Introduction to HIP

Pekka Nikander
Ericsson Research Nomadiclab

Presentation outline

- A Brief History of HIP
- Some architectural background
- Related WGs
- HIP in a Nutshell
- Draft status
- Implementation status
- Summary

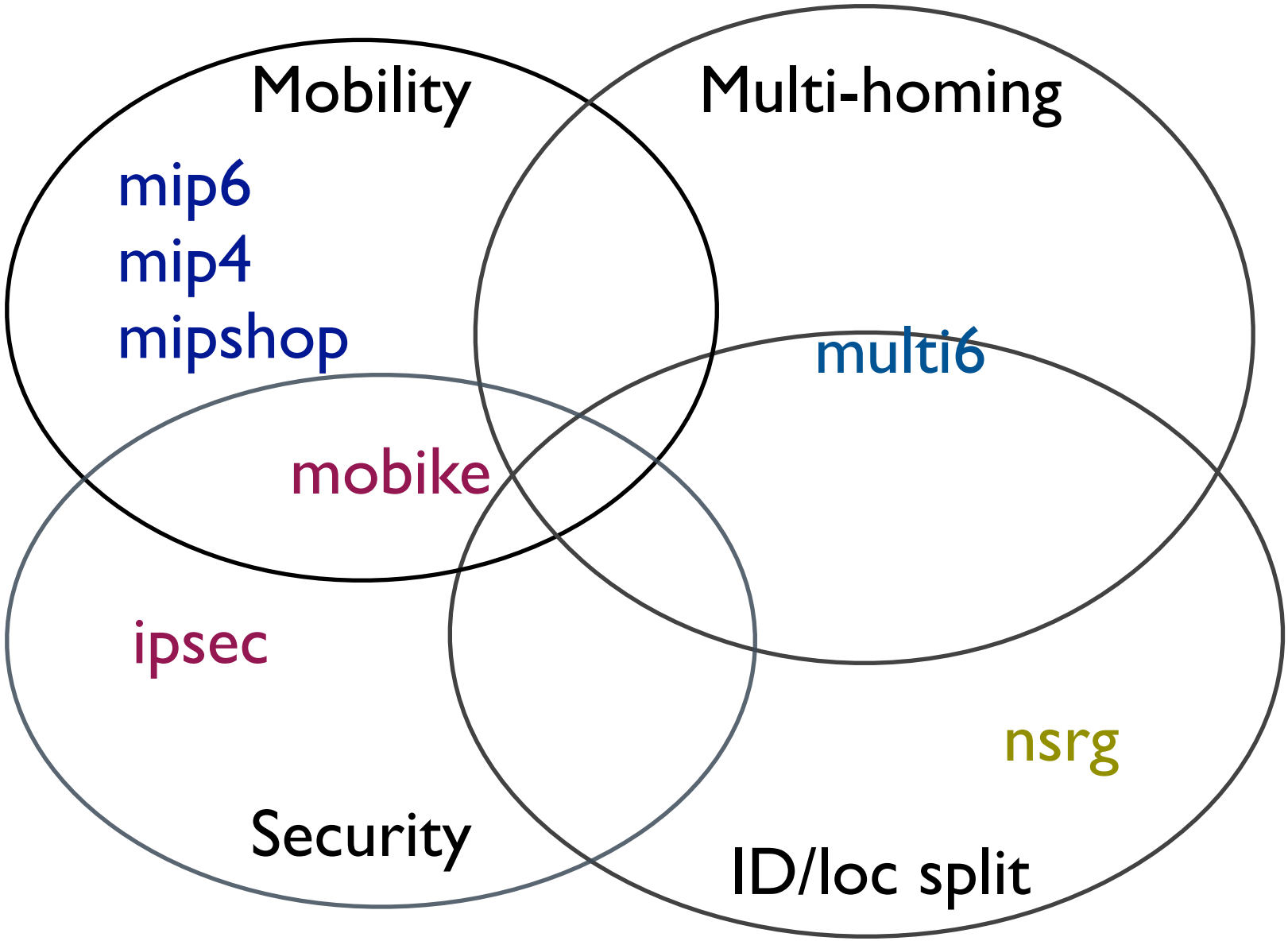
A Brief History of HIP

- Discussed briefly at 47th IETF
- Two earlier BOFs: 50th and 51st IETFs
  - No working group formed back then
- Development has happened next to the IETF
  - Active developer community
  - Five interoperating implementations
- HIP base protocol more or less ready
  - More work needed on infrastructure issues

Some architectural background

- IP addresses serve the dual role of being
  - End-point Identifiers
    - Names of network interfaces on hosts
  - Locators
    - Names of naming topological locations
- This duality makes many things hard
- IRTF Name Space Research Group (nsrg) studied the issue without reaching consensus

Related WGs and RGs

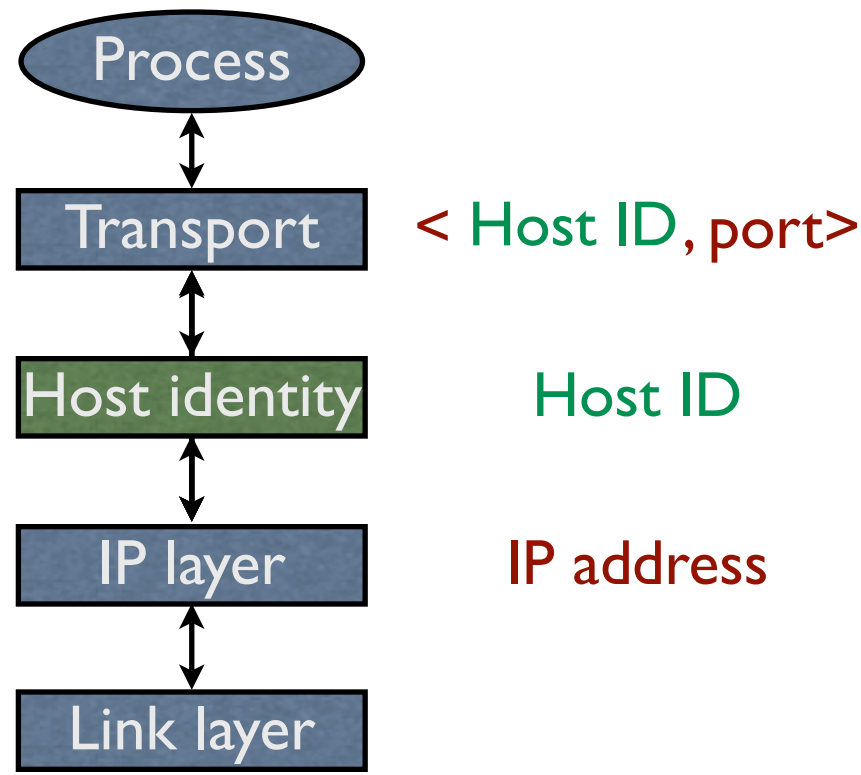


HIP in a Nutshell

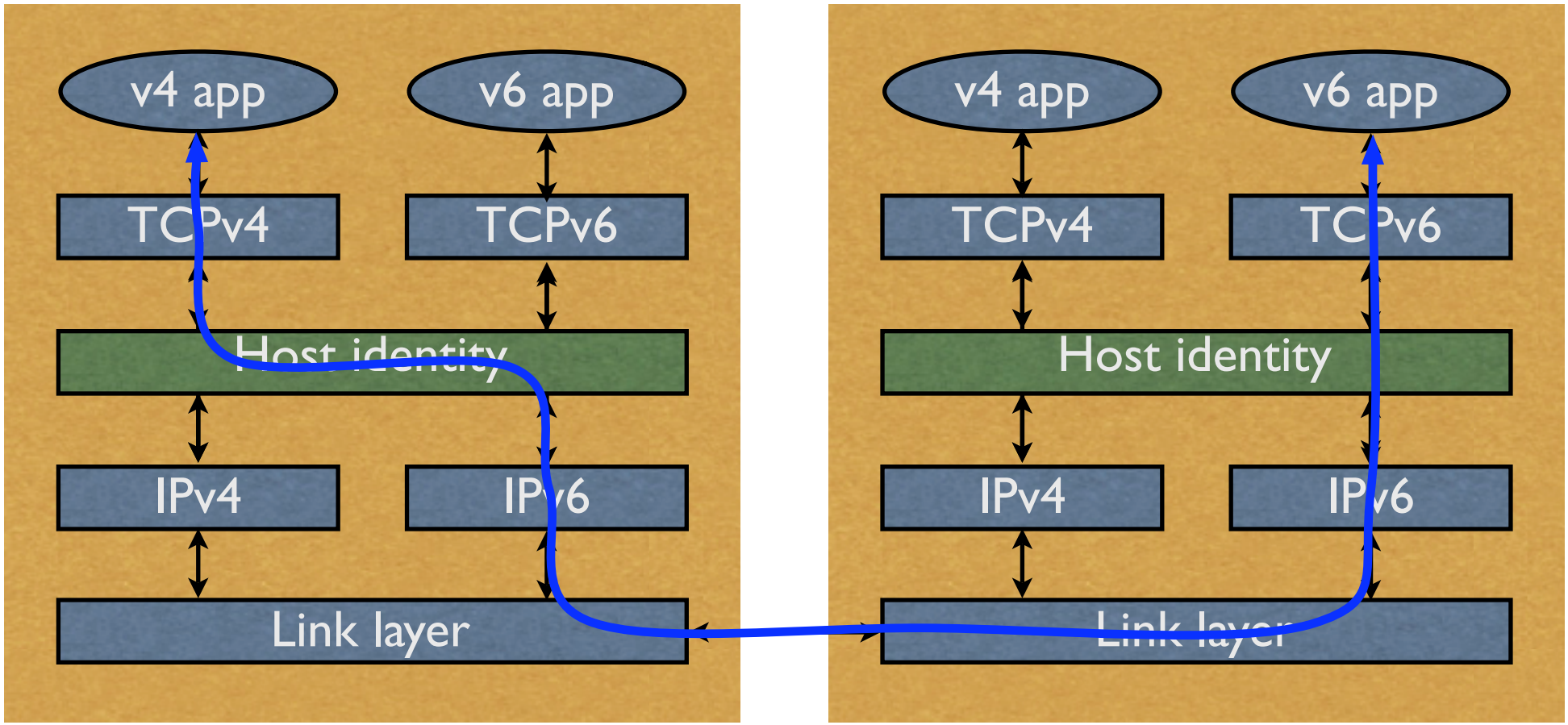
- Integrates security, mobility, and multi-homing
  - Opportunistic host-to-host IPsec ESP
  - End-host mobility, across IPv4 and IPv6
  - End-host multi-address multi-homing, IPv4/v6
  - IPv4 / v6 interoperability for apps
- A new layer between IP and transport
  - Introduces cryptographic Host Identifiers

The Idea

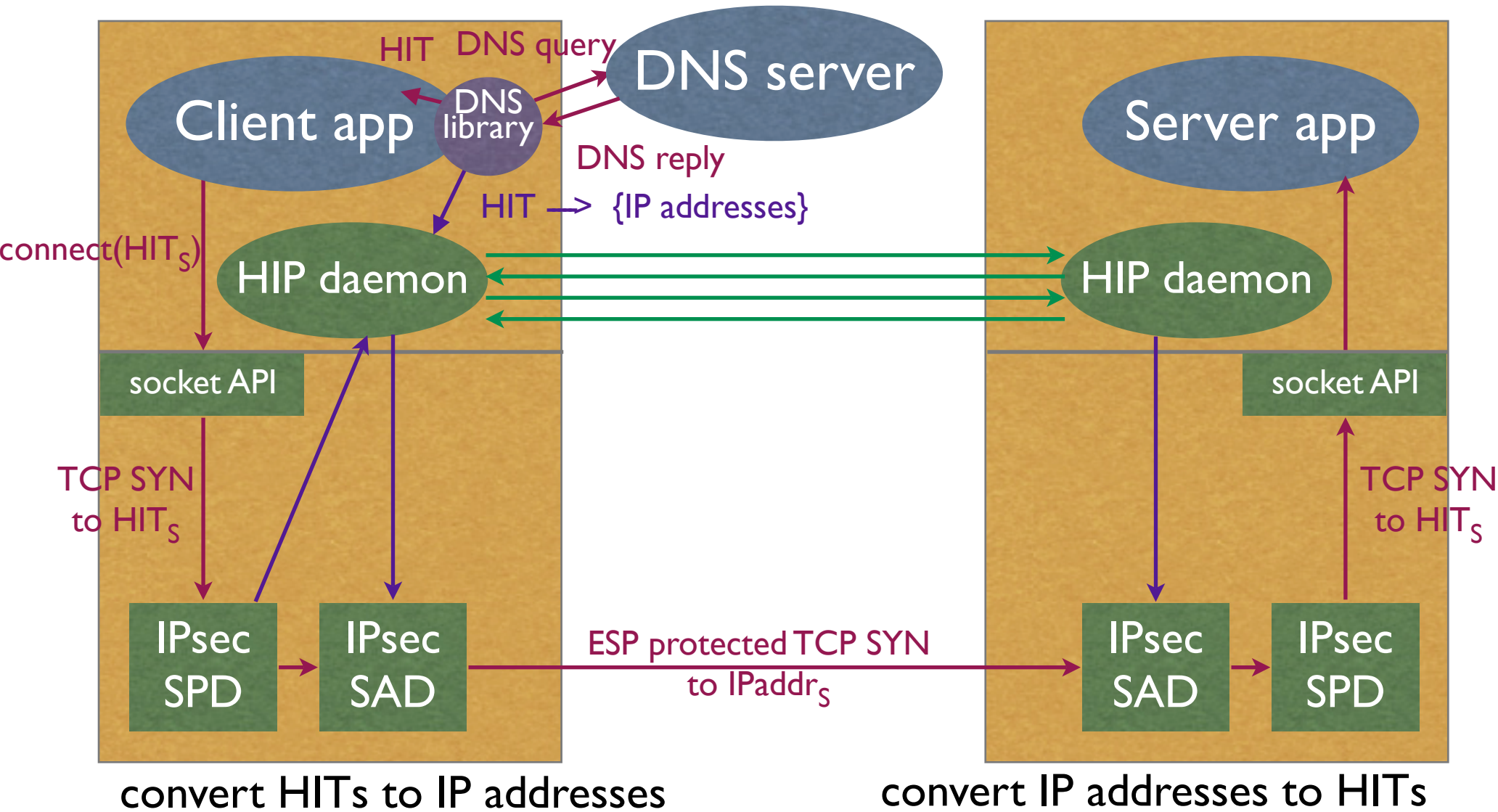
- A new Name Space of Host Identifiers (HI)
  - Public crypto keys!
  - Presented as 128-bit long hash values, Host ID Tags (HIT)
- Sockets bound to HIs, not to IP addresses
- HIs translated to IP addresses in the kernel



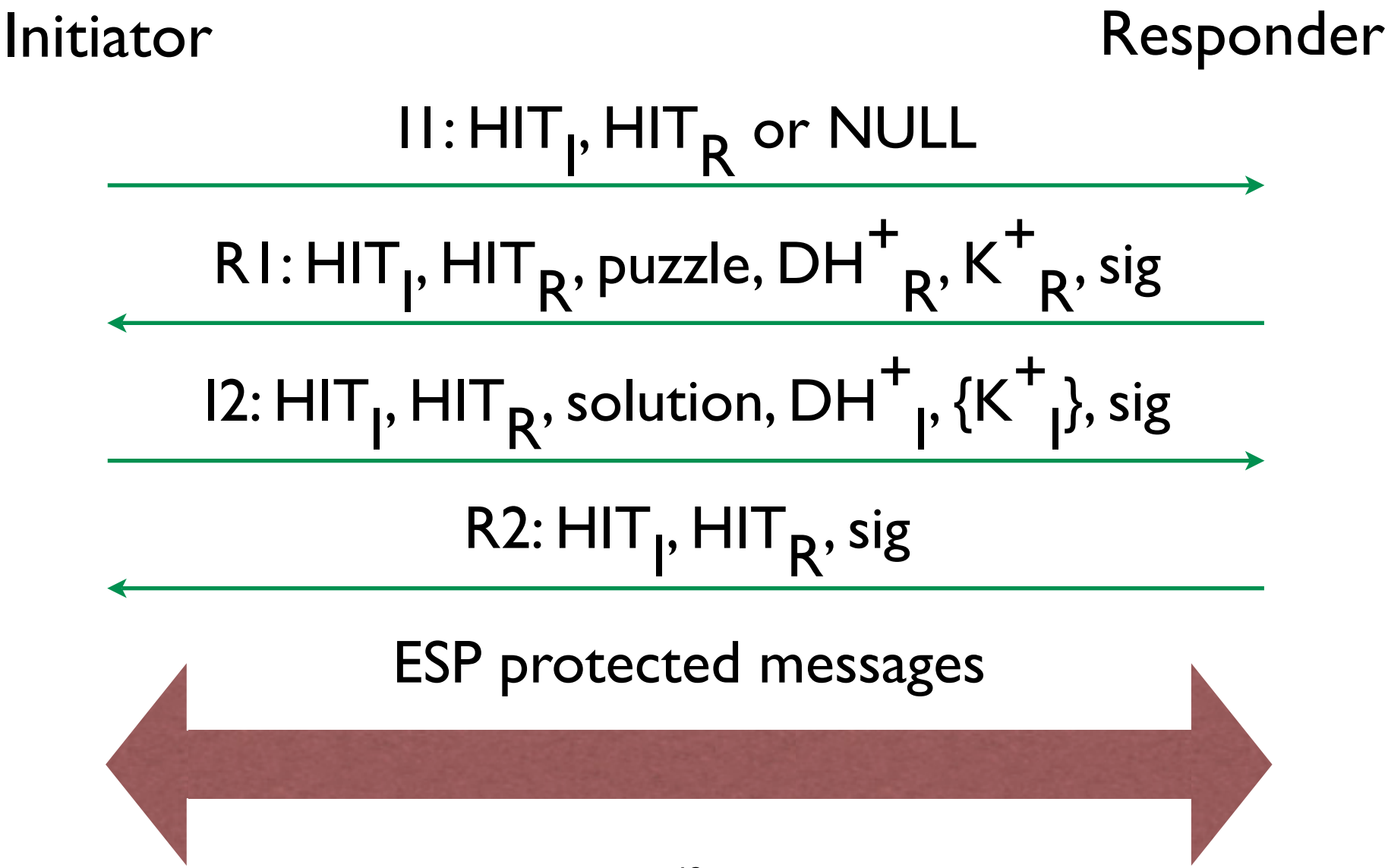
HIP as the new waist of TCP/IP



One way to implement HIP



Protocol overview



Internet drafts

- draft-moskowitz-hip-arch-05
  - architecture – sent to RFC editor
- draft-moskowitz-hip-08
  - base protocol – almost ready
- draft-nikander-hip-mm-00
  - mobility & multi-homing – needs work
- draft-nikander-esp-beet-mode-00
  - IPsec ESP extensions

Implementation status

- Five publicly known implementations
  - Boeing Phantom Works, Linux, IPv4 only
  - Ericsson Research Nomadiclab, FreeBSD
  - Helsinki University of Technology, Linux IPv6
  - Andrew McGregor, Python user level
  - Sun Labs Grenoble, Solaris?
- Fourth interop testing going on here in MPS

Summary

- New cryptographic name space
  - Hosts identified with public keys
- Integrates security, mobility, multi-homing
- Initial ideas at the IETF in late 1999
- Five interoperating implementations
- Base specifications start to be mature
  - Architecture draft at RFC editor