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From: Johannes Berg <johannes@...solutions.net>  
To: oss-security@...ts.openwall.com  
Cc: Jouni Malinen <j@...fi>  
Subject: various 802.11 security issues - fragattacks.com

Hi,

Several security issues in the 802.11 implementations were found by Mathy Vanhoef (New York University Abu Dhabi), who has published all the details at

<https://papers.mathyvanhoef.com/usenix2021.pdf>

and

<https://www.fragattacks.com/>

For Linux, we've developed the set of patches posted here:

<https://lore.kernel.org/linux-wireless/20210511180259.159598-1-johannes@sipsolutions.net/>

Specifically, the following CVEs were assigned:

- \* CVE-2020-24586 - Fragmentation cache not cleared on reconnection
- \* CVE-2020-24587 - Reassembling fragments encrypted under different keys
- \* CVE-2020-24588 - Accepting non-SPP A-MSDU frames, which leads to payload being parsed as an L2 frame under an A-MSDU bit toggling attack
- \* CVE-2020-26139 - Forwarding EAPOL from unauthenticated sender
- \* CVE-2020-26140 - Accepting plaintext data frames in protected networks
- \* CVE-2020-26141 - Not verifying TKIP MIC of fragmented frames
- \* CVE-2020-26142 - Processing fragmented frames as full frames
- \* CVE-2020-26143 - Accepting fragmented plaintext frames in protected networks
- \* CVE-2020-26144 - Always accepting unencrypted A-MSDU frames that start with RFC1042 header with EAPOL ethertype
- \* CVE-2020-26145 - Accepting plaintext broadcast fragments as full frames
- \* CVE-2020-26146 - Reassembling encrypted fragments with non-consecutive packet numbers
- \* CVE-2020-26147 - Reassembling mixed encrypted/plaintext fragments

In general, the scope of these attacks is that they may allow an attacker to

- \* inject L2 frames that they can more or less control (depending on the vulnerability and attack method) into an otherwise protected network;
- \* exfiltrate (some) network data under certain conditions, this is specific to the fragmentation issues.

A subset of these issues is known to apply to the Linux IEEE 802.11 implementation (mac80211). Where it is affected, the attached patches fix the issues, even if not all of them reference the exact CVE IDs.

In addition, driver and/or firmware updates may be necessary, as well as potentially more fixes to mac80211, depending on how drivers are using it.

Specifically, for Intel devices, firmware needs to be updated to the most recently released versions (which was done without any reference to the security issues) to address some of the vulnerabilities.

To have a single set of patches, I have included the patches for ath10k and ath11k drivers in my patch posting linked to above.

We currently don't have information about how other drivers are, if at all, affected.

Thanks,  
johannes

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