

# Password Management Using Bitwarden

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## Abstract

In an era where data breaches and password leaks are increasingly common, managing online credentials securely has become essential. This project explores the use of Bitwarden, a free and open-source password manager that follows modern security practices, including zero-knowledge encryption. The video demonstration walks through the process of account creation, securely storing and generating passwords, browser integration, desktop application features, and encrypted text sharing (refer to the attached screenshots & video in the drive). A real-life breach example using *Have I Been Pwned* highlights the relevance of such tools. The project aligns with OWASP security principles by addressing key vulnerabilities such as weak passwords (A07), broken access control (A01), and security misconfiguration (A05). It aims to promote a secure digital lifestyle through practical, accessible tools.

## Introduction

Many people use the same passwords across multiple websites. This makes them easy targets for hackers, especially during data breaches like the BOAT or Dubsmash leaks, where even my own data was exposed.

Password managers help solve this problem by creating and storing strong, unique passwords for each account. They reduce the risk of hacking and make online life easier.

I chose **Bitwarden** because it is free, open-source, and follows security practices recommended by OWASP. It's simple to use and trusted by many for managing passwords safely.

## 4. Methodology

To explore password management, I used **Bitwarden** and followed these steps:

## 1. Account Creation

I signed up on the Bitwarden website using a strong master password. This is the only password I need to remember, and it secures access to all other saved credentials.

## 2. Browser Extension Installation

I added the Bitwarden extension to my browser, which enables auto-save and auto-fill during website logins.

## 3. Vault Usage

I manually added a login (demo site: [www.ilovepdf.com](http://www.ilovepdf.com)), used Bitwarden's built-in password generator, and saved it to the vault. The vault stores logins, cards, and identities in an organized way.

## 4. Desktop Application

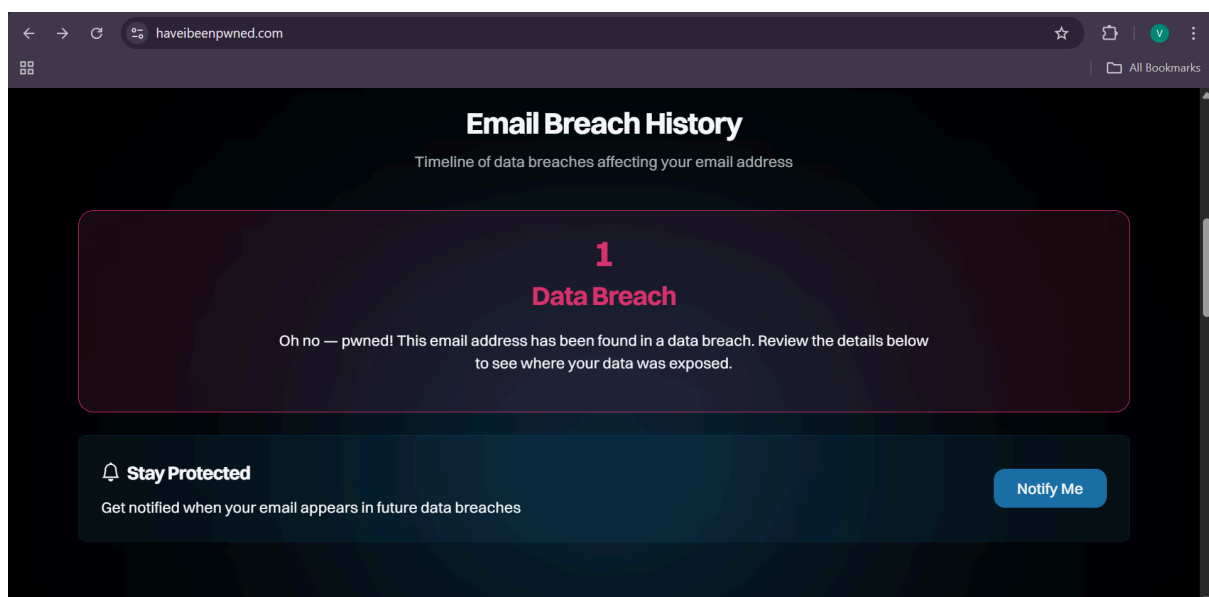
I installed the Bitwarden desktop app. It syncs with the browser and provides access to all stored data.

## 5. Secure Sharing (Send Feature)

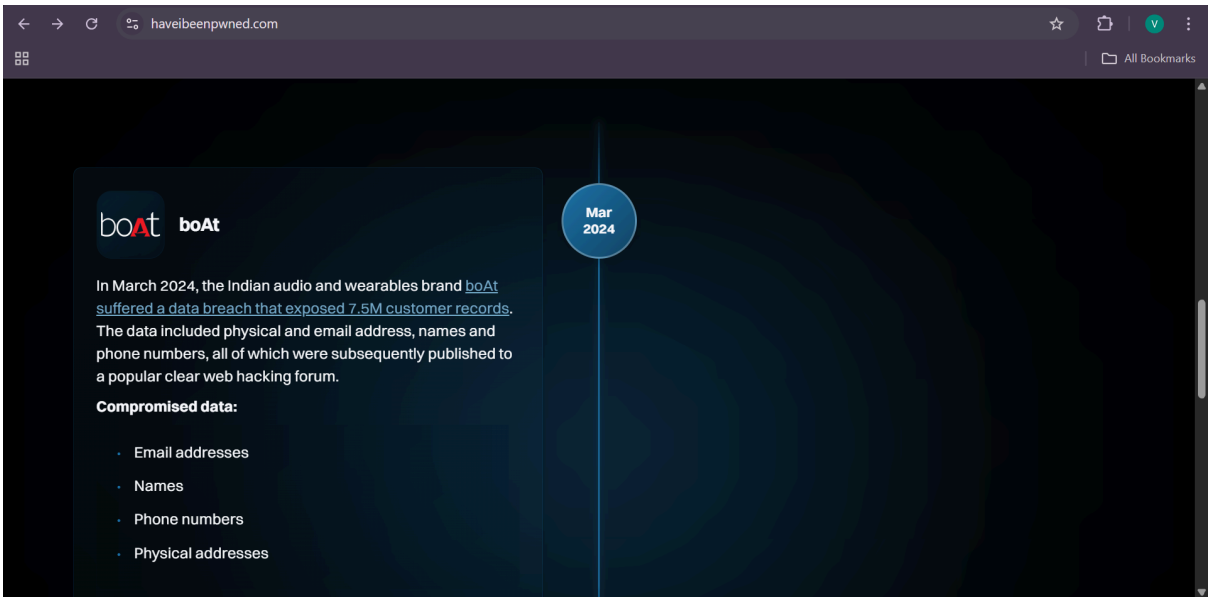
I used the **Bitwarden Send** feature to securely share encrypted text messages. This is useful for safely sharing sensitive info.

## 6. Real-World Breach Check

I visited [haveibeenpwned.com](https://haveibeenpwned.com) to check if my email was exposed in a data breach. It showed breaches linked to the boat company.



**Image:** boatbreach.png – Shows the boAt breach (March 2024).



**Image:** haveibeenpwned.png – Shows the email was found in a breach.

These results highlight how easily personal data can be exposed, and why password managers like Bitwarden are important.

*Note: All passwords used in this demonstration were test passwords created for learning purposes only.*

**5. Screenshots (Include as a Separate Folder in drive)**

Figure no:	Filenames	Caption
Fig1	creating_master_password.PNG	Figure 1: Bitwarden registration & master password setup
Fig2	desktop_version_new_item_creation .PNG	Figure 2: Adding a new login to Bitwarden vault

Fig3	password_generator_feature.PNG	Figure 3: Using Bitwarden's password generator
Fig4	browser_extention.png	Figure 4: Bitwarden browser extension in action
Fig5	desktop_homescreen.PNG	Figure 5: Bitwarden desktop app dashboard
Fig6	secure_text_share_feature.PNG	Figure 6: Secure note sharing screen
Fig7	haveibeenspwaned.png	Figure 7: haveibeenpwned result (email redacted)

### *Extra Images in drive*

Purpose	Filename
Bitwarden vault view	bitwarden_vault.PNG
Secure text view	secure_text_view_feature.PNG
Website login testing	wesbsite_testing.png
Password assistance section	website_password_assistance.png
Chrome import demo	import_data_from_chrome.PNG

Using Bitwarden on PDF tool site	ilovemypdf_vault_screen.PNG
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## 6. Security Mapping (OWASP)

OWASP Category: A07 – Identification & Authentication Failures

- Problem: Weak or common passwords
- Bitwarden Solution: Strong password generator with complexity rules

OWASP Category: A05 – Security Misconfiguration

- Problem: Storing credentials in insecure locations
- Bitwarden Solution: End-to-end encrypted, cloud-based vault

OWASP Category: A01 – Broken Access Control

- Problem: Credential reuse across multiple apps
- Bitwarden Solution: Unique passwords for each site, managed easily

OWASP Category: A02 – Cryptographic Failures

- Problem: Poor encryption during storage or transmission
- Bitwarden Solution: Zero-knowledge encryption and secure sync

OWASP Category: A04 – Insecure Design

- Problem: Unsafe manual credential management
- Bitwarden Solution: Secure vault with folders and sharing features

## OWASP Category: A06 – Vulnerable & Outdated Components

- Problem: Using outdated or unsafe tools
- Bitwarden Solution: Open-source, regularly updated manager

## 7. Findings

### Security Features

- Bitwarden provides strong password generation, encrypted storage, and autofill. It also supports secure sharing.

### Limitations of Free Plan

- The free version lacks advanced features like emergency access, hardware-based two-factor authentication, and group sharing, which are only available in the premium or family plans.

### Privacy and Trust

- Bitwarden follows a zero-knowledge encryption model, ensuring that even the company cannot access user data. Its open-source nature and regular independent audits contribute to its transparency and strong reputation in the security community.

## 8. Conclusion

Bitwarden is a reliable and secure password manager that helps users create, store, and manage strong passwords safely. Its zero-knowledge encryption and open-source approach build trust, while the free version offers enough features for basic needs. However, to unlock its full potential, users may need to upgrade to a paid plan. Overall, Bitwarden is a smart choice for improving personal digital security.

## 9. References

1. <https://bitwarden.com>
2. <https://owasp.org/Top10/>
3. <https://haveibeenpwned.com/>