

Architectures for IoT Notifications: from disruption to benefit

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1. Introduction

The importance of notifications in our daily lives is growing. However, their presence is not always perceived as a benefit by users: various factors influence the reaction and the disruption of recipients.

2. Goal

The main goal of the present work regards the **design and the development of new IoT architectures able to enhance user experience with IoT notifications**, reducing disruption caused by them.

Two different approaches were adopted

1. At the **distribution level**: notifications are intercepted and then systems decide if, when, and how to show them

Result: **Smart Notification System [1]**

2. at the **design level**: notifications are designed with the aim of reducing user disruption.

Result: **XDN framework [2]**

3. Smart Notification System

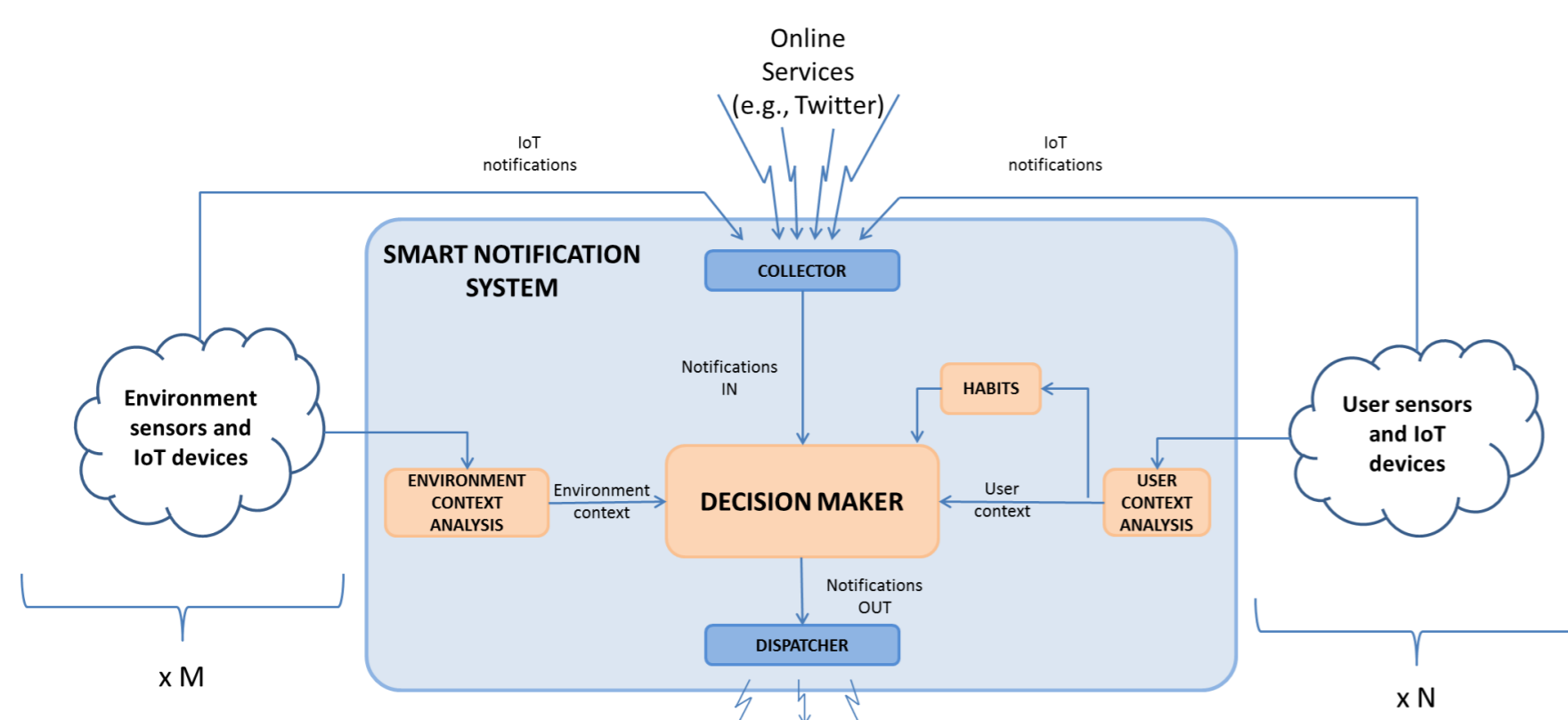


Fig. 1: Architecture of the Smart Notification System

The proposed Smart Notification System (Fig. 1) uses **machine learning algorithms** (Decision Tree, Naïve Bayes and SVM) to adequately manage incoming notifications. According to context awareness and user habits, the system decides:

- a) **who** should receive an incoming notification;
- b) **what** is the best moment to show the notification to the chosen user(s);
- c) **on which device(s)** the chosen user(s) should receive the notification;
- d) which is the **best way** to notify the incoming notification.

4. XDN framework

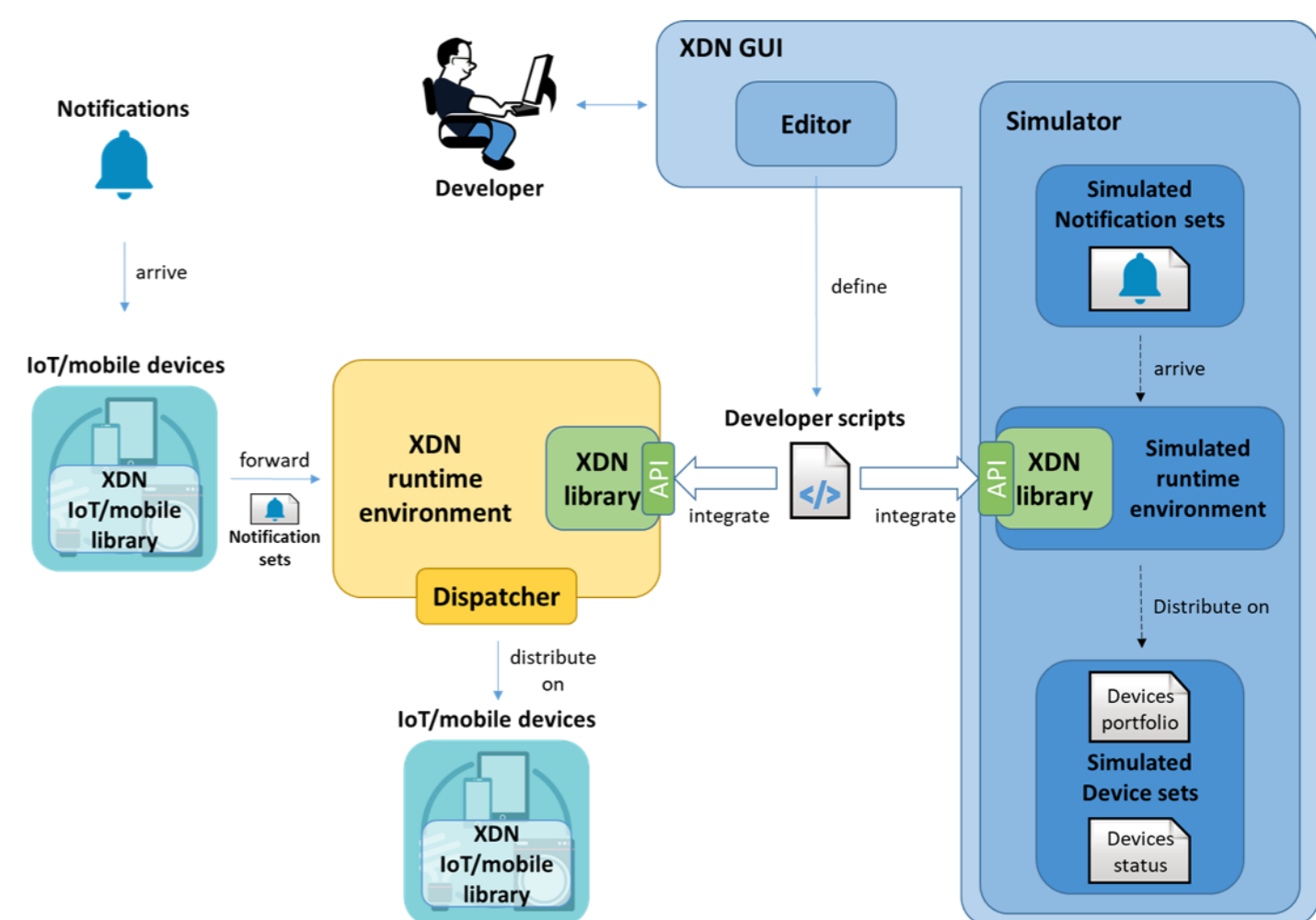


Fig. 2: Architecture of the XDN framework

The XDN (Cross Device Notification) framework (Fig. 2) aims at **assisting developers in designing, implementing and testing personalized notifications** to be distributed among ad-hoc networks of IoT/mobile devices using a **cross-device** approach.

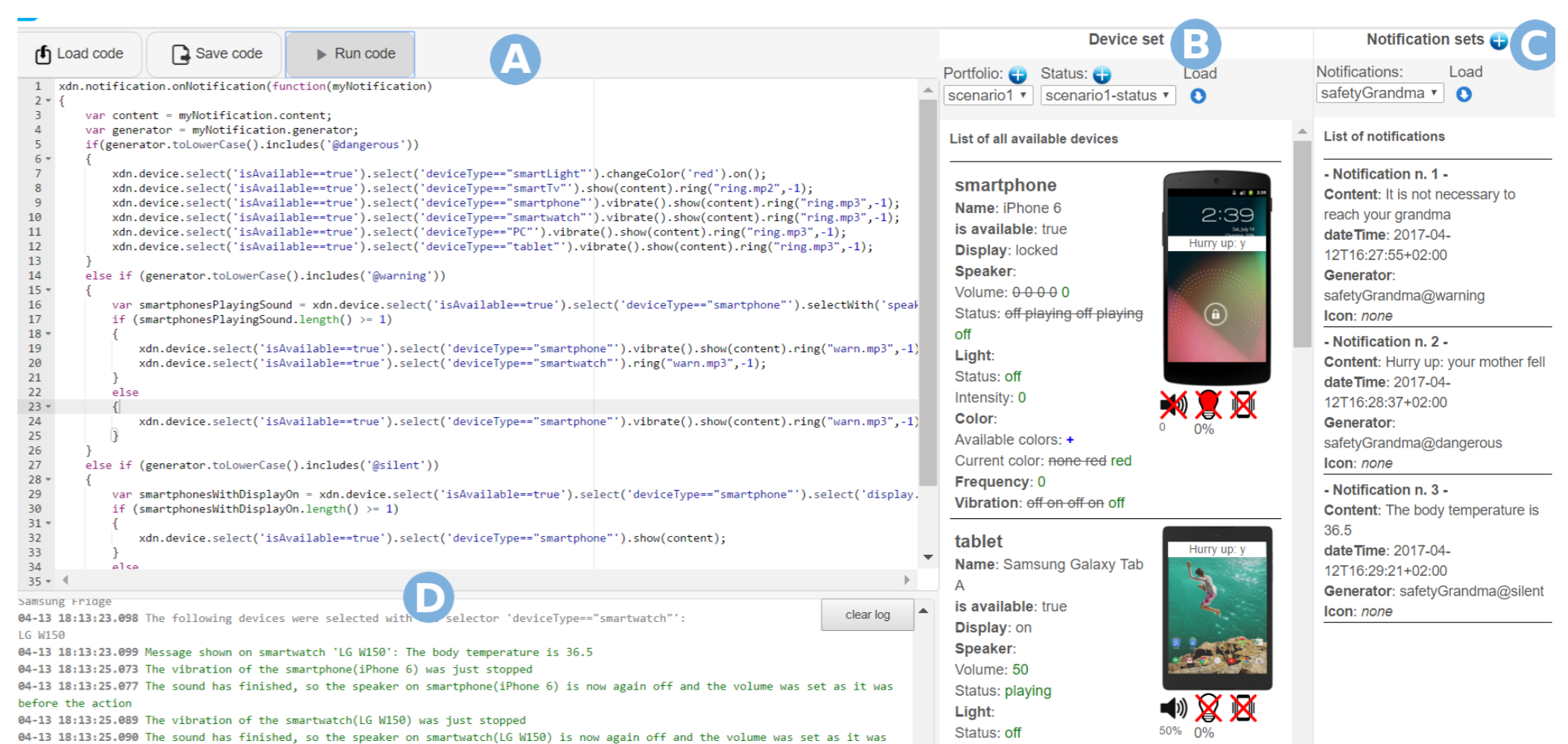


Fig. 3: Screenshot of the XDN GUI

5. Results and conclusions

Both frameworks were tested within realistic scenarios: the analysis of the assessment demonstrates that both solutions are promising technologies.

6. References

1. Corno, Fulvio; De Russis, Luigi; Montanaro, Teodoro (2015) *A Context and User Aware Smart Notification System*. In: IEEE 2nd World Forum on Internet of Things (WF-IoT), Milan, Italy, 14-16 December 2015. pp. 645-651
2. Corno, Fulvio; De Russis, Luigi; Montanaro, Teodoro (2017) *XDN: Cross-Device Framework for Custom Notifications Management*. In: The 9th ACM SIGCHI Symposium on Engineering Interactive Computing Systems, Lisbon (Portugal), June 26-29, 2017. pp. 57-62