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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

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"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

The "\_t" and "\_v" version of type traits should be used instead of "::type" and "::value"

Analyze your code

 Code Smell  Minor  Quick Fix  since-c++14 clumsy

When they were first introduced in the language, type traits, defined in header `<type_traits>`, required to use nested types (with `::type`) or nested values (with `::value`) to access the result of the trait. Since then, the language introduced templated alias declaration and variable templates that allow to define traits in a more direct and readable way.

Even if the old variant still exists, the new one, which uses `_t` (C++14) and `_v` (C++17) suffixes as discriminant, should be preferred.

### Noncompliant Code Example

```
template<class T>
void f(T t) {
    static_assert (std::is_arithmetic<T>::value); // Noncompliant
    using rawType = std::remove_cv<T>::type; // Noncompliant
}
```

### Compliant Solution

```
template<class T>
void f(T t) {
    static_assert (std::is_arithmetic_v<T>); // Compliant, C++14
    using rawType = std::remove_cv_t<T>; // Compliant, C++14
}
```

Available In:

**sonarlint**  | **sonarcloud**  | **sonarqube**  Developer Edition

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 Bug
<b>"std::move" and "std::forward" should not be confused</b>  Bug
<b>A call to "wait()" on a "std::condition_variable" should have a condition</b>  Bug
<b>A pointer to a virtual base class shall only be cast to a pointer to a derived class by means of dynamic_cast</b>  Bug
<b>Functions with "noreturn" attribute should not return</b>  Bug
<b>RAII objects should not be temporary</b>  Bug
<b>"memcmp" should only be called with pointers to trivially copyable types with no padding</b>  Bug
<b>"memcpy", "memmove", and "memset" should only be called with pointers to trivially copyable types</b>  Bug
<b>"std::auto_ptr" should not be used</b>  Bug
<b>Destructors should be "noexcept"</b>  Bug