



## **GSMA's revisited solution for 5G SA Roaming**

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# About me

## **Pieter Veenstra**

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### **Chairman GSMA 5GMRR Task Force**

The multi-working group 5G Mobile Roaming Revisited (5GMRR) task force revisits the 3GPP solutions for 5G SA roaming as a simple, scalable, usable and secure solution.

### **Deputy Chair GSMA NRG**

GSMA NRG is the parent group of the GSMA 5GMRR task force.

### **Chairman GSMA RIFS**

In 2021 re-elected for another 2-year term. The group specifies Signaling Firewalls to protect mobile roaming and alike topics.

### **Editor GSMA 5G Security Guide**

Writer and coordinator of the GSMA FS.40 document covering the features and challenges with 3GPP Releases 15 and 16.

### **Editor GSMA Interconnect Signaling Security**

The GSMA FS.21 gives overall guidelines for Signaling Firewalls and risks from interworking in 2G/3G/4G/5G roaming scenarios.

### **Editor i3forum CLI Spoofing report**

Main editor of a comprehensive report in the i3forum on the various solutions to protect against CLI Spoofing.



# Introduction

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## GSMA's Revisited Solution for 5G SA Roaming

- Reason and Charter of the 5GMRR Task Force
- Defined solution for Bilateral 5G SA Roaming
- Need identified for a Holistic Security approach

## Risks from Interworking with 2G/3G and LTE Roaming

## Summary

# 5G Mobile Roaming Revisited (5GMRR) Task Force

## Background and Introduction

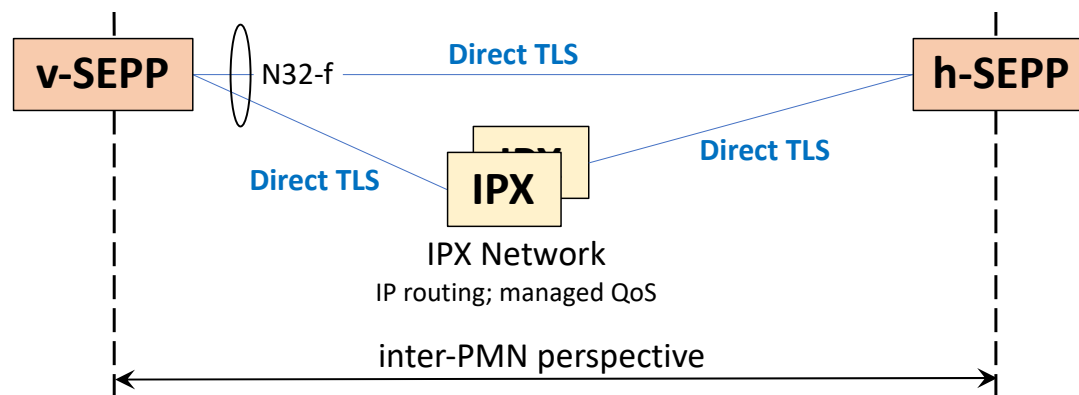
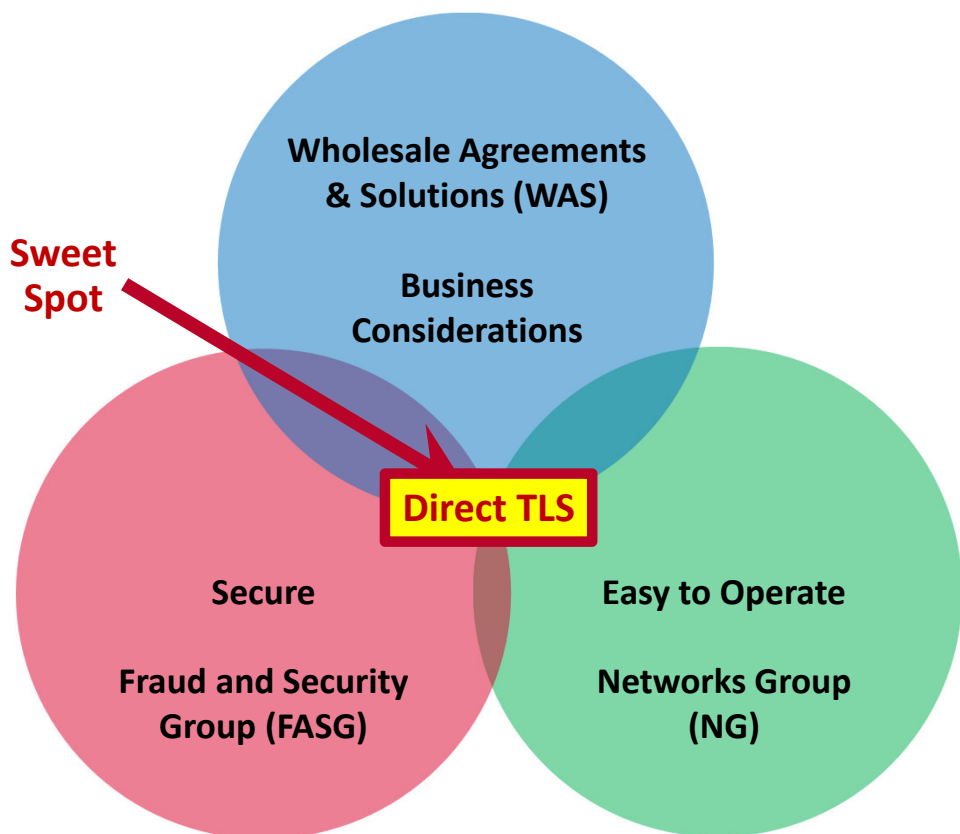
- Inter-operator signalling security was difficult to achieve in previous mobile network generations due to the legacy of early telephony signalling.
- Following a GSMA request, in 5G cores 3GPP radically rectified this through the introduction of a security proxy (SEPP) that enables either:
  - Operator-to-Operator security using Transport Level Security (TLS), or
  - Where intermediaries are used (Hubs, IPX carriers and Value Added Services) additional application level security using PRINS (3GPP developed it for IPX providers, not other intermediaries).
- However, for some there is concern that PRINS is too complex and a cross working group activity was established in 2019 to identify whether a simpler implementation could be agreed

## 5GMRR objective

- Define a **scalable, usable and secure** 5G roaming solution that meets **business and technical** needs and is backed by the industry

# 5GMRR Phase 1 – Bilateral 5G SA Roaming routes

Ready for use for about 95% of the traffic over 5% of the connections \*



- Rationales for Direct TLS**
1. The simplest (and single) solution for its purpose
  2. Confirmed by 3GPP to be in compliance with the specification for the purpose of this use case
  3. Timely documented for early bird implementation of 5G SA Roaming connections (only bilaterals)
  4. Equally balancing requirements WAS, FASG & NG

# Outsourcing Solutions for 5G SA Roaming

**Dilemma how to balance security for 5% of the traffic over 95% of the connections?**

## 1. Bilateral 5G SA Roaming (5GMRR Phase 1)

- Solution for bilateral inter-PMN connection with SEPP and RVAS located in PMN
- SEPP fully outsourced to IPX or centralized in operator group with no SEPP in the PMN

## 2. Hosted SEPP

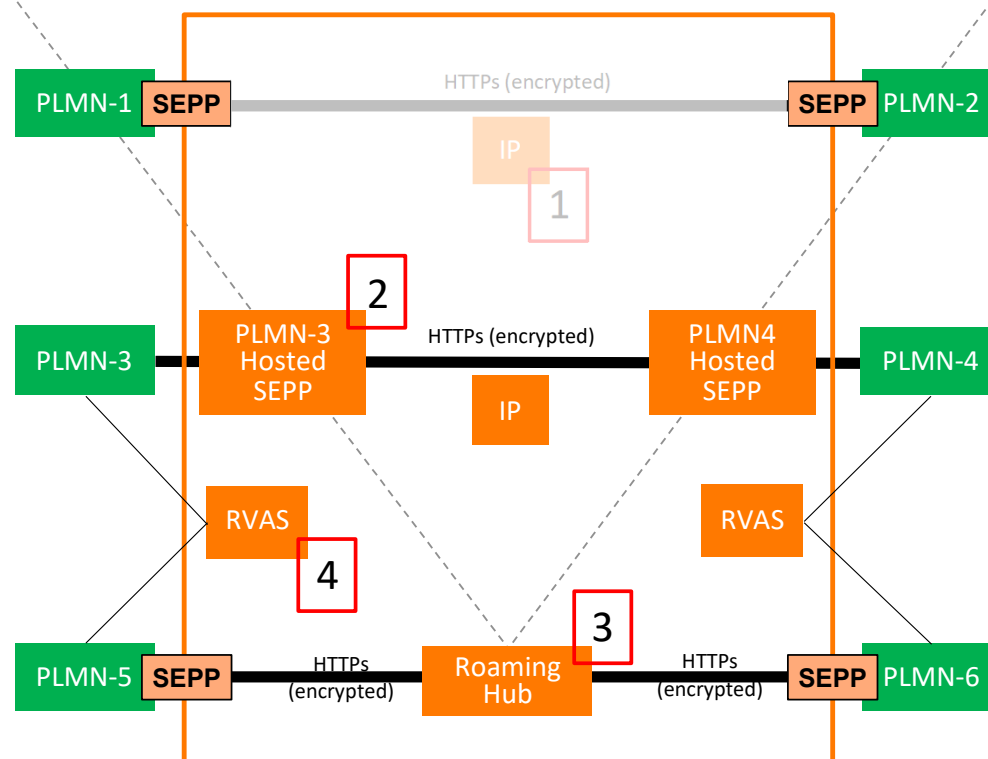
- Outsourcing of SEPP functionalities with N32 proxy service in IPX domain

## 3. Roaming Hubbing

- Outsourcing of roaming openings including signalling, testing, billing and finance

## 4. Roaming Value Added Services

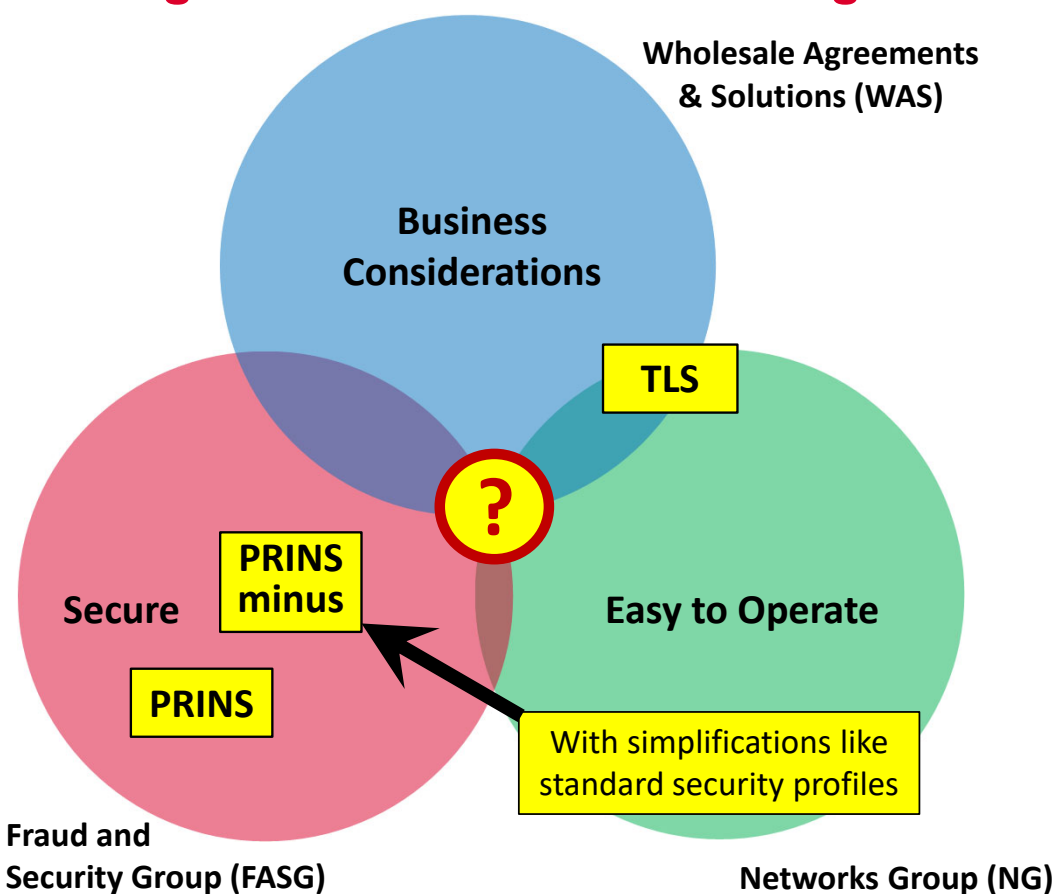
- Outsourcing of additional roaming services like Steering of Roaming, Welcome SMS



**Outsourcing Contracts and Trusted Relationships are complimentary prerequisites to the outsourcing solutions**

# Dilemma how satisfying all interests needs?

## Plotting TLS and PRINS for Roaming HUB



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## Holistic/Global Security Proposals

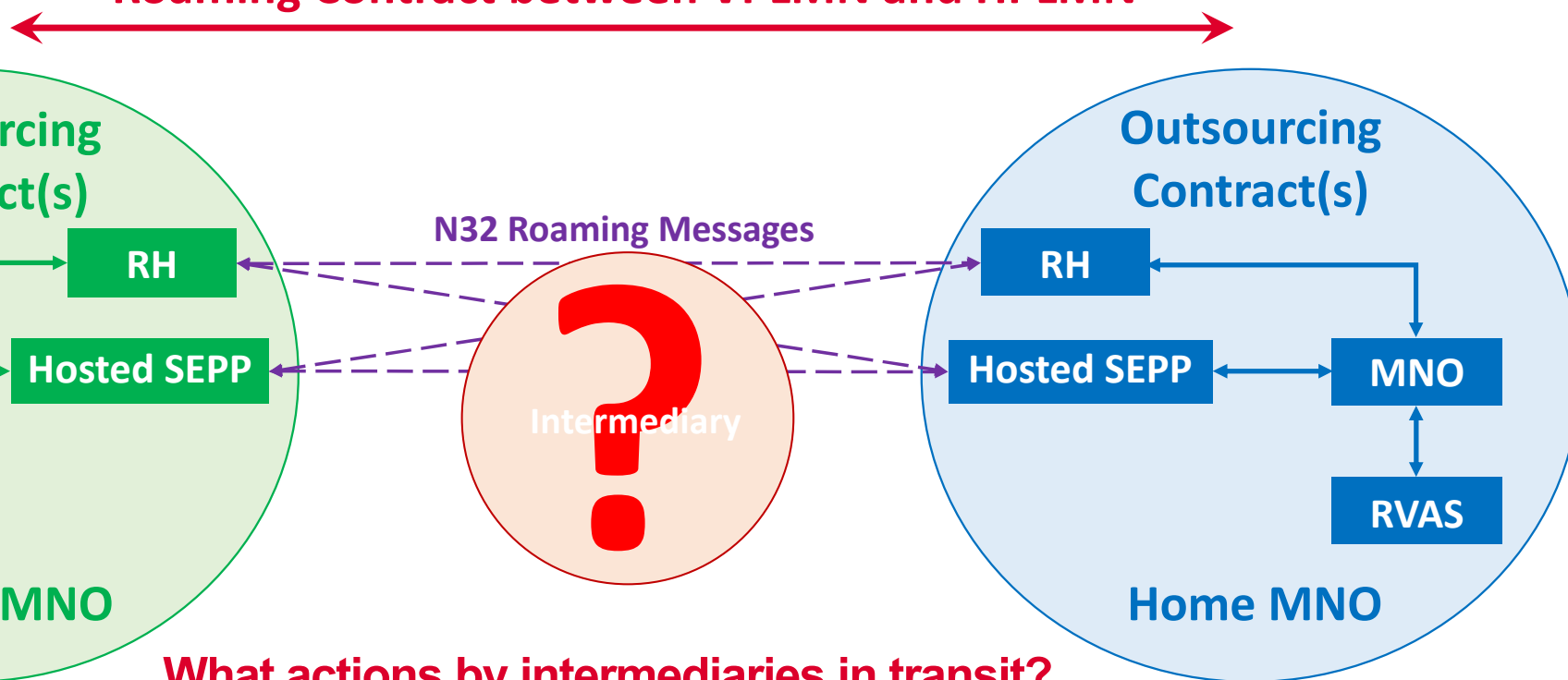
- To decide per use case to deploy either TLS, PRINS or combi of TLS and PRINS
- Use TLS hop-by-hop for all use cases to simplify and industrialize with additional security measures & contract guarantees

## Trade-offs to be decided

- Still a single solution per use case?
- Which use cases need a further analysis of alternatives?
- Are we restricted to TLS or PRINS or define an incremental solution?

# Liability and Security need to go hand-in-hand

Roaming Contract between VPLMN and HPLMN



## What actions by intermediaries in transit?

- What information can be exposed to intermediaries?
- Can we allow any change without the sender's control?

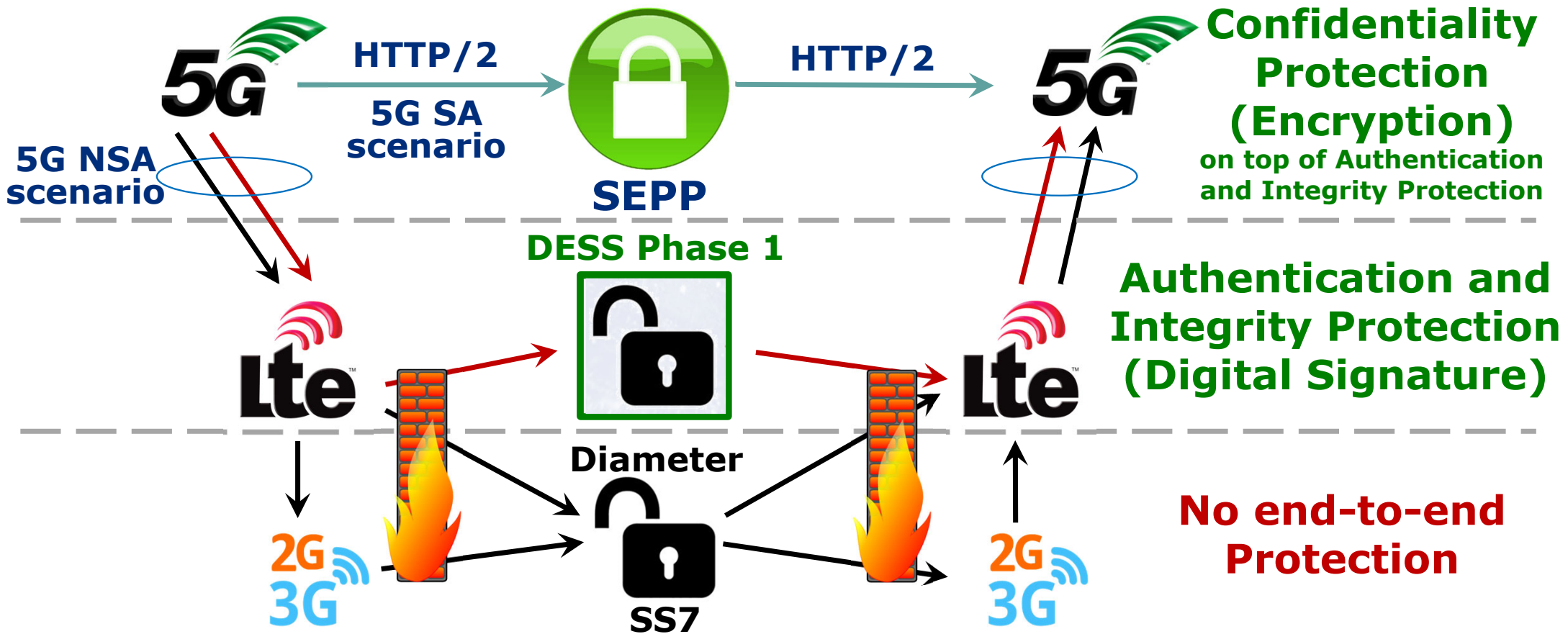


# Risks from Interworking with 2G/3G and LTE Roaming

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5G SA Roaming is not an island

# The Need for a Cross-layer Defense



Attackers have time to change their strategy as long as legacy is around

# Conclusions

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5G SA Roaming will function very differently (secure but more complex) than what we are used to today with 2G/3G and LTE Roaming

- The solution for 5G SA Roaming bilateral is relatively simple and equally balancing the business, operational and security requirements
- Intermediaries like Roaming Hub, RVAS and IPX providers will continue to play a role in 5G but introduce dilemma's how the 3GPP solutions should be used
- There is a need for a holistic security approach whereby liability and security must go hand in hand to complement the security technology controls

Security of 5G users needs a cross-layer defense strategy with 2G/3G and LTE Roaming in a global eco-system with the co-existence of technologies



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