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C++ static code analysis

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

All rules 578 | Vulnerability 13 | Bug 111 | Security Hotspot 18 | Code Smell 436 | Quick Fix 68

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

XML parsers should not be vulnerable to XXE attacks
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

Assigning to an optional should directly target the optional
Bug

Result of the standard remove algorithms should not be ignored
Bug

"std::scoped_lock" should be created with constructor arguments
Bug

Objects should not be sliced
Bug

Immediately dangling references should not be created
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

"std::has_single_bit" should be used to test if an integer is a power of two

Analyze your code

Code Smell | Minor | since-c++20 confusing

Since integers are usually represented in binary form in computers, it is efficient to check if a given number is a power of two by checking if its `unsigned` representation has a single bit set.

In C++ such check could be expressed as `x & (x-1) == 0`. However, the intent of this expression is unclear. Furthermore, it requires to take special care for the value `0`, which would pass the above check, while not having any bit set and not being a power of two.

This check can be expressed more clearly with the `std::has_single_bit` function template, introduced in C++20.

This rule reports computations that could be replaced with `std::has_single_bit`.

Noncompliant Code Example

```
void f(unsigned x) {
  if ((x > 0) && !(x & (x-1))) { // Noncompliant
    // Special algorithm for powers of 2
  }
  // Normal algorithm
}
```

Compliant Solution

```
void f(unsigned x) {
  if (std::has_single_bit(x)) {
    // Special algorithm for powers of 2
  }
  // Normal algorithm
}
```

Available In:

sonarlint | sonarcloud | sonarqube Developer Edition

Bug

"std::move" and "std::forward" should not be confused

Bug

A call to "wait()" on a "std::condition_variable" should have a condition

Bug

A pointer to a virtual base class shall only be cast to a pointer to a derived class by means of dynamic_cast

Bug

Functions with "noreturn" attribute should not return

Bug

RAII objects should not be temporary

Bug

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

Bug

"memcpy", "memmove", and "memset" should only be called with pointers to trivially copyable types

Bug

"std::auto_ptr" should not be used

Bug

Destructors should be "noexcept"

Bug