The Future of Web Payments

W3C Web Payments, and
The Interledger Protocol

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In the future:

- Payment initiation will be *frictionless*
- Payment networks will be *interoperable*
- New *business models* will be viable
- New *ecosystems* will emerge
Increasing speed increases the volume

Information exchange exploded because of the Internet’s speed and reach.
Getting there...

1. Standardize the *handshake*
2. Standardize the *messaging*
3. Standardize the *transport*
The 4-corner model
Payee-centric model
Introducing Payment Apps

Payment Request API

Sender → Payment Request API → Receiver

Photo credit: https://www.flickr.com/photos/78855484@N03/7223384344
The circle is complete
W3C Web Payments

- **Payment Request API**
  
  Defines how payment is initiated

- **Payment Apps API**
  
  Defines how payment app can respond to the request

- **Payment Method Specifications**
  
  Define the different ways to pay
Matchmaking based on payment methods

Sender

Recipient

Payment App

Website
The circle is still broken
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 payment networks
But, how do you actually **move** digital assets?
Well, digital assets are just balances in a ledger
So you just change the balances in the ledger

Sender → 50 → Recipient

Sender: 50
Receiver: 50
But not everyone has accounts on the same ledger
We need a connector that has accounts on both ledgers
The connector accepts a transfer on one ledger in exchange for making a transfer on another.
The result is that the assets move from the sender's account to the receiver's.
But how can we be sure the connector won’t drop the transfer?
We could just rely on the receiver to notify us of failures

- High volume, extremely low value use cases
- Micropayments

Sender 75
Connector 25
 Receiver 0

Connector 100
Demo video of streaming payment for BitTorrent downloads

https://www.youtube.com/watch?v=525Z7CkOY
For most use cases we need **reliable** end-to-end transfers.

We need **atomicity** of all transfers across all networks.
Either all transactions must complete...

Sender 75
Connector 25
Connector 75
Receiver 25
...Or none of them do
This problem is commonly solved using the **two phase commit** pattern for transaction atomicity.
Interledger works best if ledgers and payment networks support **conditional payments**

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<td>Connector</td>
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<td>Receiver</td>
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The payment is prepared by putting assets **on hold** on each ledger and all ledgers agreeing on a **release condition** proposed by the receiver.
The payment is executed by **releasing funds** to the **receiver first** and then passing the signed release fulfillment back down the line.
Connectors have an incentive to pass the fulfillment proof to the next ledger and get paid

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<td>Connector</td>
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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
Open Web Payment Scheme provides basic consumer payments across networks
Payment Apps + Interledger = ?
W3C Web Payment + 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
Introduction to the Interledger Protocol

https://www.youtube.com/watch?v=zaqWdL25caU
Interledger status...

Javascript implementations at JS Foundation:
http://js.foundation
https://github.com/interledgerjs

Java implementation contributed by Everis
https://github.com/everis-innolab/

Others in the Interledger Project
https://github.com/interledger
Bootstrapping the network...

Anyone can run an Interledger node using **ilp-kit**
Pair with your friends and create accounts with each other
An open, permissionless p2p payment network to test ILP

Settlement is done out-of-band using regulated channels
Over time, ILP-enabled ledgers will allow trust-less peering

https://github.com/interledgerjs/ilp-kit/wiki
Real money using the Interledger protocol (USD -> EUR)

https://www.youtube.com/watch?v=5gZgAbuzmPk&t=277s
Thank You

Web Payments Activity
https://w3.org/payments
@w3c

Interledger Protocol
https://interledger.org
@interledger