

BLOCKCHAIN ESSENTIALS GUIDE

ABSTRACT

Blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography. Each block typically contains a cryptographic hash of the previous block, a timestamp and transaction data.

In this guide you will learn essentials you would need to know about Blockchain technology.

Shanmugam Karthikeyan

Upnxtblog.com

Blockchain Essentials Guide

www.upnxtblog.com

Contents

What is Blockchain ? 2

Ethereum the next generation blockchain platform 4

Resources 9

What is Blockchain ?

1. **Definition** : In simple terms,Blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography.Each block contains typically a hash pointer as a link to a previous block, a timestamp and transaction data.
2. **Design** : By design, the blockchain is a decentralized technology.By allowing digital information to be distributed but not copied, blockchain technology was originally devised for the digital currency, [Bitcoin](#), and now its finding other potential uses for the technology. Network of computing “nodes” make up the blockchain. Computer connected to the blockchain network using a client (*that performs the task of validating and relaying transactions*) gets a copy of the blockchain, which gets downloaded automatically upon joining the blockchain network.
3. **Robustness** : It has a built-in robustness,by storing blocks of information that are identical across its network, the blockchain cannot be controlled by anyone/any single entity and has no single point of failure.
4. **Transparent**: Self-auditing ecosystem, the network reconciles every transaction that happens in ten-minute intervals. Each group of these transactions is referred to as a “block”.
5. **Use Cases** : Currently, finance offers the strongest use cases for the technology.For example : remittances, people use to buy things with Bitcoin, and store it along with other currencies.As of now,total market value of all Bitcoin is about [\\$67,134,851,755 USD](#).1 BTC = \$ 4,067.66 USD.In India, you can purchase Bitcoin from [Zebpay](#) exchange. Zebpay has Android and iPhone app which lets you link your bank account for quick transfers.[Unocoin](#), another India-based exchange, lets you trade Bitcoins. They can help you buy, sell, store, use and accept bitcoin.*Please note : RBI is yet to officially recognize the cryptocurrency and had cautioned users, holders and traders of Virtual currencies , including Bitcoins.*

Blockchain Essentials Guide

www.upnxtblog.com

6. **Enhanced Security:** By storing data across its network, the blockchain eliminates the risks that come with data being held centrally. A “public key” is a users’ address on the blockchain. Bitcoins sent across the network gets recorded as belonging to that address. The “private key” is like a password that gives its owner access to their Bitcoin or other digital assets. Store your data on the blockchain and it is incorruptible.

7. Blockchain issues/limitations

- Overcoming [transaction delays](#), the verification process, and data limits will be crucial.
- Government regulation status.
- Due to shift to a decentralized network, this requires the buy-in of its users and operators.
- While there are tremendous savings in transaction costs and time(due to decentralization) but there are high initial capital costs.

8. Future use cases :

- Peer-to-peer payments
- Crowd sourced VC funds
- Applications in KYC verification
- Stock trading
- Data storage/auditing

9. Blockchain Projects to keep note :

- [Blockstack](#) is a decentralized browser where users own their data and apps run locally. A browser portal is all that’s needed to get started. Instead of company like Google, Facebook owning your data, now you can control the data about yourself and reveal only what is minimally necessary when required.
- [Ethereum](#) is a distributed public blockchain network. While Bitcoin offers one particular application of blockchain technology, a peer to peer electronic cash system that enables online Bitcoin payments. While the

Blockchain Essentials Guide

www.upnxtblog.com

Bitcoin blockchain is used to track ownership of digital currency (bitcoins), the Ethereum blockchain focuses on running the programming code of any decentralized application. Ethereum apps run on a custom built blockchain, an enormously powerful shared global infrastructure that can move value around and represent the ownership of property.

Ethereum the next generation blockchain platform

Ethereum is a decentralized platform that runs smart contracts: applications that run exactly as programmed without any possibility of downtime, censorship, fraud or third party interference.

Ethereum apps run on a custom built [blockchain](#), an enormously powerful shared global infrastructure that can move value around and represent the ownership of property. This enables developers to create markets, store registries of debts or promises, move funds in accordance with instructions given long in the past (like a will or a futures contract) and many other things that have not been invented yet, all without a middle man or counterparty risk.

Ethereum ([ETH](#)) now has a **US\$29.4 billion** market capitalization, second only to Bitcoin ([BTC](#)) with **US\$96.7 billion**.

Blockchain Essentials Guide

www.upnxtblog.com



Image – Ethereum Price Analysis

1. **Ethereum** is an open blockchain platform that lets anyone build and use decentralized applications (*Dapp*) that run on blockchain technology. *Like Bitcoin, no one controls or owns Ethereum, it is an open-source project built by many people around the world.*
2. **Difference between Bitcoin & Ethereum:** Unlike the Bitcoin protocol, Ethereum was designed to **be adaptable and flexible**. Bitcoin is more inclined towards peer to peer electronic cash system that enables online Bitcoin payments. While the Bitcoin blockchain is used to track ownership of digital currency (bitcoins), the Ethereum blockchain focuses on running the **programming code of any decentralized application**. Ethereum is a programmable blockchain. Rather than give users a set of pre-defined operations (e.g. bitcoin transactions), Ethereum allows users to create their own operations of any complexity they wish.
3. **Ether crypto token:** In the Ethereum blockchain, instead of mining for bitcoin, miners work to earn **Ether**, a type of crypto token that fuels the network. Beyond a tradeable cryptocurrency, Ether is also used by application developers to pay for transaction fees and services on the Ethereum network.

Blockchain Essentials Guide

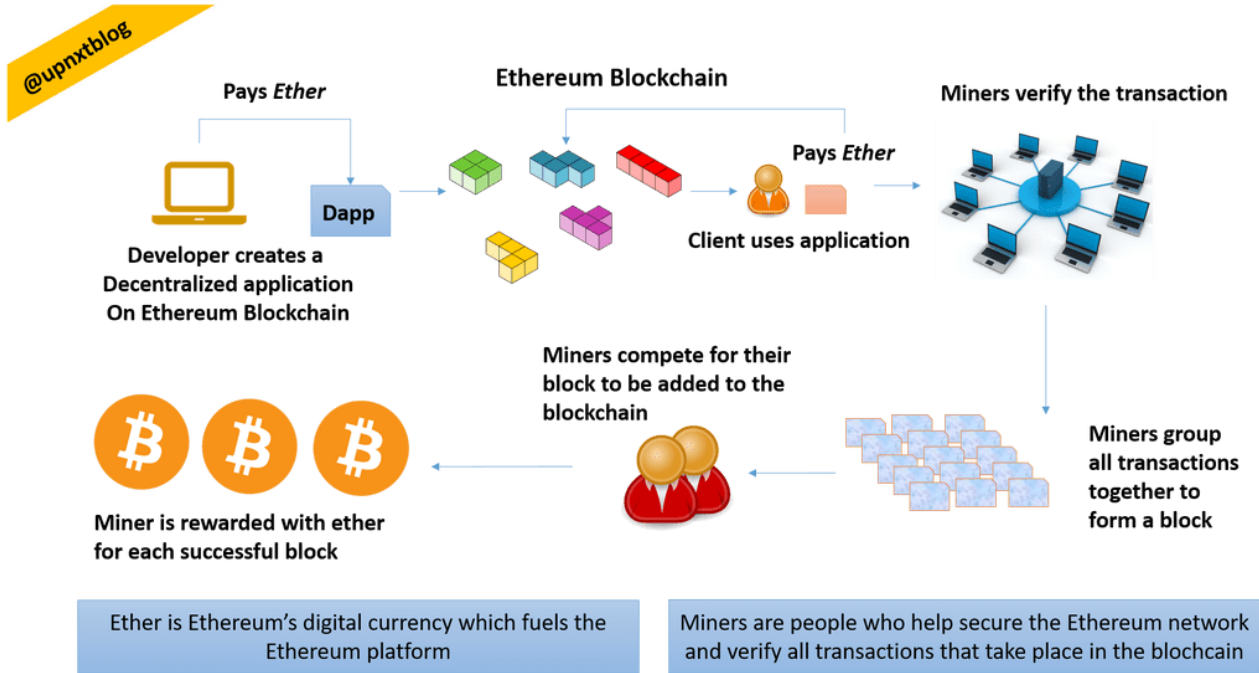
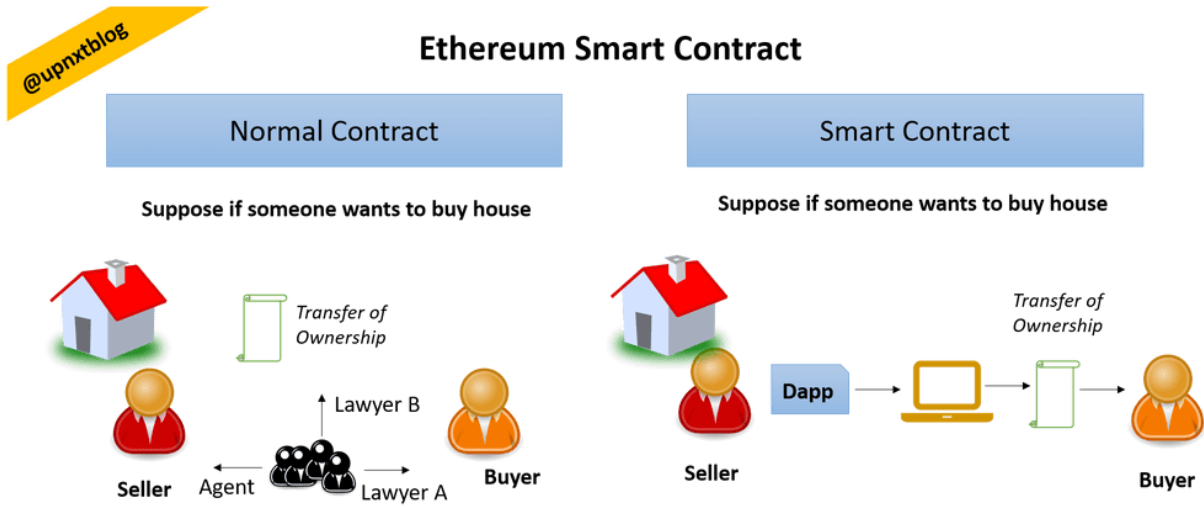


Image – What is Ethereum ?

- 4. **Ethereum's basic unit is the account.** The Ethereum blockchain tracks the state of every account, and all state transitions on the Ethereum blockchain are transfers of value and information between accounts (*basic difference between these is that human users control EOAs & Contract accounts, on the other hand, are governed by their internal code*)
 - a. **Externally Owned Accounts (EOAs)**, which are controlled by private keys
 - b. **Contract Accounts**, which are controlled by their contract code and can only be "activated" by an EOA
- 5. **Users must pay small transaction fees to the Ethereum network.** This protects the Ethereum blockchain from frivolous or malicious computational tasks, like DDoS attacks or infinite loops. The sender of a transaction must pay for each step of the "program" they activated, including computation and memory storage. *These fees are paid in amounts of Ethereum's native value-token, ether.*

Blockchain Essentials Guide

6. **Ethereum’s Smart contract** refers to code in a Contract Account ex. programs that execute when a transaction is sent to that account. Users can create new contracts by deploying code to the blockchain to describe computer code that can facilitate the *exchange of money, content, property, shares, or anything of value*. When running on the blockchain a smart contract becomes like a self-operating computer program that automatically executes when specific conditions are met. Because smart contracts run on the blockchain, they run exactly as programmed without any possibility of censorship, downtime, fraud or third party interference. **Recently** India’s largest lender State Bank of India announced that it would be rolling out beta launches of blockchain-enabled smart contracts by next month.



Smart contract refers to code in a Contract Account they are programs that execute when a transaction is sent to that account. Users can create new contracts by deploying code to the blockchain to describe computer code that can facilitate the exchange of money, content, property, shares, or anything of value. When running on the blockchain a smart contract becomes like a self-operating computer program that automatically executes when specific conditions are met. Because smart contracts run on the blockchain, they run exactly as programmed without any possibility of censorship, downtime, fraud or third party interference.

Image – Ethereum Smart Contracts

7. Transaction fees are collected by the nodes that validate the network. These “miners” are nodes in the Ethereum network that receive, propagate, verify, and execute transactions. The miners then group the transactions which include many updates to the “state” of accounts in the Ethereum blockchain into what are called “blocks”, and miners then compete with one

Blockchain Essentials Guide

www.upnxtblog.com

another for *their* block to be the next one to be added to the blockchain. Miners are rewarded with ether for each successful block they mine. This provides the economic incentive for people to dedicate hardware and electricity to the Ethereum network.

8. Most Ethereum projects today rely on Ethereum as a public blockchain, which grants access to a larger audience of users, network nodes, currency, and markets. However, there could be scenarios where private blockchain or consortium blockchain (among a group of trusted participants) can be deployed. For example, a number of companies in verticals, like banking, are looking to Ethereum as a platform for their own private blockchains.
9. To get started with Ethereum, here are some of the key tools
 - **Geth:** This is the Go implementation of an Ethereum node, and is the basis for any interactions with the Ethereum blockchain. Running this locally will allow you to easily interact with the Ethereum blockchain. Read the [go-ethereum installation instructions](#).
 - **Mist:** This is the equivalent of a web browser, but for the Ethereum platform. It acts as a user interface to display the accounts and contracts that you interact with. It also allows you to create and interact with contracts in a graphical user interface without ever touching the command line. If you are not a developer and just want to store ether and interact with Ethereum contracts, then Mist is the program to use. Downloads can be found on the [Mist releases page](#).
 - **Ethminer:** A standalone miner. This can be used to mine or benchmark a mining set-up. It is compatible with eth, geth, and pyethereum. Check out the [Mining](#) page for more information.
 - **Remix & Solidity:** Remix is an IDE for the smart contract programming language Solidity and has an integrated debugger and testing environment. More information can be found at the [Remix GitHub Page](#).
10. **Ethereum Apps** :The Ethereum platform is being used to create applications across a broad range of services and industries. Some of the Dapps are listed [here](#)

Resources

- Ethereum [blog](#)
- [Reddit](#) community
- [Ethereum Forum](#)
- Dapps [list](#)