

Project and Laboratory on Communication System

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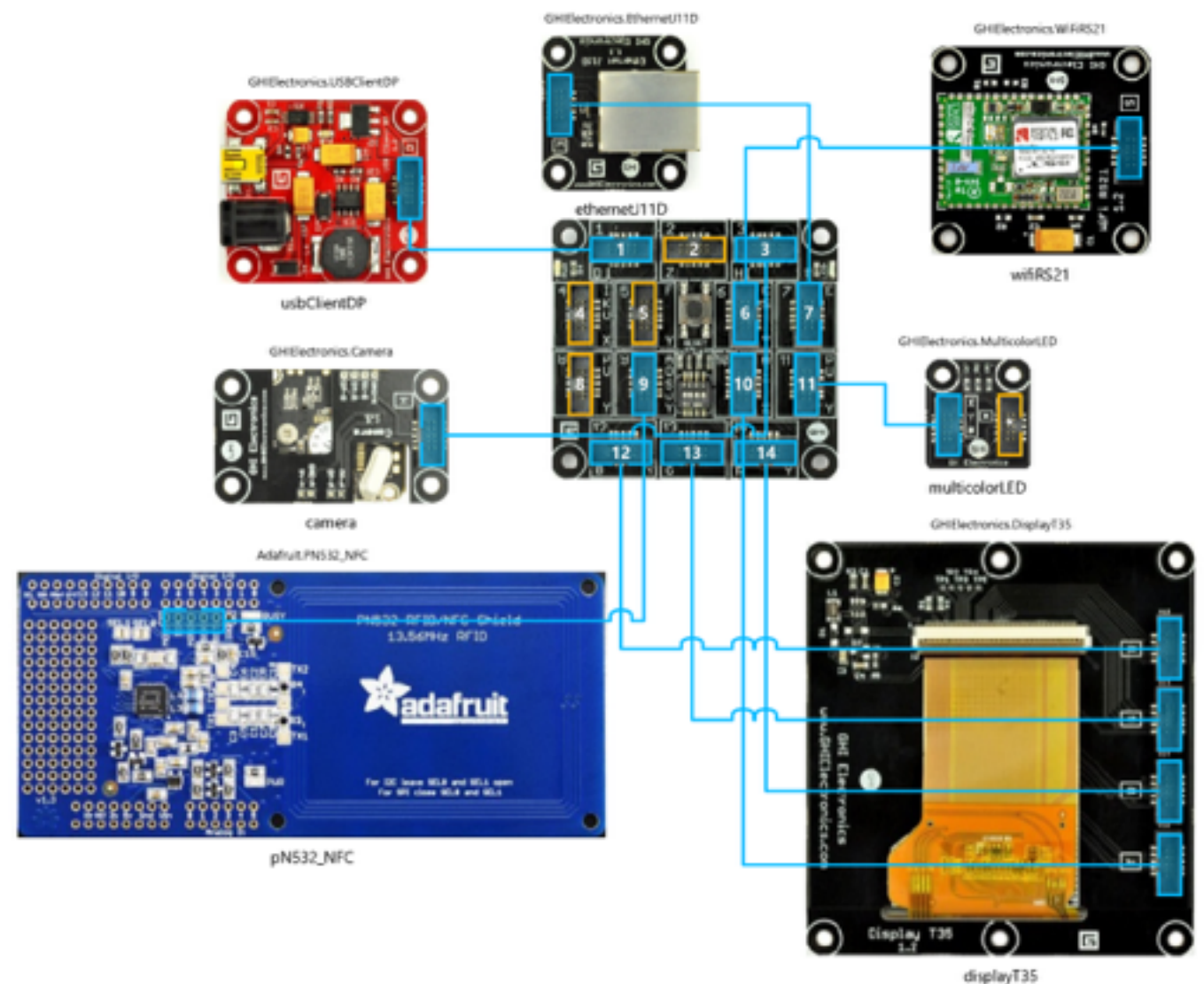
Sebastiano Miano



Goal

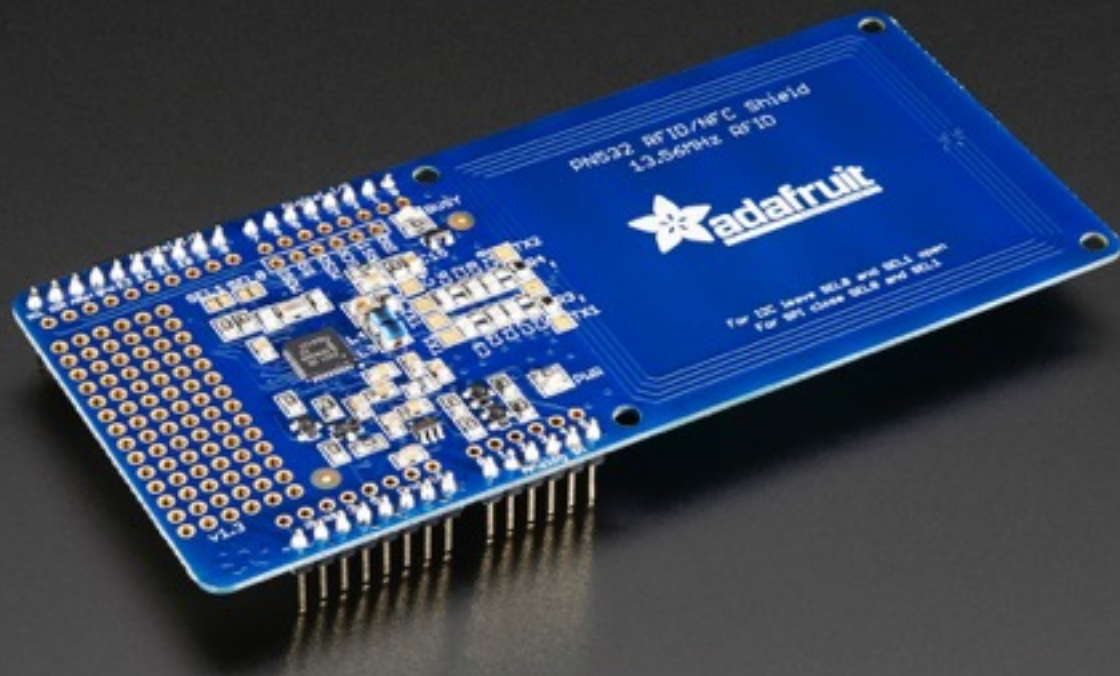
Develop an authentication mechanism based on a NFC reader with a two-factor authentication.

- User authentication.
- Registration of a new user.
- Access log.
- NFC card management.



Adafruit PN532 NFC Shield

- Detection of NFC card.
- Reading of Mifare Classic and Ultralight cards.
- Writing and Formatting a Mifare Classic card.



How the code is organized:

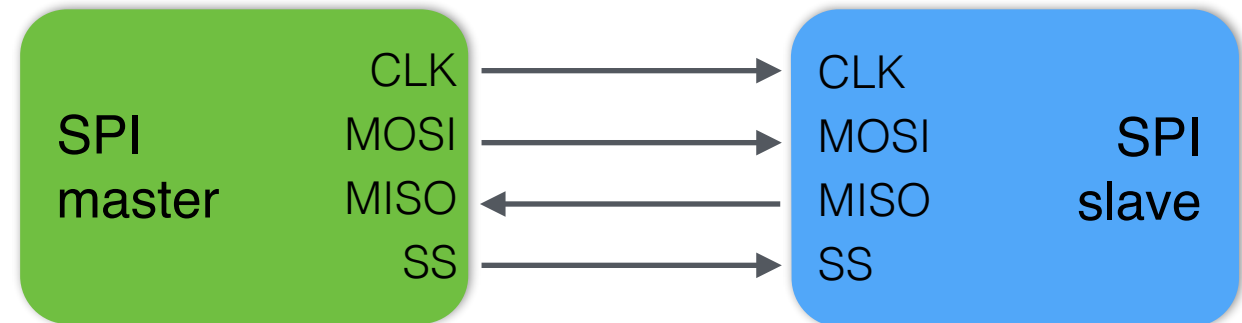
PN532 Communication

NFC Card Management

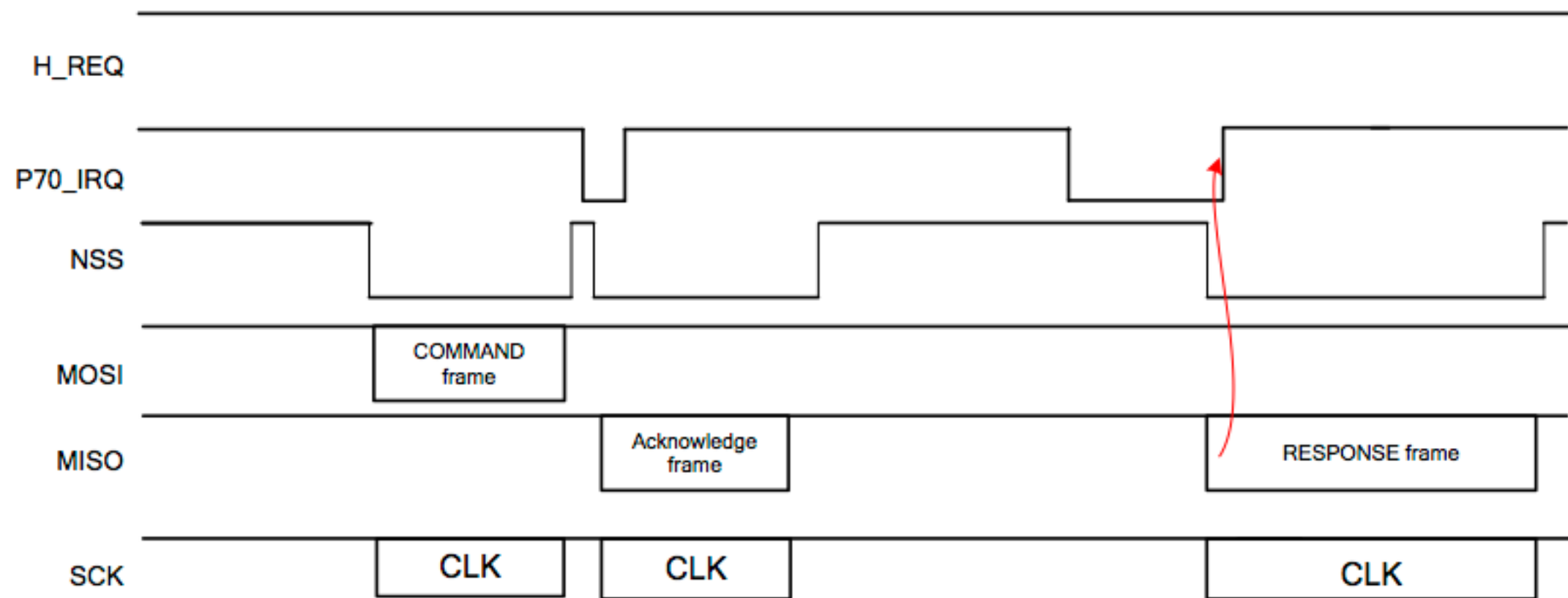
NDEF Implementation

PN532 Driver

.NET micro framework SPI
spi.Write()
spi.WriteRead()



Communication through frames in half-duplex mode.



Mifare Classic

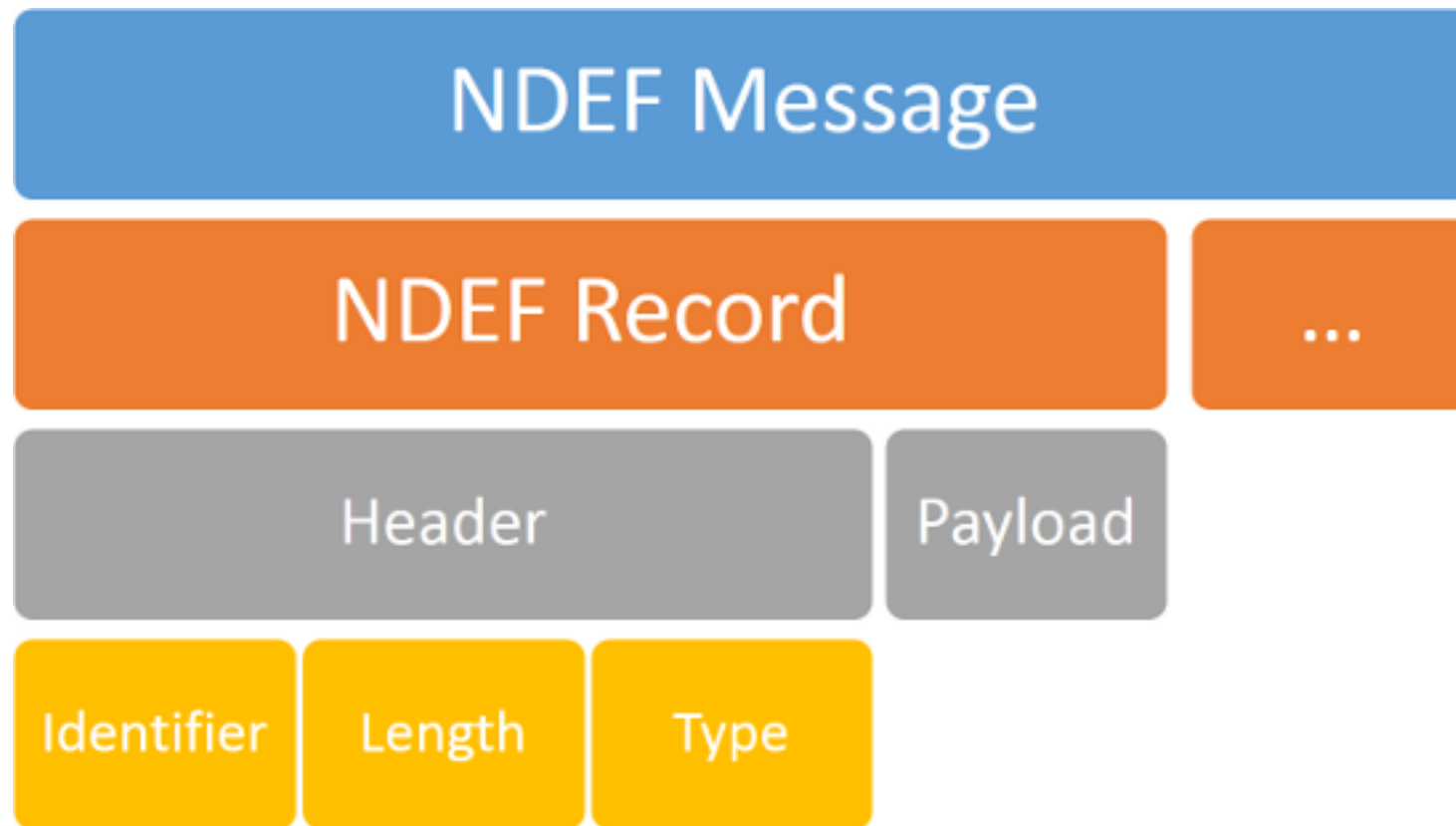
ISO 14443 Type A
13.56 MHz (High Frequency).



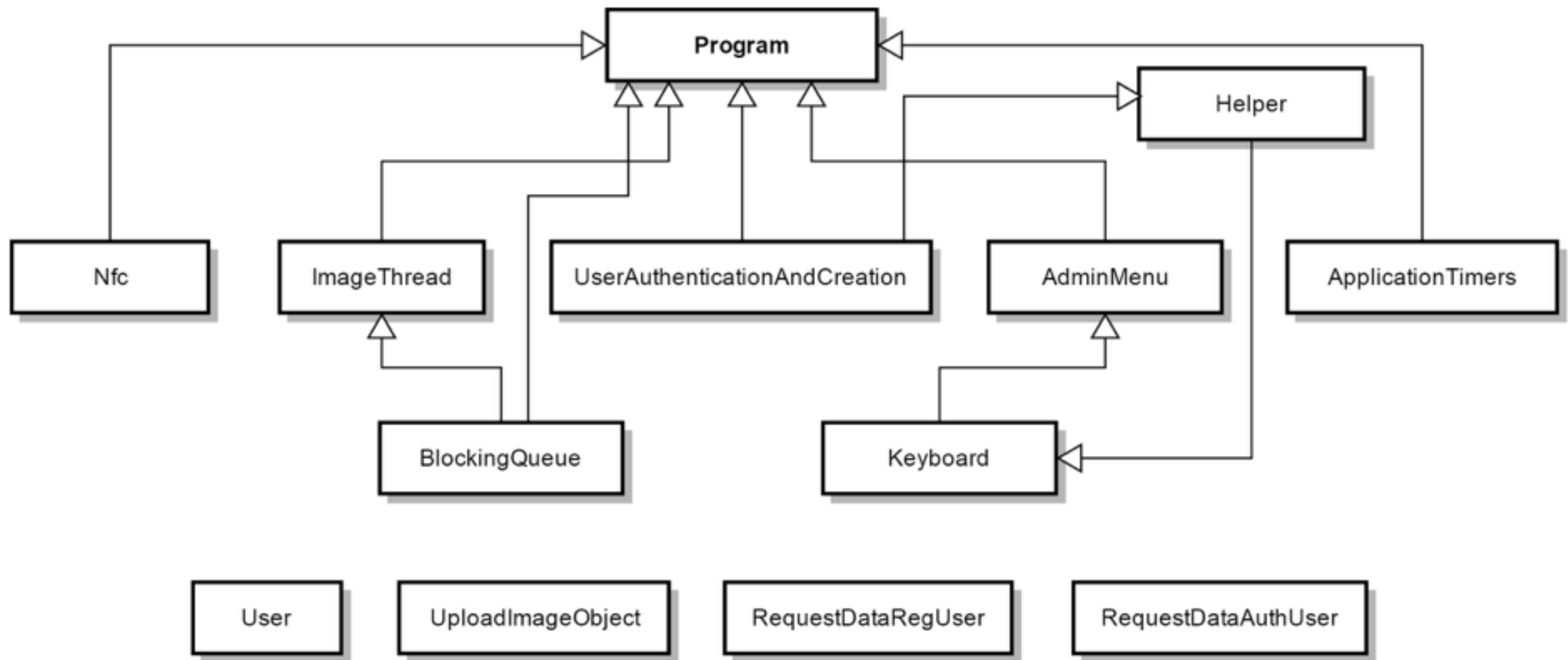
- 1Kbyte or 4Kbyte EEPROM
- Unique serial Number (4bytes)
- 16 or 64 sectors.
- Each sector is 4×16 byte length
- 2 keys of 48 bits for each sector.

More the **4 billion**
cards have been produced
over the years.

NDEF



NFC Box



**multi
thread**



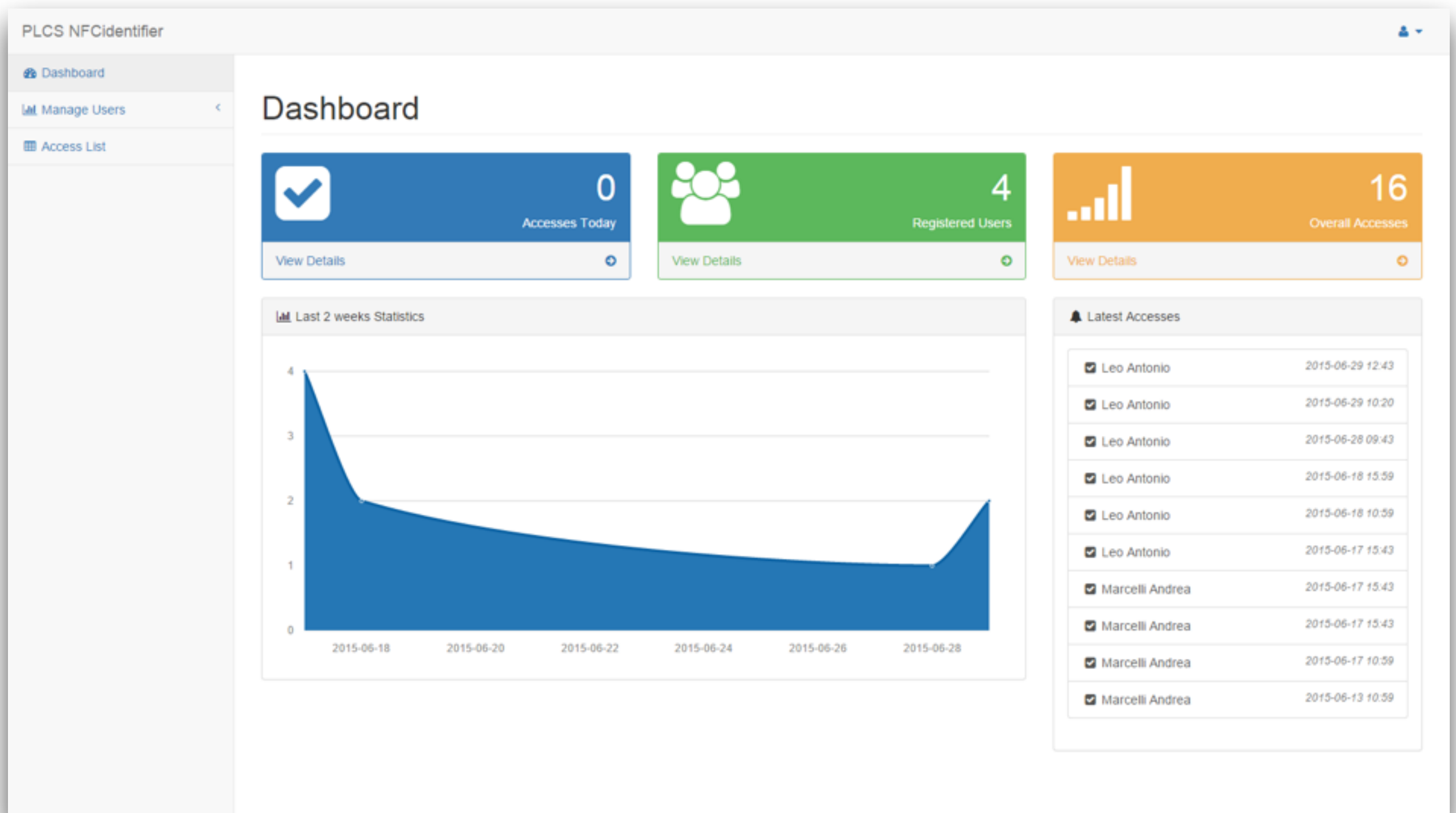
HTTPS

Application Server

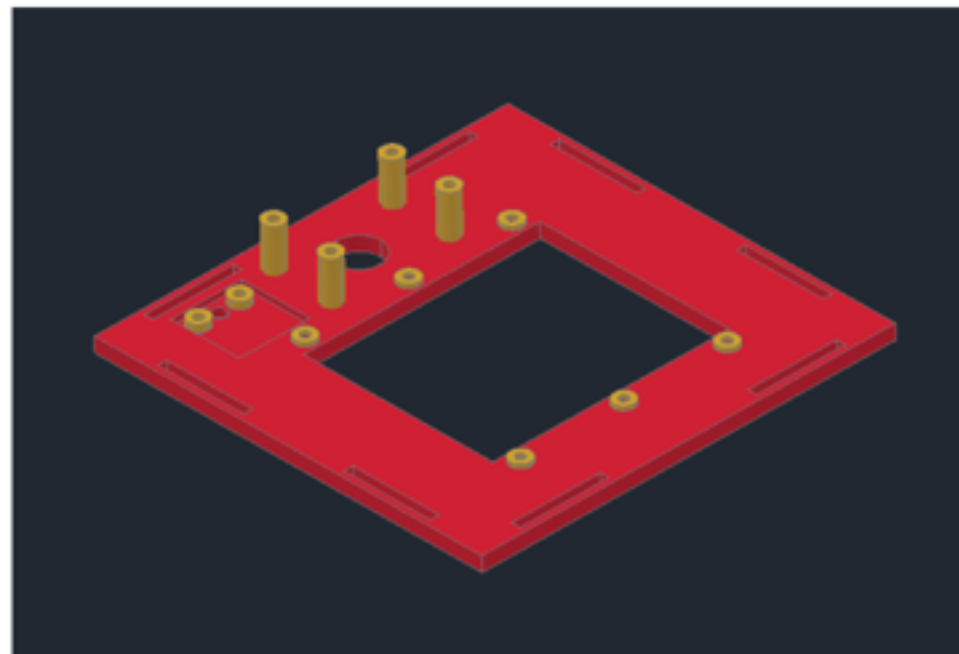
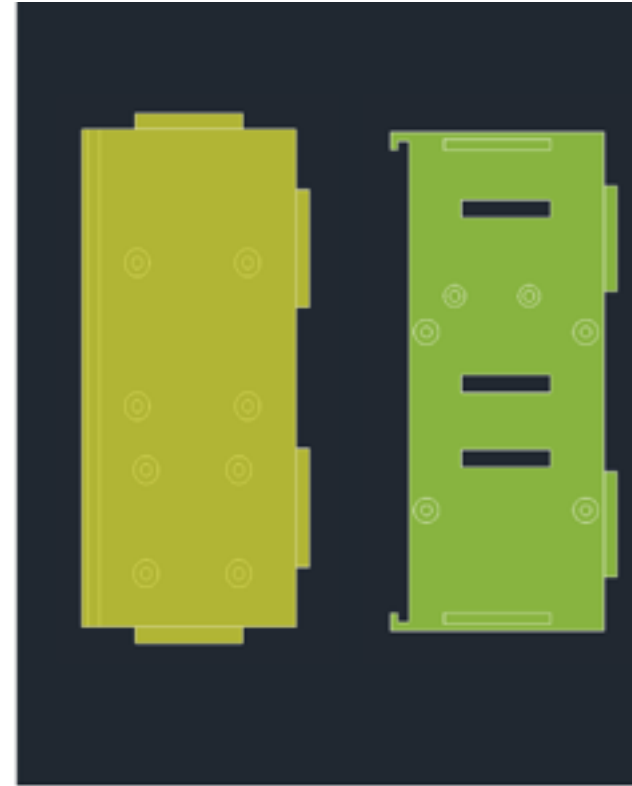
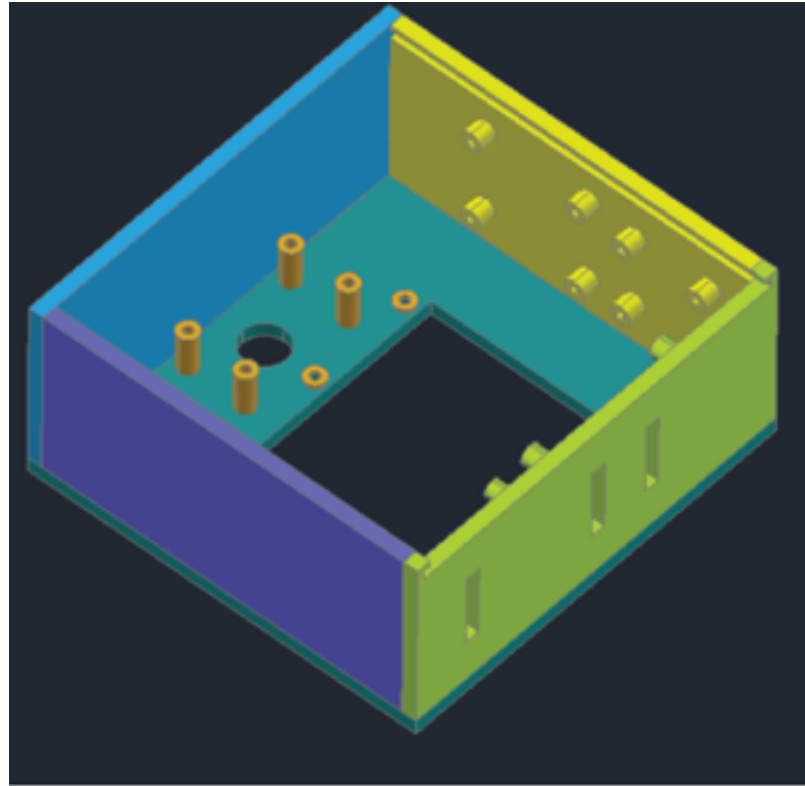


TYPE	URI	Web Service Name
POST	authenticateUser	GetAuthenticateUserAsJson
POST	uploadPhoto/{nfcID}	UploadLastPhoto
GET	downloadPhoto/{nfcID}	DownloadUserPhoto
POST	registerNewUser	GetRegistrateUserAsJson

Web Administrative Panel



3D box design



3D box

