Attestation and Verification

Season 2: Shrinking The Elephant

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Rivos

Last Season Recap

Confidential Computing is the protection of data in use by performing computation in a hardware-based Trusted Execution Environment. (CCC whitepaper)

Protecting data in use is of limited value if you can't trust who generates and uses it

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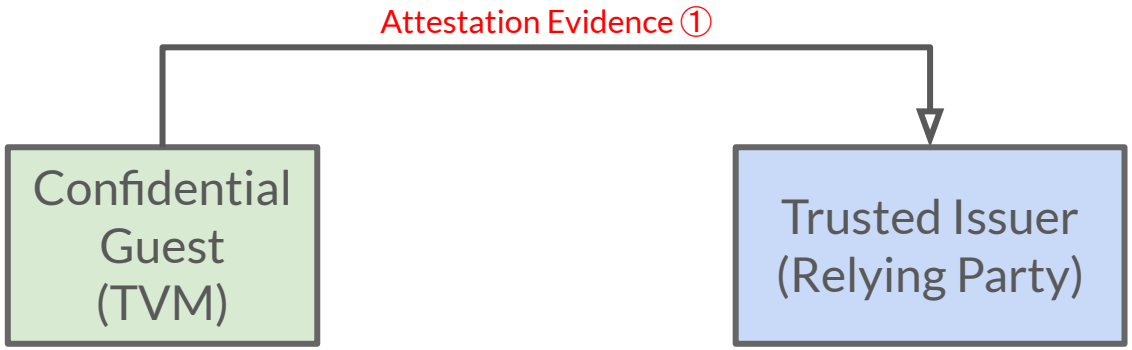
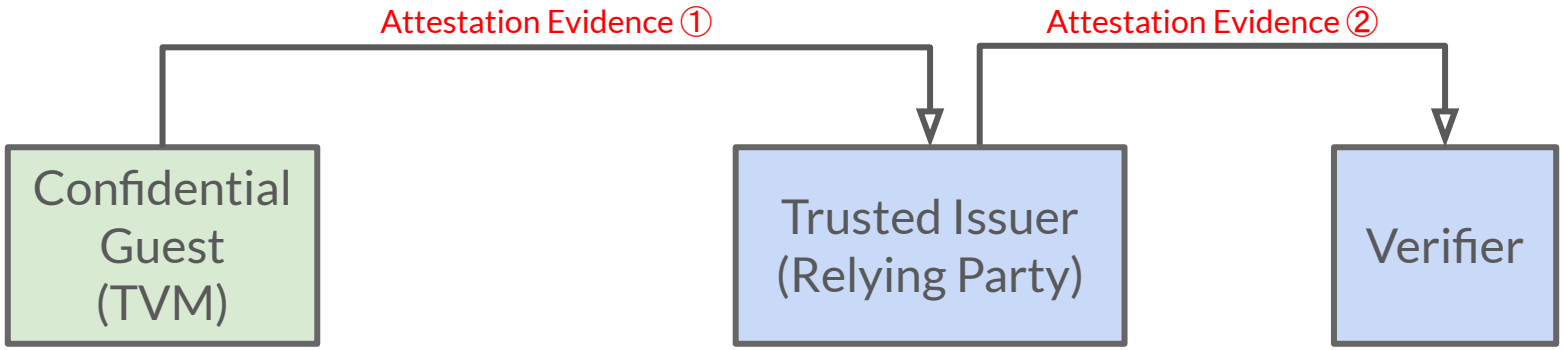
Interfaces, protocols, formats, and manufacturer interactions are very fragmented

Plumbing an attestation evidence into an attestation service is very challenging

[1] e.g. Decryption key, AI model, etc


Attestation Evidence ①
Confidential Guest (TVM)
Trusted Issuer (Relying Party)


Attestation Evidence ①
Attestation Evidence ②
Confidential Guest (TVM)
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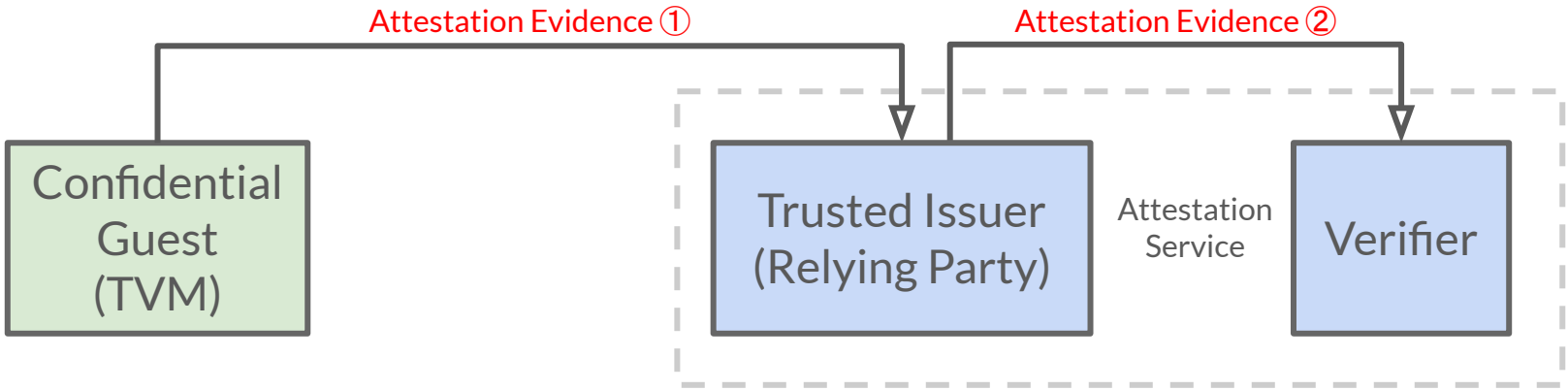
Verifier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Confidential Guest (TVM)
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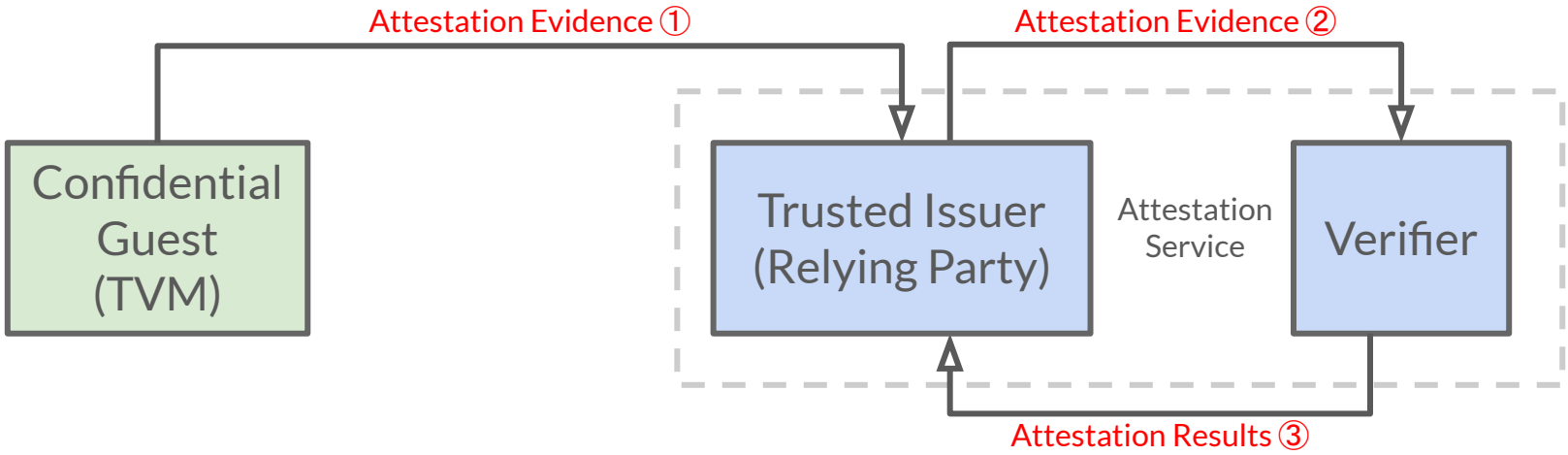
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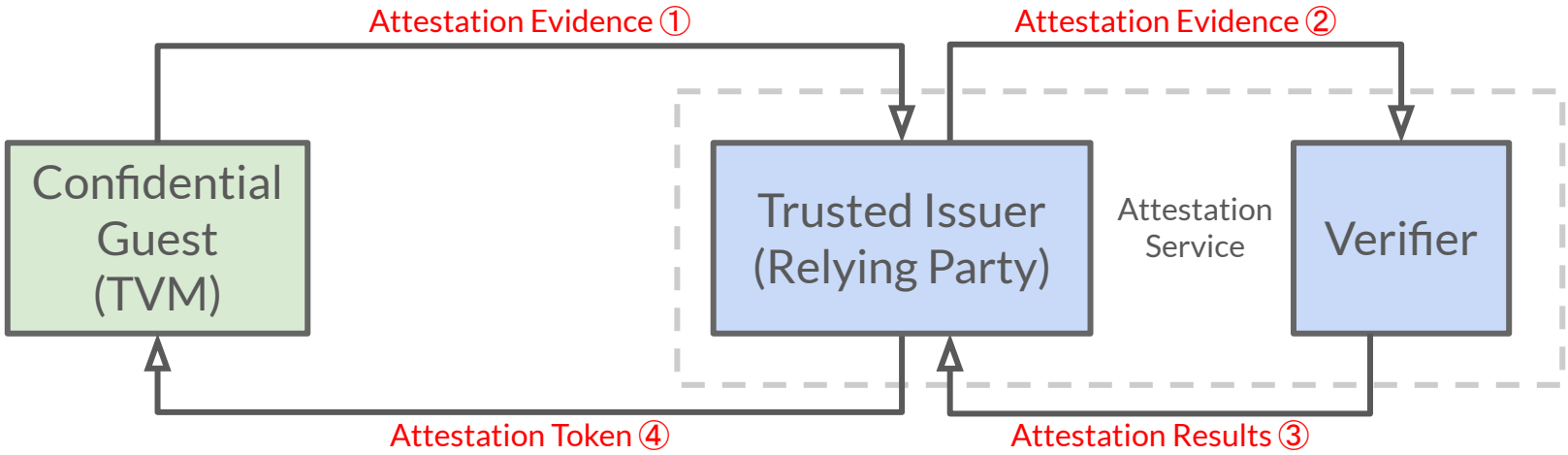
Attestation Results ③


Attestation Evidence ①
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Confidential Guest (TVM)
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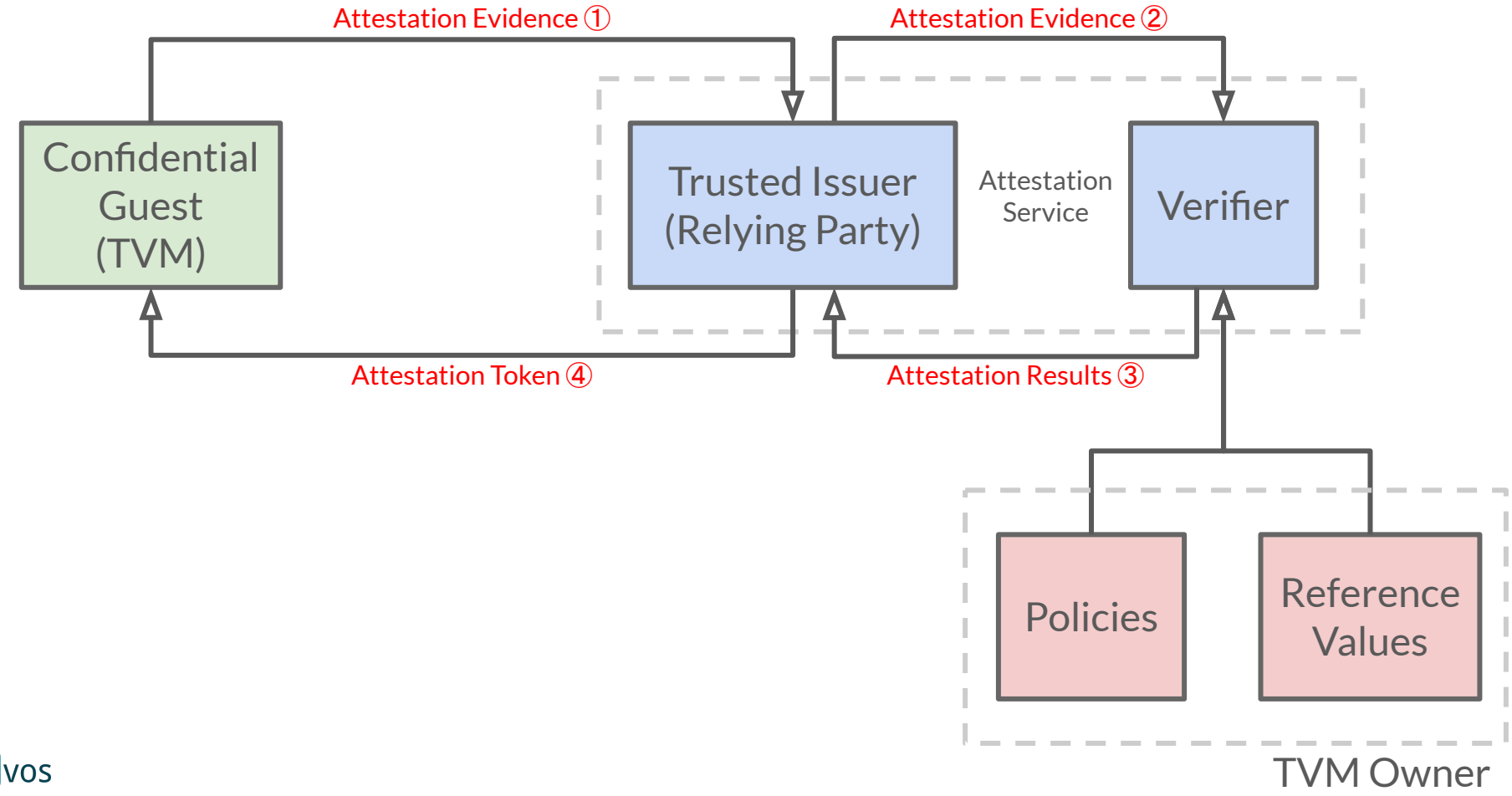
Attestation Service
Verifier
Attestation Token ④
Attestation Results ③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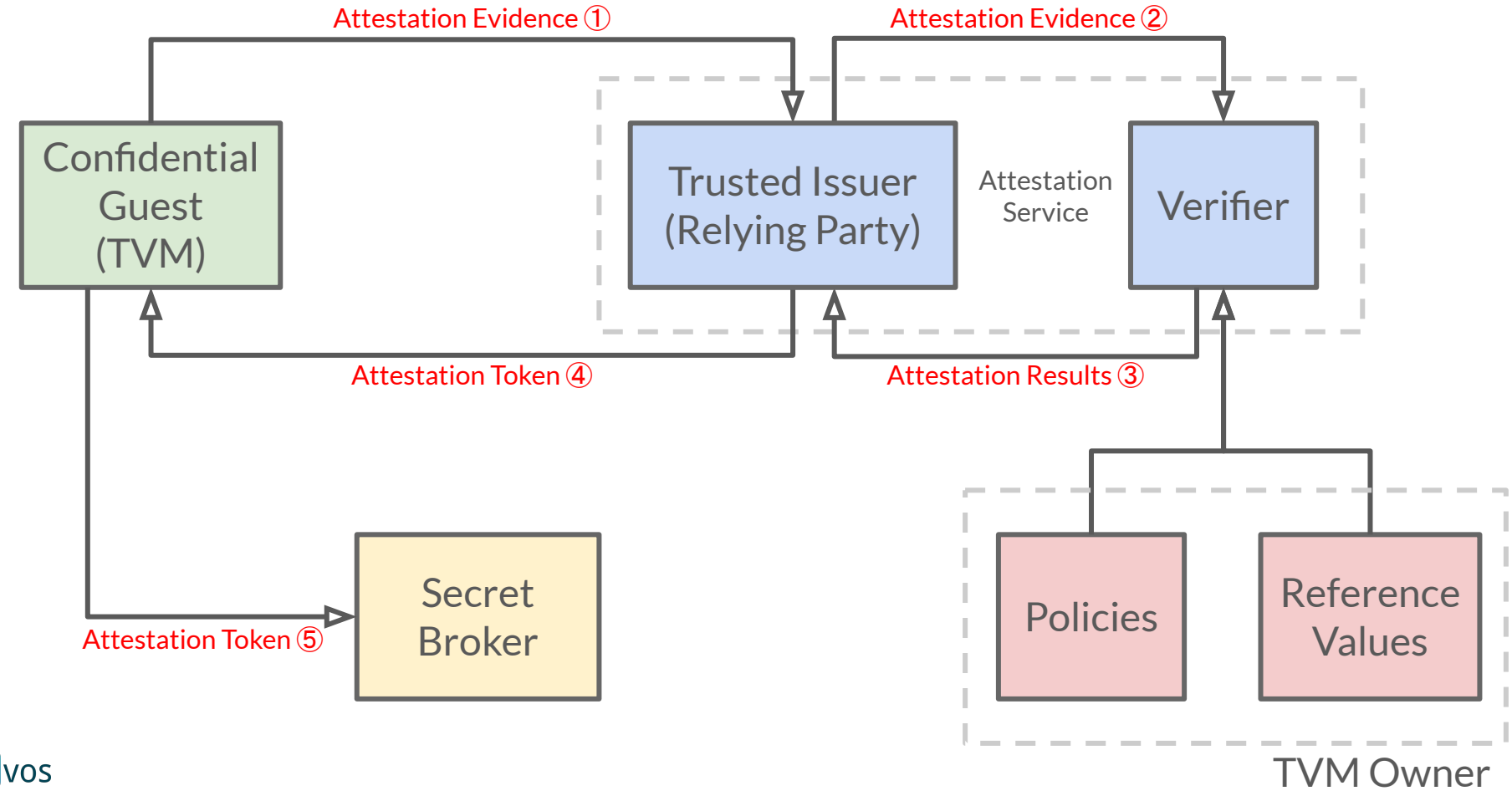
Attestation Results ③
Policies
Reference Values
TVM Owner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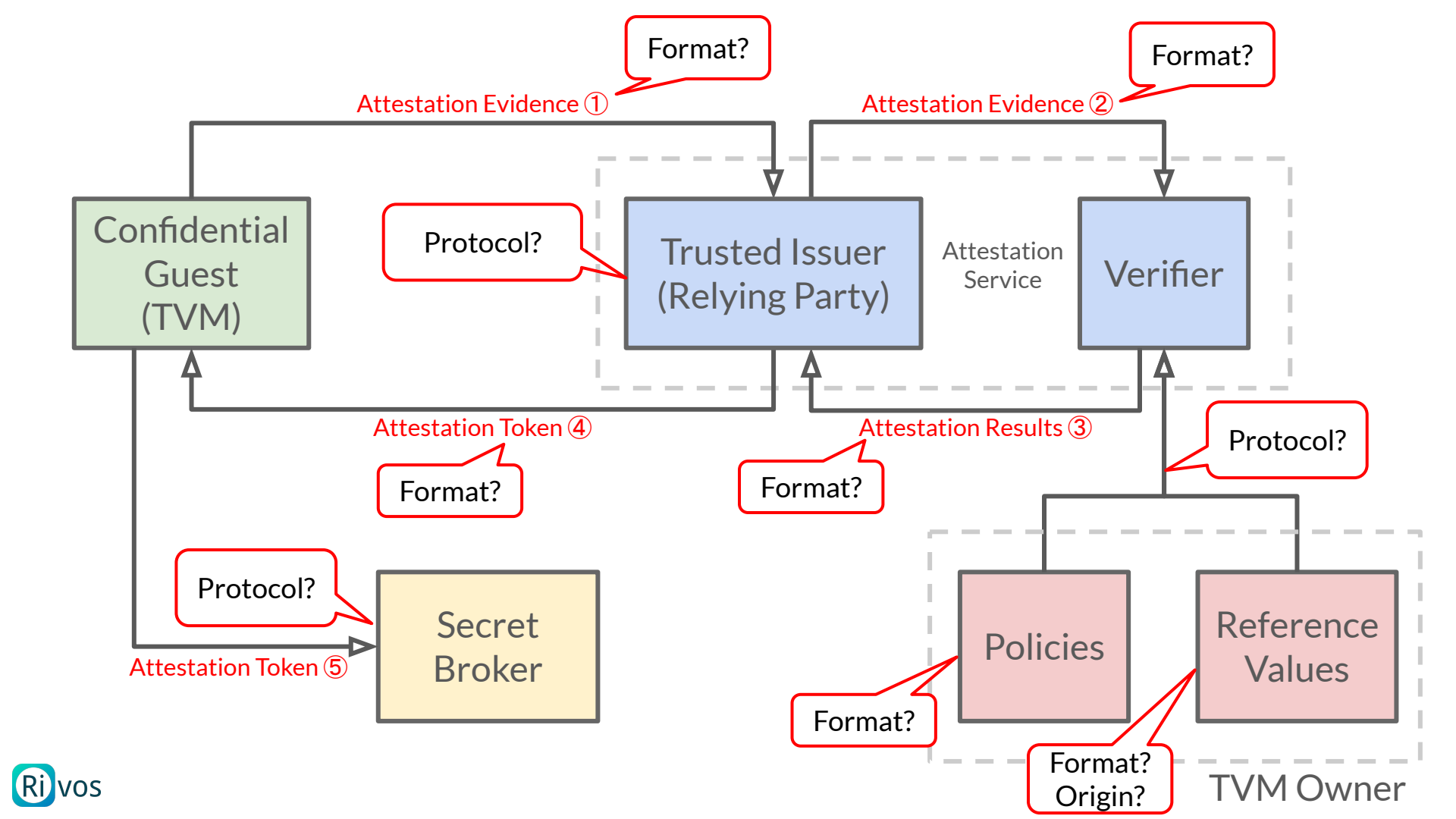
Verifier
Attestation Token ④
Attestation Results ③
Attestation Token ⑤
Secret Broker
Policies
Reference Values
TVM Owner


Format?
Attestation Evidence ①
Format?
Attestation Evidence ②
Confidential Guest (TVM)
Protocol?
Trusted Issuer (Relying Party)
Attestation Service
Verifier
Attestation Token ④
Format?
Attestation Results ③
Format?
Protocol?
Protocol?
Secret Broker
Attestation Token ⑤
Policies
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Format?
Format? Origin?
TVM Owner
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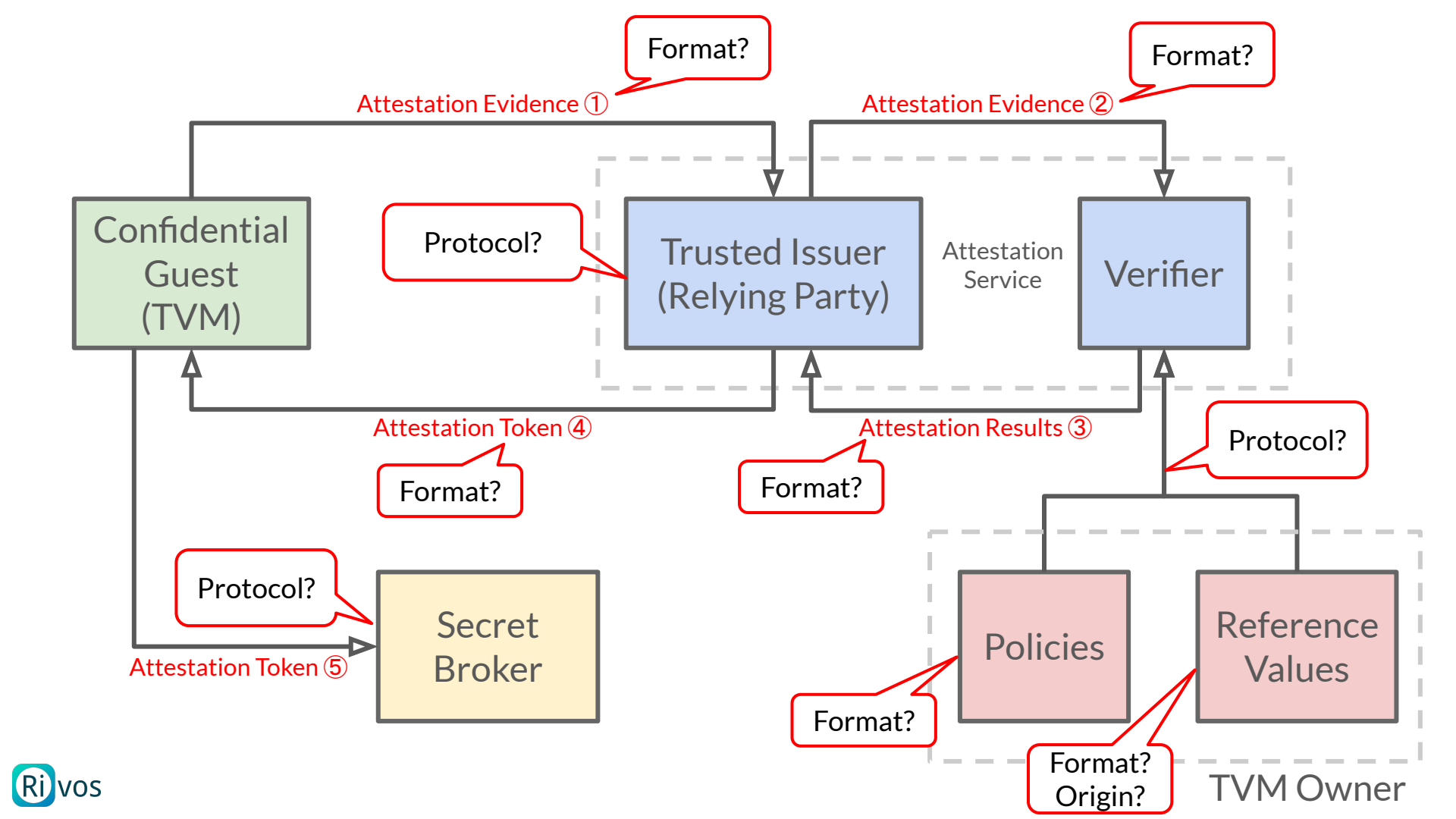
Confidential Containers Attestation Service

- Complete open source attestation service
- Architecture agnostic
  - Support for all major attestation evidence formats (TDX, SEV, CCA, SGX, Azure, CSV)
  - Supports external verifiers (Intel Amber)
- Open formats and protocols
- https://github.com/confidential-containers/kbs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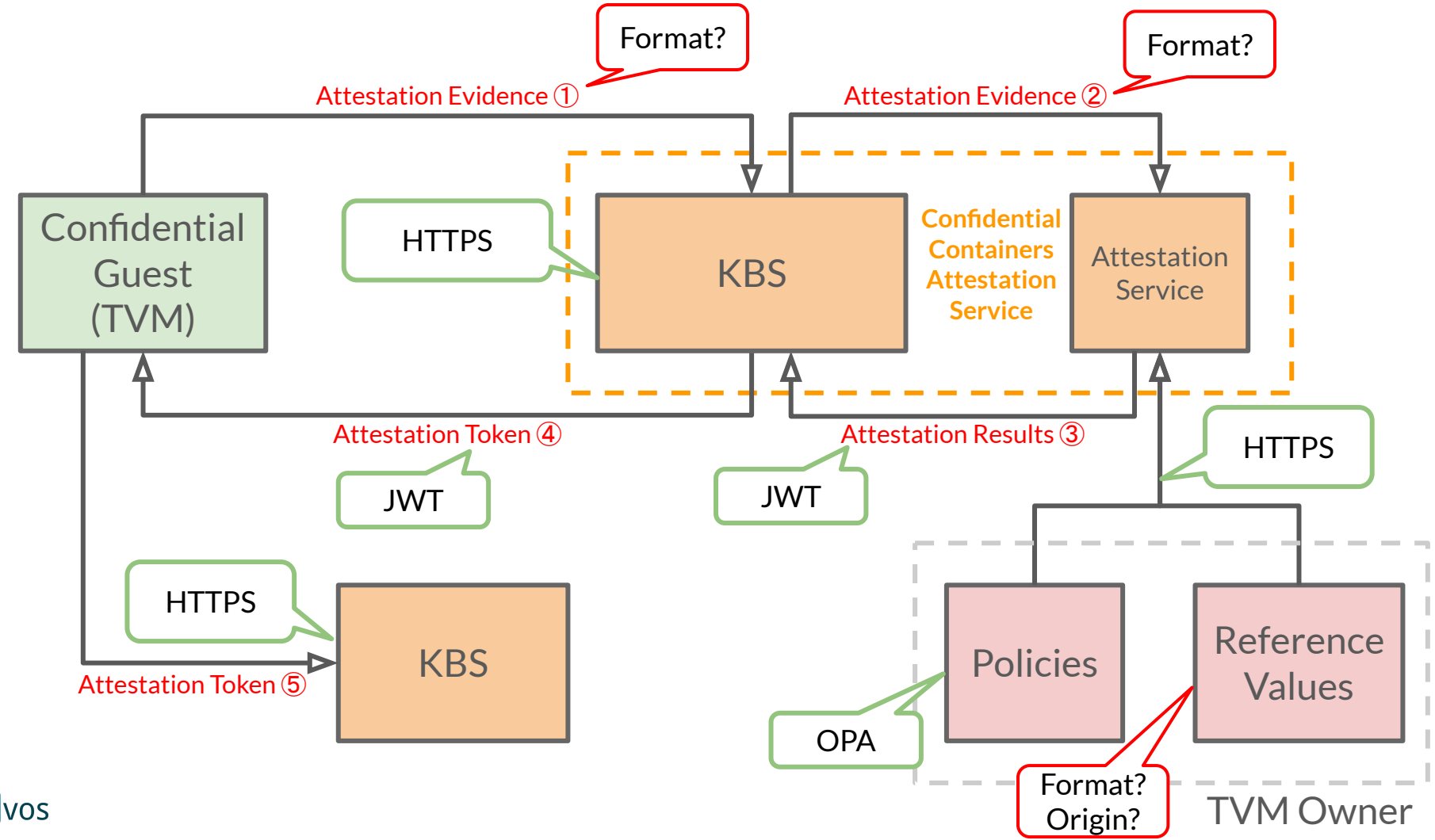
Format?
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Format?
Attestation Evidence ②
Confidential Guest (TVM)
HTTPS
KBS
Confidential Containers Attestation Service
Attestation Service
Attestation Token ④
JWT
Attestation Results ③
JWT
HTTPS
HTTPS
KBS
Attestation Token ⑤
Policies
Reference Values
OPA
Format? Origin?
TVM Owner

Attestation Evidence Format

- tsm-configfs to converge userspace ABI
- Actual evidence format is still architecture specific
- Entity Attestation Token
  - Content is arch specific, format is standard
  - Please use that!
  - ARM CCA and RISC-V

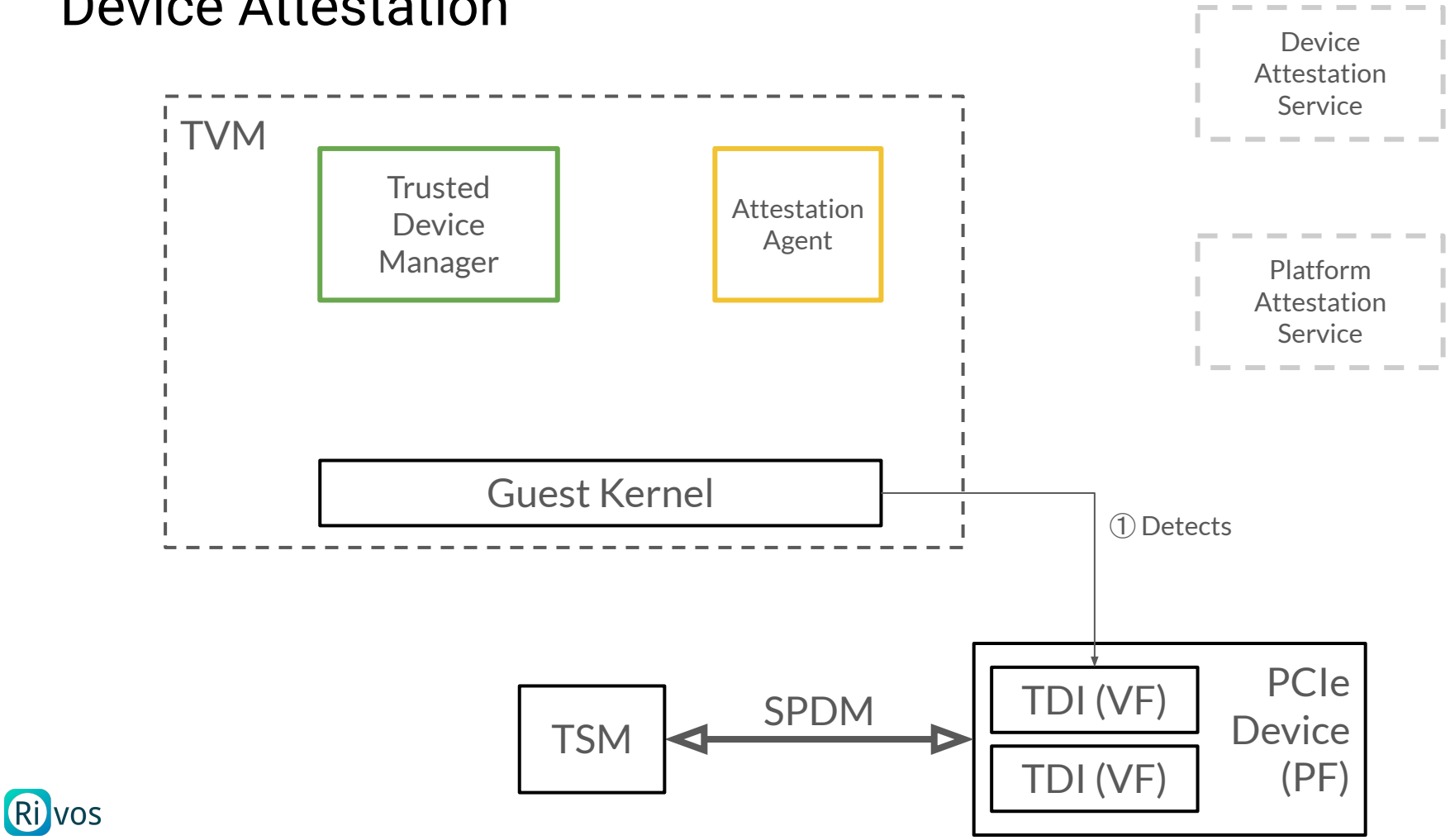
Reference Values

- IETF CoRIM for the format
- Link between supply chain and reference value provider

Device Attestation

- TVM must attest a device before accepting it
  - Kernel to offload device attestation to the Trusted Device Manager (TDM)
- Once accepted, the device is part of the TCB
  - Combined attestation: TVM attestation must include device attestation results

Device Attestation



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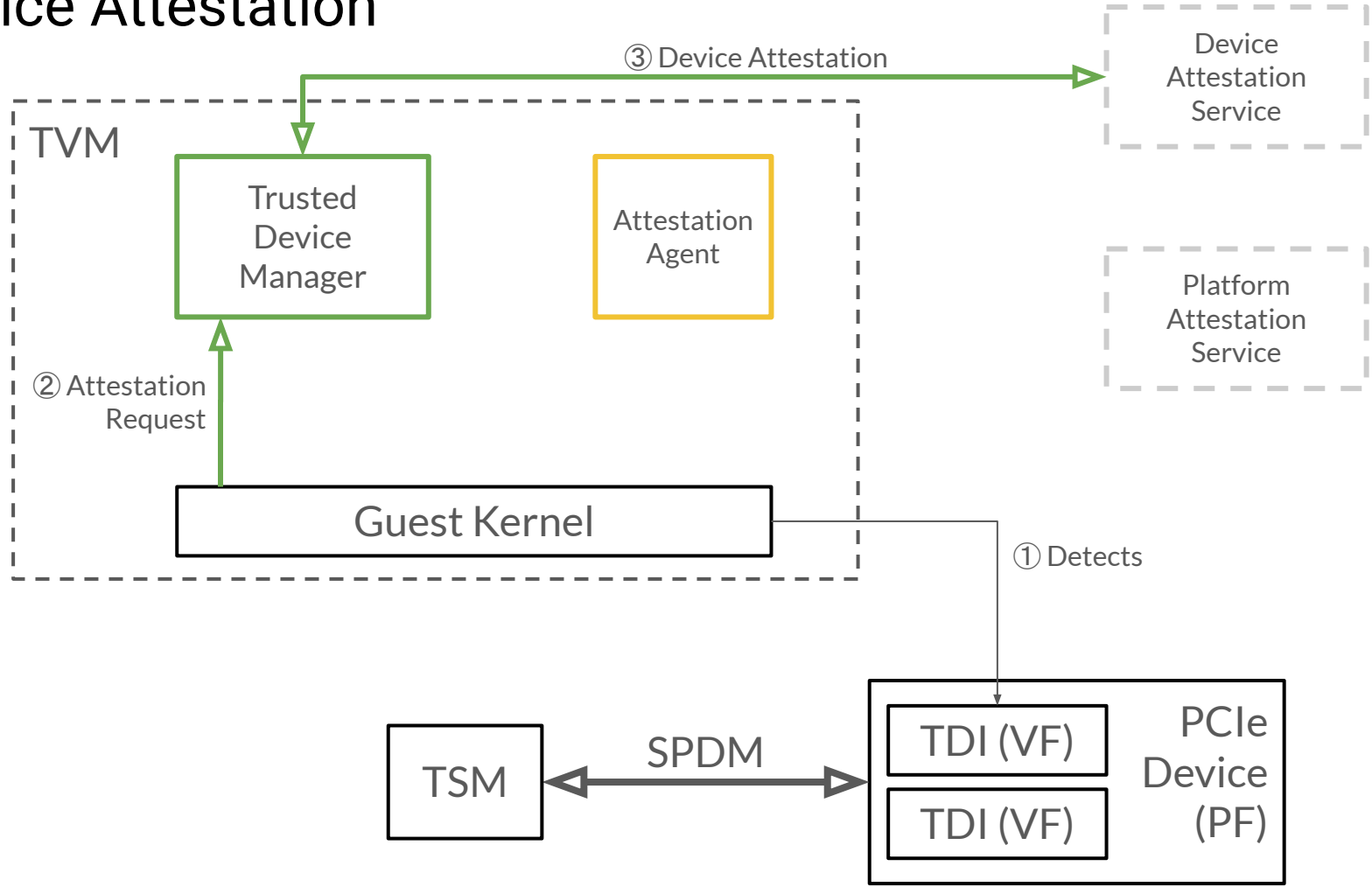

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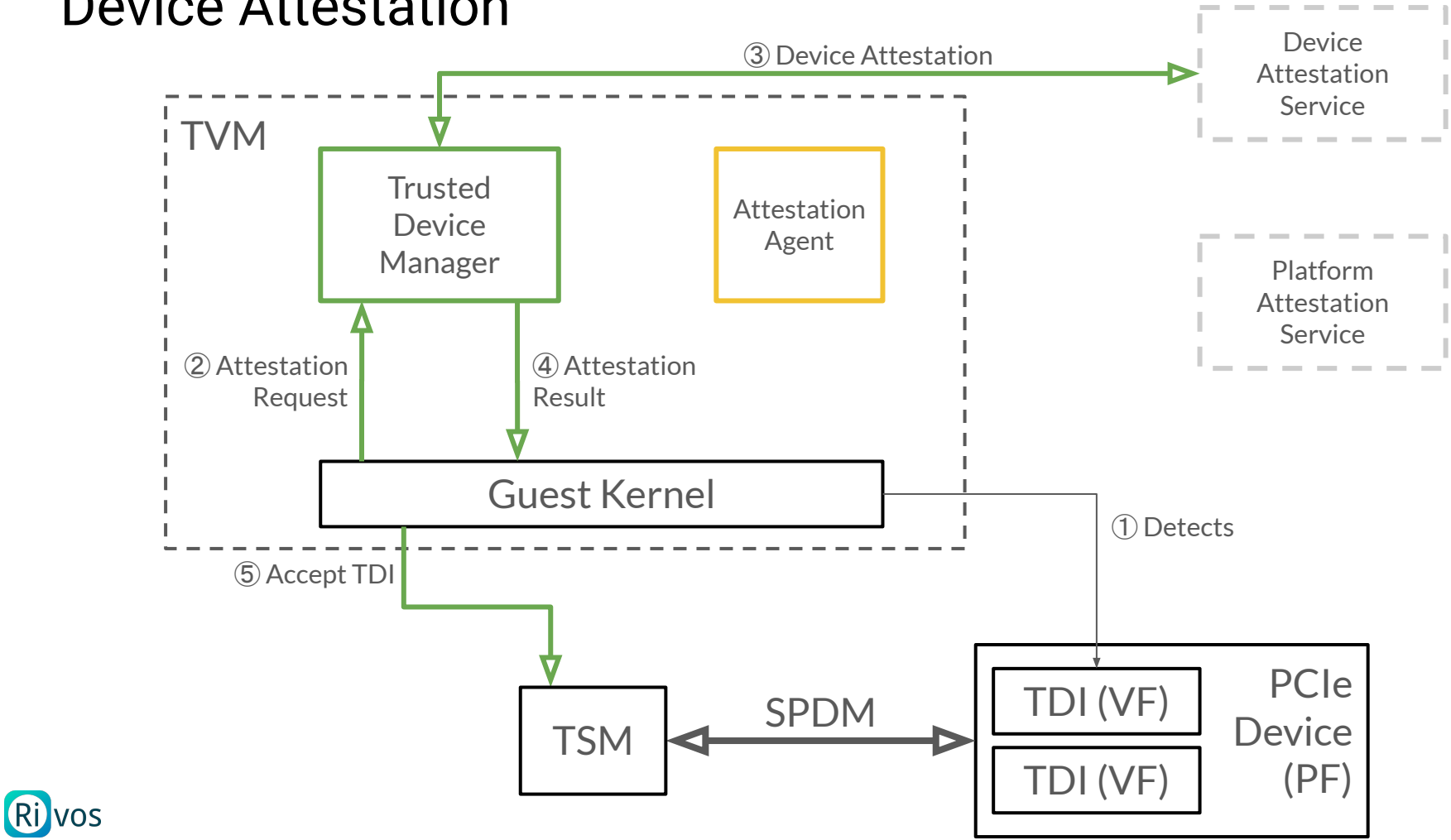

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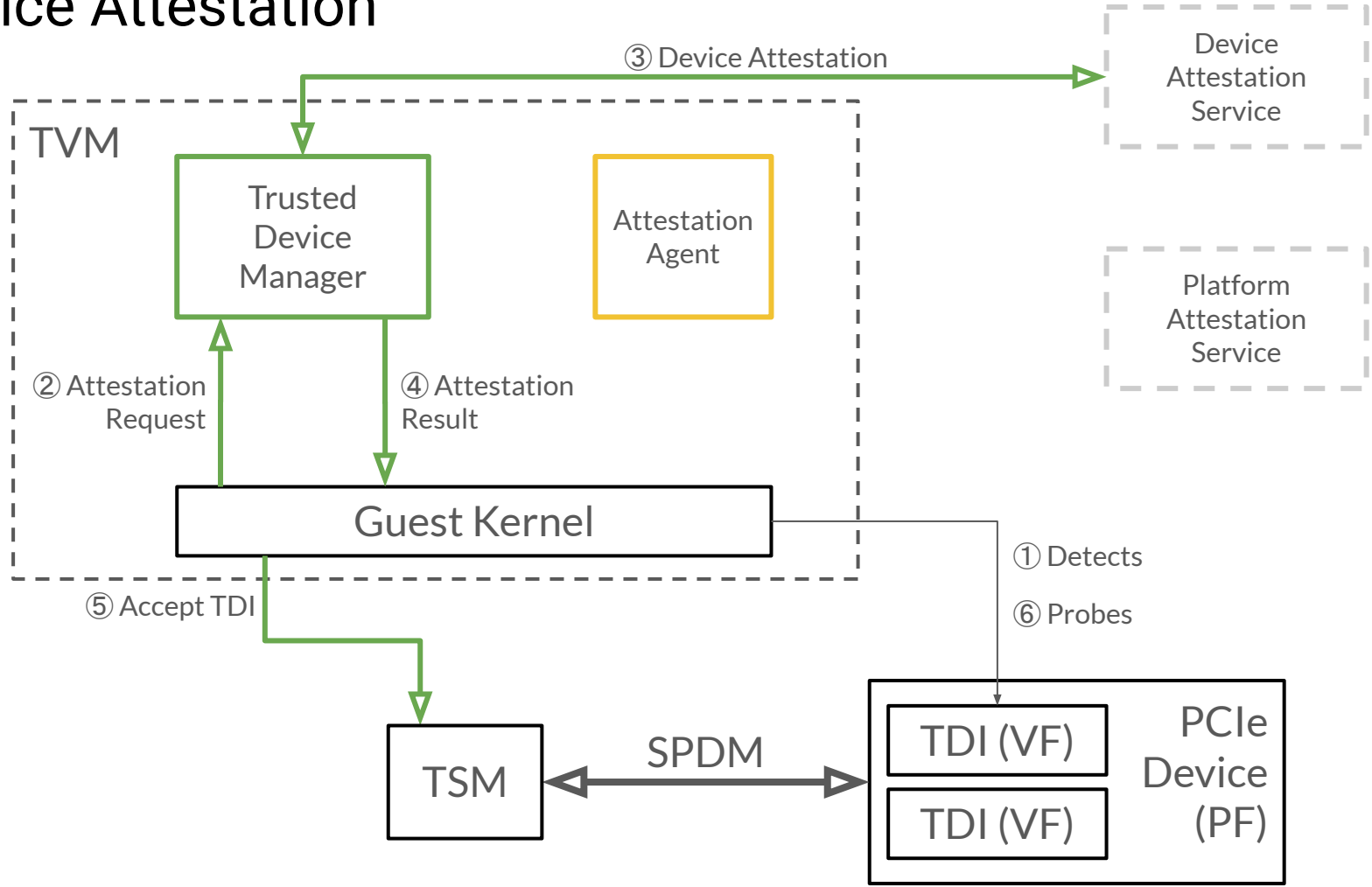

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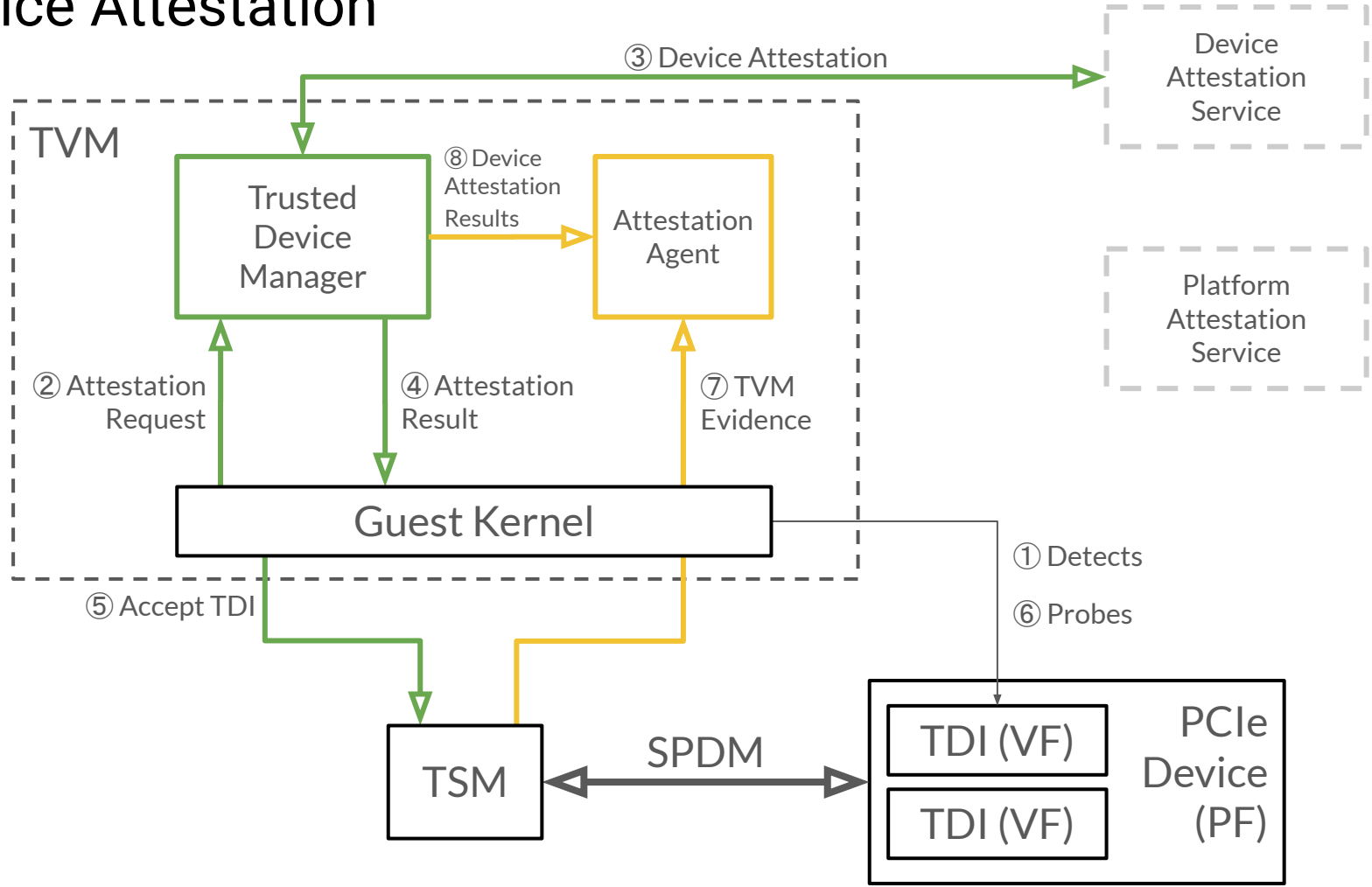

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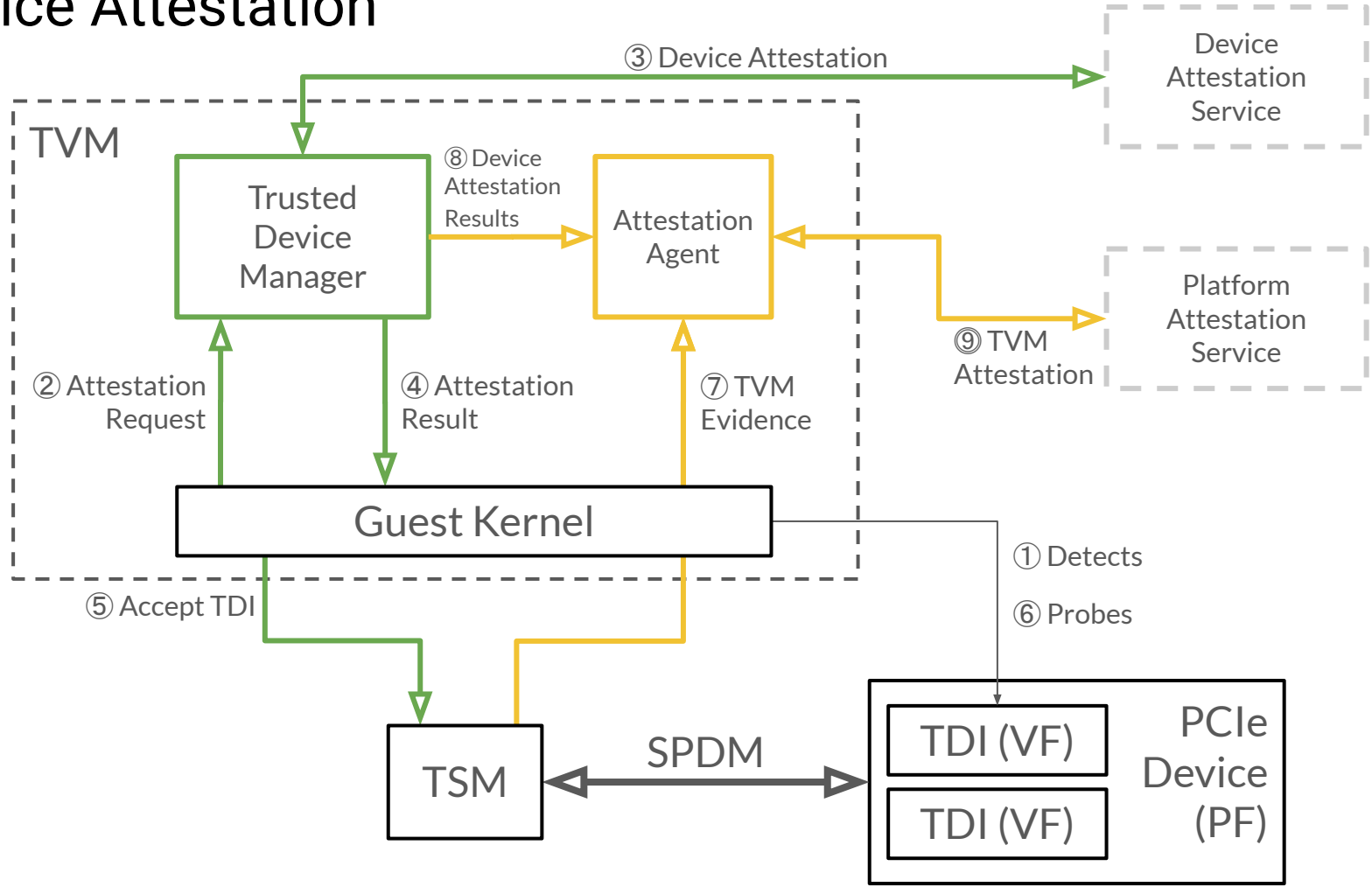

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