Hierarchical Host Identity Tag Verification

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IETF 80, Prague, Czech Republic
29.03.2011

Motivation and goals

Motivation

- Off-load Host Identity Tag (HIT) verification to trusted third party (TTP)
- No certificates
- Efficient HIT revocation
- Simple stateless routers (security gateways)
- Only symmetric cryptographic primitives

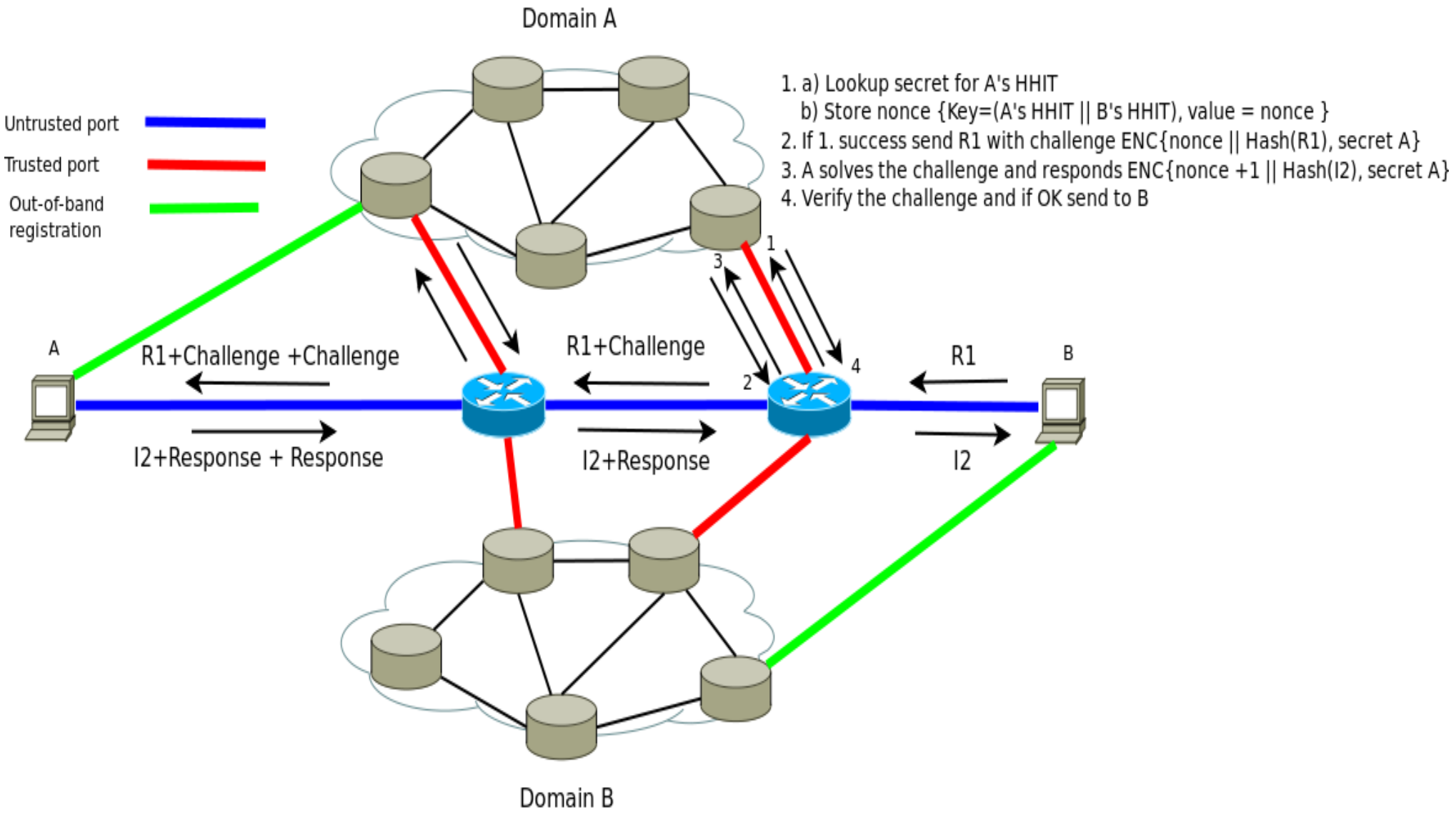
Goals

- Security gateways can:
  - Can recognize domain authority from Hierarchical HIT (HHIT)
  - Send HIP packet to domain authority for authentication
- Domain authority can:
  - Verify if it serves HHIT and it is valid
  - Authenticate the sender

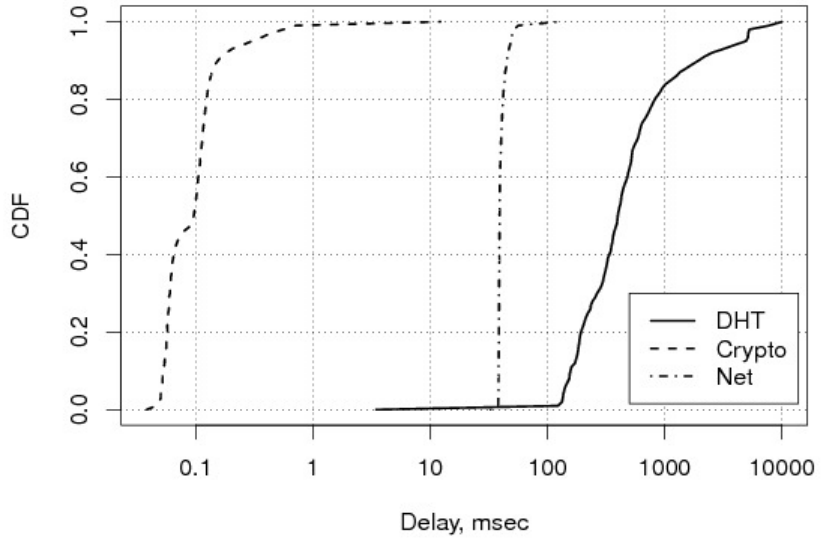
Design

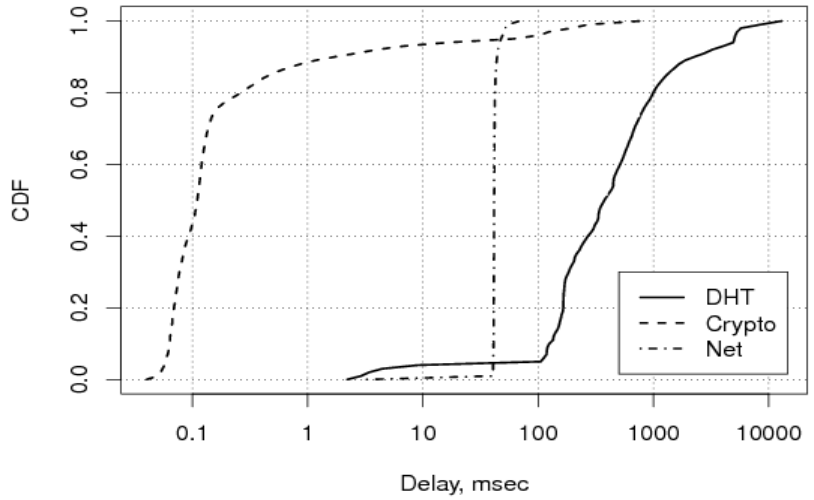
- Flat identifier comprises: trusted third party identifier (32 bits) and host identifier (96 bits)
- Hosts negotiate a secret with their domain authorities (out-of-band)
- Security gateways implement 3 simple rules:
  - Forward I1 packet without verification
  - Forward R1, I2 and R2 packets form “untrusted port” to “trusted port”
  - Forward R1, I2 and R2 packets from “trusted port” to destination
- Domain authority authenticate the clients:
  - Challenge-response-based authentication
    - Similar to “End-Host Authentication for HIP Middleboxes” by Heer et al.
- Clients should solve all advertised challenges

Implemented prototype



Performance issues





- Simulated storm of I1 packets with exp(lambda=1), exp(lambda=10)
- Loss: %3 - %10
- Almost all losses caused by DHT

Conclusions

Pros:

- Stateless security gateways
- Efficient HIT revocation
- No certificates
- Symmetric primitives only

Cons:

- DHT increases delay and loss considerably

Thank you!
Questions?