New issue

# Path Traversal Vulnerability in mcp-rtfm #35

Open

BruceJqs opened 2 weeks ago Owner

## Path Traversal Vulnerability in mcp-rtfm

### 1) CNA / Submission Type

- Submission type: Report a vulnerability (CVE ID request)
- Reporter role: Independent security researcher
- Report date: Apr 18, 2026

### 2) Reporter Contact

- Reporter name: `BruceJin`
- Reporter email: `brucejin@zju.edu.cn`
- Permission to share contact with vendor: `Yes`

### 3) Vendor / Product Identification

- Vendor: ryanjoachim
- Product: mcp-rtfm
- Repository: https://github.com/ryanjoachim/mcp-rtfm
- Affected component(s):
- `src/index.ts`

### 4) Vulnerability Type

- CWE: CWE-22 (Improper Limitation of a Pathname to a Restricted Directory)

- Short title: Path traversal in MCP documentation file handling

## 5) Affected Versions

- Confirmed affected: 0.1.0, commit `054fe515735cb477d4640c20930c04b243e443fc`
- Suspected affected range: revisions containing the same request-to-sink flows listed below
- Fixed version: Not available at time of report

## 6) Vulnerability Description

A path traversal vulnerability (CWE-22) has been identified in mcp-rtfm version 0.1.0, specifically within the get_doc_content, read_doc, and update_doc MCP tools. The tools construct filesystem paths by interpolating a user-supplied docFile value into a string without normalization or boundary checks, allowing ../ sequences to escape the intended .handoff_docs directory. An attacker with network access to the MCP interface can read or modify arbitrary files accessible to the server process, leading to data exposure, integrity loss, and potential service disruption. No fixed version is available at the time of reporting.

## 7) Technical Root Cause

1. `js/file-access-from-request`
   - Source: `src/index.ts:442` (`docFile` for documentation read tools)
   - Source: `src/index.ts:456` (`projectPath` for `update_doc`)
   - Source: `src/index.ts:460` (`docFile` for `update_doc`)
   - Source: `src/index.ts:486` (`projectPath` for `get_doc_content`)
   - Source: `src/index.ts:490` (`docFile` for `get_doc_content`)
   - Read sink: `src/index.ts:930` (`read_doc`)
   - Write sink: `src/index.ts:985` (`update_doc`)
   - Read sink: `src/index.ts:1038` (`get_doc_content`)
   - Sink path construction: `const filePath = \`${projectPath}/.handoff_docs/${docFile}\`;`

## 8) Attack Prerequisites

- Attacker can invoke the MCP tools `get_doc_content`, `read_doc`, and/or `update_doc`.
- The target path is readable or writable by the MCP server process.
- For `update_doc`, the attacker must first call `read_doc` on the same `docFile` value and provide `searchContent` that exists in the previously read content.
- No runtime policy normalizes `docFile`, rejects `..` segments, or verifies the resolved path remains inside `.handoff_docs`.

## 9) Proof of Concept / Reproduction Guidance

This proof of concept provides a concise, CVE-style reproduction example for the reported issue.

1. Reproduction request

```
{"jsonrpc":"2.0","id":1,"method":"tools/call","params":{"name":"get_doc_content","argum
```

2. Validation

- Ensure `/tmp/mcp-rtfm-poc/project/.handoff_docs` exists so that traversal is evaluated from an existing directory.
- Invoke `get_doc_content` with a traversal payload such as `../../../../etc/hosts`.
- Confirm that the `mcp-inspector` response contains the contents of `/etc/hosts`.
- For write verification, create a controlled file outside `.handoff_docs`, call `read_doc` with a traversal payload targeting that file, then call `update_doc` with the same `projectPath` and `docFile`, a matching `searchContent`, and a replacement value.
- Confirm that the controlled file outside `.handoff_docs` is modified.
- The reproduction has been manually confirmed with `mcp-inspector` for `/etc/hosts` read and for `read_doc` plus `update_doc` path traversal write behavior.

## 10) Security Impact

- Confidentiality: High (an attacker can read process-accessible files outside the intended `.handoff_docs` directory).
- Integrity: High (an attacker can modify process-writable files outside the intended `.handoff_docs` directory through `read_doc` plus `update_doc`).
- Availability: High (an attacker may corrupt writable files or application state, depending on process privileges and target path).
- Scope: Unchanged.

## 11) CVSS v3.1 Suggestion

- Suggested vector: `CVSS:3.1/AV:L/AC:L/PR:L/UI:N/S:U/C:H/I:H/A:H`
- Suggested base score: 7.8 (High)
- Adjust `AV` to `N` if the affected MCP tools are exposed through a remotely reachable MCP bridge or service.

## 12) Workarounds / Mitigations

- Do not expose the MCP server to untrusted clients until a fix is available.

- Restrict access to documentation read/update tools to trusted local users only.
- Run the MCP server with a dedicated low-privilege OS account.
- Configure filesystem permissions so the MCP process cannot read or write sensitive files.
- Monitor unexpected reads or writes outside project `.handoff_docs` directories.

## 13) Recommended Fix

- Resolve `projectPath` and `docFile` with filesystem-safe APIs instead of string interpolation.
- Reject absolute `docFile` values, path separators where not expected, `..` segments, null bytes, and symlink escapes.
- Resolve the final path and verify it remains inside the intended `${projectPath}/.handoff_docs` directory before every read or write.
- Consider accepting only a fixed allowlist of documentation filenames such as the expected default documentation files.
- Apply the same path validation to `read_doc`, `get_doc_content`, `update_doc`, metadata updates, related-document lookups, and any other filesystem tools.
- Add regression tests proving that traversal payloads cannot read or write outside `.handoff_docs`.
- Publish a maintainer security advisory once a patch is released.

## 14) References

- Repository: https://github.com/ryanjoachim/mcp-rtfm
- Reviewed source file: `src/index.ts`
- CWE-22: https://cwe.mitre.org/data/definitions/22.html

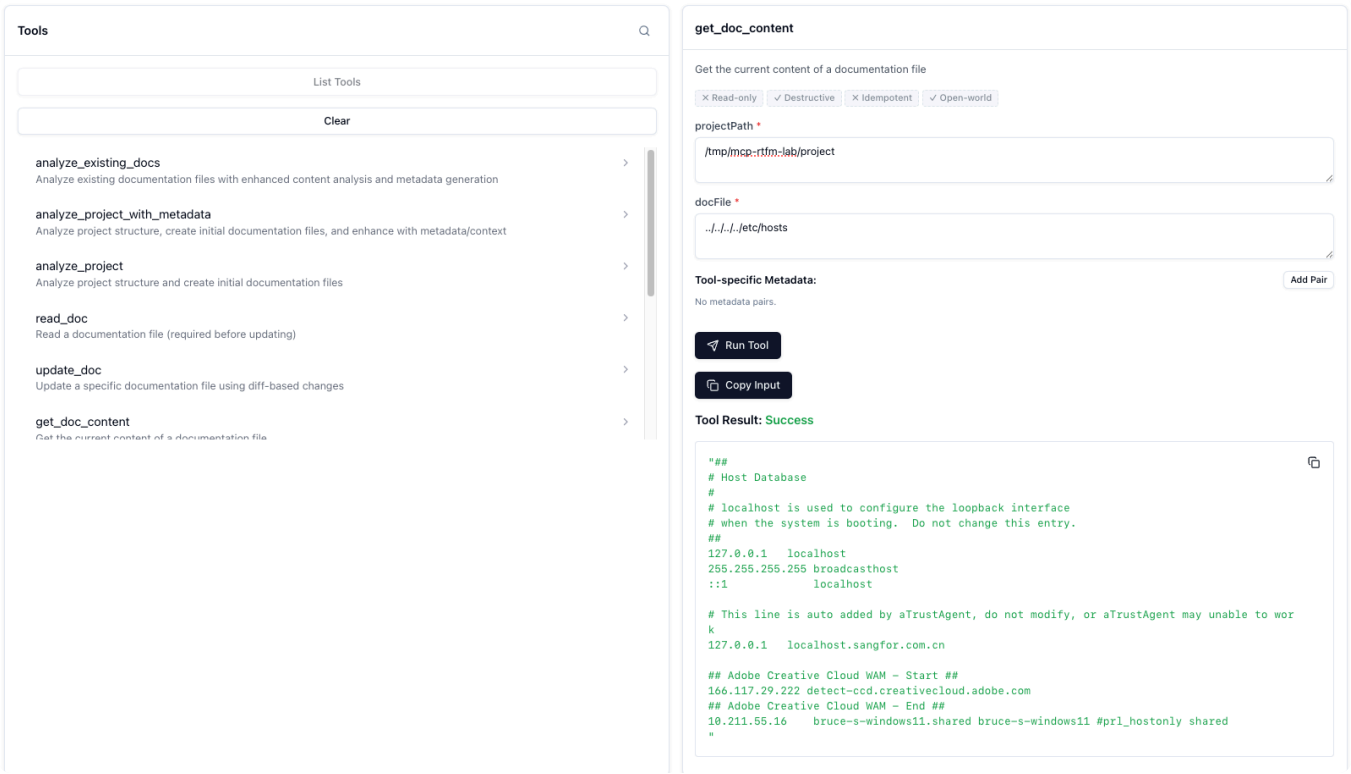
## 15) Credits

- Discoverer: `BruceJin`
- Discovery method: Static analysis (CodeQL), repository source-code audit, and manual reproduction with `mcp-inspector`

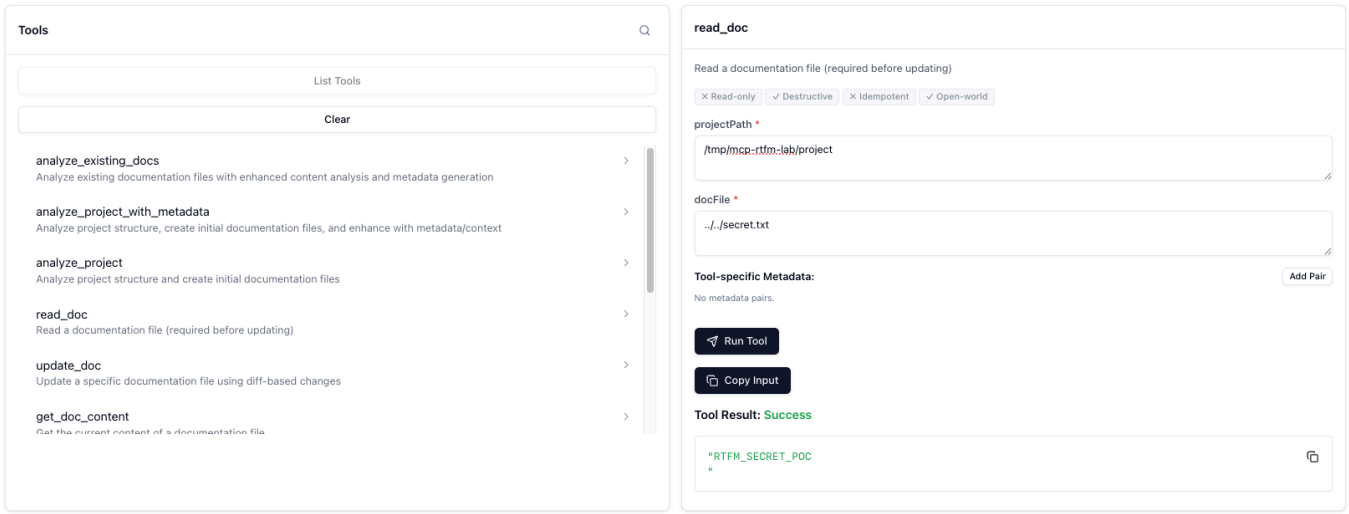
## 16) Additional Notes for Form Mapping

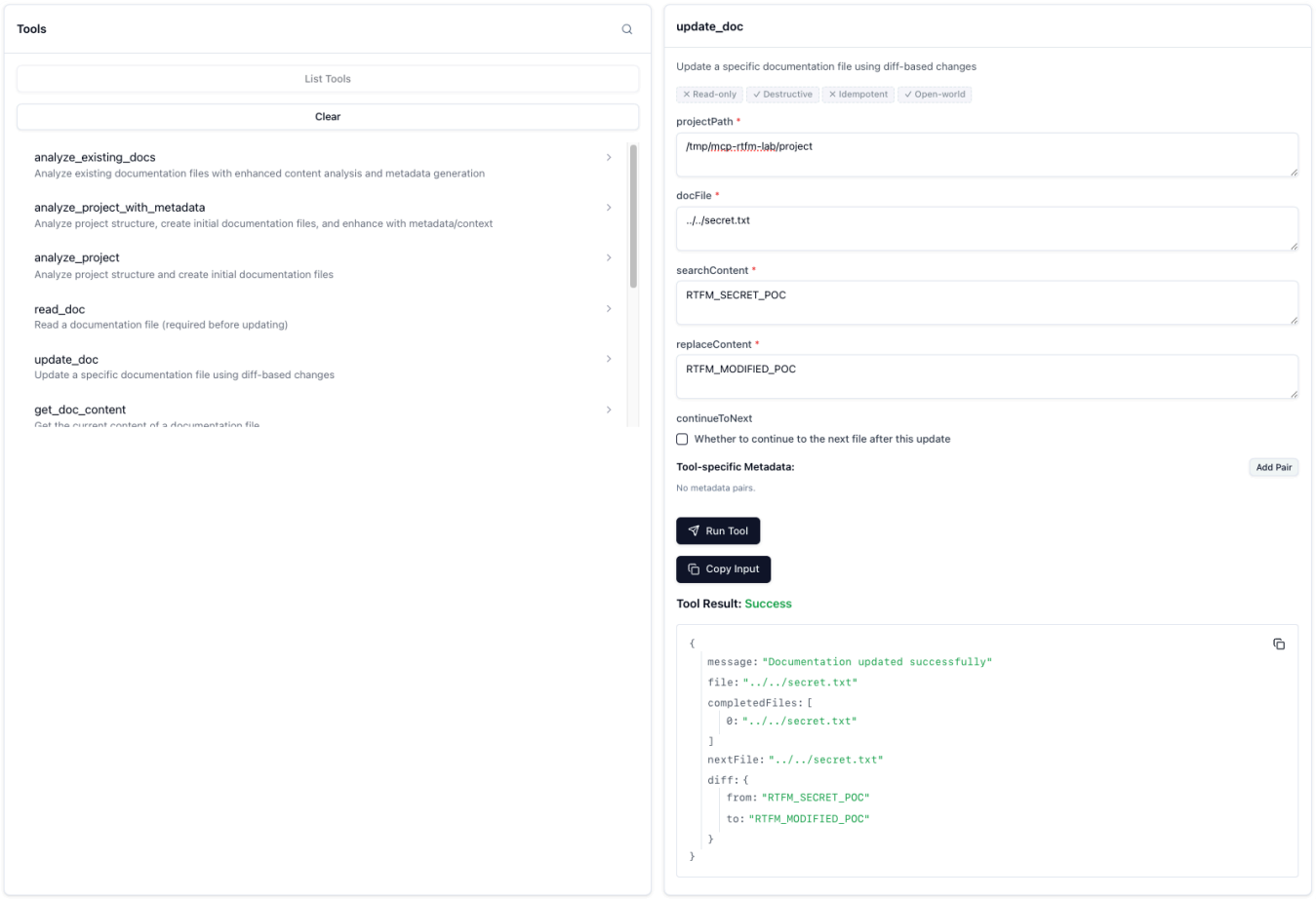
- Audit verdict: Manually reproduced: attacker-controlled MCP `docFile` reaches filesystem read and write sinks without path traversal protection.
- Dynamic exploit replay status: completed with `/etc/hosts` read through `get_doc_content`; completed with `read_doc` followed by `update_doc` to modify a traversal-selected file outside `.handoff_docs`.
- Maintainer should validate release mapping before coordinated disclosure.

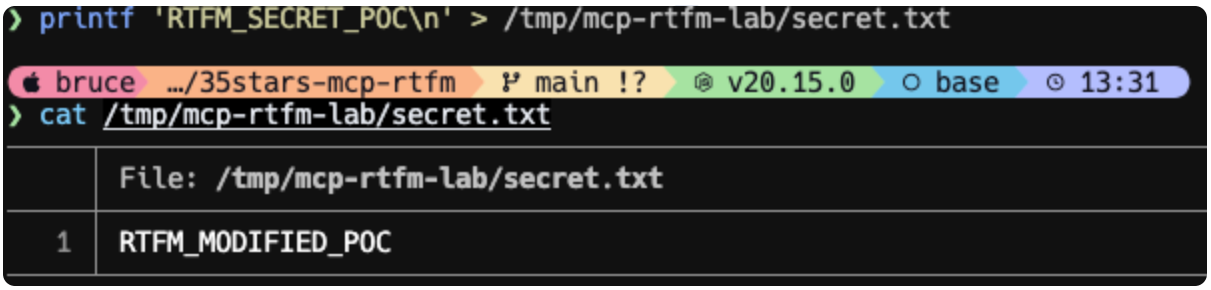
BruceJqs 2 weeks ago Owner Author •••




By exploiting vulnerability in get_doc_content, the file `/etc/hosts` has been successfully read.






By exploiting vulnerability in read_doc and update_doc, the secret file has been successfully modified.

**BruceJqs** mentioned this 2 weeks ago

Path Traversal Vulnerability in mcp-rtfm ryanjoachim/mcp-rtfm#5



## Metadata

### Assignees

No one assigned

### Labels

No labels

**Projects**

No projects

**Milestone**

No milestone

**Relationships**

None yet

**Development**

No branches or pull requests

**Participants**