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## **Red Hat Enterprise Linux Release 9.2 Manual Pages on 'EVP\_aes\_192\_ofb.3oss1' command**

**\$ man EVP\_aes\_192\_ofb.3oss1**

EVP\_AES\_128\_GCM(3oss1)      OpenSSL      EVP\_AES\_128\_GCM(3oss1)

### NAME

EVP\_aes\_128\_cbc, EVP\_aes\_192\_cbc, EVP\_aes\_256\_cbc, EVP\_aes\_128\_cfb,  
EVP\_aes\_192\_cfb, EVP\_aes\_256\_cfb, EVP\_aes\_128\_cfb1, EVP\_aes\_192\_cfb1,  
EVP\_aes\_256\_cfb1, EVP\_aes\_128\_cfb8, EVP\_aes\_192\_cfb8, EVP\_aes\_256\_cfb8,  
EVP\_aes\_128\_cfb128, EVP\_aes\_192\_cfb128, EVP\_aes\_256\_cfb128,  
EVP\_aes\_128\_ctr, EVP\_aes\_192\_ctr, EVP\_aes\_256\_ctr, EVP\_aes\_128\_ecb,  
EVP\_aes\_192\_ecb, EVP\_aes\_256\_ecb, EVP\_aes\_128\_ofb, EVP\_aes\_192\_ofb,  
EVP\_aes\_256\_ofb, EVP\_aes\_128\_cbc\_hmac\_sha1, EVP\_aes\_256\_cbc\_hmac\_sha1,  
EVP\_aes\_128\_cbc\_hmac\_sha256, EVP\_aes\_256\_cbc\_hmac\_sha256,  
EVP\_aes\_128\_ccm, EVP\_aes\_192\_ccm, EVP\_aes\_256\_ccm, EVP\_aes\_128\_gcm,  
EVP\_aes\_192\_gcm, EVP\_aes\_256\_gcm, EVP\_aes\_128\_ocb, EVP\_aes\_192\_ocb,  
EVP\_aes\_256\_ocb, EVP\_aes\_128\_wrap, EVP\_aes\_192\_wrap, EVP\_aes\_256\_wrap,  
EVP\_aes\_128\_wrap\_pad, EVP\_aes\_192\_wrap\_pad, EVP\_aes\_256\_wrap\_pad,  
EVP\_aes\_128\_xts, EVP\_aes\_256\_xts - EVP AES cipher

### SYNOPSIS

```
#include <openssl/evp.h>
```

```
const EVP_CIPHER *EVP_ciphernamename(void)
```

EVP\_ciphernamename is used a placeholder for any of the described cipher

functions, such as `EVP_aes_128_cbc`.

## DESCRIPTION

The AES encryption algorithm for EVP.

`EVP_aes_128_cbc()`, `EVP_aes_192_cbc()`, `EVP_aes_256_cbc()`,  
`EVP_aes_128_cfb()`, `EVP_aes_192_cfb()`, `EVP_aes_256_cfb()`,  
`EVP_aes_128_cfb1()`, `EVP_aes_192_cfb1()`, `EVP_aes_256_cfb1()`,  
`EVP_aes_128_cfb8()`, `EVP_aes_192_cfb8()`, `EVP_aes_256_cfb8()`,  
`EVP_aes_128_cfb128()`, `EVP_aes_192_cfb128()`, `EVP_aes_256_cfb128()`,  
`EVP_aes_128_ctr()`, `EVP_aes_192_ctr()`, `EVP_aes_256_ctr()`,  
`EVP_aes_128_ecb()`, `EVP_aes_192_ecb()`, `EVP_aes_256_ecb()`,  
`EVP_aes_128_ofb()`, `EVP_aes_192_ofb()`, `EVP_aes_256_ofb()`

AES for 128, 192 and 256 bit keys in the following modes: CBC, CFB  
with 128-bit shift, CFB with 1-bit shift, CFB with 8-bit shift,  
CTR, ECB, and OFB.

`EVP_aes_128_cbc_hmac_sha1()`, `EVP_aes_256_cbc_hmac_sha1()`

Authenticated encryption with AES in CBC mode using SHA-1 as HMAC,  
with keys of 128 and 256 bits length respectively. The  
authentication tag is 160 bits long.

WARNING: this is not intended for usage outside of TLS and requires  
calling of some undocumented ctrl functions. These ciphers do not  
conform to the EVP AEAD interface.

`EVP_aes_128_cbc_hmac_sha256()`, `EVP_aes_256_cbc_hmac_sha256()`

Authenticated encryption with AES in CBC mode using SHA256 (SHA-2,  
256-bits) as HMAC, with keys of 128 and 256 bits length  
respectively. The authentication tag is 256 bits long.

WARNING: this is not intended for usage outside of TLS and requires  
calling of some undocumented ctrl functions. These ciphers do not

conform to the EVP AEAD interface.

`EVP_aes_128_ccm()`, `EVP_aes_192_ccm()`, `EVP_aes_256_ccm()`,  
`EVP_aes_128_gcm()`, `EVP_aes_192_gcm()`, `EVP_aes_256_gcm()`,  
`EVP_aes_128_ocb()`, `EVP_aes_192_ocb()`, `EVP_aes_256_ocb()`

AES for 128, 192 and 256 bit keys in CBC-MAC Mode (CCM), Galois Counter Mode (GCM) and OCB Mode respectively. These ciphers require additional control operations to function correctly, see the "AEAD Interface" in `EVP_EncryptInit(3)` section for details.

`EVP_aes_128_wrap()`, `EVP_aes_192_wrap()`, `EVP_aes_256_wrap()`,  
`EVP_aes_128_wrap_pad()`, `EVP_aes_192_wrap_pad()`, `EVP_aes_256_wrap_pad()`,  
`EVP_aes_128_wrap()`, `EVP_aes_192_wrap()`, `EVP_aes_256_wrap()`,  
`EVP_aes_128_wrap_pad()`, `EVP_aes_192_wrap_pad()`, `EVP_aes_256_wrap_pad()`

AES key wrap with 128, 192 and 256 bit keys, as according to RFC 3394 section 2.2.1 ("wrap") and RFC 5649 section 4.1 ("wrap with padding") respectively.

`EVP_aes_128_xts()`, `EVP_aes_256_xts()`

AES XTS mode (XTS-AES) is standardized in IEEE Std. 1619-2007 and described in NIST SP 800-38E. The XTS (XEX-based tweaked-codebook mode with ciphertext stealing) mode was designed by Prof. Phillip Rogaway of University of California, Davis, intended for encrypting data on a storage device.

XTS-AES provides confidentiality but not authentication of data. It also requires a key of double-length for protection of a certain key size. In particular, XTS-AES-128 (`EVP_aes_128_xts`) takes input of a 256-bit key to achieve AES 128-bit security, and XTS-AES-256 (`EVP_aes_256_xts`) takes input of a 512-bit key to achieve AES 256-bit security.

The XTS implementation in OpenSSL does not support streaming. That

is there must only be one `EVP_EncryptUpdate(3)` call per `EVP_EncryptInit_ex(3)` call (and similarly with the "Decrypt" functions).

The `iv` parameter to `EVP_EncryptInit_ex(3)` or `EVP_DecryptInit_ex(3)` is the XTS "tweak" value.

## RETURN VALUES

These functions return an `EVP_CIPHER` structure that contains the implementation of the symmetric cipher. See `EVP_CIPHER_meth_new(3)` for details of the `EVP_CIPHER` structure.

## SEE ALSO

`evp(7)`, `EVP_EncryptInit(3)`, `EVP_CIPHER_meth_new(3)`

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