

**Course I:**

# **DeFi Infrastructure**

## **1. The History of Decentralized Finance**

**(i) Evolution**

# Evolution of finance

Barter was one of the early methods of market exchange:

- Barter is peer-to-peer and, as such, the first DeFi
- However, barter is very inefficient. If I have a cow and want two sheep, I need to find an exact match (someone with two sheep that wants a cow).
- Money solved the matching problem

# Evolution of finance

## Purposes of money:

### Primary

- Unit of Account: A way to compare the value of various goods and services
- Medium of Exchange: Allows for non-barter transactions.

### Secondary

- Store of Value: Allows value to be retained – even if partially – rather than complete decay (e.g., storing food).
- Transfer of Value: Ease of transfer of value and to defer value.

# Characteristics

## Traditional characteristics:

- Durability: Withstand repeated use (coins, paper, gold)
- Portability: You can carry around
- Divisibility: Fractional units
- Uniformity: Versions of the same currency have identical value
- Limited Supply: Unlimited supply would mean zero value
- Acceptability: “This is legal tender for all debts, public and private”
- Stability: If unstable, people will look for alternatives

# Characteristics

## Portability example:

How Many Pounds Does That Weigh?

Price of Gold

	\$1,200	\$1,400	\$1,600	\$1,800	\$2,000
Dollar	\$1,000,000	57	49	43	38
Amount	\$2,000,000	114	98	86	76
	\$3,000,000	172	147	129	114
	\$4,000,000	229	196	172	153
Dollar	\$5,000,000	286	245	215	191
Amount	\$6,000,000	343	294	257	229
	\$7,000,000	401	343	300	267
	\$8,000,000	458	392	343	305
	\$9,000,000	515	441	386	343
	\$10,000,000	572	490	429	381

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Source: Erb and Harvey (2013) "The Golden Dilemma"

# A brief history

## *9000 BCE Barter*

- Market in Egypt exchanging goods, e.g., cows for sheep



[https://en.wikipedia.org/wiki/Ancient\\_Egypt#/media/File:Rope\\_stretching.jpg](https://en.wikipedia.org/wiki/Ancient_Egypt#/media/File:Rope_stretching.jpg)

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# A brief history

## *600 BCE Coins*

- In Lydia



# A brief history

## *1290 Banknotes*

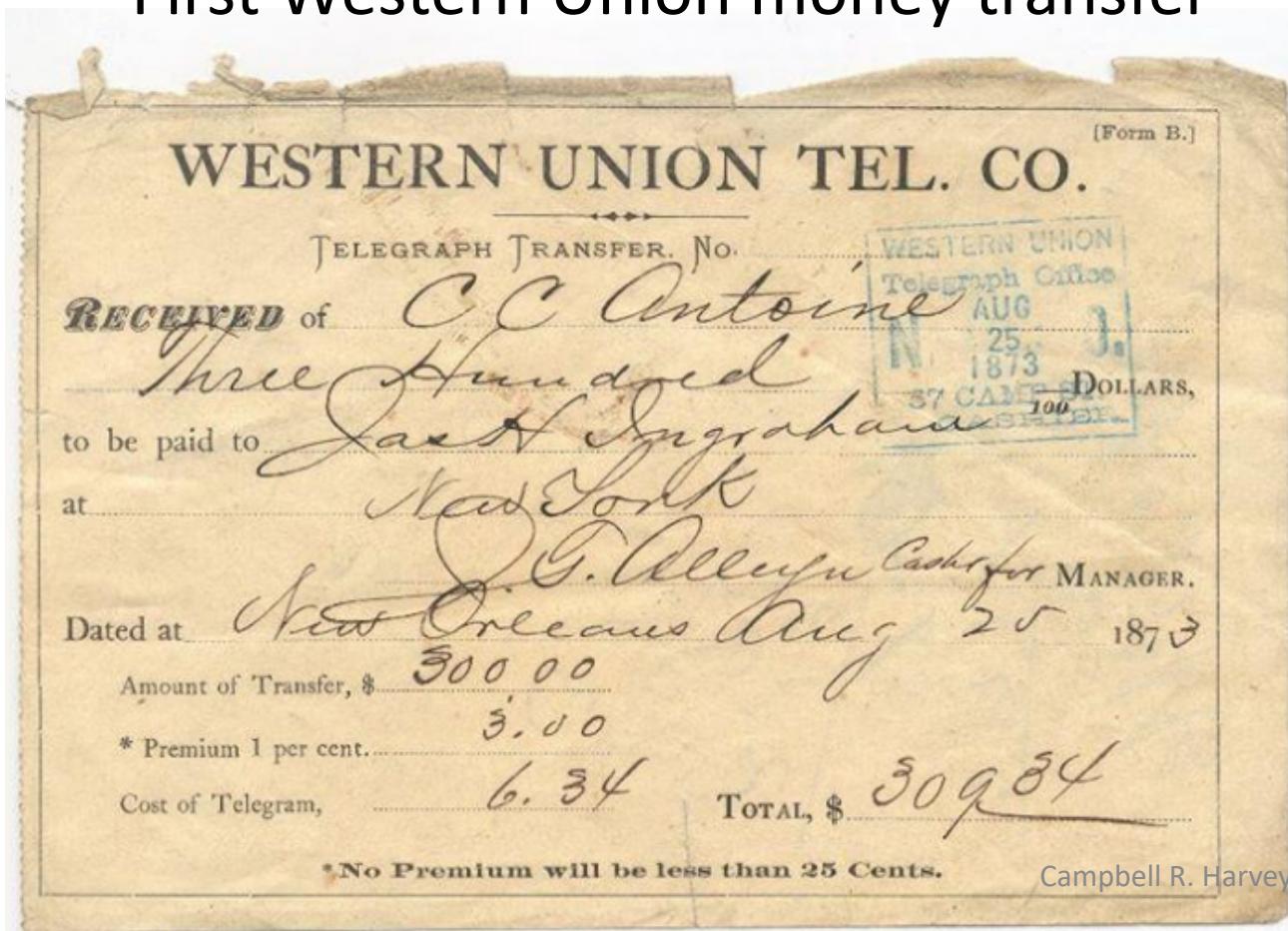
- Marco Polo introduces the idea to Europe (originates in China)



# A brief history

## 1871 e-Money

- First Western Union money transfer

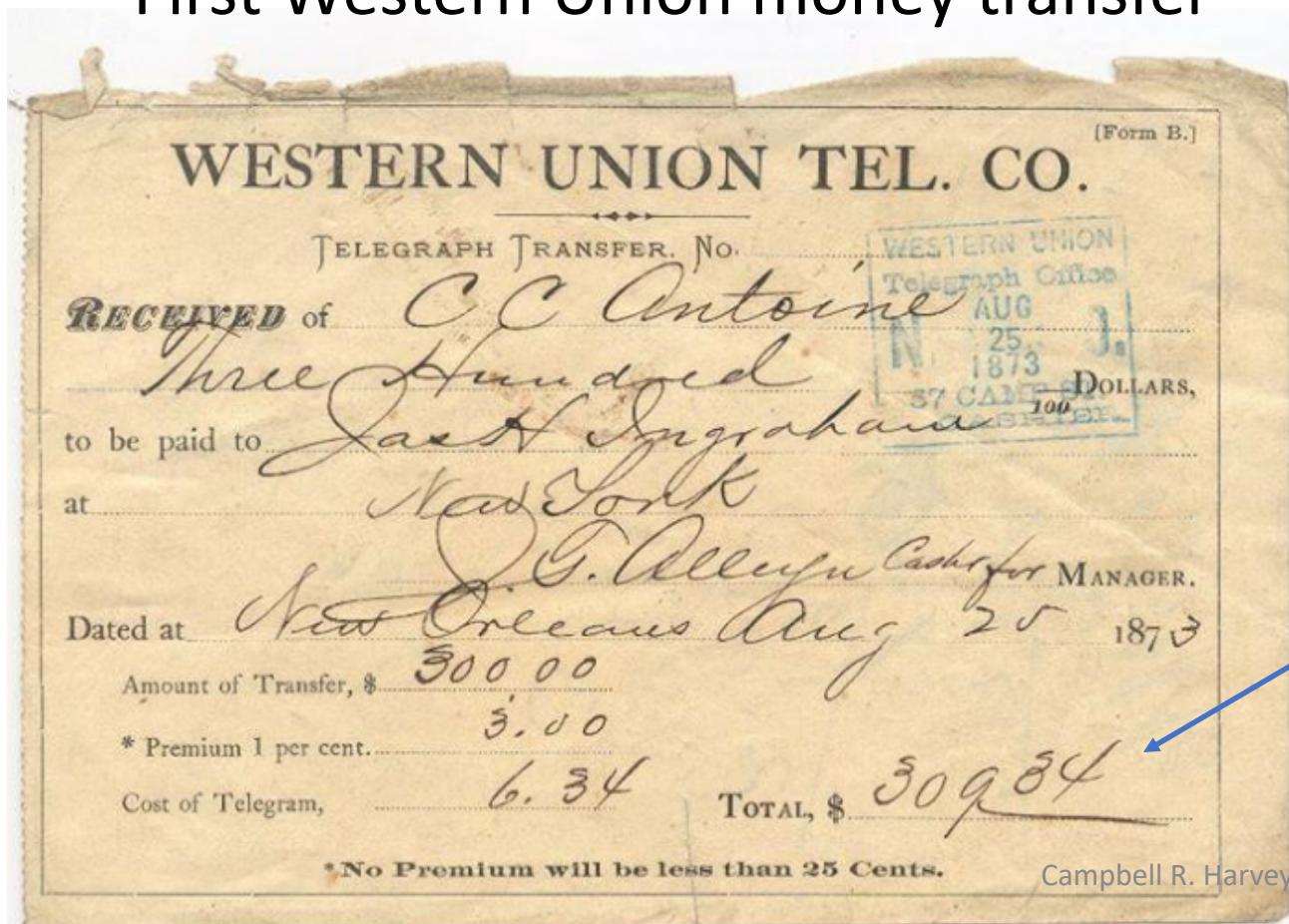


<https://twitter.com/westernunion/status/436545857404813312>

# A brief history

## 1871 e-Money

- First Western Union money transfer

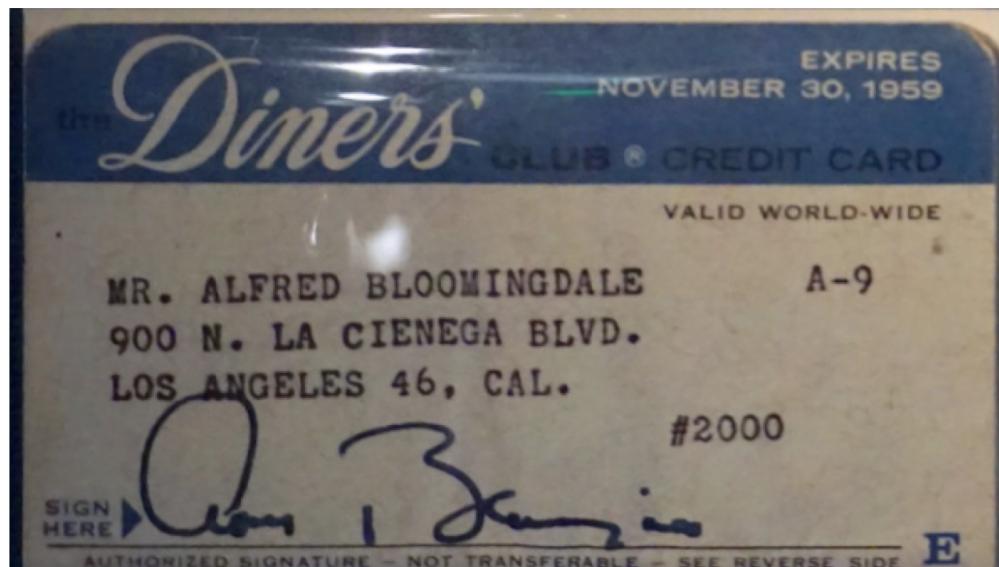


3% fee – nothing changed in 150 years!

# A brief history

## *1950 Credit Cards*

- First credit card is Diners Club



# A brief history

## 1967 ATM

- First ATM introduced in north London by Barclays Bank



# A brief history

## *1983 Telephone Banking*

- Bank of Scotland introduced Homelink which is the first application of Internet banking



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# A brief history

## *1994 Internet Banking*

- Began to become widespread in the US. Stanford Federal Credit Union offers internet banking to customers



# A brief history

## *1997 Contactless Payment*

- Mobil introduces Speedpass at gasoline stations (RFID device)



# A brief history

## *2005 Chip and Pin*

- Introduced with credit cards



# A brief history

## *2008 Bitcoin*

- Programmable money introduced by “Satoshi Nakamoto”



### **Bitcoin: A Peer-to-Peer Electronic Cash System**

Satoshi Nakamoto  
satoshin@gmx.com  
www.bitcoin.org

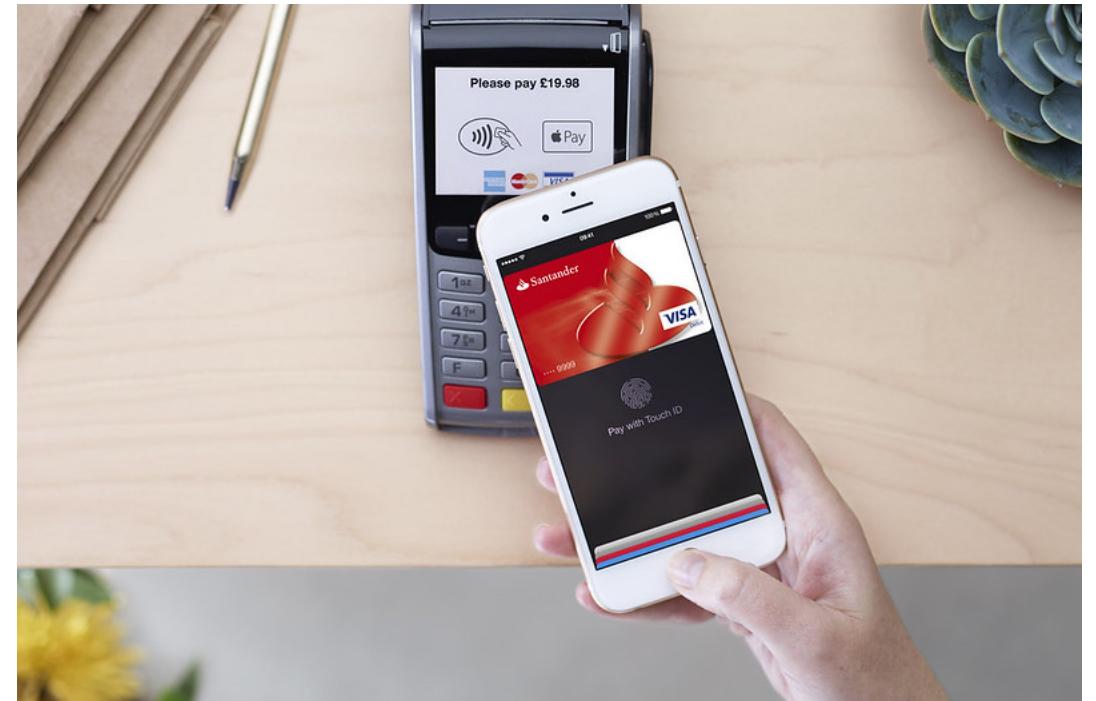
**Abstract.** A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.

White paper October 31, 2008.  
Program launched January 3, 2009.

# A brief history

## *2014 Apple Pay*

- The majority of US retailers have capability for contactless pay



# A brief history

## *2021 Blockchain*

- All leading banks have blockchain initiatives

## **David Solomon, CEO Goldman Sachs.**

- *“Assume that all major financial institutions around the world are looking at the potential of tokenization, stablecoins and frictionless payments.”*

# A brief history

## *2021 Blockchain*

- OCC grants permission to use stablecoins



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News Release 2021-2 | January 4, 2021

## Federally Chartered Banks and Thrifts May Participate in Independent Node Verification Networks and Use Stablecoins for Payment Activities

<https://www.occ.gov/news-issuances/news-releases/2021/nr-occ-2021-2.html>