

# Market Resistance to Homenet

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# What is our market right now?

- Skeptical-to-unfriendly:
  - Managers at ISPs
  - Managers at router vendors
- Friendly:
  - Early adopters who want to run it on OpenWRT
  - Developers who are doing it because we're developing it
- Our pitch to friendly people isn't working
  - because we don't really have a product
- Our pitch to the skeptical audience feels a bit hopeless

# The Competition

- Three options for multi-AP homenet
  - 1. Homenet (routed mesh, lots of services)
  - 2. Layer Two Mesh
  - 3. Layer Two Wired-to-AP infrastructure
- Current off-the-shelf solutions are all (2) or (3)
- At IETF of course we prefer Option 1
- How do we convince people who aren't part of our milieu?
- Let's compare...

# Comparison: Host Mobility

- On homenet:
  - Whenever a host switches APs, it renumbers
  - All connections have to be restarted
  - Any call I might have been on on wifi glitches or even drops
  - Latency is L2 switching time plus the L3 config time
- On an L2 network:
  - Connections remain, unless they time out (unlikely)
  - Connect Latency is time it takes to connect to the new AP
  - There are probably some congestion control issues
  - When you switch APs, the spanning tree has to adjust

# Service Discovery

- On homenet:
  - We need a complicated name resolution infrastructure
  - This probably delivers better performance
  - But it's complicated, and it has to be gotten right, or we have reliability issues
- On an L2 network:
  - Just use mDNS
  - Produces a lot of multicast traffic that can't be easily isolated
  - But in principle, it can work
  - And there are ways to mitigate the multicast traffic issue, for example by doing unicast to each host

# Routing

- On homenet:
  - We have a routing fabric, which maybe works
    - I've heard some discouraging reports from Dave Taht
  - The routing fabric can be joined by IoT gateways
  - Traffic is isolated to individual links
- On L2 mesh:
  - We have some proprietary or IEEE L2 mesh protocol
- On L2 Infrastructure or Mesh:
  - Traffic isolation relies on Spanning Tree
  - This doesn't work for mDNS
  - Doesn't entirely work for Neighbor Discovery

# Isolation

- On homenet:
  - In principle we can have separate subnets that are firewalled from each other
  - We can have a DMZ
  - We can do service discovery across the DMZ
- On L2 networks:
  - We can use VLANs for isolation
  - But then we need L3 routing
  - Can't do service discovery across VLANs

# Standardization

- Homenet can in principle be standardized, but we still have a lot of work to do
- L2 hub-and-spoke is pretty straightforward
- L2 mesh isn't usefully standardized, so everyone rolls their own which is sort of based on IEEE 802.11s
  - If you are a router vendor, this is a way to achieve lock-in
  - If you are a host vendor, you don't really care

# Stateful Name Service/ DNSSEC

- Homenet can do this without adding much complexity
- For a non-homenet router, this is a substantial increase in software footprint
- But they can just tell you to install an appliance if you want to do that, because it's a flat network
- Could even do it (shudder) in the cloud

# Code Complexity

- Homenet requires:
  - HNCP implementation
  - Discovery Proxy
  - Full-service resolver or Discovery Broker + Proxy
  - Babel routing protocol implementation
  - ???
- L2 requires:
  - L2 mesh implementation
  - Spanning tree or equivalent
  - Dumb DNS Proxy

# Multihoming

- Homenet:
  - Does this nicely, for the most part
- Layer 2:
  - Multiple RAs, one per ISP
  - Host is responsible for figuring out what to do
  - Actually pretty simple to specify

# Secure Services on the Homenet

- Homenets can do ACME over IPv6, if they have IPv6
- L2 can do ACME however they want
- This matters because it allows for validate-able TLS certs for home router services
- TLS certs allow for secure access to router web UI
- Also allow for secure communication for OAM apps, if any

# IoT Support

- Homenet
  - Allows routers to join and participate in the network
  - Has a stateful service discovery solution that can be used by IoT routers
  - Can propagate routes in such a way that non-IoT hosts can definitely talk to IoT hosts
  - IoT routers can use homenet routing plane for transit between them
- L2
  - Discovery of IoT devices on IoT network ULA prefix requires
    - changes to hosts
    - special name service behavior
  - Spanning tree has to be really effective, or this is going to completely swamp the IoT network
  - Need ALGs for every multicast protocol that is used on the IoT network
  - IoT routers can discover each other and establish transit between them

# What am I Missing?

- I think the strongest pitch here is IoT
  - The problem with this pitch is that it doesn't actually address the target market
- I would personally prefer the services a homenet offers, but
  - How would I pitch that to a manager who isn't a True Believer
  - How would I pitch that to an end user
- Is the first target market for homenet actually IoT edge routers?
- Are we even doing the right thing here? Should we just be defining how multi-homed IPv6 L2 home networks work better?