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Private user-centric management of electronic services in smart communities

Antonio Robles González

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PhD Dissertation

**PRIVATE USER-CENTRIC MANAGEMENT
OF ELECTRONIC SERVICES
IN SMART COMMUNITIES**

A DISSERTATION

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Doctoral thesis by:

Antonio Robles González

Thesis advisor:

Dr. Javier Parra Arnau

Thesis co-advisor:

Prof. Dr. Patricia Arias Cabarcos

SISCOM (Smart Services for Information Systems and Communication Networks)

Department of Network Engineering

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PRIVATE USER-CENTRIC MANAGEMENT OF ELECTRONIC SERVICES IN SMART COMMUNITIES

Antonio Robles González, 28 June 2023

Errata:

Page XIX:

In Figure 1. the reference [1] must be [16]. See below the errata for page 13.

Page 10:

The reference: *Section 0* must be *Section 4.5*.

Page 13:

The reference [1] in the title of Figure 1 must be [16], thus becoming

Figure 1. Formalized LINDDUN steps [16]. Accordingly in the list of figures on page XIX.

Page 14:

The reference in *LINDDUN-related publication [27]* must be *LINDDUN-related publication [26]*.

Page 18:

Table 1 includes errata referencing literature to the bibliography numbering starting on page 127.

Work	Title	Author(s) and Ref.	Year	(sub-) benefits (criteria)/categories	Authentication categories/schemes	Results
UDS	Paper: The Quest to Replace Passwords: A Framework for Comparative Evaluation of Web Authentication Schemes	Bonneau et al. [20]	2012	25/UDS	10/9 (35)	Usability, deployability and security benefits are applied for evaluation. Fewer security benefits with privacy aspect are considered. In the published paper nine authentication categories are considered.
	EXTENDED Version: Technical Report: The Quest to Replace Passwords: A Framework for Comparative Evaluation of Web Authentication Schemes	Bonneau et al. [49]	2012	25/UDS	10/35	See comment above. In the EXTENDED Version 35 Authentication schemes are evaluated.
UDS extension	Supporting Decision Makers in Choosing Suitable Authentication Schemes	Mayer et al. [21]	2016	63/UDS	11/45	The authors in ACCESS ⁵ [21] offer an expert based knowledge decision support system. They group the authentication schemes into thirteen categories, but the categories 2FA (only with Keystroke Dynamics and Password) and motion-based (only with KinWrite, writing in space a password) combine in both schemes two categories used in Bonneau [1], thus the remaining categories are 11 too.
	The Quest to Replace Passwords Revisited Rating Authentication Schemes	Zimmerman et al. [43]	2018	25/UDS	10-12/85	Usability, deployability and security benefits are applied for evaluation. Privacy is not considered. Present results in ACCESS ⁵ [21], an online assess tool for authentication scheme with extended UDS benefits.
	The password is dead, long live the password – A laboratory study on user perceptions of authentication schemes	Zimmerman et al. [44]	2020	48/UDS	5/12	Focused on usability, deployability and security evaluation. Privacy is not considered.
Other related frameworks	Generic Multimodels-Based Approach for the Analysis of Usability and Security of Authentication Mechanisms	Broders et al. [23]	2020	9/US	2/2	Model-based on user tasks extended with threats and effects on the tasks. The focus is on security and usability. Privacy is not considered.
	Comparative Analysis and Framework Evaluating Web Single Sign-on Systems	Alaca et al. [22]	2020	14/UDSP	1/14	The focus is on usability, deployability, security and fewer on privacy aspects.
Our work: UDSP framework	Privacy-Centered Authentication: a new Framework and Analysis.	Robles-González et al. [27]	2023	32/UDSP	11/38	The UDS framework is extended with privacy benefits, the biometrics are extended and a privacy-based evaluation is done.

Table 1: Comparison of evaluation frameworks for authentication schemes with the UDSP framework.

Page 23:

In Figure 2. UML use case of user demanding service access. the acronym *Ucs* must be *UCs*.

Page 27:

In the fourth paragraph, at the end of (RFC2289) a bracket must be added, thus becoming (*e.g. S/Key (Lesli Lampert), OTP (RFC2289)*).

Page 28:

In line 6 of the first paragraph of page 28 *Amethod* must be *A-Method*.

Page 54:

The reference *Section 0* must be *Section 4.5*

Page 59:

In the last paragraph at the end of page 59 the reference [8] must be [20] (two times).

Page 62:

In the third paragraph *article 25 of [25]*) must be without the round bracket *article 25 of [25]*

Page 68:

For **PB4** bold is not needed.

Page 72:

For **S5**, **S6** and **S7** bold is not needed.

Page 73

The last sentence in the introduction of section 4.5 must be:

Finally, in section 4.5.3 the revealed privacy threats are categorized and in section 4.5.4 implementation approaches for the mitigation of fundamental threats are presented.

Page 89:

Trustworthiness (T), **Trustworthiness**, and **smart community service** must not be in bold.

Page 92:

In Table 1 row 3 / column 3 the content must be:

obligation to include a real user identity (UID), e.g. login

Page 94:

In the paragraph starting with “Right to have privacy (RTHP)” the word *having* must be *have*.

Page 95:

The paragraph starting with the text *Revocable is defined as the capability* must be *Revocable is defined as the user capability*.

Page 115:

Table 17: List of acronyms must include: UID = User Identity / User Identifier.