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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

Macros should not be used as replacement to "typdef" and "using"

Analyze your code

Code Smell | Minor | bad-practice cert pitfall

C provides a way of defining or aliasing a type through `typedef`. On top of it, C++ adds `using` that can do the same and more.

Using a macro to define a type is inferior to the previous ways for two reasons:

- macros cannot be enclosed into scopes. Or at least, doing so is cumbersome and error-prone as in that case, the macro needs to be defined and undefined manually.
- macros are handled by the preprocessor and are not understood from the compiler. They can easily pollute the code in places where types are not expected. `typedef` and `using` are known to the compiler to define types and can be more strictly checked.

As a result, macros should not be used as a replacement to `typedef` or `using`.

Noncompliant Code Example

```
#define UINT unsigned int  // Noncompliant
#define INT int  // Noncompliant
UINT uabs( INT i );
```

Compliant Solution

```
typedef unsigned int UINT;
typedef int INT;
UINT uabs( INT i );
```

or

```
using UINT = unsigned int;
using INT = int;
UINT uabs( INT i );
```

See

- CERT, PRE03-C. - Prefer typedefs to defines for encoding non-pointer types

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