Secrets
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Flex
Go
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Kubernetes
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PHP
PL/I
PL/SQL
Python
RPG
Ruby
Scala
Swift
Terraform
Text
TypeScript
T-SQL
VB.NET
VB6
XML

C static code analysis

Unique rules to find Bugs, Vulnerabilities, Security Hotspots, and Code Smells in your C code

All rules 311 | Vulnerability 13 | Bug 74 | Security Hotspot 18 | Code Smell 206 | Quick Fix 14

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

"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
Bug

Functions with "noreturn" attribute should not return
Bug

"memcmp" should only be called with pointers to trivially copyable types with no padding
Bug

Object declarations should contain no more than 2 levels of pointer indirection

Analyze your code

Code Smell | Critical | based-on-misra brain-overload pitfall

While they are extraordinarily useful, pointers are not the most intuitive concept in the world. Pointers to pointers are even harder to understand and use correctly. And with each additional level of indirection, pointer variables become more difficult to use correctly. Therefore pointer declarators should be limited to no more than two levels of nesting.

Noncompliant Code Example

```
typedef int * INTPTR;
struct s {
 int ** s1;
 int *** s2; // Noncompliant
};

struct s ** ps1;
struct s *** ps2; // Noncompliant

int ** ( *pfunc1)();
int ** ( **pfunc2)();
int ** (***pfunc3)(); // Noncompliant
int *** ( **pfunc4)(); // Noncompliant

void function( int ** par1,
               int *** par2, // Noncompliant
               INTPTR * par3,
               int * par4[],
               int ** par5[]) // Noncompliant
{
  int ** ptr1;
  int *** ptr2; // Noncompliant
  INTPTR * ptr3;
  int * ptr4[ 10 ];
  int ** ptr5[ 10 ]; //Noncompliant
}
```

Compliant Solution

```
typedef int * INTPTR;
struct s {
 int ** s1;
 int ** s2;
};

struct s ** ps1;
struct s ** ps2;

int ** (*pfunc1)();
int ** (**pfunc2)();
int ** (**pfunc3)();
int ** (**pfunc4)();
```

Stack allocated memory and non-owned memory should not be freed

Bug

Closed resources should not be accessed

Bug

Dynamically allocated memory should be released

Bug

Freed memory should not be used

```
void function( int ** par1,
               int ** par2,
               INTPTR * par3,
               int * par4[],
               int * par5[])
{
  int ** ptr1;
  int ** ptr2;
  INTPTR * ptr3;
  int * ptr4[ 10 ];
  int * ptr5[ 10 ];
}
```

See

- MISRA C:2004, 17.5 - The declaration of objects should contain no more than 2 levels of pointer indirection
- MISRA C++:2008, 5-0-19 - The declaration of objects shall contain no more than two levels of pointer indirection
- MISRA C:2012, 18.5 - Declarations should contain no more than two levels of pointer nesting

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