# 4

# Ethereum

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## *Abstract*

Ethereum is a significant blockchain-based platform for keen agreements—Turing complete programs that are executed in a decentralized system and generally control advanced units of significant values. A shared or p-to-p system of mutually distrusting node keeps up a typical perspective on the worldwide state and executes code upo n demand. The expressed (code) is put away in a blockchain made sure about by a proof-of-work agreement component like that in Bitcoin. The fundamental belief of Ethereum is completely reliable interpolate programming language reasonable for executing complex business rationale. Decentralized applications without a trust of third party are engaging in different sectors like crowd funding, budgetary administrations, identity management and gambling. Shrewd agreements are a difficult examination theme that ranges over zones extending from cryptography, consensus algorithm, and programming dialects to administration, fund, and law.

This chapter discusses about the Ethereum installation, working, Gas, ETH, ways to buy ETH, working of Smart contracts and DApps along with their decentralized application areas.

***Keywords:*** Ethereum, GAS, BITCOIN, ethereum virtual machine, ETH, smart contractors

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## 4.1 Introduction

Ethereum is a new age of internet to make money and payments, user can own their data and your application, everyone can access to open financial system, open access infrastructure, no company or person have control. It is a programmable blockchain which means the developer can be used to build a new application. Bitcoin blockchain is the mother of all blockchains. It was intended for peer-to-peer transfer of values. The framework of code execution was introduced by Ethereum forums. The center place and thrust of the Ethereum blockchain is smart contractors. Ethereum has a decentralized application which has benefit of cryptocurrency and blockchain. The Ethereum set of rules are simple and practical, even at the amount of some data storage or time efficient. A common programmer needs to preferably be capable to follow and implement the specification, in that way to entirely understand the unequal democratizing ability that cryptocurrency brings and further the imaginative and prescient of Ethereum has a protocol that is accessible to ever user. Any development which provides complexity should not be blanketed unless that development leads to great benefit.

Ethereum was firstly reported by Vitalik Buterin in "white paper". He was a programmer and co-founder of Bitcoin Magazine and in the year 2013 he set an aim of building decentralized application. Buterin had stated that Bitcoin needed a scripting language for application development. He suggested to develop a new platform with a more general scripting language. Joseph Lubin, Gavin Wood, & Jeffrey Wilke were jointed as founders in the year 2014. Ethereum was finally launched in 2015.

The chunk of the Ethereum must be created as it can exchanged and divisible to be feasible. Their intention is to develop a program that gives facility to a single user to make a small protocol change in one location; the utility stack might not stop to feature without similarly change. Development consisting of Ethash, Patricia Bushes and RLP libraries. Ethereum does not require special features, its main intention is to provide the entire cryptocurrency environment. Every user must have an account on Ethereum known as Extremely Owned Accounts (EOA).

## 4.2 Basic Features of Ethereum

1. The capacity of resolving the problems correctly makes Ethereum blockchain the pleasant community to assist any

business or program. It is true that there's no different coin inside the crypto sphere which has potential of doing it extra correctly than Ethereum.
2. Ethereum records transaction details in just 12 s.
3. Ethereum has a natural boom and it seems to be stable. Even after the presence of DDoS and forking, to date Ethereum blockchain is in call for. The Increasing demand of Ethereum serves as a hallmark of its potential.
4. The potential of Ethereum to behave as a good platform for DApps is widely attracting businesses. Ethereum has been adopted by many companies and start-ups as a manner to transact. In February 2017, there were multiple fundamental businesses like Intel, Microsoft, JPMorgan, BP, and Thomson Reuters who collaborated at the Ethereum community technology for incorporating Ethereum into their groups. It is sponsored by Bank of America that is the primary economic institution to work with the Ethereum blockchain.

## 4.3 Difference between Bitcoin and Ethereum

1. Bitcoin and Ethereum are cryptocurrency. Bitcoins are only for digital currency whereas Ethereum is a well-known implementation of blockchain technology.
2. Bitcoin's common block time is round 10 min while Ethereum takes simply 12 s.
3. More than 65 percentage of bitcoin has already been extracted whereas not more than 50 percentage of Ethereum has been extracted to date.
4. Ethereum uses Gas to measure fees required to execute the program while Bitcoin cost of transaction depends upon the block-size.
5. Bitcoin and Ethereum vary in reason: Bitcoin is pitched as a change currency, or digital foreign money, Ethereum facilitates peer-to-peer contracts and packages via its own forex automobile. That's why bitcoin has emerged as greater solid digital foreign money, while Ethereum is more approximately clever contract applications.
6. Bitcoin blockchain has a limit of 1 MB for a block. A new bitcoin blockchain takes about 10 min to mine or create new

block. Bitcoin network can handle 3–4 transaction per second. Whereas Ethereum does not have any block limit. The number of transaction for block is decided by the miner. Each block takes 12–14 s to be mined and there are around 15 transactions per second.

7. Bitcoin and Ethereum have different methods of transaction like:
   Bitcoin—"Ram sends 10BTC to Shyam."
   Ethereum—"Send 10 ETH from Ram to Shyam if Ram balance is 15 ETH and date is 10.01.2020."

The table below shows a detailed difference between Ethereum and Blockchain:

| BASIS | BITCOIN | ETHEREUM |
|---|---|---|
| CURRENCY ISSUE | It creates 12.5 bitcoin in every 10 min | It creates 3 new ETH in every 15 s |
| CURRENCY CAP | It has a limit of 21 million bit coins, of which 17million have been created so far. | Ethereum has no cap currently, but there are plans to decrease or not to issue in a year or two. There are 100 million Ethers issued. |
| New blocks addition | It creates a block every 10 min. | It creates a new block every 15 s. |
| Language support | It has limited built in scripting languages functionality with only a few dozen operations. | It has all required language to build programs and are called as "smart contracts". |
| Costing | The amount is decided on the basis of size. | It fixes a cost, called as Gas, to each for reposit in the blockchain. |

(*Continued*)

(*Continued*)

| BASIS | BITCOIN | ETHEREUM |
|---|---|---|
| Processing Time | Every slabin BTC is restricted to 1 MB in size (or 8BM in the case of Bitcoin Cash). Bitcoin can process 4 transactions per second | In this slap are limited with the gas-limit, the total overhead of all the operations in the block. It process approximately 15 transactions per second. |
| Ease of Mining | Bitcoin's hashing algorithm (SHA-256) can be performed efficiently with special purpose hardware, known as ASICs (application-specific integrated circuit). | The Ethereum "hashing algorithm "(KECCAK-256) is storage consuming which makes difficult to make an "economical Special-purpose chip". This permits Ethereum to mine decentralization. |
| Future strategy | Bitcoin currently has no such plans. | It has schemes to move far from extracting inside and out by altering the computation from "Proof-of-Work (Pow) to Proof-of-Stake (PoS)". Postakes squares dependent on the token property of the hubs instead of computational force. Likewise, it has schemes to handle versatility by actualizing "sharding" separates the blockchain into various interconnected sub-blockchains. |

## 4.4 EVM (Ethereum Virtual Machine)

EVM aims on delivering security and executing unreliable code by computer. EVM make sure that programs do not have approach to others code and it also make sure that communication can be built without any prospective intrusion. EVM are created to provide a "Runtime Environment" to create smart contracts". Almost all cryptocurrency uses smart contracts. EVM method can be used to robotically conduct transaction.

This virtual machine is executable in various programming languages like: C++, Java, JavaScript, Python, Ruby, and many others.

The EVM is needed in the Ethereum guided and is influential to the concert mechanism of this virtual machine.

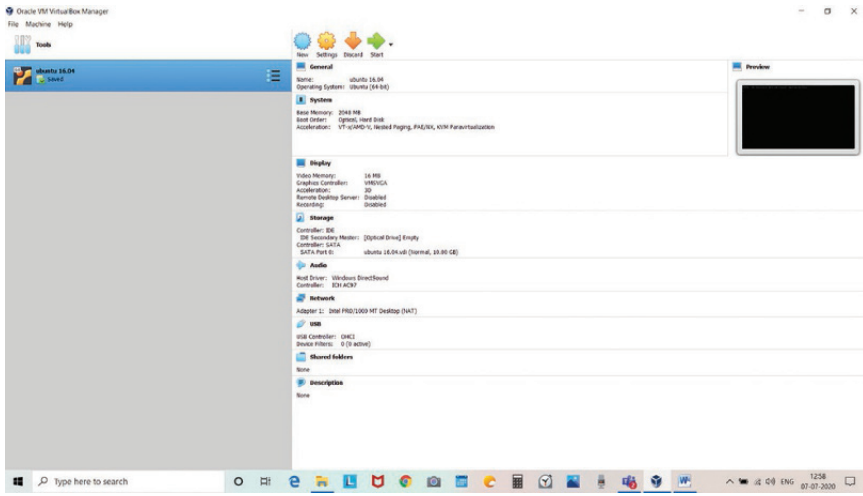
The programming language for this virtual machine is known as 'Ethereum Bytecode'. If source-code is inscribed it is esteemed for programming languages with Ethereum settlement-targeted language. This source-code is compiled to bytecode so that virtual machine can recognize the code.

This virtual machine achieve "Turing Complete" uses a marketplace that charges software steering done in preference to according to economic transaction executed as other cryptocurrency like "Bitcoin". In place of a transaction fee, you got a form of cost for coping with applications.

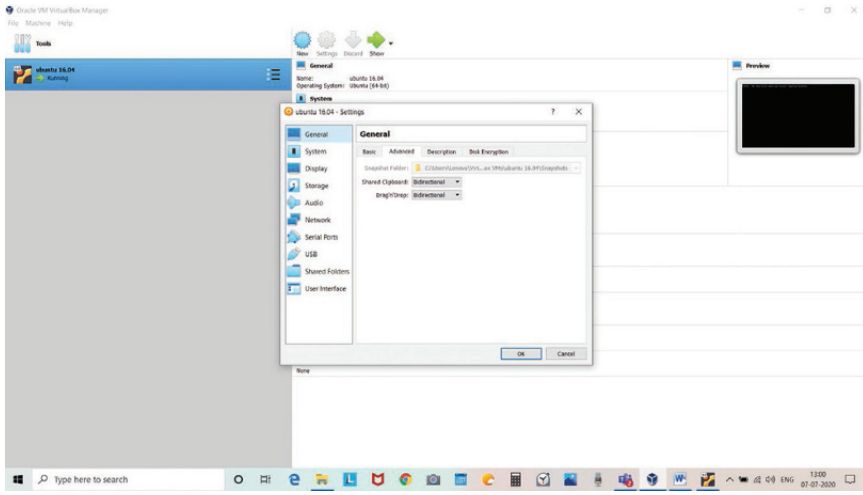
Programming language is exactly same as the structures that run and modify information. If those regulations may be used to imitate Turing's computing system, these regulations are seemed to be 'Turing entire'. This system may be numerically established to have ability to perform a viable computation. In various phrases, a Turing whole device is numerically capable of remedy any hassle which you provide. Virtual Machine is best "Quasi-Turing complete" because execution via the system are limited by way of gasoline, which act as a hindrance to the variety of computing that can be executed.

One can create its own virtual machine by installing Virtual Box on your system. After installing Virtual Box, The screenshots shown below gives step by step creation of virtual machine in order to run ethereumubuntu. Ova file to create nodes and transact them in blockchain. For Creating the Virtual Machine, Click on settings of Virtual Box and set the parameters as follows:

Set memory Size of Virtual Machine: 2,048 MB
Set operating system: Linux
Set Network to NAT
Set Advance features to Bidirectional
Install EtherumUbantu.OVA file and Run by clicking Start.



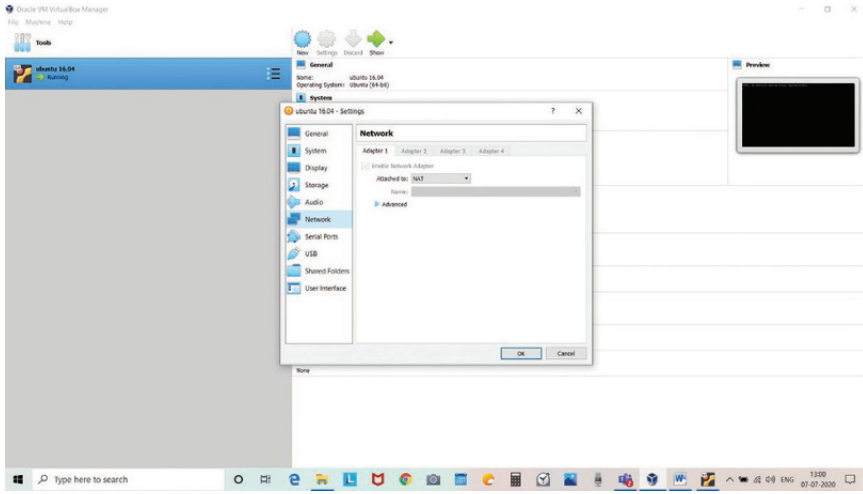
**Screenshot 1** Creating virtual machine after installing virtual box on Windows 10.



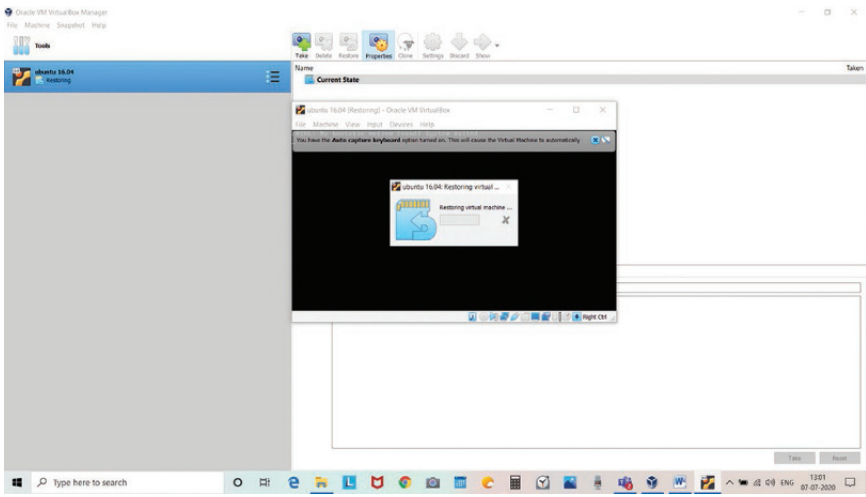
**Screenshot 2** Set the parameters for creating virtual machine.

Virtual Machine is an application which one can use for different operating systems virtually on the host operating system. Here, as shown in above screenshots, Ubuntu 16.04 runs virtually on Windows as host operating system.

All the transactions are executed through Ethereum after running Etherum.Ova file. All the transactions are executed through this file. Ethereum actually took a significant step for transforming the blockchain




**Screenshot 3** Set the network connection to NAT.




**Screenshot 4** Virtual machine is created.

into computational framework that opened up a whole world of opportunities into decentralizing them. Ethereum supports smart contractors and virtual machine on which smart contractors execute. Smart contractors in turn enable decentralized applications that accomplish more than a transfer of values with an efficient automation of decentralized applications.

## 4.5 Gas

Gas is a mechanism to evaluate the fees that will be acquired for a program to be executed. Each transaction that is executed on the Ethereum wants cost to be attached to it, paid in the form of Gas. Gas price is the measure of "ETH" that an individual is interested to invest on each Gas. Wei is the smallest unit of Ether.

1 Ether = $10^{18}$ Wei

Ether = Tx fees = Gas price ∗ Gas Limit

Actual Tx Cost Fee: The amount fees which the user will pay for transactions in Ether.

### 4.5.1 Gas Price Chart

| Unit | Wei |
|---|---|
| Wei | 1 |
| Kwei/ada/femtotether | 1,000 |
| Mwei/babbage/picoether | 1,000,000 |
| Gwei/Shannon/nano | 1,000,000,000 |
| Szabo/microether/micro | 1,000,000,000,000 |
| Finney/Milliether/milli | 1,000,000,000,000,000 |
| Ether | 1,000,000,000,000,000,000 |

Ether smallest unit is Wei. Gwei hold billions of Wei. Before Buying Ether the user must check the current price.

Before executing the sender has to set gas price and limit fixed to transaction. "Run-out or invalid" is possible when the sender does not fixes the "Limit or amount" of Gas.

Miner decides the price of Gas. If transaction does not meet the process it can be reduced.

It is crucial to note that the gas limit can be (and is typically) greater than the real fuel used inside the transaction. In instances of an ICO, the common gas fee will tend to be exponentially better as human beings might be speeding to participate within the ICO. This could result in extra people

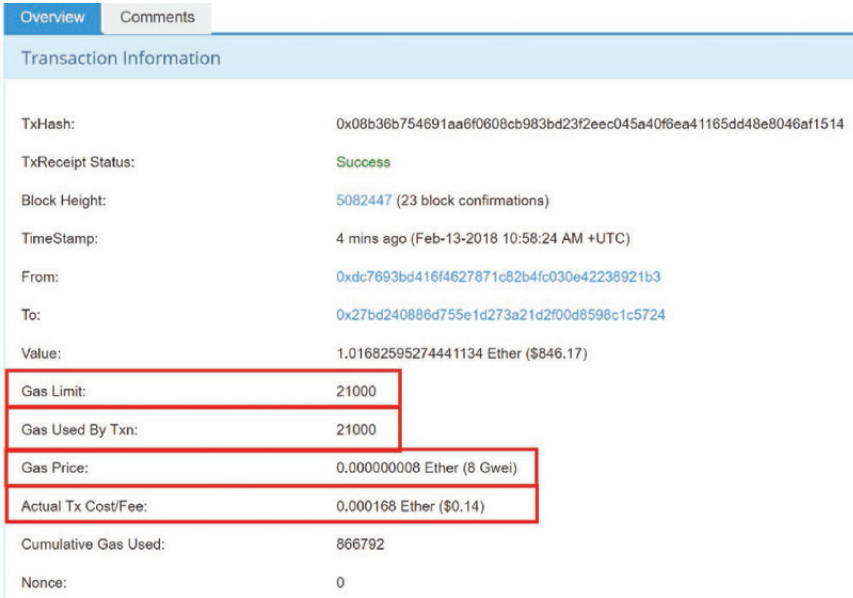



**Figure 4.1** Transaction of block [Ref:https://masterthecrypto.com].

increasing their gas prices to have a better hazard of confirming their ICO transaction.

Figure 4.1 shows an example of transaction of Block.

The transactions can be speed up. One can virtually pick out the priority level of its own transaction. Miners will "paintings on" and execute transactions that provide a better gasoline price, as they'll get to keep the expenses which they pay. Therefore, they'll be incentivized to prioritize transactions which have a better Gwei.

If the transaction is required to finish at a faster pace, then you have to be inclined to pay a higher fuel rate. You have to pay 8 Gwei if you need your transaction to be finalized inside 2 min. It all relies upon for your urgency.

## 4.6 Applications Built on the Basis of Ethereum

1. Open Finance: This points out to a number of decentralized protocols developing open monetary infrastructure. These protocols are treasured because they're creating the vital exploration to permit everyone within the international

borders with an internet connection to get entry to self-sovereign, censorship resistant economic offerings.
2. Marketplace: It is built on Ethereum that allows for the buying and selling of ERC-721 tokens together with crypto collectibles.
3. Oracles: Oracles refers to an offering to connect Ethereum to off-chain records. They may be implemented for querying statistics from the net, information about one of a kind chains (e.g. BTC transactions), or even as dispute decision mechanisms regarding different assets.
4. Gaming: Digital ledger games are the games that encompass digital ledger era in its hind or mechanics in widespread.

## 4.7 ETH

Ethereum has native cryptocurrency called ETH. It is a digital money. It has same features like Bitcoin. It can be sent or receive everywhere in the world. It is used to store values, make payments or as security for re-payments.

The user has to buy ETH to use Ethereum network. The user can buy ETH only from the person who is already to own it. ETH which the user owns has to be stored in hardware wallet. There are some cryptocurrency exchanges from where one can acquire ETH with fiat or cryptocurrency: Binance, Coinbase, Gemini, Kraken, Dether, and Localcryptos.

### 4.7.1 Why Users Want to Buy ETH?

Ethereum is currently having number of the maximum famous and widely used cryptocurrencies all around the globe. This crypto coin is of high ROI for the user that would really like to change ETH to USD and vice versa for anyone to use it on the Ethereum blockchain. It is also of specific interest for those expert buyers who are agree with the ETH rate for large-extent exchange transactions. Thus, Ethereum is said to be a proper desire for all who are interested and want to perceive it as a software asset as well as those who really would really like to exchange it.

In addition to the application cost of Ethereum, its fee is greater attractive while compared to the one of Bitcoin. While ETH is numerous times cheaper than BTC, it could draw the attention of the people who are interested in gaining some cryptocurrency but aren't limited to a particular crypto coin. Some people are also interested in making any funding

through the blockchain technology and following the concept of cash decentralization. Thus, Ethereum is one of the currencies that are broadly traded by the people at the internet and frequently used option for crypto-currency exchanges.

### 4.7.2 How to Buy ETH?

ETH can be bought through an online exchange like GDAX, Coinbase, Bitpanda and others through credit or Debit Cards.

To buy ETH, you need to follow the following steps:

1. Create an account on Binance, Coinbase, Gemini, and Kraken. To confirm the account you're required to feature files to reveal yourself. Once uploaded documents, verification takes place which takes about a day or two days.
2. Follow the guidance at the trade to deposit USD. These rely upon your financial group and twine switch. This may take three-5 corporative days.
3. Now you have got USD in you change account so now you are capable to buy ETH.
4. When you get all the ETH that you need, withdraw ETH into wallet you manipulate. Exchanges are widely diagnosed to be hacked and you need fund to be in the area which have non-public key.
5. You can deploy My-crypto pc app until the time you're expecting verification and switch.
6. During the execution, create new wallet and create fresh pockets. Use the password which you'll by no means forget about and create the account. Then it's going to offer you address starts like 0x. This is what you may use to move ETH from their account in your account.
7. For safety of your account set Address (04x234), password and private key. You must have backup of system where My crypto application is present.

### 4.7.3 Alternate Way to Buy ETH

Shape Shift is used to covert Bitcoin to ETH. Start a BTC<-ETH and it's going to tell you where to send BTC.

Then, create an Ethereum account and lower back it up. From where you have stored your BTC, send it to BTC deal with supplied via Space-Shift. The ETH will be available within 20 min in ETH wallet.

### 4.7.4 Conversion of ETH to US Dollar

The Markets Insider money calculator offers a forex conversion from Ethereum to USD in a few seconds. Vacationers in Krypto can make conversions at the contemporary change rate. The money calculator presents a great tool for traders making an investment in global stock exchanges by selecting one kind of currency.

| QUICK STATS | |
|---|---|
| **Ethereum Price** | $153.64 |
| Ethereum ROI Beta | 2948.3% |
| Market Cap | $16,987,545,314 |
| Market Cap Dominance | 8.79% |
| Trading Volume | $12,696,580,059 |
| Volume / Market Cap | 0.7512 |
| 24h Low / 24h High | $152.05 / $164.94 |
| 7d Low / 7d High | $157.74 / $172.80 |
| Market Cap Rank | #2 |
| All-Time High | $1,448.18 -89.4%<br>Jan 13, 2018 (about 2 years) |
| All-Time Low | $0.432979 35396.3%<br>Oct 20, 2015 (over 4 years) |
| Ethereum/Bitcoin Ratio | 1 BTC = 43.86 ETH |

**Figure 4.2** Transaction for buying Ethernet [Ref:https://www.coingecko.com/en/coins/ethereum].

Conversion from Ethereum to USD can be performed at day of exchange charges as well as rate at which it was allotted to do that, select the alternate fee date. Current date is ready via default. The money calculator gives the remaining price of the day prior to this in addition to the highest and lowest prices of the converting from Ethereum to USD. The consequences are displayed in a definitely organized desk. The Ethereum–USD price, the Markets Insider forex calculator additionally gives different change quotes in about a hundred and sixty worldwide currencies. User needs to first check the current price of cryptocurrency before buying and selling. Figure 4.2 shows the transaction of buying Ethernet.

## 4.8 Smart Contracts

EVM is a platform which is used to execute packages of "Smart contracts". It can be referred to as a "decentralized-worldwide-computer" where the computing of the system can be done through the nodes of Ethereum where any node can offer the computing of system and are paid for their work done in the forms of Ether tokens.

These are specially known as the "Smart-Contracts" because it works on the basis of the written contracts which are to be performed whenever the requirements are successfully matched.

For instance, consider developing a "Kickstarter"—like the practice of funding a venture by raising money from a large number of people where each one of them contributes a relatively small provider with Ethereum. Someone should install an Ethereum smart agreement that could pool coins to be despatched to someone else. The clever settlement is supposed to be a written contract that describes the terms-and-conditions, e.g. after $100.000 of forex is brought for the pool, it'll all be directly sent to the recipient. Suppose, if in any case, the threshold of $1,000,000 is not matched like we imagined inside a month, all the currencies can be sent back to the unique holders of the currency. Of course, this will use Ether tokens in desire to US greenbacks.

Contracts may be built on any blockchain platform. Smart Contracts can be used in lots of Economical Services and clinical Insurance.

### 4.8.1 Government

Insiders vouch that it is extraordinarily hard for our vote casting machine to be improvise, however, smart contracts may relieve all issues

via offering an infinitely greater 'Secure' machine. Ledger-protected votes might want to be encrypted and require excessive computing power to get access. No one has that a whole lot computing capacity that is why it want protagonist to hack the system! Another smart contracts need to hike low voter turnout. Much of the inertia comes from a mismanaged device that includes lining up, displaying your identity, and finishing bureaucracy. With clever contracts, volunteers can switch balloting online and voter will turn out all collectively to vote for his or her applicant's management

### 4.8.2 Management

Properties like accuracy, transparency and automated system, the blockchain avoids mis-communication and discrepancies on workflow while providing a trust worthy single ledger. Ordinarily, enterprise operations ought to undergo a two & fro, even as watching for consent and for inner or outside issues to type themselves out. This is served by crypto-ledger. It removes disparities that normally occur with impartial processing and that may reason steeply-priced proceedings and agreement slow down.

### 4.8.3 Benefits of Smart Contracts

- Autonomy—One must not rely upon brokers, legal professional or other agents to confirm. It removes the risk of manipulation through another party, on the grounds that execution is managed by predefined algorithms, in preference to via one or more, probably biased, organization that may fail to adhere to the proper or accepted standards.
- Trust—Your files are encoded on a crypto ledger. Misplacement of these files is highly unlikely.
- Backup—Encrypted files are shared all over the networks. Creating multiple copies for every user on the blockchain to have your back.
- Safety—Encryption makes document safe which makes hacking impossible.
- Speed—Processing of documents requires time and paperwork.
- Saving—Ethereum removes intermediary which saves money of users. For example, user should pay an official to prove his or transactions.

- Accuracy—Automatic contracts aren't quicker and inexpensive; it removes the errors that may be possible from manually filling out thousands of forms.

### 4.8.4 Problems With Smart Contracts

Smart contracts are some distance away from accuracy. Bugs in program result in alteration of contracts. How government can receive tax on this smart contract?

### 4.8.5 Solution to Overcome This Problem

The Information technology resource centre, Search Compliance indicates that smart contracts can clash changes in sure organization (companies), which includes regulation. Legal professionals will transfer from writing standard contracts to produce standard smart settlement contracts, much like the standardized traditional contracts which you'll find on LegalZoom. Other organization together with service provider acquirers, credit businesses, and accountants may hire smart contracts for responsibilities, along with real-time auditing and risk checks. Actually, the website Blockchain Technologies sees smart contracts merging into a hybrid of paper and digital content where contracts are validated through blockchain and substantiated by physical copy.

### 4.8.6 Languages to Build Smart Contracts

Smart Contracts are basically built through various programming languages as follows:

1. JavaScript
2. C++
3. Golang
4. Java
5. Sql
6. Solodity.

FLETA is an upcoming blockchain platform creating a sustainable smart contract DApp environment, as we're operating toward ensuring that the proper languages are supported in our ecosystem, our beta testnetsmart contract is constructed primarily based on Solidity. And we are able to guide Golang, Javascript, Java, C++ and SQP for smart agreement development on the main net inside the destiny.

## 4.9 DApp (Decentralized Application or Smart Contract)

DApp

Bitcoin laid the primary stone with its cryptographically saved ledger, scarce-asset model, and peer-to-peer technology that brings a brand new version to assist constructing massively scalable and worthwhile packages. A new type of software program referred to as decentralized applications, or DApps, require those vital functions to be built. The time period application is usually used to relate to a software program that it defines a particular aim. Most of the applications that we use observe a centralized server–consumer version; a few are allotted and now increasingly have become decentralized.

### 4.9.1 DApp in Ethereum

Ethereum Platform created a protocol for building decentralized programs. It is an open-source public, blockchain-primarily based dispensed computing platform which features clever contracts capability, additionally referred to as scripting. It provides a decentralized Turing-complete virtual system, the Ethereum Virtual Machine (EVM), which executes scripts the usage of an international network of public nodes. DApps are greatly flexible, transparent, dispensed, and resilient and have a higher incentivized shape software model.

Developers are sharing exceptional reviews as what defines exactly DApp. Few developers say that there has no significant factor of failure which is its most vital characteristic and others say that there are greater necessities to it. The Ethereum Platform can allow anyone to write smart contracts and decentralized packages where you may pick out your personal 'policies' for possession, transactions formats and transitions capabilities. Multiple sorts are being created, along with economic, governance, community, felony, health, training. They allow a greater direct interplay among parties.

### 4.9.2 Applications of DApps

Various applications of DApps are as follows:

1. Maker DAO: The Maker DAO Collateralized Debt Position (CDP) is a smart settlement which execute at the Ethereum blockchain. It is a basic element of the Dai Stablecoin System

whose motive is to create Dai in change for collateral which it then holds in written agreement till the borrowed Dai is lower back.

2. Chainlock: Chainlock connects clever contracts to actual-international information, events and bills. The Chainlink community offers dependable tamper-proof inputs and outputs for complicated clever contracts on any blockchain. Smart contracts are unable to connect to key outside sources along with off-chain records and APIs on their own. Chainlink allows this connection securely and reliably thru a comfortable decentralized oracle network.
3. Status: Status combines a peer-to-peer messenger, crypto wallet, and web3 browser into a private and comfortable communiqué device. Chat with pals, save crypto and explore the destiny of the net without being exploited in your records.
4. My Crypto Heros: If you ever dreamed of walking your own digital employment enterprise for ancient heroes, My Crypto Heros is the blockchain based totally casual RPG for you! Available for each cellular and on-line PC's, My Crypto Heroes lets you acquire and educate heroes from history. Equip your heroes with special and legendary items to shape the ultimate, unbeatable crew. Take your team into epic struggle and triumph over the crypto international.
5. Uniswap: A simple smart settlement surface for interchange of ERC20 tokens. A formalized simulation for pooling liquidity reserves. An open supply frontend interface for buyers and liquidity vendors. A determination to decentralized asset change.
6. Axie Infinity: Axie Infinity is a digital puppy universe where players struggle, raise, and change delusion creatures called Axies. Axie is the first blockchain sport to introduce: a mobile software. The potential to earn cash with the aid of certainly gambling the game.
7. Synthetix: Synthetix (formerly Havven) is a decentralized artificial asset platform. These assets—synths—are crypto-subsidized artificial property that music the fee of underlying property and permit publicity to an asset without the requirement of really holding it.

## 4.10 Conclusion

Ethereum is not only decentralized cryptocurrency to make payments but it can also be used to create real world application. Applications are created in the same way smart contracts are created. In this cryptocurrency there is no need of middle person. The person who buys Ethereum can circulate directly to new participants in the form of smart contract.

Ethereum provides transparency to all of its users, which means user can open own their data, application, and can access to open financial system. Ethereum can be used to develop build application. Ethereum has its own virtual machine called as EVM. EVM is accessible to every user to create their new application and smart contracts. To measure value of each application and smart contracts GAS tool is used.

Benefit of creating as smart contracts is to store contracts and user information in encrypted format and store in different servers all over the world which gives some extra feature like: safety, backup, speed.

Both Bitcoin and Ethereum have the same purpose of circulating digital money. Both uses the same technology called "Blockchain" to circulate money. Bitcoin is only used to make and receive payments all over the world whereas Ethereum is not only used to make and receive payments, it is also used to make new application. Bitcoin and Ethereum have different fuel by their native-coin called BTC and ETH. Ethereum has better model than Bitcoin. Ethereum can be used for multitasking and an Ethereum transaction fee is less expensive than Bitcoin.

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