

Interfacing with Felica cards from *nix

Lars Kotthoff
lars@larsko.org

12th July 2008

Outline

① Introduction

Felica

PC Interface

② libpasori

Introduction

Interface

③ ViewSuica

Requirements

Architecture

Implementation

④ Demonstration

⑤ Conclusion

Problems

Felica

- RFID IC card developed by Sony
- cards are completely passive, activated and powered by external reader
- can store encrypted data which requires authentication to access
- used mostly for electronic money, e.g. Suica/Pasmo
- used in Hong Kong, China, Japan. . .

Hardware

- built-in reader/writer in Sony VAIO laptops
- external USB reader/writer available from Sony and third-party vendors



Pasori RC-S320

Software

- Windows software to read the (unencrypted) data stored on the card and make internet purchases provided by Sony



利用年月日	入場駅	出場駅	残額	メモ
2004/11/06	JR東 新宿	JR東 渋谷	¥1,100	
2004/11/06	JR東 渋谷	JR東 新宿	¥1,250	
2004/10/31	JR東 渋谷		¥1,400	精算
2004/10/31	JR東 渋谷	JR東 新宿	¥1,550	
2004/10/24	JR東 新宿	JR東 渋谷	¥1,700	
2004/10/24	JR東 渋谷	JR東 新宿	¥1,850	
2004/10/10	JR東 新宿	JR東 渋谷	¥2,000	
2004/10/10	JR東 渋谷	JR東 新宿	¥2,150	
2004/09/12	臨海 東京	臨海 大井町	¥2,300	レポート
2004/09/12	臨海 大井町	臨海 東京	¥2,560	レポート
2004/09/10	臨海 大井町	臨海 天王洲アイル	¥2,820	
2004/09/07	JR東 渋谷	JR東 新宿	¥3,020	
2004/08/19	JR東 品川		¥3,170	現金チャージ
2004/08/19	JR東 渋谷	JR東 品川	¥170	
2004/08/12	JR東 新小岩	JR東 秋葉原	¥330	
2004/08/12	JR東 秋葉原	JR東 新小岩	¥490	
2004/08/01	JR東 新宿	JR東 千駄ヶ谷	¥650	
2004/08/01	JR東 渋谷	JR東 新宿	¥780	
2004/07/27	JR東 渋谷	JR東 新宿	¥930	
2004/07/13	JR東 渋谷	JR東 新宿	¥1,080	

SFCard Viewer

3rd-party software

- IC SFCard Fan project
 - documentation
 - various tools to access various Felica cards
 - webservice to resolve the station/line codes stored on Suica/Pasmo
- it's all in Japanese
- all the software is for Windows

Enter libpasori

libpasori to the rescue

- library to interface with the Pasori USB reader
- works with Linux, BSD, Solaris, Windows
- sample applications
- links to other projects
 - card viewer for MAC OS X
 - video of somebody using a Felica card as a key

Interface

- `libpasori` provides basic functions to interface with the reader and card
 - poll the reader for a card
 - read/write
 - send/receive raw commands
- very little documentation
- lots of magic bits and bytes to set to make the functions do what you want

ViewSuica

Requirements

- provide the same functionality as the reader application provided by Sony
- work on as many platforms as possible. . .
- . . . with special focus on Linux

Architecture

- application needs to interface with
 - `libpasori` to access the card
 - IC SFCard fan webservice to resolve the codes stored on the card to names
- abstraction from the low-level details
- graphical user interface

Implementation language: Ruby

- easy to write a module to talk to libpasori
- easy to call webservices
- easy to write GUIs
- available for many platforms

pasori-ruby

- Ruby module to access the `libpasori` functions
- encapsulation of the gory details and conversion of the integer array returned by the `read` function into a map
- provides methods to connect/disconnect a reader and read the current value and the history (the last 20 transactions)

GUI

- written in QT4
 - GUI designed with Trolltechs QtDesigner
 - Ruby code for the GUI is generated from the XML description generated by QtDesigner
 - the actual application subclasses the generated class and implements the actual methods
- display the information stored on the card and provide a button to update it

Webservice

- IC SFCard Fan database provides WSDL
- simply tell the Ruby SOAP implementation to process the WSDL and off you go
- resolves the codes in a background thread

Demonstration

Problems

- only little (Japanese) documentation
- IC SFCard Fan DB WSDL fails validation because of the declared namespace
- Qt and Ruby threads don't play nicely together
 - all Qt stuff happens in C – other Ruby threads don't get a chance to run
 - attach a timer which fires periodically to give Ruby a chance to schedule other threads

Conclusion

- finally an application to read Suica/Pasmo in Linux
- not perfect, but you get the basic functionality
- nice start to Felica hacking

Resources

IC SFCard Fan [http://www014.upp.so-net.ne.jp/
SFCardFan/index.html](http://www014.upp.so-net.ne.jp/SFCardFan/index.html)

[libpasori](http://libpasori.sourceforge.jp/) <http://libpasori.sourceforge.jp/>

[Felica/Suica/Pasmo](http://ja.wikipedia.org/) <http://ja.wikipedia.org/>

Questions, anyone?