LINDDUN

PRIVACY THREAT MODELING

Privacy knowledge *(tables)*

This document contains:

- the **LINDDUN mapping template** (*step 2*)
- the **LINDDUN mitigation strategies taxonomy** and corresponding **mapping table** (*step 5*)
- the **LINDDUN solutions table** (*step 6*)

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Abstract

This document contains the tables that LINDDUN provides to support the analyst with the required privacy knowledge in each of the LINDDUN steps.

More specifically, this document contains:

- the **LINDDUN mapping template** (used in *step 2*) to map DFD elements to LINDDUN threat categories
- the **LINDDUN mitigation strategies taxonomy** and corresponding **mitigation strategies mapping table** (used in *step 5*) to ease the translation of threats to the solution space
- the **LINDDUN solutions table** (used in *step 6*) to select to most appropriate privacy enhancing technologies (PETs) that correspond to the selected mitigation strategies

We refer the reader to the LINDDUN website for the most recent LINDDUN threat catalog (as required privacy knowledge in step 3) and other information on the methodology.

LINDDUN - mapping template (step 2)

	L	I	N	D	D	U	N
Data store	X	X	X	X	X		X
Data flow	X	X	X	X	X		X
Process	X	X	X	X	X		X
Entity	X	X				X	

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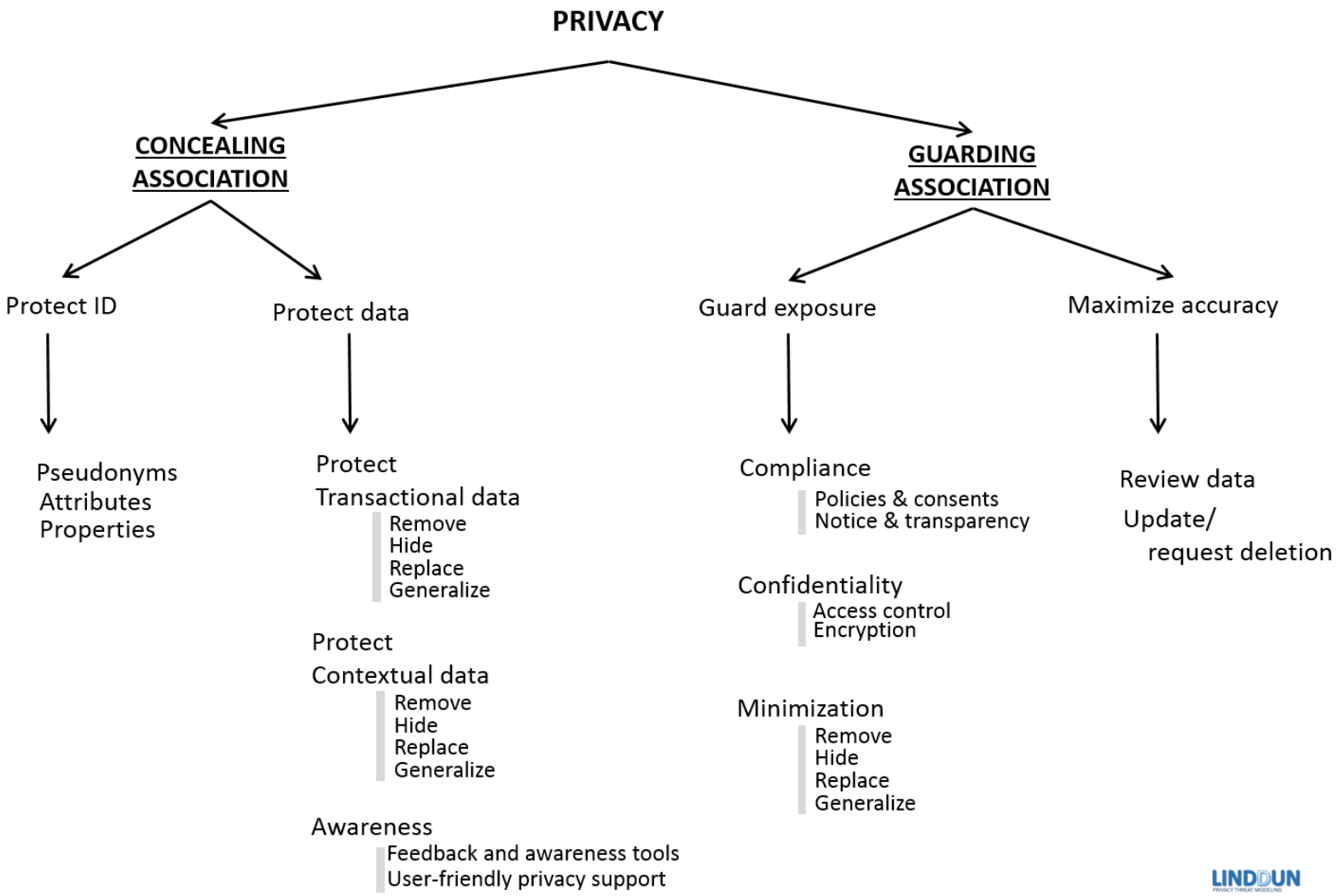
LINDDUN - mitigation strategies taxonomy (step 5)



LINDDUN - mitigation strategies mapping (step 5)

Mitigation Strategy	LINDDUN Threat Tree
Protect ID	L_e, I_e
Protect data	
Transactional data	L_DF1, I_DF1
Contextual data	L_DF2, I_DF2, D_DF, NR_DF
Awareness	U_1
Guard exposure	
Compliance	NC
confidentiality	ID_DS, NR_DS, *_P
Minimization	L_DS, I_DS, D_DS
Maximize accuracy	
Review data	U_2
Update/request deletion	NR_DS3

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LINDDUN – privacy enhancing solutions (step 6)

Mitigation Strategy					Privacy Enhancing Techniques (PETs)
Concealing association	**Protect ID**	Pseudonyms			Privacy enhancing identity management system [HBC+04], User-controlled identity management system [CPHH02]
		Attributes			Privacy preserving biometrics [STP09], Private authentication [AF04, ABB+04]
		Properties			Anonymous credentials (single show [BC93], multishow [CL04])
	Protect data	Transactional data	Remove		(see awareness to minimize information sharing)
			Hide	Data-flow specific	Multi-party computation (Secure function evaluation) [Yao82, NN01], Anonymous buyerseller watermarking protocol [DBPP09]
				General	see guard exposure - Confidentiality - encryption
			Replace		/
			Generalize		see guard exposure - minimization - generalize
		Contextual data	Remove		Mix-networks (1981) [Cha81], , ISDN-mixes [PPW91], Onion Routing (1996) [GRS96],Tor (2004) [DMS04])
			Hide	General	Crowds (1998) [RR98], Low-latency communication (Freedom Network (1999-2001) [BGS01], Java Anon Proxy (JAP) (2000) [BFK00]
				Undetectability	Steganography [AP98] , Covert communication [MNCM03], Spread spectrum [KM01]
				Non-repudiation	Deniable authentication [Nao02], Off-the-record messaging [BGB04]
			Replace		Mixmaster Type 2 (1994) [Mixa],Mixminion Type 3 (2003) [Mixb]) Single proxy (90s) (Penet pseudonymous remailer (1993-1996), Anonymizer, SafeWeb), anonymous Remailer (Cipherpunk Type 0, Type 1 [Bac],
			Generalize	Undetectability	dummy traffic, DC-networks (1985) [Cha85, Cha88]
		Awareness	Feedback and awareness tools		Feedback tools for user privacy awareness [LHDL04, PK09, LBW08]
			User-friendly privacy support		Data removal tools (spyware removal, browser cleaning tools, activity traces eraser,harddisk data eraser)
Guarding association	**Guard exposure**	Compliance	Policies and Consents		Policy communication (P3P [W3C]), Policy enforcement (XACML [oo], EPAL [IBM])
			Notice and Transparency		/
		Confidentiality	Encryption		Symmetric key & public key encryption [MOV97], Deniable encryption [Nao02],Homomorphic encryption [FG07] , Verifiable encryption [CD98]
			Access control		Context-based access control [GMPT01], Privacy-aware access control [CF08, ACK+09]
		Minimization	Remove		/
			Hide	Receiver privacy	Private information retrieval [CGKS98], Oblivious transfer [Rab81, Cac98])
				Database privacy	Privacy preserving data mining [VBF+04, Pin02], Searchable encryption [ABC+05],Private search [OS05]
				General	see guard exposure - confidentiality - encryption
			Replace		/
			Generalize		K-anonymity model [Swe02b, Swe02a], l-Diversity [MGKV06]
	Maximize accuracy	Review data			/
		Update/ request deletion			/

LINDDUN – privacy enhancing solutions - References (step 6)

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