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## The AES-XCBC-PRF-128 algorithm for IKE

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### Abstract

Some implementations of IPsec may want to use a pseudo-random function derived from AES. This document describes such an algorithm, called AES-XCBC-PRF-128.

## **1. Introduction**

[AES-XCBC-MAC] describes a method to use AES (the Advanced Encryption Standard) as a message authentication code (MAC) whose output is 96 bits long. While 96 bits is generally considered sufficient for a MAC, it is too short to be useful as a long-lived pseudo-random (PRF) in either IKE version 1 or version 2. Both versions of IKE use the PRF to create keys in a fashion that is dependent on the length of the output of the PRF. Using a PRF that has 96 bits of output creates keys that are easier to attack with brute force than a PRF that uses 128 bits of output.

Fortunately, there is a very simple method to use much of [[AES-XCBC-MAC](#)] as a PRF whose output is 128 bits: omit the step that truncates the 128-bit value to 96 bits.

## **2. The AES-XCBC-PRF-128 algorithm**

The AES-XCBC-PRF-128 algorithm is identical to [[AES-XCBC-MAC](#)] except that the truncation step in section 4.3 of [[AES-XCBC-MAC](#)] is \*not\* performed. That is, there is no processing after section 4.2 of [[AES-XCBC-MAC](#)]. Of course, the test vectors in [section 4.6](#) can be used, but only those listed as "AES-XCBC-MAC", not "AES-XCBC-MAC-96".

### **[3.](#) Security considerations**

The security considerations are the same as those in [[AES-XCBC-MAC](#)].

### **[4.](#) References**

#### **[4.1](#) Normative references**

[AES-XCBC-MAC] "The AES-XCBC-MAC-96 Algorithm and Its Use With IPsec", [draft-ietf-ipsec-ciph-aes-xcbc-mac](#). This document is currently in the RFC Editor's queue for publication.

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