

MAC address randomization

draft-zuniga-mac-address-randomization-01

IETF 112 – MADINAS WG

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Introduction and goals

- Privacy increasing concern
 - Layer-2 identifiers (MAC addresses) have been assigned uniquely to devices and are transmitted in the clear in, for instance, beacons, probe requests, or after association
 - MAC addresses can easily be intercepted and used to track location or behavior
- Several projects in IETF, IEEE 802 and among mobile OS vendors to deal with plain-text, unique, permanent MAC addresses
 - Assigning a random MAC address to a device per connection, per SSID, after some time period
 - Area of extensive research (see reference Martin et al (2017) in draft for more comprehensive list of research in this area, or IEEE 802.11 RCM TIG final report in 11-19/1442r9, also in draft)
- **Goal: Document Current State of Affairs regarding MAC address randomization at IETF and other SDOs**

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MAC randomization-related activities at the IETF

- Early work as far as back as IETF91
 - Joint W3C/IAB privacy tutorial
 - Testing MAC randomization and technical features (i.e., collisions, DHCP, etc.)
 - Thoroughly documented
- Led/linked to a number of other initiatives (see draft), e.g., RFC7217, RFC8947, RFC8948
- MAC randomization is now a default privacy feature in major mobile OS (see later slide)

Recent RCM activities at the IEEE 802

- IETF work inspired a new privacy research project, P802E
 - Study group phase to map privacy in different IEEE 802 standards (link to document repository with associated studies in draft)
 - Recommended Practice for Privacy Considerations for IEEE 802 Technologies finalized during autumn 2020
- Discussions about randomized MAC for different types of devices (industrial, sensors, personal, etc.) in e.g., 802C (“SLAP”)
- Currently, two task groups in IEEE 802.11 are dealing with issues related to Randomized and Changing MAC addresses (RCM):
 - The IEEE 802.11bh task group, looking at mitigating the repercussions that RCM creates on 802.11 networks and related services, and
 - The IEEE 802.11bi task group, which will define modifications to the IEEE Std 802.11 medium access control (MAC) specification to specify new mechanisms that address and improve user privacy

Recent MAC randomization-related activities at the WBA

- The Wireless Broadband Alliance (WBA), the Testing and Interoperability Work Group has been looking at the issues related to MAC address randomization
- WBA has documented a set of use cases that a Wi-Fi Identification Standard should address in order to scale and achieve longer term sustainability of deployed services

OS current practices

Android 10+	iOS 14+
The randomized MAC address is bound to the SSID	The randomized MAC address is bound to the BSSID
The randomized MAC address is stable across reconnections for the same network	The randomized MAC address is stable across reconnections for the same network
The randomized MAC address does not get re-randomized when the device forgets a WiFi network	The randomized MAC address is reset when the device forgets a WiFi network
MAC address randomization is enabled by default for all the new WiFi networks. But if the device previously connected to a WiFi network identifying itself with the real MAC address, no randomized MAC address will be used (unless manually enabled)	MAC address randomization is enabled by default for all the new WiFi networks

OS current practices

OS	Linux	Android 10	Windows 10	iOS 14+
Random per net.	Y	Y	Y	Y
Random per connec.	Y	N	N	N
Random daily	N	N	Y	N
SSID config.	Y	N	N	N
Random. for scan	Y	Y	Y	Y
Random. for scan by default	N	Y	N	Y

Changelog

- -00:
 - Updated name of the document
 - draft-zuniga-mac-address-randomization → draft-zuniga-madinas-mac-address-randomization
 - Several edits to match MADINAS WG scope
 - Updated text on current OS practices with results from real experiments
- -01:
 - Addressed comments from Jerome's review (THANKS!)

Next steps

- Comments and reviews are welcome!

- Call for WG adoption?