The Future of Payments

W3C Web Payments, and The Interledger Protocol

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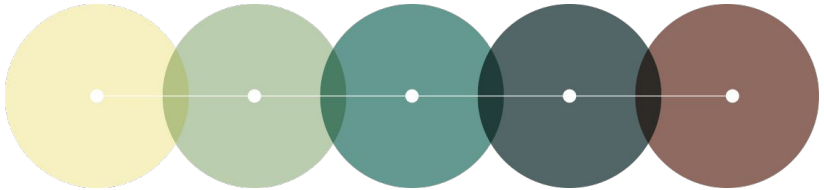


What is the future of payments?

Image credit: https://www.pexels.com/photo/smart-watch-smartwatch-futuristic-technology-9051/


How will we
get there?

In the future there will be no payments...

Because in the future:

- Payment initiation will be **frictionless**
- Payment networks will be **interoperable**

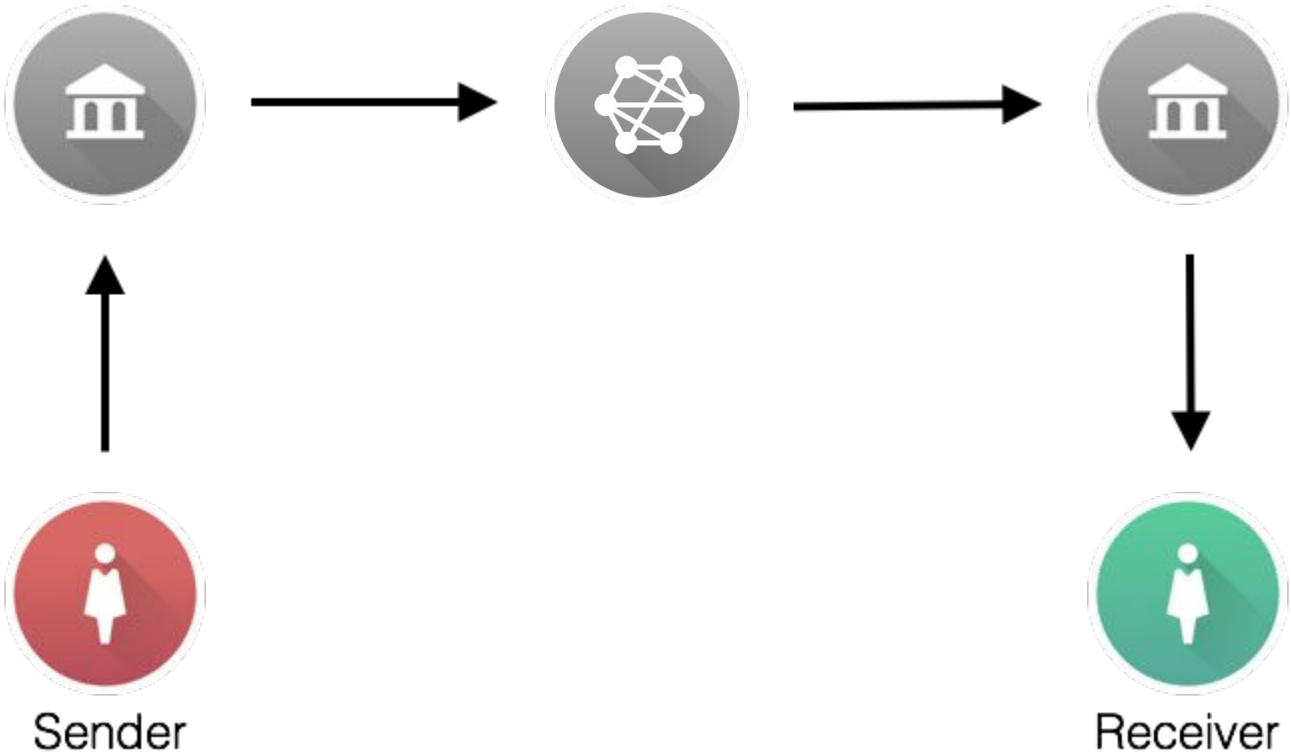
- New **business models** will be viable
- New **ecosystems** will emerge

In the future there will be no payments...

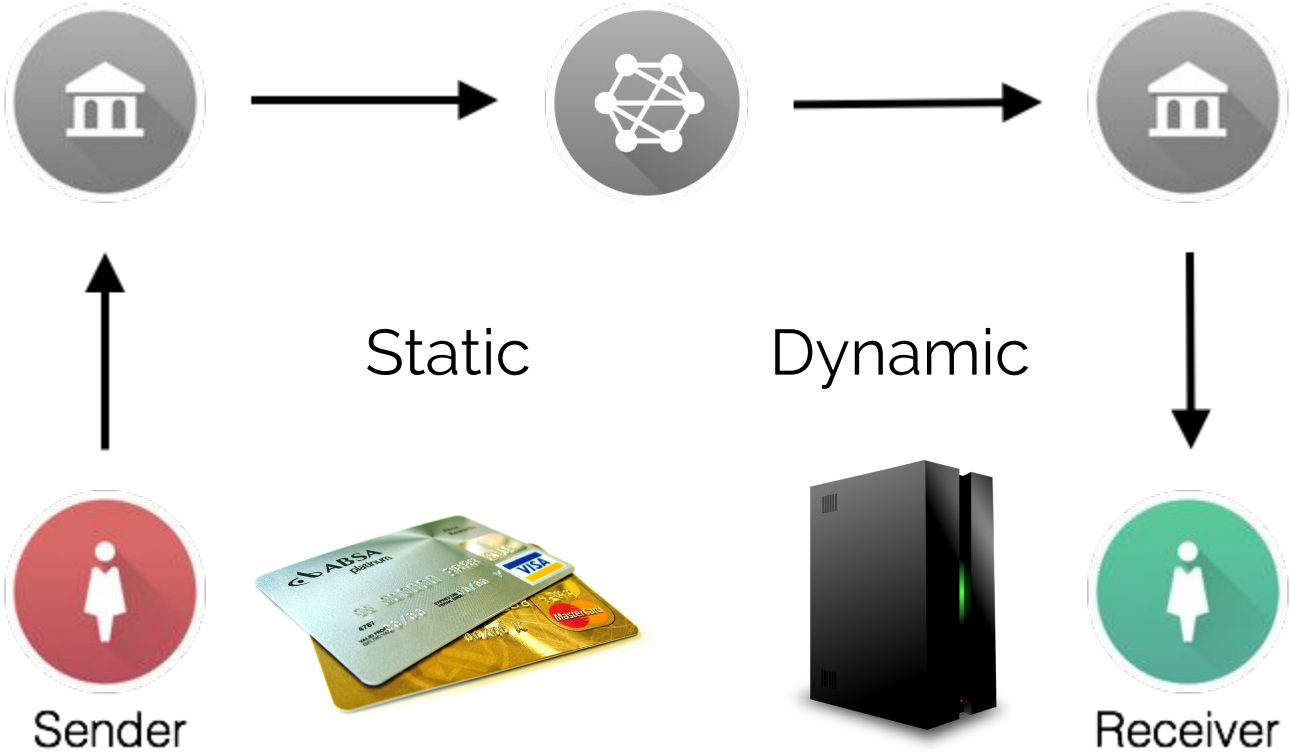
...because payments will be completely **UBIQUITOUS**


Getting there...
1. Standardize the handshake
2. Standardize the messaging
3. Standardize the transport

The 4-corner model



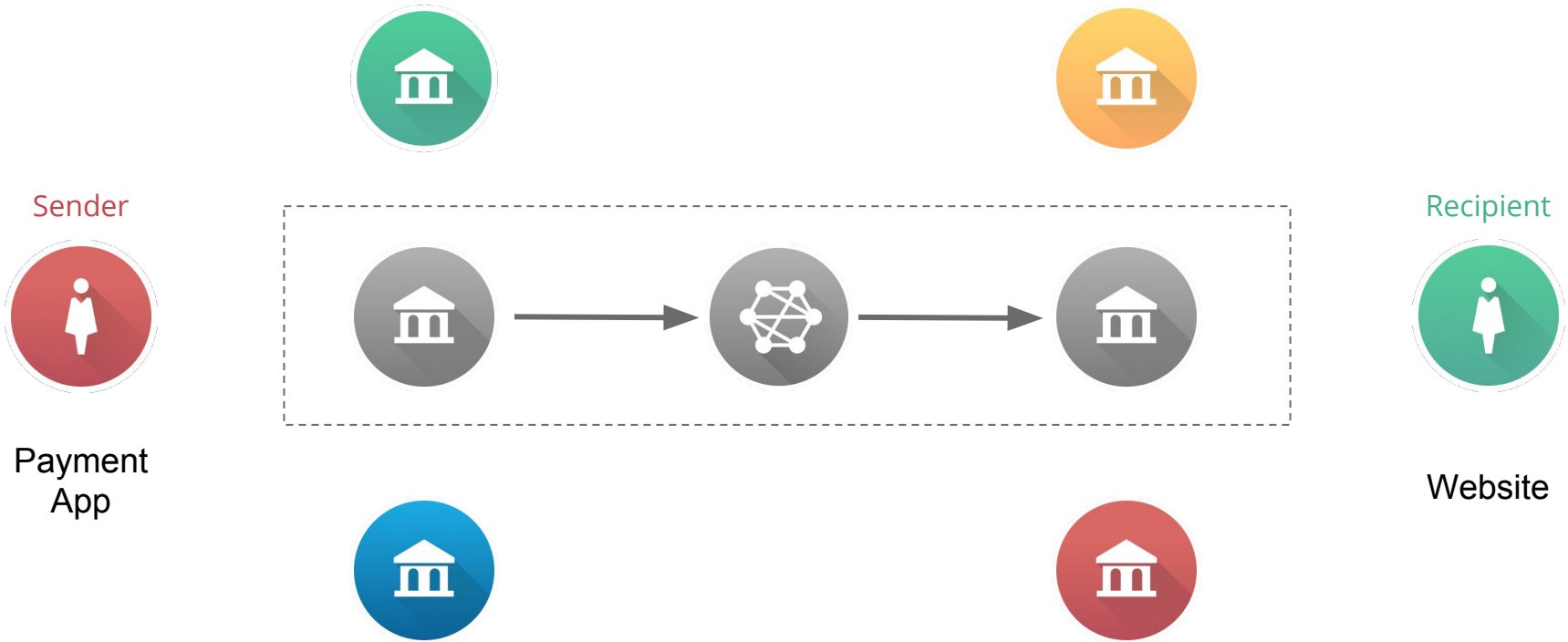
Payee centric model



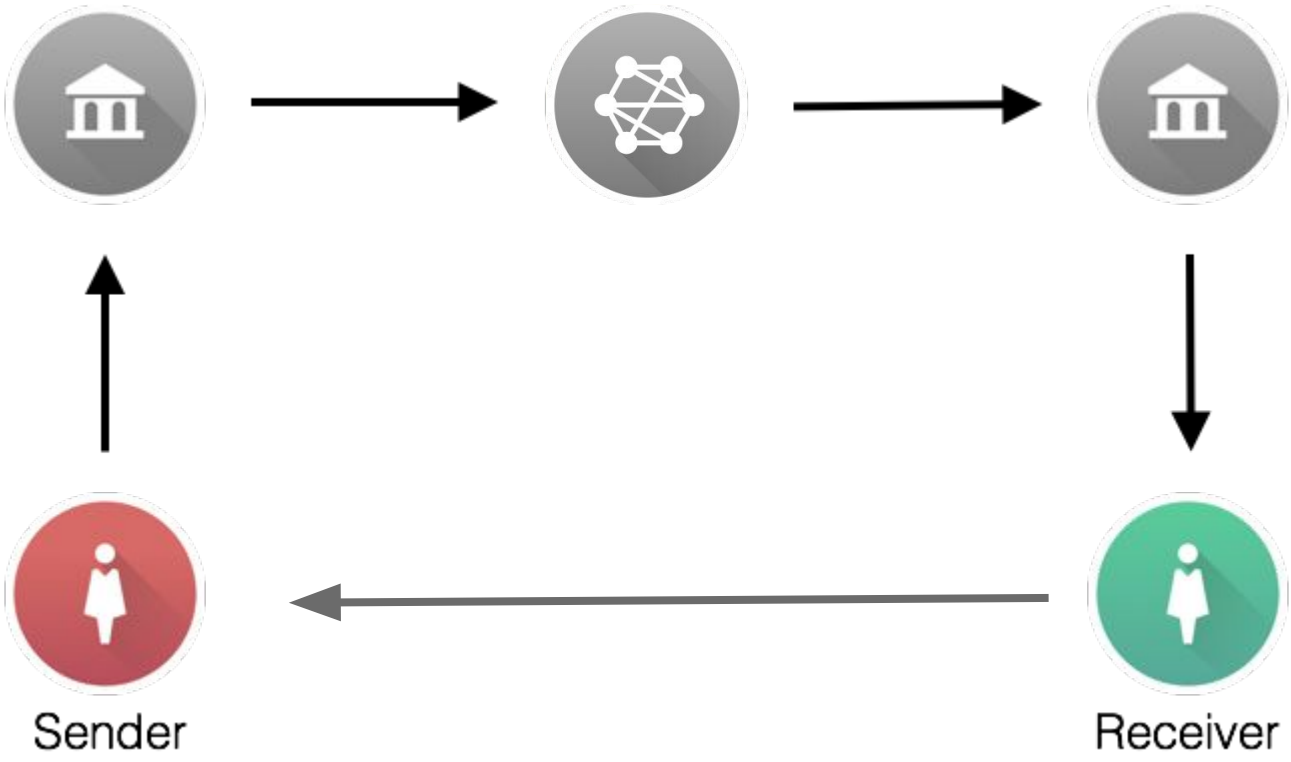
Introducing Payment Apps

Photo credit: https://www.flickr.com/photos/78855484@N03/7223384344

Matchmaking based on payment methods

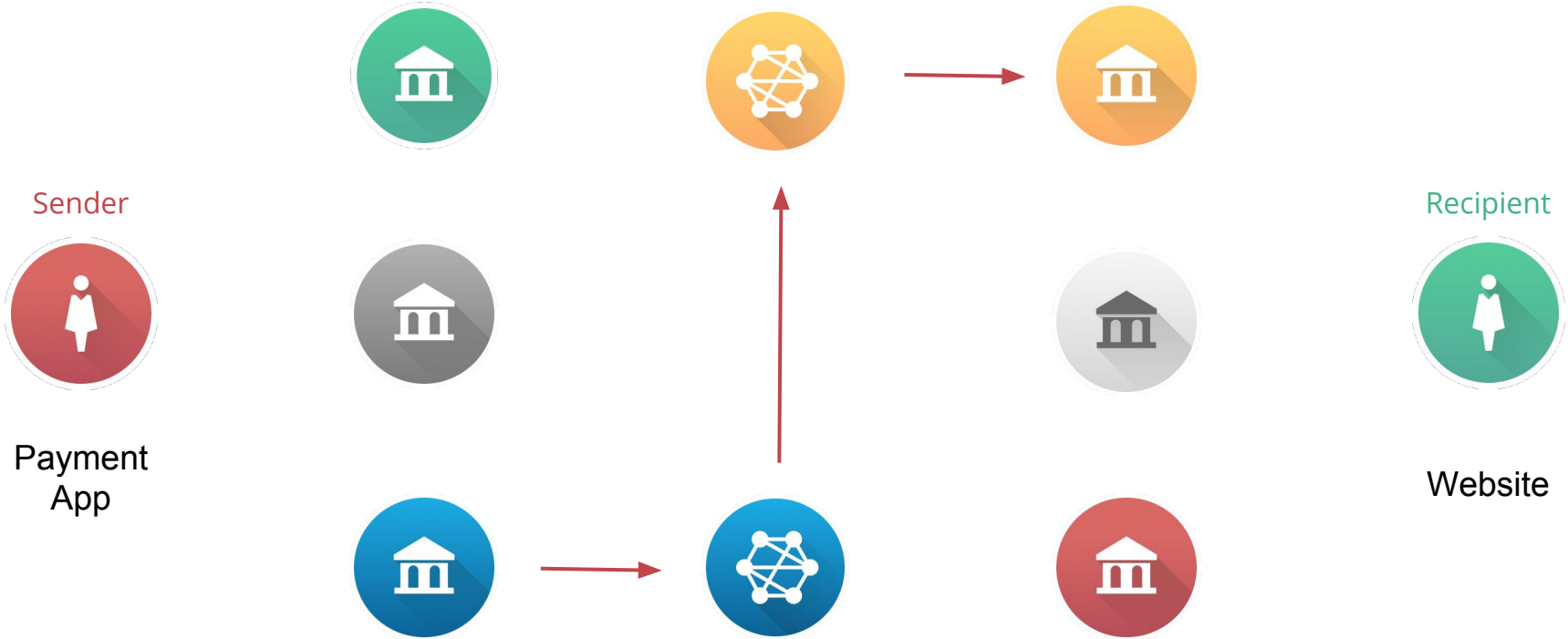


The circle is complete

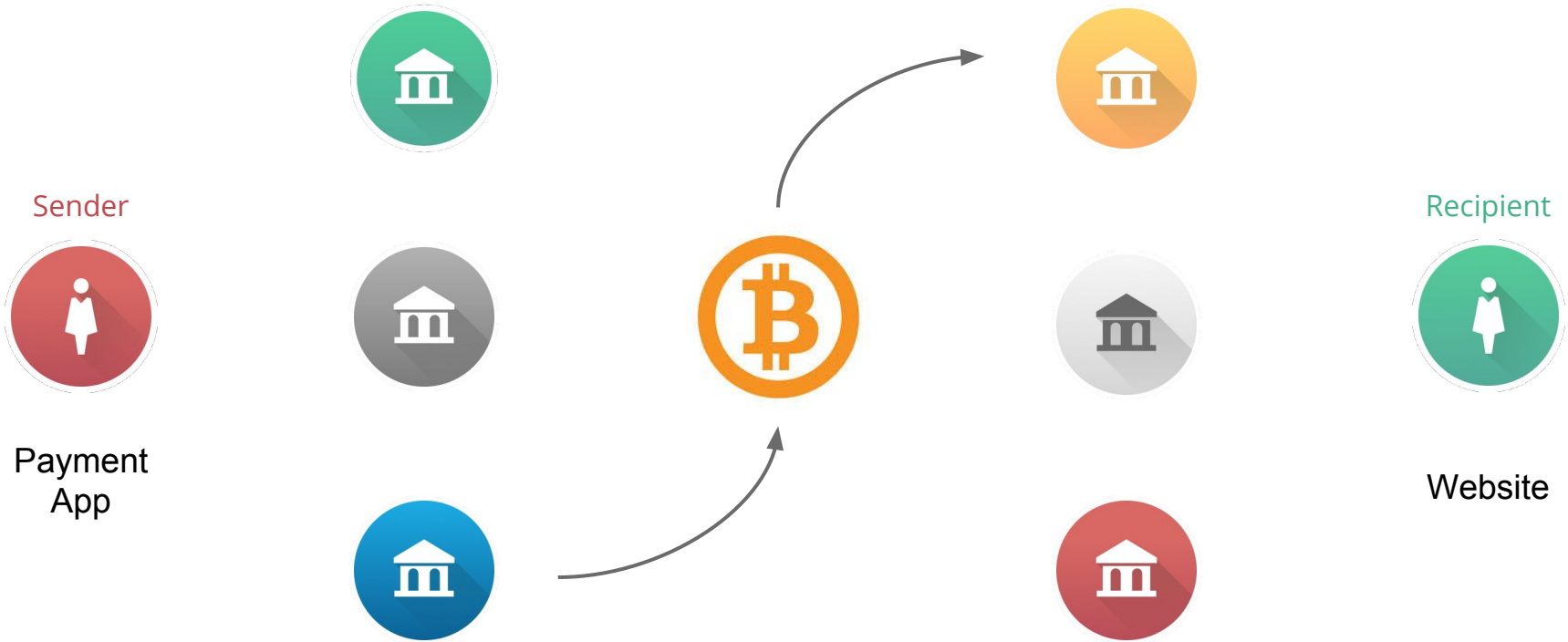


What if there is no common payment method?

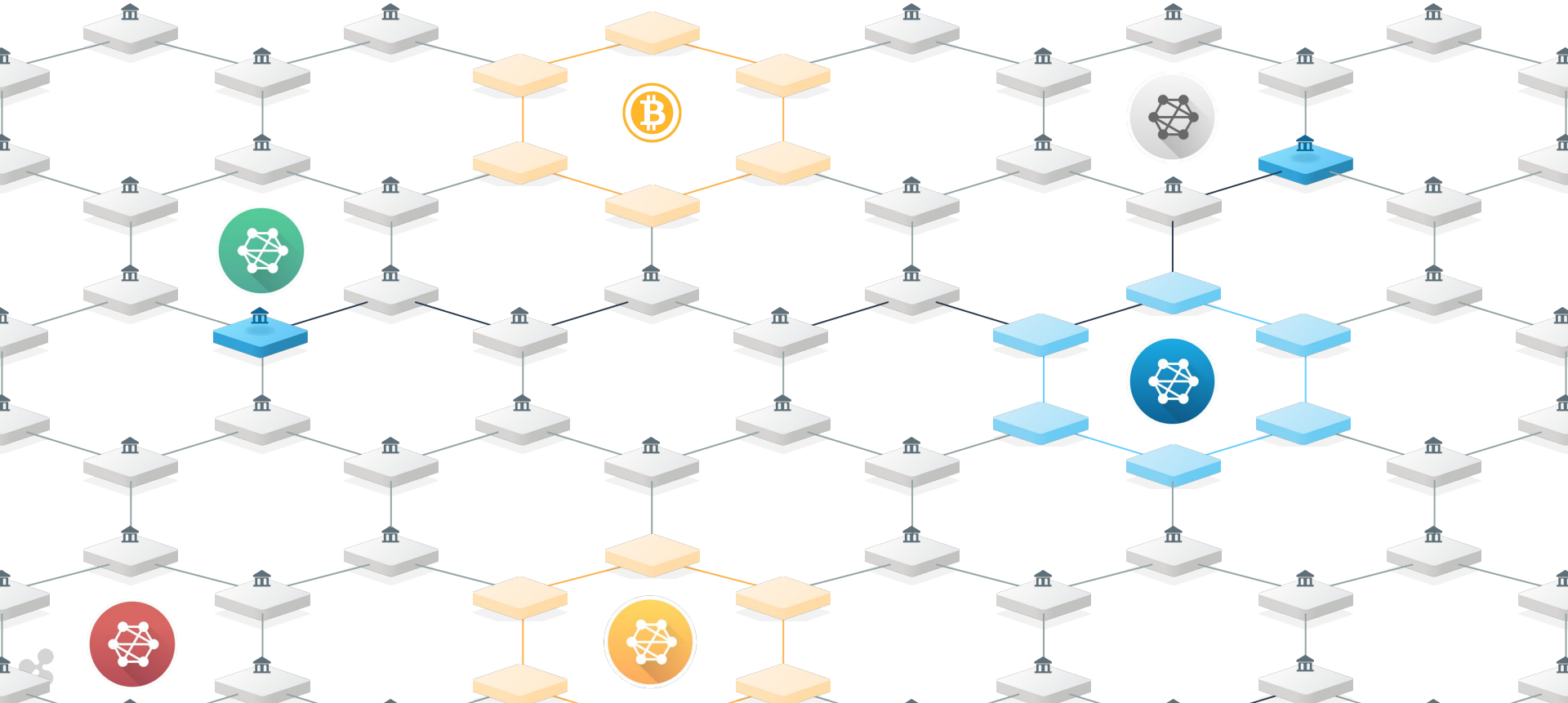
We need a way to pay **across** networks?



And the answer is not **another** network

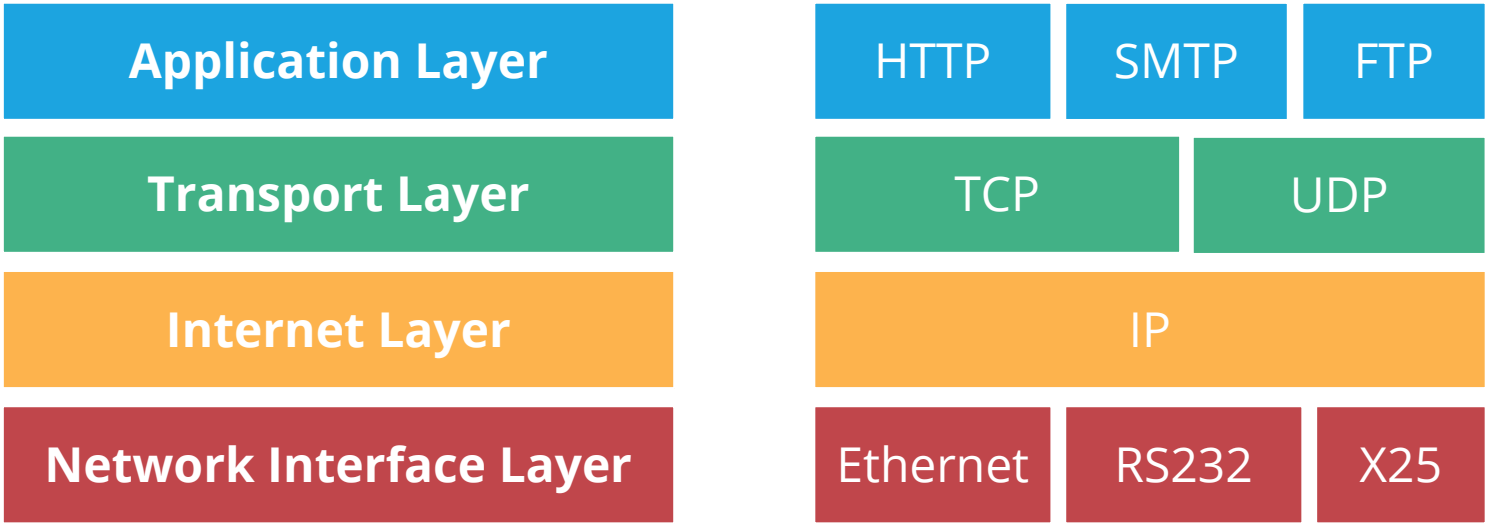


It’s a network of networks



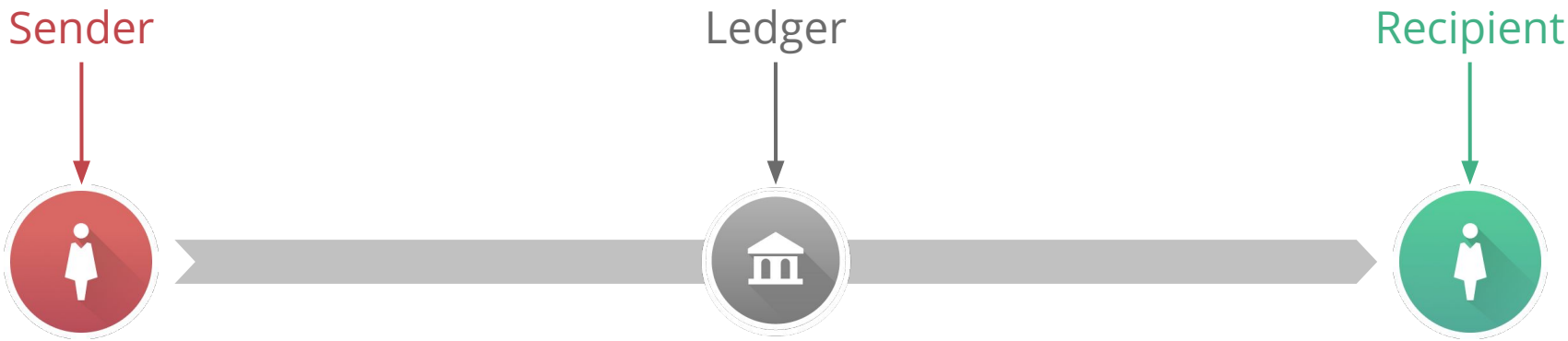
Lessons from the evolution of the Internet

RFC 1122 - Requirements for Internet Hosts -- Communication Layers
RFC 1123 - Requirements for Internet Hosts -- Application and Support
RFC 1009 - Requirements for Internet Gateways



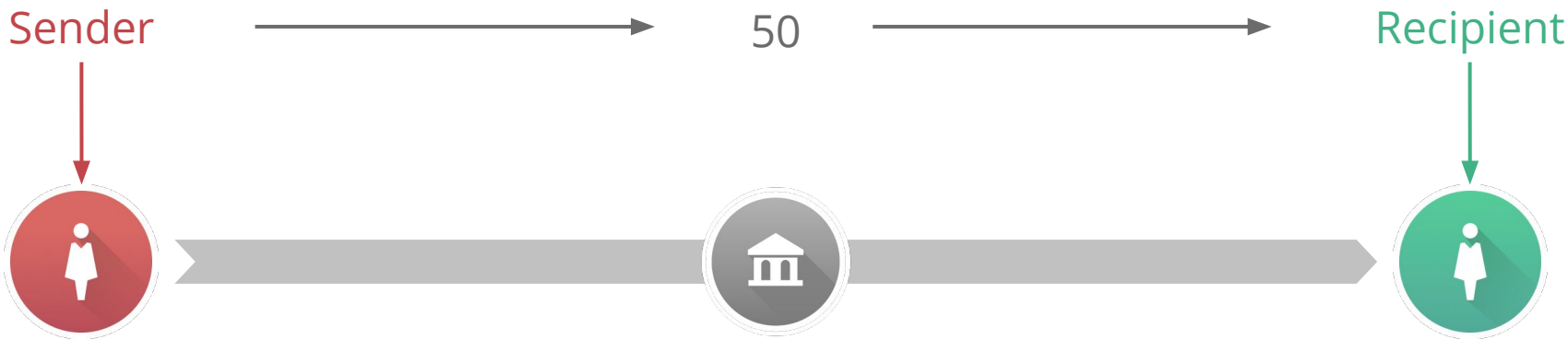
But, how do you actually **move** digital assets?

Well, digital assets are just balances in a ledger



Sender	100
Receiver	0

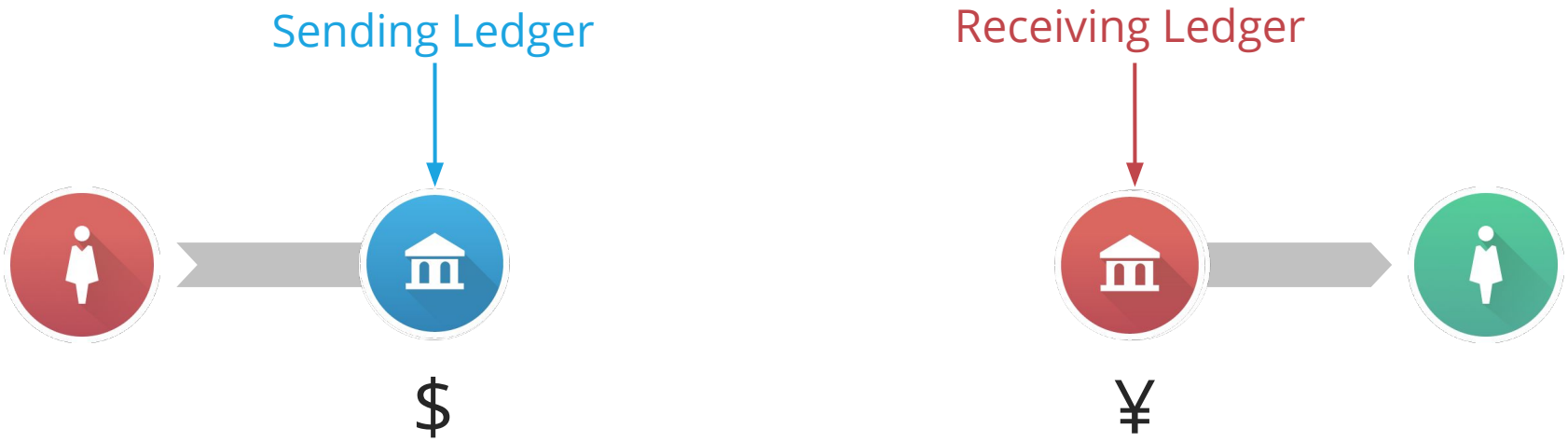
So you just change the balances in the ledger



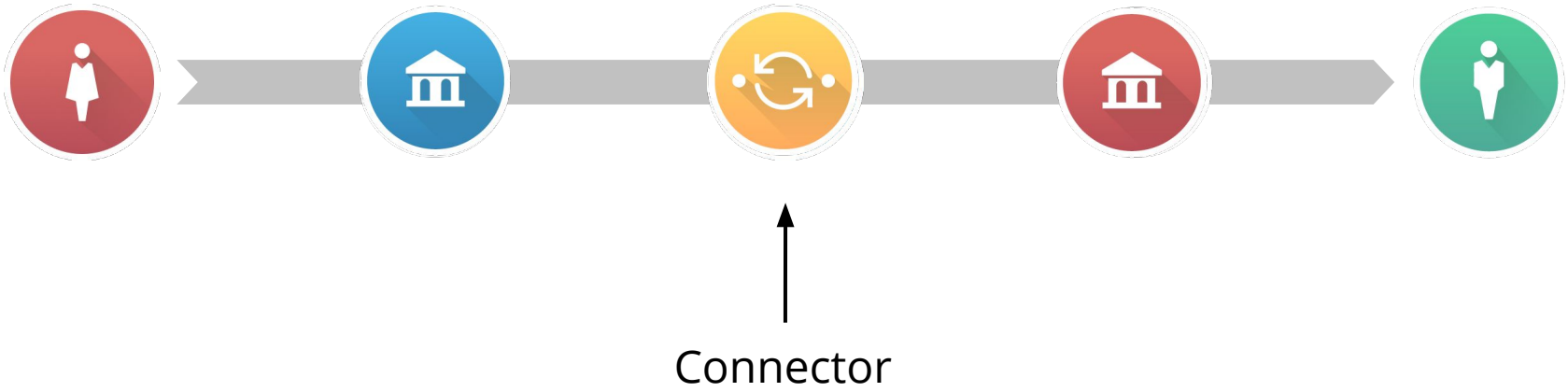
Sender	50	50
Receiver	50	

Ledger protocols move assets in a ledger

But not everyone has accounts on the same ledger



We need a connector that has accounts on both ledgers. A digital asset “switch”.

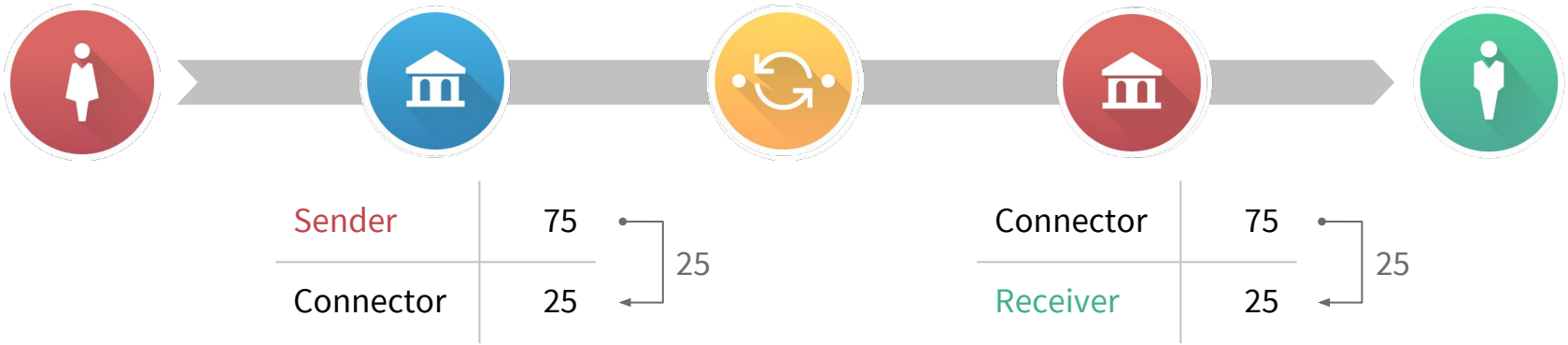


The connector accepts a transfer on one ledger in exchange for making a transfer on another

Sender	100
Connector	0

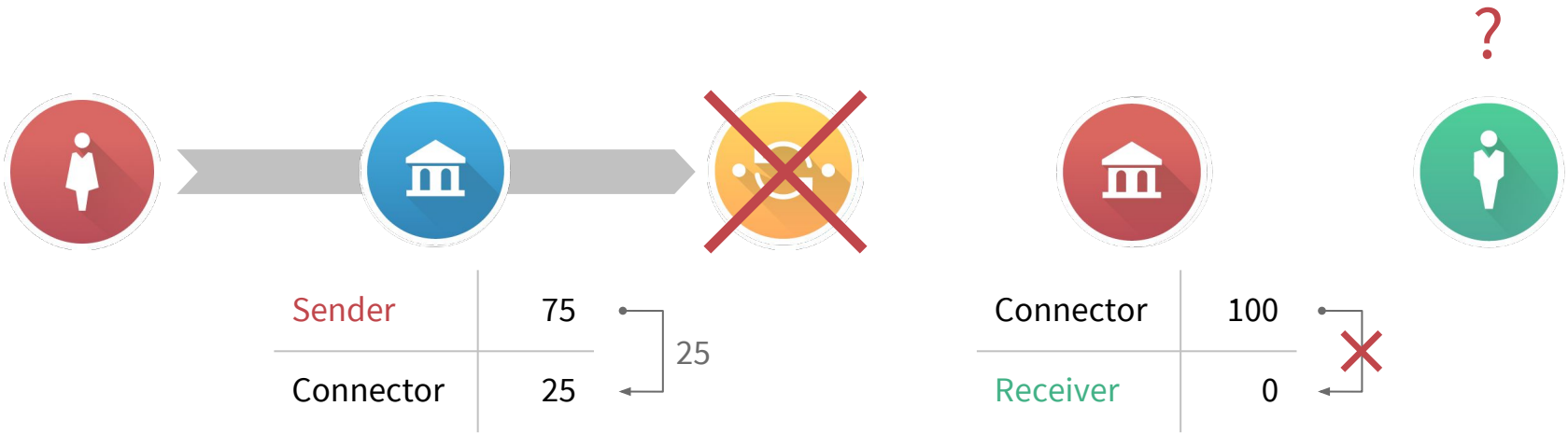
Connector	100
Receiver	0

The result is that the assets **move** from the sender's account to the receiver's



The Interledger protocols define how connectors route and transfer digital assets between ledgers

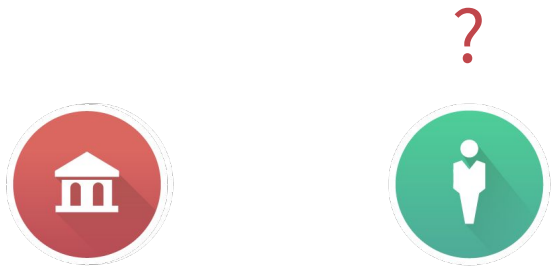
But how can we be sure the connector won't drop the transfer?



Different transport layer protocols offer different delivery guarantees

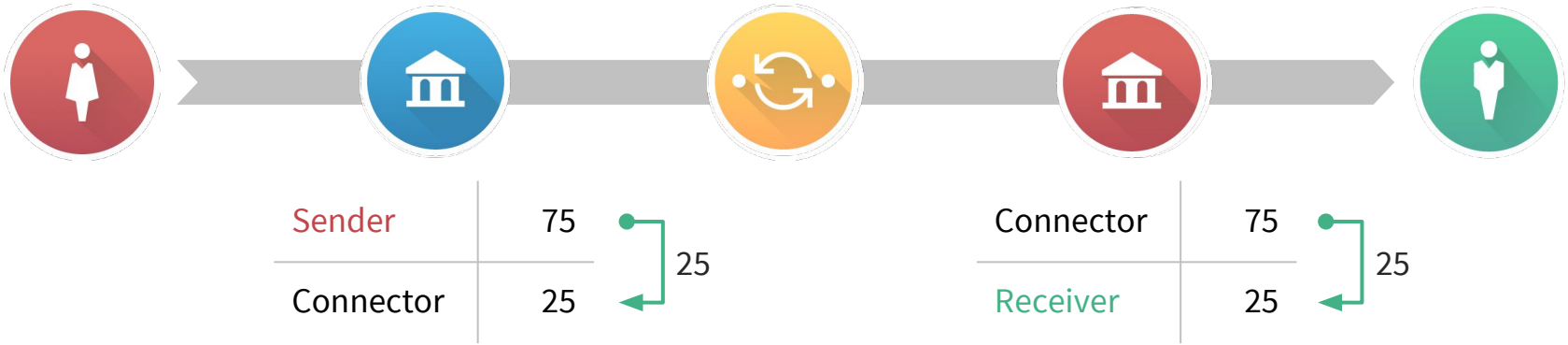
Optimistic Transfer Protocol is… optimistic

- High volume, extremely low value use cases
- Micropayments



To improve on OTP we need **atomicity**.

Either all transactions complete...



...Or none of them do

Sender	100
Connector	0

Connector	100
Receiver	0

This problem is commonly solved using the **two phase commit** pattern for transaction atomicity.

To support the Universal Transfer Protocol ledgers must be capable of staging a transfer through escrow

Sender	100
Escrow	0
Connector	0

Connector	100
Escrow	0
Receiver	0

The payment is prepared by putting assets in **escrow** on each ledger and all ledgers agreeing on a **release condition** proposed by the receiver

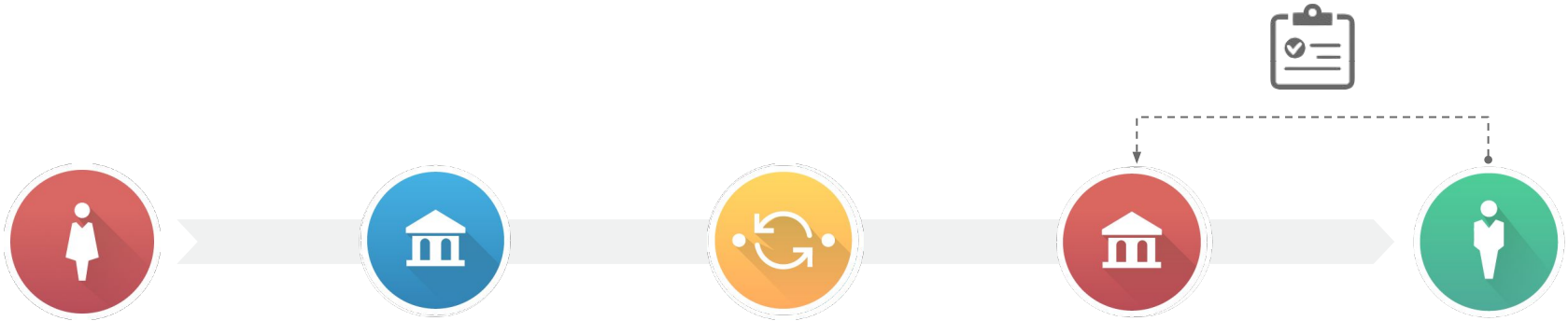
Sender	75
Escrow	25
Connector	0

25

Connector	75
Escrow	25
Receiver	0

25

The payment is executed by **releasing funds** to the **receiver first** and then passing the signed release fulfillment back down the line

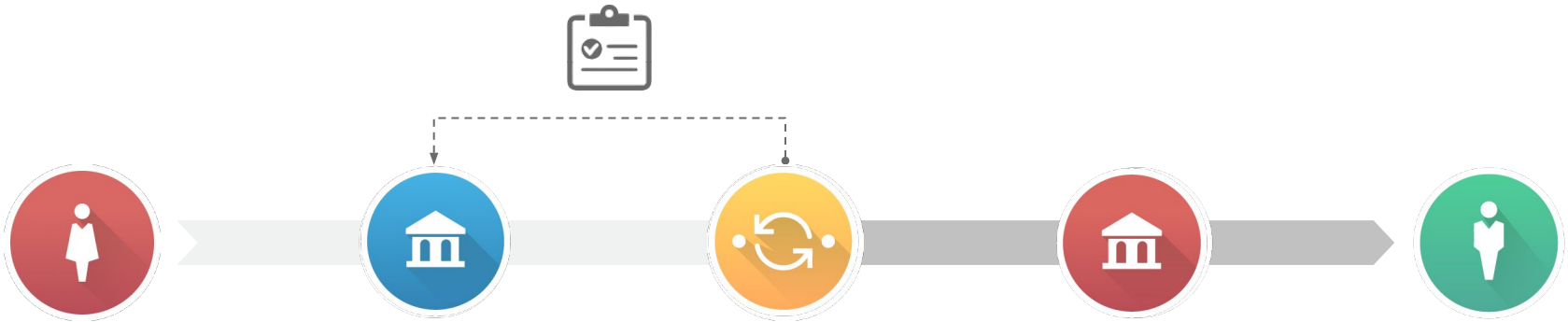


Sender	75
Escrow	25
Connector	0

Connector	75
Escrow	0
Receiver	25

25

Connectors have an incentive to pass the fulfillment proof to the next and get paid

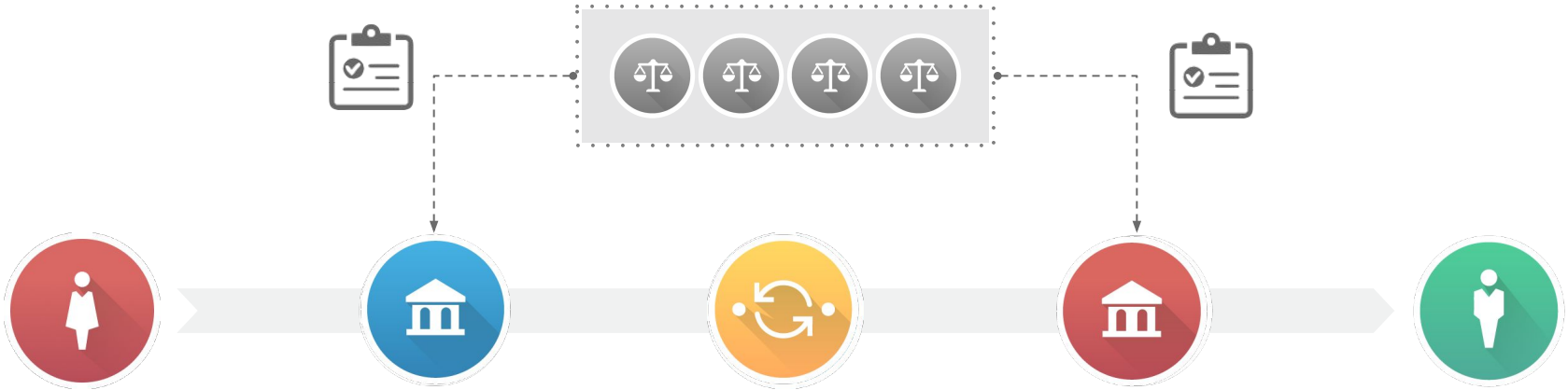


Sender	75
Escrow	0
Connector	25

25

Connector	75
Escrow	0
Receiver	25

The Atomic Transfer Protocol uses trusted **notaries** to trigger the execution of the transfers



Sender	75
Escrow	0
Connector	25

25

Connector	75
Escrow	0
Receiver	25

25

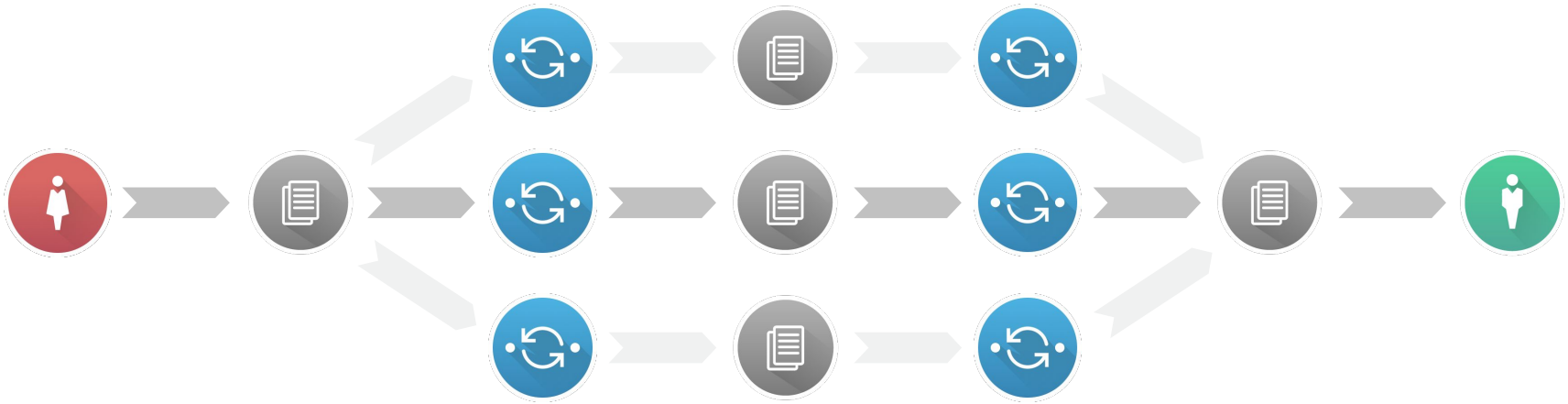
These basic building blocks enable digital assets to be securely relayed across **multiple ledgers and networks**

Chained Payments

From any sender to any receiver through one or more connectors

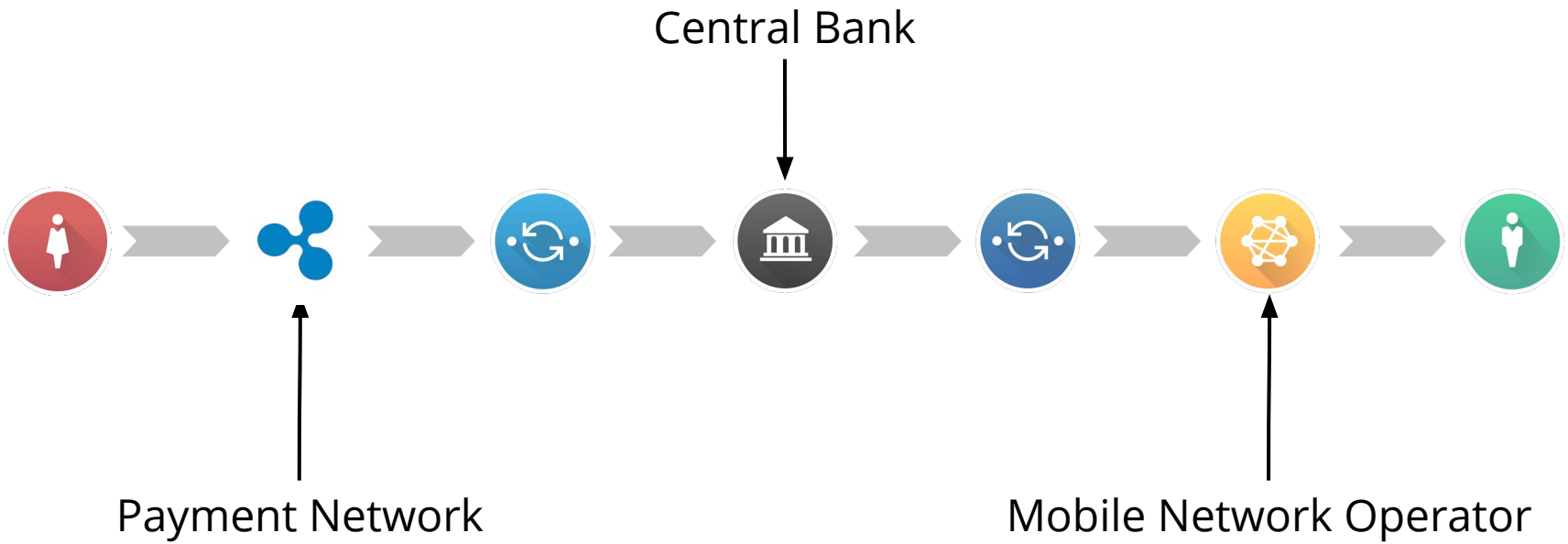
Limitlessly Scalable

Connectors and Ledgers can be added to handle more payments



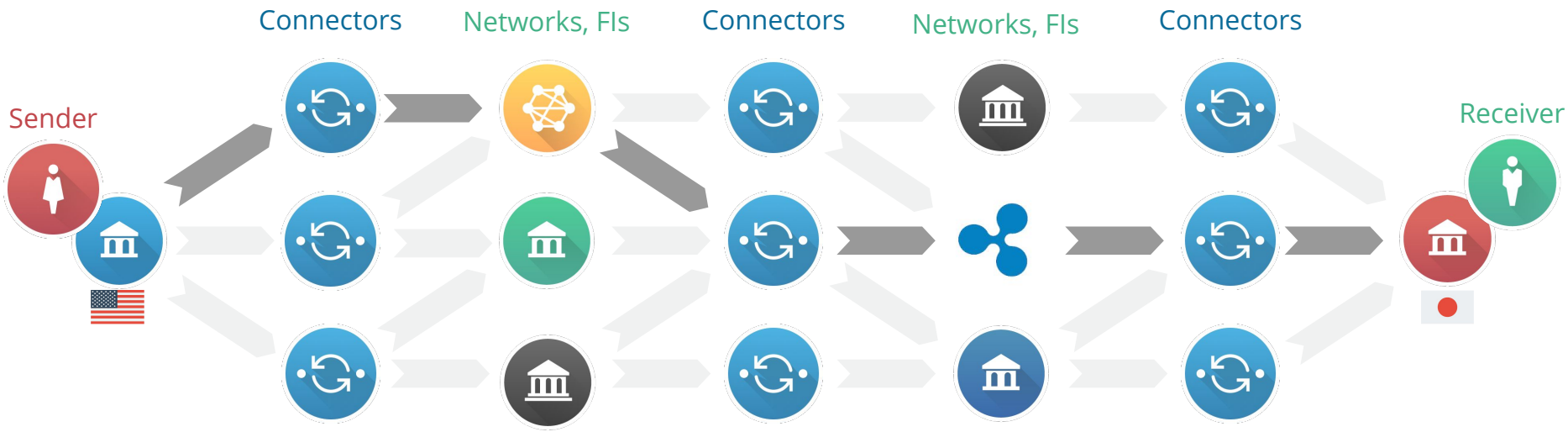
Connecting Disparate Systems

Minimal standard to link banks, networks, telcos, etc

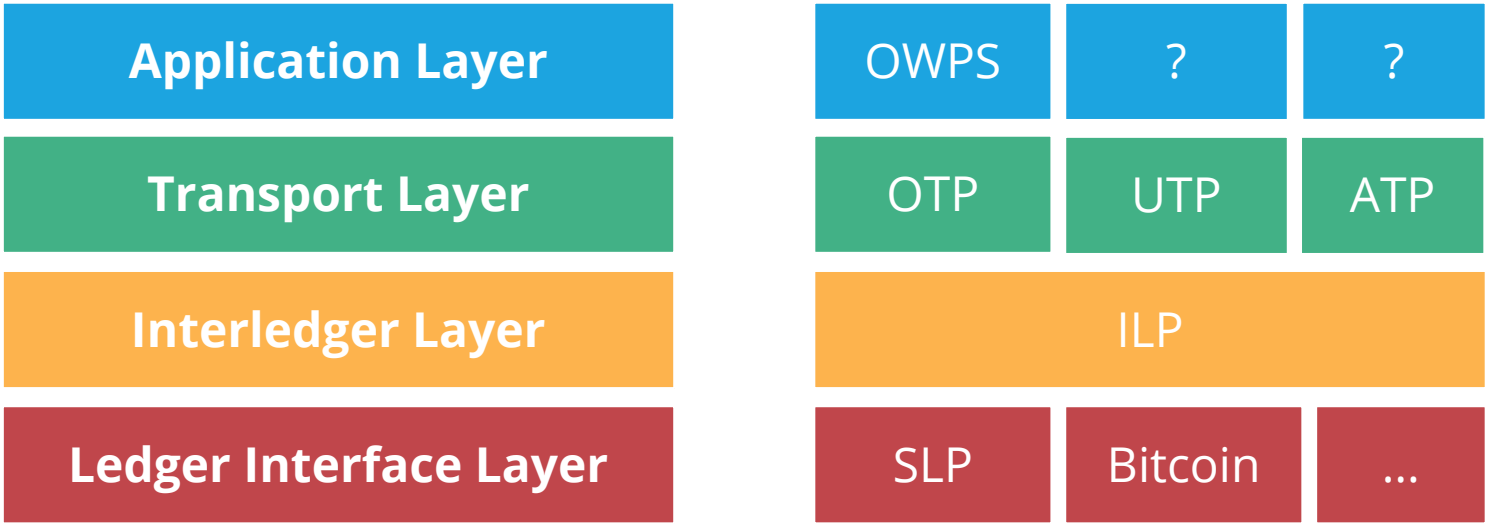


Free the world's liquidity

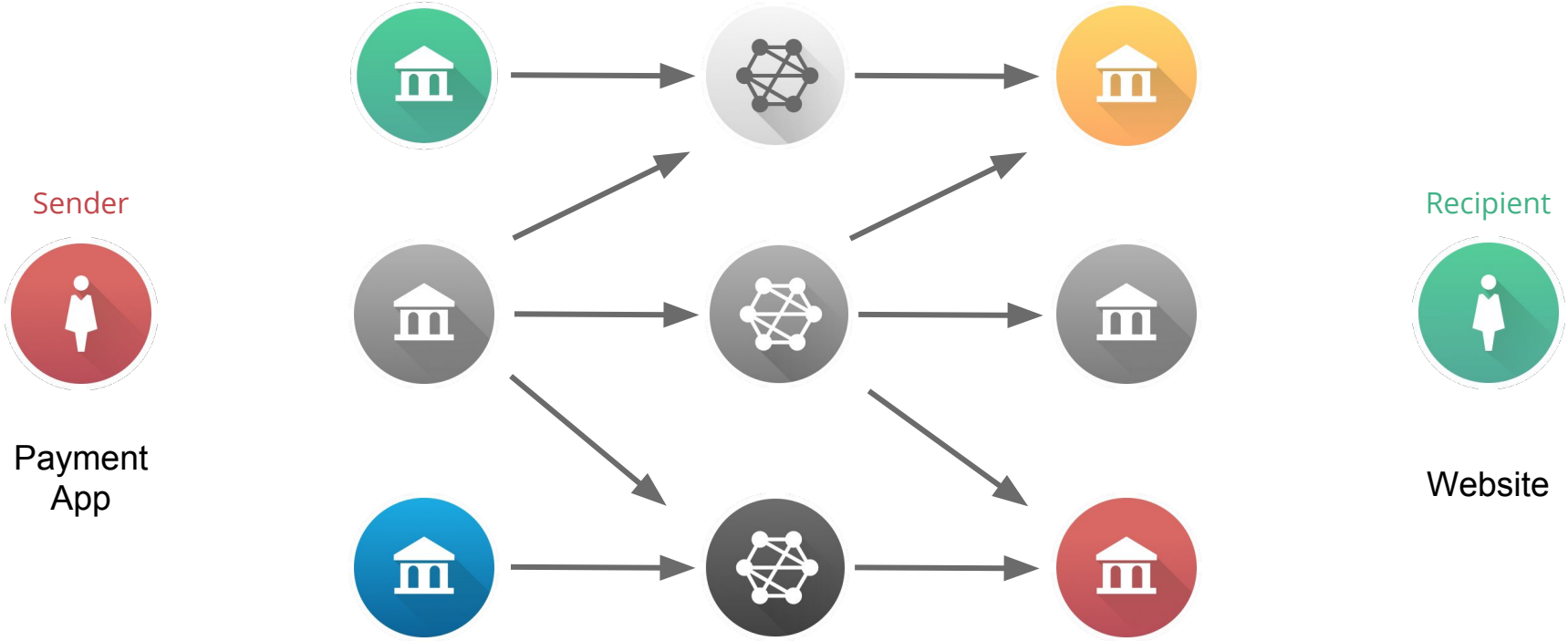
Unlocking liquidity from multiple sources to lower capital costs



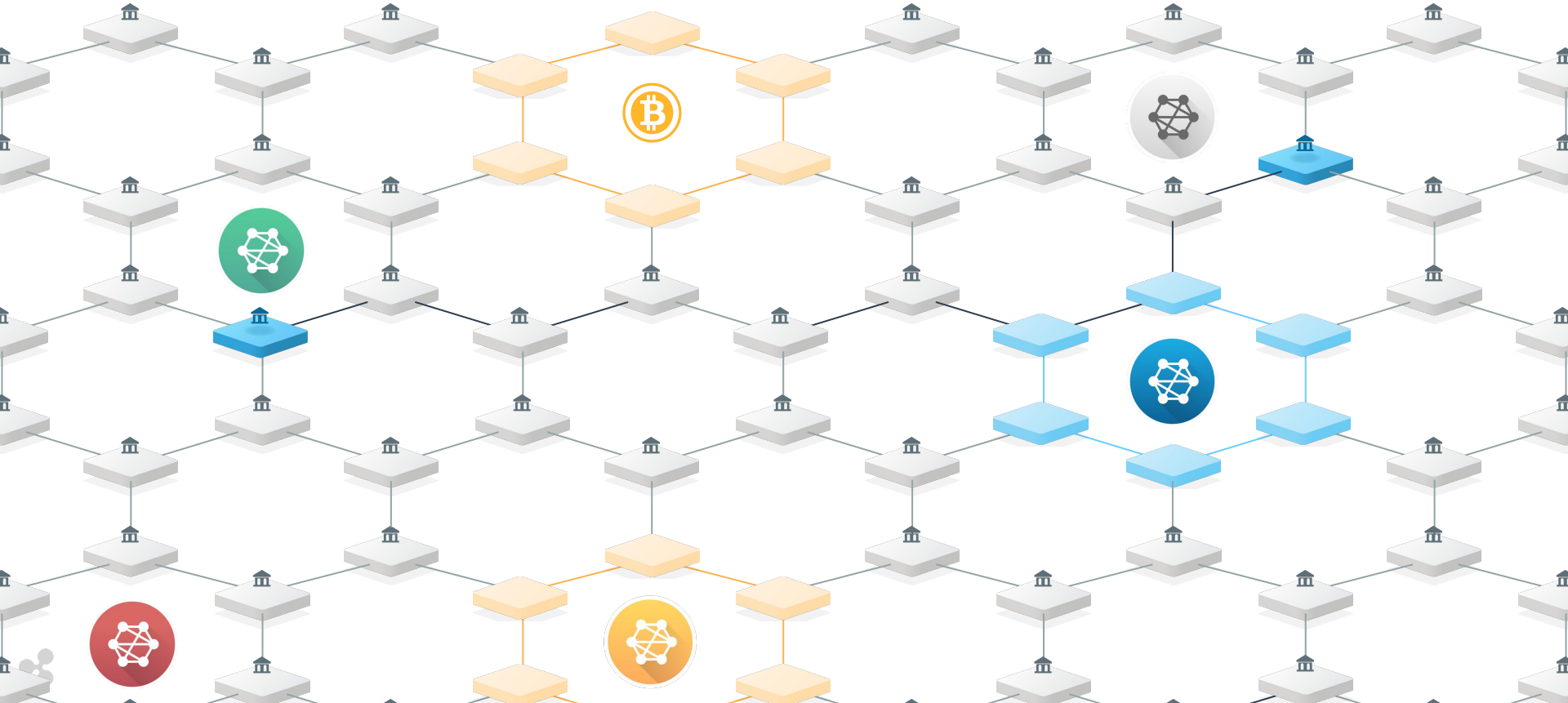
Use case specific application layer protocols can be developed on top of the Interledger stack



Open Web Payment Scheme provides basic consumer payments across networks



Payment Apps + Interledger = ?



Payment Apps + Interledger = ?

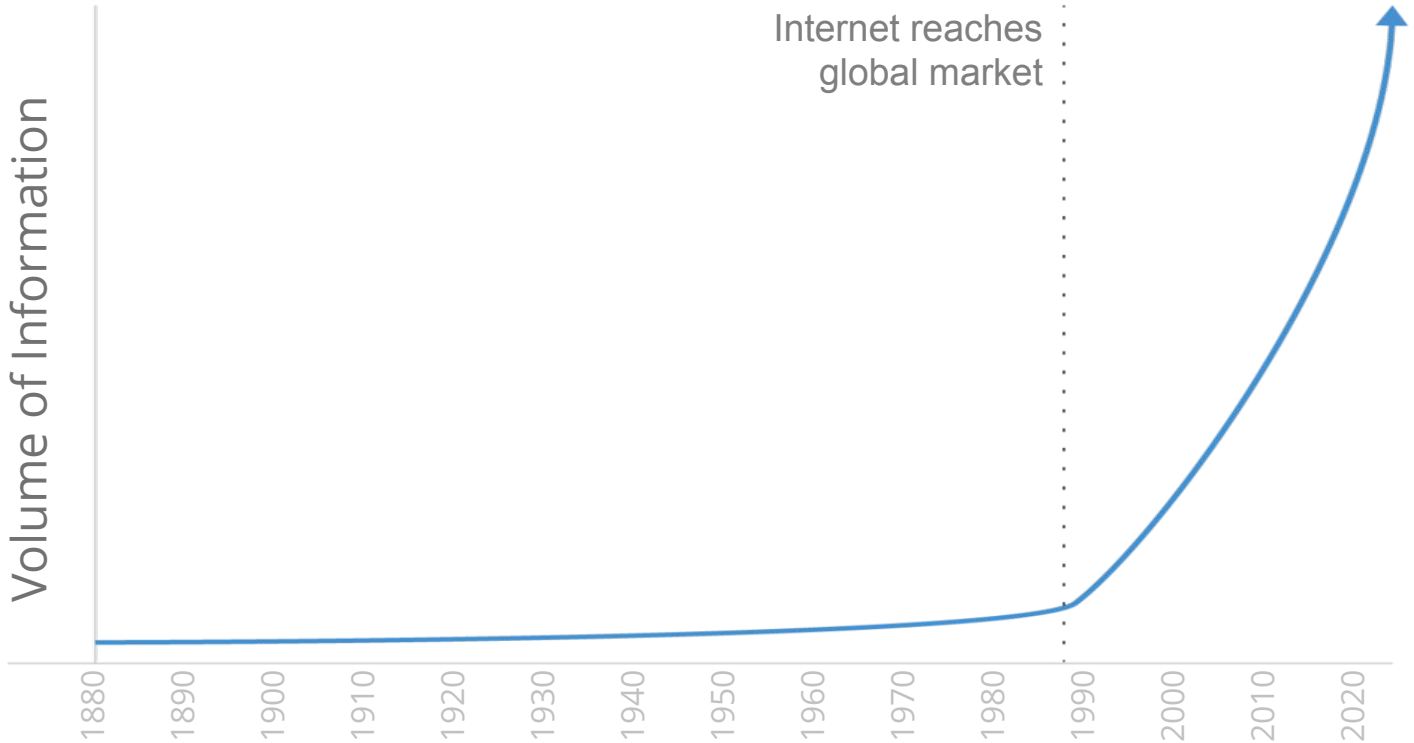
- Autonomous payments and the Internet of Things
  - Massive increase in global payments volume
  - Financial incentives driving new behaviour

- Micropayments-based business models
  - Goodbye advertising and DRM
  - Privacy and convenience… together

- Personal ledgers

Increasing speed increases the volume

Information exchange exploded because of the Internet's speed and reach



402

Payment Required

This code is **reserved for future use**

https://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html#sec10.4.3

402

Payment Required

This code is **ready for use**

https://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html#sec10.4.3

Thank You

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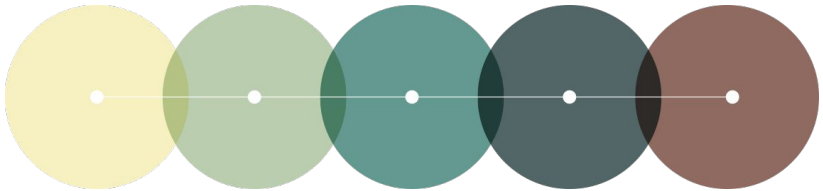
Web Payments Activity
https://w3.org/payments



Interledger Protocol
https://interledger.org