

Ripple for Financial Institutions

Executive Summary: Ripple Payment Protocol

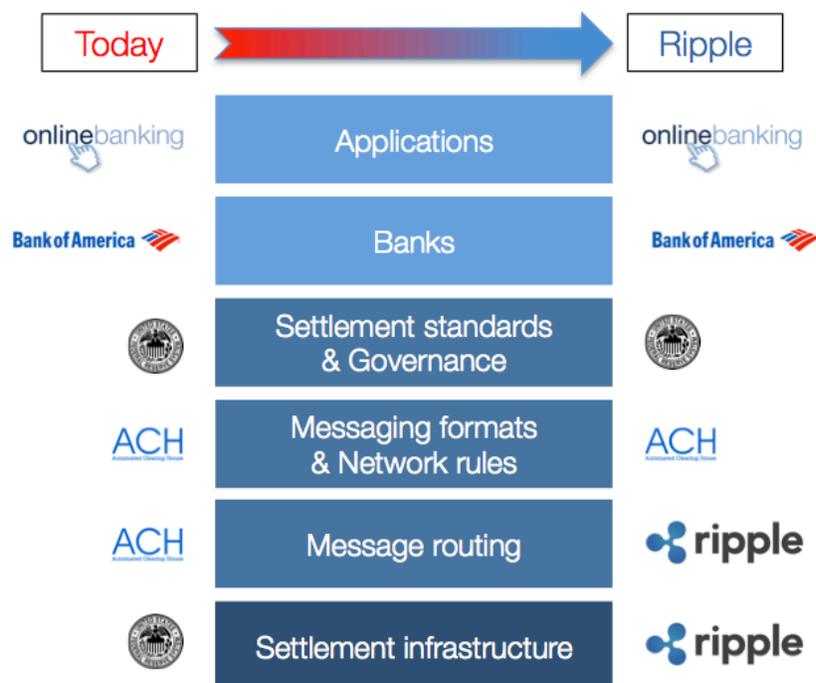
RIPPLE LABS DEVELOPS AND PROMOTES THE RIPPLE PROTOCOL

Ripple Labs is a technology company founded in 2012, financed by leading investors (Andreessen Horowitz, Google Ventures, IDG, etc.), and comprised of employees with experience in finance, payments, security, technology, and policy (Google, Goldman Sachs, Microsoft, E-Loan, Promontory Financial Group, US Federal Reserve, Square, Visa, etc.).

RIPPLE IS AN OPEN PAYMENT PROTOCOL

Ripple simplifies interbank payments at the infrastructure-level

Ripple is technology for routing payments and settling funds - it does not replace the existing networks (e.g. ACH in the US, BACS in the UK, international wire), but enables them to become faster, cheaper, and more interconnected. Banks, clearinghouses, and governments can build simple, powerful interbank payment networks on top of Ripple, enabling payment execution and fund settlement to occur simultaneously and in real time.



Ripple is Designed to Make the Payments Ecosystem More Efficient

Ripple Benefits Financial Institutions and Market Makers

Ripple provides the secure framework and process for financial institutions (FIs; e.g. banks) and market makers (MMs; e.g. institutional currency traders) to interact in real-time. FIs provide payment services to end-users (e.g. businesses). MMs provide liquidity for settlement and foreign currency exchange, resulting in reduced capital costs and currency risk for FIs.

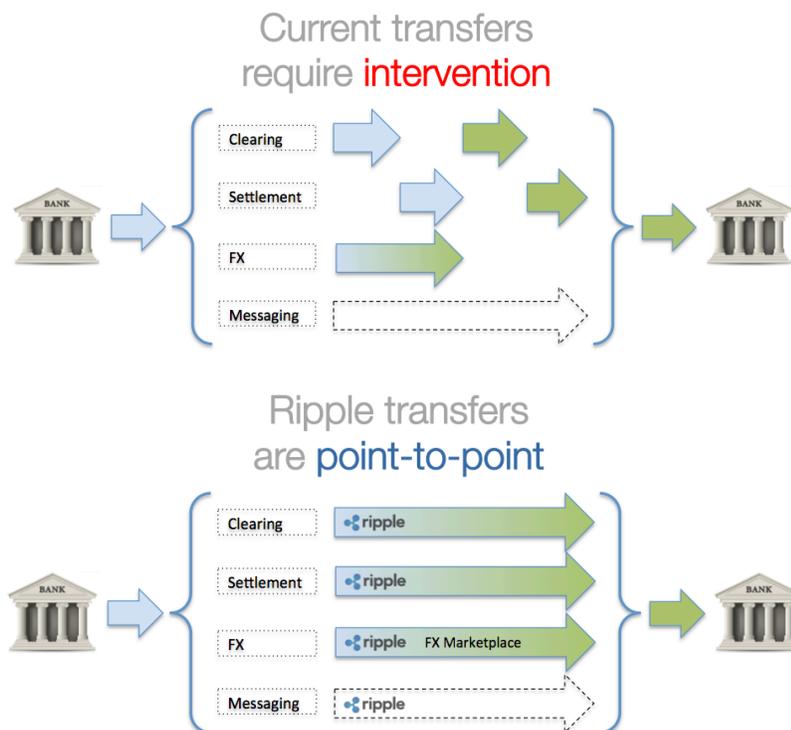
FIs can use Ripple to optimize payment operations, enhance payment services

FIs can use Ripple to optimize internal operations to lower the wholesale cost of retail, commercial, and institutional payments. FIs can maintain retail prices to increase profitability, or decrease prices to attract more deposits. The primary use cases are:

- Intra-group: Payments between FIs owned by the same group, e.g. transfers between retail banking and wealth management in the same country; or transfers between FIs in different countries
- Inter-bank: Payments between FIs owned by different groups, e.g. transfers between individuals at separate FIs; or between businesses at different FIs.

Ripple addresses structural problems with current systems

Problems with today's payment systems include **settlement risk, lack of visibility, and high costs**. Ripple enables **point-to-point, transparent, and near-free** payments; funds are available to the receiver in real-time.



How Ripple Works

Ripple settles payments without a central operator

Ripple enables real-time payments to and from authorized FIs. Payments over Ripple are facilitated by a secure, peer-to-peer (P2P) software installed locally within the premises of FIs. FIs share a ledger to track balances and transactions with authorized, counterparty FIs.

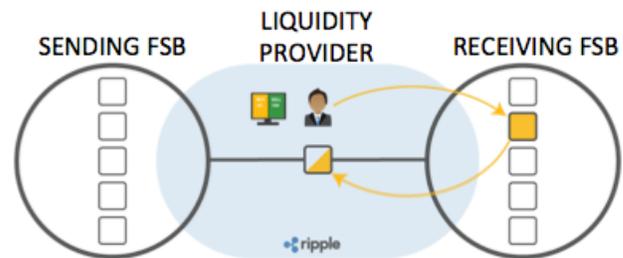
MMs pre-fund accounts with FIs (funds flow)

MMs provide liquidity by pre-funding accounts with FIs, thereby minimizing FI's liquidity costs:

1. FI authorizes MM to pre-fund account
2. MM posts bid to Ripple order book

Ripple payments are made with offsetting intra-bank transfers (data flow)

Integration & Pre-Fund: Authorized liquidity-providers pre-fund accounts

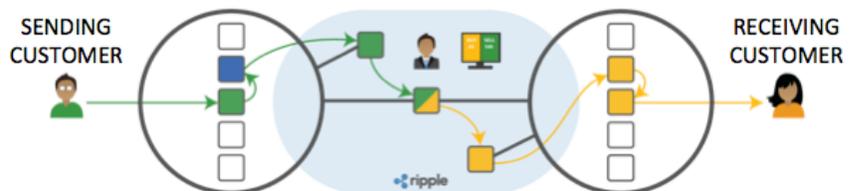


When a FI initiates a payment:

1. Ripple automatically matches the payment with the least-cost FX rate available.
2. Ripple facilitates offsetting, intra-bank transfers - both steps occur simultaneously and in real-time:
 - o Balance transfers from sender's account to MM's account at sending FI
 - o Balance transfers from MM's account to receiver's account at receiving FI

Funds flow:

Ripple messages execute two opposite, intra-bank transfers



How to integrate and use Ripple

Ripple pilot integration can occur in weeks

How a FI integrates:

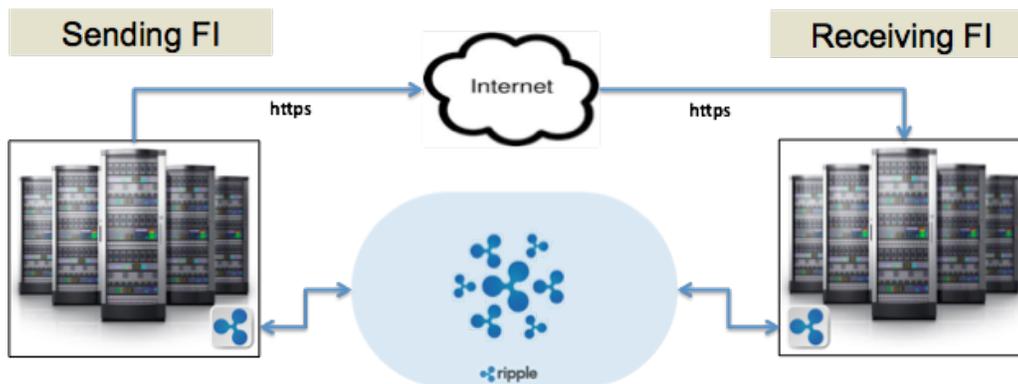
- Deploy a local server to run the Ripple software (“rippled”)
- Integrate user experience with Ripple via industry-standard REST style APIs
- Integrate with back-office functions such as support, audit trail, compliance
- Authorize MMs and correspondent FIs

How a MM integrates:

- Pre-fund an account with the FI
- Provide liquidity by posting orders (e.g. EUR/JPY) to the Ripple FX order book
- Periodically replenish or withdraw funds

Ripple Labs provides business and integration support

Ripple Labs can provide experienced business analysts and integration engineers to support FIs. FIs typically request support for onboarding (business planning, integration, introductions to MMs, etc.) and ongoing support (new deployments, relationships with new MMs and correspondent FIs, etc.).



Ripple security is bank-grade

FIs can have confidence that rippled is secure:

- FI has complete control over the location and security of rippled’s installation, ensuring full integrity
- The open-source nature of rippled makes it possible for experts and 3rd-party developers to scrutinize for vulnerabilities on a continual basis. Auditing by 3rd-party security experts has revealed no fundamental flaws, and has contributed to strengthening the codebase.
- Ripple ledger is a shared ledger which provides complete visibility and audit trail for all transactions and changes in the ledger to the participants on the network

How to build a FI business case for Ripple

Ripple can help financial institutions save costs in the following areas

Cost factors	Current state for FI	Ripple solution for FI	Benefits to FI
Reserve requirements	FI incurs cost to fund interbank & correspondent liquidity	Pre-funded model (clients and market makers provide liquidity)	Cost eliminated
Error/exception handling	FI incurs manual intervention support costs (days to resolve)	Results available in real-time (no intervention required)	Cost eliminated
Credit risk to clearinghouse	FI incurs credit risk due to asynchronous data-, funds-flow	Pre-funded P2P model (data-flow synchronous with funds-flow)	Cost eliminated
Settlement risk	FI incurs settlement risk costs of separate debit-, credit-legs	Legs initiated, completed simultaneously	Cost eliminated
FX risk	FI negotiates FX rate before payment	FX at time of payment at least cost	Cost eliminated
Systems integrations	FI incurs system-specific integration costs	New standard for future integrations, makes FI nimble	Cost eliminated

FIs can implement a simple, low-cost Ripple pilot in weeks

To fully understand the benefits and costs of Ripple, FIs can implement a simple, low-cost pilot within a private, intra-group network with no customer impact. The pilot will demonstrate a working integration, real-time settlement and exchange capabilities, near-zero transaction costs - sufficient information to determine whether to proceed with expanding the scope of the implementation.

FIs are currently engaging and implementing pilots with Ripple

Ripple is especially appealing to multinational FIs who want to lower the risks, costs, and delays of payments.

FIs and MMs engaging with Ripple Labs include:

- Top-20 global, EU, and US banks
- Consortiums of EU and US banks
- Multibillion-dollar hedge funds and quantitative trading firms
- Top-10 global remittance operators
- Top-15 global telecoms (mobile money)

How to Proceed

Suggested next steps:

1. Identify best representative to assess Ripple (typically from “payments strategy”)
2. Contact Ripple Labs (partners@ripple.com) to outline pilot, business case
3. Establish success criteria, prepare project plan
4. Execute pilot, monitor performance
5. Determine steps to expand scope of implementation (e.g. interoperability with other FIs)

Resources

Ripple Homepage - <https://ripple.com>

Ripple Primer - https://ripple.com/ripple_primer.pdf

Ripple API Tool - <https://ripple.com/tools/api/>

Ripple GitHub Repository - <https://github.com/ripple/> Ripple server code - <https://github.com/ripple/rippled>

Ripple Wiki - <https://ripple.com/wiki/>

Ripple Developer Portal - <https://ripple.com/wiki/>

Rippled JSON messages - <https://dev.ripple.com/>

JSON data formatting rules - https://ripple.com/wiki/JSON_format

Consensus - <https://ripple.com/wiki/Consensus>

Contact

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