

NEXT GENERATION INTERNET

The GNU Taler Payment System

Christian Grothoff

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Agenda

Motivation & Background

GNU Taler: Introduction

Offline payments

Future Work & Conclusion

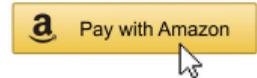
A Social Problem

“I think one of the big things that we need to do, is we need to get away from true-name payments on the Internet. The credit card payment system is one of the worst things that happened for the user, in terms of being able to divorce their access from their identity.”

–Edward Snowden, IETF 93 (2015)

The Bank's Problem

- ▶ Global tech companies push oligopolies
- ▶ Privacy and federated finance are at risk
- ▶ Economic sovereignty is in danger



Central Bank Digital Currency?

Speech by Augustin Carstens, Bank of International Settlements (October 2020) on the difference between Central Bank Digital Currencies and cash.

Central Bank Digital Currency vs. Cash

https://www.youtube.com/watch?v=R_E4Uu7ycqE (10'2020)

GNU Taler: Introduction

GNU Taler [1, 3, 2]

Digital cash, made **socially responsible**.



Privacy-Preserving, Practical, Taxable, Free Software, Efficient

What is Taler?

<https://taler.net/en/features.html>

Taler is

- ▶ a Free/Libre software *payment system* infrastructure project
- ▶ ... with a surrounding software ecosystem
- ▶ ... and a company (Taler Systems S.A.) and community that wants to deploy it as widely as possible.

However, Taler is

- ▶ *not* a currency or speculative asset
- ▶ *not* a long-term store of value
- ▶ *not* a network or instance of a system
- ▶ *not* based on proof-of-work or proof-of-stake

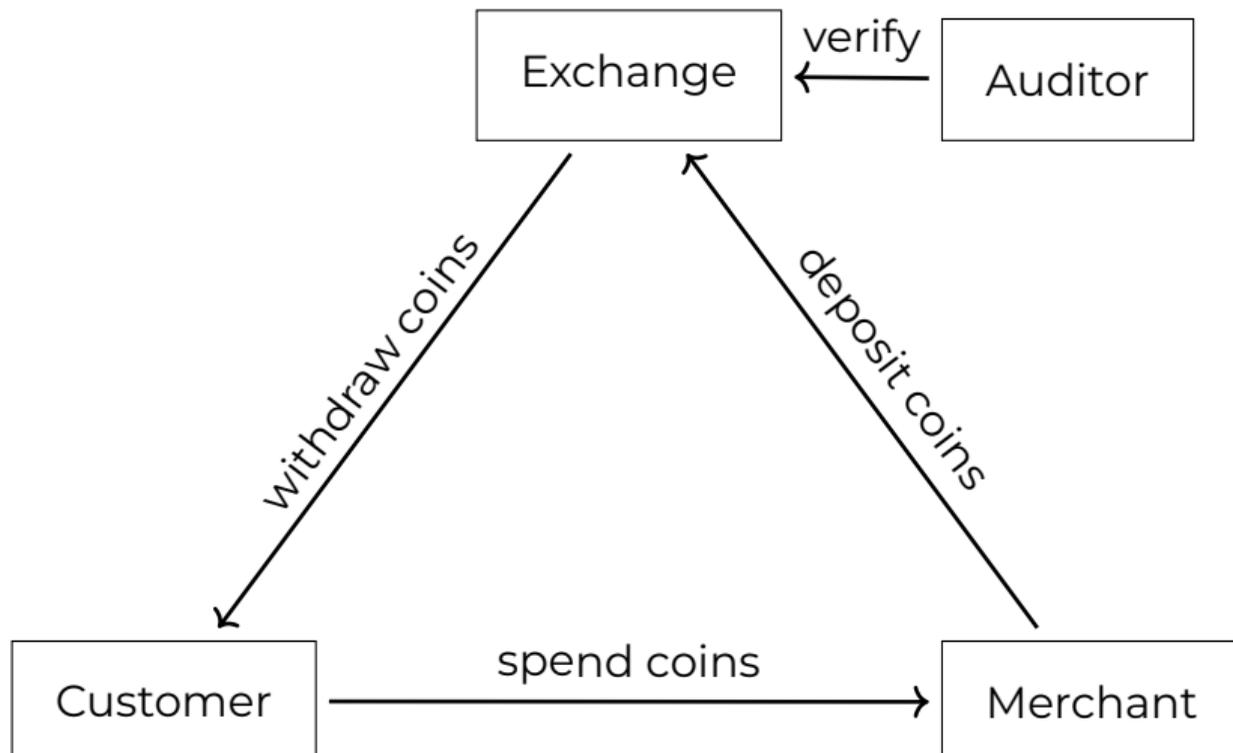
Design principles

<https://taler.net/en/principles.html>

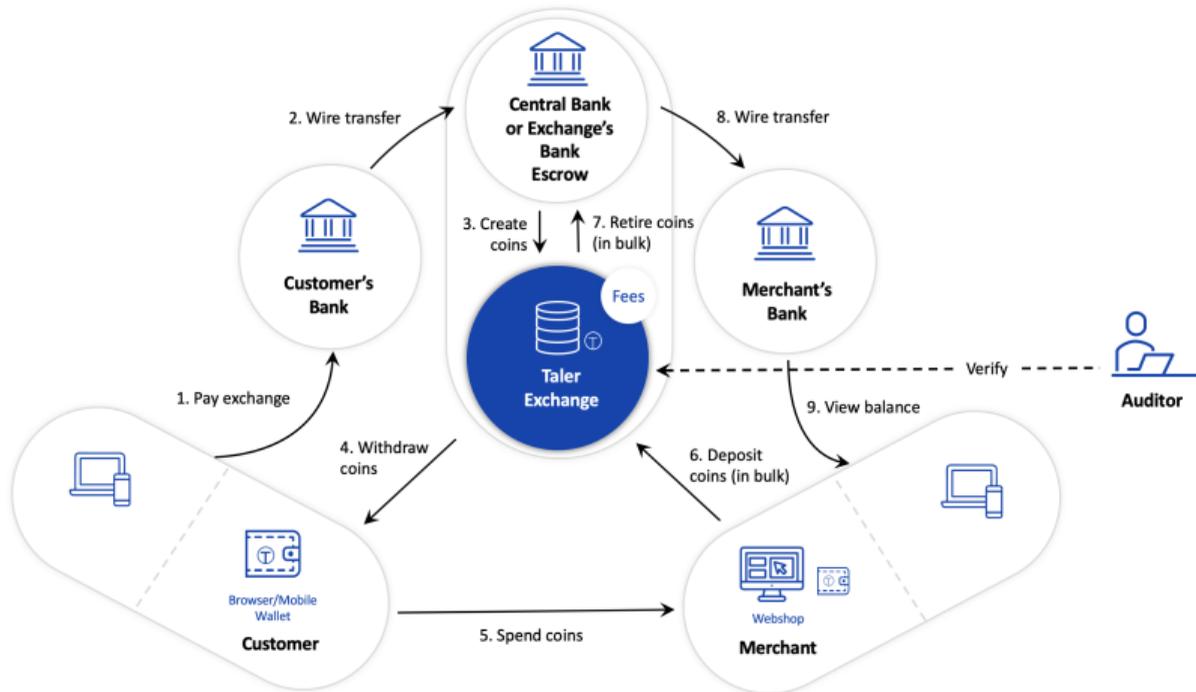
GNU Taler must ...

1. ... be implemented as **free software**.
2. ... protect the **privacy of buyers**.
3. ... enable the state to **tax income** and crack down on illegal business activities.
4. ... prevent payment fraud.
5. ... only **disclose the minimal amount of information necessary**.
6. ... be usable.
7. ... be efficient.
8. ... avoid single points of failure.
9. ... foster **competition**.

Taler Overview



Architecture of Taler



Usability of Taler

`https://demo.taler.net/`

1. Install browser extension.
2. Visit the `bank.demo.taler.net` to withdraw coins.
3. Visit the `shop.demo.taler.net` to spend coins.

Protocol Basics

How does it work?

We use a few ancient constructions:

- ▶ Cryptographic hash function (1989)
- ▶ Blind signature (1983)
- ▶ Schnorr signature (1989)
- ▶ Diffie-Hellman key exchange (1976) or Unique signatures (1977) or VRF (1999)
- ▶ Cut-and-choose zero-knowledge proof (1985)

But of course we use modern instantiations.

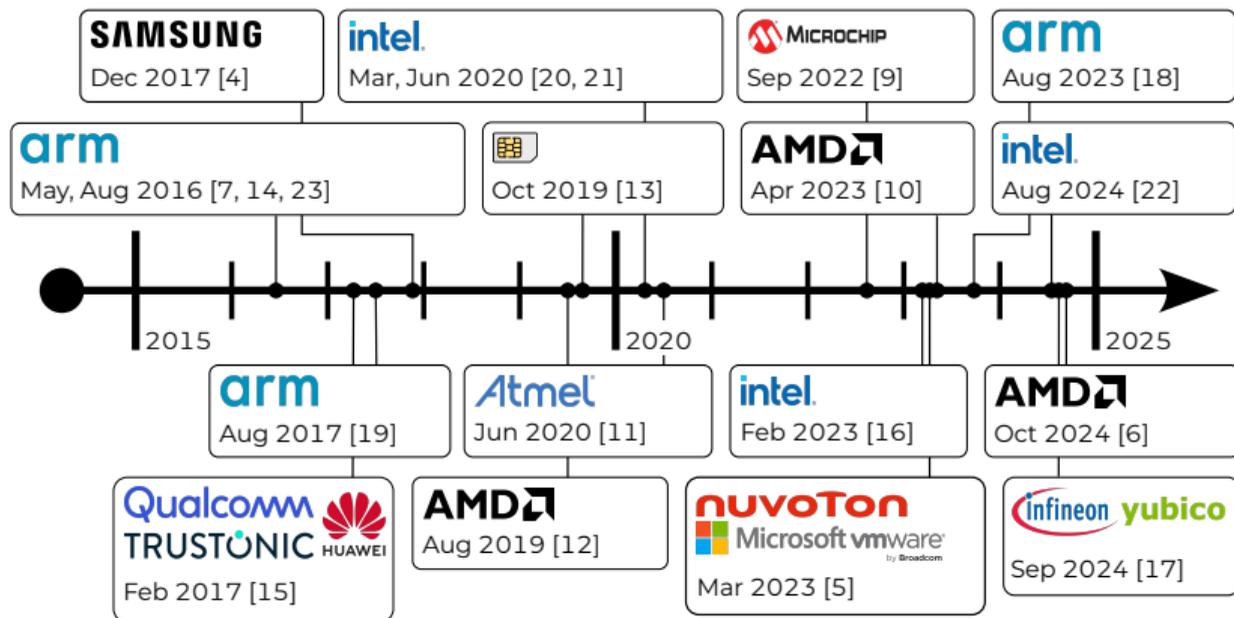
Offline payments

Digitaler Euro — Offline?

Many central banks today demand offline capabilities for CBDCs.

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A Scenario

God is offline, but customer pays online

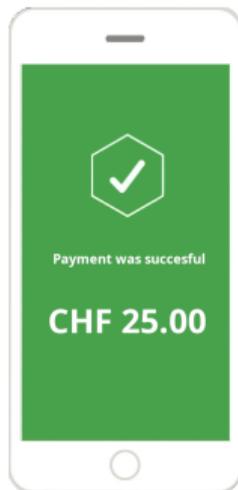


Typical Payment Process

All equivalent: Twint, PayPal, AliPay, PayTM

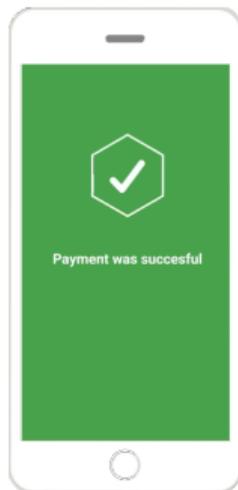
Secure Payment ...

Everything green?



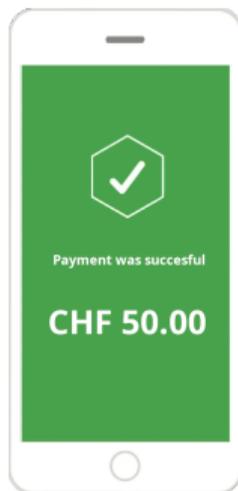
Exploit “Code”

Programming optional

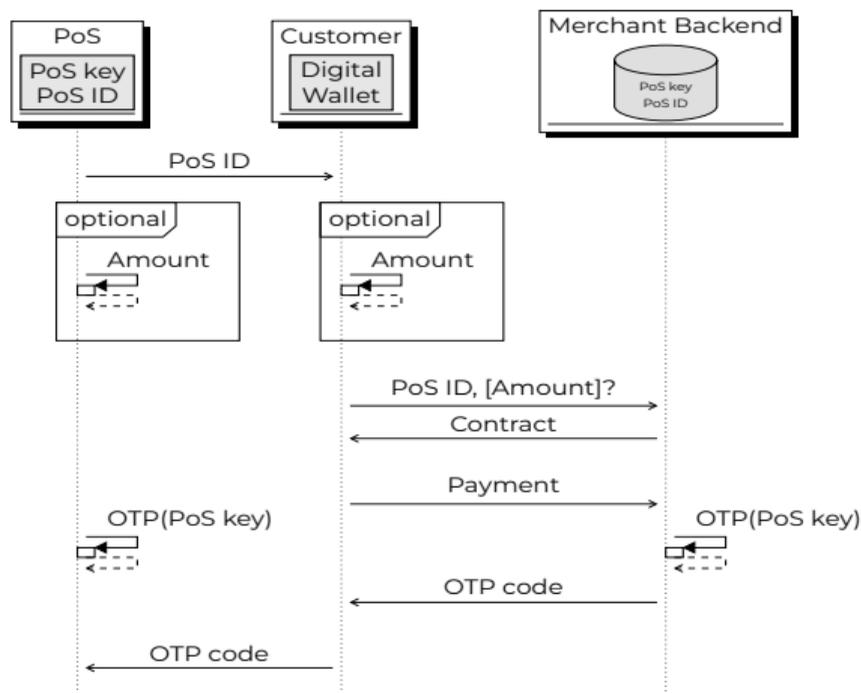


“Customers” love Twint ...

Daily non-business for shops



Partially Offline Payments with GNU Taler [8]





Future Work & Conclusion

Taler: Project Status

<https://taler-ops.ch/>

Taler Operations is live Swiss-wide!



Competitor comparison

	Cash	Bitcoin	Zerocoin	Creditcard	GNU Taler
Online	----	++	++	+	+++
Offline	+++	--	--	+	++
Trans. cost	+	----	----	-	++
Speed	+	----	----	o	++
Taxation	-	--	----	+++	+++
Payer-anon	++	o	++	----	+++
Payee-anon	++	o	++	----	----
Security	-	o	o	--	++
Conversion	+++	----	----	+++	+++
Libre	-	+++	+++	---	+++

How to support?

Join: <https://lists.gnu.org/mailman/listinfo/taler>

Discuss: <https://ich.taler.net/>

Develop: <https://bugs.taler.net/>, <https://git-www.taler.net/>

Apply: <https://nlnet.nl/propose>, <https://nlnet.nl/taler>

Translate: translation-volunteer@taler.net

Integrate: <https://docs.taler.net/>

Donate: <https://gnunet.org/ev>

Partner: <https://taler-systems.com/>

Conclusion

What can we do?

- ▶ Suffer mass-surveillance enabled by credit card oligopolies with high fees, and
- ▶ Engage in arms race with deliberately unregulatable blockchains

OR

- ▶ Establish free software alternative balancing social goals!

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