Privacy-ABC technology on Mobile Phones

by Gert Læssøe Mikkelsen,
Alexandra Institute

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Challenges and possibilities.

- Pilots and Reference implementation
  - Focus on Client(PC)-Server and smartcards
- Users are using mobile devices
- Smart Phone feasibility study

- Users bring their smart phones everywhere
- New Use cases – e.g., in the physical world.
  - Now even iPhones come with NFC – currently very restricted!

Challenges on mobile devices

- Platform?:
  - Native – very diverse
    - Android, iOS, Windows Phone etc.
  - Common language: JavaScript?
  - Cloud IdMaaS?
- Computational power?
- Storage of keys and credentials.
- Usability

p-ABC on mobile devices

- Relevant roles
  - **User**
  - **Part of User's SW (Smart Card emulation)**
  - Verifier
  - Inspection
- Not so relevant roles
  - Issuer
  - Revocation authority

Smart Card emulation

- Proof of concept
- Still Client(PC)-server setup
- \+ Development time
- \+ Performance
- \+ Convenience for the user
- \+ User interface
- \- Security
- \- Devices

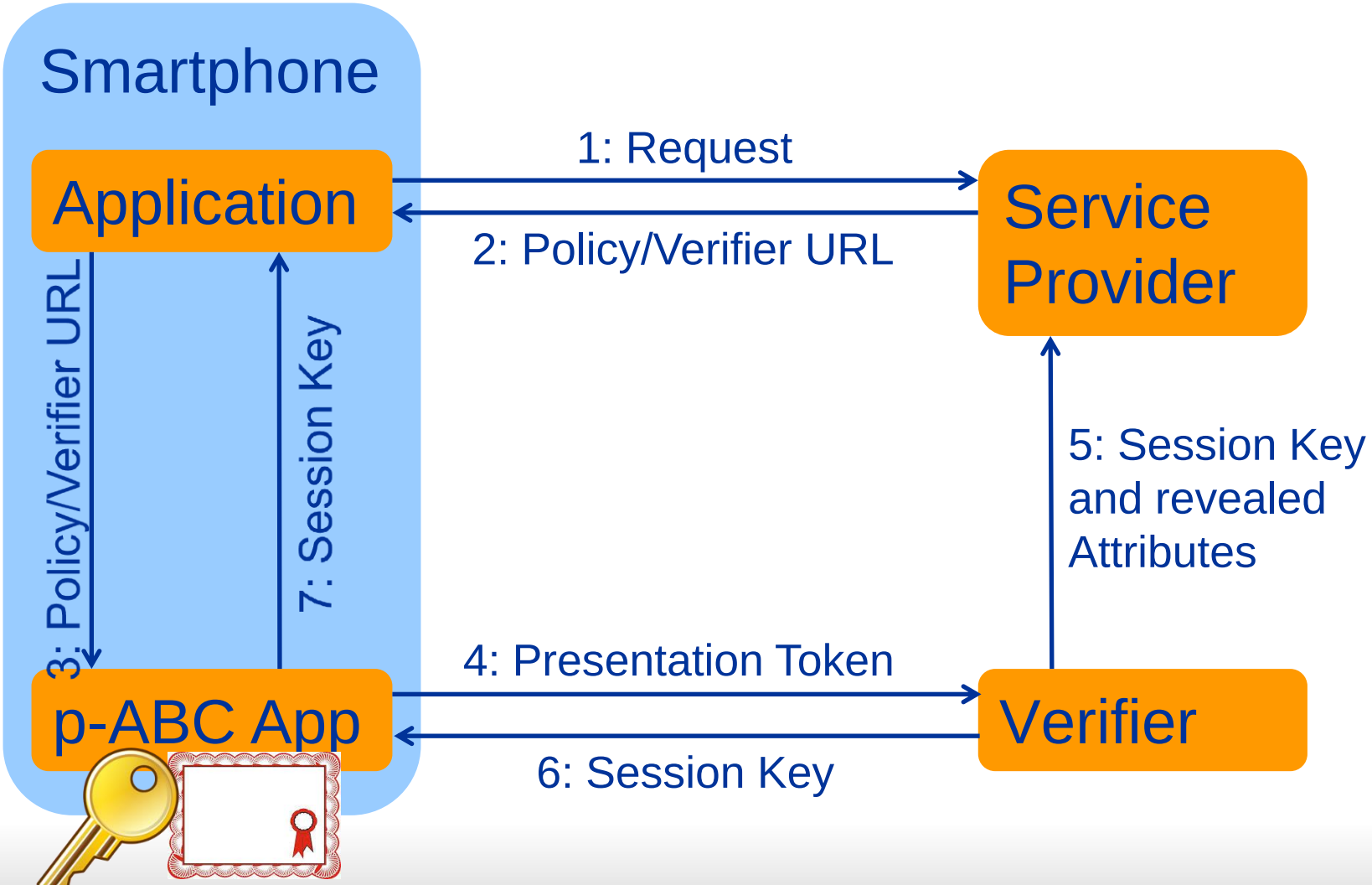
Native App

- Implemented the user service from the ABC4Trust reference implementation as a mobile service-app

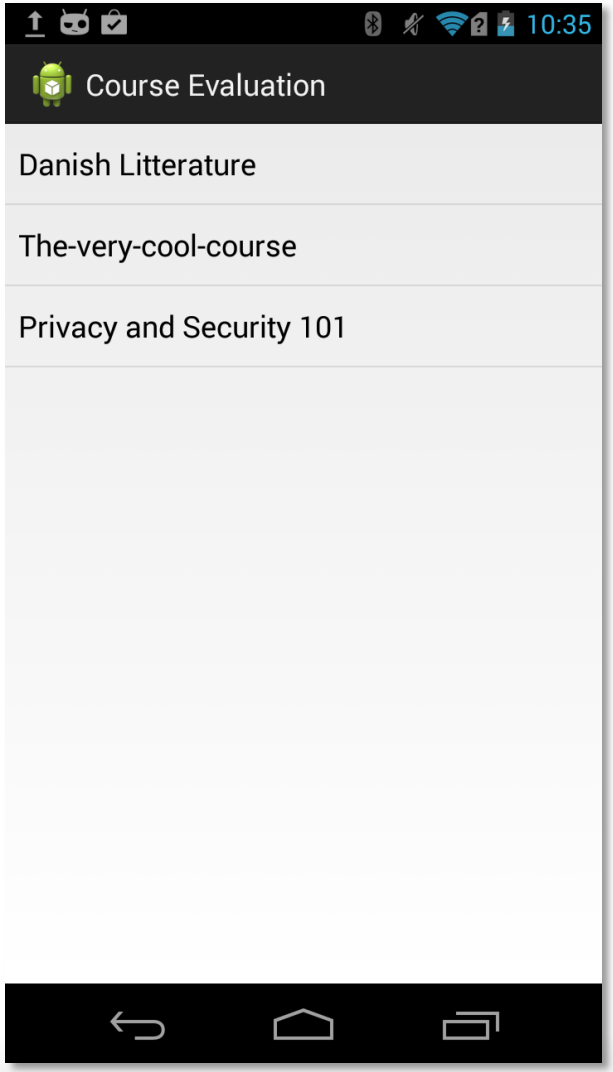
- Android!
  - ABC4Trust Reference implementation in Java

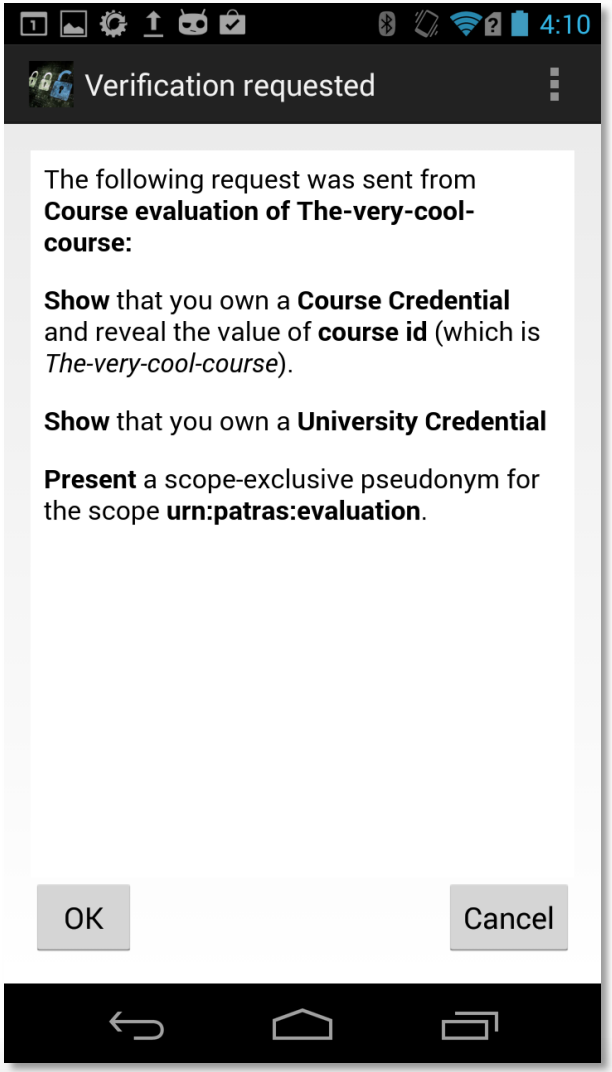
- Security
  - Keys/Credential stored in ABC4Trust App's internal memory
- Usability?

Native App


Smartphone
Application
p-ABC App
Service Provider
Verifier
1: Request
2: Policy/Verifier URL
3: Policy/Verifier URL
7: Session Key
4: Presentation Token
6: Session Key
5: Session Key and revealed Attributes

Native App


10:35
Course Evaluation
Danish Litterature
The-very-cool-course
Privacy and Security 101


4:10
Verification requested
The following request was sent from **Course evaluation of The-very-cool-course:**
Show that you own a **Course Credential** and reveal the value of **course id** (which is *The-very-cool-course*).
Show that you own a **University Credential**
Present a scope-exclusive pseudonym for the scope **urn:patras:evaluation**.
OK
Cancel

MS U-Prove Native App.

- MS U-Prove C# version can run on Windows Phones

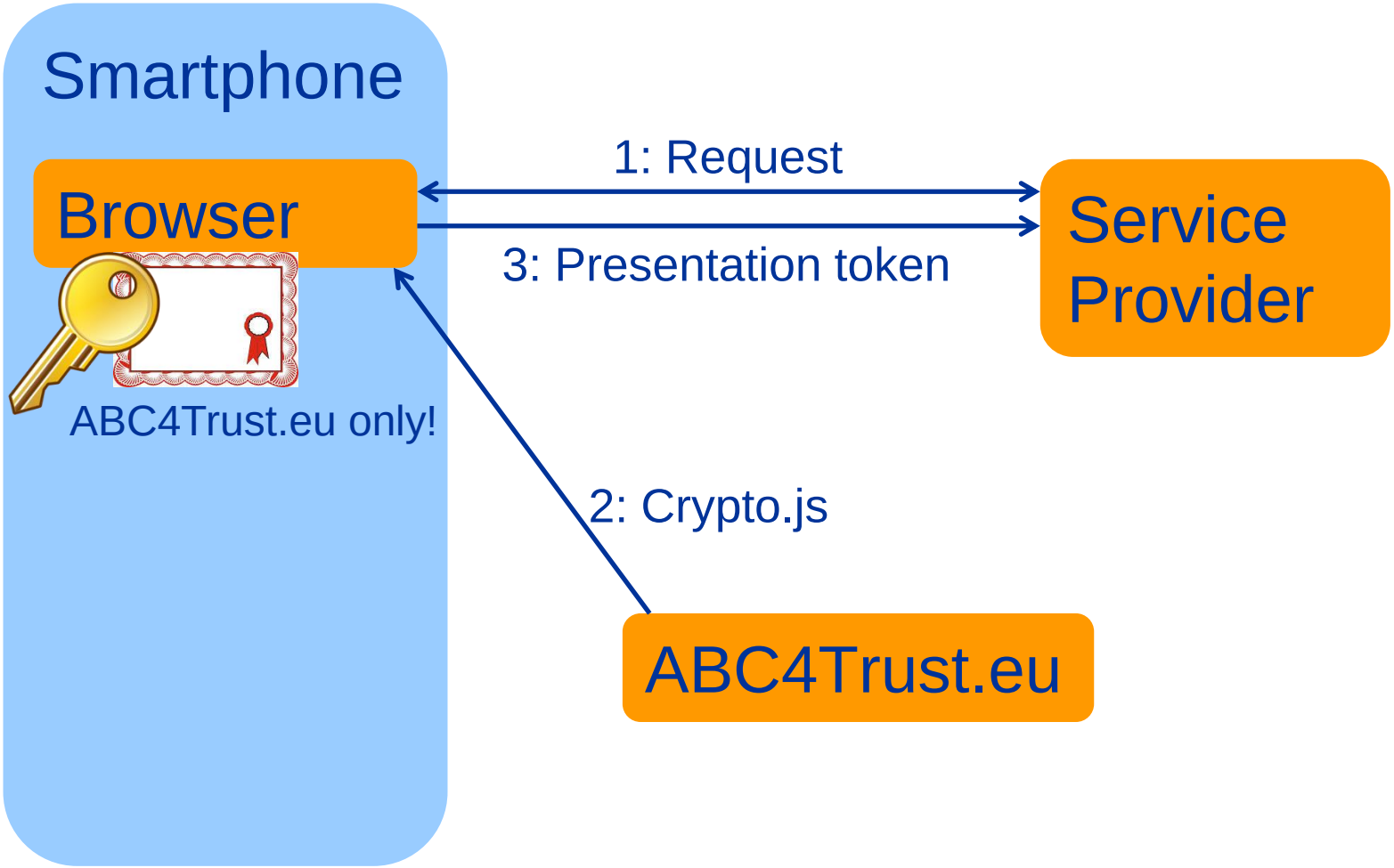
JavaScript?

- JavaScript is highly cross platform
  - Everything with a modern browser
  - Not build for security/Cryptography
  - Where to store keys/credentials securely?
    - Server side?
    - Cookies?
    - Browser Key store?
    - Issue when needed?

JavaScript Prototype

- Prototype implementation of MS U-Prove
  - U-Prove is simpler than the ABC4Trust reference implementation and Identity Mixer.
- Elliptic Curves using “jsbn” (“Stanford”) library.
- Interacts with MS U-Prove C# version

JavaScript


Smartphone
Browser
ABC4Trust.eu only!
1: Request
3: Presentation token
Service Provider
2: Crypto.js
ABC4Trust.eu

JavaScript Performance

- Very dependent on platform, and use of libraries!
- Our implementation:
  - 2.1 sec (Galaxy Nexus,default browser)
  - 30 sec (iPhone 5, Safari)
- Others are getting very different timings, with iPhones nearly as fast as Androids.

JavaScript the new language for Crypto?

- A lot is happening!
  - Since this task of the project was finished:

- Microsoft U-Prove JavaScript (July 2014)
- Microsoft Research JavaScript Cryptography Library (August 2014)
- Google End-to-end Chrome Extension (June 2014)

Conclusion

- Using p-ABC's on mobile devices is feasible
  - both as native applications and JavaScript.
- New use cases/improved user experience.
- New security issues
  - mobile devices are vulnerable to a number of attacks which should be addressed.
- A lot is happening on JavaScript right now.
- D4.4 Smartphone feasibility analysis (www.abc4trust.eu)