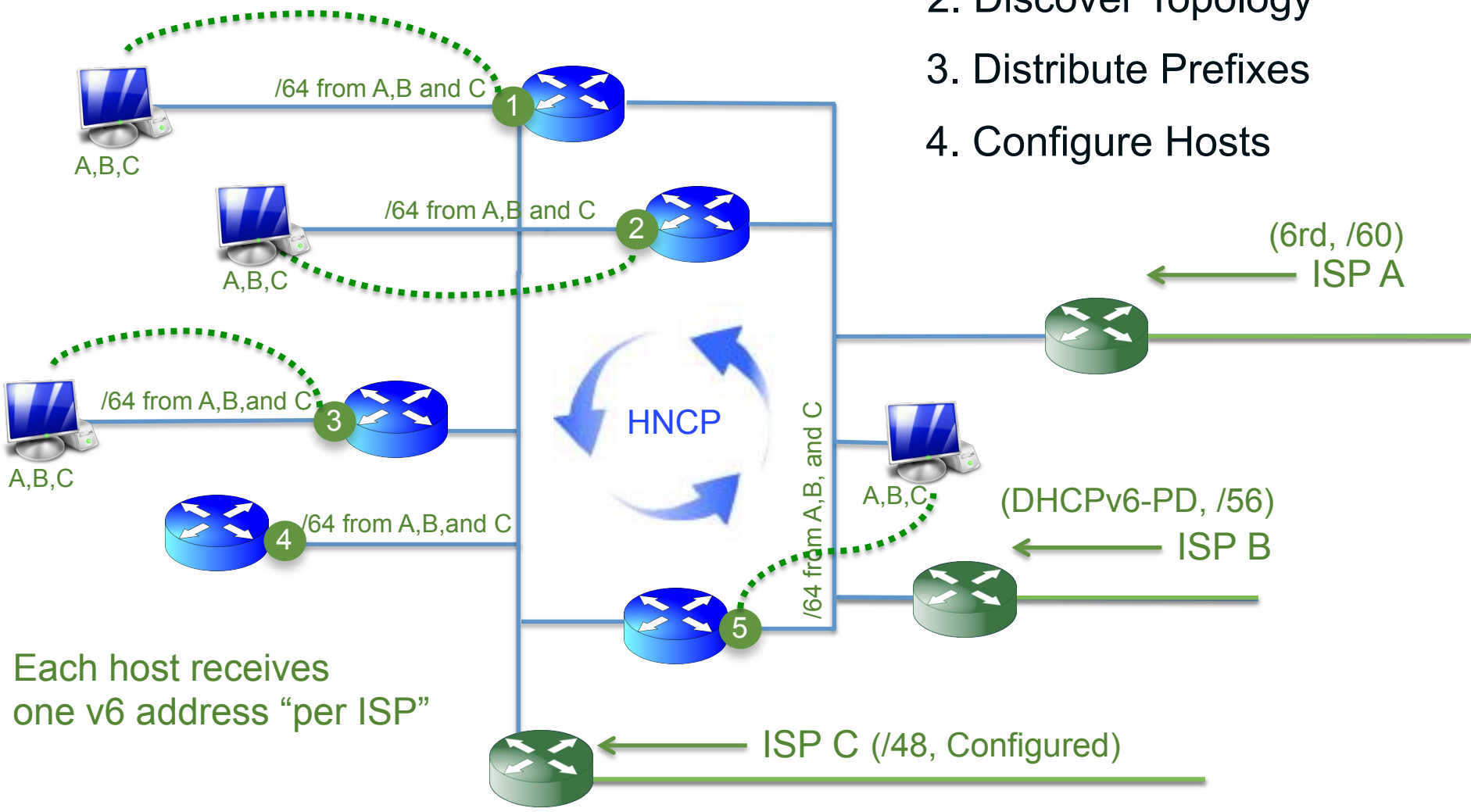


Can you find the routers?



Auto-Configuring IPv6

1. Identify Border Routers
2. Discover Topology
3. Distribute Prefixes
4. Configure Hosts



Each host receives
one v6 address “per ISP”

draft-behringer-homenet-trust-bootstrap

draft-kline-default-perimeter

draft-ietf-homenet-hncp

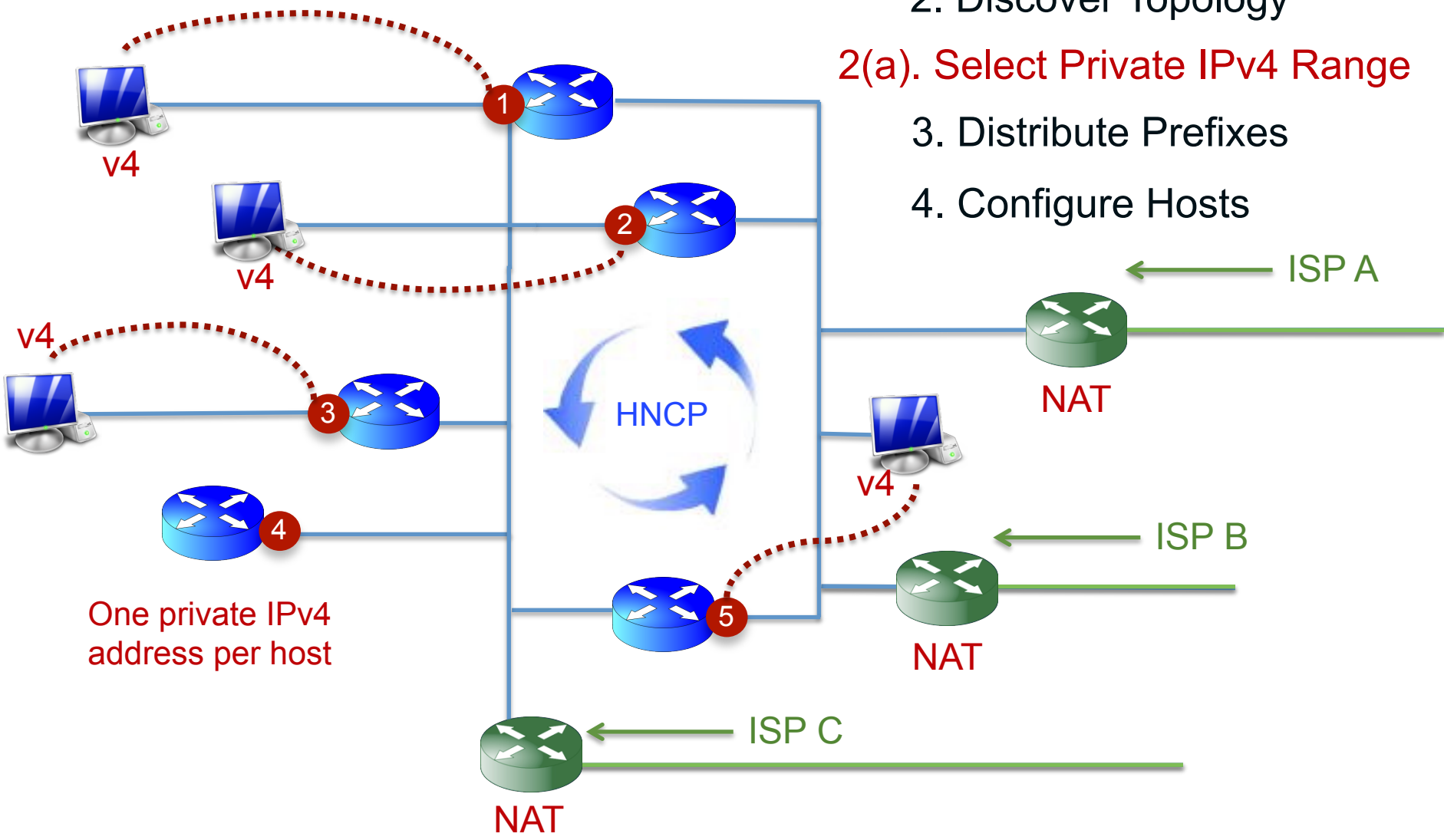
draft-ietf-homenet-prefix-assignment

Auto-Configuring IPv4

1. Identify Border Routers
2. Discover Topology

2(a). Select Private IPv4 Range

3. Distribute Prefixes
4. Configure Hosts



draft-behringer-homenet-trust-bootstrap

draft-kline-default-perimeter

draft-ietf-homenet-hncp

draft-ietf-homenet-prefix-assignment

Prefix Assignment Algorithm

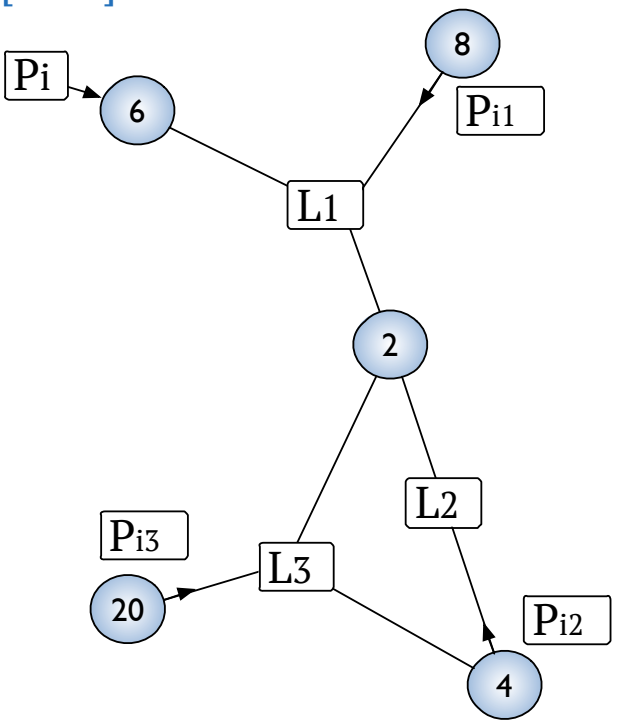
Let $P_{1 \ldots n}$ be the set of Delegated Prefixes.

Let $L_{1 \ldots m}$ be the set of Links

$\forall\, i \in [1 \ldots n]$ and $j \in [i \ldots m]$, assign P_{ij} to L_j

$\mid \forall\, k \in [1 \ldots n] \mid k \neq j$, $P_{ij} \not\subseteq P_{ik}$ and $P_{ij} \not\subseteq P_{ik}$.

$\forall\, i \in [1 \ldots n]$:



What it is:

Distributed algorithm that assigns one **Assigned Prefix (AP)** prefix per **Delegated Prefix (DP)** per Link

How it works:

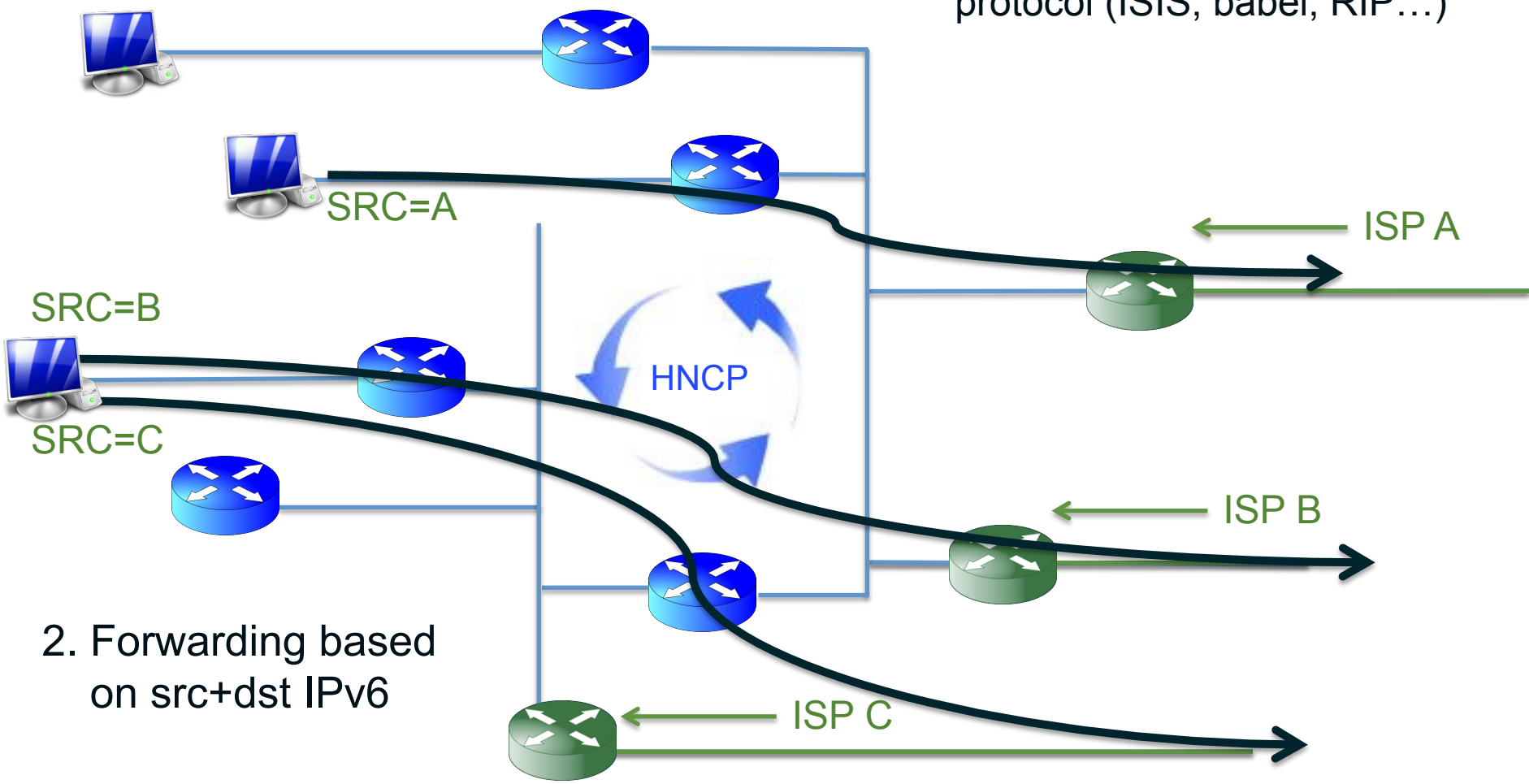
1. Advertise DPs to all nodes
2. Carve DPs into per-link APs
3. Advertise APs to all nodes
4. Correct duplicates and collisions

Tunable behavior via list of rules:

- Three mandatory (keep, accept, generate)
- Optimizations (stable storage, prefix scarcity)
- Configuration-based override (NMS, CLI, etc.)

IP Routing

1. HNCP bootstraps routing protocol (ISIS, babel, RIP…)

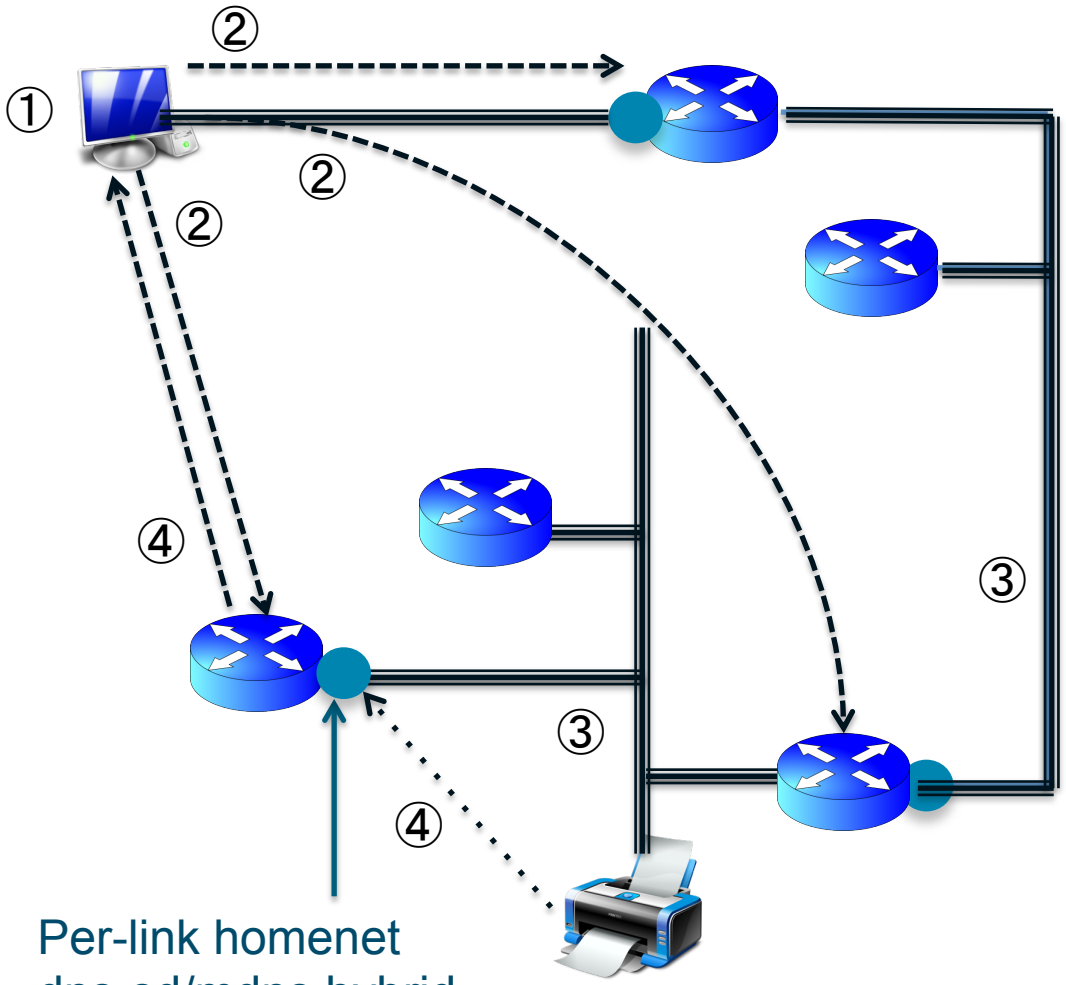


2. Forwarding based on src+dst IPv6

draft-baker-ipv6-isis-dst-src-routing

draft-baker-rtgwg-src-dst-routing-use-cases

Site-wide DNS Service Discovery (Apple Bonjour)



Per-link homenet dns-sd/mdns hybrid proxy server

1. Local dns-sd server address provided to host in DHCP config

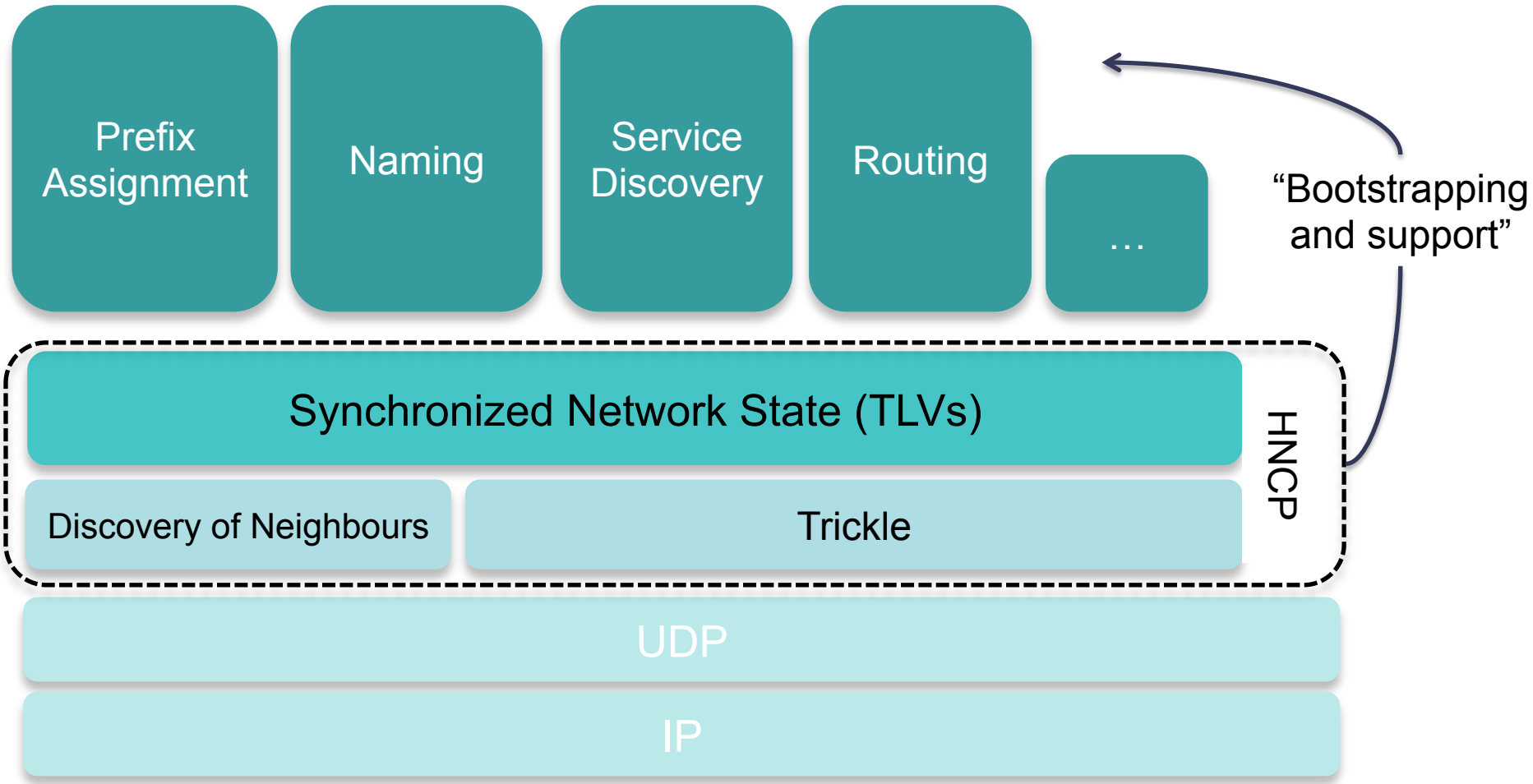
2. mdns and dns-sd requests sent by host

3. Homenet Routers relay request as mdns, once per link in the home

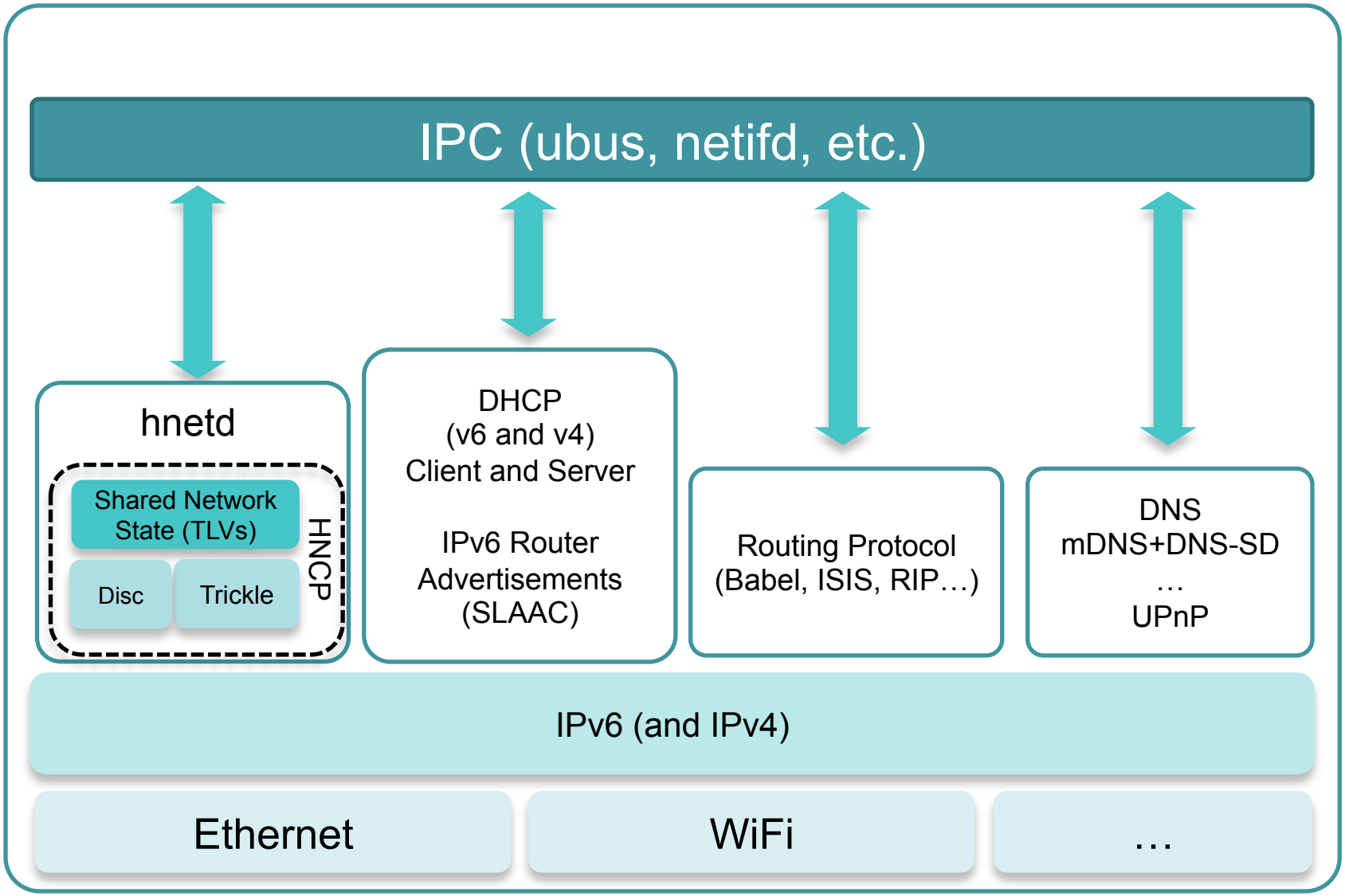
4. mdns replies are sent back to originating hosts via dns-sd

draft-cheshire-mdnsext-hybrid
draft-stenberg-homenet-dnssd-hybrid-proxy-zeroconf

HNCP: "Bootstrapping and support" of network functions



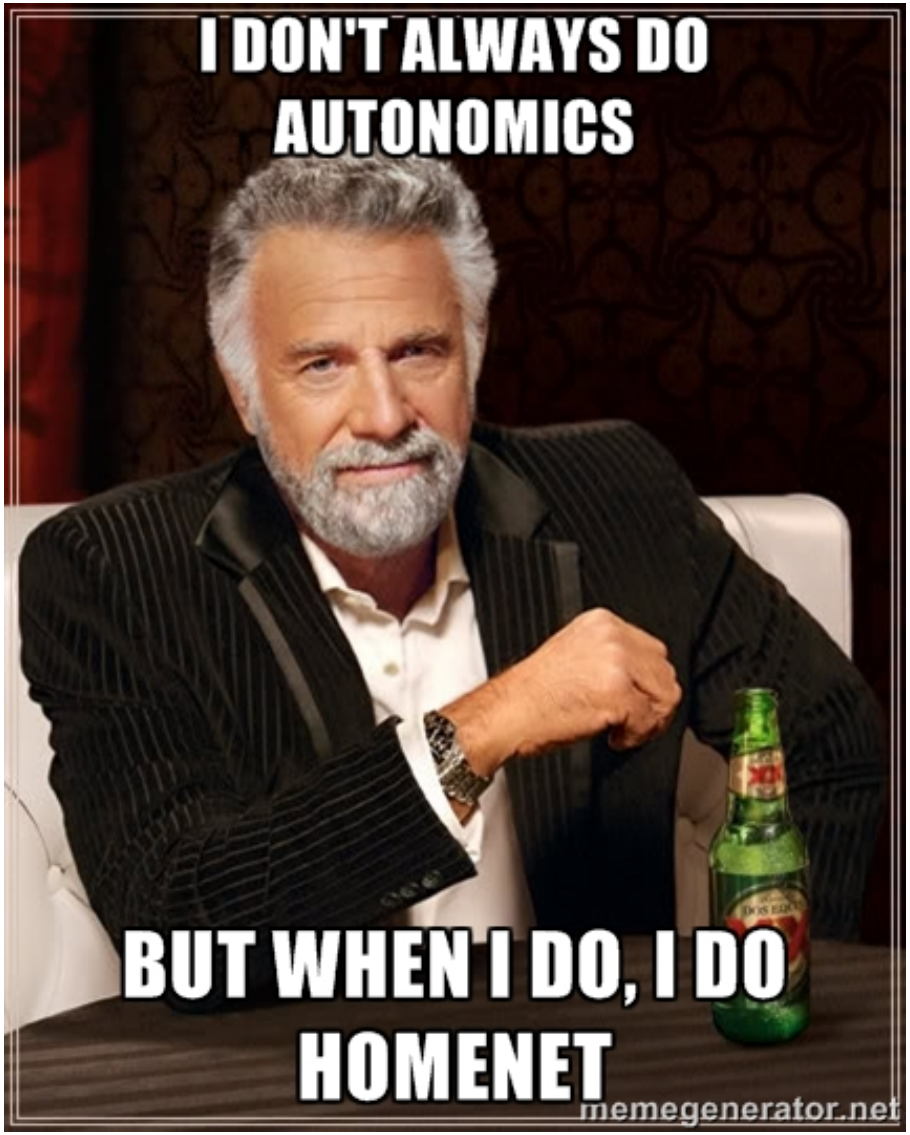
hnetd: OpenWrt Implementation



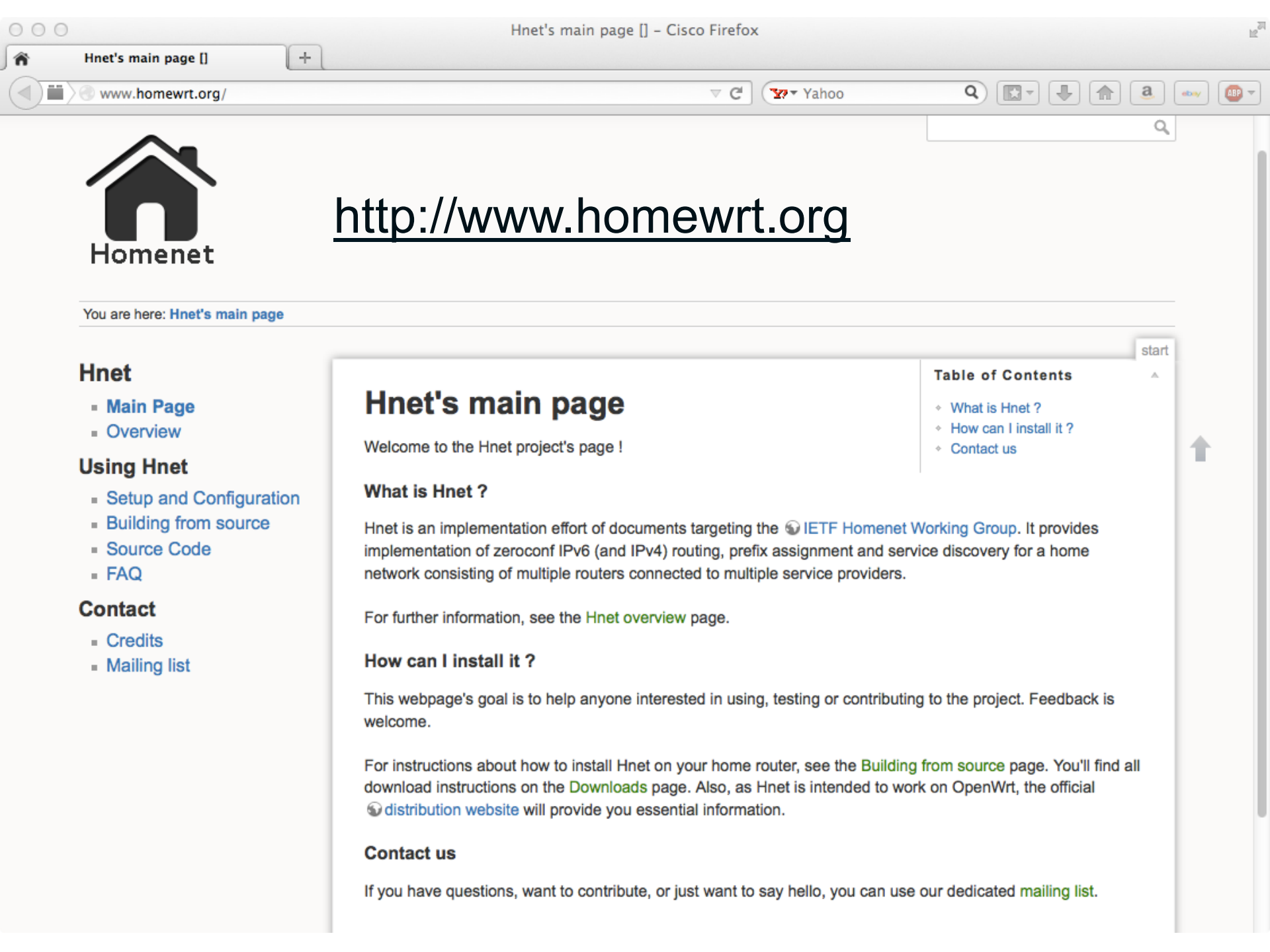
In context with anima...

- The Homenet problem space has led to solutions which could be considered “autonomic”
- Homenet technology has triggered work in in other WGs already (ospf, isis, dnssd, mif, rtgwg...)
- Our current struggles are around “secure bootstrapping” and “professionally managed” scenarios.

Questions? ☺


I DON'T ALWAYS DO
AUTONOMICS
BUT WHEN I DO, I DO
HOMENET
memegenerator.net

Backup


Hnet's main page [] – Cisco Firefox
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You are here: Hnet's main page
Hnet
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What is Hnet ?
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Welcome to the Hnet project's page !
What is Hnet ?
Hnet is an implementation effort of documents targeting the IETF Homenet Working Group. It provides implementation of zeroconf IPv6 (and IPv4) routing, prefix assignment and service discovery for a home network consisting of multiple routers connected to multiple service providers.
For further information, see the Hnet overview page.
How can I install it ?
This webpage's goal is to help anyone interested in using, testing or contributing to the project. Feedback is welcome.
For instructions about how to install Hnet on your home router, see the Building from source page. You'll find all download instructions on the Downloads page. Also, as Hnet is intended to work on OpenWrt, the official distribution website will provide you essential information.
Contact us
If you have questions, want to contribute, or just want to say hello, you can use our dedicated mailing list.