RUHR-UNIVERSITÄT BOCHUM

RUB

Sometimes it's better to be STUCK!

SAML Transportation Unit for Cryptographic Keys

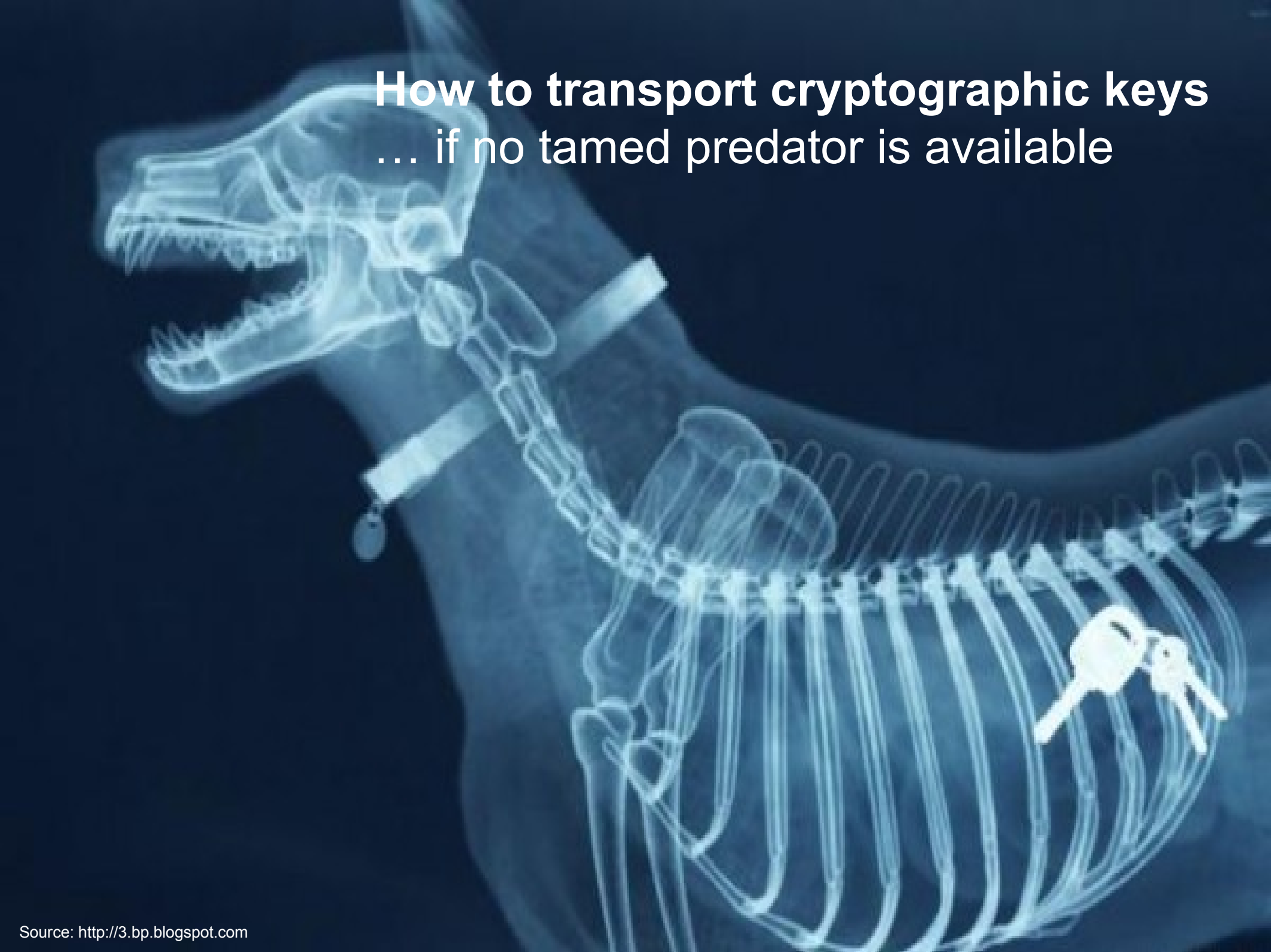
28.11.2012

Horst Görtz Institute for IT-Security
Chair for Network and Data Security

Source: http://3.bp.blogspot.com

How to transport cryptographic keys

… if no tamed predator is available



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Why transport key material?

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- Web Crypto API

  "JavaScript API for performing basic cryptographic operations in web applications"

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- Authenticated Key Exchange
- Combining Identity Management/Federation and Key Exchange

Why choose SAML for key transport?

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- SAML

  "Security Assertion Markup Language"

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- Standard for exchanging security statements (**`Assertion`**s) about subjects

  Authentication / Authorization / Attestation / …

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- Flexible, extensive, **extensible**

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- Standard for exchanging security statements (**`Assertions`**) about subjects

  Authentication / Authorization / Attestation / …
- XML-based
- Flexible, extensive, **extensible**
- Most known usage scenario: Single-Sign-On

Advantages of the proposal

Build upon approved technologies

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- XML Signature

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Seamless integration

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- Usage of standard SAML Extension Points

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- No Schema violation

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- Usage of standard SAML Extension Points
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- Fully SAML compatible

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Binding keys to assertions

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- Integrity protection through digital signatures
- Confidentiality protection through encryption
- Time-bound validity
- Detailed issuer and subject information
- Identity binding

Advantages of the proposal
Identity and Key federation

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- Key federation between multiple services

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- Key federation between multiple services
- Inseparable Identity – Key Binding, beyond service borders

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Message level security

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- Security at message level

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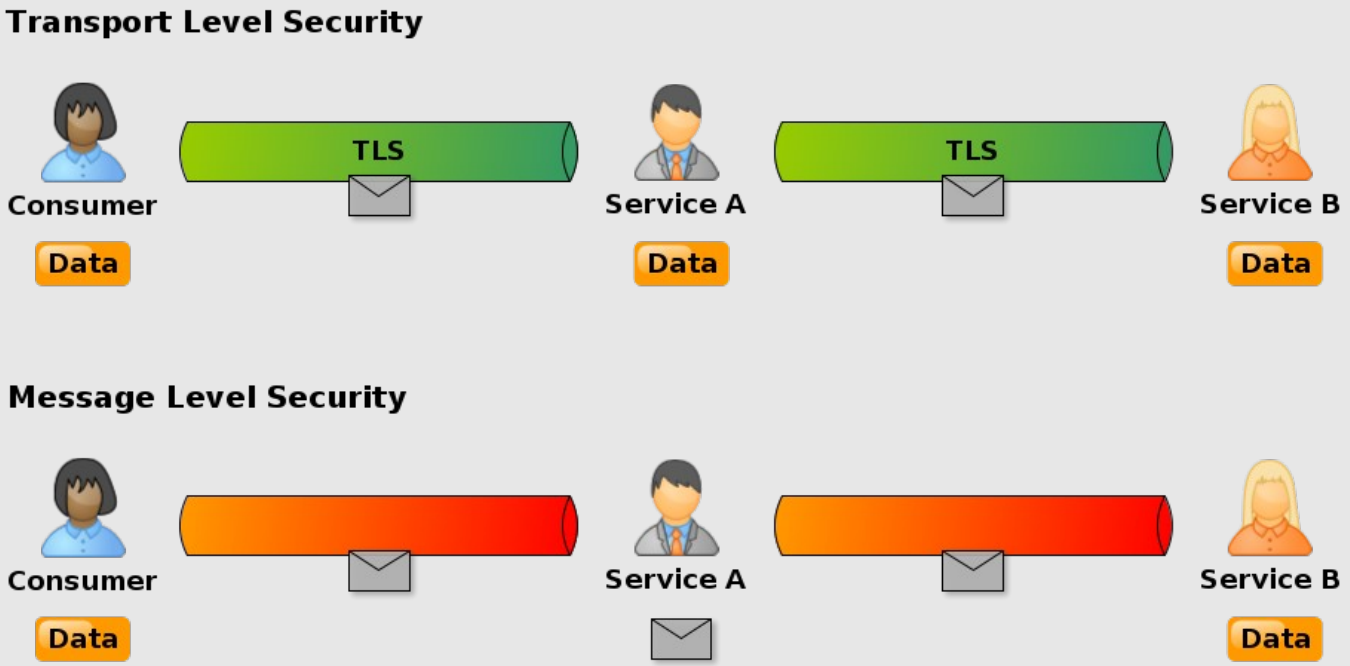

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`Assertion` structure

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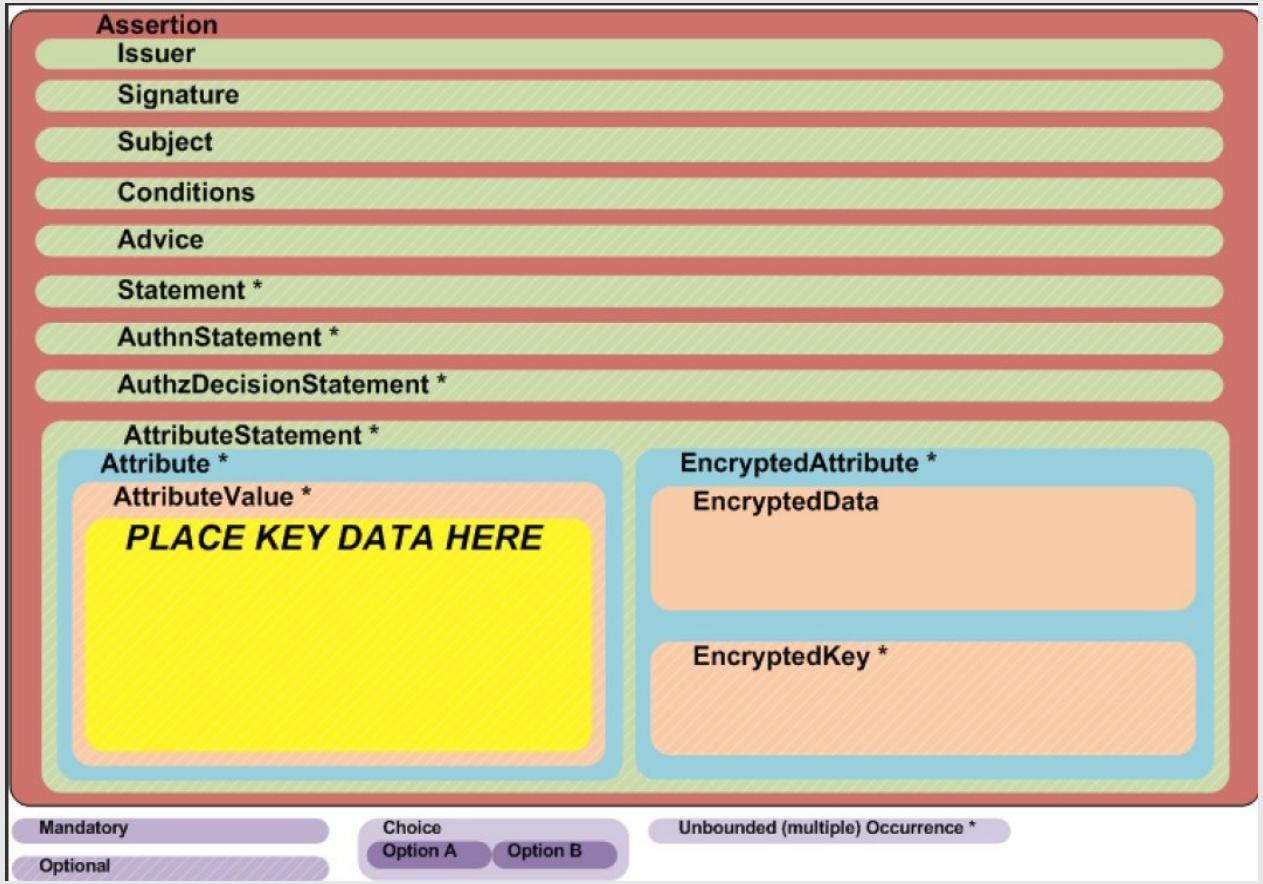
Assertion structure



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Proposal: Proof-of-concept `Assertion`

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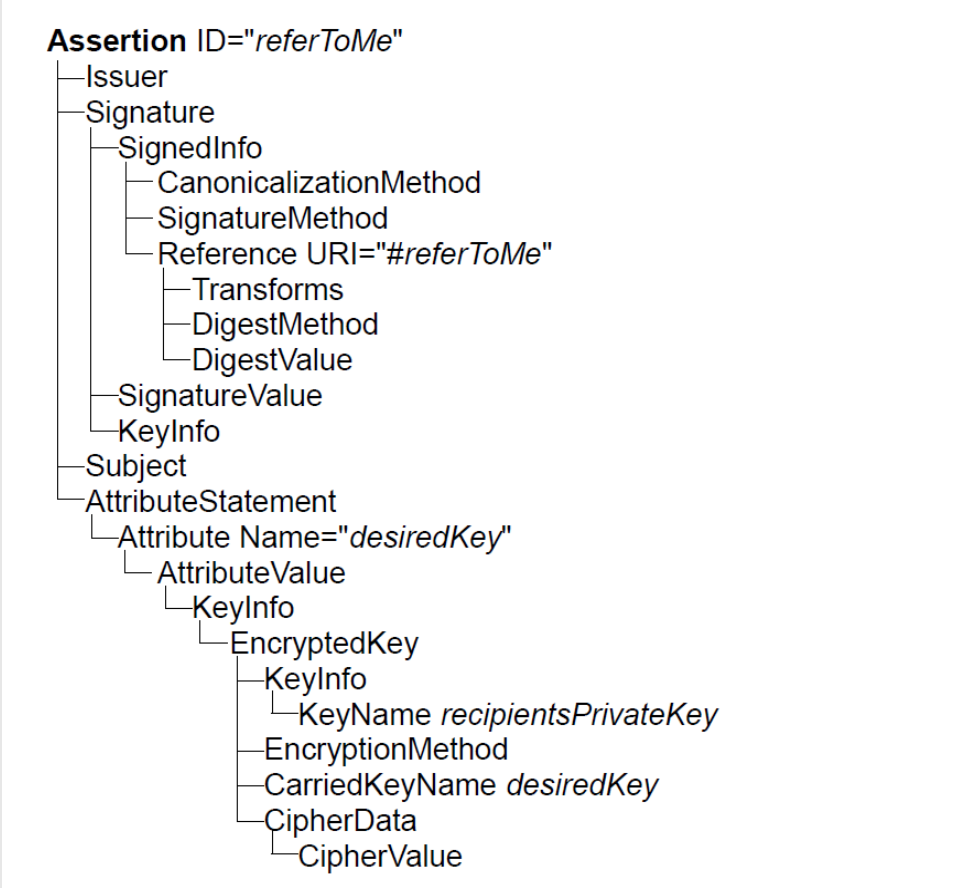
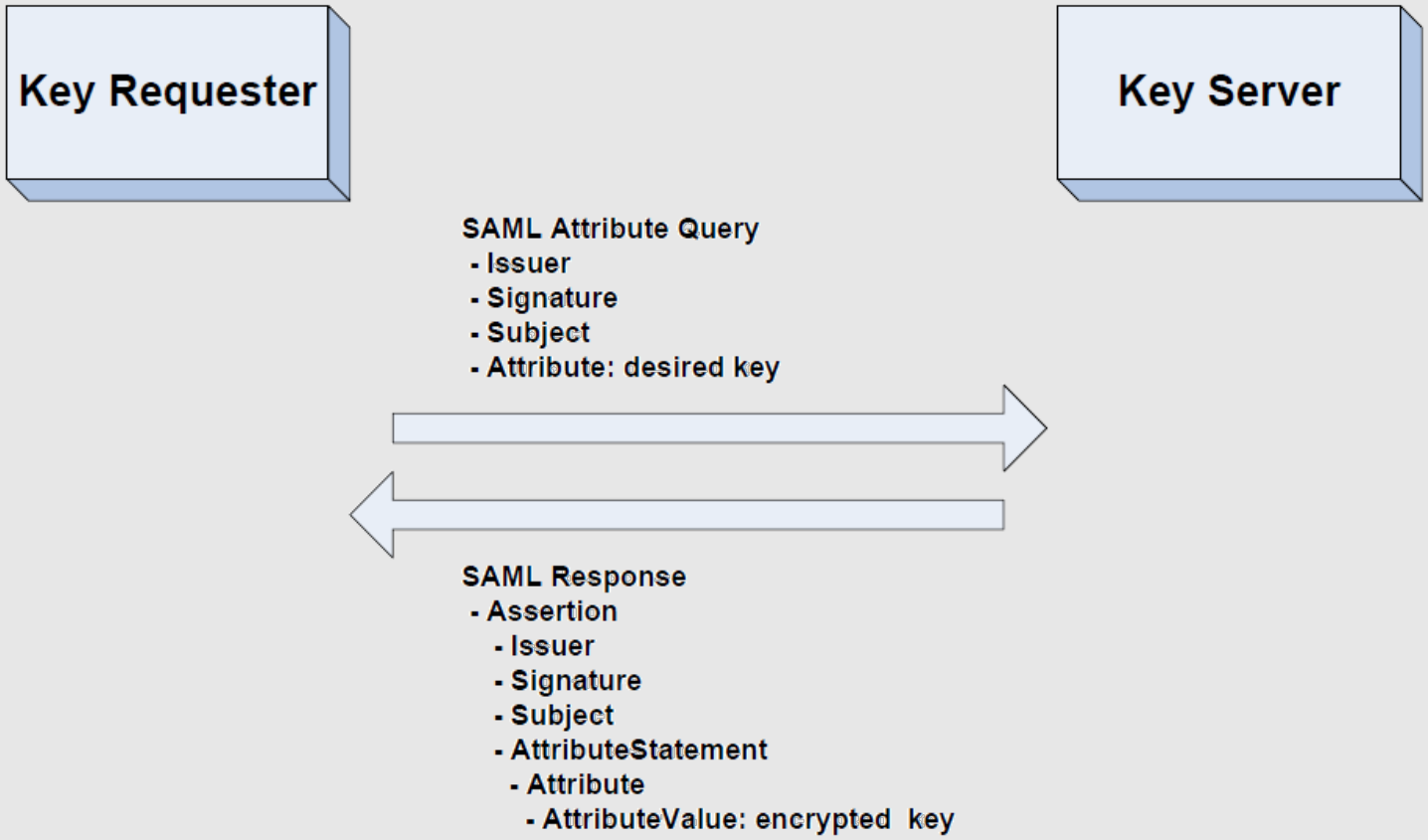
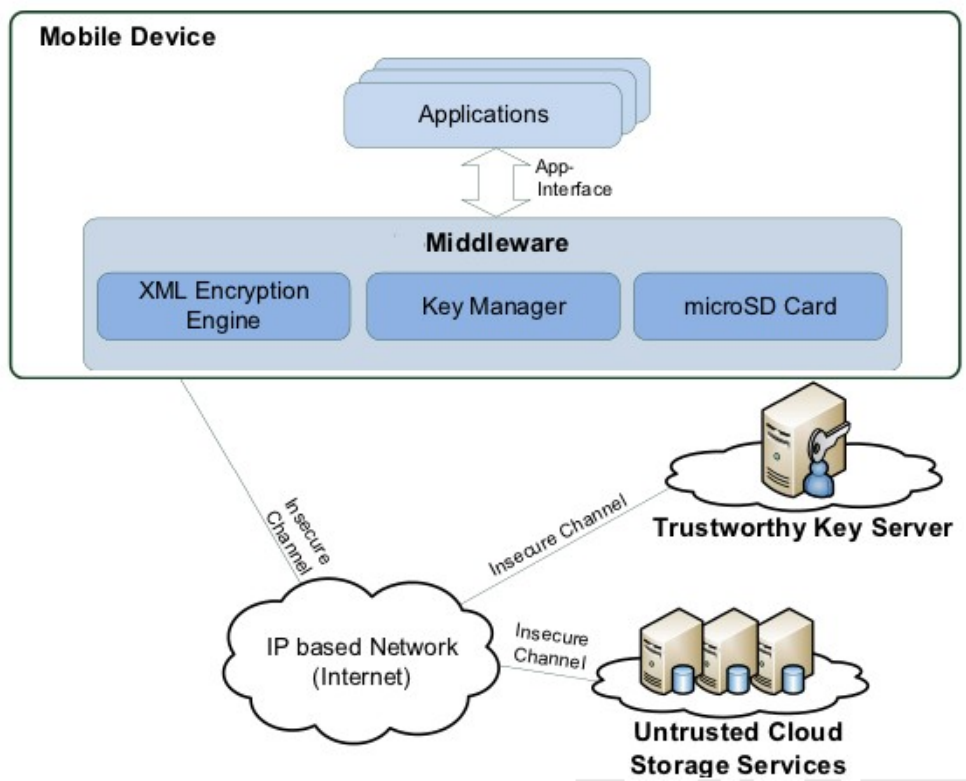


STUCK

Proposal: Compatibility with SAML Protocols



Case study
Sec² research project



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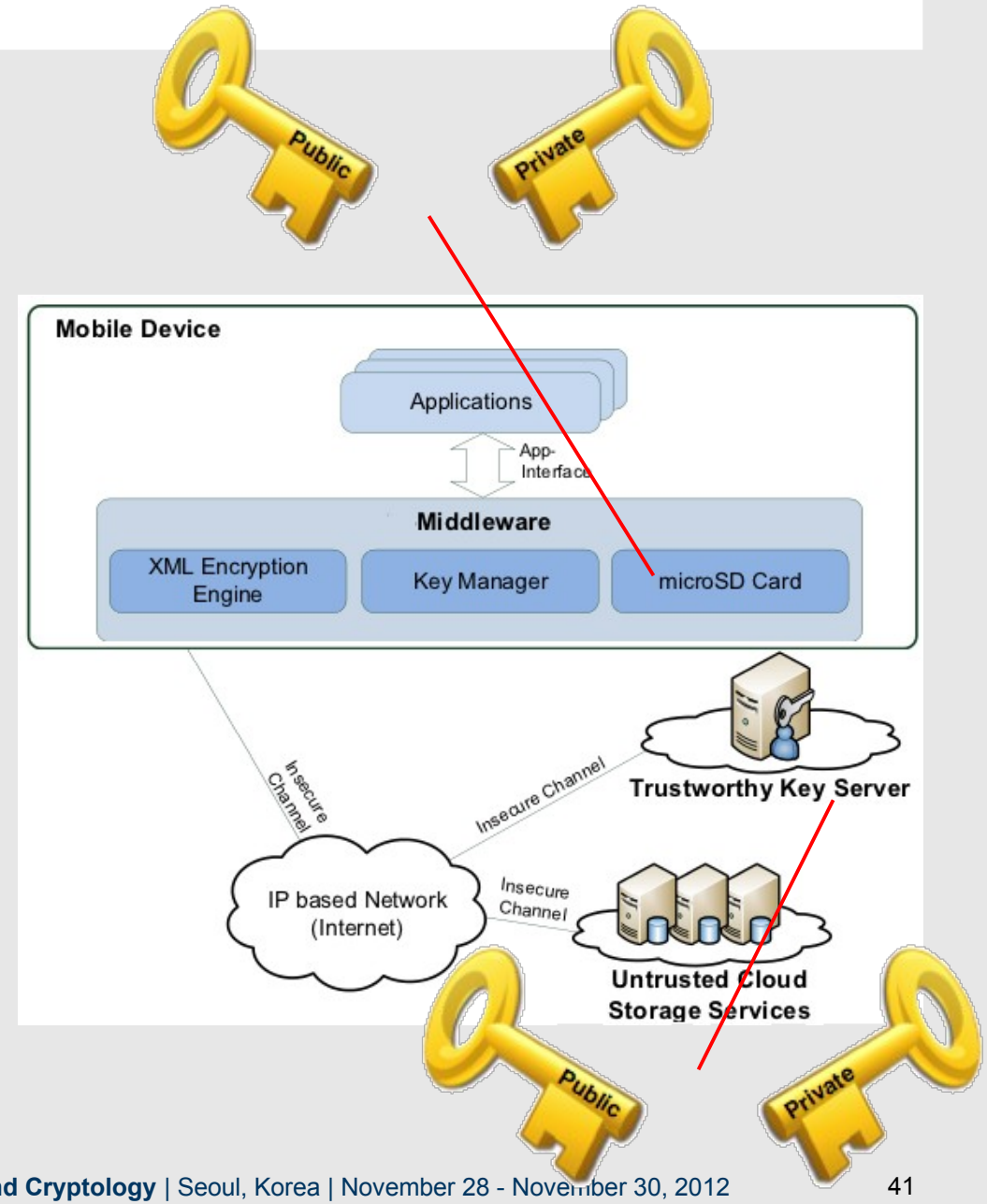
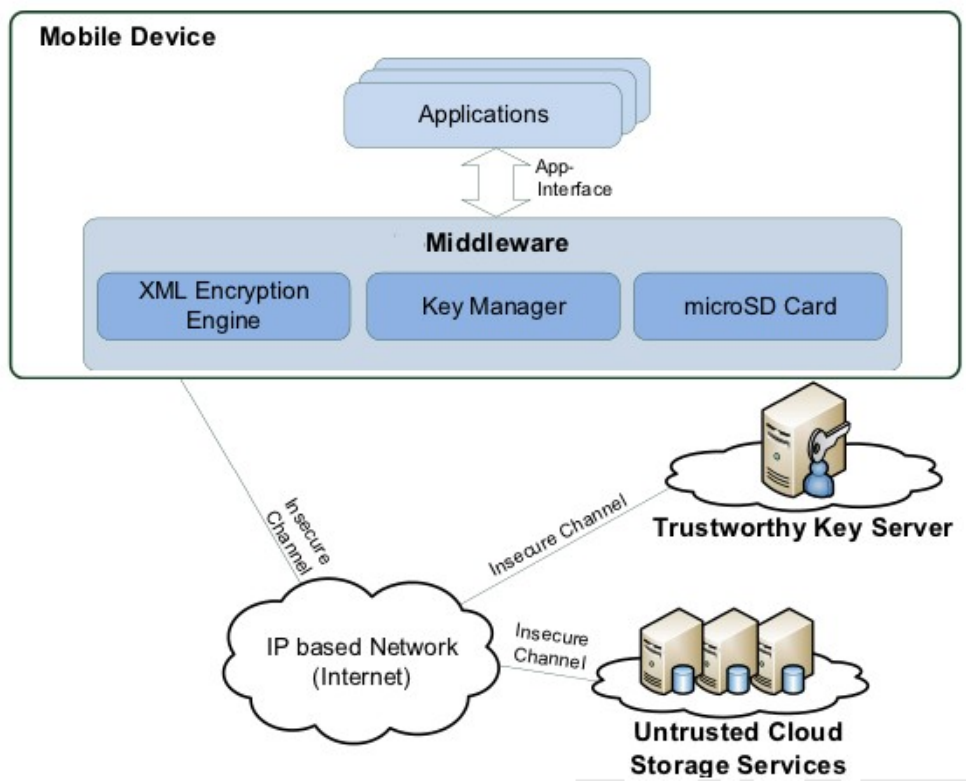


Case study
Sec² research project

1. Middleware fetches (encrypted) data from untrusted Cloud storage



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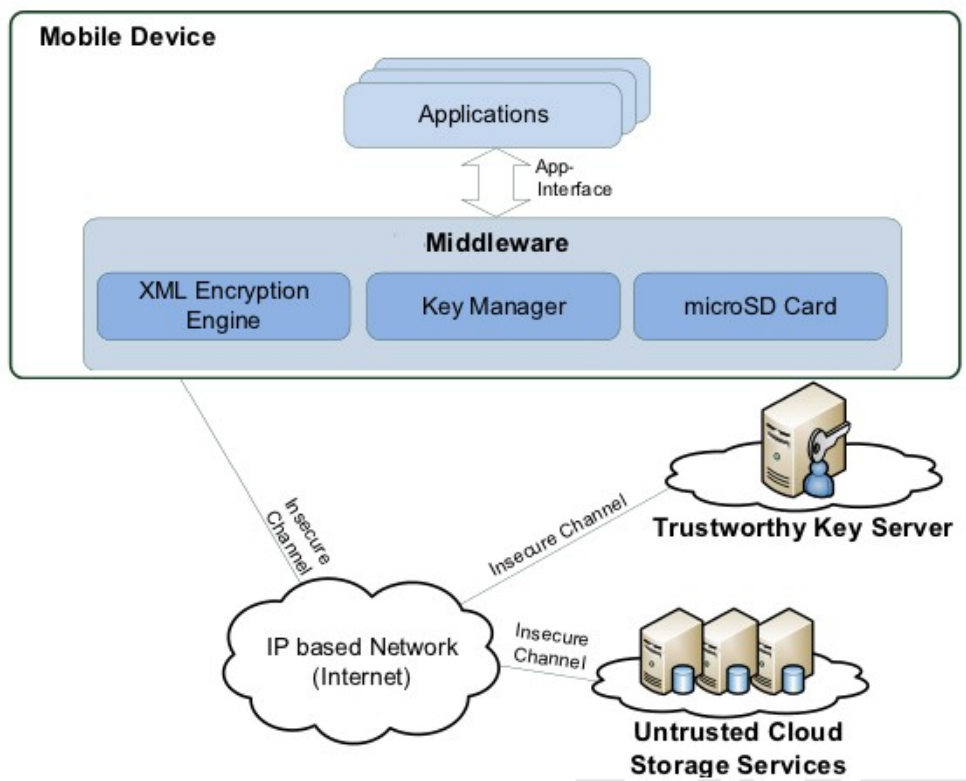

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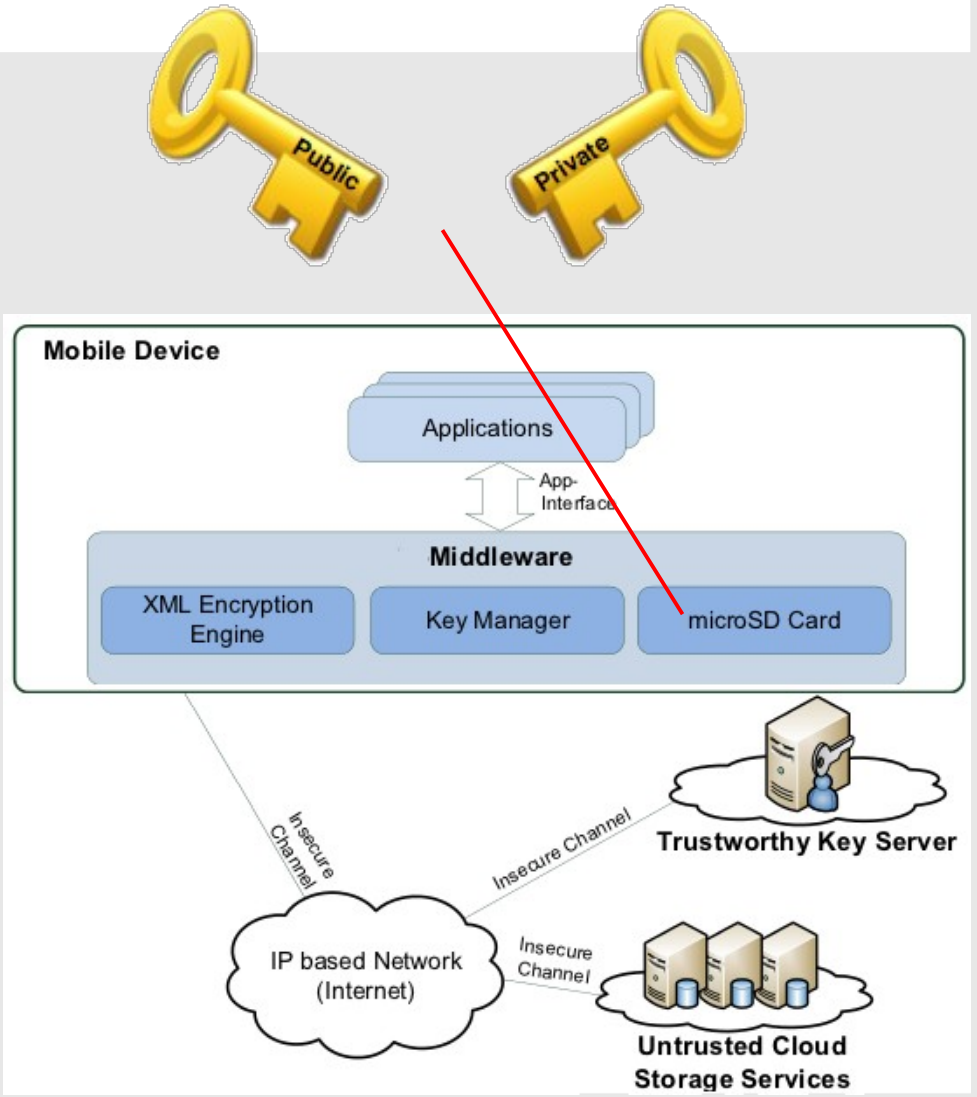

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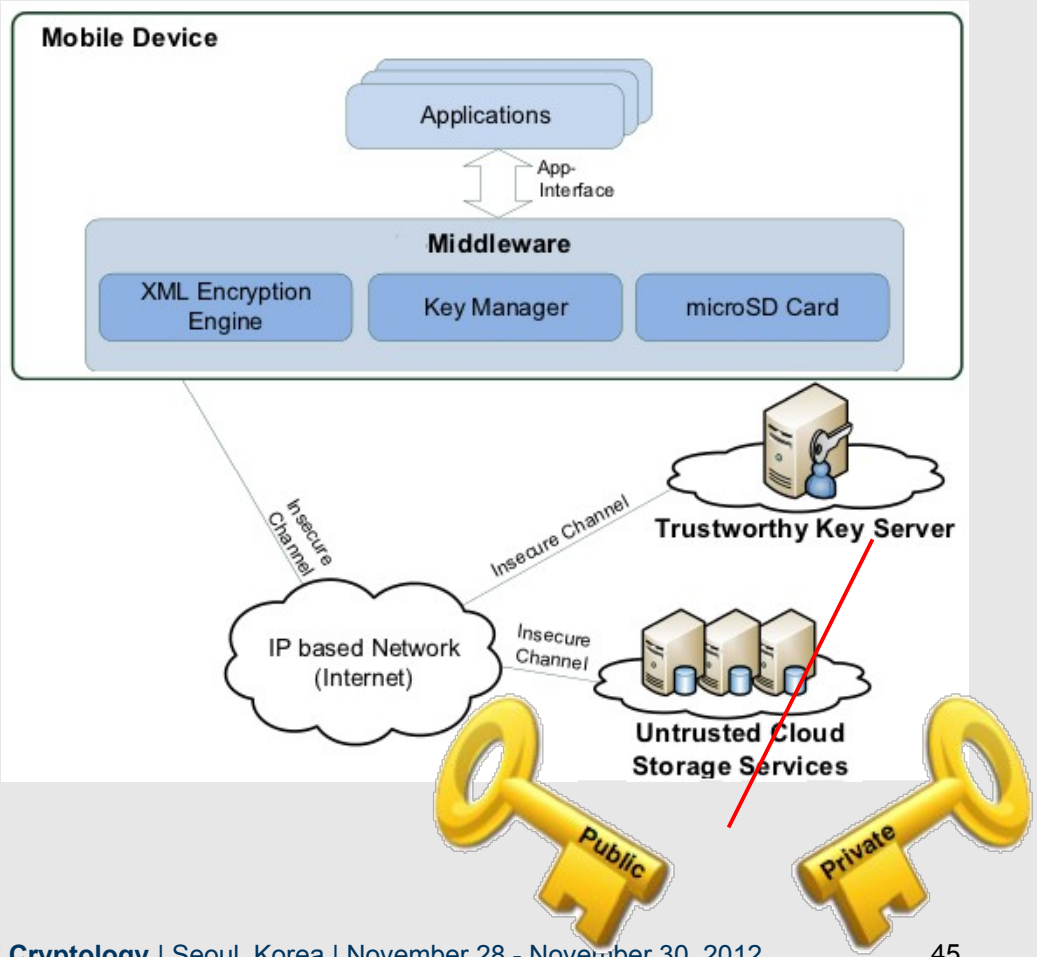

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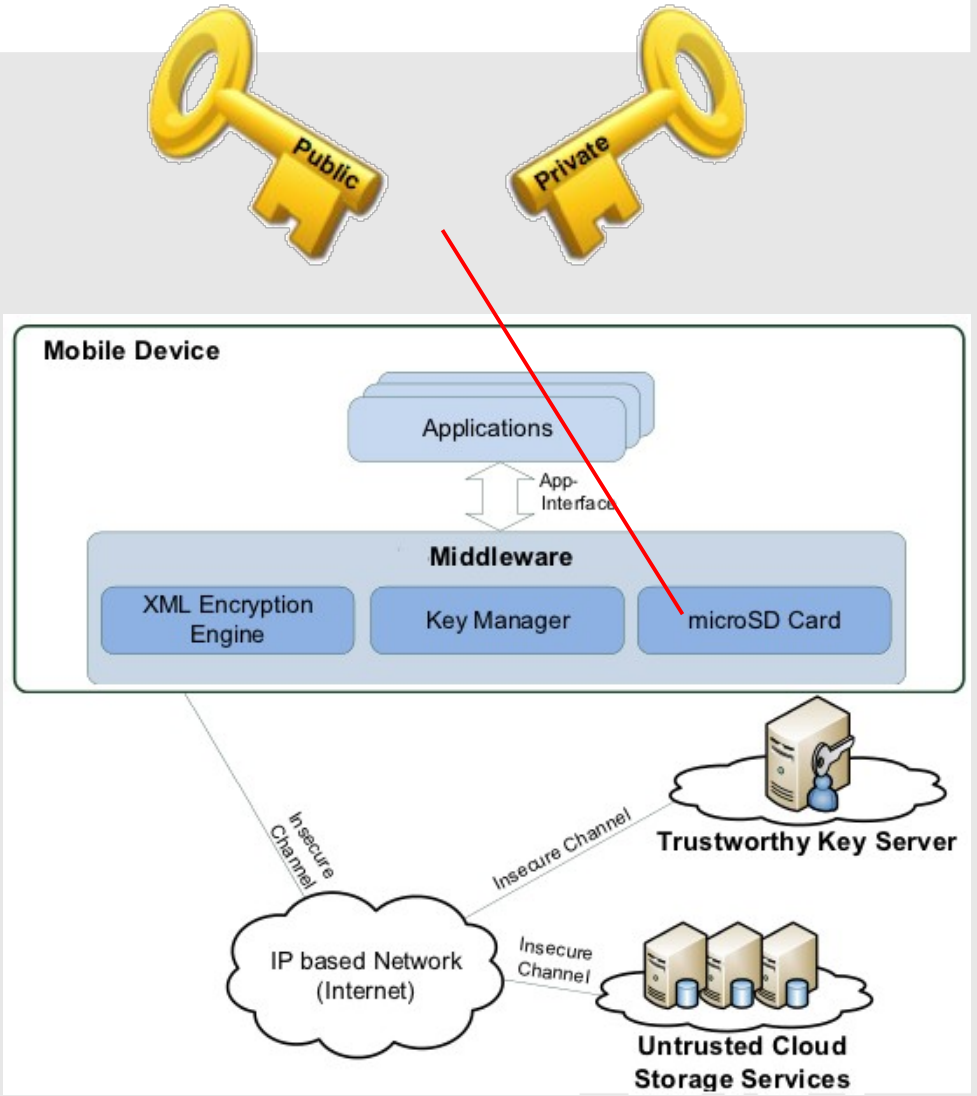

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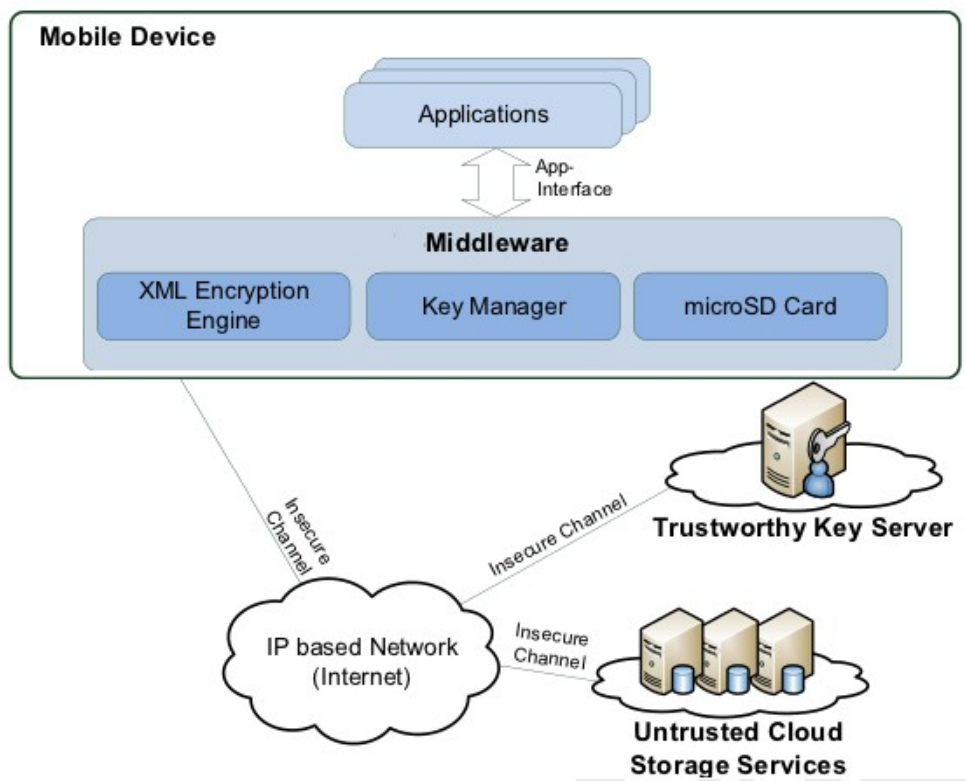
6. Middleware decrypts fetched data



Time for questions

Source:http://www.rhodius-mineralwasser.de

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http://armoredbarista.blogspot.com
http://www.nds.rub.de