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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

Generic exceptions should not be caught

Analyze your code

Code Smell | Major | cppcoreguidelines cwe error-handling bad-practice cert

Some exception classes are designed to be used only as base classes to more specific exceptions, for instance `std::exception` (the base class of all standard C++ exceptions), `std::logic_error` or `std::runtime_error`.

Catching such a generic exception types is a usually bad idea, because it implies that the "catch" block is clever enough to handle any type of exception.

Noncompliant Code Example

```
try {
  /* code that may throw std::system_error */
} catch (const std::exception &ex) { // Noncompliant
  /*...*/
}
```

Compliant Solution

```
try {
  /* code that may throw std::system_error */
} catch (const std::system_error &ex) {
  /*...*/
}
```

Exceptions

There are cases though where you want to catch all exceptions, because no exceptions should be allowed to escape the function, and generic `catch` handlers are excluded from the rule:

- In the main function
- In a class destructor
- In a `noexcept` function
- In an `extern "C"` function

Additionally, if the `catch` handler is throwing an exception (either the same as before, with `throw;` or a new one that may make more sense to the callers of the function), or is never exiting (because it calls a `noreturn` function, for instance `exit`), then the accurate type of the exception usually does not matter any longer: this case is excluded too.

See

- MITRE, CWE-396 - Declaration of Catch for Generic Exception
- C++ Core Guidelines E.14 - Use purpose-designed user-defined types as exceptions (not built-in 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