Dear all,

We have found forgery against SIV-Rijndael256-AEAD and SIV-TEM-PHOTON-AEAD exploiting improper associated data processing.

If the message length is less than 128 bits, two queries with same padded associated data (one with full block and the other with partial) generates same (ciphertext, tag) pair. Formally, the following forging attack can be mounted on SIV-Rijndael256-AEAD:

1. Step 1: Construct A (|A|=256) and A' (|A'| < 256) such that pad(A) = pad(A').
2. Query (N,A,M), with |M| < 128. Let the (ciphertext, tag) pair be (C,T).

For SIV-TEM-PHOTON-AEAD, take length of A to be 384 and A' to be less than 384 bit and follow the same attack. We have verified both these attacks using the corresponding reference implementations.

Use of different tweaks (based on full / partial) during the final associated data block processing is a solution to this attack.

Thanks and regards,

Nilanjan Datta, Ashwin Jha and Mridul Nandi,
Indian Statistical Institute, Kolkata
Dear all,

We thank Nilanjan Datta, Ashwin Jha and Mridul Nandi for spotting the issue of the domain separation. The analysis is correct, and we will update the domain separation so that it works correctly, and will send the revision to the forum.

Best regards,

SIV-Rijndael256 and SIV-TEM-PHOTON team

On 2019/04/26 0:32, NILanjan Datta wrote:
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> > 2. Query $(N,A,M)$, with $|M| < 128$. Let the (ciphertext, tag) pair be $(C,T)$.
> >
> > 3. Forge with $(N,A',C,T)$.
> >
> > For SIV-TEM-PHOTON-AEAD, take length of $A$ to be 384 and $A'$ to be less
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> > NILanjan Datta, Ashwin Jha and Mridul Nandi, Indian Statistical
> > Institute, Kolkata
> >
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