Shim6:
What, Why and When

IAB Routing and Adressing workshop

Amsterdam, 18/19 october 2006

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The Road to Shim6

- Multi6 wg started late 2000:
  - look for scalable multihoming in IPv6
- Long requirements process
  - many conflicting requirements
  - became "goals"
- Many people proposed solutions

"Rebel Group"

- Around 2002: lack of activity in multi6 wg
- Michel Py & yours truly started non-IETF mailinglist to work on solutions:
  - MHAP address rewriting, geo aggregation
- "Rebel meeting" at IETF 55
- Kicked multi6 back into gear

Multi6 RFCs

- RFC 3582: goals (9 pages)
- RFC 4116: the IPv4 mh situation (13 pages)
- RFC 4177: architectural approaches (36)
- RFC 4218: threats (31)
- RFC 4219: things to think about (12)

Lessons

- (Please jump in!)
- Change is hard: fragmentation, congestion control, traffic engineering, site policy...
- Past decisions biting us in the back side:
  - IP(v6) addresses exposed to application
  - no reasonable way to handle referrals
  - beware of the firewall...

2004 Interim Meeting

- At the meeting, active drafts grouped into:
  - addressing based (9)
  - "intermediate systems" (2)
  - host based (2)
  - tunnels (0)
  - transport (5)
  - wedgelayer 3.5 / fat IP (7)
  - components (2)

My Classification

- Nearly all full proposals were either:
  - routing/addressing based
    - proposing changes to RIR policy/BGP
  - multi-address based
    - get address space from each ISP
    - when ISP and its addresses fail, move communication to other address

Routing/Addressing

- Simply give each AS holder a PI prefix
- Geographic addressing/aggregation
- Attach bitmap to prefix to list holes
- ICMP redirect -like
- But: not very complete or little agreement
- Note: no new IDR protocols suggested!

Multi-Address Solutions

- Largest class of proposed solutions
- Host/site has addresses from each ISP
  - when ISP fails, switch to different address
- Do this at IP layer, in transport (modified TCP or SCTP) or wedge layer 3.5
- In hosts, site exit routers or middleboxes
- Mostly *not* sold as locator/identifier split

Multi-Address

- Do on each host (easier but change all hosts) / rewrite addresses for entire site
- Lookup service or negotiate with peer?
  - lookup allows jump on initial failure
- Security: IPsec, TLS, opportunistic, DNS, crypto-based interface ID
- HIP, SCTP, MA-TCP, NOID, proto-shim6

Shim6 wg

- After 2004 interim meeting design team
- Multi6 not chartered for solutions
- New wg: shim6 (yes, IETF process fun...)
- Working on core signalling, reachability detection, hash-based address security
- Active wg participation not that great...

The Shim6 Solution

- Locator and identifier both regular 128-bit IPv6 addresses:
  - locator in packets
  - identifier in transport layer and API
  - identifier is also a locator: backward compatible, allows deferred negotiation
- Hash-Based Addresses for loc/id security
- REAchability Protocol for failover

Open Issues

- Open != impossible to resolve
- We know we need traffic engineering
  - but no actual work on this so far
- What if initially chosen address unreachable
- Ingress filtering by ISPs
- Can shim6 be implemented in a middlebox?
- Extra header in data packets acceptable?

last but not least...

Deleting drafts after 6 months does *not*
help retain the IETF's collective memory!

thanks,

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