Why hasn't HIP been widely adopted (yet)?

Initial results of HIP deployment study

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Research question

- Why has HIP not been widely deployed yet?
  - Missing demand?
  - Weaknesses in technical design?
  - Disadvantages compared to substitutes?
  - Incentive problems?
  - Problems in standardization?
- Which are the primary reasons?
- What should happen that HIP would get deployed?

Research method: Expert interviews

- 17 semi-structured interviews (Jun 21 – Sep 1, 2011)
  - Duration: 45 – 90 min
  - Mostly open-ended questions

- Interviewees with different backgrounds
  - Different stakeholders: OS vendors, ISPs, Network device vendors, Application service providers, Academia
  - IETF experts (4 IAB members, 2 area directors)
  - HIP developers (4 people with HIP RFCs + close followers)
  - Developers of substitutes (MIP, IPsec, IKE, MobIKE, SHIM6)
  - Business managers

Attitudes towards HIP

- Positive feedback on architectural beauty
  - Modularity, performance, purity
  - Standardization done well (even though too slowly)

- Skepticism about real-world relevance
  - A beautiful architecture lacking real-world deployability
  - No belief in HIP due to practical and business reasons

- No hate nor strong objection
  - Harmless research activity → no need for objection

Reasons for non-deployment (1/2)

- No **business** demand (lack of **real** need)
  - No homegrown use case or a killer app
  - HIP-like mobility may not be needed or is not enough
  - Security is rarely a good selling point

- **Stack** change required in **both** ends
  - OS vendors have not had incentive to deploy (no demand)
  - No benefits unless the other end has also adopted
    → **Not incrementally deployable**

Reasons for non-deployment (2/2)

- **Point solutions** favored (specific instead of generic)
  - Optimized to single problem and easier to deploy
  - Problems solved on application layer, not with IETF protocols

- **Research mindset** = architectural beauty before deployability
  - NAT traversal problems, lack of incremental deployability, …
    → Many people abandoned as interesting but unrealistic
  - Standardization process taken too long
  - Marketing problem: no stubbornness to push to some use

Opinions not unanimous

Some suggested reasons for non-deployment	Relevance of the reason						
	Do not agree	1 (low)	2	3	4	5 (high)	AVG
HIP is missing a killer application.	0	0	0	4	8	5	4.06
There is no real demand(/need) for HIP.	**6**	0	2	2	**4**	**3**	3.73
Substitute technologies are favored.	0	1	2	3	9	2	3.53
HIP is a too big change and people favor point solutions solving a single problem.	1	0	**5**	3	3	**5**	3.50
HIP development started with research mind-set. (Real-world deployment considerations inadequate).	**2**	**2**	2	4	**6**	0	3.00
Experimental track status discourages adoption.	3	4	2	4	3	1	**2.64**

- Engineer's need ≠ Business manager's need
- Outsiders see HIP as a big change (both mental & deployment)
- HIP is missing credibility to be relevant in the real world
- Experimental flag does not matter

What should happen that HIP would get deployed?

- External event to trigger
  - Increasing mobility & multihoming make HIP more relevant
- HIP would find its niche
  - E.g., closed networks or M2M communication
- Production level implementation
  - Co-deployed with an attractive application
- Improve (incremental) deployability
  - Many things done but awareness needs to be improved
  - Also improving visibility to apps could help (API/library)
- Some parts of HIP reused in other protocols

Related work in IETF

- RFC 5218 – What makes for a successful protocol
  - http://tools.ietf.org/html/rfc5218
- IETF OUTCOMES – Successes and Failures
  - http://trac.tools.ietf.org/misc/outcomes/
- Draft: HIP Experiment Report
  - http://datatracker.ietf.org/doc/draft-irtf-hip-experiment/
- Expired draft: Issues of HIP in an Operators Networks
  - http://tools.ietf.org/html/draft-dietz-hip-operator-issues-00