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**Infineon Hackathon 2019**

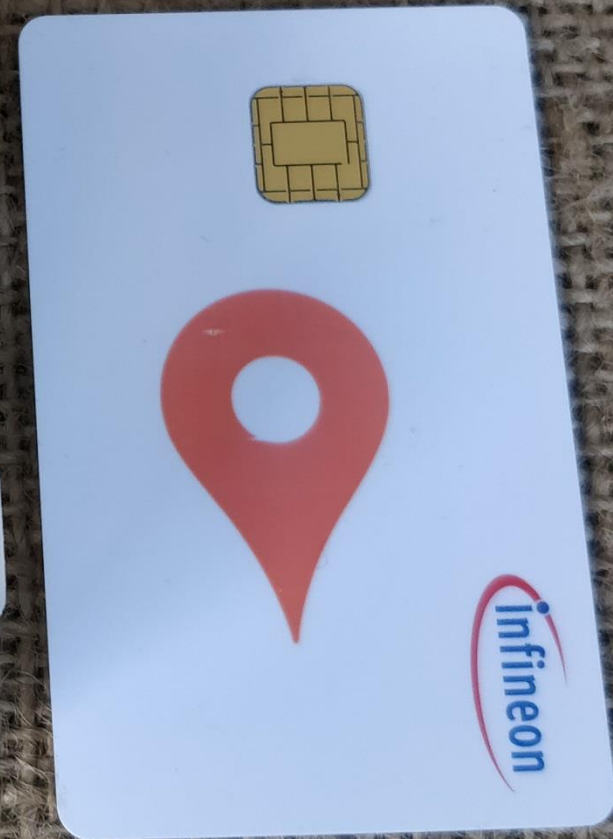
**notarization and proof for geo based games**

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## The idea

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- Infineon: Blockchain Security 2Go starter kit
  - „Bringing more security to blockchain applications“
- Me: Use it to ...
  - proof situations in geo based games (e.g. geocaching)
  - and notarize all information in a blockchain application
  - => physical logbook PLUS Chipcard





# Why blockchain?

## ■ Key facts

### □ decentralization

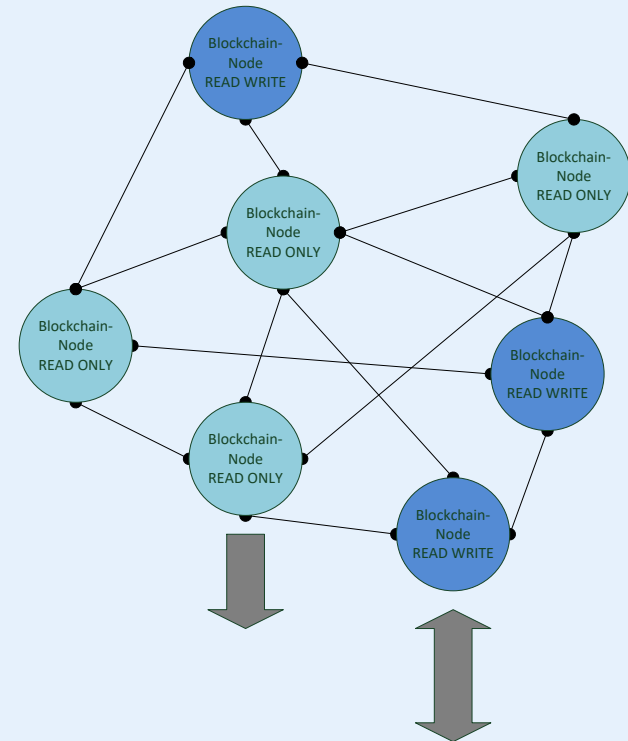
- no trusted third party necessary
- resilience: network and databases cannot be desctructed

### □ transparency

- “single truth” for all participants

### □ immutability

- data can only be appended ...
- ... never changed or deleted



## The process (overview)

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- Step 0: prepare card
- Step 1: „check in“ into blockchain
  - ... riddle is solved ...
  - ... location is visited ...
  - ... container (with card) is found!
- Step 2: register proof for „found it“ on the blockchain

## The setup

- Security 2Go starter kit
- Raspberry-Pi (2 apps)
  - Chipcard reader
  - => Mobile App (Android, iOS)
- Blockchain
  - E.g. Multichain
  - Rest-API
  - Explorer
- WebGUI



## Step 0: prepare card

- generate keypair
- read public key & card id
- transmit this data to the blockchain application
- => the card is „known“

```
pi@raspberrypi: ~/ih19
pi@raspberrypi:~/ih19 $ python3 step_1.py
-----
Step 1: Read Card ID and public key and send it to blockchain
-----
Trying to read card ...
<blocksec2go.comm.pyscard.PySCardReader object at 0x768c01d0>
Card ID: 02058d1900040016001e
v1.0
Public key: 047e10c29bd4debe34c4651e4929dfc2d1aec0858a1dcebc8c6799ddfb958c68710fa34c553d46c4cbd1c6911d9
9f8d6bdb6be91b10f42e9fb59ba47f09b485d60

SENDING DATA TO BLOCKCHAIN ...
RESULT: OK, data (from step 1) saved in blockchain transaction 2445elc36b58bfc7a0e9a02828ela2e1783924c4
ada84eea2c2f4166b368c653

pi@raspberrypi:~/ih19 $
```

Stream: bs2go – 36 of 36 items

Publishers	<a href="#">1JQhLuexFQjDAwxtnRAnV1m3jkNbakNsjNLJnz</a>
Key 0	<a href="#">02058d1900040016001e</a>
JSON data	{ "Card": "02058d1900040016001e", "PubKey": "047e10c29bd4debe34c4651e4929dfc2d1aec0858a1dce" }
Added	2019-03-26 09:36:06 GMT (confirmed)
Data location	on-chain, available

## Step 1: „Check In“

- Collect Data
  - ID
  - Solution
  - Name
  - Remark
  - ...
  - CardID
- Save to blockchain

IH19   CheckIn   Info   Solved   Found

### Check in new riddle

Enter riddle ID:

R-IH-2019-1

Enter solution (codeword etc.):

SecretSolution7612312391287391327

Enter CardId:

02058d1900040016001e

Enter your name (optionally):

chris

Enter a remark (displayed in riddle info, optionally):

Test with Infineon Security 2Go Starterkit - Card 1

Submit



# Step 1: „Check In“ - Information

## Datasheet for riddle R-IH-2019-1

26.03.2019 10:43:43

Lorem ipsum ...

Riddle ID	R-IH-2019-1
Owner	chris
Remark	Test with Infineon Security 2Go Starterkit - Card 1
Checked in	2019-03-26T10:43:35+01:00
Solution	SecretSolution7612312391287391327
Find-Code	f775e5080c534c297f856eb0434b56e8
Card-Id	02058d1900040016001e

Open the following QR-Code or link to get current info about the riddle.



Check server address when opening with a QR-code reader!  
<https://test.baumann.at/dev9/ih19/?page=info&rid=R-IH-2019-1>

IH19 CheckIn Info Solved Found

## Info about riddle

Riddle	R-IH-2019-1
Owner	chris
Remark	Test with Infineon Security 2Go Starterkit - Card 1
CardId Hash	3803129a3d9a9d556b0f493d36893d9d8e7ef0540ca95464e3f7fac8177888a4
Event	checkedin
By	chris
TimeStamp	2019-03-26T10:43:35+01:00
Transaction	b40af056d547ff33a58f44edb417fefb6f7861b80f855a235a4f62d6631f30d8
BlockHash	008a6bd76e66c1676c4d5876abcef5ec60c5bc4d3d5cfc44e69cd3fab1e19a77
BlockTime	2019-03-26T10:43:38+01:00

[Generate a datasheet](#) for your records and [generate a codesheet](#) to put into the geocache for the first finder.  
When you are done, you can [clear the session data from your browser](#).

## Step 2: Register „found it“ on the blockchain

- Read card (with mobile App)
- Server sends token to sign („challenge“)
- Digital signature is created ...
- ... sent back to the server
- Everything is stored in the blockchain

```
pi@raspberrypi: ~/ih19
pi@raspberrypi:~/ih19 $ python3 step_2.py
-----
Step 2: Sign data provided by blockchain-app and send it back
-----
Trying to read card ...
<blocksec2go.comm.pyscard.PySCardReader object at 0x769a9230>
Card ID: 02058d1900040016001e
v1.0
Public key: 047e10c29bd4debe34c4651e4929dfc2dlaec0858aldcebc8c6799ddfb958c68710fa34c553d46c4cbd1c6911d9
9f8d6bdb6be91b10f42e9fb59ba47f09b485d60

GET DATA TO SIGN ...
Text to sign: 5c99f4d30a4ef
Signature: 3045022100a0a74ea6d7ce9c0240874faa2d86b5a634f09cb45d581fa9a602b431cb2ea44002205739bd91a9678f
74c827e08762f20963c2fccaf5a0bde32e97f23342f2e801bc
Enter your name (optionally): franzi

SENDING DATA TO BLOCKCHAIN ...
RESULT: testing step 2
checking cardId 02058d1900040016001e
searching cardIdHash 3803129a3d9a9d556b0f493d36893d9d8e7ef0540ca95464e3f7fac8177888a4
CONGRATULATION! You are the first, who used this card to register a find!

pi@raspberrypi:~/ih19 $
```

BlockTime	2019-03-26T10:43:38+01:00
Event	card
By	franzi
TimeStamp	2019-03-26T10:46:07+01:00
Transaction	e2db0c04220df66bf54da5fc48cb9384249463c48c344944fbfed06390da1492
BlockHash	000a7fa14ac6f81b8d52e486e0bce384ed1f5829fdeefb5f11ac0410084e7d91
BlockTime	2019-03-26T10:46:25+01:00

## Step 2: Register „found it“ on the blockchain

- „FTF-certificate“ can be issued
- Further readings of the card show warnings

Congratulations! You seem to be the first to have found this codesheet, belonging to the following riddle:

Riddle ID	R-IH-2019-1
Owner	chris
Remark	Test with Infineon Security 2Go Starterkit - Card 1
Checked in	2019-03-26T10:43:35+01:00
Find-Code	f775e5080c534c297f856eb0434b56e8



pi@raspberrypi: ~/ih19

```
pi@raspberrypi:~/ih19 $ python3 step_2.py
```

```
-----  
Step 2: Sign data provided by blockchain-app and send it back  
-----
```

```
Trying to read card ...
```

```
<blocksec2go.comm.pyscard.PySCardReader object at 0x768d7230>
```

```
Card ID: 02058d1900040016001e
```

```
Check server address with  
https://test.baumann.at/d...
```

```
v1.0
```

```
Public key: 047e10c29bd4debe34c4651e4929dfc2dlaec0858aldcebc8c6799ddfb958c68710fa34c553d46c4cbd1c6911d9
```

```
9f8d6bdb6be91b10f42e9fb59ba47f09b485d60
```

```
GET DATA TO SIGN ...
```

```
Text to sign: 5c99f53a6ae9f
```

```
Signature: 304402207306ac913598ff6e28595fac68e53669ec6e19cb36fc0e2aee6a4271459df050220410eccd934599ad6
```

```
b23641b031e0fdddb77d748bbc49e2c6b4d88fe0beadbcf9
```

```
Enter your name (optionally):
```

```
SENDING DATA TO BLOCKCHAIN ...
```

```
RESULT: testing step 2
```

```
checking cardId 02058d1900040016001e
```

```
searching cardIdHash 3803129a3d9a9d556b0f493d36893d9d8e7ef0540ca95464e3f7fac8177888a4
```

```
Sorry, this card was ALREADY USED to register the found.
```

```
pi@raspberrypi:~/ih19 $
```

## Further ideas

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- Additional „monetary motivation“
  - Bitcoin or Ethereum on card
  - PIN to unlock the card = solution of the riddle
- Adoption of the concept for different other games or similar usecases
- ...



## Contact

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