SIM Authentication with Radiator

Features and use cases with Radiator SIM Pack

Radiator

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Radiator

Radiator AAA Server - in brief

- Radiator is the leading solution for authentication, authorisation, and accounting (AAA) which allows you to control access to your wired and wireless networks comprehensively and efficiently.

- Hundreds of companies and organisations around the world use Radiator for their AAA needs. Radiator provides RADIUS, RadSec, Diameter, and TACACS+ AAA interfaces with backends ranging from simple files to a carrier-grade 3GPP Diameter infrastructure.

- In active development - latest release Dec 2022

  - See more: https://radiatorsoftware.com/products/radiator/history/

Radiator SIM Pack

Radiator SIM Pack is the key component for seamless roaming authentication between mobile and Wi-Fi networks that use SIM-based authentication. Radiator SIM Pack also provides all the functions required for a 3GPP AAA Server.

There are multiple benefits of using Radiator SIM Pack: SIM authentication is designed for and already used with mobile devices and related infrastructure; the credentials have already been distributed to customers with SIMs; and SIM authentication is easier to use than customer/client certificates or username-password authentication.

Radiator SIM Pack includes:

- Full 3GPP AAA Server functionality for VoWiFi, VoLTE and WiFi offloading
- Standalone support for all SIM-based (EAP-SIM, EAP-AKA, EAP-AKA') authentication protocols for WiFi offloading
- HSS and HLR interface support
- Flexible REST API support for fetching SIM and AKA vectors
- Support for IMSI Privacy features

Radiator SIM Pack - business benefits 1/2

Business benefits of WiFi roaming / WiFi Offloading / VoWiFi with Radiator SIM Pack

- **Network capacity**
  - Meeting the ever increasing demand for data
  - Expanded coverage for mobile subscribers, especially in areas with limited or congested cellular coverage

- **Cost saving**
  - Reduces the need to invest in new cellular infrastructure
  - WiFi roaming costs significantly lower than cellular roaming

- **New revenue**
  - IoT and private 5G, industrial use cases
  - Network monetisation from roaming agreements

Radiator SIM Pack - business benefits 2/2

Business benefits of WiFi roaming / WiFi Offloading / VoWiFi with Radiator SIM Pack

- **QoS & QoE**
  - Superior user experience with invisible onboarding and seamless roaming between 3G/LTE/5G and WiFi
  - Enhances connectivity at various locations: home, office, commute, venues
  - Premium use cases like international roaming and in-flight connectivity

- **Easy to manage**
  - Mobile users and IoT devices already have SIMs / eSIMs / iSIMs
  - Easy to distribute and provision SIM authentication profiles

- **Security**
  - No input from user removes attack vector: no credentials, PINs or OTP to steal

Prerequisites for SIM authentication

- Provisioning
  - MNOs can add profiles to their operator packages which are distributed with their SIMs
  - Centralised management tools available for creating and distributing profiles to user equipment
  - Different solutions for Android, iOS, etc.
- HSS / HLR system for storing subscriber information
- AAA server supporting SIM authentication methods
  - Such as Radiator SIM Pack

Use case: Unified data plans for WiFi and cellular networks

SIM cards are the default way of authenticating users in cellular networks and SIM based authentication can also be used for WiFi. EAP-SIM, EAP-AKA and EAP-AKA' authentication are all supported by Radiator SIM Pack.

Using unified SIM-based authentication for both networks makes it easy to provide data plans with both WiFi and mobile access, without having to distribute separate WiFi credentials and usernames to end users.

For further QoS control and/or billing WiFi usage, Radiator SIM Pack can be combined with Radiator Policy and Charging Pack: it converts RADIUS accounting from wireless controllers into Diameter charging used in mobile networks for prepaid and postpaid billing.

Use case: VoWiFi with Radiator as 3GPP AAA Server

Radiator SIM Pack includes a fully featured 3GPP AAA Server.

3GPP AAA Server provides trusted access from trusted and non-trusted (such as WiFi) networks to use services that require authentication: VoWiFi and WiFi roaming.

The 3GPP AAA Server uses the operator's HSS (Home Subscriber Server) and does not require a separate user information database. The authorisation function determines if the authenticated user has access rights for using services, which require 3GPP access, and enforces the subscriber profile.

In a roaming situation between carriers and operators, Radiator 3GPP AAA Server also functions as a proxy server. Solution supports also VoWiFi emergency calls.
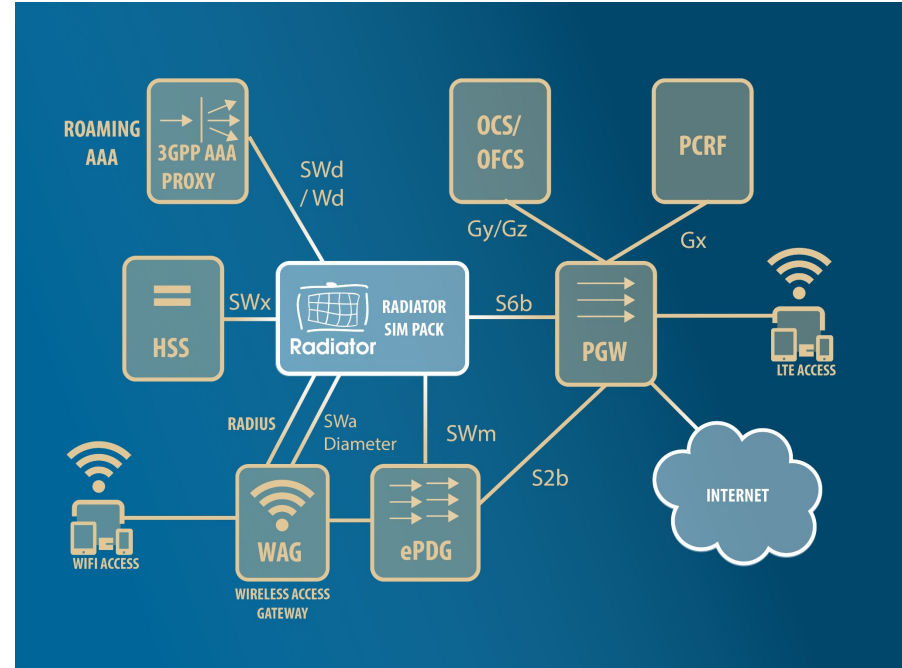
New feature: IMSI Privacy 1/2

EAP-SIM, EAP-AKA and EAP-AKA' are SIM-based WiFi authentication methods used to achieve seamless offloading to carrier and partner WiFi. International Mobile Subscriber Identifier (IMSI) derived from the SIM card is the unique identifier for each user.

On the first connection to a WiFi network, the mobile device communicates its permanent subscriber identity information (IMSI), which is then sent to the home operator for authentication. Without IMSI Privacy features, this identity is **sent in the clear.**

A potential 3rd party adversary installing a WiFi sniffer in the vicinity of such networks can harvest permanent identities and track users. This tracking can also be done by the venue or network owner when connecting to the WiFi network.

Example: warning in iOS when joining WiFi without IMSI privacy in place

New feature: IMSI Privacy 2/2

The solution is to protect user privacy by implementing IMSI encryption for EAP-SIM, EAP-AKA and EAP-AKA' authentication. As an operator, you can enable IMSI privacy easily by including it in your operator packages or provisioning profiles. This can be done incrementally for different user groups.

Radiator 3GPP AAA Server handles both encrypted and clear authentication requests. This means IMSI privacy can be offered to devices supporting it without affecting other users.

Radiator SIM Pack has supported IMSI encryption since 2020 and multiple Radiator operator customers have implemented it for their AAA server encryption for both iOS and Android.

Specification for this feature has been released by WBA: IMSI Privacy Protection for Wi-Fi – Technical Specification - Radiator is fully compliant.

Use case: Onboard Connectivity

One use case for Radiator SIM Pack is to implement onboard connectivity for airline carriers, cruise ships, among others, providing authentication to onboard WiFi that is connected by other means (such as satellite connection) to the internet.

In this scenario, Radiator provides the authentication support for WiFi roaming when subscribers of mobile operators are using their phones during the flight, cruise, etc..

With WiFi roaming authentication provided by Radiator AAA SIM Pack, end user devices can connect automatically to the in-flight WiFi network, and continue their use based on the roaming policy agreements between carriers and onboard network operators.
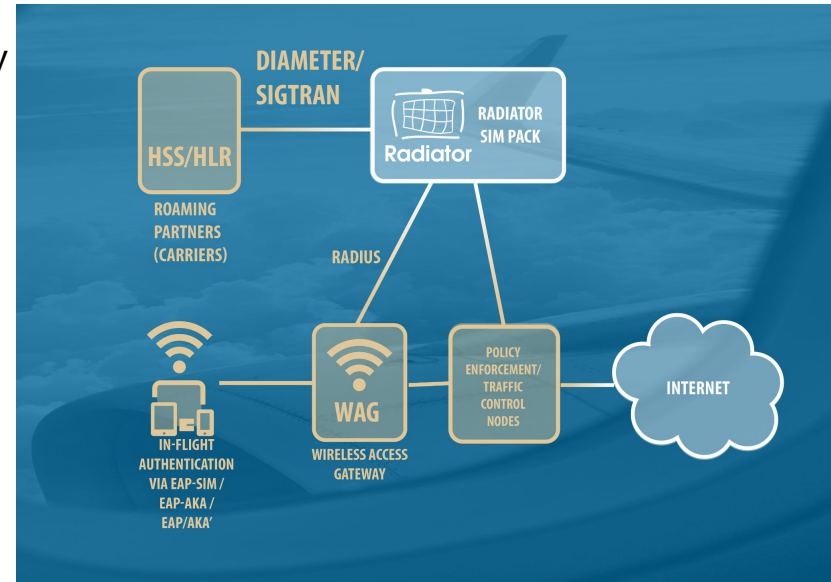
A word from the customer

"Radiator is the only choice in the industry when you need complex and flexible customization without impact on high speed performance. The fact that Radiator Software provides the source code, allows us to modify core components to suit our application and really do anything we want it to do, or integration with anything we want it to integrate with.

A Tier 1 Mobile Operator in Taiwan uses Radiator SIM Pack for all of their mobile authentication (EAP-SIM, UAM and SMS-OTP) for over 50,000 hotspots in Taiwan. A single server Radiator performs at almost 1200 transactions per second (TPS) during busy hours and has never failed in providing stable and rock solid performance."

Peter Cheng, President, Acom Networks

Acom Networks is our integrator partner working with one of the largest telecommunication service providers in Taiwan.

OpenRoaming with Radiator

- **Wireless Broadband Alliance (WBA)**, provides **OpenRoaming™**, a roaming federation service enabling an automatic and secure Wi-Fi experience globally
  - **Roaming revenue opportunities** for **(Wi-Fi) service providers**, a better and more secure **self-service guest network** for **all organisations**.
- For OpenRoaming™, support both for RadSec and DNS service discovery is needed
  - **Radiator AAA Server Software** supports already both of these and with **Radiator SIM Pack** also **SIM authentication with IMSI privacy protection** - making Wi-Fi roaming easy and secure
- **Radiator team** can offer you **a complete package**: providing **the software, the installation** and **the configuration assistance** in order to join OpenRoaming™
- Webinar coming up: see next slide

OpenRoaming with Radiator
webinar in February 2023

LEARN

- **What is** required for OpenRoaming?
- **What is the** quickest way to start testing?
- **What are the** recommended architecture **and** practices **for** adding OpenRoaming **both** for a Service/Access Network Provider and for an Identity Provider?
- **Where can one** find help **to** configure Radiator **for** OpenRoaming?

Thank you! Comments, questions?

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