



Fortify on Demand Security Review

Company:	Fortify Open Review
Project:	GNU m4
Version:	1.4.17
Latest Analysis:	4/17/2015 12:16:24 PM

Executive Summary

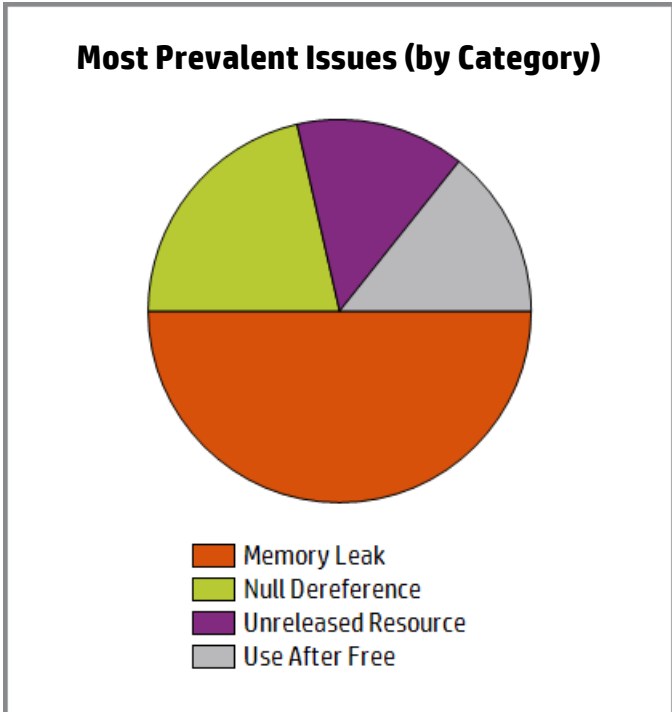
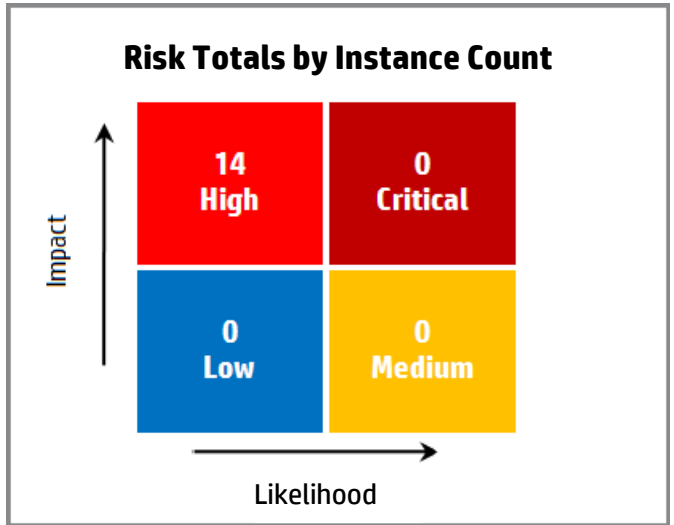
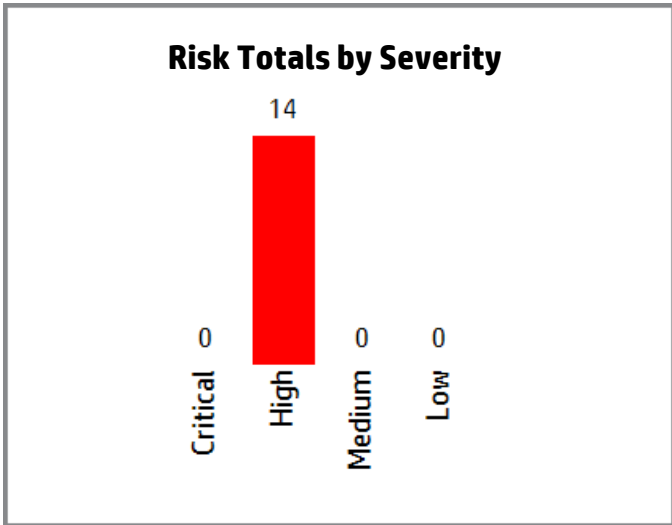
Company: Fortify Open Review
 Project: GNU m4
 Version: 1.4.17
 Static Analysis Date: 4/17/2015 12:16:24 PM
 Dynamic Analysis Date:

Fortify Security Rating

★★★★☆
14 issues

Static: ✓	Dynamic: ✗
--------------------------------------------------------------	-------------------------------------------------------------

Application Details



Remediation Roadmap

To Achieve	Major Fixes	Minor Fixes
★★★★☆	0	0
★★★★☆	0	14
★★★★☆	0	0
★★★★☆	0	0
★★★★☆	0	0

Issue Status

New	Existing	Reopened
14	0	0

Issue Breakdown

Issues are divided based on their impact (potential damage) and likelihood (probability of identification and exploit).

High impact / high likelihood issues represent the highest priority and present the greatest threat.

Low impact / low likelihood issues are the lowest priority and present the smallest threat.

See Appendix for more information.

Rating	Category	Test Type	Instance Count
High	Memory Leak	Static	7
High	Null Dereference	Static	3
High	Unreleased Resource	Static	2
High	Use After Free	Static	2

Issue Breakdown by OWASP Top 10 2013 PCI Sections 6.3, 6.5 & 6.6

The OWASP Top Ten represents a broad consensus about what the most critical web application security flaws are. Project members include a variety of security experts from around the world who have shared their expertise to produce this list.

The PCI compliance standards, particularly sections 6.3, 6.5, and 6.6, reference the OWASP Top Ten vulnerability categories as the core categories that must be tested for and remediated.

OWASP 2013 Category	Severity			
	Critical	High	Medium	Low
None		14		
Total		14		

Issue Breakdown by Analysis Type

Issues are divided based on their impact (potential damage) and likelihood (probability of identification and exploit).

High impact / high likelihood issues represent the highest priority and present the greatest threat.

Low impact / low likelihood issues are the lowest priority and present the smallest threat.

See Appendix for more information.

Category	Static	Dynamic
Memory Leak	7	0
Null Dereference	3	0
Unreleased Resource	2	0
Use After Free	2	0
Total	14	0

Issue Details

Below is an enumeration of all issues found in the project. The issues are organized by priority and category and then broken down by the package, namespace, or location in which they occur.

The priority of an issue can be Critical, High, Medium, or Low.

Issues from static analysis reported on at same line number with the same category originate from different taint sources.

6.1.1 Memory Leak

High

CWE ID 401

OWASP Top 10: None

PCI 3.0: Requirement 6.5.6

Summary

The function in allocates memory on line and fails to free it. Memory is allocated but never freed.

Explanation

Memory leaks have two common and sometimes overlapping causes:

- Error conditions and other exceptional circumstances.
- Confusion over which part of the program is responsible for freeing the memory.

In this case the memory allocated in **clean-temp.c** at line **409** is not always freed or returned by the function.

Most memory leaks result in general software reliability problems, but if an attacker can intentionally trigger a memory leak, the attacker may be able to launch a denial of service attack (by crashing the program) or take advantage of other unexpected program behavior resulting from a low memory condition [1].

Example 1: The following C function leaks a block of allocated memory if the call to `read()` fails to return the expected number of bytes:

```
char* getBlock(int fd) {
char* buf = (char*) malloc(BLOCK_SIZE);
if (!buf) {
return NULL;
}
if (read(fd, buf, BLOCK_SIZE) != BLOCK_SIZE) {
return NULL;
}
return buf;
}
```

Recommendation

Because memory leaks can be difficult to track down, you should establish a set of memory management patterns and idioms for your software. Do not tolerate deviations from your conventions.

One good pattern for addressing the error handling mistake in the example is to use forward-reaching `goto` statements so that the function has a single well-defined region for handling errors, as follows:

```
char* getBlock(int fd) {
char* buf = (char*) malloc(BLOCK_SIZE);
if (!buf) {
goto ERR;
}
if (read(fd, buf, BLOCK_SIZE) != BLOCK_SIZE) {
goto ERR;
}
```

```

}
return buf;

ERR:
if (buf) {
free(buf);
}
return NULL;
}

```

References

2003

Instances

Memory Leak

High

Package: N/A

Location	Analysis Info	Analyzer
ID 13985031 - lib/clean-temp.c:409	Sink: gl_list_add_first(?, xstrdup(absolute_dir_name)) in clean-temp.c:409 Enclosing Method: register_temp_subdir	controlflow
ID 13985025 - lib/clean-temp.c:317	Sink: tmpdir = xmalloc(...) in clean-temp.c:317 Enclosing Method: create_temp_dir	controlflow
ID 13985026 - lib/clean-temp.c:374	Sink: gl_list_add_first(?, xstrdup(absolute_file_name)) in clean-temp.c:374 Enclosing Method: register_temp_file	controlflow
ID 13985024 - lib/closein.c:102	Sink: quotearg_colon(...) in closein.c:102 Enclosing Method: close_stdin	controlflow
ID 13985023 - lib/closeout.c:114	Sink: quotearg_colon(...) in closeout.c:114 Enclosing Method: close_stdout	controlflow
ID 13985020 - lib/gl_anytree_osest.h:147	Sink: gl_tree_nx_add_first(...) in gl_anytree_osest.h:147 Enclosing Method: gl_tree_nx_add	controlflow
ID 13985027 - lib/localcharset.c:224	Sink: res_ptr = malloc(...) in localcharset.c:224 Enclosing Method: get_charset_aliases	controlflow

6.1.2 Null Dereference

High

CWE ID 476

OWASP Top 10: None

PCI 3.0: Requirement 6.5.5

Summary

The function in can crash the program by dereferencing a null pointer on line .The program can potentially dereference a null pointer, thereby causing a segmentation fault.

Explanation

Null pointer exceptions usually occur when one or more of the programmer's assumptions is violated. There are at least three flavors of this problem: check-after-dereference, dereference-after-check, and dereference-after-store. A check-after-dereference error occurs when a program dereferences a pointer that can be null before checking if the pointer is null. Dereference-after-check errors occur when a program makes an explicit check for null, but proceeds to dereference the pointer when it is known to be null. Errors of this type are often the result of a typo or programmer oversight. A dereference-after-store error occurs when a program explicitly sets a pointer to null and dereferences it later. This error is often the result of a programmer initializing a variable to null when it is declared.

In this case the variable can be null when it is dereferenced at line **4937**, thereby causing a segmentation fault.

Most null pointer issues result in general software reliability problems, but if an attacker can intentionally trigger a null pointer dereference, the attacker may be able to use the resulting exception to bypass security logic in order to mount a denial of service attack, or to cause the application to reveal debugging information that will be valuable in planning subsequent attacks.

Example 1: In the following code, the programmer assumes that the variable `ptr` is not `NULL`. That assumption is made explicit when the programmer dereferences the pointer. This assumption is later contradicted when the programmer checks `ptr` against `NULL`. If `ptr` can be `NULL` when it is checked in the `if` statement then it can also be `NULL` when it dereferenced and may cause a segmentation fault.

```
ptr->field = val;
...
if (ptr != NULL) {
...
}
```

Example 2: In the following code, the programmer confirms that the variable `ptr` is `NULL` and subsequently dereferences it erroneously. If `ptr` is `NULL` when it is checked in the `if` statement, then a null dereference will occur, thereby causing a segmentation fault.

```
if (ptr == null) {
ptr->field = val;
...
}
```

Example 3: In the following code, the programmer forgets that the string `'\0'` is actually `0` or `NULL`, thereby dereferencing a null pointer and causing a segmentation fault.

```
if (ptr == '\0') {
*ptr = val;
...
}
```

Example 4: In the following code, the programmer explicitly sets the variable `ptr` to `NULL`. Later, the programmer dereferences `ptr` before checking the object for a null value.

```
*ptr = NULL;
...
ptr->field = val;
...
```



```
}
```

Recommendation

Security problems caused by dereferencing `NULL` pointers almost always take the form of denial of service attacks. If an attacker can consistently trigger a null pointer dereference then other users may be prevented from gaining legitimate access to the application. Apart from situations where an attacker can deliberately trigger a segmentation fault, dereferencing a null pointer may cause sporadic crashes that can be hard to track down.

Implement careful checks before dereferencing objects that might be null. When possible, abstract null checks into wrappers around code that manipulates resources to ensure that they are applied in all cases and to minimize the places where mistakes can occur.

Instances

Null Dereference

High

Package: N/A		
Location	Analysis Info	Analyzer
ID 13985022 - lib/vasnprintf.c:4937	Sink: Dereferenced : result in vasnprintf.c:4937 Enclosing Method: vasnprintf	controlflow
ID 13985029 - lib/vasnprintf.c:5549	Sink: Dereferenced : result in vasnprintf.c:5549 Enclosing Method: vasnprintf	controlflow
ID 13985033 - lib/vasnprintf.c:1905	Sink: Dereferenced : result in vasnprintf.c:1905 Enclosing Method: vasnprintf	controlflow

6.1.3 Unreleased Resource

High

CWE ID 404

OWASP Top 10: None

PCI 3.0: Requirement 6.5.6

Summary

The function in sometimes fails to release a system resource allocated by on line .The program can potentially fail to release a system resource.

Explanation

The program can potentially fail to release a system resource.

In this case, there are program paths on which the resource allocated in **builtin.c** at line **1348** is not always released.

Resource leaks have at least two common causes:

- Error conditions and other exceptional circumstances.
- Confusion over which part of the program is responsible for releasing the resource.

Most unreleased resource issues result in general software reliability problems, but if an attacker can intentionally trigger a resource leak, the attacker may be able to launch a denial of service by depleting the resource pool.

Example: The following function does not close the file handle it opens if an error occurs. If the process is long-lived, the process can run out of file handles.

```
int decodeFile(char* fName)
{
char buf[BUF_SZ];
FILE* f = fopen(fName, "r");

if (!f) {
printf("cannot open %s\n", fName);
return DECODE_FAIL;
} else {
while (fgets(buf, BUF_SZ, f)) {
if (!checkChecksum(buf)) {
return DECODE_FAIL;
} else {
decodeBlock(buf);
}
}
}
fclose(f);
return DECODE_SUCCESS;
}
```

Recommendation

Because resource leaks can be hard to track down, establish a set of resource management patterns and idioms for your software and do not tolerate deviations from your conventions.

One good pattern for addressing the error handling mistake in this example is to use forward-reaching `goto` statements so that the function has a single well-defined region for handling errors, as follows:

```
int decodeFile(char* fName)
{
char buf[BUF_SZ];
FILE* f = fopen(fName, "r");

if (!f) {
goto ERR;
}
```

```

} else {
while (fgets(buf, BUF_SZ, f)) {
if (!checkChecksum(buf)) {
goto ERR;
} else {
decodeBlock(buf);
}
}
fclose(f);
return DECODE_SUCCESS;

ERR:
if (!f) {
printf("cannot open %s\n", fName);
} else {
fclose(f);
}
return DECODE_FAIL;
}

```

Instances

Unreleased Resource

High

Package: N/A

Location	Analysis Info	Analyzer
ID 13985021 - src/builtin.c:1348	Sink: fp = m4_path_search(...) in builtin.c:1348 Enclosing Method: include	controlflow
ID 13985030 - src/m4.c:338	Sink: fp = m4_path_search(...) in m4.c:338 Enclosing Method: process_file	controlflow

6.1.4 Use After Free

High

CWE ID 416

OWASP Top 10: None

PCI 3.0: Requirement 6.5.6

Summary

The function in references a freed memory location on line .Referencing memory after it has been freed can cause a program to crash.

Explanation

Use after free errors occur when a program continues to use a pointer after it has been freed. Like double free errors and memory leaks, use after free errors have two common and sometimes overlapping causes:

- Error conditions and other exceptional circumstances.
- Confusion over which part of the program is responsible for freeing the memory

In this case the data is freed in **clean-temp.c** at line **511** and used again in **clean-temp.c** at line **525**.

Use after free errors sometimes have no effect and other times cause a program to crash. While it is technically feasible for the freed memory to be re-allocated and for an attacker to use this reallocation to launch a buffer overflow attack, we are unaware of any exploits based on this type of attack.

Example: The following code illustrates a use after free error:

```
char* ptr = (char*)malloc (SIZE);
...
if (err) {
  abrt = 1;
  free(ptr);
}
...
if (abrt) {
  logError("operation aborted before commit", ptr);
}
```

Recommendation

Guard against using memory after it has been freed by giving up all references to the memory immediately after calling `free()` . This is commonly achieved by replacing calls to `free()` with a macro that assigns `NULL` to the pointer immediately after it is freed:

```
#define FREE( ptr ) {free(ptr); ptr = NULL;}
```

While this technique prevents the freed memory from being used again, if there is still confusion about when the memory is supposed to be freed, assigning the `NULL` to the pointer can result in a null pointer dereference. In most cases this is probably an improvement, because the error is more likely to be caught during testing and is less likely to lead to an exploitable vulnerability. It transforms an error with unpredictable behavior into an error that is easier to debug.

Instances

Use After Free

High

Package: N/A		
Location	Analysis Info	Analyzer
ID 13985028 - lib/clean-temp.c:525	Sink: gl_list_remove_node(.. , node) : Pointer node used after it was previously freed in clean-temp.c:525 Enclosing Method: cleanup_temp_dir_contents	controlflow

ID 13985032 - lib/clean-temp.c:511

Sink:g_list_remove_node(.., node) : Pointer node used after it was previously freed in clean-temp.c:511
Enclosing Method:cleanup_temp_dir_contents

controlflow











Analysis Traces

Below is an enumeration of all static issues with their stack trace sections.

ID 13985031 - Memory Leak

High

Analysis Trace

-  clean-temp.c:408 - Branch taken:
-  clean-temp.c:409 - xstrdup(...)
-  clean-temp.c:409 - gl_list_add_first(
 gl_xlist.h:117 - elt refers to dynamically allocated
-  gl_xlist.h:119 - gl_list_nx_add_first(?, elt)
 gl_list.h:688 - elt refers to dynamically allocated
-  gl_list.h:691 - gl_linked_nx_add_first(?, elt)
 gl_anylinked_list2.h:596 - elt refers to dynamically
-  gl_anylinked_list2.h:601 - Branch taken: (node ==
-  gl_anylinked_list2.h:602 - return
-  gl_list.h:690 - return
-  gl_xlist.h:120 - Branch not taken: (result != NULL)
-  gl_xlist.h:122 - return
- clean-temp.c:409 - <inline expression> no longer refers to
- clean-temp.c:409 - end scope : Memory leaked

Source

```
lib/clean-temp.c:405-411
struct tmpdir *tmpdir = (struct tmpdir *)dir;

/* Add absolute_dir_name to tmpdir->subdirs, without duplicates. */
if (gl_list_search(tmpdir->subdirs, absolute_dir_name) == NULL)
    gl_list_add_first(tmpdir->subdirs, xstrdup(absolute_dir_name));
}

lib/clean-temp.c:406-412

/* Add absolute_dir_name to tmpdir->subdirs, without duplicates. */
if (gl_list_search(tmpdir->subdirs, absolute_dir_name) == NULL)
    gl_list_add_first(tmpdir->subdirs, xstrdup(absolute_dir_name));
}

/* Unregister the given ABSOLUTE_DIR_NAME as being a subdirectory inside DIR,

lib/gl_xlist.h:114-120
}

GL_XLIST_INLINE gl_list_node_t
gl_list_add_first(gl_list_t list, const void *elt)
{
    gl_list_node_t result = gl_list_nx_add_first(list, elt);
    if (result == NULL)

lib/gl_xlist.h:116-122
GL_XLIST_INLINE gl_list_node_t
gl_list_add_first(gl_list_t list, const void *elt)
{
    gl_list_node_t result = gl_list_nx_add_first(list, elt);
    if (result == NULL)
        xalloc_die();
    return result;
}

lib/gl_list.h:685-691
#if __GNUC__ > 3 || (__GNUC__ == 3 && __GNUC_MINOR__ >= 4)
__attribute__((warn_unused_result))
#endif
gl_list_nx_add_first(gl_list_t list, const void *elt)
{
    return ((const struct gl_list_impl_base *) list)->vtable
        ->nx_add_first(list, elt);
}

lib/gl_list.h:688-694
gl_list_nx_add_first(gl_list_t list, const void *elt)
{
    return ((const struct gl_list_impl_base *) list)->vtable
        ->nx_add_first(list, elt);
}

GL_LIST_INLINE gl_list_node_t

lib/gl_anylinked_list2.h:593-599
}

static gl_list_node_t
gl_linked_nx_add_first(gl_list_t list, const void *elt)
{
    gl_list_node_t node =
        (struct gl_list_node_impl *) malloc(sizeof(struct gl_list_node_impl));

lib/gl_anylinked_list2.h:598-604
gl_list_node_t node =
    (struct gl_list_node_impl *) malloc(sizeof(struct gl_list_node_impl));

    if (node == NULL)
        return NULL;

    ASYNCSAFE(const void *) node->value = elt;

lib/gl_anylinked_list2.h:599-605
    (struct gl_list_node_impl *) malloc(sizeof(struct gl_list_node_impl));

    if (node == NULL)
        return NULL;

    ASYNCSAFE(const void *) node->value = elt;
    #if WITH_HASHTABLE
```

lib/gl_list.h:687-693

```
#endif
gl_list_nx_add_first (gl_list_t list, const void *elt)
{
    return ((const struct gl_list_impl_base *) list)->vtable
        ->nx_add_first (list, elt);
}
```

lib/gl_xlist.h:117-123

```
gl_list_add_first (gl_list_t list, const void *elt)
{
    gl_list_node_t result = gl_list_nx_add_first (list, elt);
    if (result == NULL)
        xalloc_die ();
    return result;
}
```

lib/gl_xlist.h:119-125

```
gl_list_node_t result = gl_list_nx_add_first (list, elt);
if (result == NULL)
    xalloc_die ();
return result;
}
```

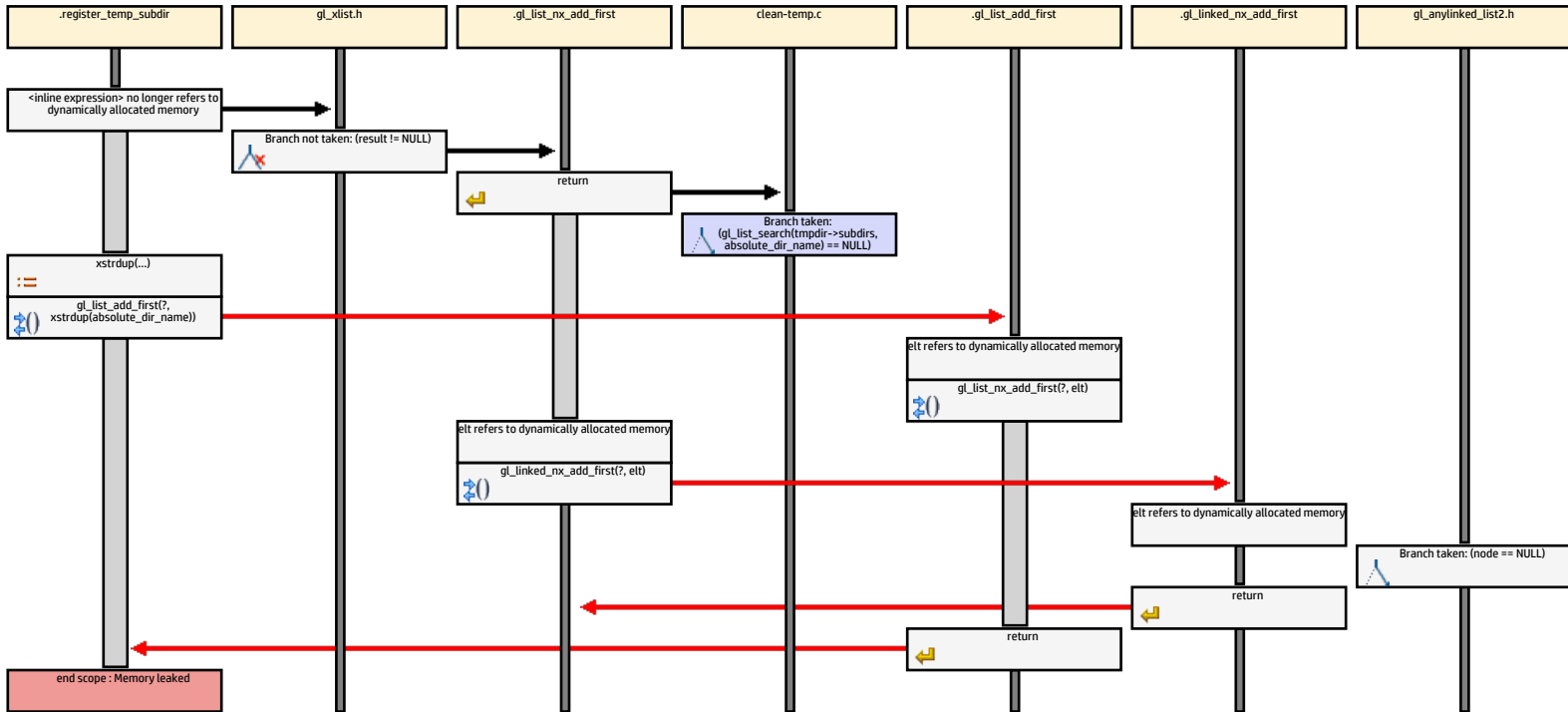
GL_XLIST_INLINE gl_list_node_t

lib/clean-temp.c:406-412





```
/* Add absolute_dir_name to tmpdir->subdirs, without duplicates. */
if (gl_list_search (tmpdir->subdirs, absolute_dir_name) == NULL)
    gl_list_add_first (tmpdir->subdirs, xstrdup (absolute_dir_name));
}
```

/* Unregister the given ABSOLUTE_DIR_NAME as being a subdirectory inside DIR,

Analysis Trace Diagram



Analysis Trace

-  clean-temp.c:317 - tmpdir = xmalloc(...)
- clean-temp.c:317 - tmpdir refers to dynamically allocated
-  clean-temp.c:329 - Branch taken: (path_search(xtemplate,
-  clean-temp.c:333 - goto
-  clean-temp.c:360 - return
- clean-temp.c:360 - tmpdir no longer refers to dynamically
- clean-temp.c:360 - tmpdir end scope : Memory leaked

Source

lib/clean-temp.c:314-320

```

}

/* Initialize a 'struct tmpdir'. */
tmpdir = XMALLOC (struct tmpdir);
tmpdir->dirname = NULL;
tmpdir->cleanup_verbose = cleanup_verbose;
tmpdir->subdirs = gl_list_create_empty (GL_LINKEDHASH_LIST,

```

lib/clean-temp.c:326-332

```

/* Create the temporary directory. */
xtemplate = (char *) xalloca (PATH_MAX);
if (path_search (xtemplate, PATH_MAX, parentdir, prefix, parentdir == NULL))
{
    error (0, errno,
        _("cannot find a temporary directory, try setting $TMPDIR"));
}

```

lib/clean-temp.c:330-336

```

{
    error (0, errno,
        _("cannot find a temporary directory, try setting $TMPDIR"));
    goto quit;
}
block_fatal_signals ();
tmpdirname = mkdtemp (xtemplate);

```

lib/clean-temp.c:357-363

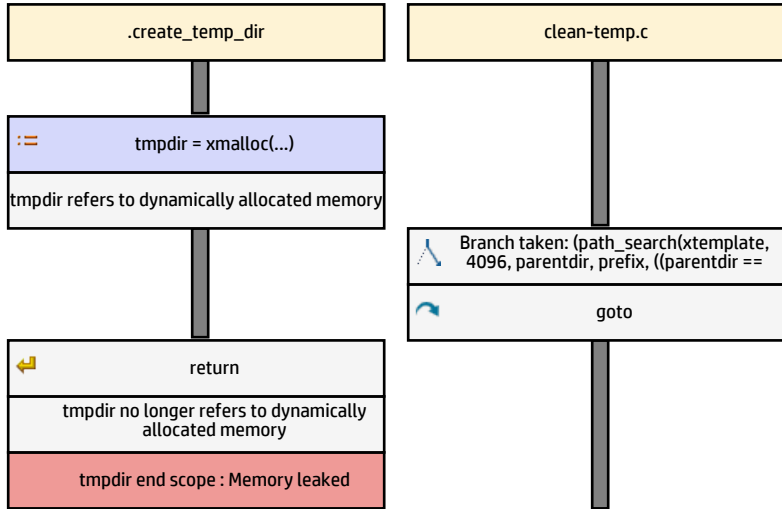
```

quit:
freea (xtemplate);
return NULL;
}

/* Register the given ABSOLUTE_FILE_NAME as being a file inside DIR, that

```

Analysis Trace Diagram



Analysis Trace

```

clean-temp.c:373 - Branch taken:
clean-temp.c:374 - xstrdup(...)
clean-temp.c:374 - gl_list_add_first(,
gl_xlist.h:117 - elt refers to dynamically allocated
gl_xlist.h:119 - gl_list_nx_add_first(?, elt)
gl_list.h:688 - elt refers to dynamically allocated
gl_list.h:691 - gl_linked_nx_add_first(?, elt)
gl_anylinked_list2.h:596 - elt refers to dynamically
gl_anylinked_list2.h:601 - Branch taken: (node ==
gl_anylinked_list2.h:602 - return
gl_list.h:690 - return
gl_xlist.h:120 - Branch not taken: (result != NULL)
gl_xlist.h:122 - return
clean-temp.c:374 - <inline expression> no longer refers to
clean-temp.c:374 - end scope : Memory leaked

```

Source

```

lib/clean-temp.c:370-376
struct tmpdir *tmpdir = (struct tmpdir *)dir;

/* Add absolute_file_name to tmpdir->files, without duplicates. */
if (gl_list_search (tmpdir->files, absolute_file_name) == NULL)
  gl_list_add_first (tmpdir->files, xstrdup (absolute_file_name));
}

lib/clean-temp.c:371-377
/* Add absolute_file_name to tmpdir->files, without duplicates. */
if (gl_list_search (tmpdir->files, absolute_file_name) == NULL)
  gl_list_add_first (tmpdir->files, xstrdup (absolute_file_name));
}

/* Unregister the given ABSOLUTE_FILE_NAME as being a file inside DIR, that

lib/gl_xlist.h:114-120
}

GL_XLIST_INLINE gl_list_node_t
gl_list_add_first (gl_list_t list, const void *elt)
{
  gl_list_node_t result = gl_list_nx_add_first (list, elt);
  if (result == NULL)
}

lib/gl_xlist.h:116-122
GL_XLIST_INLINE gl_list_node_t
gl_list_add_first (gl_list_t list, const void *elt)
{
  gl_list_node_t result = gl_list_nx_add_first (list, elt);
  if (result == NULL)
    xalloc_die ();
  return result;
}

lib/gl_list.h:685-691
#if __GNUC__ > 3 || (__GNUC__ == 3 && __GNUC_MINOR__ >= 4)
__attribute__((warn_unused_result))
#endif
gl_list_nx_add_first (gl_list_t list, const void *elt)
{
  return ((const struct gl_list_impl_base *) list)->vtable
    ->nx_add_first (list, elt);
}

lib/gl_list.h:688-694
gl_list_nx_add_first (gl_list_t list, const void *elt)
{
  return ((const struct gl_list_impl_base *) list)->vtable
    ->nx_add_first (list, elt);
}

GL_LIST_INLINE gl_list_node_t

lib/gl_anylinked_list2.h:593-599
}

static gl_list_node_t
gl_linked_nx_add_first (gl_list_t list, const void *elt)
{
  gl_list_node_t node =
    (struct gl_list_node_impl *) malloc (sizeof (struct gl_list_node_impl));

lib/gl_anylinked_list2.h:598-604
gl_list_node_t node =
  (struct gl_list_node_impl *) malloc (sizeof (struct gl_list_node_impl));

if (node == NULL)
  return NULL;

ASYNCSAFE(const void *) node->value = elt;

lib/gl_anylinked_list2.h:599-605
(struct gl_list_node_impl *) malloc (sizeof (struct gl_list_node_impl));

if (node == NULL)
  return NULL;

ASYNCSAFE(const void *) node->value = elt;
#if WITH_HASHTABLE

lib/gl_list.h:687-693

```

```
gl_list_nx_add_first(gl_list_t list, const void *elt)
{
    return ((const struct gl_list_impl_base *) list)->vtable
        ->nx_add_first(list, elt);
}
```

lib/gl_xlist.h:117-123

```
gl_list_add_first(gl_list_t list, const void *elt)
{
    gl_list_node_t result = gl_list_nx_add_first(list, elt);
    if (result == NULL)
        xalloc_die();
    return result;
}
```

lib/gl_xlist.h:119-125

```
gl_list_node_t result = gl_list_nx_add_first(list, elt);
if (result == NULL)
    xalloc_die();
return result;
}
```

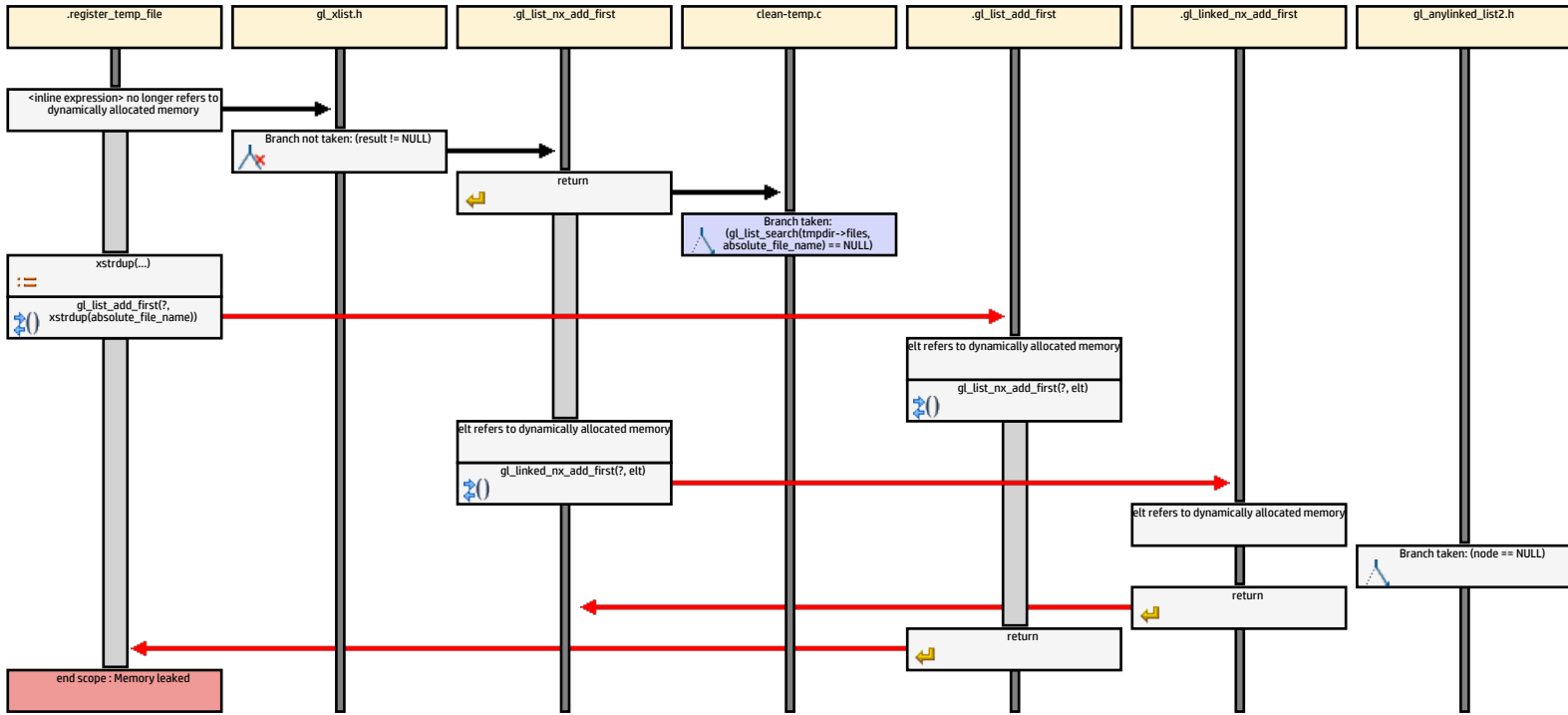
GL_XLIST_INLINE gl_list_node_t

lib/clean-temp.c:371-377

```
/* Add absolute_file_name to tmpdir->files, without duplicates. */
if (gl_list_search(tmpdir->files, absolute_file_name) == NULL)
    gl_list_add_first(tmpdir->files, xstrdup(absolute_file_name));
}
```

/* Unregister the given ABSOLUTE_FILE_NAME as being a file inside DIR, that

Analysis Trace Diagram



Analysis Trace

```

closein.c:96 - Branch taken: (fail != 0)
closein.c:101 - Branch taken: (file_name != 0)
closein.c:102 - quotearg_colon(...)
quotearg.c:894 - quotearg_char(...)
quotearg.c:888 - quotearg_char_mem(...)
quotearg.c:882 - quotearg_n_options(...)
quotearg.c:777 - Branch not taken: (nslots > n0)
quotearg.c:808 - Branch taken: (size <= qsize)
quotearg.c:813 - val = xcharalloc(...)
xalloc.h:220 - xmalloc(...)
xalloc.h:220 - return
quotearg.c:813 - val refers to dynamically allocated
quotearg.c:821 - return
quotearg.c:882 - return
quotearg.c:888 - return
quotearg.c:894 - return
closein.c:103 - <inline expression> no longer refers to
closein.c:103 - end scope : Memory leaked

```

Source

lib/closein.c:93-99

```

}
if (close_stream (stdin) != 0)
fail = true;
if (fail)
{
/* Report failure, but defer exit until after closing stdout,
since the failure report should still be flushed. */

```

lib/closein.c:98-104

```

/* Report failure, but defer exit until after closing stdout,
since the failure report should still be flushed. */
char const *close_error = _("error closing file");
if (file_name)
error (0, errno, "%s: %s", quotearg_colon (file_name),
close_error);
else

```

lib/closein.c:99-105

```

since the failure report should still be flushed. */
char const *close_error = _("error closing file");
if (file_name)
error (0, errno, "%s: %s", quotearg_colon (file_name),
close_error);
else
error (0, errno, "%s", close_error);

```

lib/quotearg.c:891-897

```

char *
quotearg_colon (char const *arg)
{
return quotearg_char (arg, ':');
}

```

char *

lib/quotearg.c:885-891

```

char *
quotearg_char (char const *arg, char ch)
{
return quotearg_char_mem (arg, SIZE_MAX, ch);
}

```

char *

lib/quotearg.c:879-885

```

struct quoting_options options;
options = default_quoting_options;
set_char_quoting (&options, ch, 1);
return quotearg_n_options (0, arg, argsize, &options);
}

```

char *

lib/quotearg.c:774-780

```

if (n < 0)
abort ();

if (nslots <= n0)
{
/* FIXME: technically, the type of n1 should be 'unsigned int',
but that evokes an unsuppressible warning from gcc-4.0.1 and

```

lib/quotearg.c:805-811

```

options->left_quote,
options->right_quote);

if (size <= qsize)
{
sv[n].size = size = qsize + 1;
if (val != slot0)

```

lib/quotearg.c:810-816

```

sv[n].size = size = qsize + 1;
if (val != slot0)
free (val);
sv[n].val = val = xcharalloc (size);
quotearg_buffer_restyled (val, size, arg, argsize, options->style,
flags, options->quote_these_too,
options->left_quote,

```

lib/xalloc.h:217-223

```
xcharalloc (size_t n)
{
    return XNMALLOC (n, char);
}
```

```
#ifdef __cplusplus
```

lib/quotearg.c:810-816

```
sv[n].size = size = qsize + 1;
if (val != slot0)
    free (val);
sv[n].val = val = xcharalloc (size);
quotearg_buffer_restyled (val, size, arg, argsize, options->style,
    flags, options->quote_these_too,
    options->left_quote,
```

lib/quotearg.c:818-824

```
    }
    }
    errno = e;
    return val;
}
}
```

lib/quotearg.c:879-885

```
struct quoting_options options;
options = default_quoting_options;
set_char_quoting (&options, ch, 1);
return quotearg_n_options (0, arg, argsize, &options);
}
```

```
char *
```

lib/quotearg.c:885-891

```
char *
quotearg_char (char const *arg, char ch)
{
    return quotearg_char_mem (arg, SIZE_MAX, ch);
}
```

```
char *
```

lib/quotearg.c:891-897

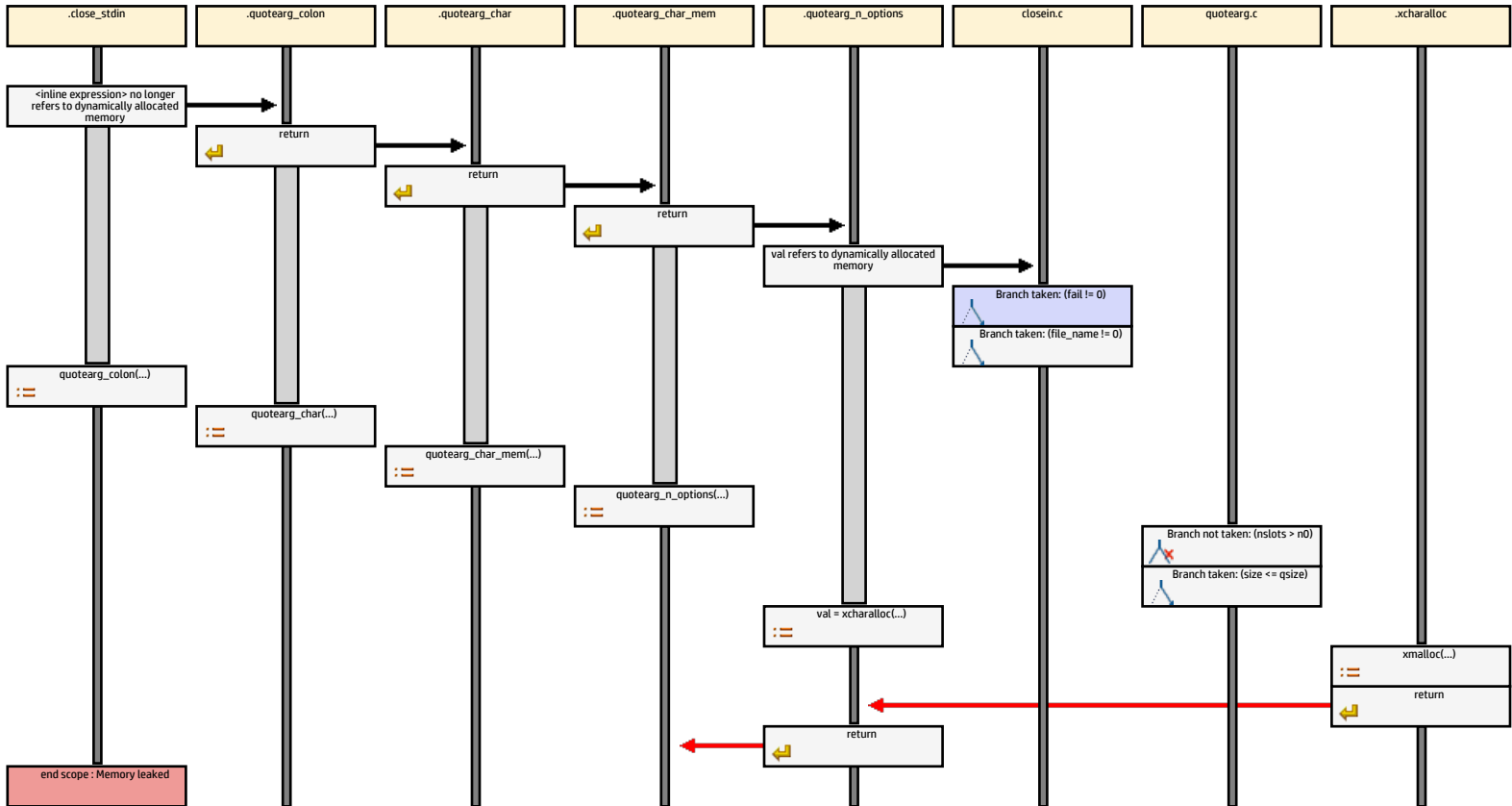
```
char *
quotearg_colon (char const *arg)
{
    return quotearg_char (arg, ':');
}
```

```
char *
```

lib/closein.c:100-106

```
char const *close_error = _("error closing file");
if (file_name)
    error (0, errno, "%s: %s", quotearg_colon (file_name),
        close_error);
else
    error (0, errno, "%s", close_error);
}
```

Analysis Trace Diagram



Analysis Trace

```

closeout.c:109 - Branch taken: (close_stream(stdout) != 0)
closeout.c:110 - Branch taken: (ignore_EPIPE == 0)
closeout.c:113 - Branch taken: (file_name != 0)
closeout.c:114 - quotearg_colon(...)
quotearg.c:894 - quotearg_char(...)
quotearg.c:888 - quotearg_char_mem(...)
quotearg.c:882 - quotearg_n_options(...)
quotearg.c:777 - Branch not taken: (nslots > n0)
quotearg.c:808 - Branch taken: (size <= qsize)
quotearg.c:813 - val = xcharalloc(...)
xalloc.h:220 - xmalloc(...)
xalloc.h:220 - return
quotearg.c:813 - val refers to dynamically allocated
quotearg.c:821 - return
quotearg.c:882 - return
quotearg.c:888 - return
quotearg.c:894 - return
closeout.c:115 - <inline expression> no longer refers to
closeout.c:115 - end scope : Memory leaked

```

Source

lib/closeout.c:106-112

```

void
close_stdout (void)
{
  if (close_stream (stdout) != 0
      && !(ignore_EPIPE && errno == EPIPE))
    { char const *write_error = _("write error");

```

lib/closeout.c:107-113

```

close_stdout (void)
{
  if (close_stream (stdout) != 0
      && !(ignore_EPIPE && errno == EPIPE))
    { char const *write_error = _("write error");
      if (file_name)

```

lib/closeout.c:110-116

```

      && !(ignore_EPIPE && errno == EPIPE))
    {
      char const *write_error = _("write error");
      if (file_name)
        error (0, errno, "%s: %s", quotearg_colon (file_name),
              write_error);
      else

```

lib/closeout.c:111-117

```

    {
      char const *write_error = _("write error");
      if (file_name)
        error (0, errno, "%s: %s", quotearg_colon (file_name),
              write_error);
      else
        error (0, errno, "%s", write_error);

```

lib/quotearg.c:891-897

```

char *
quotearg_colon (char const *arg)
{
  return quotearg_char (arg, ':');
}

```

char *

lib/quotearg.c:885-891

```

char *
quotearg_char (char const *arg, char ch)
{
  return quotearg_char_mem (arg, SIZE_MAX, ch);
}

```

char *

lib/quotearg.c:879-885

```

struct quoting_options options;
options = default_quoting_options;
set_char_quoting (&options, ch, 1);
return quotearg_n_options (0, arg, argsize, &options);
}

```

char *

lib/quotearg.c:774-780

```

if (n < 0)
  abort ();

if (nslots <= n0)
  {
    /* FIXME: technically, the type of n1 should be 'unsigned int',
       but that evokes an unsuppressible warning from gcc-4.0.1 and

```

lib/quotearg.c:805-811

```

        options->left_quote,
        options->right_quote);

if (size <= qsize)
  {
    sv[n].size = size = qsize + 1;
    if (val != slot0)

```

lib/quotearg.c:810-816

```
if (val != slot0)
    free (val);
sv[n].val = val = xcharalloc (size);
quotearg_buffer_restyled (val, size, arg, argsize, options->style,
    flags, options->quote_these_too,
    options->left_quote,
```

lib/xalloc.h:217-223

```
XALLOC_INLINE char *
xcharalloc (size_t n)
{
    return XNMALLOC (n, char);
}
```

```
#ifdef __cplusplus
```

lib/quotearg.c:810-816

```
sv[n].size = size = qsize + 1;
if (val != slot0)
    free (val);
sv[n].val = val = xcharalloc (size);
quotearg_buffer_restyled (val, size, arg, argsize, options->style,
    flags, options->quote_these_too,
    options->left_quote,
```

lib/quotearg.c:818-824

```

}

errno = e;
return val;
}
}
```

lib/quotearg.c:879-885

```
struct quoting_options options;
options = default_quoting_options;
set_char_quoting (&options, ch, 1);
return quotearg_n_options (0, arg, argsize, &options);
}
```

```
char *
```

lib/quotearg.c:885-891

```
char *
quotearg_char (char const *arg, char ch)
{
    return quotearg_char_mem (arg, SIZE_MAX, ch);
}
```

```
char *
```

lib/quotearg.c:891-897

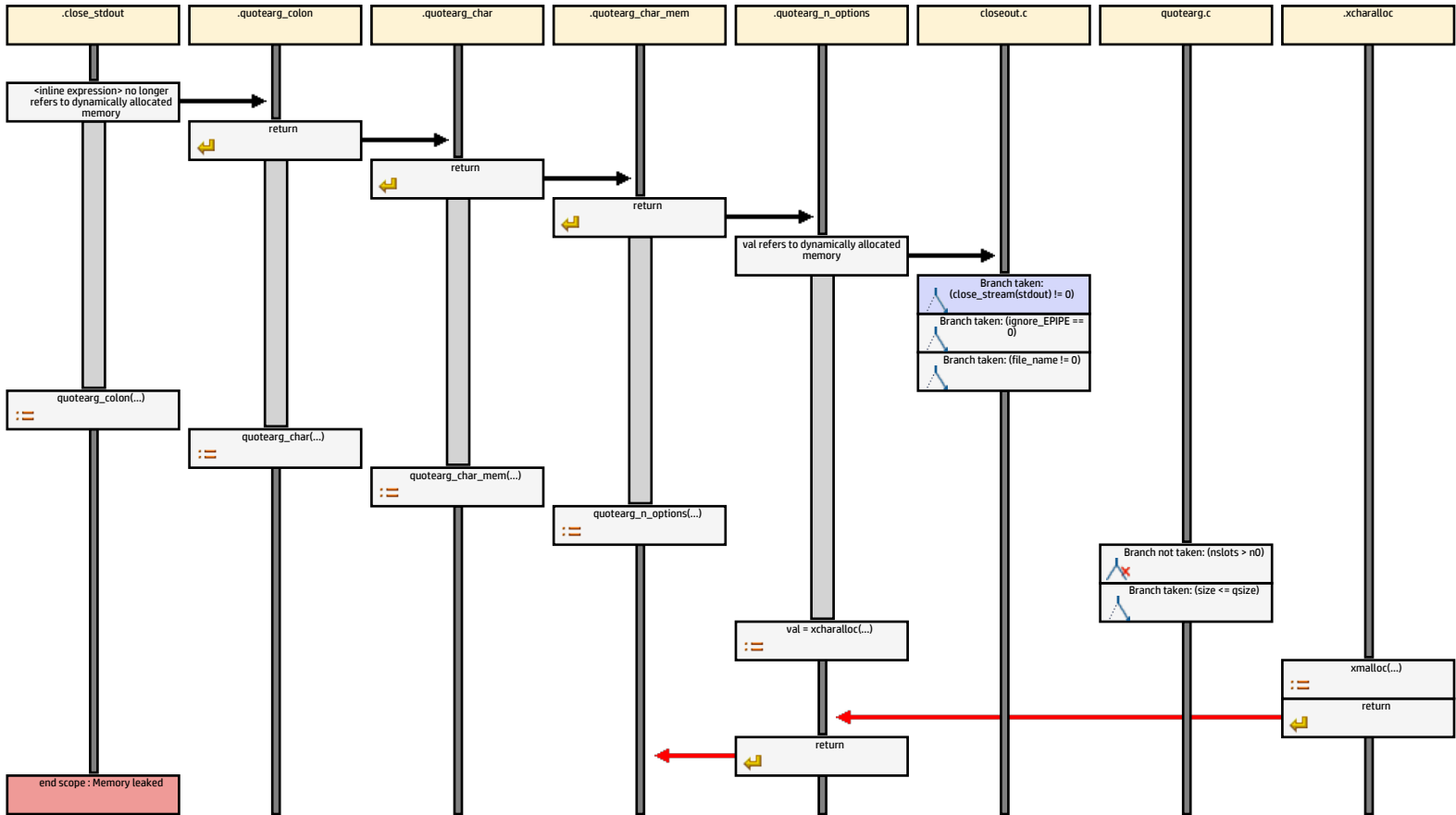
```
char *
quotearg_colon (char const *arg)
{
    return quotearg_char (arg, ':');
}
```

```
char *
```








lib/closeout.c:112-118

```
char const *write_error = _("write error");
if (file_name)
    error (0, errno, "%s: %s", quotearg_colon (file_name),
        write_error);
else
    error (0, errno, "%s", write_error);
```

Analysis Trace Diagram



Analysis Trace

 gl_anytree_osest.h:145 - Branch taken: (node == NULL)
 gl_anytree_osest.h:147 - gl_tree_nx_add_first(...)
 gl_avltree_osest.c:310 - new_node = malloc(...)
 gl_avltree_osest.c:310 - new_node refers to dynamically
 gl_avltree_osest.c:313 - Branch not taken: (new_node !=
 gl_avltree_osest.c:322 - Branch not taken: (set->root !=
 gl_avltree_osest.c:334 - new_node refers to dynamically
 gl_avltree_osest.c:341 - new_node no longer refers to
 gl_avltree_osest.c:344 - return
 gl_anytree_osest.h:147 - Branch not taken:
 gl_anytree_osest.h:148 - <inline expression> no longer
 gl_anytree_osest.h:148 - end scope : Memory leaked

Source

lib/gl_anytree_osest.h:142-148

```

gl_setelement_compar_fn compar;
gl_osest_node_t node = set->root;

if (node == NULL)
{
    if (gl_tree_nx_add_first (set, elt) == NULL)
        return -1;
}

```

lib/gl_anytree_osest.h:144-150

```

if (node == NULL)
{
    if (gl_tree_nx_add_first (set, elt) == NULL)
        return -1;
    return true;
}

```

lib/gl_avltree_osest.c:307-313

```

gl_tree_nx_add_first (gl_osest_t set, const void *elt)
{
    /* Create new node. */
    gl_osest_node_t new_node =
        (struct gl_osest_node_impl *) malloc (sizeof (struct gl_osest_node_impl));

    if (new_node == NULL)

```

lib/gl_avltree_osest.c:310-316

```

gl_osest_node_t new_node =
    (struct gl_osest_node_impl *) malloc (sizeof (struct gl_osest_node_impl));

if (new_node == NULL)
    return NULL;

new_node->left = NULL;

```

lib/gl_avltree_osest.c:319-325

```

new_node->value = elt;

/* Add it to the tree. */
if (set->root == NULL)
{
    set->root = new_node;
    new_node->parent = NULL;
}

```

lib/gl_avltree_osest.c:331-337

```

for (node = set->root; node->left != NULL;)
    node = node->left;

node->left = new_node;
new_node->parent = node;
node->balance--;

```

lib/gl_avltree_osest.c:338-344

```

/* Rebalance. */
if (node->right == NULL && node->parent != NULL)
    rebalance (set, node, 1, node->parent);
}

set->count++;
return new_node;

```

lib/gl_avltree_osest.c:341-347

```

}

set->count++;
return new_node;
}

static gl_osest_node_t

```

lib/gl_anytree_osest.h:144-150

```

if (node == NULL)
{
    if (gl_tree_nx_add_first (set, elt) == NULL)
        return -1;
    return true;
}

```

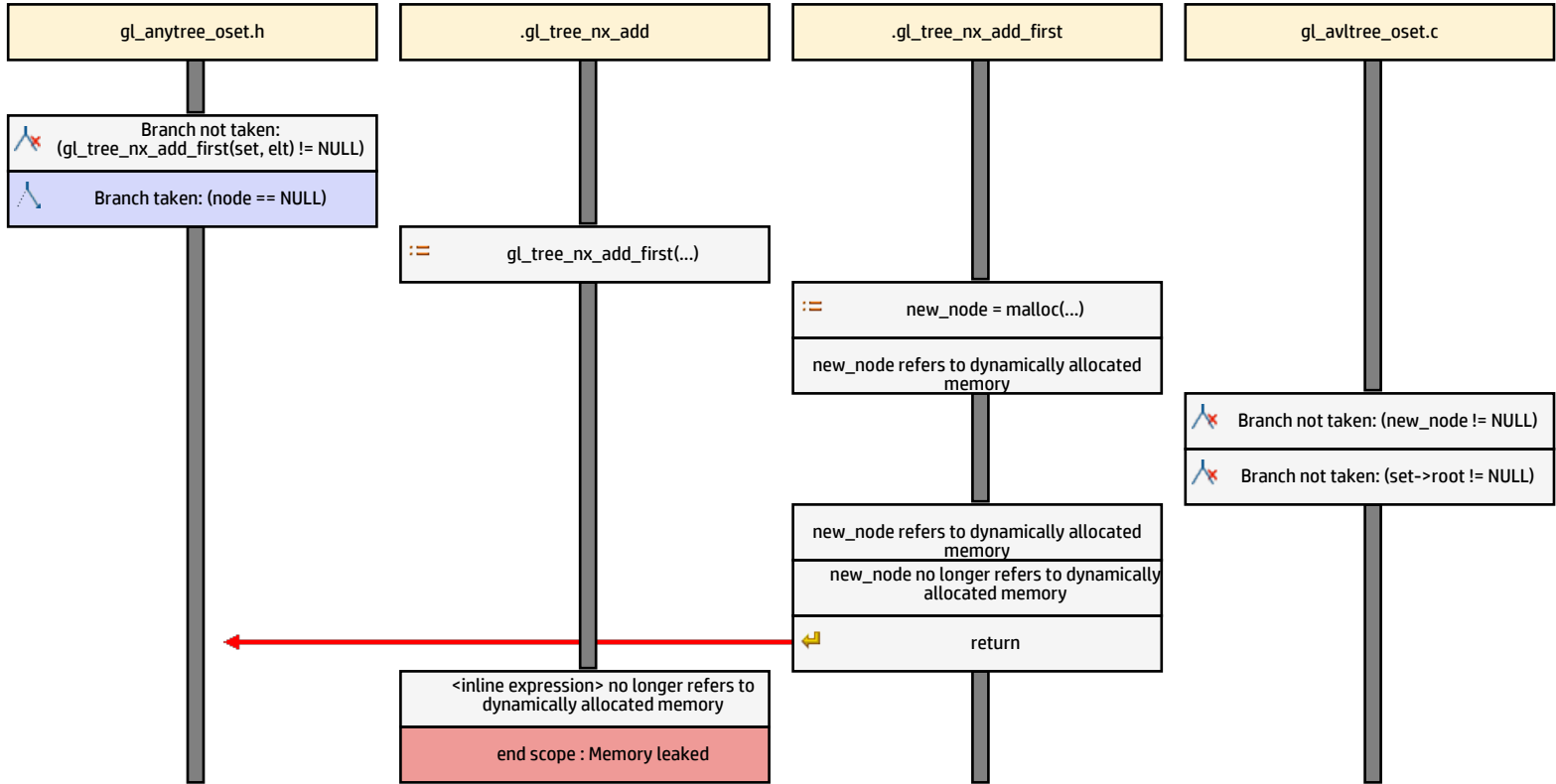
lib/gl_anytree_osest.h:145-151

```

{
  if (gl_tree_nx_add_first (set, elt) == NULL)
    return -1;
  return true;
}

```

Analysis Trace Diagram



Analysis Trace

- localcharset.c:128 - Branch taken: (cp == NULL)
 - localcharset.c:156 - Branch not taken: (file_name != NULL)
 - localcharset.c:172 - Branch not taken: (fd >= 0)
 - localcharset.c:180 - Branch not taken: (fp != NULL)
 - localcharset.c:201 - Branch not taken: (c != -1)
 - localcharset.c:203 - Branch not taken: (c != 10)
 - localcharset.c:203 - Branch not taken: (c != 32)
 - localcharset.c:203 - Branch not taken: (c != 9)
 - localcharset.c:205 - Branch not taken: (c != 35)
 - localcharset.c:216 - Branch not taken: (fscanf(fp, "%50s
 - localcharset.c:221 - Branch taken: (res_size == 0)
 - localcharset.c:224 - res_ptr = malloc(...)
 - localcharset.c:224 - res_ptr refers to dynamically
 - localcharset.c:231 - Branch not taken: (res_ptr != NULL)
 - localcharset.c:201 - Branch taken: (c == -1)
 - localcharset.c:202 - goto
 - localcharset.c:242 - Branch taken: (res_size == 0)
 - localcharset.c:249 - res_ptr no longer refers to
- localcharset.c:249 - res_ptr end scope : Memory leaked

Source

lib/localcharset.c:125-131

```
const char *cp;

cp = charset_aliases;
if (cp == NULL)
{
#ifdef !defined DARWIN7 || defined VMS || defined WINDOWS_NATIVE || defined __CYGWIN__
    const char *dir;
```

lib/localcharset.c:153-159

```
    }
}

if (file_name == NULL)
    /* Out of memory. Treat the file as empty. */
    cp = "";
else
```

lib/localcharset.c:169-175

```
    CHARSETALIASDIR to point to that directory. */
    fd = open(file_name,
              O_RDONLY | (HAVE_WORKING_O_NOFOLLOW ? O_NOFOLLOW : 0));
if (fd < 0)
    /* File not found. Treat it as empty. */
    cp = "";
else
```

lib/localcharset.c:177-183

```
FILE *fp;

fp = fdopen(fd, "r");
if (fp == NULL)
{
    /* Out of memory. Treat the file as empty. */
    close(fd);
```

lib/localcharset.c:198-204

```
char *old_res_ptr;

c = getc(fp);
if (c == EOF)
    break;
if (c == '\n' || c == ' ' || c == '\t')
    continue;
```

lib/localcharset.c:200-206

```
c = getc(fp);
if (c == EOF)
    break;
if (c == '\n' || c == ' ' || c == '\t')
    continue;
if (c == '#')
{
```

lib/localcharset.c:202-208

```
    break;
if (c == '\n' || c == ' ' || c == '\t')
    continue;
if (c == '#')
{
    /* Skip comment, to end of line. */
    do
```

lib/localcharset.c:213-219

```
    continue;
}
}
ungetc(c, fp);
if (fscanf(fp, "%50s%50s", buf1, buf2) < 2)
    break;
l1 = strlen(buf1);
l2 = strlen(buf2);
```

lib/localcharset.c:218-224

```
l1 = strlen(buf1);
l2 = strlen(buf2);
old_res_ptr = res_ptr;
if (res_size == 0)
{
    res_size = l1 + 1 + l2 + 1;
    res_ptr = (char *) malloc(res_size + 1);
```

lib/localcharset.c:221-227

```
    {
      res_size = l1 + 1 + l2 + 1;
      res_ptr = (char *) malloc (res_size + 1);
    }
    else
    {
```

lib/localcharset.c:228-234

```
      res_size += l1 + 1 + l2 + 1;
      res_ptr = (char *) realloc (res_ptr, res_size + 1);
    }
    if (res_ptr == NULL)
    {
      /* Out of memory. */
      res_size = 0;
```

lib/localcharset.c:198-204

```
char *old_res_ptr;

c = getc (fp);
if (c == EOF)
  break;
if (c == '\n' || c == ' ' || c == '\t')
  continue;
```

lib/localcharset.c:199-205

```
c = getc (fp);
if (c == EOF)
  break;
if (c == '\n' || c == ' ' || c == '\t')
  continue;
if (c == '#')
```

lib/localcharset.c:239-245

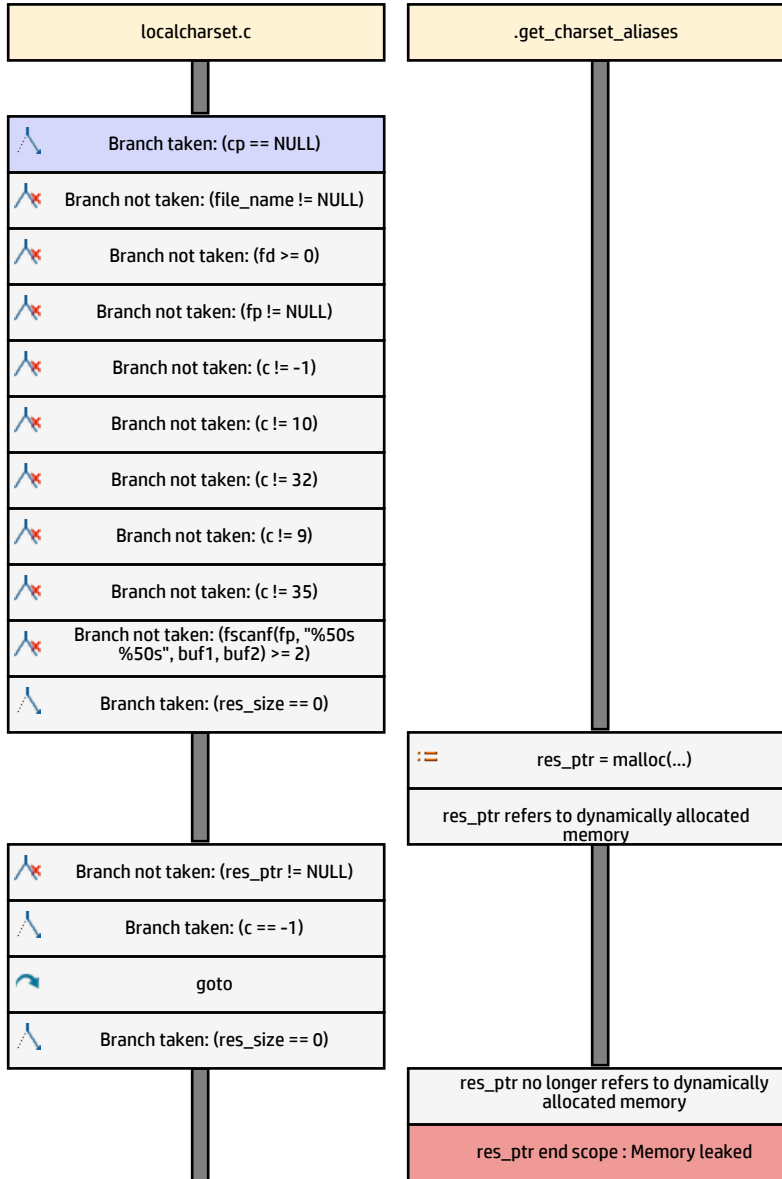
```
  strcpy (res_ptr + res_size - (l2 + 1), buf2);
}
fclose (fp);
if (res_size == 0)
  cp = "";
else
  {
```

lib/localcharset.c:246-252

```
    *(res_ptr + res_size) = '\0';
    cp = res_ptr;
  }
}

free (file_name);
```


Analysis Trace Diagram



Analysis Trace

```

vasnprintf.c:1837 - Assigned null : result
vasnprintf.c:1872 - Branch not taken: (cp == dp->dir_start)
vasnprintf.c:1893 - Branch not taken: (i != d.count)
vasnprintf.c:1910 - Branch not taken: (dp->arg_index !=
vasnprintf.c:1913 - Branch not taken: (dp->conversion !=
vasnprintf.c:3419 - Branch taken: (dp->conversion == 102)
vasnprintf.c:4910 - Branch not taken:
vasnprintf.c:4916 - Branch not taken:
vasnprintf.c:4932 - Branch not taken: (xsum(length, 2) <=
vasnprintf.c:4937 - Dereferenced : result

```

Source

lib/vasnprintf.c:1834-1840

```

}
else
{
    result = NULL;
    allocated = 0;
}
length = 0;

```

lib/vasnprintf.c:1869-1875

```

for (cp = format, i = 0, dp = &d.dir[0]; ; cp = dp->dir_end, i++, dp++)
{
    if (cp != dp->dir_start)
    {
        size_t n = dp->dir_start - cp;
        size_t augmented_length = xsum (length, n);

```

lib/vasnprintf.c:1890-1896

```

        while (--n > 0);
    }
}
if (i == d.count)
    break;

/* Execute a single directive. */

```

lib/vasnprintf.c:1907-1913

```

}
else
{
    if (!(dp->arg_index != ARG_NONE))
        abort ();

    if (dp->conversion == 'n')

```

lib/vasnprintf.c:1910-1916

```

    if (!(dp->arg_index != ARG_NONE))
        abort ();

    if (dp->conversion == 'n')
    {
        switch (a.arg[dp->arg_index].type)
        {

```

lib/vasnprintf.c:3416-3422

```

        }
    }
#endif
#if (NEED_PRINTF_INFINITE_DOUBLE || NEED_PRINTF_DOUBLE || NEED_PRINTF_INFINITE_LONG_DOUBLE || NEED_PRINTF_LONG_DOUBLE) &&
!defined IN_LIBINTL
    else if ((dp->conversion == 'f' || dp->conversion == 'F'
|| dp->conversion == 'e' || dp->conversion == 'E'
|| dp->conversion == 'g' || dp->conversion == 'G'

```

lib/vasnprintf.c:4907-4913

```

/* Construct the arguments for calling snprintf or sprintf. */
prefix_count = 0;
if (!pad_ourselves && dp->width_arg_index != ARG_NONE)
{
    if (!(a.arg[dp->width_arg_index].type == TYPE_INT))
        abort ();

```

lib/vasnprintf.c:4913-4919

```

        abort ();
        prefixes[prefix_count++] = a.arg[dp->width_arg_index].a.a_int;
    }
}
if (!prec_ourselves && dp->precision_arg_index != ARG_NONE)
{
    if (!(a.arg[dp->precision_arg_index].type == TYPE_INT))
        abort ();

```

lib/vasnprintf.c:4929-4935

```

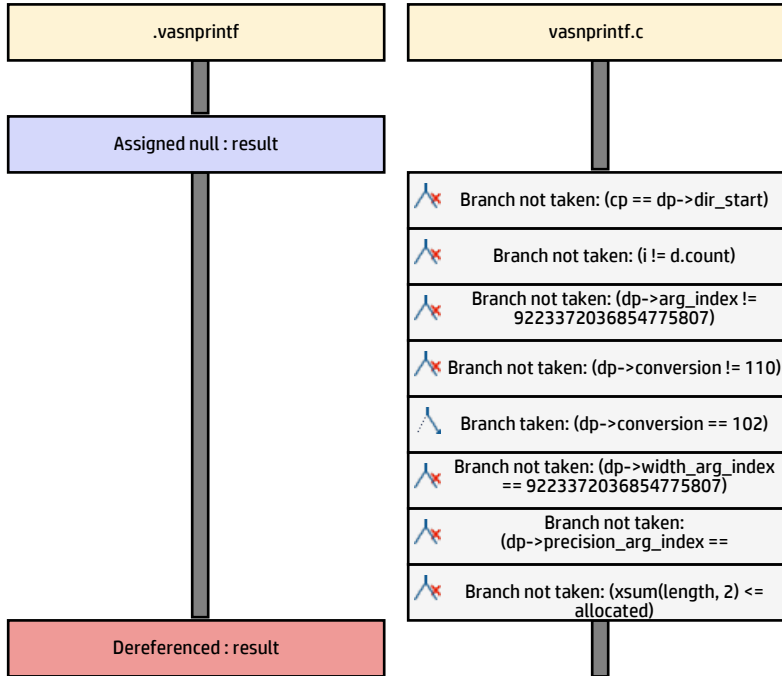
#define TCHARS_PER_DCHAR (sizeof (DCHAR_T) / sizeof (TCHAR_T))
/* Ensure that maxlen below will be >= 2. Needed on BeOS,
where an snprintf() with maxlen=1 acts like sprintf(). */
ENSURE_ALLOCATION (xsum (length,
(2 + TCHARS_PER_DCHAR - 1)
/ TCHARS_PER_DCHAR));
/* Prepare checking whether snprintf returns the count

```

lib/vasnprintf.c:4934-4940


```
/* Prepare checking whether sprintf returns the count
via %n. */
*(TCHAR_T *) (result + length) = '\0';
#endif
orig_errno = errno;
```

Analysis Trace Diagram




Analysis Trace

vasprintf.c:1837 - Assigned null : result

 vasprintf.c:1872 - Branch not taken: (cp == dp->dir_start)

 vasprintf.c:1894 - goto

 vasprintf.c:5548 - Branch not taken: (xsum(length, 1) <=

vasprintf.c:5549 - Dereferenced : result

Source

lib/vasprintf.c:1834-1840

```

}
else
{
    result = NULL;
    allocated = 0;
}
length = 0;

```

lib/vasprintf.c:1869-1875

```

for (cp = format, i = 0, dp = &d.dir[0]; ; cp = dp->dir_end, i++, dp++)
{
    if (cp != dp->dir_start)
    {
        size_t n = dp->dir_start - cp;
        size_t augmented_length = xsum (length, n);

```

lib/vasprintf.c:1891-1897

```

    }
}
if (i == d.count)
    break;

/* Execute a single directive. */
if (dp->conversion == '%')

```

lib/vasprintf.c:5545-5551

```

}

/* Add the final NUL. */
ENSURE_ALLOCATION (xsum (length, 1));
result[length] = '\0';

if (result != resultbuf && length + 1 < allocated)

```

lib/vasprintf.c:5546-5552

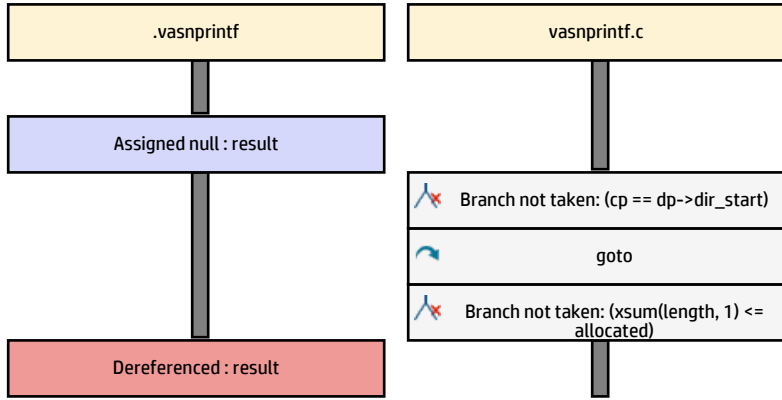
```

/* Add the final NUL. */
ENSURE_ALLOCATION (xsum (length, 1));
result[length] = '\0';

if (result != resultbuf && length + 1 < allocated)
{


```


Analysis Trace Diagram





Analysis Trace


vasnprintf.c:1837 - Assigned null : result

 vasnprintf.c:1872 - Branch not taken: (cp == dp->dir_start)

 vasnprintf.c:1893 - Branch not taken: (i != d.count)

 vasnprintf.c:1897 - Branch taken: (dp->conversion == 37)

 vasnprintf.c:1901 - Branch not taken: (dp->arg_index ==

 vasnprintf.c:1904 - Branch not taken: (augmented_length

vasnprintf.c:1905 - Dereferenced : result

Source

lib/vasnprintf.c:1834-1840

```

}
else
{
    result = NULL;
    allocated = 0;
}
length = 0;

```

lib/vasnprintf.c:1869-1875

```

for (cp = format, i = 0, dp = &d.dir[0]; ; cp = dp->dir_end, i++, dp++)
{
    if (cp != dp->dir_start)
    {
        size_t n = dp->dir_start - cp;
        size_t augmented_length = xsum (length, n);

```

lib/vasnprintf.c:1890-1896

```

        while (--n > 0);
    }
}
if (i == d.count)
    break;

/* Execute a single directive. */

```

lib/vasnprintf.c:1894-1900

```

    break;

/* Execute a single directive. */
if (dp->conversion == '%')
{
    size_t augmented_length;

```

lib/vasnprintf.c:1898-1904

```

{
    size_t augmented_length;

    if (!(dp->arg_index == ARG_NONE))
        abort ();
    augmented_length = xsum (length, 1);
    ENSURE_ALLOCATION (augmented_length);

```

lib/vasnprintf.c:1901-1907

```

    if (!(dp->arg_index == ARG_NONE))
        abort ();
    augmented_length = xsum (length, 1);
    ENSURE_ALLOCATION (augmented_length);
    result[length] = '%';
    length = augmented_length;
}

```

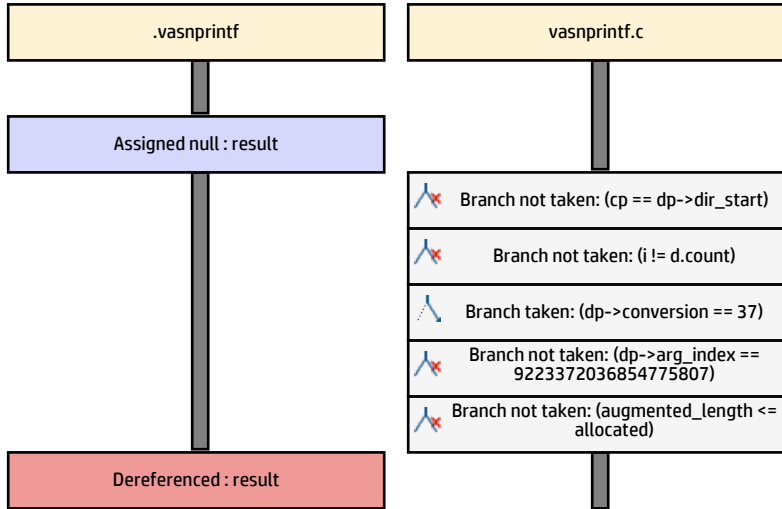
lib/vasnprintf.c:1902-1908

```

    abort ();
    augmented_length = xsum (length, 1);
    ENSURE_ALLOCATION (augmented_length);
    result[length] = '%';
    length = augmented_length;
}
else

```

Analysis Trace Diagram



Analysis Trace

```

builtin.c:1345 - Branch not taken: (bad_argc((*argv)[0],
builtin.c:1348 - fp = m4_path_search(...)
path.c:148 - Branch not taken: (*file != 0)
path.c:155 - fp = m4_fopen(...)
path.c:113 - fp = fopen_safer(...)
fopen-safer.c:33 - fp = fopen(...)
fopen-safer.c:35 - Branch taken: (fp != 0)
fopen-safer.c:39 - Branch not taken: (0 > fd)
fopen-safer.c:62 - return
path.c:114 - Branch taken: (fp != 0)
path.c:118 - Branch not taken: (fstat(fd, (&st)) != 0)
path.c:128 - return
path.c:156 - Branch taken: (fp != NULL)
path.c:160 - return
builtin.c:1349 - Branch not taken: (fp != NULL)
builtin.c:1361 - fp no longer refers to an open file
builtin.c:1361 - fp end scope : File descriptor leaked

```

Source

```

src/builtin.c:1342-1348
FILE *fp;
char *name;

if (bad_argc (argv[0], argc, 2, 2))
return;

fp = m4_path_search (ARG (1), &name);

```

```

src/builtin.c:1345-1351
if (bad_argc (argv[0], argc, 2, 2))
return;

fp = m4_path_search (ARG (1), &name);
if (fp == NULL)
{
if (!silent)

```

```

src/path.c:145-151
*result = NULL;

```

```

/* Reject empty file. */
if (!*file)
{
errno = ENOENT;
return NULL;
}

```

```

src/path.c:152-158
}

/* Look in current working directory first. */
fp = m4_fopen (file);
if (fp != NULL)
{
if (result)

```

```

src/path.c:110-116
static FILE *
m4_fopen (const char *file)
{
FILE *fp = fopen (file, "r");
if (fp)
{
struct stat st;

```

```

lib/fopen-safer.c:30-36
FILE *
fopen_safer (char const *file, char const *mode)
{
FILE *fp = fopen (file, mode);

if (fp)
{

```

```

lib/fopen-safer.c:32-38
{
FILE *fp = fopen (file, mode);

if (fp)
{
int fd = fileno (fp);

```

```

lib/fopen-safer.c:36-42
{
int fd = fileno (fp);

if (0 <= fd && fd <= STDERR_FILENO)
{
int f = dup_safer (fd);

```

```

lib/fopen-safer.c:59-65
}
}

return fp;
}

```

```

src/path.c:111-117

```

```
FILE *fp = fopen (file, "r");
if (fp)
{
    struct stat st;
    int fd = fileno (fp);
```

src/path.c:115-121

```
{
    struct stat st;
    int fd = fileno (fp);
    if (fstat (fd, &st) == 0 && S_ISDIR (st.st_mode))
    {
        fclose (fp);
        errno = EISDIR;
```

src/path.c:125-131

```
        M4ERROR ((warning_status, errno,
            "Warning: cannot protect input file across forks"));
    }
    return fp;
}
```

/* Search for FILE, first in `.', then according to -l options. If

src/path.c:153-159

```
/* Look in current working directory first. */
fp = m4_fopen (file);
if (fp != NULL)
{
    if (result)
        *result = xstrdup (file);
```

src/path.c:157-163

```
{
    if (result)
        *result = xstrdup (file);
    return fp;
}
```

/* If file not found, and filename absolute, fail. */

src/builtin.c:1346-1352

```
return;

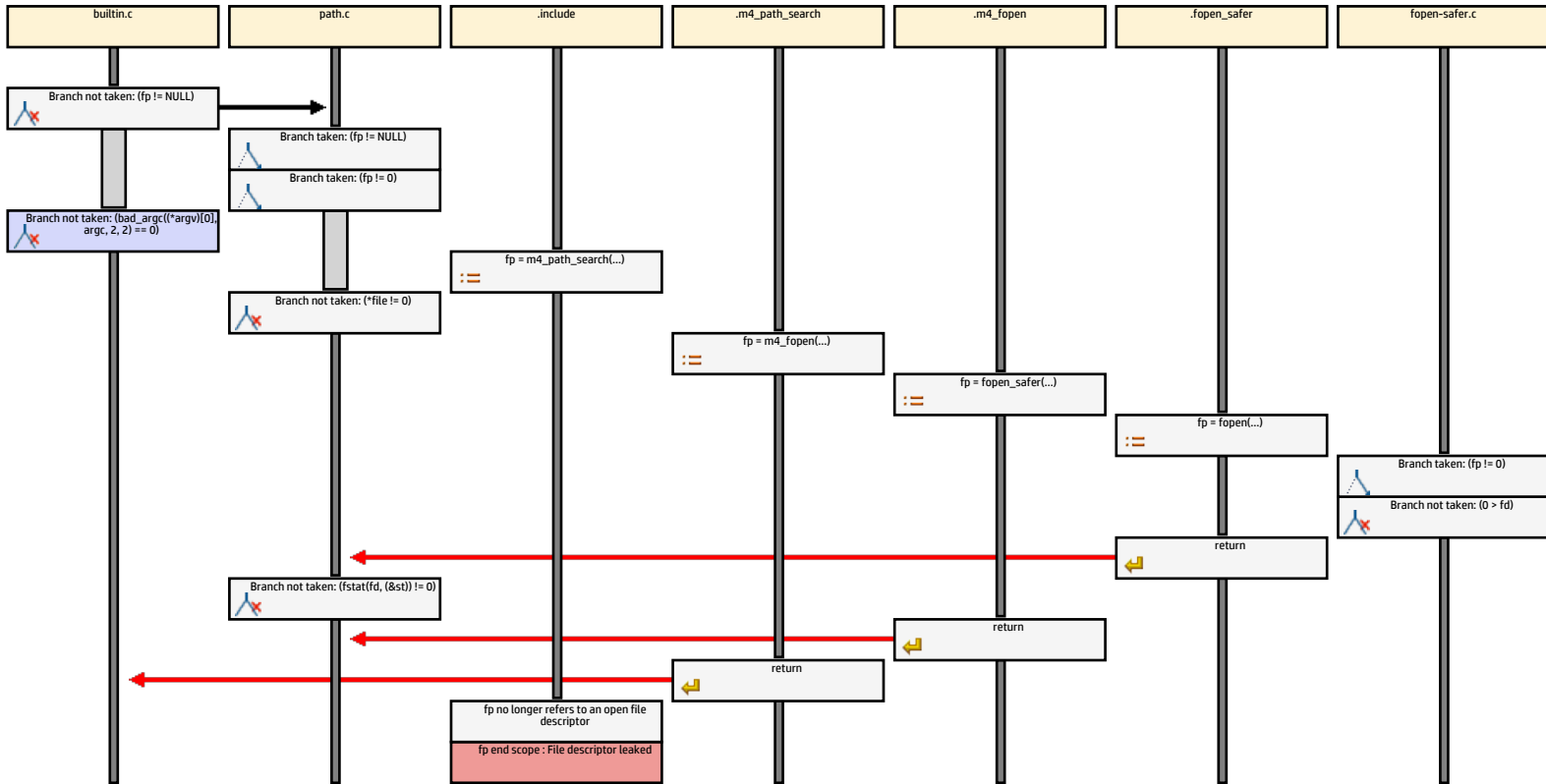
fp = m4_path_search (ARG (1), &name);
if (fp == NULL)
{
    if (!silent)
    {
```

src/builtin.c:1358-1364

```
        push_file (fp, name, true);
        free (name);
    }
}
```

/*-----
| Include a file, complaining in case of errors. |

Analysis Trace Diagram



Analysis Trace

```

m4.c:327 - Branch not taken: (strcmp(name, "-") != 0)
m4.c:338 - fp = m4_path_search(...)
path.c:148 - Branch not taken: (*file != 0)
path.c:155 - fp = m4_fopen(...)
path.c:113 - fp = fopen_safer(...)
fopen-safer.c:33 - fp = fopen(...)
fopen-safer.c:35 - Branch taken: (fp != 0)
fopen-safer.c:39 - Branch not taken: (0 > fd)
fopen-safer.c:62 - return
path.c:114 - Branch taken: (fp != 0)
path.c:118 - Branch not taken: (fstat(fd, (&st)) != 0)
path.c:128 - return
path.c:156 - Branch taken: (fp != NULL)
path.c:160 - return
m4.c:339 - Branch not taken: (fp != NULL)
m4.c:349 - fp no longer refers to an open file descriptor
m4.c:349 - fp end scope : File descriptor leaked

```

Source

src/m4.c:324-330

```

static void
process_file (const char *name)
{
  if (STREQ (name, "-"))
    /* If stdin is a terminal, we want to allow 'm4 -file -'
       to read input from stdin twice, like GNU cat. Besides,

```

src/m4.c:335-341

```

else
  {
    char *full_name;
    FILE *fp = m4_path_search (name, &full_name);
    if (fp == NULL)
      {
        error (0, errno, _("cannot open `%s'"), name);

```

src/path.c:145-151

```

*result = NULL;

/* Reject empty file. */
if (!*file)
  {
    errno = ENOENT;
    return NULL;

```

src/path.c:152-158

```

}

/* Look in current working directory first. */
fp = m4_fopen (file);
if (fp != NULL)
  {
    if (result)

```

src/path.c:110-116

```

static FILE *
m4_fopen (const char *file)
{
  FILE *fp = fopen (file, "r");
  if (fp)
    {
      struct stat st;

```

lib/fopen-safer.c:30-36

```

FILE *
fopen_safer (char const *file, char const *mode)
{
  FILE *fp = fopen (file, mode);

  if (fp)
    {

```

lib/fopen-safer.c:32-38

```

{
  FILE *fp = fopen (file, mode);

  if (fp)
    {
      int fd = fileno (fp);

```

lib/fopen-safer.c:36-42

```

{
  int fd = fileno (fp);

  if (0 <= fd && fd <= STDERR_FILENO)
    {
      int f = dup_safer (fd);

```

lib/fopen-safer.c:59-65

```

}
}

return fp;
}

```

src/path.c:111-117

```
FILE *fp = fopen (file, "r");
if (fp)
{
    struct stat st;
    int fd = fileno (fp);
```

src/path.c:115-121

```
{
    struct stat st;
    int fd = fileno (fp);
    if (fstat (fd, &st) == 0 && S_ISDIR (st.st_mode))
    {
        fclose (fp);
        errno = EISDIR;
```

src/path.c:125-131

```
        M4ERROR ((warning_status, errno,
            "Warning: cannot protect input file across forks"));
    }
    return fp;
}

/* Search for FILE, first in `.', then according to -l options. If
```

src/path.c:153-159

```
/* Look in current working directory first. */
fp = m4_fopen (file);
if (fp != NULL)
{
    if (result)
        *result = xstrdup (file);
```

src/path.c:157-163

```
{
    if (result)
        *result = xstrdup (file);
    return fp;
}

/* If file not found, and filename absolute, fail. */
```

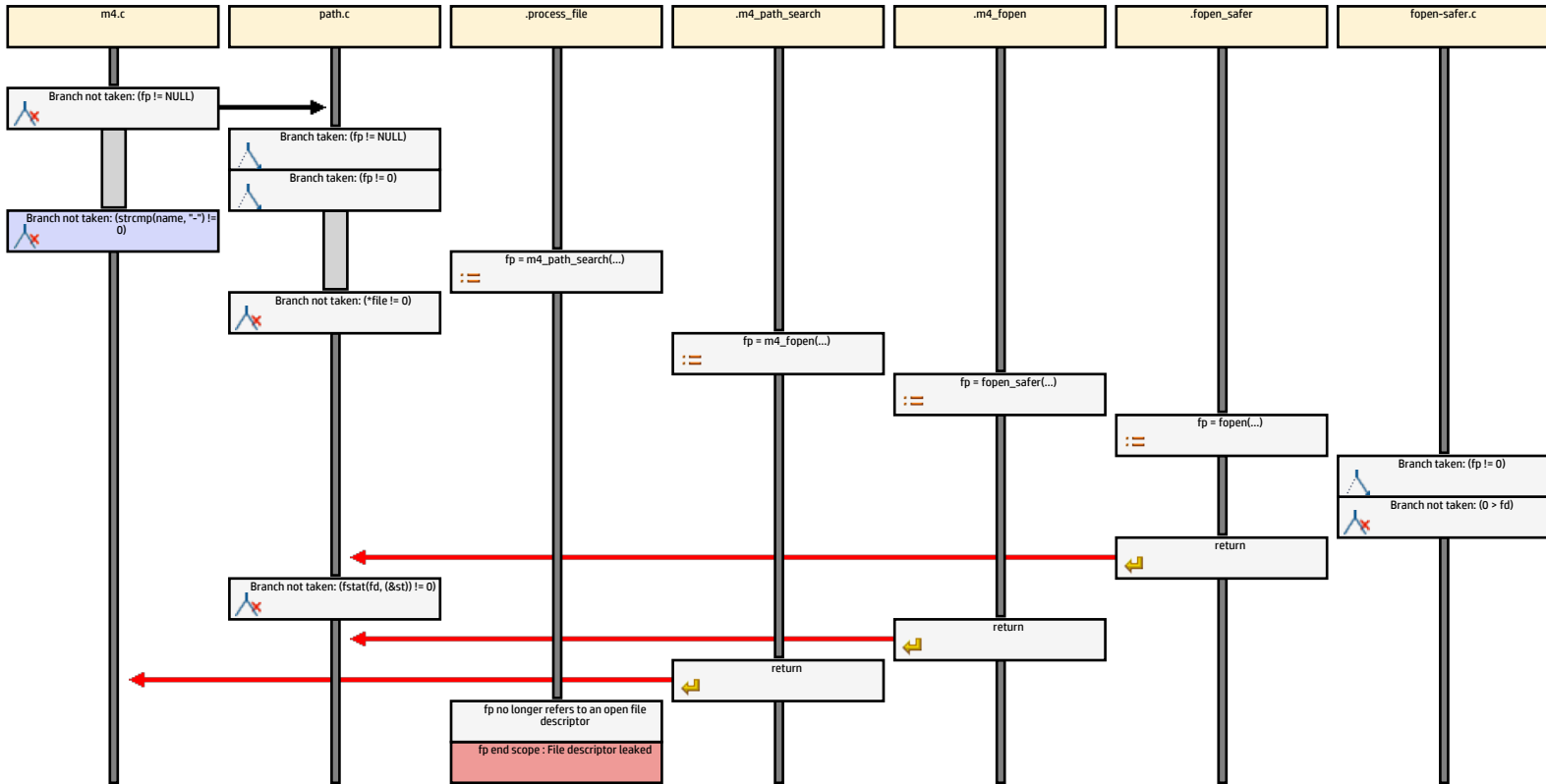
src/m4.c:336-342

```
{
    char *full_name;
    FILE *fp = m4_path_search (name, &full_name);
    if (fp == NULL)
    {
        error (0, errno, ("cannot open `%s'", name);
        /* Set the status to EXIT_FAILURE, even though we
```

src/m4.c:346-352

```
    }
    push_file (fp, full_name, true);
    free (full_name);
}
expand_input ();
}
```

Analysis Trace Diagram



Analysis Trace

```

clean-temp.c:506 - Branch taken:
clean-temp.c:511 - gl_list_remove_node(?, node)
gl_list.h:738 - gl_linked_remove_node(?, node)
gl_anylinked_list2.h:832 - free(node)
gl_anylinked_list2.h:832 - Pointer node refers to a
gl_anylinked_list2.h:833 - return
gl_list.h:737 - return
clean-temp.c:506 - Branch not taken:
clean-temp.c:520 - Branch taken:
clean-temp.c:525 - gl_list_remove_node(..., node):

```

Source

lib/clean-temp.c:503-509

```

/* First cleanup the files in the subdirectories. */
list = tmpdir->files;
iter = gl_list_iterator(list);
while (gl_list_iterator_next (&iter, &element, &node))
{
    char *file = (char *) element;

```

lib/clean-temp.c:508-514

```

    char *file = (char *) element;

    err |= do_unlink (dir, file);
    gl_list_remove_node (list, node);
    /* Now only we can free file. */
    free (file);
}

```

lib/gl_list.h:735-741

```

gl_list_remove_node (gl_list_t list, gl_list_node_t node)
{
    return ((const struct gl_list_impl_base *) list)->vtable
        ->remove_node (list, node);
}

```

GL_LIST_INLINE bool

lib/gl_anylinked_list2.h:829-835

```

if (list->base.dispose_fn != NULL)
    list->base.dispose_fn (node->value);
free (node);
return true;
}

```

lib/gl_anylinked_list2.h:830-836

```

if (list->base.dispose_fn != NULL)
    list->base.dispose_fn (node->value);
free (node);
return true;
}

```

static bool

lib/gl_list.h:734-740

```

GL_LIST_INLINE bool
gl_list_remove_node (gl_list_t list, gl_list_node_t node)
{
    return ((const struct gl_list_impl_base *) list)->vtable
        ->remove_node (list, node);
}

```

lib/clean-temp.c:503-509

```

/* First cleanup the files in the subdirectories. */
list = tmpdir->files;
iter = gl_list_iterator(list);
while (gl_list_iterator_next (&iter, &element, &node))
{
    char *file = (char *) element;

```

lib/clean-temp.c:517-523

```

/* Then cleanup the subdirectories. */
list = tmpdir->subdirs;
iter = gl_list_iterator(list);
while (gl_list_iterator_next (&iter, &element, &node))
{
    char *subdir = (char *) element;

```

lib/clean-temp.c:522-528

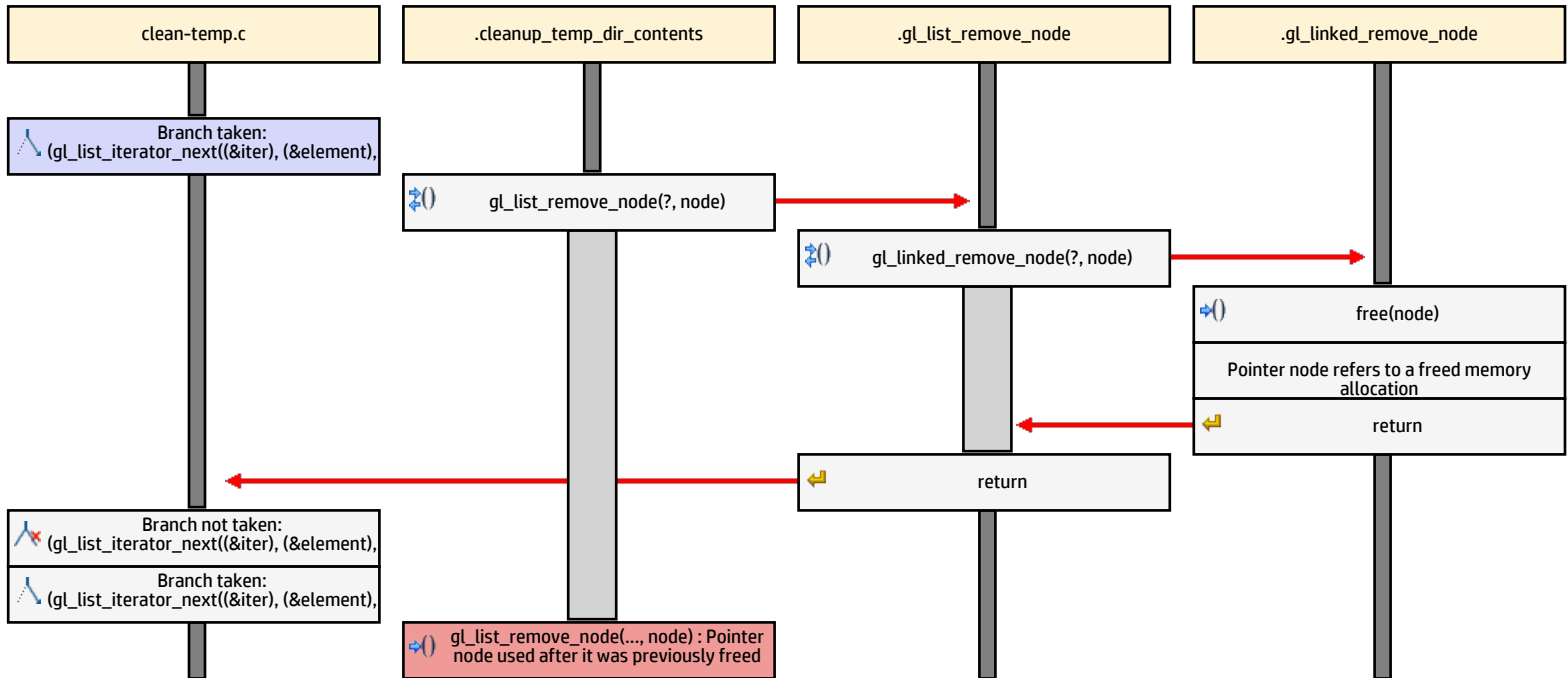
```

    char *subdir = (char *) element;









    err |= do_rmdir (dir, subdir);
    gl_list_remove_node (list, node);
    /* Now only we can free subdir. */
    free (subdir);
}

```

Analysis Trace Diagram



Analysis Trace

-  clean-temp.c:506 - Branch taken:
-  clean-temp.c:511 - gl_list_remove_node(?, node)
-  gl_list.h:738 - gl_linked_remove_node(?, node)
-  gl_anylinked_list2.h:832 - free(node)
gl_anylinked_list2.h:832 - Pointer node refers to a
-  gl_anylinked_list2.h:833 - return
-  gl_list.h:737 - return
-  clean-temp.c:506 - Branch taken:
-  clean-temp.c:511 - gl_list_remove_node(..., node):

Source

lib/clean-temp.c:503-509

```
/* First cleanup the files in the subdirectories. */
list = tmpdir->files;
iter = gl_list_iterator(list);
while (gl_list_iterator_next (&iter, &element, &node))
{
    char *file = (char *) element;
```

lib/clean-temp.c:508-514

```
char *file = (char *) element;

err |= do_unlink (dir, file);
gl_list_remove_node (list, node);
/* Now only we can free file. */
free (file);
}
```

lib/gl_list.h:735-741

```
gl_list_remove_node (gl_list_t list, gl_list_node_t node)
{
    return ((const struct gl_list_impl_base *) list)->vtable
        ->remove_node (list, node);
}
```

GL_LIST_INLINE bool

lib/gl_anylinked_list2.h:829-835

```
if (list->base.dispose_fn != NULL)
    list->base.dispose_fn (node->value);
free (node);
return true;
}
```

lib/gl_anylinked_list2.h:830-836

```
if (list->base.dispose_fn != NULL)
    list->base.dispose_fn (node->value);
free (node);
return true;
}
```

static bool

lib/gl_list.h:734-740

```
GL_LIST_INLINE bool
gl_list_remove_node (gl_list_t list, gl_list_node_t node)
{
    return ((const struct gl_list_impl_base *) list)->vtable
        ->remove_node (list, node);
}
```

lib/clean-temp.c:503-509

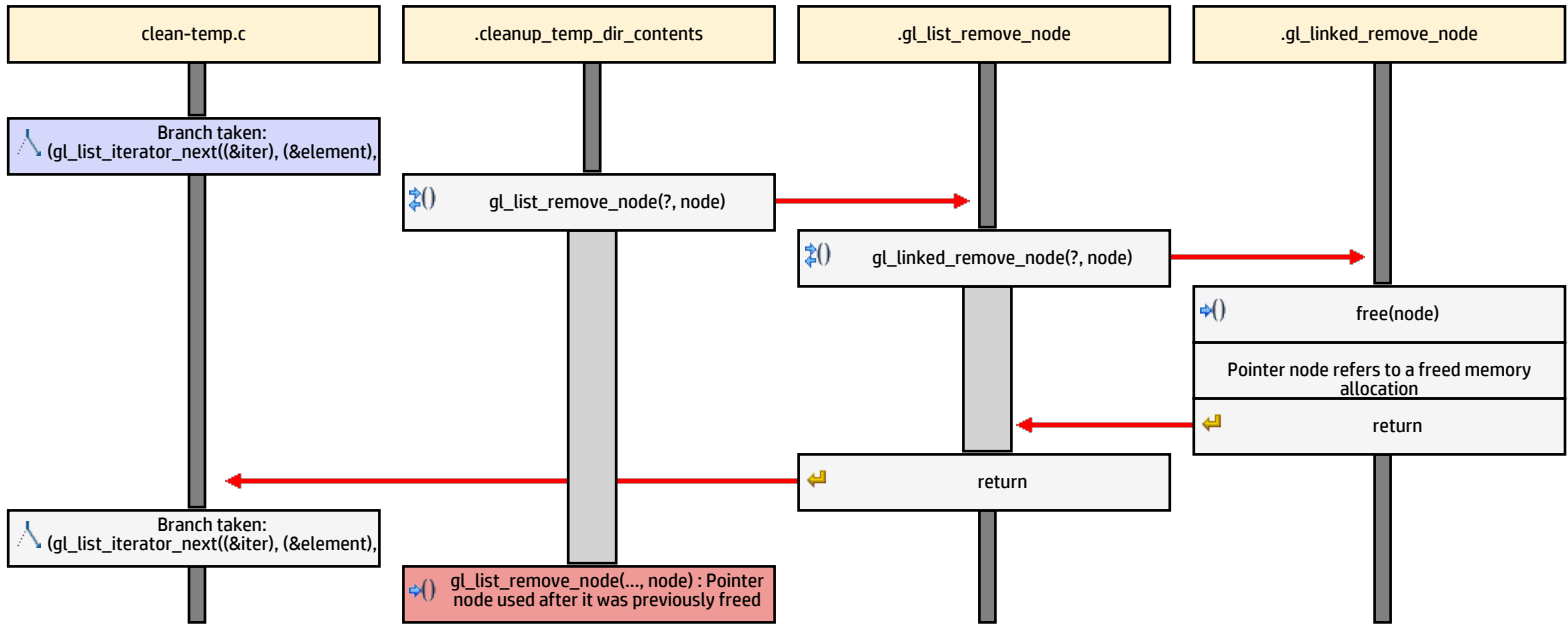
```
/* First cleanup the files in the subdirectories. */
list = tmpdir->files;
iter = gl_list_iterator(list);
while (gl_list_iterator_next (&iter, &element, &node))
{
    char *file = (char *) element;
```

lib/clean-temp.c:508-514

```
char *file = (char *) element;

err |= do_unlink (dir, file);
gl_list_remove_node (list, node);
/* Now only we can free file. */
free (file);
}
```

Analysis Trace Diagram



Static File Listing

The static file listing displays all files scanned by the SCA scanner.

Filename	Size (bytes)
/m4-1.4.17/.prev-version	8
/m4-1.4.17/.tarball-version	8
/m4-1.4.17/.version	8
/m4-1.4.17/acinclude.m4	888
/m4-1.4.17/aclocal.m4	48963
/m4-1.4.17/AUTHORS	2490
/m4-1.4.17/BACKLOG	2644
/m4-1.4.17/bootstrap	147806
/m4-1.4.17/build-aux/announce-gen	16430
/m4-1.4.17/build-aux/compile	7680
/m4-1.4.17/build-aux/config.guess	46855
/m4-1.4.17/build-aux/config.rpath	19407
/m4-1.4.17/build-aux/config.sub	37363
/m4-1.4.17/build-aux/depcomp	23220
/m4-1.4.17/build-aux/gendocs.sh	16645
/m4-1.4.17/build-aux/git-version-gen	8237
/m4-1.4.17/build-aux/gnu-web-doc-update	5583
/m4-1.4.17/build-aux/gnupload	12511
/m4-1.4.17/build-aux/install-sh	14524
/m4-1.4.17/build-aux/mdate-sh	6271
/m4-1.4.17/build-aux/missing	7088
/m4-1.4.17/build-aux/snippet/_Noreturn.h	316
/m4-1.4.17/build-aux/snippet/arg-nonnul.h	1242
/m4-1.4.17/build-aux/snippet/c++defs.h	12026
/m4-1.4.17/build-aux/snippet/unused-parameter.h	1606
/m4-1.4.17/build-aux/snippet/warn-on-use.h	5236
/m4-1.4.17/build-aux/test-driver	4104
/m4-1.4.17/build-aux/texinfo.tex	336037
/m4-1.4.17/build-aux/update-copyright	9763
/m4-1.4.17/build-aux/useless-if-before-free	6427
/m4-1.4.17/build-aux/vc-list-files	3924
/m4-1.4.17/c-boxes.el	15704
/m4-1.4.17/cfg.mk	1936
/m4-1.4.17/ChangeLog	200444

/m4-1.4.17/checks/001.preprocess	900
/m4-1.4.17/checks/002.debugging_	554
/m4-1.4.17/checks/003.command_li	454
/m4-1.4.17/checks/004.command_li	480
/m4-1.4.17/checks/005.command_li	805
/m4-1.4.17/checks/006.command_li	853
/m4-1.4.17/checks/007.command_li	660
/m4-1.4.17/checks/008.comments	539
/m4-1.4.17/checks/009.comments	668
/m4-1.4.17/checks/010.input_proc	630
/m4-1.4.17/checks/011.input_proc	589
/m4-1.4.17/checks/012.inhibiting	435
/m4-1.4.17/checks/013.inhibiting	505
/m4-1.4.17/checks/014.inhibiting	507
/m4-1.4.17/checks/015.inhibiting	433
/m4-1.4.17/checks/016.inhibiting	531
/m4-1.4.17/checks/017.inhibiting	533
/m4-1.4.17/checks/018.inhibiting	494
/m4-1.4.17/checks/019.inhibiting	491
/m4-1.4.17/checks/020.macro_argu	906
/m4-1.4.17/checks/021.macro_argu	639
/m4-1.4.17/checks/022.macro_argu	493
/m4-1.4.17/checks/023.macro_argu	472
/m4-1.4.17/checks/024.macro_argu	492
/m4-1.4.17/checks/025.quoting_ar	598
/m4-1.4.17/checks/026.macro_expa	430
/m4-1.4.17/checks/027.macro_expa	493
/m4-1.4.17/checks/028.define	461
/m4-1.4.17/checks/029.define	472
/m4-1.4.17/checks/030.define	747
/m4-1.4.17/checks/031.arguments	471
/m4-1.4.17/checks/032.arguments	520
/m4-1.4.17/checks/033.arguments	471
/m4-1.4.17/checks/034.arguments	475
/m4-1.4.17/checks/035.arguments	617
/m4-1.4.17/checks/036.arguments	648
/m4-1.4.17/checks/037.pseudo_arg	740
/m4-1.4.17/checks/038.pseudo_arg	523
/m4-1.4.17/checks/039.pseudo_arg	489
/m4-1.4.17/checks/040.pseudo_arg	489

/m4-1.4.17/checks/041.pseudo_arg	697
/m4-1.4.17/checks/042.pseudo_arg	622
/m4-1.4.17/checks/043.pseudo_arg	1318
/m4-1.4.17/checks/044.pseudo_arg	463
/m4-1.4.17/checks/045.pseudo_arg	978
/m4-1.4.17/checks/046.undefine	706
/m4-1.4.17/checks/047.undefine	522
/m4-1.4.17/checks/048.defn	508
/m4-1.4.17/checks/049.defn	503
/m4-1.4.17/checks/050.defn	557
/m4-1.4.17/checks/051.defn	571
/m4-1.4.17/checks/052.defn	581
/m4-1.4.17/checks/053.defn	616
/m4-1.4.17/checks/054.defn	1003
/m4-1.4.17/checks/055.pushdef	839
/m4-1.4.17/checks/056.pushdef	699
/m4-1.4.17/checks/057.indir	585
/m4-1.4.17/checks/058.indir	586
/m4-1.4.17/checks/059.indir	814
/m4-1.4.17/checks/060.builtin	813
/m4-1.4.17/checks/061.builtin	643
/m4-1.4.17/checks/062.builtin	883
/m4-1.4.17/checks/063.builtin	431
/m4-1.4.17/checks/064.builtin	720
/m4-1.4.17/checks/065.ifdef	745
/m4-1.4.17/checks/066.ifdef	532
/m4-1.4.17/checks/067.ifdef	627
/m4-1.4.17/checks/068.ifdef	560
/m4-1.4.17/checks/069.ifdef	840
/m4-1.4.17/checks/070.ifdef	2235
/m4-1.4.17/checks/071.shift	489
/m4-1.4.17/checks/072.shift	656
/m4-1.4.17/checks/073.shift	1510
/m4-1.4.17/checks/074.shift	922
/m4-1.4.17/checks/075.shift	1200
/m4-1.4.17/checks/076.shift	902
/m4-1.4.17/checks/077.shift	936
/m4-1.4.17/checks/078.shift	643
/m4-1.4.17/checks/079.forloop	482
/m4-1.4.17/checks/080.forloop	783

/m4-1.4.17/checks/081.forloop	718
/m4-1.4.17/checks/082.foreach	743
/m4-1.4.17/checks/083.foreach	807
/m4-1.4.17/checks/084.foreach	818
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/m4-1.4.17/checks/100.trace	679
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/m4-1.4.17/checks/102.debug_lev	715
/m4-1.4.17/checks/103.debug_lev	677
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/m4-1.4.17/checks/109.changequot	498
/m4-1.4.17/checks/110.changequot	521
/m4-1.4.17/checks/111.changequot	595
/m4-1.4.17/checks/112.changequot	784
/m4-1.4.17/checks/113.changequot	764
/m4-1.4.17/checks/114.changequot	750
/m4-1.4.17/checks/115.changequot	691
/m4-1.4.17/checks/116.changequot	545
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/m4-1.4.17/checks/132.m4wrap	1055
/m4-1.4.17/checks/133.m4wrap	1048
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/m4-1.4.17/checks/151.divert	739
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/m4-1.4.17/checks/154.undivert	705
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/m4-1.4.17/lib/memchr2.h	1131
/m4-1.4.17/lib/memchr2.valgrind	425
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/m4-1.4.17/lib/printf-args.c	6741
/m4-1.4.17/lib/printf-args.h	4089
/m4-1.4.17/lib/printf-frexp.c	5516
/m4-1.4.17/lib/printf-frexp.h	1095
/m4-1.4.17/lib/printf-frexpl.c	1125
/m4-1.4.17/lib/printf-frexpl.h	1114
/m4-1.4.17/lib/printf-parse.c	22775
/m4-1.4.17/lib/printf-parse.h	5428
/m4-1.4.17/lib/progname.c	3268
/m4-1.4.17/lib/progname.h	2077
/m4-1.4.17/lib/quote.h	1904
/m4-1.4.17/lib/quotearg.c	32612
/m4-1.4.17/lib/quotearg.h	16323
/m4-1.4.17/lib/raise.c	1738
/m4-1.4.17/lib/rawmemchr.c	5385
/m4-1.4.17/lib/rawmemchr.valgrind	271

/m4-1.4.17/lib/readlink.c	2429
/m4-1.4.17/lib/ref-add.sin	1031
/m4-1.4.17/lib/ref-del.sin	981
/m4-1.4.17/lib/regcomp.c	116957
/m4-1.4.17/lib/regex.c	3260
/m4-1.4.17/lib/regex.h	25626
/m4-1.4.17/lib/regex_internal.c	50403
/m4-1.4.17/lib/regex_internal.h	26454
/m4-1.4.17/lib/regexec.c	135432
/m4-1.4.17/lib/rename.c	13823
/m4-1.4.17/lib/rmdir.c	1617
/m4-1.4.17/lib/same-inode.h	1187
/m4-1.4.17/lib/sched.in.h	1678
/m4-1.4.17/lib/secure_getenv.c	1138
/m4-1.4.17/lib/sig-handler.c	93
/m4-1.4.17/lib/sig-handler.h	1954
/m4-1.4.17/lib/sigaction.c	7471
/m4-1.4.17/lib/siglist.h	3985
/m4-1.4.17/lib/signal.in.h	15148
/m4-1.4.17/lib/signbitd.c	2166
/m4-1.4.17/lib/signbitf.c	2175
/m4-1.4.17/lib/signbitl.c	2210
/m4-1.4.17/lib/sigprocmask.c	8948
/m4-1.4.17/lib/size_max.h	1191
/m4-1.4.17/lib/snprintf.c	1946
/m4-1.4.17/lib/spawn-pipe.c	15273
/m4-1.4.17/lib/spawn-pipe.h	6497
/m4-1.4.17/lib/spawn.in.h	37608
/m4-1.4.17/lib/spawn_faction_addclose.c	2122
/m4-1.4.17/lib/spawn_faction_adddup2.c	2210
/m4-1.4.17/lib/spawn_faction_addopen.c	2329
/m4-1.4.17/lib/spawn_faction_destroy.c	1105
/m4-1.4.17/lib/spawn_faction_init.c	1778
/m4-1.4.17/lib/spawn_int.h	1802
/m4-1.4.17/lib/spawnattr_destroy.c	1024
/m4-1.4.17/lib/spawnattr_init.c	1146
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/m4-1.4.17/lib/spawni.c	11196
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/m4-1.4.17/lib/stat.c	4672
/m4-1.4.17/lib/stdarg.in.h	1173
/m4-1.4.17/lib/stdbool.in.h	5246
/m4-1.4.17/lib/stddef.in.h	2800
/m4-1.4.17/lib/stdint.in.h	19460
/m4-1.4.17/lib/stdio--.h	1199
/m4-1.4.17/lib/stdio-impl.h	4385
/m4-1.4.17/lib/stdio-safer.h	1174
/m4-1.4.17/lib/stdio-write.c	7620
/m4-1.4.17/lib/stdio.in.h	51666
/m4-1.4.17/lib/stdlib--.h	1125
/m4-1.4.17/lib/stdlib-safer.h	1053
/m4-1.4.17/lib/stdlib.in.h	34024
/m4-1.4.17/lib/str-two-way.h	17977
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/m4-1.4.17/lib/strchrnul.valgrind	271
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/m4-1.4.17/lib/strerror-override.c	9315
/m4-1.4.17/lib/strerror-override.h	2055
/m4-1.4.17/lib/strerror.c	2153
/m4-1.4.17/lib/string.in.h	41270
/m4-1.4.17/lib/stripslash.c	1614
/m4-1.4.17/lib/strndup.c	1080
/m4-1.4.17/lib/strnlen.c	1170
/m4-1.4.17/lib/strsignal.c	5414
/m4-1.4.17/lib/strstr.c	3153
/m4-1.4.17/lib/strtod.c	10579
/m4-1.4.17/lib/sys_stat.in.h	21141
/m4-1.4.17/lib/sys_time.in.h	7894
/m4-1.4.17/lib/sys_types.in.h	1712
/m4-1.4.17/lib/sys_wait.in.h	3988
/m4-1.4.17/lib/tempname.c	9408
/m4-1.4.17/lib/tempname.h	1895
/m4-1.4.17/lib/time.in.h	9284
/m4-1.4.17/lib/tmpdir.c	4380
/m4-1.4.17/lib/tmpdir.h	1289
/m4-1.4.17/lib/unistd--.h	1027
/m4-1.4.17/lib/unistd-safer.h	1083
/m4-1.4.17/lib/unistd.c	87
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/m4-1.4.17/lib/verror.c	2706
/m4-1.4.17/lib/verror.h	2099
/m4-1.4.17/lib/version-etc-fsf.c	1184
/m4-1.4.17/lib/version-etc.c	9463
/m4-1.4.17/lib/version-etc.h	3003
/m4-1.4.17/lib/w32spawn.h	7624
/m4-1.4.17/lib/wait-process.c	11685
/m4-1.4.17/lib/wait-process.h	3088
/m4-1.4.17/lib/waitpid.c	1034
/m4-1.4.17/lib/wchar.in.h	34753
/m4-1.4.17/lib/wcrtomb.c	1538
/m4-1.4.17/lib/wctype-h.c	159
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/m4-1.4.17/lib/xasprintf.c	1069
/m4-1.4.17/lib/xmalloc.c	3505
/m4-1.4.17/lib/xmalloca.c	1102
/m4-1.4.17/lib/xmalloca.h	2162
/m4-1.4.17/lib/xprintf.c	2322
/m4-1.4.17/lib/xprintf.h	1970
/m4-1.4.17/lib/xsize.c	81
/m4-1.4.17/lib/xsize.h	3747
/m4-1.4.17/lib/xstrndup.c	1225
/m4-1.4.17/lib/xstrndup.h	1043
/m4-1.4.17/lib/xvasprintf.c	2868
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/m4-1.4.17/m4/dup2.m4	2952
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/m4-1.4.17/m4/getdtablesize.m4	575
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/m4-1.4.17/m4/gnulib-comp.m4	60561
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/m4-1.4.17/m4/manywarnings.m4	6453
/m4-1.4.17/m4/math_h.m4	17834
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/m4-1.4.17/m4/mbstate_t.m4	1440
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/m4-1.4.17/m4/memchr.m4	2872
/m4-1.4.17/m4/mkdtemp.m4	555
/m4-1.4.17/m4/mkstemp.m4	2880
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/m4-1.4.17/m4/opendir.m4	759
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/m4-1.4.17/m4/posix_spawn.m4	16607
/m4-1.4.17/m4/printf-frexp.m4	1244
/m4-1.4.17/m4/printf-frexpl.m4	1795
/m4-1.4.17/m4/printf.m4	62218
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/m4-1.4.17/m4/rawmemchr.m4	654
/m4-1.4.17/m4/readdir.m4	455
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/m4-1.4.17/m4/sched_h.m4	1125
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/m4-1.4.17/m4/spawn_h.m4	5626
/m4-1.4.17/m4/ssize_t.m4	842
/m4-1.4.17/m4/stat.m4	2771
/m4-1.4.17/m4/stdarg.m4	2898
/m4-1.4.17/m4/stdbool.m4	3421
/m4-1.4.17/m4/stddef_h.m4	1564
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/m4-1.4.17/m4/unlocked-io.m4	1600
/m4-1.4.17/m4/vasprintf.m4	9086
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/m4-1.4.17/m4/vasprintf.m4	1134
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/m4-1.4.17/m4/waitpid.m4	430
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/m4-1.4.17/m4/wchar_h.m4	9601
/m4-1.4.17/m4/wchar_t.m4	842
/m4-1.4.17/m4/wcrtomb.m4	3576
/m4-1.4.17/m4/wctob.m4	3645
/m4-1.4.17/m4/wctomb.m4	479
/m4-1.4.17/m4/wctype_h.m4	7150
/m4-1.4.17/m4/wint_t.m4	1085
/m4-1.4.17/m4/write.m4	1037
/m4-1.4.17/m4/xalloc.m4	321
/m4-1.4.17/m4/xsize.m4	418
/m4-1.4.17/m4/xstrndup.m4	424
/m4-1.4.17/m4/xvasprintf.m4	363
/m4-1.4.17/maint.mk	64546
/m4-1.4.17/Makefile.am	1983
/m4-1.4.17/Makefile.in	71221
/m4-1.4.17/NEWS	30809
/m4-1.4.17/README	4059
/m4-1.4.17/src/builtin.c	69993
/m4-1.4.17/src/debug.c	12707
/m4-1.4.17/src/eval.c	19901
/m4-1.4.17/src/format.c	11254
/m4-1.4.17/src/freeze.c	13804

/m4-1.4.17/src/input.c	36333
/m4-1.4.17/src/m4.c	21634
/m4-1.4.17/src/m4.h	16166
/m4-1.4.17/src/macro.c	13267
/m4-1.4.17/src/Makefile.am	1207
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/m4-1.4.17/src/output.c	34593
/m4-1.4.17/src/path.c	4914
/m4-1.4.17/src/symtab.c	12548
/m4-1.4.17/tests/closedir.c	1509
/m4-1.4.17/tests/dirent-private.h	1557
/m4-1.4.17/tests/dirent.in.h	8902
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/m4-1.4.17/tests/fdopen.c	1564
/m4-1.4.17/tests/filename.h	2016
/m4-1.4.17/tests/getcwd-lgpl.c	3252
/m4-1.4.17/tests/getpagesize.c	1251
/m4-1.4.17/tests/gl_array_list.c	18591
/m4-1.4.17/tests/gl_array_list.h	1150
/m4-1.4.17/tests/gl_array_aset.c	9960
/m4-1.4.17/tests/gl_array_aset.h	1146
/m4-1.4.17/tests/gnulib.mk	50025
/m4-1.4.17/tests/infinity.h	1627
/m4-1.4.17/tests/init.sh	19706
/m4-1.4.17/tests/inttypes.in.h	27732
/m4-1.4.17/tests/link.c	5894
/m4-1.4.17/tests/localename.c	85471
/m4-1.4.17/tests/localename.h	4560
/m4-1.4.17/tests/macros.h	3477
/m4-1.4.17/tests/Makefile.am	835
/m4-1.4.17/tests/Makefile.in	268540
/m4-1.4.17/tests/minus-zero.h	2463
/m4-1.4.17/tests/nan.h	1916
/m4-1.4.17/tests/opendir.c	3557
/m4-1.4.17/tests/putenv.c	5301
/m4-1.4.17/tests/randomd.c	37205
/m4-1.4.17/tests/randoml.c	47938
/m4-1.4.17/tests/readdir.c	3104
/m4-1.4.17/tests/setenv.c	11164
/m4-1.4.17/tests/setlocale.c	29622

/m4-1.4.17/tests/signature.h	2030
/m4-1.4.17/tests/sleep.c	2387
/m4-1.4.17/tests/strdup.c	1390
/m4-1.4.17/tests/symlink.c	1490
/m4-1.4.17/tests/test-alloca-opt.c	1584
/m4-1.4.17/tests/test-array_list.c	12912
/m4-1.4.17/tests/test-array_aset.c	4376
/m4-1.4.17/tests/test-avltree_aset.c	3900
/m4-1.4.17/tests/test-binary-io.c	1771
/m4-1.4.17/tests/test-binary-io.sh	385
/m4-1.4.17/tests/test-btowc.c	1799
/m4-1.4.17/tests/test-btowc1.sh	370
/m4-1.4.17/tests/test-btowc2.sh	389
/m4-1.4.17/tests/test-c-ctype.c	11693
/m4-1.4.17/tests/test-c-stack.c	2084
/m4-1.4.17/tests/test-c-stack.sh	358
/m4-1.4.17/tests/test-c-stack2.sh	873
/m4-1.4.17/tests/test-c-strcase.sh	632
/m4-1.4.17/tests/test-c-strcasecmp.c	2213
/m4-1.4.17/tests/test-c-strncasecmp.c	3113
/m4-1.4.17/tests/test-canonicalize-lgpl.c	6566
/m4-1.4.17/tests/test-chdir.c	989
/m4-1.4.17/tests/test-cloexec.c	4208
/m4-1.4.17/tests/test-close.c	1198
/m4-1.4.17/tests/test-closein.c	1512
/m4-1.4.17/tests/test-closein.sh	888
/m4-1.4.17/tests/test-dirent-c++.cc	1615
/m4-1.4.17/tests/test-dirent.c	1027
/m4-1.4.17/tests/test-dirname.c	8798
/m4-1.4.17/tests/test-dup-safer.c	5174
/m4-1.4.17/tests/test-dup.c	1197
/m4-1.4.17/tests/test-dup2.c	6085
/m4-1.4.17/tests/test-environ.c	1539
/m4-1.4.17/tests/test-errno.c	3043
/m4-1.4.17/tests/test-fclose.c	2967
/m4-1.4.17/tests/test-fcntl-h-c++.cc	1274
/m4-1.4.17/tests/test-fcntl-h.c	3009
/m4-1.4.17/tests/test-fcntl.c	10403
/m4-1.4.17/tests/test-fdopen.c	1383
/m4-1.4.17/tests/test-fflush.c	5430

/m4-1.4.17/tests/test-fflush2.c	3434
/m4-1.4.17/tests/test-fflush2.sh	351
/m4-1.4.17/tests/test-fgetc.c	2597
/m4-1.4.17/tests/test-filenamecat.c	1997
/m4-1.4.17/tests/test-float.c	9492
/m4-1.4.17/tests/test-fopen-safer.c	975
/m4-1.4.17/tests/test-fopen.c	1057
/m4-1.4.17/tests/test-fopen.h	2196
/m4-1.4.17/tests/test-fpending.c	1111
/m4-1.4.17/tests/test-fpending.sh	161
/m4-1.4.17/tests/test-fpurge.c	4065
/m4-1.4.17/tests/test-fputc.c	2520
/m4-1.4.17/tests/test-fread.c	2724
/m4-1.4.17/tests/test-freadahead.c	2146
/m4-1.4.17/tests/test-freadahead.sh	163
/m4-1.4.17/tests/test-freading.c	4821
/m4-1.4.17/tests/test-frexp.c	2033
/m4-1.4.17/tests/test-frexp.h	4917
/m4-1.4.17/tests/test-frexp.c	2033
/m4-1.4.17/tests/test-frexp.h	4917
/m4-1.4.17/tests/test-frexp.c	2033
/m4-1.4.17/tests/test-frexp.h	4917
/m4-1.4.17/tests/test-fseek.c	2354
/m4-1.4.17/tests/test-fseek.sh	125
/m4-1.4.17/tests/test-fseek2.sh	72
/m4-1.4.17/tests/test-fseeko.c	2502
/m4-1.4.17/tests/test-fseeko.sh	128
/m4-1.4.17/tests/test-fseeko2.sh	74
/m4-1.4.17/tests/test-fseeko3.c	1335
/m4-1.4.17/tests/test-fseeko3.sh	151
/m4-1.4.17/tests/test-fseeko4.c	1987
/m4-1.4.17/tests/test-fseeko4.sh	84
/m4-1.4.17/tests/test-fstat.c	1326
/m4-1.4.17/tests/test-ftell.c	2932
/m4-1.4.17/tests/test-ftell.sh	125
/m4-1.4.17/tests/test-ftell2.sh	72
/m4-1.4.17/tests/test-ftell3.c	2145
/m4-1.4.17/tests/test-ftello.c	3379
/m4-1.4.17/tests/test-ftello.sh	128
/m4-1.4.17/tests/test-ftello2.sh	74
/m4-1.4.17/tests/test-ftello3.c	2150
/m4-1.4.17/tests/test-ftello4.c	1863
/m4-1.4.17/tests/test-ftello4.sh	84

/m4-1.4.17/tests/test-fwrite.c	2694
/m4-1.4.17/tests/test-getcwd-lgpl.c	2731
/m4-1.4.17/tests/test-getdtablesize.c	1052
/m4-1.4.17/tests/test-getopt.c	2973
/m4-1.4.17/tests/test-getopt.h	45344
/m4-1.4.17/tests/test-getopt_long.h	66484
/m4-1.4.17/tests/test-gettimeofday.c	1367
/m4-1.4.17/tests/test-ignore-value.c	2045
/m4-1.4.17/tests/test-init.sh	2443
/m4-1.4.17/tests/test-intprops.c	12083
/m4-1.4.17/tests/test-inttypes.c	3238
/m4-1.4.17/tests/test-isnand-nolibm.c	833
/m4-1.4.17/tests/test-isnand.h	2131
/m4-1.4.17/tests/test-isnanf-nolibm.c	833
/m4-1.4.17/tests/test-isnanf.h	2177
/m4-1.4.17/tests/test-isnanl-nolibm.c	898
/m4-1.4.17/tests/test-isnanl.h	4547
/m4-1.4.17/tests/test-langinfo-c++.cc	1068
/m4-1.4.17/tests/test-langinfo.c	2005
/m4-1.4.17/tests/test-link.c	1327
/m4-1.4.17/tests/test-link.h	6178
/m4-1.4.17/tests/test-linkedhash_list.c	18299
/m4-1.4.17/tests/test-locale-c++.cc	1195
/m4-1.4.17/tests/test-locale-c++2.cc	844
/m4-1.4.17/tests/test-locale.c	2378
/m4-1.4.17/tests/test-localeconv.c	2343
/m4-1.4.17/tests/test-localename.c	22880
/m4-1.4.17/tests/test-lseek.c	3391
/m4-1.4.17/tests/test-lseek.sh	409
/m4-1.4.17/tests/test-lstat.c	1857
/m4-1.4.17/tests/test-lstat.h	3884
/m4-1.4.17/tests/test-malloc-gnu.c	928
/m4-1.4.17/tests/test-malloca.c	1646
/m4-1.4.17/tests/test-math-c++.cc	12624
/m4-1.4.17/tests/test-math-c++2.cc	840
/m4-1.4.17/tests/test-math.c	2384
/m4-1.4.17/tests/test-mbrtowc-w32-1.sh	86
/m4-1.4.17/tests/test-mbrtowc-w32-2.sh	94
/m4-1.4.17/tests/test-mbrtowc-w32-3.sh	85
/m4-1.4.17/tests/test-mbrtowc-w32-4.sh	85

/m4-1.4.17/tests/test-mbrtowc-w32-5.sh	84
/m4-1.4.17/tests/test-mbrtowc-w32.c	23340
/m4-1.4.17/tests/test-mbrtowc.c	11162
/m4-1.4.17/tests/test-mbrtowc1.sh	372
/m4-1.4.17/tests/test-mbrtowc2.sh	391
/m4-1.4.17/tests/test-mbrtowc3.sh	383
/m4-1.4.17/tests/test-mbrtowc4.sh	401
/m4-1.4.17/tests/test-mbsinit.c	1525
/m4-1.4.17/tests/test-mbsinit.sh	389
/m4-1.4.17/tests/test-memchr.c	3918
/m4-1.4.17/tests/test-memchr2.c	3080
/m4-1.4.17/tests/test-nl_langinfo.c	4798
/m4-1.4.17/tests/test-nl_langinfo.sh	454
/m4-1.4.17/tests/test-open.c	1168
/m4-1.4.17/tests/test-open.h	3086
/m4-1.4.17/tests/test-pathmax.c	995
/m4-1.4.17/tests/test-pipe2.c	3900
/m4-1.4.17/tests/test-posix_spawn1.c	5663
/m4-1.4.17/tests/test-posix_spawn1.in.sh	31
/m4-1.4.17/tests/test-posix_spawn2.c	4164
/m4-1.4.17/tests/test-posix_spawn2.in.sh	52
/m4-1.4.17/tests/test-posix_spawn_file_actions_addclose.c	1816
/m4-1.4.17/tests/test-posix_spawn_file_actions_adddup2.c	2027
/m4-1.4.17/tests/test-posix_spawn_file_actions_addopen.c	2038
/m4-1.4.17/tests/test-printf-frexp.c	3748
/m4-1.4.17/tests/test-printf-frexpl.c	4299
/m4-1.4.17/tests/test-quotearg-simple.c	14578
/m4-1.4.17/tests/test-quotearg.h	4063
/m4-1.4.17/tests/test-raise.c	1490
/m4-1.4.17/tests/test-rawmemchr.c	2632
/m4-1.4.17/tests/test-readlink.c	1378
/m4-1.4.17/tests/test-readlink.h	4303
/m4-1.4.17/tests/test-regex.c	6903
/m4-1.4.17/tests/test-rename.c	1339
/m4-1.4.17/tests/test-rename.h	26752
/m4-1.4.17/tests/test-rmdir.c	1324
/m4-1.4.17/tests/test-rmdir.h	3451
/m4-1.4.17/tests/test-sched.c	1259
/m4-1.4.17/tests/test-setenv.c	1662
/m4-1.4.17/tests/test-setlocale1.c	1788

/m4-1.4.17/tests/test-setlocale1.sh	872
/m4-1.4.17/tests/test-setlocale2.c	1822
/m4-1.4.17/tests/test-setlocale2.sh	758
/m4-1.4.17/tests/test-sigaction.c	3702
/m4-1.4.17/tests/test-signal-h-c++.cc	2169
/m4-1.4.17/tests/test-signal-h-c++2.cc	844
/m4-1.4.17/tests/test-signal-h.c	2667
/m4-1.4.17/tests/test-signbit.c	5336
/m4-1.4.17/tests/test-sigpipe.c	1959
/m4-1.4.17/tests/test-sigpipe.sh	849
/m4-1.4.17/tests/test-sigprocmask.c	2732
/m4-1.4.17/tests/test-sleep.c	1492
/m4-1.4.17/tests/test-snprintf.c	2074
/m4-1.4.17/tests/test-spawn-c++.cc	4964
/m4-1.4.17/tests/test-spawn-pipe-child.c	3367
/m4-1.4.17/tests/test-spawn-pipe-main.c	3734
/m4-1.4.17/tests/test-spawn-pipe.sh	207
/m4-1.4.17/tests/test-spawn.c	1689
/m4-1.4.17/tests/test-stat.c	1662
/m4-1.4.17/tests/test-stat.h	3192
/m4-1.4.17/tests/test-stdbool.c	3622
/m4-1.4.17/tests/test-stddef.c	1704
/m4-1.4.17/tests/test-stdint.c	11749
/m4-1.4.17/tests/test-stdio-c++.cc	6680
/m4-1.4.17/tests/test-stdio-c++2.cc	842
/m4-1.4.17/tests/test-stdio.c	1277
/m4-1.4.17/tests/test-stdlib-c++.cc	4534
/m4-1.4.17/tests/test-stdlib-c++2.cc	844
/m4-1.4.17/tests/test-stdlib.c	1482
/m4-1.4.17/tests/test-strchrnul.c	2428
/m4-1.4.17/tests/test-strerror.c	2066
/m4-1.4.17/tests/test-string-c++.cc	4154
/m4-1.4.17/tests/test-string-c++2.cc	844
/m4-1.4.17/tests/test-string.c	1064
/m4-1.4.17/tests/test-strnlen.c	1845
/m4-1.4.17/tests/test-strsignal.c	2272
/m4-1.4.17/tests/test-strstr.c	8649
/m4-1.4.17/tests/test-strtod.c	30002
/m4-1.4.17/tests/test-symlink.c	1345
/m4-1.4.17/tests/test-symlink.h	3223






/m4-1.4.17/tests/test-sys_stat-c++.cc	2650
/m4-1.4.17/tests/test-sys_stat.c	7689
/m4-1.4.17/tests/test-sys_time-c++.cc	1102
/m4-1.4.17/tests/test-sys_time.c	1161
/m4-1.4.17/tests/test-sys_types-c++.cc	934
/m4-1.4.17/tests/test-sys_types.c	1011
/m4-1.4.17/tests/test-sys_wait-c++.cc	1069
/m4-1.4.17/tests/test-sys_wait.c	1245
/m4-1.4.17/tests/test-sys_wait.h	1986
/m4-1.4.17/tests/test-time-c++.cc	1719
/m4-1.4.17/tests/test-time-c++2.cc	840
/m4-1.4.17/tests/test-time.c	1305
/m4-1.4.17/tests/test-unistd-c++.cc	5869
/m4-1.4.17/tests/test-unistd.c	1631
/m4-1.4.17/tests/test-unsetenv.c	1850
/m4-1.4.17/tests/test-update-copyright.sh	17604
/m4-1.4.17/tests/test-vasprintf.c	2363
/m4-1.4.17/tests/test-vasprintf-posix.c	125989
/m4-1.4.17/tests/test-vasprintf.c	2612
/m4-1.4.17/tests/test-vc-list-files-cvs.sh	1749
/m4-1.4.17/tests/test-vc-list-files-git.sh	1480
/m4-1.4.17/tests/test-verify.c	1928
/m4-1.4.17/tests/test-verify.sh	733
/m4-1.4.17/tests/test-version-etc.c	1128
/m4-1.4.17/tests/test-version-etc.sh	1461
/m4-1.4.17/tests/test-wchar-c++.cc	6345
/m4-1.4.17/tests/test-wchar.c	1154
/m4-1.4.17/tests/test-wcrtomb-w32-1.sh	86
/m4-1.4.17/tests/test-wcrtomb-w32-2.sh	94
/m4-1.4.17/tests/test-wcrtomb-w32-3.sh	85
/m4-1.4.17/tests/test-wcrtomb-w32-4.sh	85
/m4-1.4.17/tests/test-wcrtomb-w32-5.sh	84
/m4-1.4.17/tests/test-wcrtomb-w32.c	9497
/m4-1.4.17/tests/test-wcrtomb.c	4784
/m4-1.4.17/tests/test-wcrtomb.sh	788
/m4-1.4.17/tests/test-wctype-h-c++.cc	2304
/m4-1.4.17/tests/test-wctype-h.c	2111
/m4-1.4.17/tests/test-write.c	2132
/m4-1.4.17/tests/test-xalloc-die.c	1005
/m4-1.4.17/tests/test-xalloc-die.sh	1130

/m4-1.4.17/tests/test-xvasprintf.c	3280
/m4-1.4.17/tests/unsetenv.c	3001
/m4-1.4.17/tests/wctob.c	1242
/m4-1.4.17/tests/wctomb-impl.h	1132
/m4-1.4.17/tests/wctomb.c	940
/m4-1.4.17/tests/write.c	5274
/m4-1.4.17/tests/zerosize-ptr.h	2578
/m4-1.4.17/THANKS	6438
/m4-1.4.17/TODO	2109

Appendix - Descriptions of Key Terminology

Security Rating

The Fortify 5-star assessment rating provides information on the likelihood and impact of defects present within an application. A perfect rating within this system would be 5 complete stars indicating that no high impact vulnerabilities were uncovered.

Rating	
	Fortify awards one star to projects that undergo a Fortify security review, which analyzes a project for a variety of software security vulnerabilities.
	Fortify awards two stars to projects that undergo a Fortify security review that identifies no high likelihood / high impact issues. Vulnerabilities that are trivial to exploit and have a high business or technical impact should never exist in business-critical software.
	Fortify awards three stars to projects that undergo a Fortify security review that identifies no low likelihood / high impact issues and meets the requirements needed to receive two stars. Vulnerabilities that have a high impact, even if they are non-trivial to exploit, should never exist in business critical software.
	Fortify awards four stars to projects that undergo a Fortify security review that identifies no high likelihood / low impact issues and meets the requirements for three stars. Vulnerabilities that have a low impact, but are easy to exploit, should be considered carefully as they may pose a greater threat if an attacker exploits many of them as part of a concerted effort or leverages a low impact vulnerability as a stepping stone to mount a high-impact attack.
	Fortify awards five stars to projects that undergo a Fortify security review that identifies no issues.

Likelihood and Impact

Likelihood

Likelihood is the probability that a vulnerability will be accurately identified and successfully exploited.

Impact

Impact is the potential damage an attacker could do to assets by successfully exploiting a vulnerability. This damage can be in the form of, but not limited to, financial loss, compliance violation, loss of brand reputation, and negative publicity.

Fortify Priority Order

Critical

Critical-priority issues have high impact and high likelihood. Critical-priority issues are easy to detect and exploit and result in large asset damage. These issues represent the highest security risk to the application. As such, they should be remediated immediately.

SQL Injection is an example of a critical issue.

High

High-priority issues have high impact and low likelihood. High-priority issues are often difficult to detect and exploit, but can result in large asset damage.

These issues represent a high security risk to the application. High priority issues should be remediated in the next scheduled patch release.

Medium

Medium-priority issues have low impact and high likelihood. Medium-priority issues are easy to detect and exploit, but typically result in small asset damage.

These issues represent a moderate security risk to the application. Medium-priority issues should be remediated in the next scheduled

Low

Low-priority issues have low impact and low likelihood. Low-priority issues can be difficult to detect and exploit and typically result in small asset damage.

These issues represent a minor security risk to the application. Low priority issues should be remediated as time allows.

Issue Status

New

New issues are ones that have been identified for the first time in the most recent analysis of the application.

Existing

Existing issues are issues that have been found in a previous analysis of the application and are still present in the latest analysis.

Reopened

Reopened issues have been discovered in a previous analysis of the application but were not present in subsequent analyses. These issues are now present again in the most recent analysis of the application.

Fortify Remediation Effort

Major Remediation

Major remediation effort issues must often be addressed at multiple locations to fix the root problem.

Minor Remediation

Minor remediation effort issues can typically be addressed at the location of the root problem.