

# Privacy Compliance in Software Development: A Guide to Implementing the LGPD Principles Extended Abstract – CTDSI/CTCCSI 2023

Lucas Dalle Rocha<sup>1</sup>, Edna Dias Canedo (Advisor)<sup>1</sup>

<sup>1</sup>Department of Computer Science, University of Brasília (UnB)  
P.O. Box 4466, Brasília, DF, Zip Code 70910-900, Brazil

lucasdalle@live.com, ednacanedo@unb.br

**Abstract.** *This study examines the need for compliance with Brazil's General Data Protection Law (LGPD) as data breaches become more common with the widespread use of digital applications. The study identified obstacles to implementing LGPD principles and proposes a reference guide to assist ICT professionals. Surveying professionals from various software development fields, the study found that participants struggled with at least one LGPD principle, often due to a lack of knowledge about implementation techniques. Therefore, the proposed guide aims to improve developers' understanding of techniques to ensure compliance with the LGPD.*

## 1. Introduction

In the last decade, mishandling of personal data has caused numerous breaches [Cheng et al. 2017]. Developers must prioritize data protection in the initial stages of a project to reduce conflicts between security, reliability, and performance [Alkubaisy et al. 2021]. The Brazilian General Data Protection Law (LGPD) sanctions personal data protection measures [Brasil 2018], but many developers and organizations lack knowledge and initiatives to ensure privacy protection implementation [Alkubaisy et al. 2021].

This work summarizes the assignment made for SAC 2023 [Rocha et al. 2023a], that is, investigates the main points for developers to comply with the LGPD and provides a guide to help organizations guide their developers.

## 2. Related Works and Theme Overview

The guide aims to solve issues faced by developers while applying the principles of the General Data Protection Law (LGPD) and also takes into consideration the importance of privacy and data protection in preventing recurring data breaches [Cheng et al. 2017].

### 2.1. Guidelines and Principles

Data privacy is crucial and requires frameworks to ensure it, as highlighted in literature. The proposed study by Alhazmi et al. [Alhazmi and Arachchilage 2021] is important as it addresses challenges faced by developers in implementing GDPR principles, including a lack of privacy implementation techniques and familiarity. While Okano et al. [Okano et al. 2021] and Canedo et al. [Canedo et al. 2020] propose models to implement LGPD principles in specific scopes, none of them have provided a visual guide for companies.

## **2.2. General Data Protection Law (LGPD)**

The LGPD is a Brazilian law based on the European GDPR that protects personal data and establishes principles for data processing, including anonymization techniques [Novakoski and Napolini 2020]. Its ten principles [Brasil 2018] establishes legally supported data processing operations and their relation are stated in the main work, Section 2 [Rocha et al. 2023a].

## **3. Methodology**

The study aimed to assess compliance with LGPD privacy principles for a proposed scenario, an online web application for e-commerce. It involved developing UML diagrams and surveying software developers of different backgrounds [Rocha et al. 2023a]. The survey was conducted asynchronously, and the results were categorized using grounded theory. Possible solutions were then presented in a visual reference guide.

## **4. Survey**

The survey consisted of 40 questions that addressed participants' profiles and their compliance with LGPD principles. Initial questions focused on participants' background, while the majority on LGPD principles. A pilot survey was conducted with three people to ensure clarity, and their answers were discarded. Responses were categorized and displayed in a graphical scheme. The questions and categorized answers can be found on Zenodo <https://zenodo.org/record/7761038> [Rocha et al. 2023b].

### **4.1. Participants' Profiles**

Concerning the initial questions, most respondents are between 21-25 years old (62.2%), undergraduate students (53.3%), software developers/programmers (64.4%), and have 1-3 (42.2%) or 4-6 (35.6%) years of professional experience. Besides that, 73% of respondents informed that they're aware of the LGPD [Rocha et al. 2023a].

### **4.2. Analysis**

Based on survey results in Zenodo — <https://zenodo.org/record/7761038> [Rocha et al. 2023b] —, participants highlighted difficulties in implementing some principles and identified reasons why it was not carried out. A chart ranking principles by difficulty is also available and, unlike in the work of Alhazmi et al. [Alhazmi and Arachchilage 2021] and using the comparative table between LGPD and GDPR principles in the work of Canedo et al. [Canedo et al. 2020], Adequacy, Purpose, and Data Quality were not the biggest obstacles for software professionals with LGPD.

## **5. Proposed Guide**

The proposed reference guide — <https://zenodo.org/record/7761038> [Rocha et al. 2023b] — aims to help software developers understand LGPD principles by providing legal definitions and implementation techniques, along with examples. The techniques were selected based on survey results and aim to balance the interests of organizations and users, while considering limitations faced by professionals.

## 6. Threats to Validity

The survey was primarily disseminated on LinkedIn, but this could have led to bias. To address this, it was shared in various professional groups on different platforms. Asynchronous survey administration could have led to rushed or uninformed responses, so a disclaimer was added to emphasize that participation is voluntary and anonymous. Also, the sample size was small, so caution should be taken when generalizing the results.

## 7. Conclusion

This work presents a guide for software developers to comply with the General Data Protection Law (LGPD) by identifying the main difficulties through a survey of industry professionals. Results showed that most respondents were aware of LGPD guidelines, but lacked specific implementation techniques, with accountability being the most challenging principle. Future work could involve specialized studies for each stage of software development, and larger sample sizes.

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