



ABAP

Apex

С

C++

CloudFormation

COBOL

C#

CSS

Flex

Go **GO**

5 HTML

Java

JavaScript

Kotlin Kubernetes

Objective C

PHP

PL/I

PL/SQL

Python

RPG

Ruby

Scala

Swift

Terraform

Text

TypeScript

T-SQL

VB.NET

VB6

XML



Objective C static code analysis

Unique rules to find Bugs, Vulnerabilities, Security Hotspots, and Code Smells in your OBJECTIVE C code

ΑII 315 **6** Vulnerability (10) rules

R Bug (75)

• Security Hotspot

⊗ Code (212)

O Quick 13 Fix

Tags

Search by name...

"memset" should not be used to delete sensitive data

Vulnerability

POSIX functions should not be called with arguments that trigger buffer overflows

■ Vulnerability

Function-like macros should not be invoked without all of their arguments

📆 Bug

The address of an automatic object should not be assigned to another object that may persist after the first object has ceased to exist

📆 Bug

"pthread_mutex_t" should be unlocked in the reverse order they were locked

🖷 Bug

"pthread_mutex_t" should be properly initialized and destroyed

🖷 Bug

"pthread_mutex_t" should not be consecutively locked or unlocked twice

🖷 Bug

Functions with "noreturn" attribute should not return

📆 Bug

"memcmp" should only be called with pointers to trivially copyable types with no padding

🖷 Bug

Stack allocated memory and nonowned memory should not be freed

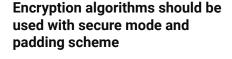
📆 Bug

Closed resources should not be accessed

📆 Bug

Dynamically allocated memory should be released

₩ Bua



Analyze your code

cwe privacy cert owasp sans-top25

Encryption operations should use a secure mode and padding scheme so that confidentiality and integrity can be guaranteed.

- For block cipher encryption algorithms (like AES):
 - o The ECB (Electronic Codebook) cipher mode doesn't provide serious message confidentiality: under a given key any given plaintext block always gets encrypted to the same ciphertext block. This mode never be used.
 - o The CBC (Cipher Block Chaining) mode by itself provides only data confidentiality. This cipher mode is also vulnerable to padding oracle attacks when used with padding. Using CBC along with Message Authentication Code can provide data integrity and should prevent such attacks. In practice the implementation has many pitfalls and it's recommended to avoid CBC with padding completely.
 - The GCM (Galois Counter Mode) mode which works internally with zero/no padding scheme, is recommended, as it is designed to provide both data authenticity (integrity) and confidentiality. Other similar modes are CCM, CWC, EAX, IAPM and OCB.
- For RSA encryption algorithm, the recommended padding scheme is OAEP.

Noncompliant Code Example

botan

```
#include <botan/cipher_mode.h>
#include <botan/pubkey.h>
#include <botan/rsa.h>
// Example for a symmetric cipher: AES
Botan::Cipher_Mode::create("AES-256/ECB", Botan::ENCRYPTION);
Botan::Cipher Mode::create("AES-256/CBC/PKCS7", Botan::ENCRYP
// Example for a asymmetric cipher: RSA
std::unique ptr<Botan::RandomNumberGenerator> rng(new Botan::
Botan::RSA_PrivateKey rsaKey(*rng.get(), 2048);
Botan::PK_Encryptor_EME(rsaKey, *rng.get(), "PKCS1v15"); // N
```

crypto++

```
#include <cryptopp/aes.h>
#include <cryptopp/modes.h>
#include <cryptopp/rsa.h>
// Example for a symmetric cipher: AES
CryptoPP::ECB Mode<CryptoPP::AES>::Encryption(); // Noncompli
CryptoPP::CBC_Mode<CryptoPP::AES>::Encryption(); // Noncompli
// Example for a asymmetric cipher: RSA
CryptoPP::RSAES<CryptoPP::PKCS1v15>::Encryptor(); // Noncompl
```

OpenSSL

```
#include <openssl/evp.h>
#include <openssl/rsa.h>
// Example for a symmetric cipher: AES
EVP_aes_128_ecb(); // Noncompliant
```

Freed memory should not be used

📆 Bug

Memory locations should not be released more than once

📆 Bug

Memory access should be explicitly bounded to prevent buffer overflows

📆 Bug

Printf-style format strings should not lead to unexpected behavior at runtime

📆 Bug

Recursion should not be infinite

📆 Bug

Resources should be closed

📆 Bug

Hard-coded credentials are securitysensitive

Security Hotspot

"goto" should jump to labels declared later in the same function

Code Smell

Only standard forms of the "defined" directive should be used

Code Smell

Switch labels should not be nested inside non-switch blocks

Code Smell

```
EVP_aes_128_cbc(); // Noncompliant
// Example for a asymmetric cipher: RSA
RSA_public_decrypt(flen, from, to, key, RSA_PKCS1_PADDING); /
RSA_public_decrypt(flen, from, to, key, RSA_SSLV23_PADDING);
RSA_public_decrypt(flen, from, to, key, RSA_NO_PADDING); // N
```

Compliant Solution

#include <botan/cipher_mode.h>

botan

```
#include <botan/pubkey.h>
#include <botan/rsa.h>
// AES symmetric cipher is recommended to be used with GCM mo
Botan::Cipher_Mode::create("AES-256/GCM", Botan::ENCRYPTION);
// RSA asymmetric cipher is recommended to be used with OAEP
std::unique ptr<Botan::RandomNumberGenerator> rng(new Botan::
Botan::RSA_PrivateKey rsaKey(*rng.get(), 2048);
Botan::PK_Encryptor_EME(rsaKey, *rng.get(), "OAEP"); // Compl
```

crypto++

```
#include <cryptopp/gcm.h>
// AES symmetric cipher is recommended to be used with GCM mo
CryptoPP::GCM<CryptoPP::AES>::Encryption(); // Compliant
// RSA asymmetric cipher is recommended to be used with OAEP \,
CryptoPP::RSAES<CryptoPP::OAEP<CryptoPP::SHA1>>::Encryptor();
```

OpenSSL

```
// AES symmetric cipher is recommended to be used with GCM mo
EVP_aes_128_gcm() // Compliant
```

// RSA asymmetric cipher is recommended be used with OAEP pad RSA_public_decrypt(flen, from, to, key, RSA_PKCS1_OAEP_PADDIN

See

- OWASP Top 10 2021 Category A2 Cryptographic Failures
- OWASP Top 10 2017 Category A6 Security Misconfiguration
- MITRE, CWE-327 Use of a Broken or Risky Cryptographic Algorithm
- SANS Top 25 Porous Defenses

#include <openssl/evp.h>

Available In:

sonarcloud 🚳 | sonarqube | Developer Edition

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