Remote attestation over EDHOC draft-song-lake-ra-01

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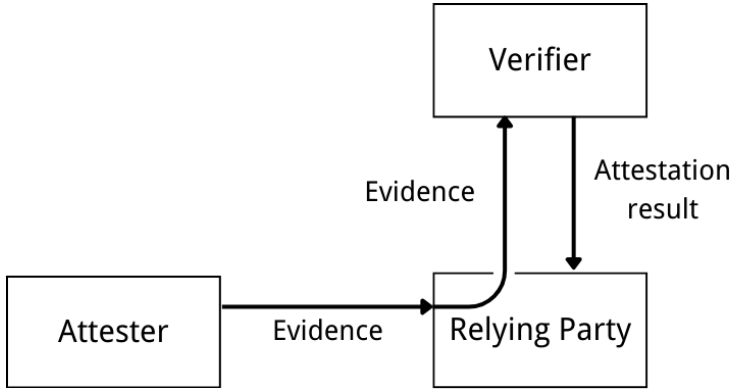
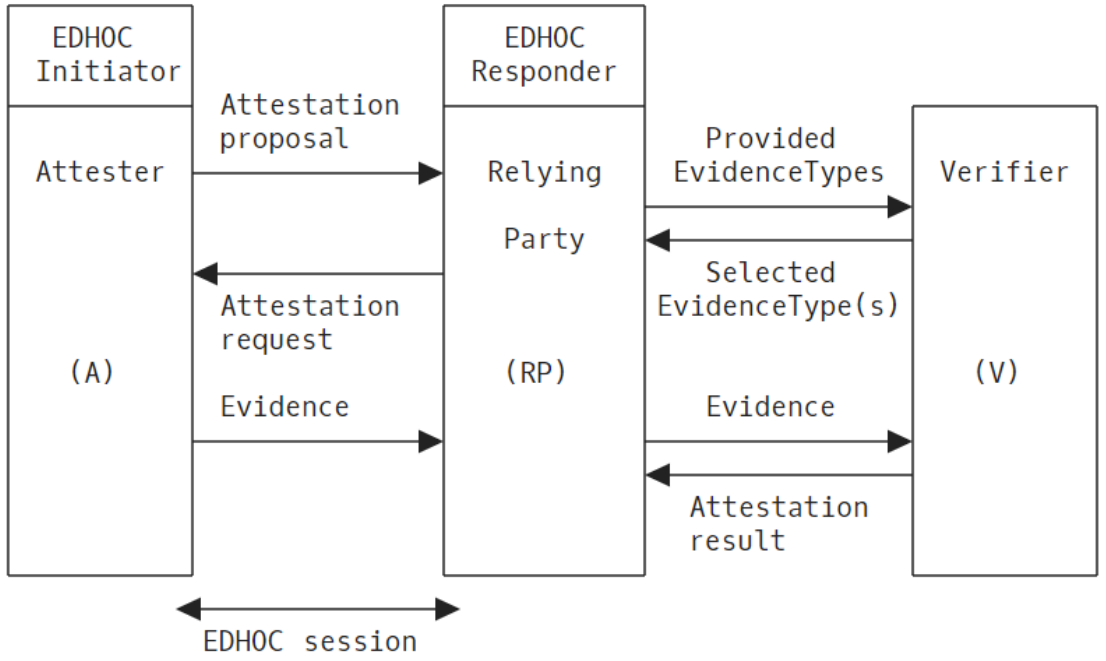
Recap: version-00

- Forward attestation in Background-check model
  - Use case: An IoT device remotely attests its firmware version to a server for network access.
- Three EAD items: Attestation_proposal, Attestation_request, Evidence

- RATS Background-check model
  RATS: Remote ATtestation procedureS [1]



- message flow



[1]https://www.rfc-editor.org/rfc/rfc9334.html#name-background-check-model

Changelog: draft-song-lake-ra-01

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- Different message flows
  - forward attestation
  - reverse attestation (new)
  - mutual attestation (new)
- Consider two RATS architectures
  - Background-check model
  - Passport model (new)
- New EAD items for passport model
- New EDHOC Error "Attestation failed"

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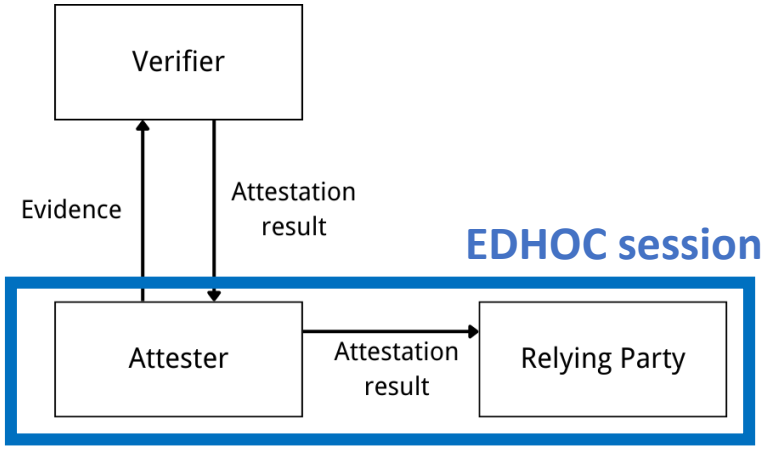
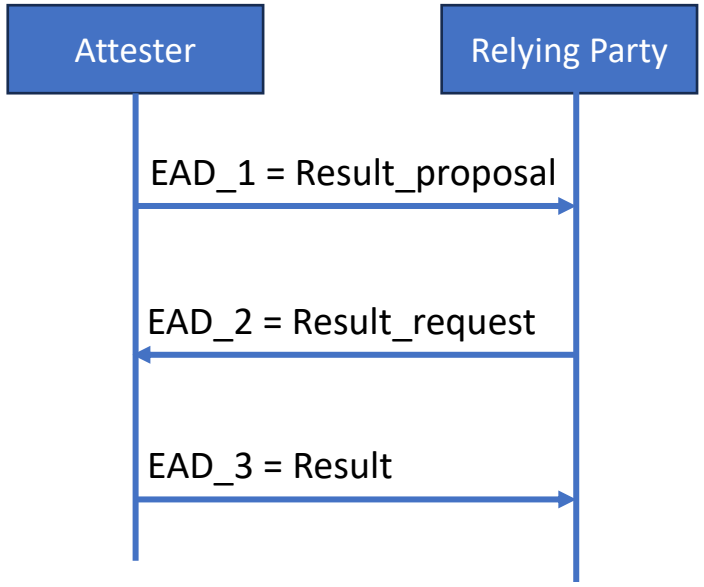
Attestation in passport model



mapping to EDHOC:



Process over EDHOC:

The Attester proposes Verifier identities from which it can relay the attestation result.

The Relying Party selects a trusted Verifier identity in common and gets the attestation result.

EAD items:

Result_proposal

```
Result_proposal = bstr .cbor Proposed_VerfierIdentity
Proposed_VerifierIdentity = [ + VerifierIdentity ]

VerifierIdentity = {
  label => values
}
```

similar to ID_CRED, from COSE Header Param. registry

Result_request

```
Result_request = bstr .cbor Request_structure

Request_structure = {
  selected_verifier: VerfierIdentity
}
```

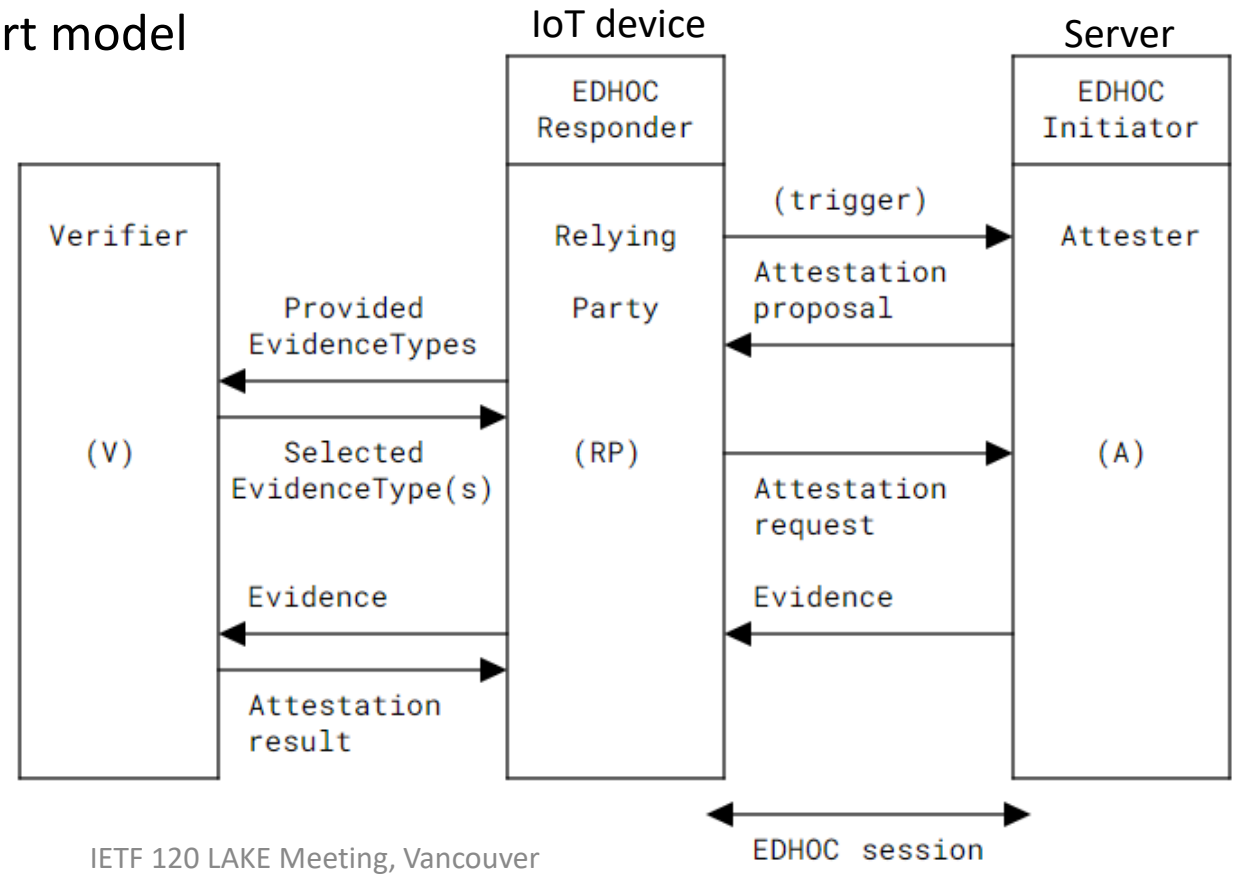
Result is a serialized EAT (Entity Attestation Token).

Reverse attestation

- Use case: A server attests remotely to gain the device's trust and retrieve its sensitive data.
- over reverse EDHOC message flow

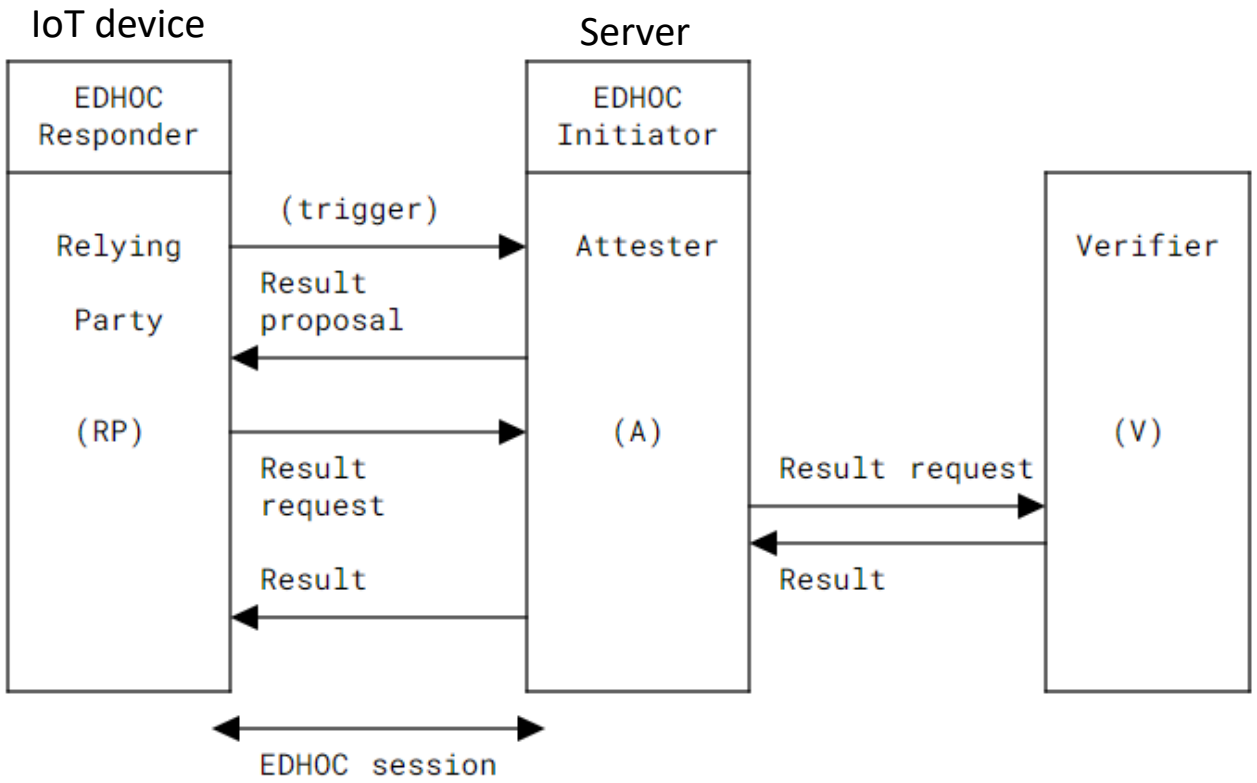
Seeking input from the WG: the feasibility of both the background-check model and the passport model

In background-check model:



Reverse attestation

In passport model:



Seeking input from the WG:

What kind of freshness is expected for the attestation result?

1. Fresh attestation result with nonce

a new remote attestation is performed
after receiving Result request

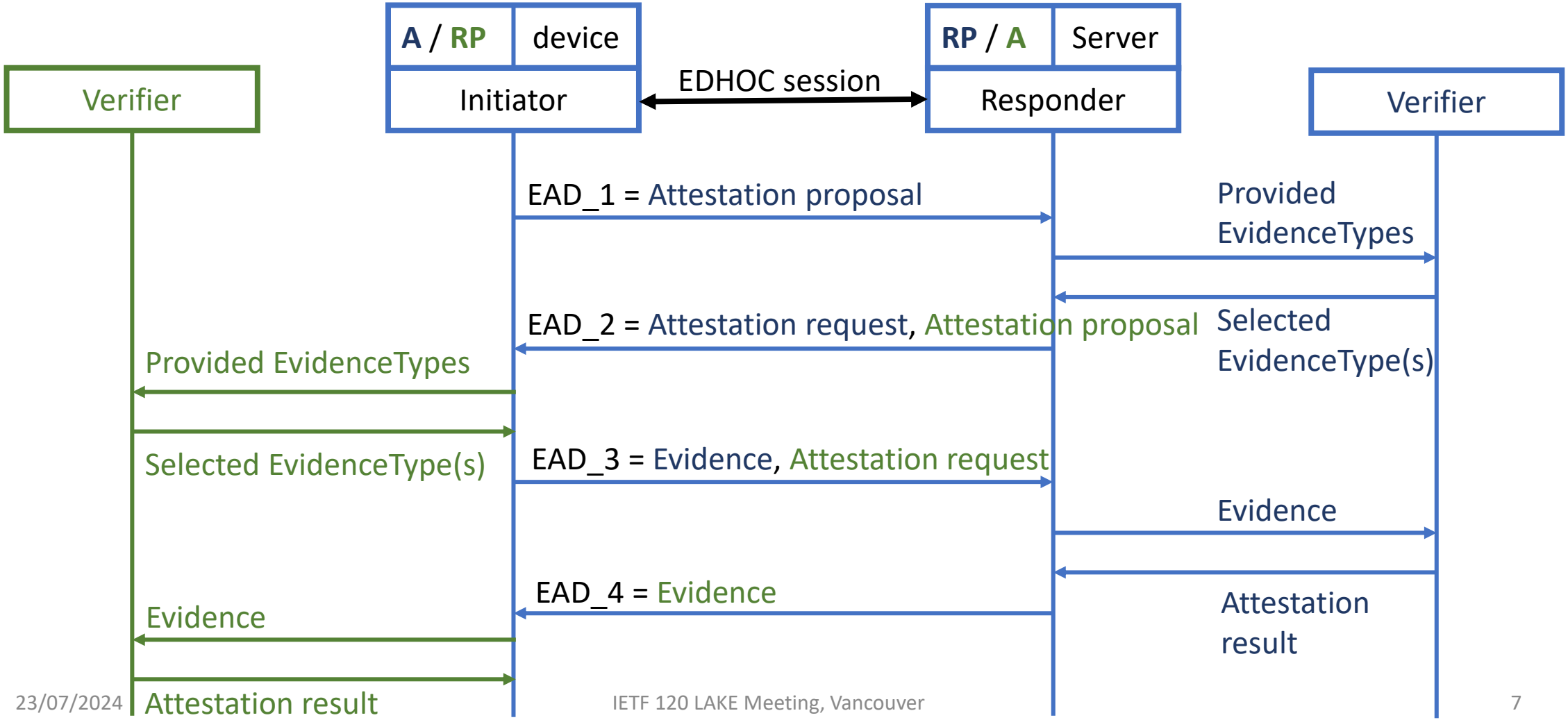
2. Pre-stored attestation result with timestamp

the attestation result is stored at the Verifier
with a timestamp indicating the generation time

Mutual attestation:

Background-check — Background-check (seeking input from the WG on feasibility)

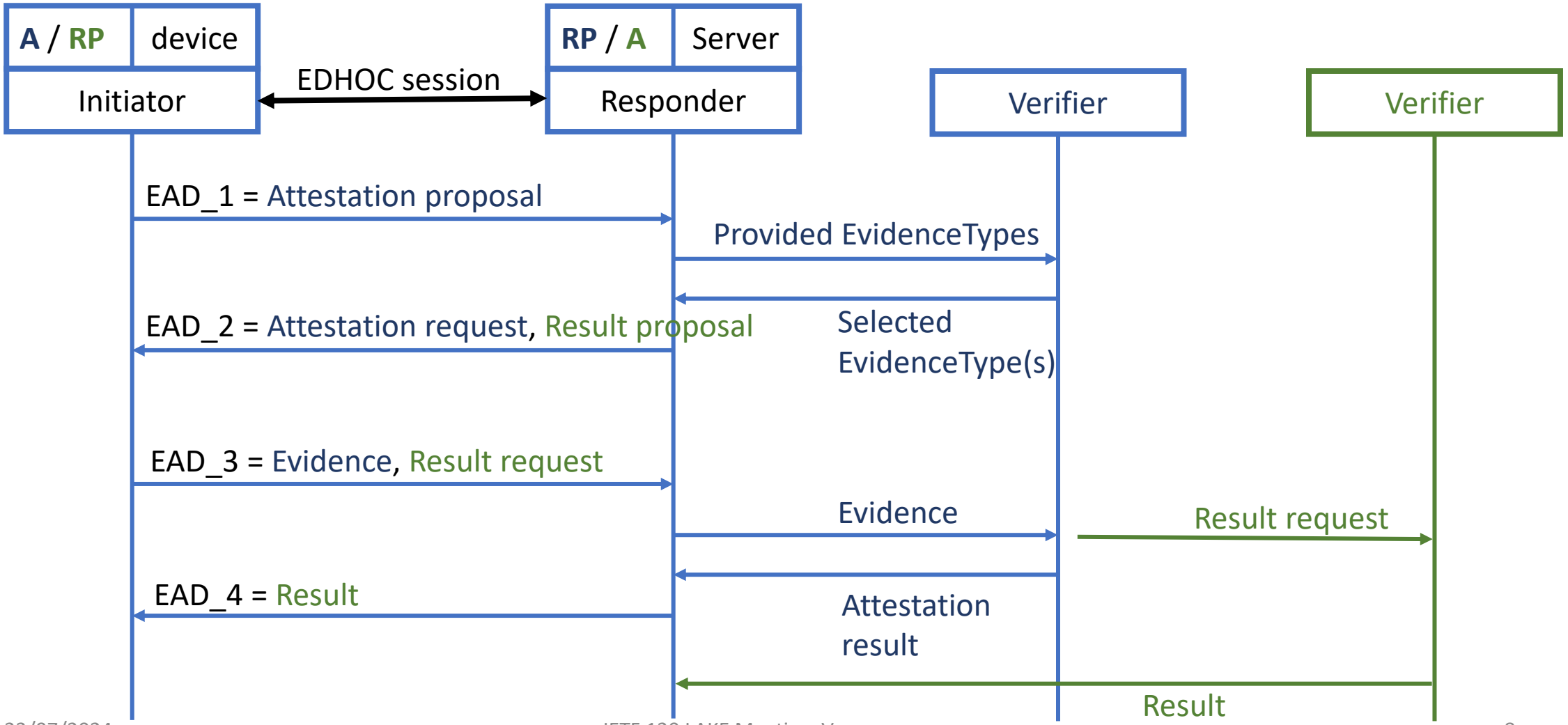
- for devices with no connectivity constraints



Mutual attestation:

Background-check — passport (seeking input from the WG on feasibility)

- for constrained devices with connectivity problem



New error: Attestation failed

ERR_CODE	ERR_INFO Type	Description
TBD7	attestation	Attestation failed

To indicate to the receiver that the remote attestation failed after the evidence is sent.

The error will be sent in two cases:

1. Verifier evaluates the evidence and generates a negative attestation result
2. Relying Party cannot establish a sufficient level of trust to proceed with decision-specific actions.

Relying Party generates the error, the application layer decides how to handle the error message.

Conclusion

- Defined three attestation flows
  - forward attestation
  - reverse attestation
  - mutual attestation
- Applied on two RATS architectures
  - Background-check model
  - Passport model
- EDHOC error: Attestation failed
- Looking for inputs from the WG
  - freshness type of attestation result, reverse attestation, mutual attestation, or any other advice.

Thank you!

Open for more discussions and collaborations: yuxuan.song@inria.fr

https://github.com/ysong02/draft-song-lake-ra

Welcome any comments and advice ☺