Distributed Financial Technology in Payments

Jessie Cheng, Deputy General Counsel, Ripple

Weil, Gotshal & Manges Roundtable
Increasing Payment Efficiency
Yale Law School — March 3, 2017

What is distributed ledger technology?

What is distributed ledger technology?

- **Blockchain** — Technology that collects transactions into blocks and chains them in chronological order, with copies distributed across a number of different servers

- **Digital signatures** — A cryptographic scheme used by parties to authorize transactions and by the protocol to authenticate transactions

- **Consensus mechanism** — A process by which multiple nodes agree to update the blockchain with new transactions

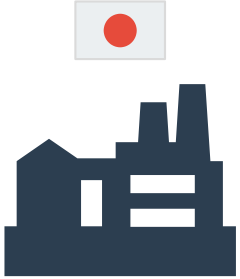
Distributed ledgers aren’t limited to virtual currencies

Different ledgers can record different things:

- Virtual currency balances (e.g., bitcoin, XRP, ether)
- Fiat currency balances (e.g., U.S. dollars, euro, yen)

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.

Alpha Corp.



Beta Corp.

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.

Hypo #1: Common correspondent bank

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.

Hypo #1: Common correspondent bank

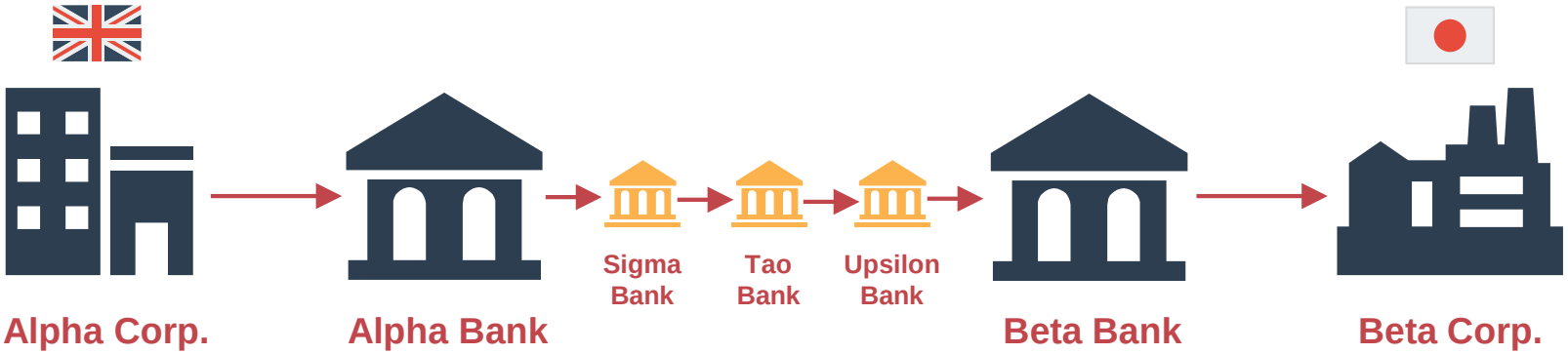
Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.

Sigma Bank

- Debits Alpha Bank's account (-£)
- Credits Beta Bank's account (+¥)

Hypo #1: Common correspondent bank

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.

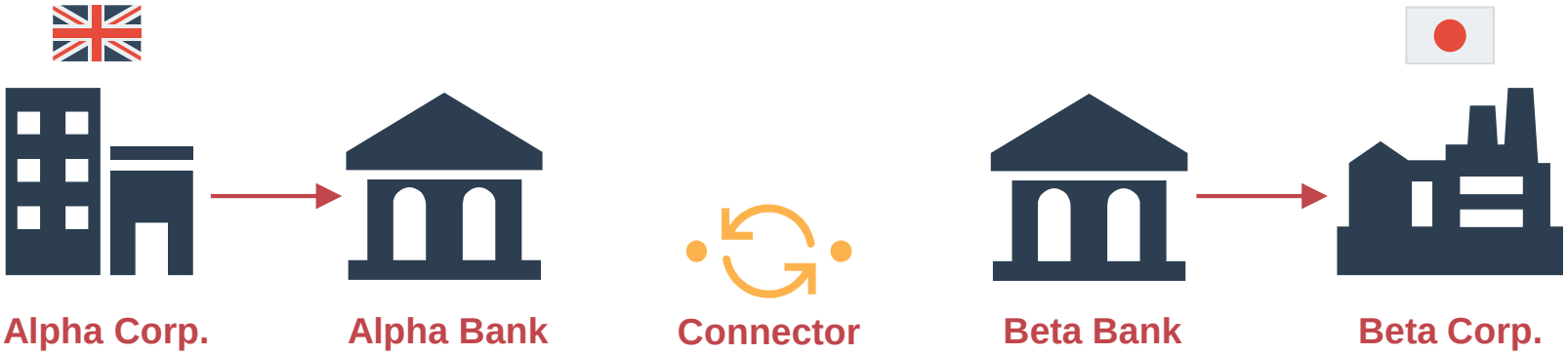


Hypo #2: Distributed Financial Technology

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.

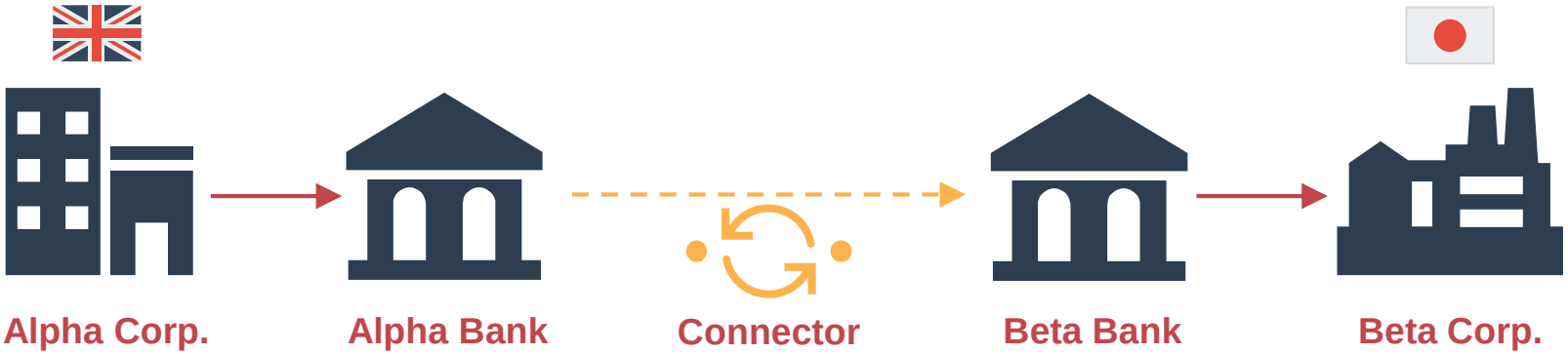
Hypo #2: Distributed Financial Technology

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.



Hypo #2: Distributed Financial Technology

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.

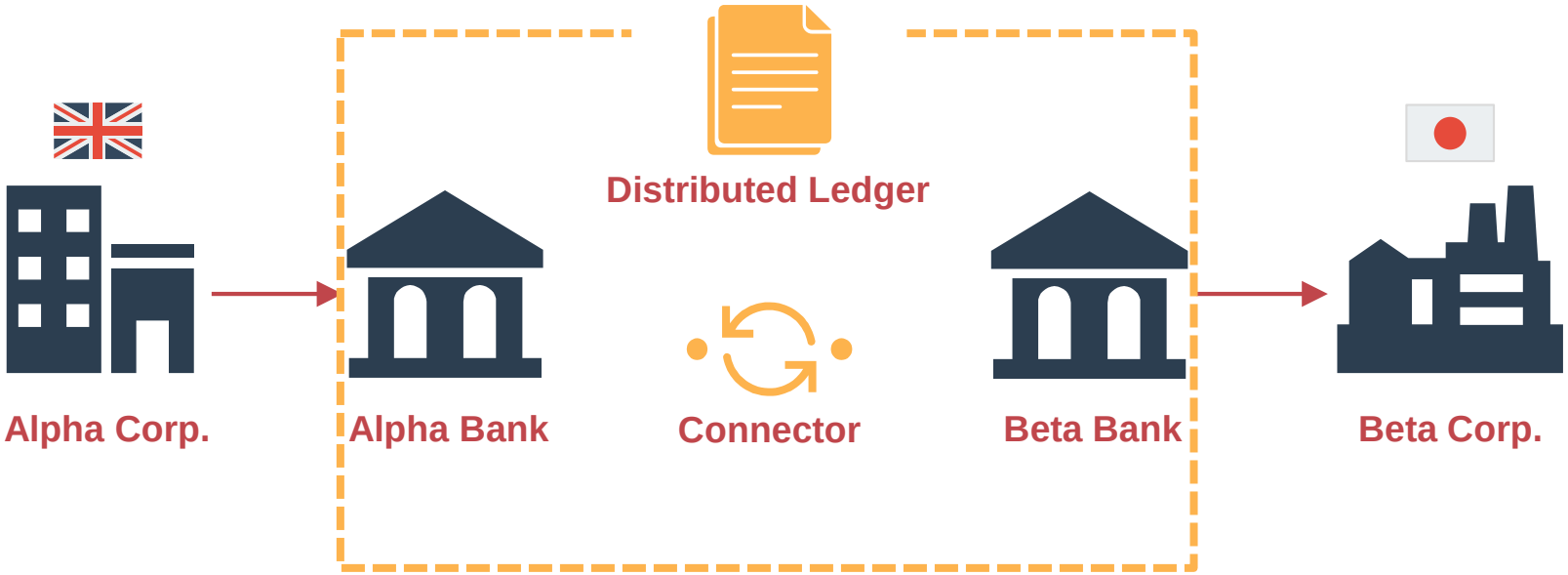


Alpha Bank
Connector's balance ↑ (+£)

Beta Bank
Connector's balance ↓ (-¥)

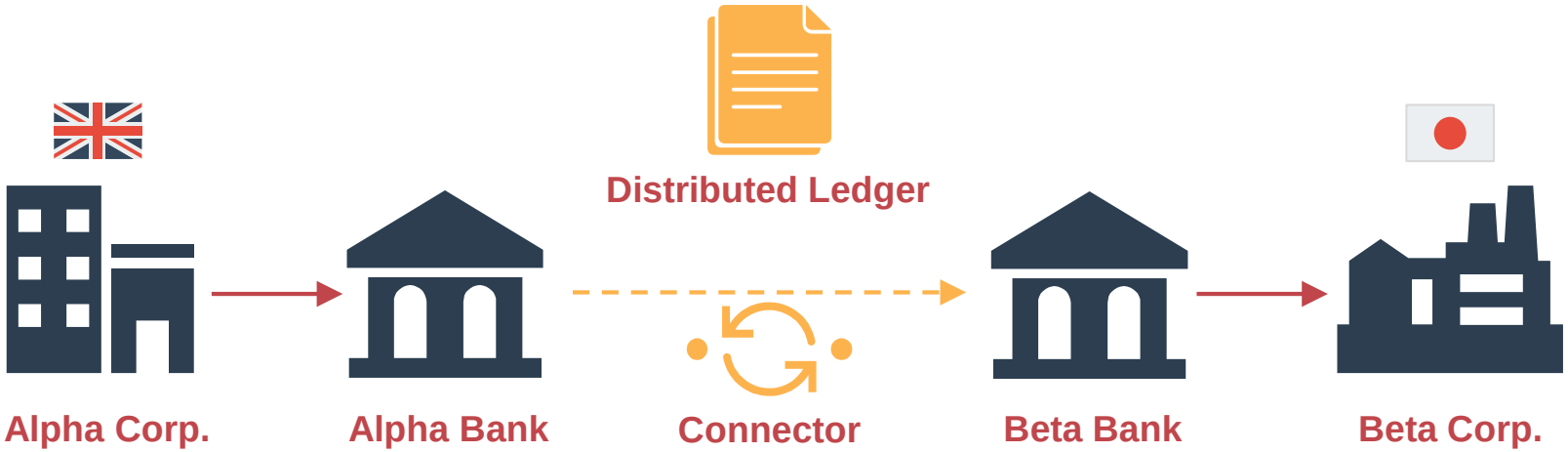
Hypo #2a: Distributed Ledgers

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.



Hypo #2a: Distributed Ledgers

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.



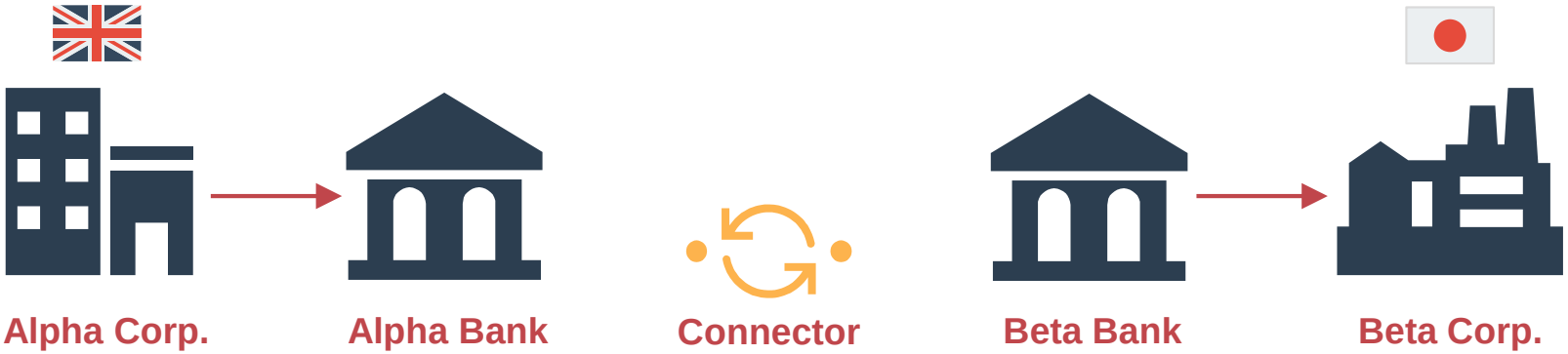
Alpha Bank
Connector's balance ↑ (+£)

Beta Bank
Connector's balance ↓ (-¥)

Do you actually need
distributed ledgers?

Hypo #2b: Interledger Protocol (ILP)

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.



Hypo #2b: Interledger Protocol (ILP)

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.

Hypo #2b: Interledger Protocol (ILP)

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.

Hypo #2b: Interledger Protocol (ILP)

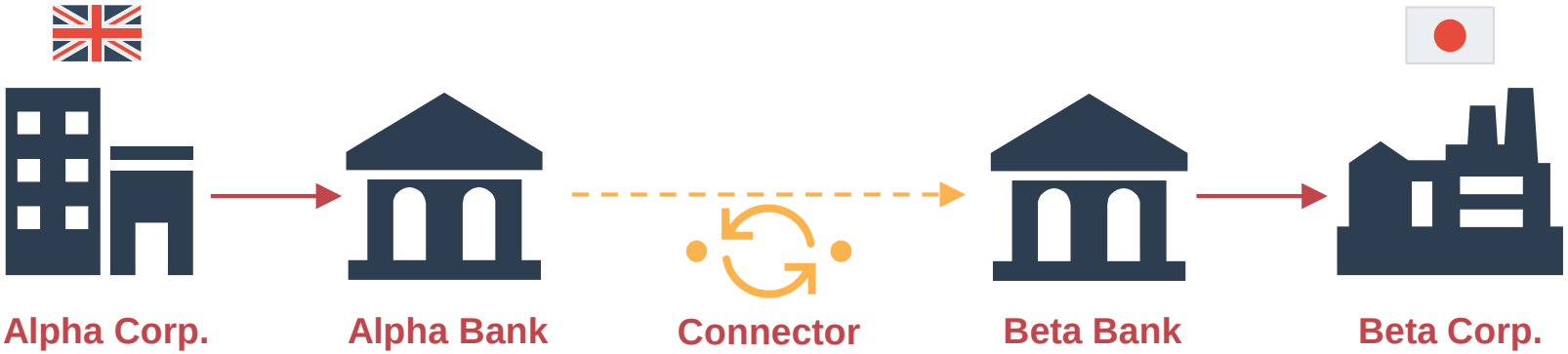
Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.

Hypo #2b: Interledger Protocol (ILP)

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.

Hypo #2b: Interledger Protocol (ILP)

Suppose that Alpha Corp. based in the United Kingdom wishes to make a payment to Beta Corp. based in Japan.



Alpha Bank
Connector's balance ↑ (+£)

Beta Bank
Connector's balance ↓ (-¥)

What are some key differences?

Common correspondent

- Centralization of trust in one counterparty, Sigma Bank
- Sigma Bank records transfers of money between banks
- Banks reconcile their own records with Sigma Bank's books

Distributed Financial Tech.

- Distribution of trust through a protocol, the process itself
- Settlement occurs on the banks' own books, coordinated by technology
- Changes are updated in real time

One last variation…

Hypo #3: XRP

Suppose that Alpha Corp. based in Brazil wishes to make a payment to Beta Corp. based in Thailand.

Hypo #3: XRP

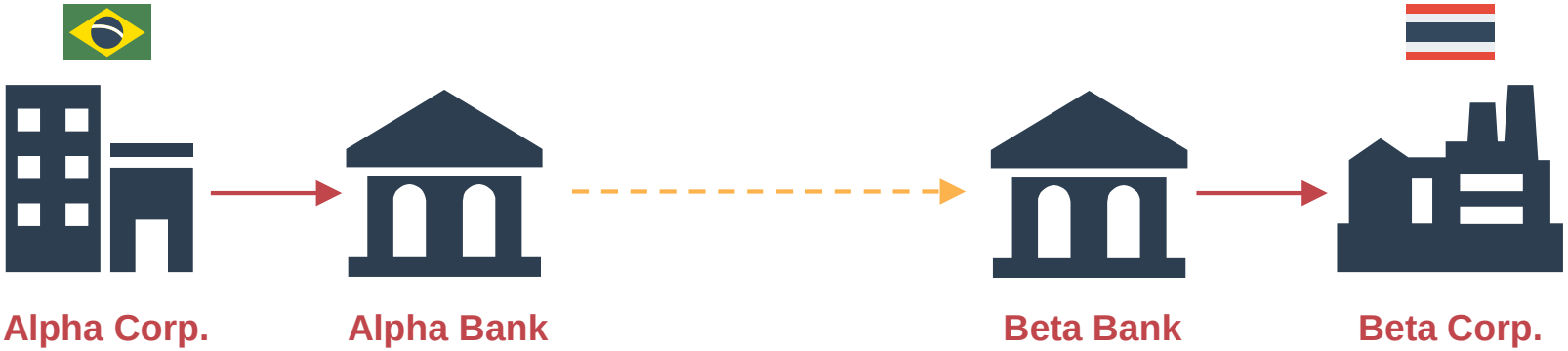
Suppose that Alpha Corp. based in Brazil wishes to make a payment to Beta Corp. based in Thailand.

Alpha Bank
XRP balance

Beta Bank
XRP balance

Hypo #3: XRP

Suppose that Alpha Corp. based in Brazil wishes to make a payment to Beta Corp. based in Thailand.



Alpha Bank
XRP balance ↑ (+XRP)

Beta Bank
XRP balance ↓ (-XRP)

Questions?

jcheng@ripple.com