# IPv6 Site Multihoming: Now What?
# (A view on what we should be doing now)

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# Now WHAT?

Now WHAT?
- ☐ Assumptions
  - ○ One size fits all solutions are only possible in fantasy or a long term
  - ○ Different sites have different requirements and priorities
  - ○ Attacking the problem piecemeal should provide some way forward

- ☐ Approach
  - ○ Some analysis and classification of existing proposals (omitted here)
  - ○ Sites are broken down, as well as their motivations
    - ▷ Minimal, Small, Large, International sites (on size and geographical breadth)
    - ▷ Independence, Redundancy, Load sharing as motivations
    - ▷ Immediate, short term and long term as possible timelines
  - ○ Last, look back what to do in the short term to fix/enhance multihoming solutions

# Analysis and solution classification

Analysis and solution classification
- ☐ Transport solutions
  - ○ TCP++, SCTP
- ☐ Locator/Identifier separation solutions (in the hosts)
  - ○ HIP, LIN6, Mobile IPv6
- ☐ Host-centric multihoming (as a generic concept)
  - ○ Including "site exit routers" (ie. tunneling)
- ☐ Geographic Address Allocation
- ☐ "ASN-PI"
- ☐ Multi-connecting
- ☐ Others
  - ○ More specific routes, end-to-end multihoming, etc.

# **Classification of sites and motivations**

Classification of sites and motivations
☐ Sites
- ○ Minimal: home/SOHO, fewer than 10 IP users
- ○ Small: small-to-mid-size enterprise, fewer than 50-150 IP users
- ○ Large: regional/national enterprise, maybe some international activity, fewer than 1000 IP users
- ○ International: large/very large enterprise, significant amount of international activity

☐ Reasons
- ○ Independence: switch ISP's without a lot of renumbering etc.
- ○ Redundancy: resiliency against failures, connection survivability
- ○ Load sharing: too much traffic/geographically separate that must have multiple major egress points

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                 ---------------------------------------------
                |  Independence | Redundancy | Load sharing  |
  --------------+---------------+------------+---------------+
 |Minimal       |      no       |     no     |      no        |
 |Small         |     maybe     |    maybe   |      no        |
 |Large         |   maybe/yes   |     yes    |     maybe      |
 |International  |      yes      |     yes    |      yes       |
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# Multihoming mechanisms

Multihoming mechanisms, by timeline
- ☐ Immediate
  - ○ Multi-connecting
  - ○ Host-centric + MH at site exit routers w/o ingress filtering
- ☐ Short term
  - ○ Host-centric + MH at site exit routers fleshed out
  - ○ "ASN-PI" or advertising more specific routes from designated block
- ☐ Long term
  - ○ Transport solutions (possibly)
  - ○ Identifier/Locator separation in hosts
    - ▷ Architecturally HIP is the most credible
    - ▷ MIPv6 could possibly used as a hack with some work
    - ▷ LIN6 a poor man's HIP, with IPR issues
  - ○ Geographic address allocation (if viable at all)
  - ○ End to end multihoming (rather radical changes)
  - ○ MHAP or other mapping mechanisms in the network

# Multihoming mechanisms, conclusions

Multihoming mechanisms, conclusions

- ☐ Generic
  - ○ Multi-connecting good, should be used more
  - ○ Id/Loc in hosts will prevail (most likely ~HIP)
    - ▷ but they won't solve the whole multihoming problem

- ☐ Site-specific conclusions
  - ○ Minimal: no requirement for multihoming, or plain host-centric without frills
  - ○ Small: multi-connecting or host-centric w/ multiple PA
  - ○ Large: as with Small, or possibly ASN-PI
  - ○ International: one ASN-PI block or each country/region as a large site of its own

# **Work to be done in the short term**

Work to be done in the short term
- ☐ Update and finish documenting v4 multihoming
  - ○ Try to understand v4 multihoming better (especially the "Why")
- ☐ Finish documenting multihoming goals (almost done)
- ☐ Realize that there are multiple major problems
  - ○ Connection survivability is just *ONE* of them
    - ▷ Try to minimize the need for connection survivability
- ☐ Create/get consensus on a roadmap how to proceed
- ☐ Work on short-term solutions
  - ○ Host-centric/site-exit when ISPs use Ingress Filtering
  - ○ Host-centric/site-exit when uplink MTU isn't bigger than 1500
- ☐ Work on procedures how to draw the lines between different multihoming site types
  - ○ (who is "privileged" for what)
- ☐ Start documenting how to do renumbering or how to make it easier

# Discussion

Discussion
- One size fits all vs piecemeal solutions?
- "Architectured solutions" vs "available solutions"?
  - If the former, need for solutions before "master plan" is perfected?
- How to deal with "difficult" requirements?
  - Especially, what level of TE is considered "valid"?
- Does classification to sites/motivations seem valid?
- Do the immediate/short term solutions selected seem valid?
- Do the future work item suggestions seem valid?