ReCRED

From Real-world Identities to Privacy-preserving and Attribute-based CREDentials for Device-centric Access Control

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ReCRED Project – Consortium

www.recred.eu

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wedia

EXUS

ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ
UNIVERSITY OF PIRAEUS

THE PRODUCTIZERS

verizon

Telefonica
Telefónica I+D

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UNIVERSIDAD CARLOS III DE MADRID

institute imdea networks

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Bringing business and IT together

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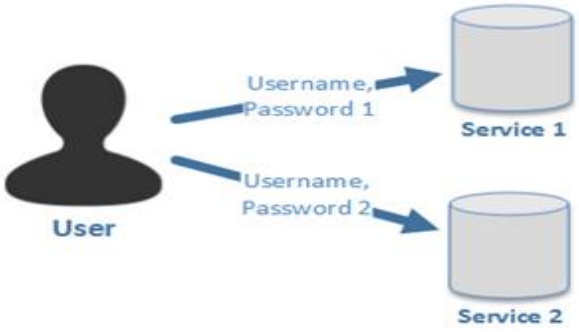
BAKER & McKENZIE

ReCRED's goal is to promote the user's personal mobile device to the role of a unified authentication and authorization proxy towards the digital world.

1. Password overload

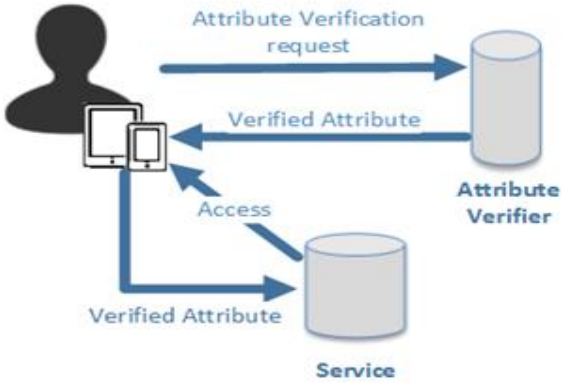


2. Identity Fragmentation

Problems addressed by ReCRED

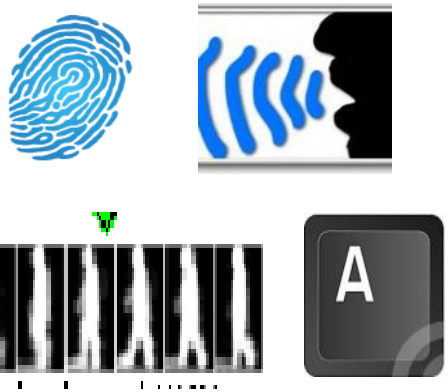
3. Lack of real-world binding

4. Lack of support for Attribute based access contol



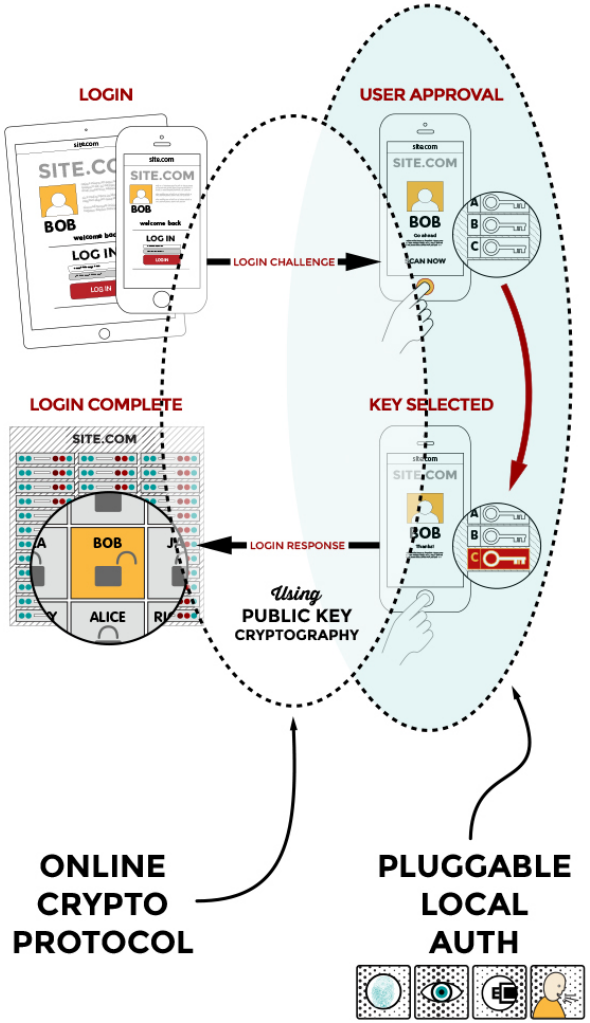
ReCRED's approach – employed technologies

User to device & device to service



ReCRED's approach – employed technologies

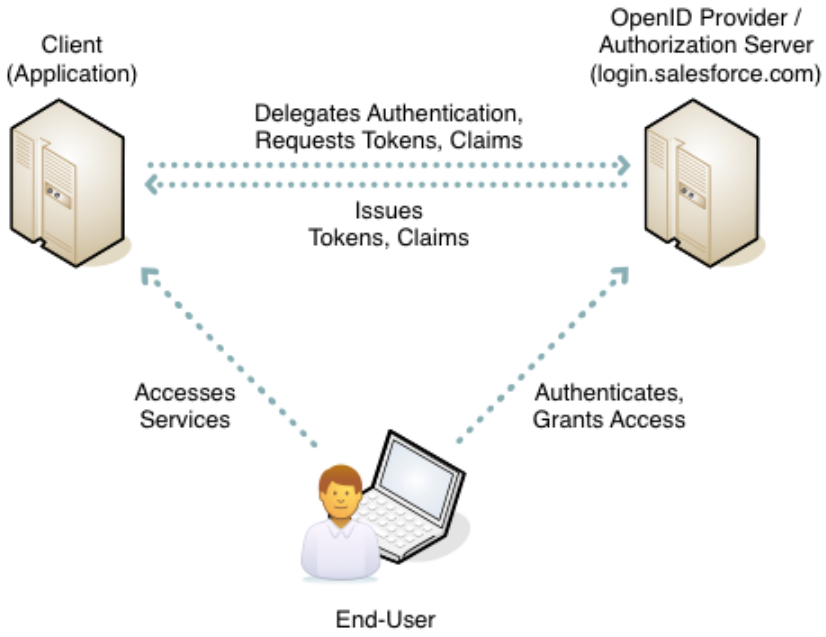
- **FIDO** (Fast IDentity Online)
  - Standardized protocols for **password-less** authentication



ReCRED's approach – employed technologies

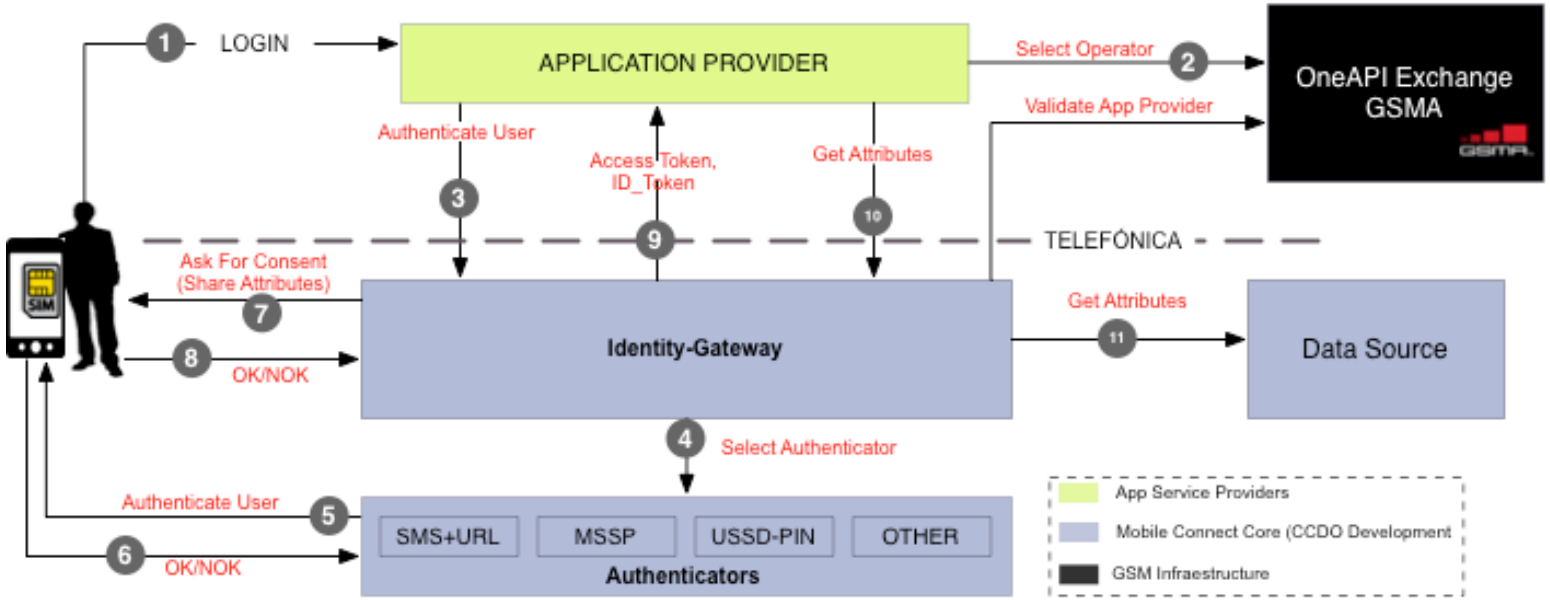
- **OpenID Connect** (Single Sing On)
  - Online services authenticate their users by employing **Google, Microsoft, PayPal**, accounts

- **OAuth 2.0** (Open standard for Authorization)
  - Issues and uses **access tokens** to be used for **authorization**



ReCRED's approach – employed technologies

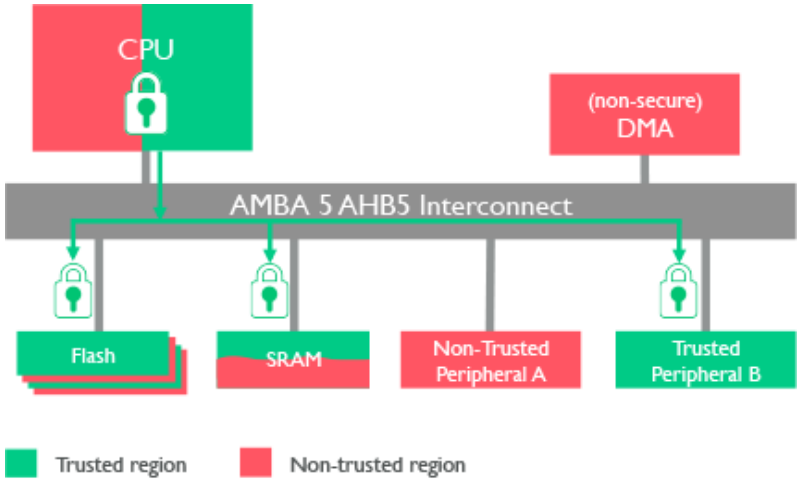
- **Mobile Connect** (Provided by mobile operators) – **GSMA**
  - **Universal log-in** solution by matching the user to their **mobile phone/subscription**

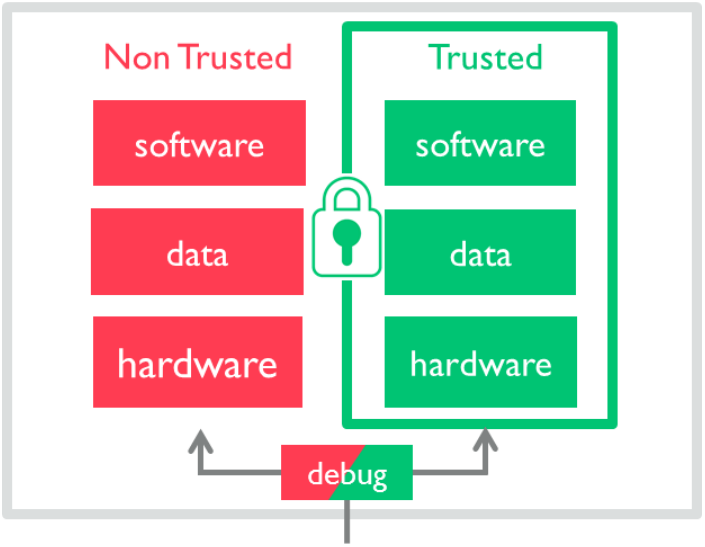


ReCRED's approach – employed technologies

- **Trusted Execution Environment** (TEE)
  - A **secure area** of the main processor of a smart phone that provides **secure storage** and **cryptographic functions**

ARM TRUSTZONE
System Security

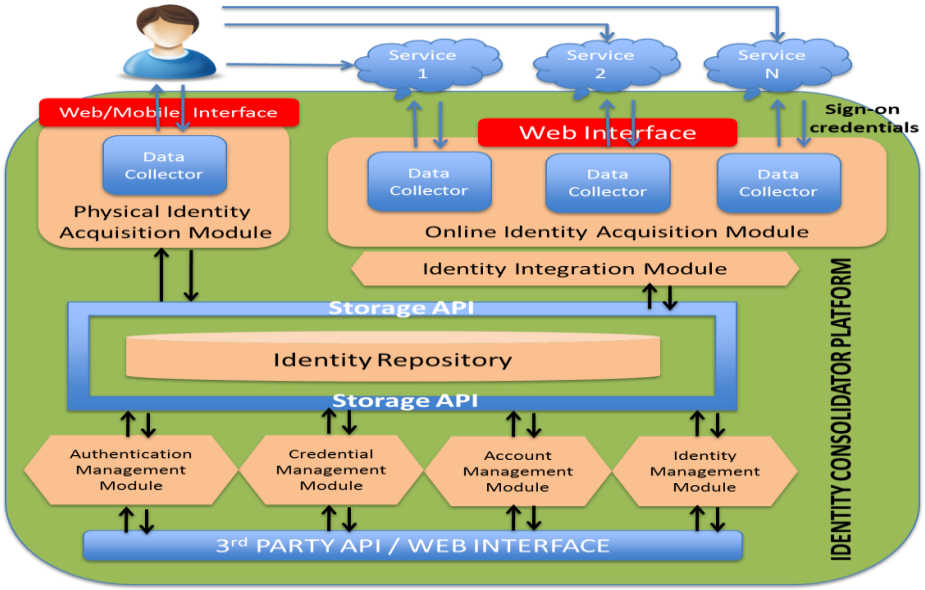




ReCRED's approach – employed technologies

ID Consolidator Credential Management Module

- Identity consolidation
- Real-to-online identity mapping



ReCRED's approach – employed technologies

Attribute-based access control

idemix
pseudonymity for e-transactions

U-Prove

Account-less access through verified identity attributes (e.g., Age, Location, etc.)

Issue cryptographic or anonymous credentials

ReCRED's Innovation

- **Standardized** and **secure** authentication using **FIDO**
- **Multifactor** & **easy to use** **password-less** authentication
  - biometrics and behavioral authentication
- **Single Sign On** (SSO) with **federated identities**
- Enhanced **security** & **privacy** by employing the **crypto functions** & **secure storage** of **TEE**
- **Privacy** of **online identities** using **anonymous credentials**
  - **Unlinkability** & **untraceability**
  - **Attribute-based access control**

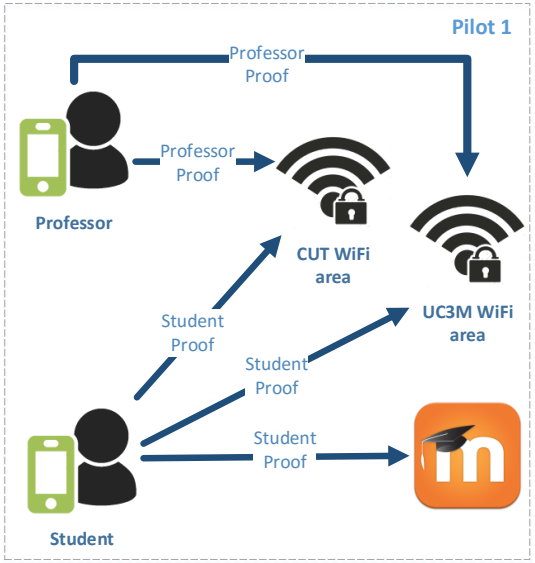
ReCRED's Innovation

- It **anchors** all **access control needs** to **mobile devices** that users **habitually use** and **carry**
- It is aligned with **current technological trends** and **capabilities**
- It offers a **unifying access control framework**
  - **On line** and **physical authentication** and **authorization**
  - Using **off-the-self mobile devices**

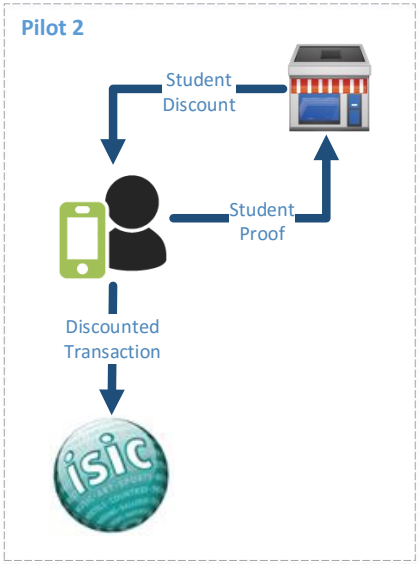
- It is **attainable** and **feasible** to implement in the existing products

ReCRED's pilots

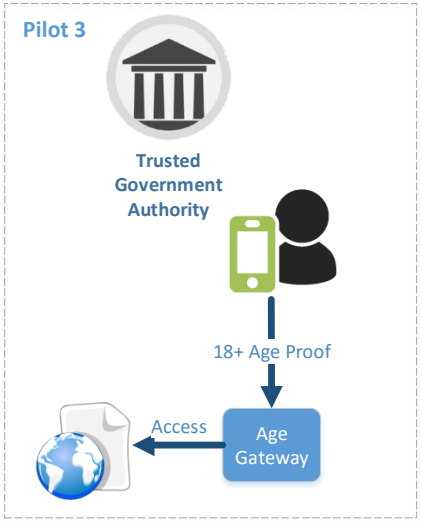
Pilot 1: Device-centric campus WiFi and web services access control



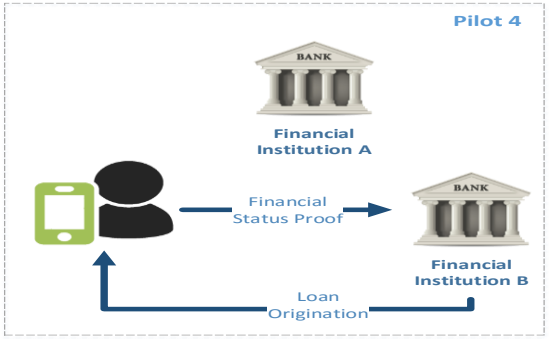
Pilot 2: Student authentication and offers



Pilot 3: Attribute-based age verification online gateway



Pilot 4: Financial services – microloan origination



ReCRED project

is partially an outcome of

Research & Development

in the Field of Security and Privacy

Before R&D !


Hope
test
holidays
technology
LEADERSHIP
GUIDANCE
SCHOOL
STUDY
ASSIGNMENT
INTELLIGENCE
FOCUS
EXPERIENCE
LECTURER
COLLEGE
dorm
IDENTITY
HOBBY
SKILLS
challenge
YOUNG
pressure
LEARN
tuition
LOANS
AWARDS
commitment
dedication
scholarship
FRIENDSHIP
SUCCESS
Job
FUN
EDUCATION
FUTURE
INDEPENDENCE
SOCIAL
hardwork
DREAMS
achievement
OPPORTUNITIES
SPORTS
CREDIBILITY
FREEDOM
UNIVERSITY
hardWORK
class
Relationship
YOUTH
GOALS
occupation
GRADUATION
INNOCENCE
smart
Laboratory
extracurricular
COMPETITION
teacher
Ambition
EMPLOYMENT
books
mentor
WORK
RESEARCH
Students

A few words about us …

- University of Piraeus, Greece
- School of Information and Communication Technologies
- Department of Digital Systems
- System Security Laboratory founded in 2008
- Research, Development & Education
  - systems security, network security
  - computer security, forensics
  - risk analysis & management

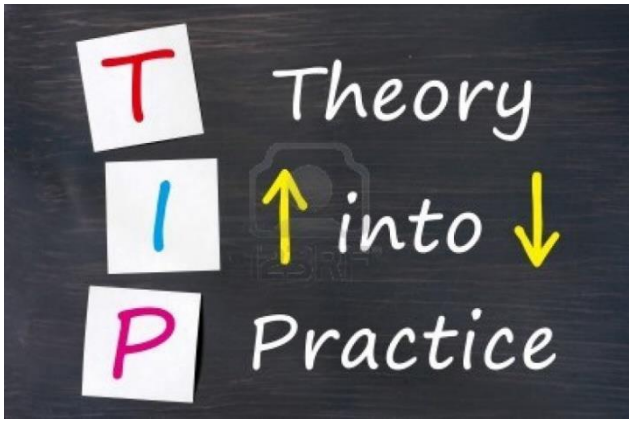
- MSc course on "Digital Systems Security" since 2009

What we do for education

- **Undergraduate studies ….**
  - **Security Policies and Security Management**
  - **Information Systems Security**
  - **Network Security**
  - **Cryptography**
  - **Mobile, wireless network security**
  - **Privacy enhancing technologies**
  - **Bachelor Thesis**

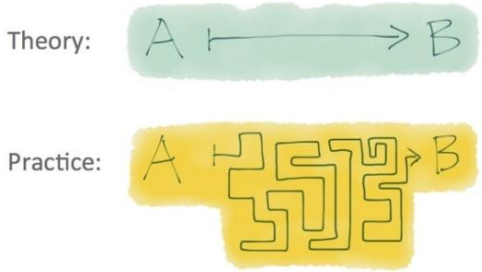
What we do for education

- **Postgraduate studies in Digital Systems Security**
- **1st semester**
  - **Security Management**
  - **Applied Cryptography**
  - **Information Systems Security**
  - **Network Security**
  - **Security Assessment and Vulnerability Exploitation**



What we do for education

- **Postgraduate studies in Digital Systems Security**
- **2nd semester**
  - **Privacy Enhancing Technologies**
  - **Mobile Internet Security**
  - **Digital Forensics and Web Security**
  - **Advanced Security Technologies**
  - **Legal Aspects of Security**



What we do for education

- **Postgraduate studies in Digital Systems Security**
- **3rd semester**
  - **Master Thesis**

  - **ISO 27001**
  - **Certified Information Security Manager (CISM)**
  - **…..**

Next, my colleagues are going to present …

- **ROPInjector:** Using Return Oriented Programming for Polymorphism and Antivirus Evasion

- **(U)SimMonitor:** A New Malware that Compromises the Security of Cellular Technology and Allows Security Evaluation

- Perform effective **command injection** attacks like Mr. Robot

Σας ευχαριστώ !

Χρήστος Ξενάκης

Εργαστήριο Ασφάλειας Συστημάτων
Τμήμα Ψηφιακών Συστημάτων

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