draft-feher-avt-approx-auth-srtp-00.txt

- Draft: Using approximate authentication with Secure Real-time Transport Protocol (SRTP)
- Author: Gabor Feher, Budapest University of Technologies and Economics
- Short abstract: Using approximate authentication in SRTP to provide integrity protection for RTP. Exact payload match is not necessary, but a certain amount of deviation is acceptable.

The research leading to these results has received funding from the European Union's Seventh Framework Programme ([FP7/2007-2013]) under grant agreement n° INFSO-ICT-214625.

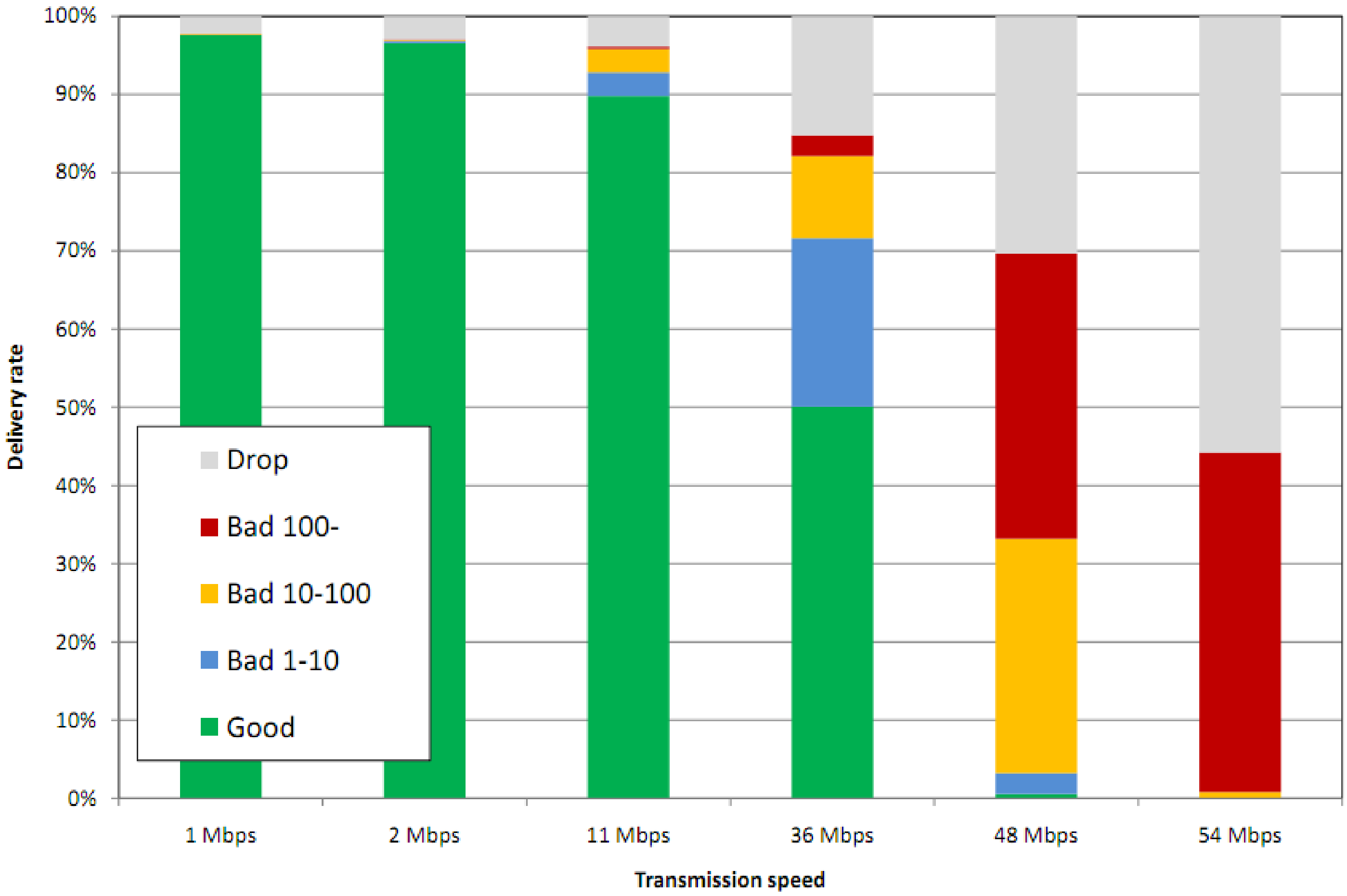
Motivation

- Error resilient video decoders – bit errors can be tolerated
  - Lots of theoretical publications. Few software releases
- Capturing corrupt frames easily
  - Works for Linux easily, can work for others

- SRTP is strict, does not work on bit errors
→ Weak payload authentication: **use approximate authentication for the payload**
  - Let the decoder decide what to drop

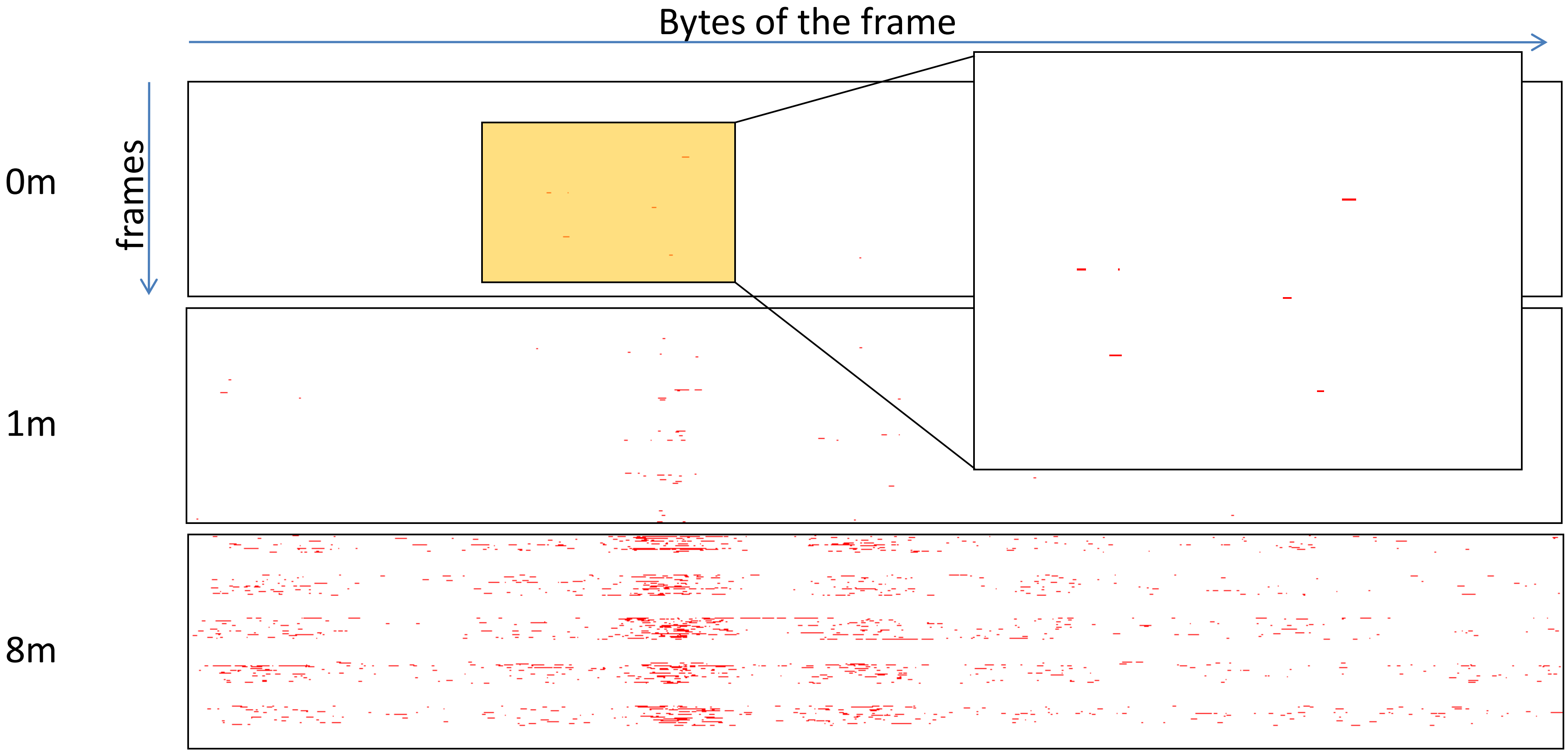
- Few errors: no attack, tolerable: KEEP
- Many errors: possible attack or quality downgrade: DROP

Corrupt WiFi frames #1



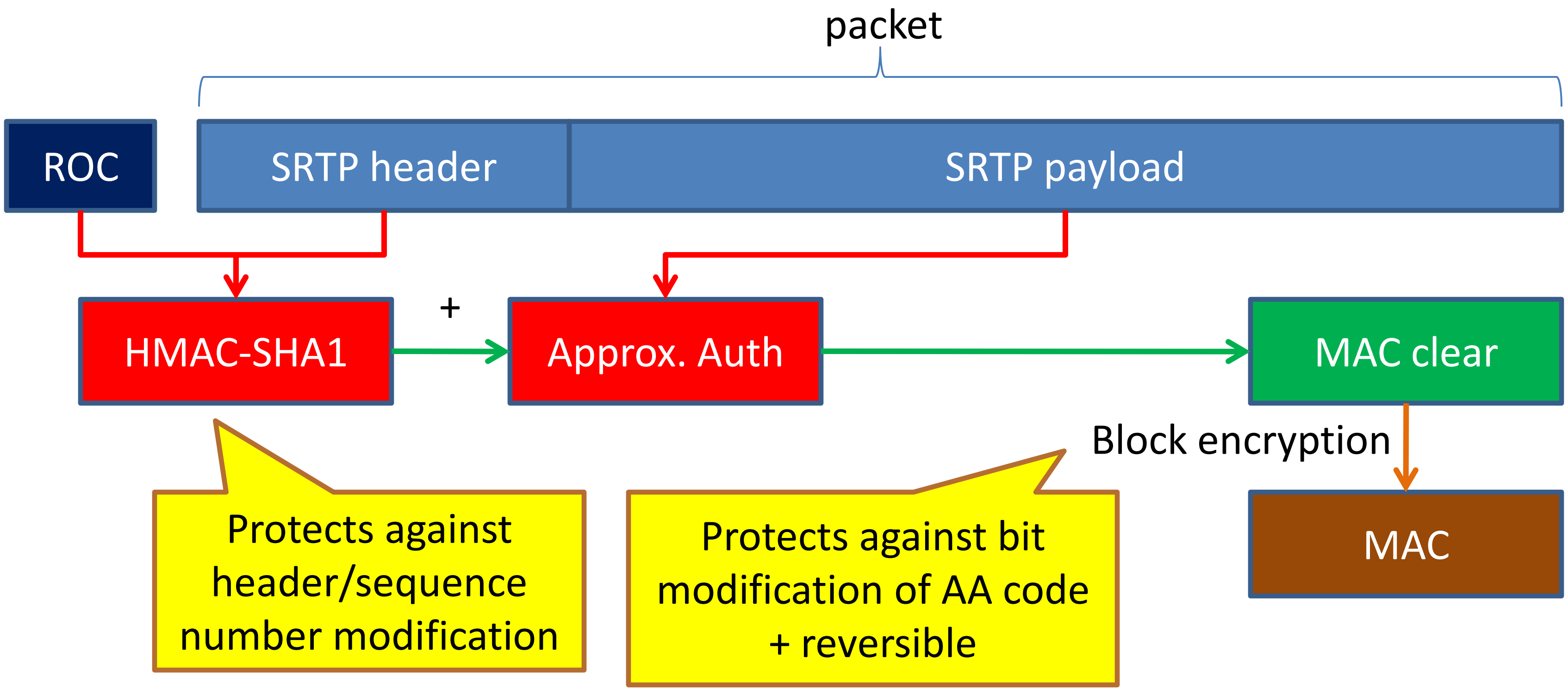
Corrupt WiFi frames #2

- 1000 byte long frames, frame burst, 36 Mbps



Proposed algorithm

- E_k1(H_k2(SRTP header||ROC) + AA_k3(SRTP payload))) using keys k1, k2 and k3

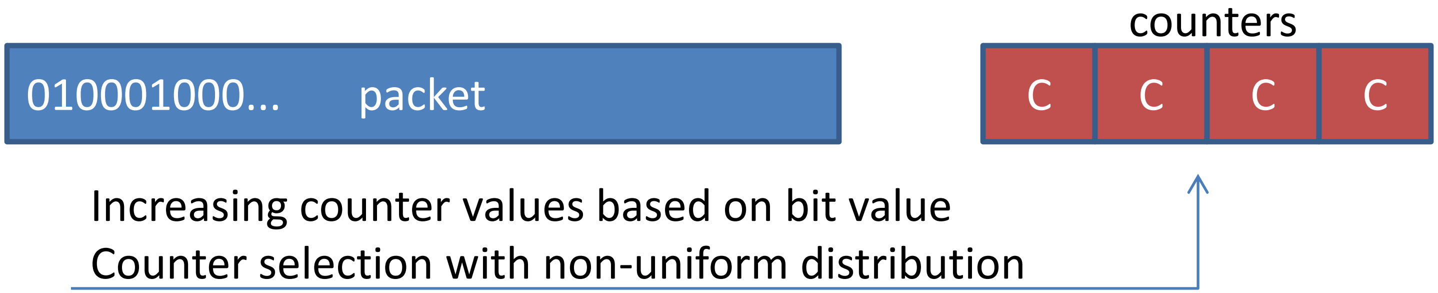


Protects against header/sequence number modification

Protects against bit modification of AA code + reversible

Approximate authentication

- Output should not be secure, the attacker can not modify it (due to the block encryption)
- Even sophisticated modifications on the input should result unpredictable change
- Distance of two inputs -> approximation
- Example algorithm:



counters

010001000... packet

C C C C

Increasing counter values based on bit value

Counter selection with non-uniform distribution

Difference of two inputs is the sum of counter differences

Plans

- Provide an approximate authentication algorithm as draft (to IETF 80)
  - There is a candidate one, but needs more testing and verification
- Go for RFC

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