# Lightning Network

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A **Lightning Network** is network layered on top of an existing blockchain technology (i.e., Bitcoin) intended to help with scalability issues. It is a decentralized system for instant, high-volume micropayments that removes the risk of delegating custody of funds to trusted third parties using a peer-to-peer (P2P) network connections called Micropayment Channel or Payment Channel. [1)]

The Lightning Network solves these problems. It is one of the first implementations of a multi-party Smart Contract (programmable money) using bitcoin's built-in scripting. The Lightning Network is leading technological development in multiparty financial computations with bitcoin.

**Instant Payments:**

Bitcoin aggregates transactions into blocks spaced ten minutes apart. Payments are widely regarded as secure on bitcoin after confirmation of six blocks, or about one hour. On the Lightning Network, payments don't need block confirmations, and are instant and atomic. Lightning can be used at retail point-of-sale terminals, with user device to-device transactions, or anywhere instant payments are needed.

**Micropayments:**

New markets can be opened with the possibility of micropayments. Lightning enables one to send funds down to 0.00000001 bitcoin without custodial risk. The bitcoin blockchain currently enforces a minimum output size many hundreds of times higher, and a fixed per-transaction fee which makes micropayments impractical. Lightning allows minimal payments denominated in bitcoin, using actual bitcoin transactions.

**Scalability:**

The bitcoin network will need to support orders of magnitude higher transaction volume to meet demand from automated payments. The coming increase in internet-connected devices needs a platform for machine-to-machine payments and automated micropayment services. Lightning Network transactions are conducted to the blockchain without delegation of trust and ownership, allowing users to conduct nearly unlimited transactions between other devices.

**How it Works?**

Funds are placed into a two-party, multisignature “channel” bitcoin address. This channel is

represented as an entry on the bitcoin public ledger. In order to spend funds from the channel, both parties must agree on the new balance. The current balance is stored as the most recent transaction signed by both parties, spending from the channel address. To make a payment, both parties sign a new exit transaction spending from the channel address. All old exit transactions are invalidated by doing so.

The Lightning Network does not require cooperation from the counterparty to exit the channel. Both parties have the option to unilaterally close the channel, ending their relationship. Since all parties have multiple multisignature channels with many di□erent users on this network, one can send a payment to any other party across this network.

1)

“The Bitcoin Lightning Network”, Lightning Network

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