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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

Free functions should be preferred to member functions when accessing a container in a generic context

Analyze your code

Code Smell | Minor | since-c++11 clumsy

It is often considered a better style to access objects in generic code with free functions than with member functions, because it allows to adapt an object to a template without modifying it, just by adding the right overload of the free function. This is especially true with containers, which can come in a wide variety (and some of them can't even have member function, for instance, C-style arrays).

Therefore, the C++ standard library provides free functions that can be applied on any standard container, and that can be adapted for user-defined containers. They are:

- Since C++11: `std::begin`, `std::end`, `std::cbegin`, `std::cend`
- Since C++14: `std::rbegin`, `std::rend`, `std::crbegin`, `std::crend`
- Since C++17: `std::size`, `std::empty`, `std::data`
- Since C++20: `std::ssize`

When writing generic code, you should prefer using those functions for objects that depend on the template arguments: it will allow your code to work with a broader variety of containers.

Noncompliant Code Example

```
template<class T>
bool f(T const &t, std::vector<int> const &v) {
  if (!t.empty()) { // Noncompliant in C++17
    auto val = (t.begin() // Noncompliant in C++11
      ->size()); // Noncompliant in C++17
    return val == v.size(); // Compliant, v does not depend o
  }
  return false;
}
```

Compliant Solution

```
template<class T>
bool f(T const &t, std::vector<int> const &v) {
  if (!std::empty(t)) { // Compliant
    auto val = std::size(*std::begin(t)); // Compliant
    return val == v.size();
  }
  return false;
}
```

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