An Integrated Six/One HIP Implementation

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Why

- Six/One implementation desired

- Integrating Six/One into HIP to maximize reuse
  - HIP already supports host multihoming (and mobility)
  - HIP already has large overlap in functionality
    - Address ownership verification
    - Context establishment
  - No support for traffic engineering in HIP
  - Six/One provides support for traffic engineering
    - Network can rewrite addresses
    - Hosts adapt to the new addresses
HIP Basic: Association Setup

- Host Identity associated with one or more IP address
- SA created during 4-way handshake, currently ESP
- Applications see only Host Identity, IP address is for routing
Comparing Functionality

**Six/One**
- IP address conf
- IP address selection
- Flow redirection
- Address ownership
- IP address mapping
- Context establishment

**HIP**
- Exists
- Does not exist
- Does not exist (network function)
- Exists (Host Identity, reachability check)
- Exists (HIT)
- Exists (Base Exchange)
1) IP address configuration

- Configure IP address bunch on one interface
  - Prefix from all available networks

- HIP: SPI based on interface
  - Small modification to HIP
2) IP Address Selection

- Find a working IP address pair
  - Six/One: Probe using different local IP addresses and destination addresses

- HIP: RFC3484
  - Needs to be modified according to Six/One
3) Flow Redirection

- **Six/One**: Router rewrites source IP address

- **HIP basically end-host protocol**
  - Not HIP related: A new function on the router
  - End-host related: Detect changed IP addresses at end-hosts
4) Address Ownership

- CGA addresses
- Reachability verification

**HIP**
- Host Identities
- Reachability verification exists (Mobility and Multihoming)
5) IP Address Mapping

- Applications: see the selected IP address
- Six/One converts the address for applications

- HIP
  - Host Identities on upper layers
  - IP -> Host Identity conversion already done
6) Context Establishment

- Establish context between hosts
  - Available IP addresses
  - Possible other parameters
  - Context ID in packets

- HIP: Base Exchange -> HIP association
  - Authentication of hosts
  - IP address exchange (existing HIP Multihoming function)
Summary: Six/One Implementation

- Based on the current HIP for BSD
  - http://hip4inter.net

- Implementation work started

- Required modifications are small
  - Only major is address rewriting in the network
Thank you