Update draft-hip-heer-middle-auth-04

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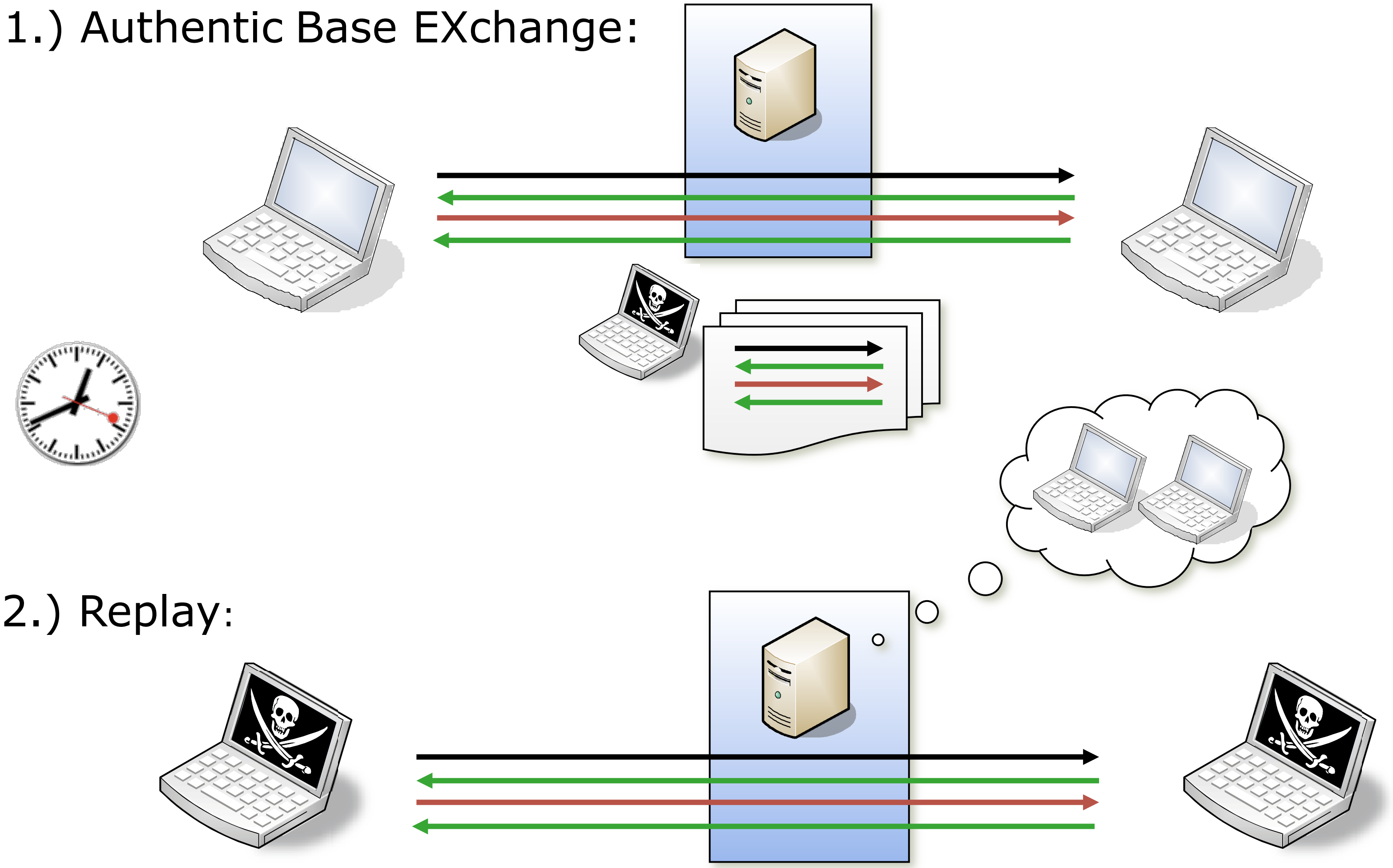
Recap: Replay Attack

1.) Authentic Base EXchange:

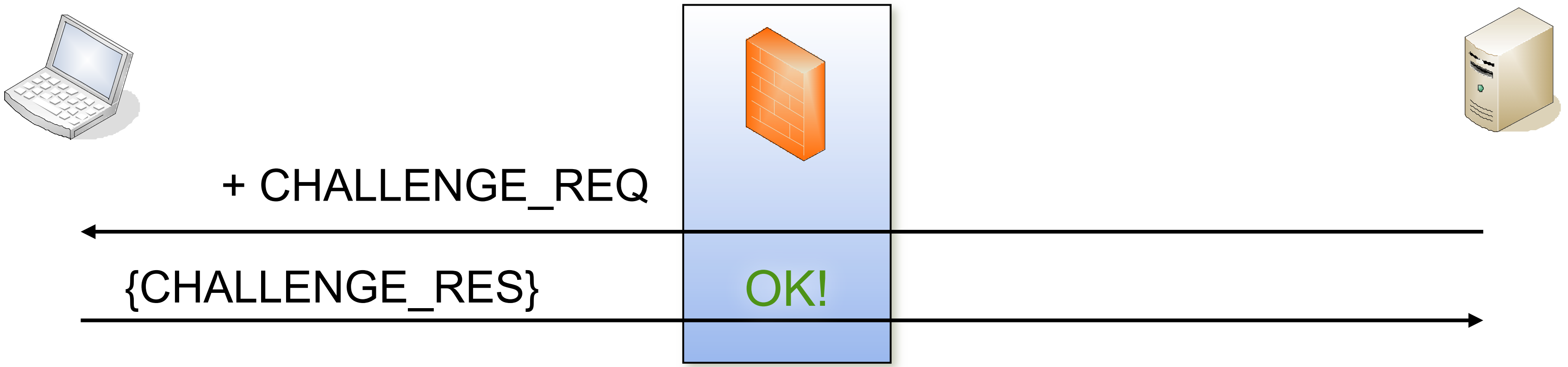


2.) Replay:

Recap: What’s the Problem?

- Everyone can replay a BEX
  - – No knowledge of private key needed
- Only end-to-end freshness in BEX
  - – Middleboxes can’t verify freshness of BEX

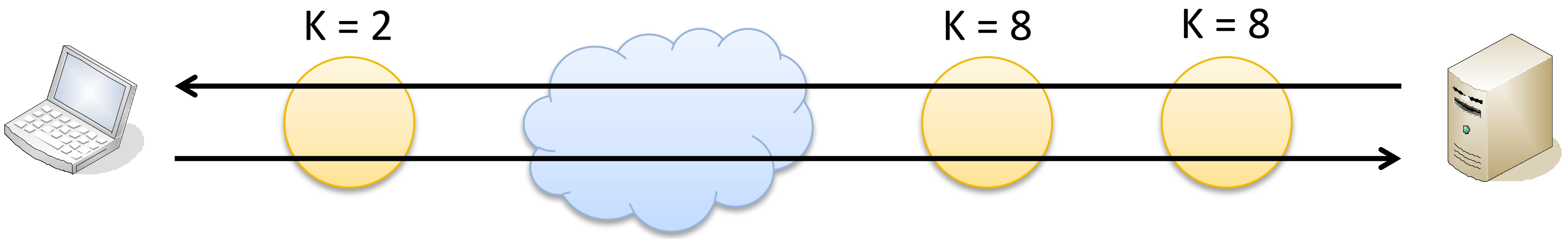
Proposed solution:



Changes Since Version 02

- Single solution for multiple middlebox challenges
  - New CHALLENGE_RESPONSE parameter layout
- Authentication of the CLOSE exchange
- Addressing of packet space restrictions
- Editorial changes

Problems with Multiple Middleboxes



- Middleboxes add own CHALLENGE_REQUEST
- End-host has to compute multiple solutions
- Exceeding packet sizes
  - CHALLENGE_RESPONSE = CHALLENGE_REQUEST + puzzle solution

Compute Single Puzzle Solution

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|             Type              |            Length             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| K, 1 byte     |   Lifetime    |                               /
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+                               /
/                                                               /
/                   Opaque, (variable length)                   /
/                                       +-+-+-+-+-+-+-+-+-+-+-+-|
/                                       |         Padding       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

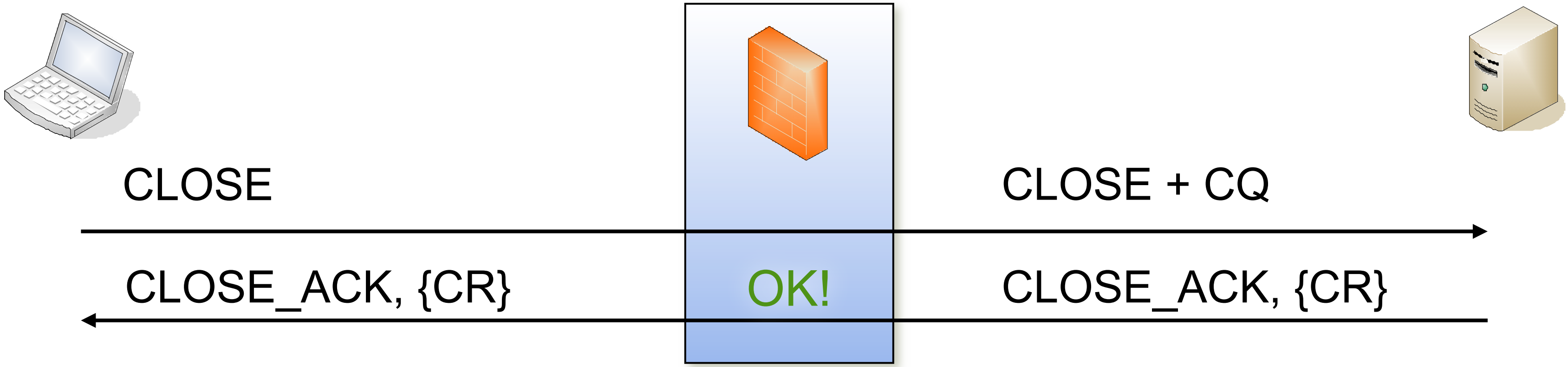
CHALLENGE_REQUEST

- Puzzle seed derivation
  - Concatenation of received opaque values
- Puzzle difficulty: max(K_i)
- Puzzle Lifetime: min(Lifetime_i)

New CHALLENGE_RESPONSE Layout

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|            Type               |            Length             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| K, 1 byte     |   Lifetime    |      No. opaque values        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
/                  Puzzle solution #J, 8 bytes                  /
/                                                               /
/                                                               /
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|         Opaque length         |        Opaque length          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
/                  Opaque, (variable length)                    /
/                                   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+
/                                   |                           /
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+                           /
/                  Opaque, (variable length)                    /
/                         +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
/                         |              Padding                |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Authentication of CLOSE



- Authentication of one peer suffices
  - Exchange freshness ✔
  - Replayed CLOSE dropped by peer
- Inclusion of HOST_IDs not required
  - Permit, but rate limit CLOSE if HIs unknown

Status Update of the Mobile ACcess Project

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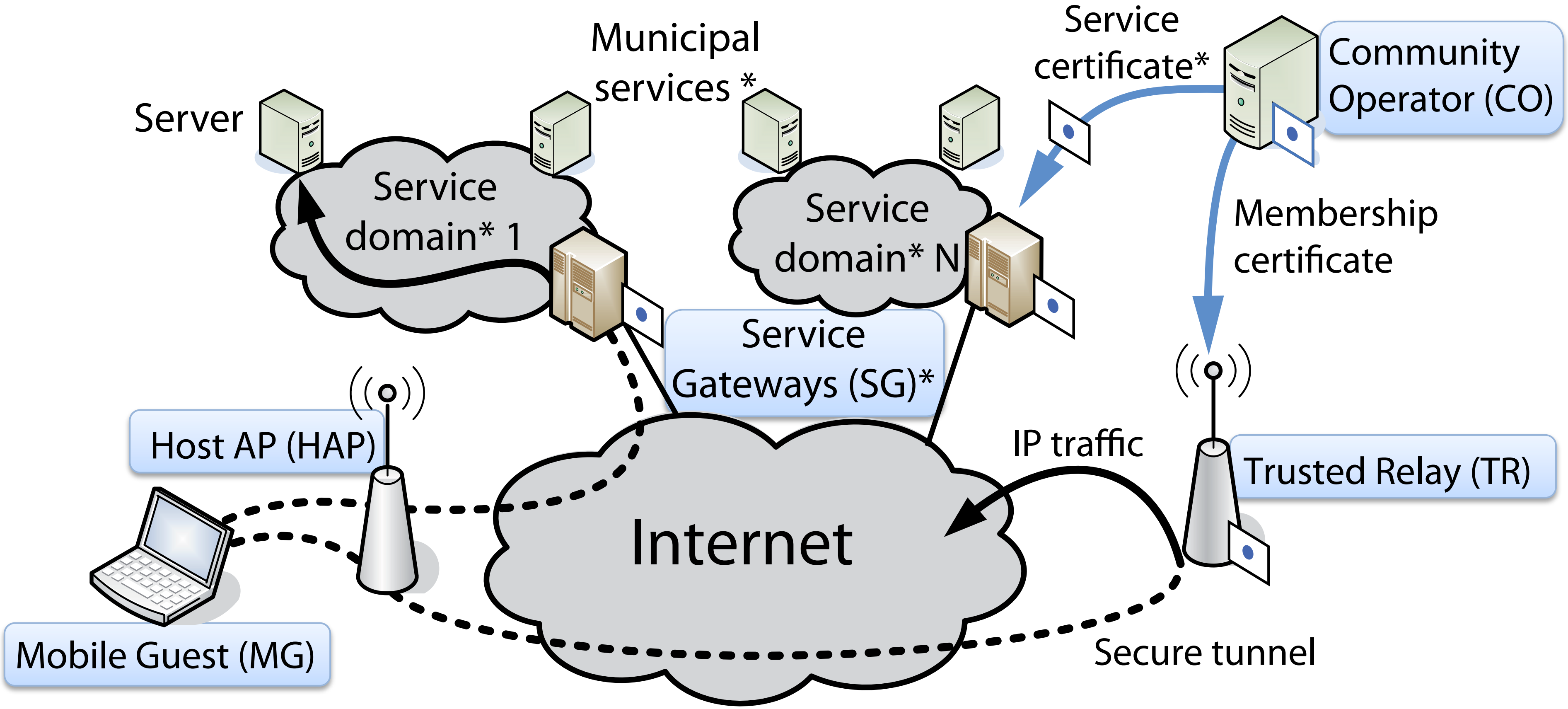
Recap: Project Goals

- Concept for ubiquitous Wi-Fi access in the cities of Aachen and Monschau
- Collaborative network with private participation (Wi-Fi sharing as basis)
  - Security and mobility → HIP
- Location-aware services

Basic Network Architecture

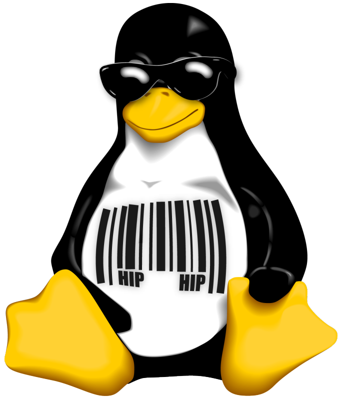


Preliminary Results

- Full implementation with testbed at the chair
  - Concept feasibility
- Collaboration through use of private APs
  - Good coverage and reachability
  - Limited uplink not problematic
- HIP abstracts nicely from network dynamics and patchwork characteristics

Release of HIPL v1.0.6

- Improved stability and robustness
- Optimized handovers
- Implemention of draft-hip-heer-middle-auth



Small **demo**

… at the next power plug near you