Update on BRSKI-AE – Support for asynchronous enrollment

draft-ietf-anima-brski-async-enroll-03

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IETF 111 – ANIMA Working Group

Problem to solve

- Limited or no connectivity between Pledge and Registrar.
- Distinction between operational modes of the pledge
  - Pledge-initiator-mode (use case 1): Pledge acts as client and follows the BRSKI approach for the voucher exchange, but allows for alternative enrollment protocols
  - Pledge-responder-mode (use case 2): Pledge acts as server and communicates with registrar via a registrar-agent. Pledge is triggered (pushed) to generate and receive bootstrapping data. → main changes made this use case
- Draft addresses these issues by defining the call flow and objects to be exchanged. To be independent of the transport security authenticated self-contained objects (signature-wrapped objects) for the certificate enrolment to bind proof of possession and poof of identity to the exchanged objects (similar to existing voucher exchanges with pledge)

BRSKI-AE Status
History of (main) changes from version 01 to version 02

- Defined detailed call flow and exchanged objects for interactions in UC2 between pledge – registrar-agent – registrar and MASA. Object format aligns with draft JOSE signed voucher artifacts (Section 5.2.3).
- Removed TLS-PSK approach between pledge and registrar-agent to allow transport security independent object exchange and also to avoid relying on PSK.
- Included enhancements in voucher-request content and handling to allow registrar to verify agent-proximity to the pledge (enhancements in voucher-request and handling on registrar) in Section 5.2.3.
- Defined enhancements in voucher-request YANG to allow for additional parameters to be transported (Section 6).
- Terminology alignment (pledge-agent -> registrar-agent; PULL/PUSH -> pledge-initiator-mode and pledge-responder-mode).

BRSKI-AE Status
History of changes from version 02 to version 03

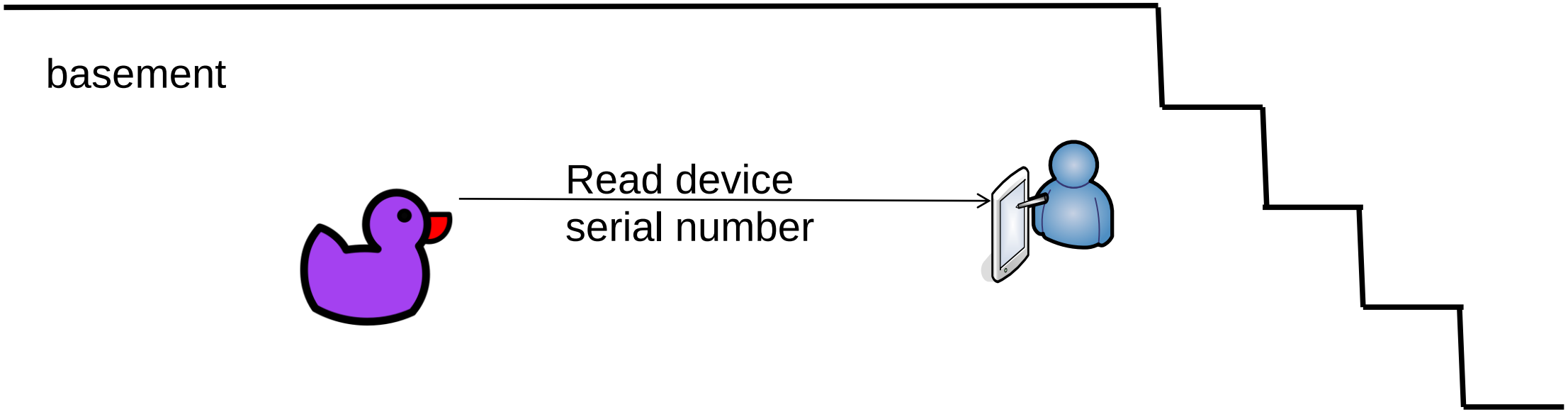
- Discussion of open issues discovered in the currently applied YANG definitions:
  - YANG doctors were informed to have an early review on
    - the enhanced voucher-request from RFC 8995
    - the enhancement of the assertion enum of the voucher to include new value agent-proximity (section 5.2) → relates to RFC 8366bis discussion

    No feedback received, yet
  - YANG module for CSR (for the enrollment request): draft currently reuses SZTP-CSR defined sub module: turns out to be not possible as the complete module must be used.
    → Proposal provided on mailing list to define csr types independent of the embedding protocol as part of SZTP-CSR is currently discussed

BRSKI-AE
Abstract view on use case 2 call flow

First Trip

First Trip



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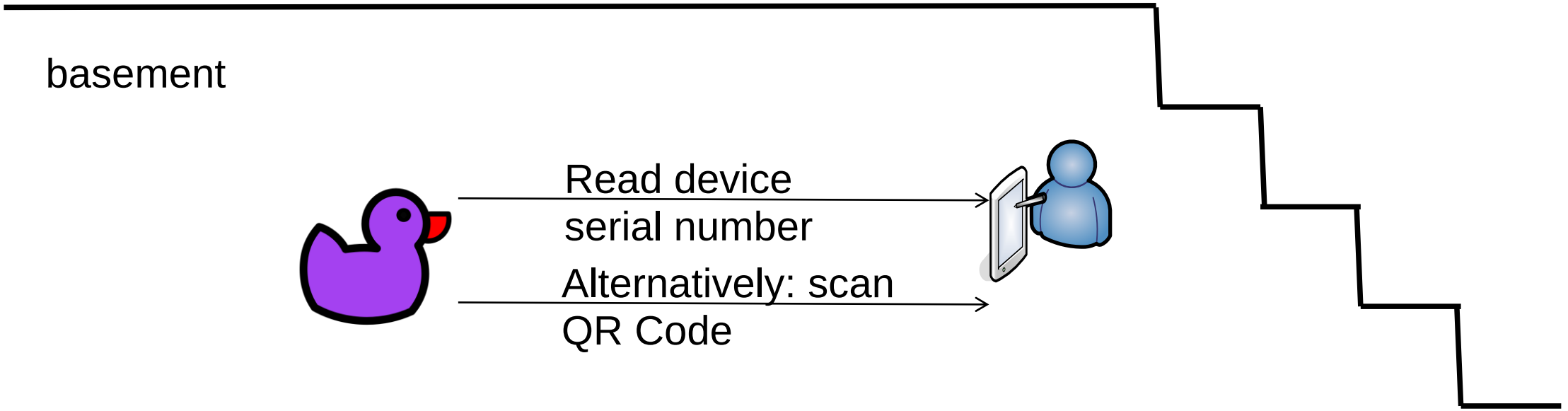
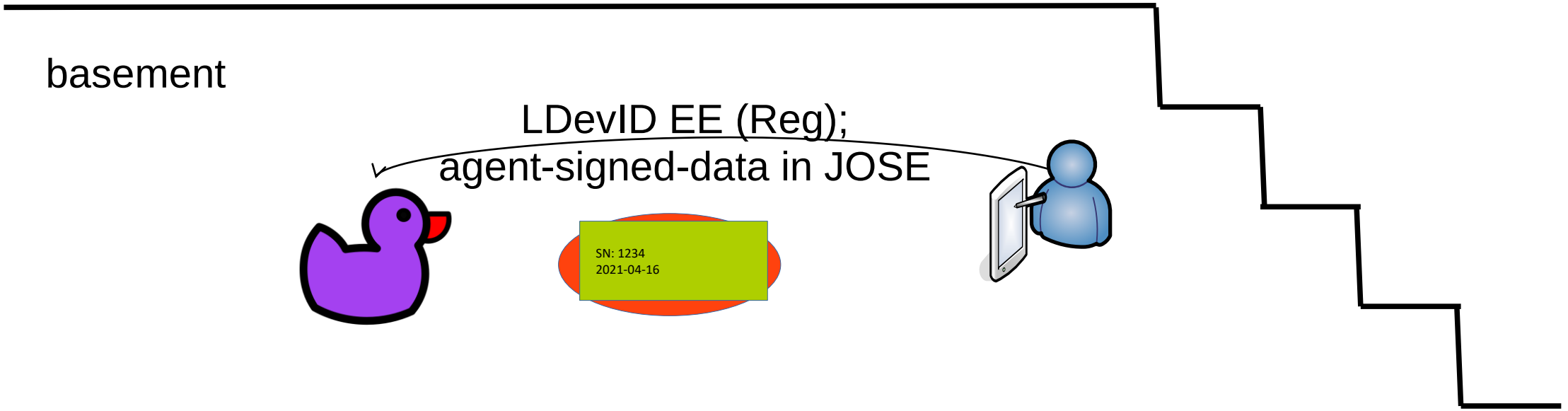

basement
Read device
serial number
Alternatively: scan
QR Code

First Trip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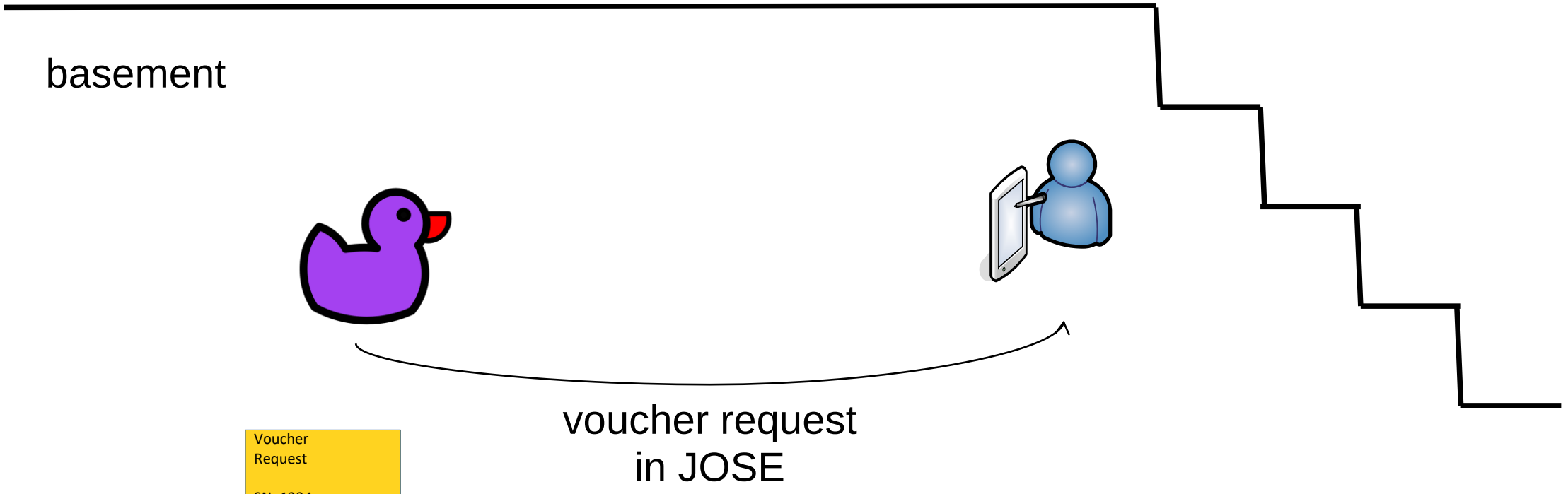
LDevID EE (Reg);
agent-signed-data in JOSE
SN: 1234
2021-04-16

First Trip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voucher request
in JOSE
Voucher
Request
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Assertion:
agent-prox
SN: 1234
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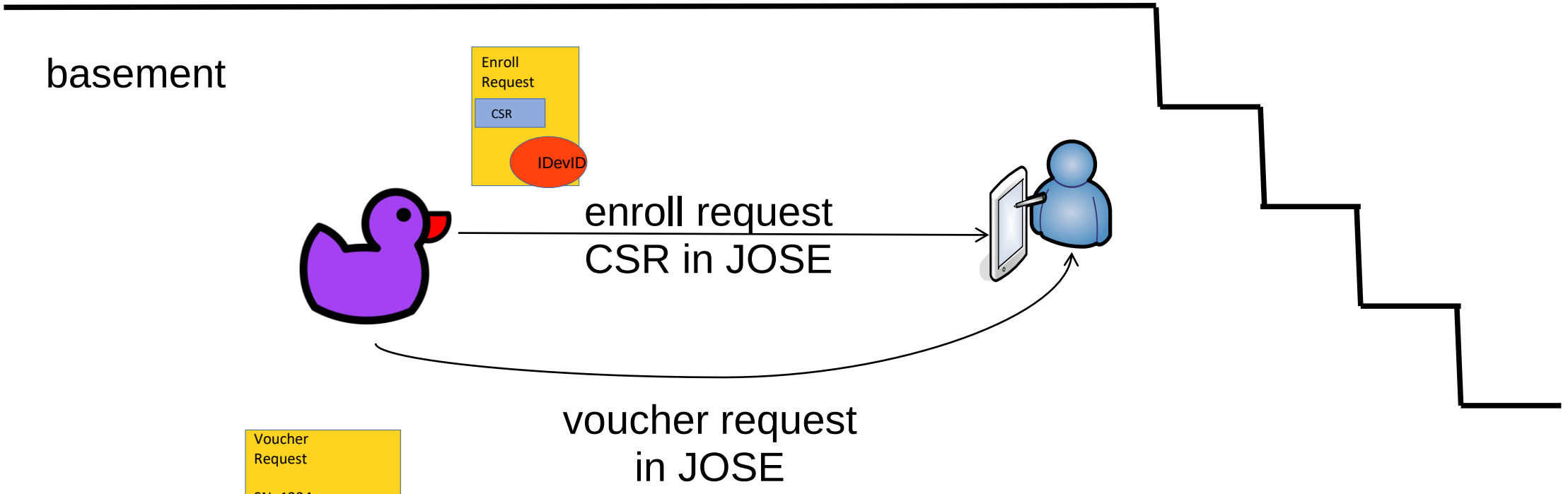
First Trip


basement
Enroll
Request
CSR
IDevID
enroll request
CSR in JOSE
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Voucher
Request
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Assertion:
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MASA

Registrar

Domain CA

basement

service
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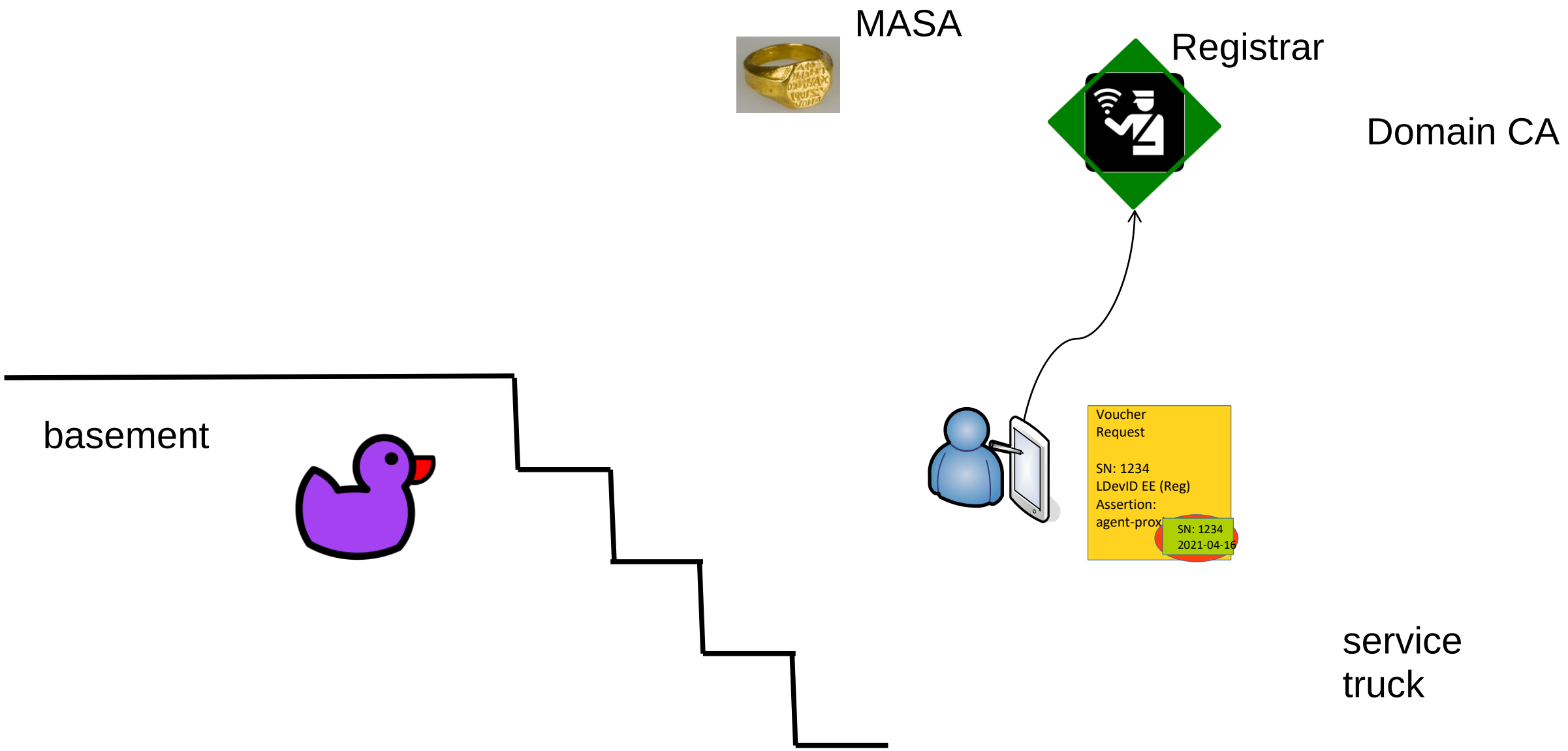
MASA
Registrar
Domain CA
basement
Voucher
Request
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Assertion:
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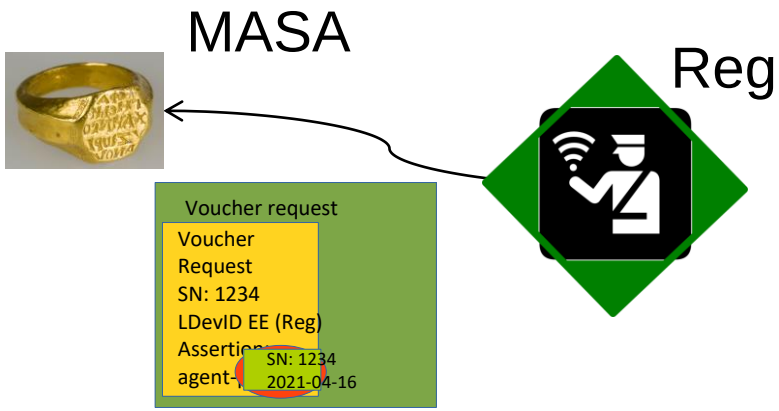

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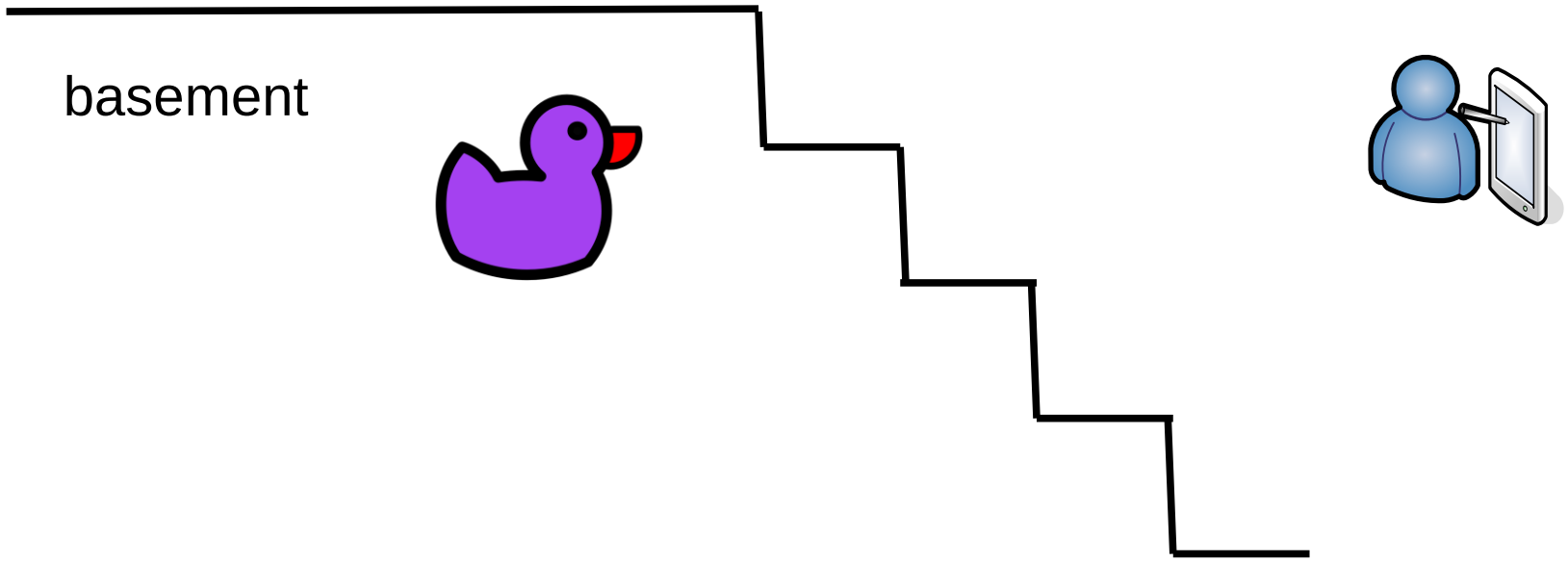

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Registrar

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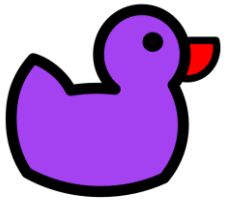
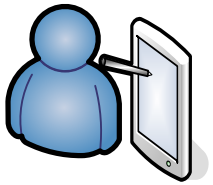
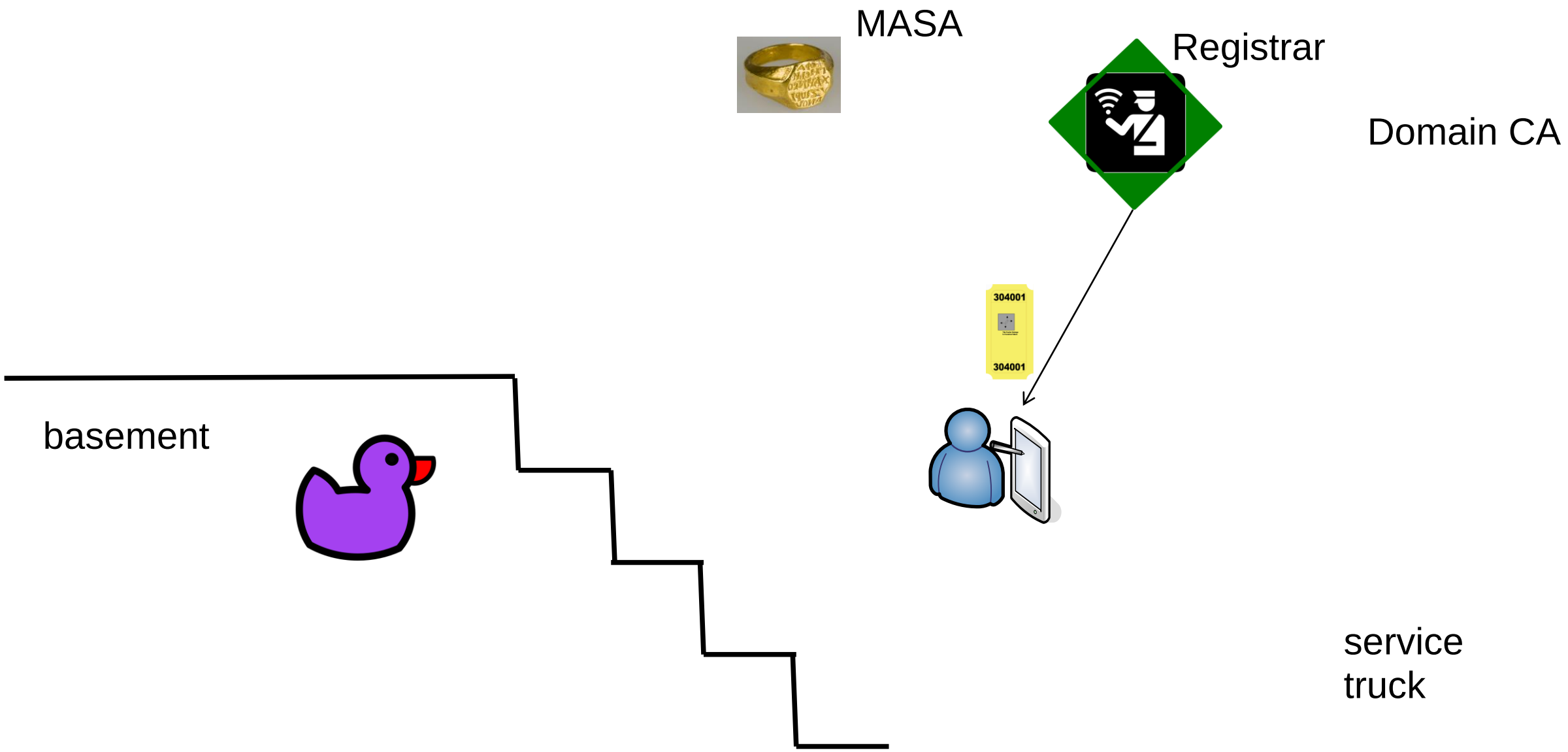




service truck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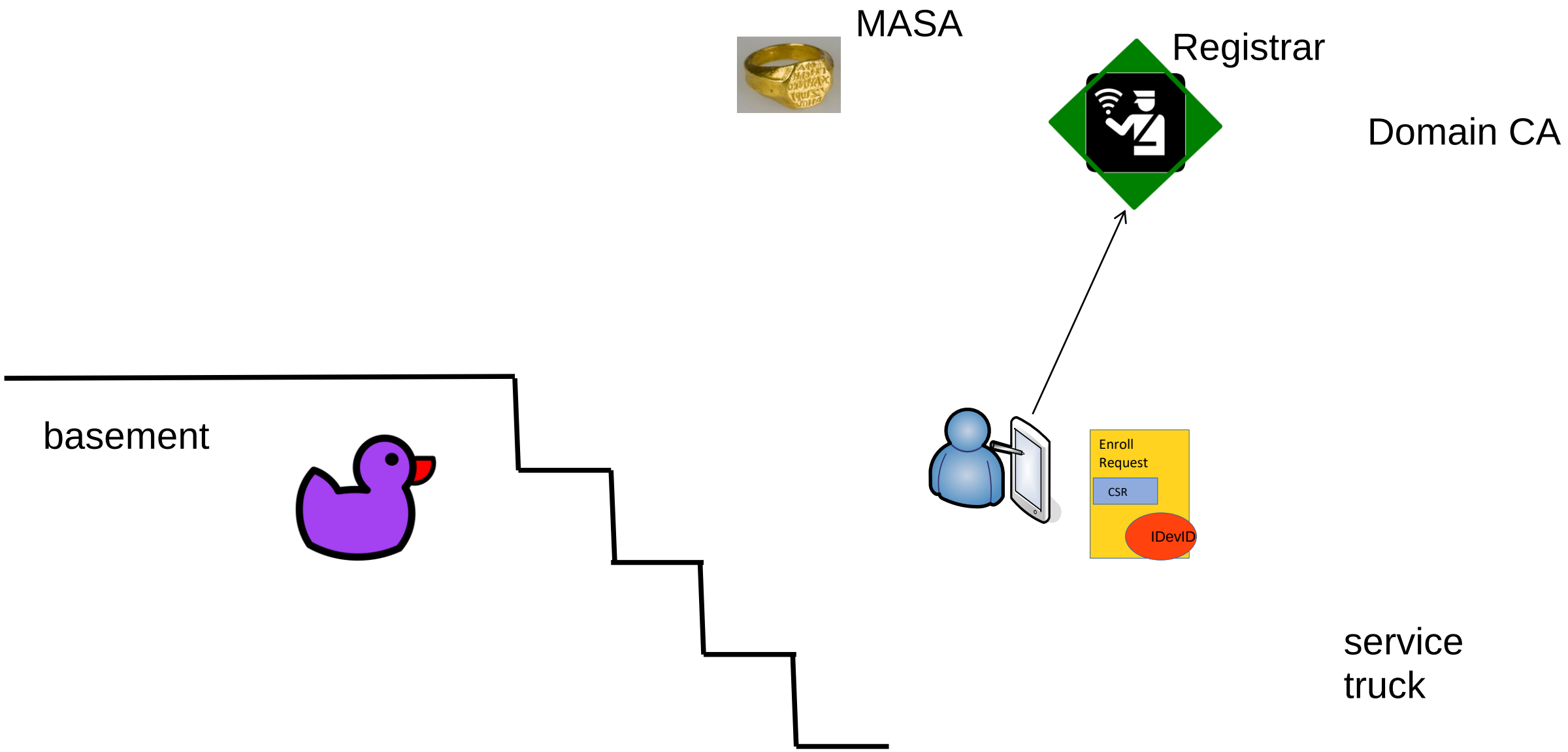
MASA
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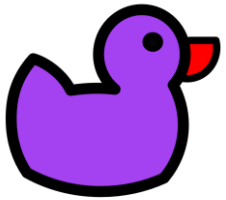

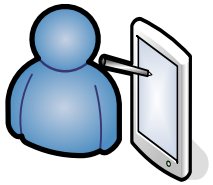

service truck

MASA

Registrar

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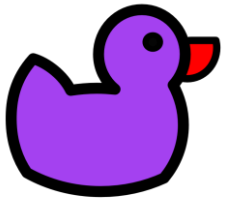

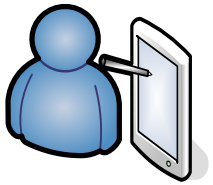

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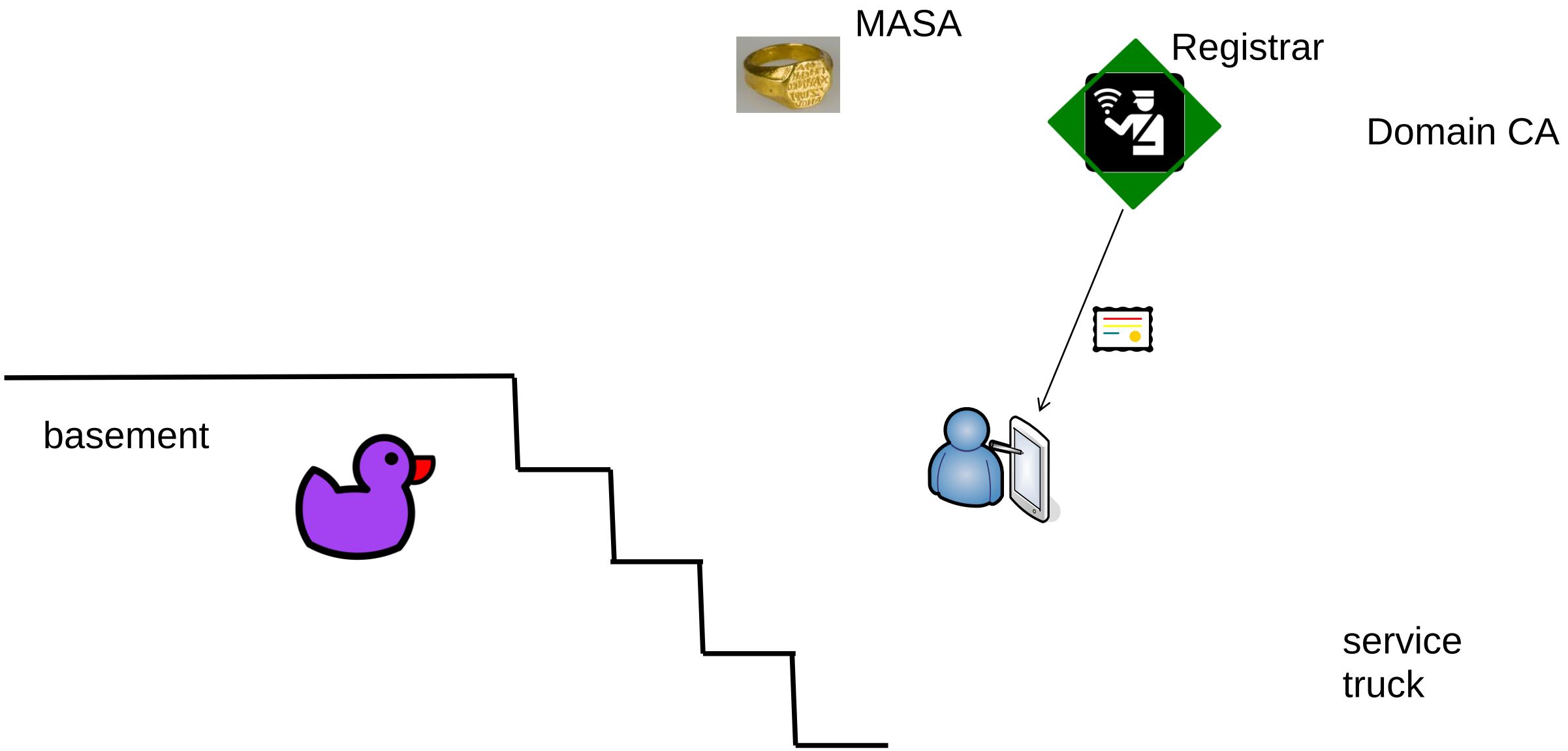
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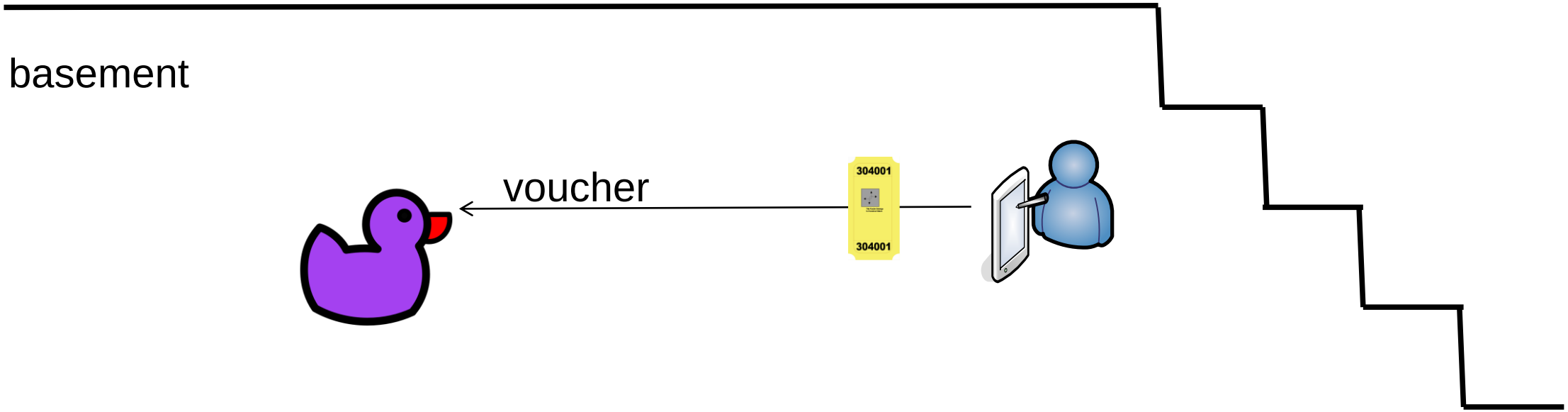
Second Trip

Second Trip



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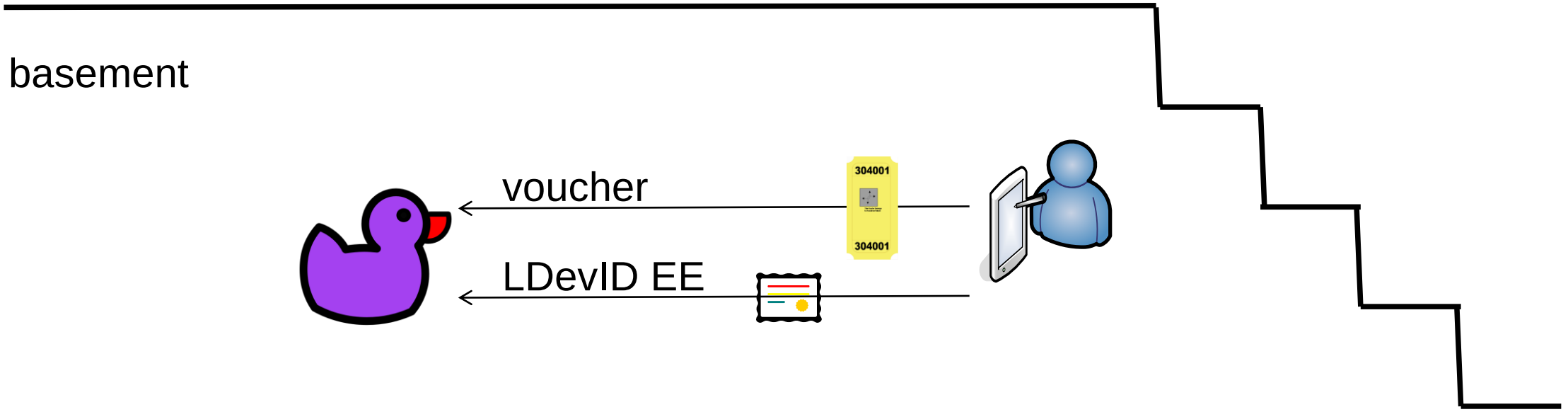

BRSKI-AE, Use Case 2
Verification of agent-proximity

- Data exchange between registrar-agent and pledge based on signed objects (no TLS)
- Enhancements in pledge voucher-request with a signed statement from registrar-agent
- Allows registrar to identify, which registrar-agent is involved in the bootstrapping
- Registrar includes LDevID EE(RegAgt) into registrar-voucher-request.
- As pledge-voucher-request is included in registrar-voucher-request MASA can also verify agent-proximity and trust relation registrar-agent / registrar
- MASA can issue assertion “agent-proximity”, which is weaker than “proximity” but stronger than “logged” or “verified”
  - "agent-proximity" is a statement that the proximity-registrar-certificate was provided via the registrar-agent and that the pledge could not verify proof-of-possession at the time of voucher-request creation
  - “proximity” is a statement that the proximity-registrar-certificate was received directly (via TLS) and that the pledge could verify proof-of-possession during the TLS handshake before voucher-request creation.

Discussion: Open issues

- Version 03 addresses most of the existing issues in the github/anima-wg
- Current open issues
  - Early review of enhanced voucher-request in section 6 by YANG doctor
  - #10: YANG module for CSR to be used in enrollment-request (to allow for P10 and further formats)
  - #18: enhancement of YANG voucher with new assertion “agent-proximity”
    → discussion in the context of revising RFC 8366 to allow for enhancements of assertion types

Discussion: Further draft handling

- Currently, BRSKI-AE addresses two use cases with different target and different level of detail
  - Use Case 1 targets the definition of requirements for a communication architecture using the existing BRSKI components and call model (pledge-initiator-mode, formerly PULL) to enable the use of alternative enrollment protocols for certificate enrollment (voucher handling untouched).
  - Use Case 2 targets the specification of a reversed call model (pledge-responder-mode, formerly PUSH) in which the pledge has no or only limited connectivity to a registrar or cannot initiate requests to a registrar. To facilitate the interaction between pledge and registrar, the registrar-agent component is established. The interaction between pledge and registrar-agent results in new or enhanced data objects (voucher-request-trigger, voucher-request, voucher, enrollment-request-trigger, enrollment-request). Exchanges between registrar-agent and registrar follow~~s~~ BRSKI (RFC8995) and EST (RFC7030), with the enhanced objects.
- Declaration of conformity to „AE“ is difficult, as the use cases have developed in different directions
- Proposal to split the draft into two separate documents for use case 1 and use case 2
- Is this a reasonable approach for the WG?

Next Steps

- Clarification of open issues stated in github/anima-wg and also in the draft
- Split into two drafts concentrating on the distinct use cases, depending on WG view
- Circulate outcome on the mailing list for further discussion
- WG review appreciated

Backup

BRSKI-AE, Use Case 2
Abstract Protocol Overview