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What is Proverie?

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- Based on applied  $\pi$ -calculus;

## • Home Network (HN):

- Authentication Server Function (AUSF)
  - Certificate CERT<sub>AUSF</sub>
- Unified Data Management (UDM)
  - Authentication Credential Repository and Processing Function (ARPF)
  - Subscription Identifier De-concealing Function (SIDF)

## EAP-1LS protocol entitles

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- User Equipment (UE):
  - Subscription Permanent Identifier (SUPI)
  - Public asymmetric key pk<sub>UDM</sub>
  - Certificate CERT<sub>UE</sub>

## 5G EAP-TLS protocol entities

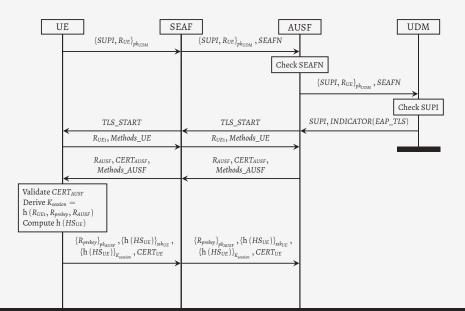
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- Serving Network (SN):
  - Security Anchor Function (SEAF)

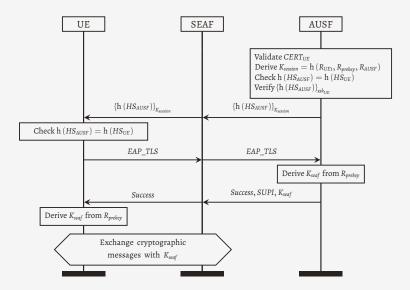
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#### Assumptions:

HN ← SN communications are secure

## 5G EAP-TLS protocol execution I





Required security properties

## • Authentication properties:

- A1. Both the home network and the subscriber should agree on the identity of each other after successful termination
- A2. Both the home network and the subscriber should agree on the pre-master key  $R_{prekey}$  after successful termination

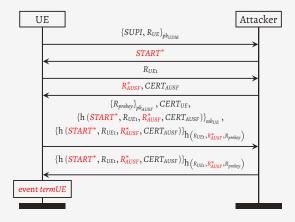
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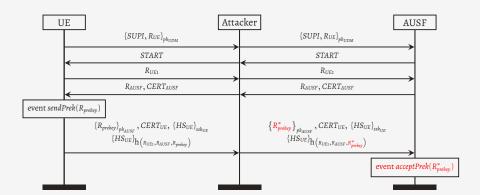
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#### Secrecy properties:

- S1. The attacker cannot obtain the identity *SUPI* of an honest subscriber
- S2. The attacker cannot obtain the pre-master key  $R_{\it prekey}$  of an honest subscriber
- S3. The attacker cannot obtain the session key  $K_{session}$  of an honest subscriber

# It's **DEMO** time!!





## Fixing the protocol



# THANKS

for your attention!!