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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

"#pragma pack" should be used correctly

Analyze your code

Bug | Major | suspicious

`#pragma pack` is a non standard extension used to specify the packing alignment for structure, union and class members.

It is useful to

- remove padding and decrease the size of objects
- align members to better fit optimal cpu alignment

However, the pragma pack directives need to be correctly defined to work properly.

This rule raises an issue if:

- the specified packing value is incorrect: it can only be 1, 2, 4, 8, or 16
- a parameter is ill-formed
- the `pop` variant of this `#pragma` is called with both arguments `identifier` and `value`: such a call is undefined behavior
- a `#pragma pack(push...)` is performed but there is not corresponding use of `#pragma pack(pop...)`
- a `#pragma pack(pop...)` is performed but there is not corresponding use of `#pragma pack(push...)`
- a `#pragma pack` is in effect across several files: this becomes too complex, and could easily lead to undefined behavior, the same structure having different layout when seen from different translation units

Noncompliant Code Example

```
#pragma pack(5) // Noncompliant, value is invalid
#pragma pack(2+2) // Noncompliant, value should be a literal

#pragma pack(4)
#include "myFile.h" // Noncompliant, the specified alignement

struct T {
   int i;
   short j;
   double k;
};

#pragma pack(push, r1, 16)
#pragma pack(pop, r1, 4)  // Noncompliant, call to pop with t

#pragma pack(push, r2, 16)
#pragma pack(pop, r3)  // Noncompliant, call to pop with no m

#pragma pack(push, 8) // Noncompliant, unmatched push
```

Compliant Solution

```
#include "myFile.h"

#pragma pack(4)

struct T {
   int i;
   short j;
   double k;
};
```

```
#pragma pack(push, r1, 16)
#pragma pack(pop, r1)

#pragma pack(push, r2, 16)
#pragma pack(pop, r2)

#pragma pack(push, 8)
#pragma pack(pop)
```

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