PS: EAP re-authentication and key management

draft-vidya-eap-reauth-ps

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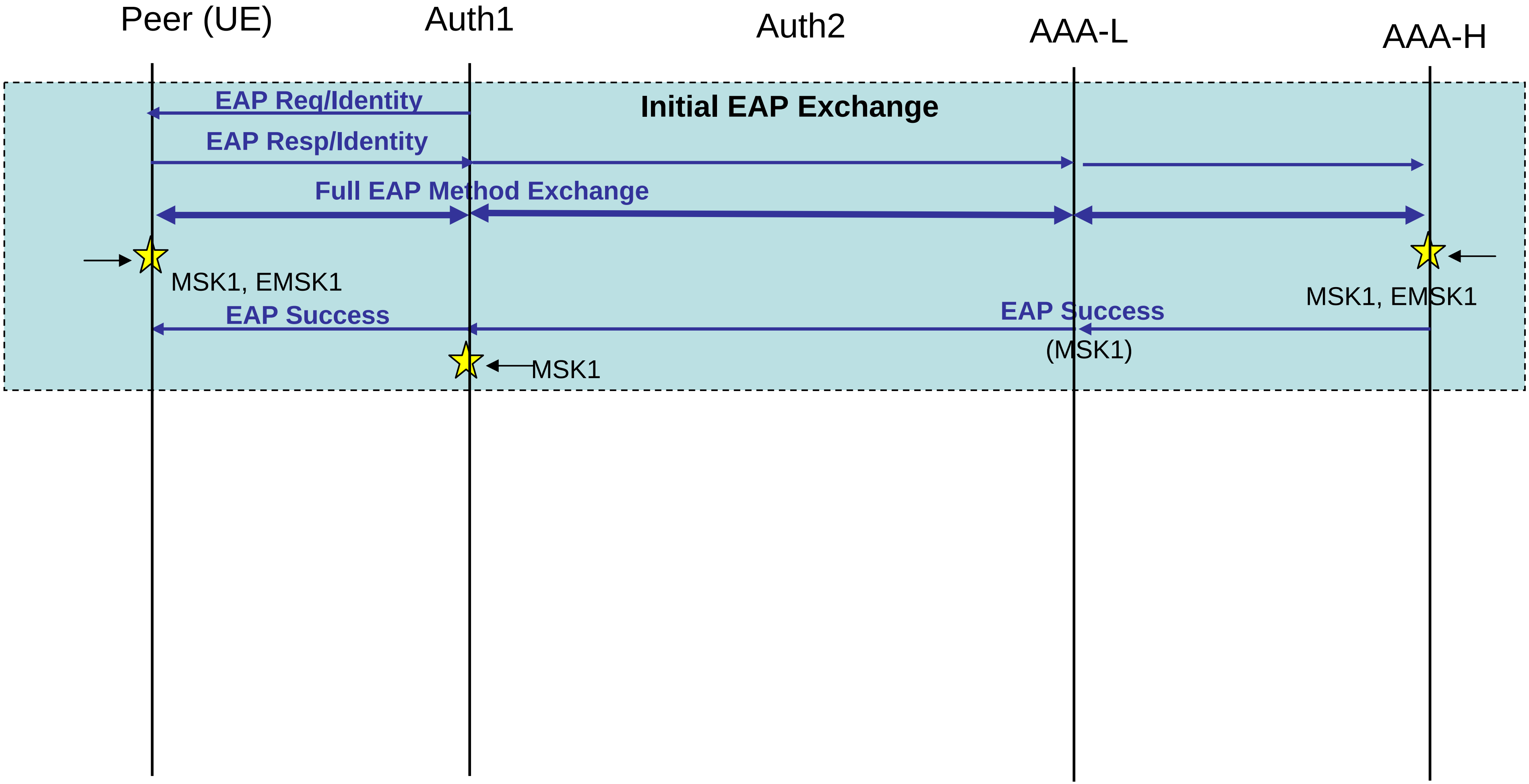
- EAP re-authentication, defined
- Re-authentication problem statement
- Design goals and constraints in solving the problem
- Necessary Extensions to EAP keying hierarchy to solve the problem
- Use cases and applicability
- Conclusion and Next steps

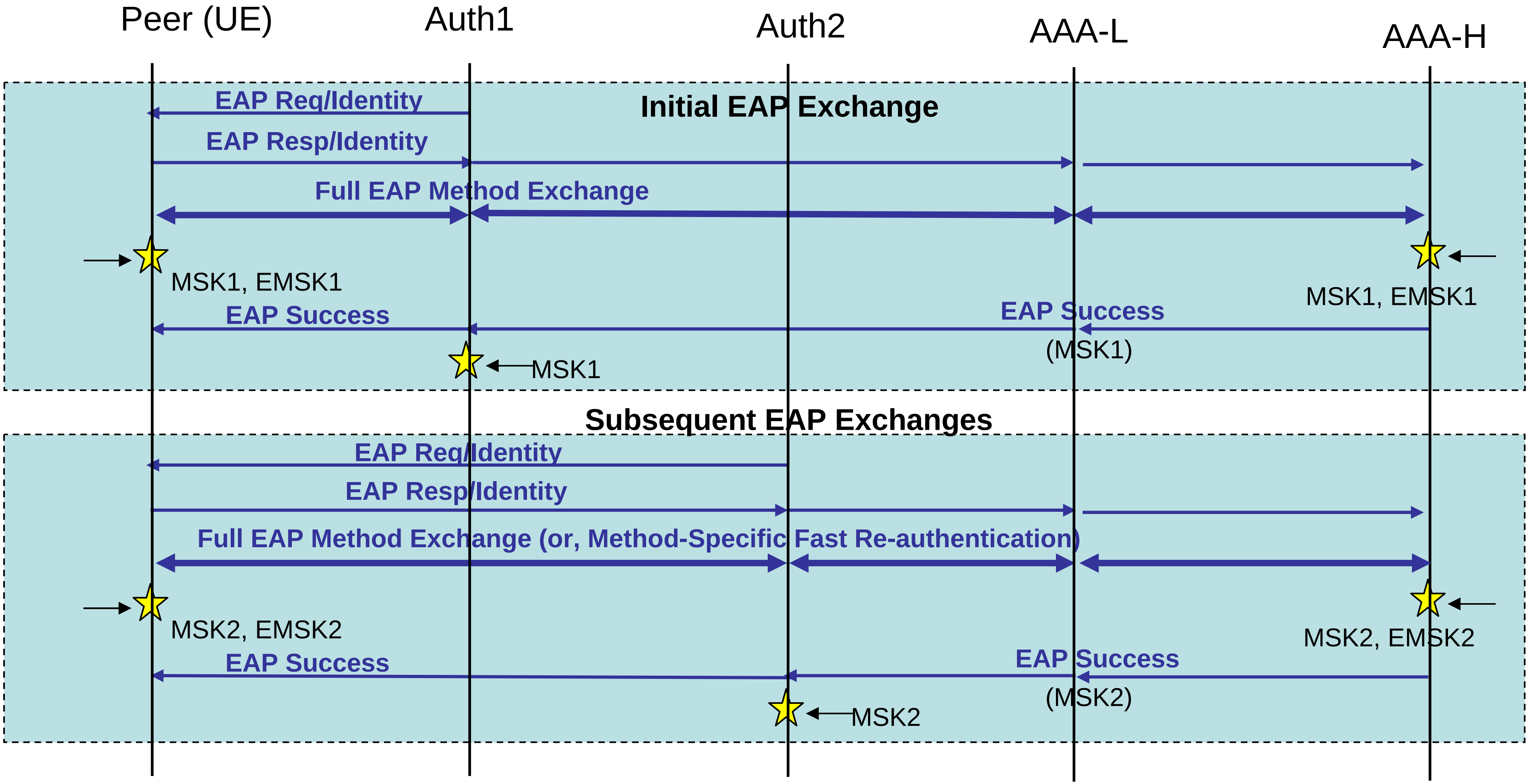
EAP re-authentication, defined

- EAP keying I-D defines it as:
  - EAP authentication between an EAP peer and a server with whom the EAP peer shares valid unexpired keying material.
- RFC 4187 defines, fast re-authentication as:
  - authentication exchange that is based on keys derived upon a preceding full authentication exchange.
- 4187’s definition is closer to what we want:
  - We want “efficient” re-authentication
  - Avoid having to do a full method run with home
  - Also need to be method agnostic

EAP Re-authentication, as per today's standards



EAP Re-authentication, as per today’s standards



Motivation (1/2)

- A full method run upon each time a peer moves to an authenticator
  - Is Expensive
  - Introduces unacceptable amt of latency

- Some methods have means to reduce computational complexity; that's not enough
  - Need a method-independent solution
  - Need a solution that reduces latency and computational complexity

Motivation (2/2)

- The other problem is interaction with the home network
  - Even if roundtrips are reduced, trips to home take too long
  - 3GPP AKA allows a visited domain server to download AKA vectors to speed-up re-authentication
  - Need something similar
    - But also a solution that is method independent

Design goals and constraints

- Low latency operation
- EAP lower layer independence
- Inter-technology handover
- EAP method independence
- AAA protocol compatibility
- Compliance to Housley Criteria

Root key selection

- MSK is delivered to the authenticator
- MSK is used differently by different lower layers and protocols
  - IKEv2 uses it for entity authentication
  - 802 lower layers use it for TSK generation
    - 802.11i uses the first 16B and 11r uses the rest
    - 802.16e uses 26B of the MSK (Verify this)
- Conclusion: use the EMSK hierarchy
  - For lower-layer independence
  - To avoid changing MSK delivery and usage semantics

Keying considerations for Re-authentication

- Need a key to support Re-authentication
  - A key to provide proof-of-possession
  - A key to derived keys to serve as an MSK does at a new authenticator

- Need key hierarchy extensions to support visited domain operation.

Applicability and use cases (1/2)

- 802.11r provides a solution to avoid EAP re-authentication
  - There are some gaps in the solution
    - Key transfer between key holders is not defined
    - Limited to mobility within an ESS
  - We may provide an alternative solution and/or complementary solution

Applicability and use cases (2/2)

- CAPWAP provides a solution for a peer moving between WTPs of an AC
  - What happens when a peer moves beyond the WTP’s coverage area?
- Inter-technology roaming
  - Re-authentication when a peer moves from a WLAN AP to a 802.16 BS
- Inter-domain roaming
  - Re-authentication when a peer moves from one administrative domain to another

Summary and next steps

- EAP re-authentication and associated key hierarchy requirements explained

- draft-vidya-eap-reauth-ps-00 contains a detailed description of all aspects covered in this presentation
  - Propose to make it a WG document
  - Invite others to work with us on it