Executive Summary for Financial Institutions

Ripple: Internet protocol for interbank payments

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ripple

Contents

ADVANTAGES OF THE RIPPLE PROTOCOL

	Typical payment	Payment via Ripple
Reserves	Provided by bank	Provided by 3rd party
Compliance costs	Limited visibility = high costs	Full visibility = lower costs
Reconciliation	Manual	Automatic
Speed (cross-border)	2+ days to settle	5 seconds to settle
Speed (domestic)	Up to 2 days to settle	5 seconds to settle
Risk	Multiple failure points	Straight-through processing
FX	One FX provider	Competitive marketplace

Introduction

Ripple is the first open-standard, Internet Protocol (IP)-based technology for banks to clear and settle transactions in real-time via a distributed network. Banks can use Ripple to make faster payments in more currencies to more markets - all with lower risks and costs than is possible today.

There is a clear opportunity to improve the infrastructure for interbank payments

Banks largely rely on intermediaries (clearinghouses, correspondents) to settle payments. As a result, banks incur material costs and risks that can be prohibitively expensive - especially for cross-border and real-time payments. One solution for addressing this structural problem is Ripple.

Ripple is basic infrastructure that optimizes the payment process

Ripple is a neutral (i.e. non-government, non-corporate public good) Internet-based protocol for connecting banks and payment systems. Banks can use Ripple as a common ledger to clear and settle transactions in real-time at the lowest-possible cost. Ripple structurally alters the payment process by enabling:

- Bilateral settlement: Eliminates intermediaries, midpoint failure, delays, lifting fees

- Real-time funding: Minimizes exchange spreads, credit risk, collateral costs

...and consequently enables new capabilities and commercial opportunities

Banks can use Ripple to provide their retail and corporate customers with new and enhanced domestic and cross-border payment services. These include: real-time payments, comprehensive transaction traceability and reporting, and additional reconciliation information. These capabilities will be critical as the global demand for great payment speeds, global coverage, and transaction complexity continues to increase.

Ripple is for members, operators, and regulators of payment systems

Ripple is designed to enhance and connect legacy systems and to enable the creation of new systems - all while minimizing critical costs and risks:
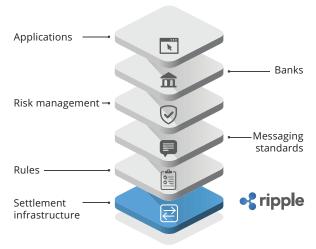
- Increases transaction speed and volume with lower credit risk

- Increases network connectivity with lower liquidity costs

- Enables more complex transactions with higher visibility and traceability

What is Ripple?

Ripple is basic infrastructure technology for interbank transactions - a neutral utility for financial institutions and systems.

Basic infrastructure for payment systems – Ripple itself is not a payment system

Ripple alone is modern infrastructure technology that provides (1) real-time and more efficient payment capabilities to existing payment networks, and (2) connectivity between payment networks. Ripple provides only the settlement or ledgering component of a payment system. Jurisdiction or network specific rules, governance, standards, and other critical functions are intended to be provided by existing systems and operators.

Applications

Banks

Risk management

Messaging standards

Rules

Settlement infrastructure

Ripple: The Foundational Layer of a Payments System

Ledgering and funds-exchange technology for clearing and settlement

The Ripple protocol enables two critical functions:

1. A common ledger to connect banks and payment networks: To clear transactions, Ripple provides continuous (24/7/365) connectivity between banks for real-time (approximately every 5 seconds) clearing, netting and monitoring - all without a central counterparty.

2. A real-time funds-exchange to settle transactions: To settle same-currency transactions, Ripple transfers funds bilaterally; for cross-currency transactions, Ripple sources funds at the best exchange rate from a competitive marketplace of liquidity providers.

Neutral transaction protocol for global connectivity

Ripple is a neutral, decentralized protocol - it is not owned or controlled by a government or corporate entity. Banks can use Ripple as an open standard - like other Internet protocols (e.g. SMTP for email) - to facilitate connectivity and interoperability.

Rather than rely on a central counterparty, Ripple uses Internet-based architecture to distribute operation of the protocol across all participating banks. This internet-like design maximizes operational redundancy, thereby minimizing risk of systemic downtime and the concentration of control within any one party.

Who can use Ripple?

Ripple is designed to be used directly by interbank payment network members and operators and by liquidity providers. This is similar to how payment infrastructure is used today.

Network members: Banks and financial service businesses

Banks and non-bank financial service businesses can use Ripple to provide their customers with new payment capabilities and with existing capabilities at a lower cost. These capabilities may be critical to responding to trends driven by commercial pressures (e.g. increasing market demand for real-time payments; global coverage) and regulatory ones (e.g. stricter liquidity requirements; consumer disclosures).

Network operators: Payment networks, clearinghouses

Interbank payment network operators can use Ripple as basic infrastructure to provide their members with critical capabilities at lower costs and with reduced systemic risks:

- Domestic: 24/7/365, real-time, bilateral clearing and settlement, thereby lowering costs and risks of high-volume and high-value payments.

- Cross-border: In addition to above, provide cost-efficient FX and liquidity management capabilities, thereby lowering costs of global reach and real-time payments.

Liquidity providers: Central banks, banks, non-bank market makers

Liquidity providers can use Ripple to fund settlement for Ripple transactions:

- Same-currency: Central banks can enable commercial banks to exchange reserves in real-time on a bilateral basis 24/7/365.

- Cross-currency: Banks and non-bank market makers can use Ripple to access additional payment volume and new markets (retail, commercial, and institutional payment flows) by providing good funds for settlement in exchange for FX spreads.

What are the use cases?

Ripple can clear and settle transactions for low-value and high-value payments of any asset type (currencies, securities, commodities). Today, the predominant use cases are for real-time currency payments.

Real-time domestic settlement without a central counterparty

With Ripple, central banks can enable banks to clear and settle transactions bilaterally, thereby lowering the costs and risks of real-time payments. Note: A central bank can test Ripple by using Ripple's clearing capabilities, but still settling net positions via an RTGS system.

Bank A → Bank B

Real-time cross-border settlement without correspondents

With Ripple, any bank can settle point-to-point using good funds from authorized liquidity providers at a competitive FX rate. This removes unnecessary intermediaries and adds competition to cross border payments.

Bank A — Sending Currency — Funds-exchange — Receiving Currency → Bank C

Provide liquidity for real-time cross-border settlement

Today, banks that provide correspondent services to respondent banks earn FX revenue only from transactions that are relayed through their banks. Although spreads may be wide, the addressable volume is limited to its existing respondents.

Ripple creates a competitive marketplace allowing banks and non-bank market makers to provide currency liquidity to a broader pool of transactions that is not limited to its existing respondents. While competition may reduce bid/ask spreads, Ripple provides access to greater transaction volume and additional revenue.

How does Ripple work?

Financial institutions use the Ripple protocol to clear transactions via a distributed ledger and to settle obligations via a distributed funds-exchange - all in real-time, 24/7/365, and at the most competitive exchange rate.

Distributed ledger clears transactions (providing real-time record of obligations)

Banks typically settle net payment obligations by exchanging funds from a central issuer (e.g. the central bank). To minimize the movement of funds, banks will use a central counterparty to clear transactions and provide a record of net positions (balances) to be settled.

TODAY: CENTRAL COUNTERPARTY

Banks clear transactions through ledgers controlled and operated by a central counterparty (e.g. a clearinghouse), which limits availability and speed of transaction services.

Bank A   Central counterparty   Bank B
              (record of balances)

WITH RIPPLE: NO CENTRAL COUNTERPARTY

Banks can clear transactions through a common ledger operated by its users.

Bank A   Ripple protocol   Bank B
              (record of balances)

How transactions clear via Ripple without a central operator

Transaction clearing is the result of consensus, the process (native to Ripple) by which financial institutions authorize a collection of counterparties to validate Ripple transactions. Using this common ledger, banks can clear transactions[1] continuously (24/7/365), and in real-time (every 5 seconds).
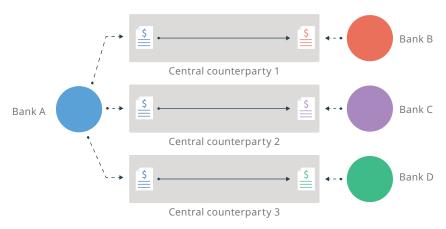
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1 https://ripple.com/knowledge_center/the-ripple-ledger-consensus-process

A standard to settle same-currency transactions directly

To minimize counterparty risk, central counterparties typically require each bank within its network to maintain a reserve account. To settle net positions, the central counterparty will transfer the appropriate amount of funds from one account to another.
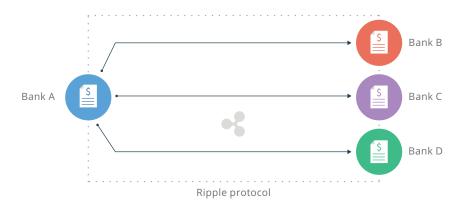
TODAY: MULTIPLE RESERVE ACCOUNTS

To pay a bank outside of one central counterparty's network, a bank may need to maintain reserves with multiple central counterparties, which can be capital-intensive.

WITH RIPPLE: SINGLE RESERVE ACCOUNT

Banks can pay any bank connected to Ripple using a single reserve, minimizing the amount of capital required.

How funds are transferred for same-currency transactions via Ripple

Funds on Ripple are cryptographically-secured balances representing funds custodied by a bank. For same-currency transactions, central banks can use Ripple to issue central bank money to authorized commercial banks. Commercial banks can use these funds to settle same-currency transactions in real-time.

A standard to settle cross-currency transactions through liquidity providers

To support payments in different currencies, a bank must be able to exchange the sending currency into the receiving currency, and then transfer the funds to the receiving bank.
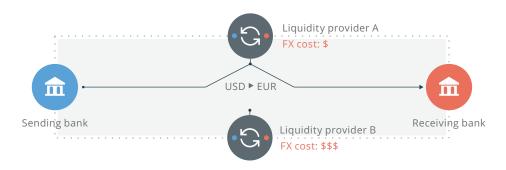
TODAY: RELAY PROCESS (2-4 DAYS)

To make payments across currencies, most banks relay transactions through a network of correspondents (banks with accounts in multiple currencies), which can result in days-long delays. The correspondent also provides FX, which can be costly to the sending bank.

WITH RIPPLE: STRAIGHT-THROUGH PROCESS (3-5 SECONDS)

Banks can settle transactions point-to-point as a straight-through process. For currency conversion, the bank can access a funds-exchange, a marketplace of liquidity providers authorized by the banks, resulting in a competitive FX rate.

How funds are transferred for cross-currency transactions via Ripple

Banks can use Ripple to issue commercial bank money to liquidity providers that have been authorized to pre-fund accounts with the banks to create FX offers. The FX rate is determined by path finding, the process by which an algorithm (native to Ripple) automatically matches the payment with the best-possible FX. Settlement results in corresponding, on-us book transfers (sending bank credits liquidity provider; receiving bank debits liquidity provider).

Why use Ripple?

Banks can use Ripple to remove unnecessary intermediaries from transactions, thereby reducing risks and costs, but retaining customer relationships and pricing power.

Ripple increases network connectivity with lower liquidity costs

Today	With Ripple
• Few banks have sufficient working capital required to maintain direct accounts with every payment network – especially for cross-border transactions. Instead, most banks rely on correspondents. • Banks are subject to risks, lifting fees, delays, and FX rates dictated by the correspondent – sometimes adding several hundred basis points to the cost of a retail remittance payment.[2]	• Banks can support cross-border transactions without having to tie up capital or rely on correspondents. • Banks benefit from straight-through processing, no lifting fees, real-time settlement, and FX rates determined by a competitive marketplace.

Ripple enables more transaction complexity with higher visibility and traceability

Today	With Ripple
• Today, transaction paths typically involve multiple counterparties with limited communication, complicating transaction monitoring and AML compliance. This forces banks to withdraw access to some markets and payment services.	• Bilateral connectivity simplifies the transaction path, improving traceability between sender and receiver. Further, banks can exchange more payment information (e.g. fee pre-disclosure; balance validation; confirmation) before and after settlement.

Ripple increases transaction speed and volume with lower credit risk

Today	With Ripple
• Banks are limited by a central counterparty's capabilities to minimize settlement risk. • This results in restricted hours of operation, predetermined settlement windows, discrete reserve requirements, and transaction limits.	• Banks can clear and settle transactions without a central counterparty or settlement risk. • Banks can access 24/7/365 availability, continuous clearing and netting, real-time (3-5 seconds) settlement, one reserve, and no transaction limits.

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2 Nikhil Joseph, "A SWIFT Disruption? Bitcoin and Peer-to-Peer Models Challenge the Remittance Business," Mercator Advisory Group, 3 December 2014, http://www.mercatoradvisorygroup.com/Reports/A-SWIFT-Disruption_-Bitcoin-and-Peer-to-Peer-Models-Challenge-the-Remittance-Business/.

Integrating Ripple

As an open-standard, neutral protocol, the Ripple technology is available to access directly. For support, one can work with Ripple Labs or a Ripple Labs partner.

Integrate on your own

Anyone can use Ripple freely and without license (code at https://github.com/ripple; APIs at https://ripple.com/build/rest-tool). Some banks have already identified valuable use cases (e.g. domestic payments, cross-border payments, securities transactions), and have implemented Ripple proofs of concept independently, as part of a consortium, or with the support of professional service providers.

Get support from Ripple Labs

Ripple Labs is the technology company that conceived of and developed Ripple. With its Ripple-specific technical and business expertise, Ripple Labs provides direct support (consultative, professional services, technical development) to banks that need it.

Ripple Labs is engaged with dozens of regulators, central banks, banks, payment networks, and liquidity providers globally (Americas, Europe, Asia-Pacific). Public engagements include: CBW Bank (US), Cross River Bank (US) Fidor Bank (Germany), Earthport (global interbank payment network operating in 65 countries). Private engagements include: top-20 EU and US banks, EU and US bank consortiums, multibillion-dollar hedge funds and quantitative trading firms, top-10 global remittance operators, and top-15 global telcos.

Get support from Ripple Labs partners

Ripple Labs has engaged with global and regional service providers to help banks bring Ripple's capabilities to market more rapidly. These include systems integrators, strategic advisory consultants, business planning consultants, program managers, and payment technology providers. These relationships are currently private.

How to contact

For more information, please email Ripple Labs (parters@ripple.com) or contact your service provider about their Ripple-specific knowledge and capabilities.

About

Ripple Labs

Ripple Labs is the technology company that conceived of and developed Ripple. The company has experience with financial services, payment networks, security, technology, and policy. Employees come from E-Loan, Goldman Sachs, Fiserv, Visa, Jumio, NSA, Apple, Google, Federal Reserve, and Promontory Financial Group. Investors include Andreessen Horowitz, Google Ventures, and IDG Capital Partners.

Ripple Labs is unique in its goal to create the 'Internet for Value' by (a) developing the most technologically advanced and extensible global transaction infrastructure using a neutral and compliant protocol, and (b) cooperating with regulators and incumbent financial institutions to enhance and connect existing systems.

Ripple Labs continues to supports its adoption by developing tools for financial institutions and payment networks.

Additional resources

- Visit Ripple website: https://www.ripple.com

- Visit Ripple Labs website: https://www.ripplelabs.com

- Download industry report: https://www.ripple.com/ripple-deep-dive

- Read what others have written about Ripple: https://www.ripple.com/news

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