Introduction

Nowadays, medical appointments dates and hours are written on small cards and useful information is transmitted orally. However, cards can be lost and this information forgotten. If patients choose to write it all down in their electronic agenda, the issue of privacy arises. Indeed, these calendars are synchronized on servers abroad and often shared. So, the patient is no longer in control of his data. Therefore, a secure medical appointment system seemed important for Switzerland. This project, Firecard, shows the necessary technical basis and demonstrates the feasibility of doing so.

Methods

A literature search was carried to determine whether such projects have been done before. This was followed by research into the semantics of FHIR and the study of possible data flows. This then allows the classification of data according to their sensitivity from a confidentiality point of view. A discussion with a member of MIDATA, as well as with application developers from the BFH's I4MI Institute, also provided useful information for the orientation of the project. From this body of knowledge, the architecture of the project has been made, as well as the choices in terms of confidentiality.

Results

It seemed that it does not exist a project using FHIR as an appointment manager. Such a system must be secure and should not share sensitive data with third parties.
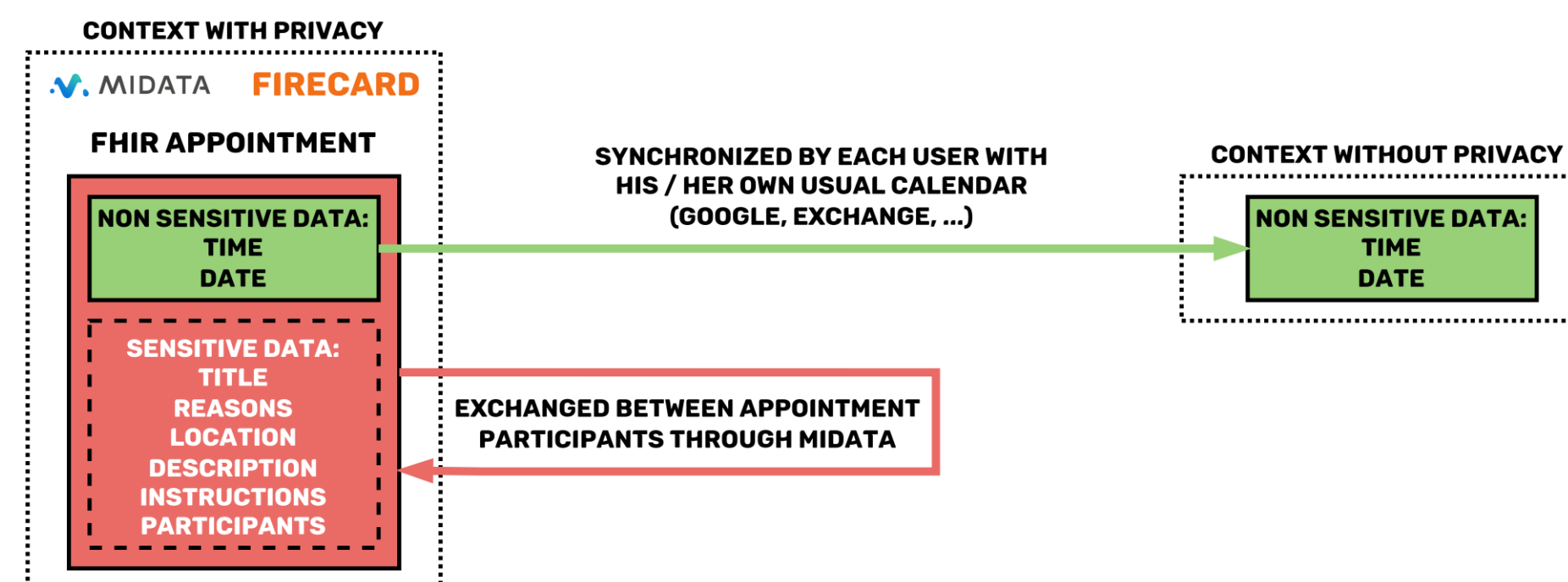

Figure 1: Diagram showing which data are shared in which context.

As show on figure 1, sensitive data for a medical appointment are: title, description, participants, location, reason, and instructions. All these data are stored securely and encrypted on MIDATA, and can be read on Firecard, a mobile application. The appointments can be exported to a usual calendar, but without these data, thus just the date and time.

There are many actors involved. The data flows through several of them. To understand how the different systems interact, here is a sequence diagram of what happens when a patient creates an appointment with Firecard and when he or she receives an invitation. Of course, a physician can also send appointments from his practice management software connected to MIDATA.
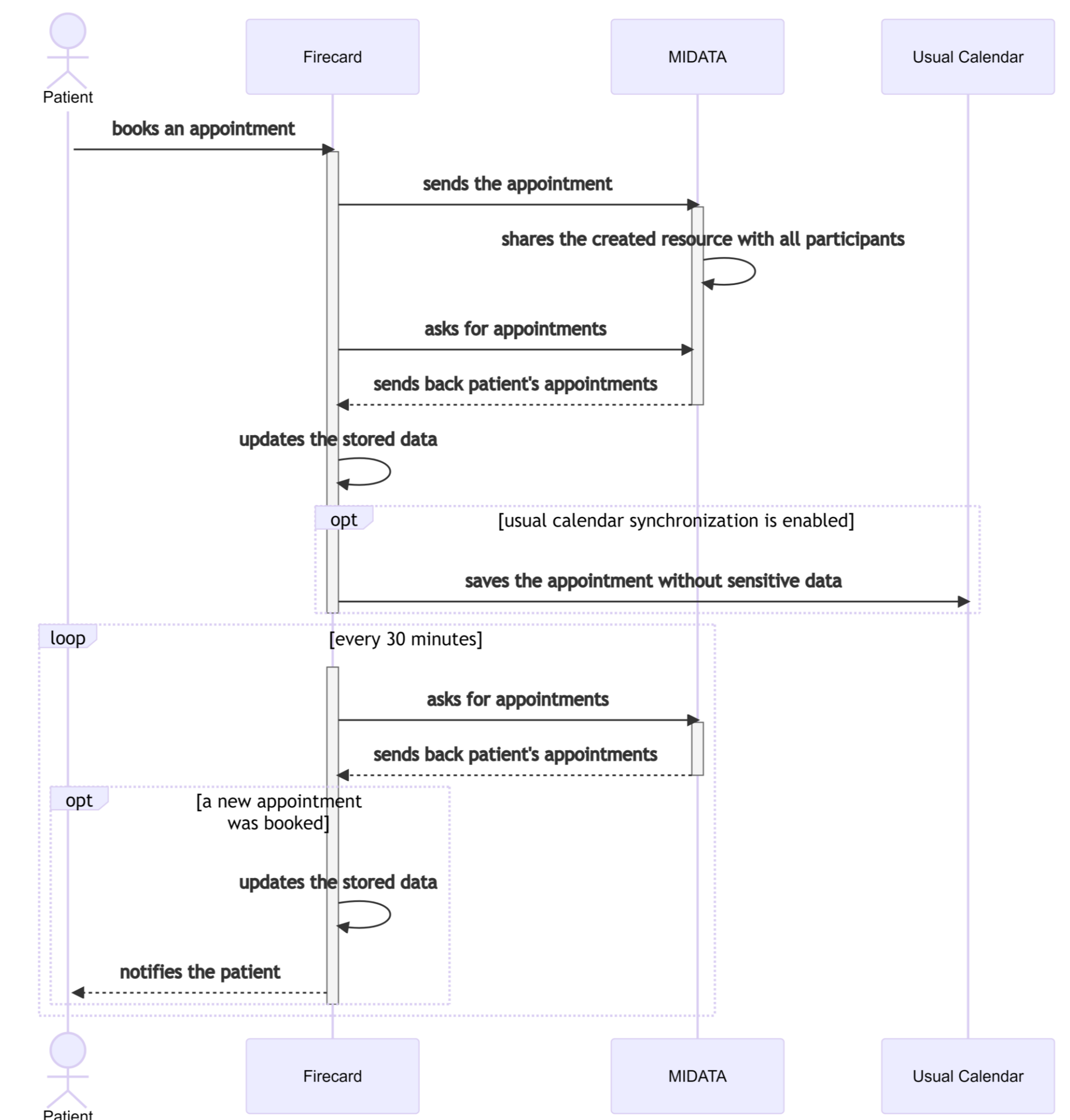

Figure 2: Sequence diagram of the Firecard project (without physician).

Discussion

Firecard demonstrates that it is entirely possible to create a secure and privacy-friendly medical appointment system, based on a secure cloud. And this, without sacrificing the convenience of a conventional calendar. For the first time, FHIR shows its flexibility and power to be used in such kinds of applications, even if some shortcomings exist due to the youth of the standard. I am confident that the project will be taken up and used in practice because we have addressed an issue that will arise in the years to come.

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A Medical Cloud Calendar with Privacy

▶ Bachelor Thesis 2022   Degree Programme Medical Informatics

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