



Interledger

Interoperable, Streaming Payments

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@justmoon



Agenda

1. The Need for Interoperability
2. Background: How Interledger Works
3. Demos: Streaming Payments



The biggest problem in
payments is the
lack of interoperability



The Payment Space is Highly Fragmented



PROBLEM

To pay someone, you need to use
the same payment network



PROBLEM

To accept payments, you need to support many different networks



Accepting Payments Online



Payment Methods Accepted By Prineta.com



Payment Handler API

W3C Working Draft 08 January 2018



This version:

<https://www.w3.org/TR/2018/WD-payment-handler-20180108/>

Latest published version:

<https://www.w3.org/TR/payment-handler/>

Latest editor's draft:

<https://w3c.github.io/payment-handler/>

Test suite:

<https://w3c-test.org/payment-handler/>

Previous version:

<https://www.w3.org/TR/2017/WD-payment-handler-20171203/>

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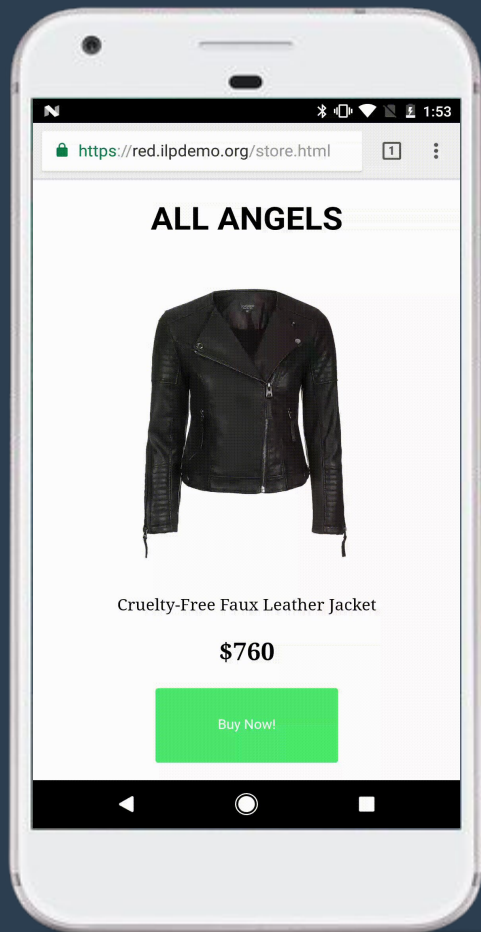
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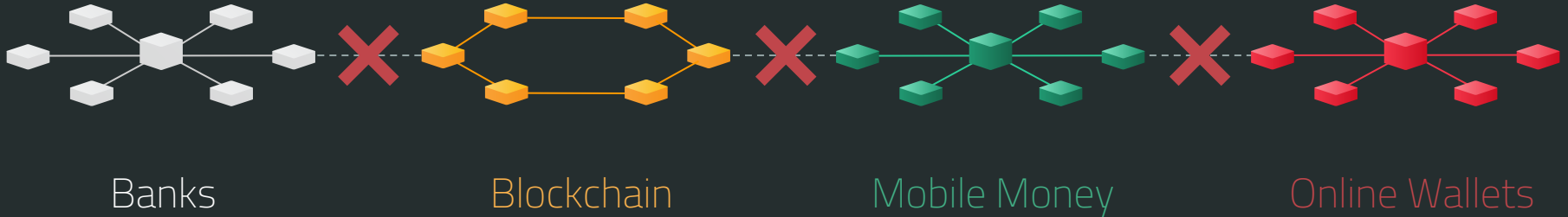
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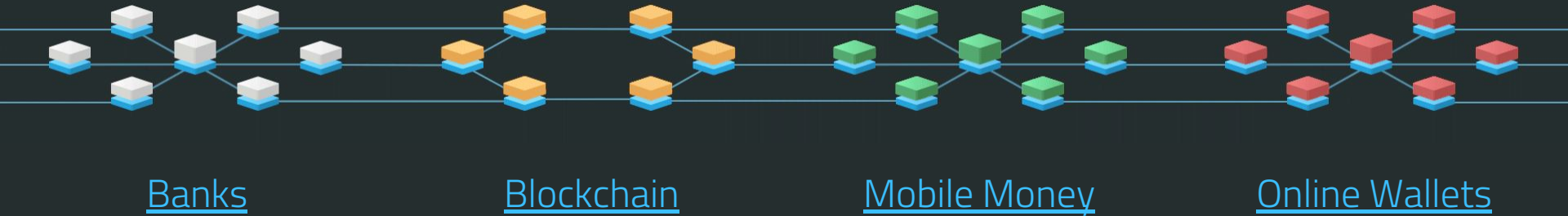
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Payment Networks Are Still Disconnected



Internetworking For Payment Networks





Interledger

Internetworking for Money



Interledger Project

Invented at Ripple, Developed as a Standalone Open Project



Open Protocol



Community Group @ W3C

Banks

Central banks

Payments companies

Tech giants

Consulting companies

Blockchain companies

390+ Contributors



OUR INSPIRATION

The [History & Architecture](#) of the Internet

Internet Architecture



Application

HTTP SMTP NNTP NTP RTP

Transport

TCP UDP

Internetwork

IP

Network

WIFI BLUETOOTH ETHERNET



Interledger Architecture

Application

SPSP HTTP-ILP PAYTORRENT

Transport

IPR PSK STREAM

Interledger

ILP

Ledger

BLOCKCHAINS BANKS
MOBILE MONEY DIGITAL WALLETS



The Core is the Packet and Address Format

3.1. Internet Header Format

A summary of the contents of the internet header follows:

0	1	2	3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1			
Version	IHL	Type of Service	Total Length
Identification		Flags	Fragment Offset
Time to Live	Protocol	Header Checksum	
Source Address			
Destination Address			
Options		Padding	

IP Packet

```
InterledgerPrepare ::= SEQUENCE {  
    -- Local amount (changes at each hop)  
    amount UInt64,  
  
    -- Expiry date  
    expiresAt Timestamp,  
  
    -- Execution condition  
    executionCondition UInt256,  
  
    -- Destination ILP Address  
    destination Address,  
  
    -- Information for recipient (transport layer information)  
    data OCTET STRING (SIZE (0..32767))  
}
```

ILP Packet



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A "Ledger" Is Any System That Transfers Value



Bitcoin / BTC



ACH / USD



Interledger Architecture

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Interledger

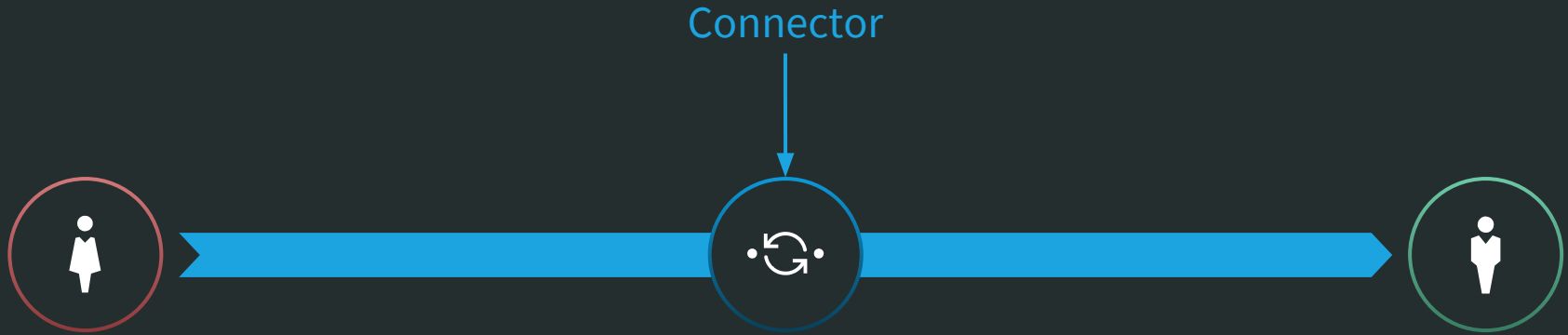
ILP

Ledger

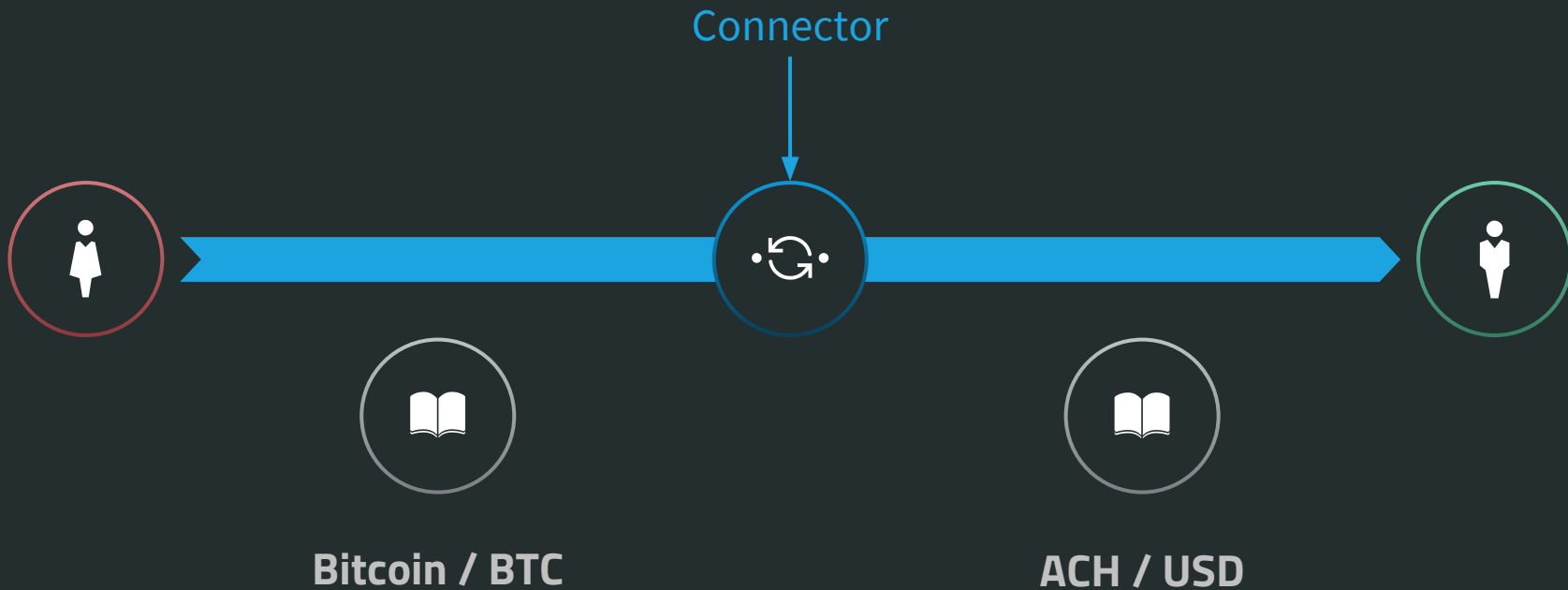
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Connectors Forward Packets



Connectors Settle on Ledgers



Interledger packets can be settled
on any ledger or even with cash.

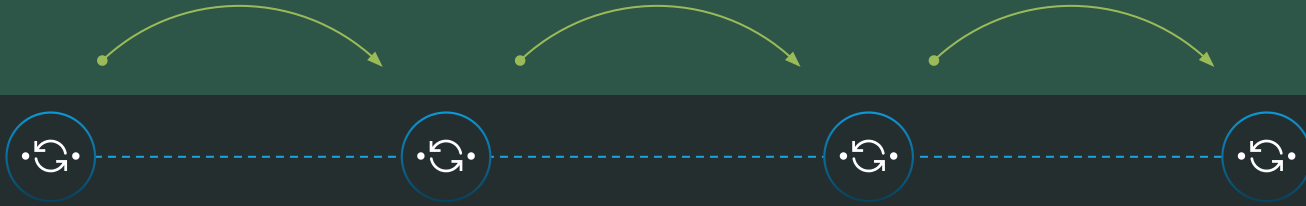


Packets Can Be Sent Across Any Number of Hops



Optimistic Execution

EXECUTE

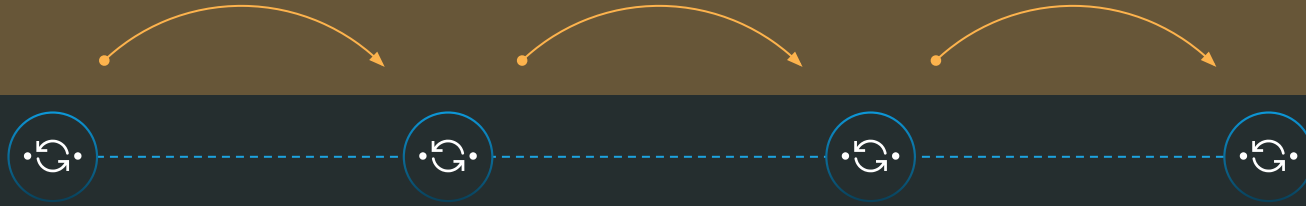


Optimistic Execution



Interledger: Two-Phase Execution Secures Multi-Hop Transfers

1. PREPARE



REFERENCES

J. Poon and T. Drya, *The Bitcoin Lightning Network: Scalable Off-Chain Instant Payments*, 2015

S. Thomas and E. Schwartz, *A Protocol for Interledger Payments*, 2015

Interledger: Two-Phase Execution Secures Multi-Hop Transfers

1. PREPARE

2. EXECUTE

REFERENCES

J. Poon and T. Drya, *The Bitcoin Lightning Network: Scalable Off-Chain Instant Payments*, 2015

S. Thomas and E. Schwartz, *A Protocol for Interledger Payments*, 2015

Interledger Architecture

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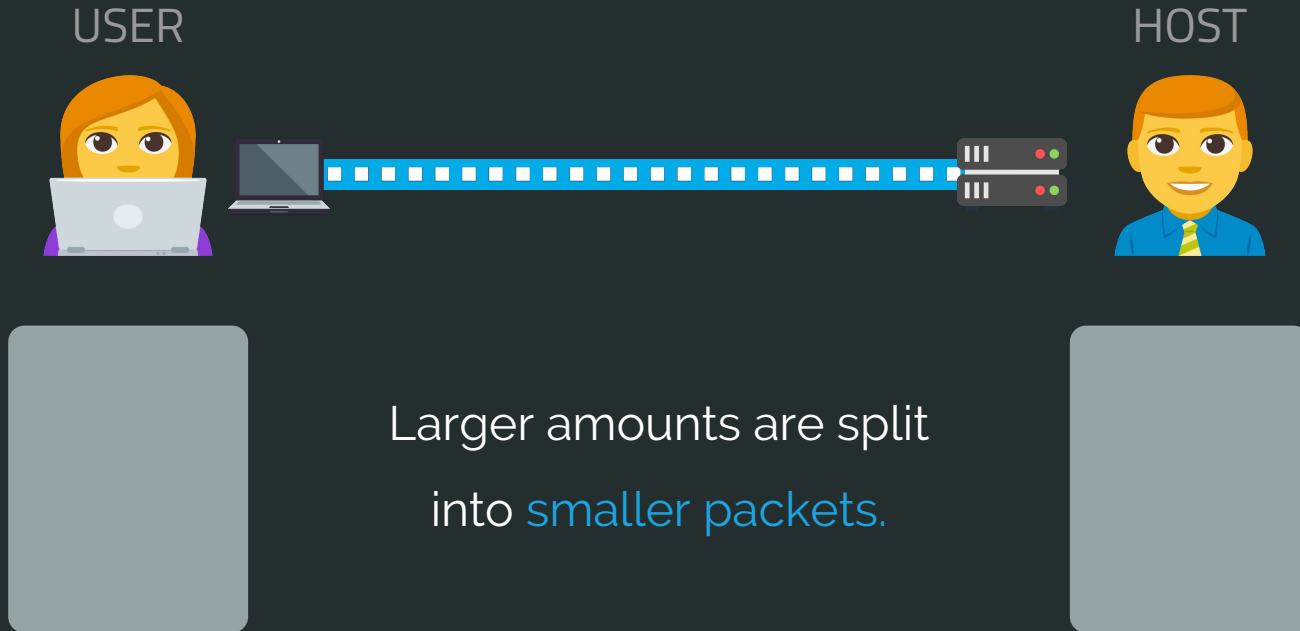
Streaming Payments



STREAM can stream **data + money** over Interledger.



Penny Switching



Interledger Architecture

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Interledger

ILP

Ledger

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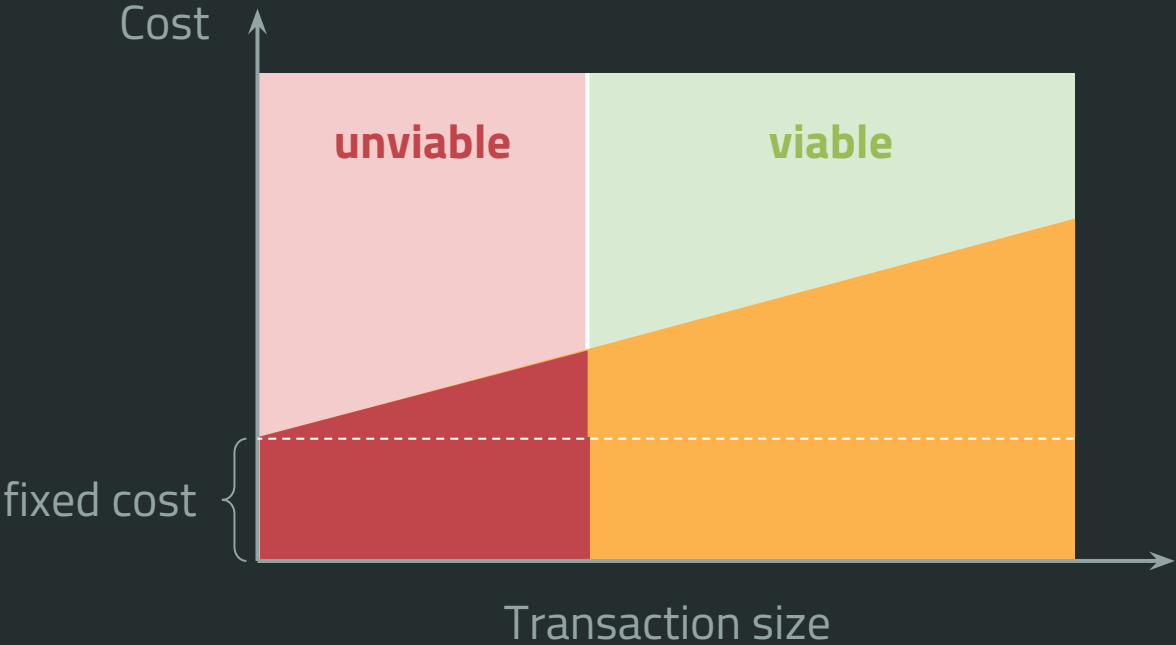


DEMO

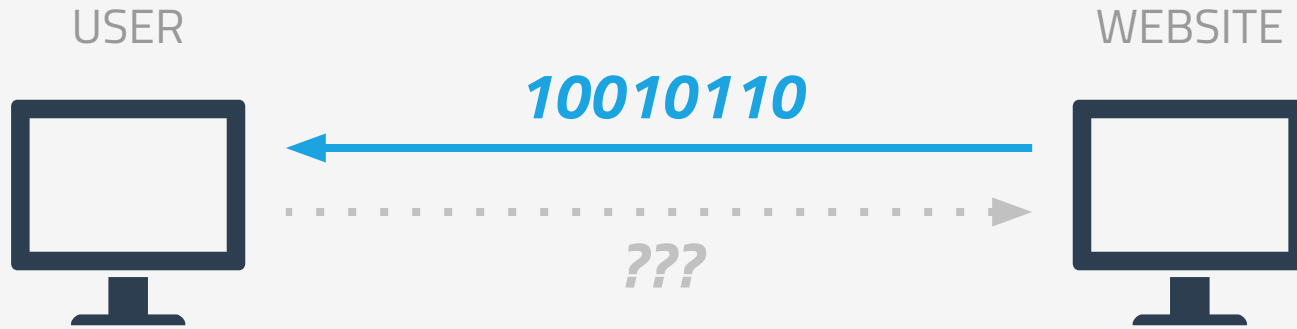
Merchant Checkout With Chunked Payments



Fixed Costs Make Micropayments Unviable



The Internet Economy is Incomplete



Today: The Web is a **Barter Economy**

Barter is Extremely Inefficient

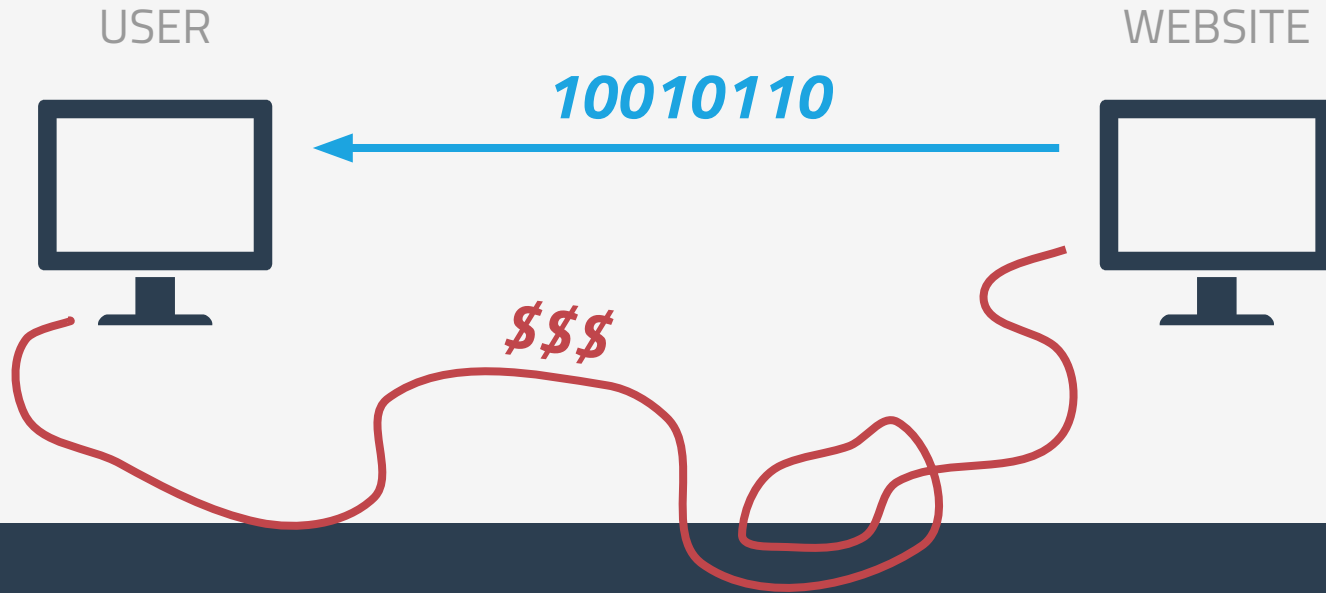
“

There may be many people wanting, and many possessing those things wanted; but to allow of an act of barter, there must be a **double coincidence**, which will rarely happen.

- *William S. Jevons, 1875*

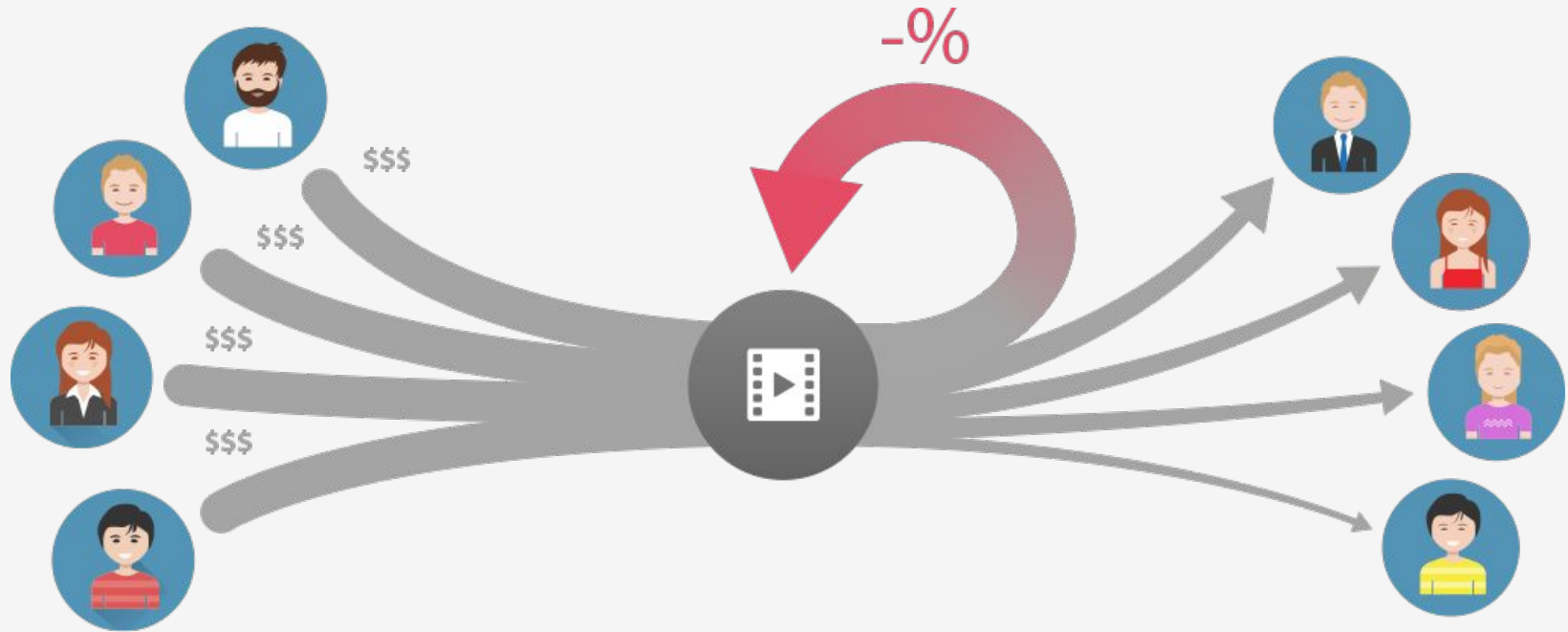


So We Use Hacks to Get Around the Problem



Hacks: Ads, Surveys, Bundling, ...

Dominance of Marketplaces



When an online service is free,
you're not the customer.

You're the product.

Tim Cook, CEO Apple



Ads Ruin the User Experience

SECTIONS

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ELECTION 2016

Clinton Still

WORLD SERIES



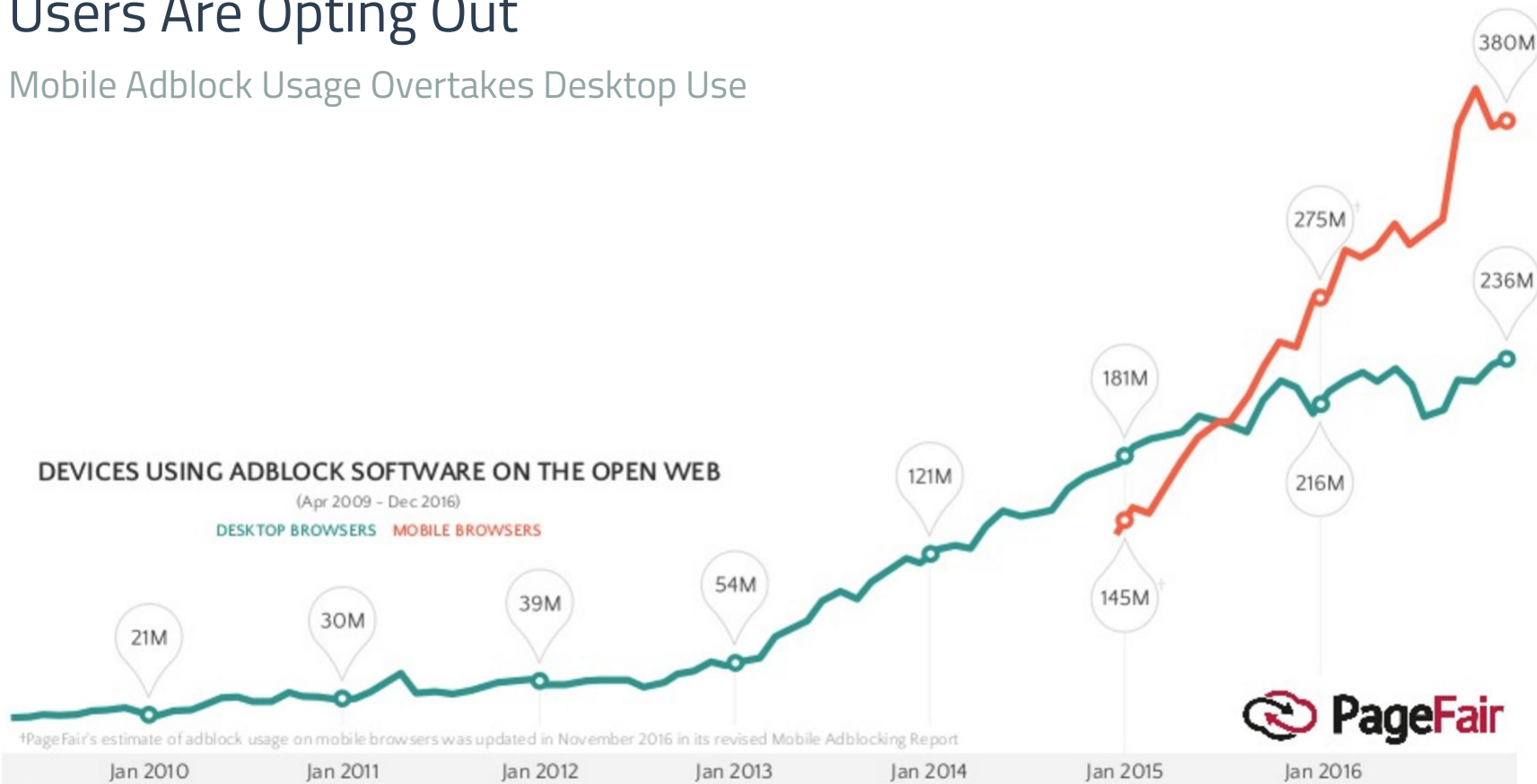
The Opinion Pages

A Stronger Court for Crimes Against Humanity

ROOM FOR DEBATE
Why Are Ballot Measures So Confusing?

Users Are Opting Out

Mobile Adblock Usage Overtakes Desktop Use



*PageFair's estimate of adblock usage on mobile browsers was updated in November 2016 in its revised Mobile Adblocking Report



Money Solves the Barter Problem



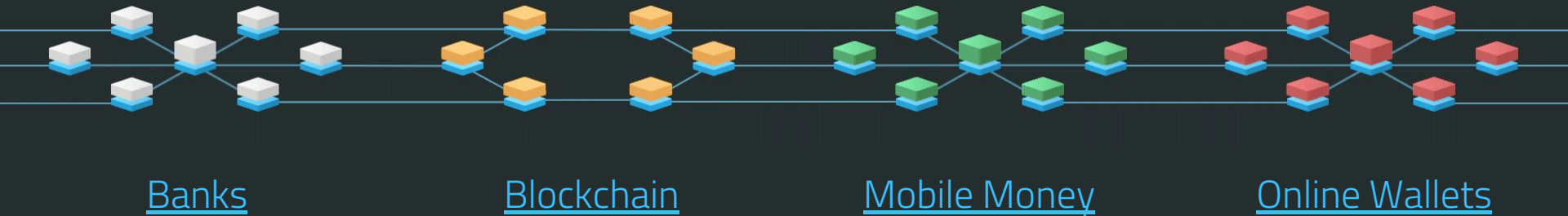
Money: Better than Barter Since 5000 BC

DEMO

Streaming Micropayments for Content



Help build the Internet of Value!



 interledger.org

 [@interledger](https://twitter.com/interledger)

